

I. J. O'MALLEY.

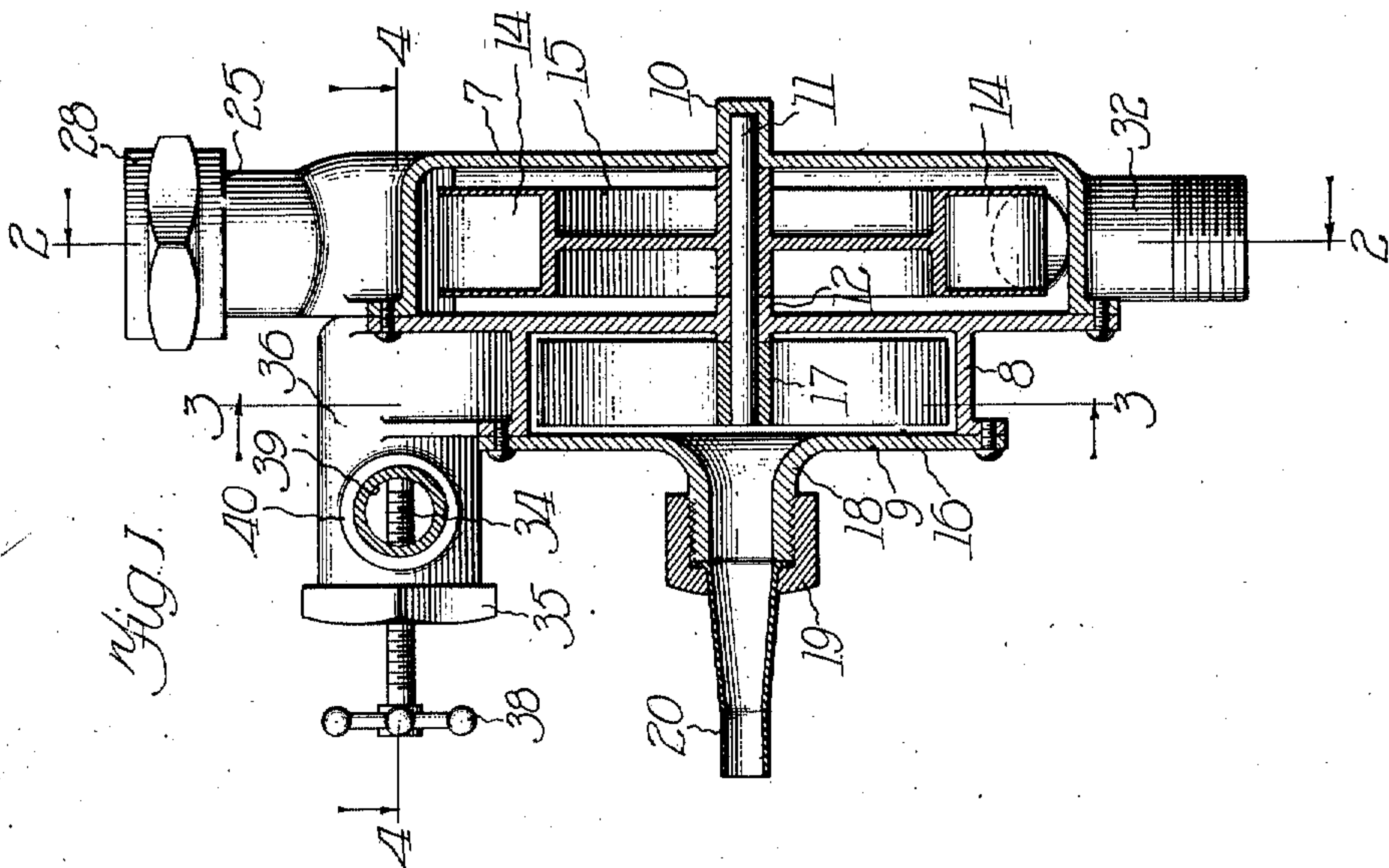
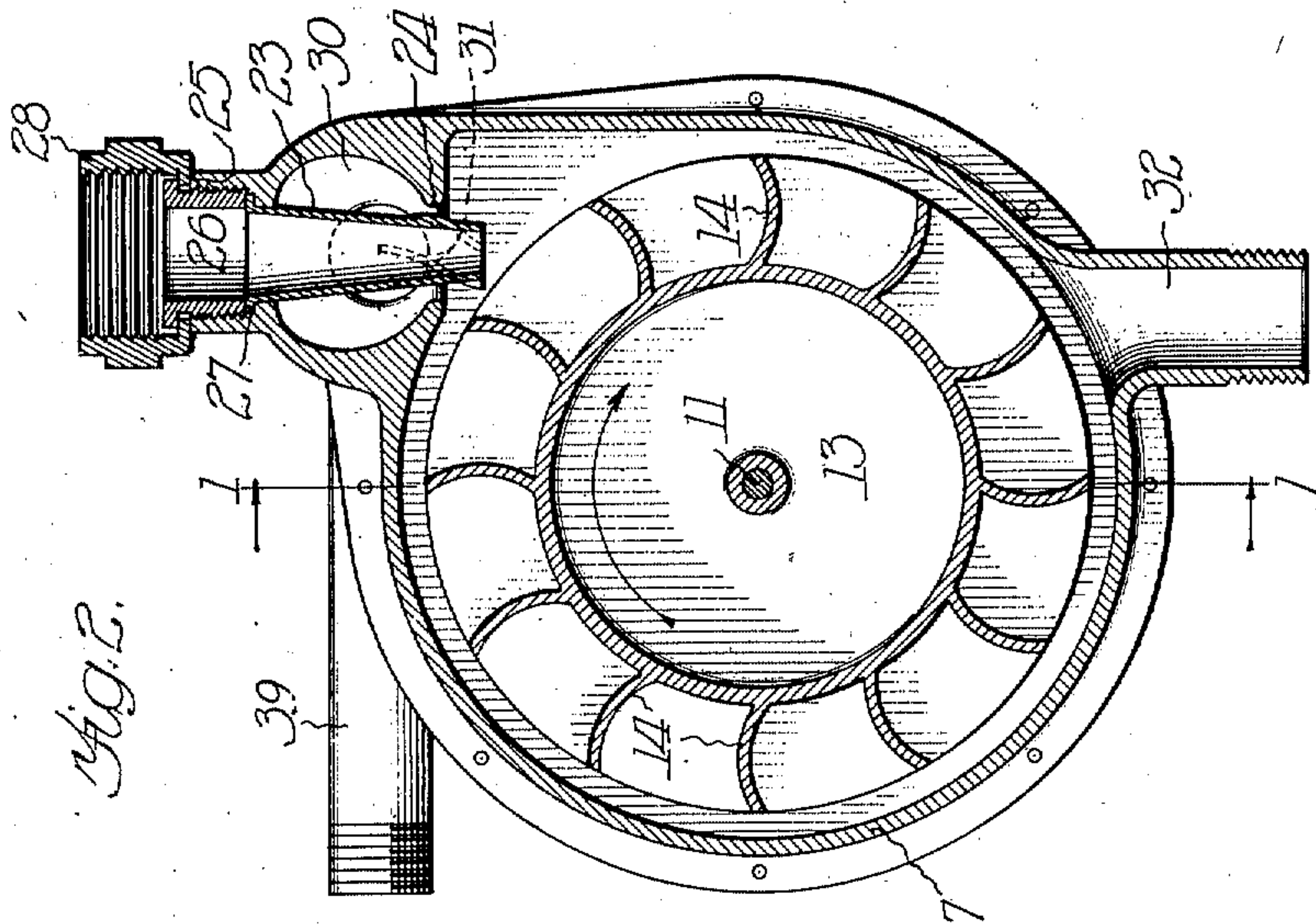
MOTOR FAN.

APPLICATION FILED MAR. 9, 1910.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

985,537.



Witnesses:
Robert N. Meir
J. Wilson

Inventor:
Ira J. O'Malley
Lincoln Bell & Fuller
Attys

I. J. O'MALLEY.
MOTOR FAN.
APPLICATION FILED MAR. 9, 1910.

985,537.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 2.

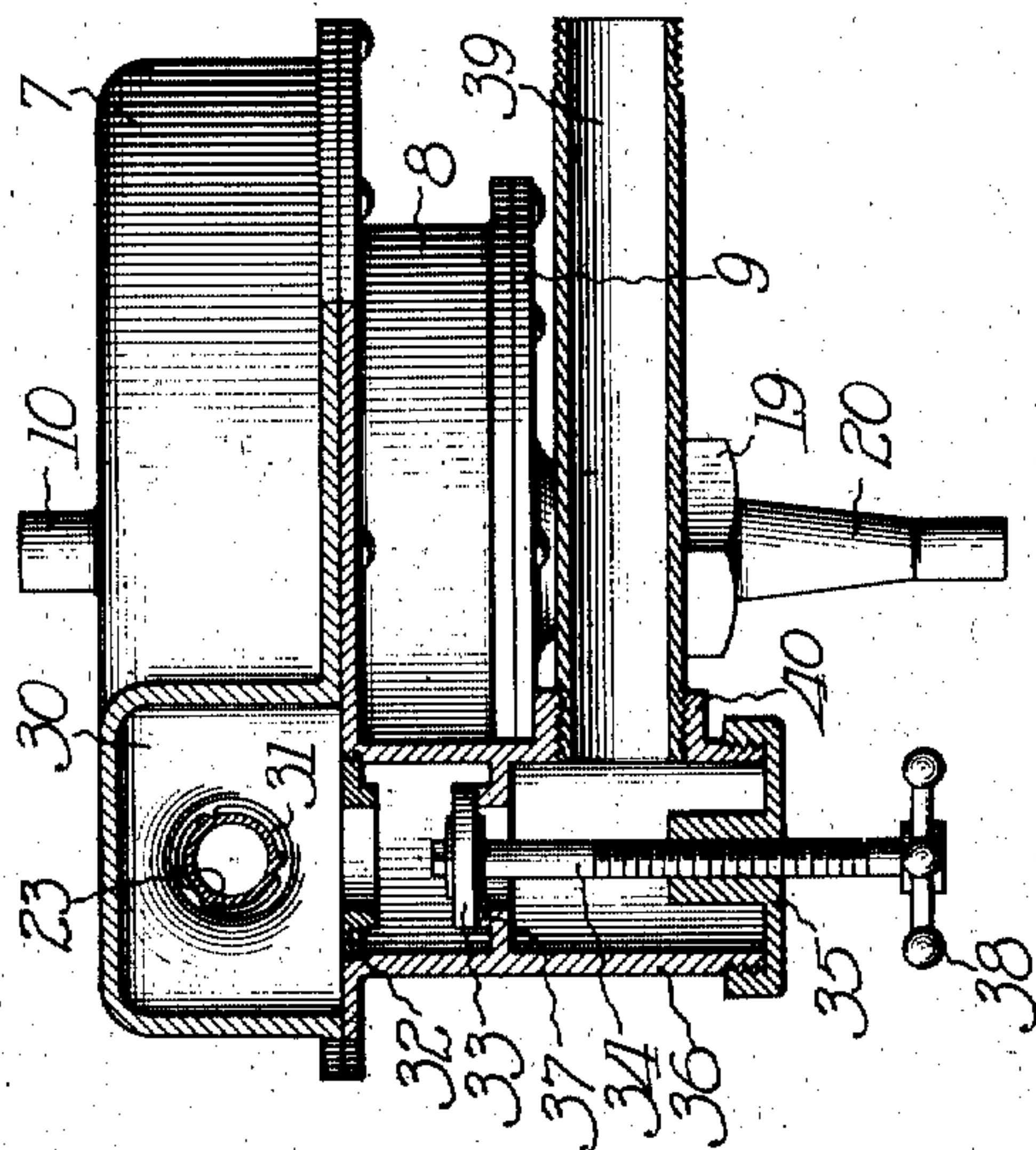


Fig. 4.

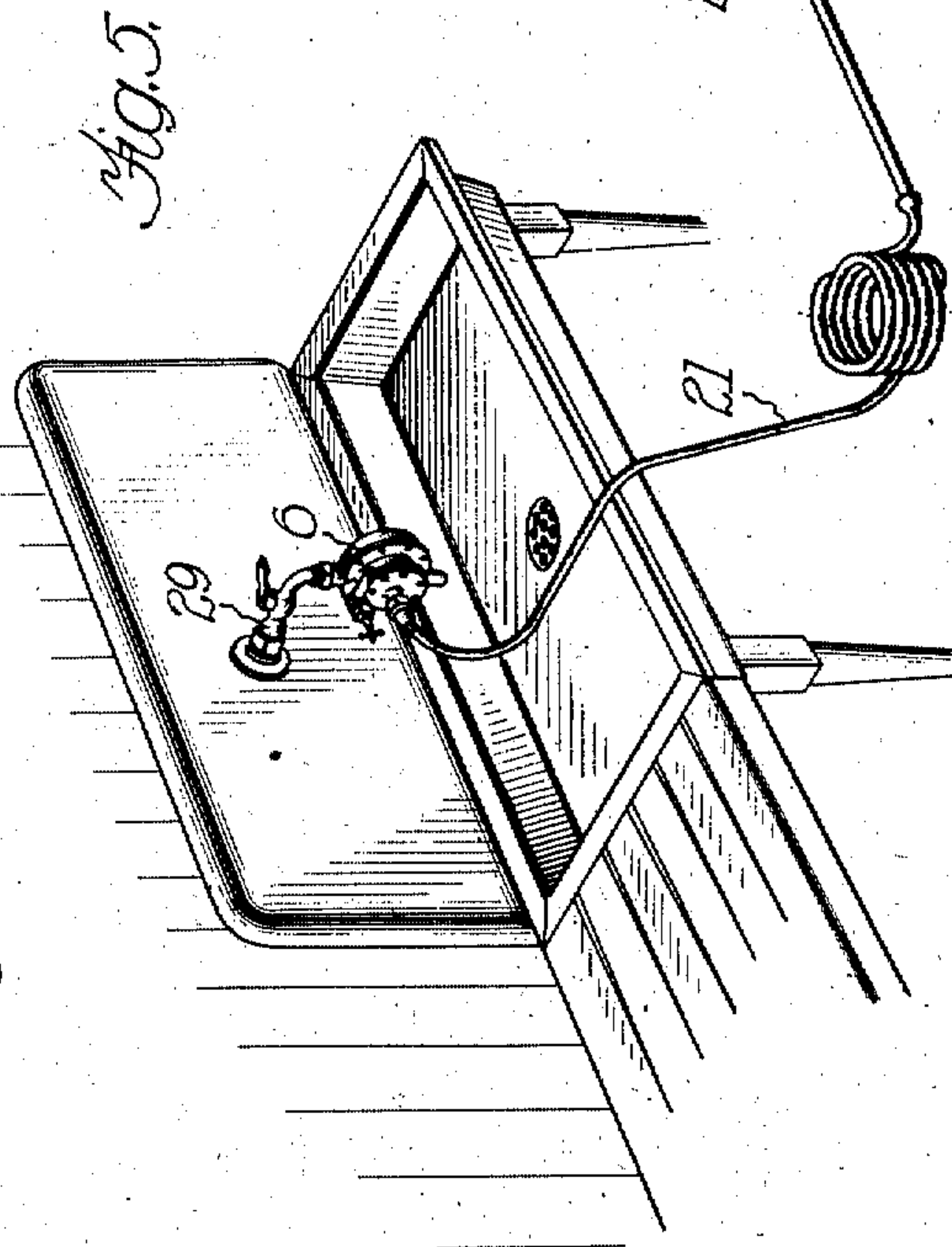


Fig. 5.

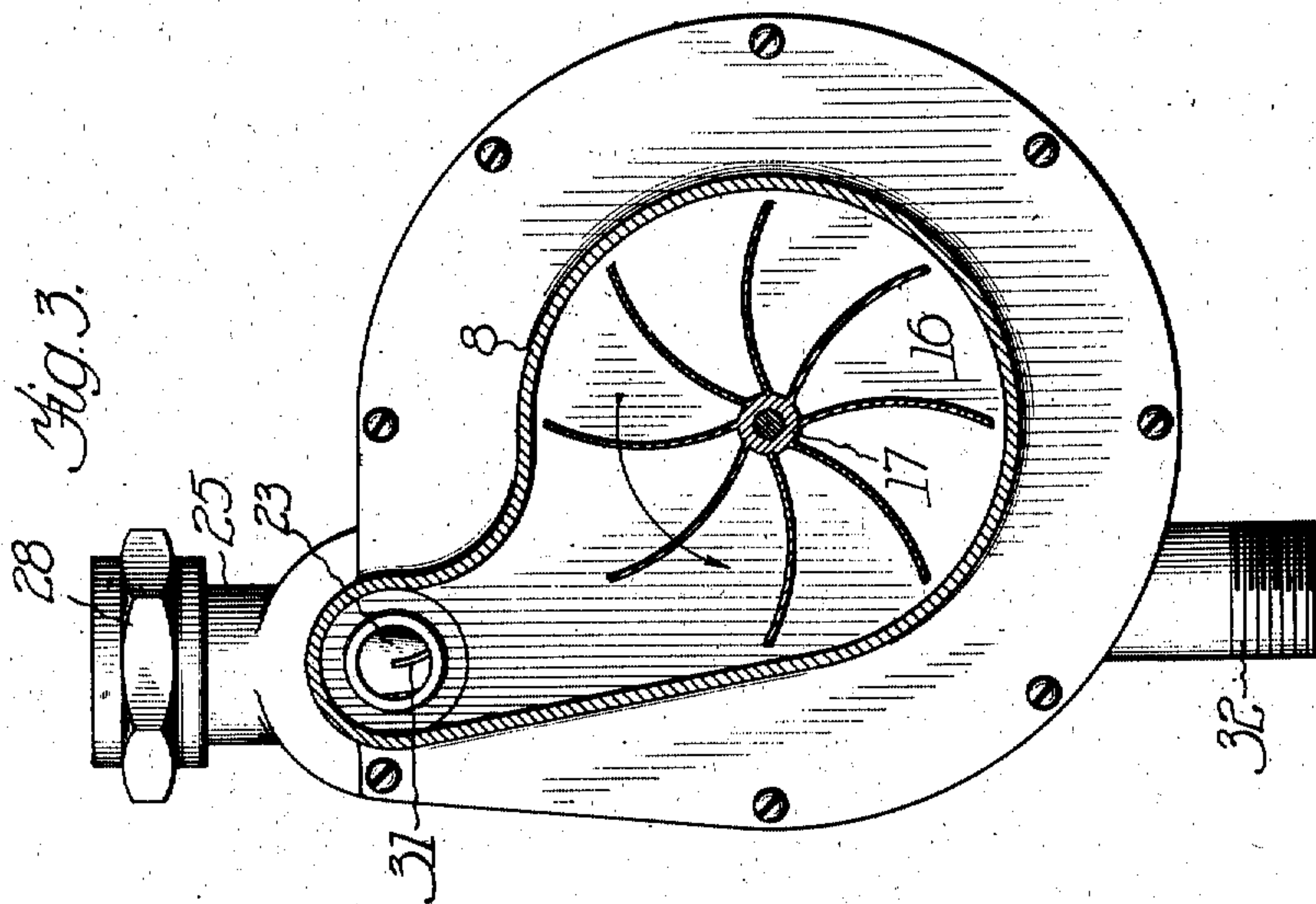


Fig. 3.

Witnesses:
Robert A. McEir
J. Wilson

Inventor:
Ira J. O'Malley
By Linthicum Bell & Fuller
Attys.

UNITED STATES PATENT OFFICE.

IRA J. O'MALLEY, OF CHICAGO, ILLINOIS.

MOTOR-FAN.

985,537.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed March 9, 1910. Serial No. 548,136.

To all whom it may concern:

Be it known that I, IRA J. O'MALLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Motor-Fans, of which the following is a specification.

This invention relates to motor fans and aims to produce a fan adapted to be used for cleaning purposes, which is efficient in operation and cheap to manufacture.

Pneumatic cleaners of small sizes which have gone into general use, are operated either manually or by an electric motor.

It is the purpose of my invention to provide an automatically operated cleaner which can be attached to any convenient water-faucet, thus rendering possible the use of cleaners of this character in dwellings or offices not supplied with electric power.

Another object of my invention is to sanitariously dispose of the dirt and dust with which the air is laden, when it is drawn into the cleaner. In order to accomplish this result, the discharge from the fan communicates with the interior of the motor casing so that the dust-laden air discharged from the fan casing into the motor casing, is thoroughly mixed with the motor fluid thereby cleansing the air, the dirt and dust being taken up by the water which is discharged from the casing into a waste-pipe or sewer connection.

Still another object of my invention is to increase the efficiency of devices of this character by assisting the action of the fan blower. I accomplish this result by restricting the opening of the discharge pipe from the fan into the motor chamber, and position the supply nozzle for the motor within this restricted opening. By this construction the inflowing water draws the air through the discharge pipe from the fan casing by an injector action, thereby relieving the compression of the air discharged from the fan, which, in ordinary constructions, tends to decrease the efficiency of the fan action.

A further object of my invention is the provision of means whereby discharge from the fan may be diverted so that the air-current may be used for blowing purposes, the means employed being a double-seating valve which can be readily manipulated to

convert the cleaner into a blower when desired.

My invention will be best understood by reference to the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a sectional elevation on the line 1—1 of Fig. 2. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section on the line 4—4 of Fig. 1, and, Fig. 5 is a perspective of my invention attached to an ordinary spigot.

In the drawings, reference character 6 designates generally, the casing, which is preferably made in three sections designated by characters 7, 8, and 9, respectively. The larger section 7 is substantially circular in cross-section as is shown in Fig. 2, and is provided with a laterally projecting hollow stud 10, which provides a bearing for the outer end of the motor and fan shaft 11, supported also in the bearing portion 12 provided on the inner wall of the section 8, as shown in Fig. 1. A fluid motor wheel 13, of any preferred construction, but which I have shown for the purpose of illustration merely, as a wheel comprising the usual curved blades 14, is rigidly secured upon the shaft 11 within the motor chamber 15. Upon the inner end of the shaft 11 and within the fan chamber 16, there is fixedly secured the fan 17, which may also be of any approved type, a common construction being shown on the drawings as comprising a number of reversely curved blades, best illustrated in Fig. 3. The section 9 of the casing comprises merely a plate adapted to cover the end of the fan and provided with an outwardly extending nipple 18 threaded to receive a coupling nut 19 carried by the member 20. The ordinary suction hose 21 provided with a cleaner 22 of any preferred type, is attached to the member 20, and when the coupling-nut 19 is screwed onto the nipple 18, as shown in Figs. 1 and 5, the usual suction action through the cleaner 22, will be produced upon rotation of the fan.

Water or other operating fluid is supplied to the motor wheel 13 through a nozzle

zle 23, which projects into the motor chamber through a restricted passage 24 disposed tangentially to the motor, as shown in Fig. 2.

The nozzle is held in position in the neck 25 of the section 7, by a flanged-nipple 26 which is threaded into the upper end of the neck 25 and bears against the upper flanged end 27 of the nozzle. The flanged-nipple carries a coupling-nut 28 of the usual form and size, adapted to be screwed upon the ordinary spigot or faucet 29.

The restricted opening 24 around the nozzle 23, constitutes the discharge outlet into the motor chamber from the fan chamber. As shown in Fig. 3, the discharge opening from the fan chamber is located near the top of the casing and communicates with the chamber 30 above the restricted opening 24 through a valve seat 32 which is screwed into a threaded opening in the inner wall of the fan section 8, as shown in Fig. 4. It will be evident that when water is admitted to the motor casing through the nozzle 23, that air will be drawn through the restricted opening 24 around the nozzle by an injector action, and this action materially increases the efficiency of the fan by relieving the compression in the discharge passage from the fan, which would tend to react upon the fan blades and retard their action.

In order to dispose of the dirt and dust with which the air drawn into the fan, is laden, I propose to cleanse the air and remove the dirt therefrom by thoroughly mixing the air with the water in the motor chamber. In order to assist in this intermingling of the water and air, the nozzle 23 is provided with a plurality of spirally-disposed ribs 31, which impart a whirling motion to the air as it is sucked through the restricted passage 24 into the motor chamber. This whirling motion of the incoming air assists in agitating the air in the motor chamber and also aids in disseminating the air through the spray occasioned by the impact of the water upon the motor blades, so that before the air escapes from the motor chamber through the discharge passage 32, it has been thoroughly cleansed of its impurities by the water. The water containing the sediment which it has accumulated from the air, may be discharged into a sink, as shown in Fig. 5, or the discharge passage 32 may be connected direct with the sewer or drain-pipe, whereby the impurities in the air are disposed of in a sanitary and satisfactory manner without necessitating the subsequent removal from the cleaner of a bag of filth, as is necessary with the ordinary type of machine.

It is often desirable to convert the cleaner into a blower for the purpose of blowing dirt out of otherwise inaccessible places, or for removing dirt from delicate articles im-

possible to be cleaned with a brush or the ordinary cleaning tool, or for drying hair, or renovating pillows, etc., and for this purpose, I have provided a valve 33 carried by a stem 34 which is threaded into a cap 35 screwed onto the end of a lateral tubular extension 36 of the fan section 8. This valve, in the position shown in Fig. 4, is seated against a seat 37 formed upon a partition in the projection 36. With the parts in the position shown, the discharge from the fan chamber passes through the valve seat 32 into the chamber 30 and into the motor chamber where it is discharged through the outlet passage 32 in the bottom thereof, as previously described. When, however, it is desired to convert the mechanism into a blower, the valve 33 is turned against the seat 31 by means of the handle-wheel 38, thus closing the port between the fan chamber and the motor chamber and opening the port in the partition 37. A pipe 39 is threaded into a lateral boss 40 on the extension 36, said pipe being threaded at its outer end for the reception of the coupling nut 19 which can be readily unscrewed from the nipple 18 and attached to the pipe 39.

Assuming the valve to be seated against the seat 32, the discharge from the fan will be conducted through the extension 36, the pipe 39, and into the flexible hose 21 which may be supplied with any form of nozzle, and the mechanism may then be used for any purpose for which it is found convenient to use a blower. The valve also serves as a controlling device by means of which the speed of the fan may be regulated between certain limits. When the valve is seated against the seat 37 the ejector action of the motor fluid supply draws the air from the fan casing, thus relieving the back pressure in the casing and reducing the atmospheric resistance to the rotation of the fan, thereby increasing the speed of the fan without varying the fluid supply to the motor, over the speed at which it would run with the valve covering the port 32 and shutting off the eductive action of the water supply.

It will be evident that my device is light, simple in construction and cheap to manufacture, that it may be readily attached to and detached from an ordinary water-faucet, and that it can be readily converted from a vacuum cleaner into a blower by simply reversing the position of the controlling valve and changing the attachment of the flexible hose.

Various minor mechanical variations in structure, may be resorted to without departing from the spirit of my invention or sacrificing any of the material advantages thereof, therefore, I do not wish to be restricted to the exact construction shown, but

am entitled to the various equivalents which fall within the purview of the following claims.

What I claim is:

1. In a motor fan, the combination of a casing comprising a motor chamber and a fan chamber, a shaft journaled in said casing, a fluid motor secured on the shaft in the motor chamber, a fan secured on the shaft in the fan chamber, a discharge passage-way leading from the fan chamber and discharging into the motor chamber adjacent the fluid inlet thereto, and a discharge passage-way from the motor chamber through which the air and fluid are discharged therefrom.
2. In a motor fan, the combination of a fan, a fluid motor operatively connected thereto, a casing comprising a fan chamber and a motor chamber in which the fan and motor are mounted respectively, means for supplying fluid to the motor, a passage-way leading from the fan chamber and communicating with the motor chamber through a restricted passage adjacent the fluid supplying means, whereby air is drawn through the discharge passage-way from the fan chamber by an injector action and discharged into the motor chamber, and an outlet passage from the motor chamber through which the air and fluid are discharged.
3. In a motor fan, the combination of a casing provided with a fan chamber and a motor chamber, a shaft mounted in said chambers, a fan secured upon said shaft in the fan chamber, a motor secured to said shaft in the motor chamber, a passage-way communicating with the fan chamber and with the motor chamber, injector means for drawing air through said passage-way from the fan chamber and discharging it into the motor chamber, and means for imparting a whirling motion to the air at its point of discharge into the motor chamber.
4. In a motor fan, the combination of a fan, a fluid motor operatively connected to said fan, separate chambers inclosing said fan and motor, an air inlet to said fan, an outlet passage leading from said fan chamber to the motor chamber, means located in said passage for supplying fluid to said motor and a device on the means for supplying fluid to the motor for imparting a whirling motion to the air as it is discharged into the motor chamber, whereby the air and motor fluid are thoroughly mixed in the motor chamber, and an outlet passage from the motor chamber through which the air and fluid are discharged therefrom.
5. In a motor fan, the combination of a rotary fan, a fluid motor operatively connected thereto, a discharge passage-way leading from the fan and discharging into the chamber in which the motor is located, a nozzle projecting through the opening in

the passage-way into the motor chamber adapted to supply fluid to the motor, spiral ribs disposed on the periphery of said nozzle to impart a whirling motion to the air as it is drawn by an injector action of the incoming fluid and discharged into the motor chamber, whereby the air and fluid are thoroughly mixed in the motor chamber to remove the dirt from the air, and an outlet passage-way from the motor chamber through which the cleansed air and the fluid are discharged.

6. In a motor fan, the combination of a casing provided with a fan chamber and a motor chamber, a fan mounted in said fan chamber, a motor operatively connected to the fan and located in said motor chamber, a discharge passage-way leading from the fan chamber to the motor chamber, a discharge passage-way leading from the fan chamber to an outlet pipe, and a valve adapted to control both of said passage-ways, whereby the discharge from the fan may be directed into the motor chamber or into the discharge pipe, as desired.

7. In a motor fan, the combination of a rotary fan, a fluid motor, a casing comprising separate chambers inclosing said fan and motor, a passage-way leading from the fan chamber to the motor chamber whereby the air and dirt discharged by the fan may be mixed with fluid in the motor chamber to cleanse the air, a second passage-way leading from the fan chamber through which the air from the fan may be directed for blowing purposes, and means whereby the discharge from the fan may be directed either into the motor chamber or into the second named passage-way.

8. In a motor fan, the combination of a fan chamber, a motor chamber, an air passageway leading from said fan chamber to said motor chamber, a motor fluid inlet pipe adapted to discharge into said motor chamber adjacent said air passage, and a discharge passageway leading from said motor chamber.

9. In a motor fan, the combination of a fan chamber, a motor chamber, a passage-way connecting said fan chamber to said motor chamber, a motor fluid inlet pipe adapted to discharge into said motor chamber adjacent the discharge opening from said passageway whereby the flow of air from the fan chamber to the motor chamber will be facilitated, and a discharge passageway leading from the bottom of said motor chamber through which the air from the fan chamber and the motor fluid are discharged.

10. The combination of a fluid motor casing, a shaft disposed therein, a fluid motor mounted on said shaft, a pneumatic device operatively connected with said shaft, a discharge passageway leading from said device

and discharging into the fluid motor casing,
means for introducing motor fluid into the
motor casing whereby said motor fluid and
the discharge from the pneumatic device
5 are mingled therein, and a common dis-
charge passageway leading from the motor
casing through which the discharge from

the pneumatic device and the motor fluid
are discharged after being mingled in the
motor casing.

IRA J. O'MALLEY.

Witnesses:

I. J. WILSON,
M. ROBERTSON.