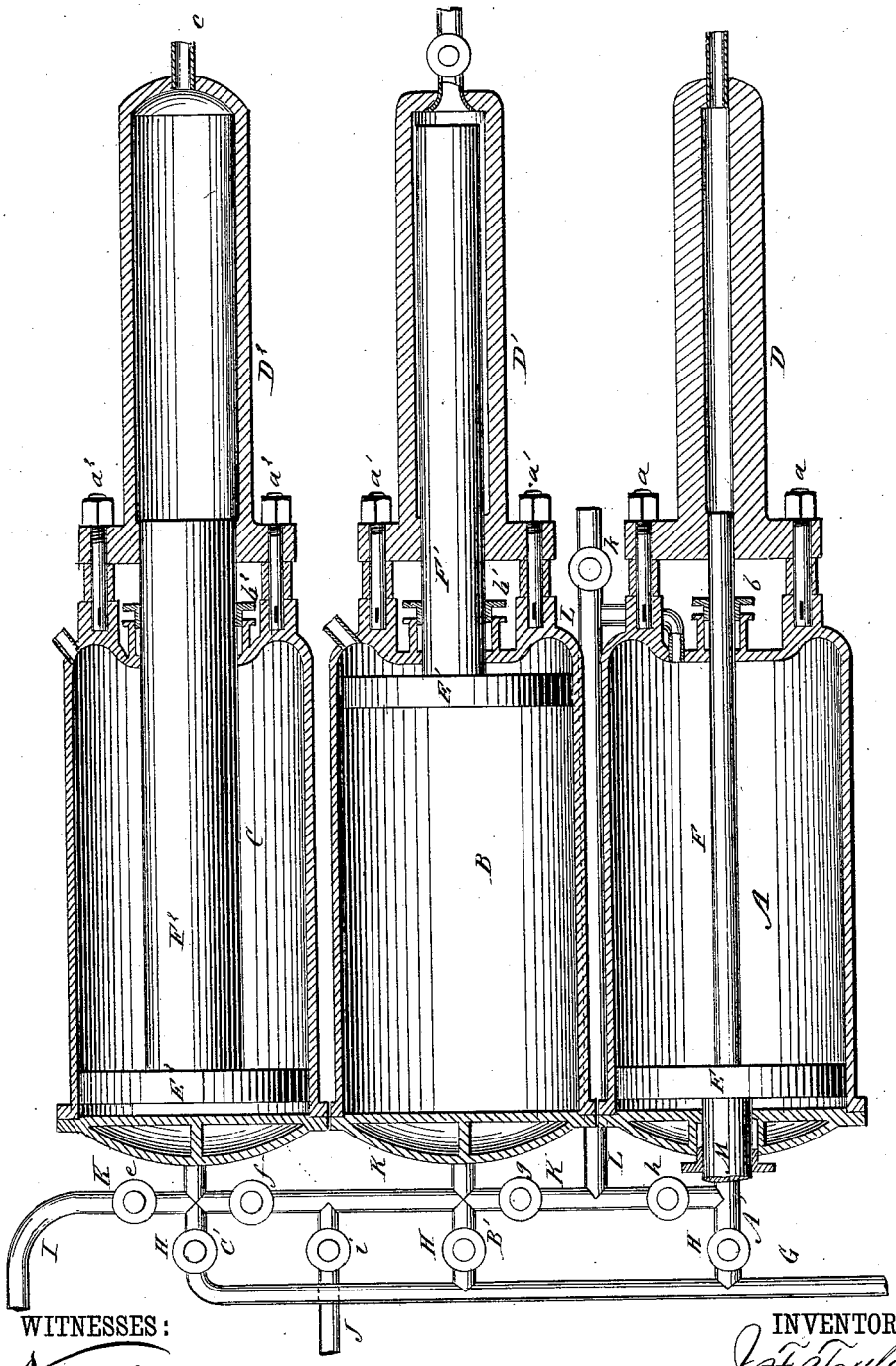
J. F. TAYLOR.

Steam and Hydraulic Press.

No. 206,501. Patented July 30, 1878.



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JOHN F. TAYLOR, OF GLENVILLE, CONNECTICUT.

IMPROVEMENT IN STEAM AND HYDRAULIC PRESSES.

Specification forming part of Letters Patent No. **206,501**, dated July 30, 1878; application filed February 1, 1878.

To all whom it may concern:

Be it known that I, JOHN FISHER TAYLOR, of Glenville, in the county of Fairfield and State of Connecticut, have invented a new and Improved Three-Cylinder Direct-Acting Steam and Hydraulic Press, of which the following is a specification:

My invention relates to an improvement on the direct-acting steam and hydraulic press for which Letters Patent No. 112,298 were granted to me February 28, 1871, which Letters Patent were reissued April 2, 1872, and numbered 4,851, in which press two steam-cylinders are employed, the pistons of the said cylinders being attached to rams of different diameter, the larger ram being employed to impart the initial pressure, and the smaller one the finishing-pressure, the piston that moves the larger ram being operated by exhaust-steam from the cylinder which drives the smaller ram.

My improvement consists in adding to the press an auxiliary steam-cylinder, having a still larger ram, for reducing the bulk of the matter in the press before applying the heavier pressure created by the smaller rams. The piston of the auxiliary steam-cylinder is operated by the exhaust-steam from one or both of the cylinders, before described.

The object of the invention is to effect economy of fuel in working hydraulic presses, and to accomplish the work by means of smaller steam-cylinders than have been hitherto employed.

In pressing cotton and similar materials it requires a very small amount of force to reduce it to half its original bulk. When this is accomplished the process may be finished by the cylinders having the smaller rams.

Referring to the drawing, A B are the steam-cylinders of a steam and hydraulic press, as formerly used, and C is the auxiliary cylinder.

A chamber, D, is secured to the end of the cylinder A by bolts *a*; and the said cylinder contains a piston, E, with which a ram, F, is connected, which extends through a stuffing-box, *b*, in the end of the cylinder, and projects into the chamber D.

A chamber, D^1, is secured to the head of the cylinder B by bolts a^1, and the cylinder B contains a piston, E^1, which is connected with a ram, F^1, that extends through a stuffing-box, b^1, in the head of the cylinder and into the chamber D^1.

To the head of the cylinder C a chamber, D^2, is secured by means of the bolts a^2, and the said cylinder contains a piston, E^2, which is attached to a ram, F^2, that projects through the stuffing-box b^2 into the chamber D^2.

The chambers D D^1 are both connected with a single pipe, which extends along a series of presses, and is connected with each press by a separate branch in which there is a check-valve. The chamber D^2 is connected with all of the presses by means of a pipe, *c*, and branch pipes having check-valves.

The cylinders A B C are connected with the steam-supply pipe G by means of the branch pipes A′ B′ C′, and each branch pipe is provided with a valve, H, for controlling the admission of live steam to the cylinders.

The branch pipes A′ B′ C′ are connected together and with the exhaust pipes I J by the pipe K. In the pipe K there are four valves, *e f g h*, and the pipe J is provided with a valve, *i*.

The pipe L is connected with the front end of the cylinder A, and communicates with the pipe K between the valves *g h*. The pipe L projects beyond the branch by which it is connected with the cylinder-head, and is provided with a valve, *k*.

A trunk, M, is attached to the piston E, and projects through a stuffing-box, *l*, in the rear head of the cylinder A. This trunk is designed to diminish the area of the rear side of the piston E, so that the steam, when admitted to the front of the cylinder, will be effectual in returning the piston to the rear end of the cylinder.

The operation of the steam-cylinders is as follows: By opening the valves H in the branch pipe A′ steam is admitted to the cylinder A, and forces the piston E forward. By closing the valve H in the pipe A′ and opening the valves *h g* in the pipe K, steam is permitted to escape from the cylinder A to the cylinder B through the pipes K B; and by closing the valve *g* and opening the valve *f*, the steam contained by the cylinder B is permitted to escape through the pipes K C′ to the cylinder C.

Should the steam that passes from the cylinder A to the cylinder B be found insufficient

to carry the piston as far as required, a small quantity of live steam is admitted to the cylinder B through the valve H in the pipe B; and should the steam that escapes from the cylinder B to the cylinder C be found insufficient, a small quantity of live steam may be admitted to the said cylinder through the valve H in the pipe C′.

Suppose the chamber D^2 to be in communication with one of a series of presses, as already described, the exhaust-steam from the cylinder B, by acting on the piston E^2, forces the ram F^2 forward, and reduces the bale in the press to half its original bulk.

While this operation progresses the piston E^1 is being forced back to the rear of the cylinder B by the water forced into the chamber D^1 by the dropping down of the rams in another of the presses; and simultaneously with this operation the piston E in the cylinder A is driven forward by steam admitted through the valve H in the pipe A′, thus finishing the compression of the bale by means of the small ram F.

When the finished bale is removed the piston E is returned to the rear end of the cylinder by the dropping of the ram in the press from which the finished bale is removed and by steam admitted to the front end of the cylinder through the valve *h* and pipe L.

It will thus be seen that to raise a press the piston E^2 in the cylinder C is first operated, which will raise the press about one-half of the whole travel.

The piston E^1 in the cylinder B is applied, which will raise the press about five-sixths of the remaining half of the travel. The piston E is then operated, which finishes the travel of the press-rams and applies the final pressure.

Any press of a series can be raised or lowered at pleasure by opening and closing the proper valves on the presses, and operating the steam-pistons in the order explained.

All of the valves are opened and closed by hand.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of the cylinders A B C, having, respectively, chambers D D^1 D^2, pistons E E^1 E^2, and rams F F^1 F^2, said cylinders being connected with pipe G, that furnishes a supply of live or exhaust steam, whereby the cotton or other material is reduced fifty per cent. by twice-exhausted steam, then this bulk again reduced fifty per cent. by a once-exhausted steam, and finally this reduced to the minimum bulk by live steam.

JOHN FISHER TAYLOR.

Witnesses:
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