

No. 654,151.

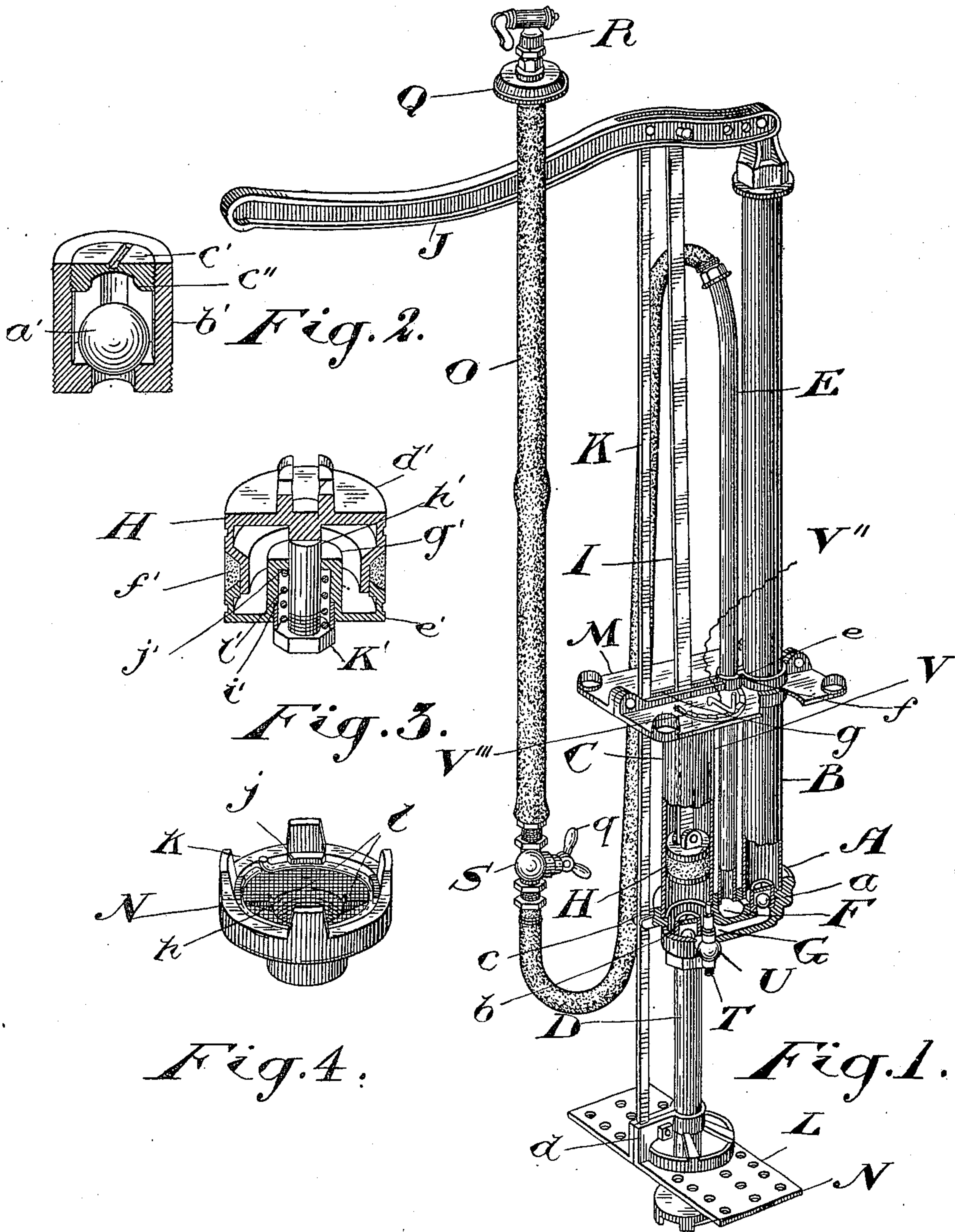
Patented July 24, 1900.

W. H. HEARD.
SPRAY PUMP.

(Application filed July 27, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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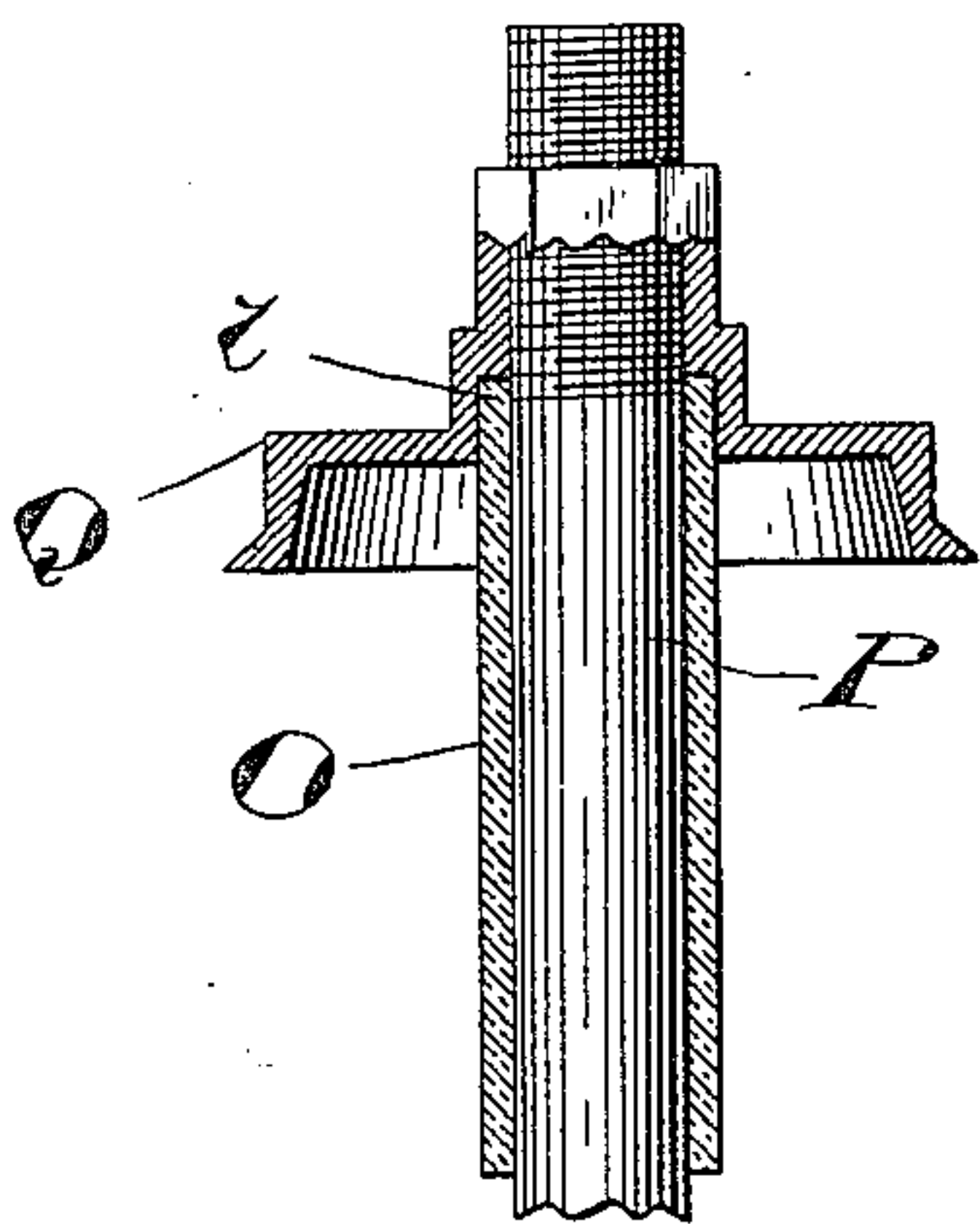
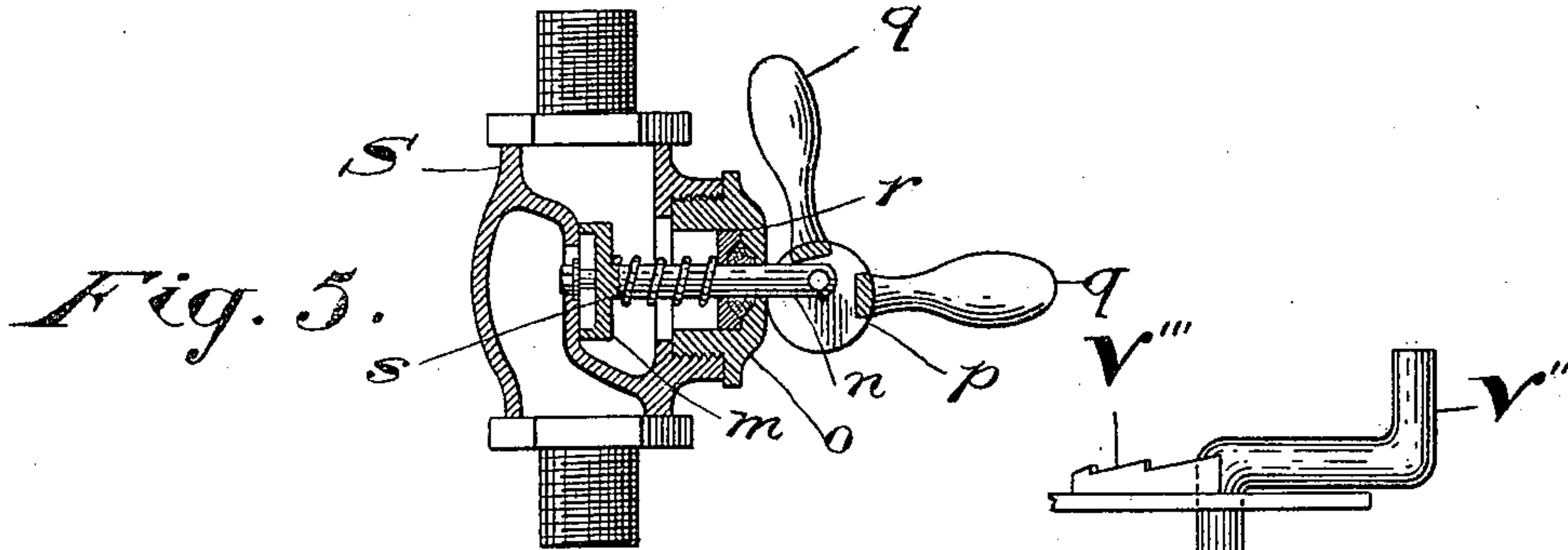


Fig. 6.

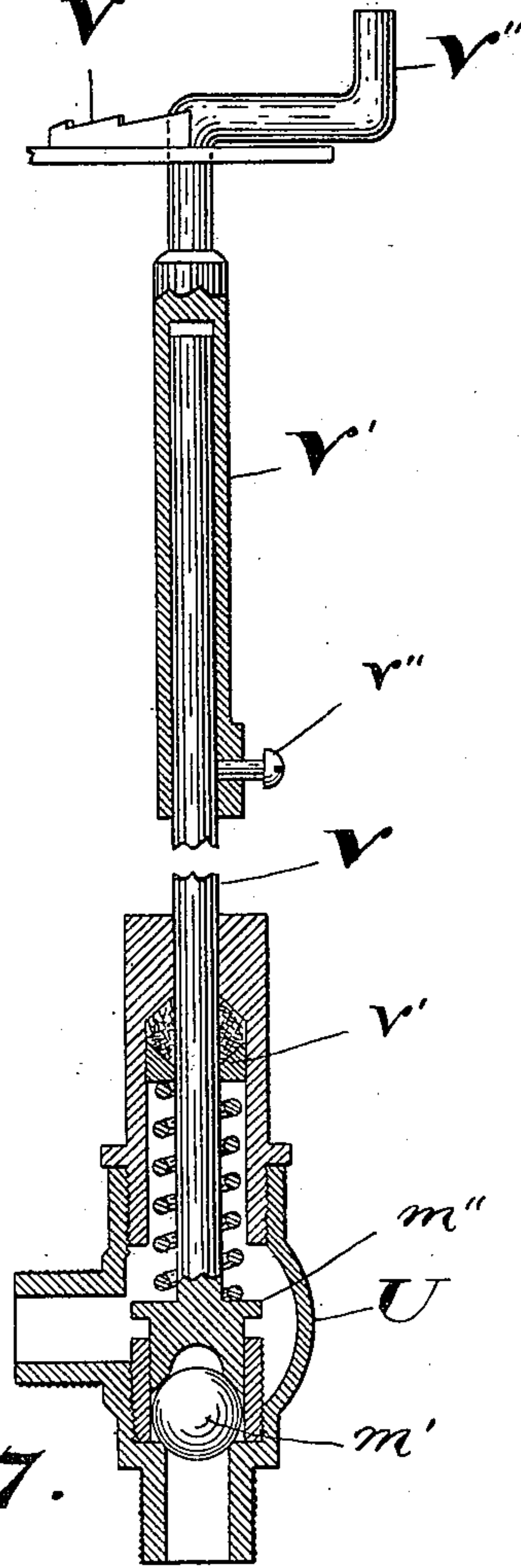


Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM H. HEARD, OF LONDON, CANADA.

SPRAY-PUMP.

SPECIFICATION forming part of Letters Patent No. 654,151, dated July 24, 1900.

Application filed July 27, 1899. Serial No. 725,256. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY HEARD, plumber, of the city of London, in the county of Middlesex and Province of Ontario, Canada, have invented certain new and useful Improvements in Spray-Pumps, of which the following is a specification.

The object of my invention is to devise a spray-pump which will be simpler and more durable in construction and more reliable in operation than any now on the market; and it consists, essentially, in such details of construction as are hereinafter more specifically described and then definitely claimed.

Figure 1 is a perspective view of my improved pump, partly broken away. Fig. 2 is a perspective sectional detail of one of the removable valves, partly broken away. Fig. 3 is a perspective sectional detail of the plunger. Fig. 4 is a perspective detail of the strainer. Fig. 5 is a sectional detail of the stop-cock in the spray-pipe. Fig. 6 is a sectional detail of the drip-cap on the end of the spray-pipe. Fig. 7 is a sectional elevation of the valve in the oil-pipe.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is the base-casting of the pump, in the openings in which are screwed the air-chamber B, the plunger-tube C, the suction-tube D, and the discharge-pipe E. In the base-casting A are formed two passage-ways F and G, the former connecting the air-chamber and the discharge-pipe and the latter opening by the valve *a* into the passage-way F, communicating with the suction-tube by means of the valve *b*, hereinafter described. Within the plunger-tube is located the plunger H, connected by the connecting-rod I with the pump-handle J, which is pivoted upon the top of the air-chamber B. The connecting-rod I has its connection with the pump-handle made detachable, so that it can be disconnected at any time.

K is the agitator-rod, pivotally connected to the pump-handle J. This rod passes between the guide-lugs C, formed upon the base-casting, and is thus effectually held in line. Its lower end is clamped by means of a suitable bolt and nut between the split portion *d* of the agitator L.

M is the plate, by means of which the apparatus is connected to the top of the can or barrel. It is formed in two parts, as shown, securely clamped together by bolts, and is provided with a hole *e* for the air-chamber, the hole *f* for the discharge-pipe, and the slot *g* for the passage of the connecting-rod and agitator-rod. The holes provided for the passage of the air-chamber and the discharge-pipe are flanged both above and below the plate, this plate being securely clamped around the air-chamber, and the discharge-pipe affords a very secure and solid attachment for the pump, the flange *g* absolutely preventing any twisting or other movement of the plate.

Secured to the bottom of the suction-pipe D is the strainer N. (Shown in detail in Fig. 4.) This strainer is of ordinary construction, except that the wire-gauze *h* is supported by ribs *l*, which prevent the gauze being sucked inwardly when its apertures are closed by a leaf or other obstruction. In order to retain the gauze in position, I form upon the strainer the inwardly-projecting lugs *j*, under which is inserted the brass wire ring *k*. If it is desired to renew the gauze at any time or remove it, the wire is readily sprung from under the lugs *j* and is as readily replaced to hold the gauze in position when desired.

Connected to the discharge-pipe by means of a flexible hose is the bamboo extension-rod O, which is lined with a brass tube P, as shown in Fig. 6. The upper end of the brass rod is screwed into the drip-cap Q, which has a recess I formed therein to receive the end of the bamboo rod to prevent it from splitting. To the upper end of the hollow drip-cap is connected the nozzle R, which may be of any ordinary construction. This drip-cap serves effectually to prevent the liquid ejected from the nozzle trickling down the extension-rod and soiling the hands or the clothes of the operator and will be used for this purpose whether the tube P is used with or without the bamboo rod O.

At the lower end of the extension-rod O is the stop-cock S. (Shown in Fig. 5.) It is similar in form to an ordinary globe-valve, with the exception of the means provided for operating the valve-spindle and the valve-disk.

The valve-disk *m* has a valve-spindle *n* connected thereto which slides freely in the valve-mounting *o*. To the outer end of the spindle is pivoted a cam-disk or eccentric provided with two handles *q*, as shown.

r is a washer with a beveled recess therein, sliding freely upon the valve-spindle *n*. The inside of the valve-mounting is similarly recessed and suitable packing arranged in the said recesses.

Between the valve-disk *m* and the washer *r* I place a spring *s*, which tends always to keep the valve closed.

By moving the handles *q* it is evident that the valve can be opened or closed at pleasure by the thumb or finger of the hand grasping the extension-rod, thus enabling the operator to turn the spray on or off while operating the pump with the hand. The chief novelty in this valve is given by the use of the two handles *q*, as the use of one alone would necessitate the operator stopping his pumping while turning the spray on or off.

On reference to Fig. 2 the construction of the valves *a* and *b*, hereinbefore referred to, will be readily understood. The ball *a'* fits a suitable seat in the bottom of the valve and is surrounded by a cage *b'*, in the top of which is screwed the plug *c'*, so that by removing the plug the ball may be removed for renewal or the valve-seat refaced at any time. It is found that the chief difficulty in a valve of this kind is to prevent the ball *a'* from being knocked out of shape by contact with the plug or other retainer. To obviate this difficulty, I provide the under side of the plug *c'* with the seat *c''*, constructed exactly similar to the seat in the bottom of the valve. Thus when the ball is forced upward by the flow of liquid it strikes on a surface which if it wears the ball at all wears it in such a way that it will always fit the seat in the bottom of the valve and will not be defaced or worn in such a manner as to destroy its fit and render the valve useless.

In Fig. 3 the construction of the plunger *H* is clearly shown. It consists of two parts *d'* *e'*, sleeved together and so shaped as to form between them a recess *f'*, the sides of which preferably though not essentially are beveled. Into a recess in the upper part extends the sleeve *g'*, formed on the lower part of the plunger. Formed on the upper part of the plunger and extending through the sleeve is the spindle *h'*. Screwed upon the end of the spindle *h'* is a nut *K'*, formed with a sleeve adapted to fit against a shoulder *j'*, formed inside the sleeve *g'*. Between the nut *K'* and the shoulder *j'* on the sleeve is located a coil-spring, which thus tends to maintain the parts of the plunger in the position shown in the drawing.

When the plunger is in use, the recess *f'* is full of a suitable packing, and as the parts of the plunger are normally somewhat separated the tension of the coil-spring, tending to draw the parts of the plunger together,

causes the beveled sides of the recess to force the packing outwardly against the inside of the plunger-tube, thus insuring a close fit. In a small plunger the packing may be sufficiently pressed outward against the sides of the plunger-tube if the sides of the recess *f'* are not made with a bevel.

When the plunger is being forced downward, the pressure of the fluid upon its lower part tends to increase the spreading action upon the packing, whereas when the plunger is raised this pressure is removed and the plunger can be raised without unnecessary friction.

In small plungers a rubber washer may be placed about the spindle above the coil-spring to prevent water entering between the two parts of the plunger, but in a large plunger the water may be allowed to enter freely between them, so as to equalize the pressure on the lower parts of the plunger to prevent the packing being forced out too tightly into contact with the plunger-tube.

The construction described is equally available for solid plungers, as shown, or for hollow plungers, in which the central spindle is a tube forming means of communication through the plunger.

In Fig. 1, *T* is a small pipe communicating with the interior of the base-casting *A* above the valve *b*. This tube may be used to introduce a small quantity of oil or other fluid to mix with the spraying mixture drawn up through the suction-tube *D*. It is preferably provided with a valve *U* (shown in detail in Fig. 7) to regulate the amount of oil introduced. Through the valve-mounting is passed the spindle *V*. The ball *m'* of the valve is fitted within a cage like the valves *a* and *b*. The spindle *V* is connected to the plug *m''* of the cage. It is evident that by lifting the spindle *V* the amount of lift of the ball *m'* may accurately regulate and readily determine quantities of fluid permitted to pass the valve. The ball-valve within a suitable cage is preferred; but any other form of valve the lift of which may be limited by the action of the spindle *V* would answer the purpose. The spindle *V* is packed at *v'* in a manner similar to that shown in Fig. 5. The upper end of the spindle *V* is preferably made adjustable by means of the telescoped portion *V'*, which may be clamped in any desired position by means of a set-screw *v''*. The upper end of the portion *V'* is cranked, as shown at *V''*. Upon the plate *M*, I preferably provide a notched semicircular inclined plane *V'''*, up which the crank *V''* may be forced to any desired height and held by the notches in the position desired till it is released by the operator. The notched inclined plane *V'''* may of course be secured to any suitable stationary part.

In starting operations the plunger-rod is disconnected and the pump-handle operated, thereby causing the agitator to thoroughly mix the contents of the vessel containing the

mixture to be used. The plunger-rod is then connected with the handle. The continued action of the latter now operates the plunger as well as the agitator, and the mixture within the vessel is drawn up into the plunger-tube at every upstroke through the valve *b*. The downstroke of the plunger forces the mixture out through the passage-way *G*, through the valve *a*, into the passage-way *F*, and out through the discharge-pipe, the valves *a* and *b* alternately opening and closing as necessary.

When desired, kerosene-oil may be introduced through the pipe *T*, where it mingles with the fluid drawn through the suction-tube and is expelled with it in a fine spray, avoiding the necessity of emulsifying the oil for use, as is now commonly done.

What I claim as my invention is—

20 1. In a pump, a base-casting having two passages formed therein, in combination with a plunger-tube and suction-tube connecting with one passage, an air-chamber and a discharge-pipe connecting with the other passage; a valve between the two passages; a valve between the first-mentioned passage and the opening of the suction-pipe; and a pipe communicating with the said passage, substantially as and for the purpose specified.

25 2. In a pump, a base-casting having two passages formed therein, in combination with a plunger-tube and suction-tube connecting with one passage; an air-chamber and a discharge-pipe connecting with the other passage; a valve between the two passages; a valve between the first-mentioned passage and the opening of the suction-pipe; a pipe communicating with the said passage; and a regulating-valve in the said pipe, substantially as and for the purpose specified.

30 3. A pump provided with a suction-tube and a valve closing the said tube thereof, in combination with a tube opening into the pump above the said valve; and a regulating-valve in the said tube, substantially as and for the purpose specified.

4. In a pump, a base-casting; two lugs formed thereon; a suction-tube and an air-chamber connected thereto, in combination with a pump-handle pivoted upon the air-chamber; an agitator sleeved upon the said suction-pipe; and a rod connected to the said agitator, pivoted to the said handle and passing between the aforesaid lugs, substantially as and for the purpose specified.

5. In a pump, a valve-cage made removable and having a seat in its lower portion, in combination with a plug closing an opening in the top of the cage, and provided with a seat similar to the aforesaid seat, and a ball between said seats free to move in all directions, substantially as and for the purpose specified.

6. In a pump, a base-casting having two passages formed therein, in combination with a plunger-tube and suction-tube connecting with one passage; an air-chamber and a discharge-pipe connecting with the other pas-

sage; a valve between the two passages; and a valve between the first-mentioned passage and the opening of the suction-pipe, each valve comprising a cage screwed into a suitable opening and having an opening in its lower portion closed by a valve, and a screw-plug closing an opening in the top of the cage, substantially as and for the purpose specified.

7. In a pump, the suction-tube *D*, in combination with the strainer *N*, provided with the ribs *i*, wire-gauze *h*, lugs *j* and bent wire *k*, substantially as and for the purpose specified.

8. In a pump, the suction-tube *D*, in combination with the strainer *N*, provided with wire-gauze *h*, lugs *j*, and bent wire *k*, substantially as and for the purpose specified.

9. In a pump, an agitator sleeved upon the suction-tube and partly split, in combination with an agitator-rod having its end inserted between the parts; and a clamping-bolt adapted to clamp the parts together, substantially as and for the purpose specified.

10. In a pump and in combination with the discharge-pipe thereof, a valve normally held closed by spring-pressure, in combination with a cam pivoted to the end of the spindle and bearing against the end of the valve-mounting, and two lever-handles connected to the said cam, substantially as and for the purpose specified.

11. In a pump, a drip-cap having a sleeve thereon, in combination with a metal tube secured within the sleeve and a bamboo tube surrounding the metal tube and having its end inserted in a recess in the drip-cap, substantially as and for the purpose specified.

12. In a pump, a metal tube and a nozzle, in combination with a drip-cap flared downward and outward and secured in position at or about the junction of the two, substantially as and for the purpose specified.

13. In a pump, a nozzle and a tube to which the said nozzle is secured, in combination with a drip-cap having a sleeve thereon within which the said tube is secured, substantially as and for the purpose specified.

14. In a pump, a plunger comprising two parts longitudinally movable upon one another and so shaped as to form between them an external recess, in combination with spring mechanism tending to draw the parts of the plunger together, substantially as and for the purpose specified.

15. In a pump, a plunger comprising two parts longitudinally movable upon one another and so shaped as to form between them an external recess with beveled sides in combination with spring mechanism tending to draw the parts of the plunger together, substantially as and for the purpose specified.

16. In a pump, a plunger comprising two parts made longitudinally movable upon one another and so shaped as to form between them an external recess with beveled sides, in combination with a spindle rigidly connected to one part of the plunger and extend-

ing through a shouldered hole formed in the other part; a nut upon the end of the spindle, and a spring upon the spindle between the nut and the shoulder within the said hole, substantially as and for the purpose specified.

17. In a pump the combination of the following elements comprising a plunger, the part *e'* having the sleeve *g'* formed thereon and provided with shoulders *i'* and *j'*; the part *d'* recessed to receive the sleeve *g'*; the nut shaped to engage the shoulder, and the spring engaging the nut and the shoulder, each part of the plunger being so shaped as to form between them an external recess for packing, substantially as and for the purpose specified.

18. A pump provided with a suction-tube and a valve closing the said tube thereof, in combination with a tube opening into the pump above the said valve; and a regulating-valve in the said tube, comprising a valve-seat, a ball fitting said seat, a cage containing the said ball, a spring-actuated plug movable within the said cage and adapted to restrain the lift of the ball and means for vertically adjusting the said plug, substantially as and for the purpose specified.

19. A pump provided with a suction-tube and a valve closing the said tube thereof, in combination with a tube opening into the

pump above the said valve; and a regulating-valve in said tube, comprising a valve-seat, a valve fitting said seat, a cage containing the said valve, a plug movable within the said cage and adapted to restrain the lift of the ball, and means for vertically adjusting the said plug, substantially as and for the purpose specified.

20. In a pump, the combination of a pipe entering the pump above the lower valve thereof and a valve located in the said pipe comprising a valve-seat; a valve fitting said seat, a cage containing the said valve, a plug movable within the said cage and adapted to restrain the lift of the valve and means for vertically adjusting the said plug, substantially as and for the purpose specified.

21. The combination with a pump having a valve adapted to close the inlet-pipe and a valve closing the outlet through which liquid is forced to the discharge, of a pipe communicating with the interior of the pump between said valves and a regulating-valve adapted to control the admission of liquid through the said pipe.

London, Canada, July 20, 1899.

WILLIAM H. HEARD.

In presence of—

L. F. EDEN,
W. REILLY.