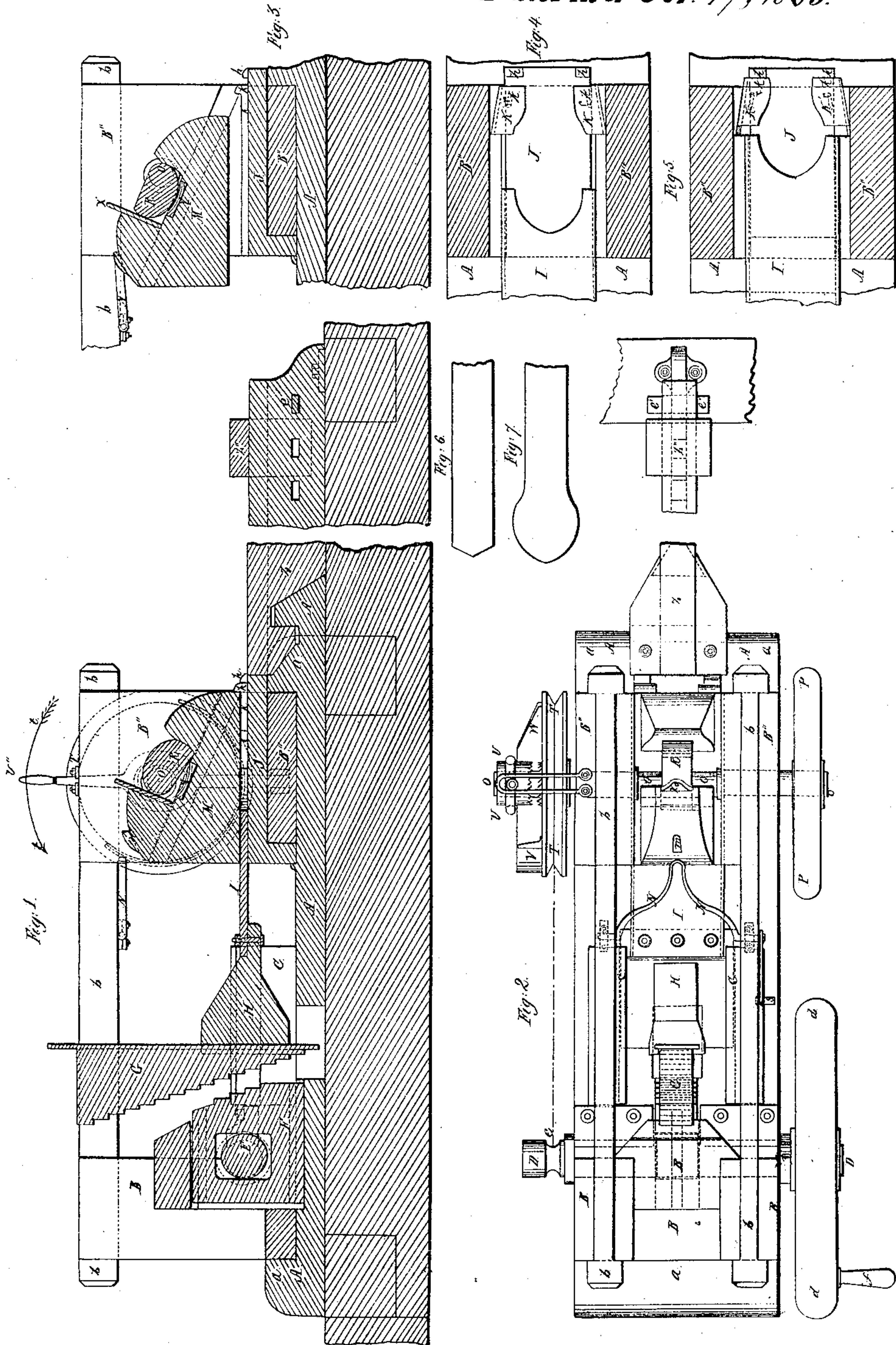


D. A. Boland

Making Bridge Irons

N^o 50,448.

Patented Oct. 17, 1865.



Witnesses:
L. W. Early
W. B. Cunningham

Inventor:
D. A. Boland

UNITED STATES PATENT OFFICE.

D. A. BOLAND, OF PITTSBURG, PENNSYLVANIA.

UPSETTING-PRESS.

Specification forming part of Letters Patent No. 50,448, dated October 17, 1865.

To all whom it may concern:

Be it known that I, D. A. BOLAND, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Presses for Upsetting or Swaging Iron; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section through center. Fig. 2 is a plan or top view. Fig. 3 is a section of part of the press to show the movable pieces in positions differing from those in Figs. 1 and 2. Fig. 4 is a horizontal section of part of the press to show the mold or former expanded. Fig. 5 is a representation of the same parts as Fig. 4, showing the mold closed or contracted. Fig. 6 represents the end of the iron bar to be worked, and Fig. 7 represents the same bar when pressed.

The same letters of reference indicate similar parts in all the figures.

The nature of my improvement is the new mode of construction and combination of certain parts in upsetting-presses in which red-hot iron is compressed in a mold or former by a plunger or shoving head-piece acted on by a cam.

My improvement has for its object—

First, to hold more permanently and rigidly in their respective positions such parts of the mold or former as in this description of presses are necessarily made movable. This I obtain by making such portions of the mold bear directly on the housing-frame without having any intermediate pieces.

Second, to take advantage of the tendency which the whole movable portion of the mold or former has to slide forward in the direction of the motion given to the heated iron by the cam or eccentric to hold and bind together said movable portions the more and the firmer as the pressure increases. This I accomplish by shaping the movable parts of my mold or former in such a manner that any strain in that direction will tend to contract the whole mold.

Third, to close the mold in as short a time as possible, and at one operation. This I obtain by taking advantage of the gravity force of my head-piece, and by making it act on the other movable parts of the mold to close it.

Fourth, to obtain a more regular and less elastic motion in the shoving-head than is now done. This I accomplish by using the new notched block hereinafter described.

Fifth, to have more room in front than there is in any of the presses now in use for the workmen to approach the press for the purpose of introducing therein the heated bar of iron, and this I obtain by the new T-shape table which I hereinafter describe and claim.

In order to enable others skilled in the art to construct and make use of my improvement, I will proceed to describe it in detail, and in so doing I am obliged to describe the whole of the press for the sake of illustration.

A A is a metal bed-plate, on which are bolted the two housing-frames B and B' and the slide-guides C C'. This bed-plate A has at both ends strong lugs *a a' a'' a'''*, to prevent the housing-frames from spreading, while the top part of said housing-frames are also bound together by two powerful iron bars, *b b' b'' b'''*. In the back housing-frame, B, is placed a shaft, D, provided with fly-wheel *d d'* and with suitable pulleys or gearings for transmitting to it a rotary motion obtained by any motive power. (This in the drawings is represented by the crank-handle *f*.) The center of the shaft D has a cam or eccentric, E, of one-inch throw, and at *e* a grooved pulley for receiving a belt, rope, or chain for the purpose of transmitting motion to the pulley T. The eccentric-cam E works in a sliding frame, F, moving in slides provided for that purpose at the top and bottom of it in the housing-frame B, so that at each revolution of the shaft D the frame F is moved backward and forward, traveling one inch in each direction at each revolution. The front part of the frame F is shaped so as to present a succession of plane surfaces at right angles with the center of motion of the frame F, each notch or step receding one from the other as they ascend, so as to present the aspect of a staircase. The horizontal parts of these notches or steps are to be almost as deep as the throw of the cam E, and the vertical parts can be made of any size desired. In the present case they are made three inches.

G is a wrought-iron block, movable in a vertical direction into grooves provided for that purpose in the shoving head-piece H, the block G having a flange which enters grooves in the

shoving-head H. The front face of this block G is straight, and has a perfect bearing at right angle with the center of motion of the head-piece H. The rear face of the block G is made in steps, so as to be the exact counterpart of the notched part or face of the frame F, presenting the appearance of an inverted staircase, so that when the block G is brought in contact with the frame F they fit exactly one against the other, having a good bearing on both faces.

H is a shoving-head sliding in the slide-guides C C', to which is bolted the shoving former or plunger I. This former I is a wide thin plate, made in the usual way, and of the proper form or shape required by the iron to be shaped.

The housing-frame B'' contains the mold or former, which is composed of five parts—viz., the bed, the cap, the two sides, and the shoving-piece or end piece. The bed J is fitted in the housing-frame so as to have perfect bearing. When thicker or thinner work is to be performed the bed is to be changed for one which will exactly leave the proper space between it and the cap-piece when the cap is down to its bearing. The flange *j* is for the purpose of preventing the bed J from sliding forward, and it has two lugs, *h h'*, at its former end, the purpose of which will soon be explained. The side pieces, K K'', are made right and left, the inner sides or edges of the proper shape for the portion of the mold they represent, and the other edges or sides are made to fit two inclined planes in the housing-frame B'', so that if the side pieces, K K, are pushed back, as in Fig. 4, they may spread apart to allow of the introduction of the heated iron, and if pushed forward, then they will be brought nearer together, as in Fig. 5, and in the exact position required for forming the hot iron. When they are "home," or in their proper place, they touch the lugs *h h*, of the bed J of the mold, and cannot go farther. The side pieces, K K, have on the under part projecting pins *r r''*, which slide in grooves (shown in dotted lines in Figs. 4 and 5) made for that purpose in the bed-piece J. These pins are to prevent the pieces K K from being thrown out of place if struck by the heated bar when it is introduced into the mold.

The cap M is flat on the bottom, and has such print or impression as is to be transferred by pressure on the iron to be formed or swaged. The top of the cap has a T-head with slightly projecting edges, the T-head being inclined at an acute angle to the horizontal bottom of the cap-piece. The projecting ledges forming the T-head slide in correspondingly inclined grooves in the housing-frame B''. The upward pressure on the bottom of the cap M is resisted and sustained by the cam, and the forward pressure and friction on the bottom of the cap tend to force it forward and, owing to its wedge shape, downward, thus increasing the pressure. When the cap M is drawn

back it is thereby raised up, as in Fig. 3, and its entire weight in this raised position will be sustained by its ledges or T-head.

N is a hook, which, by entering the notch *m*, will hold the head-piece M up, as shown in Figs. 3, and it will be observed that if, when the cam R is turned up, the hook N is raised, the head-piece M will slide forward and downward, and in its course will, by striking the projections *k k* of the side pieces, K K'', carry these pieces also forward, thereby closing the mold by one operation and in a very quick manner.

The shaft O is provided at one end with a hand-wheel, P P'', in the center with a cam, R, and at the other end with a loose pulley, T, carrying a crab, and also with a counter-crab, U, fast on a feather-key. The loose pulley T is connected by a belt, rope, or other gearing with the shaft D, so as to receive a constant rotary motion in the direction of the arrow *t t*, and it has a guard, so that when the lever V, which straddles the shaft O, is pulled toward the center of the press the crab will link only when that guard is cut off at V, then remains linked, and carries the shaft O with it half a revolution, when the part W of the guard, coming in contact with the lever V'', will at once unship the crab, and the shaft O will then remain motionless. This will have the effect of throwing the center cam, R, from the position it occupies in Fig. 1 into the position it is shown in in Fig. 3, and by its action on the two projections of the top piece, M, it will cause that piece to rise by shoving it back, as also shown in Fig. 3.

It will thus be seen that the cam R answers the double purpose of preventing the head-piece M from raising and of raising the head M alternately. The piece X is put so that when removed it leaves the head-piece M free to fall to its bearing without striking the cam R, (when that cam is up,) and when the piece X is in place it will give the cam R all the advantages of its less eccentric portion when it is required for that cam to start the head-piece M back and up.

Y is an elastic cushion to avoid jars.

Z is the bar-table, made of suitable length, hooked and bolted firmly to the bed-plate A. This table is made T shape, and, although very strong, it occupies much less room than those now employed.

The sliding head Z'' can be adjusted to any length of bar and be held from sliding back by the key *c''*, thus securing in a simple and effectual manner the cold end of the bar to be worked in the press.

Having described the whole press and my improvements thereon, I will explain its operation.

The notched block *b* being raised and held up, the cap M being hooked up, as in Fig. 3, the cam R is to be turned upward, the piece X removed, the pieces K and K'' are to be pushed back, as in Fig. 4, and the shaft D being put

in motion, the press is ready to receive the heated iron. The bar, Fig. 6, being heated to redness, is placed in the mold, so that its cold end rests on the table Z against the sliding piece Z'', while the heated part is inside the mold. Now, by pressing on the pedal S the hook N is raised, and the head-piece M will slide forward and downward, in its progress carrying also forward the two pieces K K'', thereby closing the mold at one operation and in a very short space of time. The cam R is then turned, as shown in Fig. 3, by means of the hand-wheel P P', and securely holds all parts of the mold from expanding. The notched block G is now let down to bear on the corresponding notches of the cam-yoke frame F, and at once the block G, head H, and plunger I will move forward one inch at every revolution of the shaft D until the last notch is reached and the operation is finished. The piece X is then replaced, the notched block G is raised, and the lever V'' being brought to bear on the guard W V, the crab will link as soon as the point V of the guard allows the lever to move, and the cam R, being acted on by power, will raise the head-piece M, as shown in Fig. 3, which will free the two side pieces, K and K'', and, the mold being expanded, the shaped bar can be removed.

The former and side pieces, K K'', have beveled edges, which press against the corresponding beveled edges of their recess in the housing-frame, so that when the iron is upset and the

cap M withdrawn the side pieces will rise up slightly and spread open.

During the process of upsetting the side pieces are prevented from spreading by the weight and pressure of the cap M.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an upsetting-press, the head-piece M, when shaped as a wedge, bearing directly on the housing-frame B'' in such a manner that if moved forward it will be brought down, as specified.

2. The cam R, when used in combination with the head-piece M, housing-frame B'', shaft O, and pulley T for the double purpose of holding the head-piece M down and to raise it alternately.

3. The side pieces, K K'', when having their outside edges formed as inclined planes bearing directly on corresponding inclined planes in the housing-frame B'', and having projecting lugs k k, for the purpose specified.

4. The block G, when having parallel notches, in combination with the frame F, having notches of corresponding shape and size.

5. The T-shape table Z and the sliding head Z'', when used in combination with the press, as described, and for no other purposes than the one specified and claimed.

D. A. BOLAND. [L. S.]

Witnesses:

H. P. GENGEMBER,
LEONARD S. JOHNS.