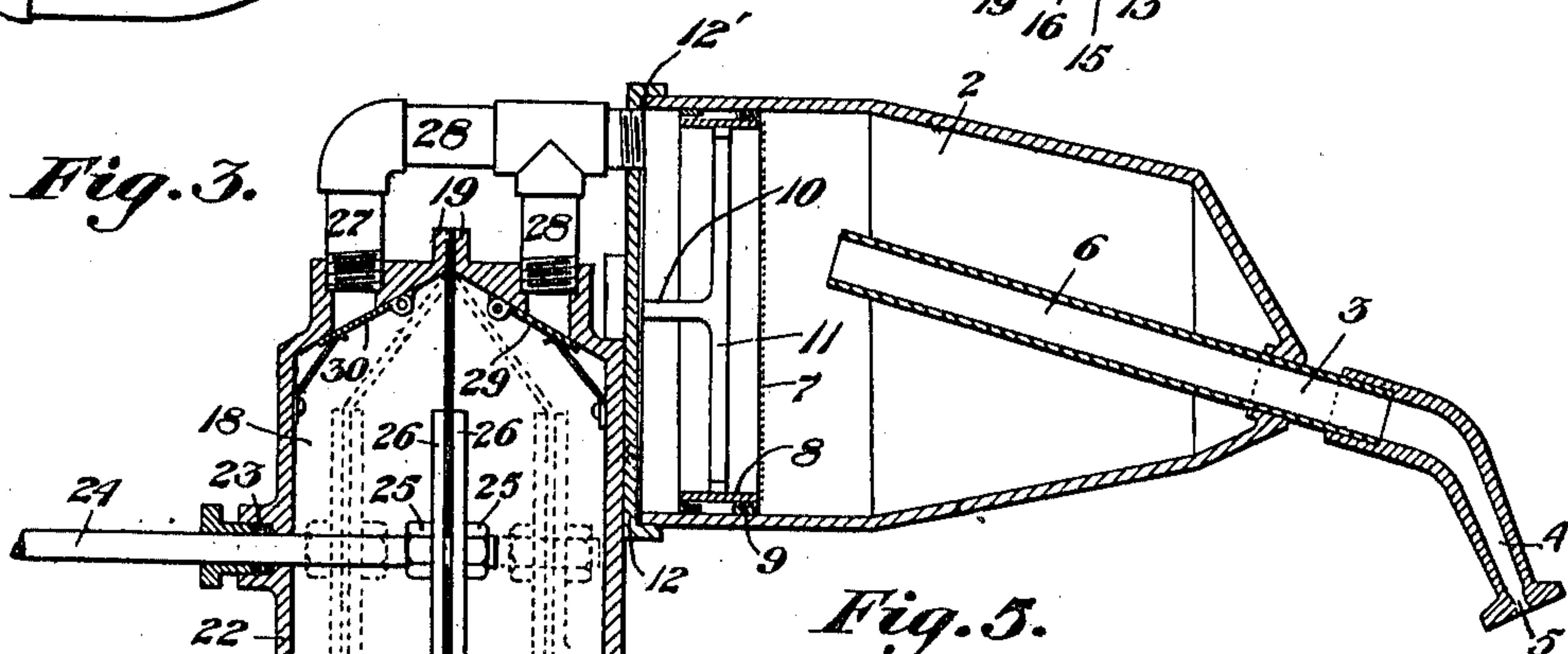
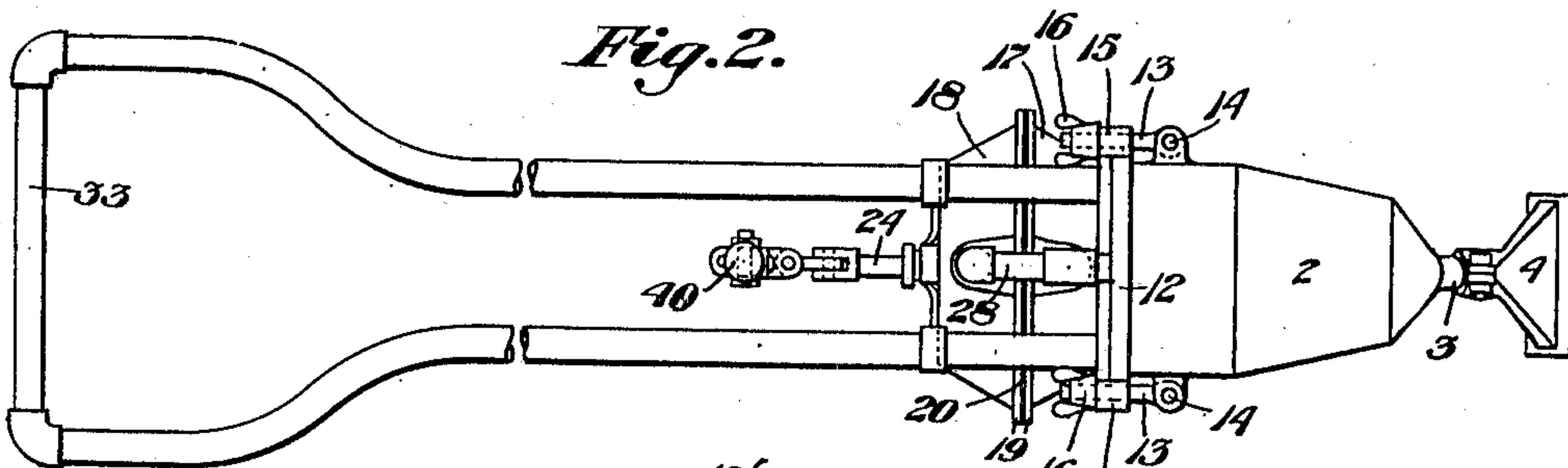
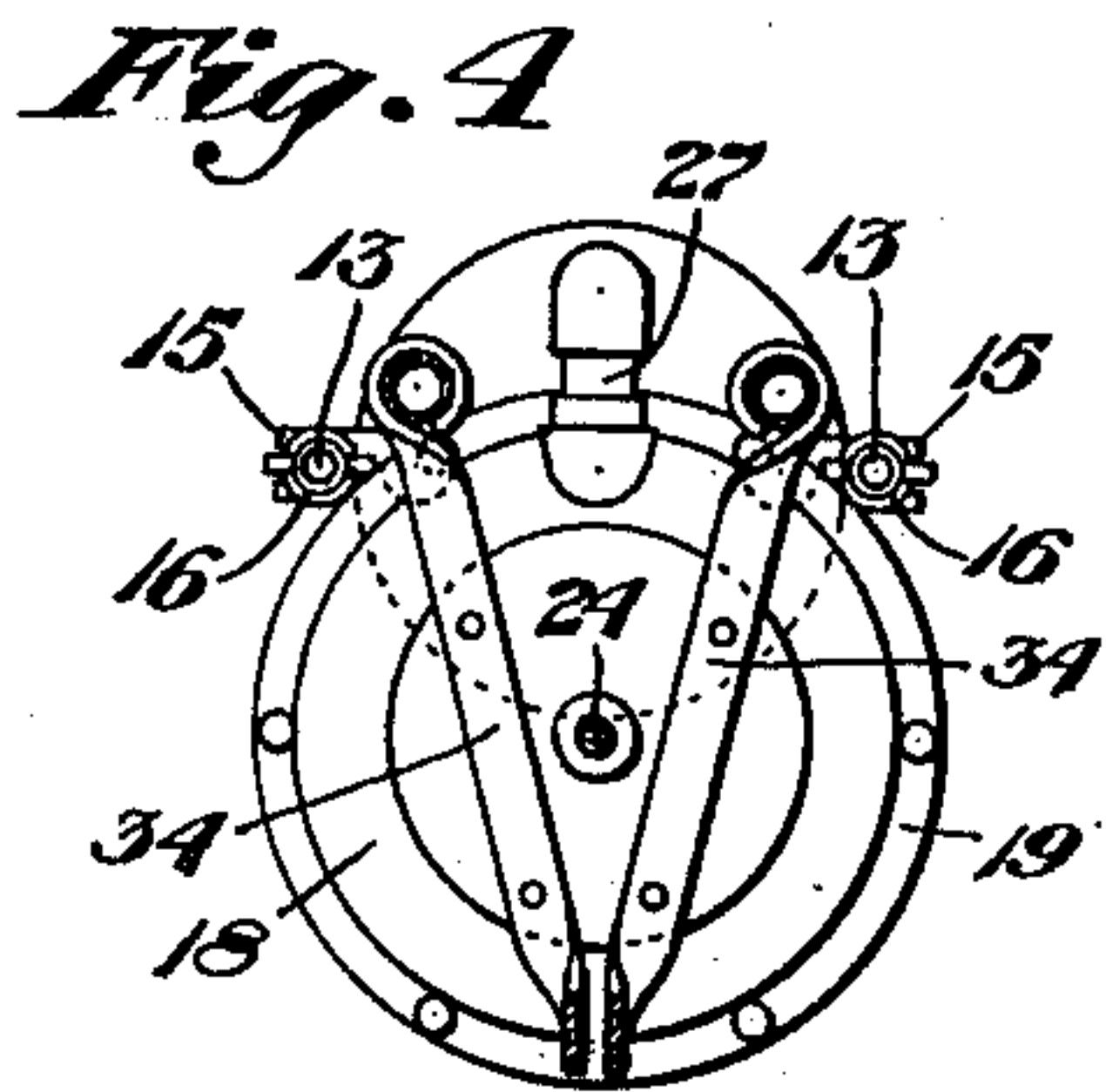
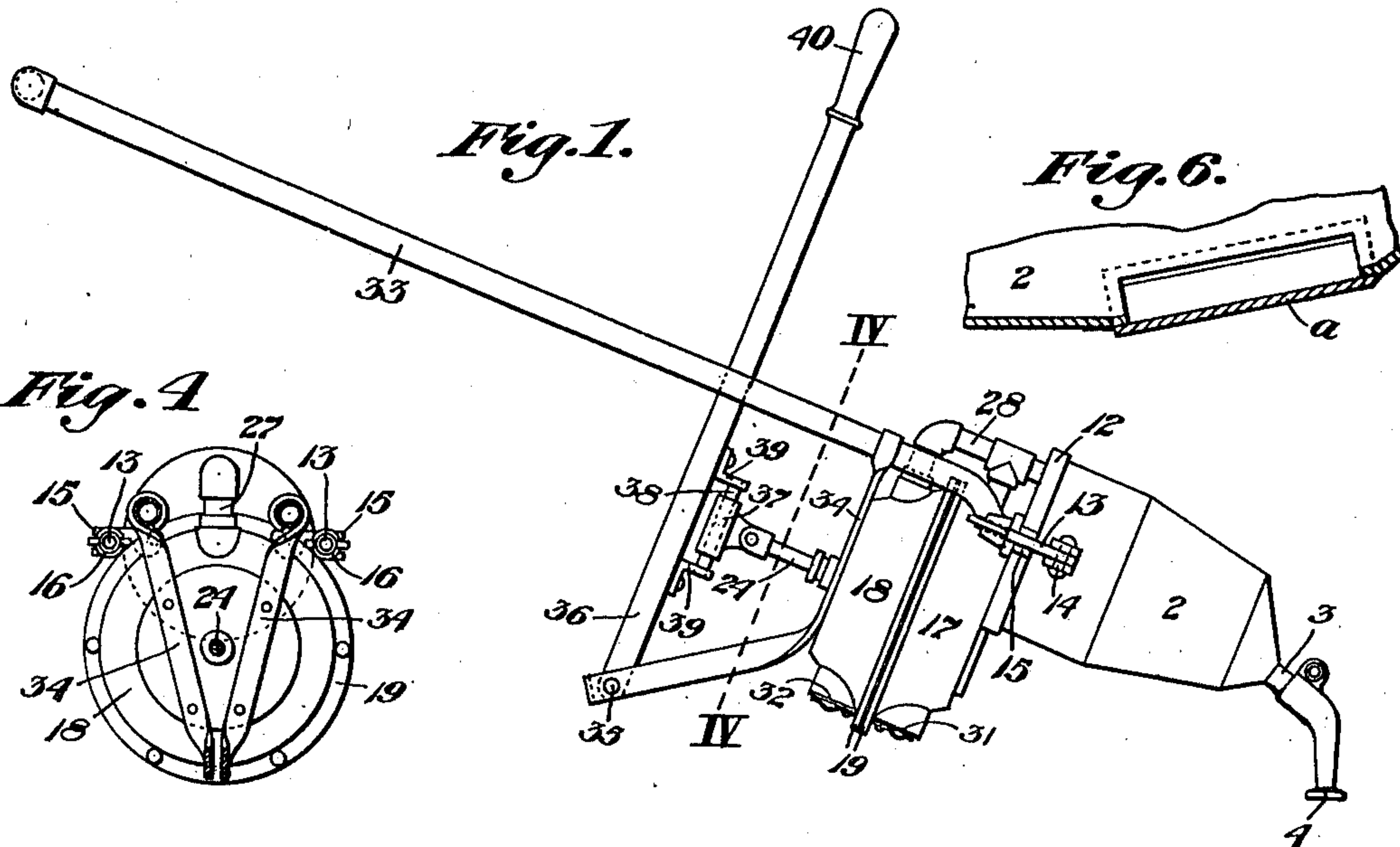


R. B. HUTCHISON.
VACUUM CLEANER.
APPLICATION FILED SEPT. 15, 1908.

956,100.

Patented Apr. 26, 1910.



WITNESSES
Chas. S. Rpley
Henry S. Sels.

INVENTOR
Robert B. Hutchison
by C. M. Chas. Co.
his Attorney

UNITED STATES PATENT OFFICE.

ROBERT B. HUTCHISON, OF WILKINSBURG, PENNSYLVANIA.

VACUUM-CLEANER.

956,100.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed September 15, 1908. Serial No. 453,198.

To all whom it may concern:

Be it known that I, ROBERT B. HUTCHISON, a citizen of the United States, residing at Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention refers to improvements in portable cleaning apparatus, and is designed for the purpose of removing dust, etc., from floors, carpets, or other surfaces, by suction.

The invention is particularly designed to provide a hand-operated machine capable of being moved around over the floor by a single operator and operated by a hand-actuated lever in connection with the handle secured to the machine, and comprises in its entirety a suction nozzle, a receiving chamber for the dust, etc., and a double-acting vacuum or suction chamber or head provided with an alternately operating diaphragm or the like dividing said chamber into two compartments, each of which is connected with the dust-receiving chamber, together with the several operating parts and other features of construction, as shall be more fully hereinafter described.

Referring to the drawings:—Figure 1 is a view in side elevation of the complete machine in position for work. Fig. 2 is a top plan view of Fig. 1. Fig. 3 is an enlarged longitudinal sectional view of the machine without the handle and operating lever. Fig. 4 is a vertical sectional view on the line IV, IV. of Fig. 1. Figs. 5 and 6 are detail views showing modifications.

In the drawings, 2 is the dust-receiving chamber, which as shown consists generally of a hollow cylindrical body, preferably tapered at its front end, which may be conveniently made of cast aluminum or other suitable material, or of sheet metal as preferable, provided at its forward end with a receiving conduit 3 to which is secured, or which may be integrally constructed as, a pan-shaped nozzle 4 having a narrow transverse slot 5, through which the dust, etc., is drawn as the machine is moved over the surface to be cleaned.

The entire interior cavity of chamber 2 is designed to constitute a reservoir for the dust, and is preferably provided with a backwardly and upwardly projecting extension 6 of the dust conveying conduit 3 terminat-

ing at the inner rear portion of the chamber 2 in front of the filtering screen, thereby preventing disturbance of the accumulated dust and allowing it to fill the lower forward interior.

At its rear end, chamber 2 is provided with one or more transversely arranged filtering screens 7 of muslin, wire gauze, or other suitable material in drum-head form, secured upon a supporting ring 8 and within a surrounding clamping ring or rings 9 to provide for easy renewal of the screen or screens 7. The screen device as thus constructed is inserted as shown, within the end of chamber 2, and is preferably fixedly held therein either by its tight fit within the shell of the chamber, or by a stem 10 of a transverse frame 11, secured within the ring 8, said stem extending backwardly against the inner face of coping or cap 12 of the casing 2. Said cap 12 as shown in preferably flanged and fits over the end of the shell 2 with an intervening packing gasket 12', being secured thereto by any suitable means, as holding bolts 13, pivotally mounted at 14 in bearing lugs extending outwardly from the side of casing 2 and engaging slotted ears 15 projecting radially from the cap 12, at each side. Bolts 13 are provided with thumb screws 16, so that by loosening them the bolts may be thrown outwardly on pivots 14 and the shell 2 separated from its head. When the chamber 2 is thus disconnected from head 12, screen frame 8 may be withdrawn by stem 10 and the contents emptied, the parts being again assembled and connected without trouble or appreciable loss of time.

If preferable, the shell of chamber 2 may be provided with a laterally opening gate *a* of any suitable construction, as indicated in Fig. 6, whereby the contents may be emptied from time to time without detaching the parts of the machine, as just described.

For the purpose of creating suction within chamber 2, I provide a cylindrical pump immediately in the rear of said chamber, preferably consisting of two heads, 17, 18, of truncated cone form, secured together at the center by flanges 19, with an intervening diaphragm 20 of rubber or other suitable material. Each head 17, 18, is provided at its outer end with terminal walls 21, 22, respectively, the avial center of the pump extending transversely through said walls in a direction longitudinal of chamber 2, the

2
cylindrical pump thus being arranged immediately in the rear of the dust chamber and whereby the actuating diaphragm 20, operates alternately in opposite directions lengthwise of the dust chamber.

5 End wall 22 is provided with a suitable stuffing box 23 in which is mounted the stem 24 connected by nuts 25, 25, and disks 26, 26, at each side with the diaphragm 20, so that
10 as stem 24 is reciprocated, a corresponding motion will be given to the diaphragm, the purpose of which is to alternately create a partial vacuum and resulting suction within one or the other of the suction chambers
15 of the pump. Each of said suction chambers is connected with the cap 12 of chamber 2 by connections 27, 27, respectively, and common pipe 28, which parts may be of short sections of pipe as shown, or of any
20 other suitable construction, whereby as the diaphragm 20 is actuated, alternate suction will be exerted through one or the other of said connections, producing a partial vacuum within the chamber 2 and drawing
25 thereinto the dust, etc., which will be prevented from further backward travel by the screens 7. The inner ends of connections 27, 27, are closed by flap or check valves 29, 30, respectively, as shown in Fig. 3, allowing for
30 free inward travel of the air but closing against reverse pressure upon reversal of the diaphragm as will be readily understood, thereby providing for a practically constant exhaust from the interior of chamber 2.
35 Likewise, each of the compartments at opposite sides of diaphragm 20 are provided at the bottom or sides, with similar outlet flaps or check valves 31, 32, preferably spring actuated, adapted to open and close automatically in conformity with the movement of the
40 diaphragm, to provide for outward travel of the confined air when the diaphragm is closed inwardly toward each chamber, and to close against ingress of outside air when
45 the diaphragm is reversed, the operation continuing automatically at each side, in conformity with the operation of check valves 29, 30, as long as the machine is operated. The operation of the diaphragm is dependent upon the reciprocating movement of the
50 operating lever of the machine.

33 represents the handle of the machine which may conveniently be made of pipe, having an outer cross handle as shown and
55 side members secured at their inner ends in the cap 12 and by bracket 34 to the pump, thereby connecting the parts rigidly together. Bracket 34 is extended downwardly and backwardly across the rear of the pump, to
60 which it is secured, and terminates in a pivotal mounting 35 for the lower end of the operating lever 36. Any other suitable or convenient mechanism may however be employed for the lever mounting, but the
65 bracket construction shown rigidly connects

the parts and is a simple and economical form for the purpose.

Stem 24 of diaphragm 20 is provided at its outer end with a terminal pivotally-jointed cross-head 37 slidingly mounted on
70 rod 38 secured at its ends in brackets 39, 39, mounted on the handle 34 as shown, by which construction the central arrangement and position of stem 24 is not disturbed by the varying positions of lever 36 and where-
75 by ample provision is made for the variation in relative positions of said operating parts. The mounting of supporting stem 38 facilitates the operation of the parts, especially at
80 the extremes of movement.

While the construction as just described is well adapted for the purposes in view, it will be obvious that other means of connecting the stem 24 with lever 36 may be provided for flexibility, as by means of
85 linked connections.

At its outer end lever 36 is provided with a grip 40, and in the normal position of the parts, (Fig. 1), the lever will be spaced forwardly of the holding handle 33 a convenient distance for operation to be readily
90 grasped by the hand of the operator.

As thus constructed the machine may be moved over the floor or other surface and operated by merely operating by an in-and-out movement the lever 36 on its pivotal
95 mounting 35, the resulting reciprocation of diaphragm 20 setting up the alternate suction in the pump and within chamber 2, and it will be seen that the speed of operation may be varied to suit the conditions
100 of work.

The nozzle 4 as shown is tightly clamped around the pipe 3, and a feature of advantage of this construction is that the relative
105 position of the nozzle and machine may be changed as by turning the nozzle one quarter way around, permitting it to be used on a wall surface.

In Fig. 5 I show a detail construction of
110 the nozzle employing ball bearings 41 set in rows at one or both sides of slot 5, whereby the movement of the nozzle over the surface to be cleaned is facilitated.

The machine is thus rendered completely
115 manipulative and operable by hand. It is of extremely simple construction and few parts; not liable to get out of order, it will effectually operate to remove the dirt from the surface operated upon; it provides for
120 easy disengagement and re-assembly of parts and will be found to provide an efficient and useful article for cleaning in the manner described.

Having described my invention, what I
125 claim is:—

1. In a cleaning apparatus, the combination of a pump, a dust receiving chamber having a coniform terminal, a centrally
130 arranged inlet pipe extending outwardly be-

yond said terminal and centrally inward
through its interior, and a suction nozzle se-
cured on the outer end of said inlet pipe and
angularly adjustable about the axis of the
5 pipe, substantially as set forth.

2. In a cleaning apparatus, the combina-
tion of a pump, a dust receiving chamber
having a coniform terminal, a centrally
arranged inlet pipe extending outwardly be-
10 yond said terminal and centrally inward

through its interior, and a suction nozzle
adjustably secured on the outer end of said
inlet pipe, substantially as set forth.

In testimony whereof I affix my signature
in presence of two witnesses.

ROBERT B. HUTCHISON.

Witnesses:

R. M. PASETTI,
C. M. CLARKE.