

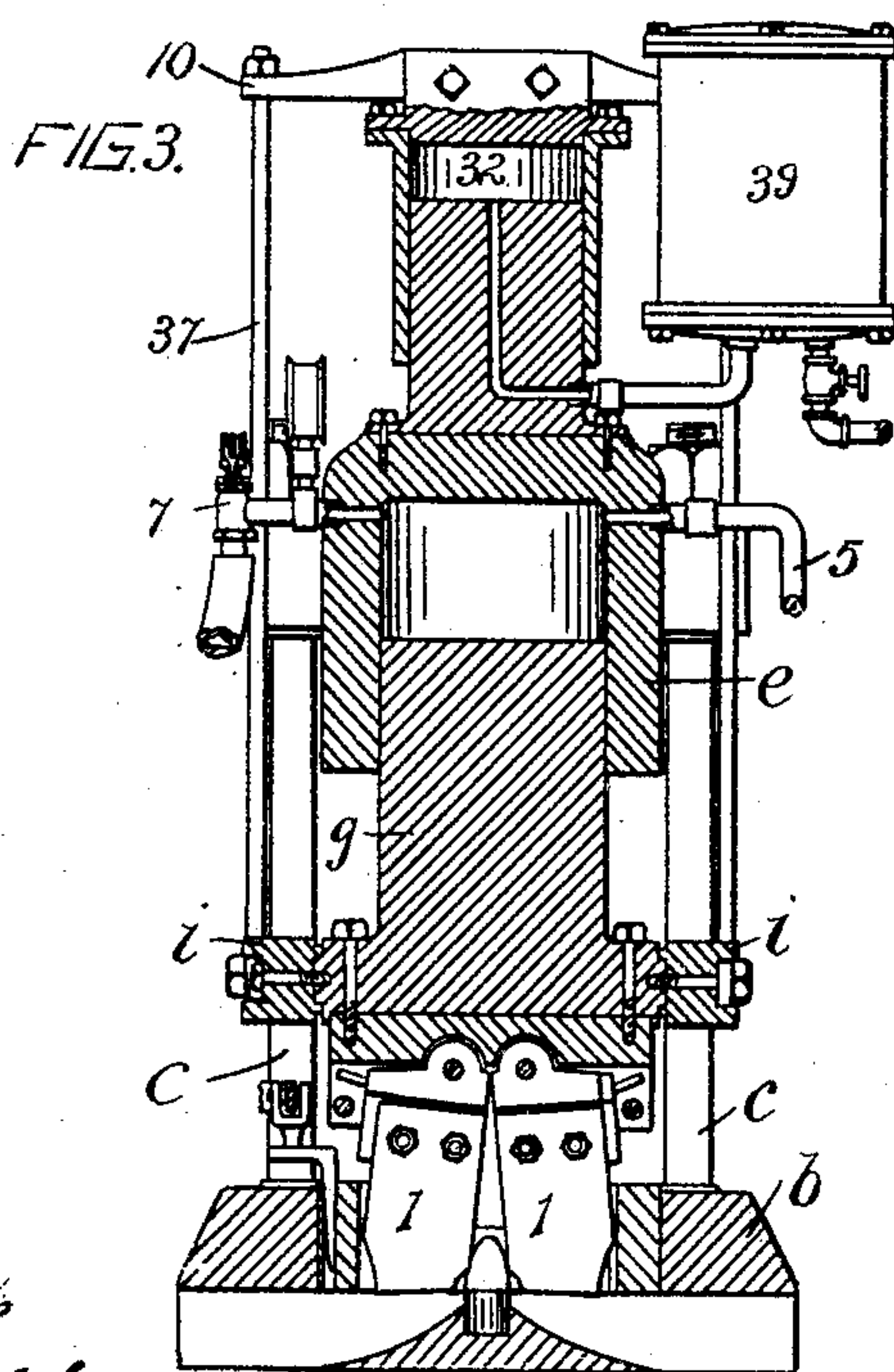
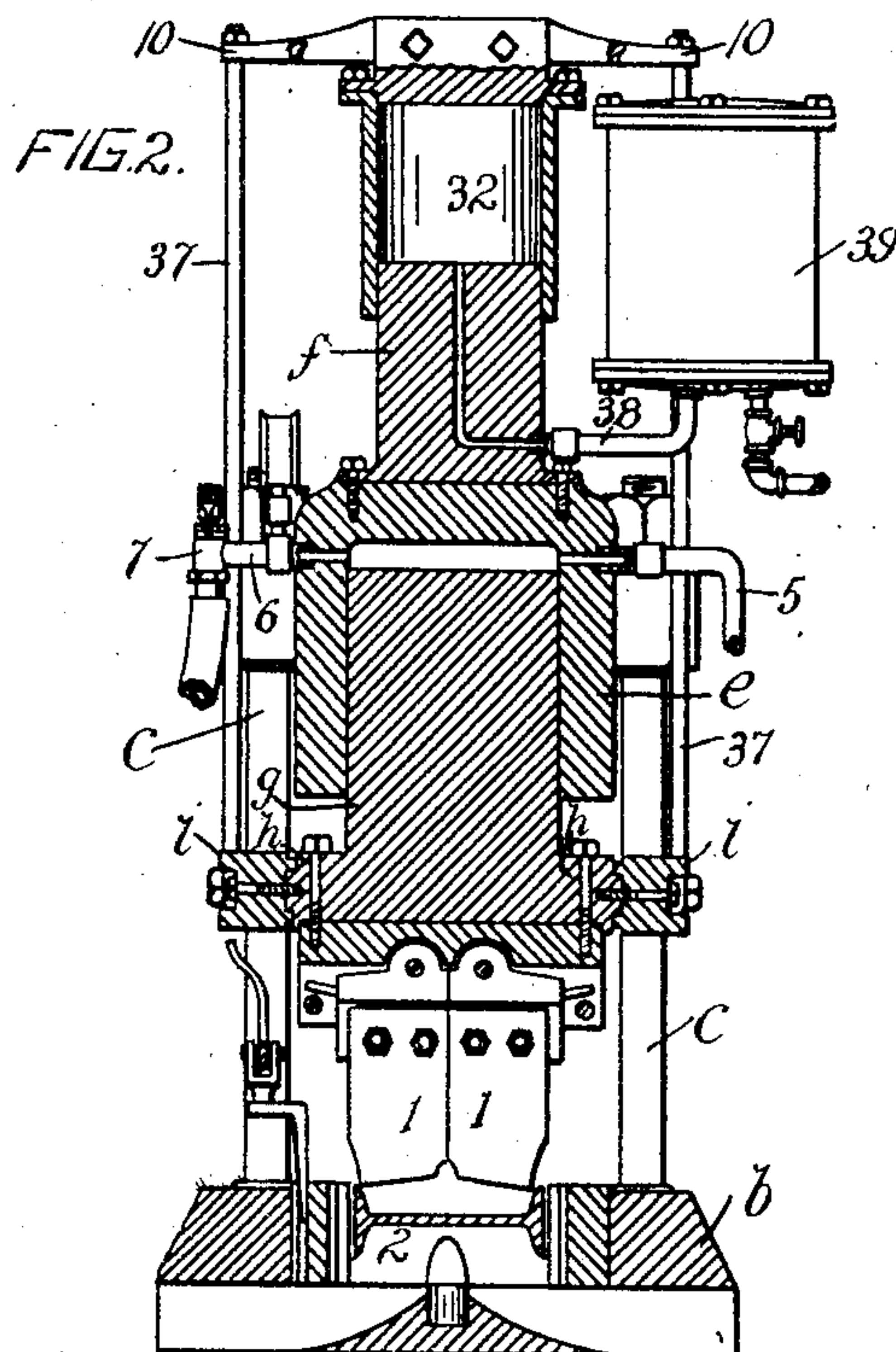
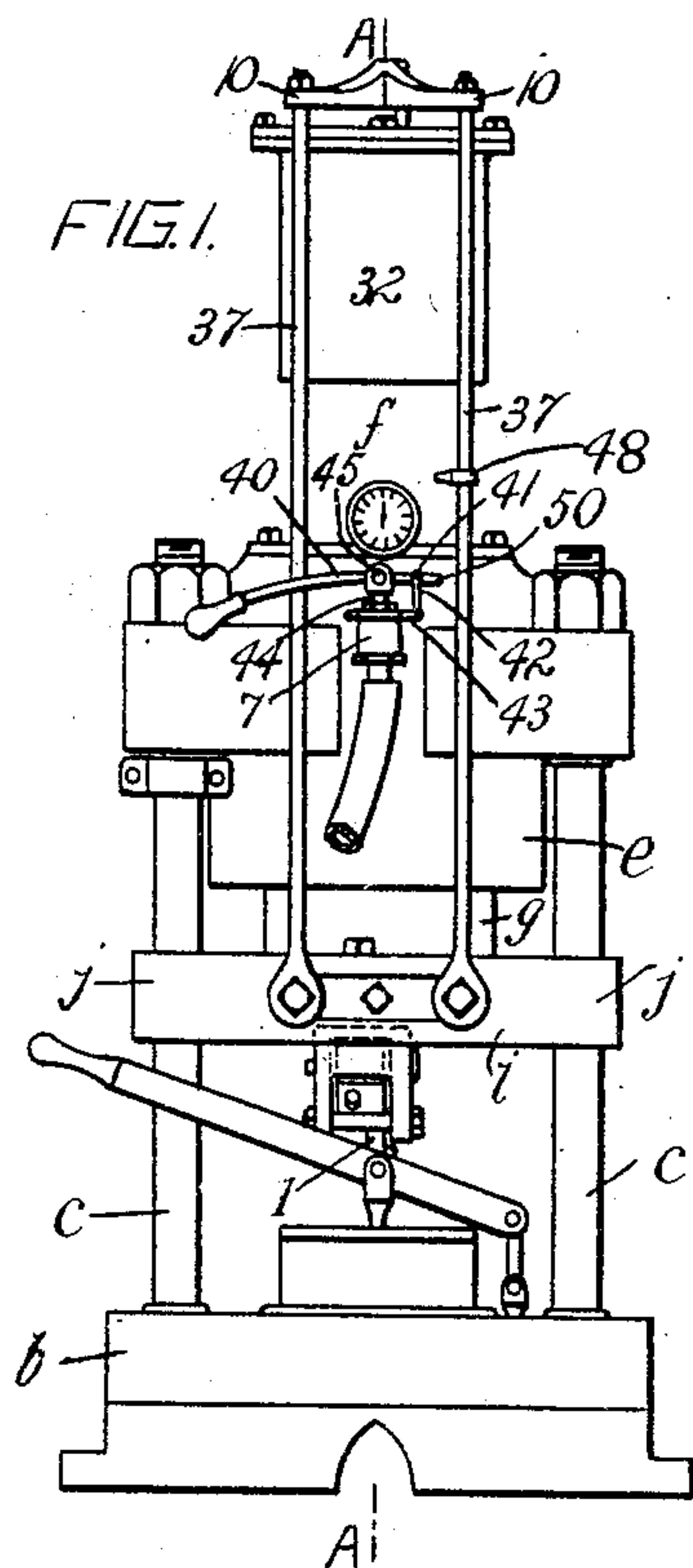
No. 786,236.

PATENTED MAR. 28, 1905.

W. ROSS.  
HYDRAULIC MOTOR FOR PRESSES.

APPLICATION FILED FEB. 27, 1903.

2 SHEETS—SHEET 1.



Witnesses

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No. 786,236.

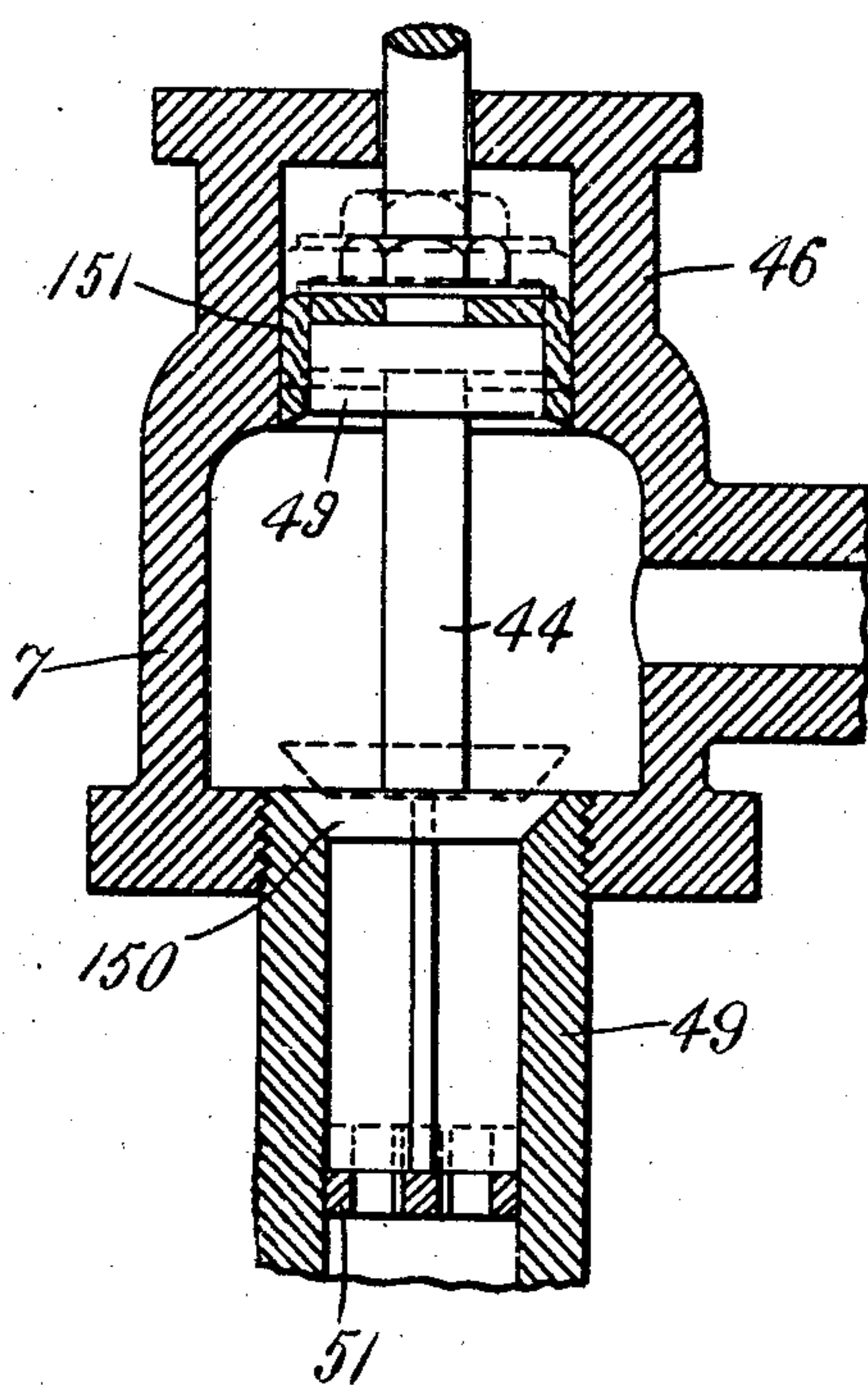
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2 SHEETS—SHEET 2.

FIG. 4.



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# UNITED STATES PATENT OFFICE.

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## HYDRAULIC MOTOR FOR PRESSES.

SPECIFICATION forming part of Letters Patent No. 786,236, dated March 28, 1905.

Original application filed September 29, 1902, Serial No. 125,259. Divided and this application filed February 27, 1903. Serial No. 145,424.

*To all whom it may concern:*

Be it known that I, WILLIAM ROSS, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Hydraulic Motors for Presses; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates particularly to low-speed motors; and it has for its object to provide a motor the actuated part whereof will move under great pressure and very slowly.

The invention may be said briefly to consist of an abutment member, a movable member constituting the actuated part adjacent to the abutment member, means inclosing the space between said members, a liquid flowing under pressure through the space thus inclosed while the actuated part is at rest, means for arresting the flow of said liquid from and accumulating the pressure thereof in the space, thereby moving the movable member from the abutment member under the pressure thus accumulated, and means for releasing the liquid from the space upon the completion of the movement of the movable member, thereby enabling the latter to be returned to its normal position, means being provided for causing the movable member to automatically recoil to its normal position and consisting, preferably, of a permanent countervailing pressure of compressed air of less power than the pressure of the liquid during its accumulation and when accumulated.

For full comprehension, however, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate the same parts, and wherein—

Figure 1 is a side elevation of a motor constructed according to my invention. Fig. 2 is a longitudinal vertical sectional view thereof, taken on line A A, Fig. 1. Fig. 3 is a similar view to Fig. 2 and illustrating the movable parts in a different working position, and Fig. 4 is a detail longitudinal sectional view of the longitudinally-movable one-way valve for controlling the exhaust of the liquid from the main cylinder.

In order that my invention may be thoroughly understood, I have illustrated and will hereinafter describe same applied to a machine for cutting heavy ware, such as I-beams, channel-irons, and other angle-irons or the like.

*b* is the base-frame, constituting a support for the metal to be cut or otherwise worked, such base having four standards *c*, constituting cross-head guides and supporting at their upper ends a cylinder *e*, constituting the abutment member and having its lower end open. A stationary cylindrical piston *f* is mounted rigidly upon the closed upper end of this abutment-cylinder. A cylindrical piston *g*, constituting the movable member, fits into the cylinder *e*, and the lower end thereof has a pair of lateral extensions *h*, having bars *i* with perforated ends *j* secured thereto. The lower end of this piston or movable member, together with the extension *h* and bars *i*, constitute a cross-head, which has a working tool 1 secured to the under side thereof. This tool may be of any desired form, a pair of blades being indicated, and stationary shearing devices 2 are carried upon the base-frame *b* in line with said blades and are adapted to coact therewith.

The movable member is moved from the abutment member under high pressure by water or other inelastic fluid conducted to the upper end of the interior of the cylinder through a pipe 5, leading from any suitable pump, (not shown,) and said fluid is exhausted from the cylinder through a pipe 6, carrying a pressure-gage, and controlled by a balanced valve, (indicated at 7.) This movable member is returned to its normal position adjacent to the abutment member by, preferably, pneumatic pressure, to which end a cylinder 32, open at its lower end, is fitted slidably upon the piston *f*. A frame having four arms is bolted or otherwise secured to the closed end of the cylinder 32, and a series of rods 37 extend from the ends of said arms to the cross-head, to which they are connected. A pipe 38 is taken from the interior of the cylinder 32 through the piston *f* and out to a storage-tank 39, wherein a pressure of air or other elastic fluid is constantly maintained at



a degree in excess of the weight of the movable member and the parts carried thereby.

The balanced valve is operated by a lever 40, fulcrumed a short distance from one end, as at 41, upon the top of a link 42, pivoted at its lower end to a bracket 43, carried by the casing of the valve 7, while the upper end of the valve-stem 44 is pivotally connected, as at 45, to said lever. This balanced valve consists of a valve-casing 7, having guiding-sleeves 46 and 47 at its top and bottom, respectively, the latter constituting an exit-port. A valve proper located in this casing consists of a stem 44, having a collar 49 integral therewith and adapted to slide in the guiding-sleeve 46, while a valvular disk 150 upon the lower end of the stem is adapted to be seated upon the flared upper end of sleeve 47 and control the passage therethrough. This valvular disk is of greater area than that of the under side of the collar 49, but equal in area to the collar and a packing 151. The packing 151 encircles and is carried by the collar, and a spider 51 slides in sleeve 47 and coacts with collar 49 in guiding the valve in its movement.

The fluid is automatically exhausted from the main pressure-cylinder at the completion of the movement of the movable member by means of a dog 48, carried rigidly by one of the rods 37 and adapted to trip upon the projecting end 50 of the lever 40.

The operation of my improved motor is as follows: Under normal conditions the water or other inelastic fluid flows continuously through the cylinder *e*. Upon the valve 7 being closed, which is done manually, pressure is accumulated in the cylinder *e*, or, in other words, between the abutment and movable members, and the movable member (the piston *g*) is moved gradually away from the abutment member under the pressure accumulating until the dog 48 trips upon the valve-lever and opens the valve, thereby allowing the motive liquid to exhaust from the cylinder *e* through the port controlled by said valve and allow the countervailing pressure in the pneumatic cylinder 32 to return the movable member to its normal position.

It is obvious that, although I have illustrated my improved motor as applied to a metal-cutting machine, it may be used in any connection where great power and low speed of an initial operating part is required.

I do not herein claim specifically the particular machine illustrated, as it forms the subject-matter of an application filed by me on September 29, 1902, under Serial No. 125,259, of which this is a divisional part.

What I claim is as follows:

1. In a low-speed motor the combination with an abutment member, a movable member adjacent to said abutment member and means inclosing the space between said movable and abutment members, a conductor for

a liquid flowing under pressure, said conductor communicating with said space, means for allowing the liquid to flow through said space continuously while the machine is at rest and means for actuating said last-mentioned means and for arresting the flow of said liquid from and accumulating the pressure thereof in said space thereby moving said movable member from said abutment member, a second abutment member, a second movable member adjacent to said last-mentioned abutment member, means inclosing the space between said last-mentioned abutment and movable members, a tank adapted to hold compressed air, and a constantly-open conductor leading from said tank to said last-mentioned space.

2. In a metal-working machine the combination with an abutment member, a movable member adjacent to said abutment member, means inclosing the space between said movable and abutment members, and movable means upon the movement whereof said movable member is moved, of a receptacle adapted to hold compressed air and a constantly-open communicating duct between said receptacle and said space.

3. In a metal-working machine the combination with an abutment member, a movable member adjacent to said abutment member, means inclosing the space between said movable and abutment members, and movable means upon the movement whereof said movable member is moved, of a receptacle for compressed air said receptacle being carried by and movable with said metal-working machine and a constantly-open communicating duct between said receptacle and said space.

4. In a metal-working machine the combination with an abutment member, a movable member adjacent to said abutment member and means inclosing the space between said movable and abutment members, of a receptacle adapted to hold compressed air, a constantly-open communicating duct between said receptacle and said space, a second member, a second movable member adjacent to said second abutment member, means inclosing the space between the last-mentioned movable and abutment members, a conductor for a liquid flowing under pressure, said conductor communicating with said last-mentioned space, means for allowing the liquid to flow through said space continuously while the machine is at rest, means for actuating said last-mentioned means and for arresting the flow of said liquid from and accumulating the pressure thereof in said space thereby moving said second movable member from its abutment member, means for releasing said liquid from said space when said movable member has moved a predetermined extent and means connecting said movable members together to move in unison.

5. In a metal-working machine the combination with a support for the metal to be worked,



of a cylinder supported in line with said work-  
 support and having the end thereof adjacent  
 thereto open and its other end closed, a pis-  
 ton slidable within said cylinder, a supply-port  
 5 leading into the upper end of said cylinder, an  
 exhaust-port leading therefrom, an exhaust-  
 pipe communicating with the said exhaust-  
 port of said cylinder, a valve controlling said  
 exhaust-pipe, said port and cylinder and ex-  
 10 haust-pipe being for conducting an inelastic  
 fluid flowing constantly under pressure there-  
 through and while the valve is open, and adapt-  
 ed to be checked and the pressure thereof ac-  
 cumulated in said cylinder when the valve is  
 15 closed, a stationary piston mounted rigidly  
 upon the closed end of said cylinder, a cylin-  
 der slidable upon said piston, a compressed-  
 air supply, a duct leading from said com-  
 pressed-air supply to said last-mentioned cyl-  
 20 inder, and means connecting said last-men-  
 tioned cylinder to said first-mentioned piston,  
 substantially as described and for the purpose  
 set forth.

6. In a metal-working machine the combina-  
 25 tion with a support for the metal to be worked  
 and stationary metal-working means carried  
 by said support, of a cylinder supported in  
 line with said stationary working means and  
 having the end thereof adjacent to said work-  
 30 ing means open and its other end closed, a

piston slidable within said cylinder, a work-  
 ing tool in line with said stationary metal-  
 working means and adapted to coact with the  
 latter, means connecting said working tool to  
 said slidable piston, a supply-port leading into 35  
 the upper end of said cylinder, an exhaust-  
 port leading therefrom, an exhaust-pipe com-  
 municating with the said exhaust-port of said  
 cylinder, a valve controlling said exhaust-pipe,  
 said port, cylinder, and exhaust-pipe being 40  
 for conducting an inelastic fluid flowing con-  
 stantly under pressure through said cylinder  
 while the valve is open, and adapted to be  
 checked and the pressure thereof accumulated  
 in said cylinder when the valve is closed, a 45  
 stationary piston mounted rigidly upon the  
 closed end of said cylinder, a cylinder slid-  
 able upon said piston, a receptacle adapted to  
 hold compressed air a duct leading from said  
 compressed-air receptacle to said last-men- 50  
 tioned cylinder, and means connecting said  
 last-mentioned cylinder to said first-mentioned  
 piston substantially as described and for the  
 purpose set forth.

In testimony whereof I have affixed my sig- 55  
 nature in presence of two witnesses.

WILLIAM ROSS.

Witnesses:

WILLIAM P. McFEAT,  
 FRED. J. SEARS.