

(No Model.)

2 Sheets—Sheet 1.

W. KRUTZSCH.
HYDRAULIC ACCUMULATOR.

No. 503,091.

Patented Aug. 8, 1893.

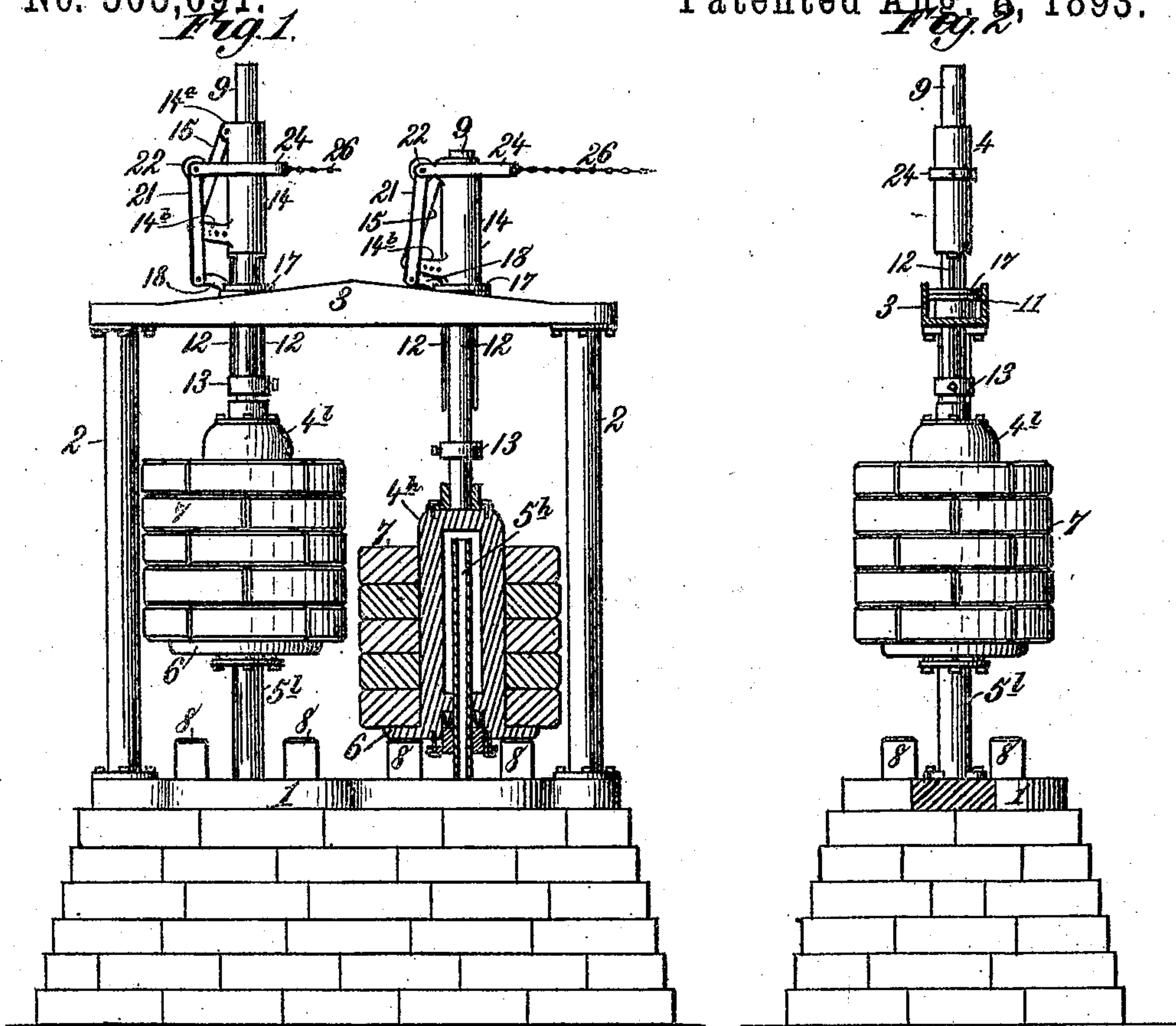
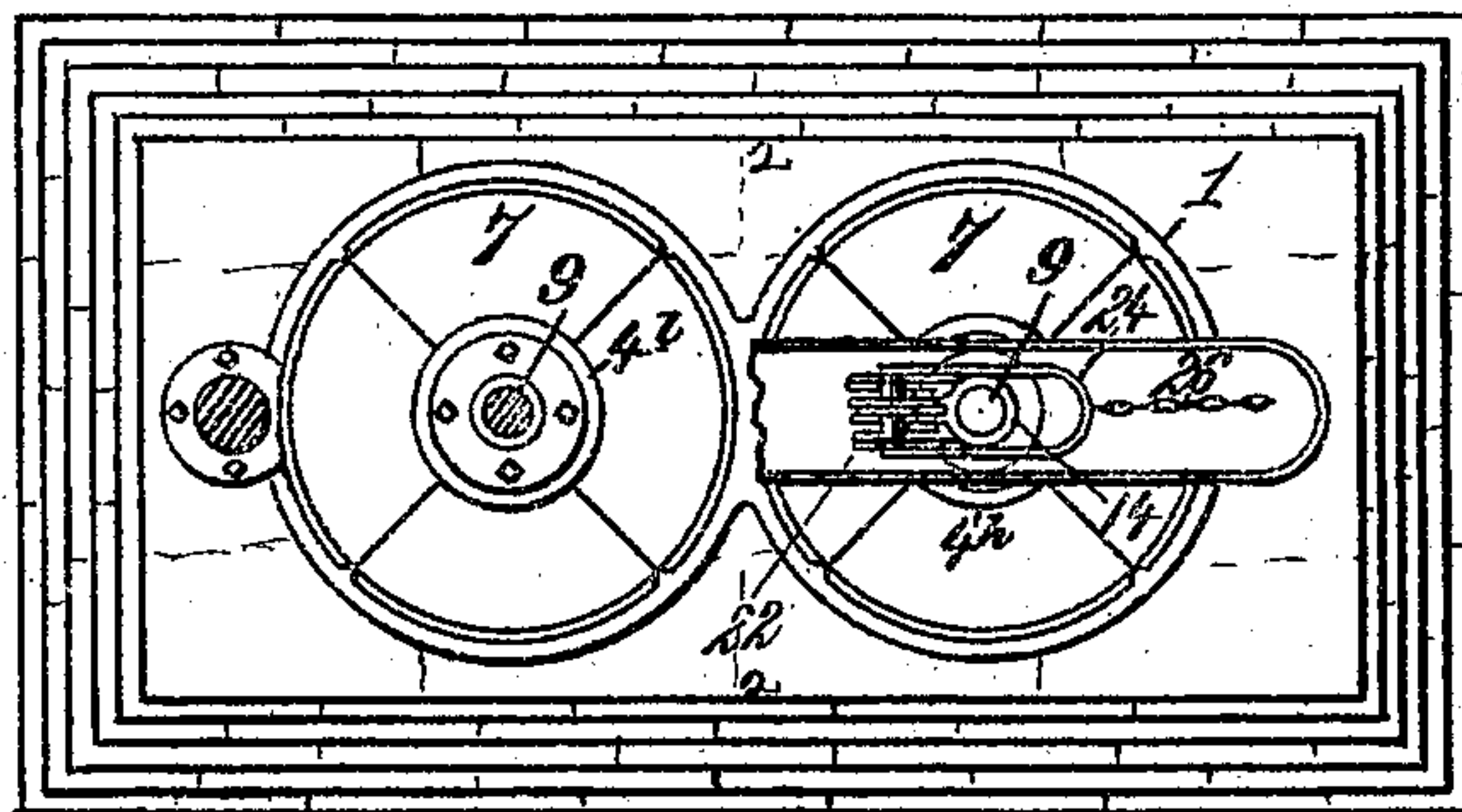


Fig. 3.



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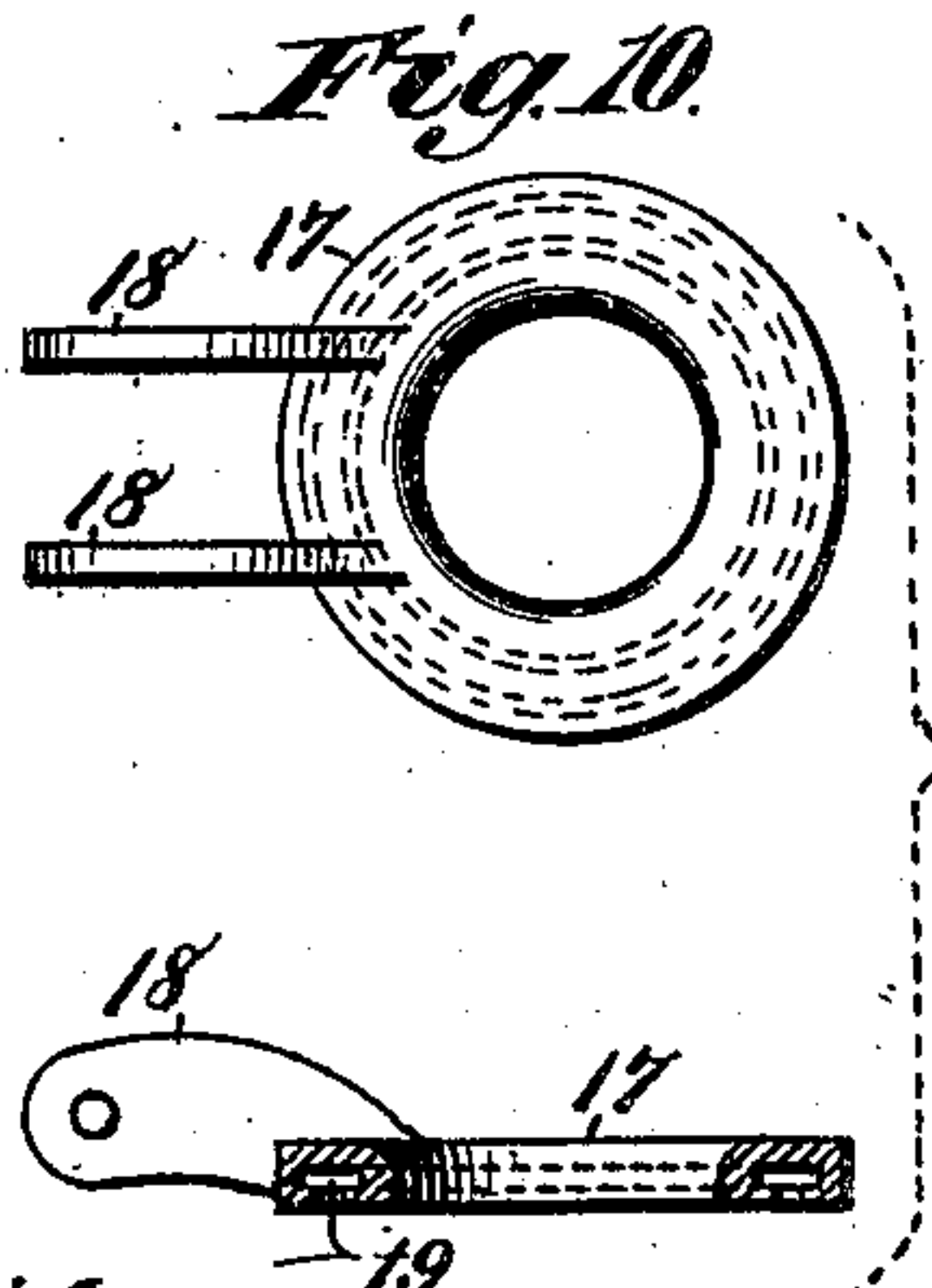
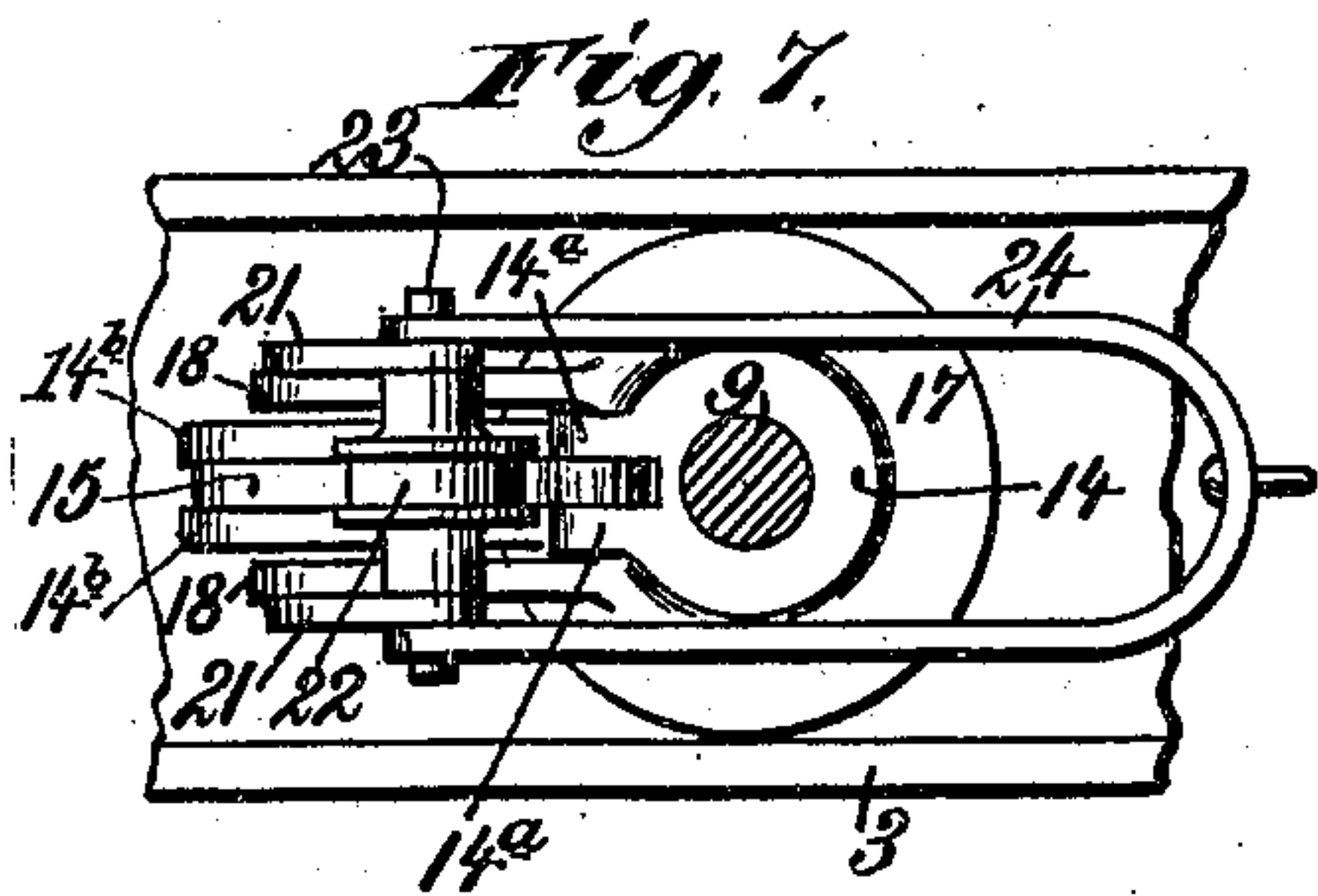
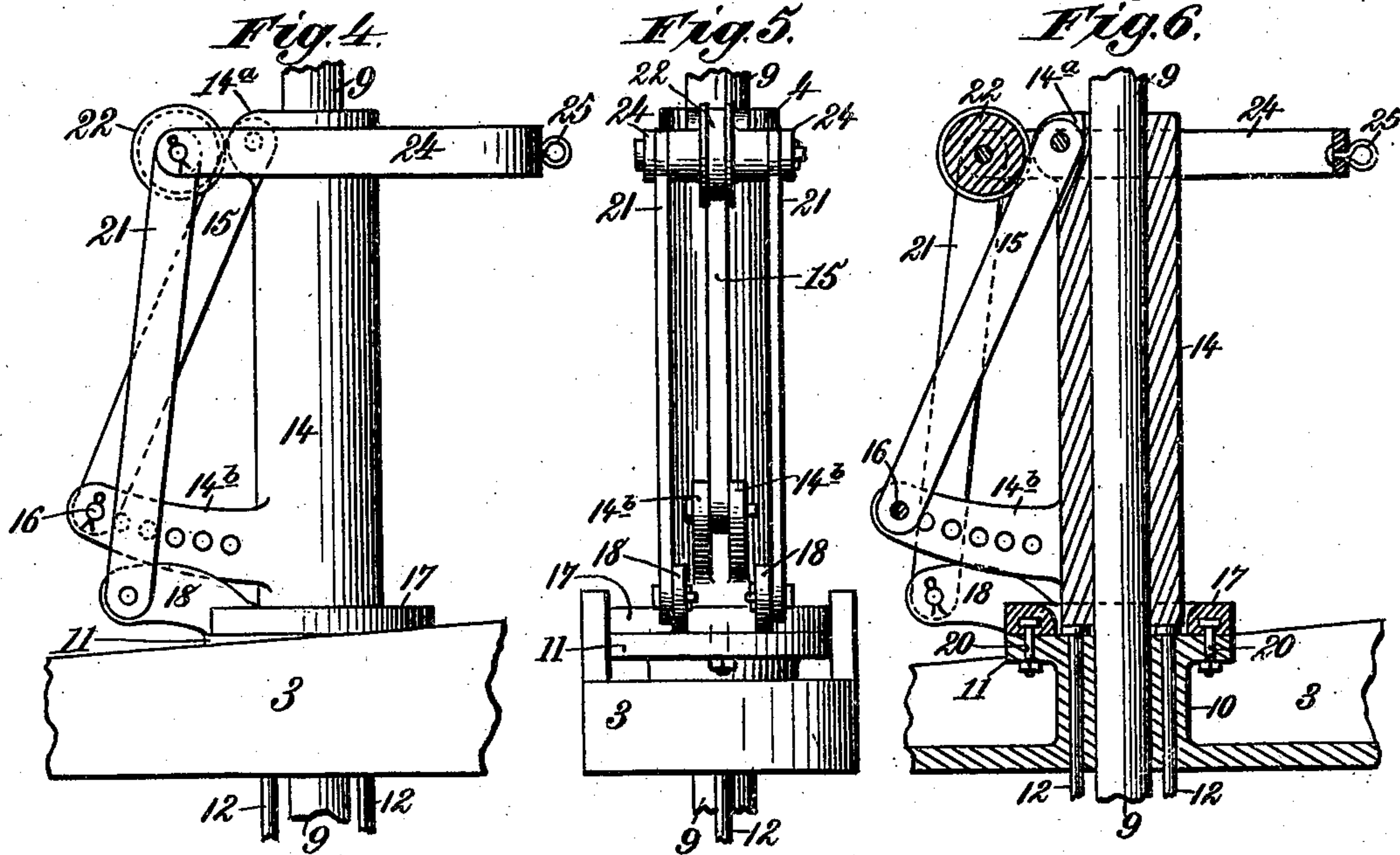
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2 Sheets—Sheet 2.

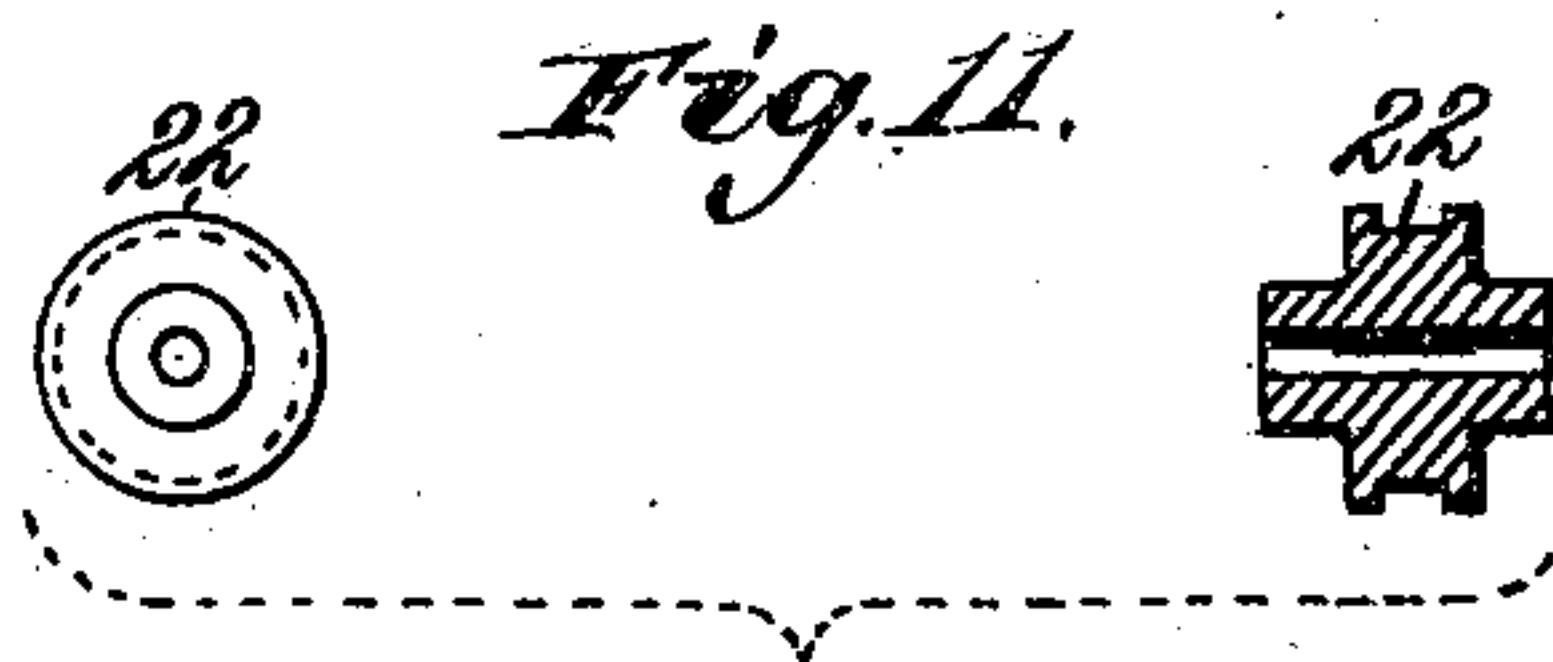
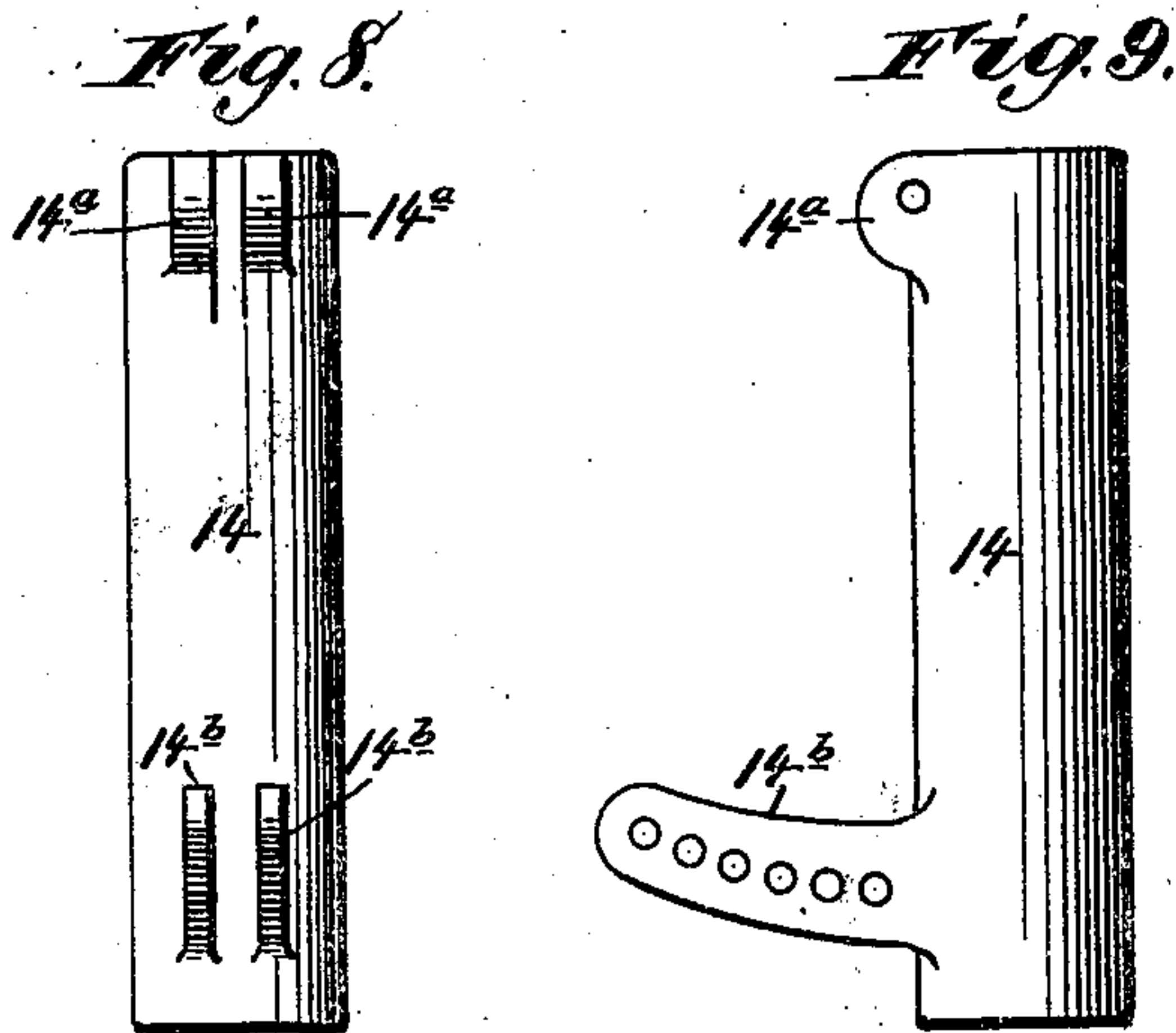
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HYDRAULIC ACCUMULATOR.

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UNITED STATES PATENT OFFICE.

WILLIAM KRUTZSCH, OF DAYTON, OHIO, ASSIGNOR TO THE BUCKEYE IRON
AND BRASS WORKS, OF SAME PLACE.

HYDRAULIC ACCUMULATOR.

SPECIFICATION forming part of Letters Patent No. 503,091, dated August 8, 1893.

Application filed March 11, 1893. Serial No. 465,587. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KRUTZSCH, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented new and useful Improvements in Hydraulic Accumulators, of which the following is a specification.

This invention has for its object to provide a new and improved regulating mechanism particularly designed for hydraulic accumulators for the purpose of regulating hydraulic presses, mills and like apparatus for pressing oil cakes and for other purposes.

The invention consists in certain features of construction and novel combinations of parts in a hydraulic accumulator and its regulator mechanism for controlling the action of a pump by which the press or mill is supplied with working fluid, as hereinafter described and claimed.

In the annexed drawings illustrating the invention,—Figure 1, is a view showing the low pressure accumulator in elevation and the high pressure accumulator in vertical section. Fig. 2, is a vertical transverse section on the line 2—2, of Fig. 3. Fig. 3, is a partly sectional plan. Fig. 4, is an enlarged side elevation of the regulator. Fig. 5, is an end elevation of the same. Fig. 6, is a sectional side elevation of the same. Fig. 7, is a plan of the regulator. Fig. 8, is an elevation of a tubular vertically sliding portion of the regulator. Fig. 9, is a view of the same at a right angle to Fig. 8. Fig. 10, shows a plan and section of an annular plate or turntable forming part of the regulator mechanism. Fig. 11, shows an end view and a longitudinal section of a grooved roller.

Referring to Figs. 1, 2 and 3 the numeral 1, designates a base plate supported on a masonry foundation and provided at its opposite ends with columns 2 which are connected by a cross beam 3 at the top.

4^h designates the cylinder of the high pressure accumulator and 4^l, the cylinder of the low pressure accumulator. Each of these cylinders is closed at the top and open at its lower end to receive a stationary plunger 5^h, or 5^l fixed to the base plate. The plungers are of tubular form, as shown in Fig. 1, to afford an inlet and outlet for passage of oil, water

or other working fluid to and from the vertically movable cylinders. At its lower end each cylinder is provided with an annular flange 6 to support sectional cast iron weights 7, of segmental form that will permit them to be readily removed and replaced as required. On the base plate 1 are placed wooden blocks or bumpers 8 to receive the impact of the weighted cylinders when they descend and to support them in their lowest positions.

To the top of each accumulator cylinder is secured a vertical rod or shaft 9 which is extended through a flanged boss 10 on the cross beam 3, as shown in Fig. 6. The boss 10 is located on the upper side of the cross beam 3 and is provided at its upper end with an annular flange 11, Figs. 3, 5 and 6.

Extended vertically through perforations in the body of each boss 10 are two lift pins 12 the heads of which rest on the top of the boss while their lower ends are suspended on opposite sides of the rod or shaft 9, below the cross beam. On each rod or shaft 9, below the pins 12 is a set collar 13 which may be adjusted at any height to act on said lift pins at any required point in the travel of the accumulator cylinder.

Above the boss 10 each cylinder rod or shaft 9 is surrounded by a tubular vertically sliding guide casting 14 Figs. 8 and 9, the lower end of which normally rests on the heads of the lift pins 12, as shown in Fig. 6. On the upper end of each tubular guide 14 are two perforated lugs 14^a, between which is pivotally supported the upper end of an inclined bar 15, Figs. 4 and 6, which I term a wedge-bar. The lower portion of each tubular guide 14 is provided with a pair of parallel curved arms 14^b each of which is provided with a series of perforations to receive a pin 16 passed through the lower end of the wedge bar 15 and by which it can be adjustably supported between said arms at any desired inclination.

On the flanged upper end of the boss 10, outside the lower end of the tubular guide 14, is supported an annular plate or turntable 17, Fig. 10, having two lugs 18 which project below and outside the arms 14^b of the tubular guide. In the under side of this annular plate 17 is an annular T-groove 19 which enables said plate to be secured to the flange 11

of the boss 10 by means of bolts 20, Fig. 6 in such manner that the plate can be turned or adjusted in any direction to bring the lugs 18 into any required position. The lugs 18 of the adjustable annular plate 17 afford pivot support for the lower ends of a pair of swinging radius bars 21 between the upper ends of which is journaled a roller 22, Fig. 11, having a circumferentially grooved periphery with which the wedge bar 15 is adapted to be engaged. The grooved roller 22 is mounted loosely on a pin or shaft 23 supported in the upper ends of the swinging radius bars 21 and having its ends projecting beyond the same a sufficient distance to be engaged in the open end of a yoke or U-shaped strap 24, Fig. 7, having an eye 25 for attachment of one end of a chain or flexible connection 26, Figs. 1 and 3, which connects with a valve or other movable part of a pump, not shown, in such a manner that when the yoke 24 is moved in such direction as to draw on the chain the pump, which supplies oil, water or other fluid to the accumulator, will be stopped. The chain 26 is always kept taut by means of a weight, not shown, which may be attached at any convenient point.

It will be observed that the plungers 5^h and 5^l, are stationary while the accumulator cylinders 4^h and 4^l, are arranged to rise and fall with the admission and exit of fluid. These inverted vertically movable cylinders are of great weight independent of the additional weights 7 that are placed thereon, so that when the pump is stopped and the oil or other fluid flows out from the accumulator to a press or mill the cylinders will readily descend.

The vertical rods or shafts 9 carried by the accumulator cylinders serve as guides to keep the cylinders steady in their up and down movements.

When either cylinder 4^h or 4^l, rises under the pressure exerted by the fluid admitted thereto through the tubular plunger, the rod or shaft 9 in moving upward will carry its collar 13 into lifting contact with the lower ends of the lift pins 12 which will in turn lift the tubular guide 14 and carry the attached wedge bar 15 into frictional engagement with the grooved roller 22 of the regulator mechanism in such a manner as to force said roller and the supporting radius bars 21 outward or away from the tubular guide 14 thereby moving the yoke 24 longitudinally and causing it to draw on the chain 26 so as to stop the pump. The pump being stopped and the pressure on the fluid in the accumulator thereby relieved so that it will flow outward to supply the requirements of the mill or press, the cylinder will descend, and the guide 14 and wedge bar 15 will drop to normal position, thereby releasing the roller 22, yoke 24 and chain 26 so as to permit the pump to resume its operation. By giving the lower end of the wedge bar 15 a proper adjustment between the perforated arms 14^b the inclination of the wedge

bar can be varied so as to increase or lessen the pull on the chain 26, as occasion may require; and by adjusting the set collar 13 on the shaft 9, up or down, it may be made to act on the regulator at any desired point in the travel of the accumulator cylinder. By means of the adjustably mounted annular plate 17 with its lugs 18 and attached radius bars 21 projecting on each side of the wedge bar 15 and its supporting arms 14^b the regulator mechanism, including the guide 14, wedge bar 15, roller 22 and yoke 24 may be turned in any direction to permit the chain to be led off to the pump directly and by the shortest route.

It will be seen that by the mechanism described a simple and reliable means is afforded for automatically controlling the operation of the hydraulic press or mill.

What I claim as my invention is—

1. In a hydraulic accumulator, the combination with a reciprocating cylinder and a guide rod or shaft attached thereto, of a tubular sliding guide surrounding a portion of said rod or shaft, lift pins on which said tubular guide is normally supported, a wedge bar carried by the sliding guide, a swinging support having a roller mounted therein in position to be engaged by the wedge bar, a chain connected with said roller to stop a pump from which the accumulator cylinder is supplied with working fluid, and a collar mounted on the cylinder guide rod or shaft to actuate the lift pins and tubular guide and thereby cause the wedge bar to engage the roller and pull the chain, substantially as described.

2. In a hydraulic accumulator, the combination of a vertically movable cylinder, a sliding guide adapted to be lifted by the cylinder, a wedge bar carried by said sliding guide, a swinging support having a roller mounted therein in position to be engaged by the wedge bar, and a chain connected with said roller and adapted to be pulled when the roller is swung outward, to stop a pump or engine from which the accumulator cylinder is supplied with working fluid, substantially as described.

3. In a hydraulic accumulator, the combination of a weighted vertically movable cylinder, a stationary tubular plunger constituting an inlet and exit for working fluid to and from said cylinder, a sliding guide adapted to be lifted by the cylinder, a wedge bar carried by said sliding guide, a swinging support having a roller mounted therein in position to be engaged by the wedge bar and a connection leading from said roller to a pump or engine from which the accumulator cylinder is supplied with working fluid, whereby the pump or engine is stopped when the cylinder lifts the wedge bar into engagement with the roller, substantially as described.

4. In a hydraulic accumulator, the combination of an inverted vertically movable cylinder, a stationary tubular plunger constituting an inlet and exit for working fluid, a guide rod or shaft carried by the cylinder and pro-

vided with an adjustable collar, a cross beam having a boss through which the cylinder guide rod is extended, lift pins suspended in said boss and having their lower ends in the path of the collar on the cylinder guide rod, a tubular sliding guide supported on said lift pins and carrying a wedge bar, a roller mounted in a swinging support in position to be engaged by the wedge bar, and a flexible connection leading from said roller to the pump or engine from which the accumulator cylinder is supplied with working fluid and through which said pump is stopped when the cylinder lifts the wedge bar into engagement with the roller, substantially as described.

5. In a hydraulic accumulator, the combination with an inverted vertically movable cylinder having a guide rod provided with an adjustable collar, of a cross beam having a boss through which said guide rod is extended, lift pins suspended in said boss in the path of the collar on the guide rod, a sliding tubular guide supported on the lift pins and provided with an adjustable wedge bar, an adjustable annular plate supported on the boss of the cross-beam and provided with a pair

of lugs, radius bars having their lower ends pivoted to said lugs, a roller journaled between the upper ends of said bars, a yoke connected with the roller shaft or journals, and a chain or flexible connection leading from said yoke to a pump from which the accumulator cylinder is supplied with working fluid, substantially as described.

6. In a hydraulic accumulator, the combination with an inverted vertically movable cylinder, of a regulator mechanism actuated from said cylinder and comprising a swinging roller and a vertically movable wedge bar adapted to actuate said roller, and a chain or flexible connection for connecting said roller with a pump or engine from which the accumulator is supplied with working fluid, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM KRUTZSCH.

Witnesses:

DAVID C. RENCH,
JOHN L. H. FRANK.