

(No Model.)

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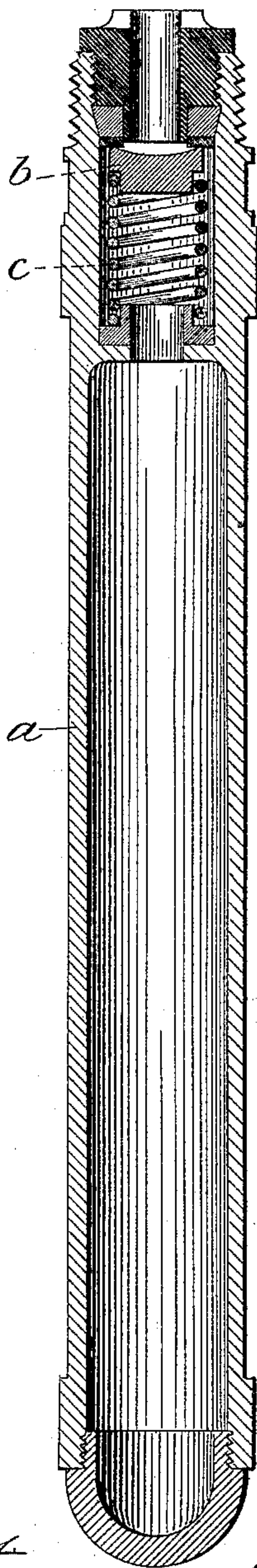
P. GIFFARD.

APPARATUS FOR CHARGING MAGAZINES WITH LIQUEFIED GAS.

No. 475,728.

Patented May 24, 1892.

Fig. 1.



Witnesses:
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(No Model.)

2 Sheets—Sheet 2.

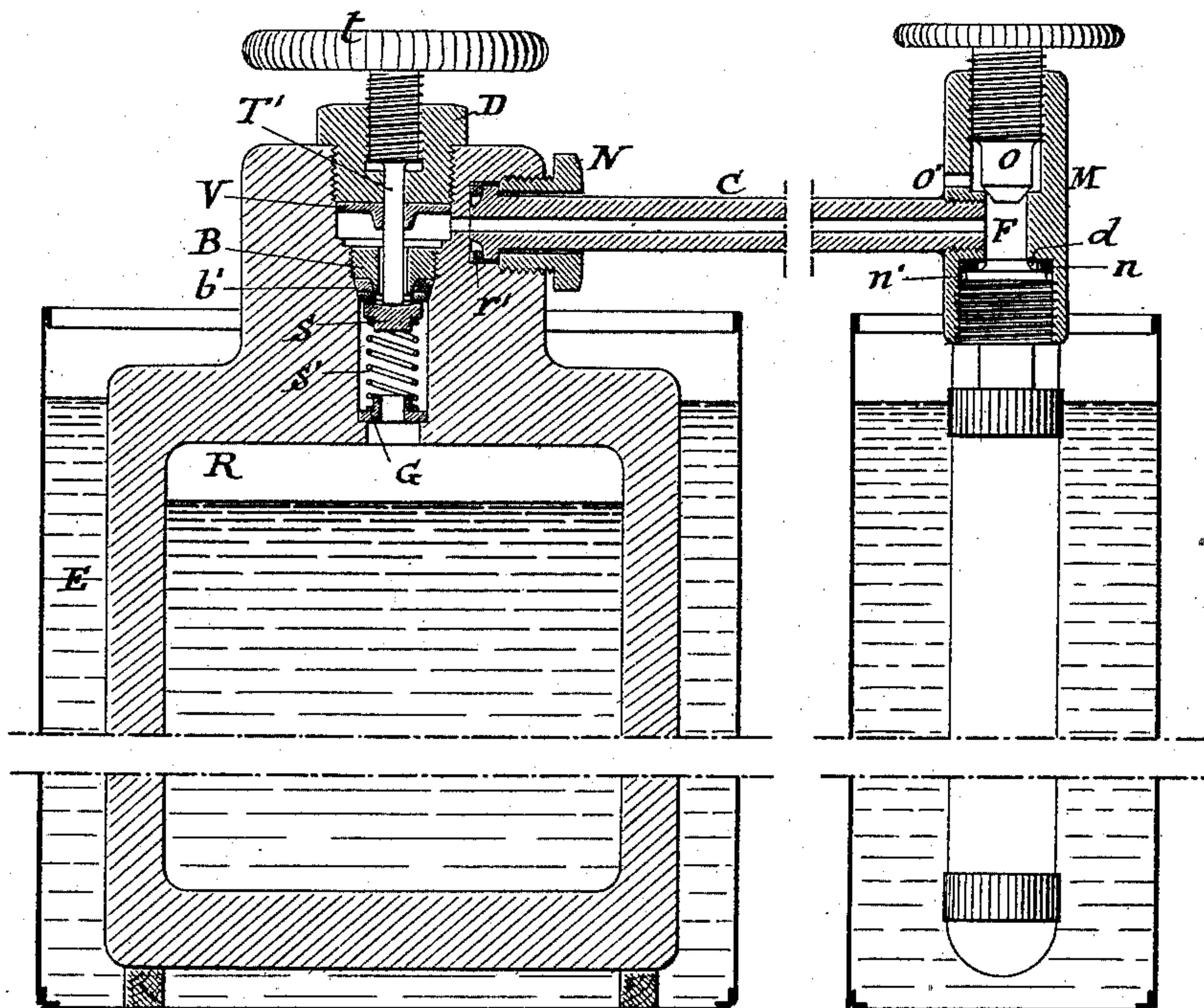
P. GIFFARD.

APPARATUS FOR CHARGING MAGAZINES WITH LIQUEFIED GAS.

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Patented May 24, 1892.

Fig. 2.



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UNITED STATES PATENT OFFICE.

PAUL GIFFARD, OF PARIS, FRANCE, ASSIGNOR TO THE INTERNATIONAL (GIFFARD) GUN AND ORDNANCE COMPANY, LIMITED, OF LONDON, ENGLAND.

APPARATUS FOR CHARGING MAGAZINES WITH LIQUEFIED GAS.

SPECIFICATION forming part of Letters Patent No. 475,728, dated May 24, 1892.

Application filed August 2, 1890. Serial No. 360,738. (No model.) Patented in France May 31, 1890, No. 206,020; in Belgium July 3, 1890, No. 91,125, and in England July 3, 1890, No. 10,308.

To all whom it may concern:

Be it known that I, PAUL GIFFARD, of Paris, in the Republic of France, have invented a new Improvement in Charging Magazines with Liquefied Gas, (patented in France May 31, 1890, No. 206,020; in Belgium July 3, 1890, No. 91,125, and in Great Britain July 3, 1890, No. 10,308;) and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal section of a gun-magazine which this invention is adapted to charge. Fig. 2 represents a vertical longitudinal central section of the apparatus, the figure represented as broken both vertically and longitudinally for convenience of illustration.

This invention relates to an apparatus for charging magazines with liquefied gas for use in guns and similar purposes. The magazine such as this apparatus is designed to charge is illustrated in Fig. 1 and consists of a tube *a*, made from metal of a strength to withstand the pressure and of a size corresponding to the arm or purpose for which the magazine is designed. The magazine is closed at one end and open at the other end, the open end being closed by a valve *b*, arranged to open inward against the pressure of the magazine, and is also provided with a spring *c*, which yieldingly holds the valve in the closed position. The end of the magazine is screw-threaded, as shown, for the convenient attachment of the magazine to the gun. The gun for which such a magazine is specially designed is an invention of mine and for which Letters Patent of the United States No. 452,882, dated May 27, 1891, were granted to me. The gas with which the magazine is to be charged is what is commonly called "liquefied gas"—that is to say, gas, such as, for illustration, carbonic-acid gas, compressed to liquefaction—and the magazine is of a size to contain sufficient gas for many charges, and it is arranged

in the gun so that the blow of the hammer will open the valve for a length of time sufficient only to permit the requisite amount of gas for a single charge to escape. The magazines are prepared and furnished to users of the gun and may be sold in the market as common cartridges are sold. It is found impracticable to charge these magazines direct from the compressor.

The object of this invention is an apparatus by which the magazine may be practically charged; and it consists in the apparatus as hereinafter described, and particularly recited in the claims.

The apparatus for charging the magazines is illustrated in Fig. 2.

R represents a reservoir, preferably of metal, and of great strength, sufficient to withstand the required pressure. The reservoir is provided with a valve for the inlet and outlet of the gas, and, as here represented, this consists of a stopper *B*, screwed into a passage leading into the reservoir, and preferably with a semi-hard-rubber valve-seat *b'*. The valve *S* is of metal and adapted to be forced against the packing *b'* by a coiled spring *S'*, which takes a seat on a shoulder *G* below the valve and so as to bear upwardly against the valve at one end to yieldingly hold it upon its seat, and so that the valve may open inward from a pressure from the outside. In the passage into the reservoir and above the valve is a stuffing-box *V*, preferably of hard rubber, and through which a metal spindle *T* passes, the spindle being fitted with a handle *t* for operating it. The rod *T* is adapted to bear upon the valve and is screwed into the gland *D*, and so that by turning the handle *t* in one direction the valve may be forcibly opened against the pressure of its spring or pressure from within the reservoir, and so as to permit the introduction of the gas or the escape of such gas, as the case may be. Surrounding the reservoir *R* is a tank or vessel adapted to contain hot water or other medium, which should be at a temperature of from 45° to 50° centigrade. From the reservoir above the valve and below the stuffing-box a conductor

or channel C leads into a head M, one end of which is fitted to receive the cartridge-case, which may be set therein as shown. The head M is provided with a spindle O, terminating at its inner end in a conical shape and is provided with a suitable head or handle by which it may be rotated. The channel C opens into a passage F in the head M, and the conical end of the spindle O is adapted to close that passage above the channel. A tank is provided, as shown, filled with cold water or other medium at a temperature of about 15° centigrade, so that the magazine to be charged may be immersed therein, as shown. Above the seat upon which the spindle O rests to close the passage F is an outlet O', and so that if the passage F be opened by raising the spindle O there will be an outward communication from the passage F through the outlet O'.

The reservoir is charged with liquefied gas in any convenient manner by disconnecting the channel C or through that channel or by any convenient or suitable means, and having been charged it is immersed in the hot medium, as before described, and the magazine to be charged is attached to the head M, the passage F being closed. Then by opening the valve of the reservoir liquid carbonic-acid gas will pass through the channel C in a gaseous state into the magazine, the valve of the magazine readily opening for such discharge of the gas therein, and in the magazine it becomes liquefied, owing to the difference in temperature, and at once completely fills the magazine with liquefied carbonic-acid gas. When this filling has been completed, the valve of the reservoir is closed and then the spindle O is raised as quickly as may be. The gas contained in the passage between the reservoir and the magazine escapes through the outlet O' and this permits the gas within the magazine to act automatically to close its valve and so as to secure the liquefied gas within the magazine. This done, the magazine is removed and another applied to be filled in like manner. A suitable washer *n* is applied in the recess *n'*, formed in the end of the head to receive the magazine and which will serve as a packing between the magazine and the head.

While it is preferred to employ the spindle O and the outlet O' as a means for permitting the escape of the gas in the passage after charging, these may be omitted and the gas

escape gradually as the magazine is being removed.

I claim—

1. The herein - described apparatus for charging magazines for guns with liquefied gas, consisting of a reservoir adapted to contain liquefied gas, a tank within which said reservoir is placed, and a heating medium in said tank around the reservoir, the temperature of which medium is 45° to 50° centigrade, combined with a second tank, a cooling medium in said tank at a temperature of about 15° centigrade, a head over said second tank, a conductor leading from the gas-reservoir to the head over said second tank, a valve between the said head and the gas-reservoir, whereby communication from the gas-reservoir through the conductor may be opened or closed with the magazine to be charged, the head and magazine constructed for removably attaching the magazine to the head, the communication through the conductor and head opening into the magazine so attached, and the arrangement of the head with relation to the said second or cooling tank being such that the magazine is held by the head suspended in said tank, substantially as described.

2. The herein - described apparatus for charging magazines with liquefied gas, consisting of a reservoir adapted to contain liquefied gas, and a tank within which the said reservoir is placed, the tank being filled around the reservoir with a heating medium at a temperature of 45° to 50° centigrade, provided with a valve in the reservoir adapted to open and close the passage thereto or therefrom, combined with a second tank adapted to receive the magazine, the said second tank containing a cooling medium surrounding the magazine, at a temperature of about 15° centigrade, a head to which the said magazine may be attached with a connection between the said head and the said reservoir above the valve of the reservoir, with a valve in a head above the passage through which communication is made from the reservoir, and an outlet through the head above the valve, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL GIFFARD.

Witnesses:

R. J. PRESTON,
ALBERT COHEN.