

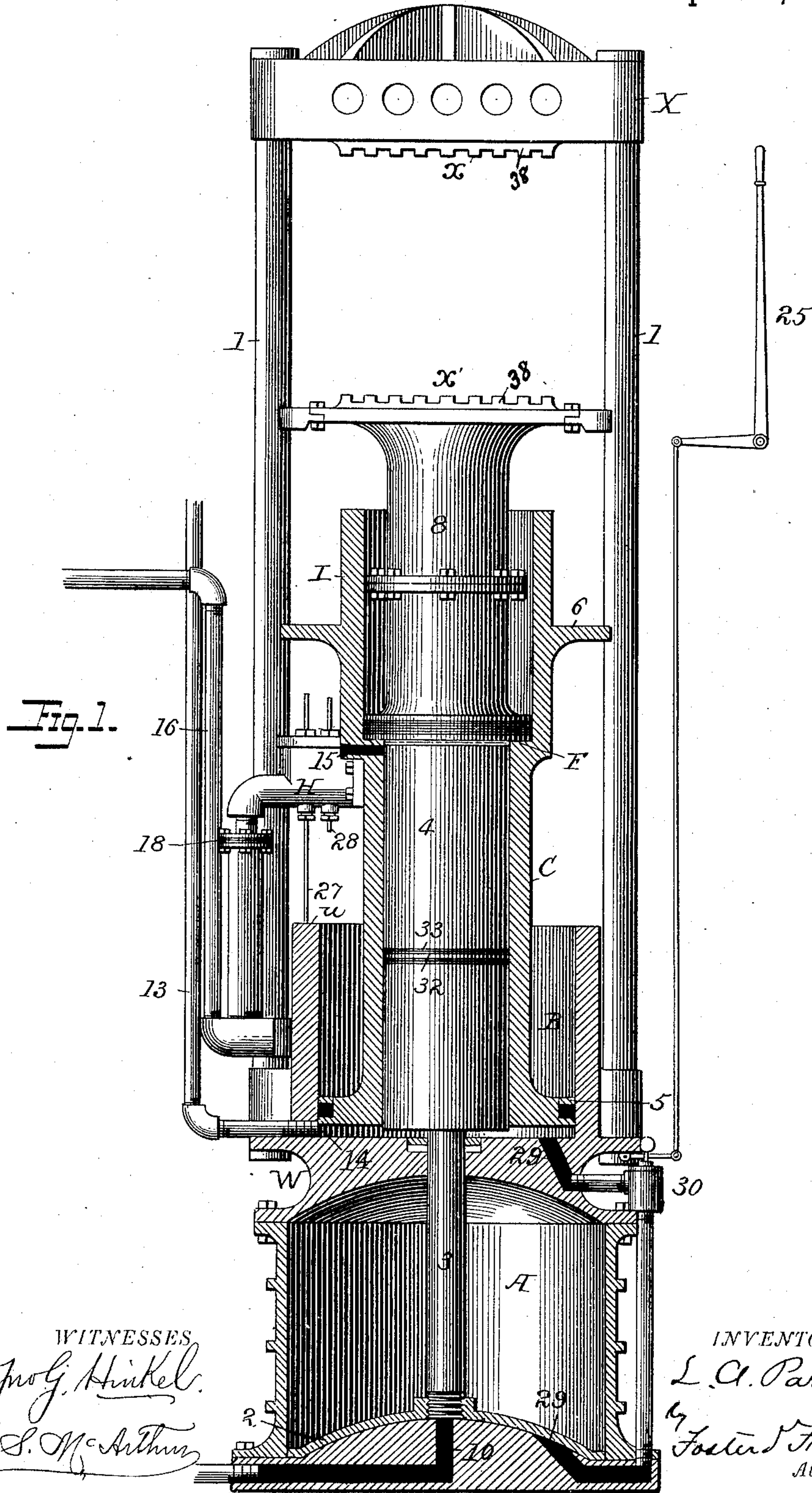
(No Model.)

4 Sheets—Sheet 1.

L. A. PARISHER.
COMPRESSING APPARATUS.

No. 473,472.

Patented Apr. 26, 1892.



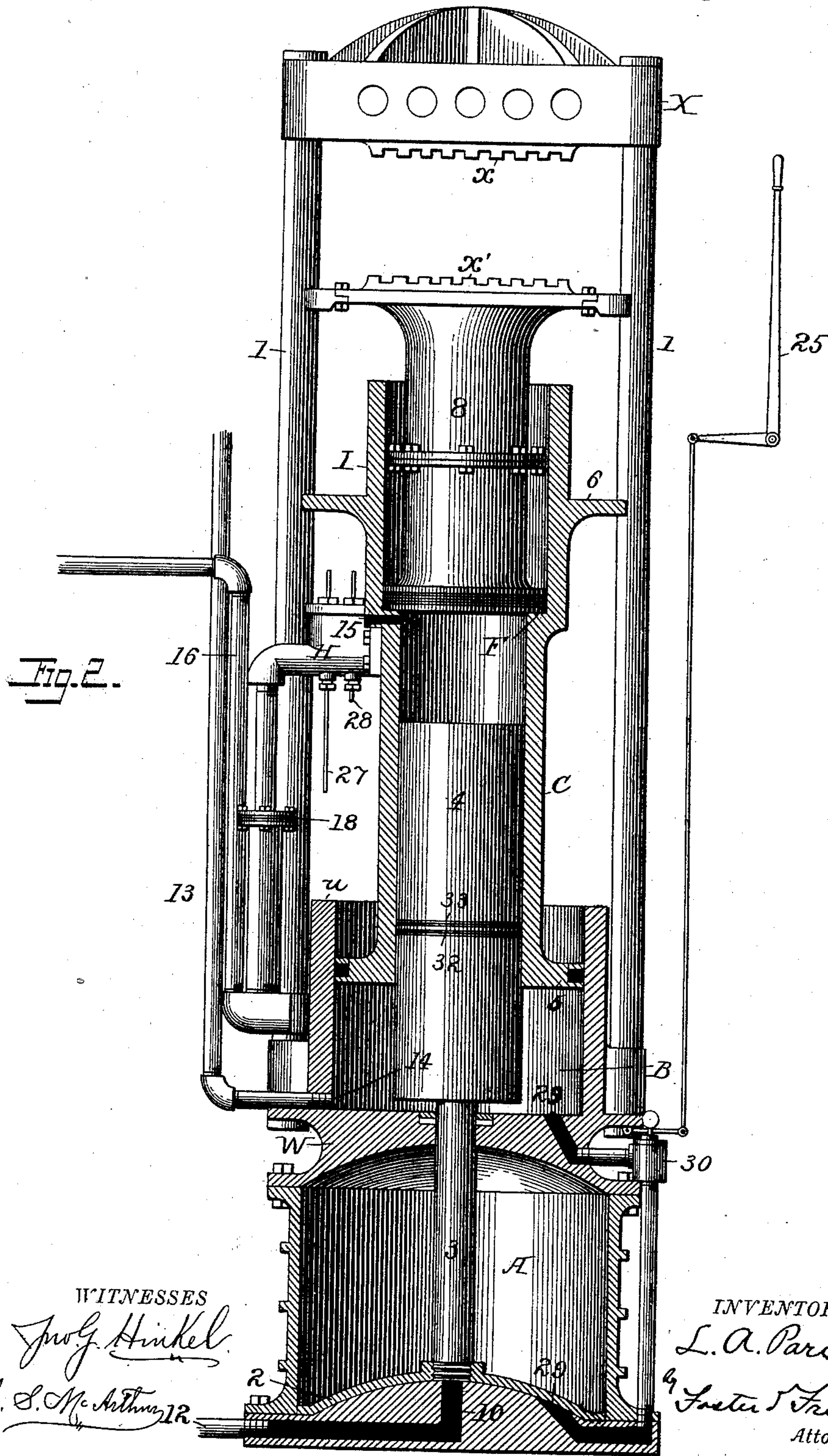
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WITNESSES

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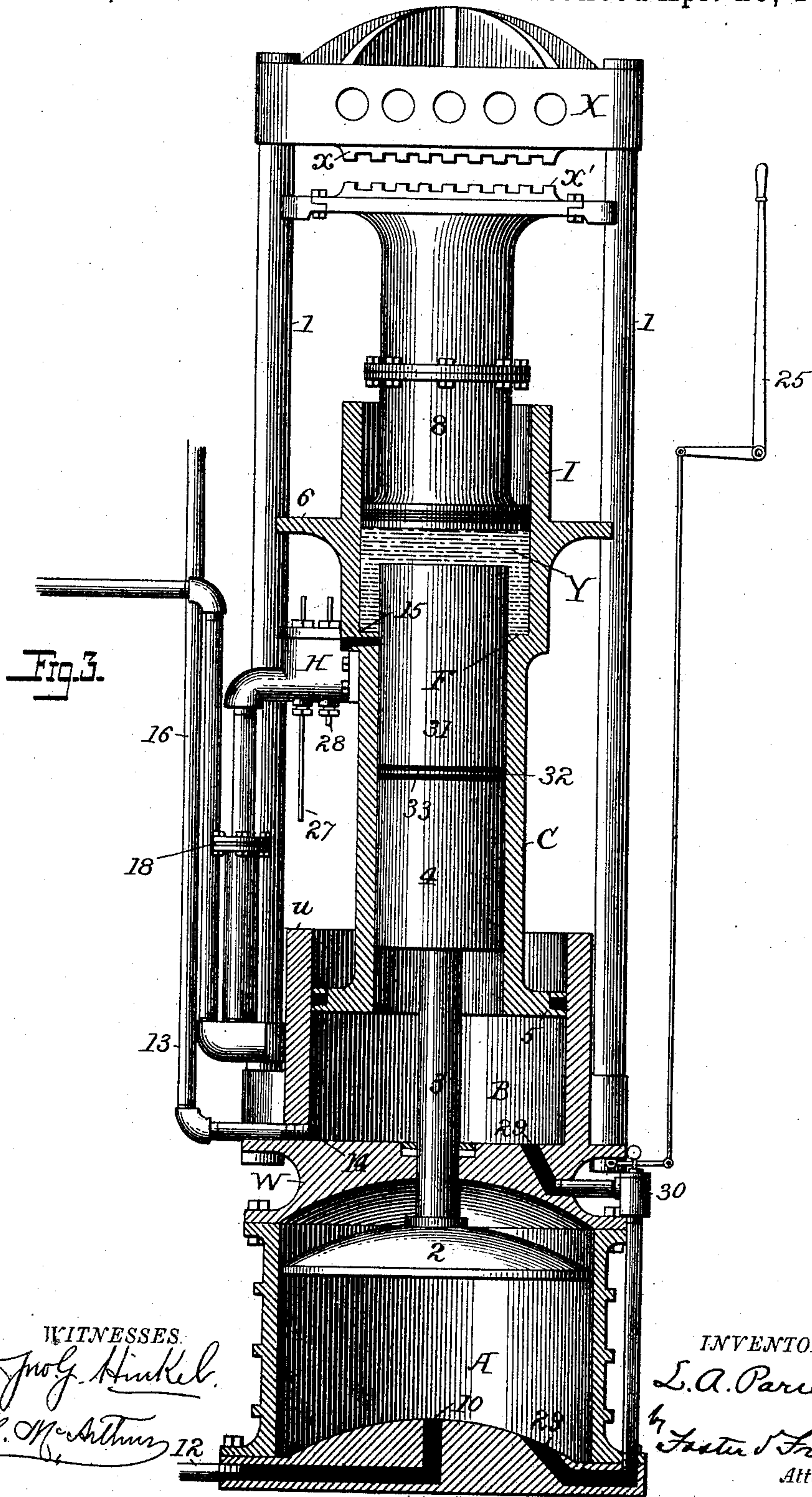
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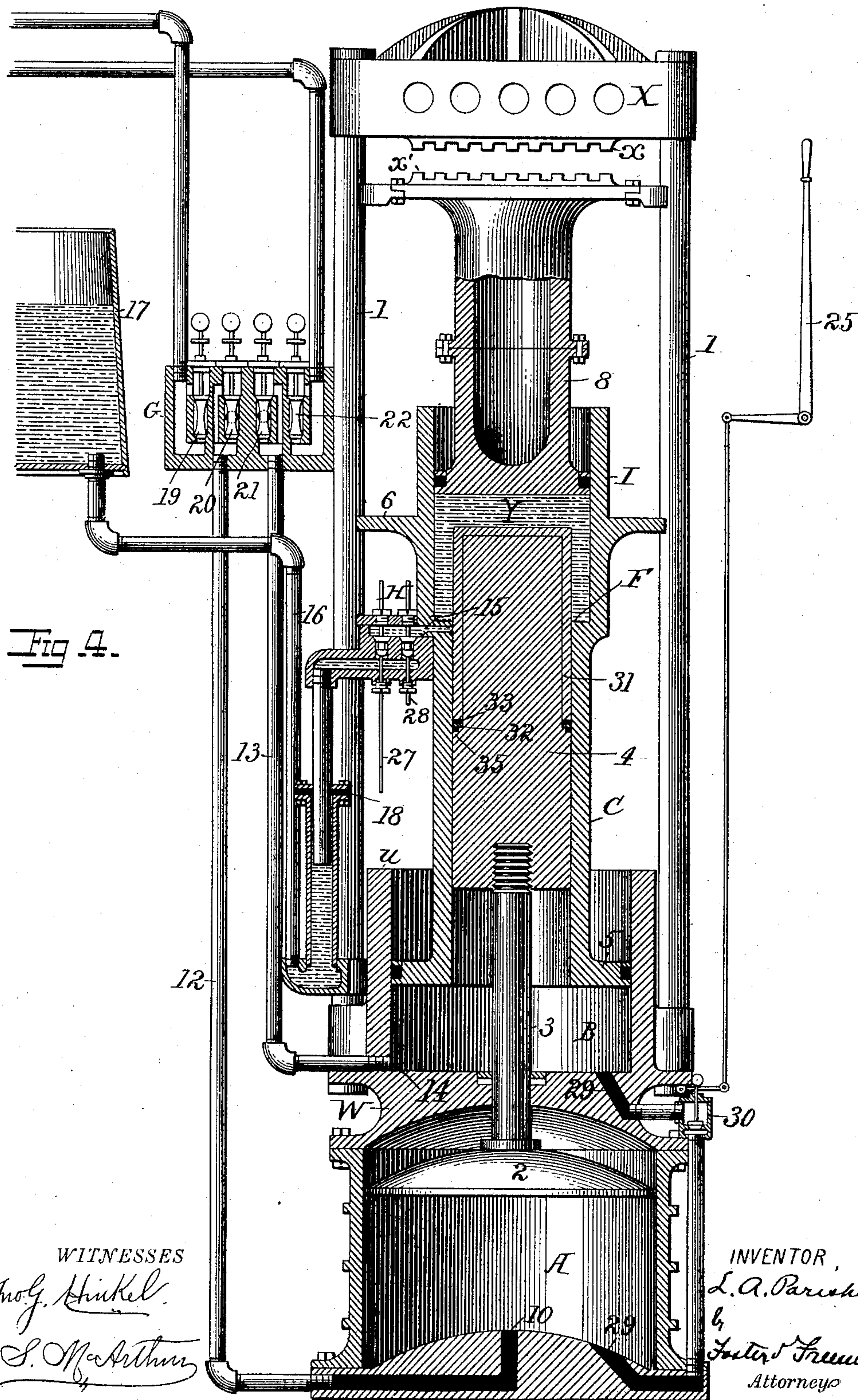
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UNITED STATES PATENT OFFICE.

LEMUEL ALPHUS PARISHER, OF SHREVEPORT, LOUISIANA.

COMPRESSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 473,472, dated April 26, 1892.

Application filed August 1, 1890. Serial No. 360,664. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL ALPHUS PARISHER, a citizen of the United States, residing at Shreveport, Caddo parish, Louisiana, have
5 invented certain new and useful Improvements in Compressing Apparatus, of which the following is a specification.

My invention relates to that class of presses that is used for compressing bales of cotton
10 to small dimensions; and my invention consists of a press constructed as fully set forth hereinafter, so as to combine both the power derived from the direct pressure of the steam from the generator and that derived from a
15 hydrostatic press.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved press; Figs. 2, 3, and 4, the same, showing the parts
20 in different positions.

A base-plate or foundation W of the press is tied to the cross head or plate X through the medium of a suitable number of bolts 1
25 1, the parts being arranged with the bolts either vertical or horizontal. As shown, the bolts are vertical, and to the base W is connected or formed integral therewith a steam-cylinder A, provided with a piston 2, the piston-rod 3 of which extends through the head
30 of the cylinder A and carries at its upper end a cylindrical piston, plunger, or ram 4. Connected to or forming a part of the base, but above the latter, is a second cylinder B, within which slides the annular piston 5, connected to a cylinder C, to which the piston 4
35 is fitted, and which expands above an annular face F to form a cylinder I, to which is connected a sliding cross-head 6. To the cylinder I is fitted a piston 8, that carries the movable plate X of the press.

With the cylinder A communicates a port
40 10, with which connects a steam-pipe 12, and a steam-pipe 13 communicates with a port 14, leading to the cylinder B, and with a port 15 of the cylinder I communicates a water-pipe
45 16, supplied with water or other fluid from a reservoir 17. As the cylinder I has a vertical movement, the supply-pipe 16 is flexible or otherwise constructed to supply the desired liquid during the movement of the piston. As shown, one portion of the pipe is
50 fixed to the frame of the apparatus, while another portion moves with the cylinder, slid-

ing in a packing-box 18. The pipes for the admission and outflow of fluid to the three cylinders are provided with suitable valves. 55 Thus there is a casing G provided with chambers, ports, and passages for four balanced piston-valves 19 20 21 22, the valves 19 and 20 controlling the flow of steam to and from the pipe 12, and the valves 21 and 22 controlling its
60 flow to and from the pipe 13, the pipes 23 and 24 conveying steam to the casing from a suitable generator. In the line of the pipe 16, and connected with that portion which moves with the cylinder, is a casing H, containing
65 two valves similar to check-valves, provided with stems 27 28, the former adapted to make contact with a face or bearing *u* of the apparatus as the cylinders C and I reach the lowest position, so that the valve will always be
70 open when said cylinders are in said position.

Between the cylinder B and the bottom of the cylinder A is a by-passage 29, in which is a valve 30, the stem of which is connected to
75 be operated by a lever.

The several pistons described are provided with suitable packings, the construction of the piston 4 and its packings being best illustrated in Fig. 4, which shows the said piston
80 as reduced in diameter for the upper half of its length to receive a tubular cap or cover 31, between the edge of which and a ring 32, bolted onto the body of the piston, intervenes the packing-ring 33, while a similar packing-
85 ring is between the ring 32 and an annular shoulder 35 of the piston, the space between the respective shoulders being greater than the thickness of the packing-rings, so as to
90 allow for a certain play, which insures a better joint if any fluid under pressure reaches said space. The cap 31 may be bolted to the body of the piston in any suitable manner.

It will be noted that the lowest steam-cylinder A is larger in diameter—say ninety
95 inches—than the upper steam-cylinder B—say seventy-two inches—and that the water-cylinder I is smaller in diameter—say forty inches—than the smaller steam-cylinder B, the piston 4 being smaller in diameter than the piston 8—
100 say thirty inches.

The fixed and movable plates or platens X X' of the press are provided with the usual channeled face-plates 38 38, between which the

bale is placed when the parts are in the position shown in Fig. 1.

Assuming that all of the pistons are down in the position shown in Fig. 1 and that a bale of ordinary size has been placed upon the platen X, the operation will be as follows: The valve 22 is first opened and steam flows into the cylinder B, raising the piston 5 and cylinders C I to the extent limited by the compression of the bale—say forty inches—compressing the bale to twenty inches. The valve 22 is then closed to lock the steam in the cylinder B under the boiler-pressure—say one hundred pounds. As the cylinder C rises, it carries with it the cylinder I and the piston 8, which is thereby separated from the piston 4, and the water is drawn through the port 15 into the chamber Y of the cylinder C, the valve 28 rising freely to permit the inflow. The piston 2 rests normally upon the bottom of the cylinder A. When the machine is operated, the plunger 4 will tend to raise the piston 2; but this movement will be immediately checked by the formation of a vacuum beneath the piston, inasmuch as the space beneath the piston is entirely cut off from communication with the atmosphere. The atmospheric pressure therefore on the upper side of the piston will keep it and the plunger 4 nearly or quite at their lowest positions until steam is admitted into the cylinder A. The valve 19 is then shifted to permit steam to flow from the boiler into the cylinder A to lift the piston 2, thereby also raising the piston or plunger 4, which displaces a portion of the water in the chamber Y, causing it to press upon the lower end of the piston 8 and also upon the annular piston-face F of the cylinder C, so that the same pressure lifts the piston 8 and presses the water down against the piston-face F of the cylinder C and forces the latter down, reducing the amount of the space in the cylinder B and compressing the steam, which is locked therein. With a pressure of one hundred pounds to the square inch below the piston 2 and with the parts proportioned as above estimated the hydraulic pressure will be sufficient to force down the cylinder C until the steam in the cylinder B is compressed to nearly one-half its original volume, thereby increasing the pressure in said cylinder to, say, one hundred and eighty pounds to the square inch. The pressure in the cylinder B will of course act upon the under side of the piston 4 as against the pressure against the upper end of said piston, the pressure below being greater, but the area being reduced to the extent of the area of the piston-rod 3. It will be seen that the plunger or piston 4 is between two chambers Y B, and that by forcing the plunger by the action of steam upon a large piston connected therewith into the chamber Y, filled with water, and by bringing the pressure in the chamber Y to act upon a piston that compresses the steam in the chamber B, I secure additional pressure upon the piston 4, all of which is employed by utiliz-

ing the differential action of the smaller piston or plunger 4 and the larger piston or plunger 8, between which intervenes the incompressible fluid. If extra pressure should be required to force the bale to the required size after the parts are in the position shown in Fig. 4, the valve 19 is shifted to lock the steam in the cylinder A and the valve 30 is opened, thereby permitting the portion of the steam under excessive pressure in the chamber B to pass below the piston 2, lifting the latter and increasing the hydraulic pressure in the chamber Y, and consequently the pressure on the platen-piston 8. When the bale has been completely pressed, the parts will be substantially in the position shown in Fig. 4.

When the bale has been bound and is to be released, the parts are brought to their original position, as follows: First the valve 22 is shifted to open communication between the cylinder B and the boiler, so that a portion of the steam in the cylinder B, which is under high pressure, will flow back to the boiler until the pressure in the two are equalized, after which the valve 22 is closed and the valve 21 is opened to permit the remaining portion of the steam from the cylinder B to pass to the exhaust, when the cylinder C, together with the cylinder I, will descend to the lower position, the piston 8 following the movements of the cylinders and the stem 27 finally striking the edge of the cylinder B, whereby the valve 25 is opened and the water is permitted to flow out of the chamber Y and back into the reservoir under the weight of the piston 8 and its adjuncts. The steam is then permitted to pass from the cylinder A.

It will be evident that various valve appliances may be employed differently constructed from those shown in the drawings and that the parts may be modified, as may be necessary, to adapt them to the different situations and purposes.

Without, therefore, limiting myself to the precise construction shown and described, I claim—

1. The combination, with a movable platen X' and with the main cylinder A of a press, of a smaller cylinder B, an annular piston 5 in cylinder B, movable cylinders C and I, carried by said annular piston, a plunger connected with the piston of the main cylinder and sliding in the movable cylinder C, and a piston within the cylinder I, connected with the platen, substantially as set forth.

2. The combination, with the main cylinder A, its piston-rod, and plunger 4, of a smaller cylinder B, having an annular piston 5, a cylinder C, connected with the piston 5 and receiving the plunger 4, a larger cylinder I, connected with the cylinder C and communicating with the source of water-supply, having a check-valve in the communication, and a platen having a plunger or piston fitting the cylinder I, substantially as set forth.

3. The combination, with the cylinder A, its piston and piston-rod, and the cylinder B

and its piston, said cylinders having separate steam-inlet passages provided with valves, of means for moving the piston of the cylinder B to compress the steam therein after the communication with the generator has been cut off and a passage between said cylinders provided with a valve, substantially as set forth.

4. The combination, with the plunger 4 and means for operating the same, of a cylinder B, a piston 5 within the cylinder B, a cylinder C, connected with the piston 5, a cylinder I, containing the plunger 4 and being arranged above and connected with the cylinder C, a plunger 8, connected with the platen and fitting the cylinder I, and means for introducing an incompressible fluid into the cylinder I between the plungers, substantially as set forth.

5. The combination, with the movable cylinders C and I, rigidly connected together, the plungers 4 and 8, arranged within said cylinders, respectively, and the extensible water-channel, of a casing H, carried by the

cylinders and having its cavity in communication with the space between the plungers, and a check-valve within the casing, said valve having a stem arranged to be moved by contact with a stationary part of the machine, for the purpose set forth.

6. The combination, with the cylinder I, having an annular face F, a plunger within the cylinder connected with the platen, and a body of incompressible fluid in said cylinder, of a plunger 4 and means for forcing it into the body of fluid in the cylinder I and a piston 5, connected with the cylinder I, a cylinder B, a cylinder A, having a piston connected with the plunger 4, and a by-pass between cylinders A and B, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEMUEL ALPHUS PARISHER.

Witnesses:

JOHN R. JONES,
DON CAMPBELL.