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J. WEEKS.

FORCE PUMP AND SIMILAR APPARATUS.

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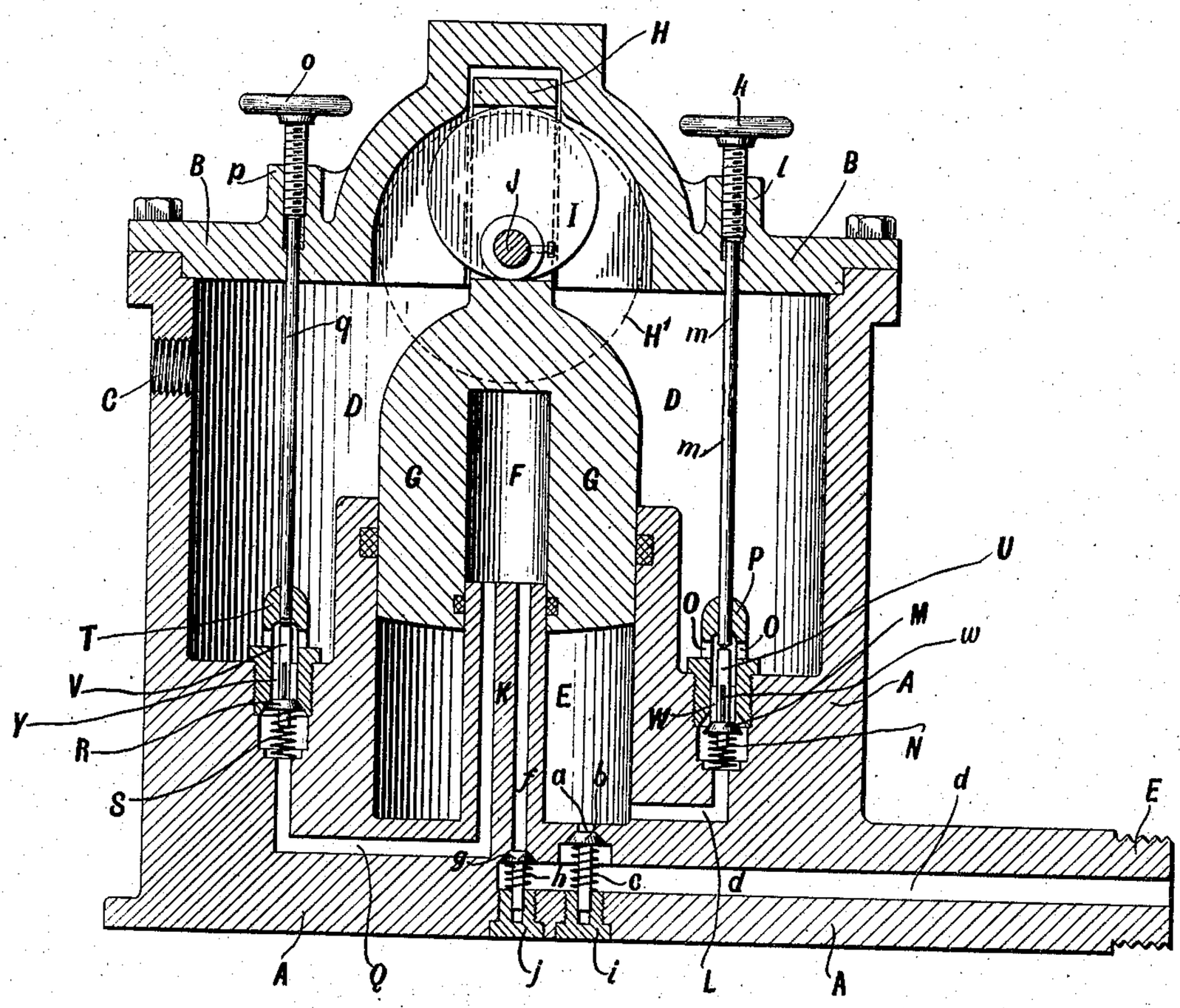

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FORCE-PUMP AND SIMILAR APPARATUS.

No. 867,932. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed March 5, 1907. Serial No. 360,747.

To all whom it may concern:

Be it known that I, JOHN WEEKS, a citizen of the United States, and a resident of Locust Valley, Nassau county, Long Island, State of New York, have invented certain new and useful Improvements in Force-Pumps and Similar Apparatus, of which the following is a specification, reference being had to the accompanying drawing, which illustrates a vertical sectional view of one form of pump in which my invention may be embodied.

In the use of force pumps, it is a matter of frequent occurrence that the amount of water desired differs at different times. Take, for example, the case of a steam fire engine. If the fire is a trivial affair, the full capacity of the engine might deliver so much water that the damage therefrom would exceed the fire damage; on the contrary, if the fire be a dangerous one, the utmost amount of water that the engine can deliver may be required, and later on, when the fire is practically under control, a relatively small delivery is all that will be desired, with which to extinguish the spasmodic outbreaks of flame and cool down the ruins.

The above is a single instance only of the desirability for a force pump adapted to deliver differing amounts of liquid at different times, and, as an incident in the use of such apparatus, the difference in wear and tear upon the machinery, coal consumption, etc., are likewise of consequence.

It is the purpose of this invention to provide a force pump simple and inexpensive in construction and of relatively light weight, in which the reciprocation of a single piston may, by proper manipulation of co-acting parts, effect three differing degrees of pumping action.

Referring to the drawing, A represents the main casting of the structure, B a cover plate adapted to make water-tight connection with the upper edges of the base piece A.

C is the intake port from any suitable source of liquid supply.

D is the reservoir in the upper part of the structure.

E is the pump chamber for the big pump, F the pump chamber for the little pump.

G is a piston reciprocated by a cross-head H, actuated by a cam I, on a cam shaft J, which may be rotated by a pulley H′, on the end of the shaft J, or in any other preferred manner. The part which acts as the piston for the little pump is a mere core K, left standing in the center of the force chamber for the big pump.

L is the intake waterway for the big pump. It connects with the reservoir D through a valve M, which may beneficially be re-seated by a spring N. The ports through which the liquid passes from the reservoir into the waterway L are shown at O, O. They are made in a bonnet P, as usual.

Q is the waterway for supplying liquid to the pump chamber F of the little pump. The water reaches this waterway by passing through a valve R, which may beneficially be re-seated by a spring S, and is provided with a perforated bonnet T, substantially the same as above described. The upwardly projecting stems U and V, respectively of these two valves, are provided with laterally projecting webs W and Y, respectively, whereby the stems are guided as they rise and fall through the respective waterways.

The delivery ports from the two pump chambers are as follows: Waterway *a* delivers from the big pump through the valve *b*, re-seated by a spring *c*, into the delivery waterway *d*, which is common to both pumps, at the end of which any desired pipe connection can be made by means of threads *e*. Any other means of attachment may be employed. The small pump delivers through the waterway *f*, provided with a valve *g*, re-seated by a spring *h*, delivering also into the waterway *d*. The two valves *b* and *g* are supported upon screw-plugs, *i* and *j* respectively, which are threaded into the bottom of the main casting, so that upon unscrewing these plugs, the valves and their springs may be dropped out of the apparatus for inspection and repair.

k is a hand wheel, threaded into a lug *l*, cast on the cover plate B. The hand wheel is provided with a spindle *m*, which projects downwardly through the reservoir and through the upper part of the bonnet P, and is adapted to engage with the upwardly extending stem U of the valve M, so that upon running down the hand wheel, the lower end of the spindle will press against the upper end of the stem and permanently hold the valve off its seat, but when elevated, so that it does not engage with the stem of the valve, the latter will be uncontrolled and acts as an ordinary check valve, permitting the flow of liquid on the intake stroke, but closing and preventing its passage on the forcing stroke.

o is a hand wheel similar to that described above, the stem of which is threaded into a lug *p* cast on the cover plate B and provided with a spindle *q* which engages with the stem V of the valve R, the same as described above.

The two pumps may beneficially be provided with packing as shown in the drawing. It does not require description. I prefer to use the hard packings shown, but cup packing, ring packing, or any other preferred sealing means may be employed.

The operation is as follows: When the full power of the apparatus is desired, the two hand wheels, *k* and *o*, are run backwardly, in other words, into a position in which they do not engage with the stems U and V of the valves M and R, as illustrated at the left hand

side of the drawing, so that those valves act as ordinary check valves. The piston G being now reciprocated, it will be readily understood that both pumps will receive their supply of liquid from the reservoir, which is in turn supplied through the inlet C, and consequently the full capacity of both pumps is utilized by the forcing of the liquid from both pump chambers through the delivery waterway *d*, which is common to both, and thence to the point of use. If it is desired to reduce the amount of liquid pumped, then the hand wheel *k* being run down, its spindle *m* impinging upon the upper end U of the valve M, will permanently hold it off its seat, so that the liquid taken into the pump chamber of the large pump upon the upward movement of the piston G, will, upon its downward movement, be expelled not through the delivery port *a* to the common waterway *d*, but through the now open check valve M and back again into the reservoir, from whence it came, so that the large pump will effect no water delivery, merely churn the water back and forth from and to the reservoir; the small pump, however, being still in operative condition, will deliver the liquid pumped by it through its delivery waterway *f* and the main waterway *d* to the point of use. In this way the smallest amount of liquid that the apparatus will deliver is pumped. If it be desired to have an intermediate amount of water delivered, then the little pump will be cut out by running down the hand wheel *o*, so that its stem *q* shall impinge upon the upper end of the stem V of the valve R, and hold it off its seat, the same as above described relative to the other valve, which latter is put in operative condition by running backwardly its hand wheel *k*, relieving the stem U of its valve M from control so that it shall act as an ordinary check valve. When the parts are in this position, obviously the large pump alone will be in operation, the small pump being cut out.

It will thus be seen that under my invention with the same apparatus and by the reciprocation of a single piston, with an exceedingly small number of moving parts and exceedingly simple, hence inexpensive and durable construction, I produce a force pump having three markedly different capacities: first; that of both pumps combined; second; that of the small pump, the larger one being cut out; third; that of the larger pump, the smaller one being cut out.

It will be obvious to those who are familiar with such matters that the details of construction described and illustrated herein may be very extensively departed from and yet the essentials of the invention be retained. In fact I have not attempted in the drawing to illustrate any existing forms of force pump, nor have I incorporated in the drawing certain features which are usually present. These have been omitted for the sake of clearness. It will also be obvious that the size relation between the two pumps may be such as preferred, and that there is no necessity for a reservoir so large as that shown. Indeed, there may be no reservoir, so called, all that is necessary being some suitable liquid supply for the pumps; and as stated, the delivery waterways and the method of making connections at both sides of the pump may be such as preferred. Also an air chamber and other devices may be embodied, if desired.

I claim:

1. In hydraulic apparatus of the class stated, the combination of two pumps of different capacities, one located within the piston of the other, waterways for supplying liquid to and conveying it from both pumps, a valve set in the intake waterway of each pump and means actuated from the exterior of the apparatus and adapted to co-act with each of said valves, whereby they may be controlled and the pumps which they respectively supply thrown into and out of operation at will.

2. In hydraulic apparatus of the class stated, the combination of two pumps of different capacities, one located within the piston of the other, a single piston the reciprocation of which operates both pumps, waterways for supplying liquid to and conveying it from both pumps, a valve set in the intake waterway of each pump and means actuated from the exterior of the apparatus and adapted to co-act with each of said valves, whereby they may be controlled and the pumps which they respectively supply thrown into and out of operation at will.

3. In hydraulic apparatus of the class stated, the combination of two pumps of different capacities, waterways for supplying liquid to and conveying it from both pumps, a valve set in the intake waterway of each pump, and means actuated from the exterior of the apparatus and adapted to co-act with each of said valves, whereby they may be controlled and the pumps which they respectively supply thrown into and out of operation at will.

4. In hydraulic apparatus of the class stated, the combination of two pumps of different capacities, a single reciprocating part or piston which actuates both pumps, waterways for supplying liquid to and conveying it from both pumps, a valve set in the intake waterway of each pump and means actuated from the exterior of the apparatus and adapted to co-act with each of said valves, whereby they may be controlled and the pumps which they respectively supply thrown into and out of operation at will.

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

JOHN WEEKS.

Witnesses:
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