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PUMP WITH PERMEABLE PISTON FOR MULTIPLE PURPOSES.

APPLICATION FILED MAR. 29, 1919.

**1,410,530.** **Patented Mar. 21, 1922.**

Fig. 1

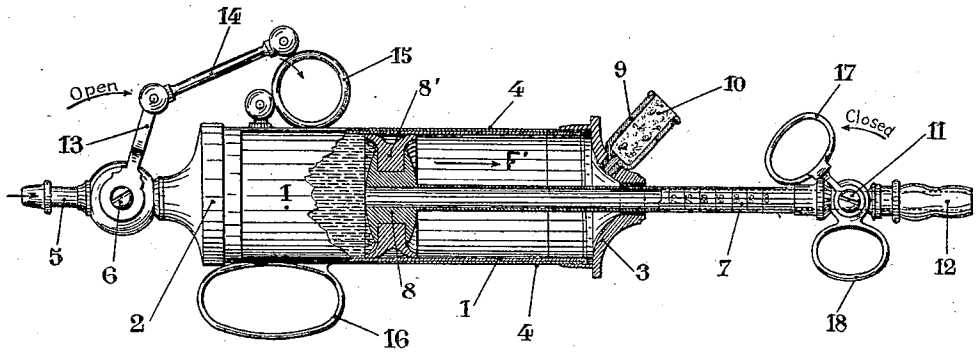



Fig. 2

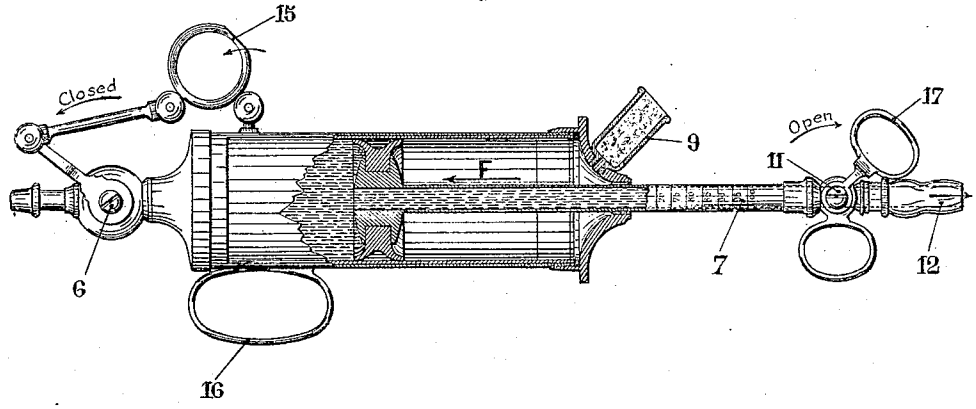
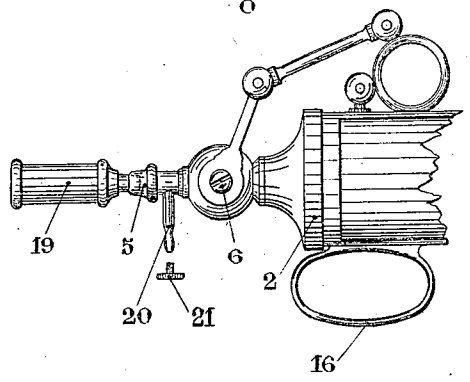



Fig. 3




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# UNITED STATES PATENT OFFICE.

JEAN ETIENNE LARCHÉ, OF PARIS, FRANCE.

## PUMP WITH PERMEABLE PISTON FOR MULTIPLE PURPOSES.

1,410,530. Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed March 29, 1919. Serial No. 285,998.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

*To all whom it may concern:*

Be it known that I, JEAN ETIENNE LARCHÉ, a British subject, residing at Lariboisiere Hospital, Rue Ambroise Paré, Paris, Seine, France, have invented a certain new and useful Pump with Permeable Piston for Multiple Purposes, (for which I have filed applications in Great Britain Aug. 6, 1918, Patent Number 125,050, and in France Apr. 3, 1918, Patent Number 489,539,) and of which the following is a specification.

The present invention has for its object a pump with permeable piston capable of being utilized in medicine and in surgery for numerous applications.

This apparatus is essentially characterized by the combination with a syringe having a permeable piston of a particular arrangement of cocks mounted the one upon the boss of the injection tube, the other upon the piston rod, the operating handles of these cocks being provided in such manner that the opening or the closure of each of the cocks is obtained by a natural movement of the hand of the operator.

The pump is also characterized by details which will hereafter be described.

In the accompanying drawing there is represented one construction according to the present invention.

Figure 1 is an elevation in partial longitudinal section, the cocks being in the position which corresponds to the suction.

Figure 2 is a section similar to that of Figure 1, the cocks being in the reverse position, while

Figure 3 is a view in detail showing an additional arrangement capable of being mounted upon the boss of the pump in certain particular cases.

In the construction represented in the drawing, the apparatus is provided partly in metal, partly in glass, but it is to be understood that according to requirements other materials may be used.

As is to be seen upon the drawing the body or the injection tube of the pump is formed of a tube of glass 1 and of a metallic casing of known construction formed of two ends 2 and 3 connected by strips of metal 4. The end 2 is extended to form a boss which carries one of the cocks 6. The end 3 allows of passage through it of the rod 7 of the piston 8. The joint between the rod 7 and the end 3 is rendered perfectly air tight by any appropriate means for preventing penetration at that position in the body of the syringe of air charged with impurities while the piston is displaced in the direction of the arrow F (Figure 2); the entry of the air in this part of the syringe is effected by a casing 9 fixed upon the end 3 or formed integral with it and containing a substance 10 (impregnated cotton wool for example) for the filtration of the air.

Upon the rod 7 of the piston is mounted the second cock 11; the rod is prolonged by a nipple 12 adapted to receive a rubber tube.

In the construction illustrated the piston is formed as a metallic body 8 upon which is mounted a ring of rubber 8′ assuring tightness but a piston may be used entirely of metal, glass or any other material.

The operation of the cock 6 is effected by means of a jointed system formed of the two rods 13 and 14 and of the pivoted ring 15 in which may engage the thumb of one hand of the operator. On the under side of the syringe and in the same plane as the ring 15 is fixed a ring 16 as a second point of support for the hand, one or more of the fingers of the hand passing through the ring 16 while the thumb passes through the ring 15.

The cock 11 of the piston rod is operated by the other hand of the operator by means of the ring 17; another fixed ring 18 is mounted beneath and upon the rod in substantially the same plane as the ring 17.

As a second point of support for the hand one or more of the fingers of the hand passes through the ring 18 and the thumb through the ring 17. Thus the pump may be operated by being held by the operator at its respective ends, the rings 15 and 17 being easily moved by the thumbs while the pump is supported in the hands, and by one or more of the fingers of each hand passing through the rings 16 and 18 in the manner described.

The cock 6 is mounted in such manner that its opening is effected while the ring 15 moves from the position of Figure 2 to that of Figure 1, that is to say in moving it towards the body of the pump. The opening of the cock 11 is effected by oper-

ation away from the body of the pump: Figure 1 indicates the closed position of the cock 11 and Figure 2 its open position.

It is to be observed that these movements of the rings of the cocks correspond to the movements that the hands of the operator make quite naturally in the use of the apparatus: in the case of suction through the boss 5, it is necessary to maintain the body of the pump to resist the effort exercised upon the piston in its displacement in the direction of the arrow F' (Figure 1). For this operation the cock 11 should be closed.

On the contrary, when it is desired to compress through the piston rod 7, a liquid contained in the pump, the cock 6 should be closed and the cock 11 open. For this operation the ring 15 occupies the position of Figure 2 to afford to the operator an effective point of support together with the ring 16.

The pump presenting the characteristics described finds its application in numerous cases. It permits especially:

1. The evacuation of any collection of pathological liquid by suction at one side and compression at the other.

2. The transfusion of blood;

3. Intravenous injections of serum.

The boss 5 can receive in known manner a rubber tube, at the extremity of which is mounted a needle. For certain operations one can mount upon the boss 5 as indicated in Figure 3 a casing 19 similar to the casing 9 which has been referred to above, and filled similarly with a suitable material to filter a gas. This arrangement is utilized when it is desired to inject a gas into a cavity.

Upon the boss 5 laterally a fitting 20 may be disposed (see Figure 3) permitting escape of a globule admitted by accident into the apparatus, and which one does not desire to inject into the vein, or to mount a rubber tube by which one delivers an antiseptic liquid in case of need. This fitting can be closed, when it is not utilized, by means of a plug 21.

The pump just described can be utilized as a syringe or ordinary suction pump in leaving the cock 6 open, the cock 11 being closed, and in manipulating the apparatus without operating the said cocks.

I claim:

1. In a pump closed at its respective ends and having hollow piston and piston rod, in combination a cock upon the outwardly protruding end of the piston rod and another cock upon the pump at the end of the pump opposite to that through which the hollow piston rod passes, substantially as described.

2. In a pump closed at its respective ends and having hollow piston and piston rod, in combination a cock upon the outwardly protruding end of the piston rod, another cock upon the pump at the end of the pump opposite to that through which the hollow piston rod passes and rings by which the said respective cocks may be opened and closed in the use of the pump, substantially as described.

3. In a pump closed at its respective ends and having hollow piston and piston rod, in combination a cock upon the outwardly protruding end of the piston rod, another cock upon the pump at the end of the pump opposite to that through which the hollow piston rod passes, rings by which the said respective cocks may be opened and closed in the use of the pump, and means carried in position adjacent the respective cocks by which the pump may be held and the cocks may be operated while so held, substantially as described.

4. In a pump closed at its respective ends and having hollow piston and piston rod, in combination a cock upon the outwardly protruding end of the piston rod, another cock upon the pump at the end of the pump opposite to that through which the hollow piston rod passes, rings by which the said respective cocks may be opened and closed and rings in position adjacent the cocks and beneath the rings last referred to by which the pump may be held in the hands of the operator and the cocks operated when so held, substantially as described.

5. In a pump closed at its respective ends and having hollow piston and piston rod, in combination a cock upon the outwardly protruding end of the piston rod, another cock upon the pump at the end of the pump opposite to that through which the hollow piston rod passes and an air filter mounted upon the end of the pump through which the piston rod passes, substantially as described.

In testimony whereof, I have signed my name to this specification.

JEAN ETIENNE LARCHÉ.