

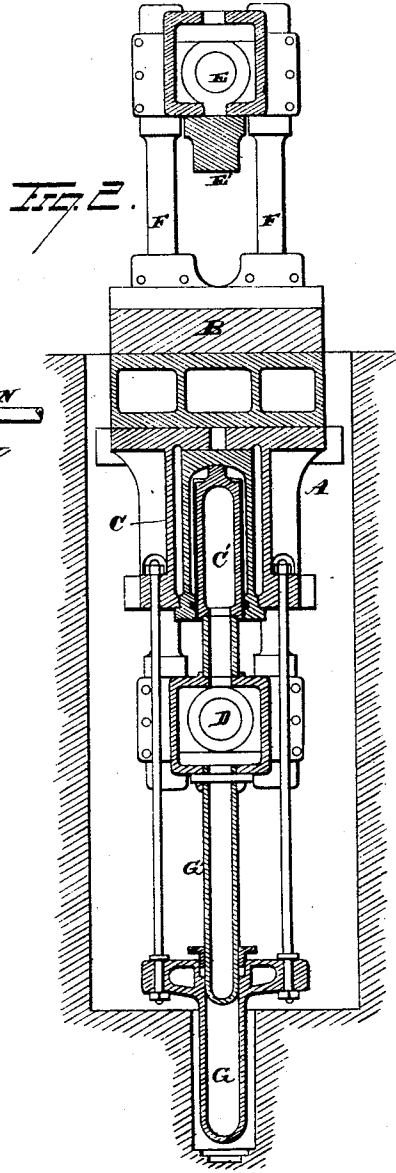
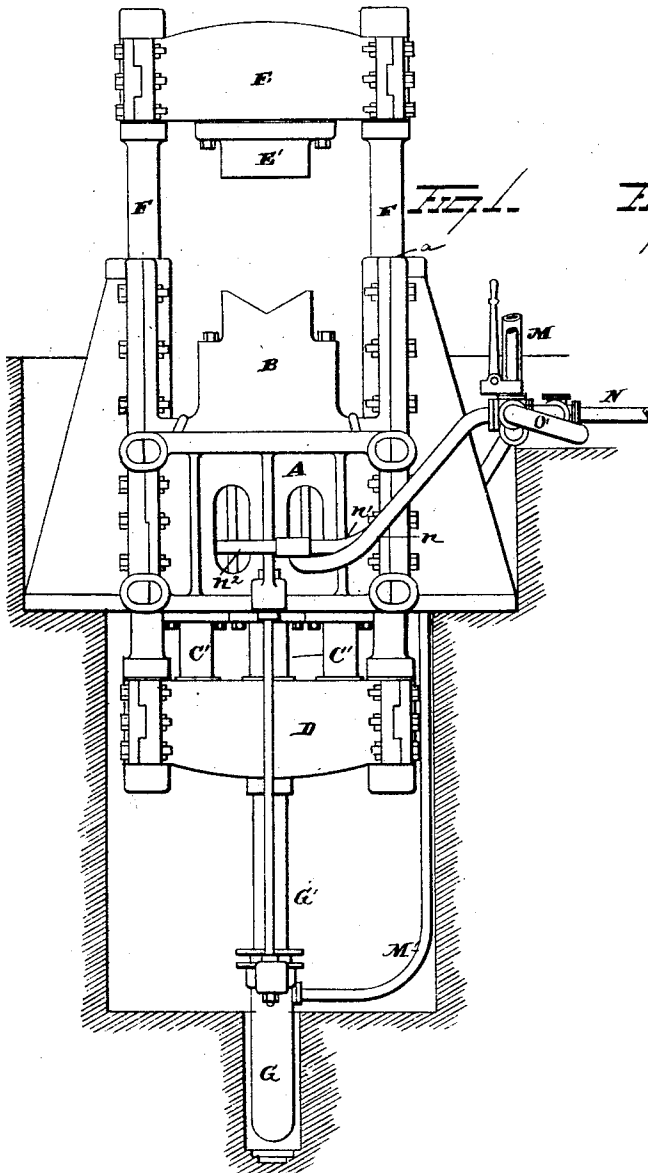
(No Model.)

2 Sheets—Sheet 1.

R. H. TWEDDELL, J. PLATT & J. FIELDING.
HYDRAULIC FORGING PRESS.

No. 336,604.

Patented Feb. 23, 1886.



WITNESSES

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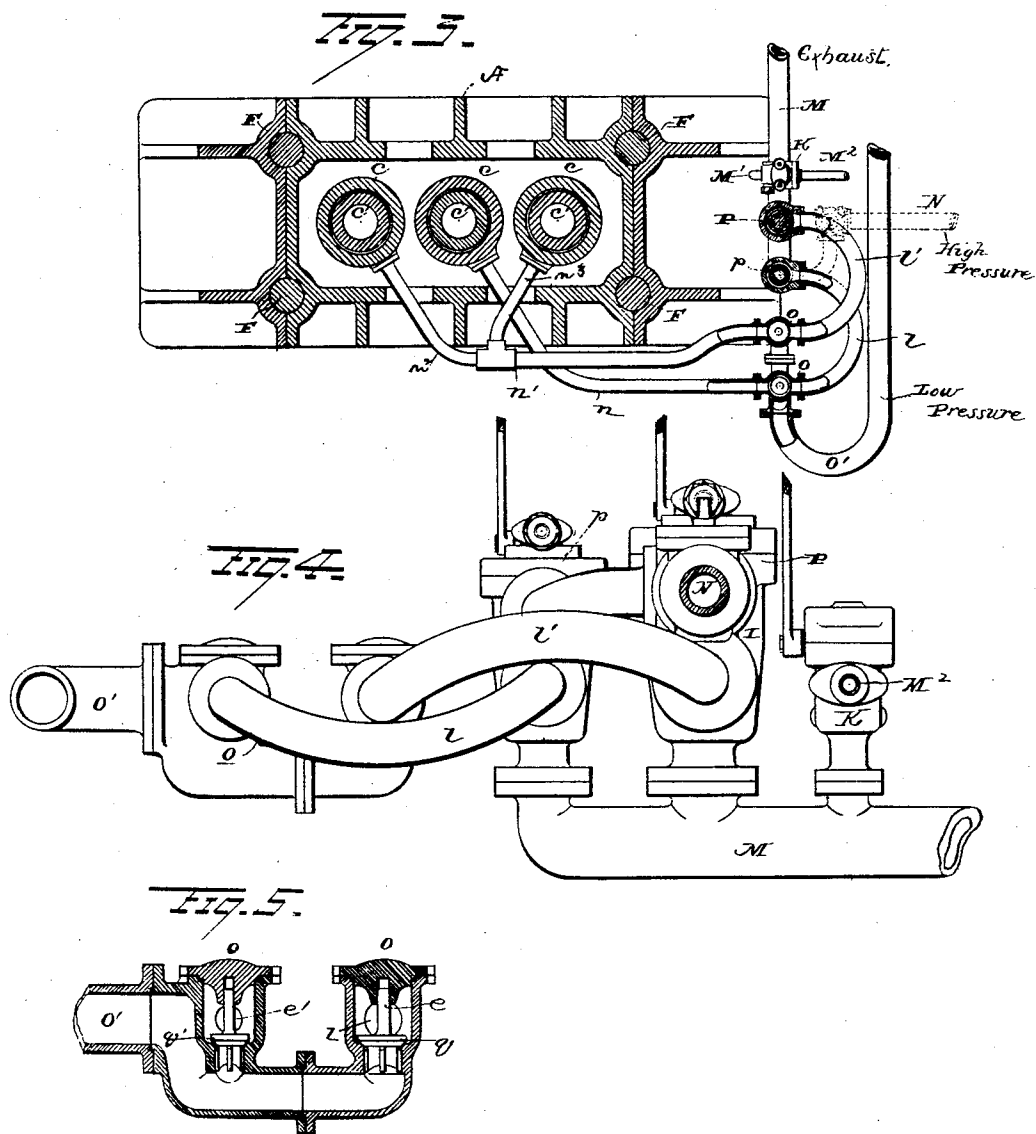
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UNITED STATES PATENT OFFICE.

RALPH HART TWEDDELL, OF WESTMINSTER, COUNTY OF MIDDLESEX, AND
JAMES PLATT AND JOHN FIELDING, OF GLOUCESTER. COUNTY OF
GLOUCESTER, ENGLAND.

HYDRAULIC FORGING-PRESS.

SPECIFICATION forming part of Letters Patent No. 336,604, dated February 23, 1886.

Application filed April 11, 1885. Serial No. 161,909. (No model.)

To all whom it may concern:

Be it known that we, RALPH HART TWEDDELL, of Westminster, county of Middlesex, and JAMES PLATT and JOHN FIELDING, of Gloucester, in the county of Gloucester, England, have invented certain new and useful Improvements in Hydraulic Forging-Presses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to an improvement in hydraulic presses, and more particularly to presses adapted to forging, and other purposes of a like nature, the object of the same being to provide means for conveniently varying the pressing power, for economizing the pressing-fluid, and for varying the hydraulic cylinders so that they will not interfere with the operation of the press; and with these ends in view our invention consists in certain features of construction and combinations of parts as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view of one form of press adapted to forging purposes. Fig. 2 is a vertical transverse section. Fig. 3 is a horizontal transverse section through the cylinders. Fig. 4 is an end view showing the arrangement of valves and pipes; and Fig. 5 is a vertical sectional view of the check-valves.

A is a stationary frame or base on which is placed the anvil or bottom tool, B. Within the frame A are arranged several (in the present instance three) hydraulic cylinders, C, with their rams C' projecting downwardly through packing in the lower ends of the cylinders and abutting against a lower cross-head, D. The cross-head D is connected with an upper cross-head, E, by suitable ties, F, which extend through suitable guideways, a, in the frame or base A. The upper tool or die, E', is secured to the upper cross-head, E. Below the lower cross-head, D, another hydraulic cylinder, G, is located, its ram G' abutting against the under side of the cross-head D.

Each of the cylinders C is connected with a

high-pressure supply through the main pipe N and branch pipes $n n'$, the latter of which is connected with the two outside cylinders through the branch pipes $n^2 n^3$. The pipes $n n'$ are also connected with a water-tank (not shown) located at a suitable height for filling the cylinders, through the pipe O', and with an exhaust-pipe, M. Suitable valves, o, are located at the junctures of the pipe O' with the pipes $n n'$, for the purpose of filling the cylinders from the tank and for shutting off communication with the tank when the high pressure is turned on. Valves P p are also provided for admitting high-pressure water to the two outside cylinders and to the middle cylinder, respectively. These valves P and p are similar in construction and operation to the valves shown and described in our Patent No. 317,427, granted to us May 5, 1885. A pipe, M', connects the high-pressure pipe with the lifting-cylinder G, and is provided with a suitable valve, K, for regulating the flow. The cylinder G is also connected at its bottom with the exhaust.

The operation is as follows: The head E being raised by the action of pressure in the cylinder G, and the piece to be forged being laid on the lower tool or die, B, the pressure in G is released by opening the exhaust, and the heads D and E thereupon descend by gravity, bringing the upper tool, E', into contact with the piece to be forged. As the rams in the cylinders C descend, the cylinders are filled with low-pressure water from the tank through the supply-pipe O'. The high-pressure service is now turned on, and the upper tool is thereby forced onto its work with the required pressure, one, two, or three of the cylinders C being used, as may be required, to accomplish the work. On releasing the pressure in the cylinders C and again admitting pressure to act in G, the cross-heads D and E are raised, ready for a succeeding operation. The cylinder G may be kept in constant communication with the high-pressure service, provided the area of its ram be sufficiently small to allow the pressure on it to be overcome by the pressure in the cylinders acting against it. When the high pressure is turned onto the cylinders C, the check-valves

e and e' are closed to the tank of low pressure; but these valves may be opened when the cross-heads are raised and the water in the cylinders C forced back into the tank to be again used.

By the above arrangement, all the actuating parts of the press being below the base, there is free access to the work above, and when the press is used for forging the packings are so far distant from the work that they are not injuriously affected by the heat.

By the use of one, two, or more of the several cylinders C, the power of the press can be varied as required, and as a considerable part of the descending movement may be effected without great pressure, the cylinders C during that part of the stroke may merely draw in low-pressure water without involving waste of the high-pressure water, which may be turned on at any desired part of the stroke.

It is evident that the cylinders and rams might occupy reversed positions without changing the principle or general plan of operation, and the number of cylinders might be increased as found convenient or necessary, and other changes might be resorted to without departing from the spirit and scope of our invention, hence we do not wish to limit ourselves strictly to the construction herein set forth; but,

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

1. In a hydraulic press, the combination, with a base or supporting frame, a stationary

tool located therein, and a movable tool connected with a cross-head below the base, of a lifting-cylinder located beneath the said cross-head, depressing-cylinders located beneath the base, pipes connected with said depressing-cylinders, and with high and low pressure supply, and valves connected with said pipes, whereby a varying pressure can be exerted upon the movable tool at any part of the stroke, substantially as set forth.

2. In a hydraulic press, the combination, with the base or supporting frame and a stationary tool located thereon, of a movable tool secured to a cross-head above the base, a cross-head located below the base and rigidly connected with the upper cross-head by ties having a sliding motion in the base, a lifting-cylinder, and depressing-cylinders, all located beneath the stationary tool, substantially as set forth.

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

RALPH HART TWEDDELL.

Witnesses:

H. H. NEWMAN,
I. J. WHITMORE.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JAMES PLATT.
JOHN FIELDING.

Witnesses:

JOHN A. POPE,
GILMORE G. BAKER.