(No Model.) 2 Sheets—Sheet 1.

C. E. HEISS.

HYDRAULIC PRESS.

No. 346,913. Patented Aug. 10, 1886.

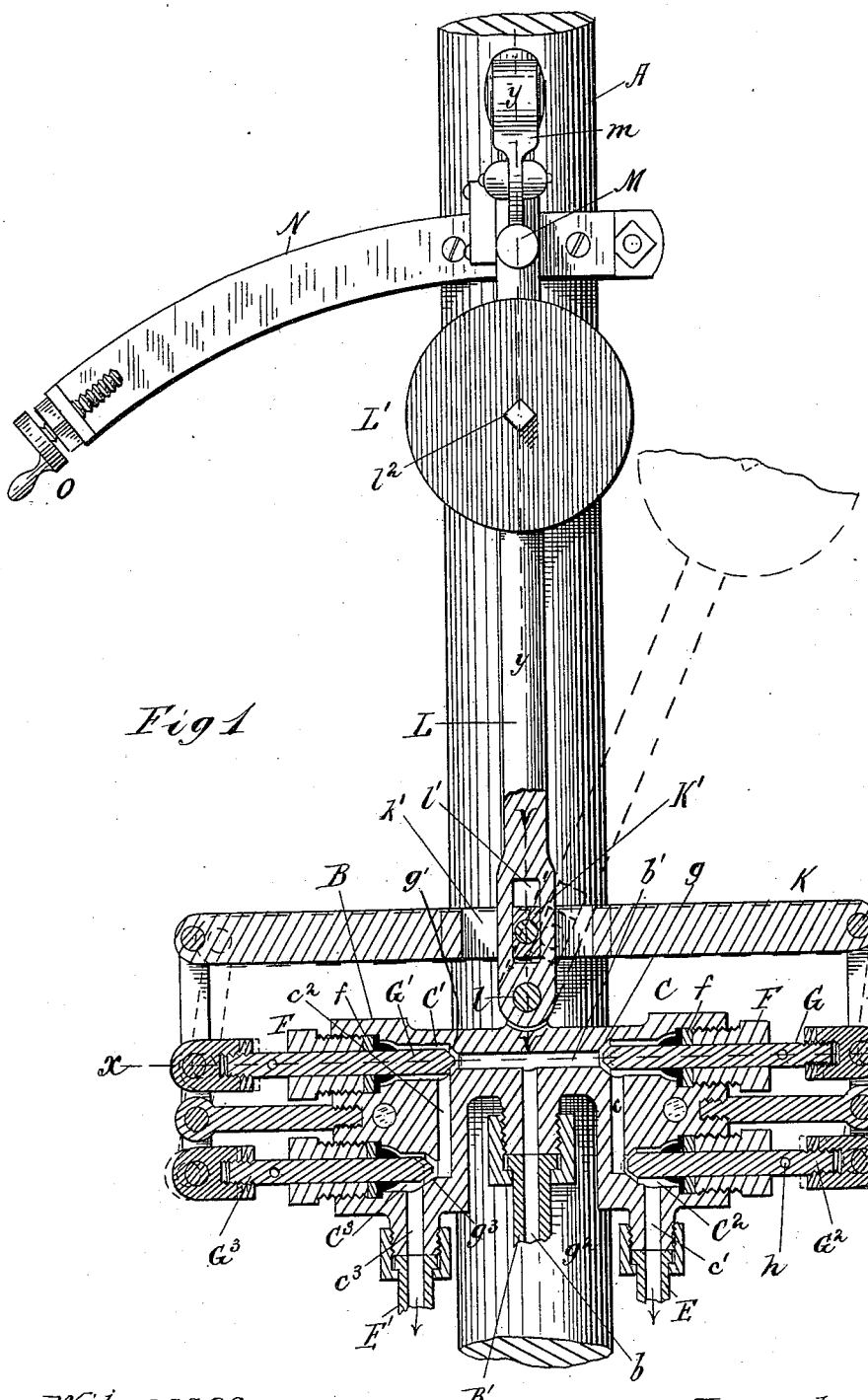

Fig 1

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(No Model.) 2 Sheets—Sheet 2.

C. E. HEISS.

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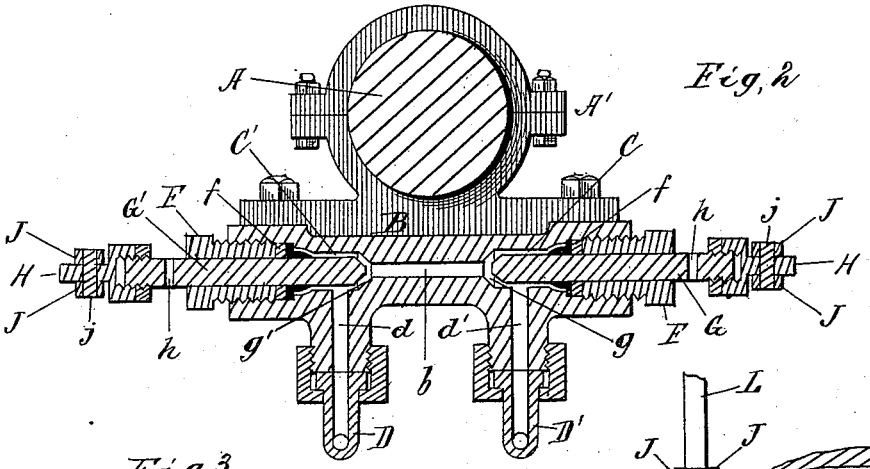
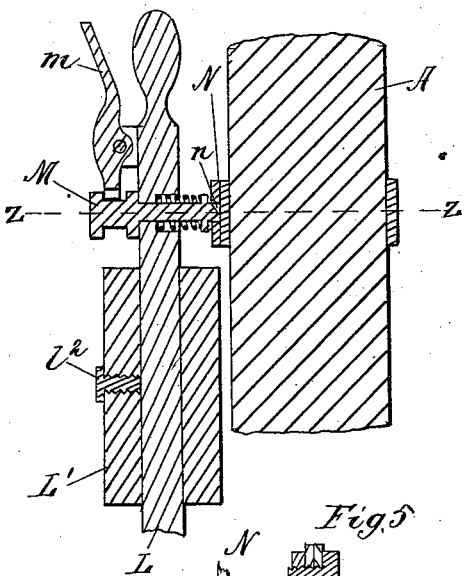


Fig. 2

Fig. 3



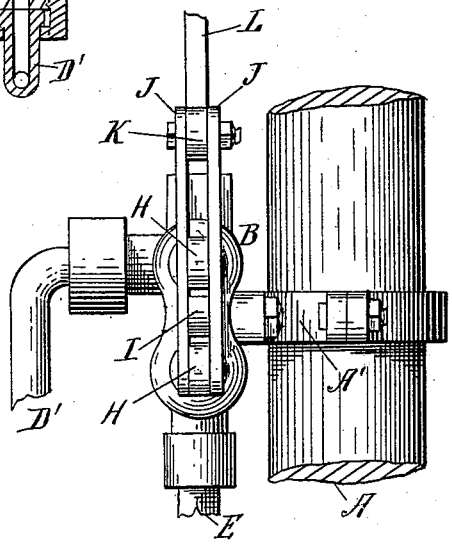
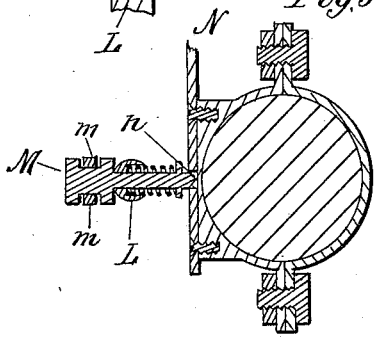


Fig. 4

Fig. 5



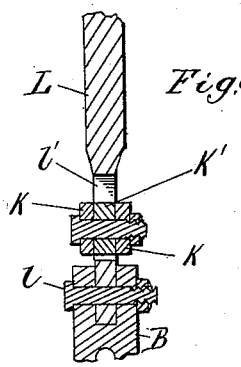


Fig. 6

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UNITED STATES PATENT OFFICE.

CHARLES E. HEISS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JAMES N. RAYMOND, OF SAME PLACE.

HYDRAULIC PRESS.

SPECIFICATION forming part of Letters Patent No. 346,913, dated August 10, 1886.

Application filed November 11, 1885. Serial No. 182,497. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HEISS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Hydraulic Presses, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of a mechanism embodying my improvement; Fig. 2, a plan section of the same, taken on the line *x x* of Fig. 1; Fig. 3, a detail sectional view taken on the line *y y* of Fig. 1; Fig. 4, an elevation of one end of the valve-chest; Fig. 5, a detail section taken on the line *z z* of Fig. 3, and Fig. 6 a detail sectional view taken on the line *v v* of Fig. 1.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to hydraulic presses, and more particularly to the regulating-chest employed in connection with hydraulic presses used in the manufacture of lead pipes and other similar articles; and it has for its object the production of a more perfect and simultaneous regulation of the valves which control the operations of the press, whereby the danger of accidental fracture of or other damage to the press or any of its parts is reduced to a minimum.

I will now proceed to describe a construction in which I have practically carried out my invention in one form, and will then point out in the claims those features which I deem to be new and desire to protect by Letters Patent.

In the drawings, A represents a supporting-post—such, for instance, as one of the pillars of a hydraulic press; and B, the valve-chest, attached thereto in any suitable manner, the means employed in the present instance consisting of the split collar A′, surrounding the post A and bolted to the valve-chest. The chest is provided with an inlet-passage, *b*, which communicates at one end with the supply-pipe B′, by means of which water is supplied to the press from the pump or other suitable device. The other end of the inlet-passage *b* communicates with a passage, *b′*, at the ends of which are spaces C C′, provided at their sides with passages *d d′*, as shown in Fig. 2 of the drawings. These passages communicate, respectively, with the pipes D and D′, which lead to the press proper, the former pipe being so connected to the press as to produce the upward stroke of the piston thereof when the water passes through it to the press, while the pipe D′ is so connected to the press as to produce the downward stroke of the piston when the water passes through said pipe to the press. From the space C a passage, *c*, extends downward to a similar space, C^2, from which an outlet-passage, *c′*, extends to a waste-pipe, E. On the opposite side of the chest a similar passage, c^2, extends from the space C′ to a space, C^3, corresponding to the space C^2, and a similar outlet-passage, c^3, leads from said space to the waste-pipe E′. These spaces C, C′, C^2, and C^3 form valve-chambers, the outer ends of which are closed by means of screw-plugs F, provided with suitable packings, *f*.

G and G′ represent valves, which extend, respectively, into the valve-chambers C and C′, passing through the plugs F and packing *f*, and having their inner extremities shaped to fit correspondingly-formed valve-seats, *g* and *g′*, formed on the respective ends of the passage *b*. G^2 and G^3 represent similar valves extending, respectively, into the valve-chambers C^2 and C^3, and having their inner extremities shaped to fit against correspondingly-formed valve-seats, g^2 and g^3, at the ends of the passages *c* and c^2. It will be seen that when these valves are brought up against these seats they are adapted to close the several passages at the ends of which they are located, in order to regulate the flow of the water through the valve-chest in the manner desired.

The valves are operated in the following manner: The outer end of each valve is screw-threaded and fits within a corresponding socket in a head piece or block, H. By screwing the valve into this head-piece to a greater or less extent it may be adjusted nearer to or farther from the corresponding valve-seat, so as to bring it into the proper position. Each valve is provided with a hole or socket, *h*, to receive a rod, by means of which the valve can readily be turned to perform this adjustment. At each end of the valve-chest is arranged a supporting rod or bar, I, upon which is pivoted

in any suitable manner a lever, J. This lever is double, the two halves being connected by means of the pivot-pins hereinafter described, the main pivot-pin *i*, which connects the lever to the supporting-bar I, being arranged between the two valves at that end of the valve-chest, as clearly shown in Fig. 1 of the drawings. Pivot-pins *j*, arranged above and below the pivot *i*, pass through slots *h'* in the blocks H, thus connecting the valves on each side of the chest to the lever J on that side. The upper ends of the levers on each side are connected to each other by means of the transverse bar K, through which the pivot-pins *k* of the levers J pass. The connecting-rod K is operated by means of a lever, L, pivoted on the top of the valve-chest at *l*, and passing up through a central slot or opening, *k'*, in the connecting-rod K. At this point the lever L is itself provided with a slot, *l'*, to receive a pivoted block, K', arranged in the opening *k'* in the connecting-bar K, as shown more particularly in Figs. 1 and 6 of the drawings. By means of this construction any motion imparted to the lever L will be communicated to the connecting-bar K, and thence by means of the levers J to the valves, in an obvious manner.

L' represents a weight mounted on the lever L, and capable of adjustment thereon to a position farther from or nearer to the pivot *l*, which forms the fulcrum of the lever, for the purposes hereinafter described, the said weight being provided with a suitable set-screw, *l²*, by means of which it can be secured in position upon the lever after adjustment.

M represents a spring catch or bolt passing through the lever L, as shown in detail in Fig. 3 of the drawings, and provided with a small lever, *m*, for operating the same. This catch is adapted to engage, when the lever is in the position shown in full lines in Fig. 1, with a suitable notch or recess, *n*, formed in a quadrant-bar, N, attached to the post A in any suitable manner. This engagement takes place when the lever is in a vertical position, and serves to lock the lever in that position. The quadrant-bar N extends, as shown in Fig. 1, to one side of the post A, being provided at its extremity with an adjustable stop-screw, O, for the purposes hereinafter described.

Heretofore in regulating chests for hydraulic presses the valves employed have been screw-valves, which are each operated independently of all the others, so that in adjusting the valves to apply the pressure to the press in the desired direction any oversight or mistake in regulating the position of any of the valves to be adjusted is liable to fracture the valve-chest, the valves, or the connecting-pipes through a failure to properly regulate the pressure. This danger is effectually overcome by the use of my improvement, the operation of which is as follows: When the operating-lever L is in the position shown in full lines in Fig. 1 of the drawings, the valves are all opened, and the water flows freely from the supply-pipe B' through the valve-chest and out at the waste-pipes E and E'. When it is desired to lower the piston of the press in order to prepare it for an operative stroke, the lever L is moved over into the position shown in dotted lines in Fig. 1, the catch M being of course freed for this purpose. The water then passes from the supply-pipe B' into the valve-chamber C, the valves G' and G² being closed, while the valves G and G³ are open. From the valve-chamber C the water passes through the pipe D' to the press and forces the piston down, the water below the piston escaping at the same time through the pipe D into the valve-chamber C', and then through the passage c^2, valve-chamber C^3, and passage c^3 out through the waste-pipe E'. When it is desired to impart to the press its effective upstroke, the lever L is thrown over to the opposite side until it bears against the stop-screw O. The position of the valves is then reversed, and the water passes from the supply-pipe to the valve-chamber C', and thence through the pipe D to the press below the piston. The waste water escapes at the same time through the pipe D', valve-chamber C, passage *c*, valve-chamber C^2, and passage *c'* out through the waste-pipe E. In case of any increase in the pressure, for any reason whatever, so great as to endanger the safety of the machine, this pressure, acting upon the closed valves, will overcome the resistance of the weight L', attached to the lever L, and will lift the said lever and weight, moving it toward the position shown in full lines, and thereby removing the excessive pressure from the machine. By properly adjusting the weight L' upon the lever its resistance to the pressure of the water may be so gaged as to cause the lever to yield to any desired pressure. The valves are simultaneously and positively operated by the movement of the lever L in such a manner as to render it impossible to set any one of the valves in a wrong position relatively to the others—that is to say, it being necessary that two of the valves should be closed and two open at the same time, the operating mechanism is so arranged that no other position of the one pair except the proper position, either open or closed, is possible when the other pair is in the closed or open position, respectively. Moreover, the valves themselves act as safety-valves and yield, as hereinbefore described, to any excess of pressure over that for which they are adjusted.

The purpose of the adjustable stop-screw O is as follows: In forming lead pipe by pressing it through a die the lead is poured into the lead-cylinder of the press above the piston thereof while in a molten condition, and when it first begins to set is not in a condition to bear the full force of the hydraulic pressure of which the press employed is capable. The stop-screw O is therefore adjusted so as to arrest the lever L before it is thrown completely over, thereby stopping the said lever when the valves are in such a position that only a portion of the water passes to the press. As the

lead sets and more pressure is required, the stop-screw is turned so as to allow the lever to descend to the full limit of its stroke, thus allowing the full pressure to the lead in the lead-cylinder of the press when the same is necessary.

It is obvious that various modifications in the details of construction and arrangement of the parts may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described, and shown in the drawings.

I am aware that heretofore the regulating-valves of hydraulic presses have been connected by a system of levers, so as to operate all the valves simultaneously, such a construction being shown in Letters Patent No. 44,829, granted to Edwin Squire October 25, 1864, and I therefore do not wish to be understood as claiming such a construction, broadly.

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

1. The combination, with the valve-chest B, provided with the valves G G′ G^2 G^3, of the levers J, mounted on suitable supports and connected to the said valves, the connecting-rod K, pivoted to the levers J, and the operating-lever L, suitably connected to the rod K, substantially as and for the purposes specified.

2. The combination, with the regulating-chest and its valves, of the operating-lever L, suitably connected to said valves, and the weight L′, adjustably mounted on said lever, substantially as and for the purposes specified.

3. In a hydraulic press for use in conjunction with a lead-press, the combination, with the regulating-chest and its valves, of the weighted operating-lever suitably connected to the valves, and the stop-screw O, upon which the said operating-lever rests at the end of its stroke, substantially as and for the purposes specified.

CHAS. E. HEISS.

Witnesses:
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IRVINE MILLER.