No. 774,175. PATENTED NOV. 8, 1904.

W. H. HEARD.

SPRAYING APPARATUS.

APPLICATION FILED SEPT. 9, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

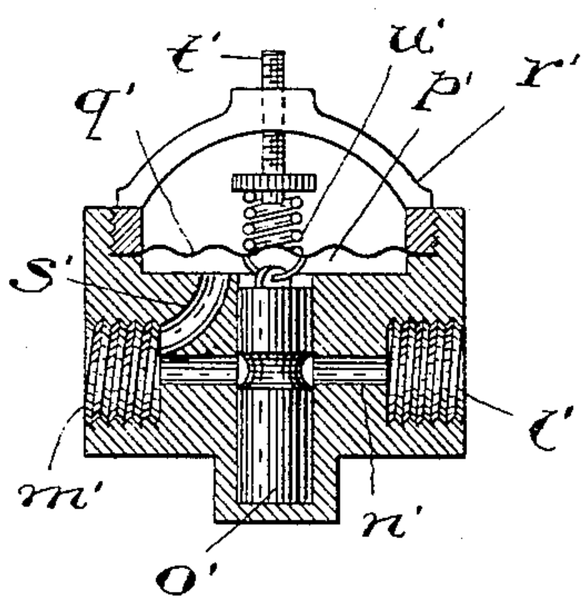


Fig. 8.

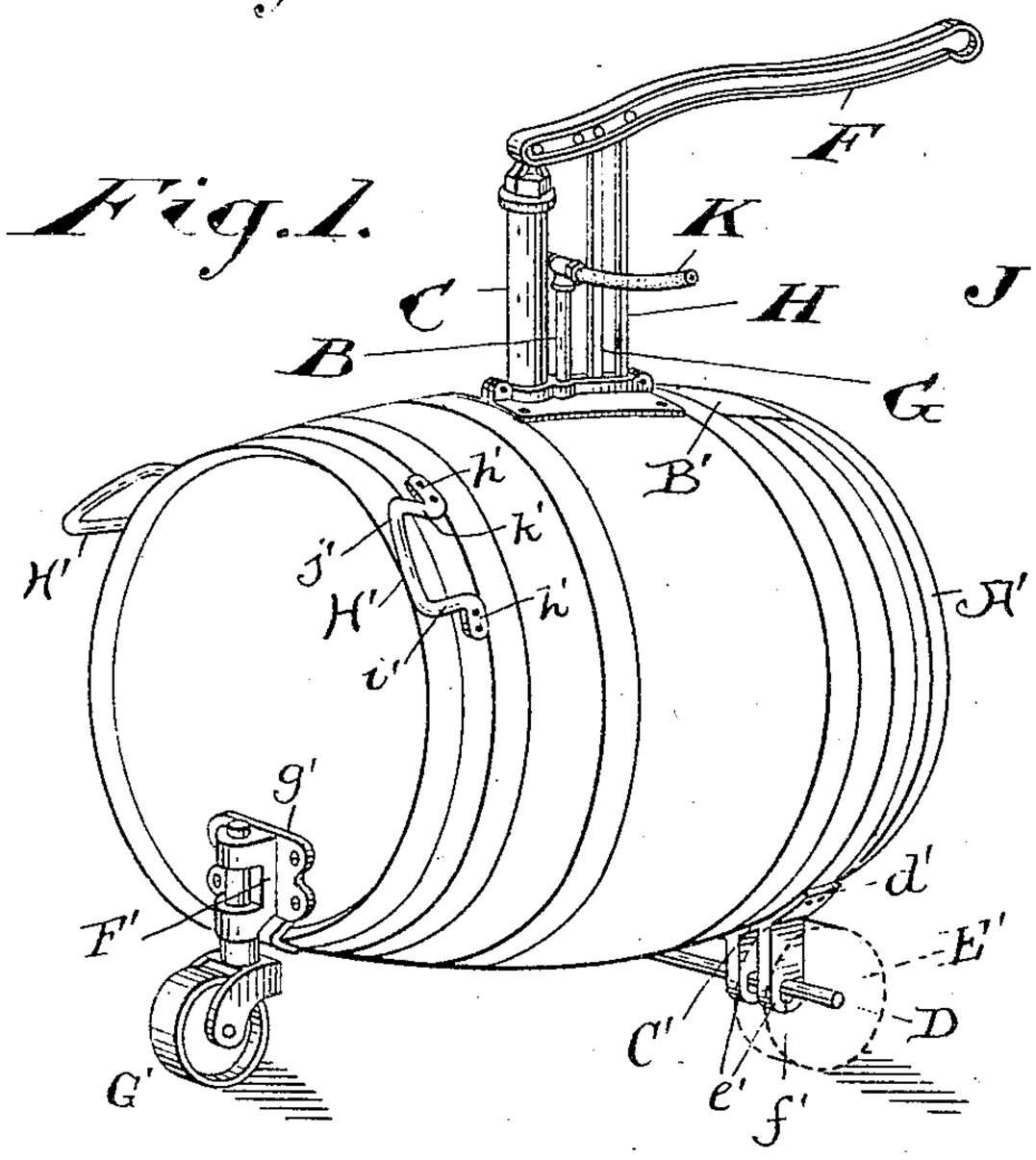
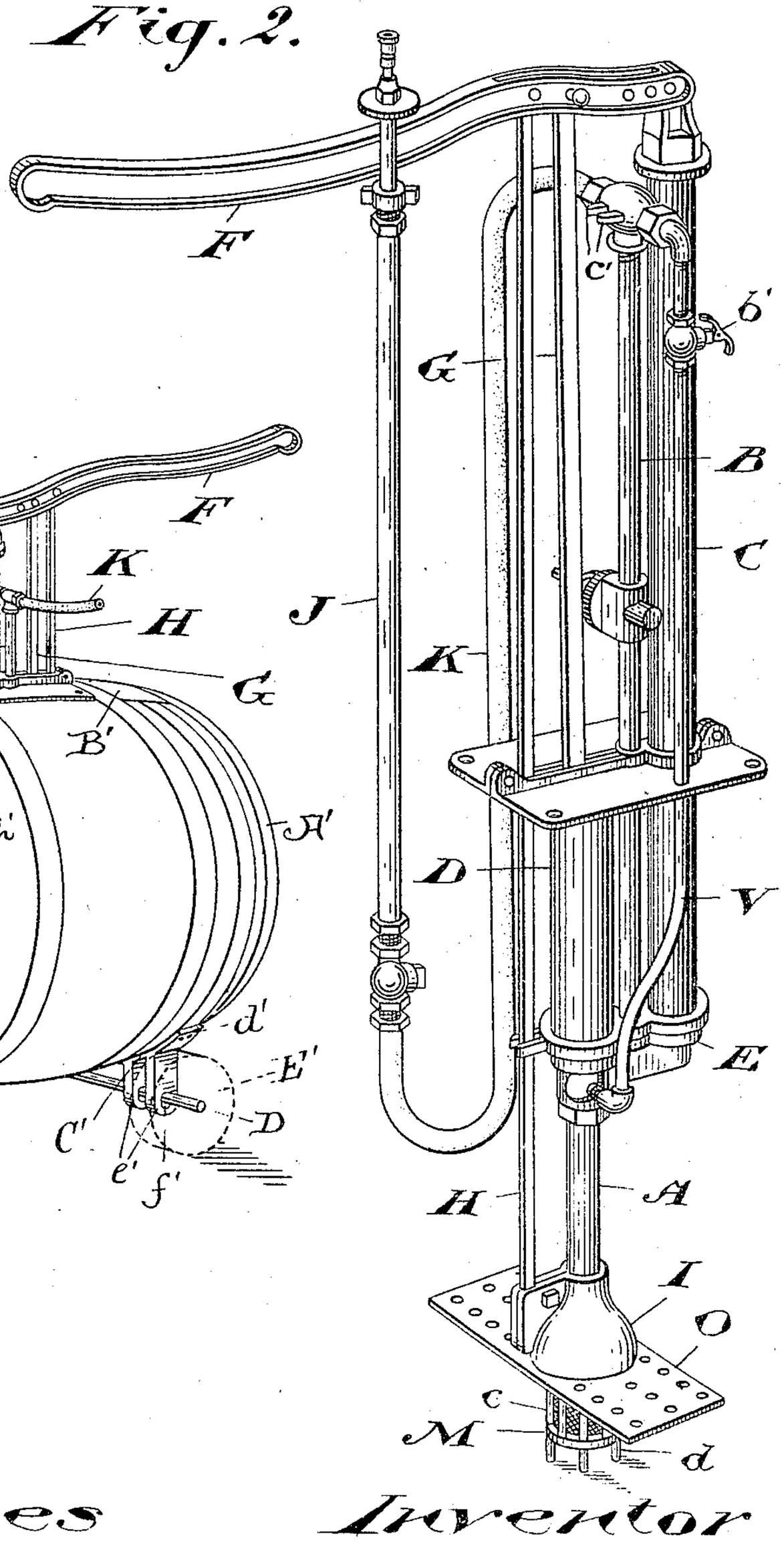


Fig. 1.

Fig. 2.



Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

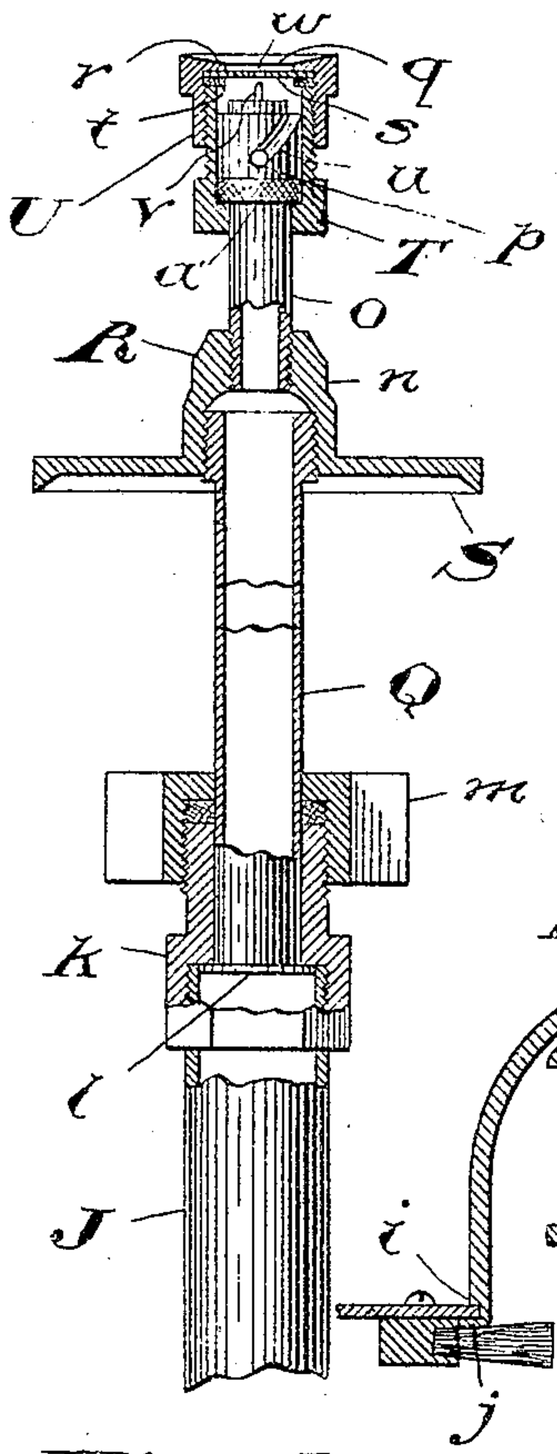
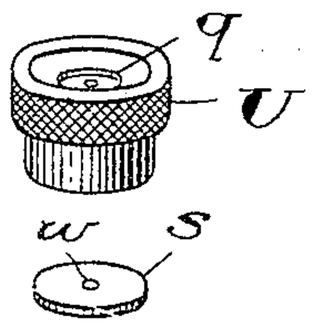


Fig. 5.



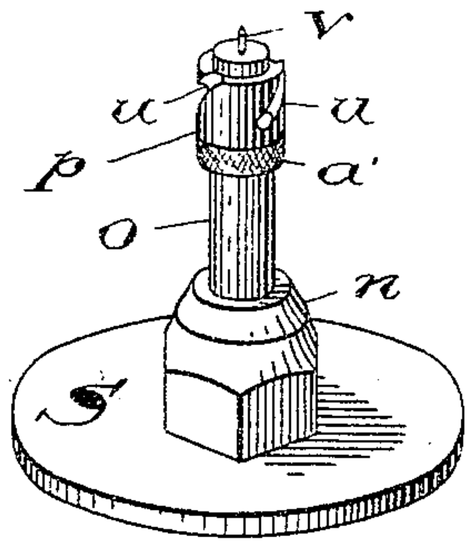


Fig. 4.

Fig. 3.

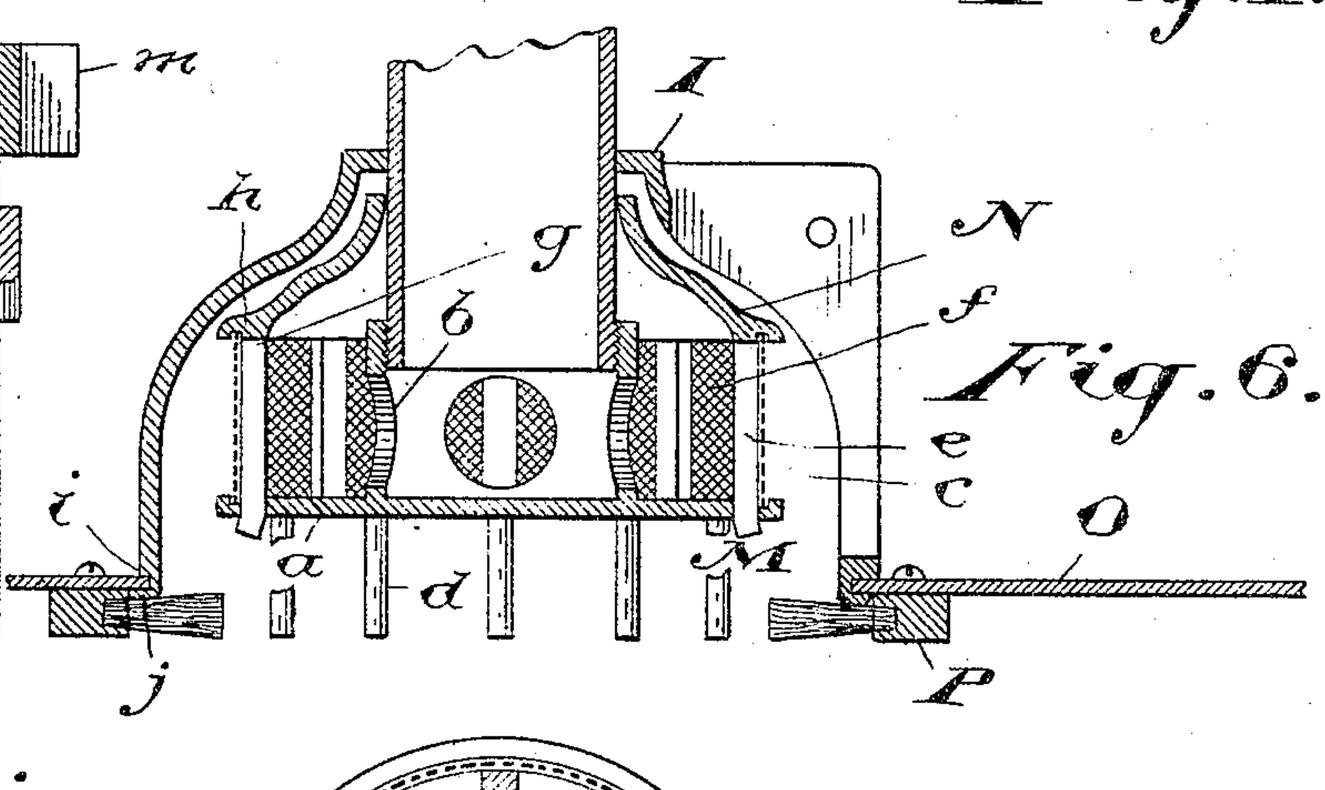


Fig. 6.

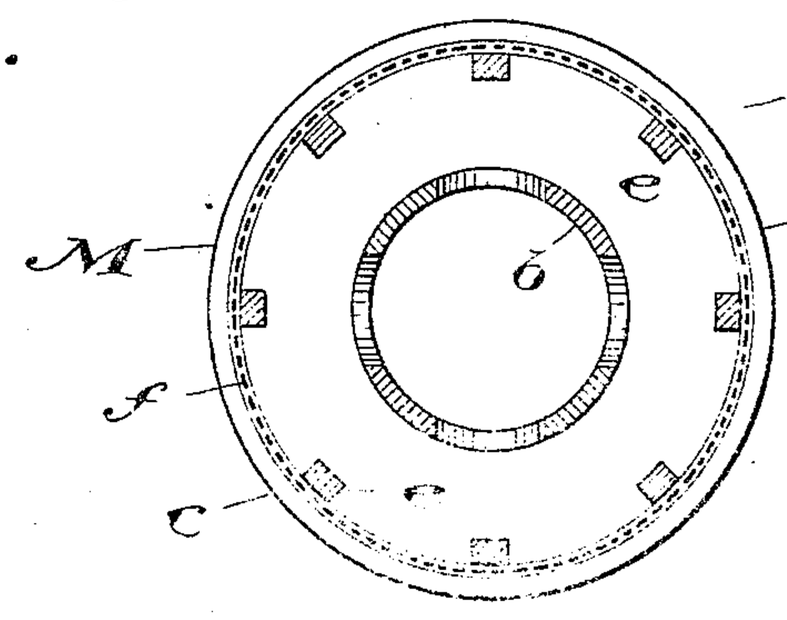


Fig. 7.

Witnesses

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No. 774,175. Patented November 8, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM HENRY HEARD, OF LONDON, CANADA.

SPRAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 774,175, dated November 8, 1904.

Application filed September 9, 1901. Serial No. 74,808. (No model.)

To all whom it may concern:

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

The object of my invention is to improve the construction of spraying apparatus of the general nature of that described in my prior United States patent, No. 654,151, dated July 24, 1900; and it consists, essentially, of improvements in the strainer and agitator, of a new telescopic extension-rod, of an improved nozzle and drip-cap, of means for forming a connection between the pressure part of the machine and the suction-pipe, so that the strainer may be blown clear of obstructions when necessary, of means for holding the plunger-rod in position when it is disconnected from the handle, and of improved wheel attachments and handles for the barrel-tank to which the apparatus is connected, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a perspective view of my invention as used with a tank-barrel. Fig. 2 is a perspective view of the pump alone. Fig. 3 is a sectional elevation of part of the telescopic extension-rod, showing the nozzle and drip-cap. Fig. 4 is a perspective view of the supply-pipe of the nozzle with the drip-cap. Fig. 5 is a perspective detail of the cap of the casing on the nozzle and metal disk in which the spray-opening is formed. Fig. 6 is a vertical section of the agitator and strainer on the end of the suction-pipe. Fig. 7 is a sectional plan of the strainer and the brush on the agitator. Fig. 8 is a sectional detail of the pressure-regulator.

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

As the general construction and operation of the pump has been described in the prior patent referred to, it will not be necessary to go into details. Suffice it to say that A is the suction-pipe of the pump; B, the discharge-pipe; C, the air-chamber; D, the plunger-tube; E, the base-casting in which the valves are located; F, the handle pivoted to the top of the air-chamber; G, the plunger-rod pivoted to the handle and also to the plunger, (not shown;) H, the agitator-rod pivoted to the handle and also secured to the agitator I; J, the hollow extension-rod connected, by means of the flexible hose K, with the upper end of the discharge-pipe B, and L the two-handled stop-cock at the bottom of the extension-rod.

The lower end of the suction-pipe is provided with a cylindrical strainer. This strainer comprises a cage formed in two parts M and N. The part M comprises a circular base *a*, from the center of which extends upwardly a piece of perforated pipe *b*, threaded so that it may be screwed into the lower end of the suction-pipe. (See Fig. 6.) To the lower side of the base *a* are connected suitable legs *d*. The part N of the cage fits loosely about the suction-pipe and has a series of side rods *e* connected thereto. The two parts M and N thus form a cage around the lower end of the suction-pipe, the spaces between the side rods forming openings communicating with the interior of the cage. Around the set of side rods is placed a gauze cylinder *f*, which is securely held in position against the side rods by having its edges fitted into the grooves *c* and *g* in the parts M and N. Two of the side rods are longer than the rest of the set and are adapted to pass through holes in the base *a* and are bent or otherwise caused to engage the base to hold the two parts of the strainer together. The agitator I, being hollow underneath, when in its lowermost position completely surrounds and incloses the strainer. Hence as the agitator is lifted up and down when the pump is working the surface of the strainer is kept from clogging by the strong currents of fluid thus caused to rush over its surface. As an additional precaution I secure to the plate O of the agitator a circular brush P, the bristles of which are adapted to brush the surface of the gauze cylinder *f* as the agitator is raised and lowered. When this brush is used, it becomes almost impossible to choke up the strainer. The plate O is secured to the upper part of the agitator in a novel manner. The lower edge of the circular part of the

agitator is reduced in thickness, as shown in Fig. 6, forming a shoulder *i* and a thin projecting flange *j*. A hole is formed in the plate O to enable it to fit around the flange *j* against the shoulder *i*. The flange *j* is then turned over, as shown in the drawings, and pressed down in contact with the under side of the plate, which is thus securely held in position.

The extension-rod J is made telescopic, a second extension-rod, Q, being made to slide therein. The upper end of the extension-rod J has a nut *k* screwed thereon. This nut is shouldered on the inside, as shown, to engage the flange *l*, formed on the lower end of the extension-rod Q, which is adapted to slide through the body of the nut. On the nut is screwed the stuffing-box *m*, adapted to make tight the opening in the nut through which the second extension-rod passes. The upper end of the second extension-rod, Q, is threaded, so that the coupling-nut *n* of the nozzle R may be screwed thereon. On the nozzle, preferably on the coupling-nut thereof, is cast integrally a disk-shaped flange S to serve as a drip-cap. Screwed into the coupling-nut *n* is the supply-pipe *o*, having a large end *p*. The upper end of the supply-pipe is closed, as indicated. The casing of the nozzle is formed in two parts, the body T and the cap U, the cap screwed onto the outside of the body, as shown. The body is shaped to fit underneath the enlarged end of the supply-pipe, as shown. In the cap is formed an opening *q*, surrounded by an annular flange *r*. Beneath this flange is fitted a circular steel disk *s*, and between the disk and the upper end of the body of the casing is placed a packing-ring *t*. The upper end of the supply-pipe is preferably reduced in diameter, as shown, and from the annular space thus formed extends downwardly at the opposite sides of the pipe two similar inclined grooves *u*, which have an opening communicating with the interior of the pipe. The reducing of the diameter of the end of the supply-pipe gives a free discharge of fluid from the grooves. At the center of the end of the supply-pipe is located the disgorging-needle *v*, and in the center of the disk *s*, immediately opposite the end of the disgorge-needle, is formed the spray-opening *w*. When the two parts of the casing are screwed together, as indicated in Fig. 3, sufficient space is left between the disk *s* at the end of the suction-pipe to permit of the casing being slipped up and down to force the needle into and withdraw it from the spray-opening, so as to effectually disgorge the same if it becomes clogged.

The operation of the nozzle is substantially as follows: The stream of liquid entering through the supply-pipe passes from opposite sides thereof through the inclined grooves *u*, which cause it to have a whirling action in the small chamber formed between the disk *s* and the end of the supply-pipe, discharging through the spray-opening in a fine spray. The pressure of the fluid in this chamber is sufficient to maintain the casing in its raised position, with the shoulder at the bottom of the body portion pressed into contact with the packing-ring *a'*, preferably placed around the shoulder formed by the enlarged end of the supply-pipe. If it becomes necessary to disgorge the nozzle, the cap may be pressed against any convenient stationary body. The casing may thus be slid backward on the supply-pipe and the needle caused to disgorge the spray-opening, as already described. Upon releasing the pressure on the cap the pressure of the fluid within the casing returns the casing to its normal working position.

The use of the detachable steel disk *s* is an important feature of my invention, as when an ordinary brass cap is used with a spray-opening therein the hole soon becomes worn too large and it is necessary to replace the entire cap. With my steel disk this wearing takes place much more slowly, and if the spray-opening does become worn too large it costs exceedingly little to replace the disk. It further becomes possible by having disks of different thickness with different-sized openings therein to produce the spray in any form desired either close to the nozzle or some distance away from it, so that the nozzle is readily adapted to different classes of work.

It is sometimes found that careless or ignorant operators will sometimes try to operate the pump after the fluid being used has been allowed to settle for some time and find that their pump is choked. As the fluid in use in most cases contains solid matter in suspension, this settles at the bottom and cakes around the strainer, completely clogging it. As it is not easy to dislodge this matter from without, I provide means for blowing it outwardly from within.

V is a pipe connected at one end with the suction-pipe A and at the other end with some convenient part of the pressure side of the machine—such, for example, as the air-chamber C or the discharge-pipe B. In the drawings I show it connected with the upper end of the discharge-pipe B. In this pipe I locate a stop-cock *b'*, preferably of the type shown in Fig. 5 of the prior patent already referred to, though any form of stop-cock would answer the purpose of the invention. If it is found after pumping a few strokes that the suction-pipe is clogged, the stop-cock may be opened and a rush of fluid or air from the pressure side of the apparatus is forced back through the suction-pipe and out through the strainer, effectually clearing the meshes of the wire-gauze, so that liquid will pass freely in the suction-pipe upon further operation of the pump.

It is a common thing when starting opera-

tions to disconnect the plunger-rod from the handle, so that when the handle is worked the agitator alone is moved to properly mix the fluid in the tank. The plunger-rod then sometimes falls to one side or the other and interferes with the proper action of the handle. To avoid this difficulty, I provide the head of the discharge-pipe B with jaws c', between which the plunger-rod may be slipped when it is disconnected, as described. It is thus held centrally and in proper line till the operator is ready to again connect it with the handle.

In Fig. 1 I show the pump set in in a barrel A', the plate B', which embraces the discharge-pipe and air-chamber, being secured to the top of the barrel. At each side of the barrel underneath I connect a bracket C', provided with suitable flanges d', by which it is screwed to the sides of the barrel, and also depending lugs e', in which are formed vertical oblong holes f'. In these holes are journaled the axle D', on which are placed the wheels E'. The reason for making the holes f' oblong, as described, is that barrels vary in shape and it is impossible to properly attach the wheels unless some accommodation for the axle is provided, as described. To one end of the barrel is secured a bracket F', in which is journaled the vertical axle of the swivel-wheel G'. This bracket is provided with the flange g', screwed to the head of the barrel, and it is also shaped to engage the chine. Near the same end of the barrel as the swivel-wheel are the handles H', secured at each side of the barrel near the top. These handles are provided with the flanges h', by which they are secured to the barrel. From the lower flange h' each handle extends outwardly and rearwardly to form the part i''. The handle then turns at an angle and is bent somewhat backwardly in the direction of the barrel and at the same time is run on a circle substantially concentric with the end of the barrel. This part is lettered j''. The handle then turns inwardly and rearwardly, k', to join the upper flange h'. These handles make the barrel very easy to operate, as a straight pull is easily obtained on the parts i''. The hands also slide naturally up to the part j'' when a lift is desired.

In Figs. 2 and 8 is shown the pressure-regulator by means of which the discharge from the spray-nozzle is rendered constant in force and volume. It consists, as will be seen, of a casing comprising an inlet-pipe l' and an outlet-pipe m'. These communicate with one another by means of the channel n'. Sliding in a suitable guideway across this channel is the regulator-plug o', having a groove formed around its center, which when the plug is in its normal position registers with the channel n'. Above the plug o' is formed a chamber p', the upper side of which is formed by the corrugated diaphragm q', held in place by the screw-plug r'. To the inside of this diaphragm the regulator-plug o' is preferably connected. s' is a discharge-way forming a connection between the discharge m' of the regulator and the chamber p'. t' is a regulating-screw adjustable in the plug r' and suitably arranged to press against a coil-spring u', which engages the diaphragm q'. This regulator is arranged in the discharge-pipe B, as shown in Fig. 2. From this construction and arrangement it follows that any excess of pressure in the discharge-pipe raises the diaphragm, and with it the regulator-plug, so that the channel M' is restricted and a less amount of liquid is allowed to flow through to the nozzle until the pressure again drops to the normal, when the regulator again assumes the position shown in Fig. 8.

What I claim as my invention is—

1. In a pump, a suction-pipe, in combination with a cylindrical strainer located at the lower end of the suction-pipe, and an agitator extending around the strainer in proximity thereto, the said agitator being vertically movable with respect to said cylindrical strainer, substantially as described.

2. In a pump a suction-pipe, in combination with a cylindrical strainer located at the lower end of the suction-pipe; a vertically-movable agitator extending around the strainer in proximity thereto; and a circular brush secured to the agitator with its bristles adapted to contact with the cylindrical surface of the strainer, substantially as described.

3. In a pump a suction-pipe, in combination with a cylindrical strainer-cage communicating with the suction-pipe and formed in two parts fitted together, one part being secured to the suction-pipe and the other slidable thereon; and wire-gauze located around the cage, the latter having openings therein so that fluid may freely pass through the gauze, substantially as described.

4. In a pump a suction-pipe, in combination with a cylindrical strainer-cage communicating with the suction-pipe and formed in two parts fitted together, one part being secured to the suction-pipe and the other slidable thereon; wire-gauze located around the cage, the latter having openings therein so that fluid may freely pass through the gauze; and legs formed on the cage, substantially as described.

5. In a pump a suction-pipe, in combination with a strainer-cage communicating with the suction-pipe and formed in two parts; a cylinder of wire-gauze; a series of side rods formed around the outer edge of one part of the cage inside the gauze cylinder, each part of the cage having a groove formed therein to receive one edge of the gauze cylinder, substantially as described.

6. In a pump a suction-pipe, in combination with a strainer-cage communicating with the suction-pipe and formed in two parts; a cylinder of wire-gauze; a series of side rods

formed around the outer edge of one part of the cage inside the gauze cylinder; two side rods of greater length than the others formed at the outer edge of one part of the cage outside the gauze cylinder; holes being formed in the other part of the cage through which the said side rods may pass and there be bent or otherwise engaged with the cage, substantially as described.

7. In a pump a suction-pipe, in combination with a strainer-cage communicating with the suction-pipe and formed in two parts; a cylinder of wire-gauze; a series of side rods formed around the outer edge of one part of the cage inside the gauze cylinder; two side rods of greater length than the others formed at the outer edge of one part of the cage outside the gauze cylinder; holes being formed in the other part of the cage through which the said side rods may pass and there be bent or otherwise engaged with the cage and legs formed on the lower part of the cage, substantially as described.

8. In a pump, the combination of the suction-pipe A; the part M of the strainer provided with the base *a* and perforated tube *b* formed thereon and screwed to the lower end of the suction-pipe; the part N of the strainer sleeved on the suction-pipe; the side rods *e* depending therefrom, and the gauze cylinder *f* surrounding the side rods, substantially as described.

London, August 30, 1901.

WILLIAM HENRY HEARD.

In presence of—
FLOYE E. LAWSON,
HERBERT BEATTY.