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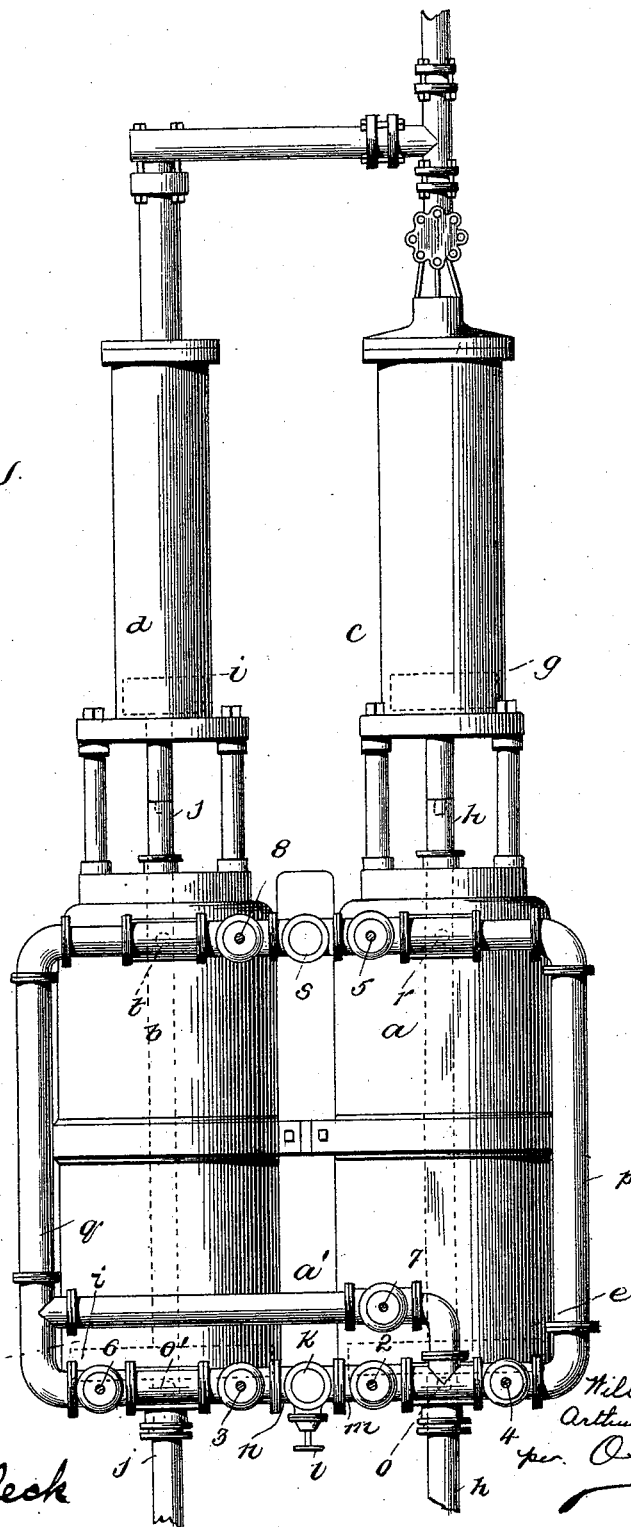
2 Sheets—Sheet 1.

W. W. BIERCE & A. THOMLINSON.  
HYDRAULIC COMPRESS.

No. 523,925.

Patented July 31, 1894.

Fig. 1.



Witnesses  
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*Will H. Bierce*  
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per *O. C. [Signature]*  
Attorney

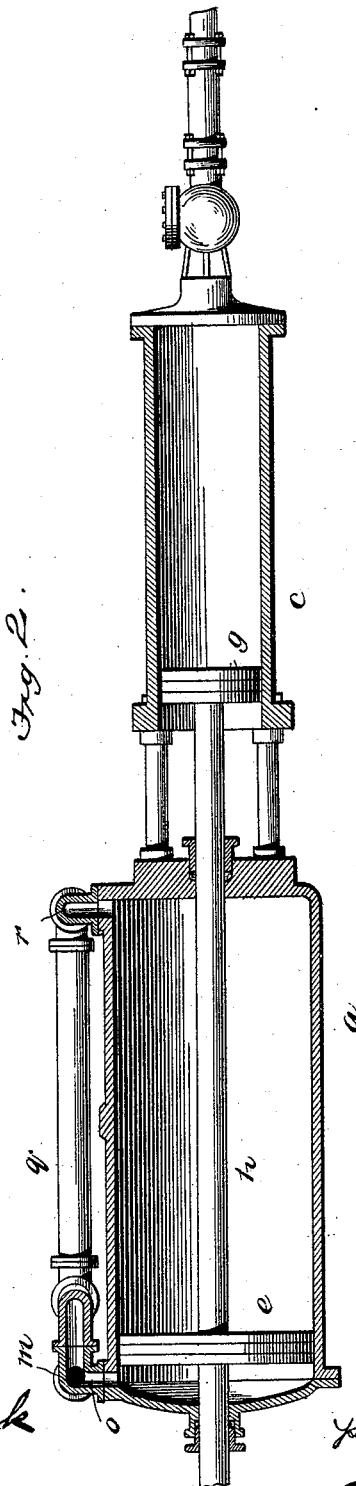
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2 Sheets—Sheet 2.

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HYDRAULIC COMPRESS.

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Witnesses

*Hubert E. Peck*

Inventors

*Will H. Bierce and  
Arthur Thomlinson  
per O. C. Jeff*

# UNITED STATES PATENT OFFICE.

WILL W. BIERCE AND ARTHUR THOMLINSON, OF MONTGOMERY, ALABAMA.

## HYDRAULIC COMPRESS.

SPECIFICATION forming part of Letters Patent No. 523,925, dated July 31, 1894.

Application filed October 2, 1893. Serial No. 487,006. (No model.)

*To all whom it may concern:*

Be it known that we, WILL W. BIERCE and ARTHUR THOMLINSON, of Montgomery, in the county of Montgomery and State of Alabama, have invented certain new and useful Improvements in Hydraulic Compresses; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

15 This invention relates to certain improvements in hydraulic compresses.

The invention relates more particularly to improvements in the construction of the "Taylor" hydraulic cotton compresses wherein 20 high pressure and low pressure hydraulic cylinders are connected with the press cylinders and are, respectively, provided with steam cylinders secured thereto in alignment therewith and the pistons on the steam cylinders are rigidly connected by piston rods with the pistons in their respective hydraulic cylinders. A suitable system of steam pipes is provided for the steam cylinders so that the piston in the low pressure steam cylinder 30 is first forced forward to impart the initial stroke to the press, and then the steam is turned into the high pressure steam cylinder which gives the final quick heavy stroke to the press, so that the two successive strokes 35 are imparted to the bale. A suitable system of steam pipes has been so arranged that the exhaust steam from the high pressure cylinder has been utilized to move the low pressure piston and each cylinder has been provided with a suitable exhaust. This system 40 has certain disadvantages, such as the drawing in of air in the low pressure cylinder when its piston is forced back by the pressure from the high pressure cylinder. Furthermore the steam from one exhaust has been utilized to supply the heater with steam for heating the feed water for boilers. The entrance of air to the low pressure cylinder or either one of the cylinders is a great disadvantage and is 45 accompanied by many serious objections.

It is the object of our present invention to

so connect and construct a system of steam pipes that all of the exhaust steam will be utilized and discharged into a single exhaust 55 passing through heater and also both cylinders will be cut off from the outer air, so that the air will not enter the cylinders, whatever the movement or position of the pistons therein.

This invention consists of a hydraulic compress comprising the two adjacent steam cylinders, a steam supply pipe, branch pipes therefrom extending across the rear end of the cylinders and from thence extending across and opening into the front ends of the 65 cylinders, a single exhaust arranged at the front end of the cylinders, into which both of said branches open from the front ends of the cylinders, the valved side connection, the valves arranged in the branch pipes on opposite sides of the opening into the rear ends of the cylinders, and the valves in the front 70 ends of the pipe between the exhaust and the openings into the front ends of the cylinders.

Referring to the accompanying drawings: 75 Figure 1, is a plan view of the cylinder and feed conduit of a press constructed after our invention. Fig. 2, is a longitudinal section of one of the steam cylinders, and of the hydraulic cylinder connected therewith. 80

In the drawings the reference letter *a*, indicates the low pressure steam cylinder, and the letter *b*, the high pressure steam cylinder. These two cylinders are preferably secured together in a horizontal parallel position, substantially as shown. 85

*c*, indicates the low pressure hydraulic cylinder secured to the front end of the low pressure steam cylinder in alignment therewith a distance therefrom. The low pressure steam piston *e*, is connected with the pressure hydraulic piston *g*, by means of the rigid piston rod *h*, so that these two pistons move together. The high pressure steam piston is connected to the high pressure hydraulic piston *i*, by the rigid piston rod *j*, in the 95 same manner, and the high pressure hydraulic cylinder is secured to the front end of the high pressure steam cylinder in a similar manner to that of the low pressure cylinder 100 as before described.

The front ends of the hydraulic cylinder

are connected with the press operating cylinder in any usual or suitable manner.

*k*, indicates the live steam supply pipe located above and midway between the rear ends of the steam cylinders. A branch *m*, extends laterally from said steam supply pipe across the rear end of the low pressure steam cylinder and is from thence continued around, see *p*, and up beside said cylinder to the front end thereof, and from thence is continued across the front end of said cylinder to the final exhaust pipe *s*, located midway between the front end of the cylinders, and preferably in a line above the same. A branch steam pipe *n*, extends from said live steam supply pipe across the rear end of the high pressure steam cylinder, and is from thence extended up beside said high pressure cylinder see *q*, to the front end thereof where it is continued across the front end of said cylinder to the said exhaust *s*.

The steam supply pipe *m*, is provided with an opening into the rear end of the low pressure steam cylinder at *o*, and the pipe *p* is provided with an opening *r* into the front end of the low pressure steam cylinder. The pipe *n*, is provided with an opening into the rear end of the high pressure steam cylinder, and the pipe *q*, is provided with an opening *t* into the front end of the high pressure steam cylinder.

2, indicates a cut off valve located in the pipe *m*, between the opening *o*, and the cut off valve *l*, in the live steam supply pipe.

4, indicates a cut off valve in the pipe *p*, at the rear end of the low pressure cylinder located between the opening *o* and *r*, into said low pressure cylinder.

5, is a cut off valve in the pipe *p*, at the front end of the low pressure cylinder and located between the opening *r*, in the low pressure cylinder, and the exhaust *s*.

3, is a cut off valve in the pipe *n*, between the live steam supply pipe *k*, and the opening *o'* into the rear end of the high pressure cylinder.

6, is a cut off valve in the pipe *q*, at the rear end of the high pressure cylinder between the openings *o'* and *t*, into said high pressure cylinder.

8, is a cut off valve in the pipe *q*, between the opening *t*, and the exhaust pipe *s*.

*a'* is a side connection pipe extending from the pipe *q*, at a point between the valve 6, and the opening *t*, to the pipe *m*, at the point where it discharges into the rear end of the low pressure cylinder at *o*, and between the valves 2 and 4. This side connection pipe *a'* is provided with the cut off valve 7.

In operation, the valve 1, being open, and the valves 7, 4, 5, 8, 6 and 3 being closed and the live steam valve 2, open, the live steam in pipe *k* passes through pipe *m* and opening *o*, into low pressure cylinder behind the piston thereof, imparting the initial stroke to the piston and to the press through the medium of the mechanism hereinbefore described.

The valve 2, is then closed, and the valve 3, is then opened permitting live steam to flow through pipe *n*, and opening *o'* into the high pressure cylinder, thereby forcing the piston thereof forward and imparting the finishing quick heavy stroke, to pass through the medium of the mechanisms before described. The valve 3, is then closed. The valve 4 in pipe *p*, is then opened so that the steam exhausts from behind the low pressure piston, passes up through opening *o*, and pipe *p* into the front end of the low pressure cylinder thereby permitting its piston to move back to the rear end of the cylinder ready for another stroke. The valve 4, is then closed. The valve 6, is then opened permitting the steam to exhaust from the rear end of the high pressure cylinder through pipe *q*, into the front end of the high pressure cylinder thereby permitting the high pressure piston to move back in readiness for another stroke. The valve 6, is then closed. The valve 7, is then opened thereby permitting the steam to exhaust from the front end of the high pressure cylinder through openings *t*, pipe *q*, and side connection pipe *a'*, and opening *o*, into the rear end of the low pressure cylinder, moving the low pressure piston forward its entire or a portion of its entire stroke. The valve 5, having been previously opened so that the exhaust steam in front of the low pressure piston discharges into the exhaust pipe *s*. If the exhaust steam from the high pressure cylinder does not carry the low pressure piston forward its complete stroke, the valve 7, is closed, and the valve 2 opened so that the live steam is provided to finish the stroke of the low pressure piston. The valve 3, is then opened permitting live steam to flow behind the high pressure piston, the valve 8, having been previously opened. The high pressure piston then makes its stroke. The exhaust steam in front of the high pressure piston is discharged through valve 8 into the exhaust pipe *s*. These operations are continued in proper sequence as the machine is actuated.

It will be observed that all the exhaust steam from the cylinder is exhausted into the single exhaust pipe *s*, which is usually connected with the feed water heater, not shown or to some other device, where the heat of the steam, or the steam can be utilized for some useful purpose. It will also be observed that the parts are so connected and arranged that no cold air can be drawn into the cylinder, and thereby the cylinders are not suddenly chilled but are kept heated at the proper point to prevent injury to the cylinders, or undue condensing of the steam. By this peculiar arrangement, a very material saving is affected in the running of the machine, and furthermore the durability and life of the apparatus is increased.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

A hydraulic compress comprising the ad-

10 jacent steam cylinders, a steam supply, steam  
pipes therefrom opening into the rear ends of  
said cylinders and extending to and opening  
into the front ends of the cylinders, a single  
5 pipe s, at the front ends of the cylinders, all  
of said steam pipes extending beyond their  
openings into the front ends of the cylinders  
and opening into said single exhaust pipe, as  
set forth, a side steam connection, the valves  
10 controlling the discharge of steam into and  
from the rear ends of said steam cylinders,  
and the valves 5, 8,—in said steam pipes be-

tween the exhaust and the openings into the  
front ends of the cylinders, for the purpose  
set forth.

In testimony that we claim the foregoing as  
our own we affix our signatures in presence of  
two witnesses. 15

WILL W. BIERCE.  
ARTHUR THOMLINSON.

Witnesses:

HORACE MCFADDIN,  
W. A. SAFFORD.