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# INSTRUCTION

ON

# CHARGING THE RECUPERATORS

OF THE

# SCHNEIDER MATÉRIEL

WITH

# SHELL RESERVOIRS AND NITROGEN CYLINDERS

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Translated and Edited at the

ARMY WAR COLLEGE

1917

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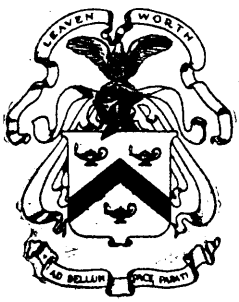
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WAR DEPARTMENT,

WASHINGTON, *November 20, 1917.*

The following pamphlet entitled "Instruction on Charging the Schneider Matériel with Shell Reservoirs and Nitrogen Cylinders," is published for the information of all concerned.

[062.1, A. G. O.]

BY ORDER OF THE SECRETARY OF WAR:

JOHN BIDDLE,
*Major General, Acting Chief of Staff.*

OFFICIAL:

H. P. McCAIN,
*The Adjutant General.*

*75, Model 1912.* *75, Model 1914.*

*105 Gun, Model 1913.* *120 Schneider Howitzer.*

*155 Howitzer, Model 1915.* *155 Gun, Model 1877–1914.*

*220 Schneider Mortar.*

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# INSTRUCTION ON CHARGING THE RECUPERATORS OF THE SCHNEIDER MATÉRIEL.

## I.

### Charging the Recuperators with Shell Reservoirs.

Recuperators are charged from shell reservoirs, the mouth of which is fitted with a tubulure having a valve communicating with the recuperator by means of a tube with jointed sections.

#### 1. SHELL RESERVOIR.

(FIG. 1.)

The shell reservoir is a rejected steel projectile of the 155 piece, Model 1890 or 1914, the outer surface of which has been planed down on a lathe, so as to reduce the dead-weight to be transported, while leaving sufficient thickness in the walls.

The mouth of the shell and the profile of the interior are left unaltered. A slight granulation is given to the rim of the mouth to make sure of the air-tightness of the receptacle.

The shell, with an interior capacity of 6.45 liters, is tested with a pressure of 200 kilograms and receives a nitrogen charge of 150 kilograms.

Into the mouth of the shell is screwed a tubulure with three channels, one of them with a center-punch closing communication with the shell reservoir, another with a permanently attached manometer graduated from 0 to 200 kilograms, and the third with a removable pipe with jointed sections.

The center punch is formed of a piston guide D screwed into the tubulure and capable of revolving on a movable bushing C, a cone-shaped face of which rests on the margin of the opening of communication between the shell reservoir and the tubulure.

The piston guide D, screwed into the tubulure, contains a square aperture in which is lodged the extremity of the operating axis of the center punch.

This axis is mounted on the tubulure plug and turns only in unison with it. It is held in a vertical position by means of an adjusting ring J which at the same time compresses the packing H by means of the packing ring I.

Every movement of rotation of the axis E determines, by means of the special screw of the center punch of the matériel, the rotation of the guide D screwed into the tubulure, which, by gliding on the axis, provides for the raising or closing of the bushing C.

The tubulure is usually closed by a milled plug K with cone-shaped joint and the adjutage for releasing the gas by a plug L with a leather joint M.

### 2. THE PIPE WITH JOINTED SECTIONS.

(FIG. 2.)

Communication is established between the shell reservoir and the manometer coupling device of the recuperator by means of the jointed tube.

It is formed in five jointed sections. One of the end sections is attached to the shell reservoir, the other to the recuperator. This latter has a retaining valve. The three other sections can turn on four axes of articulation, making possible their orientation in two perpendicular planes. Each link is formed of a hollow axis D, constituting a cock, onto which is screwed and welded the steel tube C for the transmission of the gas. On this axis is mounted a coupling E, the cylindrical channel of which communicates at one extremity with the cock axis, at the other with the steel tube of the next section following on which it is mounted.

The airtightness of the movable parts (axes and couplings) is insured by two leather joints F, compressed by means of a packing ring with leather lining G, on which three Belleville disks H rest, the tension being supplied by the adjustable nut I screwed on to the axis cock.

The couplings of the end sections are marked "shell" and "recuperator," respectively, to avoid any error in connecting them.

### 3. CHARGING A RECUPERATOR BY MEANS OF A SHELL RESERVOIR.

(Fig. 3.)

The following operations are performed with the shell reservoir placed near the piece:

(*a*) Remove the plug L (fig. 1) and screw on in its place the nut of the jointed tube marked "shell."

(*b*) Open the port of the châssis of the matériel and screw the manometer coupling of the matériel on to the adjutage of the cradle. Screw on to the coupling the end of the jointed tube marked "recuperator."

(*c*) Remove the milled nut K (fig. 1).

(*d*) Gently unscrew the operating axis E (fig. 1) of the center punch; the pointer of the manometer responds as soon as this center punch releases gas.

(*e*) Open the center punch of the recuperator and then close it as soon as the manometer of the matériel shows that the recuperator is filled to service pressure.

(*f*) Manipulate the axis E (fig. 1) to close the center punch of the shell reservoir, remove the linked tube and replace the plugs, remove the manometer coupling from the gun mounting, and close the port of the châssis of the matériel.

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## II.

## CHARGING THE 155-SHELL RESERVOIRS AND THE RECUPERATORS BY MEANS OF THE NITROGEN CYLINDERS OF 46 LITERS CAPACITY.

Figure 4 represents the cock on nitrogen cylinders. A coupling *b* has been added to the adjutage *a*, because the linked tube could not be screwed on to the latter. The coupling is only removed in the shops for charging the cylinders. Care must therefore be taken, when the adjutage of the linked tube is unscrewed, to hold the coupling *b* in place with a wrench, so that it will not come loose.

Figure 5 represents the connection of the jointed tube with the coupling of the cylinder for the matériel of the 75, Model 1912 and Model 1914; of the 105 gun, Model 1913; of the 120 Schneider howitzer; of the 155 howitzer, Schneider Model 1915; of the 155 gun, Model 1877–1914; and of the 220 Schneider mortar.

Figure 6 represents the charging of a shell reservoir by means of a cylinder.

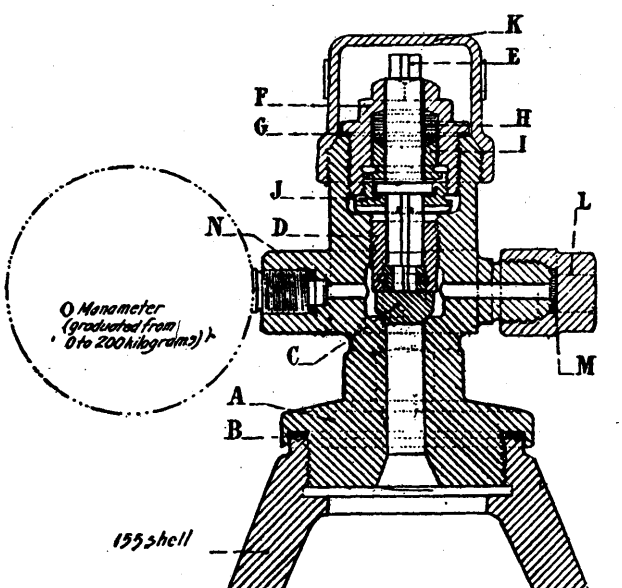
NOTE.—It is very important to observe that in charging it is always the end of the tube marked "shell" which must be connected with the charging receptacle (shell or cylinder); the other adjutage of this tube, marked "recuperator," has a retaining valve. (See fig. 2.)

Paris, July 20, 1916.

General of Division, Inspector of Technical Investigations and Experiments for the Artillery.

GOSSOT.

Fig. 1. Shell-reservoirs of 155 Projectiles for charging Recuperators of the Materiel, 75, Model 1912, 75, Model 1914, 105 Gun, Model 1913, 120 Schneider Howitzer, 155 Schneider Howitzer Model 1915, 155 Gun Model 1877-1914; 220 Schneider Mortar.



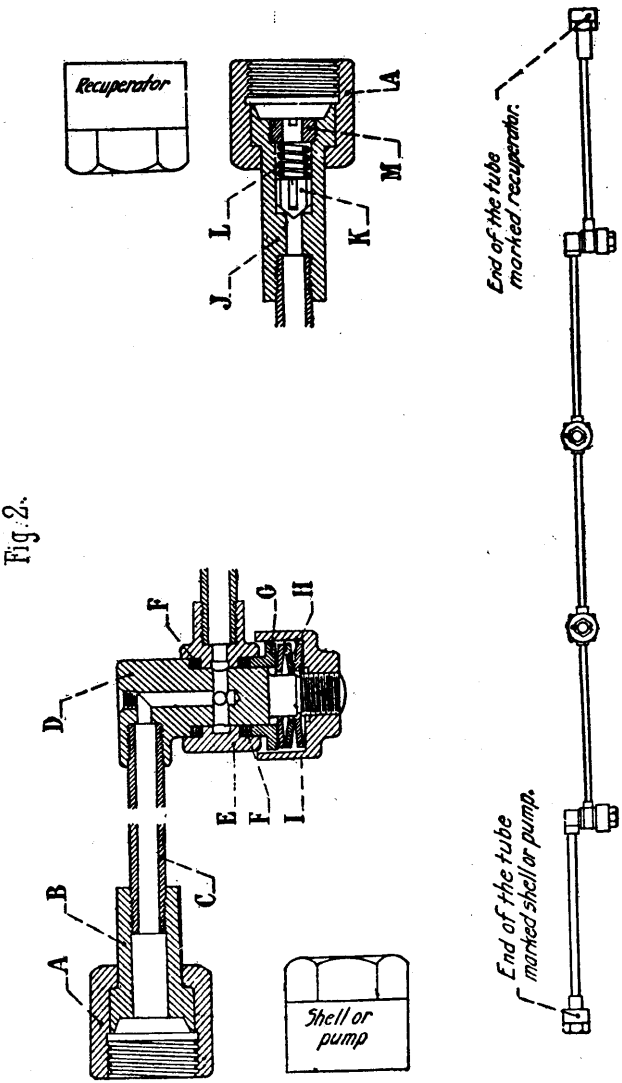

Recuperator
A
M
L
K
J
End of the tube marked recuperator.
F
G
H
D
E
F
I
B
C
A
Shell or pump
End of the tube marked shell or pump.

Fig. 2.

Fig. 3 Charging of a Recuperator by means of a Shell-reservoir or a Cylinder.

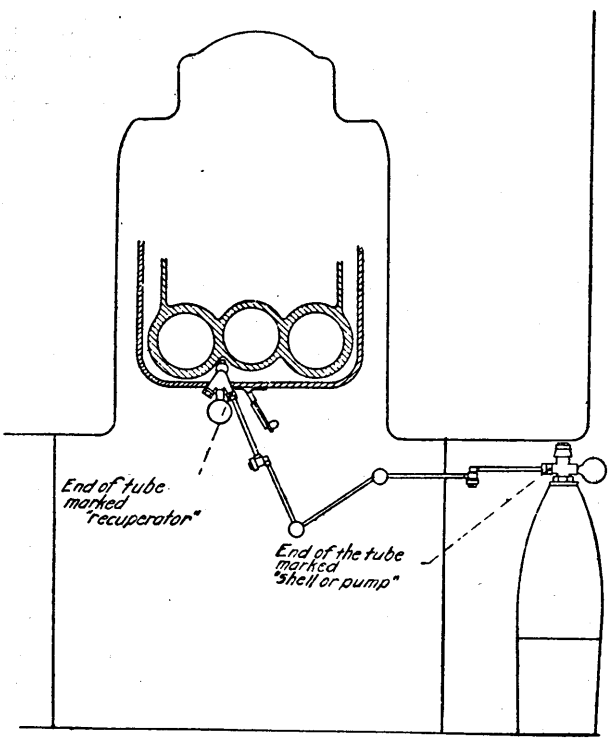


*Fig. 4 Nitrogen Cylinder Cock for charging shell-reservoirs and recuperators of all the Schneider Materiel*

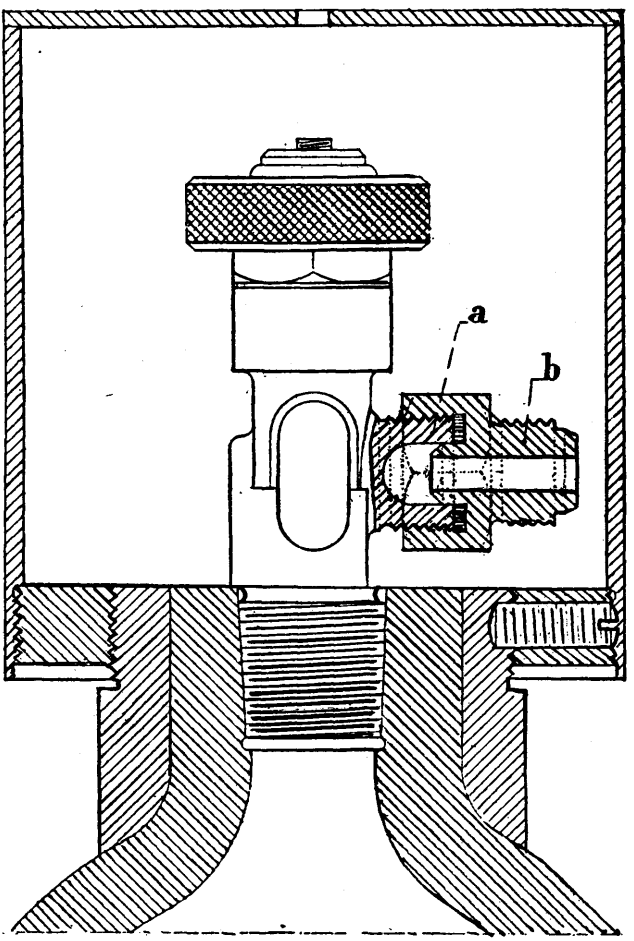
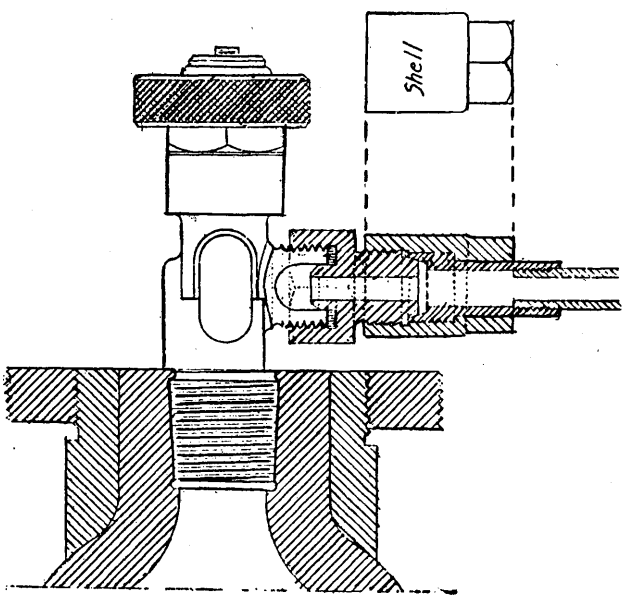


*Fig. 5 Mounting of the linked Tube of the Schneider Materiel on the Cock of the Nitrogen Cylinders*



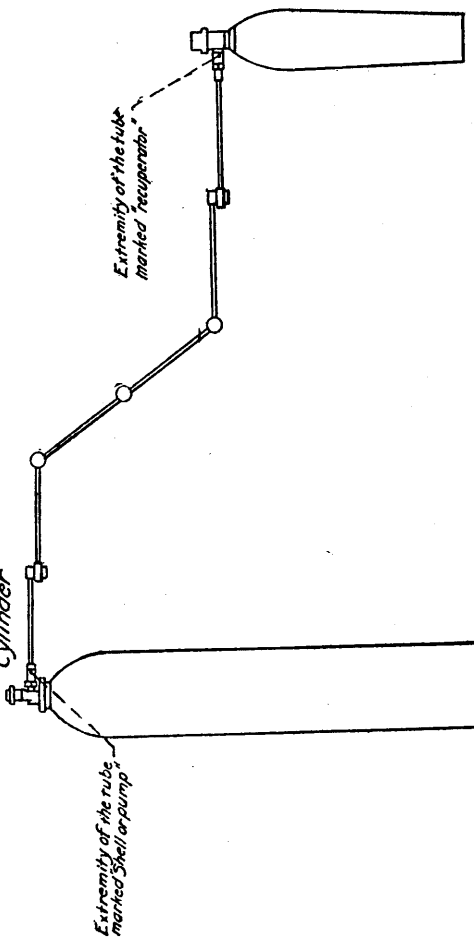



FIG. 6. *Charging of a Shell - reservoir by means of a Cylinder*

Ministry of War. Artillery. November 23, 1916.

# INSTRUCTION ON CHARGING THE RECUPERATORS OF THE SCHNEIDER MATÉRIEL WITH SHELL RESERVOIRS AND NITROGEN CYLINDERS.

## APPENDIX TO THE PROVISIONAL RULES

ON THE

## DESCRIPTION AND MAINTENANCE OF THE MATÉRIEL

OF THE

**75, Model 1912; 75, Model 1914; 105 Gun, Model 1913; 120 Schneider Howitzer; 155 Howitzer, Model 1915; 155 Gun, Model 1877–1914; and 220 Schneider Mortar.**

REVISION SHEET No. 1.

The present revision sheet is intended for the purpose of introducing into the Appendix the method of charging the recuperators of the matériels of the 75, Model 1912; 75, Model 1914; 105, Model 1913; 120 Schneider howitzer; 155 Schneider howitzer, Model 1915; 155 gun, Model 1877–1914; and 220 Schneider mortar by means of shell reservoirs formed of 270-caliber projectiles.

Consequently the following additions and alterations will be introduced in red ink in all copies of the aforesaid document.

Write at the top of the cover, "See the revision sheet No. 1."

After page 6, insert the page 7 here inclosed.

After figure 6, add the figure 7 here inclosed.

Paris, November 17, 1916.

General of a Division, Inspector of Technical Investigations and Experiments of the Artillery. GOSSOT.

Approved:

Paris, November 23, 1916.

For the Subsecretary of State and by his order:

The General in Charge of the Heavy Artillery.

DUMÉZIL.

## III.

## CHARGING THE RECUPERATORS OF THE MATÉRIEL

OF THE

**75, Model 1912; 75, Model 1914; 105 Gun, Model 1913; 120 Schneider Mortar; 155 Schneider Howitzer, Model 1915; 155 Gun, Model 1877–1914; and 220 Schneider Mortar with the 270-Caliber Shell Reservoirs.**

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The recuperators of the above-mentioned matériels can also be charged with 270-caliber shell reservoirs, which are reserved as a rule for charging the recuperators of the matériel of 280.

In case the recuperators of the above-mentioned matériels are to be charged with the 270-shell reservoirs, an adjutage A must be screwed onto the 270 shell before fitting the jointed tube used with these types of artillery. (See fig. 7.)

The recuperator is then charged in the same manner as already described in connection with the shell reservoir of 155 caliber.

Fig. 1. Shell-reservoirs of 155 caliber, for charging the Recuperators of the Materiels of the: 75, Model 1912; 75, Model 1914; 105 Gun, Model 1913; 120 Schneider Howitzer; 155 Schneider Howitzer; 155 Gun, Model 1877-1914; and 220 Schneider Mortar.

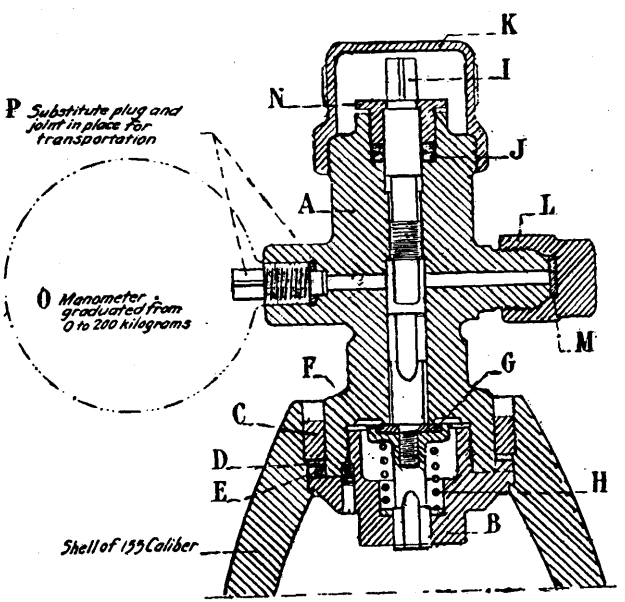
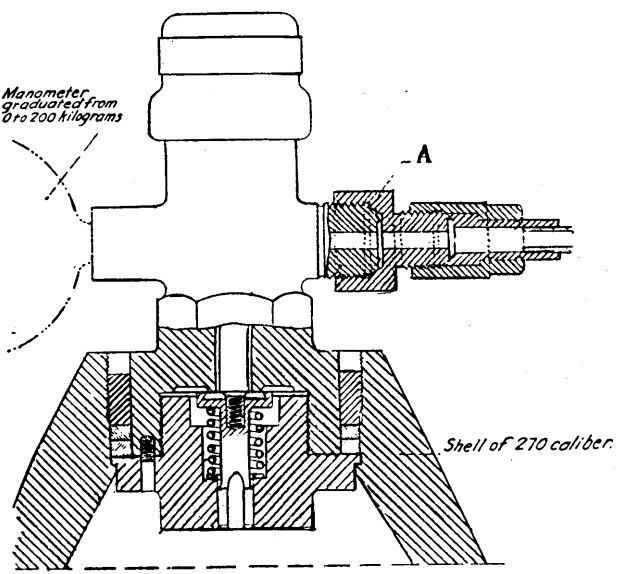


*Fig. 7 Shell-reservoirs of 270 caliber for charging the Recuperators of the Schneider Materiels.*



Ministry of War. Artillery. May 11, 1917.

# INSTRUCTION ON CHARGING THE RECUPERATORS OF THE SCHNEIDER MATÉRIELS WITH SHELL RESERVOIRS AND NITROGEN CYLINDERS.

## APPENDIX TO THE PROVISIONAL RULES ON THE DESCRIPTION AND MAINTENANCE OF THE MATÉRIEL OF THE

**75, Model 1912; 75, Model 1914; 105 Gun, Model 1913; 120 Schneider Mortar; 155 Schneider Howitzer, Model 1915; 155 Gun, Model 1877–1914; and 220 Schneider Mortar.**

Approved July 20, 1916.

One insert. One intercalary, pages 2 and 3. Two figures, I and II.

REVISION SHEET No. 2.

The purpose of the present revision sheet is to introduce into the Instruction certain modifications arising from improvements made in the shell reservoirs in respect to the air-tightness of the tubulure and center punch.

Consequently the following additions and alterations will be made in red ink on all copies of the aforementioned document:

At the top of the cover, in place of "See the revision sheet, No. 1," write "See the revision sheets Nos. 1 and 2."

Strike out pages 2 and 3 and replace them by the inclosed pages 2 and 3.

Strike out lines 19 to 32, inclusive, on page 4, and attach the inclosed insert in their place.

Replace figure 1 by the inclosed figure 1.

Replace figure 7 by the inclosed figure 7.

Approved:

Paris, May 11, 1917.

For the minister and by his order:

The colonel, director of the artillery.

COFFEC.

INSERT.

(*d*) Screw up tight, but without exaggerated effort, the control rod I (fig. 1) of the charging valve by turning the center punch screw counterclockwise. The pointer of the manometer responds as soon as the valve releases gas.

(*e*) Open the center punch of the recuperator and then close it as soon as the manometer of the matériel shows that the recuperator is filled to service pressure.

(*f*) Unscrew the rod I (fig. 1) by turning it clockwise until the shoulder rests, without strain, against the packing N, so as to let the valve rest on its seat; remove the linked tube, and replace the plugs; remove the manometer coupling of the mount and close the port of the châssis of the matériel.

(Page 2.) * * * The dead weight to be transported, while leaving sufficient thickness in the walls.

The mouth of the shell is altered to receive the tubulure A, and a joint with movable head formed by the packing C, the tubulure B, and the intercalary washers, D of bronze and E of leather.

The shell, with an interior capacity of 6.45 liters, is tested with a pressure of 200 kilograms and receives a nitrogen charge of 150 kilograms.

The tubulure with three channels can communicate by means of a valve shutter with the shell, with a permanently attached manometer graduated from 0 to 200 kilograms and with a removable jointed tube.

The valve F, furnished with a leather packing G, is held in its seat by interior pressure and by a spring H. The opening of the valve for charging is effected by screwing a control rod I by means of the manipulation screw of the charging center punch of the reservoirs with the truck.

The manipulation of the control rod gives a maximum valve lift of 4 millimeters.

For transportation, the manometer is replaced by a substitute plug P with leather joint.

The tubulure is ordinarily closed by a milled plug K with a conical joint and the adjutage for releasing the gas by a plug L with leather joint M.

NOTE.—Before screwing up the joint J by means of the packing N, the control rod I must be screwed up several millimeters, so as to avoid the bearing of the packing on the shoulder of the

rod and prevent the possible wearing of this rod from too strained a setting.

### 2. JOINTED TUBE.

By means of the jointed tube communication is established between the shell reservoir and the manometer coupling of the recuperator.

It is formed of five jointed sections. One of the end sections is attached to the shell reservoir, the other to the coupling of the recuperator. This latter has a retaining valve. The three other sections can turn on four articulation axes, making possible their orientation on two perpendicular planes. Each link is formed of a hollow axis D, constituting a cock, onto which is screwed and welded the steel tube C for the transmission of the gas. On this axis is mounted a coupling E, the ring-shaped aperture of which communicates at one extremity with the cock axis, at the other with the steel tube of the next section following, on which it is mounted.

The air-tightness of the movable parts (axes and couplings) is insured by two leather joints F, compressed by means of a packing ring with leather lining G, on which three Belleville disks rest, the tension being supplied by the adjustable nut I screwed onto the axis cock.

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