

F. FINK.

AUTOMATIC HOSE CLEANING APPARATUS.

APPLICATION FILED JAN. 6, 1905.

3 SHEETS—SHEET 1.

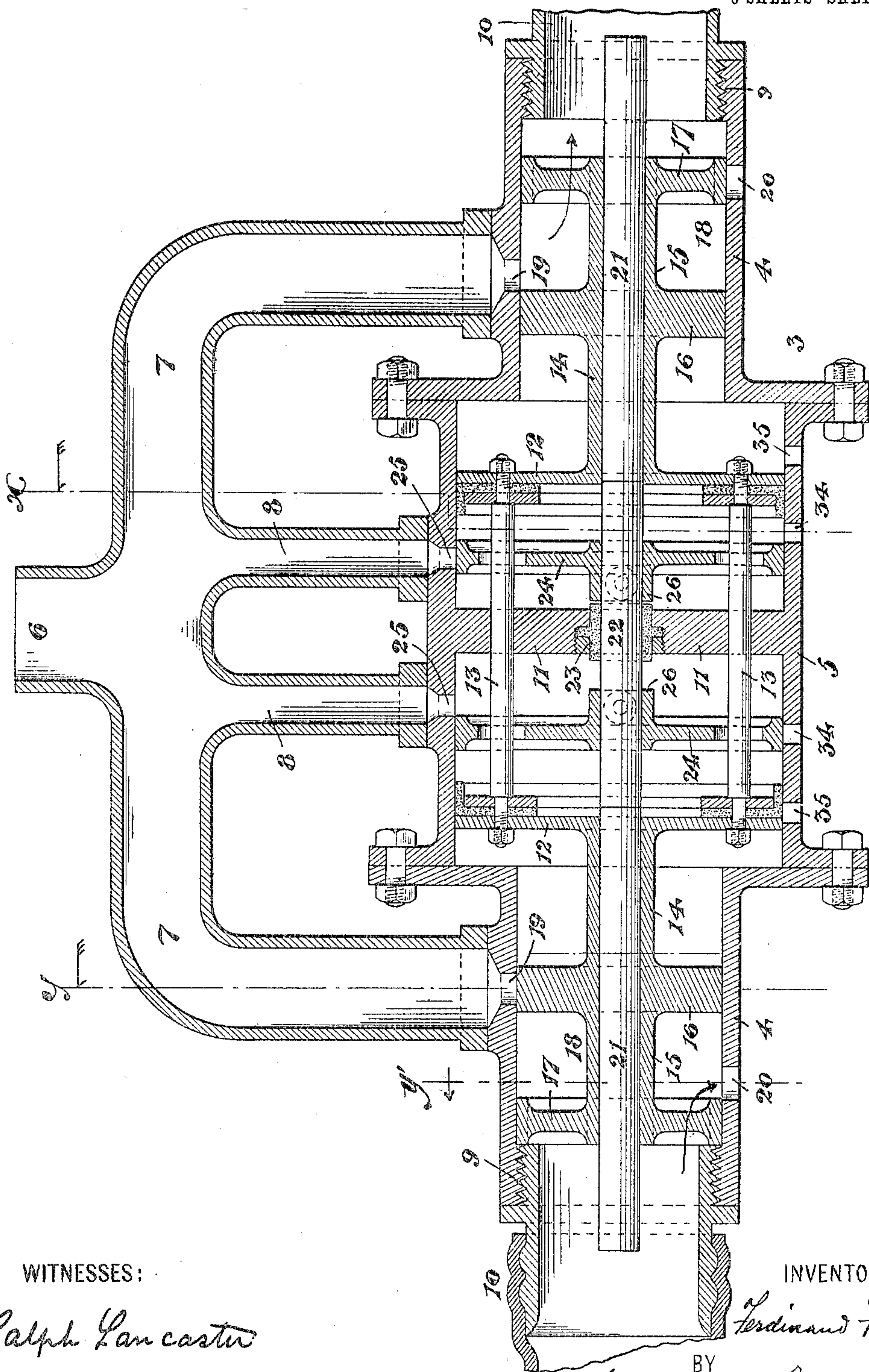


Fig. 1.

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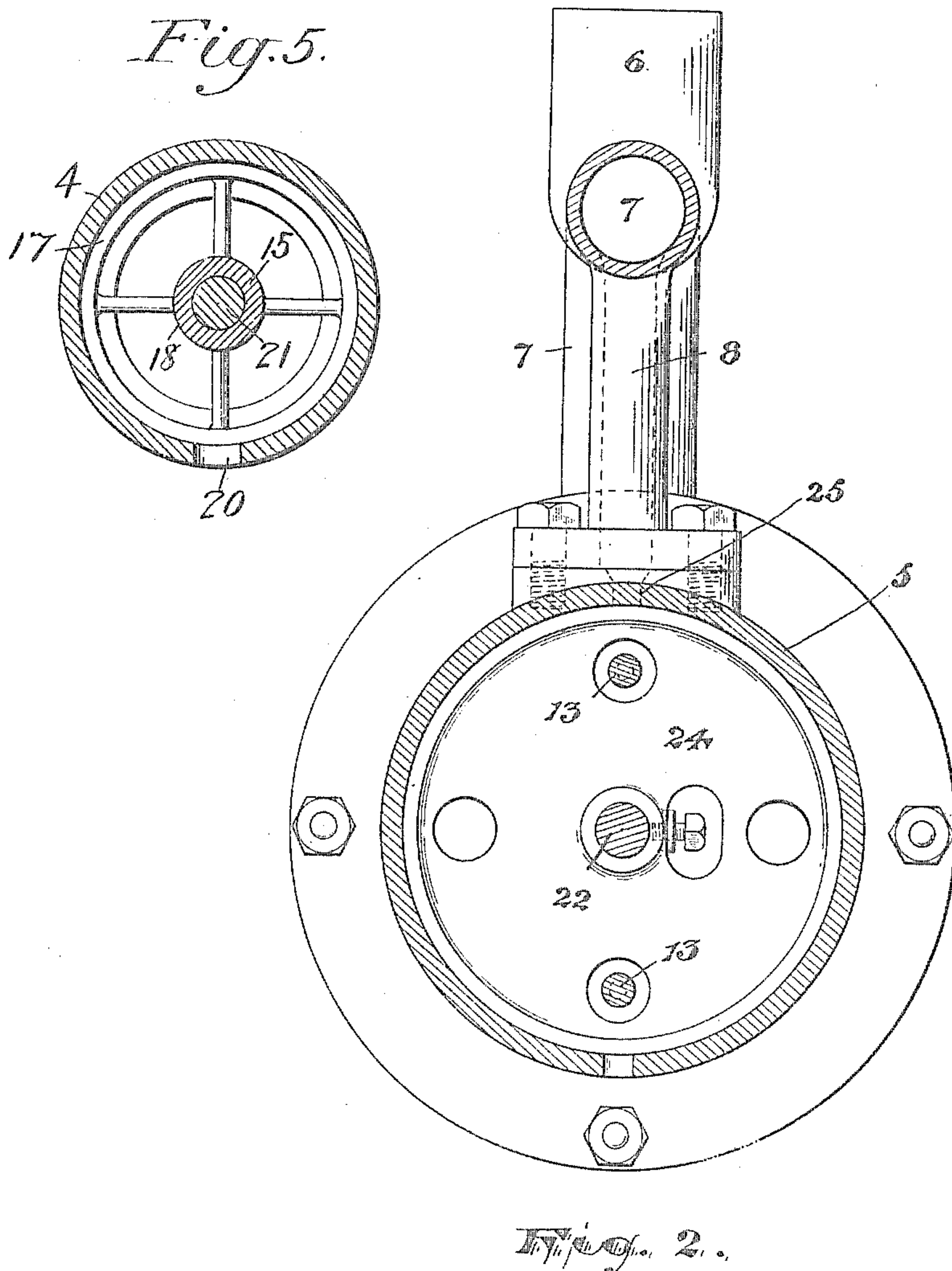
No. 804,592.

PATENTED NOV. 14, 1905.

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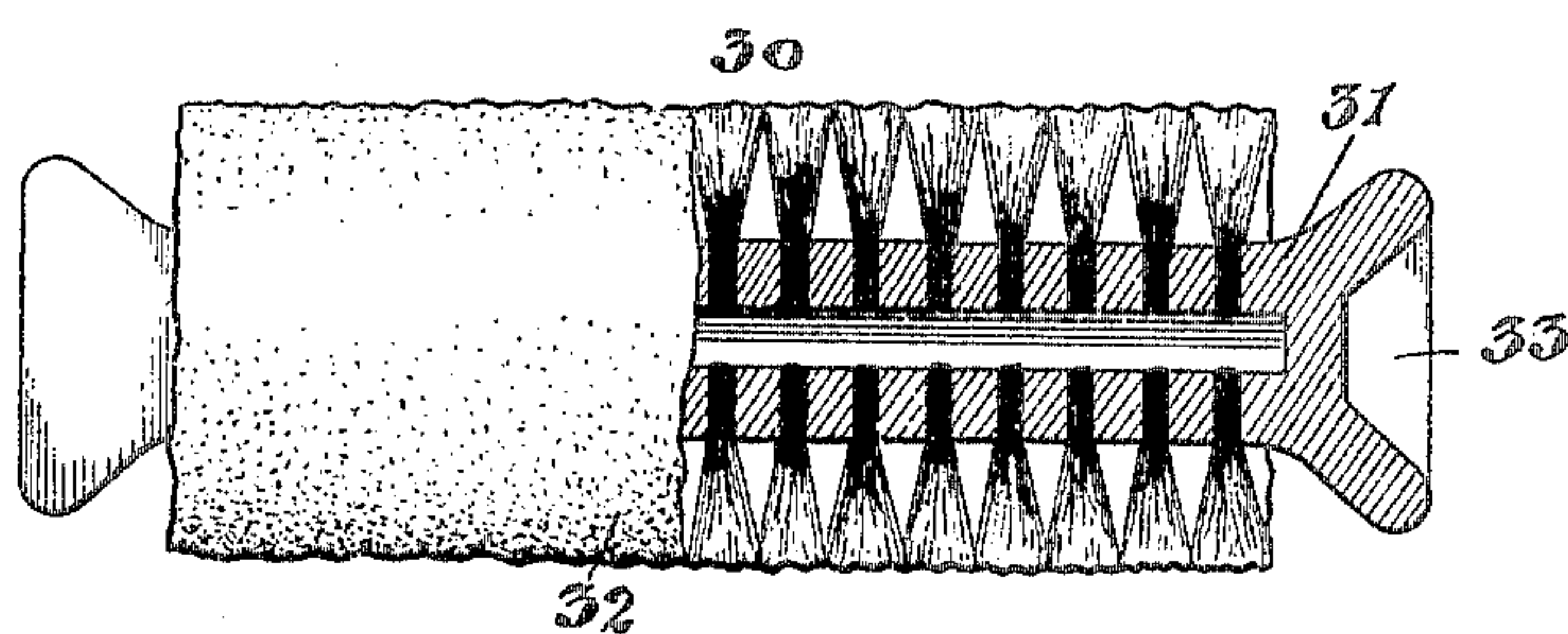
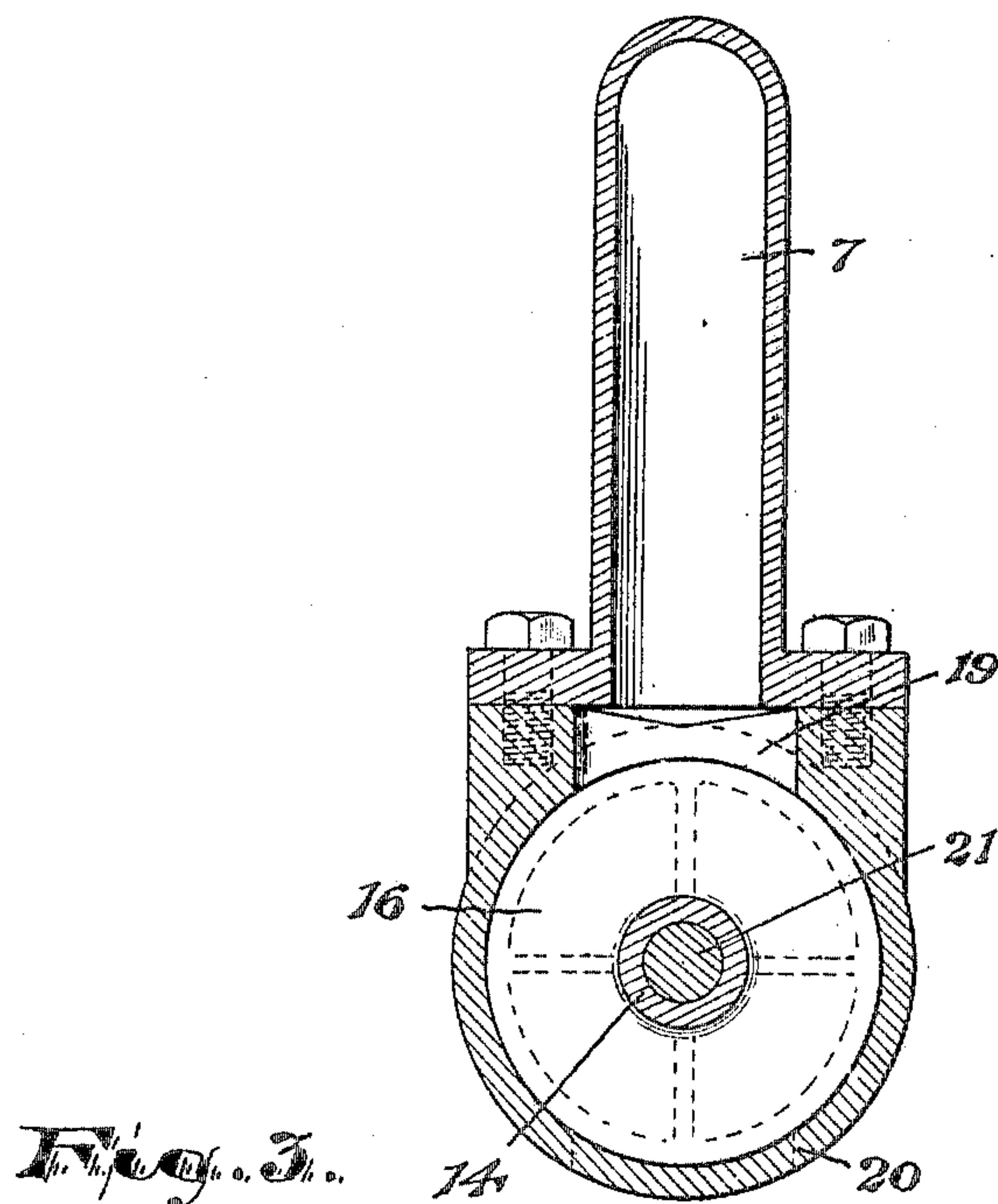


Fig. 4.

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AUTOMATIC HOSE-CLEANING APPARATUS.

No. 804,592.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed January 6, 1905. Serial No. 239,861.

To all whom it may concern:

Be it known that I, FERDINAND FINK, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Automatic Hose-Cleaning Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to the cleaning of tubes or pipes, and more particularly to the cleaning of hose as it is done by brewers and the like, the objects of the invention being to provide a device to which the opposite ends of the hose may be attached and water driven through said hose in alternate directions and carrying with it a brush; to thus clean the hose with a plentiful supply of constantly-renewed water, which keeps both brush and interior surface of the hose flushed; to mechanically loosen the dirt by the moving brush; to utilize the water-pressure for driving said brush; to obtain an automatic operation of the device whereby it needs no attention other than coupling on and uncoupling the hose at the beginning and end of the operation; to thus reduce the labor and expense of cleaning hose; to secure more perfect cleansing, and to obtain other advantages and results, some of which may be hereinafter referred to in connection with the description of the working parts.

The invention consists in the improved hose-cleaning device and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like figures of reference indicate corresponding parts in each of the several figures, Figure 1 is a vertical central longitudinal section of my improved device. Fig. 2 is a cross-section of the device upon line *x*, Fig. 1; and Fig. 3 is another cross-section taken upon line *y*, Fig. 1. Fig. 4 illustrates a form of brush adapted for use with my improved device; and Fig. 5 is a cross-sectional view upon line *y'*, Fig. 1, illustrating the flow-valve more clearly.

In said drawings the body of my device is shown as comprising a longitudinal tubular

part 3 with end portions 4 4 and a middle portion 5 of larger diameter than said end portions 4 4. Said middle part is divided by a transverse partition 11, and a water-supply duct 6 communicates by branches 7 7 with the said end portions 4 of the body part and by smaller ducts 8 8 with the middle portion 5 on opposite sides of its partition 11. Each of said end portions 4 is threaded at its extremity, as at 9, to receive an end 10 of the hose, and obviously either one length or any number of lengths of hose connected together may be applied to the opposite ends of my device, as shown in Fig. 1, so as to form a complete ring or circuit through which the water passes. The coupling ends of the hose may be either screwed directly to said threaded ends 9 of the device or any suitable and well-known form of intermediate couplings may be employed to facilitate the attachment of different sizes of hose, as desired. Within the said middle large portion 5 of my improved device and on opposite sides of the said partition 11 are piston-heads 12 12, which are rigidly connected by rods 13, extending slidably through the said partition 11. Each piston-head 12 carries at its outer side a stem or rod 14, projecting centrally and axially into the adjacent end portion 4 of the body part of the device and having in said end portion a slide-valve 15. Preferably each slide-valve comprises an inner solid disk 16 and an outer spider 17, both said parts having continuous unbroken peripheries fitting against the walls of the tubular portion 4 and being separated by an annular space 18, as shown in the drawings. Other constructions might be employed, however.

The port 19 of the water-supply duct 7 and a discharge or exit port 20 in opposite sides of each portion 4 of the body part are disposed at such points along the length of said end portion that when the former is closed by the disk 16 of the slide-valve the other or discharge port is open to the middle open space 18 of the valve and similarly when the spider 17 closes the said exit-port 20 the inlet-port 19 is open to the space 18 of the valve.

Each stem or rod 14 and its slide-valve 15 are centrally bored to slidably receive each a shaft 21, which shafts are in alinement with a corresponding shaft 22, passed centrally through the partition 11 and sliding in a stuffing-box 23. Upon the said shaft 22 at each of the opposite sides of the partition 11 is mounted a discous slide-valve 24, fixed upon

the shaft and perforated to receive the rods 13. These slide-valves 24 are adapted to govern the admission of water by the ducts 8 to the middle portion 5 of the body of the device, the distance between said disks differing from the distance between the ports 25 of said ducts by at least the diameter of said ports, so that as one port is covered the other is uncovered.

As the device is shown in the drawings the port 19 of the water-supply duct 7 at the left-hand side of Fig. 1 is closed by the valve 15, while the discharge-port 20, leading from the tubular end portion 4, is open. The port 25 of the inlet 8 to the large central portion 5 of the device at the same or left-hand side of the partition 11 is open; but obviously the water-pressure entering therethrough cannot effect the adjacent slide-valve 15, since the outer end of the same is engaging the end 10 of the hose connection as a stop. At the other end of the machine or right-hand side of Fig. 1 of the drawings the inlet 25 of the duct 8 to the middle portion 5 of the body part is closed by its valve 24 and the water-supply duct 7 to the adjacent end portion 4 is open, since the solid disk 16 of the slide-valve 15 lies inside the port 19 of said duct. The spider 17 at the same time is closing the discharge-port 20, and thus the water-supply will be directed into the hose in the direction shown by the arrow and passing around the hose throughout its entire length escape at the open discharge-port 20 at the opposite end of the device.

Within the hose is placed a short cylindrical brush 30, preferably comprising a rubber body portion 31, in which tufts of bristles 32 are set, so that the whole brush is somewhat flexible longitudinally. Flexibility of the brush may be otherwise secured, however, in any manner known to the art. The ends of the body portion 31 of the brush are flared and hollowed out, as at 33, so as to present cup-like extremities to the water-pressure. This brush is inserted in the hose before coupling to my improved device, and the water-pressure forces the brush ahead of it from one end of the hose to the other. With the parts as shown in Fig. 1 this would be from the right-hand end of the machine around to the left-hand end of the machine, where the brush would engage the end of the shaft 21. The shock of such engagement is transmitted to the middle shaft 22, and said shaft is thereby slid to reverse the positions of its two slide-valves 24, so that the one at the right-hand end of the figure will open the port 25 of the inlet-duct 8, while the corresponding port at the left-hand end of the drawing will be closed. Water then enters upon the right-hand side of the partition 11 and acts upon the piston-head 12 to force the same away from said partition. This slides the valve 15 at the right-hand end of the drawing to close

the port 19 of the water-supply duct 7 and open the exit 20, while by means of the rods 13 the slide-valve 15 at the opposite end of the machine, or at the left-hand side of the drawing, is simultaneously slid to effect an exactly opposite result—namely, a closing of the exit-port 20 and opening of the port 19 of the water-supply duct 7. All the parts are now exactly reversed from what is shown in Fig. 1 and water runs through the hose in the opposite direction from at first or as indicated by the arrows, carrying with it the brush 30, which when it reaches the opposite end engages the shaft 21 to effect another change. This alternation is kept up automatically as long as the water-pressure remains in force, and obviously the cleansing of the hose is a wholly mechanical operation to a great saving of labor and expense. In fact, it is only necessary for the workman to couple the hose to the opposite ends of the device, turn on the water, and turn it off again when he thinks the hose is sufficiently cleaned.

It will be understood that stops suitably regulate movement of the center shaft 22, so as to bring the governing slide-valves 24 into proper relation to the ports 25—for instance, by having the ends 26 of the hubs of said slide-valves engage the partition 11. Similarly the stops provided by the hose-coupling connections or otherwise are so disposed as to limit movement of the water-controlling slide-valves 15 to proper relation to the ports 19 and 20.

The chambers of the middle portion 5 for the piston-heads 12 are each provided with relief-ports 34 35, one of which, as 34, is so disposed as to be covered and closed by the governing slide-valve 24 when the inlet-port 25 is open. The other relief-port 35 is located nearer the outer end of the chamber and adapted to be covered and closed by the piston-head 24 in its outermost position and exposed or opened when the said head slides inward.

It will be noted that in the operation of my device the impacts of the traveling brush against the shafts 21 simply slide said shafts longitudinally to move the governing-valves 24. These impacts do not affect the slide-valves 15 except as they move the governing-valves 24 to admit water-pressure against one or the other of the piston-heads 12, carrying the valves 15.

Obviously other pipes and tubes than brewers' hose might be cleaned by means of my invention, and I wish to be understood as employing the term "hose" in a broad generic sense which will include all tubular forms.

Having thus described the invention, what I claim as new is—

1. A hose-cleaning device comprising a hollow body portion with means at its opposite ends for attaching the ends of a hose, a water-inlet intermediate of said ends of the body

portion, and valve means adapted to be operated to admit the water alternately to each of the ends of the body portion and simultaneously open an exit in the opposite end, the
5 said valve cutting off direct communication between said ends.

2. A hose-cleaning device, comprising a body portion having a partition and means at the opposite sides of said partition for the attachment of the opposite ends of a hose, valve
10 means in said body portion adapted to in one position lead water to one end of the said body and open a discharge-port in the other and to in another position reverse such flow in direction, and water-supply ducts.

3. A hose-cleaning device, comprising a body portion having means for attachment of the opposite ends of a hose, a water-inlet intermediate of said ends of the body, valve
20 means in said body portion adapted to admit the water alternately to each of the ends of the body and simultaneously discharge from the other, said valve means cutting off direct communication between said ends, and a brush
25 adapted to travel through the hose and engage said valve means.

4. A hose-cleaning device, comprising a body portion having opposite end portions divided from each other and each having means
30 for the attachment of the end of a hose and a lateral discharge-port, water-supply ducts opening by ports into said ends, slide-valves in said ends each adapted to open the inlet-port and close the exit, or vice versa, and
35 means for operating said valves so that they stand in contrary positions at the same time.

5. A hose-cleaning device, comprising a body portion having opposite end portions divided from each other and having means
40 for attachment of the end of a hose and a lateral discharge-port, water-supply ducts opening by ports into said ends, slide-valves in said ends each adapted to open the inlet-port and close the exit, or vice versa, means
45 for operating said valves so that they stand in contrary positions at the same time, and a brush adapted to travel in the hose from end to end and govern said operating means.

6. A hose-cleaning device, comprising a
50 body portion having a middle portion and opposite end portions, said end portions each having means for the attachment of the end of a hose and water inlet and discharge ports, slide-valves in each end portion adapted to
55 open the inlet-port and close the exit or vice versa, means for connecting said valves so that they are always in opposite relations to their ports, a brush adapted to travel in the hose, slidable shafts extending through said
60 valves into the middle body portion and adapted to be engaged by said brush, and means in said middle body portion adapted to be engaged by said shafts to effect a sliding of the slide-valves.

65 7. A hose-cleaning device, comprising a

body having a transversely-divided middle portion and smaller opposite end portions, the compartments of said middle portion each having an inlet and an exit port and said end portions each having means for the attachment of the end of a hose and having water
70 inlet and discharge ports, piston-heads in the compartments of the middle body portion connected to each other, a slide-valve upon the outer side of each piston-head and adapted to
75 lie in the adjacent end portion and simultaneously open the inlet-port and close the exit or vice versa, the two slide-valves being adapted to always lie in opposite relations to their ports, governing slide-valves in said
80 compartments of the middle body portion, means for operating said governing-valves, and a branched water-duct leading to all the said inlet-ports.

8. A hose-cleaning device, comprising a
85 body having a transversely-divided middle portion and smaller opposite end portions, the compartments of said middle portion each having an inlet and an exit port and said end portions each having means for the attachment of the end of a hose and having water
90 inlet and discharge ports, piston-heads in the compartments of the middle body portion connected to each other, a slide-valve upon the outer side of each piston-head and adapted to
95 lie in the adjacent end portion and simultaneously open the inlet-port and close the exit or vice versa, the two slide-valves being adapted to always lie in opposite relations to their ports, governing slide-valves in said compartments of the middle body portion, a brush
100 adapted to travel in the hose, a shaft extending loosely through each piston-head and its slide-valve, a middle shaft in alignment with said end shafts and having the governing-valves fast
105 thereon, and a branched water-duct leading to all the said inlet-ports.

9. A hose-cleaning device comprising a body portion with means for attachment of the opposite ends of a hose, a fluid-inlet, and valve
110 means adapted to admit the fluid alternately to each of the ends of the hose and simultaneously shut it off from the other end and open an exit thereat.

10. A hose-cleaning device having a body
115 portion with means for attachment of the opposite ends of a hose, a fluid-inlet, and valves each adapted to simultaneously admit fluid to one of the hose ends and close an exit, or vice versa.
120

11. A hose-cleaning device having a body portion with means for attachment of the opposite ends of a hose, a fluid-inlet, flow-valves each adapted to simultaneously admit fluid to one of the hose ends and close an exit, or vice
125 versa, and controlling means for operating said valves oppositely.

12. A hose-cleaning device having a body portion with means for attachment of the opposite ends of a hose, a fluid-inlet, flow-valves
130

each adapted to simultaneously admit fluid to one of the hose ends and close an exit, or vice versa, and a controlling-valve for operating said flow-valves oppositely.

5 13. A hose-cleaning device having a body portion with means for attachment of the opposite ends of a hose, a fluid-inlet, valve means adapted to admit the fluid alternately to each of the ends of the hose and simultaneously
10 shut it off from the other end and open an exit thereat, and a cleaning implement adapted to travel in the hose and actuate said valve means.

15 14. A hose-cleaning device having a body portion with means for the attachment of the opposite ends of a hose, a fluid-inlet, valves each adapted to simultaneously admit fluid to one of the hose ends and close an exit, or vice

versa, and a cleaning implement adapted to travel in the hose and actuate said valves. 20

15. A hose-cleaning device having a body portion with means for attachment of the opposite ends of a hose, a fluid-inlet, flow-valves each adapted to simultaneously admit fluid to one of the hose ends and close an exit, or vice
25 versa, a controlling-valve for operating said flow-valves, and a cleaning implement adapted to travel in the hose and actuate said controlling-valve.

In testimony that I claim the foregoing I
30 have hereunto set my hand this 23d day of December, 1904.

FERDINAND FINK.

Witnesses:

RALPH LANCASTER,

RUSSELL M. EVERETT.