

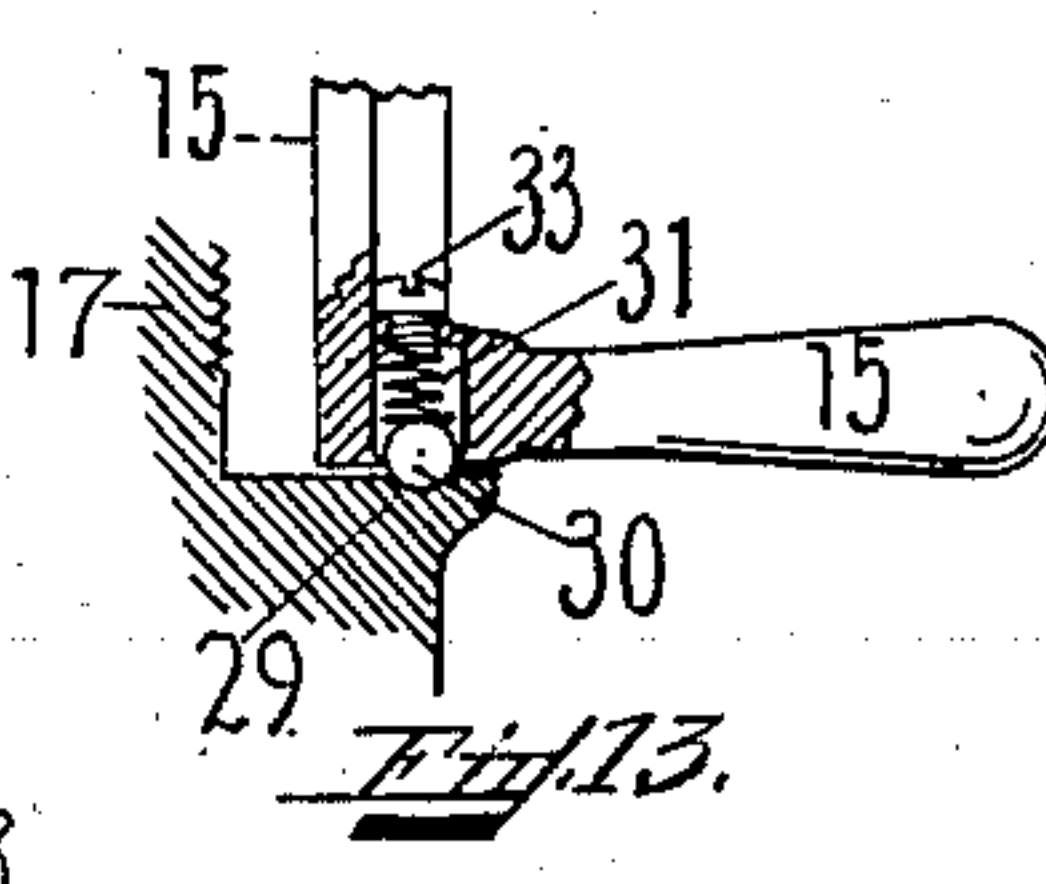
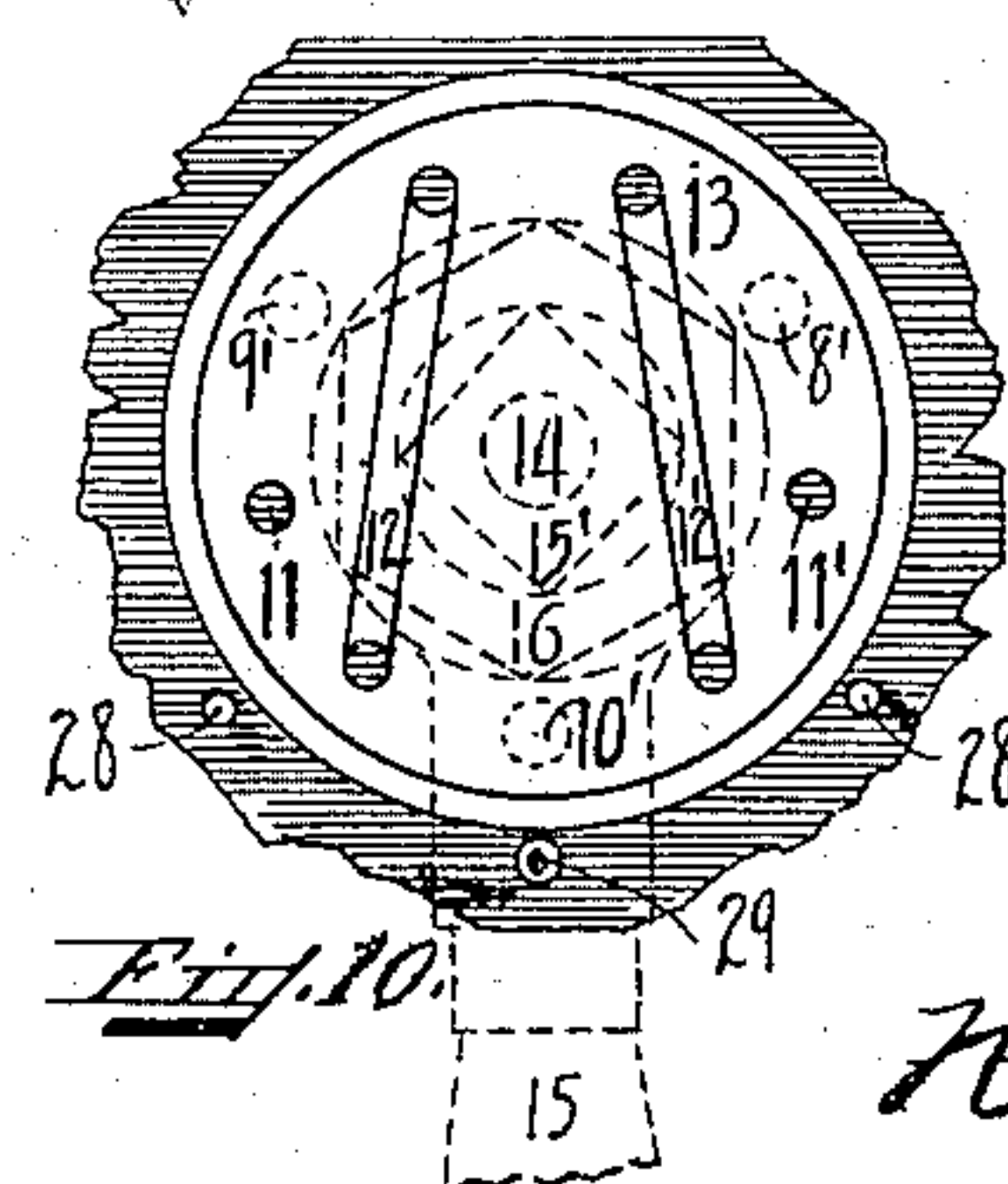
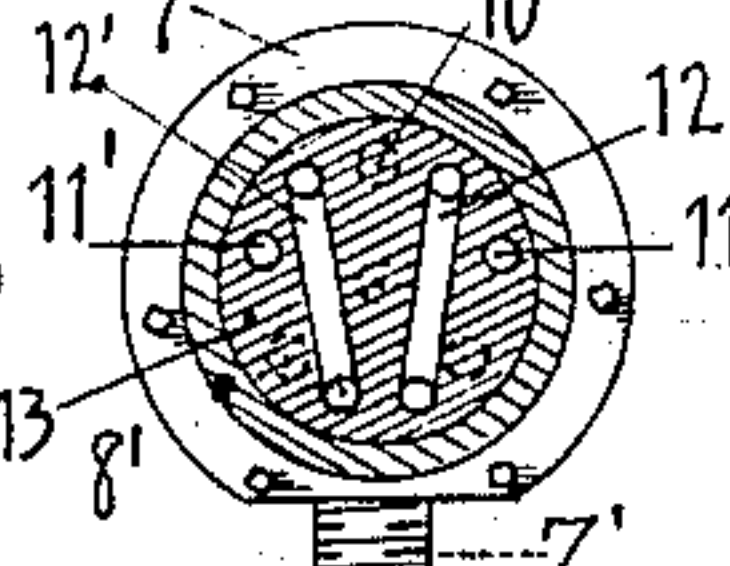
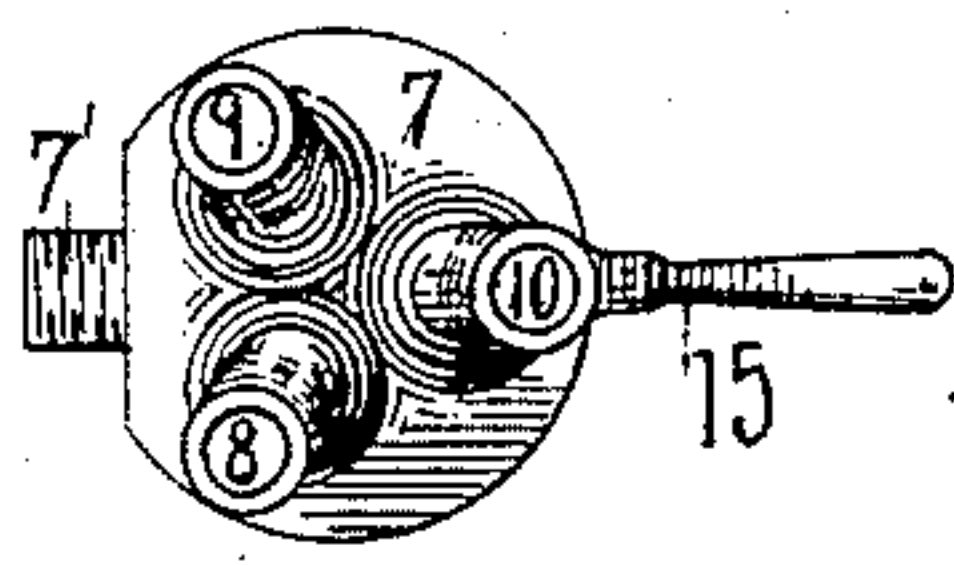
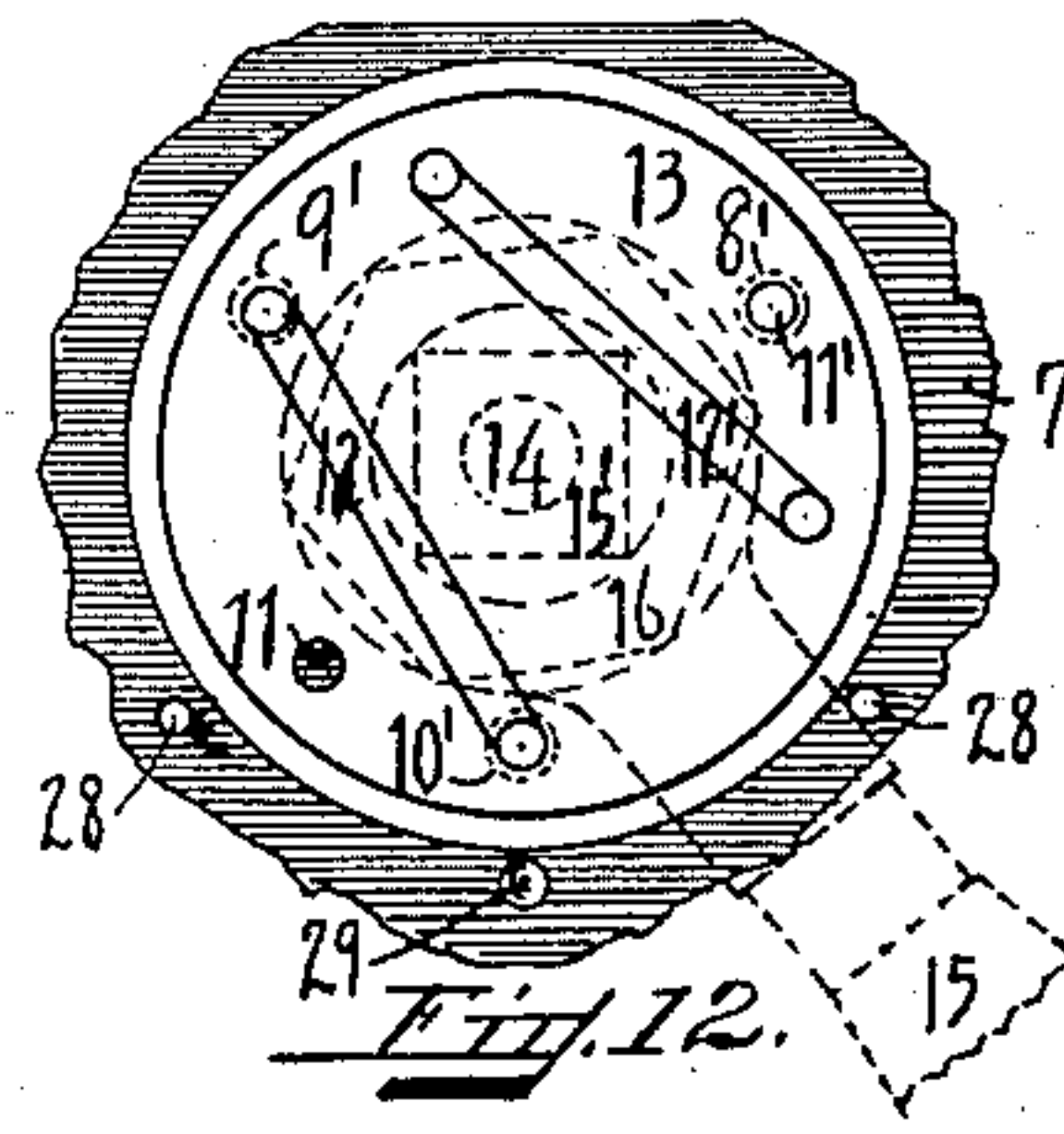
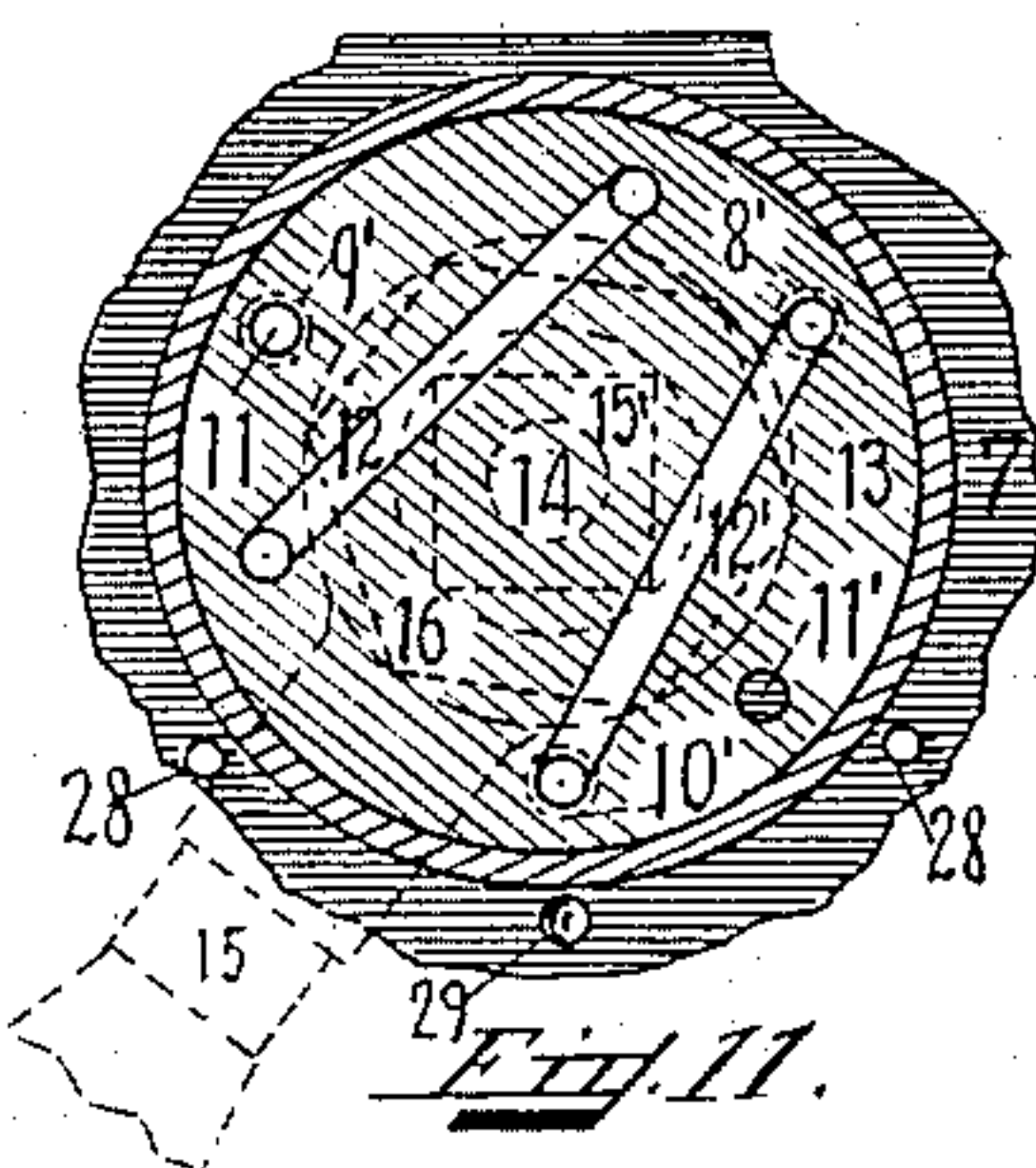
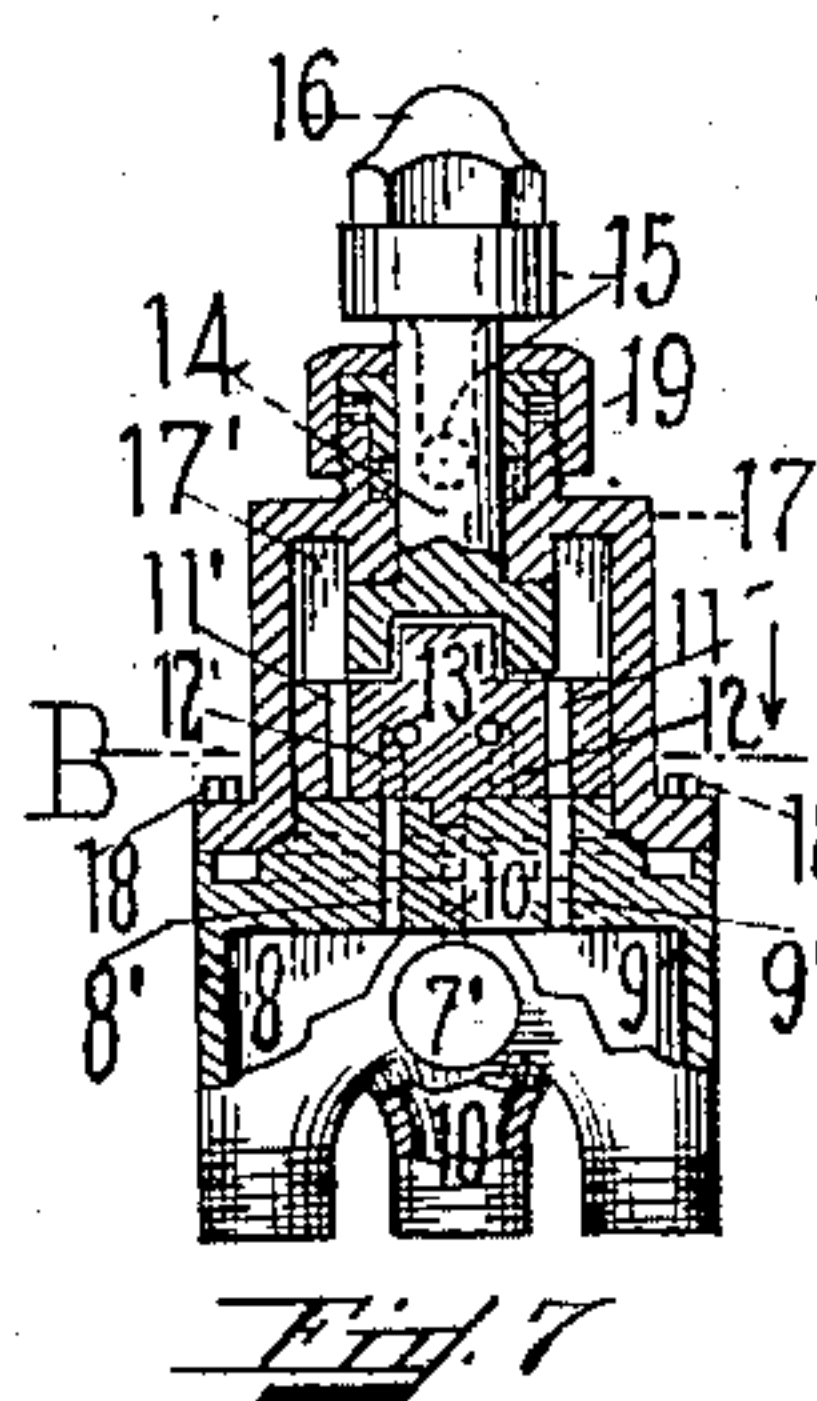
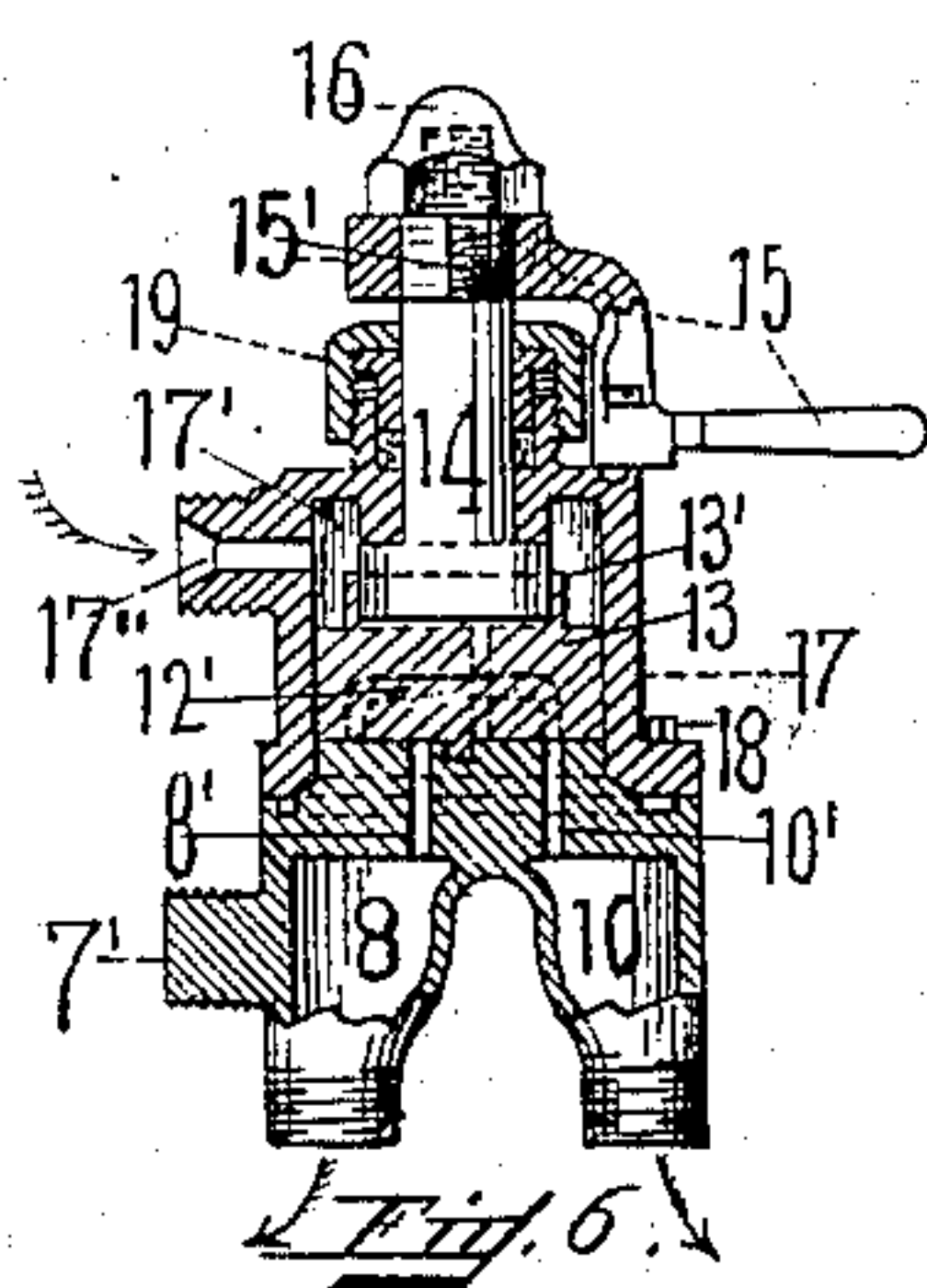
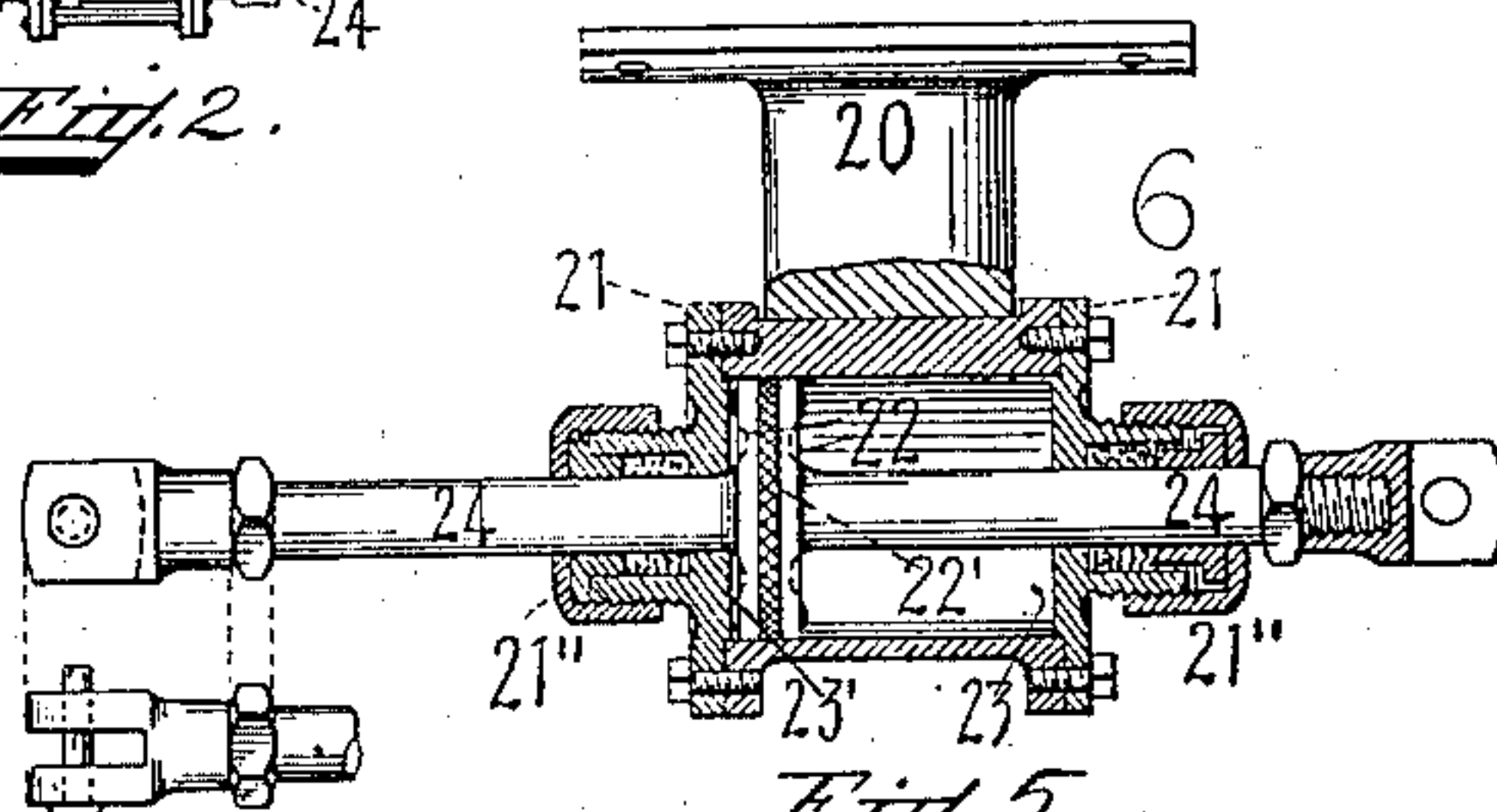
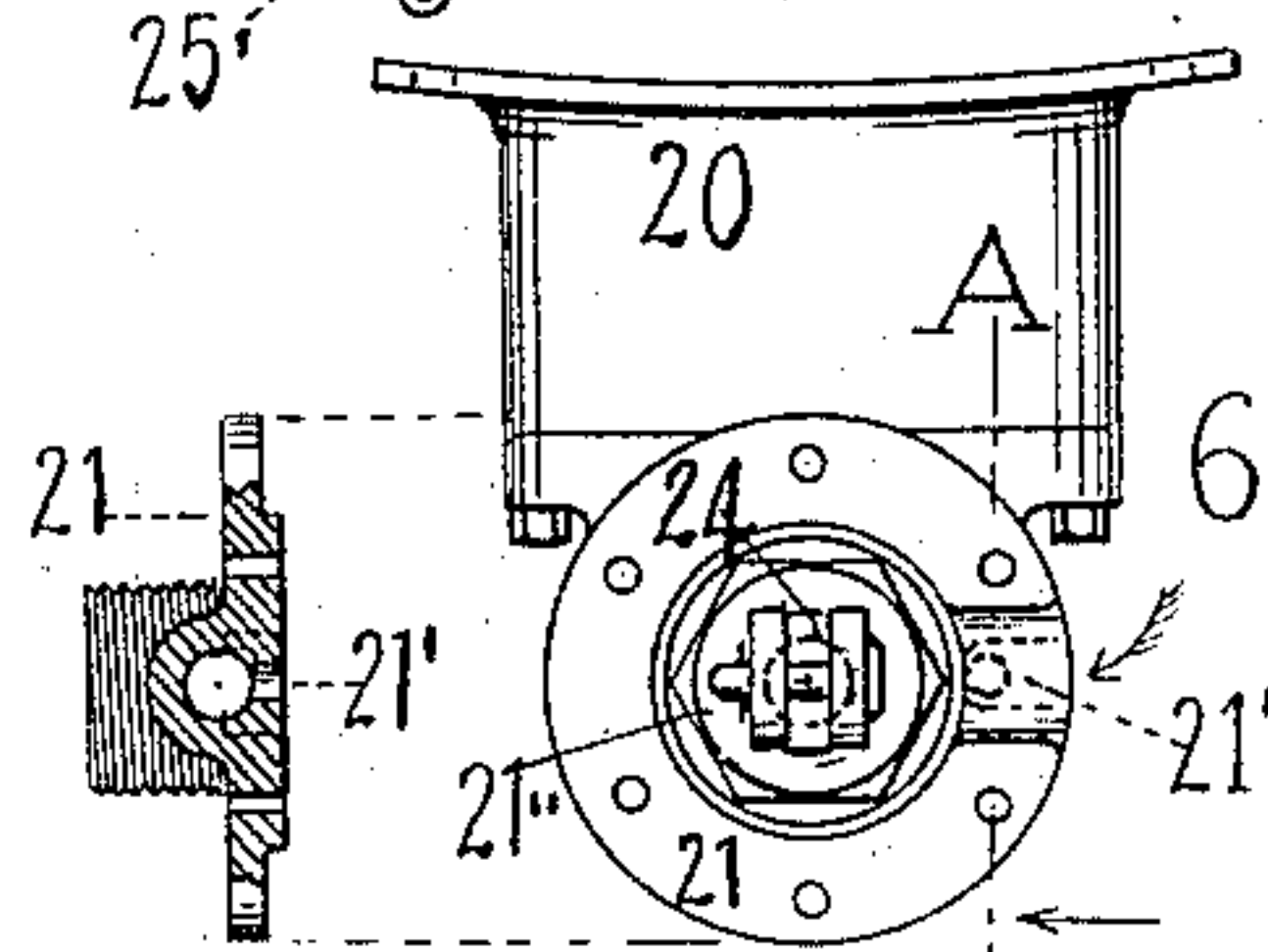
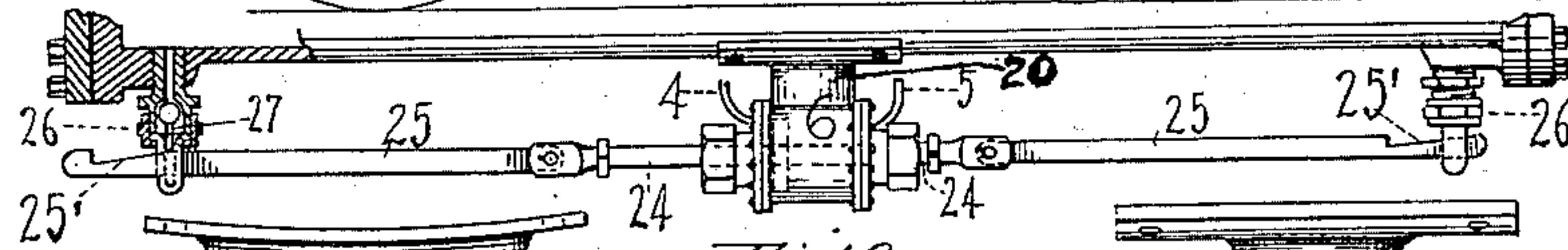
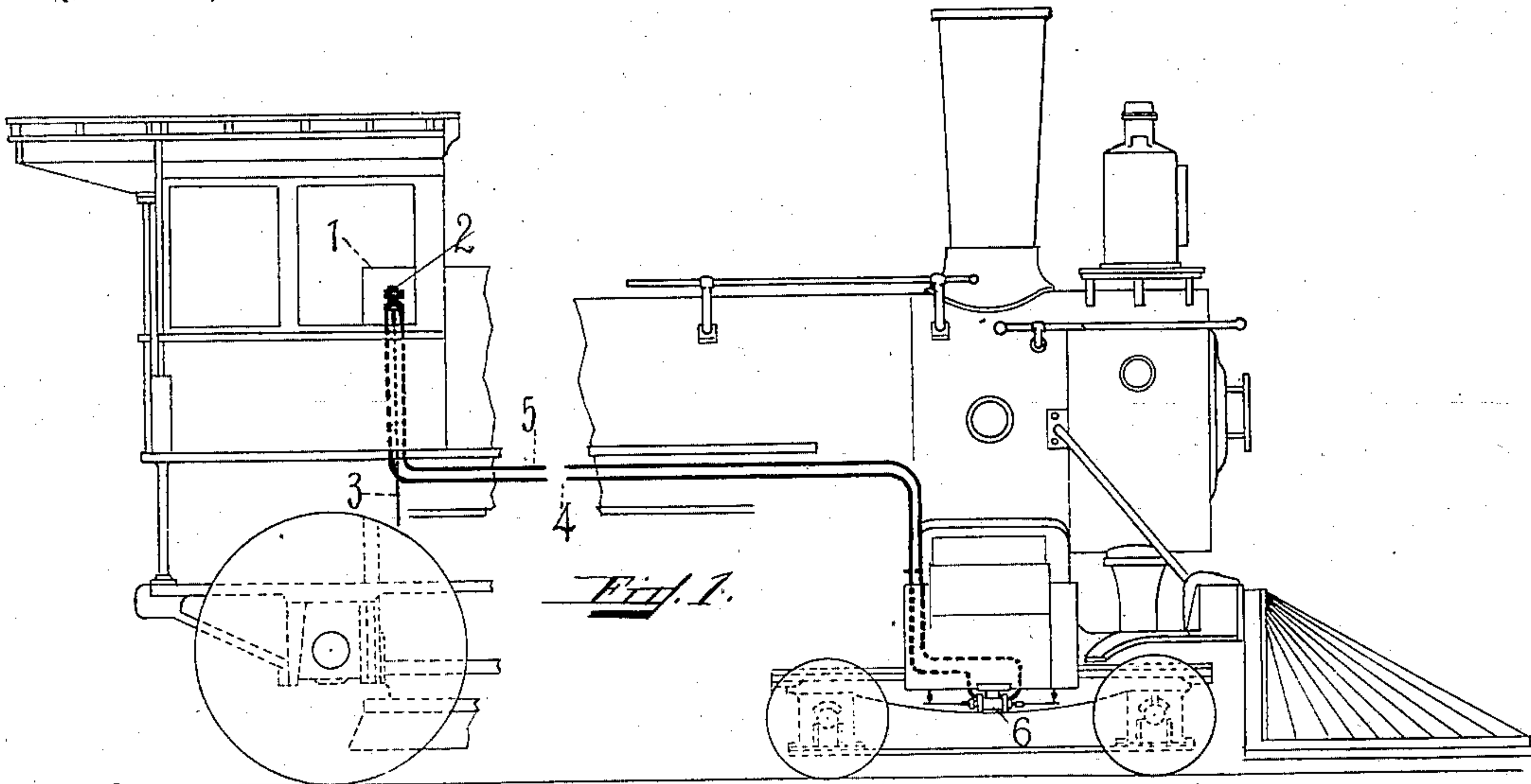
No. 651,879.

Patented June 19, 1900.

H. W. McCOMBS.
STEAM CYLINDER DRAIN VALVE.

(Application filed Dec. 27, 1899.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY W. McCOMBS, OF BOSTON, MASSACHUSETTS.

STEAM-CYLINDER DRAIN-VALVE.

SPECIFICATION forming part of Letters Patent No. 651,879, dated June 19, 1900.

Application filed December 27, 1899. Serial No. 741,726. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. McCOMBS, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Steam-Cylinder Drain-Valves, of which the following is a specification.

My invention relates to improved means for draining the steam-cylinders of engines, both stationary and marine; and it pertains more particularly to the cylinders of locomotives.

The object of my improved invention is to efficiently drain the cylinders of the steam condensation through devices which are improvements upon my apparatus previously filed November 16, 1899, serially numbered 737,209, and which comprise the supply-cock in the locomotive-cab and the operating-cylinders attached to the steam-cylinder, which is operated by air under compression or steam.

I accomplish my purpose by the mechanism illustrated in the annexed drawings and particularly defined in the claims.

Referring to the drawings, Figure 1 shows fragmentary elevations of the rearward and forward parts of a locomotive, showing my organized invention thereto attached. Fig. 2 exhibits a longitudinal elevation of the invention depending from the bottom of the steam-engine cylinder, one of the cylinder-cocks being shown in section. Fig. 3 is a partial section on line A of Fig. 4 of one of the caps of the operating-cylinder, showing the ducts leading to the cylinder-chamber. Fig. 4 is an end elevation of said cylinder. Fig. 5 denotes a central longitudinal section thereof. Fig. 6 is a vertical central section of the supply-cock controlling the air or steam through the pipes leading from the cab to the operating-cylinder, Fig. 7 being a similar section viewed from the opposite side. Fig. 8 is a plan of the lower end, exhibiting the pipe connections. Fig. 9 designates a transverse section on line B of Fig. 7. Fig. 10 is an enlarged diagram of the supply-cock, its several parts and connecting-ducts in normal position, all ports being closed, Fig. 11 being a like view with certain ports opened, and Fig. 12 the reversed position opening the remaining ports and closing those previously opened. Fig. 13 is an enlarged vertical section of the hand-

lever shank, exhibiting the method of temporarily holding said lever in a central position.

Similar numerals denote corresponding parts throughout the various figures, referring to which—

1 designates the head of the boiler, to which is attached the supply-cock 2, located conveniently to the hand of the engineer.

3 is the exhaust, and 4 5 are the pipes conveying air or steam to the operating-cylinder 6, centrally situated and attached to the lower side of each steam-engine cylinder, as in Fig. 2, to liberate the condensed steam therefrom. This, in brief, is the function of my device.

The particular construction is as follows: The supply-cock 2 has its base 7 (see Fig. 8) arranged into three chambers 8, 9, and 10, the two former for air or steam and the latter for exhaust, each communicating with the pipes 3, 4, and 5, (shown in Fig. 1,) the two latter leading to the operating-cylinder 6 and the former to the exhaust. Three ducts 8', 9', and 10' lead from their respective chambers and from the exhaust. Said ducts communicate with the series of ports 11 11' and the sinuous ducts 12 12' in the centered valve 13, as it is manually semirotated at predetermined intervals over or above said triplet chambers 8, 9, and 10, in the manner and for the purpose hereinafter more fully described. To actuate said valve 13, its upper face has transversely the raised block 13', which is saddled by the bifurcated stem 14, which in turn is operated by the lever 15, fitted upon the squared member 15' and held thereon by the threaded nut 16. The valve-case 17 is attached circumferentially to the chambered base 7 by tap-bolts 18, the valve-chamber 17' receiving compressed air or steam (from a reservoir not herein illustrated) through the orifice 17". The usual stuffing-box is shown at 19.

To the center longitudinally and at the lowest circumference of the steam-engine cylinder is attached the frame 20, as in Fig. 2, which upholds or may be an integral part of the operating-cylinder 6. The cylinder-heads 21 are each provided with the compound duct 21', as seen in Fig. 3, which connects with the air or steam supply pipes 4 and 5 in a way that the force is received in the circumferential depressions 22 in the faces of the piston-head 22', reciprocating in the chamber 23 and

simultaneously actuating the right and left piston-rods 24, whose outer ends are pivotally connected to the contiguous ends of the cylinder-cock slides 25. The cylinder-heads 5 are provided with the usual steam-packing, as at 21", and are bolted to the cylinder-body, as shown.

The practical operation is as follows: To liberate the condensation, the supply-cock lever 15 is swung from normal place, Fig. 10, to position shown in Fig. 12, carrying the valve 13 around so that its port 11' coincides with duct 8' and sinuous port 12 with duct 9' and 10' to the chamber 10 and exhaust-pipe 3. Air or steam filling the chamber 17' thus finds exit through port 11', duct 8' to chamber 8, and through pipe 5 (see Figs. 1 and 2) to the cylinder-chamber end 23, moving the piston-head 22' to the position shown in Figs. 2 and 5. The piston-rods 24 thus carry simultaneously in one direction the cylinder-cock slides 25, which are each provided at their remote ends with inclines 25', upon which rest the valve-stems 27 of the ordinary cylinder-cocks 26, one of which is shown in section in open position in Fig. 2. Any overplus of air or steam remaining in the cylinder-chamber end 23' (from previous similar operations) returns through pipe 4, chamber 9, duct 9', through the sinuous duct 12, and is discharged through duct 10' to chamber 10 and exhaust-pipe 3 to the atmosphere. Reversing the position of said piston closes the cylinder-cocks. The supply-cock lever 15 being moved to the position disclosed in Fig. 11, the several ports would aline thus: Port 11 coacts with duct 9', leading to chamber 9 and pipe 4, while the duct 8' connects with the sinuous duct 12', duct 10' to the chamber 10 and the exhaust-pipe 3. Thus positioned the air or steam is admitted through pipe 4 (see Figs. 1 and 2) to the cylinder-chamber end 23', actuating the piston-rods and their attached cylinder-cock slides to close said cylinder-cocks. As before, the surplus, if existing, escapes upwardly through pipe 5, chamber 8, duct 8', sinuous duct 12', and passes off through duct 10' to the chamber 10 and exhaust-pipe 3, as in the previous instance.

To prescribe the swing of the lever-handle 15, right and left stops 28 project from the rim of the valve-case 17. A depression 29 centrally between said studs receives the spring-actuated ball 30, held temporarily within the depression 29 when the supply-cock is in normal position, Fig. 10, by the spring 31, secured in the ball-pocket 32 within the lever-shank 15 by the retaining-screw 33. A threaded stud 7' supports the assembled cock by a suitable bracket secured to the desired position within the engine-cab.

While my improved invention is applicable to a part of the devices commonly in use on locomotives for the purposes above specified, it also possesses greater facilities for expeditious action and is more economical in its application than many devices now used, the

novelty of my invention lying in the special features of construction herein demonstrated, which having defined I desire not to be confined to the strict interpretation of the details thereof, but may employ such equivalents therefor as will come within the fair scope and spirit of my invention.

I claim—

1. An improved operating-cylinder for draining the steam-cylinders of engines, provided with valve-heads having each a compound duct for the admission and expulsion of air or steam, the valve-chamber, the piston-head therein reciprocating having a circumferential depression in each face to receive the impact of said air or steam, the duplicate piston-rods forming an integral part of said piston-head, having their outer ends provided with pivotal connections adapted to receive the cylinder-cock slides, thereby actuated, the frame adapted to suspend the said operating-cylinder and means to confine the air or steam within the valve-chamber substantially in the manner specified.

2. In an apparatus for draining the cylinders of engines of steam condensation the combination with an operating-cylinder provided with duplicate compound ducts, admitting air or steam under pressure to the operating-cylinder chamber, and means within said chamber to simultaneously actuate the cylinder-cock slides in alternate directions, of the supply-cock provided with triplet chambers at its base to receive air or steam, the ducts to communicate with said chambers at predetermined intervals, the centered valve provided with duplicate direct ports and duplicate sinuous ducts, the chamber retaining said valve arranged to receive air or steam and means to actuate said centered valve to permit the access of air or steam to said triplet chambers and to the operating-cylinder, to operate the cylinder-cock slides to open or close the steam-engine-cylinder cocks substantially in the manner and for the purpose set forth.

3. In a supply-cock arranged to supply air or steam to the operating-cylinder, the series of chambers having intercommunicating ducts and ports, the centered valve adapted in one position to admit air to said operating-cylinder through one set of ducts and ports and in the second position to receive air or steam from the operating-cylinder through a second set of ducts and ports, the stem actuating the centered valve provided with a bifurcated end adapted to embrace and to operate said valve and means to actuate the stem, in combination therewith the operating-cylinder, the cylinder-cock slides and the engine-cylinder cocks thereby opened and closed to exhaust the steam-engine cylinders of condensation substantially as set forth.

4. In an organized apparatus for releasing the condensation from the steam-cylinders of engines, the following instrumentalities, the supply-cock having multiple chambers for compressed air or steam, the oscillating cen-

tered valve governing the supply thereof, the
ports and ducts conveying air or steam to and
from said chambers and means to actuate and
control said valve to render operative said
5 ports and ducts, in combination with the op-
erating-cylinder provided with a reciprocating
piston-head having duplicate piston-rods,
the cylinder-cock slides thereto pivotally
connected, the steam-engine-cylinder drain-

cocks, and means to convey air or steam from to
the supply-cock to the operating-cylinder for
the purpose substantially as specified.

Signed by me, at Boston, Massachusetts,
this 22d day of December, 1899.

HENRY W. McCOMBS.

Witnesses:

FRANK H. McCOMBS,
SAM. F. TUCKERMAN.