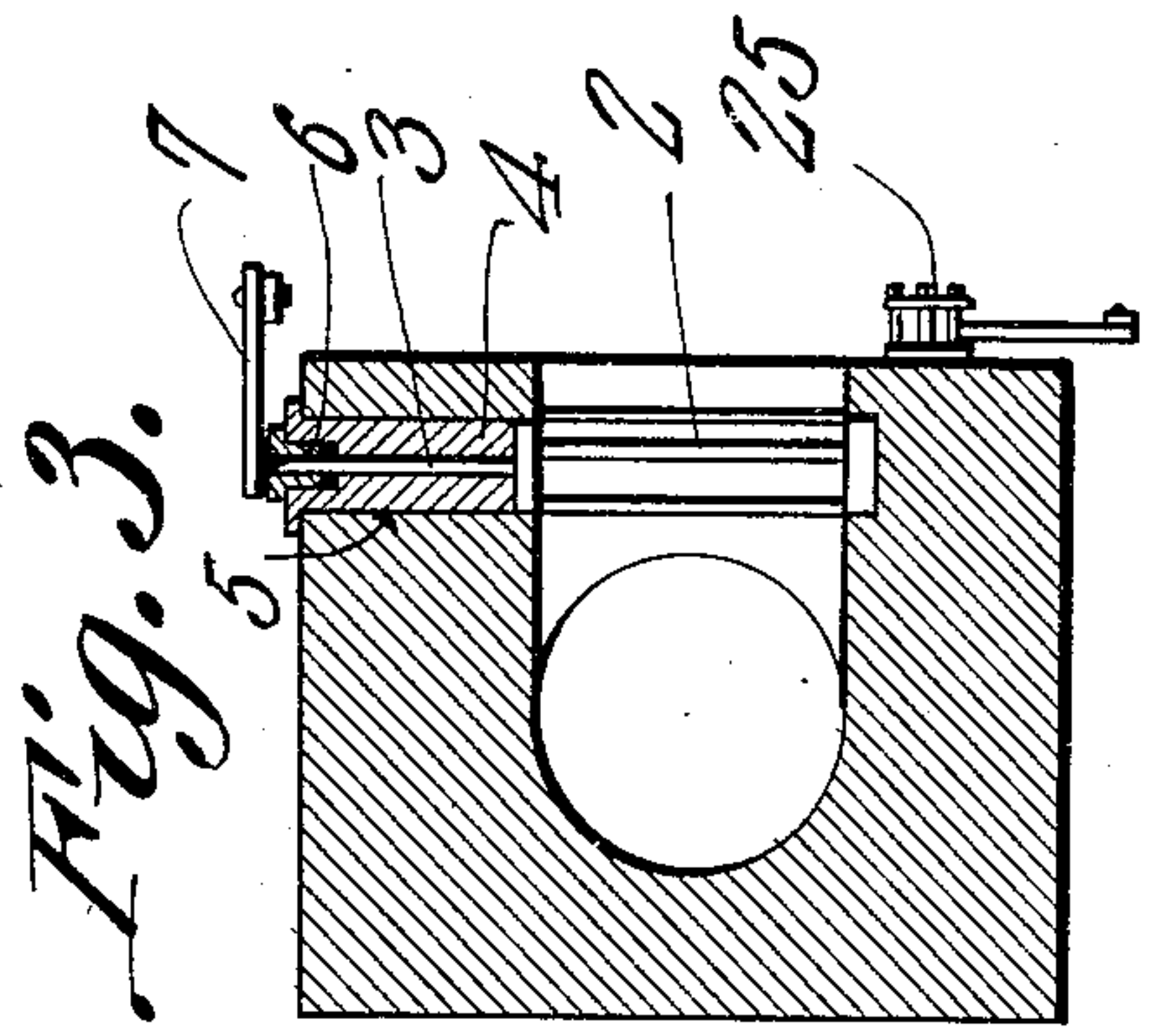
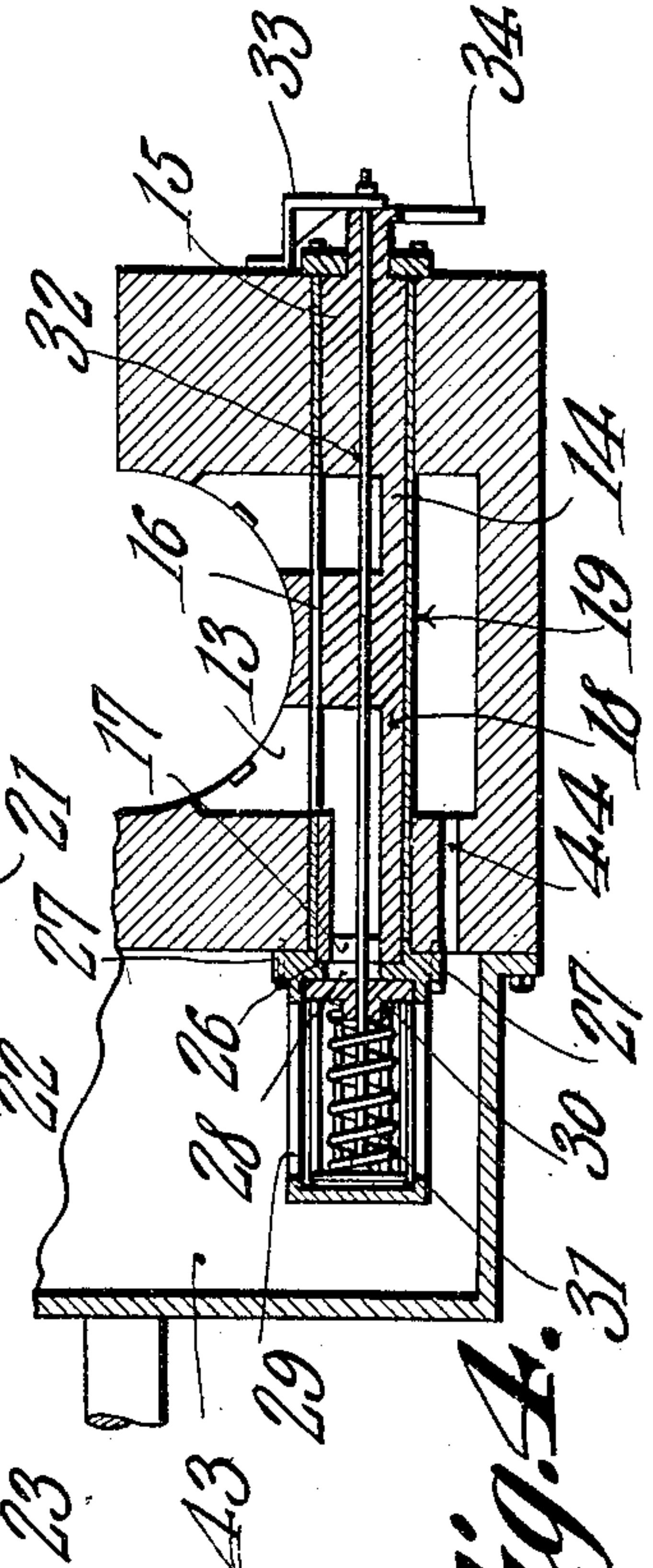
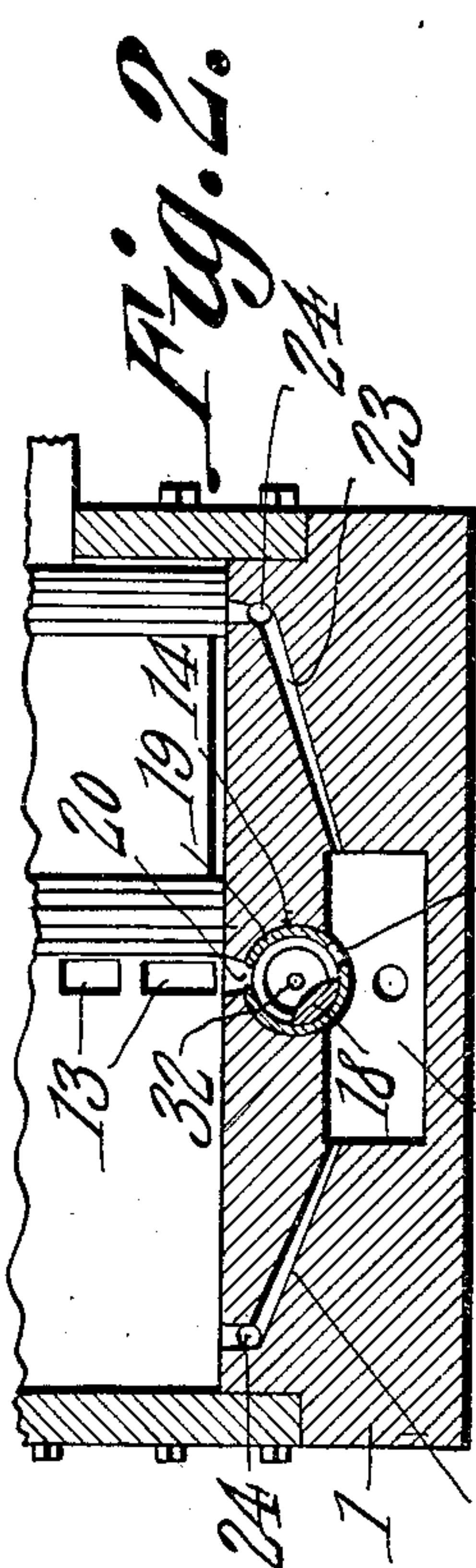
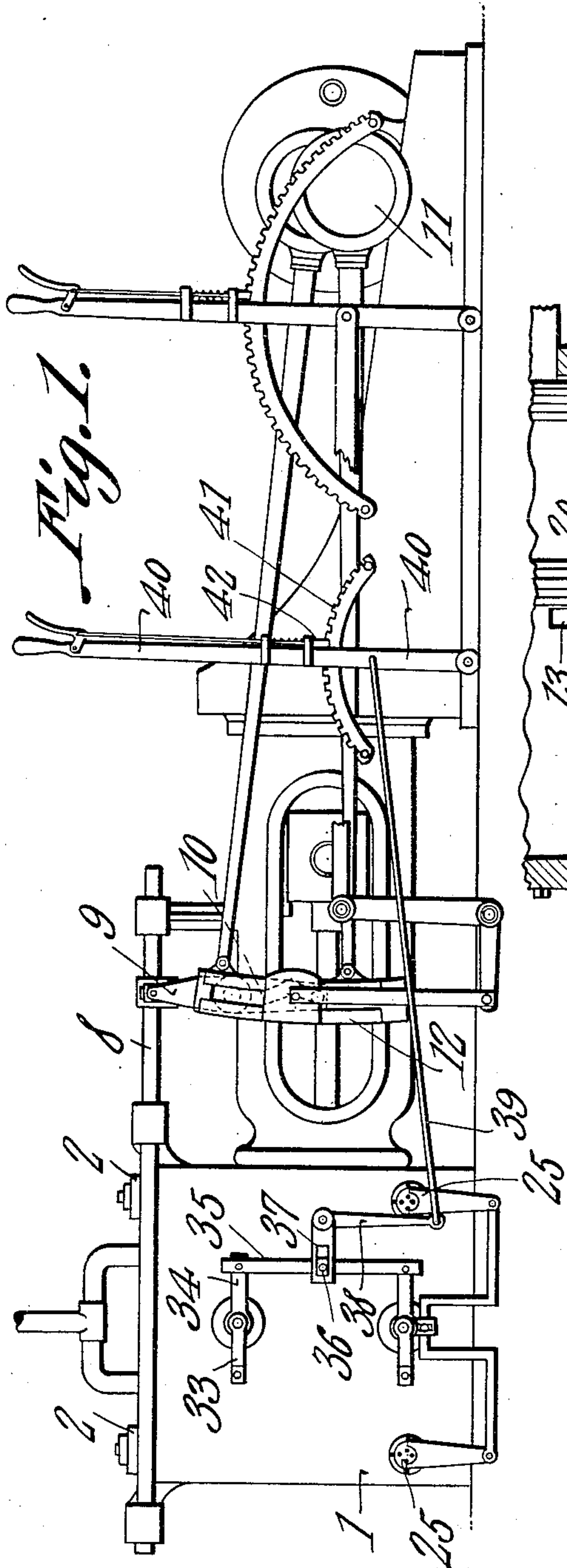


G. W. BAKER.  
ENGINE.

APPLICATION FILED DEC. 23, 1909.

999,142.

Patented July 25, 1911.



Witnesses  
*E. H. Hunt*  
*Herbert Lawson*

Inventor  
*George W. Baker.*  
By *C. A. Snow & Co.*  
Attorneys



# UNITED STATES PATENT OFFICE.

GEORGE W. BAKER, OF RHEEMS, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO  
MONROE EBERSOLE, OF RHEEMS, PENNSYLVANIA.

## ENGINE.

999,142.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed December 23, 1909. Serial No. 534,575.

*To all whom it may concern:*

Be it known that I, GEORGE W. BAKER, a citizen of the United States, residing at Rheems, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Engine, of which the following is a specification.

The object of the present invention is to provide in combination with a steam engine of that pattern generally known as the Corliss type, valves and valve operating mechanism which may be manipulated when the engine is running at a high rate of speed to trap in the engine cylinder, as the piston covers the exhaust port upon its return movement to the induction port, an amount of the steam under pressure, which trapped steam is part of that which has previously been used while expanding to force the piston toward the exhaust port. The steam thus trapped is compressed within the cylinder between the piston and the cylinder head as the piston moves toward the induction port, but by reason of the fact that the engine is running at a fast or high rate of speed, this compression is accomplished by the momentum of the engine and the load that it carries, and does not materially or even perceptibly retard the engine or speed of the engine.

When the piston arrives near the end of its stroke toward the induction port, live steam is admitted into the cylinder and this steam mixes with the before mentioned compressed steam and thus the mixture of live and compressed steam serves as means, while expanding after the valve that controls the induction port is closed and by impact prior to this time as actuating means for forcing the piston toward and beyond the exhaust port of the cylinder. This results in a saving of steam pressure and is the economic feature of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings: Figure 1 is a side elevation of an engine having the present improvements embodied therein. Fig. 2 is a vertical longitudinal section through a portion of the cylinder of the engine and showing one of the exhaust valves in section. Fig. 3 is a vertical transverse section through one side of one end portion of the cylinder. Fig. 4 is a central vertical transverse section through a portion of said cylinder and showing the lower exhaust valve in section.

Referring to the figures by characters of reference 1 designates the cylinder of an engine of the "Corliss" type having valves 2 which control the intake, each of these valves being tapered longitudinally and being designed to gradually cut-off or admit the motive fluid to the cylinder. Each valve has a stem 3 extending from one end and mounted for rotation within a sleeve 4 which is insertible into the bore 5 cut into the cylinder for the reception of the valve 2. The outer end of the sleeve may be flanged and bolted or otherwise secured to the cylinder and a gland 6 may be arranged in the outer end of the sleeve and around the valve stem so as to prevent leakage of motive fluid.

The valves 2 are designed to alternately open or close and each has an arm 7 extending from the outer end of its stem 3, the arms being attached to an actuating rod 8 which is, in turn, movably connected to a rocker 9 connected with the link 10. The link mechanism is the same as that which has been set forth in my application heretofore referred to it being understood that the eccentrics 11 may be advanced upon the crank shaft in the usual manner.

As shown in the drawings the cylinder is provided with central exhaust ports 13 controlled by valves 14 each of which consists of disk like heads 15 and 16 disposed at one end and the center respectively of the valve and a ring 17 located at the other end of the valve. The ring 17 and disks 16 and 15 are connected together by eccentrically disposed cut-off webs 18 the outer surfaces of which lie in the arc of the same circle as that in which the peripheries of the said ring and disks lie. The ring 17 is provided with an opening which serves in part as a by-pass for the valve 14 as will be hereinafter explained. Each valve is mounted for rotation within a cylindrical bushing 19 having a port 20 communicating with the ports 13 and another port 21 opening into a compartment 22 within the wall of the cylinder 1. Passages 23 extend from this compartment 22 to compression exhaust ports 24 opening into the piston chamber of the cylinder at points about one-eighth the distance from the cylinder heads to the transverse center of the cylinder. Each of these compression exhaust ports is provided with a spring controlled valve such as has been described in my application hereinbefore referred to and which constitutes no part of the present in-



vention. Portions of these valves have been indicated at 25 in the drawings.

The ring 17 is located at one end of the exhaust valve 14 and projects into a circular seat 26 formed within a collar 27 which is bolted or otherwise secured upon one side wall of the cylinder, the opening 28 in this collar being approximately of the same diameter as the internal diameter of the ring 17 whereby a by-pass from the valve 14 is provided. A skeleton frame or cage 29 is formed integral with or is suitably secured to the collar 27 and is concentric with the opening 28, this cage being cylindrical and housing a valve 30, which is held normally seated upon the collar 27 and across the opening 28, by means of a spring 31. A rod 32 extends through the center of the valve and is secured at one end to the outer end of the spring 31, this rod also passing through openings formed in the centers of the disks 15 and 16 and being secured at its other end within a bracket 33 which laps the adjoining end disk 16 of the valve 14. An arm 34 is attached to this end of the valve and is also lapped by the bracket 33. The arms 34 of the two valves 14 are connected by a link 35 having a block 36 pivotally connected to the middle portion thereof, this block being slidably mounted in a slot 37 formed in one arm of a bell crank lever 38, the other arm of this lever being connected by a rod 39 with an actuating lever 40. A toothed segment 41 and a spring pressed dog 42 constitute means for locking the lever 40 in any position to which it may be shifted. As shown in the drawings the compartment 22 opens into a muffler 43 through one or more ports 44, the auxiliary valve 30 being also arranged within the muffler.

When the lever 40 is swung toward the cylinder 1 the two exhaust valves 14 are opened and as the piston 45 is reciprocated by the admission of motive fluid successively to the two ends of the piston chamber, the used fluid will pass outward through the ports 13 upon the completion of each stroke of the piston and will then escape through the open port 21 to the port 44 of the chamber 22. By shifting the lever 40 to an intermediate position, each of the valves 14 is rotated so as to close the port 21 and excess pressure is exhausted through the compression exhausts which are opened at this time. When the engine is traveling at a high speed the lever 40 can be swung away from the cylinder 1 so as to still further move the exhaust valve 14, the ports 21 however remaining closed. The compression exhaust will at this time be closed and the excess pressure will escape past the auxiliary valve

30 and to the muffler compartment 43, it being understood that springs 31 are stronger than the springs of the compression valves. 65

What is claimed is:—

1. The combination in an engine, including a cylinder having a piston mounted for reciprocation therein, said cylinder having an induction port and an exhaust port, a stationary valve located at the exhaust port and manually adjustable to increase or diminish the passage way through said port, a muffler compartment in communication through the exhaust port with the cylinder, said stationary valve being provided with a by-pass which communicates with the exhaust port and said muffler compartment, a spring-pressed valve mounted upon the exhaust valve and normally closing the by-pass thereof, the tension of said spring being opposed to the pressure of the cylinder, a stem connected to said valve and extending exteriorly of the stationary valve, and a bracket exterior of the engine and into which the outer end of said valve stem is mounted. 75 80 85

2. The combination in an engine, including a cylinder, said cylinder having two passages leading from the ends thereof and provided with a compartment into which said passageways terminate, said cylinder being further provided with two induction ports and a centrally arranged exhaust port, said exhaust port being in communication with said compartment between the inner ends of the passages leading therefrom, a piston mounted for reciprocation within the cylinder, a stationary tubular valve interposed in the exhaust between the cylinder and compartment, means for manually adjusting said valve to increase or diminish the passageway through the central bore of said valve, a muffler compartment in communication with the exhaust port and said first mentioned compartment, said tubular valve being provided with a by pass in communication with the exhaust port and said muffler compartment, the spring actuated valve mounted upon the exhaust valve and normally closing the by-pass thereof, the tension of the spring being opposed to the pressure of the cylinder, a stem connected to said valve and extending exteriorly of said tubular valve, and a bracket exterior of the engine and into the outer end of which the said valve is mounted. 90 95 100 105 110 115

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE W. BAKER.

Witnesses:

MONROE EBERSOLE,

HERBERT D. LAWSON.