

F. J. PERKINS.

PRESS.

APPLICATION FILED MAR. 26, 1910.

1,085,296.

Patented Jan. 27, 1914.

4 SHEETS-SHEET 1.

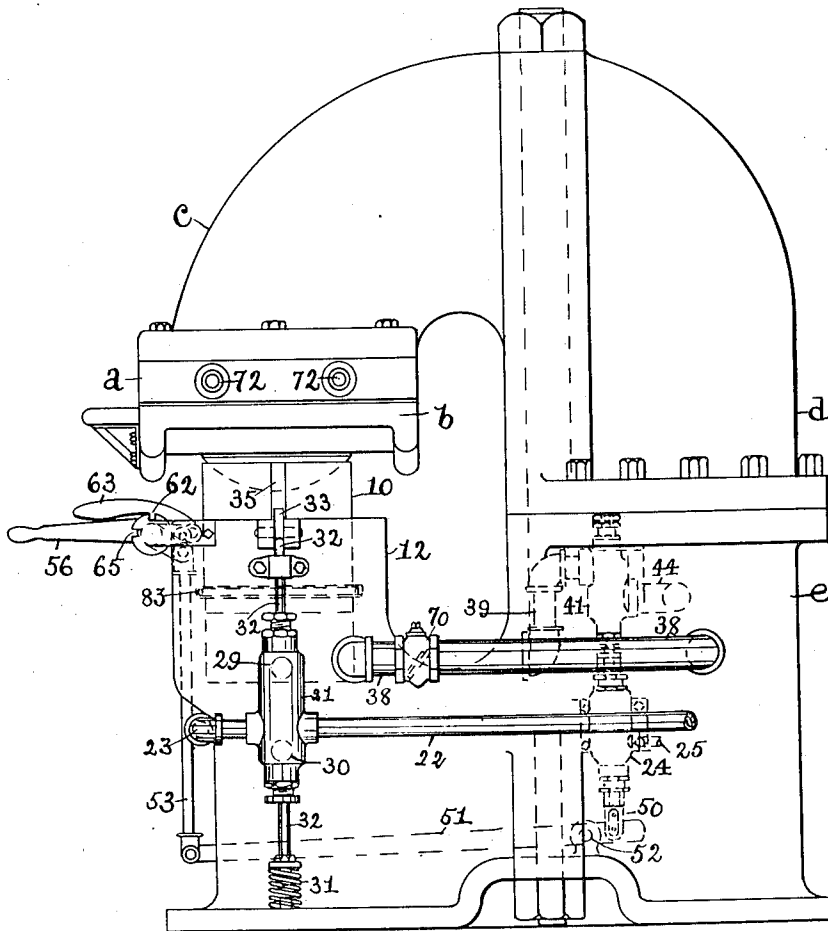


Fig. 1.

Witnesses.

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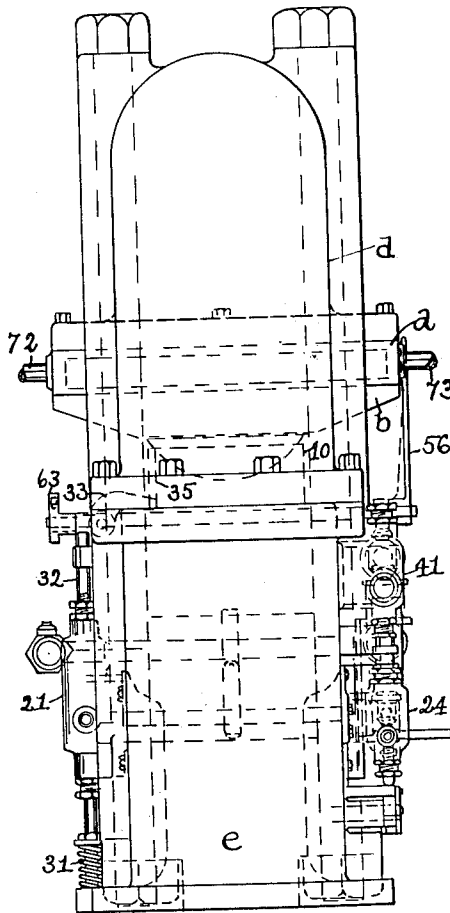
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4 SHEETS—SHEET 2.

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Witnesses.
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4 SHEETS—SHEET 3.

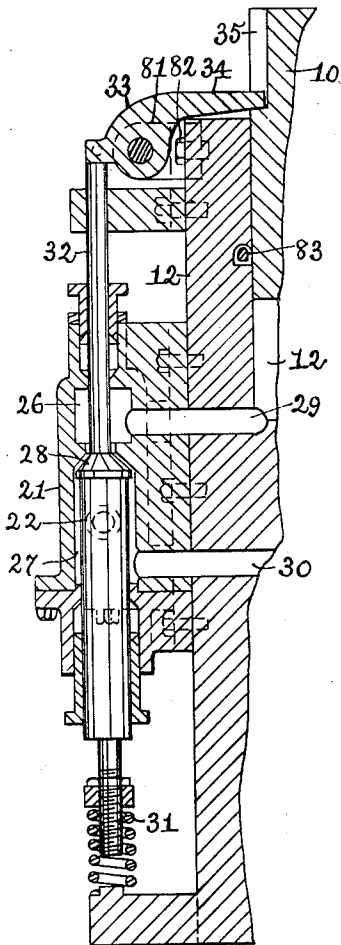


Fig. 3.

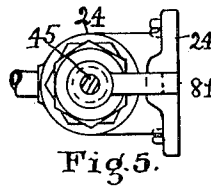


Fig. 5.

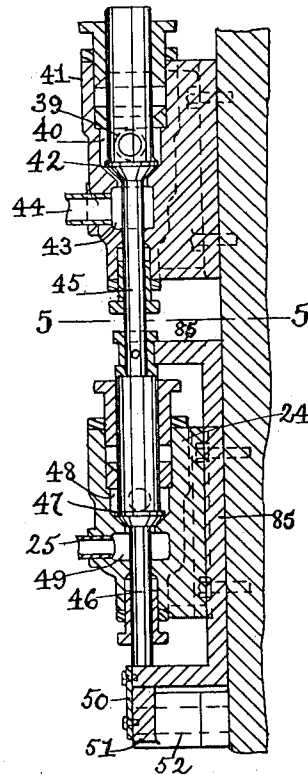


Fig. 4.

Witnesses.

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4 SHEETS-SHEET 4.

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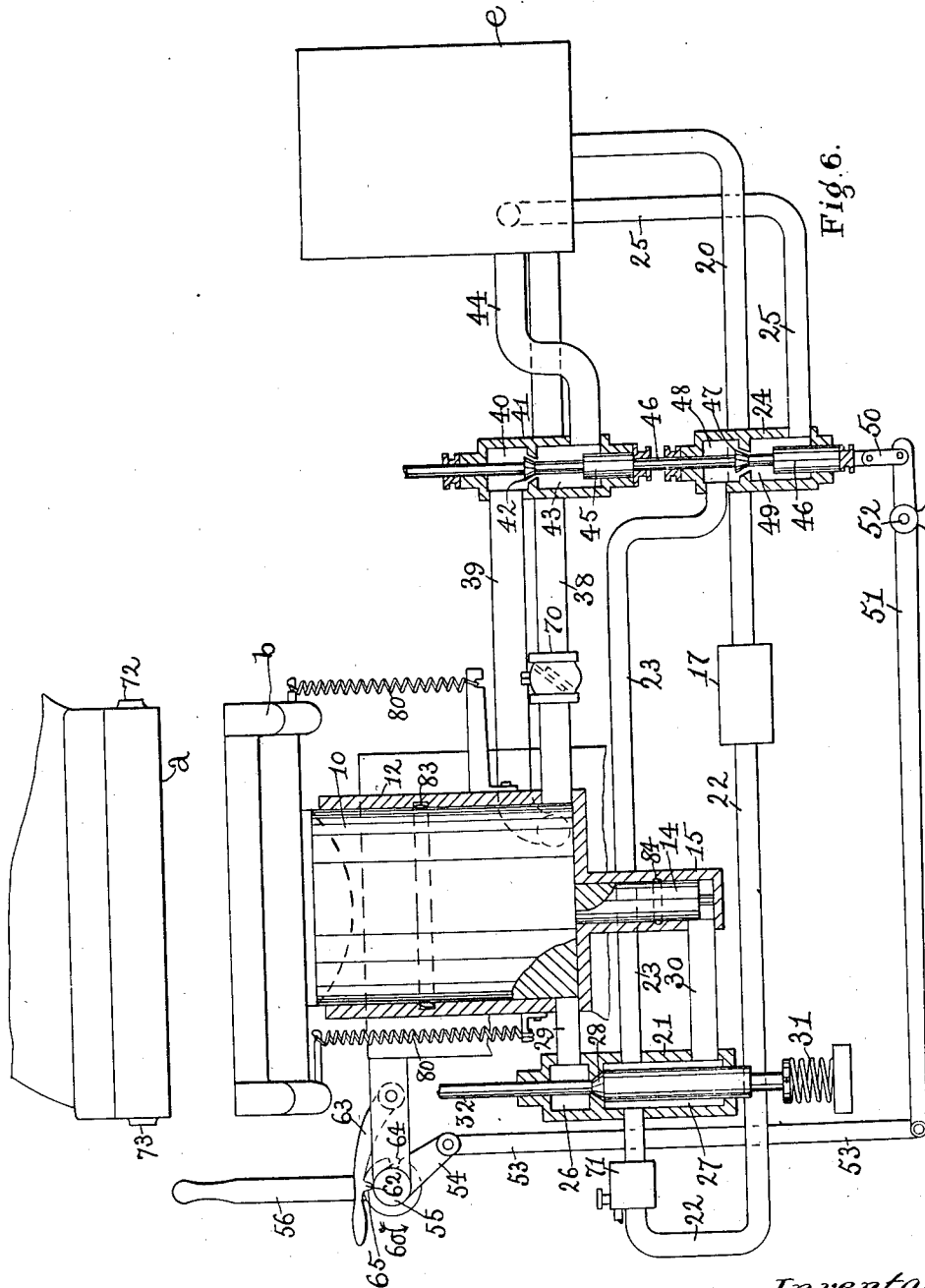


Fig. 6.

Witnesses.

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UNITED STATES PATENT OFFICE.

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PRESS.

1,085,296.

Specification of Letters Patent.

Patented Jan. 27, 1914.

Application filed March 26, 1910. Serial No. 551,752.

To all whom it may concern:

Be it known that I, FRANKLIN J. PERKINS, a citizen of the United States, residing in Woburn, county of Middlesex, and State of Massachusetts, have invented an Improvement in Presses, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a fluid-operated press especially designed and adapted among other uses to be employed for subjecting leather to a very considerable pressure.

The invention has for its object to provide a press, which is reliable, quick in action, simple and highly efficient in operation.

For this purpose, the press is provided with a platen carried by a piston or ram of substantially large diameter, with which co-operates a second piston of materially smaller diameter, with which the larger piston or ram is initially started on its movement toward its cooperating platen. Provision is made for maintaining a circulation of fluid through a normally open circuit or system, with which the cylinder for the smaller piston is in communication, and for closing said system by the operator so as to cause the fluid to move the smaller piston and through the latter start the larger piston or ram on its compressing movement. Provision is made for the larger piston or ram to act as a pump and draw fluid into its cylinder so as to substantially fill the same and thereby reduce to a minimum the space left to be filled with fluid under pressure as will be described, which enables the fluid-operated platen to be moved into its operative position in a minimum time, whereby a quick-acting fluid-operated press is obtained. Provision is made for preventing the work being subjected to an excessive pressure. Provision is also made for admitting fluid under pressure into the larger cylinder after the ram or piston therein has traveled a predetermined distance. Provision is also made for preventing accidental starting of the press in operation as will be described. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of one form of press embodying this invention. Fig. 2, a rear elevation of the press shown in Fig. 1. Figs. 3, 4 and 5, details to be referred to.

Fig. 6, a diagrammatic view to illustrate the operation of the press.

In the present instance, the invention is shown as embodied in a press provided with a stationary upper platen *a* and a movable lower platen *b*, both of which may be of any suitable or desired construction. The stationary platen *a* is shown as attached to an overhanging arm *c* secured to or forming part of an upright frame *d*, the lower portion *e* of which may be made hollow to form a fluid supply chamber or reservoir. The lower platen *b* rests upon a piston or ram 10 of substantially large diameter, which reciprocates in a cylinder 12 open at its top and located below and substantially in line with the upper platen *a*, and preferably the lower platen *b* will be mounted on the piston or ram 10 so as to have a limited rocking movement thereon to compensate for uneven thickness in the material being pressed.

The piston or ram 10 may be designated the platen carrying piston and has cooperating with it a materially smaller piston 14, which may be designated the starting piston. The piston 14 may be separate from or attached to the lower surface of the large piston 10 and reciprocates in a small cylinder 15, located centrally below the cylinder 12 and in open communication therewith at its top, as clearly represented in Fig. 6.

The lower platen *b* is forced toward the upper platen *a* by pressure of a fluid, such as water, which is admitted into the small cylinder 15, and preferably into the large cylinder 12 after the piston in the latter cylinder has been moved a predetermined distance.

The fluid pressure is supplied from the hollow standard or reservoir *e* by a pump 17 of any suitable construction and which is designed to run continuously, and for this purpose is included in a normally open circulating system or circuit comprising as shown in Fig. 6, the reservoir *e*, pipe 20 connecting the pump 17 therewith, a valve casing 21 connected with the pump by a pipe 22 and by a pipe 23 with a second valve casing 24, which is connected to the reservoir *e* by a pipe 25.

The valve casing 21 is provided with two chambers 26, 27, normally separated by a valve 28, the chamber 26 being connected by the pipe 29 with the lower end of the large cylinder 12, and the chamber 27 being

connected by the pipe 30 with the lower end of the small cylinder 15. The valve 28 is normally seated by a spring 31 and has its stem 32 extended up into position to be engaged by a lever 33 (see Fig. 3) whose long arm 34 is extended into the path of movement of the piston or ram 10 to be engaged by the latter, after the said piston or ram has been moved a predetermined portion of its working stroke toward the upper platen. To this end, the piston 10 is provided with a slot, groove or channel 35 extended from its upper end toward its lower end, into which the lever arm 34 is extended, whereby the piston 10 may be moved a given distance before the bottom of the slot or channel 35 engages the lever arm 34, after which on the continued upward movement of the piston 10 the latter turns the lever 33 on its pivot and forces the valve rod 32 downward, thereby opening the valve 28 and connecting the chambers 26, 27, so that fluid under pressure is admitted into the large cylinder 12. The large cylinder 12 and its piston 10 have the functions of a pump, and the piston on its upstroke draws water or other fluid from the tank or reservoir *e* through a substantially large pipe 38, and on its downstroke said piston forces the water back through a pipe 39 into a chamber 40 in a valve casing 41 provided with a valve 42, which controls communication between the chamber 40 and a second chamber 43, which is connected by a pipe 44 with the reservoir *e*. The stem 45 of the valve 42 is operatively connected with the stem 46 of a valve 47 located in the casing 24 and controlling communication between the chambers 48, 49 therein, and the valve stem 46 is designed to be operated by the operator, and is herein shown as joined by a link 50 to one end of a lever 51, pivoted at 52 and having its other end connected by a link 53 to a crank 54 on a rock-shaft 55 provided with a second crank or handle 56. As represented in Fig. 6, the handle 56 is in an upright position, which may be considered the normal position for the same, when the press is not in operation.

When it is desired to start the press in operation, the handle 56 may be turned down into a substantially horizontal position in the direction indicated by the arrow 60, Fig. 6, which movement rocks the shaft 55 and lifts the link 53, thereby lowering the valve stem 46 so as to close the valve 47 and close the circuit through which the fluid is being circulated by the pump. At the same time, the valve 42 is closed, which closes the return from the cylinder 12 to the reservoir *e*. When the handle 56 has been turned into its operative position, it may be retained therein by a locking device, herein shown as a tooth, lug or projection 62 on a lever 63, said lug being adapted to enter a recess or notch 64 in the rock-shaft 55, which is also

provided with a second notch 65 into which the lug 62 enters when the handle 56 is in its inoperative position shown in Fig. 6. The handle 56 and the locking lever 63 may and preferably will be located at opposite ends of the rock-shaft 55, so as to require both hands of the operator to start the press and thereby reduce to a minimum the danger of the operator resting one hand on the movable platen when starting the press, with liability of the hand being caught between the platens. The inlet pipe 38 for the cylinder 12 is provided with a check valve 70 of known construction, which opens on the upward movement of the ram or piston 10, and which closes on the downstroke of the same.

Provision is made for preventing the fluid pressure in the cylinder 12 exceeding a predetermined point, which may be effected by means of a pressure relief valve 71 of any suitable or known construction, which is located in the circulating system and is shown as located in the pipe 22.

The upper platen *a* may be made in the form of a steam chest having inlet and outlet openings 72, 73.

By reference to Fig. 1, it will be seen, that the space between the platens is open on all sides, which allows the leather or other work to be pressed to be placed between the platens in a flat condition.

The operation of the press may be briefly described as follows:—When the press is not in use, the lower platen *b* is in its lowered position, and is separated from the platen *a* a distance suitable for the ready insertion of the leather or other material to be pressed, which is laid upon the lower platen in a flat condition. The pump 17 is designed to be driven continuously in any suitable manner, and serves to circulate the water or other fluid through a normally open circuit, which may be traced as follows:—From the reservoir *e* by pipe 20 to the pump 17, thence by pipe 22, relief valve 71, chamber 27, of valve casing 21, thence by pipe 23 to chamber 48 of valve casing 24 and thence by pipe 25 back to the reservoir *e*. The fluid also flows from the chamber 27 by pipe 30 into the smaller cylinder 15, but exerts no pressure on the piston 14. The valve 28 cuts off the large cylinder 12 from the circulating system. The workman places the leather or other material on the lower platen *b*, and then with one hand operates the locking lever 63 to unlock the rock-shaft 55 and with the other hand operates the handle 56 to turn the rock-shaft, so as to close the valve 47 and thereby interrupt the flow of liquid through its normally open circuit and cause it to exert pressure on the piston 14 in the small cylinder 15 and thereby start the ram 10 and the platen *b* toward the upper platen *a*. As soon as the ram 10 begins to move upward, it acts as the pis-

ton of a pump and draws fluid from the reservoir *e* through the pipe 38 into its cylinder 12, with the result that the space formed in the cylinder 12 by the movement of the ram 10 is filled with liquid and a solid backing for the lower platen is obtained. After the ram 10 has moved a portion of its stroke, and preferably at or about the time the leather or other material is engaged with the upper platen, the ram engages the lever 33 and opens the valve 28, whereupon the fluid under pressure flows into the large cylinder below the ram and forces the latter against the upper platen, thereby subjecting the work to the pressure desired, an excess of pressure being prevented by the relief valve 71, which opens when the pressure in the cylinder 12 reaches a predetermined point. After the work has been subjected to the desired pressure, the operator releases the locking lever 63 and restores the handle 56 to its starting position, which movement of the handle opens the valves 42, 47, thereby opening the circulating system and also the return from the cylinder 12, which permits the ram 10 to descend in its cylinder by gravity assisted by springs 80 if desired, and force the water therein back into the reservoir through the pipe 39, chambers 40, 43, of valve casing 41 and pipe 44.

From the above description, it will be seen that the cylinder 12 and its piston 10 has the double function of a hydraulic ram and of a pump, whereby the time required to fill the cylinder with fluid behind the piston is reduced to a minimum, which serves to obtain a quick acting hydraulic press. It will also be observed that the press is simple in construction, inexpensive and efficient in action. In Fig. 6, the pipe connections are shown at different levels so as to enable the flow of the fluid to be easily traced, but it will be understood that the invention is not restricted in any way to the plan or arrangement shown.

The lever 33 may be pivoted to a bracket 81, which is vertically adjustable by the screw 82 or otherwise on the cylinder 12 (see Fig. 3) so as to regulate the opening of the valve 28 to the desired portion of the stroke of the ram 10.

A fluid-tight joint may be obtained in any suitable manner between the pistons 10, 14, and their cylinders 12 and 15, as for instance by the packing rings 83, 84.

In the construction of the apparatus, the lever 51 is connected by the link 50 to a slide 85 (see Fig. 4), which slides in a vertical way in the back of the valve casing 24 and has attached to its upper end the stem 45 of the valve 42, the stem 46 of the lower valve 47 resting on the slide bar.

Claims:

1. In a machine of the class described, in combination, a stationary upper platen, a

lower platen movable toward and from said upper platen, a cylinder, a piston therein upon which said lower platen is supported, a second cylinder of smaller diameter than the first mentioned cylinder and in open communication therewith, a piston in said second cylinder cooperating with the piston in the first-mentioned cylinder to start the latter toward said upper platen, a fluid supply, a pump included in a normally open circuit with said fluid supply, a manually operated valve in said circuit normally open, means for connecting said cylinders with said circuit, a second valve normally closed to cut off the first-mentioned cylinder from said circuit, and operatively connected with the first-mentioned piston to be actuated thereby after the said piston has been moved a predetermined distance, a fluid inlet pipe for the first-mentioned cylinder, a fluid outlet pipe for said first-mentioned cylinder, a valve in said outlet pipe normally open, and means under control of the operator for operating the valve in the fluid outlet for the first-mentioned cylinder, and the valve in said circuit, substantially as described.

2. In a machine of the class described, in combination, a fluid-operated platen, a platen cooperating therewith, a cylinder, a piston therein upon which the fluid-operated platen is supported at the upper end of the piston, a starting piston for said platen-supporting-piston, a cylinder in which said starting piston is located, a normally open fluid circulating system in communication with said starting cylinder, a pump in said system, means to close said system and cause the fluid to move the starting piston, a plurality of fluid inlets for the cylinder of the platen-supporting-piston and a fluid outlet therefor, separate from the circulating system, and means to interrupt the circulating system and close the outlet for the cylinder of the platen supporting piston, substantially as described.

3. In a machine of the class described, in combination, a fluid-operated platen, a platen cooperating therewith, a cylinder, a piston therein upon which the fluid-operated platen is supported at the upper end of the piston, a starting piston for said platen-supporting-piston, a cylinder in which said starting piston is located, a normally open fluid circulating system in communication with said starting cylinder, a pump in said system, a valve casing connected with the cylinder of the platen-supporting-piston and included in said circulating system, a valve to control communication between the said system and the cylinder of the platen-supporting piston, means operated by the platen-supporting piston and cooperating with said valve to open the same after the platen-supporting piston has been moved a predetermined distance, a second fluid inlet and a separate

fluid outlet for the cylinder of the platen supporting piston, means to interrupt the said circuit and means to simultaneously close the fluid outlet for the cylinder of the
s platen supporting piston, substantially as described.

In testimony whereof, I have signed my

name to this specification in the presence of two subscribing witnesses.

FRANKLIN J. PERKINS.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.