No. 1962

HANDBOOK OF THE

ARTILLERY REPAIR TRUCK BODY MODEL 1918

FIFTY-FOUR PLATES

August 1, 1918



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August 1, 1918



WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
WASHINGTON, Aug. 1, 1918.

This manual is published for the information and government of the Regular Army, National Guard, and National Army of the United States.

By order of the Secretary of War:

C. C. WILLIAMS,
Maj. Gen. Chief of Ordnance, U. S. A.

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HANDBOOK OF THE ARTILLERY REPAIR TRUCK BODY MODEL 1918

CHAPTER I.

GENERAL DESCRIPTION AND INSTRUCTIONS.

GENERAL WEIGHTS AND SPECIFICATIONS.

Weight of body empty ..... 3060 lb.
Weight of body with full load ..... 7040 lb.
Length of platform ..... 132 31/32 in.
Length with drop end down ..... 156 31/32 in.
Width of body platform ..... 71¾ in.
Width with drop sides down ..... 119¾ in.
Height of drop sides ..... 24 in.
Height of drop end ..... 24 in.
Chassis used ..... Nash 2-ton or F. W. D. 3-ton
Floor material ..... poplar, 1½ in. thick
Body equipment ..... Lantern, axe, safety can, lantern bracket straps, canvas buckets, bucket straps, canvas cover, hatchets, pick-axe, short-handled shovels, straps for implements

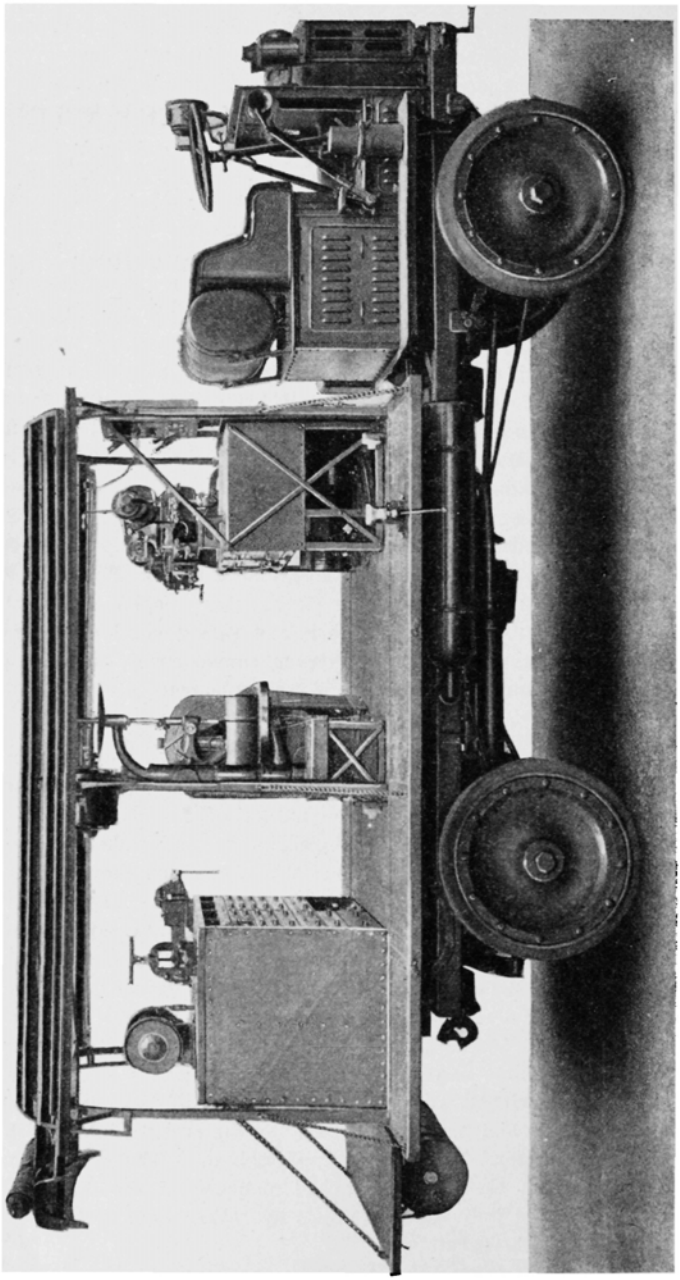
GENERAL DESCRIPTION

The Artillery Repair Truck Body, model 1918, is mounted on the 3-ton F. W. D. or the 2-ton Nash chassis, and is intended for the purpose of effecting repairs in the field. The nature of its equipment is such that repairs of a highly varied nature can be undertaken. The tool equipment takes in all the essential outfit of a machine shop, and is also suitable for a wide variety of bench work. Among the larger tools and equipment of the body there is a lathe, drill press, complete engine-generator set for generating the current to run the machines, complete bench cabinet, acetylene welding and cutting unit, grinder, and an air-compressor set with a complete set of hammers and chisels.

Power for the various repair units is supplied by the electric generator driven by the gasoline engine. This feeds the motors which run the drill press, lathe grinder, etc. It also takes care of the electric illumination of the body and provides current for the sockets into which are plugged the connectors for the air-compressor set. The master control is by means of an electric switchboard mounted at the front end of the truck, while the individual machines are taken care of by switches on the motors which operate them.

The engine motor-generator set acts as the power station for all the

PLATE No. 1



RIGHT SIDE OF ARTILLERY REPAIR TRUCK MODEL 1918.

machines mounted on the truck body. It is therefore essential that this system should be kept in the best possible condition. Good performance of the motor-generator set means an adequate supply of power to run the various machines comprising the body load. It can only be secured if the gasoline engine, which is the initial power source, be kept running at its highest efficiency.

The lathe, drill press, bench cabinet, etc., are all equipped with a sufficient number of tools and fittings to permit of a widely varied line of repair work. The lathe is mounted across the front end of the body on a special frame of light structural steel material. The space beneath the lathe is utilized for the storage of the air-compressor set and the stove pipe for light forging work. There are also two drawers for lathe equipment.

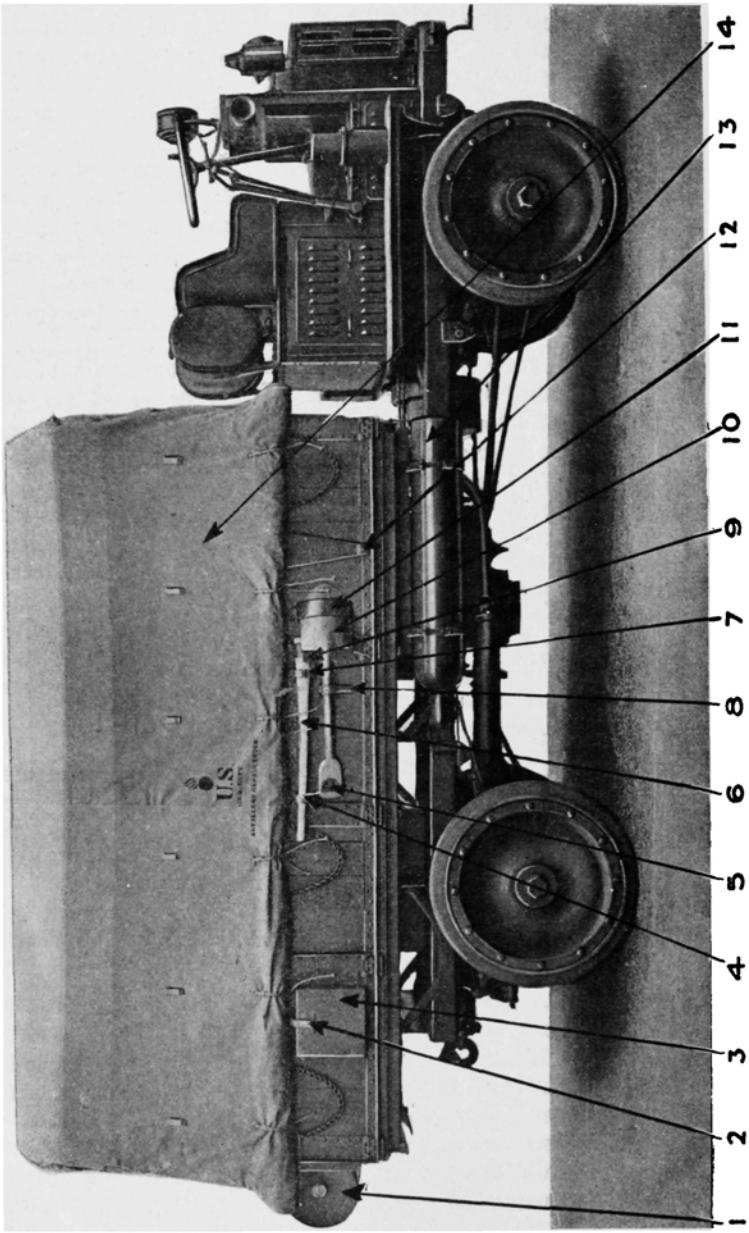
The center of the body is occupied by the engine motor-generator set on the left and the drill press on the right. Across the rear of the body is the bench cabinet, which is fitted with fifteen drawers, in which are contained a complete assortment of bench tools. Mounted on the bench is a bench vise and a bench grinder with two grinding wheels. There is plenty of room to operate these machine tools on account of the aisle space on the body itself. Additional room is gained by letting down the drop sides and drop end. These drop pieces each add twenty-four inches to the width or length of the body platform. By lowering the two drop sides a total floor width of 119¾ in. is secured. The normal width of the body platform is 71¾ in. The length of the body platform is 132 31/32 in. without the drop end down. With this lowered the length is increased to 156 31/32 in.

The body is mounted on either the Nash 2-ton truck chassis or on the 3-ton Four-Wheel-Drive chassis. The body is identical, whether mounted on the Nash or F. W. D. chassis. For complete details of the 2-ton truck chassis, Nash model 4017-A and 4017-L, see handbook No. 1999. For complete details of the 3-ton truck chassis, F. W. D. model B-1917, see handbook No. 1997.

BRIEF DESCRIPTION NASH 2-TON CHASSIS, MODELS 4017-A AND 4017-L. WEIGHTS AND OUTLINE SPECIFICATIONS.

Rated load capacity	4,000.00 lb.
Body weight allowance	1,200.00 lb.
Weight of chassis only	6,700.00 lb.
Maximum gross w'ght (including chassis, body and pay load)	11,900.00 lb.
Percentage of chassis weight on front tires (without load)	66.66
Percentage of chassis on rear tires (without load)	33.33
Percentage of load weight on front tires	30.00
Percentage of load weight on rear tires	70.00
Percentage of gross weight on front tires	45.00
Percentage of gross weight on rear tires	55.00

PLATE No. 2



Over-all length of chassis (without body).....202.50 in.
Over-all width of chassis (at widest part).....78.50 in.
Chassis wheelbase .....124.00 in.
Length of frame back of driver's seat.....117.13 in.
Height of rear end of frame from ground, loaded.....35.50 in.
Height of rear end of frame from ground, unloaded.....38.50 in.
Diameter of turning circle.....50.00 ft.
Tread of front wheels.....60.50 in.
Tread of rear wheels.....60.50 in.
Road clearance under front axle (lowest point).....14.75 in.
Road clearance under rear axle (lowest point).....14.75 in.

Engine—Four-cylinder, 4-cycle, L-head type, cylinders cast en bloc, with integral head. Bore, 4.25 inches; stroke, 5.5 inches; horsepower, 28.9, N. A. C. C. rating.

Cooling—Water, centrifugal-pump circulation.

Lubrication—Force feed, using drilled crankshaft; spray to cylinders.

Radiator—Tubular type, with fins, removable cast-iron headers.

Ignition—Eisemann high-tension variable spark magneto, type G4-11 Edition. Model 4017-L fitted with an impulse starter.

Carburetor—Type M-2, 1.25-inch Stromberg, plain tube type, with hot-air connection.

Fuel Feed—From main tank, 27 gallons capacity to auxiliary tank, holding two quarts, from latter to carburetor by gravity.

Governor—Fly-ball type, drives through flexible shaft from camshaft, and is mounted between carburetor and short external inlet manifold.

Clutch—Single plate, dry disk, fitted with clutch brake.

Transmission—Selective, sliding-jaw clutch type, combined with silent chain reduction. Four speeds forward, one reverse.

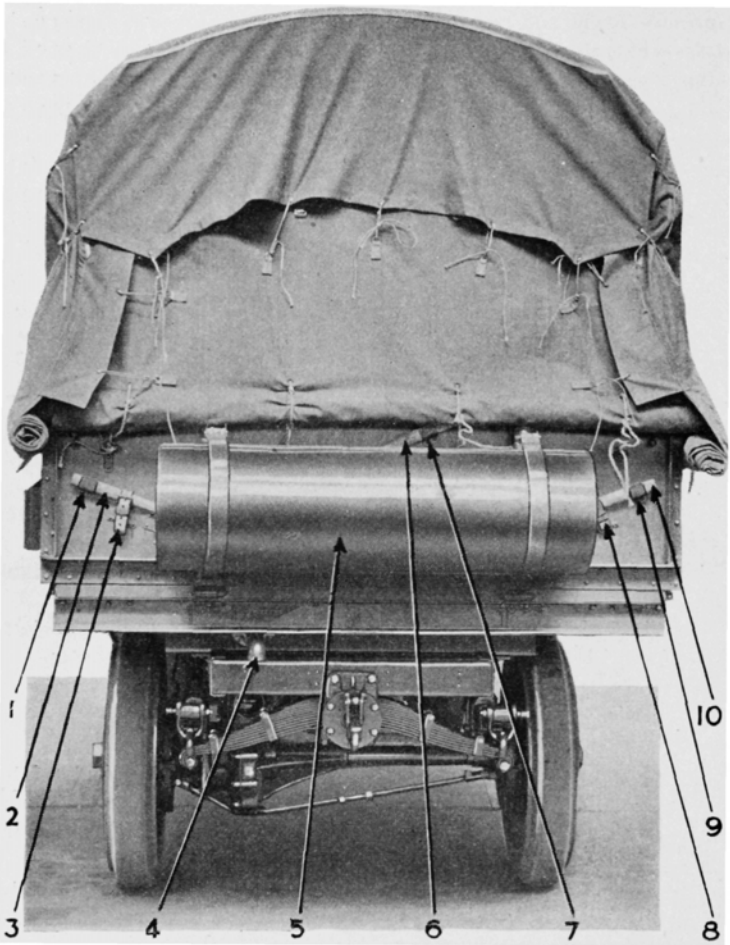
Drive—Drive from transmission through two propeller shafts fitted with Spicer universal joints, then to bevel ring gear in axles, and through axles to internal gearing in four wheels. Torque absorbed through springs. Full Hotchkiss drive.

Frame—Channel section pressed steel. Six cross members. Five

RIGHT SIDE VIEW OF ARTILLERY REPAIR TRUCK.

1 Air receiving tank.
2 Water bucket strap.
3 Water bucket bracket.
4 Pick axle handle rest.
5 Shovel handle bracket.
6 Pick axe.
7 Pick axe handle strap.
8 Shovel handle strap.
9 Pick head bracket.
10 Shovel, short handle.
11 Shovel support.
12 Vise reinforce.
13 Oxygen tank (200 cu. ft. cap.)
14 Canvas cover for truck.

PLATE No. 3



ARTILLERY REPAIR TRUCK—REAR END.

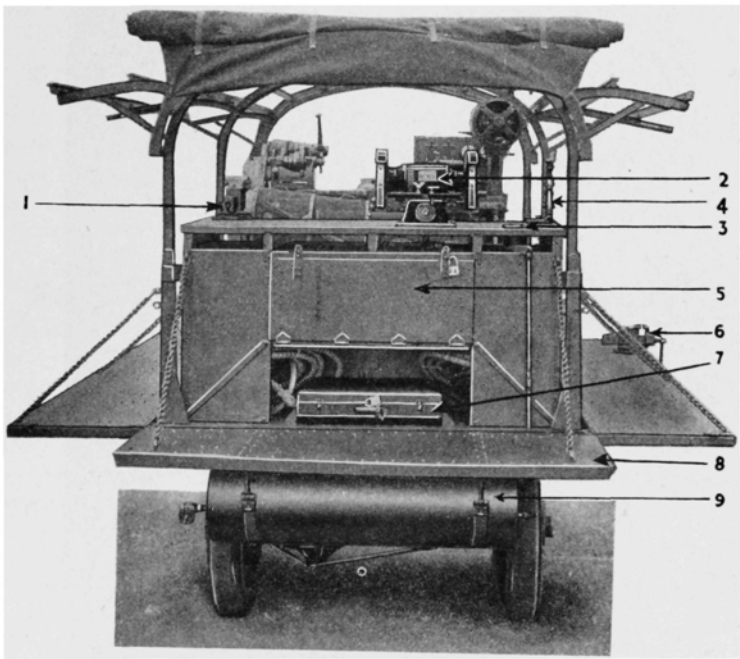
1 Hatchet handle bracket.
2 Hatchet.
3 Hatchet handle strap.
4 Exhaust outlet—motor generator set.
5 Air receiving tank.
6 Axe.
7 Axe handle bracket.
8 Hatchet handle strap.
9 Hatchet handle bracket.
10 Hatchet handle.

standard ordnance transoms. Ordnance pintle at rear, towing hooks in front.

Springs—Front and rear semi-elliptic, with auxiliary coil springs.

Axles—Front and rear identical. Bevel pinion and gear, with M. & S. locking type differential at propeller shaft and internal gear at wheels.

PLATE No. 4



REAR VIEW OF BODY—END DOWN.

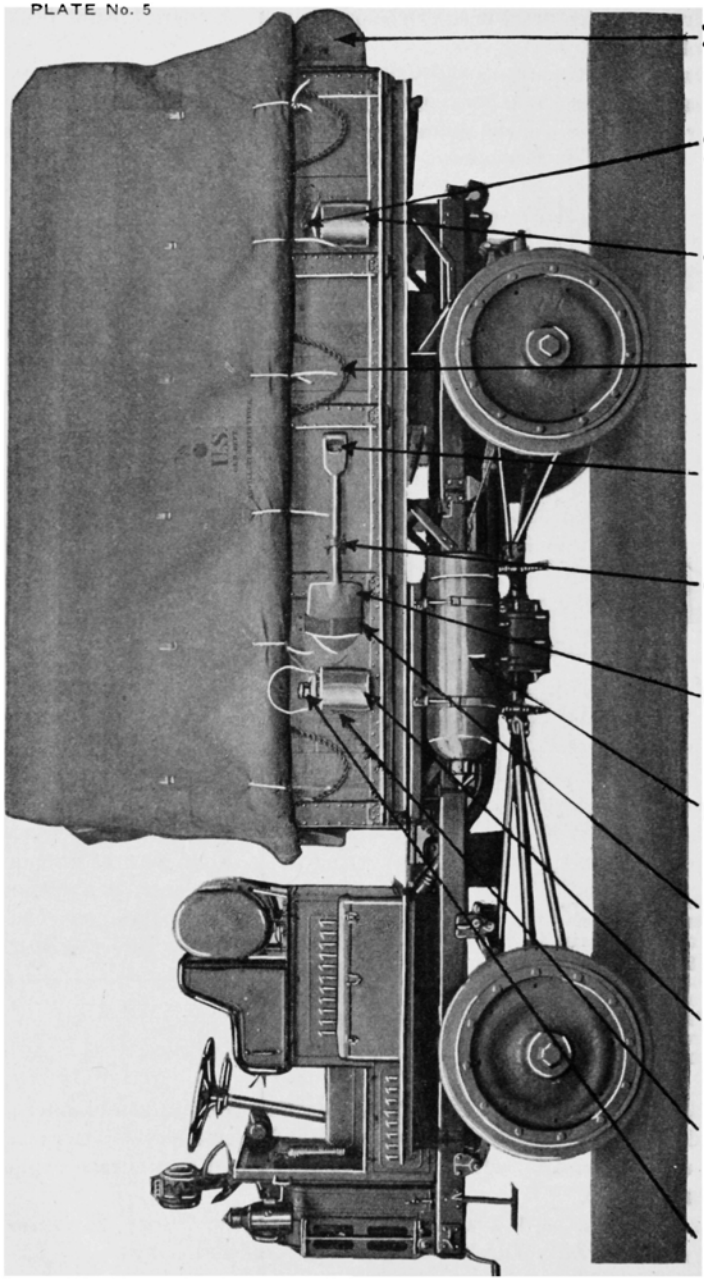
1 Bench vise, 4 in.
2 Bench grinder.
3 Water pot—grinder.
4 Pipe vise.
5 Rear upper compartment door.
6 Machinists' vise—swivel jaw.
7 Welding and cutting supplies case.
8 Drop end.
9 Air receiving tank.

Brakes—Two sets of brakes. Pedal-operated service brake of internal expanding type in wheel brake drums. Hand-lever operated emergency brake of external contracting type on transmission; hand brake applies foot brakes also.

Wheels—Cast-steel disk wheels, all four identical. Wheels have brake drums cast integral. Wheels fitted with taper roller bearings.

Tires—36 inches x 6 inches, solid tires, pressed-on type.

PLATE No. 5



Steering—All four wheels used for steering. Vertical steering column. Steering gear of screw and split-nut type. Hardwood steering wheel.

Controls—Left-hand steer. Change gear and emergency brake levers in front of driver's seat to right of steering column. Spark and throttle lever operated on sector clamped below steering wheel on front of steering column. Ignition ground wire switch on left-side dash. Carburetor choke control on steering column. Clutch and service brake pedals left and right respectively. Accelerator pedal to left of change-gear lever.

Main Gasoline Tank—Steel tank, 27-gallon capacity.

Auxiliary Gasoline Tank—Steel tank, two quarts capacity.

Equipment—Pyrene fire extinguishers; non-skid chains, complete in chain box; eyes for non-skid chains; hand-operated horn; odometer; hand flashlight; Model 4017-A, fitted with speedometer; electric searchlight, electric side lamps, electric tail lamp, Bijur generator, storage battery. Model 4017-L, acetylene searchlight, acetylene generator, oil side lamps, oil tail lamp and speedometer.

BRIEF DESCRIPTION NASH MODELS 4017-A AND 4017-L.

With the exception of a few details of equipment these models are identical. The Model 4017-L uses an impulse starting device on the magneto shaft, while the 4017-A model has none; it uses acetylene lighting, while the 4017-A model employs an electric generator and storage-battery system; it is fitted with a speedometer in addition to an odometer, while the Model 4017-A has only an odometer.

The chassis is one of 124 inches wheelbase, and is fitted with a four-cylinder engine, dry-disk clutch, four-speed transmission, and a drive to all four wheels, through shafts and internal gear-drive axles which are identical front and rear.

The engine is a standard design L-head, of Buda make, using force-feed lubrication, pump cooling, and fitted with a Stromberg carburetor feeding through cored manifold cast integral with cylinder block, and Eisemann magneto, and on the Model 4017-A only, with a Bijur generator.

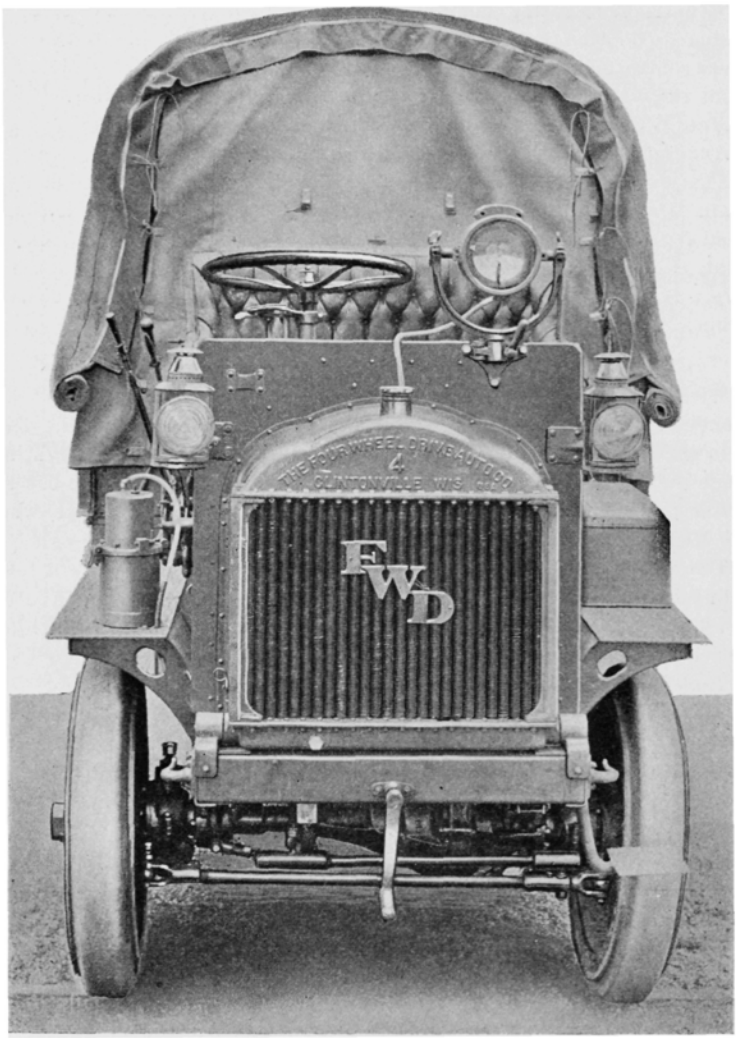
The clutch is of the dry-plate type, and the drive from it is through an open two-joint propeller shaft to a four-speed, sliding jaw clutch type, transmission. From the latter extend two two-joint propeller shafts,

---

LEFT SIDE VIEW OF ARTILLERY REPAIR TRUCK.

1 Lantern.
2 Lantern bracket body.
3 Acetylene cylinder (200 cu. ft. cap.).
4 Shovel support.
5 Shovel, short handle.
6 Shovel handle strap.
7 Shovel handle bracket.
8 Drop side chain.
9 Lantern bracket body.
10 Safety can (Pyrene pat.) for gasolene.
11 Air receiving tank.
12 Lantern strap.

PLATE No. 6



FRONT VIEW ARTILLERY REPAIR TRUCK.

one forward and one rearward, to identical internal gear-drive axles. The live member has exposed axle shafts extending from it, and the ends of these shafts are each fitted with a universal joint and a spur pinion, the latter meshing with an internal gear bolted to a disk steel wheel. All the wheels are interchangeable, and are all driving and steering wheels.

SHORT DESCRIPTION OF 3-TON F. W. D. CHASSIS.

WEIGHTS AND OUTLINE SPECIFICATIONS.

Rated load capacity	6,000 lb.
Body weight allowance	1,200 lb.
Weight of chassis with transoms	7,308 lb.
Maximum gross weight loaded	14,510 lb.
Percentage of chassis weight on front tires (without load)	62
Percentage of chassis weight on rear tires (without load)	38
Percentage of load weight on front tires	19
Percentage of load weight on rear tires	81
Percentage of gross weight on front tires	47
Percentage of gross weight on rear tires	53
Over-all length of chassis (without body)	213.5 in.
Over-all width of chassis (at widest part at hubs)	70.5 in.
Chassis wheelbase	124 in.
Length of frame back of driver's seat	128 in.
Width of frame (outside dimensions)	36 in.
Height of rear end of frame from ground (empty)	39.5 in.
Height of rear end of frame from ground (loaded)	35.875 in.
Diameter of turning circle	50.5 ft.
Tread of front and rear wheels	56 in.
Road clearance under front axle (lowest point)	9.68 in.
Road clearance under rear axle (lowest point)	9.68 in.
Height of pintle from ground	29.25 in.

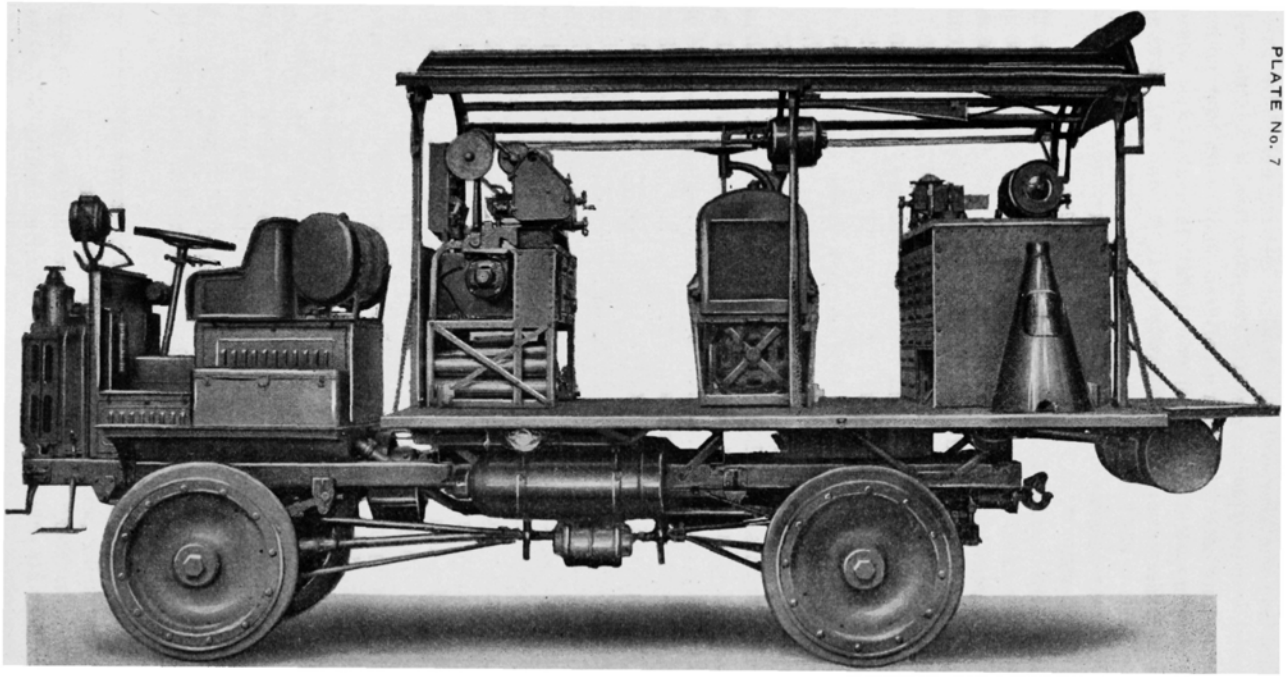
Purpose—This chassis will carry the body and load of the artillery repair and the equipment repair trucks, as well as standard ordnance supply and ammunition bodies.

Engine—Wisconsin make, 4-cylinder, cast in pairs, 4-cycle. Bore, 4.75 inches; stroke, 5.5 inches; N. A. C. C. rating, 36.1 hp. Mounted on 4 points on sub-frame. Lubrication by combined force feed and splash system. Centrifugal water pump.

Radiator—Tubular type, with fins, tubes soldered in. Head, base and sides cast separately and bolted together. Mounted by trunnions in brackets at front end of main frame.

Ignition—Eisemann high-tension, variable spark magneto, driven by shaft from the timing gears through a flexible coupling.

Carburetor—Stromberg Model G, having two fixed nozzles, spring-retained auxiliary air valves; equipped with hot-air connection to outside of exhaust manifold.



LEFT SIDE OF ARTILLERY REPAIR TRUCK.

Fuel Feed—Gasoline feed by gravity from tank behind driver's seat.

Governor—Pierce governor, of fly-ball type, mounted between carburetor and intake manifold. Driven from camshaft through flexible shaft.

Clutch—Hele-Shaw multiple-disk running-in-oil clutch. Twelve bronze drive disks. Eleven steel driven disks. Clutch brake provided.

Clutch Alignment Joint—Double universal type formed of two male and two female members.

Transmission—Suspended from sub-frame. Selective sliding jaw clutch type. Aluminum case. Three speeds forward, one reverse. All gears constantly in mesh. Final drive to front and rear axles through silent Link Belt chain, and (integral) bevel pinion type center differential. Hand-operated differential locking device.

Drive—Shaft drive from transmission through universal joints to bevel ring gear in axles.

Torsion Rods—V-shaped torsion rod of seamless tubing extending from collar on differential housing of each axle to bracket on main frame. Take torsion only, propulsion is through springs.

Frame—Channel section, heat-treated pressed steel, riveted together. Eight cross members. Five standard ordnance transoms. Frame 36 inches wide, 192 inches long. Ordnance spring-cushioned pintle at rear of frame and towing hooks in front.

Axles—Internal shaft, full floating type. Front and rear axles of same general type and construction, except front axles provided with ball members to accomplish steering. Central housing of axles encloses spur pinion type of differential. Wheel hubs fitted with roller bearings.

Brakes—Two sets. Service brake on transmission, operated by foot pedal. Hand-lever emergency brake of external contracting type, operating on rear wheel brake drums. Raybestos brake lining.

Wheels—Disk steel wheels, supported on axles by roller bearings. Rear wheels have brake drums cast integral.

Tires—Size, 36 by 6 inches.

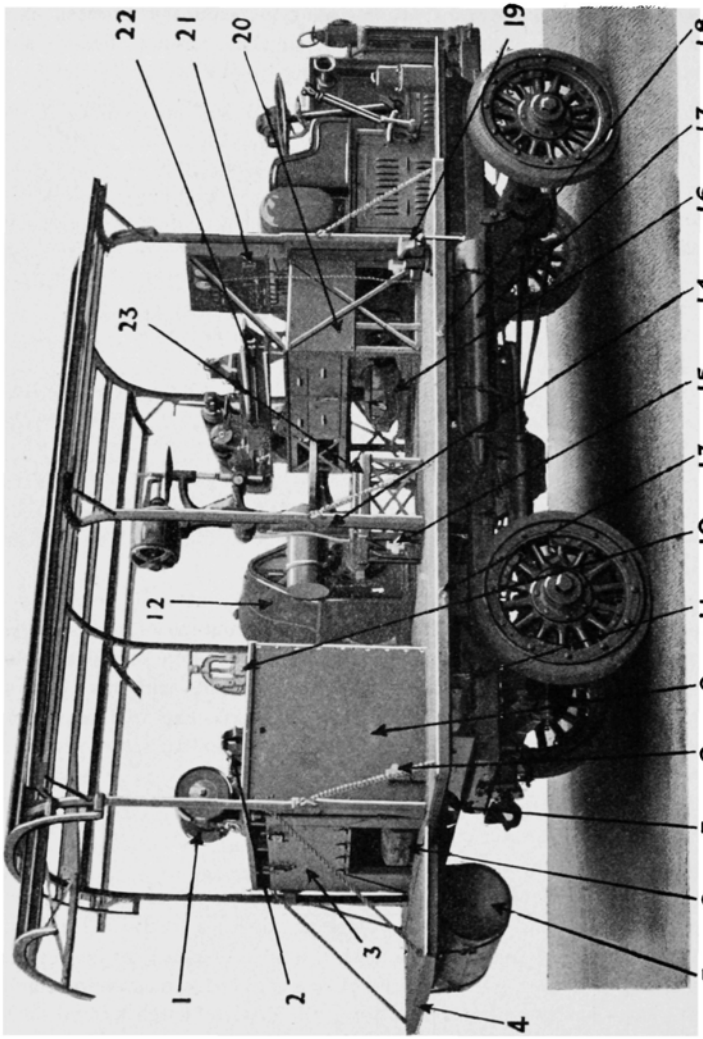
Steering—Front wheels only used for steering. Steering gear of differential screw type. Hardwood steering wheel; diameter, 22 inches.

Controls—Right-hand steer, gear shift and emergency brake levers at right of driver's seat. Spark and throttle levers operate on sector clamped to left-side steering column. Ignition ground wire switch located on heel board. Accelerator and cut-out pedals located on floor. Clutch and service pedals are located left to right respectively.

Gasoline Tank—Located behind driver's seat, galvanized steel elliptical receptacle of 30-gallon capacity. Gravity feed.

Equipment—Pyrene fire extinguisher; oil side lamps, oil tail lamp, acetylene searchlight, with swivel yoke and bracket; searchlight cover, acetylene generator with bracket, paulin 12 feet by 12 feet; non-skid chains complete and chain box; hand-operated horn; speedometer; hand

PLATE No. 8



RIGHT (REAR) VIEW OF ARTILLERY REPAIR TRUCK.

1 Bench grinder, with 2 emery wheels.
2 Machinist's vise, 4 in.
3 Bench cabinet door.
4 Drop end.
5 Air receiving tank.
6 Oxy-acetylene welding and cutting supplies cabinet.
7 Air compressor receptacle.

flashlight; 15 feet towing chain; instruction books with canvas cover; motor vehicle tool box, model 1918, including tools and spare parts.

REMOVE SLUSH.

On receipt of the truck the slush which covers the metal parts should be removed either with a dry cloth, or, if this will not remove it, take kerosene. After the slush is thoroughly removed re-oil all the parts in accordance with the instructions given under heading of the different pieces of equipment in the following chapters. All of the bench tools and the small metal tools and equipment should be wiped off with a rag to preserve them against rust. This is true of all tools in the entire equipment, as they will quickly become unfit for use unless protected by a film of oil or light grease against the effects of moisture.

CHECK EQUIPMENT.

One of the first pieces of work which should be done on the receipt of the body is to check over the equipment to find that none of it has been left off the body in transit. The equipment list on pages 146 to 152 can be utilized for this purpose. To check over the small pieces contained in the 15 drawers of the bench cabinet and in the 2 drawers of the lathe frame, the best place to refer is to the list of contents of drawers which appears on pages 99 to 110.

OIL WEARING PARTS.

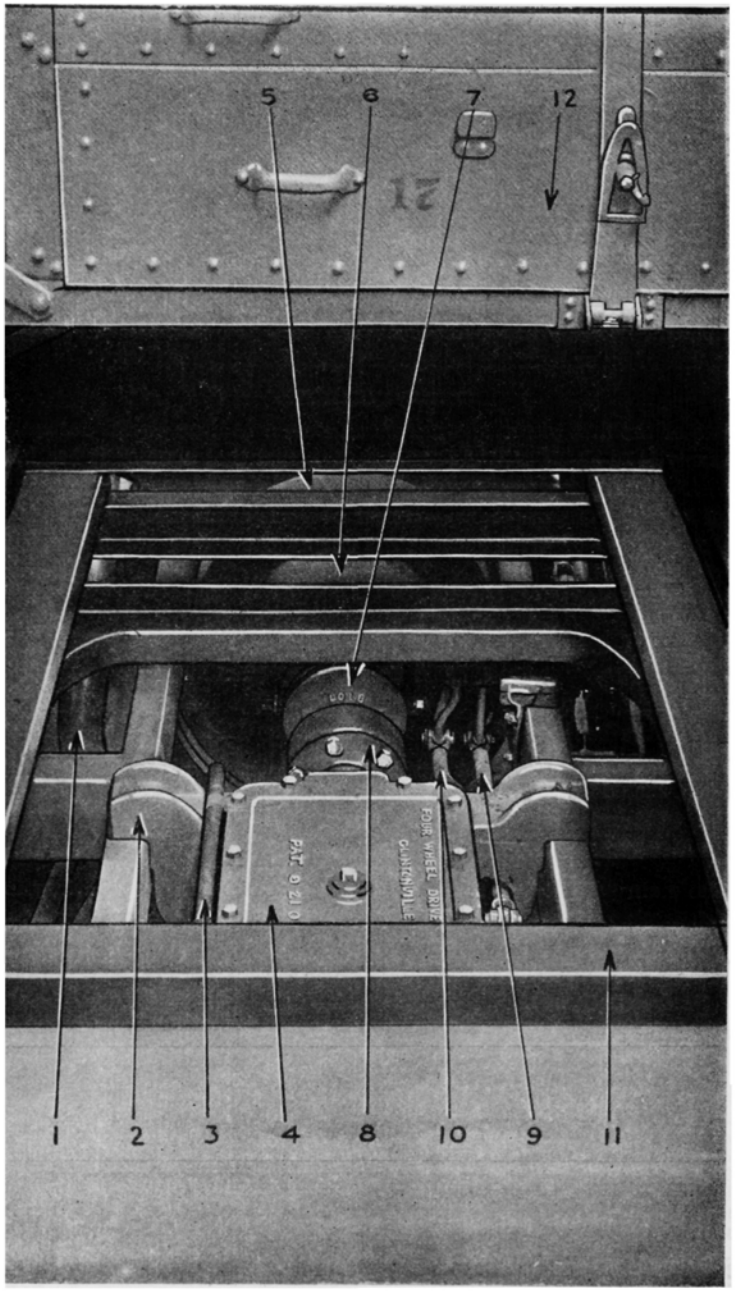
The wearing parts and joints on the body should be lubricated from time to time to preserve them against rust and to prevent binding. Such parts of the body as the hinges for the drop sides and drop end, the chain pivots, etc., the floor of the body, the chains, and various parts of the top, should be kept clean in order to preserve the life of the equipment and keep it in its highest state of efficiency.

MAIN UNITS ON BODY.

The main parts of the tool equipment are given in the following list, which is simply a general outline to show the scope of the work which

---

8 Receptacle (lamp).
9 Bench cabinet.
10 Pipe vise.
11 Bolt snap (for drop side chain).
12 Generating unit (gasolene, electric).
13 Hanger eye (for drill press tie rod).
14 Drill press.
15 Receptacle (lamp).
16 Air compressor outfit.
17 Oxygen cylinder (200 cu. ft. cap.)
18 Hanger eye (for drill press tie rod).
19 Machinist's vise, 3½ in., swivel jaw and base.
20 Lathe frame.
21 Switchboard.
22 9 in. screw cutting lathe.
23 Drill press frame.


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12
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3
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10
9
11
FOUR WHEEL DRIVE
CLINTON, IOWA

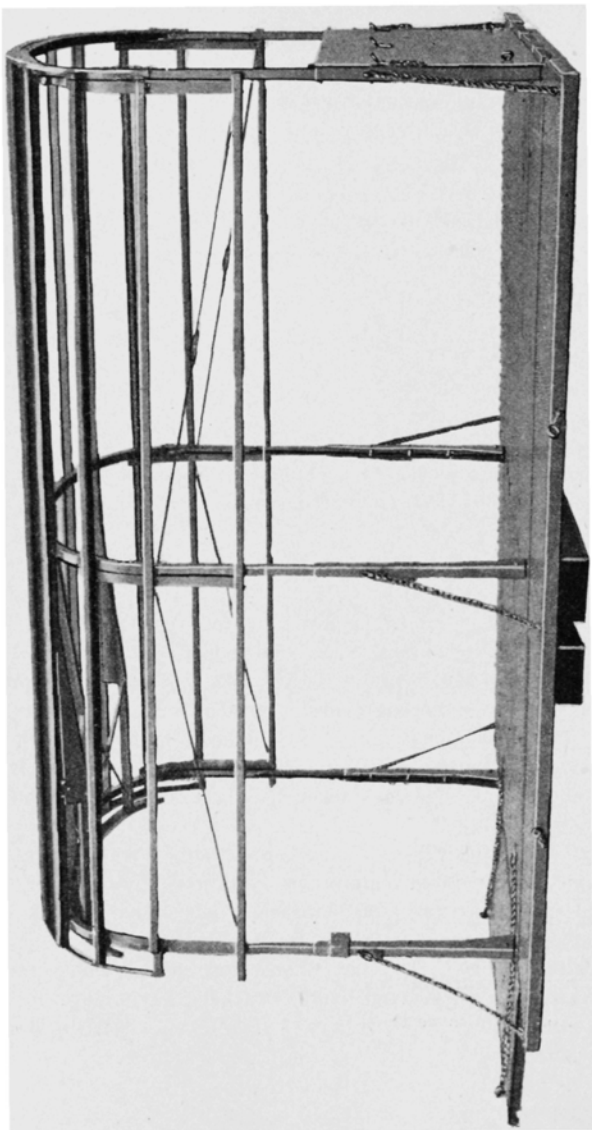
may be undertaken with this equipment. For a complete list of tools, equipment, and fittings on the body, the tabulations on pages 140 to 152 should be referred to. The larger pieces of equipment are given in the following lists:

1. Acetylene cylinder, filled.
2. Air compressor and motor complete.
3. Air-receiving tank.
4. Bench grinder with 2 emery wheels.
5. Die stock set.
6. Dresser, emery wheel.
7. Drill, portable; electric, heavy duty.
8. Drill press.
9. Oxygen cylinder, filled.
10. Generating unit.
11. Switchboard for generating unit.
12. Grinder, tool post type.
13. Grinder, automobile valve.
14. Lamp, adjustable floor.
15. Lathe complete.
16. Milling and gear-cutting attachment for lathe.
17. Oxy-acetylene welding and cutting outfit.
18. Pipe tool set.
19. Riveting set, button-head.
20. Stove, Sibley, complete.
21. Switchboard.
22. Tap and die set.
23. Three vises, two machinists' and one pipe.
24. Chipping tools.

VIEW OF CHASSIS—FRONT FALSE FLOOR REMOVED.

1 Exhaust pipe.
2 Transmission case lug.
3 Speedometer drive chain.
4 Transmission front cover plate.
5 Engine flywheel.
6 Engine clutch.
7 Clutch brake flange.
8 Clutch alignment joint.
9 2nd and 3rd gear shift rod.
10 1st and reverse, gear shift rod.
11 Standard Ordnance transom.
12 Drawer No. 17 (in lathe bench).

PLATE No. 10



BODY STRUCTURE FOR ARTILLERY REPAIR TRUCK.

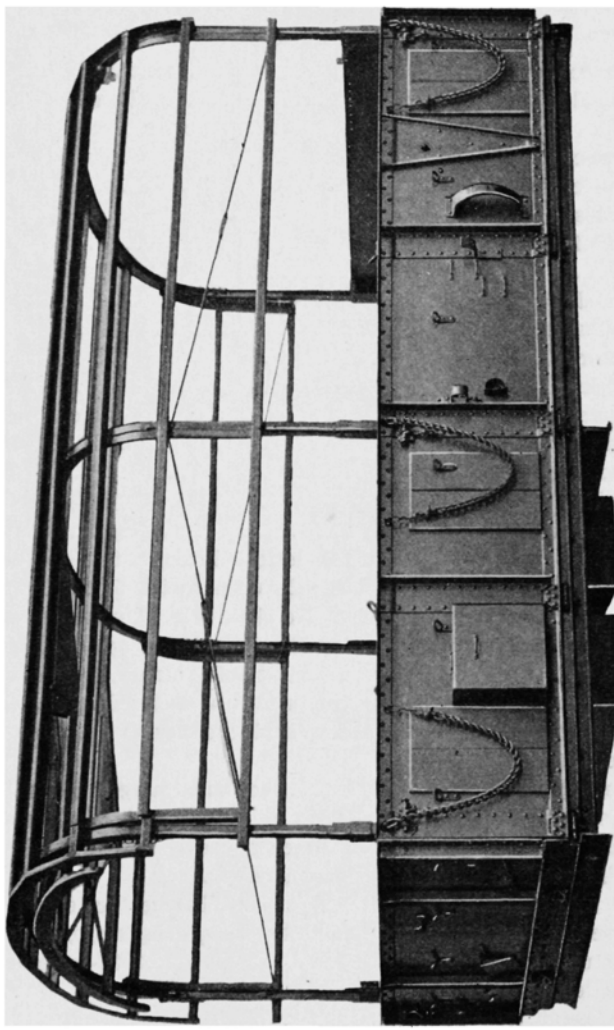
CHAPTER II.

BODY STRUCTURE.

GENERAL SPECIFICATIONS.

Structural material.....commercial steel stock
Longitudinal sills.....2½ x 2 x 3/16 angle
Draft sills.....2½ x 3 x 2 x ¼ flange steel
Transverse cross channels.....3 in., 4 lb. per ft.
Transverse cross angles.....2 x 2 x 3/16
Splice plates.....¼ in. thick
Corner reinforce.....¼ in. thick
Floor box.....3 32 in. thick flange steel
Floor box, depth.....7 29/32 in.
Floor box, width.....28 in.
Floor material.....poplar
Floor thickness.....1½ in.
Floor fastening.....⅜-in. carriage bolts
False floor, front.....30 x 42½ in.
False floor, rear.....30 x 21½ in.
Floor binding.....1½ x 1½ x ⅛ steel angle
Binding screws.....⅜ in., countersunk
Conduits.....12 ft. 1 in. loricated iron, 72 ft. ½-in. loricated iron, 200 ft. No. 14 R. C. S. B. solid copper wire, 50 ft. No. 12 R. C. S. B. solid copper wire, 40 ft. No. 4 R. C. S. B. solid copper wire, 5 ft. No. 16 double lamp cord, 2 attachment plugs, condulets, etc.
Drop side, left attachments.....Shot bolts, hinges, lantern bracket, bracket for Pyrene safety can, shovel blade bracket, shovel strap fastener, shovel handle bracket, hook eye, hanger eyes, bolt snaps, etc., reinforce.
Drop side, right attachments.....Shot bolts, hinges, bucket holder, hanger eye, chain wearing strips, reinforces, pick handle rest, pick head brackets, shovel blade bracket, shovel handle bracket, vise reinforce bolt snaps, strap fasteners, etc.
Drop-end attachments.....Shot bolts, hatchet blade and handle brackets, axe pocket and handle brackets, hanger eye, hinges, etc.
Drop side, material.....3/32-in. flange steel
Drop side, length.....132 in.
Drop side, height.....24 in.
Drop side, top reinforce.....2 x 2 x 3/16 in.
Drop end, material.....3/32-in. flange steel
Drop end, width.....75 7/16 in.
Drop end, height.....24 in.

PLATE No. 11



BODY CONSTRUCTION SHOWING DROP SIDES AND END UP.

Lathe frame, width ..... 56 in.
Lathe frame, height ..... 29 in.
Lathe frame, depth ..... 24 in.
Lathe frame, angle ..... 1½ x 1½ x ⅛ in.
Rheostat block ..... oak, 2 x 7¼ x 8 in.
Number of top bows ..... 6, 3 per side
Bow material ..... steel, 3/32 in. thick
Canvas support strips ..... 9, hickory

BODY STRUCTURE, GENERAL DESCRIPTION.

The body structure is made up of commercial flange steel and angle iron. It is 132 31/32 in. long by 71¾ in. wide. This can be enlarged by means of the drop sides and drop end to 156 31/32 in. long and 119¾ in. wide. The body is built up on longitudinal sills and sub-sills and draft sills. Transversely, the body is reinforced by angle or channel bars, which stiffen the structure. The junction points between the longitudinal members and the transverse members are secured by splice plates, which are riveted to the above members. The drop sides are hinged to the main body platform, and these hinges are supported by the transverse members, which carry the hinges at their outer extremities. Over the top of the structural work is laid a flooring of poplar, 1½ inches thick. Contained within the platform are two false bottoms, the one at the forward end being removable, and disclosing the transmission cases for lubrication and inspection purposes, and the rear covering a floor box which contains some of the tools.

Structural work on the body also includes the frame for mounting the lathe and drill press, and also includes a bench chest which contains 15 drawers capable of holding most of the small tool equipment and other parts furnished with the truck body.

The top of the body is carried on six bows, three on each side. These bows are arched over the top of the body, and carry nine long canvas supporting strips of hickory. The canvas top covers the body and extends down on each side, sufficient material being left to form a roll at the side, which can be extended out as a sunshade, or as rain protection, while the occupants of the truck are at work.

The top itself can be extended at the sides by hinged pieces which lift up or extend at the rear end by extension pieces, thus providing adequate shelter while the repair shop is in use.

The conduits for the electric wires are clipped to the structural work and convey the current from the motor generator set to the switchboard, and thence to the individual motors which operate the lathe drill press and bench grinder. There are also receptacles provided to plug in for operating air compressor set or any other electrical equipment not rigidly connected with the body.

The height of the top above the body can be adjusted by means of the

bow pins which fasten the bows to the upright stanchions on the sides of the body platform. These pins pass through holes in the stanchions and bows, and the height of the top above the body is governed by the holes in which the pins are placed.

The general layout of the parts on the body corresponds with the structure so that the stiffening members beneath take the load at the front end of the lathe and lathe motor; at the center, the motor generator set, and the drill press; and at the rear, the bench cabinet, and bench grinder. The drop sides and drop end provide the necessary floor space for working around any of these units and the drop sides and end are held horizontal by forged steel chains, 5/16 in. in diameter.

CHAPTER III

ENGINE—MOTOR—GENERATOR SET

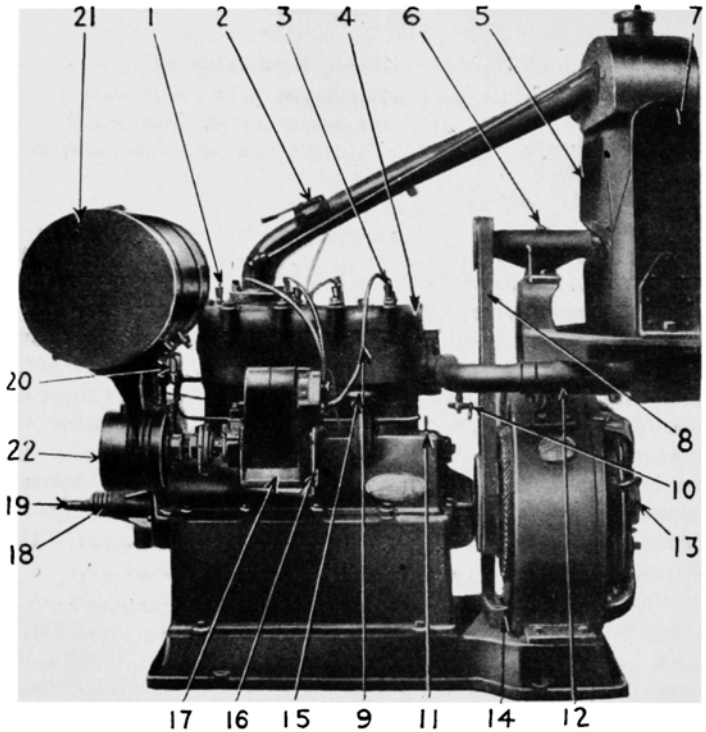
GENERAL SPECIFICATIONS.

Type of engine	four cycle
Number of cylinders	four
Cylinder diameter, bore	2⅝ in.
Stroke	4 in.
Brake horsepower	8 at 1100 r.p.m.
Cylinders cast	in block
Cylinder material	gray iron
Piston material	gray iron
Piston clearance	.003 in.
Number of piston rings	3 per piston
Connecting rod	I-beam forging
Piston pin bushing	bronze
Lower rod bearing	die cast babbitt
Crankshaft	drop forged steel
Crankshaft, diameter	1½ in.
Crankpin, diameter	1½ in.
Crankpin, length	1¾ in.
Cylinder head	detachable
Ignition	Bosch magneto
Governor	centrifugal type
Lubrication	circulating splash
Cooling	thermo-syphon
Gasoline tank capacity	5 gal.
Generator	multiple pole type
Voltage	110
Winding	compound
Capacity	4 kw.
Switchboard size	14 x 24 in.

GENERAL DESCRIPTION.

Electrical power to operate the various repair units mounted on the artillery repair truck body is supplied by an engine-motor-generator set mounted transversely across the center length of the body at the left side. This is a self-contained unit comprising an engine, direct connected with a generator, the armature of which acts as the flywheel of the engine. In connection with these two main components there is a radiator sufficiently large to take care of the cooling, a five-gallon gasoline tank and the necessary piping connecting these units. There is also an elec-

PLATE No. 12



FRONT VIEW OF GASOLENE ELECTRIC GENERATOR OUTFIT.

1 Priming cup.
2 Ignition switch.
3 Spark plug.
4 Cylinder head—removable.
5 Fan.
6 Fan shaft oil hole plug.
7 Radiator.
8 Fan belt.
9 Spark plug cable.
10 Cooling system drain cock.
11 Oil gage.
12 Water outlet hose.
13 Generator.
14 Starting crank.
15 Oil filler and breather.
16 Spark control bracket.
17 Magneto—Bosch DU-4.
18 Starting crank spring.
19 Crank shaft.
20 Oil sight feed.
21 Gasolene tank (5 gal. cap.).
22 Governor cover.

tric switchboard mounted at the front end of the body through which the current generated by the unit is controlled.

The unit mounted on the truck body is protected by screens on each side, and a screen which goes over the top. The switchboard is at the extreme front end of the body just ahead of the lathe frame, being a direct-connected unit. The speed of the armature is the same as that of the crankshaft.

ENGINE.

The engine has a four-cylinder unit with the cylinders cast in block. It has a bore and stroke of 2⅝ by 4 in. Manifolds are cast integrally with the cylinders and the cylinder head is detachable. Gray iron pistons are used with three piston rings, all of which are above the wrist pin. The pistons have a clearance of .003 in. and below the lowest ring are drilled to furnish an oil return passage for the lubricant scraped off the cylinder walls by the piston rings. The piston pin or wrist pin is hollow, hardened, and ground. It operates within a bronze bushing contained in the upper end of the connecting rod.

The connecting rod is a drop forging of I-beam section. At the lower end it contains die cast babbitt bearing for the crank pin.

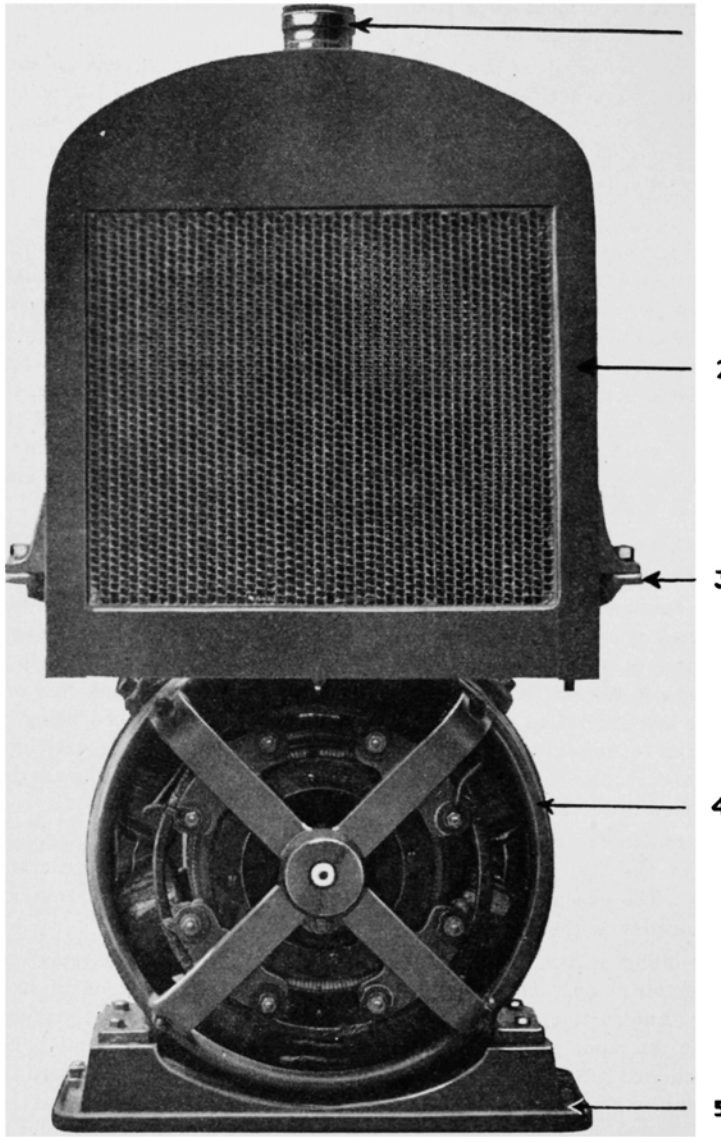
The crank shaft is a steel drop forging 1½ in. in diameter and direct connected at one end with the armature of the generator which acts as a fly wheel at the other extremity. The crank shaft terminates in a squared end to take the starting crank engagement. The crank case and engine bed are bolted together by flange connections, the bed being so shaped as to support the frame of the generator containing the stationary fields and to provide a substantial base upon which the unit is carried and bolted to the floor of the truck.

The radiator is an automobile type with a shield to secure the maximum draft of the fan. It is mounted on a frame bolted to the generator casing. The gasoline tank is supported on a bracket on the crank case of the engine at the starting crank end.

The oiling system is automatic, being taken care of by a removable plunger oil pump. The plunger is actuated by an eccentric on the cam shaft. The suction pump has a fine gauze cap to prevent dirt working up into the pump and this is inspected by removing the oil pump. The oil is carried to a sight feed device located over the gear case where the oil flows over the gears and down to the dip pan below the connecting rods and then into the reservoir below. The rods dip at each revolution and throw oil over all the interior, thoroughly lubricating all working parts. A form of piston is used to prevent excessive oil from working over the piston. The surplus oil is scraped down by the lower ring, flowing back through the holes below the lower ring.

The oil sight feed device is comprised of a large glass body so the

PLATE No. 13



LEFT VIEW OF GASOLENE ELECTRIC GENERATOR OUTFIT.

1 Radiator filler cap.
2 Radiator.
3 Radiator support.
4 Generator.
5 Motor generator base.

circulation of the oil can be seen from a distance and from different places on the truck body.

The cooling is by thermo-syphon system, the flow being upward through the straight water pipe connection between the cylinder head and the top of the radiator, then down through the radiator itself and through the jackets of the cylinders.

Gasoline is fed by gravity from the five-gallon cylindrical tank mounted on the rear end of the engine to a float feed carburetor. The carburetor is an auxiliary air valve type. Air enters at the side opposite the float bowl and passes through a venturi containing the needle valve and jet. The primary air passage is supplemented by an auxiliary air valve retained by a spring. The adjustments on the carburetor consist of governing the size of the primary jet by means of the needle valve under the carburetor and also by setting the tension on the auxiliary air valve spring.

TO ADJUST CARBURETOR.

The carburetor is adjusted properly before shipment. If it is necessary, however, to make an adjustment the needle valve at the bottom is turned to the right lightly until the needle valve is seated. Do not do this roughly, or the seat of the needle valve will be damaged. Turn the needle valve back one complete turn and start the engine, allowing it to run slowly. Adjust the needle valve gradually until smooth running is secured. The engine is then increased to high speed and satisfactory operation secured by turning the knurled screw on top of the auxiliary air valve, thus properly adjusting the tension of the spring.

MAGNETO CURRENT.

Ignition is provided by the Bosch high tension magneto type DU-4.

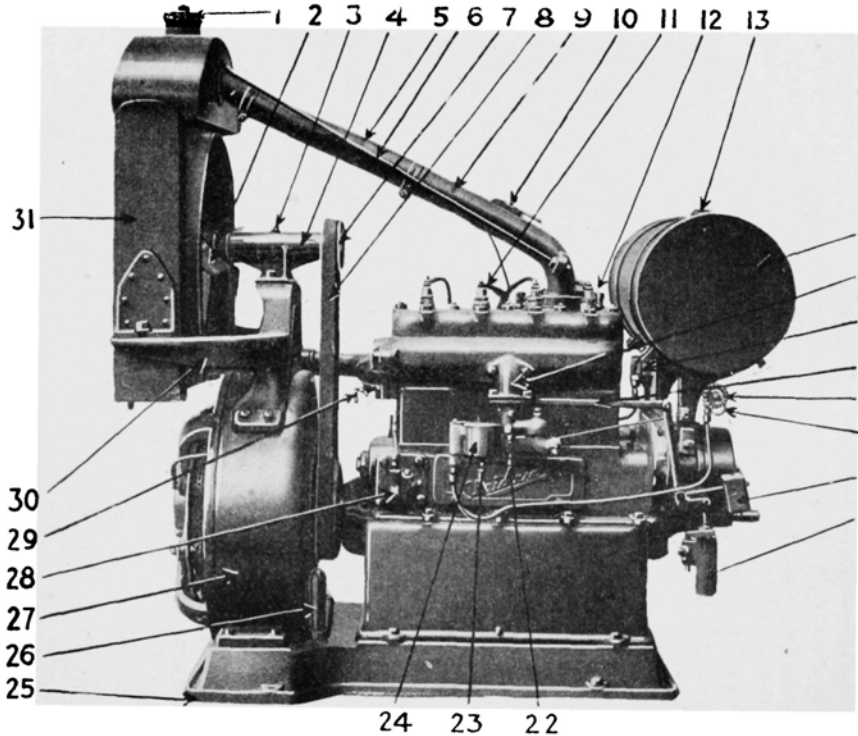
The magneto generates its own high-tension current directly in the magneto armature (the rotating member of the magneto) without the aid of a separate step-up coil, and has its timer and distributer integral.

The armature winding is composed of two sizes of wire, one size comparatively heavy and the other very fine. The heavy wire constitutes the primary or low-tension circuit and the very fine wire the secondary or high-tension circuit.

The rotation of the armature between the poles of strong permanent magnets results in the induction of a current in the armature primary circuit, and this is further augmented at regular intervals in the rotation of the armature shaft by the abrupt interruption of the primary circuit by means of the magneto interrupter. At the opening of the primary circuit the resulting discharge of current from that circuit induces a current of high voltage in the armature secondary circuit. The high-tension current thus created is collected by the slip ring on the armature and passed through the slip-ring brush, then to the various magneto

REAR VIEW OF GASOLENE ELECTRIC GENERATOR OUTFIT.

1 Radiator filler cap.
2 Fan.
3 Fan shaft oil hole plug.
4 Fan shaft bracket.
5 Top water hose.
6 Radiator brace.
7 Fan pulley.
8 Fan belt.
9 Water outlet elbow.
10 Ignition switch.
11 Spark plug.
12 Priming plug.
13 Gasolene filler cap.
14 Gasolene tank.
15 Intake manifold.
16 Valve cover plate.
17 Oil sight feed.
18 Gasolene valve supply.
19 Carbureter air choke rod.
20 Governor weight.
21 Governor weight.
22 Carbureter needle valve.
23 Carbureter drain cock.
24 Carbureter.
25 Motor generator base.
26 Starting crank.
27 Electric generator.
28 Oil pump.
29 Cooling system drain cock.
30 Radiator support.
31 Radiator.



distributor terminals, each of which is connected by cable to the spark plug in its respective cylinder. The operation of the instrument will be more clearly understood from a study of the complete circuits, primary and secondary, which follow.

PRIMARY OR LOW-TENSION CIRCUIT.

The beginning of the armature primary circuit is in metallic contact with the armature core, and the end of the armature primary circuit is connected by means of the interrupter fastening screw to the insulated contact block supporting the long platinum contact on the magneto interrupter. The interrupter lever, carrying a short platinum contact, is mounted on the interrupter disk, which in turn is electrically connected to the armature core. The primary circuit is completed whenever the two platinum interrupter contacts are brought together, and interrupted whenever these contacts are separated. The separation of the platinum contacts is controlled by the action of the interrupter lever as it bears against the steel segments secured to the inner surface of the interrupter housing.

The high-tension current is generated in the secondary circuit only when there is an interruption of the primary circuit, the spark being produced at the instant the platinum interrupter contacts separate.

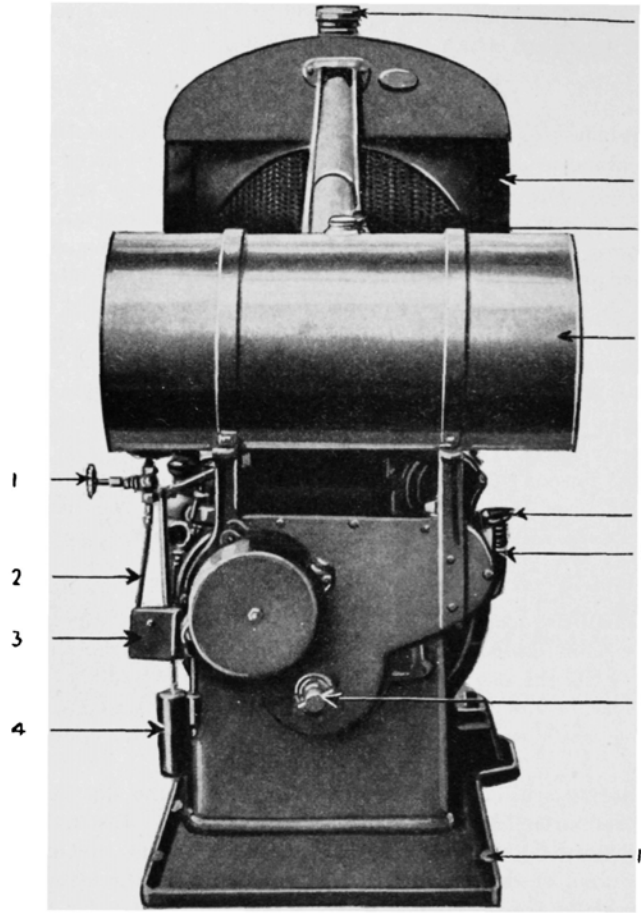
SECONDARY OR HIGH-TENSION CIRCUIT.

The armature secondary circuit is a continuation of the armature primary circuit, the beginning of the secondary being connected to the primary, while the end of the secondary is connected to the insulated current collector ring, or slip ring, mounted on the armature just inside the driving shaft end plate of the magneto. This form applies in all DU types.

The slip-ring brush, which is held in contact with the slip ring by the brush holder at the shaft end of the magneto, receives the high-tension current collected by the slip ring, and, by means of the connecting bar under the arch of the magnets passes the current to the metal contact in the center of the distributor plate. From the latter point the high-tension current passes to the distributor brush, which is held in a brush holder mounted on the distributor gear, and, consequently, rotates with the gear.

Metal segments are imbedded in the distributor plate, and as the distributor brush rotates it makes contact successively with the segments in the distributor plate. The segments in turn are connected with the terminal studs on the face of the distributor plate, and the latter are connected by cables to the spark plugs in the various cylinders. In the cylinders the high-tension current produces a spark which causes ignition and then returns through the engine to the magneto armature, thus completing the circuit.

PLATE No. 15



RIGHT VIEW OF GASOLENE ELECTRIC GENERATOR OUTFIT.

1 Gasolene supply valve.
2 Gasolene pipe.
3 Governor weight.
4 Governor weight.
5 Radiator filler cap.
6 Radiator.
7 Gasolene filler cap.
8 Gasolene tank (5 gal. cap.).
9 Spark control lever.
10 Spark control segment.
11 Starting crank pin.
12 Base.

SAFETY SPARK GAP.

In order to protect the armature and other current-carrying parts a safety spark gap is provided.

Under ordinary conditions, the current will follow its normal path to the spark plug, but if for any reason the electrical resistance in the secondary circuit is increased to a high point—as when a cable becomes disconnected or a spark-plug gap too wide—the high-tension current will discharge across the safety gap.

The current should never be allowed to pass across the safety spark gap for any length of time, and if the engine is operated on a second or auxiliary ignition system the magneto must be grounded in order to prevent the production of high-tension current. The snapping sound by which the passage of the current across the safety gap may be noted should always lead to an immediate search for the cause of the difficulty.

TIMING RANGE.

The magneto interrupter housing is arranged so that it may be rotated through an angle of 35 deg. with respect to the armature shaft. The movement of this housing in one direction or the other causes the interrupter lever to strike the steel segments earlier or later in the revolution of the armature, the spark occurring correspondingly earlier or later in the stroke of the piston.

The spark can be advanced by moving the interrupter housing, by means of the timing-control arm, in the direction opposite the rotation of the armature, and can be retarded by moving the interrupter housing in the same direction as the rotation of the armature. The armature rotation is indicated by the arrow on the oil-well cover at the driving-shaft end of the magneto.

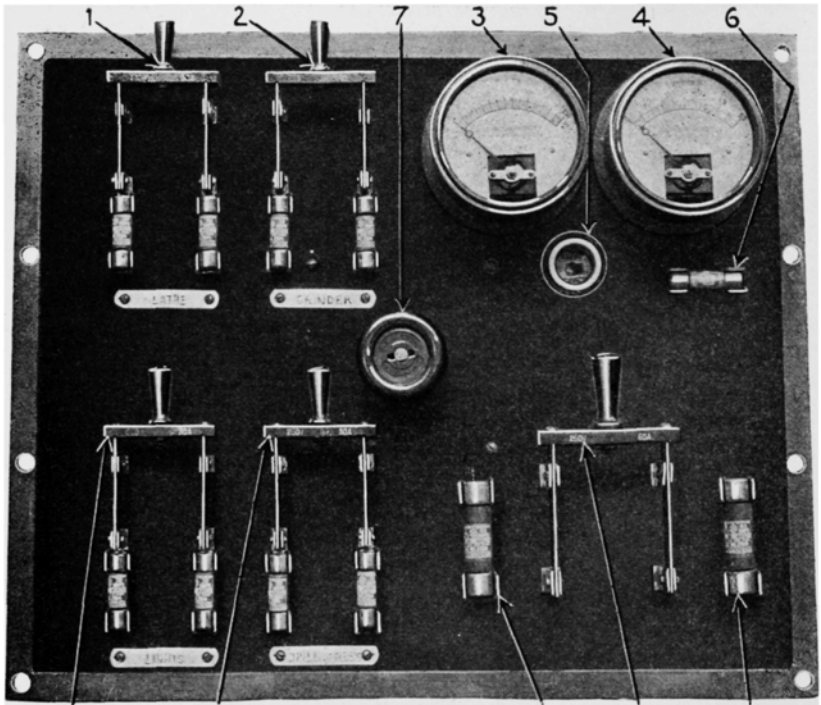
CUTTING OUT THE IGNITION.

Since high-tension current is generated only on the interruption of the primary circuit, it is evident that in order to cut out the ignition it is necessary merely to divert the primary current to a path which is not affected by the action of the magneto interrupter. This is accomplished as follows:

An insulated grounding terminal is provided on the cover of the magneto interrupter housing, with its inner end (consisting of a spring with carbon contact) pressing against the head of the interrupter fastening screw. The outer end of the grounding terminal is connected by low-tension cable to one side of a switch, and the other side of the switch is grounded by connecting another cable between it and the engine or chassis.

When the switch is open the primary current follows its normal path across the platinum interrupter contacts, and is interrupted at each separation of these contacts; however, when the switch is closed, the

PLATE No. 16



SWITCHBOARD.

1 Lathe switch.
2 Grinder switch.
3 Voltmeter.
4 Ammeter.
5 Receptacle for connection to top lights.
6 Voltmeter fuse—3 amps.
7 Regulator.
8 Motor generator switch.
9 Motor generator fuse.
10 Motor generator fuse.
11 Light switch.
12 Drill press switch.

primary current passes from the head of the interrupter fastening screw to the carbon contact of the grounding terminal, thence through the switch to the engine and back to the magneto, and as the primary current remains uninterrupted when following this path no ignition current is produced.

MAGNETO CARE AND MAINTENANCE.

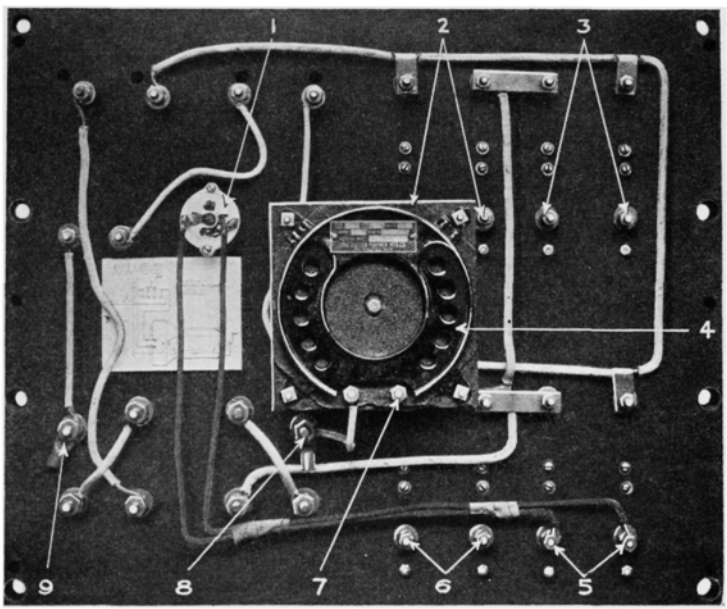
Aside from keeping the magneto clean externally, practically the only care required is the oiling of the bearings; of these, there are two ball

bearings supporting the armature, and in this type with gear-driven distributor a single plain bearing supporting the shaft of the distributor gear.

Any good, light machine oil may be used for this purpose (never cylinder oil), and each of the bearings should receive not more than two or three drops about every 500 miles, applied through the oil ducts under the covers marked "Oil" located at both ends of the magneto.

The interrupter is intended to operate without lubrication, and as oil on the platinum interrupter contacts will prevent good contact, cause sparking and burning, as well as misfiring, care should be exercised to prevent the entrance of oil to these parts.

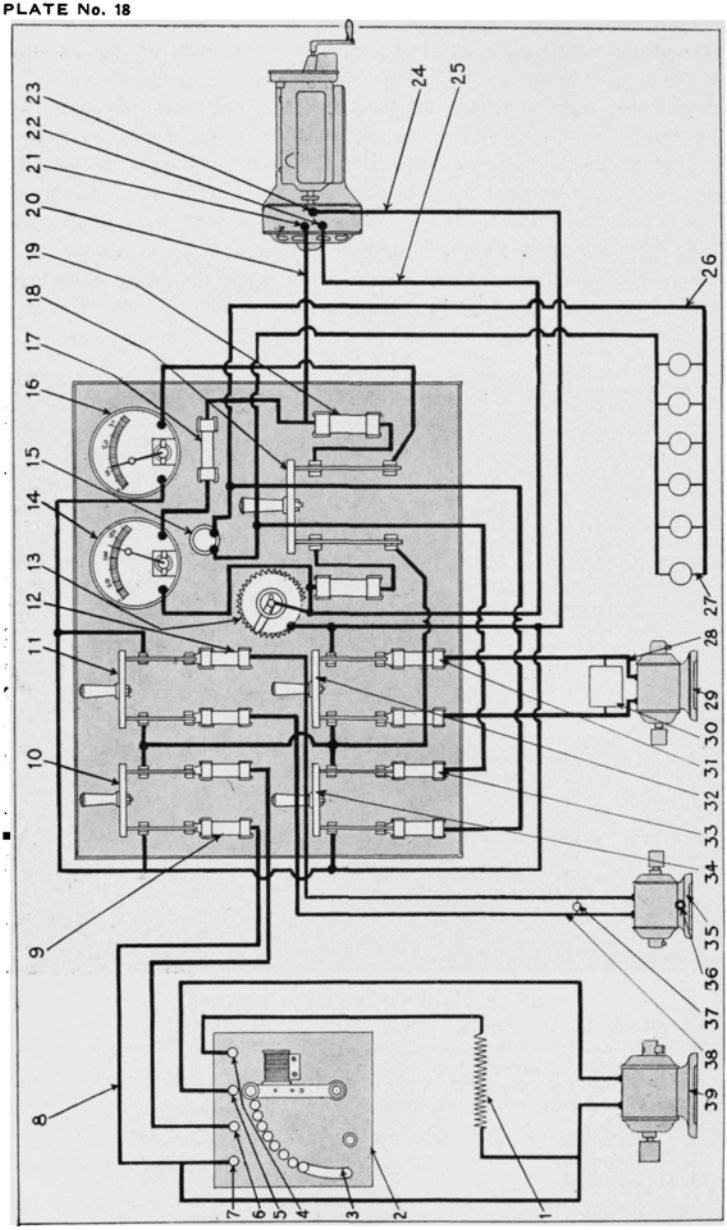
PLATE No. 17



REAR VIEW OF SWITCH BOARD.

1 Receptacle for top lights.
2 Grinder circuit terminals.
3 Lathe circuit terminals.
4 Motor generator regulator.
5 Light circuit terminals.
6 Drill press.
7 M. G. terminal.
8 M. G. terminal.
9 M. G. terminal.

PLATE No. 18


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IGNITION TROUBLES.

Ignition difficulties may be divided into two main classes, one, the most common, due to spark plugs and cables, and the other due to the magneto.

In general, when only one cylinder misfires, the fault is in the spark plug, the most common plug difficulties being as follows:

PLUG GAP TOO WIDE.

The distance between the electrodes of the spark plugs varies according to the individuality of the engine, but normally this distance should not be less than 1/50 inch. On the other hand, however, too wide a gap increases the electrical resistance, and interferes with the proper generation of current at low speed. Difficulty in starting an engine, and missing at low speeds, are very often due to the spark-plug gaps being too wide; and, as the spark will have a tendency to burn the electrodes, and thereby gradually increase the gap, it is especially important that the plugs be

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WIRING DIAGRAM.

1 Lathe motor shunt field.
2 Lathe motor starting box.
3 Starting lever "off" position.
4 Field terminal.
5 Armature terminal.
6 Line terminal.
7 Line terminal.
8 No. 12 wire.
9 30 ampere 250 volt fuse.
10 Lathe switch.
11 Grinder switch.
12 30 ampere 250 volt fuse.
13 Generator rheostat.
14 Voltmeter.
15 Receptacle for connection to overhead lamp circuit.
16 Ammeter.
17 3 ampere 250 volt fuse, volt meter
18 Generator main switch.
19 50 ampere 250 volt fuse.
20 No. 4 wire, generator line.
21 Generator negative terminal.
22 Generator positive terminal.
23 Generator field terminal.
24 No. 14 wire generator field line.
25 No. 4 wire generator line.
26 No. 14 wire floor light.
27 Floor light receptacle.
28 No. 12 wire drill press line.
29 Drill press motor.
30 Drill press starting box.
31 30 ampere 250 volt fuse.
32 Drill press switch.
33 30 ampere 250 volt fuse.
34 Light switch.
35 Grinder motor.
36 Snap switch on grinder motor.
37 Receptacle for air compressor.
38 No. 12 wire, grinder and air compressor line.
39 Lathe motor.

examined occasionally for assurance that the gap is not too great; any difficulty due to this cause may be readily overcome by readjusting the electrodes.

PLUG SHORT-CIRCUITED.

This is usually caused by a cracked or porous insulator, or by fouling of the electrodes or insulator. Any of these conditions will cause misfiring by permitting the current to stray from its intended path.

CABLES.

Misfiring of one cylinder, either continuous or intermittent, may be due also to a chafed or broken cable or to a loose cable connection. The cables should be carefully examined, special attention being paid to the insulation. The metal terminals of the cables must not come into contact with any metal parts of the engine or of the magneto, except those designated as being correct according to the instructions given.

IGNITION FAILS SUDDENLY.

A sudden failure of ignition may indicate a short circuit in the low-tension cable, due either to a defect in the cable, to a faulty connection at the switch, or to the presence of dirt or moisture. A test for trouble in the switch or low-tension cable can be made by removing the cable from the grounding terminal on the cover of the magneto interrupter housing and endeavoring to start the engine on the magneto. If the engine runs with this wire disconnected, but stops when the wire is connected, it is evident the magneto is in good order and that the trouble is due to some fault in the switch or grounding wire permitting the low-tension current to escape to ground.

IRREGULAR FIRING.

If the cables and plugs are in good condition, and yet the ignition is irregular, the trouble is probably with the magneto, and the interrupter should be carefully examined. It should be seen that the interrupter lever moves freely on its pivot, that the hexagon-headed fastening screw in the center of the interrupter is properly tightened, and also that the two platinum interrupter contacts are properly secured in position.

If the interrupter lever does not move freely on its pivot, which is sometimes possible, particularly with new magnetos, the hole in the fiber bushing in which the lever pivots may be slightly enlarged by means of a reamer or small round file; this work, however, should be carefully done, as very little reaming accomplishes the desired result.

PLATINUM INTERRUPTER CONTACTS.

The platinum interrupter contacts should be examined for the correctness of their adjustment, and they should be so set that they are separated by a distance of 0.4 of a millimeter (about 1/64 inch) when the interrupter lever is resting on either of the segments in the interrupter

housing. The strip of steel attached to the magneto adjusting wrench drawer No. 11, which is furnished with each magneto, is to be used as a gage for this distance. The adjustment of the platinum interrupter contacts may be made by loosening the lock nut of the long contact screw which passes through the interrupter contact block and turning the hexagon head of the screw itself by means of the before-mentioned adjusting wrench. When the adjustment is made, care should be taken to tighten the lock nut firmly.

The platinum contacts of the interrupter should be clean, and in proper alignment with each other, and any oil, grease or dirt that is deposited on them should be removed. If they are uneven, or in bad condition (but only then), they may be smoothed by means of a fine, flat jeweler's file. The platinum contacts should be kept clean, and in that condition and with proper attention they will last a considerable length of time.

TO REMOVE INTERRUPTER.

The interrupter itself may be taken out as a unit by removing the interrupter housing and withdrawing the hexagon-headed fastening screw in the center of the interrupter by means of the adjusting wrench. Should the interrupter stick on its seat after the fastening screw is withdrawn it may be pried loose by means of two small screwdrivers inserted back of the interrupter disk, one on each side. When replacing the interrupter, care must be taken that the key on the interrupter disk fits exactly into the keyway on the armature shaft.

DAMAGED INSULATING PARTS.

As it sometimes happens that brush holders and other insulating parts of the magneto are damaged through accident or carelessness, these parts should also be carefully examined for possible disarrangement or damage of the insulation which might permit leakage of current.

SUMMARY OF TROUBLES.

In brief, providing the magneto is properly timed to the engine, trouble due to ignition may be as follows:

Engine Will Not Start—Switch closed, switch or switch wire short-circuited, interrupter lever sticks.

Engine Stops Abruptly—Switch closed, switch or switch wire short-circuited; distributer or collector-ring carbon brush broken.

Misfiring at Low Speed—Spark-plug gap too wide.

Misfiring at All Speeds—Defective or dirty spark plug, improper spark-plug gap, cable insulation chafed, cable connections loose, brush holder cracked, platinum interrupter contacts dirty or oily, interrupter lever sticks.

TIMING THE MAGNETO.

With the average four or two-cycle engine the proper operating results are obtained by timing the magneto, as follows:

The crankshaft is rotated to bring the piston of No. 1 cylinder (in this generator set this is the cylinder nearest the radiator) exactly on top dead center of the compression stroke, and the piston is to be maintained in that position. The magneto is then to be secured to its bracket or bed on the engine, and the timing-control arm on the interrupter housing placed in the fully retarded position.

REMOVE DISTRIBUTER PLATE.

With that done, the magneto distributor plate should be removed by withdrawing the two holding screws or depressing the two catch springs, as the case may be, thus exposing the distributor gear and brush. The cover of the magneto interrupter housing is also to be removed to permit observation of the interrupter.

The armature should then be rotated by means of the exposed distributor gear in the direction in which it is to be driven, until the platinum interrupter contacts are just about to separate, which occurs when the interrupter lever begins to bear against one of the steel segments of the interrupter housing.

The armature should be held in that position while the magneto drive is connected to the engine, due care being taken that the piston of No. 1 cylinder is still exactly on top dead center of the compression stroke. The installation is completed by replacing the interrupter housing cover and distributor plate, and connecting the cables between the magneto and spark plugs.

COOLING WATER.

It is of great importance that the water used for cooling purposes is soft, and free from lime or other alkaline substances. Rain water is greatly to be preferred whenever obtainable. In some well water, alkaline substances are deposited when the water becomes heated, and gradually fill up the water jacket until it interferes with the circulation or stops it entirely. Should this ever occur, the deposit may usually be removed by taking off the cylinder head and filling the water jacket and cylinder head with a mixture of No. 8 acetic acid and water, using about one part of acid to one or two parts of water. Allow to stand for a few hours, and drain and wash out thoroughly. This process may be repeated, if necessary.

OILING.

Pour light cylinder No. 3502 oil in the base through the filler hole, watching the oil gage, and feeling the gage indicator at times while filling, to see that it is floating. Pour in oil until the indicator moves up well to the top of the slot. This indicator should always be floating,

and should be worked by hand occasionally to be sure there is oil in the base. The oil is pumped through a tube to the sight feed in front; from here it flows down through the gear case and back into the oil pan below the connecting rods, which has a trough below each rod. The long bolt extending down from each connecting rod dips in this oil and throws it in a mist through the entire inner compartments, completely lubricating all inner working parts. As long as the oil is seen flowing down the sight feed, lubrication is going on properly, but should the oil stop flowing, the cause should be determined at once, to save the possibility of burning out a bearing. Every month, at least, the oil should be drawn off and replaced with fresh.

STARTING.

Before starting, see that the water system is in good working order and that there is a sufficient amount of oil in the base. See that the timer on the ignition is up to give a late or retarded spark, open carburetor needle valve about three-quarter turn, close the choking valve, or hold the hand over the air inlet of the carburetor and turn the starting crank so as to give a quick turn over the top center. It may be necessary to give it several turns to draw in the mixture. The engine will start on the first turn if a little gasoline is poured in the priming cups and drawn into the cylinders by turning the crank slowly. To facilitate starting, especially in cold weather, priming is suggested. The engine runs to the right when facing the crank end. Be sure switch is open.

UNEVEN RUNNING.

After the engine is started the gasoline should be adjusted by closing off as much as possible to give the maximum power. If the engine runs uneven with the carburetor adjusted to the different points, it is most probably due to a defective spark plug. To determine which plug is the cause of the trouble hold a screwdriver across the top of each plug to the cylinder head; when the missing plug is touched there will be no noticeable difference in the running of the engine, but when the working plugs are touched you will notice the result.

FLUCTUATION.

If the governor should fluctuate a little at light load the carburetor can be adjusted to insure even and smooth running. Also see that the dash pot has kerosene or light oil in it.

CHANGE OF SPEED.

The speed is determined by the governor springs. The cap over the governor can be removed and the springs adjusted by stretching or by cutting off a small portion to diminish or increase the speed. A limited change in speed while running can be made by moving the governor weight toward the end of the lever to reduce, or back to increase.

To Stop—Short-circuit the magneto by closing the ignition switch between the binding post on the timer and the ground.

GENERATOR AND GOVERNOR.

The generator is compound wound. The circuit is of 4-Kw. or 4000 watts capacity and operates at 110 volts. Regulation of the current output is secured by governor. This governor is fitted in an oil-tight casing with easily removable cover. In this location it receives oil automatically from the gear case. The speed is maintained at a uniform point by the governor acting on the throttling valve of the carburetor. A weight is provided on the governor lever which can be moved a limited distance along its supporting rod to change the speed to a limited degree. This weight holds the governor parts against lost motion.

A dash pot is provided, with a plunger connected to the governor lever which prevents sudden fluctuation, the same as is used in the large steam engines. This is kept filled with kerosene or light oil and prevents the plunger and lever from suddenly moving from one extreme to the other.

The fact that the governor is inclosed and runs in oil eliminates the trouble of oiling these small parts. In fact, the entire oiling system is automatic, the oil being delivered from the pump to the gear case and governor, thence down into the dip pan below the connecting rods, where each rod dips and splashes oil entirely over its bearings, over the cam shaft and upon the cylinder wall and inside the piston, the piston pin also receiving its share of the splash. The oil then flows down to the reservoir below the pan to be again circulated by the oil pump.

GENERATOR INFORMATION.

Voltage—The voltage is dependent on the speed of the generator. The governor is set for the proper speed to give the full voltage. Should it be desired to increase or decrease the voltage, the speed can be increased or decreased by means of the governor springs, stretching them a little or cutting off a coil. A slight change in voltage can be made by the sliding weight on the governor lever or by the rheostat.

Amperes—The amperes depend on the amount of load on the generator. On the 110-volt generator, 38 amperes gives the full load. Of course, the amperage takes care of itself; the more load the more amperes, until the limit is reached.

Sparking—Sparking at the brushes on light load is harmless, but on heavy load it is liable to gradually burn or heat the commutator bars and connections.

The brushes should fit the commutator perfectly. If this is not the case, or if they touch only at a single point, they should be shaped to fit the surface by drawing a piece of sandpaper between the brush and the commutator with the sand side against the brush. Properly adjusted

brushes will stop sparking, unless the commutator surface is uneven, in which case the commutator can be turned down slightly in a lathe. Sometimes uneven commutator bars can be smoothed down by means of sandpaper or a file. *Do not use emery paper.* All metallic dust must be carefully removed before starting, as this is liable to short-circuit the bars.

A very small amount of vaseline or oil may be used on the commutator, but too much will cause sparking. Sparking may also be caused by a burned-out armature coil.

KEEP ARMATURE CLEAN.

The armature and commutator should be kept clean at all times, and, as a general rule, there is seldom any trouble from the generator, because it is designed to carry an overload greater than the engine will pull, which makes it safe in this respect.

SWITCHBOARD.

The switchboard has the volt and ammeter fully connected and rheostat fitted. The main switch has two fuses of sufficient capacity to carry the load.

TROUBLES AND REMEDIES.

Keep the generator commutator clean by occasionally holding a little smooth, fine sandpaper on it while running.

Failure to Start—Too much or not enough gasoline, usually the latter. Contact points on igniter or magneto may require cleaning.

Other causes of failure to start are magneto interrupter out of adjustment, or contact worn; defective spark plugs or loose wires; or wires leading to the wrong plugs.

Misfiring—Generally caused by defective spark plugs or too much gasoline.

Loss of Power—Too much gasoline, spark not sufficiently advanced, defective spark plug, leaky valves, or worn piston rings.

Look at the sight feed, and see that the oil is flowing to insure proper lubrication.

Loss of Current—Clean commutator on generator as above suggested, and see that all brushes are in contact and fit accurately.

In the 110-volt generator the field current is about 1½ amperes.

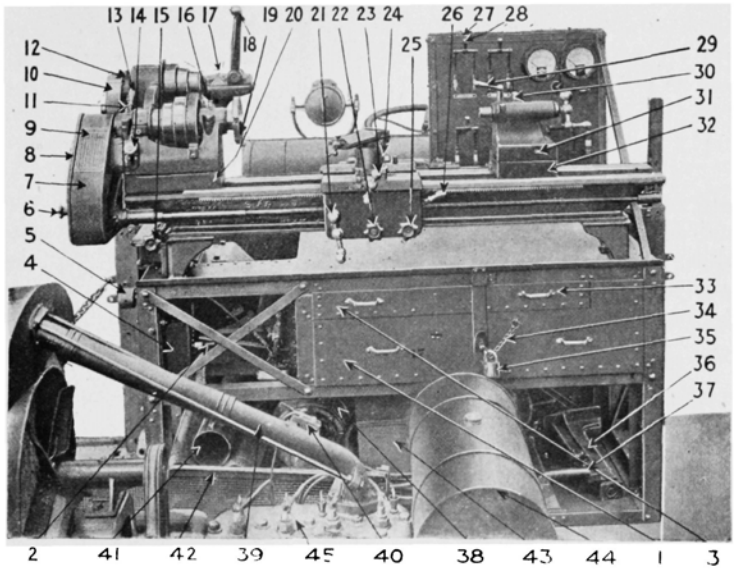
Engine Tight—In case the engine sticks, the trouble is most likely a dry bearing or a bearing that is too tight, either crankshaft or connecting rod, and should be investigated at once. If necessary, scrape the bearing or loosen it slightly. Be sure all nuts on main bearings are locked with spring cotters.

INSTRUMENT LOCATION.

The current from the generator is delivered to a switchboard. This is a master electric control. This board, which is illustrated on page 38,

has a rheostat connected with the fields of the generator governing its output. The master switch is located at the lower right corner of the board and four switches are on the left side controlling current for the motors of the lathe, drill press and grinder and also current for the lighting system. At the top right of the board there is a voltmeter and an ammeter. Beneath the two instruments, the volt meter and ammeter, is a socket in which is plugged the flexible lamp cord connection to the lighting system along the top of the body. There are eleven fuses on the board taking care of the lines controlled by the master and subsidiary switches.

PLATE No. 19



LATHE AND FRAME ARRANGEMENT.

1 Drawer No. 17.
2 Lathe motor starting box handle.
3 Drawer No. 16.
4 Lathe motor starting box.
5 Motor pulley.
6 Guard door knob.
7 Guard frame.
8 Guard door.
9 Index plate.
10 Counter shaft pulley.
11 Spring oiler.
12 Spring oiler.
13 Back gear lever.
14 Feed lever.
15 Belt tightener knob (counter shaft to lathe).
16 Spring oiler.
17 Spring oiler.
18 Countershaft clutch handle.
19 Small face plate.
20 Head stock block, 2 in. high.
21 Feed screw hand crank.
22 Friction stem knob.
23 Cross slide screw crank.
24 Compound rest block, 2 in. high.
25 Change feed tumbler knob.
26 Clamp nut lever (open position).
27 Switchboard.
28 Lathe knife switch.
29 Spindle clamp, tailstock.
30 Binder bolt nut.
31 Tailstock adjusting screw.
32 Tailstock block, 2 in. high.
33 Drawer handle.
34 Chain for lock.
35 Lock.
36 Jack.
37 Air compressor handle.
38 Air compressor motor, 1½ h.p.
39 Motor generator cylinder water outlet elbow.
40 Motor generator ignition switch.
41 Stove pipe.
42 Motor generator guard.
43 Air compressor tool box.
44 Motor generator gasolene tank.
45 Cylinder head.

CHAPTER 4.

LATHE AND LATHE EQUIPMENT.

GENERAL SPECIFICATIONS.

Lathe rating	9 in.
Lathe drive	electric motor
Method of drive	belt
Speed control	rheostat
Regular change gears	11

LATHE FITTINGS AND EQUIPMENT.

The lathe is a nine-inch Star screw cutting type made by the Seneca Falls Manufacturing Co. It is fitted with two bench legs and a small face plate. The lathe is connected to the motor through a counter shaft attached to the lathe bed. The drives are taken through two belts, one from the motor to the counter shaft, and one belt from the counter shaft to the headstock. The belts are laced by patent hinged-type lacing. Included in the equipment are attachments of the widely varied nature which are given in the list herewith. Some of the more important fittings include two-inch blocks for the headstock, tail stock, and straight tool post. There is a taper attachment, bushings for drawing in chuck in headstock and a rheostat bolted to the inside left side of the lathe frame.

The change gears include eleven regular gears, one extra 45-tooth gear, one extra 80-tooth gear. A complete set of wrenches is furnished and the locations are given in the list of lathe equipment on page 62.

LATHE DESCRIPTION.

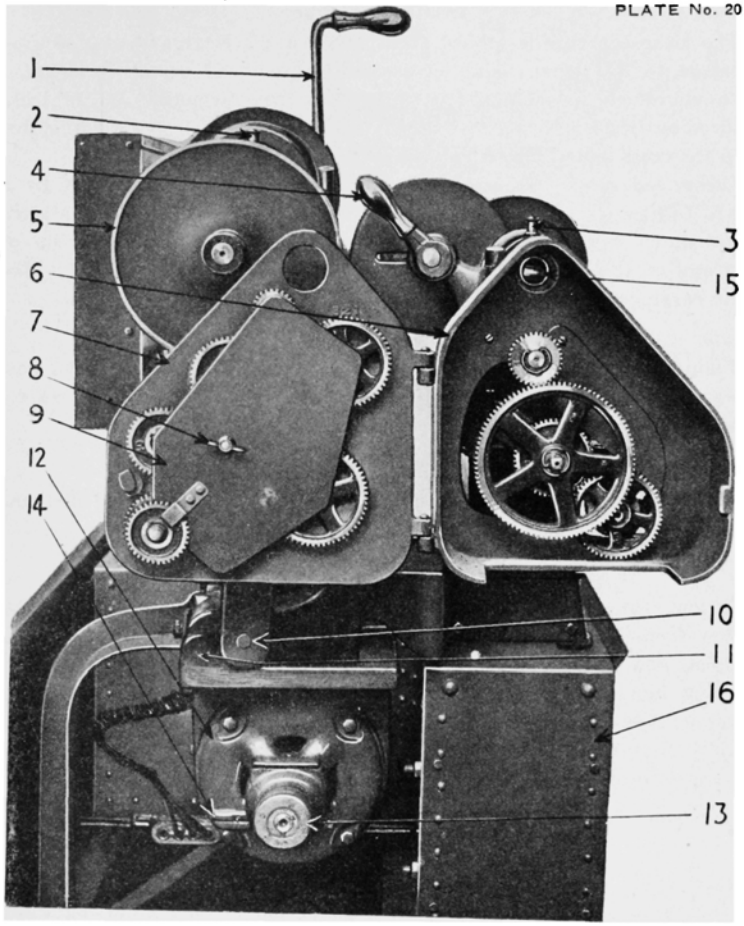
The lathe is arranged for motor drive, the motor being mounted in the lathe frame. There is a complete set of attachments, as indicated in the above list, and the following few notes give additional details on the construction.

LATHE HEADSTOCK.

The lathe headstock is a web pattern, hollow spindle made from 60-65 carbon crucible steel, accurately ground to size, revolving in ample hand-scraped ring-oiling bearings, nose is threaded part way only to facilitate changing chucks and face plates without damaging threads and to insure perfect fit.

All spindles have large hole suitable for draw-in chuck. Cone is finished inside and outside, balanced for high speeds, is locked to head-gear by push-pin, and may be secured or released without using wrench, all gears are guarded.

PLATE No. 20



LATHE—LEFT END WITH GUARD DOOR OPEN.

1 Counter shaft clutch lever.
2 Spring oiler.
3 Spring oiler.
4 Back gear lever.
5 Counter shaft pulley.
6 Guard frame.
7 Guard door.
8 Shield wing nut.
9 Change gear shield.
10 Counter shaft pivot.
11 Motor base pivot.
12 Lathe motor.
13 Lathe motor pulley.
14 Oil cup, hinged cover.
15 Hollow spindle.
16 Lathe frame.

LATHE CARRIAGE.

The lathe carriage is gibbed front and rear; a locking device secures carriage to bed when using cross-feed. Cross-feed screw is supplied with micrometer collar graduated to read in thousandths of an inch, secured by friction spring and readily set to any position. An adjustable stop for cross slide is provided for screw-cutting, etc.

Cross-feed screw and ways are protected from chips and dirt by a guard full length of slide. The carriages are arranged for taper attachment which can be affixed. There are four 7/16-in. holes in top of carriage of the lathe for clamping work. T-slots are provided on the lathe carriages.

RESTS.

Plain and compound rests interchange, one cross slide and tool post answering for both rests; a binding device facilitates changes and rigidly binds either rest to cross slide, which is graduated 180 degrees.

TOOL POST.

The tool post has patented collar and shoe, which exclude all dirt and chips, and admits of adjustment of tool.

FEEDS.

Power cross and longitudinal feeds are actuated by worm, receiving power from head spindle through spur gears and lead screw, which is splined, and acts as a feed rod. Feeds may be thrown in or out by turning hand knob on apron, which operates friction clutch, shifting reverse lever in headstock will feed in or out, right or left, or throw entirely out of engagement. The automatic power cross-feed is for accurate results and smooth surfaces when facing and other similar service.

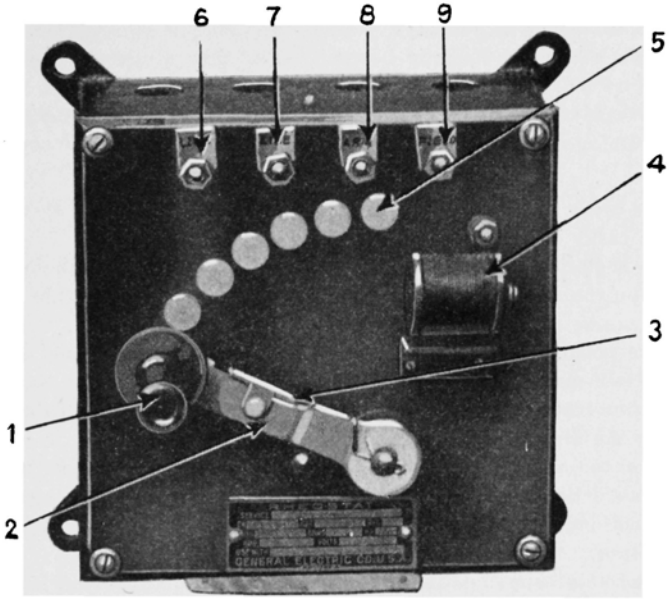
SCREW CUTTING.

Range, all standard threads, right and left from 3 to 72 per inch, including 11½ and 27. Transposing gears and index for cutting International Standard Metric threads from 0.5 mm. to 8 mm. pitch are carried in drawer No. 17.

DETACHED PARTS.

Each lathe is furnished with both large and small face plates, center rest, follow rest, two point centers hardened and ground, center oiler, full set of change gears and drop forged tool-post wrench. All gears are guarded. The door of change gear guard has pegs for holding loose gears. Change gears have rounded edges to avoid injury to hands. Split spring washers hold change gears in place and facilitate quick shifting. All adjusting screws have uniform size heads to fit tool-post wrench. Screws, nuts and small parts liable to become bruised are case-hardened.

PLATE No. 21



LATHE MOTOR STARTING BOX.

1 Lever handle.
2 Lever.
3 Magnet shoe.
4 Magnet.
5 Running position.
6 Line terminal.
7 Line terminal.
8 Armature terminal.
9 Field terminal.

OILING THE LATHE.

Oil every place provided for oiling.

Use nothing but a light machine oil.

Oil frequently. If the lathe is not in constant use, oil every time before using.

Study the machine carefully, so as to find all the places to oil; and then omit none of them in oiling.

The ways on which the carriage runs should be oiled on top and below by putting a little oil on the fingers and rubbing it on.

Do not forget to oil the under side of the ways at the back, where the gib holding the carriage down bears. If this is omitted the carriage will run hard and the ways may be cut.

The screw operating the tail spindle should be oiled occasionally by running the spindle clear out, taking it out of the tail stock and oiling the collar nut in the end.

The bearings of the little reversing gears in the head are likely to be forgotten and cause trouble by the lack of oil.

The bearing of the cone pulley on the spindle can be oiled by taking out the proper screws in the steps of cone.

A little oil used frequently is much better than a quantity used more seldom.

All excess of oil should be wiped off before using the machine, as any oil remaining outside the bearings only serves to catch the dust and chips.

CLEANING THE LATHE.

After using the lathe it should be wiped off with a cloth or waste, as it is most easily cleaned at this time.

If by neglect the ways become gummed with oil and dirt, one must rely wholly on the solvent action of kerosene or gasoline to loosen the film so that it can be rubbed off.

If the polished surfaces other than the wearing surfaces get stained, emery cloth may be used for cleaning, but the surfaces should be rubbed only in the direction in which they were originally finished. This can be seen by the direction in which the grain of the finish runs. *Never use emery on the wearing surfaces.* After cleaning any surfaces with emery they should be washed thoroughly with gasoline to remove emery, and lubricated immediately in order to prevent rust, as the emery scores the surface.

After the lathe is oiled the belt may be put on, and it is very desirable not to have it too tight, as a tight belt causes much unnecessary friction and consequently makes the lathe run hard.

STARTING THE LATHE.

Before starting the lathe for the first time under power, look carefully at the following points:

Examine the "back gears" and see whether or not they are in mesh. If they are, the cone lock pin must be pulled out to stop. If this is not done, the lathe will not run. If the back gears are out of mesh, see that the cone lock pin is adjusted to lock the cone to the head gear, as otherwise the cone will simply revolve without turning the spindle or work.

Have the feed lever in its midde position, so the feed gears are stationary, until you are certain of the proper operation and adjustment of the back gears.

PUTTING IN FEED GEARS.

Before moving the feed lever be sure that all the feeds on the apron are thrown out so that the lead screw can be turned easily by hand. The feed lever can now be thrown down (*with the lathe stopped*), and on starting the lathe the screw will be turning. By raising the lever to its highest position the screw will turn in the reverse direction.

THROWING IN THE FEEDS.

Turning the knurled handle will connect the friction feed used for turning. If the carriage does not move in the proper direction, change it by moving the feed lever.

Loosening the handle and lowering it will connect the automatic cross-feed, which may be stopped and started by the use of the proper handle.

Be sure that the friction feed handle is off, and then try the clamp nut. This is used in thread-cutting only, and must *never* be thrown in with any other feed or the carriage locked to bed. If it is, something *must break.*

ADJUSTING GEARS.

When setting up the gears for screw-cutting or feeding, be sure to leave a little slack between the teeth, for if they are crowded closely together it makes the gears run hard, and any particle of dirt getting in will have a tendency to break the teeth.

ADJUSTING GIBS ON THE SLIDES.

When it is necessary to tighten up the gibs on the slides it is a good plan to tighten up the first screw so tight that it binds, then slack it up a very little, and treat the next screw in the same way; by following this plan each screw will have the same tension and the gib will bear evenly its whole length.

TURNING TOOLS.

These tools come properly ground, and in sharpening every effort should be made to preserve the cutting angles as they are when the tool is new. Much difficulty will be avoided by following the hints on grinding given here. The SIDE TOOLS should be ground only on the TOP and FRONT END. If a burr is thrown up on the side when you grind the top, this burr should be removed on the OIL STONE, and NOT GROUND.

The Diamond Point is to be ground on the TOP and FRONT; the caution as to maintaining the original angles is especially applicable to this tool. For taking a finishing cut, the point of this tool should not be V-shaped and come to a point, but should have the extreme point flattened off so that it is about a thirty-second of an inch wide. In setting this tool, to insure easy cutting, the point should be set as far above the center as the diameter of the work will admit. For work one-eighth to one-fourth of an inch in diameter, the point must be set nearly or quite on the center. But for work, say six inches in diameter, the cutting point should be set one-fourth or three-eighths above.

THE SIDE TOOL.

Is to be set with the straight side nearly parallel to the face of the work, but since the side is not exactly straight, the tool should be set so that about one-eighth of an inch at the point is all that is cutting. This tool is to be used by starting at the center of the piece and working toward the outside. The point of the tool should be of sufficiently acute angle that the tool may be pressed in close to the dead center, with the point of the tool touching the work and the center at the same time. In order to remove the burr from the center of the piece, one can slack up

the dead center slightly, and then feed the tool forward, so that the point will project over the edge of the countersink, which will be exposed by slacking up the center. *Be careful not to slack up the center too much, or to let the tool catch in the work.*

THE CUTTING OFF OR PARTING TOOL.

This tool is to be ground only on the front end, and the clearance angle maintained as it is when the tool is new. Care must be used in setting the tool, so that the sides of the cutting part do not rub on the sides of the cut. The top surface of the tool should be set at the height of the center, and if, in cutting, the tool seems to ride and glaze the surface, with also a tendency to dig in, look carefully to the height of the tool, and the probabilities are that you will find it too high. Lard oil is to be used as a lubricant when cutting steel with this tool, but brass and cast iron are cut dry.

THE THREAD TOOL.

Good threads depend to a great extent on the thread tool being in good condition. This means that the angle of the tool should be exactly that required by the thread. Sixty degrees is correct for U. S. S. threads, and 55 degrees for Whitworth threads. These angles can best be determined by the use of a Center Gage, which is provided with notches of the proper angle, and which also serves to assist in setting the tool with the center line of the angle perpendicular to the axis of the piece. The catalogue of the makers shows the method of using the gage. The height of the tool is to be adjusted so that the top of the tool is the same height as the center.

THE BORING TOOL.

Is to be ground on the front and set as *low* as possible without having the lower part scrape on the hole. Run the tool in the whole depth of the hole before trying to cut, so as to be sure that the shank does not touch.

SHARPENING TOOLS TO CUT BRASS.

No tool that has top rake should be used on brass, since these tools have a tendency to dig into the work. On this account the side tool and diamond point are not suited to cutting brass, but a flat-topped tool, similar in shape to the thread tool, will be found most convenient.

TYPICAL OPERATIONS.

TURNING ON CENTERS.

Have the piece of stock as nearly the right length as you can, cutting it from the bar, if possible, with a hack-saw, so as to leave the ends reasonably flat. If the bar is one-half inch or smaller it may be passed through the spindle of the lathe and held in the chuck, and then cut off with the cutting-off tool. In this case it will only be necessary to leave the piece about a thirty-second part of an inch longer than the

finished length. With a pair of dividers find the center of the end of the piece and mark the place with a prick punch. Then mount the piece between the centers of the lathe and spin it rapidly with the fingers of one hand, while the other holds a piece of chalk lightly in contact with the piece. This will show whether or not the trial centers are correctly placed, and if not, they can be shifted by slanting the prick punch toward the side that the chalk has marked, and driving it over a little and then straighten up the punch and strike a few blows to make the mark round, and then try the piece again in the lathe. Repeat the operation until the piece runs true; it is better to have the piece run quite true, even if there is plenty of stock on it, as the turning would much more apt to be true if the stock is uniform than it is where it is irregular. Having found the center with sufficient accuracy, drill and countersink the centers, preferably with a combination center drill. Do not make the centers too large; one-sixteenth of an inch is big enough for most work less than an inch in diameter, and for larger work, if the centers are about one-eighth, they will be about right. Always countersink centers.

With the side tool face up one end, taking off about half the excess of stock left in cutting off, then face the other end to the proper length. One thing to be borne in mind is that at this stage the piece is to be of the *finished length,* the exceptions to this rule are very few and seldom met.

With the cutting-off tool make cuts in the piece to locate whatever shoulders there are to be made. A little judgment must be used in applying this rule, as it would not be advisable to make a cut with the parting tool in the center of the length, as the cut might so weaken the work that the other cuts could not be taken. The object of using the parting tool in this way is to clear the corner of the diamond point so that at the end of the cut the corner of the tool will not dig in and bend or otherwise spoil the work. From this it will be seen that if the shoulder is very slight, it may not be necessary to use the parting tool.

In setting the parting tool it is well to leave about a sixty-fourth of an inch, to be faced off with the side tool afterward, and also to leave the same amount in excess of the finished diameter.

The diamond point is the tool to use for taking off the heavy chips, if the piece is steel or wrought iron, and the round-nosed tool is right for this work in cast iron.

In calipering the piece while taking these roughing cuts, set the calipers to the diameter that you wish to turn, and make the piece of such size that the calipers just touch—not go over by the application of appreciable force. Having roughed out the entire piece, we can start with the finishing, remembering to finish the least important thing first. In finding the finished size, cut and try on the piece for a short distance

at one end, and having determined the proper size at that point, let the cut run right across the length to be turned of that diameter. The hints given under the heading of the diamond point will apply in making the tool cut smoothly for a finishing chip. A fine feed is not at all necessary in order to produce smooth work if the tool is properly set and ground. A fine feed is only to be used where the work is so small that it is not stiff enough to stand a coarse feed.

SETTING THE LATHE TO TURN STRAIGHT.

Several methods might be given for making this adjustment, but perhaps the simplest one is as follows:

Put any piece of stock that has good centers in the lathe, and put in a diamond point and raise it up very high, so it will not cut, but just rub, against the piece. Twirl the piece with the fingers, as was done with the trial centering, and screw the tool in until it binds the pieces slightly. Then take the piece out of the lathe and run the tool along to the other end, and put in the piece again with the ends reversed. Try the tool and piece together again and see if the tool rubs just the same at the same place as it did before. If the tool does not touch or bears harder than it did, the screws at the side of the foot-stock are to be turned so as to move the upper part of the stock in the right direction, and then repeat the testing until the adjustment is correct.

Sometimes we find that, in turning a piece where the cuts taken from each end come together in the middle, they do not match, although the diameters caliper the same. This is caused by dirt or grit in the center hole, which should be carefully wiped out, or the live center not running true; and truing up the center with a tool will overcome the difficulty.

TAPER TURNING.

Tapers should be turned by the use of the taper attachment with which the lathe is equipped, altho they may be turned by setting over the foot stock to the desired position. Without the attachment the final adjustment of the foot stock is a cut-and-try matter, where accurate results are necessary; but we can approximate very closely by a little calculation, and so reduce the number of trials to those needed for the final adjustment. If the taper is given as so much per foot, we would find how much taper there would be in our piece if the taper ran the whole length, by making this proposition:

Twelve inches $\div$ taper per foot = length of piece $\div$ taper. Having found the total amount of taper in this way, we move the foot stock one-half the amount of the taper as found above. The amount of set-over depends only upon the taper per foot and the length of the piece, and is independent of the length of the tapered part of the piece.

If the taper is to be copied from a sample, we are to measure the

sample at two points, a known distance apart, and from this find the taper per foot for use as above.

Tapers that are steep enough to require the use of the compound rest are generally given in degrees which makes the setting of the rest very simple, as it is graduated and the degrees can be read off directly. It is to be remembered that the rest graduations read O when the tool moves perpendicular to the axis of the work, and if the angle given on the drawing is measured from the axis, the setting for the rest will be the difference between 90 degrees and the given angle.

Tapers that are required to fit taper sockets must, for the final adjustment, as indicated above, be tried in the place they are to go. Three or four light chalk marks running the length of the taper, when tried in the socket will show where the contact is, and the adjustment may be made accordingly. For very nice fitting a light coat of bearing blue (such as the artists use) is better than chalk.

CHUCK WORK.

In using the universal chuck one must not expect that one screw will operate the chuck so as to hold the piece firmly. To be sure, one screw does move all the jaws, but after tightening one screw enough to hold the piece from dropping out, one ought to tighten up the next screw a little and then the next. It will be found that the first screw can now be tightened a little more quite easily, and *this process is to be repeated several times,* until the jaws are all as tight as is necessary. In loosening the chuck the same process is to be followed. This method insures that the mechanism of the chuck will not be damaged by overstraining in tightening. Never use any other wrench in operating a chuck than the one furnished with it. By following this plan all damage of the chuck screws will be avoided.

If it is required to set up a piece of stock to run true in an independent chuck, we can grasp the pieces in the jaws, and by observing the direction of the greatest eccentricity we can roughly center the piece by loosening one jaw and tightening the others. Having the piece nearly true, we can hold a piece of chalk near the revolving work and the chalk mark will be on the side of the work that is too far from the center, so that we must move the jaws so as to move the piece away from the chalk-marked side. If the piece does not have the same eccentricity at both ends, we can tap it with a hammer until it remains parallel to itself while it is revolving, and then correct the eccentricity as directed before.

If a hole is to be drilled in the end of a piece held in the chuck, we must make a countersink for starting the drill with the centering tool, as was directed in describing that tool. Make the countersink of about the size and angle of the point of the drill; this will almost insure that the drill will start true in the work. If it is necessary for the drill

to run very true, it will be a good plan to start the drill in the countersink until it cuts nearly its full size, and then true up the hole again with the centering tool, being very careful to keep the proper angle that matches the drill.

In drilling, the drill is kept from turning by a dog put on the shank, if the drill is large; or, if the drill is small, it may be held in a chuck which fits the foot-stock spindle. In either case the drill is fed forward by the foot-stock screw.

For drilling out a hole that has already been cored, a twist drill is not very well suited; a flat or a four-lip drill is very much better. The flat drill is held in a holder which goes in the tool-post and which must be adjusted in height to be the same as the center. A little strain is put upon the drill with a wrench and the drill fed forward, being careful that the drill does not come off the dead center.

Drilled holes are generally not good enough for holes in wheels and gears that have to be fitted to shafts, but after the holes have been drilled they should be reamed with a reamer which leaves the hole more nearly round than the drill does. Use smaller drill to start, for accuracy.

SCREW CUTTING.

The lathes are provided with an index, giving the proper gears for cutting a wide range of threads in most general use. The term "Stud" used in connection with the gears and index refers to the place for the upper change gear of the screw-cutting train.

"Screw" means the end of the lead screw. When the number of threads to be cut is not found on the index, we suggest the following rule, which in this form will apply only to these lathes:

Make a fraction having the turns per inch of the required screw as the numerator, and 12 (the pitch to which the lead screw is geared) as the denominator. Reduce this fraction to its lowest terms; the result will be the ratio of the required gears. Multiply both terms of this ratio by some multiple of six; this gives two gears that will do the work. If these gears are not both in stock, try another multiple of six as a multiplier, and so on until satisfied that no pair of stock gears will suit. In this case another gear will have to be procured. Any of the fractions found as above that gives *one* gear that is in stock will have as its other term the gear necessary as a mate.

The washers that hold the change gears in place are slotted on one side, so that when the knurled sleeve is pulled out the washer will turn and fall off; the required change is made by slipping proper gears over sleeve to correct position on stud. When replacing washer, be sure the flat side goes next the gear.

If the original ratio is less than one, the smaller gear goes on the screw; if the ratio is greater than one, the larger gear goes on the screw.

First, set the compound rest at one-half the angle of the thread. The grinding and setting of the thread tool have been dealt with in a previous paragraph. After the gears have been put on and the tool properly set, we can cut the thread. The clamp nut lever at the right of the apron should be pressed down to connect the carriage directly with the lead screw; *other feeds all off*. The stop on the cross slide is to be set so that the point of the tool just touches the work when the slide is against the stop. Take very light cuts over the work and withdraw the tool at the end of each cut before running the tool back.

Generally the best way to get the tool back to the starting point is to run the lathe backward; but if the piece is large, so that it must turn slowly, or is very long, a good deal of time can be saved by stopping the lathe, opening the split nut and moving the carriage back a whole number of inches by hand and then closing the nut for another cut.

The thread is to be cut till it fits whatever nut is taken as a standard. Be sure that the tops of the threads never become sharp; if they get sharp before they will go into the nut, the extreme points must be taken off with a fine file.

THE COUNTERSHAFT.

In setting up the countershaft, be sure there is a little (one-sixteenth of an inch) end play between the shaft and hangers. This insures free running and a good distribution of oil from the self-oiling boxes. These hanger boxes, when once filled with clean oil, will not need attention for a long time. When it is necessary to drain the oil wells, the small screws in the bottom of the bearings may be removed to allow the oil to run out.

The pulleys and clutch fork should be oiled frequently, a little at short intervals being better in these places than a larger quantity more seldom.

If the clutches slip they may be tightened by moving the adjusting screw shown in the end of the clutch lever in the illustration. Care must be used not to tighten the clutch so much that the lever will not ride up onto the straight part of the cone without the application of too much force to the shipper. If the lever does not go up onto the cylindrical part of the clutch cone, the clutch will not remain engaged when thrown in by the movement of the shipper.

Be sure to tighten the lock nut on the adjusting screw after making the adjustment.

TOOL POST GRINDER.

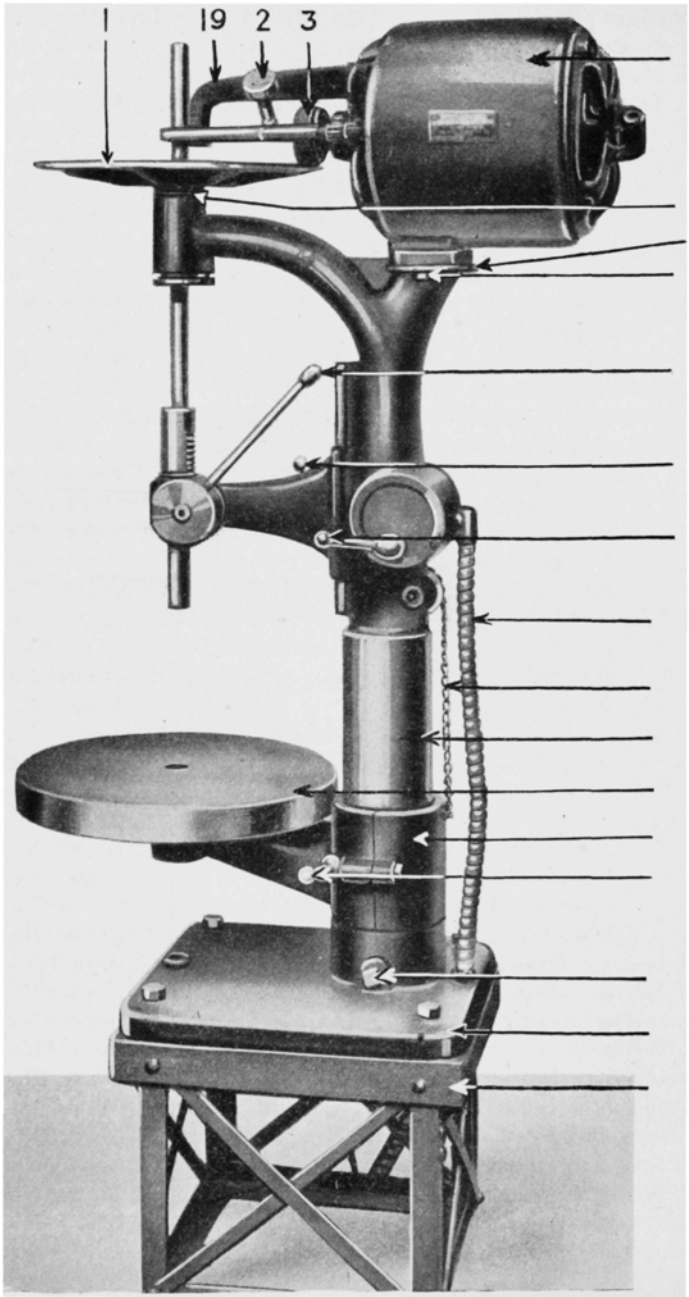
A tool post grinder is supplied and is carried in drawer No. 15. It is operated by a type P, Cincinnati ¼ horsepower motor, operating on 110 volts D.C. It is fitted with two wheels, one 4½ in. in diameter with a ⅜-in. face for exterior grinding and one 1½-in. wheel for internal grinding. These wheels are both Norton Alundum grain 3860 grade N. In the equipment of the tool post grinder there is one extension mandrel, one tooth wrench, one shank, ⅝ x 1 x 4½ in., and a conductor table to plug in for operating the grinder.

LIST OF LATHE EQUIPMENT.

Name of piece.	Location on truck.
Bushing, expansion for taper mandrels	Drawer No. 8
Cutters, side milling, ¼ in	Drawer No. 12
Cutters, side milling, 5/16 in	Drawer No. 12
Cutters, side milling, ⅜ in	Drawer No. 12
Cutters, side milling, 7/16 in	Drawer No. 12
Cutters, side milling, ½ in	Drawer No. 12
Cutters, milling, 45 deg. angle, r.h., ½ x 2½ x ⅞ in	Drawer No. 12
Cutters, milling, 45 deg. angle, l.h., ½ x 2½ x ⅞ in	Drawer No. 12
Cutters, milling, convex, carbon steel, ⅛ in	Drawer No. 12
Cutters, milling, convex, carbon steel, ¼ in	Drawer No. 12
Cutters, milling, convex, carbon steel, ⅜ in	Drawer No. 12
Cutters, milling, convex, carbon steel, ½ in	Drawer No. 12
Cutters, milling, 60 deg. double angle, ½ x 2½ x ⅞ in	Drawer No. 12
Cutters, slitting, 1/32 x 2½ x ⅞ in. hole. P. & W	Drawer No. 12
Cutters, slitting, 3/64 x 2½ x ⅞ in. hole	Drawer No. 12
Cutters, slitting, 1/16 x 2½ x ⅞ in. hole	Drawer No. 12
Cutters, slitting, 3/32 x 2½ x ⅞ in. hole	Drawer No. 12
Cutters, slitting, ⅛ x 2½ x ⅞ in. hole	Drawer No. 12
Cutters, slitting, 5/32 x 2½ x ⅞ in. hole	Drawer No. 12
Cutters, threading, single point, U. S. form thread	Drawer No. 8
Dogs, lathe, clamp, 1¾ in., No. 11	Drawer No. 16
Dogs, lathe, clamp, 2¾ in., No. 13	Drawer No. 16
Gauge, center, No. 390 Starrett	Drawer No. 1
Gauge, micrometer, depth, No. 446-A	Drawer No. 1
Gauge, screw threading tool, 29 deg., No. 715	Drawer No. 1
Gauge, worm thread, No. 720	Drawer No. 1
Gauge, V-thread, screw pitch, No. 436	Drawer No. 1
Gauge, Universal, surface, with 9-in. spindle	Drawer No. 1
Grinder, tool post, type "P"	Drawer No. 15
Holder, boring tool, "Agrippa," No. 80	Drawer No. 8
Holder, cutting off tool	Drawer No. 8
Holder, cutting off tool	Drawer No. 8
Holder, cutting off tool	Drawer No. 8
Holder, side tool	Drawer No. 8
Holder, threading tool	Drawer No. 8
Holder, turning tool, No. OS, ⅜ x ⅞ x 5 in	Drawer No. 8
Holder, turning tool, No. OR, "Agrippa," ⅜ x ⅞ x 5½ in.	Drawer No. 8
Holder, turning tool, No. OL, ⅜ x ⅞ x 5½ in	Drawer No. 8
Indicator test, No. 64, Starrett, Universal	Drawer No. 1
Lathe, No. 20, "Star," 9 in	On body platform
Lathe, 1—Block 2 in. for straight tool post	Drawer No. 16
Lathe, 2—Bolts, steady rest (spare)	Drawer No. 16
Lathe, 1—Bolt, steady rest with blocking	Drawer No. 16

Name of piece.	Location on truck.
Lathe, 4—Centers, point No. 2 Morse	Drawer No. 16
Lathe, 1—Chart, metric gear change	Drawer No. 17
Lathe, 1—Chart, milling and gear cutting attachment	Drawer No. 17
Lathe, 1—Chuck "Draw-in"	Drawer No. 17
Lathe, 1—Clamp, for steady rest	Drawer No. 17
Lathe, 10—Collets No. 2, split, 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 3/8, 7/16, 1/2	Drawer No. 8
Lathe, 1—Dog lathe center	Drawer No. 17
Lathe, 1—Gears, metric transposing	Drawer No. 17
Lathe, 11—Gears, regular set	Drawer No. 17
Lathe, 1—Gear, 45 tooth	Drawer No. 17
Lathe, 1—Gear, 80 tooth	Drawer No. 17
Lathe, 1—Guard, spindle	Drawer No. 16
Lathe, 1—Milling and gear cutting attachment 593 consists of:	
1 Vertical slide column	Drawer No. 17
1 Clamp for vertical slide column	Drawer No. 17
1 Clamp for bar support	Drawer No. 17
1 Crank for vertical column	Drawer No. 17
1 Crank—dividing head	Drawer No. 17
1 Cutter—block with shaft and collar	Drawer No. 17
1 Dividing head	Drawer No. 17
1 Overhanging—bar with tail center	Drawer No. 17
1 Support—overhanging bar	Drawer No. 17
1 Vise—milling	Drawer No. 17
Lathe, 1—Motor G.E., shunt wound, 3/4 H.P., 115 volt D.C., with CR 1000 rheostat	Mounted on lathe
Lathe, 1—Plate, face, 9 in	Drawer No. 16
Lathe, 1—Post, tool, straight, including:	
1 Washer	Drawer No. 16
1 Rocker	Drawer No. 16
1 Screw	Drawer No. 16
1 Wrench	Drawer No. 16
Lathe, 1—Rest, follow	Drawer No. 16
Lathe, 1—Rest, steady	Drawer No. 17
Lathe, 1—Sleeve, lathe center	Drawer No. 16
Lathe, 1—Wrench, tail stock	Drawer No. 16
Mandrels, taper, Nos. 3 to 9 inclusive	Drawer No. 8
Mills, end, spiral, No. 1, Morse taper	Drawer No. 8
Mills, end, spiral, No. 2, Morse taper	Drawer No. 8
Wheel, Norton Alundum, 4½ x 3/8 in	Drawer No. 15
Wheel, Norton Alundum, 1½ x 3/8 in	Drawer No. 15

PLATE No. 22



CHAPTER V.

DRILL PRESS.

GENERAL SPECIFICATIONS.

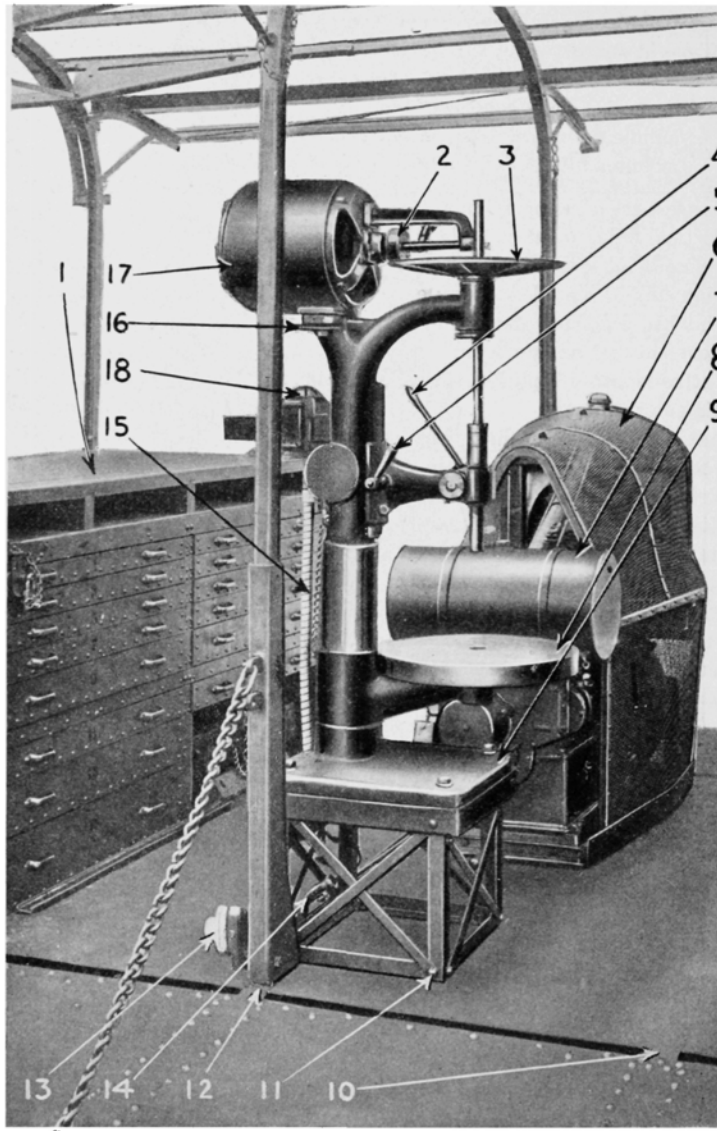
Drills up to ⅝-in. hole in center of	16 in.
Greatest distance from table to spindle	12 in.
Vertical traverse of spindle	3 in.
Vertical adjustment of table	7½ in.
Diameter of spindle in sleeve	15/16 in.
Diameter of spindle above sleeve	⅞ in.
Finished diameter of column	4¼ in.
Movement of sliding head	8 in.
Entire length of spindle	27½ in.
Diameter of table	15½ in.
Maximum height of drill with spindle up	47½ in.
Hole in spindle fits Morse taper	No. 2
Weight of machine	320 lbs.
Minimum speed of drill spindle, approximate	300 r.p.m.
Maximum speed of drill spindle, approximate	850 r.p.m.
Speed of motor, approximate	1400 r.p.m.
Maximum horsepower of motor	½
Floor space	2½ sq. ft.

Wound for 110 volts direct, 60 cycle.

DRILL PRESS.

1	Friction disc.	
2	Friction wheel shifter adjusting screw.	
3	Friction wheel.	
4	Motor.	
5	Friction disc thrust ball bearing.	
6	Motor frame to column screw ½ x 1½ in.	
7	Feed handle.	
8	Sliding head handle.	
9	Starter handle.	
10	Conduit.	
11	Chain for counterweight.	
12	Table.	
13	Table arm clamp screw.	
14	Base set screw.	
15	Base.	
16	Drill press bench.	
17	Column.	
18	Table arm.	
19	Outboard bearing arm.	
20	Tie rod bracket.	
21	Artillery repair truck-body (sides down)	7
22	Artillery repair truck-body (sides up)	8
23	Artillery repair truck-body—left	9
24	Artillery repair truck-body—right	11
25	Drawer No. 6 and contents	11

PLATE No. 23



GENERAL DESCRIPTION.

This tool is designed for light work requiring rapidity and accuracy and will drill holes up to 5/8 in. in diameter. The spindle is made of tool steel, is counterbalanced by a spring and is provided with a ball thrust bearing. The weight and thrust of the friction disc is also carried on a ball bearing. The table is counterbalanced by a weight in the column and can be swung around out of the way when desired. A finished boss is provided on base under spindle for convenience in centering long shafts. There is an index line on column for setting table central at any height. The friction disc drive permits quick adjustment of speed and also keeps the power in proper proportion to the size of the drill, thus avoiding drill breakage.

The motor is of the simplest construction, having steel magnet cores, form-wound field coils, ironclad armature, tool steel shaft, commutator insulated throughout with mica and self-feeding carbon brushes. Complete with V block, cup and point centers, but no chuck.

LIST OF EQUIPMENT.

Name of piece	Location on Truck.
Blocks, drill, with clamp	Drawer No. 12
Chuck, combination screw geared, 606-J Skinner	Drawer No. 17
Chuck, drill, No. 9, capacity 0 to 1/2 in	Drawer No. 12
Countersink, 82°, round shank, 5/8 in. dia., No. 01 1/2	Drawer No. 12
Countersink, 82°, square shank, 5/8 in. dia., No. 5	Drawer No. 12
Countersink, 90° angle, shank, 1/2 in. dia. body, 1 in. dia	Drawer No. 12
Cover, canvas, for drill press.	
Drill press, sensitive, bench type, friction drive.	
Drills, taper shank, 1/2 in. to 1 1/4 in	Drawer No. 3
Drills, straight shank, carbon steel	Drawer No. 4
Drill and countersinks, 1/16 in. drill, 13/64 in. body	Drawer No. 12
Drill and countersink, 3/32 in. and 1/8 in. dia. drill	Drawer No. 12

DRILL PRESS.

1 Maple bench top.
2 Friction wheel.
3 Friction disc.
4 Feed handle.
5 Sliding head handle.
6 Motor generator screen.
7 Motor generator gasolene tank.
8 Table.
9 Base.
10 Drop side hinge.
11 Drill press bench.
12 Drop side hinge.
13 Receptacle.
14 Conduit.
15 Conduit.
16 Tie plate.
17 Motor.
18 Machinists' vise on bench.

Name of piece.	Location on truck.
Drill holder, No. 2 Morse taper	Drawer No. 16
Drill drift, No. 2 Morse, Armstrong Tool Co	Drawer No. 3
Gauge, jobbers' drill, 1/16 to ½ in	Drawer No. 1
Parallels, ⅜ x ¾ x 6 in. and ½ x 1 x 6 in	Drawer No. 1
Sleeves, with No. 1 Morse taper hole and No. 2 Morse Taper outside	Drawer No. 3

SPECIAL NOTE

When traveling, the rods which support the drill press, by locking it to the drop sides, should be in position. These rods extend from a bracket on the motor frame to corresponding eyes on the drop sides. This relieves the standard from the stresses imposed by road shocks and the heavy electric motor mounted at the top of the drill press.

CARE OF DRILL PRESS

Lead wires from motor should pass through hole in top of column down to starting switch. Friction pressure is adjusted by screw on underside of disc bearing. This screw raises the friction disc. Care should be used in making this adjustment so as to avoid too much pressure, which will cause friction wheel to wear out too rapidly. A light pressure is all that is necessary for driving the disc. Do not attempt to drill maximum hole with the friction wheel close to the drill spindle. It should be at the outer edge. Keep surface of disc clean and free from oil.

Be sure starting switch is full on or off. The resistance units in these direct current starters are for starting and stopping duty only. Never use them for controlling the speed of these motors. If so used, they will burn up. In case drill stalls or sticks, turn current off immediately to prevent damage. See that all bearings are judiciously lubricated. Should commutator of motor become rough, smooth with fine sandpaper. Apply a little oil occasionally to keep carbon brush from drying out and wearing excessively.

If motor fails to start with starting switch at "on" position, inspect contact fingers of starting device to see that they are making contact. Diagram of connections on the inside of starting cover.

CHAPTER VI.

BENCH GRINDER.

GENERAL SPECIFICATIONS.

Number of grinding wheels 2
Motor voltage 110
Rated horsepower ..... ½
R.p.m. without load (rated) 3000
Size of wheel in inches ..... 10 x 1
Diameter of spindle at wheel ..... 10 x 1
Distance between wheel centers in inches 16 5/16
Size of base at bottom in inches ..... 9½ x 10¾
Height, bottom of base to center of spindle 8
Weight in pounds 88
Equipment ..... 2 grinding wheels, 10 x 1 in., 2 adjustable steel guards, detachable water pot, in bench, 1 electric operating switch.

GENERAL DESCRIPTION.

The bench grinder is mounted on the bench cabinet at the rear end of the Artillery Repair Truck Body. It consists of a 110-volt electric motor with two grinding wheels; carried at each extremity of the armature shaft. These wheels are 10 in. in diameter and have a 1-in. face. They are the Norton Alundum type of the commercial grade known as grain 46, grade 0.

The armature shaft is mounted on ball bearings which are placed close to the grinding wheels in motor end caps. The bearing housings permit mounting from the exterior of the motor and the bearings are protected against dust and grit by felt protector washers on each side of the bearing housing. Each machine is fitted with a quick acting snap switch inclosed in the base. Access to the switch mechanism can be secured by removing the cover plate.

The spindles upon which the wheels are mounted are of one piece construction, ground to final size. All the wheels are fitted directly on the spindle, and the arbor diameters on which the wheels are mounted are of standard dimensions. The wheels are protected by steel guards which enclose them for three-quarters of their circumference. These guards are so designed that the wheels can be removed independently.

A direct current motor is used, the winding being a compound shunt type. For cleaning the commutator hinged windows are provided. The motor develops ½ horsepower and runs at a speed of 3000 r.p.m. without load. The nominal voltage is 110.

PLATE No. 24



END VIEW OF BENCH GRINDER.

1 Adjustable steel wheel guard.
2 10 x 1 in. Norton alundum grinding wheel (grain 46, grade 0).
3 Tool rest.
4 Snap switch.
5 Bench grinder base.

CARE OF GRINDER.

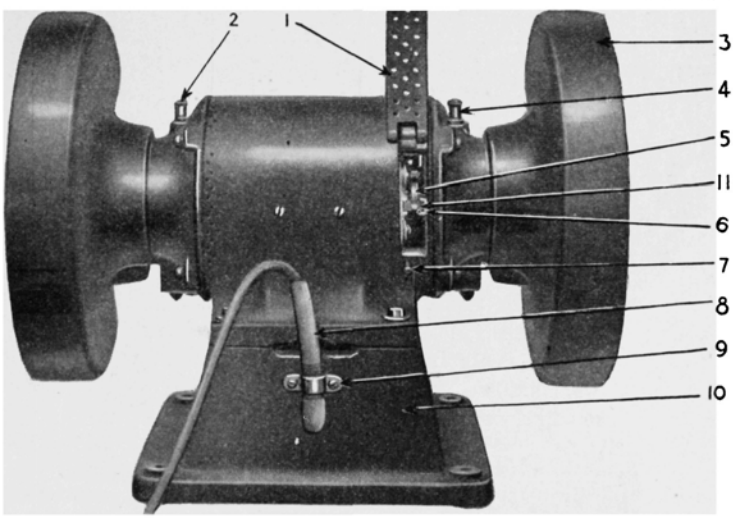
Lubricate bearings once a week. Use chemically neutral oil only to insure the longest possible life to ball bearings. Felt packing in the oil chambers hold all surplus lubricant and prevent any foreign matter from entering the bearings.

Adjustment of bearings is seldom necessary as they are firmly locked on the motor shaft. The stationary right end bearing which is of extra heavy type carries the end thrust of both grinding wheels. Bearing on opposite end is mounted with required end clearance. When assembling, care should be taken to have all parts free from dirt and grit.

Caution.—Felt washers are necessary to keep the bearings clean and should never be omitted. The oiling points are at the spring oilers above each end bearing.

The two spare wheels for the grinding motor are carried in drawer No. 6. The troubles which may occur are those common to any electric motor.

PLATE No. 25



FRONT VIEW OF BENCH GRINDER.

1 Brush holder cover plate, hinged.
2 Spring oiler.
3 Adjustable steel wheel guard.
4 Spring oiler.
5 Brush holder spring.
6 Brush holder.
7 Cover plate lock screw.
8 Cord conduit.
9 Conduit clip.
10 Bench grinder base.
11 Brush.

BALANCING OF EMERY WHEELS.

To get the best results from grinders it is necessary for grinding wheels to be perfectly balanced, if possible. If the wheel is out of balance, it causes vibration of the tool. Being out of balance may be due to several causes, the most common of which is the wheel being out of round or a little thicker in one part than the other. In other words, the sides are not parallel. If the wheel is out of round, true up with ordinary truing wheel or diamond point. If wheel is still out of balance, place on mandrel and then on knife edges, scraping the sides to balance. It occasionally happens that after a wheel is trued and balanced and used for awhile, owing to the difference in the density of the material, it causes a slight vibration again. When this happens, it is necessary to take the wheel off; put on mandrel; place on knife edge and balance again. As it is very important for wheels to be in balance, if the above is followed good results will be obtained.

Very important.—Always examine grinding wheels to see that they are not cracked.

CHAPTER VII.

AIR COMPRESSOR SET.

GENERAL SPECIFICATIONS.

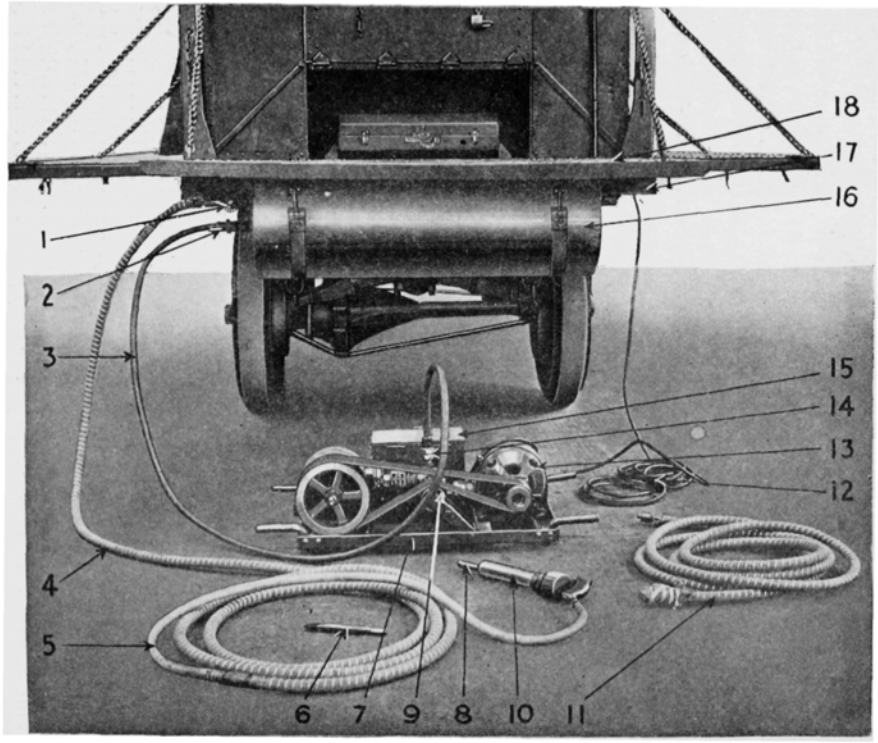
Electric motor	1.5 horsepower
Voltage	115
Amperage	12.4
Nominal speed	1700 r.p.m.
Idler pulley diameter	3 in.
Idler face width	3 in.
Motor pulley diameter	3 in.
Motor pulley face width	3¼ in.
Width of belt	3 in.
Length of belt	67½ in.
Material of belt	Leather
Air compressor capacity	125 lb. per sq. in.
Compressor bore	2½ in.
Compressor stroke	3 in.
Compressor speed, max.	600 r.p.m.
Minimum speed	400 r.p.m.
Method of lubrication	Splash
Compressor flywheel and belt pulley	9 in. diameter
Flywheel face width	3⅜ in.
Compressor shaft diameter	1 in.
Tool box length	12½ in.
Tool box width	6¼ in.
Tool box depth	9½ in.
Air tank diameter	14 in.
Air tank length	48 in.
Air tank capacity	150 lb. per sq. in.
Air compressor location	Beneath lathe frame

GENERAL DESCRIPTION.

An air compressor set mounted as a unit on a frame is carried beneath the lathe frame. The set comprises a General Electric 1½-h.p. motor and a 2½ by 3-in. compressor operated from the electric motor by a belt. The tension on the belt is maintained by a spring tension rod carrying the idler over which the belt travels. The compressed air tank is mounted on the drop end at the rear of the body. On the frame which carries the electric motor and the compressor, there is also mounted a tool box which contains the air rivet sets and other tools for operation with the air set. When operating the air compressor unit it is lifted out from beneath the

REAR VIEW OF
AIR COMPRESSOR OUTFIT.

1 Air tank outlet—globe valve.
2 Air tank inlet—horizontal check valve ¾ in.
3 10 ft. 0 in. length ¾ in. bronze metal hose.
4 25 ft. 0 in. length ½ in. armored rubber hose.
5 6 ft. 0 in. length ½ in. flexible rubber hose.
6 Chipping chisel.
7 Air compressor frame.
8 Buttonhead rivet set.
9 Compressor belt idler.
10 Riveting and chipping air hammer.
11 25 ft. 0 in. length ½ in. armored rubber hose.
12 Electric cord.
13 Air compressor motor, 1½ h.p.
14 Air compressor discharge.
15 Air compressor tool box.
16 Air receiving tank.
17 Air ompressor electric receptacle.
18 Drop end.



SIDE VIEW OF AIR COMPRESSOR OUTFIT.

1 Bronze metal hose, 10 ft. 0 in. x ¾ in. diameter.
2 Armored rubber hose, 5-ply, 25 ft. x ½ in. diameter.
3 3 braid rubber hose, 6 ft. 0 in. x ½ in. diameter (flexible).
4 Armored rubber hose, 5-ply, 25 ft. 0 in. x ½ in. diameter.
5 Pneumatic chipping and riveting hammer.
6 Buttonhead rivet set.
7 Air compressor frame.
8 Electric cord.
9 Air tank outlet hose.
10 Air intake hose.
11 Air receiving tank.
12 Air pressure gage.
13 Air tank safety pop valve.
14 Air compressor electric receptacle.

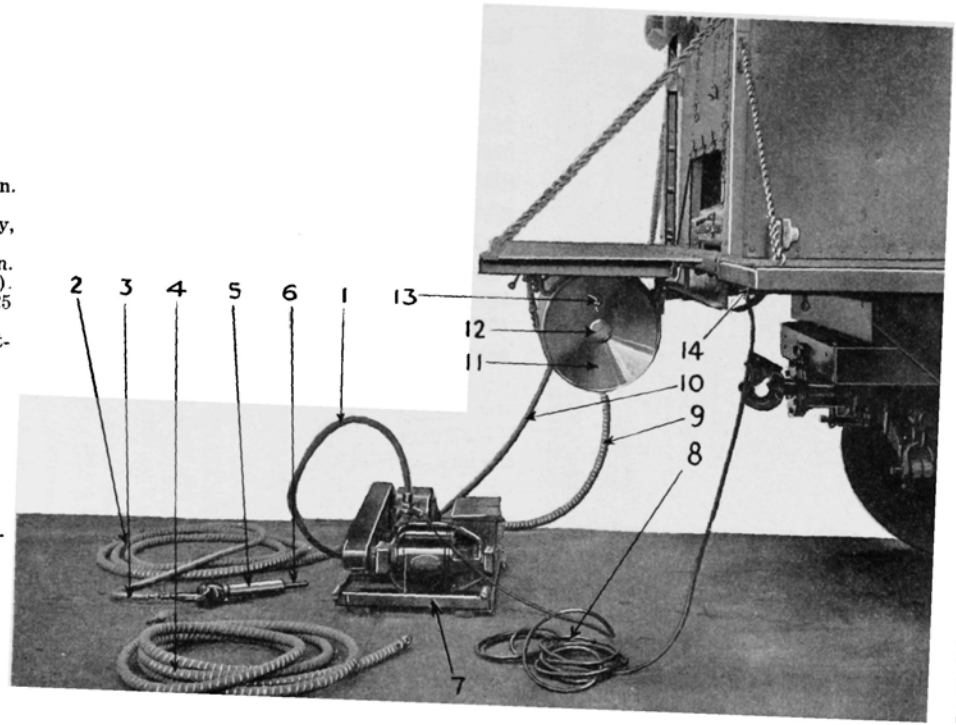
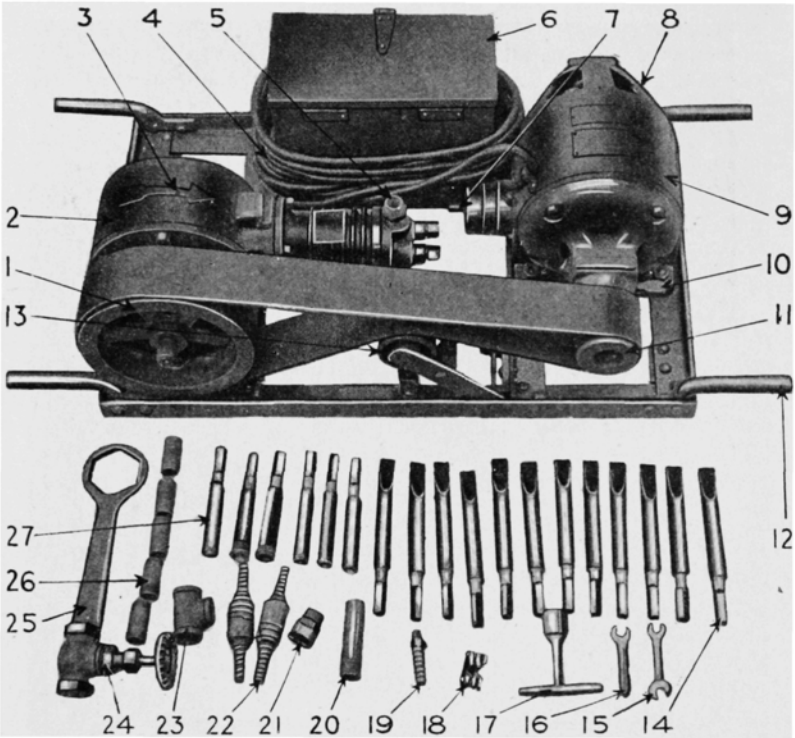


PLATE No. 27

PLATE No. 28



BELT SIDE OF AIR COMPRESSOR WITH TOOLS (CARRIED IN BOX).

1 Air compressor (flywheel) pulley.
2 Air compressor case.
3 Arrow indicating direction of rotation.
4 Electric cord.
5 Air compressor discharge.
6 Tool box, hinged cover.
7 Snap switch.
8 Oil well, hinged cover.
9 Motor, 1½ h.p.
10 Oil well, hinged cover.
11 Motor pulley.
12 Handle.
13 Idler.
14 Set of 12 chipping chisels.
15 Double end wrench (No. 23).
16 Single end wrench (No. 701-A).
17 Socket wrench.
18 Adjustable hose clamp.
19 Hose nipple.
20 ¾ x 4 in. gas pipe nipple.
21 Half coupling for hose, threaded outside, female joint end.
22 Coupling.
23 ¾ in. malleable iron tee.
24 ¾ in. globe valve.
25 Air hammer wrench.
26 ¾ in. x 2 in. gas pipe nipple.
27 Set of 6 buttonhead rivet sets 3/16 in. to ½ in.

lathe frame and placed on the ground behind the truck. The compressor is connected with the air tank by means of the air line provided and the operations with the air set are thus carried on at the rear of the repair truck.

The electric motor is operated by plugging in at the receptacle beneath the rear right end of the chassis frame. The motor is a four-brush type, the brushes being mounted side by side in two brush holders. The motor pulley diameter is 3 in. and the pulley on the compressor flywheel is 9 in., giving the necessary reduction between the motor whose nominal speed is 1700 r.p.m. and the compressor which has a maximum speed of 600 r.p.m.

The air compressor is a single cylinder air-cooled unit with six cast radiating fins or rings on the cylinder. The compressor head is removable, being bolted to the cylinder by four cap screws. The cylinder is bolted to the one-piece cast base by four cap screws and the bearing support of cast iron is bolted to each end of the base casting by six cap screws.

LUBRICATION OF AIR UNITS.

Lubricating oil cups with hinged covers are placed at each end of the electric motor. These should be lubricated in proportion to the frequency with which the compressor is used.

The idler pulley bearing is lubricated by means of a grease cup on the inner end of the idler pulley shaft. This should be filled and kept turned down frequently.

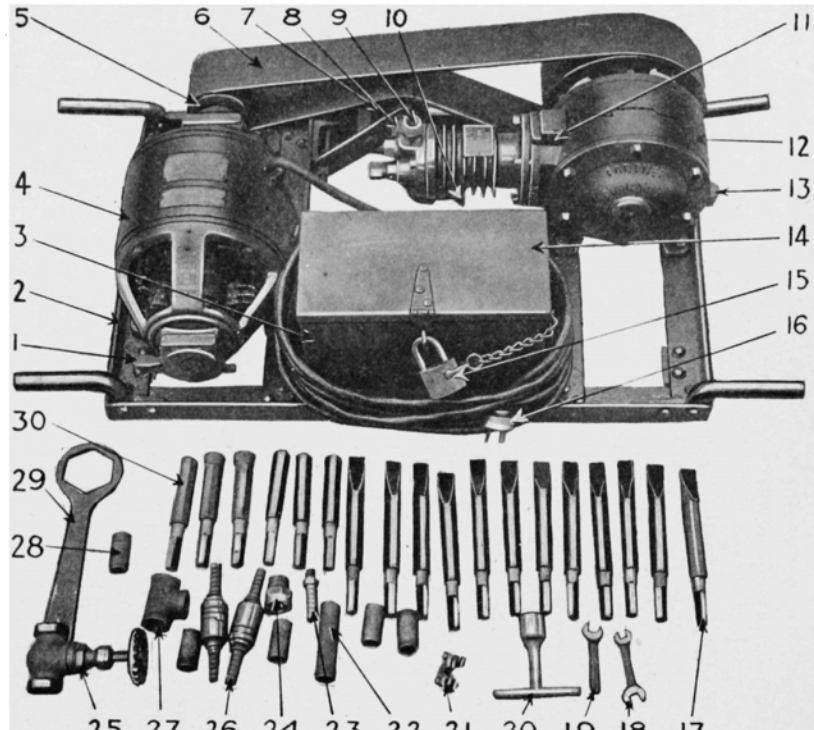
The air compressor is lubricated with light cylinder oil by filling the air compressor crank case to the top of the oil filler hole. This should be done each time before running.

Equipment of Air Set.

Name of piece.	Location on truck.
Hammer, pneumatic, including:	
6 Sets, buttonhead rivet, 3/16 in., 5/16 in., ⅜ in., 7/16 in., ½ in.	Compressor box
12 Chipping chisels, 2 each ¼ in., ⅜ in., ½ in., ⅝ in., ¾ in.	Compressor box
1 Wrench spanner	Compressor box
1 Nipple, ⅜ in. for ½ in. hose	Compressor box
Tank, compressed air 14 in. diameter by 48 in. long	On drop end
This includes:	
1 Clamp, hose, "Cooper adjustable"	Drawer No. 10
1 Cock drain, ⅜ in. brass, No. 305 crane.	
1 Coupling, "Bowes" hose, male half	Compressor box
1 Coupling, "Bowes" hose, female half	Compressor box
2 Coupling, "Bowes" ½ in. hose, female end, outside ¾ in. thread	Compressor box

TOOL BOX SIDE OF AIR COMPRESSOR WITH TOOLS (CARRIED IN BOX)

1 Oil well hinged cover.
2 Air compressor frame.
3 Tool box.
4 Motor, 1½ h.p.
5 Motor pulley.
6 Belt.
7 Belt idler.
8 Belt idler grease cup.
9 Air compressor discharge.
10 Air compressor intake.
11 Air compressor case breather.
12 Air compressor.
13 Oil filler, hinged cover.
14 Tool box, hinged cover.
15 Lock, with chain.
16 Electric cord socket.
17 Set of 12 chipping chisels.
18 Double end wrench (No. 23).
19 Single end wrench (No. 701-A).
20 Socket wrench.
21 Hose clamp, adjustable.
22 ¾ in. x 4 in. gas pipe nipple.
23 Hose nipple.
24 Half coupling for hose, threaded outside, female joint end.
25 ¾ globe valve.
26 Coupling.
27 ¾ in. malleable iron tee.
28 ¾ in. x 2 in. gas pipe nipple.
29 Wrench—for air hammer.
30 Set of 6 buttonhead rivet sets 3/16 in. to ½ in.



1 Gauge, pressure, brass cast with screwed on ring dial, approx. 2¼ in. indestructible face, 200 lb. capacity, arranged for back connection ¼ in. pipe thread.
2 Hose, pneumatic, ½ in., 5 ply, 25 ft. armored "Quarry" "Bowes" coupling each end.....Bench Cabinet
1 Hose, pneumatic, ½ in., 6 ft. Goodrich 3 braid "Mainstay," "Bowes" ½ in. coupling on one end .. ..Bench Cabinet
1 Hose, pneumatic ¾ in., "Penflex" bronz No. 2 metal, 10 ft. long, with ¾ in. Union pipe coupling at each end..... .....Bench Cabinet
4 Nipple, ¾ in. pipe, 2 in. long. . .. . .Compressor box
2 Nipples, ¾ in. pipe, 4 in. long..... . ....Compressor box
1 Tee, ¾ in. malleable iron..... .....Compressor box
2 Valves, ¾ in. globe, No. 12 brass body, Jenkins soft disc for 150-lb. pressure.....Compressor box
1 Valve, ¾ in., Consolidated, safety pop with soft disc, to blow-off at 150 lb. pressure, Fib., No. 1211 Lunkenheimer Co.....Compressor box
1 Valve, ¾ in. check, horizontal brass body, soft disc, 150-lb. pressure.....Compressor box

Note—The air tank is 14 in. diameter x 48 in. long, No. 12 Std. black iron shell, No. 7 Std. black iron ends. Test 150 lbs. per sq. in. with ¾ in. inlet and outlet connections, ¾ in. safety valve connection, ¼ in. gauge connection, ⅜ in. drain cock connection.

CHAPTER VIII.

Welding and Cutting Outfit.

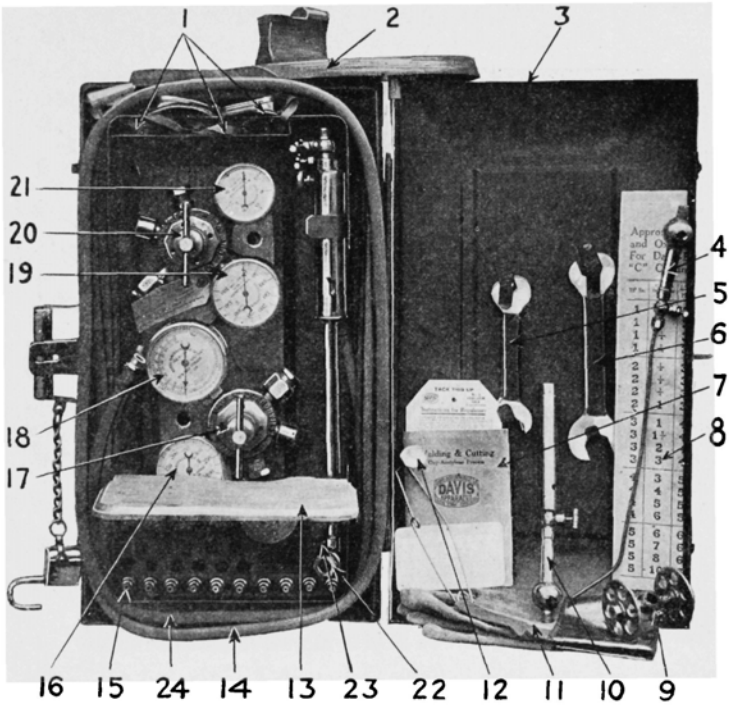
The oxy-acetylene welding and cutting outfit is carried in two cases. One of these, known as the welding tool case, is located in space No. 14, which is at the left front side of the bench cabinet, and the welding supply case which carries the remainder of the equipment is located in the lower rear compartment of the bench cabinet. The welding tool case contains the following:

11 Broaches, special.
1 Burner, Bunsen (acetylene).
1 Pair gloves (canvas).
3 Pair goggles.
1 Hose, 25-ft. standard black.
1 Hose, 25-ft. standard red.
1 Book of instructions.
1 Lighter, spark.
6 Lighter renewals, spark.
1 Regulator gauge, No. 2 acetylene, 30 to 400 lbs.
1 Regulator gauge, No. 2 oxygen, 400 to 3000 lbs.
10 Tips, 2 each, cutting, Nos. 1, 2, 3, 4, 5.
10 Tips, 2 each welding Nos. 6, 7, 8, 9, 10.
5 Tips, 1 each, special welding (for light gauge metal), Nos. 0, 1, 2, 3, 4.
1 Torch cutting, No. 3000, two-hose.
1 Torch, welding, No. 146, Standard.
1 Torch, decarbonizing.
1 Wrench, regulator.
2 Wrench, torch.
1 Wheel, torch guide.

1 Welding supply case containing:

1 lb. flux, Marvel (in can).
1 lb. flux, Peerless aluminum (in can).
2 Pair gloves, canvas.
1 lb. powder, cast iron sealing (in can).
9 lbs. rods, Atlas cast iron welding, ¼ in.
4½ lbs. rods Atlas cast iron welding, 3/16 in.
2½ lbs. rods, aluminum welding, ¼ in.
4 lbs. rods, Gem welding (malleable iron), ¼ in.
5½ lbs. rods, Marvel welding (bronze and brass) ¼ in.
11½ lbs. rods, nickel steel, 3/16 in.

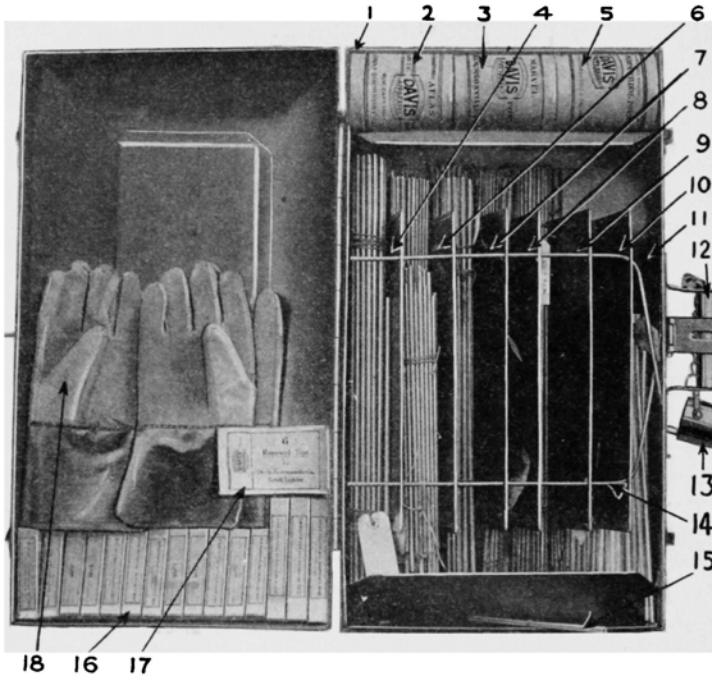
PLATE No. 30



WELDING AND CUTTING TOOL CASE.

1 3 pr. goggles.
2 Wood packing.
3 Steel carrying case.
4 Decarbonizing torch.
5 2 torch wrenches.
6 Regulator wrench.
7 Instruction book.
8 Instruction cards.
9 Torch guide wheel.
10 Bunsen burner—acetylene.
11 Gloves (1 pr.).
12 Spark lighter.
13 Hinged cover (over tips).
14 25 ft. 0 in. red hose.
15 Welding and cutting tips (5 each).
16 Oxygen regulator gauge (400 lbs.).
17 No. 2 oxygen regulator.
18 Oxygen regulator gauge (3000 lbs.).
19 Acetylene regulator gauge (400 lbs.).
20 No. 2 acetylene regulator.
21 Acetylene regulator gauge (30 lbs.).
22 No. 3000 D.B. cutting torch.
23 No. 146 welding torch.
24 25 ft. 0 in. black hose.

PLATE No. 31



WELDING AND CUTTING SUPPLIES.

1 Steel carrying case.
2 Cast iron welding flux.
3 Brass, bronze and malleable iron welding flux.
4 9 lbs. ¼-in. cast iron welding rods.
5 Aluminum welding flux.
6 4½ lbs. 3/16 in. iron welding rods.
11½ lbs. 3/16 in. nickel steel welding rods.
7 4 lbs. ¼ in. malleable iron welding rods.
6½ lbs. ¼ in. wrought iron and steel welding rods.
8 1 lb. ¼ Vanadium steel welding rods for alloy steels.
5½ lbs. ⅛ in. wrought iron and steel welding rods.
9 6½ lbs. 3/16 in. wrought iron and steel welding rods.
10 5½ lbs. ¼ in. brass and bronze welding rods.
11 2½ lbs. ¼ in. aluminum welding rods.
12 Carrying case handle.
13 Lock with chain.
14 Steel retaining rod.
15 Set of tip broaches.
16 Extra tips for welding and cutting torches.
17 Six renewal tips for spark lighter.
18 Canvas gloves (2 pair).

1 lb. rods, vanadium steel, ¼ in.
6½ lbs. rods, wrought iron and steel, 3/16 in.
6½ lbs. rods, wrought iron and steel, ¼ in.
5½ lbs. rods, wrought iron and steel, ⅛ in.

OXY-ACETYLENE WELDING AND CUTTING.

Proficiency in the art of Oxy-Acetylene welding and cutting is difficult to acquire from printed instructions. Personal instruction is very desirable. This can usually be obtained in any given line, in from one to three weeks, according to the ability of the operator and the earnestness with which he applies himself, and can best be obtained by taking a course of instruction from one who is expert in this work. After receiving instructions, and working by himself for a few weeks, it will be found very advantageous for the beginner to take additional instructions for a brief period, as his experience will enable him to comprehend the instructions given much more intelligently than in the first instance.

When personal instruction is not available, a skilled and resourceful mechanic, familiar with metals and metal working, should be selected for the oxy-acetylene operator. Many operators have attained considerable efficiency through their own intelligence, resourcefulness and experience.

SETTING UP THE EQUIPMENT.

Davis-Bournonville welding or cutting units comprise the individual welding or cutting torch, acetylene and oxygen hose of suitable lengths to connect the torch with the regulators, or reducing valves, an acetylene pressure regulator and an oxygen pressure regulator to connect with the source of gas supply, interchangeable tips for the torch for different thicknesses of metal, colored glasses for the operator, necessary wrenches.

These units are used in shop work, with acetylene and oxygen provided generating systems and the gas delivered to the operating stations by pipe line, or as portable outfits with acetylene and oxygen compressed in portable tanks. The portable outfit is supplied with the Artillery Repair Truck, model 1918.

The regulators or reducing valves are connected, for these portable outfits, direct to the portable tanks. The regulators reduce the high storage tank pressure to the lower working pressure, which is adjusted with the regulator to the required pressure for each size of welding or cutting tip. Each regulator has a high pressure gauge which records the supply pressure, and a low pressure gauge for the required working pressure. When acetylene is supplied by a generator and pipe line, only the working pressure gauge is required on the acetylene regulator.

Fine threads are used for the oxygen hose connections to both torch

and regulator, and coarse threads for the acetylene connections, so that the hose will not be interchangeable.

When portable acetylene and oxygen tanks are used, they should be placed so they will not fall over or be banged against each other, avoiding danger of breaking the regulators or tank valves, and in field work it is practical to lay them on the ground.

Oxygen is usually compressed for welding and cutting service at about 1800 lbs. pressure, and care should be taken to open the tank valve slowly so as not to permit the pressure to rush suddenly into the regulator. A little care in this respect will protect the high pressure gauge from damage, and a little carelessness will put it out of commission within a short time. No gauge can be made to withstand the continual sudden impact of 1800 lbs. pressure.

The acetylene in portable tanks is dissolved in acetone under pressure, and the acetylene should not be drawn from the tank at a rate of more than one-seventh the tank capacity per hour, otherwise acetone will be drawn off with the acetylene, which will be detrimental to the weld. Learn the capacity of the acetylene tank used, and of the size of welding tip to be employed, and be governed accordingly. When through with tanks, always close the tank valves when the regulators are removed.

OPERATION OF REGULATORS.

He should learn the correct operation of the regulators, noting carefully the instructions given on the attached tags, so that he can apply the proper gas pressures as shown by the tables included in the torch box.

When both oxygen and acetylene are in readiness for operation, he should properly connect the regulator and torch, seeing that there are no leaks, and that the torch tip is of the proper size to weld the metal with which he begins to experiment, as given in the table.

He must be careful when seating tips in the torchhead, to screw them in until the conical seat fits tightly, otherwise some of the oxygen may pass into the acetylene chamber surrounding the head of the tip and produce an imperfect gas mixture, which would probably result in a defective mold.

The necessity of careful handling of the tips has resulted in their being sealed in cartons immediately after inspection. They should therefore be in perfect condition when opened by the user, and if not should be immediately returned together with the carton in which received.

It is absolutely necessary that the oxy-acetylene flame be accurately adjusted. Too much oxygen will oxidize the metal, and too much acetylene will carbonize it, either excess being fatal to the best work. The strength of the weld will not be injured quite so much by a slight excess of acetylene, as it will be an excess of oxygen, but only the clearly outlined flame is just right.

LIGHTING THE TORCH AND REGULATING THE FLAME.

The following instructions must be strictly adhered to if the best results are desired:

1—See that the oxygen regulator and tank valve connections are free from oil, grease or dirt. Open up the oxygen tank valve slowly so that oxygen will just issue, then close again gently. This is to insure the easy opening of the valve after the regulator is attached, which otherwise might be damaged.

2—Connect the regulator to the tank or service pipe, noting carefully the instructions on tag attached to regulator. See that both regulator adjusting screws are turned back until the spring pressure is no longer felt, and also that both needle valves on the torch are closed.

3—Open the oxygen tank valve *very slowly* and continue to unscrew it until it cannot be unscrewed any further (to prevent leak around spindle). If a new tank is used the tank pressure gauge (large gauge) will record a pressure of about 1,800 lbs. per square inch, varying slightly according to temperature.

4—Open the oxygen needle valve (upper valve) on the torch.

5—Turn in the oxygen regulator adjusting screw. The torch pressure gauge (small gauge) will then indicate working pressure. Adjust this to two pounds above that shown in table (page 96) for the tip being used (the two pounds extra pressure will allow for adjustment for drop caused by lowering of pressure in tank, variations in gauges, or other local causes).

The pressures given in the table, page 96, are correct for the different tips. Each tip is tested to this pressure before being sealed in carton. It is more convenient in operation, however, to have this excess pressure for adjustment instead of resetting oxygen regulator to deliver the correct pressure.

6—Shut off oxygen needle valve on torch.

7—Turn on acetylene needle valve on torch (lower valve).

8—Turn on acetylene at source of supply (pipe line or tank).

9—Turn in the acetylene regulator adjusting screw until the pressure given by the table for the size of tip being used is recorded.

10—Light the gas issuing from the tip. This will give a long, white, smoky flame of comparatively low temperature.

11—Slowly open the oxygen needle valve on the torch. This will gradually reduce the size of flame, the outer end (the envelope) becoming less luminous and the tip end more so until the luminous portion at the tip assumes a clear outline without any ragged edges (the cone).

12—When this is obtained, again turn off the oxygen slightly until a shadowy point shows from the cone. Then with extreme care turn on the oxygen again until this shadowy point just disappears into

the cone. This, with the type of mixing device used in this type of torches, gives the correct flame (temperature 6,300 degrees Fahr.), which, in the torches furnished with this truck, is neither oxidizing nor carbonizing, and in this torch uses as close to the theoretically correct proportion of the two gases as is obtainable.*

13—From time to time test the correctness of the adjustment by the method indicated under 12, so as to be sure that no change has taken place due to change of temperature or to the drop in pressure of the oxygen in the tank (all regulators change slightly due to this). A slight excess of oxygen pressure will not readily show in the flame, and can only be discovered by this test.

The freedom of a flame from being carbonizing and oxidizing is not necessarily indicated by the clear outline of the cone, which merely indicates that all the particles of oxygen and carbon that come together are burnt, but free particles of each may, with some torches, pass through the flame into the molten metal, which is thus injured, and gas wasted, even though the theoretically correct proportions of the two gases are being supplied; this condition is only prevented by the extreme mixing vortex which is produced in this type of mixing device, scientifically adjusted for each size of tip.

With the nearest approach to the theoretical 1 to 1 proportioning of the two gases in the latest type of torch, of greater importance is the perfect mixing of the gases obtained in the tip, without which neither theoretically correct proportions nor low gas consumption is obtainable with efficient results in welding. The size of the mixing chamber is varied in ratio to the volume of the gases required with each size of tip for varying thicknesses of metal, and the proportions are maintained in each size of tip by drilling of ports and conduits in relation to determined pressures.

OPERATION OF TORCH.

In operation, the point of the white cone should be held from 1/16 to ¼ inch from the metal being welded, dependent upon the size of the tip in use, care being taken to hold the torch steadily, as touching the point of the torch to the metal will obstruct the flow of gas and may cause it to backfire and burn within the tip. In such case, turn off the oxygen immediately, and the torch will then relight, the correct flame being again obtained as described at 12.

The table published at the back of this chapter will give the oxygen pressures best adapted for the size of tip in use. It should be carefully studied, and frequently referred to, until the operator becomes familiar with it. This will be helped by noting the relation of the pressures to the tip numbers.

Both the oxygen and the acetylene gases should always be turned off at the service pipe, or acetylene cylinder, and at the oxygen cylinder, when welding is discontinued.

LEARNING TO WELD.

Beginners should commence by welding thin strips of iron or steel one-eighth inch or less in thickness. These light metals can be welded without the addition of welding material. The torch should be given a slow cross motion, with a slight forward movement. This will tend to blend the metal and reduce the liability of overheating. The practice on this light metal should be continued for a day or two, or until the operator becomes instinctively familiar with the apparatus, so that he can devote his whole attention to the flow of the metal. It should be realized that muscular training is necessary in this way until complete control of the torch is obtained.

There is a strong tendency with beginners to experiment with various kinds and thicknesses of metal, but they will become efficient far more quickly by mastering one kind of weld before undertaking another.

BACKFIRING.

Flashbacks, or backfiring in the torch, are of more or less frequent occurrence, dependent on the type of torch used. The basic principles and design of the torch, as a result of long experience and knowledge of the use of acetylene and oxygen for welding and cutting, are such that backfiring, or burning of the gas back in the torch tip, seldom occurs except as it is due to local conditions and usually careless operation. The cause of backfiring is due to insufficient flow of gas from the outlet of the tip. If the flow is sufficient the gas will burn outside the tip. If the pressure of acetylene is insufficient, if the hole in the tip is obstructed by dirt, particles of molten metal, letting the tip rest against the work or drop into the molten metal while welding, or if the tip is excessively overheated, the flame will pass back into the tip. In nearly all cases it is due only to the operator not having sufficient acetylene pressure turned on at the regulator. The remedy is obvious—use the proper pressures recommended by the manufacturer, because each size of tip is drilled for an accurately determined flow of both gases at specified pressures. When a backfire occurs in the tip immediately turn off the oxygen with the torch needle valve (the upper valve) and the gas will relight outside the tip; if not, turn off the acetylene at the regulator, examine the tip, clean if necessary, turn on the proper acetylene pressure, and relight. After a backfire relight immediately to prevent unnecessary cooling of weld before completion of the work.

POINTS TO BE OBSERVED.

Be careful that there are no leaks in any of the connections or in the rubber tubing, and that the torch tip is always free from obstruction.

Always have an ample supply of gases before commencing a job, as it is injurious to stop in the middle of the work.

Always wear tinted glasses, or goggles, supplied with the equipment.

If the flame is accidentally extinguished, the oxygen should be turned off and the acetylene jet turned away from the heated surface of the metal, or cut off, so that the metal will not be injured.

In doing heavy work, if the torch is used continuously for a long time, or held in a confined space, it will become heated. In such case, turn off the gases and dip *only the torch tip* half its length in cold water.

When working inside a boiler or tank, or any small enclosure, two operators should be employed, so that one will be available to quickly turn off the gases in case of accident, such as the bursting of the hose.

In very heavy welding, two operators should always be used, so that one can relieve the other, and the work be continued without interruption until finished. In a great many cases it is disastrous to leave the work even for a few minutes before it is completed.

An excessive discharge of sparks indicates that too much oxygen is being used, and that the metal is being burned or oxidized. In very heavy welding there will, of course, be a considerable volume of sparks, even when the flame is correctly adjusted.

REMOVE THE SCALE.

Care should be taken to remove the scale and clean the surface wherever the metal is to be welded.

Butt welds made with the edges beveled, so as to form a groove of 90 degrees, should be used wherever possible. No welds over ⅛ inch thick in steel and ¼ inch in cast iron, should be made without beveling.

No one but a thoroughly instructed, experienced operator should attempt boiler welding, and then only with the consent of the constituted authorities.

In cleaning the torch tips do not use steel; employ copper wire, or some other soft metal, or use tools supplied for the purpose.

Remember that the welder who does not insist that the thicker metals to be welded be beveled or chamfered to their full depth, that all metal from previous welds be removed before rewelding, and who does not cause the edges of the metals to be thoroughly molten at all times before adding the welding metal, and does not make it a practice of touching the adding metal to the parts to be welded, will always be an inferior operator.

PREHEATING.

EXPANSION AND CONTRACTION.

As practically all metals expand upon heating, and contract upon cooling, the heating of any piece of metal locally must act as a wedge, and tend to tear the metal apart. Local welding may cause fractures either during heating or cooling, or warping.

If possible, preheat every piece to be welded. This will not only save 90 per cent of the normal time required to weld the joint when cold, but will save the gases, which must be conserved, unless a surplus supply is readily obtainable. Preheating will also prevent distortion and cracking.

This, in small articles, may be done with the welding flame, but in large castings is usually accomplished by means of a charcoal or cook fire, or gas or oil torches.

Hard welds are caused almost exclusively by the sudden cooling of the molten metal, resulting from too great a difference between the temperature of the metal at the weld and the adjoining metal. A hard weld must be avoided, as it cannot be finished (because of hardness), it is very brittle, and, as it is caused by unequal cooling, contains a strain. Never place a heated part in contact with any cold material.

A cylinder casting, an aluminum crankcase, or any casting of about similar size, should not be allowed to become cold in less than 10 hours.

When the metal has been preheated, sheets of asbestos paper can be placed over it to protect the operator and prevent heat radiation, of course leaving the portions to be welded exposed to the welding flame.

When the weld is completed, the torch flame should be passed over the weld, and the portion adjacent thereto, until the surrounding metal becomes the same color as the part where the last weld was made, or, better still, additional fuel can be piled on until this uniform condition is obtained. The whole metal should then be covered with asbestos and allowed to cool slowly, drafts of cold air being most carefully avoided. The preheating flame should never be directed against the weld itself, but the heat should be evenly distributed, if possible, so that the article to be welded will be heated uniformly throughout.

All welds of brittle metal should be tested by judicious jarring with a hammer, so that if excessive internal strains are present they will relieve themselves at that time by cracking, instead of the fracture occurring when the part is again in operation.

EXPAND BEFORE WELDING.

It cannot be too strongly impressed upon the operator that it is far better to produce expansion by heat before welding, rather than attempt to care for the contraction afterward.

When welding two pieces of unequal thickness heat the thicker part first, to prevent burning the thin section.

For filling material in heavy work use broken pieces of metal of about the same thickness, rather than welding rod, which will melt too fast.

Where a piece of metal has been broken squarely in two, or a projection has been broken off, preheating may not be necessary, unless in heavy welds it is desired to reduce the time of operation and save the consumption of gases.

Never add metal from the welding stick or wire before the part to be

welded is itself in fusion, and always have the welding stick in contact with the work when adding metal, to prevent the drop of added metal being overheated by the 6,300-degree flame; at the same time, the adding metal should be rubbed into the weld whenever possible.

In heavy welding, the parts to be joined must be brought to a red heat for as great a distance as possible on each side of the joint. It is better to preheat the entire job than to risk loss of the finished weld by shrinkage.

HEAT THE SURROUNDING PARTS SUFFICIENTLY.

In heavy welding, it frequently occurs that the direct application of the flame to the spot to be welded does not cause fusion. The cause is that the metal surrounding this spot is not hot enough, the heat being conducted into the cold metal. The remedy is to play the flame around the refractory spot until the surrounding metal is at a white heat, then apply the flame to the spot itself, and it will quickly fuse.

In welding two pieces of metal together, care must be taken not to heat one side more than the other, for if this is done the hottest piece will expand most, throwing the work out of alignment, possibly causing the weld to crack in cooling, because of uneven contraction. It may also cause adhesion or insufficient fusion on the cool side.

PROPER SIZE OF FLAME.

Do not use too small a tip for the thickness of metal to be welded, because in such case the heat will be radiated almost as fast as produced, and the flame will have to be held at one point so long before the weld can be accomplished, that the metal will be burned. Furthermore, it will take much longer to make the weld, and require a much greater consumption of gases to do the work.

Too large a flame is equally bad, because the operator will not be able to correctly place the mass of molten metal fused. The proper flame will reduce the metal to a molten condition, and of a width about equal to the thickness of the metal welded.

When welding heavy metal be very careful not to blow a part of the molten metal onto a portion of the weld that is not in fusion (called an "adhesion"), as it will make a defective weld at this point. If this should occur, do not fail to pass the flame over this chilled portion until it is again in fusion with the molten metal of the weld.

CAST IRON.

If the piece to be welded is of such form that it will be liable to crack in cooling, it should be preheated, but not sufficiently to warp the metal, no part to be brought to a bright red except at the welding point. Charcoal is a good material to preheat with, as the heat is uniform and not excessive. A blacksmith's forge, in connection with a sheet-iron hood, can

be used to good advantage. Another method of preheating is to build up around the piece with fire brick in such a manner as to cause the heat to be confined and distributed evenly, with an opening left through which an oil or gas flame can be used. A heating oven is also convenient for this purpose. Whether the metal is preheated or not, it should always be covered immediately after the weld is finished, and allowed to cool slowly. Some operators use slaked lime or very dry sand in which to bury the parts until they cool. Where the conditions will permit, it is best to allow parts to cool in the position in which they were preheated. The shredded portion of waste asbestos paper, collected in a metal box, can be used to bury the small parts in. Always use a baffle to distribute heat.

If the metal is more than ¼ inch in thickness the edges should be chipped or ground to a beveled form of 45 degrees on each side. In welding irregular shapes it is desirable to leave three slight points of contact to assist in adjusting and holding the broken parts in their exact original position.

To start the weld, the flame should be passed for some distance around the fracture, gradually reducing the circle until it is concentrated at the point where fusion is required, and then directed on to the fracture until the metal becomes a cherry red. When this occurs, the operator should throw on a little Atlas Scaling Powder, and when the metal begins to run, add cast iron from the Atlas Welding Rod. Powder should only be added when the metal does not flow well, but do not add too much, and finish with as little powder as possible, as an excess will tend to make the weld hard. Beginners will generally find that their cast-iron welds are hard. This will disappear when they become expert in the handling of the flame.

Much ingenuity can be used in overcoming the bad results of expansion and contraction, and in making repairs that might at first have appeared impossible. For instance, in welding the combustion chamber of an automobile cylinder a piece can be cut from the outer shell of the water jacket, the crack repaired, and the piece which was removed welded into place again.

Never attempt to weld pieces that have been previously brazed without cutting away all the brazed metal.

STEEL.

Steel of one-eighth inch and less in thickness may be welded without chamfering the edges of the metal. Thicker metal should be beveled or chamfered, and will always require metal to be added.

In welding steel, remember that the welding material should never be added until the edges of the metal to be welded are fused, or molten, at the place where the weld is being made.

In no case should the flame be held on to the weld until a foam is produced, as such foam is an indication that the metal is being burned.

When adding metal to the weld always hold the added metal so that it touches the metal to be welded. This enables the heat to be radiated from the welding rods to the body of the metal to be welded, whereas if the welding metal is allowed to drop through the flame it probably would be burned to an injurious extent. Do not hold the flame steadily in the center of the weld, but use a slow cross motion with a steady forward movement, always driving the molten metal toward the center of the weld.

In welding a crack in the middle of a heavy steel sheet prepare the crack by chamfering the metal on each side at an angle of 45 degrees right through to the bottom; then, as previously directed, apply the welding torch to the metal beyond the end of the crack until it is expanded enough to open the crack perceptibly, and proceed to make the weld while the metal is in this condition. Usually it will be found that expansion then given has been sufficient to offset the contraction in the weld when cooling.

ALUMINUM

Aluminum to be welded should be well scraped and cleaned, on account of oxidation, and all aluminum solder or paint which may have been previously used must be removed. If the metal is more than ¼ inch in thickness it is advisable to chamfer it.

The oxy-acetylene flame may be softened by using an excess of acetylene to an extent which will be indicated by the extension of the acetylene cone from 1 inch to 1½ inches beyond the white cone. This excess of acetylene does not injure aluminum, but lowers the temperature of the flame, which is desirable in welding aluminum.

A good flame for welding large areas of aluminum is best secured by using compressed air and acetylene. Remove the tip, if necessary to secure the proper size flame. Connect oxygen hose direct to air tank, regulating air supply with torch needle valve.

The proper preheating temperature for aluminum is attained when a piece of half-and-half solder, when rubbed over the surface of the heated metal at a speed of about two inches per second, will melt in small drops, showing a faint bright streak. Cover the piece with asbestos, or by other means, making an opening where the weld is to be made, thus keeping the whole piece hot until the weld is completed. After the weld is finished cover the piece completely to protect it against drafts, and so that it will cool very slowly, to prevent shrinkage cracks.

It will be noticed when the aluminum at the fracture is fused it does not run together, because the melting temperature of the aluminum oxide greatly exceeds that of the aluminum, preventing union of the pure metal. An iron rod, the point of which is flattened, should be used to puddle the aluminum, and this rod should be wiped frequently on a rough brick and cooled in water.

In some cases, temporary molds of plaster of paris or fire clay can be used to advantage in making welds. Temporary molds or backing are best made of a number of layers of asbestos paper secured with silicate of soda. If a large area is covered, reinforce with wire netting or steel wire across back. Pieces broken out and entirely lost can in nearly all cases be fitted in, or built up with little difficulty.

BRASS AND BRONZE.

Adjust the flame with the single cone as for steel welding. Keep the point of the white flame slightly away from the weld, according to the thickness of the piece, so that the heat will not be sufficient to volatilize the zinc or tin which is in the brass. If a white smoke should be created, remove the flame, as this indicates that too much heat is being used. Marvel Flux should be used in both Brass and Bronze welding. In welding these metals it is desirable to use about one size larger tip than for an equal thickness of steel.

Care should be taken not to breathe any fumes given off while welding brass.

COPPER.

To weld copper, use the same kind of flame as for steel, but a much larger tip and flame must be employed for pieces of equal dimensions, because of the great radiating property of copper.

Welded copper has only the strength of cast copper, but it can be rendered more tenacious by hammering.

The radiation of heat from copper can be much lessened by covering the same with asbestos sheets while welding.

COPPER TO STEEL.

To weld copper to steel, first bring the steel to a white heat (the welding point), then put the copper into contact and the two metals will fuse together, making a perfect weld. When the copper commences to flow, withdraw the flame slightly, not to burn the same.

HIGH-SPEED STEEL.

To weld high-speed steel to ordinary machine steel the end of the high-speed steel to be welded must first be heavily coated with soft special iron. This can best be done by preheating the piece uniformly all over as hot as is safe before welding. After being cooled it can then be welded to an ordinary machine steel without burning, but it takes an experienced welder to make a good weld of this kind.

CAST IRON TO STEEL.

To weld cast iron to steel, cast-iron rods must be used as the welding material. The steel must be heated to the melting point first, as cast iron melts at a lower temperature. A very little Atlas Scaling Powder should be used.

MALLEABLE IRON.

Welding malleable iron is difficult for several reasons. If brought to the melting point, and kept there for any length of time the metal becomes spongy. When brought to the melting point it is no longer malleable iron, but is practically cast iron. It is, therefore, undesirable to fuse it. This can be obviated by using Gem Bronze Welding Rod with Marvel Flux in much the same way as brass is welded. If properly done, this will have a strength comparable with the malleable iron.

Frequently, desirable results can be obtained by welding malleable iron with cast-iron welding rod and cast-iron flux. *Caution*—Malleable iron is very easily broken while hot. Do not handle a heavy part by a thin section when hot.

OXYGEN CUTTING.

Steel, wrought iron—or, as it is sometimes called, "old-fashioned iron"—and cast steel are the only materials capable of being cut by this process. *Cast iron cannot be cut.*

The work requires a cutting torch, and cannot be done successfully with the welding torch.

The process consists of heating a spot of the metal to be cut to a red heat and projecting upon it a jet of pure oxygen, which causes the metal to burn away, a stream of oxide running out of the kerf thus produced.

The torch is advanced at a rate dependent upon the thickness and nature of the metal and the pressure and volume of oxygen being used.

The cutting equipment is set up in the same manner as the welding equipment, except that the oxygen regulator is set at the pressure necessary to produce the required cut. This may be taken from the table on page 96.

After lighting the acetylene the oxygen is turned on by means of the by-pass needle valve on the side of the handle, until a correct flame is obtained. It will be necessary to adjust the flame with the cutting trigger valve *open* to get correct results.

Tips for different purposes have from one to five flames; the tip with two heating flames and one cutting jet is used for most classes of work. These are played upon the metal until it is seen to glow all over. The trigger on the underside of the handle is then pulled with the first finger, allowing a stream of oxygen to impinge on the hot spot, which starts the cut, and when it is desired to stop the trigger is pushed in the opposite direction by the back of the second finger.

The torch is traversed along at a uniform rate about the same as that necessary to saw by hand equal thicknesses of hard wood. The torch must be kept moving, or the flow of slag stops, thus stopping the cut.

The principal factor in successful cutting is to properly support the body and torch to as great an extent as possible commensurate with the forward movement of the torch. The position must be an easy one, as

muscles under tension will cause vibrations, and these are fatal to good cutting. This is one condition in which "lounging" is allowable, and an actual benefit.

Oxygen pressure should be kept as low as possible, and the most economical cut is one in which the striations formed on the surface of the cut show a considerable lag. This, however, affects somewhat the smoothness of the cut. Extreme smoothness is more dependent upon a uniform correct traverse in accordance with the size of the tip and presssure being used. Too fast and too slow traverse will both produce a rough cut.

APPROXIMATE ACETYLENE AND OXYGEN PRESSURES

Tip No.	Thickness of Metal Inches	Acetylene Pressure Lbs.	Oxygen Pressure Lbs.	Acetylene Consumption Per Hour	Oxygen Consumption Per Hour
00	{ Very	1	1	0.6 cu. ft.	0.8 cu. ft.
0	{ Light }	1	2	1 "	1.3 "
1	1/32–1/16	1	2	3.21 "	3.65 "
2	1/16–3/32	2	4	4.84 "	5.50 "
3	3/32–1/8	3	6	8.14 "	9.28 "
4	1/8–3/16	4	8	12.50 "	14.27 "
5	1/4–5/16	5	10	17.81 "	21.32 "
6	5/16–3/8	6	12	24.97 "	28.46 "
7	7/16–1/2	6	14	33.24 "	37.90 "
8	1/2–5/8	6	16	41.99 "	47.87 "
9	5/8–3/4	6	18	57.85 "	65.95 "
10	3/4–Up	6	20	82.50 "	94.05 "
11	{ Extra	8	22	88.78 "	101.21 "
12	{ Heavy }	8	24	114.50 "	130.50 "

CUTTING TORCHES WITH STYLE 12 TIPS

Tip No.	Thickness of Metal Inches	Acetylene Pressure Lbs.	Oxygen Pressure Lbs.	Acetylene Consumption Per Hour	Oxygen Consumption Per Hour
1	1/8	3	10	12.22 cu. ft.	42 cu. ft.
1	3/16	3	15	12.22 "	48 "
1	1/4	3	20	12.22 "	55 "
1	5/16	3	20	12.22 "	55 "
2	1/4	3	10	12.22 "	62 "
2	1/2	3	20	12.22 "	84 "
2	3/4	3	30	12.22 "	106 "
2	1	3	35	12.22 "	116 "
3	1	4	30	19.67 "	142 "
3	1½	4	40	19.67 "	172 "
3	2	4	50	19.67 "	202 "
3	3	4	60	19.67 "	232 "
4	3	5	60	30.60 "	316 "
4	4	5	70	30.60 "	356 "
4	5	5	85	30.60 "	416 "
4	6	5	100	30.60 "	476 "
5	6	6	90	30.60 "	600 "
5	7	6	100	30.60 "	668 "
5	8	6	125	30.60 "	838 "
5	10	8	150	30.60 "	1008 "

Hourly Consumption" is the *maximum* with torch burning *continuously* at the pressures given. Maximum hourly consumption is rarely obtained with either welding or cutting torch in practical work. These figures are principally useful in estimating costs of gas on actual welding and cutting time.

CHAPTER IX.

CHEST AND DRAWER EQUIPMENT.

GENERAL DESCRIPTION.

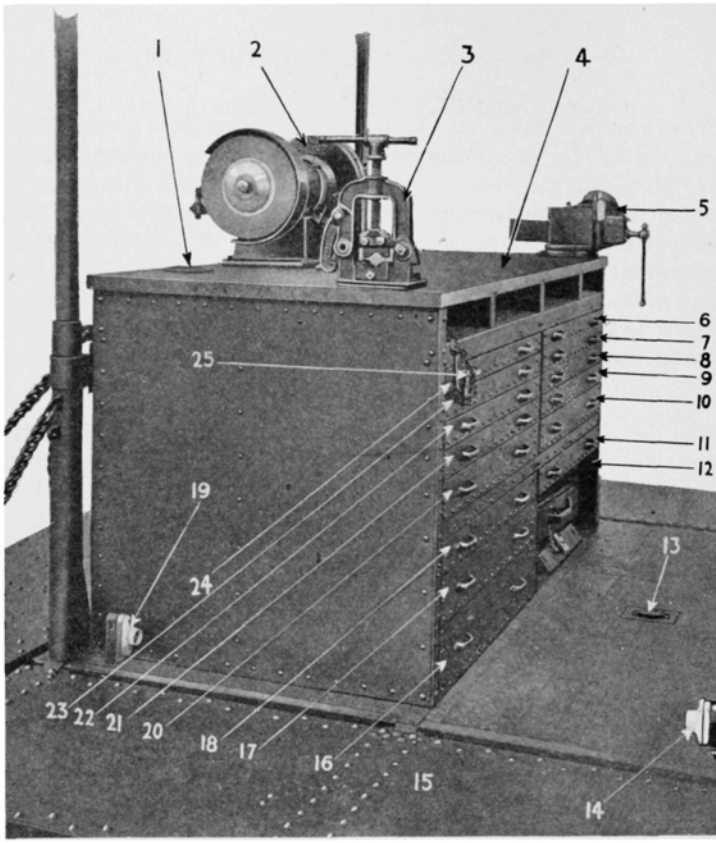
The small tools and parts are carried in drawers and chests distributed about the body. These drawers are systematically arranged and each tool has its assigned place, as will be seen from the following lists. There are fourteen drawers and one space in the bench cabinet at the rear of the body and these are known as drawers 1 to 15. In the lathe frame at the front end of the body there are two drawers numbered 16 and 17. There is a tool box also mounted beneath the floor boards of the body and the bench cabinet has spaces in the rear which are also given definite tools, as will be noted by the lists on page 99.

BENCH CABINET.

The bench cabinet, which is located across the rear end of the Artillery Repair Truck body, is filled up of steel plates and angles. It is provided with a 1½-inch maple wood top supported and held together by five wooden cross pieces, three of which are dove-tailed. The bench grinder 4-inch machinist's vise, a pipe vise, and bench grinder water pot, are supported on this bench top. The rear of the bench cabinet is divided into two parts by a vertical steel plate. The rear compartment is divided into an upper and lower rear compartment by a steel shelf located about half the height. The upper rear compartment is provided with a steel door hinged at the bottom of four hinges and secured in position when closed by two drawer fasteners, one of which is locked by an ordnance lock with chain, and the other by a snap.

The lower compartment of the bench cabinet is closed only by the drop end when same is raised. The front half of the bench cabinet is filled with drawers except at the lower left corner, where a space is provided for the welding and cutting outfit. These drawers are of steel construction and provided with drawer pulls and a locking device. This locking device is operated from drawer No. 1, which when closed automatically locks all others. A single lock with chain on drawer No. 1 provides means of locking the entire cabinet. Each drawer is fitted with wooden packing of suitable size and shape to prevent misplacement or breakage of the parts which are carried therein. Each drawer is provided with a set screw at the upper rear side, preventing the drawer from dropping out when pulled to the front of the cabinet. Drawers can only be removed from the cabinet by first pulling out drawer No. 1, removing set screw from one side and pulling that corner out first. This will provide sufficient space from which to remove the set screws from the other drawers. The contents of the various drawers are listed as follows:

PLATE No. 32



BENCH CABINET.

1 Grinder water pot.
2 Bench grinder with 2 emery wheels.
3 Pipe vise.
4 Bench top, 1½ in. poplar.
5 Machinist's vise, 4 in.
6 Drawer No. 2.
7 Drawer No. 4.
8 Drawer No. 6
9 Drawer No. 8.
10 Drawer No. 10
11 Drawer No. 12
12 Space No. 14 — Oxy-acetylene welding and cutting outfit.
13 Floor box cover handle.
14 Receptacle (light).
15 Drop side.
16 Drawer No. 15
17 Drawer No. 13.
18 Drawer No. 11.
19 Receptacle (light).
20 Drawer No. 9.
21 Drawer No. 7.
22 Drawer No. 5.
23 Drawer No. 3.
24 Drawer No. 1.
25 Lock, with chain.

CONTENTS OF DRAWERS

Contents Drawer No. 1.

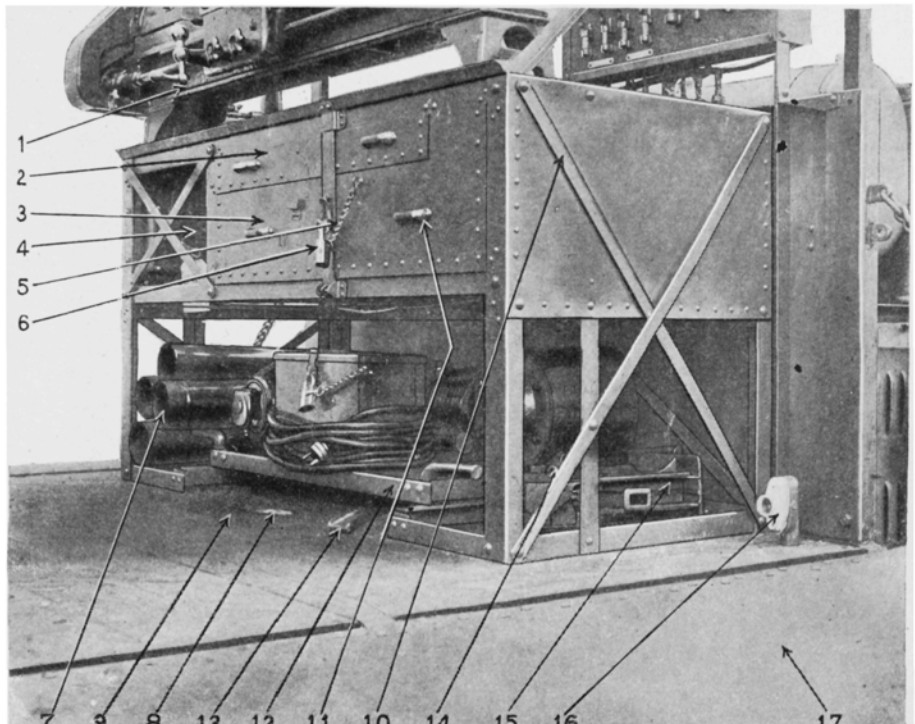
Description.	No. of pieces.
Calipers, hermaphrodite, 6 in	1
Calipers, inside spring, 5 in	1
Calipers, inside spring, 6 in	1
Calipers, lock joint transfer, *inside,* 10 in	1
Calipers, lock joist transfer, 10 in., *outside*	1
Calipers, outside spring, 3 in	1
Calipers, outside spring 6 in	1
Calipers, pocket slide rule, English, 3 in	1
Dividers, spring, 3 in	1
Dividers, spring, 6 in	1
Gauge, center	1
Gauge, jobber's drill	1
Gauge, micrometer depth	1
Gauge, screw pitch, V thread	1
Gauge, screw thread tool, 29 deg. with tool setting gauge	1
Gauge, screw worm thread tool, with tool-setting gauge	1
Gauge, thickness, 9 blades	1
Indicator, Universal test	1
Attachment for test indicator.	
Parallels, ¾ x ⅜ x 6 in	2
Parallels, 1 x ½ x 6 in	2
Pliers, curve needle, 5½ in	1
Pliers, round nose, 5½ in	1
Puhen machine center	3
Rule, flexible steel, No. 264, 6 in	1
Rule, tempered steel, No. 211, 3 in	1
Rule, tempered steel, No. 213, 6 in	1
Scriber, improved adjustable sleeve	1
Square, combination set, 12 in	1
Square, patent double, 2-4 in. blades	1
Square, solid steel, 5 in	1
Square, solid steel, 6 in	1
45 Deg. blade for patent double square	1

Contents Drawer No. 2.

Trammels	1
Calipers, inside micrometer set "B" in case	1

LATHE FRAME.

1 Lathe, 9 in.
2 Drawer No. 16.
3 Drawer No. 17.
4 Lathe motor starting box.
5 Chain, for lock.
6 Lock.
7 Stove pipe (4 joints).
8 Front false floor handle.
9 Front false floor.
10 Lathe frame cross brace.
11 Drawer handle.
12 Air compressor.
13 Jack handle.
14 Air compressor clamping bolt.
15 Jack.
16 Receptacle.
17 Drop side.



Description.	No. of pieces.
Calipers, outside micrometer, set in case	1
Calipers, outside micrometer, metris in case	1
Die stock set, small	1
Rules, metric folding	4
Scales, steel metric, 150 mm	4
Scales, steel metric, 300 mm	4

Contents Drawer No. 3.

Drift, Drill, No. 2	1
Drills, Twist, 37 in set, ½ to 1¼ in	1
Sleeve, Collet, for drills	2

Contents Drawer No. 4.

Drills, Twist:

14 sizes, 1/16 to 17/64 in. by 64ths ..... 6 sets
7 sizes, 9/32 to ⅜ in. by 64ths ..... 5 sets
8 sizes, 25/64 to ½ in. by 64ths ..... 2 sets

Reamers, hand, 25 sizes, ¼ to 1 in., by 32nds ..... 1 set
Reamers, taper pin, 6 sizes, Nos. 0 to 5 ..... 1 set
Taps, hand, 7 sizes, ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾ ..... 1 set

Note: Each tap size contains 3 taps:
1 Starting tap.
1 Taper tap.
1 Bottom tap.

Taps, pipe, Briggs Standard, 6 sizes, ⅛ to 1 in ..... 1 set

Wrench, adjustable tap, 7 in	1
Wrench, adjustable tap, 11 in	1
Wrench, adjustable tap, 15 in	1
Wrench, adjustable tap, 20 in	1

Contents Drawer No. 5.

Plates, automobile screw, No. 1462	1

Detail as follows:
1 Stock complete.
1 Stock key.
11 Taps.
11 Dies.

Contents Drawer No. 6.

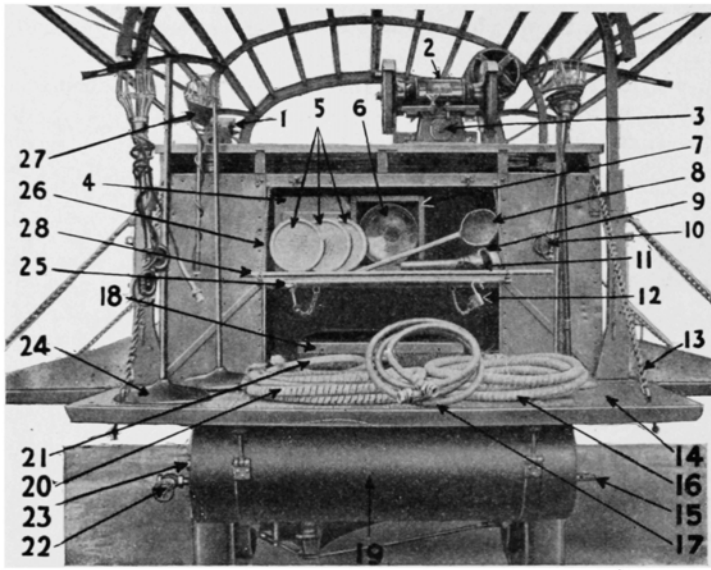
Wheels, emery, for bench grinder, 10 x 1 x ⅞ in. hole	2

Contents Drawer No. 7.

American Machinist Hand Book (in cover)	1
Automobile Repairing Made Easy (in cover)	1
Automobile Questions and Answers (in cover)	1

Miscellaneous washers, bolts and rivets.

PLATE No. 34



REAR VIEW OF BENCH CABINET AND CONTENTS.

1 4 in. machinist's vise.
2 Bench grinder with two emery wheels.
3 Bench grinder snap switch.
4 Funnel container box, hinged lid.
5 Funnel filtering rings.
6 Filtering funnel (No. 2 Schuyler).
7 Funnel container box.
8 Melting ladle.
9 Pneumatic chipping and riveting hammer.
10 Adjustable floor lamp.
11 Floor lamp, adjustable clamp.
12 Lock, with chain.
13 Drop end chain.
14 Drop end.
15 Air tank safety pop valve.
16 Armored hose, ½ in., 25 ft. 0 in. long, 5-ply.
17 Metal hose, ¾ x 10 ft. 0 in. long.
18 Welding and cutting supplies case.
19 Air receiving tank.
20 Armored hose, ½ x 25 ft. 0 in. long, 5-ply.
21 Pneumatic hose, ½ x 6 ft. 0 in. (air hammer).
22 Globe valve ¾ in. (outlet).
23 Inlet connection ¾ in.
24 Adjustable floor lamp base.
25 Bench cabinet door.
26 Bench cabinet door chain.
27 Adjustable floor lamp cord.
28 Adjustable floor lamp conduit.

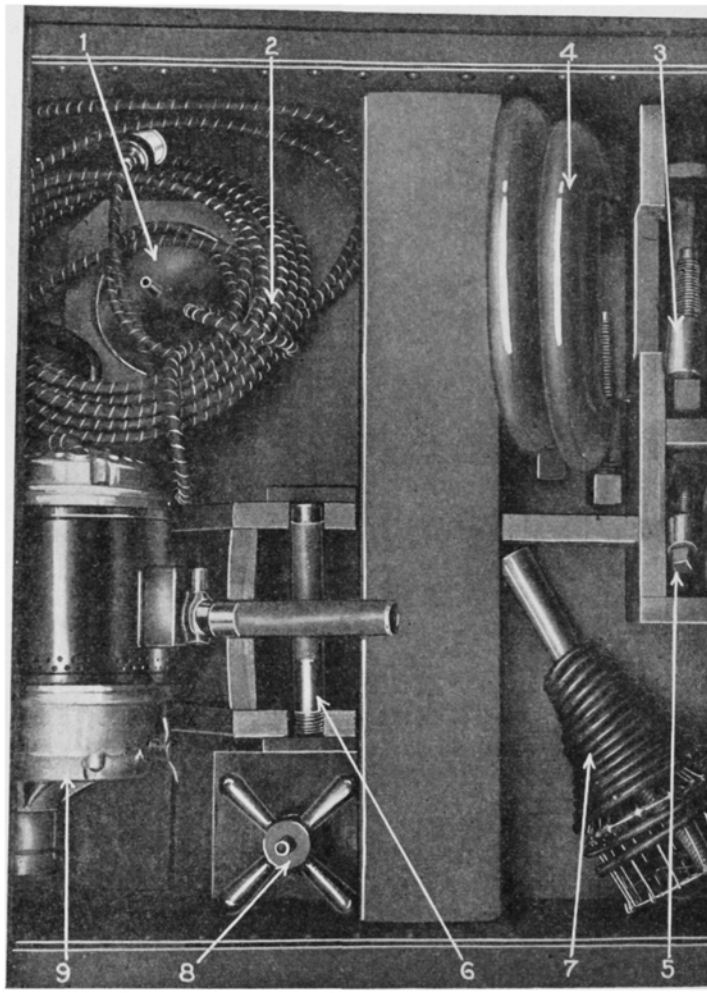
Contents Drawer No. 8.

Description.	No. of pieces.
Boring tool, "Agrippa," with 1 45-deg., 11 30-deg. cutter	1
Bushing, expansion, 23 in set	1 set
Collets, sleeve, for draw-in chuck, 10 in set (1 carried in chuck carried in drawer No. 17)	9
Cutters, threading tool, 13 in set	1 set
End mills, spiral, 8 sizes, right hand	1 set
End mills, spiral, 8 sizes, left hand	1 set
Holder, tool, No. O-L, with 1 cutter	1
Holder, tool, No. O-R, with 1 cutter	1
Holder, tool, No. O.-S., with 1 cutter and wrench	1
Holder, tool, No. 2OR, with 1 cutter and 1 wrench	1
Holder, tool, No. 3OL, with 1 cutter and 1 wrench	1
Holder, tool, No. 3OL, with 1 cutter and 1 wrench	1
Holder, tool, No. 3OR, with 1 cutter and 1 wrench	1
Holder, tool, No. 5OR, with 1 cutter and 1 wrench	1
Holder, tool, No. 5O, with 1 V-thread cutter	1
Mandrels, taper, 7 in set	1 set
Wrench for tool holder, No. 5O	1 set
2 Wrenches for boring tool "Agrippa"	1
Wrench for tool holders (O-L) (O-R) and (O-S)	1 each
1 Extra cutter for O-L holder.	
1 Extra cutter for O-R holder.	
1 Extra cutter for O-S holder.	

Contents Drawer No. 9.

Files:	
Half round 2nd cut, 6, 8, 10 and 12 in	1 each
Mill, 8, 10, 12 in. bastard, single cut	2 each
Mill, smooth, single cut, 6 in	4
Mill Smooth, single cut, 8 to 12 in	1 each
Mill, smooth, single cut, 10 in	2
Square, bastard, 12 in	2
Square, bastard, 14 in	1
Flat, bastard, 10 in	2
Flat, bastard, 12 in	3
Flat, bastard, 14 in	1
Flat, second cut, 10 in	2
Flat, second cut, 12 in	3
Half-round, bastard, 10, 12 in	1 each
Square, second cut, 6, 8, 10, 12 in	1 each
Taper, saw, single cut, 4 in	4
Taper, saw, single cut, 6 in	2
Hand saw, taper, 8 in., single cut	2

PLATE No. 35



FLOOR BOX AND CONTENTS.

1 Funnel.
2 Electric drill cord—30 ft. long.
3 Clamp, 4½ in. Vulcan.
4 Clamp, 6½ in. Vulcan.
5 Clamp, 2¼ in. Vulcan.
6 Drill handle.
7 Trouble lamp (with 20 ft. cord).
8 Drill screw feed.
9 Portable electric drill.

Files (*Continued*)

Description.	No. of pieces.
Round, bastard, 12 in.	2
Round, second cut, 6, 8, 10, 12 in.	1 each
3 Square, slim, 6 in.	2

Contents Drawer No. 10.

Chisel, cold, ¼ in., Octagon steel	2
Chisel, cold, ⅜ in., Octagon steel	2
Chisel, cold, 6 in. long	2
Chisel, cold, 8 in. long	2
Clippers, bolt, size O	1
Copper, soldering, 1½ in.	1
Copper, soldering, ¾ in.	1
Dresser, emery wheel	1
Hack saw frame, adjustable	1
Hack saw blades, 10 in., No. 310	12
Hack saw blades, 10 in., No. 320	12
Hammer, claw, ball face, size No. 11	1
Hammer, machinist's ball peen, No. 00	1
Hammer, sounding, 2 lb.	1
Screw driver, 4 in.	1
Screw driver, 6 in.	2
Screw driver, 8 in.	1
Snips, tinners, 10 in.	1
Wrench, 6 in., adjustable	1
Wrench, 6, 22½ in., degree angle	1
Wrench, 8, 22½ in., degree angle	1
Wrench, double end automobile, No. 5A	1 set of 55
Wrench, screw, 10 in., solid bar, Trimo	1
Wrench, screw, 12 in., solid bar, Trimo	1
Wrench, Trimo pipe, 14 in.	1

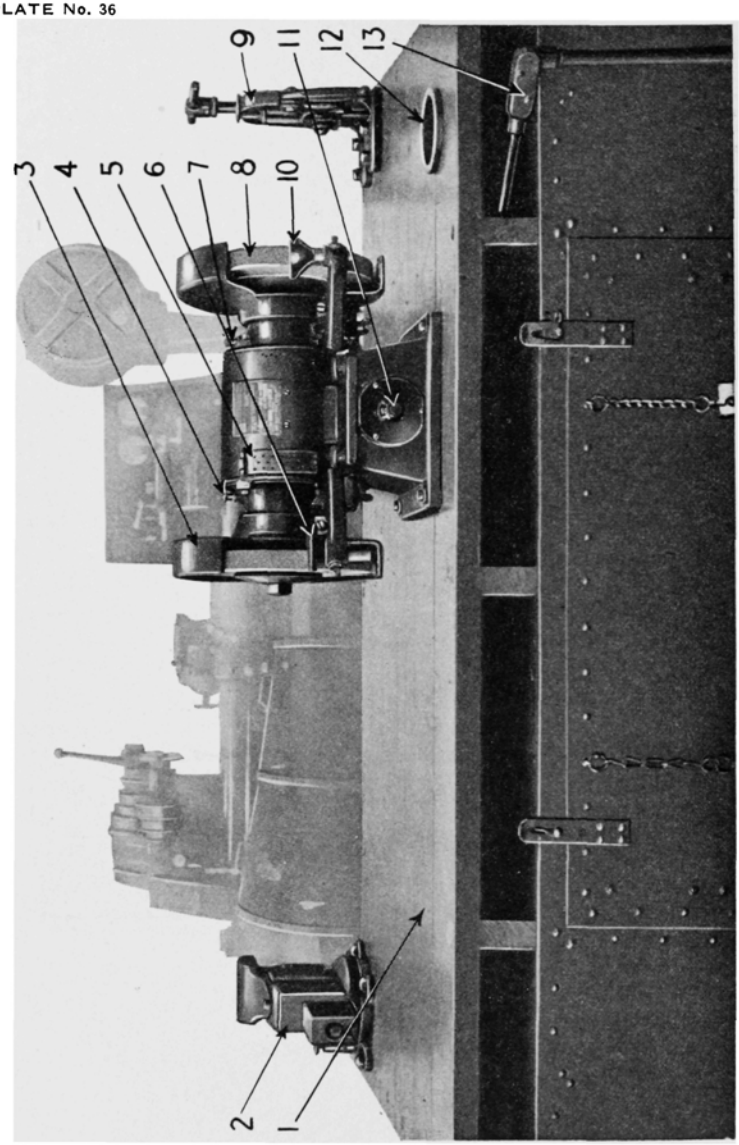
Contents Drawer No. 11.

20-50 Watt carbon lamps.
4 Carbon brushes for drill press.
2 Tappet wrenches.
1 Wrench, spark gap and magneto.

Spare parts for gas-elect. con. unit:

4 Pairs connecting rod bearings.
8 Armature brushes for generator.
4 Spark plugs.
2 Cylinder head gaskets.
1 Valve tappet.
2 Valves.
4 Piston rings, ⅛ in.
2 Piston rings, 3/16 in.

PLATE No. 36



Contents Drawer No. 12.

Description.	No. of pieces.
Ammeter, "Eveready" 0 to 55 ampere	1
Batteries for "Eveready" Flashlight	2 extra
Blocks, drill, with clamp	1
Bulb, lamp, for flashlight	1 extra
Chuck, drill, No. 9, with key and taper shank	2
Clamp, tool makers, 1¾ in	2
Clamp, tool makers, 3½ in	2
Countersink, 82 deg., ⅝ in. diam., round shank	1
Countersink, 82 deg., square shank, ⅝ in. diam	1
Countersink, 90 deg., 1 in. diam	1
Cutter, milling, 45 deg. angle, right hand	1
Cutter, milling, 45 deg. angle, left hand	1
Cutter, circular glass	1
Cutters, convex milling, ⅛, ¼, ⅜, ½	1 set
Cutters, double angle, 60 deg	1
Cutters, metal slitting, 1/32, 3/64, 1/16, 3/32, ⅛, 5/32	1 set
Cutters, side milling, ¼, 5/16, ⅜, 7/16, ½	1 set
Drill and countersink, ⅛ in. diam., 3/32, No. 26	2
Drill and countersink, 1/16, 13/64, No. 22	1
Flashlight, "Eveready," with battery and bulb	1 complete
Fuses, inclosed, 5 amp., 250 volts	20
Fuses, union cartridges, 10 amp., 250 volts	20
Fuses, union cartridges, 20 amp., 250 volts	40
Fuses, union cartridges, 50 amp., 250 volts	20
Gauge, Universal surface, 9 in. spindle	1
Large drill block "V."	
Drill cup.	
Voltmeter, "Eveready," for battery	1

Contents Drawer No. 13.

Grinder, valve, automobile	1
Lamp shades	3
Wrenches, socket, set	1 set

BENCH CHEST TOP.

1 Maple bench top.
2 4 in. bench vise.
3 Emery wheel guard.
4 Spring oiler—grinder.
5 Armature brush cover—grinder.
6 Tool rest—grinder.
7 Spring oiler—grinder.
8 Emery wheel—grinder.
9 Pipe vise.
10 Tool rest—grinder.
11 Grinder snap switch.
12 Grinder water pot.
13 Condulet—to grinder.

Description.	No. of pieces.
Compound for valve grinder	2

Contents Drawer No. 14.

Suit case containing oxy-acetylene welding and cutting outfit	1

Contents Drawer No. 15.

Drill, hand and breast	1
Pipe tools, set (except vise)	1

Details for the pipe tools, set (except vise), as follows:

1 Stock complete.
5 Dies, ¼ to 1 in.
5 Bushings, ¼ to 1 in.
1 14-in. pipe wrench.
1 Pipe cutter.
1 Oilcan.
1 lb. pipe cement.

Torch, gasoline, double jet, No. 92	1
Tool post grinder and equipment, with 1 4½ in emery wheel	1
Extra emery wheel, 4½ in. diameter	1
Extra emery wheel, 1½ in. diameter	1

Emery wheel details for tool post grinder and equipment with 1 4½ in. emery wheel, as follows:

1 1½ in. emery wheel on extension mandrel.
1 Tooth rest.

Contents Drawer No. 16.

1 Center oiling knob.
1 Drill press center
4 Lathe Centers.
1 Center sleeve.

Straight tool post with rocker, washer, screw and wrench	1
Follow rest lathe	1
9-in. face plate lathe	1
Bolts, spare	3

Details:

1 1½ in. x 7¾ in. bolt, square head
4 5/16 x 1¼ in. tap bolts, square head
1 ⅜ x 2 in. tap bolts, square head.
1 ⅜ x 4¼ in. bolt, square head.
2 5/16 washers.

2 in. block for straight tool post, 2 pieces	1
Drill holder	1
Dog, clamp lathe, 1¾ in	1
Dog, clamp lathe, 2¾ in	1
Wrench, tail stock	1

Contents Drawer No. 17.

Description.	No. of pieces
Bar, overhanging and tail center (M&G)	1
Gear, change	2
Chuck, combination with wrench	1
Chuck, draw-in with one sleeve collet	1
Clamp for vertical slide column (M&G)	1
Clamp for steady rest, including 1 bolt, nut and washer. Bolt size ⅜ x 2¼	1
Crank, dividing head (M&G)	1
Shaft, cutter block and Universal driving (M&G)	1
Dog, lathe center (M&G)	1
Head, dividing (M&G)	1
Rest, steady	1
Support, overhanging bar (M&G)	1
Vise, milling (M&G)	1
Rule, Standard, steel 36 in. long, No. 205	1
Milling and gear cutting index card.	
1 Jacobs No. 2 drill chuck for drill press.	
1 Morse taper shank for above.	
1 Steady rest swing block.	
Spindle guard—knurled nut.	
Metric transposing gears (3 pieces)	1 set of 3
Metric transposing gear index plate, brass	1 set of 3

Machine and Tools Carried on Repair Truck.

Drill press	1
Generating unit, gasoline, electric	1
Switchboard	1
Lathe	1
Motor for lathe with rheostat	1
Bench grinder with two emery wheels and 1 water pot	1
Vise, machinists, No. 19	1
Vise, machinists, No. 19½	1
Vise, pipe	1
Canvas cover for truck	1
Canvas cover 12 x 12	1
Canvas cover for lathe and switchboard	1
Canvas cover for generating outfit	1
Canvas cover for drill press	1
Canvas cover for bench grinder	1
Stove, Sibley, with 4 joints pipe, 1 elbow and 1 pipe tent shield (No. 222)	1

Description.	No. of pieces.
Air compressor outfit with 3 wrenches: 1 single end, 1 double end, 1 socket wrench } in tool box	
Air receiver tank, 14 in. diameter, 48 in. long	1
Oxygen tank, filled	1
Acetylene tank, filled	1
Canvas cover for searchlight.	

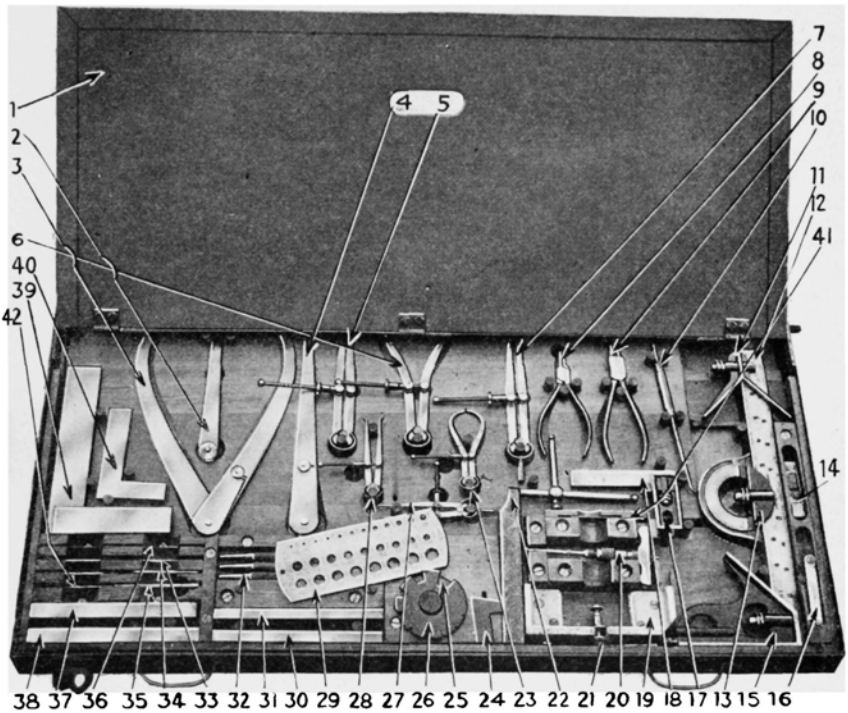
Contents—Bench Cabinet Rear Compartments.

Suit case containing supply parts and material for welding and cutting outfit	1
Adjustable floor lamps	3
Box containling 1 No. 2 Schuyler filling funnel, 3 filtering rings.	
Ladle, melting, 1-pint capacity	1
Armored hose, ½ inch, 25 ft. length	2
Pneumatic hose, ½ inch, 6 ft. length	1
Metal hose, bronze ¾ inch, 10 ft. length	1

Tools Carried in Floor Box.

Clamp C, 2¼ in. Vulcan	2
Clamp C, 4½ in. Vulcan	2
Clamp C, 6½ in. Vulcan	2
Drill, portable electric	1
Trouble lamp, 20 feet cord	1
Special funnel Pc. mark 462—Dwg., 15-5-46.	

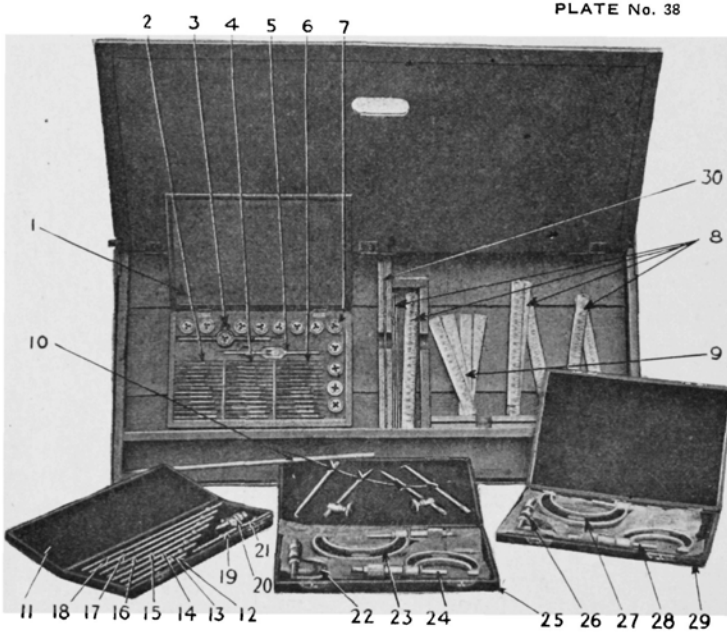
PLATE No. 37



DRAWER NO. 1 AND CONTENTS.

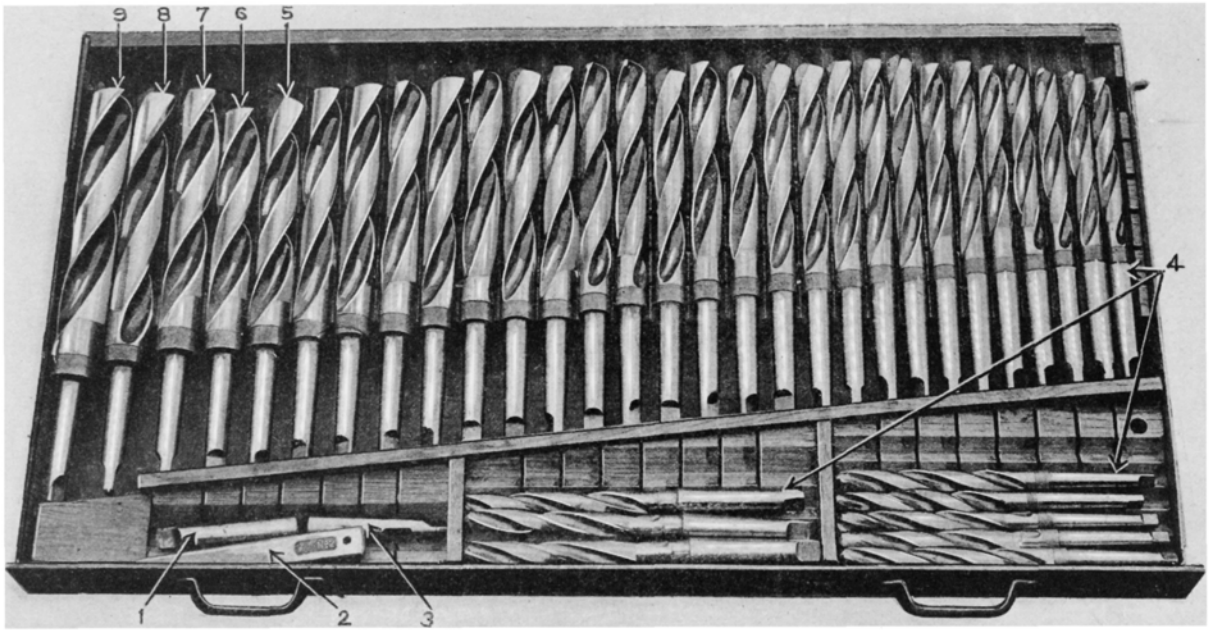
1 Steel cover, hinged.
2 Calipers, hermaphrodite, 6 in.
3 Calipers, outside, 10 in., lock joint.
4 Calipers, inside, 10 in., lock joint.
5 Calipers, inside, spring, 6 in.
6 Calipers, outside, spring, 6 in.
7 Dividers, spring, 6 in.
8 Pliers, round nose, 5½ in.
9 Pliers, curved needle, 5½ in.
10 Adjustable sleeve scriber.
11 Center head.
12 Scale, steel, 12 in.
13 Bevel protractor head.
14 Thread gauge.
15 Stock head.
16 Thickness gauge.
17 Head patent double square.
18 Scale 4 in. patent double square.
19 Universal test indicator bracket.
20 Micrometer depth gauge.
21 Universal test indicator.
22 Attachment for Universal test indicator.
23 Calipers, outside, spring, 3 in.
24 Screw gauge.
25 Gauge.
26 Gauge.
27 Dividers, spring, 3 in.
28 Calipers, inside spring, 3 in.
29 Jobbers' drill gauge.
30 Parallel, ¾ in. x ⅜ in. x 6 in.
31 Parallel, ¾ in. x ⅜ in. x 6 in.
32 Center punch.
33 Tempered steel rule, 6 in.
34 45 deg. blade for patent double square.
35 Tempered steel rule, 3 in.
36 Flexible steel rule, 6 in.
37 Parallel, 1 in. x ½ in. x 6 in.
38 Parallel, 1 in. x ½ in. x 6 in.
39 Try square, 6 in.
40 Try square, 3 in.
41 Wrench for micrometer depth gauge.
42 Center gauge.

PLATE No. 38



DRAWER NO. 2 AND CONTENTS.

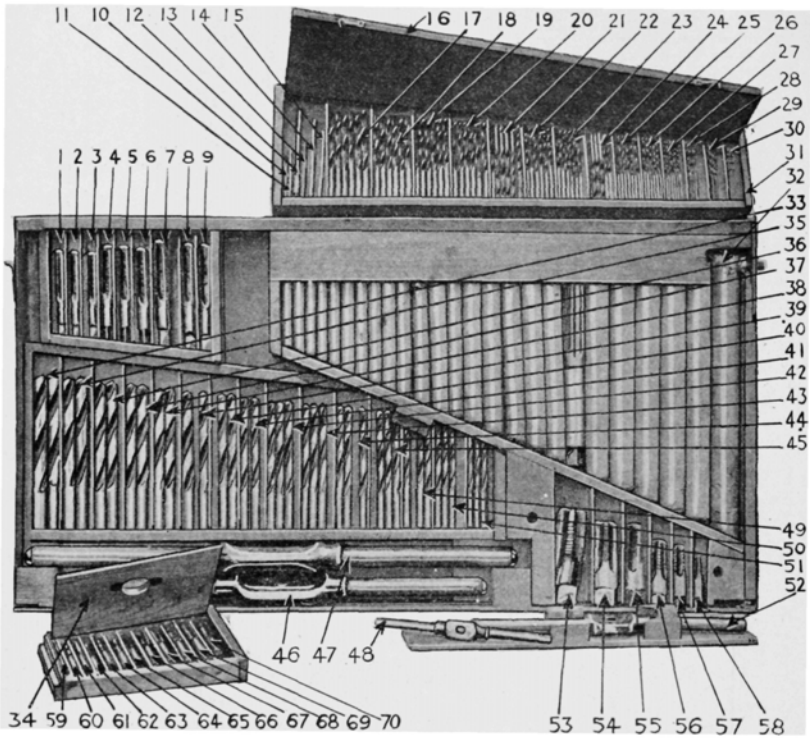
1 Dies stock, hinge cover.
2 Taper taps No. 0-48 to No. 12-28 (13 in set).
3 Die stock.
4 Plugtaps No. 0-48 to No. 12-28 (13 in set).
5 Tap wrench.
6 Bottom taps No. 0-48 to No. 12-28 (13 in set).
7 Dies, U. S. thread, No. 0-48 to No. 12-28 (13 in set).
8 Metric folding rules.
9 Metric steel scale, 150 mm.
10 Trammels.
11 Inside micrometer case.
12 Inside micrometer 5-in. rod.
13 Inside micrometer 6-in. rod.
14 Inside micrometer 7-in. rod.
15 Inside micrometer 8-in. rod.
16 Inside micrometer 9-in. rod.
17 Inside micrometer 10-in.rod.
18 Inside micrometer 11-in. rod.
19 Inside micrometer 4-in. rod.
20 Inside micrometer head.
21 Inside micrometer 3-in. rod.
22 Outside micrometer calibers, Metric, 1 in.
23 Outside micrometer calibers, Metric, 3 in.
24 Outside micrometer calibers, Metric, 2 in.
25 Outside micrometer calibers case.
26 Outside micrometer calibers, English, 1 in.
27 Outside micrometer calibers, English, 3 in.
28 Outside micrometer calibers, English, 2 in.
29 Outside micrometer calibers case.
30 Steel scale, 300 mm.



DRAWER NO. 3 AND CONTENTS

1 Sleeve collet.
2 Drift No. 2.
3 Sleeve collet.
4 Twist drills, ½ to 63/64 in. by 1/64 in.
5 Twist drills, 1 in.
6 Twist drills, 1 1/16 in.
7 Twist drills, 1⅛ in.
8 Twist drills, 1 3/16 in.
9 Twist drills, 1¼ in.

PLATE No. 40



DRAWER NO. 4 AND CONTENTS.

1 ½ in. 13 tap, taper.
2 ½ in. 13 tap, plug.
3 ½ in. 13 tap, bottom.
4 ⅝ in. 11 tap, taper.
5 ⅝ in. 11 tap, plug.
6 ⅝ in. 11 tap, bottom.
7 ¾ in. 10 tap, taper.
8 ¾ in. 10 tap, plug.
9 ¾ in. 10 tap, bottom.
10 No. 0 taper pin reamer.
11 No. 1 taper pin reamer.
12 No. 5 taper pin reamer.
13 No. 2 taper pin reamer.
14 No. 4 taper pin reamer.
15 No. 3 taper pin reamer.
16 Hinged cover.
17 6—17/64 in. dia. twist drills.
18 6—¼ in. dia. twist drills.
19 6—15/64 in. dia. twist drills.
20 6—7/32 in. dia. twist drills.
21 6—13/64 in. dia. twist drills.
22 6—3/16 in. dia. twist drills.
23 6—11/64 in. dia. twist drills.
24 6—5/32 in. dia. twist drills.
25 6—9/64 in. dia. twist drills.

26 6—⅛ in. dia. twist drills.
27 6—7/64 in. dia. twist drills.
28 6—3/32 in. dia. twist drills.
29 6—5/64 in. dia. twist drills.
30 6—1/16 in. dia. twist drills.
31 Removable box with cover.
32 Hand reamers, ¼ in. to 1 in. by 1/32 in. (25 in set).
33 2—½ in. dia. twist drills.
34 Hinged lid.
35 2—31/64 in. dia. twist drill.
36 2—15/32 in. dia. twist drills.
37 2—29/64 in. dia. twist drills.
38 2—7/16 in. dia. twist drills.
39 2—27/64 in. dia. twist drills.
40 2—13/32 in. dia. twist drills.
41 2—25/64 in. dia. twist drills.
42 3—⅜ in. dia. twist drills.
43 3—23/64 in. dia. twist drills.
44 3—11/32 in. dia. twist drills.
45 3—21/64 in. dia. twist drills.
46 Tap wrench, 15 in.
47 Tap wrench, 20 in.
48 Tap wrench, 7 in.
49 3—5/16 in. dia. twist drills.
50 3—19/64 in. dia. twist drills.
51 3—9/32 in. dia. twist drills.
52 Tap wrench, 11 in.
53 1 in. Pipe tap, Briggs std.
54 ¾ in. Pipe tap, Briggs std.
55 ½ in. Pipe tap, Briggs std.
56 ⅜ in. Pipe tap, Briggs std.
57 ¼ in. Pipe tap, Briggs std.
58 ⅛ in. Pipe tap, Briggs std.
59 ¼ in. 20 tap, taper.
60 ¼ in. 20 tap, plug.
61 ¼ in. 20 tap, bottom.
62 5/16 in. 18 tap, taper.
63 5/16 in. 18 tap, plug.
64 5/16 in. 18 tap, bottom.
65 ⅜ in. 16 tap, taper.
66 ⅜ in. 16 tap, plug.
67 ⅜ in. 16 tap, bottom.
68 7/16 in. 14 tap, taper.
69 7/16 in. 14 tap, plug.
70 7/16 in. 14 tap, bottom.

PLATE No. 41

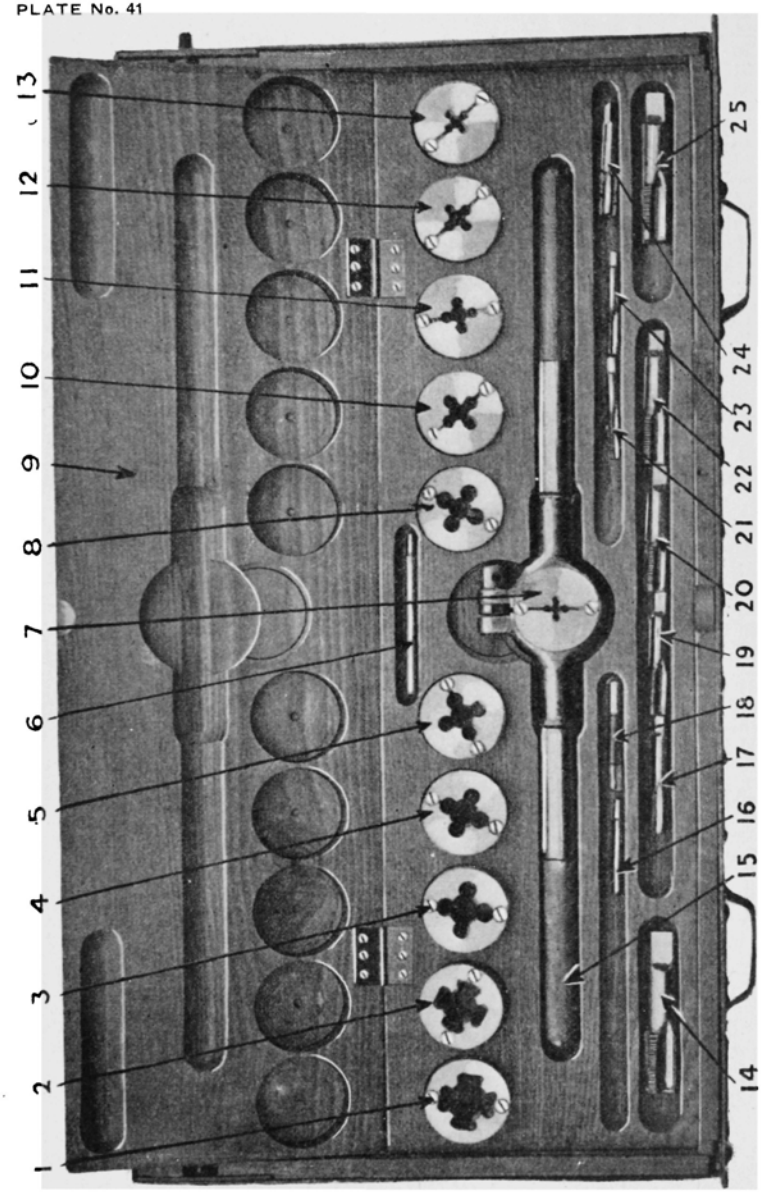
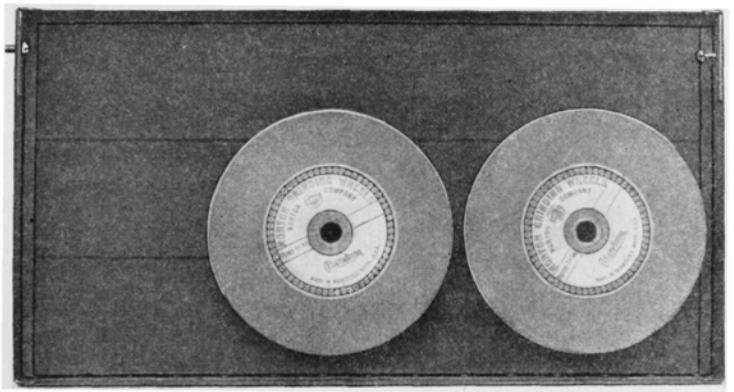


PLATE No. 42

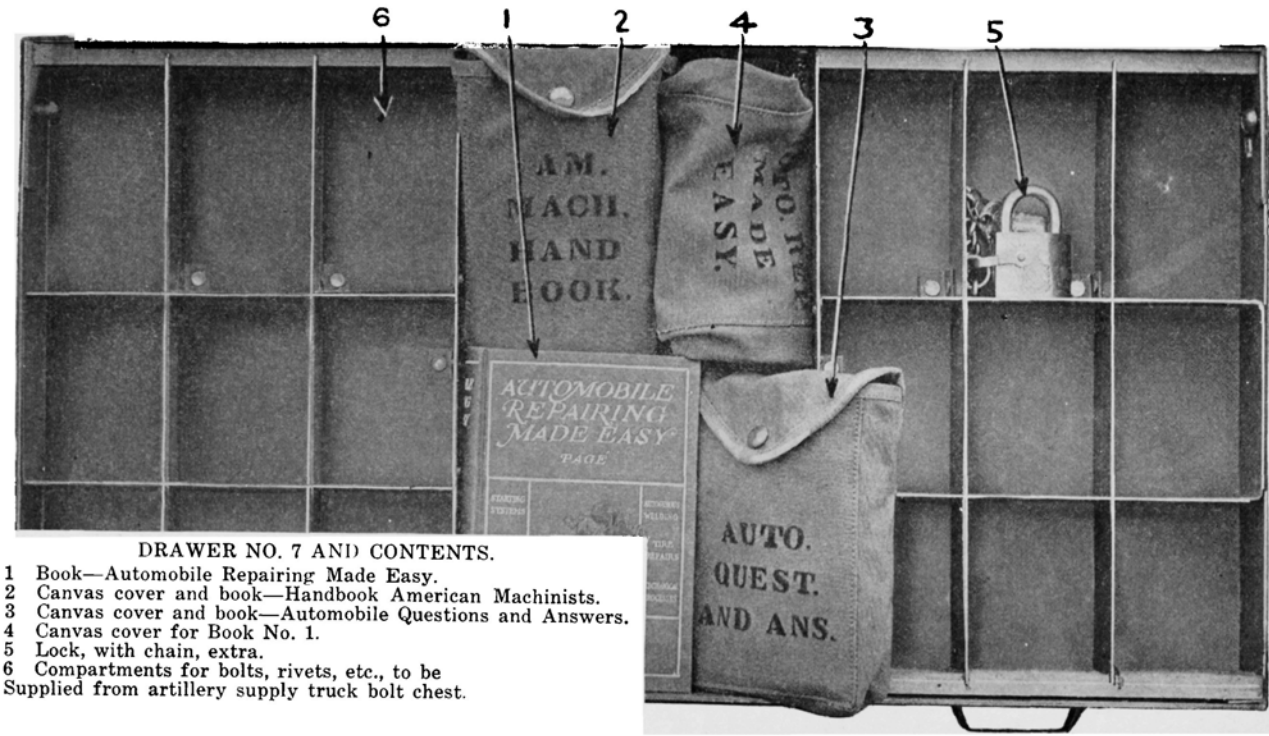


DRAWER NO. 6 AND CONTENTS.

2 spare grinding wheels.

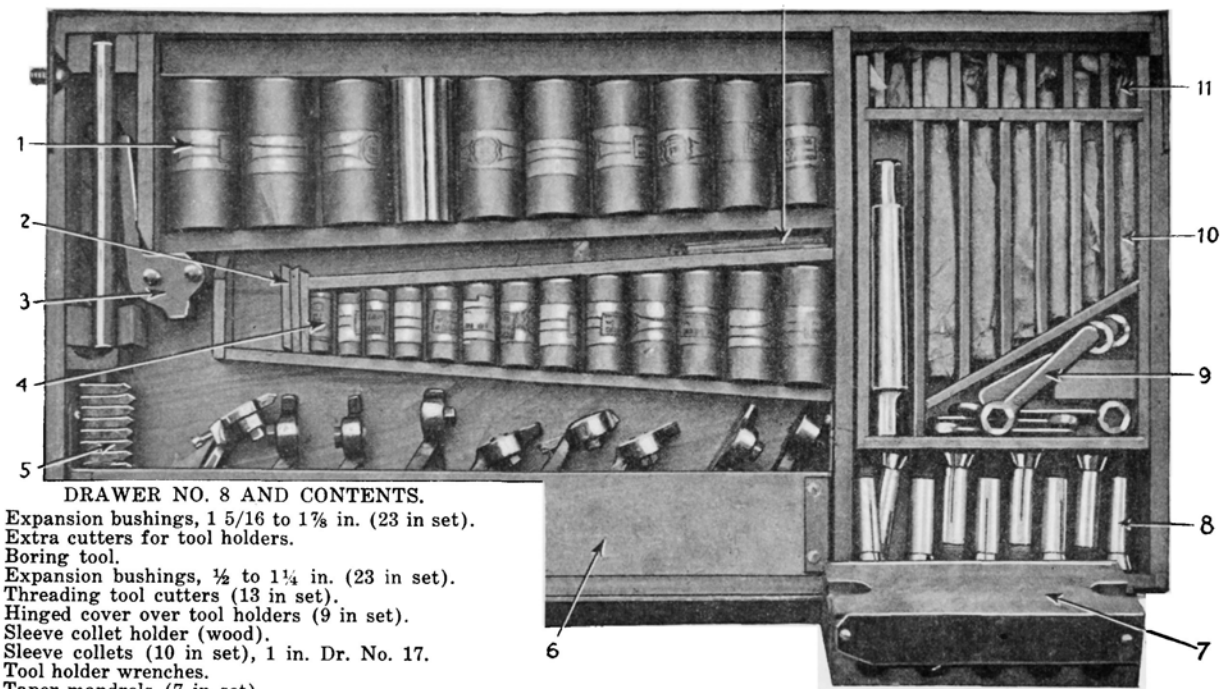
DRAWER NO. 5 AND CONTENTS.

1 1 in. 14-thread die.
2 ⅞ in. 14-thread die.
3 ¾ in. 16-thread die.
4 11/16 16-thread die.
5 ⅝ in. 18-thread die.
6 Die stock key.
7 ¼ in. 28-thread die.
8 9/16 in. 18-thread die.
9 Hinged lid.
10 ½ in. 20-thread die.
11 7/16 in. 20-thread die.
12 ⅜ in. 24-thread die.
13 5/16 in. 24-thread die.
14 1 in. 14-thread tap.
15 Die stock.
16 ¼ in. 28-thread tap.
17 9/16 in. 18-thread tap.
18 7/16 in. 20-thread tap.
19 ⅝ in. 18-thread tap.
20 11/16 16-thread tap.
21 5/16 in. 24-thread tap.
22 ¾ in. 16-thread tap.
23 ⅜ in. 24-thread tap.
24 ½ in. 20-thread tap.
25 ⅞ in. 14-thread tap.



DRAWER NO. 7 AND CONTENTS.

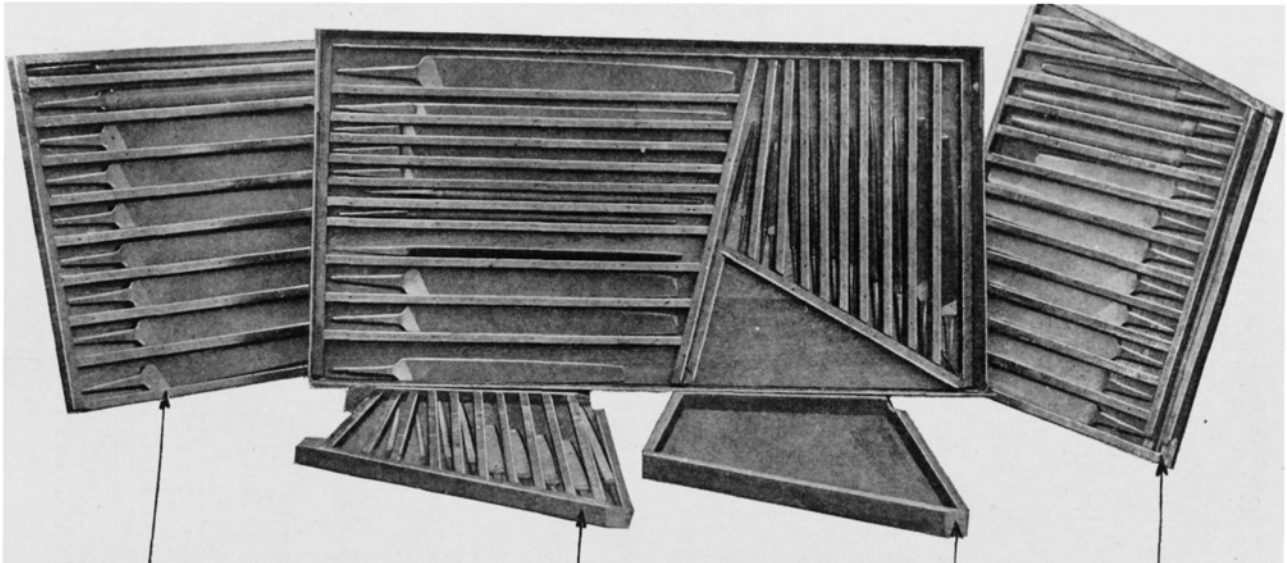
1 Book—Automobile Repairing Made Easy.
2 Canvas cover and book—Handbook American Machinists.
3 Canvas cover and book—Automobile Questions and Answers.
4 Canvas cover for Book No. 1.
5 Lock, with chain, extra.
6 Compartments for bolts, rivets, etc., to be
Supplied from artillery supply truck bolt chest.



DRAWER NO. 8 AND CONTENTS.

1 Expansion bushings, 1 5/16 to 1⅞ in. (23 in set).
2 Extra cutters for tool holders.
3 Boring tool.
4 Expansion bushings, ½ to 1¼ in. (23 in set).
5 Threading tool cutters (13 in set).
6 Hinged cover over tool holders (9 in set).
7 Sleeve collet holder (wood).
8 Sleeve collets (10 in set), 1 in. Dr. No. 17.
9 Tool holder wrenches.
10 Taper mandrels (7 in set).
11 Spiral end mills (8 R.H., 8 L.H.).
12 Extra cutters.

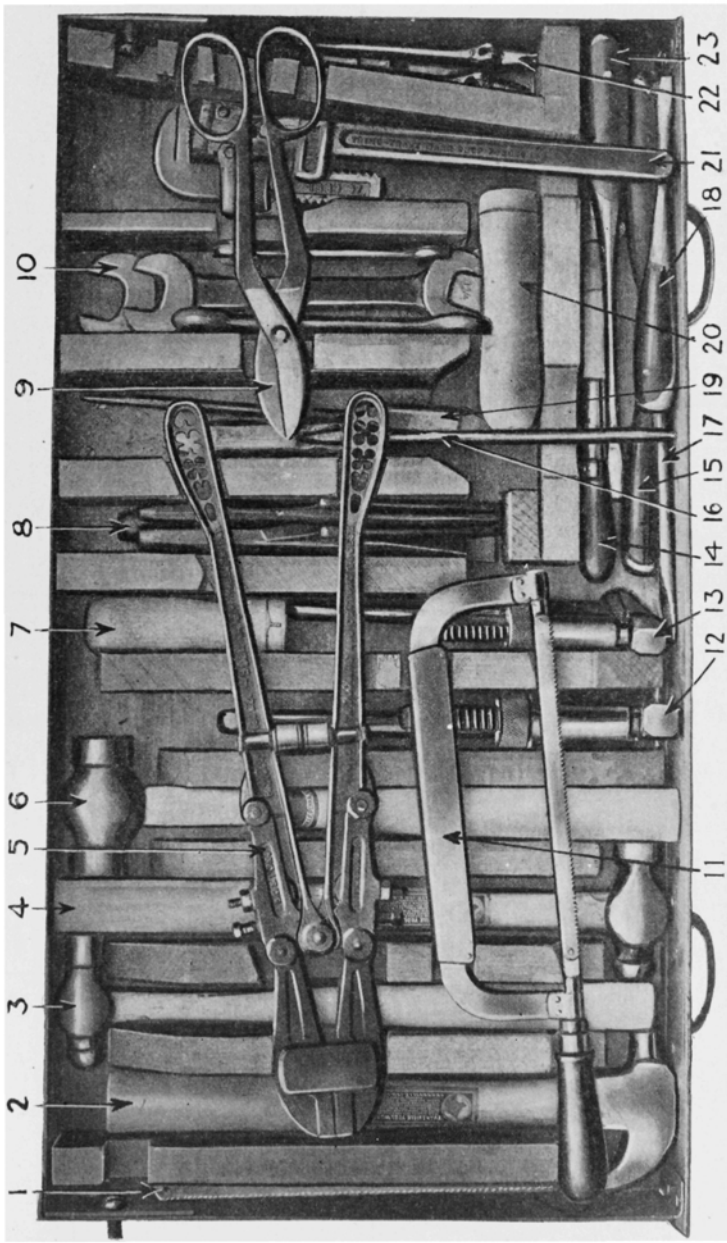
PLATE No. 44



DRAWER NO. 9 AND CONTENTS.

1 Top file packing with 9 files.
2 Top file packing with 9 files.
3 Middle file packing.
4 Middle file packing with 13 files.

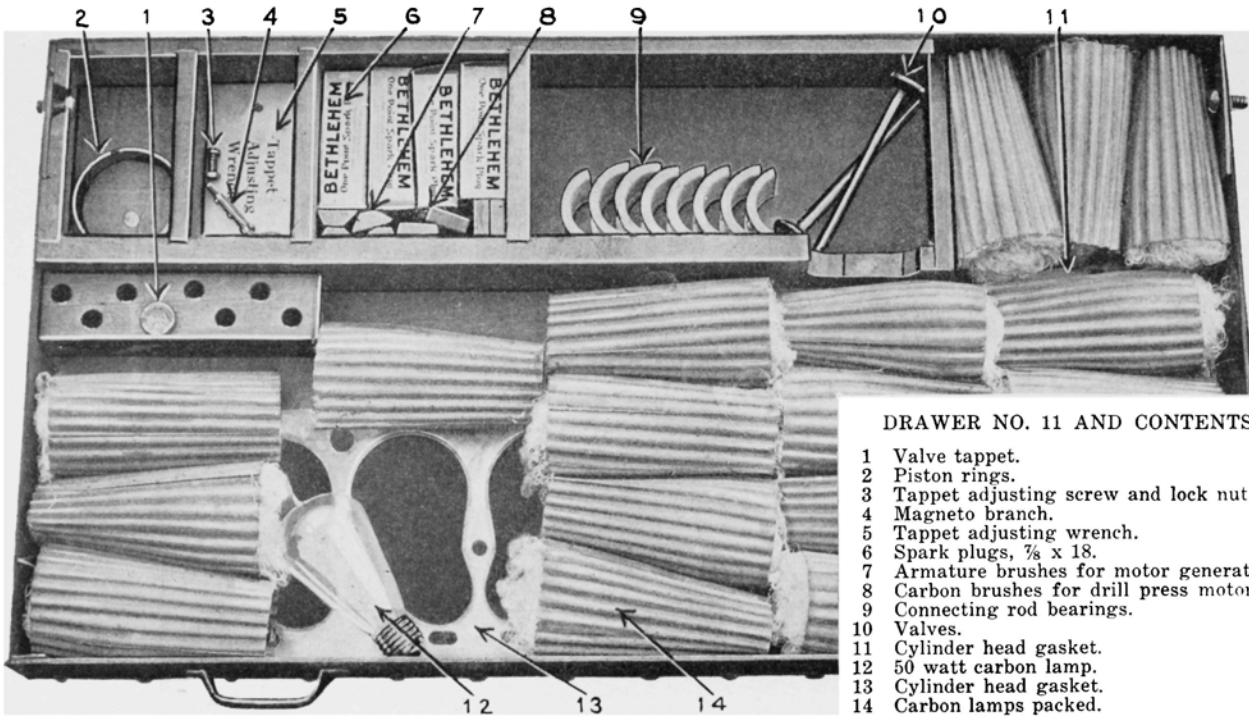
PLATE No. 46



DRAWER NO. 10 AND CONTENTS, SEE PAGE 122

DRAWER NO. 10 AND CONTENTS.

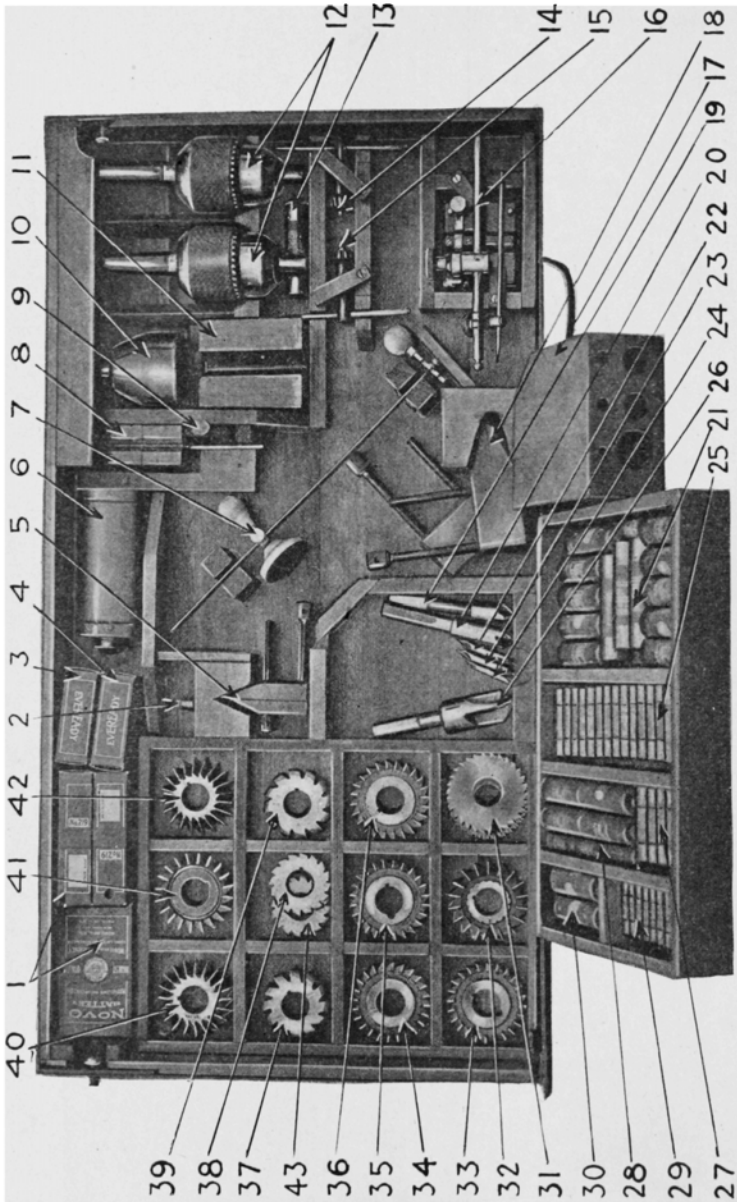
1 Hack saw blades.
2 Claw hammer.
3 Ball pien hammer.
4 Ball pien hammer.
6 Sounding hammer.
5 Bolt clipper.
7 Handle, soldering copper.
8 Cold chisels.
9 Tinner's snips, 10 in.
10 Wrenches, double end, automobile (5 in set).
11 Hack saw frame.
12 12 in. Trimo solid bar wrench.
13 10 in. Trimo solid bar wrench.
14 Emery wheel dresser.
15 Screw driver, 6 in.
16 Soldering copper, 1½ lb.
17 Screw driver, 8 in.
18 Screw driver, 4 in.
19 Soldering copper, ¾ lb.
20 Handle, soldering copper.
21 14 in. Trimo pipe wrench.
22 Wrench 22½ deg. angle.
23 Screw drivers, 6 in.



DRAWER NO. 11 AND CONTENTS.

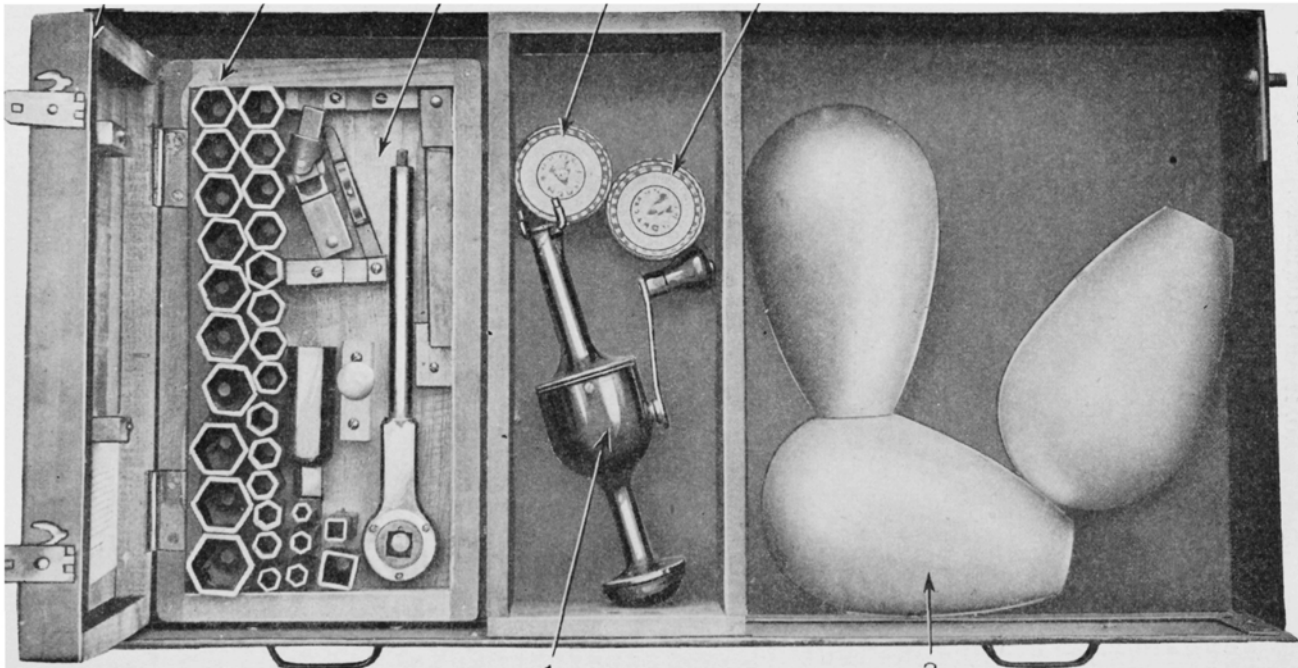
1 Valve tappet.
2 Piston rings.
3 Tappet adjusting screw and lock nut.
4 Magneto branch.
5 Tappet adjusting wrench.
6 Spark plugs, ⅞ x 18.
7 Armature brushes for motor generator.
8 Carbon brushes for drill press motor.
9 Connecting rod bearings.
10 Valves.
11 Cylinder head gasket.
12 50 watt carbon lamp.
13 Cylinder head gasket.
14 Carbon lamps packed.

PLATE No. 48


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DRAWER NO. 12 AND CONTENTS.

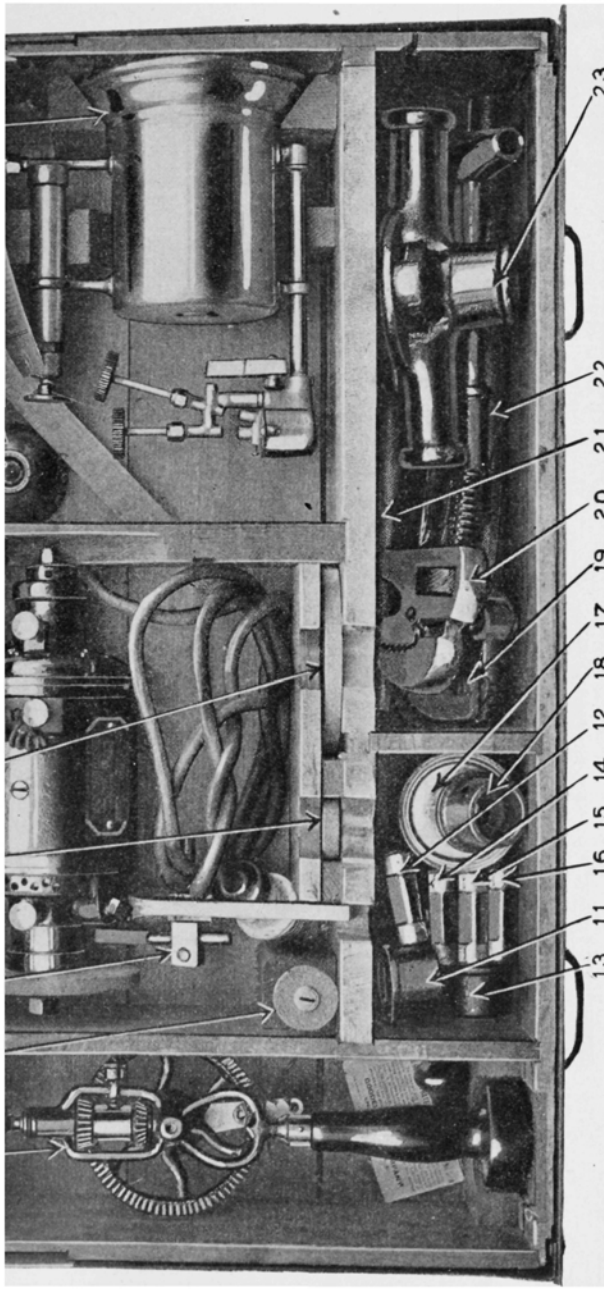
No.	
1	Batteries for flashlight.
2	Bulb for flashlight.
3	Voltmeter.
4	Ammeter.
5	Tool makers' clamps, 1¾ in.
6	Flashlight.
7	Circular glass cutter.
8	Drill blocks.
9	Drill blocks clamp.
10	Drill cup.
11	Large V drill block.
12	Drill chuck No. 9.
13	Fuse.
14	Drill chuck key.
15	Drill chuck key.
16	Universal surface gauge.
17	Drill and csk. holder, wood.
18	Toolmakers' clamps, 3½ in.
19	Countersink, ⅝ in., 82 deg., square shank.
20	Countersink, ⅝ in., 82 deg. round shank.
21	Fuses, 50 amp., 250 volt.
22	Drill and countersink, 3/32 in. and ⅛ in.
23	Drill and countersink, 3/32 in. and ⅛ in.
24	Drill and countersink, 1/16 in. and 3/64 in.
25	Fuses, 20 amp., 250 volts.
26	Countersink, 1 in., 90 deg.
27	Fuses, 10 amp., 250 volts.
28	Fuses, 50 amp., 250 volts.
29	Fuses, 5 amp., 250 volts.
30	Fuses, 50 amp., 250 volts.
31	Metal slitting cutters (6 in set).
32	Side milling cutter, ½ in.
33	Side milling cutter, ¼ in.
34	Side milling cutter, 5/16 in.
35	Side milling cutter, ⅜ in.
36	Side milling cutter, 7/16 in.
37	Convex milling cutter, ½ in.
38	Convex milling cutter, ⅛ in.
39	Convex milling cutter, ⅜ in.
40	60 deg. double angle milling cutter.
41	45 deg. angle L. H. milling cutter
42	45 deg. angle R. H. milling cutter.
43	Convex milling cutter, ¼ in.



DRAWER NO. 13 AND CONTENTS.

1 Automobile valve grinder.
2 Lamp shade.
3 Socket wrench box, hinged cover.
4 Socket wrench box.
5 Socket wrench set.
6 Valve grinding compound—fine.
7 Valve grinding compound—coarse.

PLATE No. 50

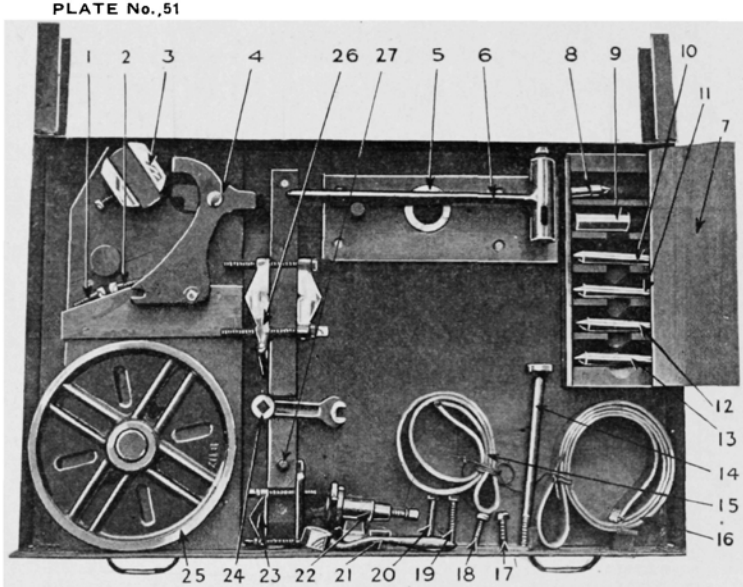


DRAWER NO. 15 AND CONTENTS, SEE PAGE 128.

DRAWER NO. 15 AND CONTENTS.

1 Drawer stock.
2 Tool post grinder.
3 Grinder wheel, 1½ in. extra.
4 Grinder wheel, 4½ in. extra.
5 Oil can.
6 Gasoline torch, double jet.
7 Drawer stock.
8 Tooth rest. tool post grinder.
9 Hand and breast drill.
10 Emery wheel, 1½ in. on extension mandrel, 4½ in. long.
11 Pipe set bushing, ¼ in.
12 Pipe die, ¼ in.
13 Pipe set bushing, ⅜ in.
14 Pipe die, ⅜ in.
15 Pipe die, ½ in.
16 Pipe die, ¾ in.
17 Pipe cement.
18 Pipe die bushing, ½ in.
19 Pipe cutter.
20 Pipe branch, 14 in.
21 Pipe stock handle.
22 Pipe stock handle.
23 Pipe stock w.th 1 in. die and bushing.

PLATE No. 51

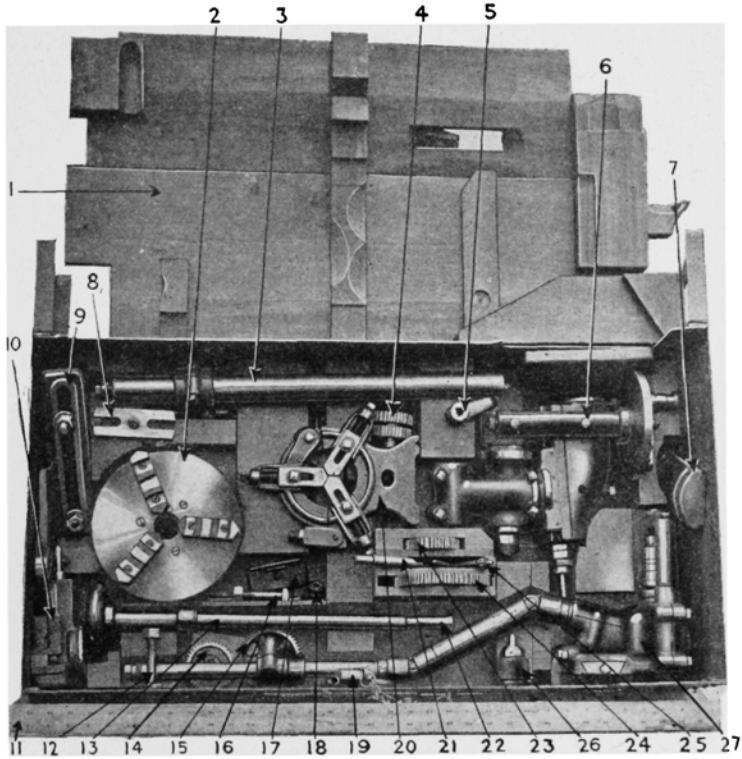


DRAWER NO. 16 AND CONTENTS.

1 5/16 x 1¼ tap bolt.
2 ⅜ x 4¼ sq. head bolt.
3 Tool rest.
4 Follow rest.
5 Center sleeve.
6 Drill holder.
7 Hinge cover.
8 Drill press center.
9 Center sleeve.
10 Lathe center.
11 Lathe center.
12 Lathe center.
13 Lathe center.
14 ½ x 7¾ in. bolt.

15 Belt, counter shaft lathe.
16 Belt, motor counter shaft.
17 5/16 x 1¼ tap bolt.
18 5/16 x 1¼ tap bolt.
19 ⅜ x 2 tap bolt.
20 Bolt.
21 Tail stock wrench.
22 Straight tool post.
23 Lathe clamp dog, 1¾ in.
24 Tool post wrench.
25 9 in. face plate.
26 Center oiling knob.
27 Lathe clamp dog, 2¾ in.

PLATE No. 52



DRAWER NO. 17 AND CONTENTS.

1 Wood packing.
2 3-jaw combination chuck.
3 Overhanging bar and tail center.
4 Metric transposing gear, double.
5 Dividing head crank.
6 Dividing head.
7 Dividing head clamp.
8 Lathe center dog.
9 Clamp for vertical slide column.
10 Milling vise.
11 36 in. steel rule.
12 Clamp bolt for steady rest.
13 Draw-in chuck (with 1 sleeve collet).
14 Metric transposing gear.
15 Metric transposing gear.
16 Clamp bolt for steady rest.
17 Clamp bolt for steady rest.
18 Chuck wrench.
19 Lock, with chain.
20 Steady rest.
21 Taper shank—for drill press chuck.
22 Sleeve collet (on drawin chuck)
23 Change gear.
24 Change gear.
25 Drill chuck key.
26 Drill chuck, Jacobs.
27 Cutter block and universal driving shaft.

CHAPTER X

MISCELLANEOUS TOOLS AND FITTINGS

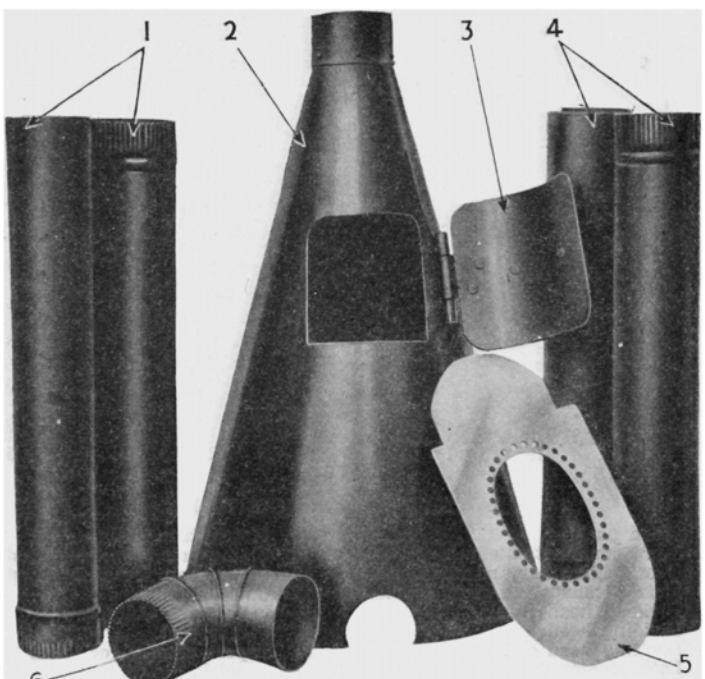
SIBLEY STOVE

The Artillery Repair Truck is supplied with a Sibley Stove, which is complete with 4 joints of black iron stove pipe, 1 black iron stove pipe elbow and 1 galvanized iron tent shield.

The stove is carried, during transit, between the bench cabinet and the drill press or generator. The stove pipe, elbow and shield are carried in the lower left corner of the lathe frame.

The stove is provided with a hinged door. Draft is supplied thru a hole in the front of the stove, at the bottom, where the opening can be closed by a shovelful of dirt.

PLATE No. 53



STOVE.

1 Stove pipe.
2 Stove—Sibley.
3 Stove door.
4 Stove pipe.
5 Stove tent shield.
6 Stove pipe elbow.

FLOOR LAMPS.

Each Artillery Repair Truck is equipped with three adjustable floor lamps which are carried in the rear upper compartment of the bench cabinet. Each lamp unit consists of the following:

One cast-iron base, weight 12 pounds; three 5/16″ diameter holes spaced equidistant around rim, painted black as a protection against moisture. Two pieces of 40 x ⅜″ galvanized conduit and one piece of 30 x ⅜″ galvanized conduit.

The long piece of conduit is threaded on one end, which screws into the tapped hole in the cast-iron base.

Two "Holdfast" adjustable clamps which join the conduit together at any desired angle.

One ⅜″ bushing.

One aluminum shell socket.

One lamp shade (carried in drawer No. 13).

One lamp guard.

One 12′ length waterproof cord.

One plug.

Current for this lamp is secured by plugging in any of the floor receptacles.

DIES AND TAPS.

A complete assortment of the most used sizes of taps and dies, with tap wrenches and die stocks to fit, is carried in the bench cabinet drawers. The complete assortment consists of the following sets of A. S. M. E. Standard, S. A. E. Standard, U. S. Standard, and Briggs Standard (pipe) and Metric Standard thread.

A. S. M. E. STANDARD.

1 Die stock.

13 Die and collet, one each, of the following sizes:

No. 0—80 thread.	No. 5—44 thread.	No. 9—32 thread.
No. 1—72 thread.	No. 6—40 thread.	No. 10—30 thread.
No. 2—64 thread.	No. 7—36 thread.	No. 12—28 thread.
No. 3—56 thread.	No. 8—36 thread.	No. 14—24 thread.
No. 4—48 thread.		

1 Tap wrench, adjustable.

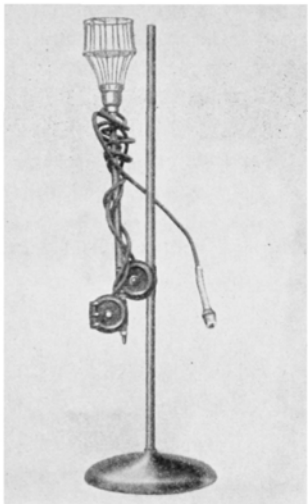
13 Taper taps, one each, of the above sizes.

13 Plug taps, one each, of the above sizes.

13 Bottom taps, one each of the above sizes.

The above set carried in a plush-lined hinged-covered case, in drawer No. 2.

PLATE No. 54



ADJUSTABLE FLOOR LAMP.

Cast Iron base (12 lbs.).
Conduit, galvanized 40 x ⅜ in.
Conduit, galvanized 20 x ⅜ in.
Adjustable clamps.
12 ft. 0 in. lamp cord, water proof.
Aluminum shell socket.
Lamp guard.
(Lamp shade carried in drawer No. 13.)

DIES AND TAPS.

S. A. E.

1 Die stock.

11 Die and guide, one each, of the following sizes:

¼″—28 thread.	½″—20 thread.	¾″—16 thread.
5/16″—24 thread.	9/16″—18 thread.	⅞″—14 thread.
⅜″—24 thread.	⅝″—18 thread.	1″—14 thread.
7/16″—20 thread.	11/16″—16 thread.	

13 Plug taps, one each, of the above sizes.

The above set is carried in a hardwood box with hinged cover in drawer No. 5.

Tap wrenches, for use with these taps, are carried in drawer No. 4.

U. S. STANDARD.

4 Adjustable tap wrenches, one each, of the following sizes:

7″ long, for taps 1/16″ to ¼″ diameter.
11″ long, for taps 3/16″ to ½″ diameter.
15″ long, for taps ¼″ to ¾″ diameter.
20″ long, for taps ¼″ to 1″ diameter.

7 Taper taps, one each, of the following sizes:

7 Plug taps, one each, of the following sizes:

7 Bottom taps, one each, of the following sizes:

¼″—20 thread.	½″—13 thread
5/16″—18 thread.	⅝″—11 thread.
⅜″—16 thread.	¾″—10 thread.
7/16″—14 thread.	

The above set is carried in drawer No. 4.

BRIGGS STANDARD PIPE.

1 Die stock.

5 Dies, one each, of the following sizes:

5 Guide bushings, one each, of the following sizes:

¼″	½″	1″
⅜″	¾″	

6 Taper taps, one each, of the following sizes:

⅛″	⅜″	¾″
¼″	½″	1″

Tap wrenches, for use with these taps, are carried in the same drawer.

The dies and stock are carried in drawer No. 15.

The taps are carried in drawer No. 4.

FRENCH AND INTERNATIONAL METRIC STANDARD.

3 Die Stocks, one each for 20.6 mm., 25.4 mm., and 63.5 mm., outside diameter dies.

16 Dies, one each, of the following sizes:

Size, mm.	Pitch, mm.	Outside dia., mm.
2	.45	20.6
3	.50	20.6
4	.75	25.4
5	.75	25.4
6	1.00	25.4
7	1.00	25.4
8	1.00	25.4
10	1.5	25.4
12	1.5	63.5
14	2.	63.5
16	2.	63.5
18	2.5	63.5
20	2.5	63.5
22	2.5	63.5
24	3.	63.5
26	3.	63.5

3 Tap wrenches, one each, for 3 to 6 mm. taps, 6 mm. to 16 mm. taps, and 14 to 24 mm. taps.

16 Taper taps, one each, of the above size and pitch.

16 Plug taps, one each, of the above size and pitch.

16 Bottom taps, one each, of the above size and pitch.

The above set is carried in a hardwood case.

ELECTRIC PORTABLE DRILL.

Portable heavy-duty air-cooled electric drill, having capacity up to 2⅞ in., is carried in the floor box. This drill is 110 volt D.C., type equipped with 30 feet extension cord, which may be plugged in any of the floor receptacles. This drill is fitted with the telescope screw feed and spade handle.

The controlling switch is fully inclosed and operated from one side handle, the other side handle being detachable. This drill is fitted with a No. 2 slip socket obviating the use of drift hole and key. The motor mountings are fully inclosed, being dirt and dust proof. A fan mounted on the armature forces a strong current of air through the ventilator holes in the motor housing and in cap providing the necessary cooling. The armature is built up of electric sheet steel wound with special magnet wire. Field coils are formed, wound and baked and insulated. Commutator is made of segments of hard drawn copper, which are insulated from each other with amber mica.

Carbon brushes are mounted in die cast brush holders and are held against the commutator by two springs pressing from the rear. The switch is entirely inclosed in a pocket on the side of the motor housing. It is operated through the attached side handle. The armature is mounted on ball bearings, the outer race of the ball bearings which carries the armature shaft being held in place by a threaded nut. The inner race of ball bearing is a tight fit on the shaft. The clutch spindle is fitted with a ball thrust bearing. The motor housing is separated from the gears, by an aluminum plate provided with packing to prevent oil and grease, which lubricate the gears, from getting into the motor mounting. The gears are heat treated, steel, hardened. The gear case is filled with lubricant at the factory, but this lubricant should be renewed at frequent intervals. The gear case is filled with graphite grease which lubricates both the bearings at the lower end of the armature shaft. A special grease cap is provided for lubrication of the ball bearing at the top of armature shaft. This drill will run at a speed of 220 r.p.m. or 410 r.p.m., speed being changed by shifting the wing nut which throws the gears into high or low, as may be desired. The speed may be changed while the motor is running. This drill may be used for reaming up to about $\frac{5}{8}$-in. holes. It will drill about $1\frac{1}{4}$-in. diameter holes in wood.

LATHE FRAME.

Lathe frame, which is located across the extreme forward end of the Artillery Repair Truck body, is built up of steel angles and plates reinforced with steel cross pieces. The lathe is mounted on the top frame plate, which serves as an oil-proof cover for the contents of the lathe frame. This plate is bent up in front preventing oil from running down over the front of the drawers, lathe motor rheostat and air compressor outfit which are carried therein. The lathe starting motor is supported at the left forward corner of the lathe frame directly beneath the lathe counter shaft, which is just forward of the lathe headstock. The lathe motor starting box is located at the left corner of the lathe frame directly behind the starting motor and to the left of the two drawers. These drawers are numbered 16 and 17 and are constructed of steel fitted with wooden packing preventing the misplacement and breakage of the parts con-

tained therein. Each drawer is provided with two drawer pulls and are locked by a single padlock with chain. These drawers contain the parts listed on pages 108 and 109.

VISES.

Vise equipment consists of a 4-inch machinist's vise located at the left forward corner of the bench cabinet, a 3½-inch swivel jaw machinist's vise with swivel base bolted to the forward end of the right drop side and a pipe vise located at the right forward corner of bench cabinet. This pipe vise is of the hinged type and has capacity of from ⅛ to 2½-in. pipe.

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NOMENCLATURE
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NOMENCLATURE OE PARTS

PROPERTY CLASSIFICATION—CLASS 4, DIVISION 9

BODY

Lumber

Number per Truck		Number per Truck	
1	Drawer No. 1 Wood Packing.	1	Drawer No. 13 Wood Packing.
1	Drawer No. 2 Wood Packing.	1	Drawer No. 15 Wood Packing.
1	Drawer No. 3 Wood Packing.	1	Drawer No. 16 Wood Packing.
1	Drawer No. 4 Wood Packing.	1	Drawer No. 17 Wood Packing.
1	Drawer No. 5 Wood Packing.	1	Floor Box Wood Packing.
1	Drawer No. 6 Wood Packing.	1	Welding Case Wood Packing.
1	Drawer No. 7 Wood Packing.	11	Chain wearing strip No. 1 (ash).
1	Drawer No. 8 Wood Packing.	1	Chain wearing strip No. 2 (ash).
1	Drawer No. 9 Wood Packing.	1	Rear center floor (ash).
1	Drawer No. 10 Wood Packing.	1	Door floor (ash).
1	Drawer No. 11 Wood Packing.	1	Lathe rheostat block (ash).
1	Drawer No. 12 Wood Packing.		

2	Extension bow (ash).
1	Suit case stops—bench cabinet (ash or oak).
4	Suit case stops—bench cabinet (ash or oak).
2	Canvas cover side extension stops (hickory).
2	Canvas cover side extension stops (hickory).
4	Canvas support strip detail (hickory).
4	Canvas support detail (hickory).
4	End support rear detail (hickory).
4	End support strip, rear (hickory).
4	End support, front, detail (hickory)..
4	End support strip, front (hickory).
9	Canvas support strip No. 1 (hickory).
4	Canvas support strip No. 1 (hickory).
1	Extension reinforcement (hickory).
5	Canvas support (hickory).
4	Canvas supports, rear (hickory).
1	Bench top (maple).
1	Truck floor (poplar).
1	False floor, front (poplar).
1	False floor, rear (poplar).
4	Drawer stops (oak).

Aluminum, Sheet

Number Per Truck	Size	Location
1	1½" x .05 x 0' 4⅜".	Bench Cabinet Drawer 4.
1	1¼" x .05' x 0' 3⅞".	Bench Cabinet Drawer 4.
1	1⅛" x .05 x 0' 3½".	Bench Cabinet Drawer 4.
1	1" x .05 x 0' 3⅛".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 3 15/16".	Bench Cabinet Drawer 4.
1	⅞" x .05 x 0' 4".	Bench Cabinet Drawer 4.
1	⅞" x .05 x 0' 4 1/16".	Bench Cabinet Drawer 4.
1	⅞" x .05 x 0' 4⅛".	Bench Cabinet Drawer 4.
1	⅞" x .05 x 0' 4 3/16".	Bench Cabinet Drawer 4.
1	⅞" x .05 x 0' 4¼".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 4⅜".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 4½".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 2⅛".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6¾".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6⅞".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6½".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6⅞".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6½".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 6⅛".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 5⅞".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 5¾".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 5⅝".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 5½".	Bench Cabinet Drawer 4.
1	¾" x .05 x 0' 5¼".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 5⅛".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 5".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 4⅞".	Bench Cabinet Drawer 4.
2	⅝" x .05 x 0' 4⅝".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 4⅜".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 4¼".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 4".	Bench Cabinet Drawer 4.
2	⅝" x .05 x 0' 3¾".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 3½".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 3½".	Bench Cabinet Drawer 4.
1	⅝" x .05 x 0' 3⅜.	Bench Cabinet Drawer 4.

NOMENCLATURE OF PARTS—Continued

Aluminum, Sheet—Continued

Number Per Truck	Size	Location
1	5/8" x .05 x 0' 3 1/4".	Bench Cabinet Drawer 4.
2	5/8" x .05 x 0' 3 1/8".	Bench Cabinet Drawer 4.
1	5/8" x .05 x 0' 3".	Bench Cabinet Drawer 4.
2	1/2" x .05 x 0' 3 5/8".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 3 11/16".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 3 3/4".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 3 13/16".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 3 7/8".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 3 15/16".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 4".	Bench Cabinet Drawer 4.
2	1/2" x .05 x 0' 4 1/16".	Bench Cabinet Drawer 4.
1	1/2" x .05 x 0' 4 1/8".	Bench Cabinet Drawer 4.

Plates and Bars

Number Per Truck	Description	Size
2	Draft sills R. & L.	7 1/4 x 1/4 x 10' 8 1/2"
2	Sub sills R. & L.	7 1/4 x 1/4 x 3' 10 1/4"
2	Gusset plate No. 2	6 1/8 x 1/4 x 7"
1	Vise reinforcements	10 1/2 x 3/16 x 1' 11"
1	Front plate	32" x 1/8 x 5' 8"
1	Drawer front plate	6 1/8 x 1/8 x 2' 6"
6	Drop side support	11 1/4 x 1/8 x 2' 8"
1	Lathe frame lower drawer plate	10 1/4 x 1/8 x 2' 11 3/4"
1	Lathe frame lower drawer body	28 3/4 x 3/32 x 4' 4"
1	Floor box body	27 1/2 x 3/32 x 4' 8"
1	Door—bench cabinet	14" x 3/32 x 2' 11"
1	Drop end	24 1/8" x 3/32 x 6' 4"
2	Drop side	24 1/8" x 3/32 x 11' 1"
2	Canvas support reinforcement	24 1/2 x 3/32 x 6' 4"
4	Canvas support extension	11 1/2 x 3/32 x 5'
2	Floor box end	9 1/2 x 3/32 x 2' 7 1/2"
2	Bench cabinet end plate	31 1/2 x 1/16 x 2' 9"
1	Bench top plate	31 3/4 x 1/16 x 5' 4 1/2"
1	Lathe frame plate No. 1	25 1/2 x 1/16 x 7' 1 1/2"
2	Drawer cover	13 1/2 x 1/16 x 2' 7"
2	Drawer body	18 x 1/16 x 2' 10"
2	Drawer body	18 3/4 x 1/16 x 2' 11 1/2"
4	Drawer body	18 1/4 x 1/16 x 2' 10 1/2"
2	Drawer body	18 1/2 x 1/16 x 2' 11"
2	Drawer body	19 5/8 x 1/16 x 3' 1"
1	Drawer body	20 1/4 x 1/16 x 3' 2 1/2"
1	Drawer body	22 1/8 x 1/16 x 3' 6"
1	Switchboard cover	22 1/4 x 1/16 x 2' 6 1/2"
2	Drawer plate	18 1/2 x 1/16 x 2' 8"
1	Lathe frame upper drawer body	21 3/4 x 1/16 x 2' 11"
1	Condulet mud guard	7 1/2 x 1/16 x 8"
1	Bench cabinet center plate, upper	14 7/8 x 1/32 x 5' 4 1/2"
1	Lathe frame plate No. 2	8 5/8 x 1/32 x 1' 1"
1	Lathe frame plate No. 3	14 1/2 x 1/32 x 3' 4"
1	Bench cabinet drawer No. 10, lining	8 3/4 x 1/32 x 9"
2	Bench cabinet rear plate	14 3/4 x 1/32 x 2' 6"
1	Bench cabinet center plate, lower	14 3/4 x 1/32 x 5' 4 1/2"
6	Splice plate No. 6	3 3/4 x 1/4 x 5"
2	Gusset plate	5 3/8 x 1/4 x 5 7/8"
2	Splice plate	5 3/4 x 1/4 x 6 5/8"
2	Splice plate	3 x 1/4 x 5 3/4"
4	Splice plate No. 8-10	4 3/8 x 1/4 x 6 1/8"
2	Splice plate No. 2	5 5/8 x 1/4 x 11 1/4"
1	Splice plate No. 3	5 x 1/4 x 1' 2"
3	Splice plate No. 4	4 1/4 x 1/4 x 1' 2"
2	Splice plate No. 5	5 1/2 x 1/4 x 6"
2	Splice plate No. 9	4 5/8 x 1/4 x 6 7/8"
1	Tie rod plate No. 1	2 7/8 x 1/4 x 3"
1	Lock controller	1 1/2 x 1/4 x 3 1/2"
1	Tie rod plate No. 2	2 7/8 x 1/4 x 4"
6	Filler washer	2 x 1/4 x 2"
2	Filler plates	2 3/4 x 1/4 x 4 1/4"
4	Corner reinforcement No. 1	2 x 1/4 x 8 7/8"
1	Corner reinforcement No. 2	2 x 1/4 x 1'
2	Lathe frame reinforcement	1 1/2 x 1/4 x 6 3/4"
2	Lathe frame reinforcement	3 x 1/4 x 3"
2	Wing nut filler piece	1 1/2 x 1/4 x 2"
4	End brace drill press frame	3/4 x 3/16 x 1' 4"
4	Side brace—drill press frame	3/4 x 3/16 x 1' 4"
1	Screen support No. 6	3/4 x 3/16 x 2' 1"
1	Bench cabinet filler plate, upper	2 x 3/16 x 1' 1"
1	Bench cabinet filler plate, lower	2 x 3/16 x 1' 1 1/2"
2	Bench cabinet cross brace	1 x 3/16 x 1' 8"
1	Locking plate lathe frame drawer	1 1/2 x 3/16 x 8 1/4"
10	Drop side reinforcement Nos. 1 and 2	5 7/8 x 3/16 x 1' 11"
1	Drop end reinforcement	4 3/4 x 3/16 x 6' 4"

NOMENCLATURE OF PARTS—Continued

Plates and Bars—Continued

Number per car	Description	Size
2	Lathe frame cross brace	1 x 3/16 x 1' 9¼"
2	Lathe frame cross brace	1 x 3/16 x 2' 3½"
2	Lathe frame cross brace	1 x 3/16 x 3' ¼"
1	Lathe frame cross brace	1 x 3/16 x 3' 11½"
1	Lathe frame cross brace	1 x 3/16 x 5' 1½"
2	Lathe frame cross brace	1 x 3/16 x 4' 11½"
1	Lathe frame right center filler	1½ x 3/16 x 1' 9"
6	Shot bolt filler	1¼ x 3/16 x 2¼"
1	Splice plate No. 11	2¾ x 3/16 x 3½"
2	Floor box support angle filler	1½ x 3/16 x 2' 7/16"
1	S. B. stiffener bracket	1⅛ x 3/16 x 4¾"
4	Door hinge filler piece	⅞ x 3/16 x 3¼"
1	Angle, drawer No. 16	⅞ x 3/16 x 2"
3	Padlock staple (1 as shown, 2 reverse)	1 9/16 x 3/16 x 2"
1	Lock controller release	1½ x ⅛ x 2¼"
1	Screen reinforcement plate	1¾ x ⅛ x 3 5/16"
1	Screen reinforcement plate	2½ x ⅛ x 3 13/16"
1	Bench cabinet, door angle, lower	2 x ⅛ x 2' 8¼"
1	Bench cabinet, door angle, upper	1⅞ x ⅛ x 2' 8¼"
6	Shot bolt bracket reinforcement	3 x ⅛ x 3¼"
2	Screen strip No. 1B	⅝ x ⅛ x 2' 2"
1	Screen support No. 8	¾ x ⅛ x 3½"
1	Screen support No. 3	1 x ⅛ x 7¾"
1	Screen support No. 4	1 x ⅛ x 5¾"
2	Screen support No. 7	1⅞ x ⅛ x 2"
2	Screen clip No. 1	¾ x ⅛ x 3¼"
4	Foot, screen angles	¾ x ⅛ x 1¾"
21	Screen strip No. 1A	⅝ x ⅛ x 1' 3¾"
21	Screen strip No. 2A	⅝ x ⅛ x 1' 6⅛"
21	Streen strip No. 2B	⅝ x ⅛ x 1' 11½"
14	Drawer reinforcements	1¼ x ⅛ x 1' 1½"
2	Drawer front plate	2 x ⅛ x 2' 6"
4	Drawer front plate	2¼ x ⅛ x 2' 6"
2	Drawer front plate	2½ x ⅛ x 2' 6"
2	Drawer front plate	2¾ x ⅛ x 2' 6"
2	Drawer front plate	3 9/16 x ⅛ x 2' 6"
1	Drawer front plate	4¼ x ⅛ x 2' 6"
2	Chest stop plate	1⅛ x ⅛ x 3"
2	Chest stop	3¾ x ⅛ x 4¼"
1	Screen strip No. 4	¾ x ⅛ x 3' 5"
1	Screen strip No. 6	¾ x ⅛ x 3' 7"
1	Screen strip No. 7	¾ x ⅛ x 3' 3"
2	Screen strip No. 5	¾ x ⅛ x 2' 6"
1	Screen support No. 5	1 x ⅛ x 1' 2½"
1	Drop side support brace, right	2¾ x ⅛ x 7"
2	Drop end reinforcement No. 2	5 x ⅛ x 1' 10"
8	Shot bolt filler	2½ x ⅛ x 2⅞"
8	Shot bolt stop	⅝ x ⅛ x 6' 3"
4	False floor strips	1 x ⅛ x 1' 7½"
1	Screen strip No. 3A	⅝ x ⅛ x 1' 9¼"
2	Screen strip No. 3C	⅝ x ⅛ x 1' 2¼"
1	Screen strip No. 38	⅝ x ⅛ x 1' 7"
1	Lathe frame left center filler	½ x ⅛ x 4⅝"
1	Lathe frame drawer plate	3 x ⅛ x 2' 5¾"
1	Lathe frame lower drawer brace	1 x ⅛ x 7¾"
1	Lathe frame lower drawer brace	1 x ⅛ x 10½"
2	Locking post guide	2 x ¼ x 3⅞"
8	Shot bolt bracket	3½ x ½ x 4¾"
2	Lathe reinforcement filler	1½ x ⅛ x 4¼"
26	Drawer stops	¾ x ⅛ x 3½"
1	Conduit shield, drill press frame	2 x ⅛ x 1' 2½"
1	Front screen apron	2 x 1/16 x 1' 6¾"
1	Bench top plate hand hole cover	4½ x 1/16 x 5¾"
1	Wing nut pin washers	1⅜ x 1/16 x 1⅜"
12	Drawer cover hinge	1 x 1/16 x 2"
10	Brace (drawer No. 7)	¾ x 1/16 x 1½"
2	Filler "G"	9/16 x 1/16 x 1 3/16"
2	Lathe frame upper drawer bearing	4¾ x 1/16 x 6"
2	Extension bow reinforcement	5½ x 1/16 x 2' 8½"
6	Locking plug, short	½ x ½ x 1½"
7	Locking plug, long	½ x ½ x 1¾"
21	Steel wire rings	⅛" Rd. x 2½
18	Bow pin chain rings	5/32" Rd. x 2½"
1	Pin-locking post end	¼" Rd. x 1"
1	Lock controller pin	3/16" Rd. x 1¼"
4	Wing nut washer	⅝" Rd. x ¼"
1	Wing nut pin	¾" Rd. x 1¼"
1	Wing nut pin	¾" Rd. x 1⅝"
2	Wing nut pin	¾" Rd. x 2¼"
1	Locking post end	⅝" Rd. x 1¼"
1	Locking post pin	3/16" Rd. x 2"
2	Drawer cover hinge rod	⅛" Rd. x 2' 4 5/32"
2	Packing, drawer No. 8	1¼ x 1/32 x 7⅝"

NOMENCLATURE OF PARTS—Continued

Plates and Bars—Continued

Number Per Truck	Description	Size
12	Drop side hinges	1¾ x 1 5/16 x 6½"
4	Tank Strap pin	0.368" Dia. x 2½"
12	Hinge pin, drop side and end	0.5" Dia. x 4⅛"
1	Tank strap pin	0.5" Dia. x 2⅝"
1	Condulet bracket	6 x ⅛ x 8"
6	Bow stop	2 x 3/32 x 5"
2	Support tie piece	2¾ x 3/32 x 1'
1	Locking plate bracket	2 x 3/32 x 3"
3	Bow splice plate	3¾ x 3/32 x 5¾"
6	Bow	4¼ x 3/32 x 7' 8"
1	Extension bow splice	1¼ x 3/32 x 4¾"
1	Extension bow reinforcement splice plate	2 x 3/32 x 3"
1	Wing nut pin base	1¼ x 5/32 x 2¾"
1	Exhaust pipe plate (galvanized iron)	4½ x 18 x 5"
4	Partition "A"	2 x 0.05 x 1' 2⅝"
2	Partition "B"	2 x 0.05 x 1' 4⅛"
2	Partition "C"	2 x 0.05 x 2' 2½"
2	Side screen apron	3 x 1/16 x 2' 9⅜"
4	Handle filler	⅞ x 1/16 x 1⅞"
2	Top screen filler	2¼ x 1/16 x 4⅜"
6	Canvas support brace, rear	¾ x 1/16 x 2' 5"
4	Canvas support reinforcement front	3 x 1/16 x 6"
4	Canvas support reinforcement, rear	3 x 1/16 x 6"
2	Drawer cover hinge bracket	2¾ x 1/16 x 2' 2"
2	Hinge drawer No. 8	1⅜ x 1/16 x 4½"
1	Locking plate rest	1¼ x 1/16 x 2"
1	Front lower tee filler bench cabinet drawer	1¼ x 1/16 x 1½"
1	Front screen filler	4¼ x 1/16 x 1' 10¾"

Shapes

1	Top frame drill press	2½ x 2 x 3/16 x 5' 10"
2	Longitudinal sill, R. & L.	2½ x 2 x 3/16 x 10' 8 5/16"
1	Drop end top reinforcement	2 x 2 x 3/16 x 6' 4"
4	Angles No. 1 and No. 2	2 x 2 x 3/16 x 3' 5¼"
2	Drop end reinforcement	2 x 2 x 3/16 x 1' 11"
4	Drop side reinforcement	2 x 2 x 3/16 x 11' 1"
1	Cross angle No. 2	2 x 2 x 3/16 x 3' 4"
1	Cross angle No. 2	2 x 2 x 3/16 x 3' 4"
1	Cross angle No. 3	2 x 2 x 3/16 x 2' 10¾"
1	Lathe frame front support angle	2 x 1½ x 3/16 x 1' 2½"
1	Bench cabinet front top angle	2 x 1½ x 3/16 x 5' 8¼"
1	Bench cabinet rear top angle	2 x 1 x 3/16 x 5' 8¼"
1	Lathe frame corner angle No. 4	2 x 1½ x 3/16 x 3' 8"
3	Corner angle No. 1 and No. 2 lathe frame	2 x 1½ x 3/16 x 2' 5"
2	Corner angle No. 3 lathe frame	2 x 1½ x 3/16 x 1' 3"
12	Connection plate drop side chain	2 x ¾ x 3/16 x 5"
1	Lathe frame corner angle No. 6	1½ x 1½ x 3/16 x 1' 4"
1	Lathe frame center angle No. 2	1½ x 1½ x ⅛ x 8' 11½"
1	Upper top angle No. 4	1½ x 1½ x ⅛ x 6' 3"
1	Lathe frame corner angle No. 5	1½ x 1½ x ⅛ x 2' 6"
1	Bench cabinet front center angle	1½ x 1½ x ⅛ x 5' 7¼"
1	Bench cabinet center angle No. 1	1½ x 1½ x ⅛ x 3' 1"
2	Bench cabinet center angle No. 2	1½ x 1½ x ⅛ x 1' 6"
28	Center drawer guides	1½ x 1½ x ¼ x 1' 6"
2	Drawer guide, long	1½ x 1½ x ⅛ x 2' 10¾"
1	Bench cabinet center angle	1½ x 1½ x ⅛ x 5' 1¼"
2	Lathe frame corner angle support, front	1½ x 1½ x ⅛ x 1' 8"
3	Lathe frame drawer guide, outer	1½ x 1½ x ⅛ x 2' 2¾"
2	Lathe frame upper top angle No. 3	1½ x 1½ x ⅛ x 9¾"
2	Lathe frame upper top angle Nos. 1 & 2	1½ x 1½ x ⅛ x 4' 10½"
1	Lathe frame center angle No. 1	1½ x 1½ x ⅛ x 4' 10¾"
2	Lathe frame bottom angle No. 1	1½ x 1½ x ⅛ x 4' 1"
1	Lathe frame bottom angle No. 3	1½ x 1½ x ⅛ x 1' 1"
1	Lathe frame bottom angle No. 4	1½ x 1½ x ⅛ x 1' 3"
2	Lathe frame bottom angle No. 2	1½ x 1½ x ¼ x 2' 4½"
6	Canvas bracket	1½ x 1½ x ⅛ x 2' 2"
6	Canvas bracket prop	1½ x 1½ x ¼ x 1' 3¼"
2	Floor angle No. 3	1½ x 1½ x ⅛ x 2' 7"
2	Floor angle, rear, No. 4	1½ x 1½ x ⅛ x 1' 7"
1	Floor angle intermediate No. 5	1½ x 1½ x ⅛ x 2' 10½"
1	Lathe support	1½ x 1½ x 3/16 x 1' 8"
4	Bench cabinet corner angles	½ x 1½ x ⅛ x 2' 9"
2	Bench cabinet rear center angles	1½ x 1½ x ⅛ x 2' 7"
2	Bench cabinet middle side angles	1½ x 1½ x ⅛ x 2' 8⅜"
2	Bench cabinet side top angle	1½ x 1½ x ⅛ x 2' 10¾"
2	Bench cabinet base angle	1½ x 1½ x ⅛ x 4' 2"
2	Cross channel conn. angle	1½ x 1½ x 3/16 x 2¼"
2	Floor box support	1½ x 1½ x ¼ x 2' 10¾"
4	Leg drill press frame	1¼ x 1¼ x ⅛ x 1' 1"
1	Cross angle drill press frame	1¼ x 1¼ x ⅛ x 1¼"
1	Base frame drill press	1¼ x 1¼ x ⅛ x 4' 5¼"
2	Bench cabinet center cross angle	1¼ x 1¼ x ⅛ x 2' 10½"
2	Switchboard frame leg	1¼ x 1¼ x ⅛ x 4' 4½"
2	Floor angle No. 1	1½ x 1½ x ⅛ x 2' 4"

NOMENCLATURE OF PARTS—Continued

Shapes—Continued

Number Per Truck	Description	Size
2	Floor angle No. 2	1½ x 1½ x ⅛ x 2' 1"
2	Canvas extension	1¼ x 1¼ x ⅛ x 11¾"
2	Canvas extension angle	1¼ x 1¼ x ⅛ x 1' 11¾"
2	Screen angle No. 1	1 x 1 x ⅛ x 4' 5"
1	Screen support No. 1	1 x 1 x ⅛ x 1' 3"
2	Screen support No. 2	1 x 1 x ⅛ x 4½"
4	Drawer support	1 x 1 x ⅛ x 2' 9½"
2	Hasp angle lathe frame drawer	1 x 1 x ⅛ x 1¼"
2	Bench cabinet end plate stiffener No. 1	1 x 1 x ⅛ x 1' ¼"
2	Bench cabinet end plate stiffener No. 2	1 x 1 x ⅛ x 9¼"
1	Switchboard frame brace	1 x 1 x ⅛ x 2' 11"
3	Lathe frame drawer support	1 x 1 x ⅛ x 2' 1½"
1	Drop side support brace	1 x 1 x ⅛ x 4¾"
1	Lathe frame lower drawer bearing	1 x 1 x ¼ x 1' 8"
1	Lathe frame lower drawer bearing	1 x 1 x ⅛ x 1' 5"
1	Screen angle No. 6	¾ x ¾ x ⅛ x 6' 1"
2	Bench cabinet door angle end	¾ x ¾ x ⅛ x 1' ¼"
2	Screen angle No. 2	¾ x ¾ x ⅛ x 3' 11"
1	Bench cabinet center plate angle, lower	¾ x ¾ x ⅛ x 5' 4¼"
1	Bench cabinet center plate angle, upper	¾ x ¾ x ⅛ x 5' 4¼"
1	Switchboard frame	¾ x ¾ x ⅛ x 6' 10"
1	Screen angle No. 3	¾ x ¾ x ⅛ x 8' 4"
1	Screen angle No. 4	¾ x ¾ x ⅛ x 3' 3"
1	Screen angle No. 5	¾ x ¾ x ⅛ x 3' 6"
92	Spacer angles	¾ x ¾ x ⅛ x 1½"
1	Bench cabinet, front upper tee	1½ x 1½ x 3/16 x 1' 5¾"
1	Bench cabinet, front lower tee	1½ x 1½ x 3/16 x 1' 5¾"
1	Bench cabinet, center tee	1½ x 1½ x 3/16 x 2' 8½"
1	Bench cabinet, center cross tee	1½ x 1½ x 3/16 x 1' 5¾"
1	Drawer guide, inner	1½ x 1½ x 3/16 x 2' 8½"
1	Cross channel No. 1	3" x 6' ½" x 4.0 lb.
2	Cross channel No. 2 (R&L)	3" x 1' x 4.0 lb.
1	Cross channel No. 6	3" x 5' 6" x 4.0 lb.
4	Cross channel Nos. 3 and 4 (R&L)	3" x 1' x 4.0 lb.
1	Cross channel No. 5	4" x 6' ½" x 5.25 lb.

Steel Forgings

Number Per Truck	Description
4	Chain eye.
2	Shot bolt eye.
6	Drop side catch, lug.
6	Drop side catch, back piece.
12	Top bow pin.
4	Hand hole cover pin.
1	Clamping nut.
4	Strap link.
1	Exhaust pipe bracket No. 2.
12	Hinge pins.
26	Eye rivet.
21	Rings.
4	Clamping bolt.
4	Tank strap pins.
4	Tank strap pins.
2	Air tank clamp screws.
2	Air tank clamp.
2	Air tank clamp support.
2	Air tank support.
2	Air tank clamp support.
1	Locking plate rivet, lathe frame D.
12	Drop side hinge, female.
2	Clamping bolts, air compressor.
4	Shoulder rivets, canvas extension.
2	Stop pins, canvas extension.
2	Filler, canvas extension.
2	Reinforced plate canvas extension.
3	Eye bolts, drill press.
6	Link No. 1 drop side chain.
2	Filler piece, bench cabinet.
1	Hasp pin, lathe frame drawer.
1	Pick handle rest prop.
3	Tie rod, drill press, short end.
1	Tie rod, drill press "B," 4' 3⅞"
2	Tie rod, drill press "B," 2' 3⅜"
1	Hinge pin.
2	Screen pin.
2	Hasp, bench cabinet door.
1	Pick head bracket.
13	Locking arm pin.
6	Canvas bracket rivet, long.

NOMENCLATURE OF PARTS—Continued

Steel Forgings—Continued

Number Per Truck	Description
6	Canvas bracket rivet, short.
2	Canvas bracket brace, long.
2	Canvas bracket brace, short.
2	Link No. 2, drop end chain.
8	Ring, bow pin chains.
2	Drawer pins.
4	Door hinge pins.
3	Locking arm, single.
2	Drawer cover hinge rod.
5	Locking arm, double.
18	Bow spacers.
4	Canvas support pin.
6	Canvas support brace.
4	Door hinge, male.
4	Door hinge, female.
1	Hasp.
1	Hasp.
1	Hasp hinge, bench cabinet.
1	Hook eye.
2	Hanger No. 2 (acetylene tank).
2	Hanger No. 3 (oxygen tank).
2	Clamping lug No. 2.
2	Strap, upper, No. 2.
2	Strap, upper, No. 1.
2	Strap, lower, No. 1.
2	Strap, lower, No. 2.
2	Clamping lug No. 1 (oxygen tank).

Electrical Material

Number Per Truck	Description	Size
8	Condulet ells (without covers), type LL-11	½ x ½
4	Condulet ells (without covers), type LR-11	½ x ½
1	Condulet ells (without covers), type LB-33	1 x 1
4	Condulet tees (without covers), type T-111	½ x ½ x ½
8	Condulet bodies (without covers), type E-1	½"
3	Condulet bodies (without covers), type C-1	½"
1	Condulet bodies (without covers), type A-1	½"
1	Condulet bodies (without covers), type E3	1"
1	Condulet bodies (without covers), type B1	½"
1	Condulet ell (without cover), LB-33	1"
2	Condulet covers (composition), type CF-1400.	
1	Condulet covers (composition), type CF-12.	
1	Condulet covers (composition), type CF-33.	
1	Condulet cover, type JR-12.	
2	Condulet covers (blank metal, galvanized), type 300.	
15	Condulet covers (blank metal, galvanized), type 100.	
10	Receptacles, type JR-1.	
11	Condulet gaskets, type GASTK-1.	
1	(T&B) Condulet bushing	1"
6	(T&B) Condulet bushing	½"
1	(P&S) Receptacle No. 61,072, complete with wood screws.	
10	Conduit, iron, loricated feet	1"
68	Conduit, iron, loricated feet	½"
1331½	No. 14 wire, rubber covered, single braid, solid copper, feet.	
108	No. 12 wire, rubber covered, single braid, solid copper, feet.	
31	No. 4 wire, rubber covered, single braid, solid copper, feet.	
4	No. 16 B. & S. gauge. Packing house cord, feet.	
2	Attachment plugs, Edison base, wood enameled fuseless.	
1	Galvanized conduit strap	1"
5	Galvanized conduit strap	½"
5	Conduit pipe straps	1 x 24 x 3"
1	C. H. type QEE condulet body.	
1	C. H. type BP-50 plugs.	
1	Mall. iron street ells, 1".	
1	4½ lineal feet No. 6 D. B. R. C. stranded copper wire.	
1	1" Standard conduit bushing.	
1	1" Standard conduit locknuts.	
1	4" 1" Standard conduit, black enameled.	
1	30' 3½" No. 6 twin conductors, flexible cable.	

Commercial Pipe and Fittings

1	Drain pipe	⅛" x 4' 8" long
1	Exhaust pipe	1¼" x 6' long
6	Bow spacers	⅜ x 1 5/16" long
4	Canvas supp. ext.	⅛ x 1 3/16"long
6	Bow spacers top	¼ x 1 1/16" long

NOMENCLATURE OF PARTS—Continued

Commercial Pipe and Fittings—Continued

Number Per Truck	Description	Size
6	Bow spacers	¼ x 1¼" long
1	Locking post	½ x 2' 5 7/16" long
4	Elbows	1¼"
2	Brass unions	1"
1	Galvanized iron tee	1"
3	Galvanized iron elbows	1"
1	Brass steam cock	1"
3	Close nipples	1"
1	Coupling without bead	1¼"
1	Union, ground joint	1¼"

Hex. Head Bolts

1	Conduit support strap to bow	3/16 x ½"
8	Canvas support brace (rear)	¼ x 1½"
51	Bow spacer angles	¼" x 1½/
4	Rheostat to lathe frame	¼ x 3"
8	Switchboard frame	5/16 x 1¾"
1	Switchboard frame brace	5/16 x 2¼"
2	Switchboard frame, stiffener bracket	5/16 x 1"
4	Emery wheel to cabinet	5/16 x 2¾"
4	Canvas support reinforcement (front)	⅜ x 1¾"
12	Lathe frame to body floor	⅜ x 2½"
2	Rheostat block to lathe frame	⅜ x 8¼"
4	Bench cabinet and support tie piece	⅜ x1½"
4	Lathe to frame	⅜ x 1½"
2	Drill press frame and floor	½ x 3"
2	Drill press frame and floor	½ x 2¾"
6	Tank arm support to frame	½ x 1⅝"
3	Vise and drop side	½ x 1½"
4	Pipe vise and bench cabinet	½ x 2¾"
1	Tank arm support to frame	½ x 1¼"
1	Tank arm support to frame	½ x 1⅞"
22	Drop side hinges	½ x 3"
2	Bench cabinet base angle	½ x 2½"
4	Gas engine to floor	⅝ x 3"
4	Drill press and frame	⅝ 2½"
3	Vise and bench cabinet	⅝ x 2¾"
14	Floor frame to chassis	¾ x 1¾"

Carriage Head Bolts

8	Bench cabinet door floor to door	¼ x 1"
12	Drawer stop to center plate (upper and lower)	¼ x 1½"
16	Rear center floor to supports	¼ x 1¼"
1	Packing drawer No. 16, I. W. W.	¼ x 2⅜"
16	Bench top and bench top plate	5/16 x 1¾"
6	Bench top and bench top plate	5/16 x 5"
1	Long stud, drawer No. 16	3/16 x 2⅞"
44	Floor to frame	⅜ x 2¼"
2	Floor to frame	⅜ x 2½"
6	Floor to frame, end	⅜ x 2⅜"

Bolts

6	Bow supp. and bow stop	⅜ x 2¼", Sq. head
2	Exhaust pipe bracket No. 2	⅜ x 1⅛", Sq. head
2	Lathe motor to lathe	⅜ x 1⅜", Sq. head Tap bolt
2	Screen support No. 1	⅜ x ¾", thread ⅝" long
8	Switchboard cover	¼ x ⅜", thread ¼" long
4	Screen support No. 2	⅜ x ¾", thread ⅝" long
2	Lathe and support	⅜ x ¾", thread ⅝" long

Round-Head Machine Screws with Nuts

2	Condulet and bracket	No. 14-20 x ⅞"
4	Front screen filler	No. 10-30 x ½"
2	Screen support No. 1	No. 10-30 x ½"
2	Screen support No. 2	No. 10-30 x ½"
2	Condulet bracket and end plate	No. 14-20 x ⅝"
26	Drawer stops (without nuts) threaded full length	No. 24-16 x ¾"
2	Bracket, end plate and switchboard leg	No. 14-20 x ¾"
2	Conduit support strap to bow	3/16"

Standard Hex. Nuts

2	3/16".
104	¼".
129	⅜".
47	5/16".
55	½".
9	Hanger eye bolt, compressed air tank ⅝"
14	Floor frame to chassis ¾"

NOMENCLATURE OF PARTS—Continued

Standard Hex. Nuts, L. H. Thread

Number Per Truck	Location	Size
4	Canvas bracket cross brace turnbuckle	¼"
2	Tie rod turnbuckle	⅝"

Lock Washers

25	National lock washers	3/16"
95	National lock washers	¼"
37	National lock washers	5/16"
127	National lock washers	⅜"
7	National lock washers	⅝"
57	National lock washers	½"

Wrought Washers

4	Emery wheel to cabinet	5/16"
10	Canvas support, reinforced front	⅜"
41		¼"
4		⅝".
10		½"

Crown Nuts

4	Canvas support reinforced	⅜"
4	Drop end chain eye	½"

Cap Screws

14	Drop side hinges	½ x 2½", Csk. head
34	Floor to side and rear sills	⅜ x 2⅝", Csk. head

Countersunk Flat-Head Machine Screws with Square Nuts

8	False floor strip (rear)	No. 14-24 x 2"
1	Condulet and bracket	No. 14-20 x 1⅛"

Spring Cotters

2	Air compressor clamping bolt	⅛ x ¾"
4	Clamping bolt	⅛ x 1½"
24	Hinge pin	5/32 x 1"
13	Locking arm pin	3/32 x ½"
4	Canvas support pin	⅛ x 1¼"
4	Drop end chain eye	⅛ x 1½"
4	Canvas support reinforced, front	3/32 x 1"
2	Canvas extension pin	3/32 x 1"
2	Hanger eye bolt, comp. air tank	⅛ x 1¼"
16	Strap pin	⅛ x 1"

⅝" Jam Nuts, ⅜" Thick

2	Hanger eye bolt, comp. air tank	⅝"

Lock Nuts

1	Conduit at bench cabinet	½"

Round-Head Brass Machine Screws

2	Instruction plate—drill press	No. 6-40 x ¼"

Flat Head Wood Screws

153	Canvas support strip No. 1	¼" x No. 8
76	Canvas support strip No. 2 and end strip	1¼" x No. 8
4	End support and strip front	1¼" x No. 8
32	Canvas support reinf., front	½" x No. 8
24	Canvas support reinf., rear	½" x No. 8
11	Canvas support reinf., front	⅝" x No. 8
44	Canvas support reinforcement	1" x No. 8

NOMENCLATURE OF PARTS—Continued

Round Head Wood Screws

Number Per Truck	Description	Size
20	Bench cabinet center plate and rear floor	¾" x No. 8
28	Canvas support extension	¾" x No. 8
20	Canvas support, rear	1¼" x No. 8
8	Extension reinforcement	1⅜" x No. 8
2	No. 8 drawer hinge	½" x No. 8
4	Packing drawer No. 8	½" x No. 6

R. H. Stove Bolts with Nuts

2	Hand hold cover to bench top plate	3/16 x ⅝"
7	Conduit clamps and front plate	¼ x ¾"
2	Bench top plate and center side angles	¼ x ½"
12	Lantern bracket and drop side	3/16 x ⅝"
6	Bucket holder and drop side	¼ x ⅝"

Countersunk Head Stove Bolts with Nuts

11	Canvas supp. reinf., front and rear	3/16 x 2¼"
4	Extension bow, reinf. and knee	¼ x 1½"
2	Canvas extension	3/16 x 2¼"

No. 12 R. H. Wood Screws

4	Condulet mud guard	1"

Brass Belt Rivets

8	Drawer No. 8 (with burs)	1⅛" x No. 10
19	Drawer No. 4 (with burs)	1⅛" x No. 10
22	Drawer No. 3 (with burs)	1⅛" x No. 10
6	Drawer No. 10 (with burs)	1⅛" x No. 10
25	Switchboard cover (no burs)	½" x No. 10
21	Bench cabinet drawers (without burs)	¾" x No. 10
2	Drawer No. 16 (no burs)	½" x No. 10
48	Chain wearing strips to drop sides	⅞" x No. 8

Flat Head Brass Wood Screws

4	No. 8 drawer hinge	½" x No. 8
4	No. 10 drawer lining	¾" x No. 8
4	No. 1 drawer block I. R.	¾" x No. 8
4	Canvas extension (in slow stock)	¾" x No. 8
12	Chest handle to false floor	¾" x No. 12
2	Canvas extension (slow stock)	1¼" x No. 7
8	Bench top plate and bench top	1¼" x No. 10
4	Extension bow reinforcement	¾" x No. 10
4	Exhaust pipe plate	1" x No. 10
16	Suit case stops, bench cabinet	2" x No. 14

Round Head Wood Screws

4	Conduit supp. strap	1¼" x No. 10
18	Extension bow reinforcement	¾" x No. 10

Miscellaneous

8	Shot bolts—4R-4L.
1	Stud, long (aluminum casting).
1	Stud, short (C. R. bronze), ⅝" dia. x ½"
12	Eye rivets
4	Door hinges, male.
4	Door hinges, female.
1	Instruction plate drill press, sheet brass — 1 x 1/16 x 6"
2	Drop end chain, outer 3' ½" long — 5/16 twist link
6	Drop side chain, 2' 7¼" long — 5/16 twist link
6	Canvas bracket prop 7⅝" long — Twist link chain
6	Bow pin 9½" long — Twist link chain
1	Harness snap 5" long — Twist link chain
2	Bench cabinet door 1' 5⅝" long — Twist link chain
2	Chest handle, false floor.
3	Turn buckles, ⅜" for tie rods.
4	Turn buckles, ¼" for tie rods.
2	Galvanized wire netting, 4" mesh, .049 wire, Screen No. 1 — 19⅝ x 2' 4¼"
1	Galvanized wire netting, 4" mesh, .049 wire, Screen No. 3 — 29" x 4' 4"
1	Galvanized wire netting, 4" mesh., .049 wire, Screen No. 2 — 15⅛ x 1⅜"

NOMENCLATURE OF PARTS—Continued

Miscellaneous—Continued

Number Per Truck	Description	Size
3	Bar sash lift (drawer-pull), for screens.	
32	Bar sash lift (drawer-pull), for drawers.	
1	Rawhide thong ⅜" wide, 4' 9" long, for screen.	
4	Wing nuts, cast bronze.	
1	Locking post support, cast bronze.	
1	Tool post holder, cast bronze.	
1	Aluminum copper alloy block.	
1	Spring torsion.	
2	Spring, hard sheet brass.	
1	Bolt snap, bench cabinet chain.	
6	Bolt snap, body drop side chains.	

BODY FITTINGS.

1 Number plates.
All other body fittings listed as load on page 152.

NOTE

The following list gives, in alphabetical order, the list of parts, tools and equipment classified as body load. This includes the tools regularly supplied together with the various spare parts and equipment which goes with them.

BODY LOAD

No. per Truck	Item	Specifications	Location on Truck
1	Ammeter	No. 1002 Eveready, 0-35 amp. range	Drawer No. 12
2	Batteries	Tungsten, American Eveready No. 793	Drawer No. 12
1	Blocks	Drill, with Clamp	Drawer No. 12
1	Book	American Machinists' Handbook	Drawer No. 7
1	Book	"Audel's Automobile Questions and Answers for Operators and Repairmen"	Drawer No. 7
1	Book	"Automobile Repairing Made Easy." By Victor W. Page.	Drawer No. 7
1	Bulbs	For Flashlight, Mazda 2.7-volt	Drawer No. 12
20	Bulbs	50-watt Carbon, 110-volt	Drawer No. 11
1 set	Bushing	Expansion for Taper Mandrels. 23 in set, ½" to 1⅞", advancing by sixteenths	Drawer No. 8
1	Calipers	10", Outside, Lock Joint Transfer	Drawer No. 1
1	Calipers	10", Inside, Lock Joint Transfer	Drawer No. 1
1	Calipers	6", Hermaphrodite, Firm Joint, with Adjustable Point	Drawer No. 1
1	Calipers	6", Outside, Spring	Drawer No. 1
1	Calipers	6", Inside, Spring	Drawer No. 1
1	Calipers	3", Outside, Spring	Drawer No. 1
1	Calipers	3", Inside, Spring	Drawer No. 1
1	Calipers	3", Pocket, Slide Rule, English	Drawer No. 1
1	Calipers	Micrometer, Inside, Set 10 Extension Rods. 1 Gauge, ½". 1 Case, Leather	Drawer No. 2
1	Calipers	Micrometer, Outside, Metric (set) 1—0 to 25 mm. (2 standards, 1 leather case). 1—25 to 50 mm. 1—50 to 75 mm	Drawer No. 2
1	Calipers	Micrometer, Outside, Set 1—1" Caliper. 1—2" Caliper. 1—3" Caliper. 1 Test Gauge, 1". 1 Test Gauge, 2". 2 Adjustable Wrenches. 1 Leather Case.	Drawer No. 2
2	Chisels	6", Cold, ⅜" Octagon Steel	Drawer No. 10
2	Chisels	6", Cold, ½" Octagon Steel	Drawer No. 10
2	Chisels	5", Cold, ¼" Octagon Steel	Drawer No. 10
2	Chisels	8", Cold, ¾" Octagon Steel	Drawer No. 10
1	Chuck	Combination Screw Geared, 3-jaw, rated size 6"	Drawer No. 17
2	Chucks	Drill, capacity 0 to ½", with No. 2 Morse Taper Shank	Drawer No. 12
1	Clamp	Hose, Adjustable	Compressor tool box

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
2	Chucks	Key	Drawer No. 12
2	Clamps	"C" (Vulcan), 2¼"	Floor Box
2	Clamps	"C" (Vulcan), 6½"	Floor Box
2	Clamps	"C" (Vulcan), 4½"	Floor Box
2	Clamps	Tool Maker, 1¾"	Drawer No. 12
2	Clamps	Tool Maker, 3½"	Drawer No. 12
1	Clippers	Bolt, 18" long, $\frac{1}{16}$" capacity	Drawer No. 10
2	Compound	Valve Grinding, 7 oz. box	Drawer No. 13
1	Copper	Soldering, 1½ lb., pointed pattern, with handle	Drawer No. 10
1	Copper	Soldering, ¾ lb., pointed pattern, with handle	Drawer No. 10
1	Compressor	Air, Unit Consisting of: 1 Compressor, 2½"x3". 1 Base, with Idler. 1 Motor Compound Wound, 1½ h.p., 1700 r.p.m.	Lathe frame
1	Countersink	82°, Round Shank, ⅝" dia	Drawer No. 12
1	Countersink	82°, Square Shank, ⅝" dia	Drawer No. 12
1	Countersink	90° Angle, Shank ½" dia., Body 1" dia., 2¼" long	Drawer No. 12
1	Cover	Canvas, for Bench Grinder	
1	Cover	Canvas, for Generating Unit	
1	Cover	Canvas, for Drill Press	
1	Cover	Canvas, for Lathe	
1	Cover	Canvas, for Truck	
1	Cover	Canvas, for American Machinists' Handbook. Pc. Mk. A.	Drawer No. 7
1	Cover	Canvas, for "Automobile Questions and Answers." Pc. Mk. B	Drawer No. 7
1	Cover	Canvas, for "Automobile Repairing Made Easy." Pc. Mk. C	Drawer No. 7
1	Cutters	Side Milling, ¼"	Drawer No. 12
1	Cutters	Side Milling, $\frac{1}{16}$"	Drawer No. 12
1	Cover	Canvas, for Searchlight	Rear upper Compartment
1	Cutters	Side Milling, ⅜"	Drawer No. 12
1	Cutters	Side Milling, $\frac{1}{16}$"	Drawer No. 12
1	Cutters	Side Milling, ½"	Drawer No. 12
1	Cutters	Milling, 45° Angle, R. H., ½"x2½"x⅞"	Drawer No. 12
1	Cutters	Milling, 45° Angle, L. H., ½"x2½"x⅞"	Drawer No. 12
1	Cutters	Milling, Convex, Carbon Steel, ⅛"	Drawer No. 12
1	Cutters	Milling, Convex, Carbon Steel, ¼"	Drawer No. 12
1	Cutters	Milling, Convex, Carbon Steel, ⅜"	Drawer No. 12
1	Cutters	Milling, Convex, Carbon Steel, ½"	Drawer No. 12
1	Cutters	Milling, 60° Double Angle, ½"x2½"x⅞"	Drawer No. 12
1	Cutters	Slitting, $\frac{1}{32}$"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Slitting, $\frac{1}{16}$"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Slitting, $\frac{1}{32}$"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Slitting, $\frac{1}{32}$"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Slitting, ⅛"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Slitting, $\frac{1}{32}$"x2½"x⅞" Hole	Drawer No. 12
1	Cutters	Threading, single point, U. S. Form Thread, to cut standard pitches, 6 to 20. inclusive. Set consists of: 1 Cutter, No. 00T, single point. 1 Cutter, No. 50, single point.	Drawer No. 8
1	Cutters	Circular, Glass, Adjustable, 3" to 22", with graduated bar and locking device	Drawer No. 12
1	Cylinders	Oxygen, 200 cu. ft. capacity, filled	
1	Cylinders	Acetylene, 200 cu. ft. capacity, filled	
1	Die-Stock	A.S.M.E. Standard, set. Set consists of: 13 Dies and Collets, complete. 13 Taper Taps. 13 Plug Taps. 13 Bottoming Taps. Nos. 0—80 Nos. 4—48 Nos. 8—36 1—72 5—44 9—32 2—64 6—40 10—30 3—56 7—36 12—28 14—24 1 Tap Wrench, adjustable. 1 Die Stock.	Drawer No. 2
1	Dividers	6" Spring	Drawer No. 1
1	Dividers	3" Spring	Drawer No. 1
1	Dogs	Lathe, Clamp, 1¾"	Drawer No. 16
1	Dogs	Lathe, Clamp, 2¾"	Drawer No. 16
1	Dresser	Emery Wheel, ⅝"x10"	Drawer No. 10
1	Drill	Electric, Portable, Type EE, Cincinnati, 110-volt, D.C. Capacity, ⅞" Steel. No. 2 Slip Socket. 30' Extension Cord.	Floor box
1	Drill	Hand and Breast, with Chuck. Capacity 0 to ⅜"	Drawer No. 15

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
1	Drill, Press	Sensitive, Bench Type, Friction Drive, Motor, ½ h.p., 110-volt, D.C. 1 V Block. 1 Cup Center. 1 Point Center.	
37	Drills, Twist	Taper Shank, ½″ to 1¼″. Sizes advancing by 64ths, ½″ to 1″. Advancing by sixteenths from 1 1/16″ to 1¼″, inclusive. Standard Morse Taper	Drawer No. 3
84	Drills, Twist	Straight Shank, Carbon Steel. 14 Sizes, 6 of each, 1/16 to 11/64, advancing by 64ths	Drawer No. 4
21		7 Sizes, 3 of each, 13/64″ to 25/64″, advancing by 64ths	Drawer No. 4
16		8 Sizes, 2 of each, 13/32″ to ½″, advancing by 64ths	Drawer No. 4
1	Drill and Countersinks	1/16″ Drill, 11/64″ Body	Drawer No. 12
2	Drill and Countersink	3/32″ and 1/16″ dia. Drill, .302 dia. of Body	Drawer No. 12
1	Drill Holder	No. 2 Morse Taper	Drawer No. 16
1	Drill Drift	No. 2 Morse	Drawer No. 3
1	Extension Cord	20′ No. 18 P. K. W. P. Cord 1 Lamp Guard, No. 112. 1 Swivel Attachment Plug. 1 Aluminum Shell Socket, with wooden handle.	Floor Box
2	File, Flat	10″, Double Cut, Bastard	Drawer No. 9
3	File, Flat	12″, Double Cut, Bastard	Drawer No. 9
1	File, Flat	14″, Double Cut, Bastard	Drawer No. 9
2	File, Flat	10″, Double Cut, Second Cut	Drawer No. 9
3	File, Flat	12″, Double Cut, Second Cut	Drawer No. 9
1	File, Half Round	10″, Double Cut, Bastard	Drawer No. 9
1	File, Half Round	12″, Double Cut, Bastard	Drawer No. 9
1	File, Half Round	6″, Double Cut, Second Cut	Drawer No. 9
1	File, Half Round	8″, Double Cut, Second Cut	Drawer No. 9
1	File, Half Round	10″, Double Cut, Second Cut	Drawer No. 9
1	File, Half Round	12″, Double Cut, Second Cut	Drawer No. 9
1	File, Round	6″, Double Cut, Second Cut	Drawer No. 9
1	File, Round	8″, Double Cut, Second Cut	Drawer No. 9
1	File, Round	10″, Double Cut, Second Cut	Drawer No. 9
1	File, Round	12″, Double Cut, Second Cut	Drawer No. 9
2	File, Round	12″, Double Cut, Bastard	Drawer No. 9
4	File, Mill	6″, Single Cut, Smooth	Drawer No. 9
1	File, Mill	8″, Single Cut, Smooth	Drawer No. 9
2	File, Mill	10″, Single Cut, Smooth	Drawer No. 9
1	File, Mill	12″, Single Cut, Smooth	Drawer No. 9
2	File, Mill	8″, Single Cut, Bastard	Drawer No. 9
2	File, Mill	10″, Single Cut, Bastard	Drawer No. 9
2	File, Mill	12″, Single Cut, Bastard	Drawer No. 9
1	Files, Square	6″, Double Cut, Second Cut	Drawer No. 9
1	Files, Square	8″, Double Cut, Second Cut	Drawer No. 9
1	Files, Square	10″, Double Cut, Second Cut	Drawer No. 9
1	Files, Square	12″, Double Cut, Second Cut	Drawer No. 9
2	Files, Square	12″, Double Cut, Bastard	Drawer No. 9
1	Files, Square	14″, Double Cut, Bastard	Drawer No. 9
4	File, Taper Saw	4″, Single Cut. Pc. Mk. U69Q	Drawer No. 9
2	File, Taper, Saw	6″, Single Cut. Pc. Mk. U69S	Drawer No. 9
2	Files, Taper, Saw	8″, Single Cut, Second Cut	Drawer No. 9
2	Files, 3 Square	6″, Slim, Double Cut, Second Cut	Drawer No. 9
1	Flashlight	No. 1991, Eveready	Drawer No. 12
1	Funnels	Filtering, Set This includes: 1 Small Special Funnel. Pc. Mk. U46E. 1 No. 2 Filtering Funnel. 3 Filtering Rings for No. 2 Funnel. 1 Container Box. Pc. Mk. 1E.	Bench cabinet
20	Fuse	5-amp. Union, 250-volt	Drawer No. 12
20	Fuse	10-amp., N. E. C. Union, 250-volt	Drawer No. 12
40	Fuse	20-amp., N. E. C. Union, 250-volt	Drawer No. 12
20	Fuse	50-amp., N. E. C. Union, 250-volt	Drawer No. 12
1	Gauge	Center	Drawer No. 1
1	Gauge	Micrometer, Depth, with 2 extra rods	Drawer No. 1
1	Gauge	Screw Threading Tool, 29°, includes setting gauge	Drawer No. 1
1	Gauge	Worm Thread	Drawer No. 1
1	Gauge	V-Thread, Screw Pitch	Drawer No. 1
1	Gauge	Jobbers Drill, 1/16 to ½″	Drawer No. 1
1	Gauge	Thickness, 9-Blade	Drawer No. 1
1	Gauge	Universal Surface, with 9″ Spindle, base not hardened	Drawer No. 1
1	Generating Unit	Universal, 4-kw., 110-volt, D.C., with Switchboard. This includes: 4 Pairs Connecting Rod Bearings. 4 Piston Rings, 1/8″. 2 Piston Rings, 1/16″. 2 Cylinder Head Gaskets. 2 Valves. 1 Valve Tappet. 8 Armature Brushes. 4 Spark Plugs.	Drawer No. 11 Drawer No. 11 Drawer No. 11 Drawer No. 11 Drawer No. 11 Drawer No. 11 Drawer No. 11 Drawer No. 11
1	Grinder	Automobile Valve	Drawer No. 13

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
1	Grinder	Bench, 110-volt, D.C., ½ h.p. This includes: 2 Alundum Wheels, 10″x1″, Grain 46, Grade 0. 2 Adjustable Steel Guards. 1 Detachable Water Pot. 1 Electric Operating Switch.	
1	Grinder	Tool Post, ¼ h.p., 110-volt, D.C. This includes: 1 Alundum Wheel, 4½x⅜″. Grain 3860, Grade N. 1 Alundum Wheel, 1½″x⅜″. Grain 3860, Grade N. 1 Extension Mandrel, 4½″ long, ⅜″ diameter. 1 Tooth Rest. 1 Shank, ⅝″x1″x4½″. 2 Cords, Extension, 7′, with Fuse Plugs. 2 Fuse Plugs extra.	Drawer No. 15
1	Grinder Wheel	Norton Alundum, 4½″x⅜″. Grain 3860, Grade N. (Extra for Tool Post Grinder)	Drawer No. 15
1	Grinder Wheel	Norton Alundum, 1½x⅜″. Grain 3860, Grade N. (Extra for Tool Post Grinder)	Drawer No. 15
2	Grinder Wheel	Norton Alundum, 10″x1″. Grain 46, Grade N. (Extra for Bench Grinder)	Drawer No. 6
1	Hack Saw	Frame, Adjustable	Drawer No. 10
12	Hack Saw	Blades, 10″, 24 teeth	Drawer No. 10
12	Hack Saw	Blades, 10″, 14 teeth	Drawer No. 10
1	Hammer	Claw, Bell Face, 1 lb., 3 oz.	Drawer No. 10
1	Hammer	Machinist's, Ball Pein, 12 oz.	Drawer No. 10
1	Hammer	Machinist's, Ball Pein, Octagon, 1 lb.	Drawer No. 10
1	Hammer	Rounding, 2 lb.	Drawer No. 10
1	Hammer	Pneumatic This includes: 6 Sets Buttonhead Rivet, 3/16″, ¼″, 5/16″, ⅜″, 7/16″, ½″. 12 Chipping Chisels, 2 ea., ¼″, ⅜″, ½″, ⅝″, ¾″. 1 Wrench Spanner. 1 Nipple, ⅜″ for ½″ Hose.	Compressor box
1	Holder	Boring Tool, No. 80 This includes: 1 Sleeve Bar. 1 Cutter, 45°. 1 Cutter, 90°. 1 Wrench.	Drawer No. 8
1	Holder	Cutting-off Tool, No. 20-R, ⅜″x¾″	Drawer No. 8
1	Holder	Cutting-off Tool, No. 30-R, ⅜″x¾″	Drawer No. 8
1	Holder	Cutting-off Tool, No. 30-L, ⅜″x¾″	Drawer No. 8
1	Holder	Side Tool, No. 30-R, ⅜″x¾″	Drawer No. 8
1	Holder	Side Tool, No. 30-L, ⅜″x¾″	Drawer No. 8
1	Holder	Threading Tool, No. 50, ⅜″x⅞″	Drawer No. 8
1	Holder	Turning Tool, No. 0S, ⅜x⅞x5″, Straight Shank This includes: 2 Cutters, ¼″ High Speed. 1 Hex. Head Cam. 1 Hardened Wrench.	Drawer No. 8
1	Holder	Turning Tool, No. 0R, ⅜x⅞x5½″. Right Hand, Off-set Shank This includes: 2 Cutters, ¼″ High Speed. 1 Hex Head Cam. 1 Hardened Wrench.	Drawer No. 8
1	Holder	Turning Tool, No. 0L, ⅜x⅞x5½″. Left Hand, Off-set Shank This includes: 2 Cutters, ¼″ High Speed. 1 Hex Head Cam. 1 Hardened Wrench.	Drawer No. 8
1	Indicator	Test, Universal	Drawer No. 1
7	Locks	With Chains	On truck
1	Ladle	Metal, 1¼ pt. The Fairbanks Company	Bench cabinet
3	Lamp Stands	Portable Adjustable Floor, No. 1. Mathews, with 12′ Cord	Bench cabinet
1	Lathe	9″, with Taper Attachments This includes: 1 Block, 2″, for Straight Tool Post 2 Bolts, Steady Rest (Spare) 1 Bolt, Steady Rest, with Blocking 4 Centers, Point No. 2 Morse 1 Chart, Metric Gear Change 1 Chart, Milling and Gear Cutting Attachment 1 Chuck "Draw-in" 1 Clamp, for Steady Rest 10 Collets, No. 2 Split 1/8, 5/32, 3/16, 7/32, ¼, 9/32, 5/16, 3/8, 7/16, ½ 1 Dog Lathe Center 1 Gears, Metric Transposing 11 Gears, Regular Set	On body platform Drawer No. 16 Drawer No. 16 Drawer No. 16 Drawer No. 16 Drawer No. 17 Drawer No. 17 Drawer No. 17 Drawer No. 17 Drawer No. 8 Drawer No. 17 Drawer No. 17 Drawer No. 17

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
		1 Gear, 45-tooth	Drawer No. 17
		1 Gear, 80-tooth	Drawer No. 17
		1 Guard, Spindle	Drawer No. 16
		1 Milling and Gear Cutting Attachment. Consists of:	
		1 Vertical Slide Column	Drawer No. 17
		1 Clamp for Vertical Slide Column	Drawer No. 17
		1 Clamp for Bar Support	Drawer No. 17
		1 Crank for Vertical Column	Drawer No. 17
		1 Crank, Dividing Head	Drawer No. 17
		1 Cutter-block, with Shaft and Collar	Drawer No. 17
		1 Dividing Head	Drawer No. 17
		1 Overhanging-bar, with Tail Center	Drawer No. 17
		1 Support, Overhanging Bar	Drawer No. 17
		1 Vise, Milling	Drawer No. 17
		1 Motor, Shunt Wound, ¾ h.p., 115-volt, D.C., with Rheostat	
		1 Plate, face 9″	Drawer No. 16
		1 Post, Tool Straight, including:	
		1 Washer	Drawer No. 16
		1 Rocker	Drawer No. 16
		1 Screw	Drawer No. 16
		1 Wrench	Drawer No. 16
		1 Rest, Follow	Drawer No. 16
		1 Rest, Steady	Drawer No. 17
		1 Sleeve, Lathe Center	Drawer No. 16
		1 Wrench, Tail Stock	Drawer No. 16
7	Mandrels	Taper, Nos. 3 to 9, inclusive	Drawer No. 8
8	Mills	End, Spiral, No. 1 Morse Taper. Right Hand, ¼″, 5/16″, ⅜″, 7/16″. Left Hand, ¼″, 5/16″, ⅜″, 7/16″	Drawer No. 8
8	Mills	End, Spiral, No. 2 Morse Taper. Right Hand, ½″, 9/16″, ⅝″, ¾″. Left Hand, ½″, 9/16″, ⅝″, ¾″	Drawer No. 8
2	Parallels	⅜″x¾″x6″	Drawer No. 1
1	Paulin	12′x12′	On truck
2	Parallel	½″x1″x6″	Drawer No. 1
1	Plates	Automobile Screw, ¼″ to 1″, S. A. E. Standard. This includes: 1 Stock, 22″ long. 11 Plug Taps. 11 Dies and Guides, 2 1/16″ O. D. 5/16″—18. Sizes ¼″—28, 5/16″—18, 5/16″—24, 11/16″—16, ⅜″—24, ¾″—16, 7/16″—20, 7/8″—14, ½″—20, 1″—14	Drawer No. 5
1	Pliers	Long Round Nose, 5½″	Drawer No. 1
1	Pliers	Curve Nose, 5½″	Drawer No. 1
3	Punch	Machine Center	Drawer No. 1
1	Reamer	Hand, set of 25, advancing by 32nds, ¼″ to 1″	Drawer No. 4
1	Reamer	Taper Pin, No. 0 to 5, set	Drawer No. 4
1	Rule	3″, Graduation	Drawer No. 1
1	Rule	6″, Graduation	Drawer No. 1
1	Rule	6″, Flexible, Graduation	Drawer No. 1
4	Rule	Metric Folding	Drawer No. 2
1	Rule	36″ Steel, English Graduation	Drawer No. 17
1	Screwdriver	4″, Perfect Handle	Drawer No. 10
2	Screwdriver	6″, Perfect Handle	Drawer No. 10
1	Screwdriver	8″ Perfect Handle	Drawer No. 10
4	Scale	Flexible, 300 mm	Drawer No. 2
4	Scale	Semi-Flexible, 150 mm	Drawer No. 2
1	Scribers	Adjustable Sleeve	Drawer No. 1
2	Sleeves	With No. 1 Morse Taper Hole and No. 2 Morse Taper Outside	Drawer No. 3
1	Snips	10″ Tinner, Forged Steel	Drawer No. 10
1	Square	3″ try, Solid Steel	Drawer No. 1
1	Square	6″ try, Solid Steel	Drawer No. 1
1	Square	4″ Patent Double, 2 Blades and Stock	Drawer No. 1
1	Square	12″ Combination Set	Drawer No. 1
1	Stove	Sibley, complete with:	On truck
		1 Tent Shield	Lathe frame
		4 Joints Pipe	Lathe frame
		1 Elbow	Lathe frame
1	Tank	Compressed Air, 14″ dia. x 48″ long, No. 12 Std. Black Iron Shell, No. 7 Std. Black Iron Ends. Test, 150 lbs. per sq. in., with ¾″ inlet and outlet connections, ¾″ safety valve connection, ¼″ gauge connection, ¾″ drain cock connection	On drop end
		This includes:	
		1 Clamp, Hose, Adjustable	Drawer No. 10
		1 Cock Drain, ⅜″, Brass	
		1 Coupling, Hose, male half	Compressor box
		1 Coupling, Hose, female half	Compressor box

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
		2 Coupling, ½" Hose, female end, outside ¾" thread	Drawer No. 12
		1 Gauge, pressure, cast with screwed on ring dial, approx. 2½" indestructible face, 200 lb. capacity, arranged for back connection ¼" pipe thread	
		2 Hose, Pneumatic ½", 5 ply 25', armored, coupling each end	Bench cabinet
		1 Hose, Pneumatic ½", 6', 3-braid, ½" coupling on one end	Bench cabinet
		1 Hose, Pneumatic ¾", bronze metal, 10' long, with ¾" union pipe coupling at each end	Bench cabinet
		4 Nipples, ¾" pipe, 2" long	Compressor box
		2 Nipples, ¾" pipe, 4" long	Compressor box
		1 Tee, ¾" Malleable Iron	Compressor box
		2 Valves, ¾" globe, No. 12 Brass body. Soft disc for 150 lb. pressure	Compressor box
		1 Valve, ¾" Consolidated, safety pop with soft disc, to blow-off at 150 lb. pressure	Compressor box
		1 Valve, ¾" check, horizontal brass body, soft disc, 150 lb. pressure	Compressor box
1 set	Tap & Die Metric Set	French and International Standard. This contains (in hardwood case): 1 Die-Stock, No. 6, for 20.6 mm. O. D. Die. 1 Die-Stock, No. 7, for 25.4 mm. O. D. Die. 1 Die-Stock, No. 10, for 63.5 mm. O. D. Die. 1 Tap Wrench, Adjustable No. 1, 3.5 to 6 mm. tap. 1 Tap Wrench, Adjustable No. 2, 6 to 16 mm. tap. 1 Tap Wrench, Adjustable No. 3, 14 to 24 mm. tap. 16 Dies, Adjustable Round Split, as follows:	

Size, mm.	Pitch, mm.	Outside dia.
2	.45	20.6
3	.50	20.6
4	.75	25.4
5	.75	25.4
6	1.00	25.4
7	1.00	25.4
8	1.00	25.4
10	1.5	25.4
12	1.5	63.5
14	2.	63.5
16	2.	63.5
18	2.5	63.5
20	2.5	63.5
22	2.5	63.5
24	3.	63.5
26	3.	63.5

		16 Taps, taper, metric, size and pitch as dies. 16 Taps, plug, metric, size and pitch as dies. 16 Taps, bottoming, metric, size and pitch as dies.	
1	Taps, Hand	U. S. Standard Set. This contains: 7 Taps, taper. 7 Taps, plug. 7 Taps, bottoming, as follows: ¼"—20, ⅜"—18, ⅜"—16, ½"—14, ½"—13, ⅝"—11, ¾"—10.	Drawer No. 4
1	Tap, Pipe	Briggs Standard. This contains: 6 Taper Pipe Taps: ⅛", ¼", ⅜", ½", ¾", 1".	Drawer No. 4
	Tools, Pipe	Set, ¼" to 1". This includes: 1 Set Stocks and Dies Cutting ¼ to 1". 1 Wrench, 14" Wells Pipe, ⅛ to 1½". 1 Cutter, Wells Roller Pipe, ⅛ to 1¼". 1 Vise, Pipe Malleable Iron Hinge ⅛ to 2½". 1 Oil Can. 1 lb. Pipe Joint Cement (in can).	Drawer No. 1
1	Torch	Gasoline, double jet, 1 qt	Drawer No. 15
1	Trammel	14" Beam Caliper	Drawer No. 2
1	Voltmeter	Eveready No. 1005, 0-10-volt	Drawer No. 12
1	Vise	Machinist's, 3½", Swivel Jaw and Swivel Base	On drop side
1	Vise	Machinist's, 4"	On bench cabinet
1	Welding and Cutting	Outfit Oxy-acetylene. This includes: 1 Welding Tool Case containing: 11 Broaches, special. 1 Burner, Bunson (Acetylene). 1 Pair Gloves (Canvas). 3 Pairs Goggles. 1 Hose, 25', standard black. 1 Hose, 25', standard red. 1 Book of Instructions.	Space No. 14

NOMENCLATURE OF PARTS—Continued

No. per Truck	Item	Specifications	Location on Truck
		1 Lighter, Spark. 6 Lighter Renewals, Spark. 1 Regulator Gauge, No. 2 Acetylene, 30 to 400 lbs. 1 Regulator Gauge, No. 2 Oxygen, 400 to 3,000 lbs. 10 Tips, 2 each, Cutting, Nos. 1, 2, 3, 4, 5. 10 Tips, 2 each, Welding, Nos. 6, 7, 8, 9, 10. 5 Tips, 1 each, Special Welding (for Light Gauge Metal), Nos. 0, 1, 2, 3, 4. 1 Torch, Cutting, No. 3000, Two-hose. 1 Torch, Welding, No. 146, Standard. 1 Torch, Decarbonizing. 1 Wrench, Regulator. 2 Wrench, Torch. 1 Wheel, Torch Guide. 1 Welding Supply Case containing: 1 lb. Flux, Marvel (in can). 1 lb. Flux, Peerless Aluminum (in can). 2 pr. Gloves, Canvas. 1 lb. Powder, Cast Iron Sealing (in can). 9 lbs. Rods, Atlas Cast Iron Welding, ¼". 4½ lbs. Rods Atlas Cast Iron Welding, 3/16". 2½ lbs. Rods Aluminum Welding, ¼". 4 lbs. Rods, Gem Welding (Malleable Iron), ¼". 5½ lbs. Rods, Marvel Welding (Bronze and Brass), ¼". 11½ lbs. Rods, Nickel Steel, 3/16". 1 lb. Rods, Vanadium Steel, ¼". 6½ lbs. Rods, Wrought Iron and Steel, 3/16". 6½ lbs. Rods, Wrought Iron and Steel, ¼". 5½ lbs. Rods, Wrought Iron and Steel, ⅛".	
1	Wrench	"Trimo" Monkey, 1912 pattern, 10"	Drawer No. 10
1	Wrench	"Trimo" Monkey, 1912 pattern, 12"	Drawer No. 10
1	Wrench	"Trimo" Pipe, 14" metal handle	Drawer No. 10
1	Wrench	6" "Crescent" Adjustable, 22½° angle	Drawer No. 10
1	Wrench.	8" Crescent Adjustable, 22½° angle	Drawer No. 10
1	Wrench	6" Adjustable	Drawer No. 10
1	Wrench	Double End Auto Set, semi-finish, for S. A. E. cap screw. 1—¼" and 5/16". 1—⅜" and 7/16". 1—½ and 9/16" 1—⅝ and 11/16" 1—¾ and 13/16"	Drawer No. 10
1	Wrench Socket	Patent Ratchet (set in box) This contains: 27 Hexagon Steel Sockets by 32nds from 1/16 to 1", also 1 1/32", 1 3/32", 1 5/32", 1 7/32". 2 Square Steel Sockets, 11/32 and 13/32". 1 Ratchet Wrench, with reversible pawl. 1 Spark Plug Socket. 1 Universal Joint. 2 Screwdriver Bits.	Drawer No. 13
	Wrench	Adjustable Tap set, including	
1		No. 107— 7" long for 1/16" to ¼"	Drawer No. 4
1		No. 211—11 long for 3/16" to ½"	
1		No. 315—15" long for ¼" to ¾"	
1		No. 320—20" long for ¼" to 1"	

Body Equipment

1 Axe.	2 Lantern Bracket Straps and Fasteners.
1 Axe Handle Strap, 12" long.	1 Lantern, complete.
1 Axe Handle Bracket.	2 Lantern Pads.
1 Axe Handle Plate.	2 Lantern Straps.
1 Axe Pocket.	1 Pickaxe.
1 Bucket Holder Body.	1 Pickaxe Handle Strap 12" long.
2 Canvas Water Buckets.	1 Pickaxe Handle Rest.
2 Hatchets	2 Short Handle Shovels.
2 Hatchet Handles, strap, 12" long.	2 Shovel Straps, 15" long.
2 Hatchet Blade Brackets.	2 Shovel Blade Brackets.
2 Hatchet Handle Brackets.	2 Shovel Handle Brackets.
2 Hatchet Handle Rests.	11 Strap Fasteners
24 Hanger Eyes.	1 Safety Can (for volatile liquid), Pyrene patent.
2 Lantern Straps.	1 Water Bucket Strap.
2 Lantern Bracket Bodies.	1 Pyrene Fire Extinguisher.
2 Lantern Bracket Bottoms.	

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