

(No Model.)

2 Sheets—Sheet 1.

E. B. MEATYARD.
INGOT PRESS.

No. 290,448.

Patented Dec. 18, 1883.

FIG. 2.

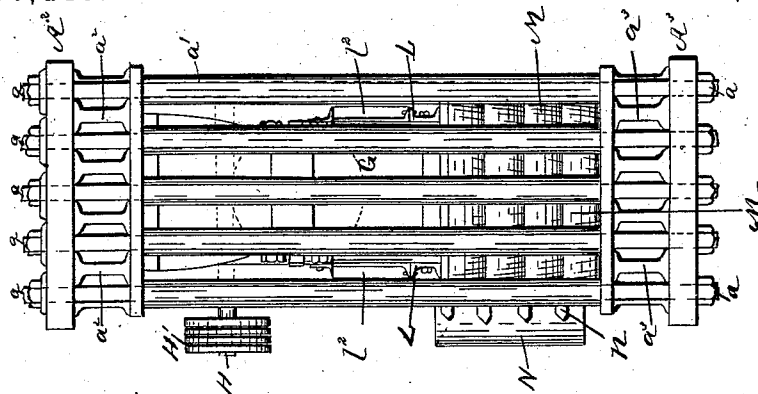
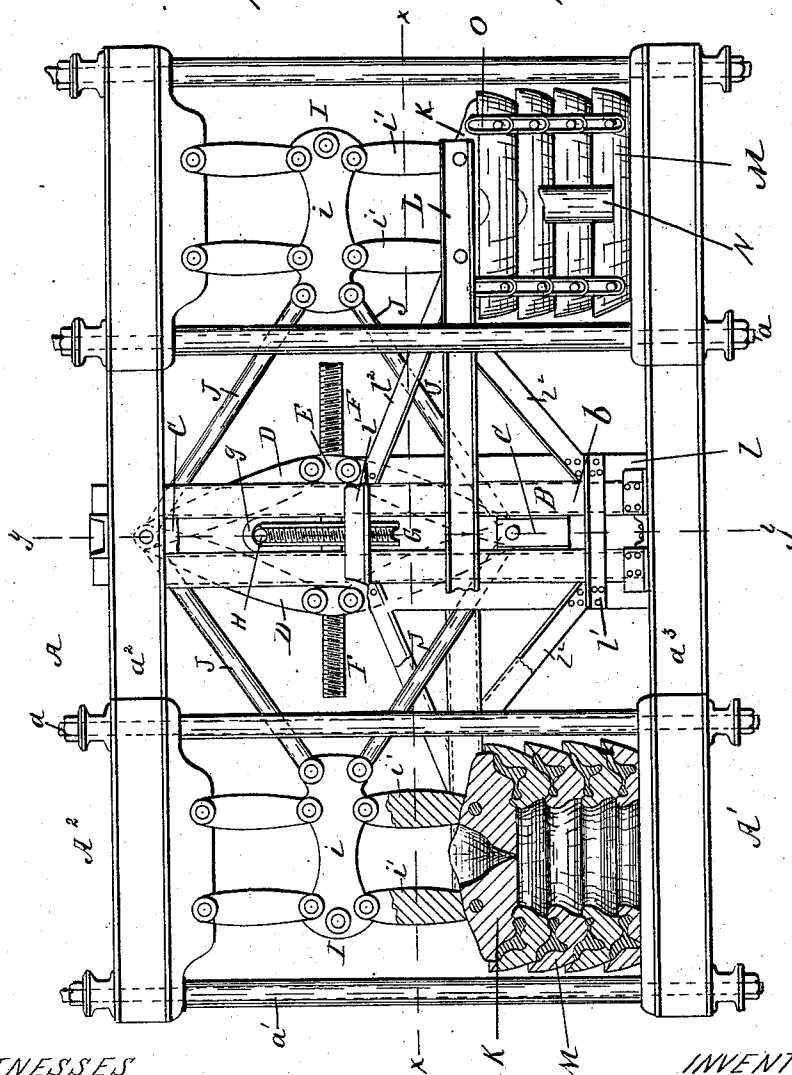


FIG. 1.



WITNESSES
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INGOT-PRESS.

SPECIFICATION forming part of Letters Patent No. 290,448, dated December 18, 1883.

Application filed May 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. MEATYARD, a citizen of the United States, residing at Lake Geneva, in the county of Walworth and State of Wisconsin, have invented certain new and useful Improvements in Ingot-Presses, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, of a press embodying my improvements; Fig. 2, an end elevation of the same; Fig. 3, a plan section of the same, taken on the line *x x*, Fig. 1; Fig. 4, a vertical section of the same, taken on the line *yy*, Fig. 1; Fig. 5, a detail plan section taken on the line *v v*, Fig. 1, on an enlarged scale; and Fig. 6, a vertical section of the same, taken on the line *v v*, Fig. 5.

The same letters denote the same parts in all the figures.

The object of my invention is to provide a powerful press, the operation of which will drive out all the air, gas, and liquid cinders and make the ingots dense and pure, and also to provide for the employment of two or more presses, arranged in line one-half on each side of the toggle-operating mechanism by which the presses are worked.

I will proceed to describe in detail the construction and operation of the presses embodying my invention, and will then point out definitely in the claims the special improvements which I believe to be new and wish to protect by Letters Patent.

In the drawings, A represents the press-frame, which in this instance is intended for a pair of presses—one at each end. The bed-pieces A' and the head-pieces A² are fitted to the upper and lower beams of the frame, and the whole secured together by strong vertical rods *a*, provided with nuts, by means of which the proper deflection is brought upon the beams for a safe load, these rods being inclosed by cylinders *a'* between the bed and head pieces for the purpose of properly distancing them. Two of the upper beams, *a*², run across from end to end, being arranged near the outside of the frame, and two corresponding lower beams, *a*³, also extend across from end to end of the machine. A central upright frame, B, is arranged between the two

end presses, consisting of upright channel-beams *b*, running from the upper to the lower side beams, and arranged a slight distance apart. In this space between the channel-beams, on each side, are arranged upper and lower blocks, C, being provided with flanges *c*, so as to be guided by the flanges of the upright channel-beams, between which they move. The actuating toggle-arms D are pivoted at their outer ends, respectively, to these blocks, and are bifurcated at their inner ends, so as to obtain a wide bearing at the knuckle-nuts E, to which their inner ends are respectively pivoted. The knuckle-nuts E are arranged on an ordinary right-and-left-hand screw, F, and a worm-wheel, G, is centrally connected to this screw-shaft between the knuckle-nuts.

A worm-shaft, H, is held at its inner end to the worm-gear by a strap, *g*, and at its outer end is mounted in a movable journal, *h*, and connected by a link-rod, *h'*, to the worm-shaft, as shown in Fig. 4 of the drawings. On the outer end of the shaft is a pulley, H', by means of which the necessary motion is given to the shaft to turn the screw in either direction, as may be desired. Each press is provided with a press-toggle, I, composed of a toggle-block, *i*, connected by upper and lower toggle-arms, *i'*, pivoted, respectively, to the head-piece of the press and the followers K. These toggle-arms are arranged in pairs—one pair above the block and one pair below—as shown in the drawings, and are preferably in the same vertical plane running lengthwise of the press. The toggle-blocks *i* are connected by guide toggle-arms J to the guide-blocks, to which the actuating-toggles are also connected, these latter being all pivoted together at their outer ends by the same pins, while the guide-toggles are pivoted at their inner or lower ends to their respective press-toggle blocks. The followers K are connected together by beams L, which are arranged one on each side of the presses outside of the vertical guide-bars, to hold the followers at a proper distance apart. Upright guide-bars *l* are attached to the inside of the beams, being fitted alongside the upright beams *b*, and connected together at their upper and lower ends by cross-bars *l'*. Truss-bars *l''* extend from the guide-bars *l* to the beams L, these truss-bars being arranged

one above and one below the beam. The followers are kept in a level position one way by reason of the press-toggles being arranged in pairs, always parallel, and the other way by the width of the press-toggles, and from the description above it is obvious that the said followers will be held apart by the strong truss-beams described, which are provided with long guides, which keep the beams level in their vertical movement.

In the drawings I have shown my improved press applied to casting of steel tires for car or other wheels, though of course I do not wish to be understood as limiting my invention to this particular purpose.

It is well known that it requires no more power to compress a nest of molds than it does to compress one. I have shown a series of molds, *M*, arranged in each press in nests, these molds being for the casting of steel tires, as mentioned above. In the rim of each mold, on each side of the ingate, short dovetail grooves or notches *m* are connected, extending down a short distance. For the purpose of pouring, I provide what may be called a "main" or "general" gate, *N*, which is provided with dovetail projections *n* on one side, adapted to fit the dovetail grooves in the molds, whereby it is attached to the molds, as shown in Figs. 5 and 6 of the drawings. This gate is provided with branch gates *n'*, which constitute the ingates to the respective molds, and the mode of attaching it to the molds prevents it from interfering with the pressing home of several molds when the press is put in operation. The joints between the several molds are stopped by a cord of asbestos, or "mineral wool," as it is sometimes called, or some other analogous material, which may be held in place by mucilaginous paste or coal-tar, to prevent the sand backing from entering the mold. The ingates can be readily closed by a plunger drop into the main gate *N*, so as to force its contents into the molds just before the power is applied. The vent should be at the highest point of casting to allow any light impurity free egress. Obviously, each lower mold, as it is filled, heats the one above, and so the metal is kept at a high temperature, and is in this condition when the press is put in operation. The molds are connected together, and to their respective followers by links *O*, as shown in Fig. 1 of the drawings. Now, as soon as the molds are filled, if the crank-shaft be set in motion in the proper direction, obviously a greater pressure will speedily be brought upon the molds. It will be seen that through the operation of the screw and the knuckle-nut the press-toggles will be straightened by the great force applied to them through the operation of the two sets of toggle-arms described above, and the metal being at a high temperature when the final squeeze is made, the air, gas, cinders, &c., will be expelled and a pure dense casting produced.

As stated above, I have shown my press

applied to nests or molds, these latter being of special form. It is obvious, however, that the press is applicable to molds of any form, and to include single molds as well as nests of molds. I do not wish to be understood, then, as limiting my invention to any particular form of molds, or to the arrangement of molds as nests; but I do wish to be understood as claiming my improved press applied to molds of any form, either singly or in nests.

It is obvious that metallic molds must be thick and well lined with suitable paste to keep the heat in the operated metal until the press closes and crushes out the friable packing from the joints, and give vent to the air, gas, and cinders. A thin flanged ring of metal may be used in the joints to hold the sand or other friable packing from entering the molds until the hot metal rises to melt it out and give it vent at once.

I think it must be obvious with my improved press that metal can be worked at much higher temperature than by hammer or rolls, which modes are well known and have been employed for the purpose expressed above. Hydraulic presses have also been used in casting for the purpose of pressing hot metal and securing the results named. I think it is also obvious that my improved press is adapted to secure better results than the hydraulic press, and in a hydraulic press the power must be increased as the resistance increases.

The usual way of storing power to these presses is by pumping water into an accumulator against multiplied atmospheric resistance of any number of atmospheres. Now, it is apparent that as the water passes out of the accumulator to operate the press the atmospheric pressure in the accumulator diminishes. In my improved press the effect of the power is steadily augmented as the metal under treatment becomes harder, and consequently the resistance greater by means of the system of grooves and lever above described by the final effort when the press-toggles are straightened, if the operation is carried so far. The value of this method of pressing steel while it is hot enough to part with such foreign elements as are of less specific density than the steel is well understood, and therefore I think the advantages of my press mentioned above will also be well understood in the application of my press to this purpose.

I have shown and described one stand of presses arranged on each side of the operating mechanism. It is obvious, however, that additional stands may be fitted up on each side, provided, however, that the presses employed must always be of even number, arranged equally on each side of the operating mechanism. It will only be necessary to duplicate the bed-pieces and head-pieces and press-toggles connecting the latter to accomplish the result named above.

I do not wish to be understood as limiting myself to the devices herein shown and described for operating the toggles, for instead

of the screw-gear some other suitable mechanism may be used for the purpose of drawing the actuating-toggles together in operating the press, and, in fact, the actuating-toggles themselves may be dispensed with, and some suitable mechanism substituted in place of that shown for the purpose of operating the guide-toggles.

Obviously, the mechanism for pouring and filling the nests of molds constitute no part of my present invention, which relates to the press, and I do not claim this mechanism in this present application; but I reserve the right to file a separate application therefor, if necessary.

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

1. In a toggle-press, each follower, in combination with its toggle-block, and a pair of toggle-arms connecting the follower to its toggle-block, whereby the said follower is maintained in planes parallel with its bed-plate, substantially as and for the purposes set forth.

2. In a toggle-press, the followers K, in combination with toggle-blocks *i* and toggle-arms *j*, arranged in pairs, one pair pivoted to the toggle-block and the corresponding head-piece of the press, and the other pair pivoted to the toggle-block and its respective follower, substantially as and for the purposes set forth.

3. In a toggle-press, one or more pairs of followers arranged evenly on each side of the actuating mechanism, in combination with toggle-blocks for the respective followers, toggle-arms arranged in pairs and connecting the followers to their respective blocks by a pair of arms to each block, and mechanism whereby the press toggles and followers are all operated simultaneously, substantially as and for the purposes set forth.

4. The press-toggles, in combination with the guides to which the inner end of the guide-toggles are pivoted and mechanism for spreading the guide-toggles to operate the press-toggles, substantially as and for the purposes set forth.

5. The press-toggles I, in combination with the guide-toggles J, the guide-blocks C, the upright guideways *b*, and mechanism for op-

erating the guide-toggles, substantially as and for the purposes set forth.

6. The press-toggles, in combination with the guide-toggles, guide-blocks, to which the inner ends of the latter are pivoted, the actuating-toggles, the knuckle-nuts, the actuating-screw, and suitable mechanism for turning said screw, substantially as and for the purposes set forth.

7. The press-toggles I, in combination with the guide-toggles J, the guide-blocks C, the guide-beams B, the guide-toggles D, the knuckle-nuts E, and the worm-shaft H, substantially as and for the purposes set forth.

8. The press-toggles, in combination with the guide-toggles and guide-blocks, to which the inner ends of the guide-toggles are pivoted and arranged in suitable guideways, and mechanism whereby said guide-blocks are moved to operate the press-toggles, substantially as described.

9. The knuckle-nuts, in combination with the actuating-toggles and the guide-toggles, and guide-pin fastening the ends of both sets of toggles by a single pin to the guide-blocks, substantially as described.

10. In a toggle-press, one or more pairs of followers, in combination with connecting-bars, whereby the followers are maintained at a proper distance apart, a toggle-block for each of the followers, and a pair of toggle-arms connecting each follower to its respective block, whereby the level position of the follower is maintained, substantially as and for the purposes set forth.

11. The followers, in combination with the distancing-beams connecting said followers together, and a guide attached to the central portion of the beams, whereby the lateral movement of the distancing-bars rising from inequalities of resistance is prevented, substantially as described.

12. The followers K, in combination with the distancing-bars L, the guide-bars *l*, the truss-bars *l'*, and the upright beams *b*, substantially as and for the purposes set forth.

EDWARD B. MEATYARD.

Witnesses:

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M. I. HAMMILL.