

No. 671,862.

Patented Apr. 9, 1901.

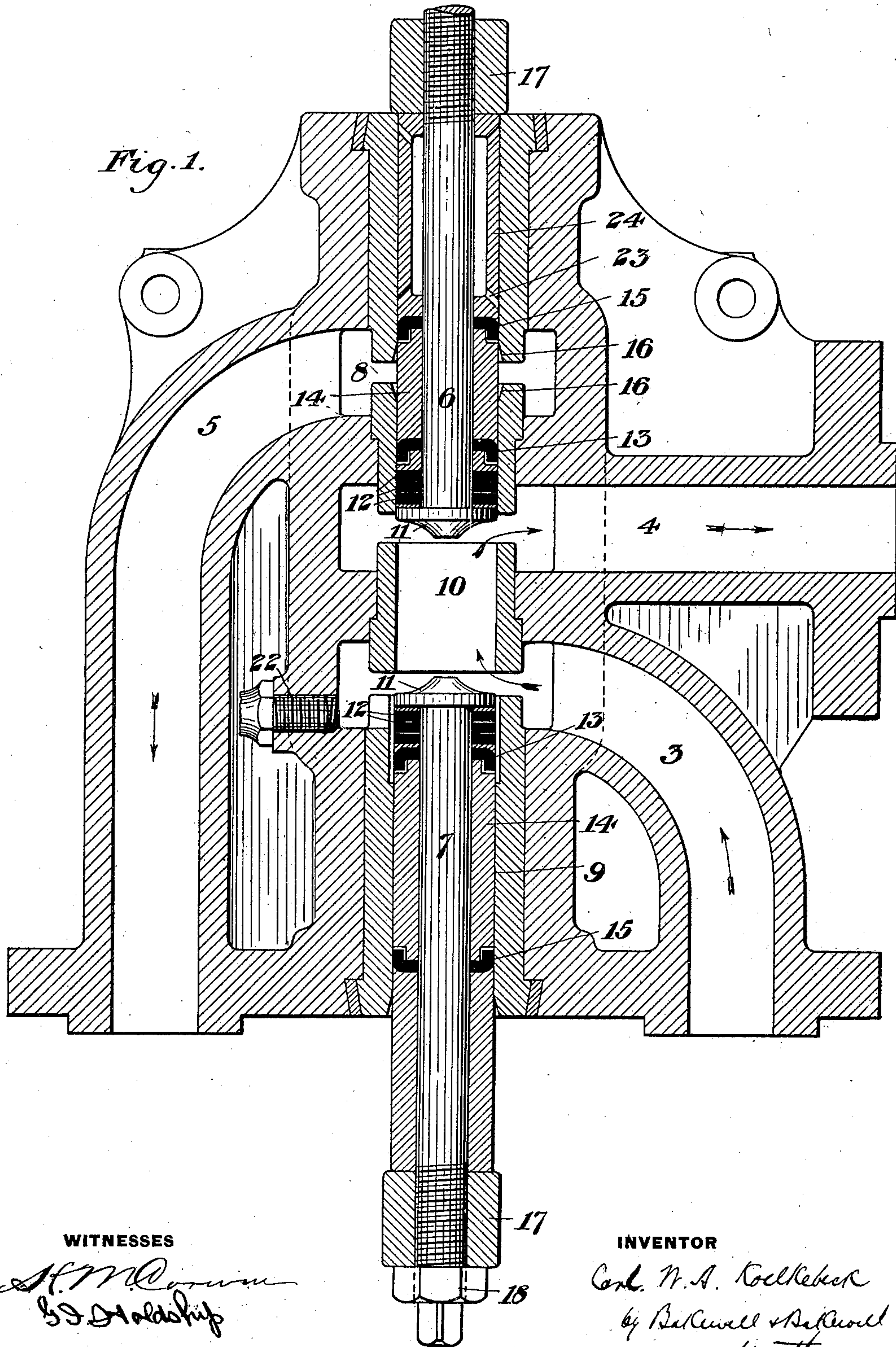
C. W. A. KOELKEBECK.

VALVE.

(Application filed Dec. 22, 1898.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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No. 671,862.

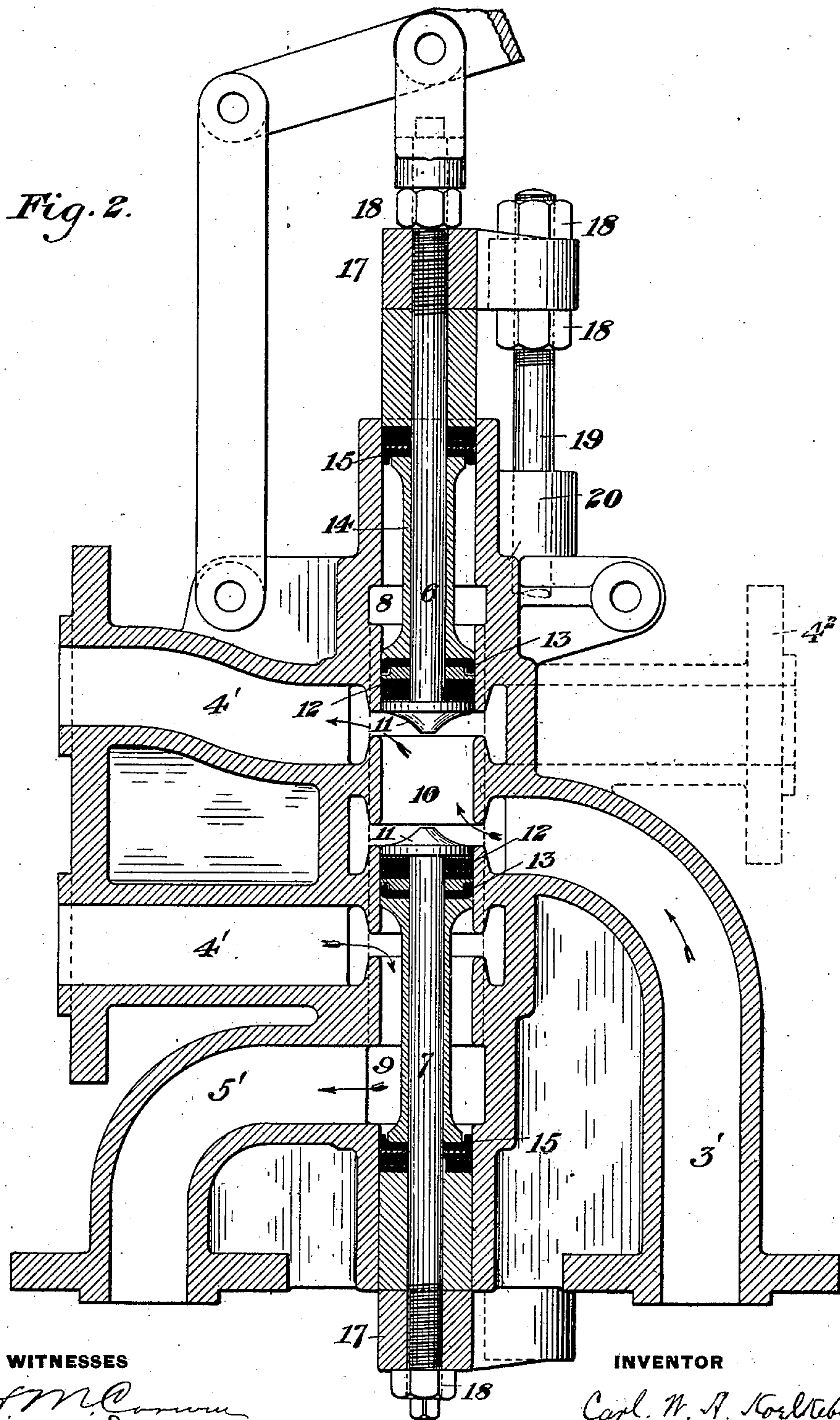
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VALVE.

(Application filed Dec. 22, 1896.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES

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Fig. 3.

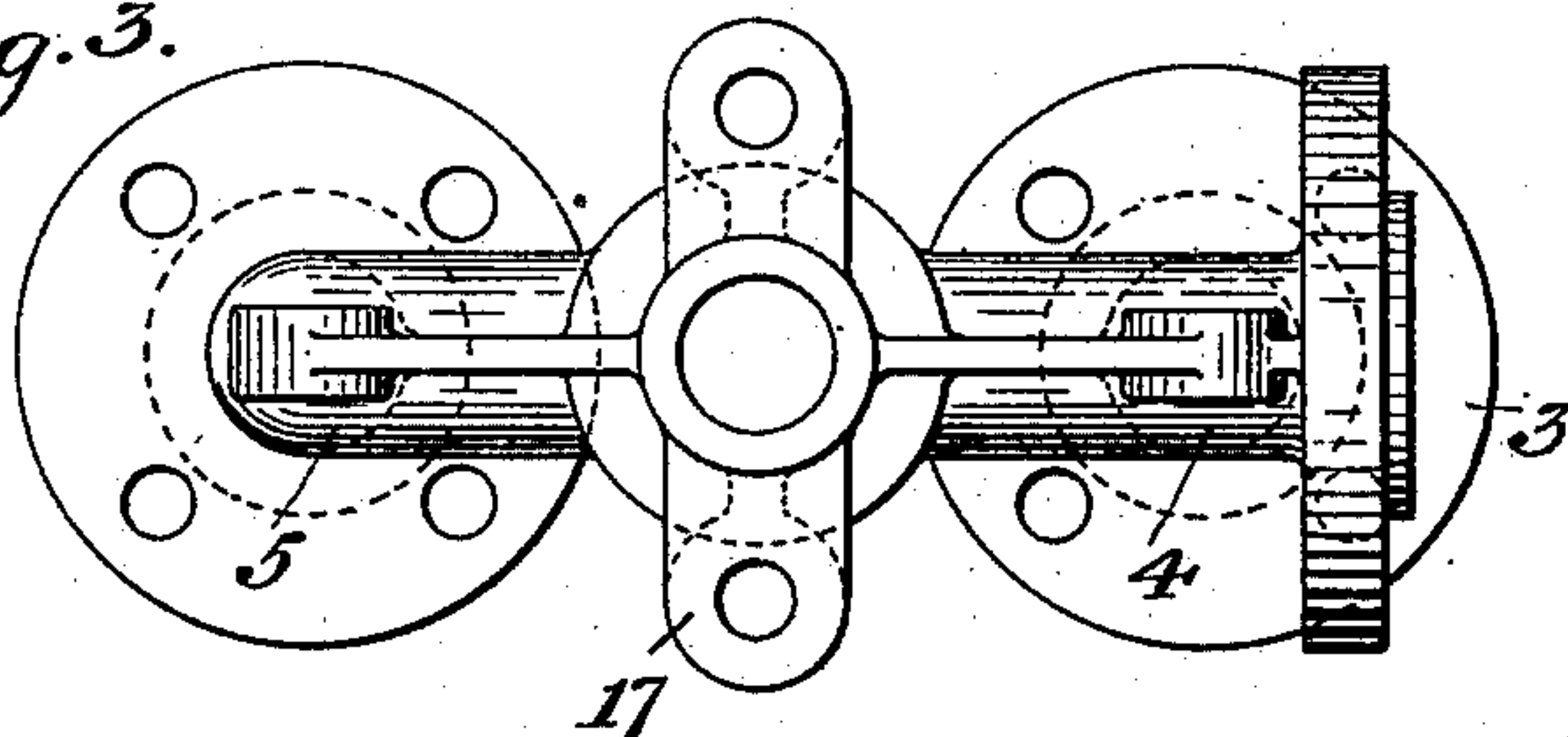


Fig. 6.

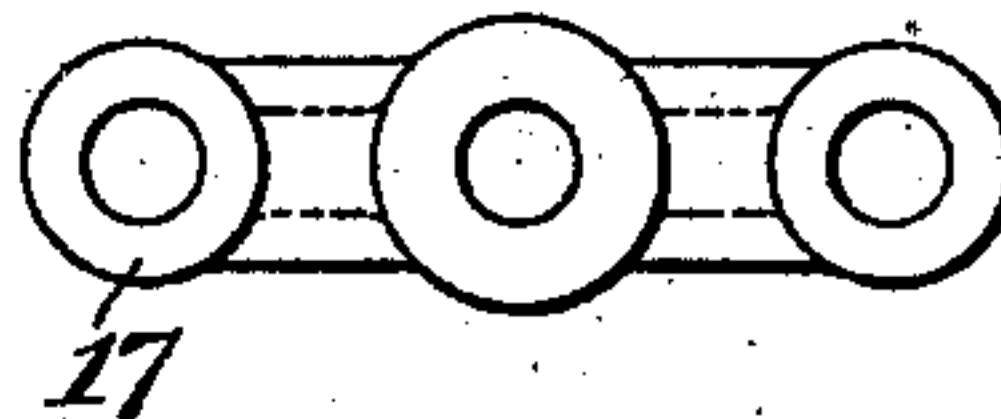


Fig. 4.

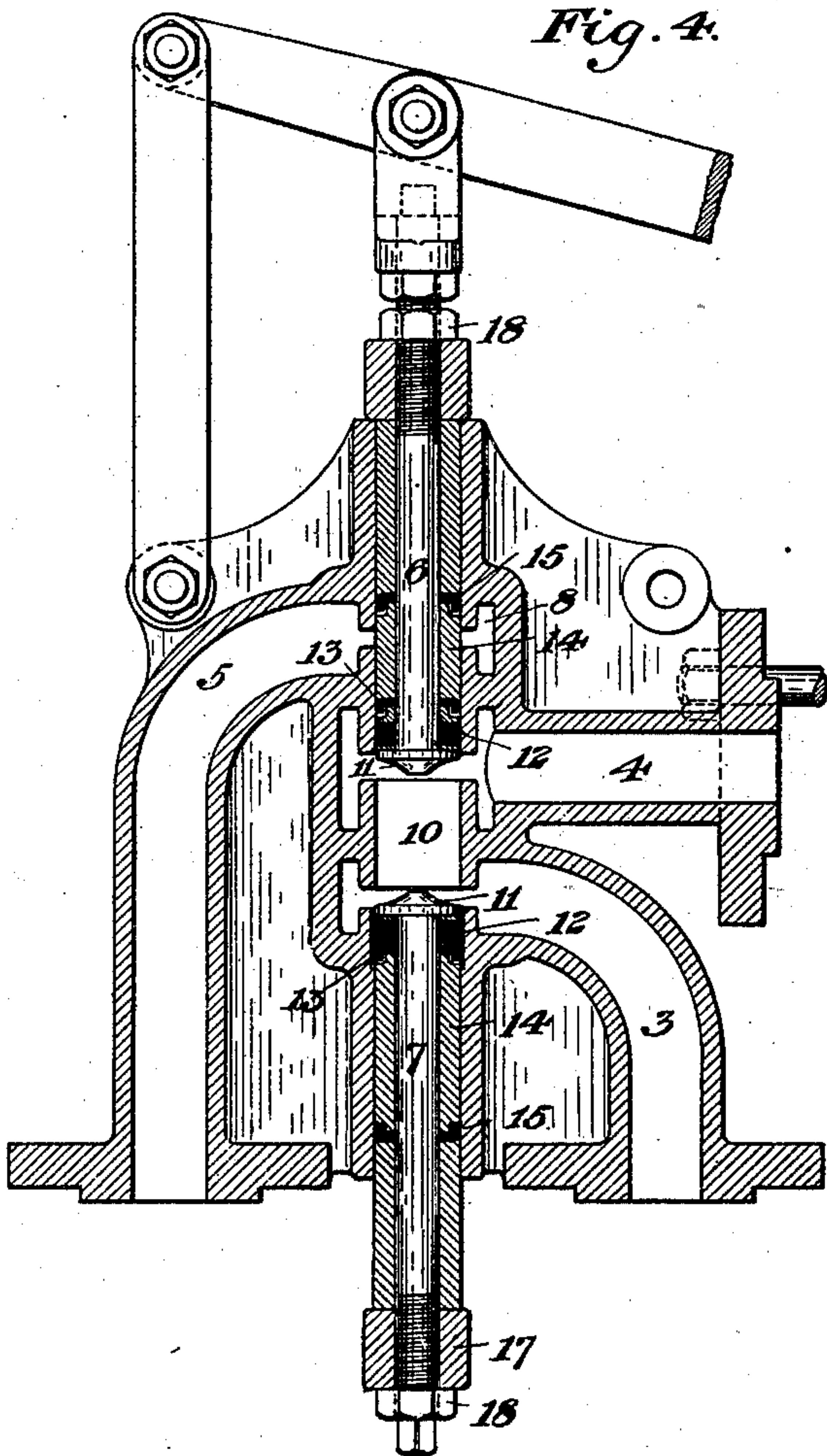
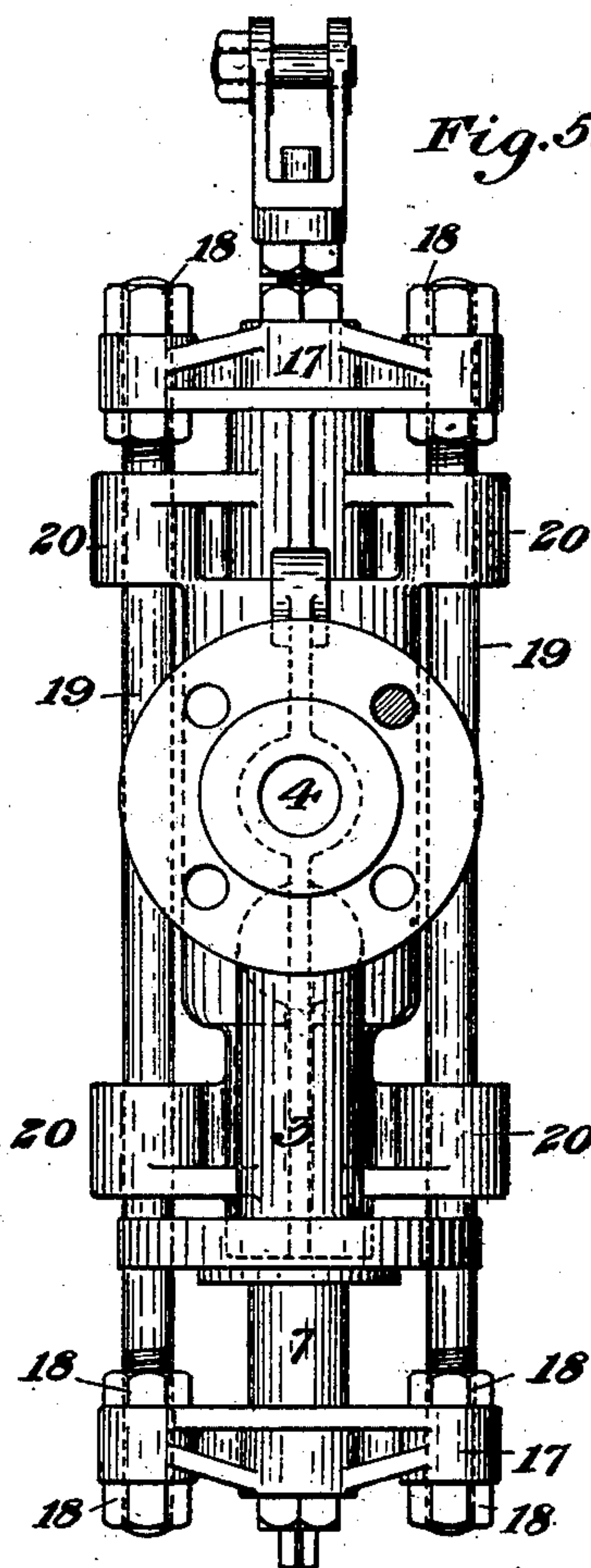


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

CARL W. A. KOELKEBECK, OF PITTSBURG, PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 671,862, dated April 9, 1901.

Application filed December 22, 1896. Serial No. 616,583. (No model.)

To all whom it may concern:

Be it known that I, CARL W. A. KOELKEBECK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Valves, of which the following is a full, clear, and exact description.

My invention relates to an improvement in valve mechanism, and more especially to that class of valve mechanism employed for regulating the flow of liquid to and from hydraulic motors, such as the cylinders of hydraulic cranes or similar devices; and it consists in the construction and arrangement of parts, as hereinafter more fully described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a central vertical section of my improved valve. Fig. 2 is a similar view of a modified form of the same. Fig. 3 is a plan view of the form of Fig. 1. Fig. 4 is a vertical section similar to that of Fig. 1, but on a smaller scale, and showing the lever mechanism. Fig. 5 is a front elevation of the valve of Fig. 1, and Fig. 6 is a plan view of the cross-head I employ.

In the drawings, 2 represents a casting, in which the valve-chambers and nozzles or passages are formed. In the form of Fig. 1, 3 is a supply-passage 4 the passage leading to the motor, and 5 the waste-passage. The arrangement of these nozzles or passages, however, may be varied according to the requirements of the motor or other apparatus with which the valve is used. Thus in the form of Fig. 2 four nozzles or passages are shown, 3' being the supply-passage, 4' 4' the passages leading to opposite ends of the cylinder, the upper one of which may be placed on the opposite side of the valve, if desired, as shown at 4², and 5' being a waste-passage. The several nozzles or passages lead to annular ports surrounding a central bore or hole which extends longitudinally through the casting, in which bore work two plungers 6 and 7. In the form of Fig. 1 these two plungers normally rest within the chambers 8 and 9 of the central bore, these plungers being movable endwise and arranged to be moved into a central chamber 10, situate between the plungers and in alinement therewith. Each plunger is provided at its inner end with a head 11, in the rear of which and encircling it are placed

a series of washers 12 of leather or some similar material, and in the rear of these washers is provided the valve-cup 13. In the rear of the valve-cup the stem is surrounded by a sleeve 14, and in the rear of the sleeve is provided a valve-cup 15, which insures the plunger against leakage.

In order to secure a proper working of the plungers, the central bore is provided with an extremely smooth hard surface, this being preferably secured by cold-rolling, by which the pores of the metal are closed up and the forcing of the leather washers or cups into such pores is prevented.

The chamber 9 for the plunger is preferably counterbored or enlarged, as shown, so as to allow the free downward movement of the plunger in entering the chamber. For a similar reason the portions of the upper chamber 8 adjacent to the annular port are preferably beveled, as shown at 16. The stems or rods of the plungers are threaded at their outer ends and secured within cross-heads 17, being locked thereto by nuts 18. The cross-heads 17 are secured together by rods 19, which pass through guides 20, secured to the casing of the valve.

The operation of the valve is apparent. When the plungers are in the position shown in Fig. 1, the central chamber 10 is open and a free passage for the water is afforded from the nozzle 3 through the chamber 10 to the nozzle 4, leading to the motor, while the waste-nozzle is closed by the upper plunger resting in its chamber. When the hand-lever 21, connected to the upper cross-head, is moved so as to open the waste-port and connect the passages 4 and 5, the lower plunger moves upwardly into the central chamber 10 and the supply is cut off. It will be noticed that on account of the plungers being arranged on separate stems a free and uninterrupted passage for the water is permitted through the central chamber 10, thus offering least resistance to the water. The function of the washers 12 is an important one, since when the lower plunger is moved into the central chamber, so as to shut off the flow of water through the nozzle 3, the washers enter the central chamber and cut off the flow of water before the cup has left the chamber 9, whereby the cup, upon which the com-

plete sealing of the valve depends, is protected from the cutting action of the current of water. The heads upon the inner end of the plungers serve to protect the washers from injury.

Where small valves are used, I form the valve-casing of bronze; but where large valves are employed I form the casing of cast-iron and line the same with bushings for the central bore, as shown in Fig. 1. To lubricate the leathers and prevent their becoming stiff, I provide a spigot 22, leading into the lower port, as shown in Fig. 1, by which oil may be introduced, and for a similar purpose I provide holes 23 in the hollow sleeve 24, surrounding the upper valve-stem.

The advantages of my invention will be apparent to those skilled in the art, since the valve is easily operated, is not liable to leakage, an uninterrupted waterway is given, and the friction is reduced to a minimum. The valve is also long-lived and not liable to get out of order.

Many changes in the form and arrangement of the parts may be made by the skilled mechanic without departing from my invention, which may be used for controlling oil, air, or other fluids as well as water, since I consider myself the first to use the two separate plungers having the packing attached thereto, with a free open chamber between their ends, and also the first to devise the combination of the washers with the cups, whereby the flow of water is cut off before the cup passes into the path of the current.

I do not claim herein the combination of the case having a main bore and inlet and outlet passages extending therefrom, two cross-heads adjustably connected together, and two valves or plungers adjustably connected to the cross-heads, as this is claimed in my copending application, Serial No. 507,858, filed April 17, 1894.

I claim—

1. In a valve, a movable stem having leather packing thereon arranged to stop the fluid current through a port, and a cup-leather in the rear of the packing, the packing and the cup-leather being arranged so that as the stem moves longitudinally in one direction the packing will act to stop the current through the port and the cup-leather will act thereafter to completely seal the same port.

2. In a valve, a movable stem having leather packing thereon arranged to stop the fluid current through a port, said packing extending at least the width of the port, and a cup-leather in the rear of the packing, the packing and the cup-leather being arranged so that as the stem is moved longitudinally in one di-

rection the packing will stop the current through the port and with the further movement of the stem the cup-leather will completely seal the same port.

3. A valve-casing having an intermediate uninterrupted chamber with open ends, ports surrounding the said ends, plunger-chambers beyond the port and in line with the bore of the intermediate chamber, and two plungers each carrying packing at their inner ends, said packings being arranged to enter the opposite ends of the intermediate chamber and engage its bore, said plungers having exterior connections and being arranged so that their packings will rest within the plunger-chambers when the valve is open.

4. In a valve, the combination with a plunger-stem, having washers surrounding the same and arranged to stop a fluid current through a port, of a valve-cup surrounding the stem in the rear of the washers, and arranged to completely seal the same port after the washers have stopped the current there-through.

5. In a valve, the combination with a valve-carrying packing, of packing upon the plunger in the rear of and separated from the first-named packing, and a chamber arranged to receive the plunger, said chamber having a portion closely fitting the rear packing, and an enlarged portion within which the other packing rests loosely.

6. In a valve, the combination with a plunger, having a valve-cup, of a second cup surrounding the stem in the rear of the valve-cup, a chamber arranged to receive the valve-cup when in inoperative position, said chamber having a portion arranged to closely fit the rear cup, and an enlarged portion within which the valve-cup proper fits loosely.

7. In a valve, the combination with two separate plungers, of a chamber between the ends of the plungers forming an uninterrupted waterway, each plunger having packing thereon arranged to stop the fluid current through a port at the end of the chamber, and a cup-leather in the rear of the packing, the packing and cup-leather being so arranged that as the stem moves longitudinally into the intermediate chamber the packing will act to stop the current through the port and the cup-leather will act thereafter to completely seal the said port.

In testimony whereof I have hereunto set my hand.

CARL W. A. KOELKEBECK.

Witnesses:

JAMES K. BAKEWELL,
G. I. HOLDSHIP.