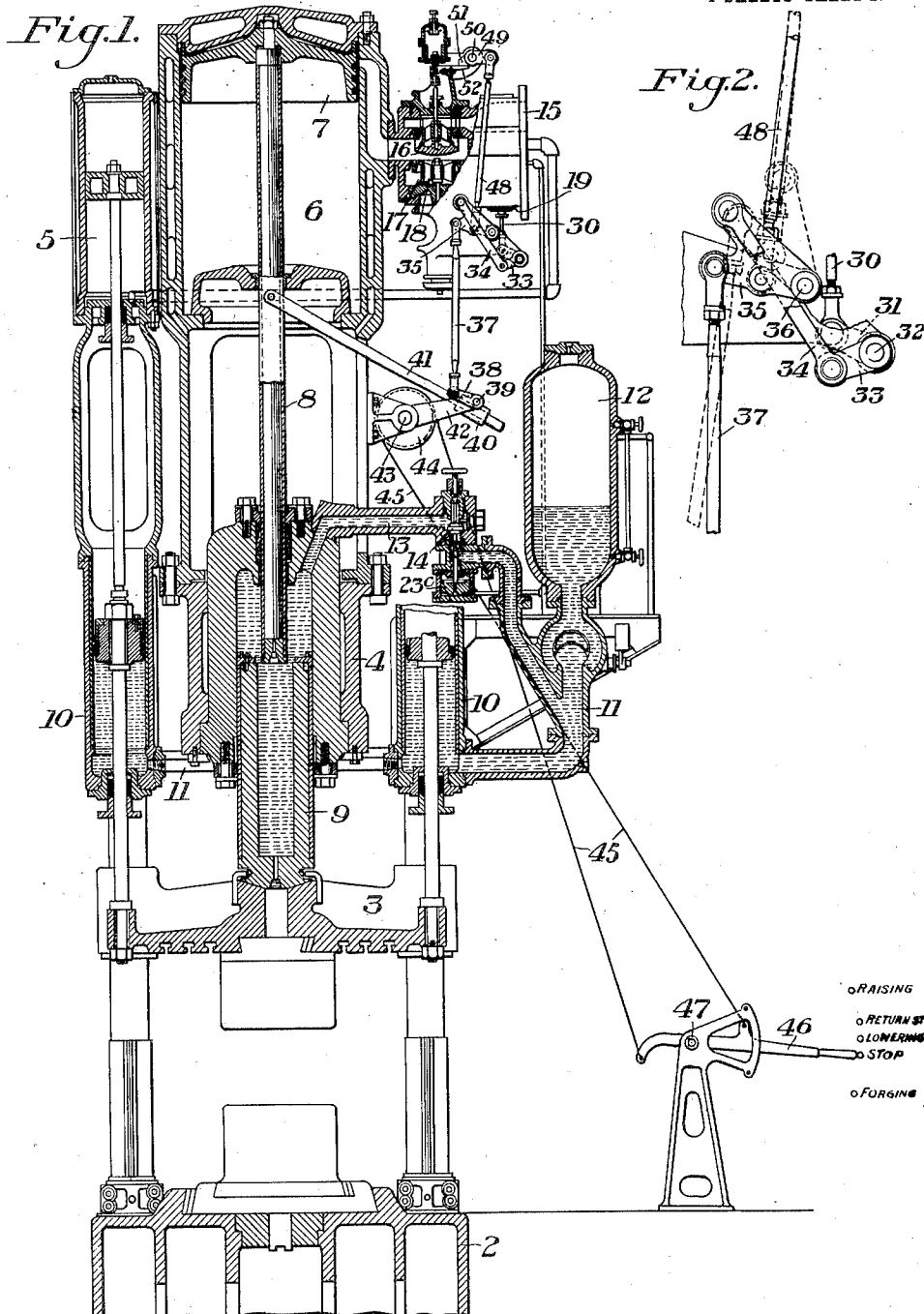


L. IVERSEN.
STEAM HYDRAULIC PRESS.
APPLICATION FILED JUNE 24, 1912.

1,068,243.

Patented July 22, 1913.

4 SHEETS—SHEET 1.



WITNESSES

R. A. Balderson
Jesse B. Heller

INVENTOR

Loring Iversen
by *Ballou, Ames & Parmelee*
his attys

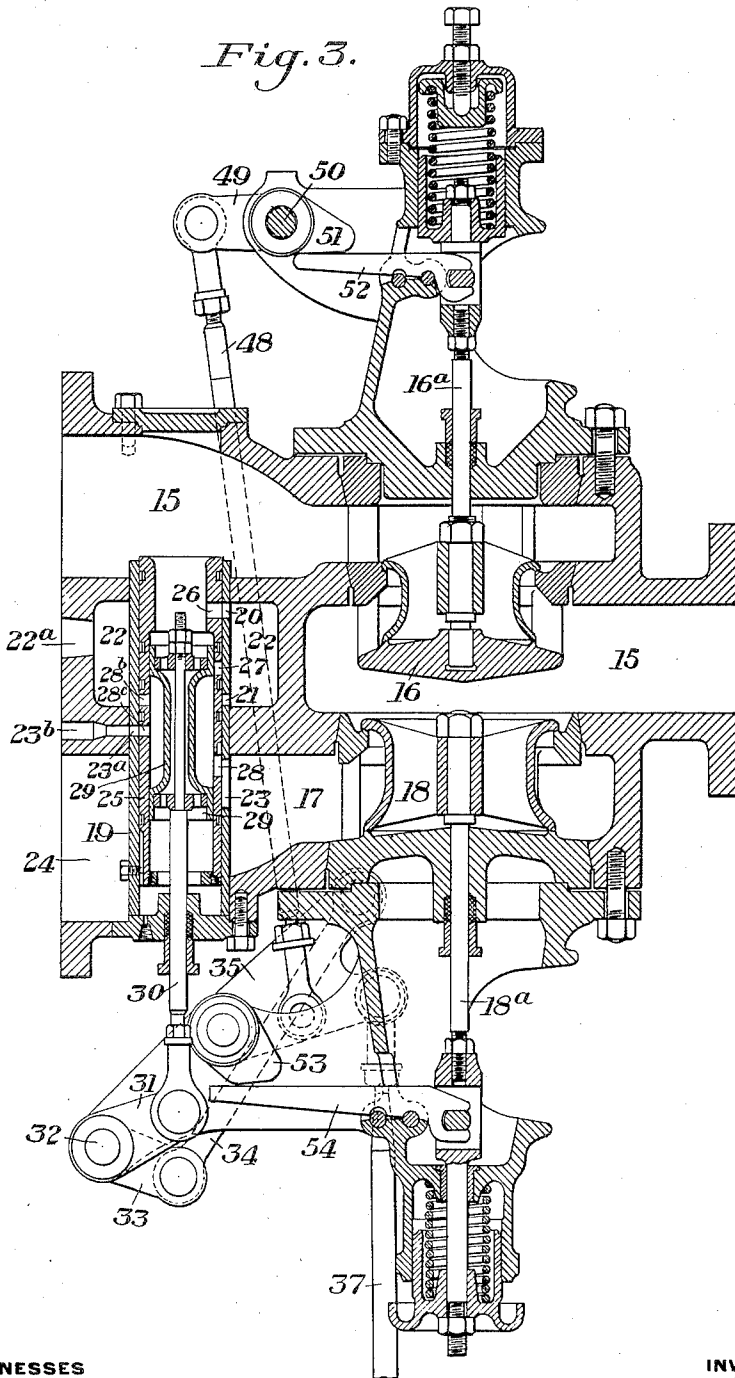
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4 SHEETS—SHEET 2.

Fig. 3.



WITNESSES

R. A. Balderson
Jesse B. Helker

INVENTOR

Lorenz Iversen
by Oskars Oymos & Parnell
his attys

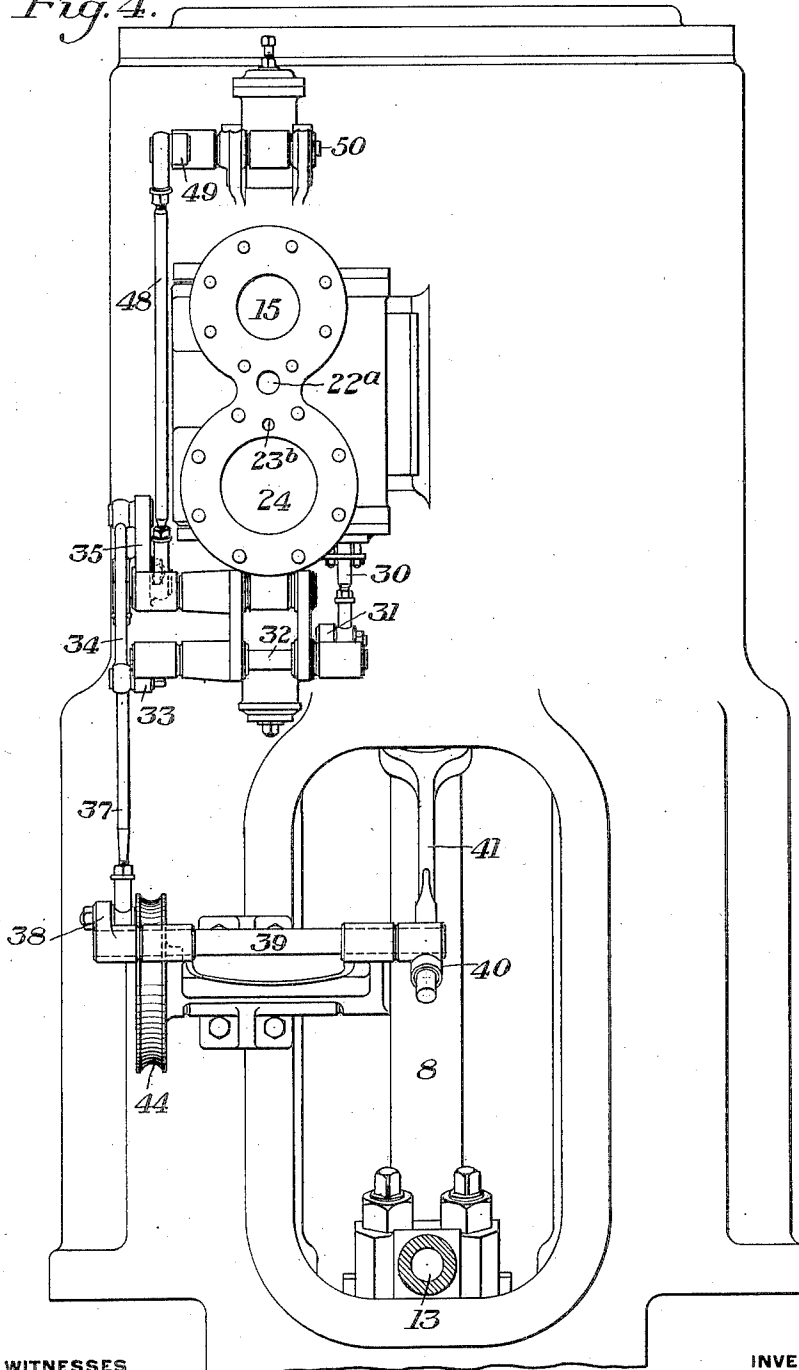
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4 SHEETS—SHEET 3.

Fig. 4.



WITNESSES

R. A. Balderson
Jesse B. Hellier

INVENTOR

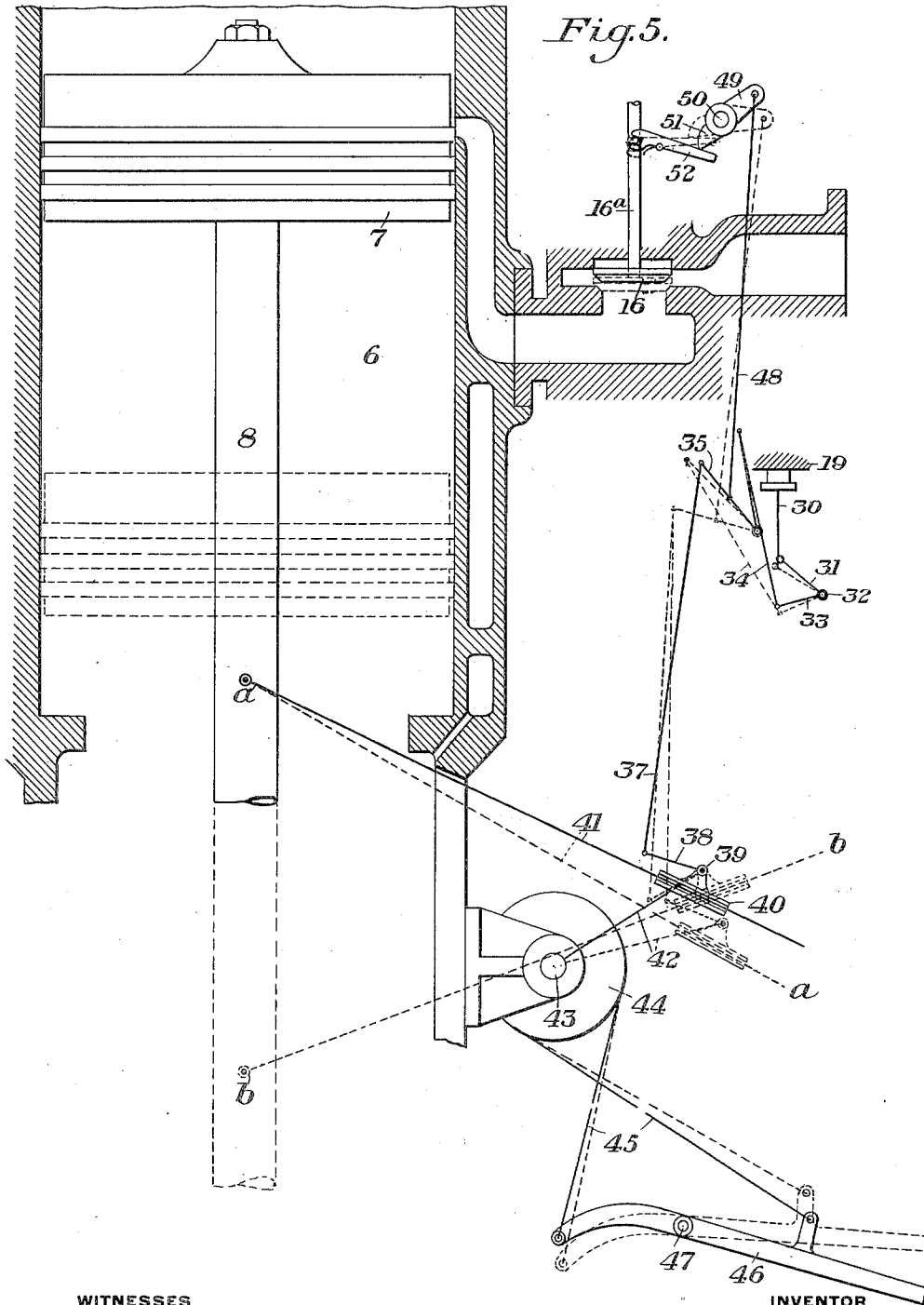
Loring Iversen
by R. A. Balderson & Jesse B. Hellier
his attys

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4 SHEETS—SHEET 4.



WITNESSES

R. A. Balderson
Jesse B. Heller

INVENTOR

Lorenz Iversen
by Salomon Pymis & Pymis
his attys

UNITED STATES PATENT OFFICE.

LORENZ IVERSEN, OF WEST HOMESTEAD, PENNSYLVANIA, ASSIGNOR TO MESTA MACHINE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STEAM HYDRAULIC PRESS.

1,068,243.

Specification of Letters Patent.

Patented July 22, 1913.

Application filed June 24, 1912. Serial No. 705,570.

To all whom it may concern:

Be it known that I, LORENZ IVERSEN, a resident of West Homestead, Allegheny county, State of Pennsylvania, have invented a new and useful Improvement in Steam Hydraulic Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of a portion of a press embodying my invention; Fig. 2 is a detail view of a portion of the valve-operating mechanism; Fig. 3 is a vertical section of the valves and valve-operating mechanism; Fig. 4 is a side elevation of a portion of the press; and Fig. 5 is a diagrammatic view, illustrating the operation of my invention.

My invention has relation to hydraulic presses, hammers, shears, punches and the like of the type which employs steam-hydraulic intensifier apparatus; and relates more particularly to the mechanism employed for controlling the operation of the press; the object of my invention being to provide means of simple and efficient character operated by the movement of the control lever, whereby the stroke of the press can be automatically controlled.

The nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown the preferred embodiment thereof and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the several parts by those skilled in the art, without departing from the spirit and scope of my invention as defined in the appended claims.

In the accompanying drawings, I have shown the invention as applied to a press having valve mechanism of the character described and claimed in my Patent No. 1,028,356, dated June 4, 1912, but it will be understood that my invention is not limited in its application to that particular press.

In the drawings, the numeral 2 designates the bed of the press and 3 the vertically movable press head which is arranged to work within the cylinder 4.

5 designates one of the pull back or lifting cylinders; 6 is the intensifier; and 7 the

steam piston of the intensifier having a rod 8.

9 is the plunger of the press head 3 and 10 designates hydraulic balancing cylinders for the pull back or lifting cylinders 5, these cylinders 10 having liquid supply connections 11 with an accumulator 12.

13 designates the supply connection for the hydraulic cylinder 4, and 14 is a check valve which normally prevents back flow of liquid out of the said cylinder.

15 designates the steam supply connection for the cylinder 6, said connection being controlled by a vertically movable admission valve 16.

17 is the exhaust for the cylinder 6, controlled by the vertically movable exhaust valve 18.

The parts thus far referred to are well known in the art, and form no part of the present invention.

The numeral 19 designates the casing for the control valve, this casing and valve being substantially as shown in my patent above referred to. The casing is in the form of a cylinder, provided with inlet ports 20 and 21 at different vertical heights which open into a chamber 22, communicating with the steam inlet passage 22^a. The casing also has the exhaust port 23 opening into the exhaust chamber 24, which communicates with and forms a part of the exhaust passage 17. The casing also has the exhaust port 23^a which registers with the steam passage 23^b leading to a cylinder 23^c whose piston is arranged to control the check valve 14, before referred to.

25 is a bushing within the casing 19 having its open upper end communicating directly with the steam inlet passage 15. The bushing has an upper inlet port 26, a lower inlet port 27, an exhaust port 28, and two ports 28^b and 28^c, which are arranged in different positions of the bushing to register with the port 23^a and passage 23^b, all as in my said patent.

The numeral 29 designates a reciprocating valve member seated within the bushing 25 and having a downwardly extending stem 30.

In accordance with my present invention, the stem 30 is connected at its lower end to a crank arm 31 on a shaft 32 having another crank arm 33, connected by a link 34 with a

bell crank lever 35, which is pivoted at 36. Connected to another arm of the bell crank lever 35 is a link 37, which extends downwardly and is connected at its lower end to a crank arm 38, secured to a shaft or pin 39, which is journaled in suitable bearings on a sleeve member 40. This sleeve member 40 has a sliding engagement with a lever arm 41, which is pivoted at its opposite end to the rod 8 of the steam piston 7 of the intensifier cylinder. The pin or shaft 39 also connects the sleeve member 40 to a lever arm 42, fixed to a shaft 43 on which is mounted a sheave or pulley 44. A cross belt or cable 45 extends over this wheel or pulley 44 and has its ends connected to the control lever 46 at opposite sides of the fulcrum 47 of said lever. The control lever 46 corresponds to the lever 40 of my said patent and has the several positions indicated, respectively, as "raising", "return stop", "lowering", "stop" and "forging".

The movement of the lever 46 to the above indicated positions operates the control valve 29 and bushing 25 in the manner described in my said patent to effect the different operations there described.

The numeral 48 designates a link which is connected to the bell crank 35 at its lower end and at its upper end is connected to a crank arm 49 on a shaft 50, having an arm or cam 51 adapted to act on a lever 52. The lever 52 has a lifting engagement with the upwardly extending stem 16^a of the intensifier cylinder admission valve 16. The bell crank lever 35 also has a cam 53, which is arranged to act upon a lever 54 having a lifting engagement with the depending stem 18^a of the exhaust valve 18.

The general operation of the press is the same as that described in my said patent, being effected by the movement of the control lever 46, but by the provision of the lever 41 and the connections operated thereby, I provide for automatically cutting off the admission steam at any desired point in the movement of the press head 3, and thus enable the stroke of said head to be automatically regulated. This operation is as follows: Assuming the control lever 46 to be in the stop position indicated in Fig. 1, it will be readily seen that the downward movement of said lever to a position intermediate the stop and forging positions will, through the cord or belt 45 and the wheel or pulley 44, effect a movement of the arm 42, to thereby change the position of the pin 39 and also the position of the crank arm 38. This movement of the crank arm lifts the link 37 and through the bell crank 35, link 48 and the parts operated by said link, opens the admission valve 16 to admit steam to the cylinder 6 above the piston. Referring to the diagram (Fig. 5) the dotted line *a-a* represents the initial position of the lever

41, corresponding to the position of the parts shown in Fig. 1, and also corresponding to the dotted line position of the lever 46 shown in Fig. 5. When the lever 46 is moved downwardly to the full line position shown in Fig. 5, the lever 41 is moved to the full line position shown in that figure and the valve-operating parts above the lever 41 are shifted from the dotted line position shown to the full line position shown, thereby opening the valve 16, as before stated. Steam being now admitted to the intensifier cylinder 6, the piston 7 makes its downward stroke, carrying with it the inner end of the lever 41. When said lever assumes the dotted position *b-b*, the valve-actuating parts are shifted back to the dotted line position shown in Fig. 5, thereby closing the valve 16 and shutting off the supply of steam to the intensifier cylinder.

It will be apparent that by varying the exact position to which the lever 46 is moved intermediate the stop and forging positions, and thereby shifting the initial positions of the arm 38 and lever 41, the steam cut-off may be made to occur at any desired point in the stroke of the piston 7. This movement of the lever 46 will, through the link 34, crank arms 31 and 33 and stem 30, effect a slight movement of the valve member 29. This movement will, however, be very slight and it will not affect the operative position of said valve. In other words, said valve is operated by the lever 46 in the same manner as in my patent above referred to and is unaffected by the extent to which the lever 46 is moved between the stop and forging positions, this movement affecting only the point at which the cut-off will occur. In my said patent I have fully described the operation of the said valve in its various positions, and reference may be had to that patent for a more complete description of the operation of said valve and of the press as a whole.

The expansion of steam in the intensifier cylinder above the piston 7 after the cut-off occurs will cause a slight further downward movement of said piston sufficient to operate the connections 53 and 54, and thereby open the exhaust valve 18.

My invention provides means of very simple and effective character for automatically regulating the stroke of the press, whereby overrunning is prevented.

It will be obvious that the invention is not limited in use to the particular valve mechanism which is here shown and described, but that it may be adapted for use with a variety of valve mechanisms.

It will also be obvious that any desired mechanism may be employed for connecting the hand lever 46 with the lever 41 in a manner to provide for the initial adjustments thereof.

I claim:

1. A steam-hydraulic press having an intensifier cylinder, a piston therein, an admission valve for controlling said cylinder, a rock shaft having a movable fulcrum and operatively connected with said valve, hand lever connections for shifting the rock shaft fulcrum, and a member operated by the work stroke of the piston for actuating the rock shaft; substantially as described.

2. A steam-hydraulic press having an intensifier cylinder, a piston therein, an admission valve for controlling said cylinder, a hand lever, and actuating connections between the hand lever and the valves, said connections comprising the rock shaft having a floating fulcrum which can be shifted by moving the hand lever, and means actuated by the rod of said piston for actuating said rock shaft; substantially as described.

3. A steam-hydraulic press having an intensifier cylinder, a piston therein, an admission valve for controlling said cylinder, a rock shaft, actuating connections between said shaft and the valve, said connections comprising a movable fulcrum member, connections between the hand lever and the movable fulcrum member for shifting the position of said member, and a lever connected with the piston rod of the intensifier cylinder and having a sliding engagement with said fulcrum member; substantially as described.

4. A steam-hydraulic press having an intensifier cylinder, a piston therein, an admission valve for said cylinder, link and

lever mechanism for actuating said valve, a lever arm actuated by the rod of said piston and connected with the link and lever mechanism, and a hand-operated connection arranged to shift the point of connection between the lever arm and the link and lever mechanism, whereby the lever arm will actuate said mechanism to close said valve at a point in the stroke of said piston dependent upon the degree of shift of said connection; substantially as described.

5. A steam-hydraulic press having an intensifier cylinder having a piston therein, an admission valve for said cylinder, a movable fulcrum member, actuating connections between said member and the valve, hand-operating connections for shifting the position of the movable fulcrum member, and a lever arm connected to the rod of said piston and engaging the fulcrum member; substantially as described.

6. A steam hydraulic press, having an intensifier cylinder, an admission valve controlling said cylinder, a piston in said cylinder, a lever operated by the piston, a shiftable fulcrum member carried by said lever, and actuating connections between said member and the said valve, substantially as described.

In testimony whereof, I have hereunto set my hand.

LORENZ IVERSEN.

Witnesses:

J. THOS. BEALL, Jr.,

J. R. BERG.