

Jan. 2, 1923.

G. PARENTE.
POWER CYLINDER CONSTRUCTION FOR MOTORS.
FILED FEB. 3, 1921.

1,440,623

3 SHEETS-SHEET 1

Fig. 1

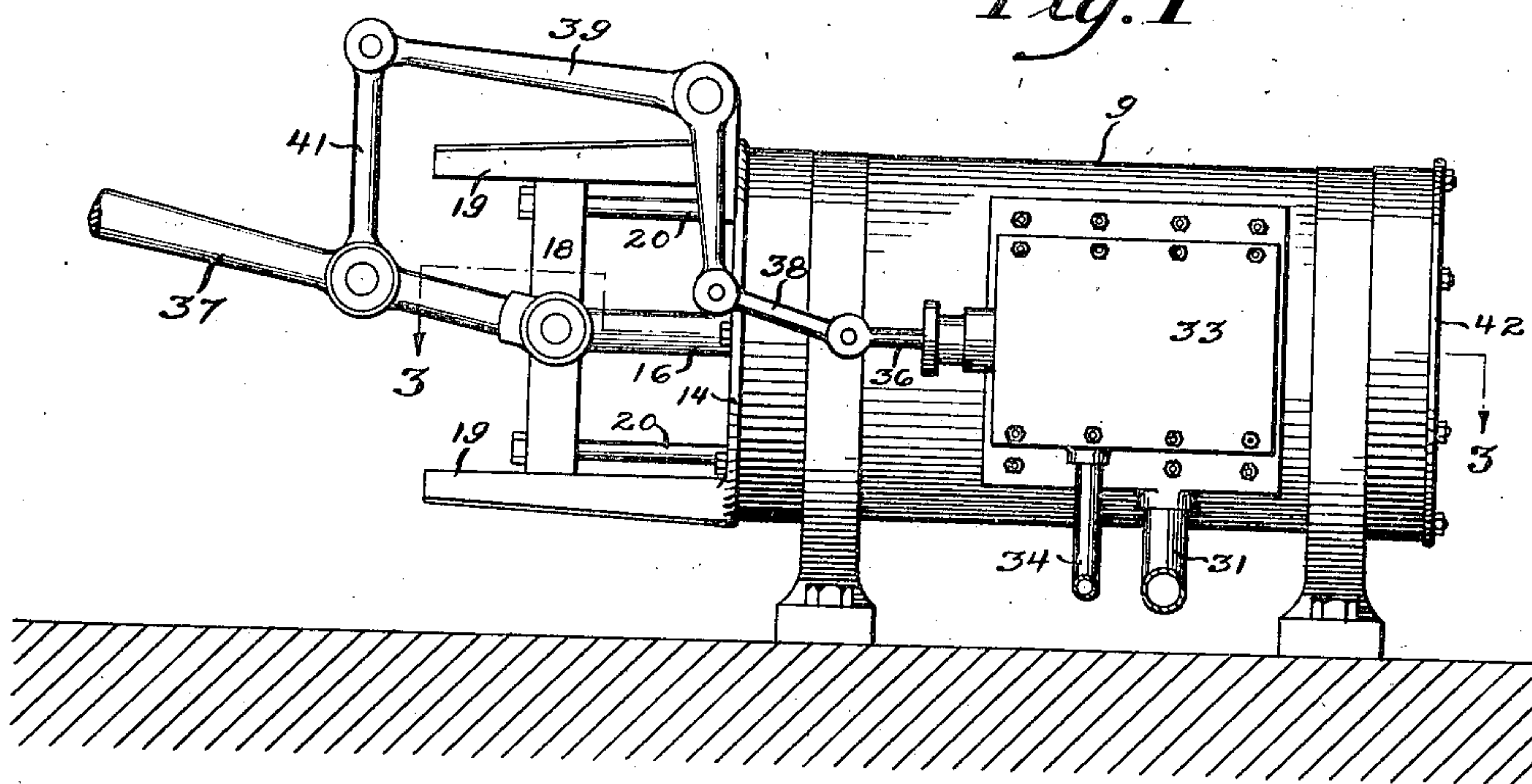
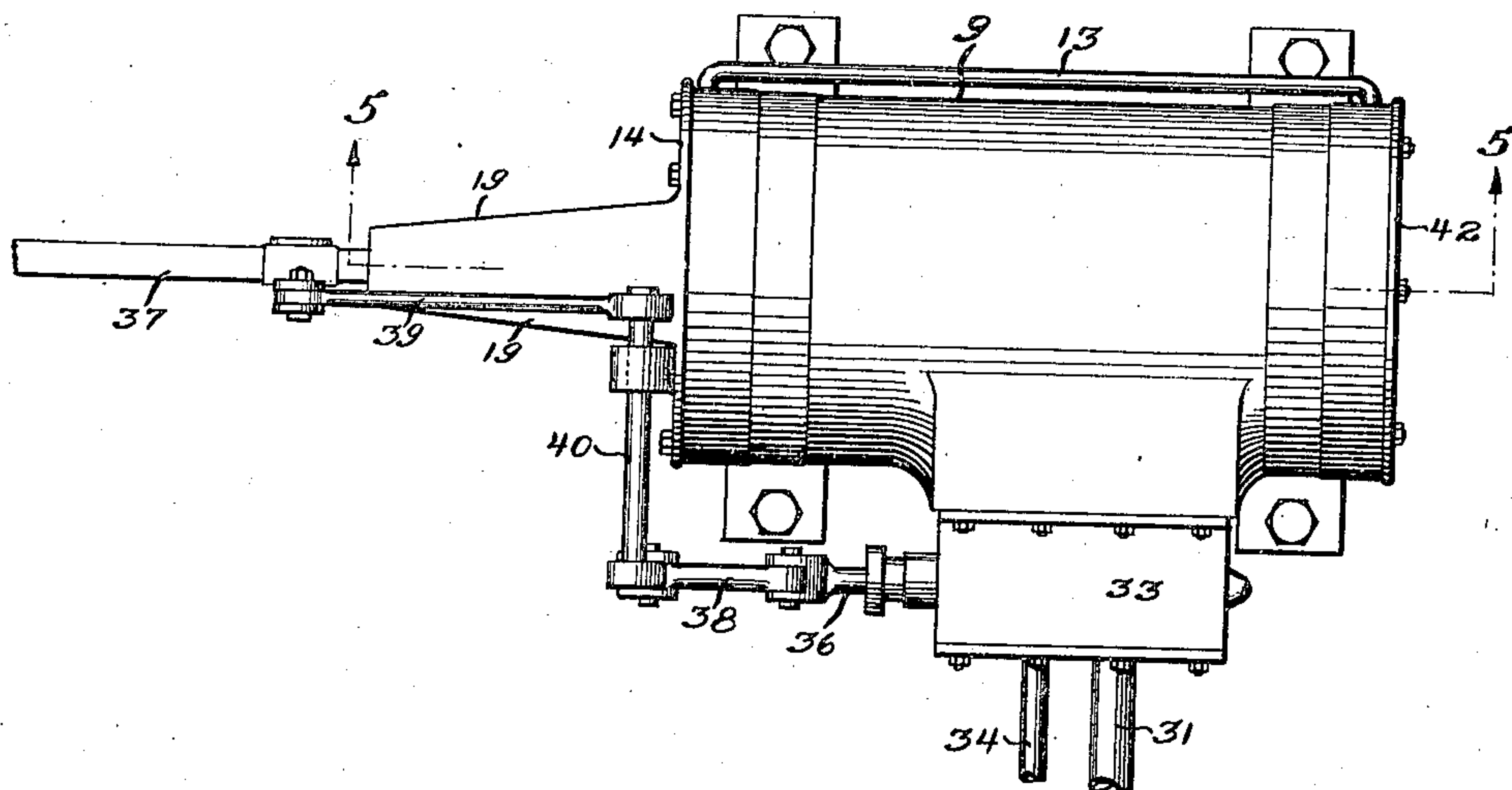


Fig. 2



Witnesses,
Spencer W. Megonegal,
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by

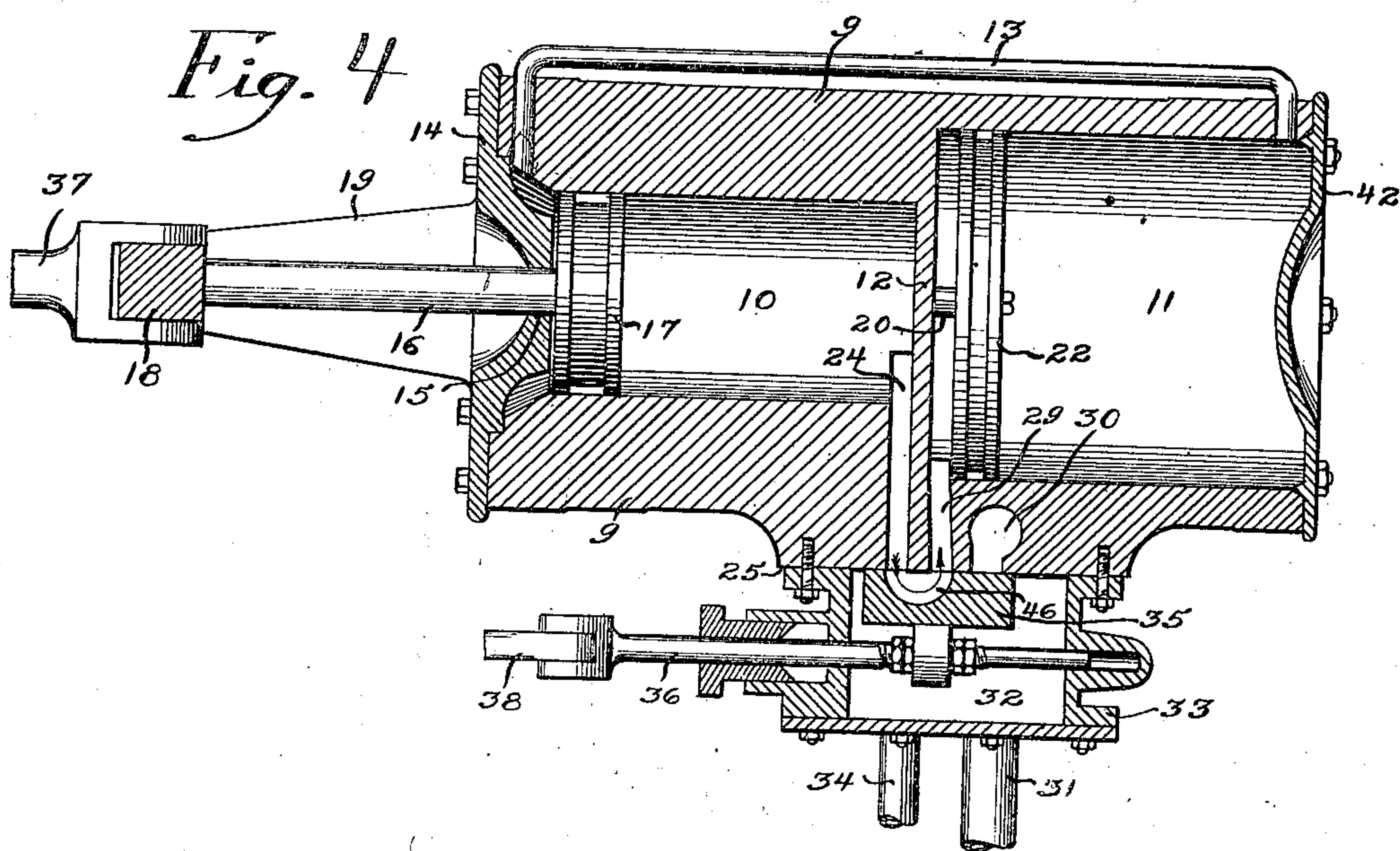
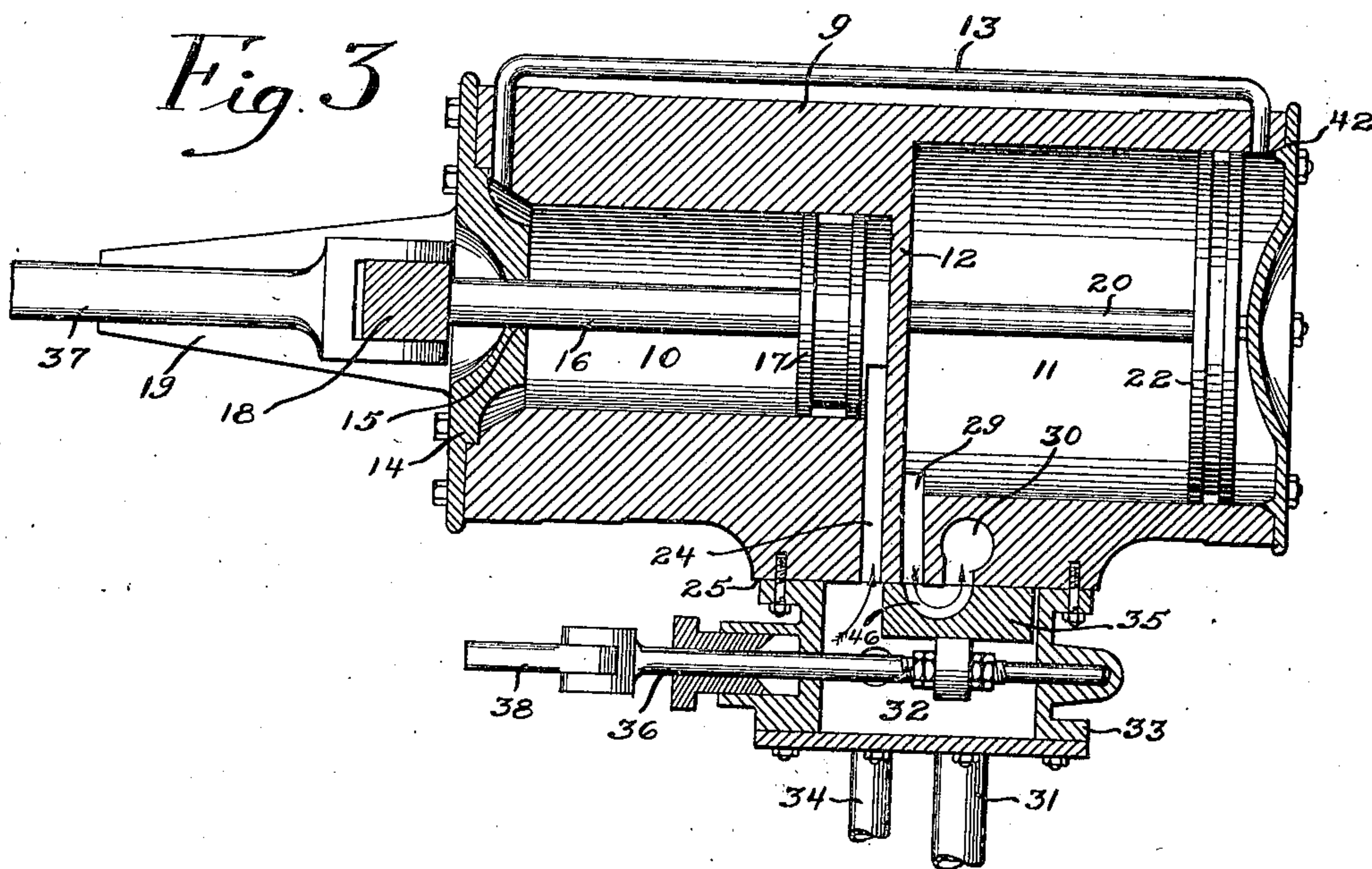
Inventor,
Giuseppe Parente,
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3 SHEETS-SHEET 2



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Spencer W. Mezongal,
Augustus B. Cooper

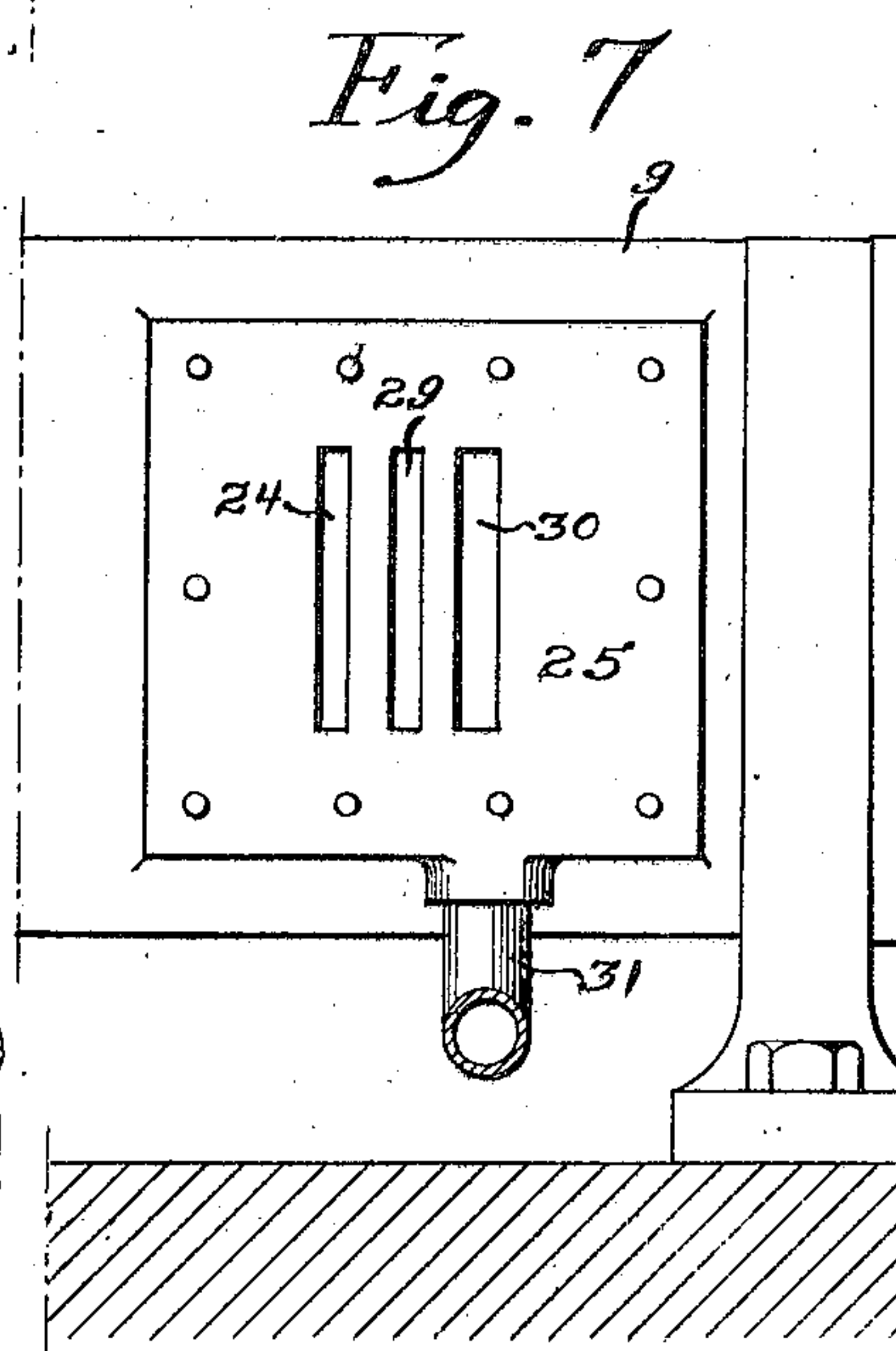
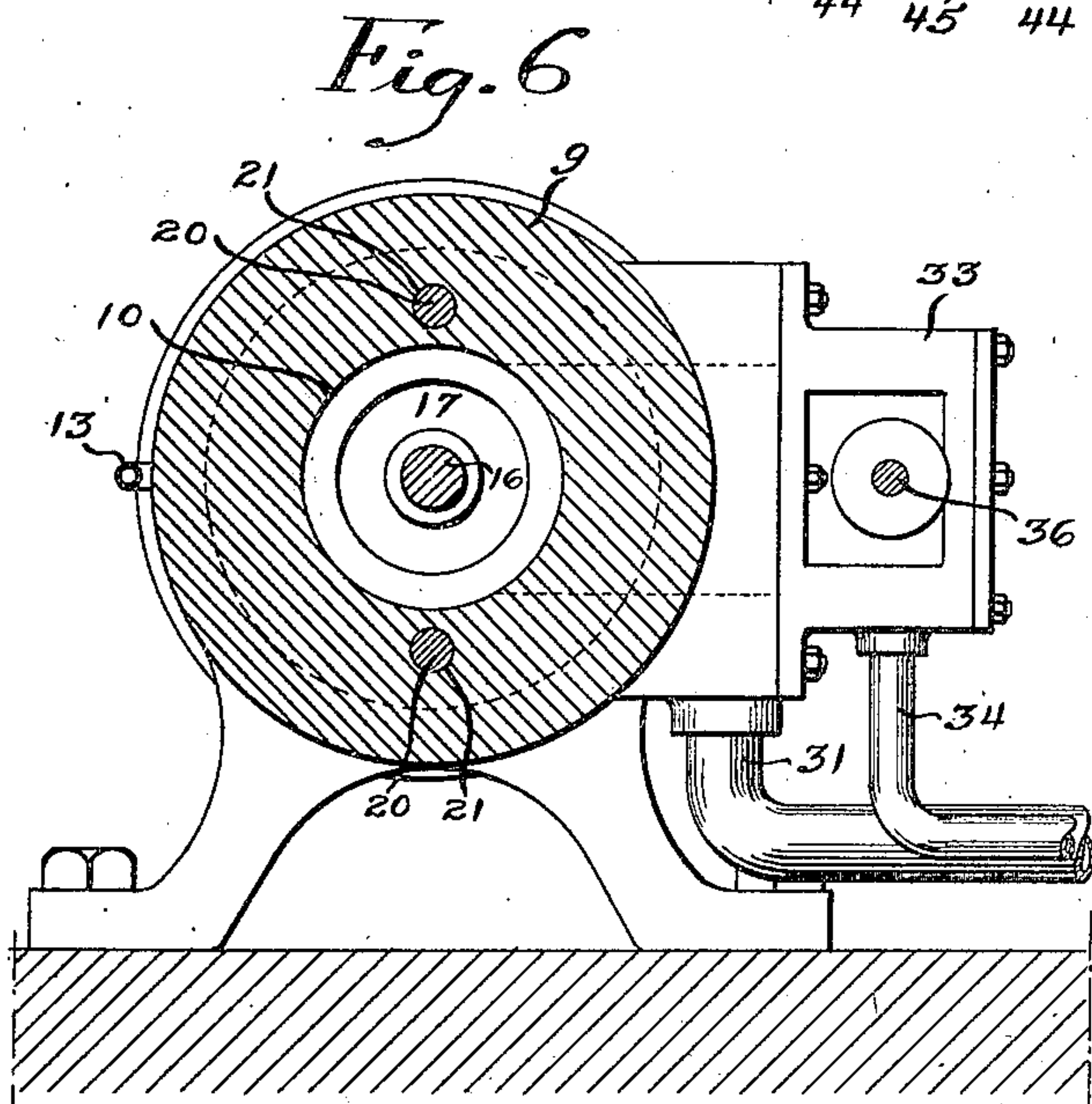
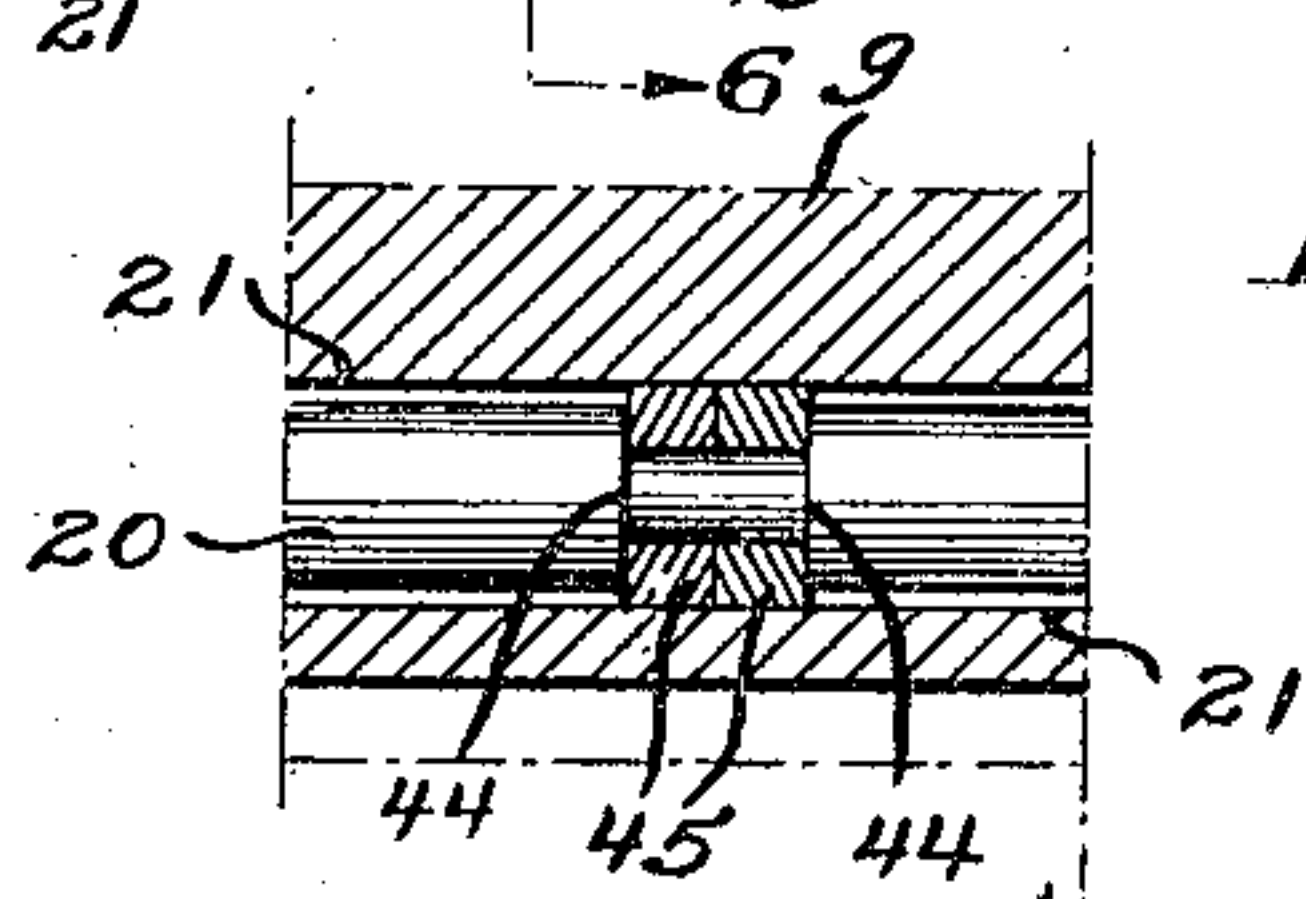
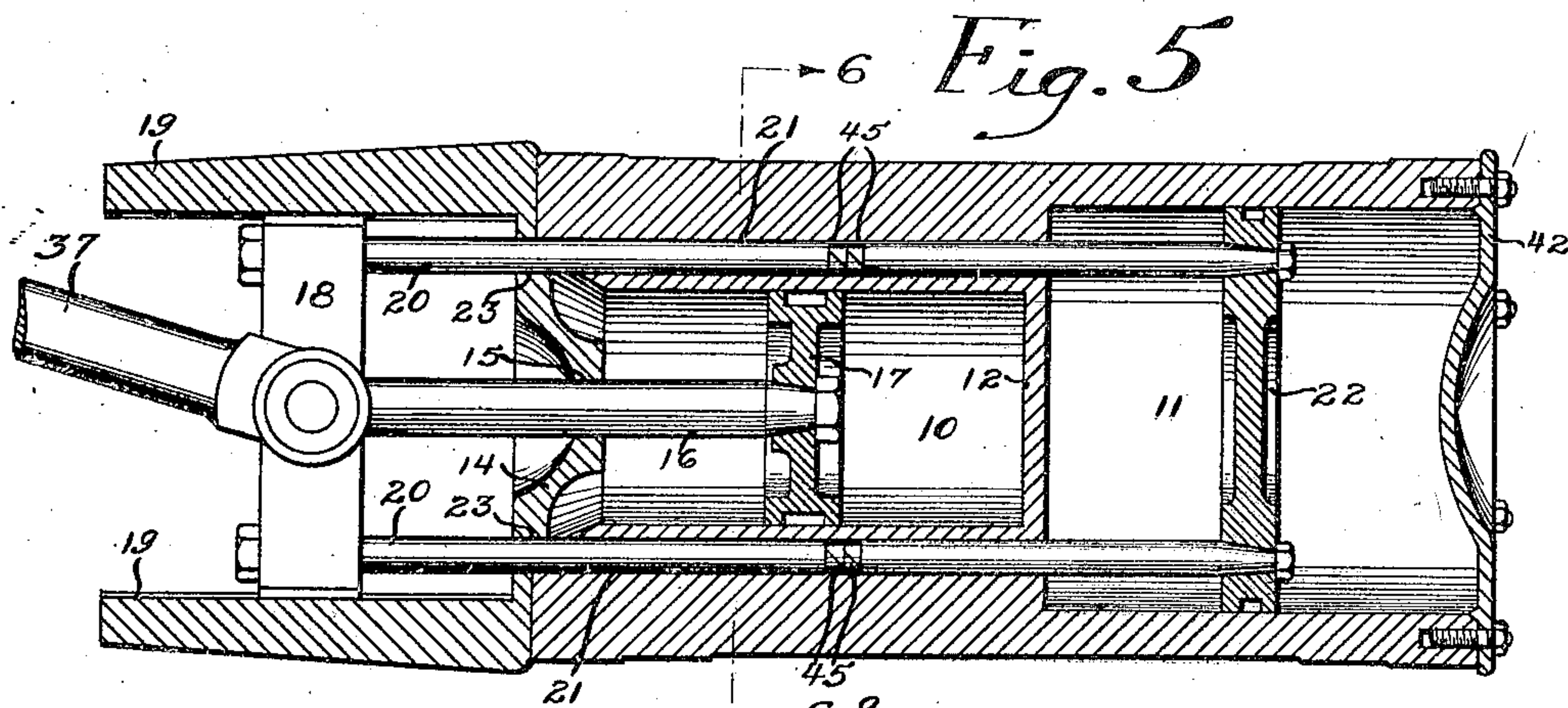
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3 SHEETS-SHEET 3



Witnesses,
Spencer W. Megonegal,
Augustus B. Lopes

Inventor,
Giuseppe Parente,
by Joshua R. Hoff
his Attorney.

Patented Jan. 2, 1923.

UNITED STATES PATENT OFFICE.

GIUSEPPE PARENTE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-EIGHTH
TO PETER MOREL, OF BROOKLYN, NEW YORK.

POWER-CYLINDER CONSTRUCTION FOR MOTORS.

Application filed February 3, 1921. Serial No. 442,078.

To all whom it may concern:

Be it known that I, GIUSEPPE PARENTE, a subject of the King of Italy, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Power-Cylinder Constructions for Motors, of which the following is a specification.

My invention relates to power cylinders and to a method of applying in succession power in such a cylinder for the actuation of the moving parts.

The object of my invention is to provide a cylinder or cylinders in which a pair of pistons operate against a common cylinder head, said pistons forming the respective end walls of their respective cylinders and the common cylinder head forming the other end walls of the cylinders.

My invention is distinguished by the fact that no packing or stuffing boxes are necessary. It is a further object to provide a means of utilizing the same power charge, either gas or fluid, for the successive actuations of the two pistons and to also actuate those pistons in synchronism with one another.

It is my object to provide a cylinder and a means of distributing fluid or gases under pressure thereto without the aid of stuffing boxes, distributing eccentrics, special guides and cross heads, etc.

It is a further object of my invention to provide a cylinder or cylinders in which the motive power in the form of steam, gas or fluid or the like is applied in a single charge once for each revolution of the shaft and during this single application it exercises a dual effect or an effect in both directions in succession, thus imparting to the reciprocating connecting rod both a thrust and a pull. Consequently, the power is continuously applied.

It is a further object of my invention to provide a single common cylinder head for the two cylinders so that the cylinder head will act in a double capacity for both steam chambers or cylinders.

It is a further object of my invention to provide a very simple arrangement by which the entrance port to one cylinder may also be utilized as the exit port for the charge of steam or other motive fluid or gas into the second cylinder on the other side of the common cylinder head.

It is my object to provide a very simple construction with the above mentioned elimination of stuffing boxes, bearings, glands, etc., with a simple method of interconnecting the pistons and interconnecting the pistons, cross head, guide and connecting rod.

It is an additional object of my invention to provide means of actuation for a slide valve and a slide valve which will be simple in operation and will positively control the entrance and exit ports communicating with the two cylinders on either side of the common cylinder head.

This results in high velocity of the moving parts due to their lightness, the absence of weight because it is not necessary to make them heavy to withstand great strains and because durability is secured due to the smooth and even operation of the device of my invention.

It is an additional object to provide interconnecting linkage to operate the slide valve, the linkage being connected to the reciprocating connecting rod so that the introduction of the fluid or gaseous pressure into the cylinders in succession from the source of supply will be synchronized.

It is a further object to provide means of regulating the accumulated air pressure on the sides of the pistons opposite the location of the steam or fluid pressure and also to provide means of exhausting any surplus air compressed between the outer ends of the cylinders and the pistons.

Referring to the drawings:

Fig. 1 is a side elevation from the slide valve side of the assembled parts constituting my construction;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the same line with the slide valve in a different position and the pistons in their reverse position;

Fig. 5 is a section taken on the line 5—5 of Fig. 2;

Fig. 6 is a section taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail of the slide valve; and,

Fig. 8 is a detail of a bearing member on the connecting rods between one of the pistons and the cross head.

Referring to the drawings, 9 is a cylinder divided into two compartments or chambers 10 and 11. 10 is smaller in diameter than 11.

10 constitutes the high pressure chamber and 11 constitutes the low pressure chamber. The different size chambers and the different size pistons 17 and 22 working
5 therein are proportioned on the basis of the difference in pressures.

In the respective chambers or cylinders separating these cylinders 10 and 11 is a common cylinder head so that the cylinders
10 are formed of a common cylinder head 12 with the cylinders on either side thereof, the other end of the cylinders being formed by the pistons 17 and 22. It will be apparent, therefore, that no stuffing boxes, glands,
15 etc., will be necessary as whatever steam escapes around the pistons is negligible and no pressure is to be taken into account save as hereinafter related on the left hand of 17 and on the right hand of 22, as Fig. 3 is
20 viewed. 17 is provided with a piston rod 16 traveling in a supporting bearing which is not airtight but is sufficiently loose to provide the escape of any air that may be compressed in 10 on the left hand side of
25 17. This bearing is designated 14 and the point of contact between 16 and 14 through which the compressed air may escape if there is a surplus thereof is 15. The usual head 18 is provided on 16 to which there is pivotally connected the connecting rod 37 which
30 passes to the conventional fly wheel of the engine, being pinned thereto near the periphery thereof. 18 in this instance is extended to form a cross head, the outer ends
35 of which are guided by projections or arms mounted on the cylinder and designated 19.

It will be apparent in this unique organization of parts that the usual stuffing box at 15 is entirely absent and that the
40 construction need only be strong enough to support 16. The heavy construction of the cylinder itself with the attendant walls, strength of casting, etc., need not be employed because there is no pressure of any
45 appreciable extent exerted against 14.

At the other end of the cylinder 1 the same thing is true and the head 42 is of very light construction. This elimination of the unnecessary parts and unnecessary
50 weight permits of very considerable lightness in the structure, greater speed of the reciprocating parts and consequently greater durability due to the fact that the parts do not need to be made as heavy to withstand
55 the strains set up in heavy reciprocating parts and parts subjected to heavy pressures.

On the left hand of 17 and the right hand of 22 are the chambers in which air will be more or less confined and will be compressed before it can escape due to the movement of 17 and 22 in alternate directions. In order to compensate for this a communicating passage way 13 communicates with each of these chambers on the respective
65 sides of 17 and 22. Due to the fact that the

area on the left hand side of 17 is of lesser area than that on the right hand side of 22, it will be apparent that there will be greater pressure set up in the area on the left hand side of 17. For that reason the juncture
70 of 14 at 15 with 16 is relatively loose so that the excess air may escape. By partially confining the air in these chambers by the bearing 14 and head 42 the collection of dust in the chambers will be more or less prevented. It is apparent that if the engine be kept covered from dust, these parts 14 and 17 may be entirely omitted.

The steam or other fluid or gaseous motive power is introduced through the pipe
80 34 into the slide valve chamber 32. The slide valve rod 36 has attached to it a slide valve 35. The one end of this rod is guided in the member 33. 36 is connected by 38 to a bell crank 39 which in turn is connected by
85 a link 41 to the connecting rod 37 in order to give the proper reciprocation to 35 in the conventional manner.

A passage way 46 is cut out in 35 for the passage of the steam and the like in the alternate positions of 35.

In the position shown in Fig. 3 the steam is introduced through 24 to the right hand side of 17 driving 17 to the left. 17 forms one end of the cylinder and 12 the other end
95 of the cylinder. The air that is behind 17 to the left hand passes up through the pipe 13 to the right into the area at the right hand side of 22.

It will be observed that the cross head 18
100 has connected therewith the piston rods 20 being guided in the cylinder walls and connected at their outer end to the piston 22 so that when 17 and 16 pass to the left 22 and 20 will also pass to the left together
105 with the connecting rod 17 and the cross head 18. Simultaneously the slide valve 35 in due season will be actuated to pass over the entrance port 24 and form a channel through 46 by which the steam under high
110 pressure between 17 and 12 can pass from that high pressure area into the area to the left hand of 22 between 12 and 22 thus moving 22 to the right and likewise moving
115 17 to the right. The air that is caught on the right hand side of 22 will return through 13 behind 17.

35 and its connecting parts are so timed that when the steam has exerted itself on 22 on the left hand side thereof and moved
120 it into the position shown in Fig. 3, 35 will be in the position so that 46 will communicate with 29, the entrance and exit passage way to the left hand of 22 and will also communicate with 30 and the pipe 31 to
125 exhaust the steam.

It will be thus seen that in one revolution but one charge of steam will be introduced and this one charge of steam will act on the high pressure piston and on the low pres-
130

sure piston during the single cycle of the fly wheel and single cycle of movement of the connecting rod.

If desired packing rings 45 can be provided on 20 but the long bearing surface of 20 in 1 under some conditions will be sufficient without necessity of any packing rings and therefore introduction is optional.

In this single cylinder having two chambers, it is my usual practice to provide a larger chamber about one and one-half times greater in surface area than the smaller. The fluid pressure in the larger chamber is from one to two atmospheres lower than the pressure in the high pressure or smaller chamber. Thus the steam due to my method of control through the valve pushes the piston for a portion of the stroke corresponding to an angle of about 138 degrees upon the circumference of an arc described by the crank shaft pin on the fly wheel. The remainder of the stroke is a pull being exerted through the agency of the pressure in the other chamber.

While I have shown and described certain features as constituting my invention, it will be understood that parts have been shown for purposes of illustration only, and that I do not desire to be limited to such details, as obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In combination, a cylinder in one piece divided into two compartments by an imper-

forate central integral partition, a single port communicating with each compartment of the cylinder so divided, each of said ports being adapted to be alternately used as exit and inlet ports, a valve for controlling the ports, pistons in said respective compartments of the cylinder, piston rods for the pistons, a cross head connecting the piston rods, and guides for the cross head.

2. In combination, a cylinder divided into two compartments by a common imperforate dividing wall, each compartment having a single port, a piston in each compartment, means to interconnect said pistons, a connecting rod connected to said piston rods, a slide valve operated through said connecting rod to control a port to each of the compartments, said ports being used alternately as entrance and exit ports, and an exhaust port adapted to be connected with one of the compartment ports, whereby as the pistons operate in conjunction with the common dividing wall between the chambers, power may be continuously applied to the piston rods, and the entrance and exit of the same power charge first to one chamber, then to the other, and finally exhausted, will be accomplished.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GIUSEPPE PARENTE.

Witnesses:

SAVERIO BALZANA,
GATANO BAGNATURO.