

I. K. BAXTER & C. F. BARRETT.  
PUMP FOR PORTABLE VACUUM CLEANERS.  
APPLICATION FILED MAY 24, 1910.

997,732.

Patented July 11, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

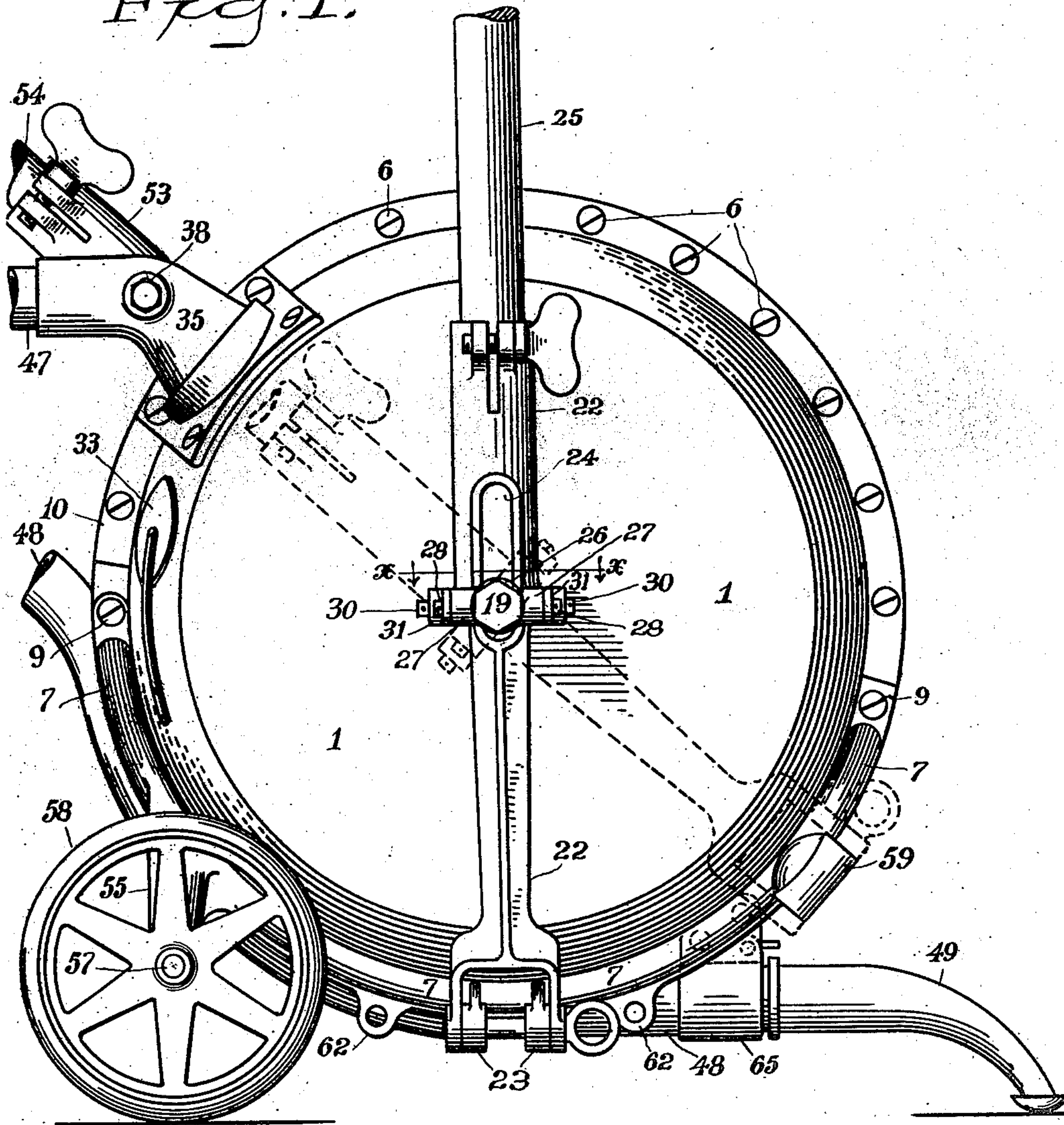
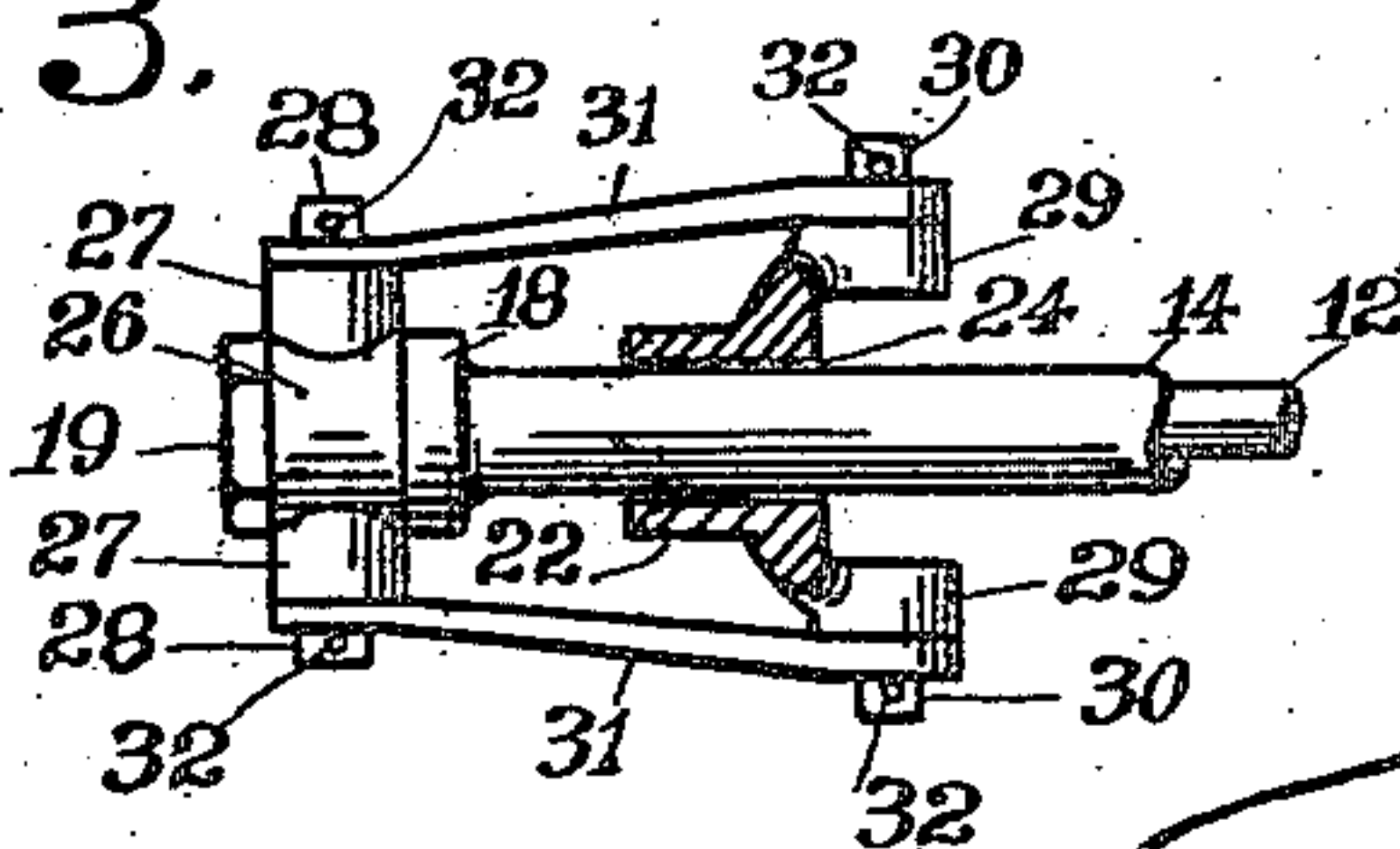


Fig. 3.

WITNESSES:

H. A. Lamb.  
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INVENTORS

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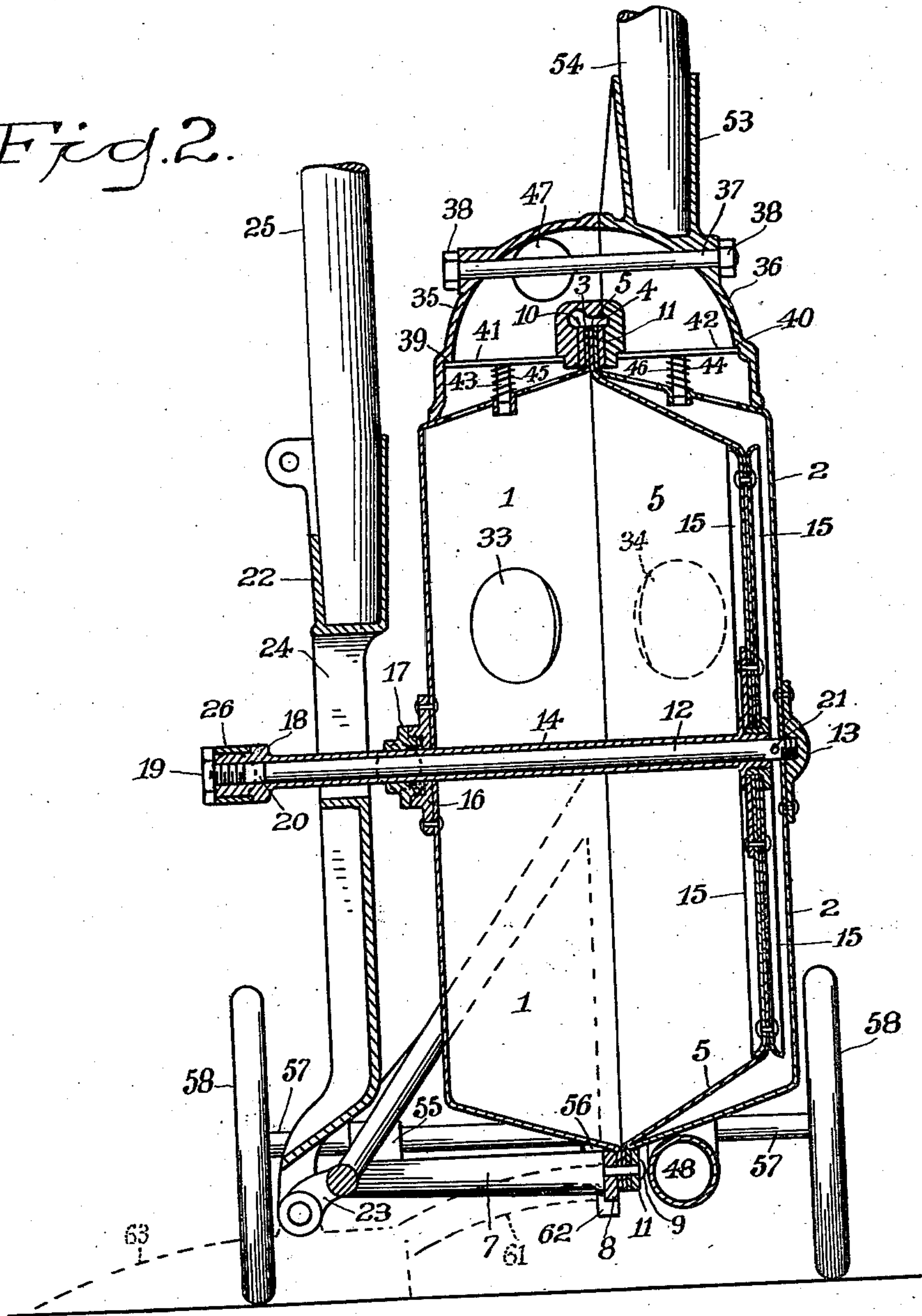
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3 SHEETS-SHEET 2.

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Fig. 2.



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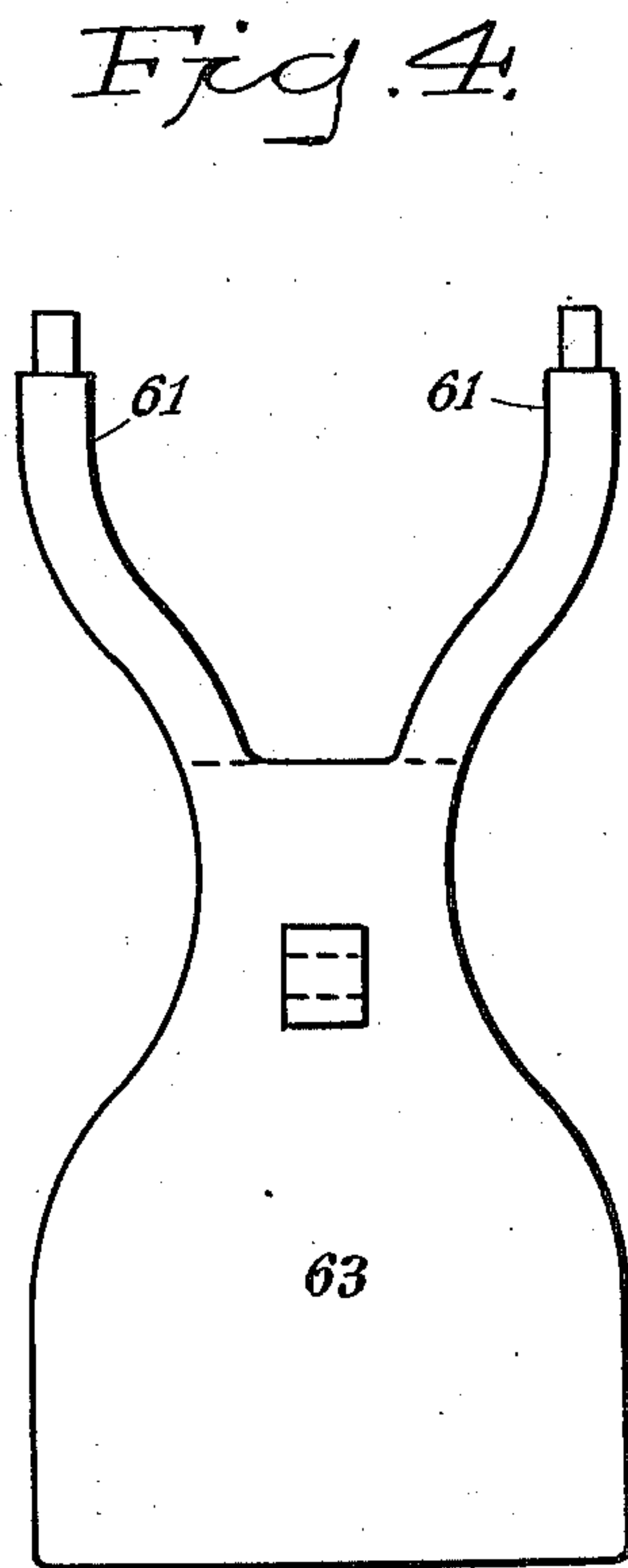
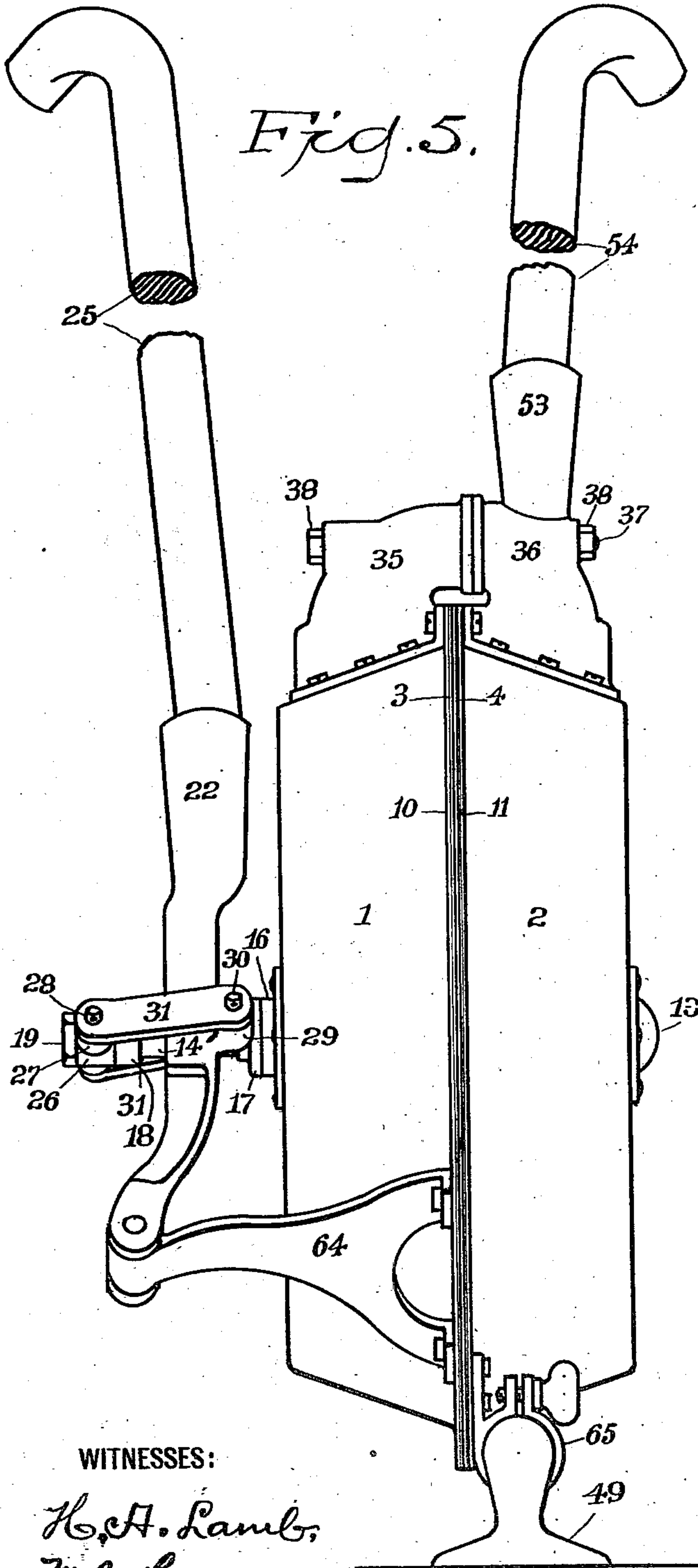
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# UNITED STATES PATENT OFFICE.

IRVING K. BAXTER, OF UTICA, NEW YORK, AND CHARLES F. BARRETT, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO THE STANDARD VACUUM CLEANER CO., OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## PUMP FOR PORTABLE VACUUM-CLEANERS.

997,732.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed May 24, 1910. Serial No. 563,123.

*To all whom it may concern:*

Be it known that we, IRVING K. BAXTER, a citizen of the United States, residing at Utica, Oneida county, New York, and  
5 CHARLES F. BARRETT, also a citizen of the United States, residing at Bridgeport, Fairfield county, Connecticut, have invented certain new and useful Improvements in Pumps for Portable Vacuum-Cleaners; and  
10 we do 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.

15 Our invention relates to certain improvements in portable vacuum cleaners, but more particularly has reference to the pump whose function is to exhaust the air through the dust collector, and to the manner of supporting and operating said pump, and has  
20 for its object simplicity of construction, and efficiency in operation, and with these ends in view our invention consists in the combination and arrangement of parts herein-  
25 after fully set forth and then particularly pointed out in the claims which conclude this description.

In the accompanying drawing Figure 1 is a side elevation of our improvement—Fig. 2  
30 a sectional elevation—Fig. 3 a detail section at the line  $x, x$ , of Fig. 1—Fig. 4 a detail plan of the foot rest such as we prefer to employ when the apparatus is to be held stationary during the pumping operation,  
35 and Fig. 5 a front elevation of a modified form of our improvement.

Similar numbers of reference denote like parts in the several figures of the drawing.

Our improved pump is what is known as  
40 a "diaphragm pump" the diaphragm being double acting, while the pump piston is preferably operated by hand levers, the pump and levers being preferably supported by any suitable carriage or equivalent  
45 means, all of which will be readily understood from the following description:—The pump is formed of two complementary cup-like sections 1, 2, having flanges 3, 4, extending from their edges, and a diaphragm 5  
50 forming the piston made of leather or other suitable material and cup shaped, the edge of this diaphragm being confined between the flanges 3, 4, these parts being firmly se-

cured together by means of bolts or screws 6, this arrangement not only serving to secure  
55 the diaphragm in position but also affording an air tight connection between the flanges 3, 4.

7 is a cradle which is preferably an integral arcuately disposed casting and within  
60 which the pump is supported and to the back rib 8 of this cradle the flanges 3, 4, with the edge of the diaphragm 5 therebetween are secured by means of suitable bolts  
65 9. This cradle extends throughout about one-half of the circumference of the pump structure, and throughout the upper half of such structure we prefer to employ a half  
70 ring 10 which lies against the flange 3 and meets the cradle while at the rear against the flange 4 we employ a whole ring 11  
75 through which the bolts or screws 6 are passed in the proper clamping of these flanges and the diaphragm 5, the lower portion of the ring 11 being bolted directly to  
the back rib 8, as above set forth.

12 is a rod preferably of brass the rear end of which is secured within a hub 13 that is rigid with the outer face of the section 2, and surrounding this rod is a steel tube 14,  
80 hereinafter referred to as the "piston" rod. The outer or wall portion of the diaphragm 5 is clamped between metal disks 15 and the piston rod 14 is secured thereto in any suitable and ordinary manner, so that when the  
85 piston rod is reciprocated it will carry the diaphragm with it. On the outside of the section 1 is fixed an additional support 16 for the piston rod, which latter passes outwardly through any suitable stuffing box 17  
90 secured to such support.

The head 18 of the piston rod is closed by means of any suitable bolt 19 between the end of which bolt and the outer extremity of the rod 12 is an air space 20. The rod  
95 12 is preferably a tube and a vent 21 is provided at the inner end of said tube and leading into the air space between the diaphragm and the section 2.

22 is the operating lever which is pivoted  
100 at the lower end to ears 23 that extend from the cradle, and is provided with an elongated slot 24 through which the support 16 extends, a suitable handle 25 being fixed within the upper portion of this lever.  
105 Since the reciprocating movements of the



piston rod are in a fixed horizontal plane, and since the operating lever describes an arc in its movements in a plane that intersects the plane within which said piston rod moves, it follows that some sort of means must be employed as a compensating device, whereby the lever may operate the piston rod by a force directly applied and without any cramping or binding whatsoever, and therefore we have contrived such means and will now describe the same. Swiveled around the head 18 of the piston rod is a sleeve 26 from which extend diametrically opposite studs 27 having reduced portions 28, and extending from the lever 22 on opposite sides of the slot 24 and near the base thereof are ears 29 having extending therefrom reduced stud-like portions 30, and to these portions 28 and 30 are pivoted links 31, these links being held in position by means of any suitable cross pins 32. Thus it will be seen that we have yoked the operating lever directly to the piston rod through the medium of pivotal connections which constantly compensate for the arc-like movements of the lever and always permit the piston rod to be operated by a direct force and without any cramping or binding whatsoever.

The sections 1, 2, are equipped with spring actuated valves 33, 34, the spring in each instance operating to close the valves while the latter always open outwardly into the external atmosphere. Secured to the outside of the sections 1, 2, in any suitable manner so as to form an air tight connection with such sections are complementary nozzle blocks 35, 36, which, when the sections 1, 2, are secured together, likewise meet so as to be air tight, this being effected by means of any suitable gasket (not shown) placed intermediate of such nozzle blocks, the latter being firmly clamped together by means of any suitable bolt 37 and nuts 38. Within the lower portions of these blocks 35, 36, are valve seats 39, 40, which are normally closed by disk valves 41, 42, that have depending stems 43, 44, that extend freely through bearings in the sections 1, 2, these stems merely serving to steady the movements of the valves and at the same time to permit the free opening and closing of the latter, the valves being normally closed against the seats 39, 40, by light coil springs 45, 46, which surround the stems and are confined between the valves and the sections 1, 2.

In the drawing only one of the valves 33, 34, is shown in solid lines, but the other valve is precisely the same both as to construction and arrangement, these valves normally closing the exhaust openings in the pump sections while the valves 41, 42, normally close the inlets to the pump, so that the air, after purification, can be drawn from the dust separating chamber into said

pump and thence expelled into the outside atmosphere.

Secured within the extremity of the socket formed by the blocks 35, 36, is the exhaust pipe 47 which leads within the top of any suitable dust collector (not shown), and 48 is the inlet pipe preferably supported by the cradle and provided at its front end with any approved form of nozzle 49 while the rear extremity of said inlet pipe communicates with the dust collector in any ordinary way.

We have not shown herein nor will we describe any construction of dust collector, since our improvement may be utilized in connection with any approved form of dust separating chamber, and it is merely necessary to state that the chamber which contains the air purifying means is preferably connected with the exhaust pipe 47 and inlet pipe 48 in such manner as to be suspended therefrom. Extending from the block 36 is a socket 53 within which is located any suitable handle 54, the disposition of this socket being such that this handle may extend at any suitable and convenient angle to a horizontal plane.

55, 56, are bearings which depend from the cradle 7 and through which extends an axle 57 having at its extremities wheels 58, these wheels being near the rear of the pump and in connection with the nozzle 49 constituting the means for supporting the pump and the parts carried thereby.

Our improvement may be operated while it is pushed about a room, in which instance the operating lever 22 would be hinged to a lug 59 extending from the lower forward portion of the cradle, the position of such lever and its handle portion 25 when thus pivoted being indicated at Fig. 1 by dotted lines, and the handles 25, 54, would then be extended at the same inclination so that they could be conveniently grasped by the operator and the apparatus not only be readily propelled, but the pump operated at the same time by either swinging the lever 22 inwardly and outwardly from its pivotal point, or, the apparatus could be raised so that the wheels would be clear of the floor with the nozzle 49 only in contact therewith, and then both handles could be worked inwardly and outwardly after the manner of bellows handles so as to create the desired suction through the dust separating chamber. Or, the operating lever 22 with its handle 25 could be pivoted as shown in solid lines at Fig. 1 so as to stand in a vertical plane, and the apparatus could be held stationary by means of any suitable foot rest such as is shown at Fig. 4, having at one end forked arms 61 adapted to be inserted within perforated ears 62 depending from the lower portion of the cradle, the other extremity of said rest being in the form of a



platform 63 upon which latter the operator would place his foot and thus hold the apparatus firmly at the same time operating the pump by means of the handle 25.

5 For the purpose of cleaning carpets, rugs, or other horizontal surfaces, our improvement would be operated in the manner first described, but in cleaning walls, curtains, furniture or irregular surfaces, our im-  
10 provement would be held stationary by means of the foot rest in the manner last described.

The operation of our improved pump as hereinbefore described is as follows:—As  
15 the piston rod is drawn outwardly carrying with it the diaphragm, the air in the space inclosed by the section 1 and diaphragm will be expelled through the opening in the section 1 that is normally closed by the valve  
20 33, the valve 41 meanwhile being closed, and at the same time this collapsing action of the diaphragm will tend to create a vacuum in the space inclosed by said diaphragm and the section 2 and this will cause the valve  
25 42 to open while the valve 34 will remain closed whereby a suction will be created through the pipe 47 and consequently through the pipe 48; on the return move-  
30 ment of the piston rod the valve 42 will be closed and the air in the space inclosed by the diaphragm and the section 2 will be expelled through the valve 34, and at the same time the valve 33 will remain closed and the valve 41 will be opened thereby also  
35 creating a suction through said pipes 47, 48. Thus it will be seen that our improved pump is double acting, in that a suction is created at both strokes of the piston rod and accordingly the exhaust from the dust separating  
40 chamber is exceedingly strong and pronounced, thus greatly increasing the efficiency of our apparatus.

Of course it will be readily understood that our improved pump may be operated  
45 by means of any suitable motor which is connected up with the piston rod in any ordinary and well known manner, and therefore we do not wish to be limited to any construction of pump that is to be operated  
50 entirely by hand.

Neither the cradle nor the wheels are necessary elements of our improvement since the nozzle 49 may act as the sole point of support and the operator may grasp the handles  
55 25, 54, and propel the apparatus, at the same time operating these handles after the manner of bellows handles, and at Fig. 5 we have illustrated a form of our improvement especially adapted to be used in this  
60 particular manner, the only difference between the construction heretofore described and that shown at Fig. 5 being that in the latter the cradle and wheels are omitted and instead of the lug 59 a bracket 64 is bolted  
65 directly to the ring 10 and the operating

lever 22 pivoted to the extremity of said bracket. In both instances, however, the nozzle 49 is supported within a suitable clamp 65 that is bolted to the pump sections, and one handle is operatively connected  
70 with the pump piston rod while the other handle, the pump casing and the nozzle are all rigid together, and are therefore incorporated into one operative system the other system being the operating lever and  
75 the piston rod.

In the construction shown at Figs. 1 and 2, the shifting of the hand operating lever from one pivotal point to another is a very simple matter requiring but little time, and  
80 our improvement is thereby easily converted from a movable to a stationary apparatus. The provision of a hollow piston rod sliding over and closely fitting a brass rod or tube makes a very advantageous construction, in  
85 that the piston rod has an elongated support and cannot possibly jam or bind as it starts on its inward stroke, and the vents 21 or 21<sup>a</sup> provide against any undue expansion and compression of the air which would other-  
90 wise impede the movements of the piston rod. By removing the bolt 19 when the piston rod is drawn out, oil may be injected into the piston rod so as to sufficiently lubricate the latter in its movements along the  
95 rod 12.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In a vacuum cleaner, in combination  
100 with a wheeled support, spaced pivotal points carried by the support, suction creating means secured to the support, a handle rigid with the support and a second handle having operating connection at an inter-  
105 mediate point with the said means for operating the latter, the inner end of said second handle being movable to be pivoted to either of said pivotal supports whereby the second handle may assume a vertical or  
110 inclined position with respect to said means.

2. In a vacuum cleaner, in combination with a base having wheels, a pump carried by the base, spaced pivotal points carried by the base, a handle rigid with respect to  
115 the support, and an operating lever for the pump operatively connected to the latter and being for interchangeable pivotal connection with said pivotal points of the base whereby the lever may be moved to inclined  
120 and vertical positions with respect to the surface being cleaned.

3. In a vacuum cleaner, in combination with a base having wheels, a pump carried by the base, spaced pivotal points carried  
125 by the base, a handle rigid with respect to the base, and an operating lever for the pump pivotally connected to the latter and being for interchangeable pivotal connection with said pivotal supports of the base  
130



whereby the lever may be moved to inclined and vertical positions with respect to the surface being cleaned, and means to engage the base to hold the same stationary when  
5 said lever is in its vertical position.

4. The herein described means for operating a portable suction creating device, comprising a wheeled support, spaced pivotal points carried by said support, suction  
10 creating means mounted on said support and having a horizontally disposed operating rod, a handle inclined to a horizontal and rigid with said support, and a lever operatively connected with said rod at a point  
15 intermediate of the ends of said lever, the

inner ends of said lever capable of being pivoted to either of said pivotal points, whereby said lever may be operated in conjunction with a stationary handle while the support is propelled or said lever may be 20 operated in a vertical position while such support is stationary.

In testimony whereof we affix our signatures in presence of two witnesses.

IRVING K. BAXTER.  
CHARLES F. BARRETT.

Witnesses:

F. W. SMITH, Jr.,  
M. T. LONGDEN.