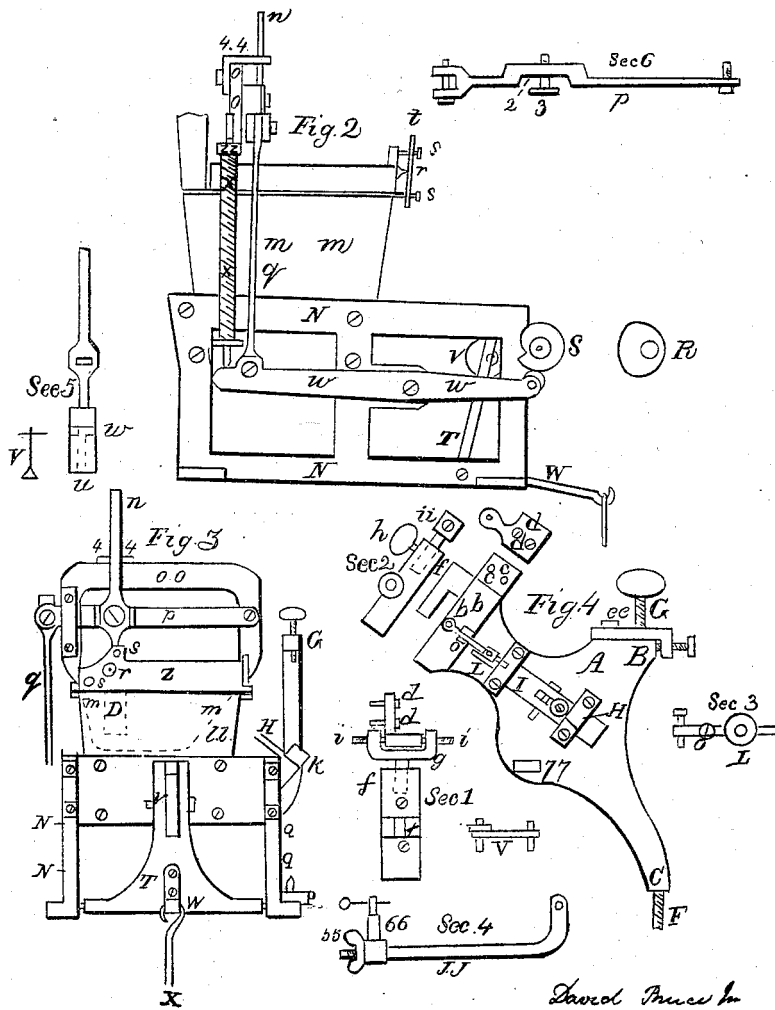




*D. Bruce Jr., Sheet 2.3, Sheets*  
*Type Machine.*

*No. 4072*

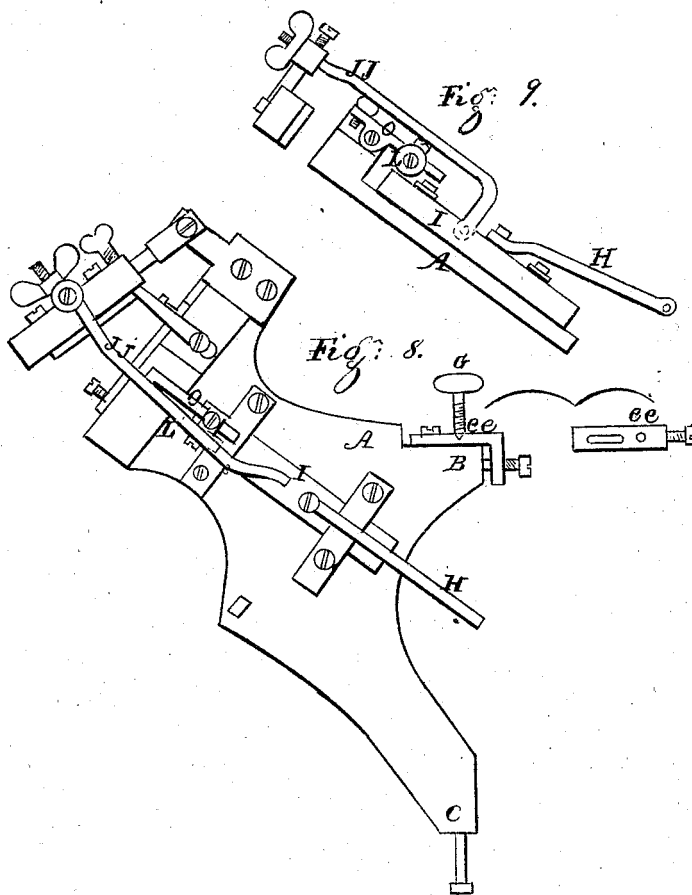
*Patented June 7, 1865*



D. Bruce Jr.,  
Type Machine.

No. 4072.

Patented June 7, 1845.



# UNITED STATES PATENT OFFICE.

DAVID BRUCE, JR., OF WILLIAMSBURG, NEW YORK.

## IMPROVEMENT IN MACHINES FOR CASTING TYPES.

Specification forming part of Letters Patent No. 4,072, dated June 7, 1845.

*To all whom it may concern:*

Be it known that I, DAVID BRUCE, Jr., of Williamsburg, Long Island, county of Kings, State of New York, have invented a new and Improved Machine for the Casting of Printing-Types; and I do declare that the following is a full and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view; Fig. 2, a longitudinal elevation; Fig. 3, a transverse section.

In the construction of this machine I have endeavored, as near as possible, to imitate by mechanical means the process of casting types as usually performed by hand. With this view I have placed the mold on what I shall denominate the "crane," at an inclination of about fifty degrees from the perpendicular, to give greater freedom to the discharge of the type, and, as in the process of hand-casting, the lifting of the matrix precedes that of the opening of the mold.

I have thought it unnecessary to give a description of the mold, as the one I use differs in no way from those ordinarily used in type-machines, and is the same as the hand-mold in its main principles.

The advantage of placing the mold on the crane consists in the circumstance of the upper half of the mold in its movements of rising and falling. It does so vertically, thereby avoiding what is called a "cutting" of its bodies and carriages, a serious evil incident to all molds in proportion as they deviate from this position.

To avoid extending the machine unnecessarily in width, I have placed the nipple and pump as far over to the left as possible. (See Fig. 3.) By so doing I have been enabled to accomplish a very desirable point of placing the furnace-door on the right-hand side of the furnace. This arrangement avoids the liability of chilling the pump and nipple by the introduction of fresh coal, but inclines the left-hand side of the kettle to be the hottest.

In Fig. 1 most parts of the machine may be seen in their proper position. A is the crane; G and F, steel centers on which it swings; C, the lower socket; B, the upper and adjustable socket. Attached to the side of the frame Q

may be seen rod H, extending to the slide I. From the slide I extends upward the opening-rod J J, whose office is to open and close the mold K. The upper end of the slide I, in moving upward, passes under the small roller L, attached to the lever O, whose office is to elevate the matrix. (See Figs. 8 and 9.) M (the crank-shaft) may be seen fitted in boxes to the end of the frame N and Q. This shaft M has two cams, S and R—R, for moving the crane and its appendages, S for operating on the pump through arrangements to be seen in Figs. 2 and 3. That the cam R may perform its duty properly in the movement of the crane A it is necessary to introduce the rocking shaft T, containing roller U near its upper end, upon which cam R acts. To the upper end of this rocking shaft T the crane A is united by connecting-link V. To the middle of the rocking shaft T, and in a line with its center of motion, may be seen lever W, to which is attached a weight, X, whose office is to draw back the crane A through its connection, before mentioned, with the rocking shaft T. The crank and handle Y Y may be seen at the right-hand end of the shaft M. In this position of the cam R, Fig. 1, it will be seen that the crane A is pressed up toward the kettle Z, the mold is drawn shut, and the matrix is pressed down into its place by the spring *a*. The rod H, by its lower end being placed out of line with the centers F and G of the crane A, consequently gives motion to the slide I at every swing of the crane A, thereby tilting the matrix P and closing the mold K.

Fig. 4 gives a face view of the crane A with its centers of motion B and C. Attached to it may be seen again slide I, part of rod H, matrix-lever O, roller L, and mold-block *b b*; also, the recess *c c* therein for the hinge-stud *d d*. It will be seen that the socket *e e*, Figs. 1 and 8, into which the upper center, G, of the crane A sets, admits of a movement along the upper edge of the crane A, and is adjusted by one screw and secured by another. This is for the purpose of adjusting the mold K over the orifice of the plate and nipple *r*. (See Figs. 2 and 3.)

Section 1 is a downward view of the upper mold-block, showing by dotted lines the cylindrical slide *f* passing into it; also, the formation of the hinge *g* as connected with the stud

*d d*. (Shown in Fig. 4.) Section 2 is an edge view of the upper mold-block, showing the thumb-screw *h* pressing on the cylindrical slide; also, the holes for the center-pins *i i* and the eye *j* for the opening-rod J J. Section 3 is a view of the matrix-lever O and roller L; section 4, the opening-rod J J, with thumb-nut 5 5 and transverse pin 6 6.

The hinge-stud *d d* is fitted into the recess *c c* on one side of the lower mold-block, *b b*, and is secured with two screws.

Fig. 3 shows a front sectional view of the machine with the shaft and crane A removed. Here may be seen the rocking shaft T, with its roller U and lever W for the weight X. The points for the crane A may be seen in the right-hand part of the frame Q Q. The socket *k* for the rod H may also be seen forming a part of the frame Q Q. The furnace *l l*, kettle Z, and pump arrangements may also be seen. The dotted line *m m* upon the furnace *z* indicates the shape of this portion of the bottom of the kettle Z. The dotted square indicates the pump-chamber D. The pump-bar *p* and piston-rod *n* may be seen. Sec. 5 is a view of the piston and piston-rod, denoting by the dotted lines *u u* the passage for the metal and the chamber for the valve *v*. Sec. 6 is an edge view of the pump-bar *p*, showing the recess, Fig. 2, for the eye of the piston-rod *n*. Fig. 3 is a flat-headed screw which secures the piston-rod to the bar. On the left hand and nearly opposite to the pump-piston is seen the position of the nipple *r* and its pins *s s* to support the plate *t*, as seen also in Fig. 2.

Fig. 2 exhibits the left-hand side of the machine, showing a portion of the rocking shaft T, with roller U, lever W, and pump-cam S. The beam *w w*, rod *q*, and the pump-spring X X extending from the beam to the eye *z z* in the pump-frame *o o*. The dotted line *m m* denotes the shape of this portion of the bottom of the kettle Z.

The nipple plate and pins are of the same construction as that patented by W. Johnson, August 21, 1828, and may be distinguished from the plate adopted by me in my patent of November 6, 1843, by being called the "female" plate, whereas in my patent it was called the "male" plate. In the female plate of Mr. Johnson the nipple was conical, and passed a short distance into the plate, whereas the male plate had a conical nipple protruding from its back surface, which passed into the mouth of the spout. In this instance I use the plate as constructed by him and dispense with the use of springs. This construction of the plate and nipple is found in practice preferable to the other.

Letters A A in Figs. 3 and 4 is the collar for the steadiment of the upper end of the piston-rod *n*, which is open on the front side, as shown in Figs. 1 and 2.

V is the connecting-link which unites crane A with the top of the rocking shaft T. In the top of the rocking shaft there is an accommodating socket, into which one of the limbs of

the link is inserted. The other limb of the link plays in an eye, F F, screwed into crane A. (See Fig. 4.)

Having noticed the various sectional parts of the machine, I will now describe their combined effect and uses and what I conceive to be some of its advantages over others.

By a half-revolution of the crank Y Y the cam R presses forward the rocking shaft, which communicates a like motion to the crane A. In doing this the slide I is drawn downward by the rod H, the rod J being connected with the slide at the lower extremity and the eye of the upper mold-block at its upper end, the effect of which is to close the mold by bringing down the upper half upon the lower. At the time this is being done the slide I draws from beneath the roller L, attached to the lever O, Fig. 9, which permits the spring *a* to press downward the matrix into its proper position for receiving a cast. The same movement that closes the mold and brings the matrix into its place also presses the mouth of the mold K firmly up to the nipple *r* and plate *s s*, making throughout the whole a close fitting of the parts. In this position it is ready to receive a cast. Continuing the revolution of the crank the knuckle of the cam *s* allows the roller in the beam *w w* to rise into the recess in its circumference, into which it is forced by the pump-spring *x x* acting at its opposite end. In doing this the beam *w w* communicates a downward motion to the pump through the rod *q* and the lever *p*, thereby forcing the fluid metal into the mold. Continuing the revolution of the crank the cam *s* forces the roller downward, and through the mechanical arrangements before described raises the pump-piston to its former position. Continuing the revolution of the crank the crane A is released from its pressure against the nipple and plate, and is swung outward therefrom by the descent of the weight X, attached to lever W, the formation of the cam R producing a rectilinear motion to the rocking shaft T, and hence to the crane A. In swinging the crane outward the rod H presses the slide I upward, which carries with it the rod J J, which lifts the upper mold-block and that part of the mold attached thereto from the lower half, and as the slide has run under the roller L and elevated the matrix the type is discharged from the mold in the ordinary way common both in machine and hand molds. Thus, by a continuous rotary motion of the crank and a harmonious working of the parts, as before stated, types can be cast by this machine with great expedition and of a very superior quality.

The parts of the above-described machine, which I claim by right of original invention, are, first, the method of bringing the mold to and from the nipple by placing it upon what I call the "crane" A, whose centers of motion are vertical, thereby allowing the mold a horizontal movement, as described; also, as forming a part of the arrangement of this

crane, the adjustable socket *e e* for the upper center, B; also, as forming part of said arrangement, slide I, with rod H.

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

1. The combination of the slide I and rod H with the horizontal moving crane A, substantially in the manner described, the crane receiving its reciprocating motion from the combination of the crank-shaft M Y, cam R, roller U, connecting-link V, rockingshaft T,

lever W, and weight X, or by other means substantially the same.

2. The arrangement of the adjustable socket *e e*, for the upper center, B, of the crane A, as described, for adjusting the mouth of the mold to the orifice of the nipple-plate, in combination with the crane.

DAVID BRUCE, JR.

Witnesses:

W. K. WINANT,  
DAVID BRUCE.