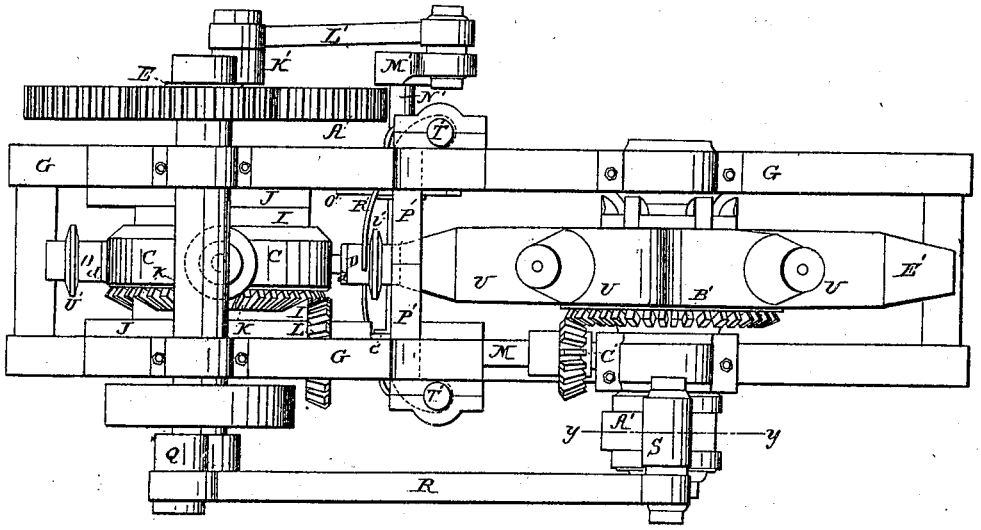
2 Sheets—Sheet 1.

J. W. McDERMOTT.

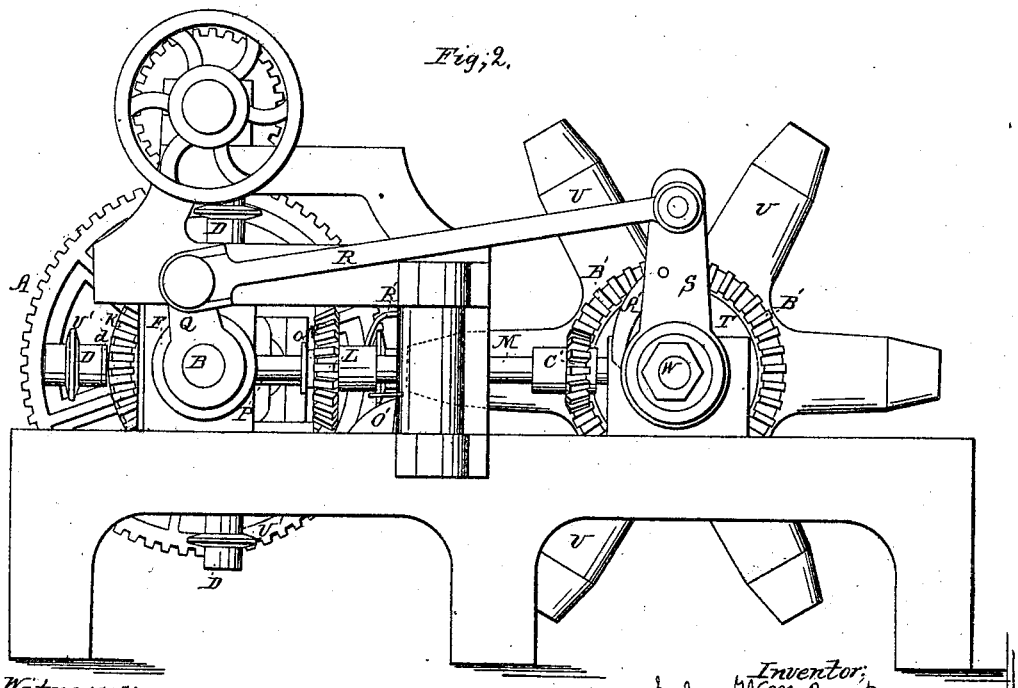
BOLT HEADING MACHINE.

No. 52,433. Patented Feb. 6, 1866.

Fig; 1.



Fig; 2.



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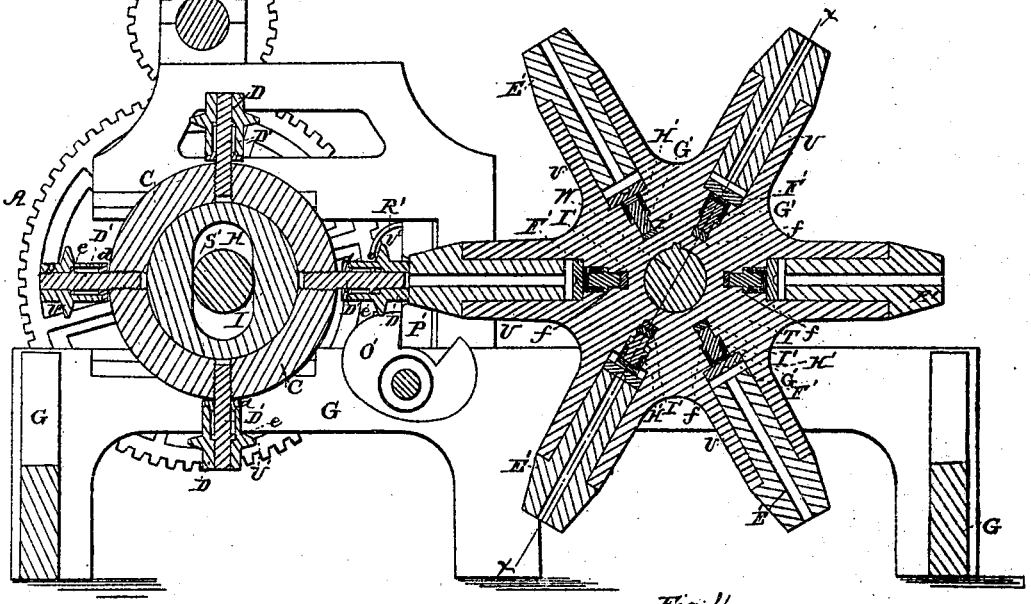
2 Sheets—Sheet 2.

J. W. McDERMOTT.

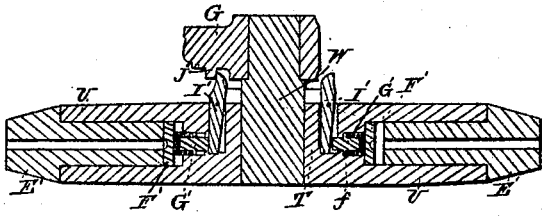
BOLT HEADING MACHINE.

No. 52,433. Patented Feb. 6, 1866.

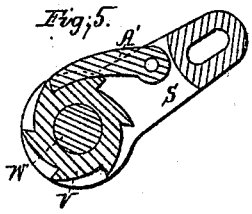
Fig; 3.



Fig; 4.



Fig; 5.



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UNITED STATES PATENT OFFICE.

JOHN WM. McDERMOTT, OF NEW YORK, N. Y.

BOLT-HEADING MACHINE.

Specification forming part of Letters Patent No. **52,433**, dated February 6, 1866.

To all whom it may concern:

Be it known that I, JOHN WM. MCDERMOTT, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Bolt-Heading Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of my invention is to furnish a machine for heading bolts speedily and accurately; and it consists, principally, of two wheels and an accompanying system of cams and gearing, the one wheel being furnished with a series of radial arms into the ends of which the unheaded bolts are inserted, and the other wheel being furnished with a series of radial dies corresponding with the radial arms of the first wheel. By the action of the necessary cams and gearing each arm of the one wheel with its unheaded bolt is brought into linear contact with the corresponding dies of the other wheel, and the head of the bolt is then formed. The die is then withdrawn from the head of the bolt by the action of a set of jaws operated by cams, and the headed bolt is finally expelled from the arm in which it had been placed by the action of a lever, the action of the whole being hereinafter more fully described.

Figure 1 is a top or plan view of the machine. Fig. 2 is a side view of the same. Fig. 3 is a vertical longitudinal central section of the same. Fig. 4 is a section of two opposite arms through the line *x x*, Fig. 2, showing the lever for expelling the headed bolts and the manner in which it is operated. Fig. 5 is a section through the line *y y*, Fig. 1, showing the ratchet-wheel and pawl for communicating rotary motion to the wheels which carry the arms and dies.

A is the driving-wheel by which motion is communicated to the machine either directly or through the intervention of any well-known system of gearing.

B is the driving-wheel shaft which passes through the slide which carries the wheels C and the dies D. The shaft B, after passing through the bearings E and F in the frame G of the machine, is bent at right angles, so as to form a crank, S′, working in the slot H in the sliding frame I of the die-wheel C, so that by the revolution of the said driving-wheel shaft B an alternate backward and forward motion is given to the sliding frame I and die-wheel C. The die-wheel C is hung and revolves upon the central part of the sliding frame I, which is supported by and slides backward and forward upon the guides J.

The die-wheel C is made to revolve at the proper time and through the proper space by means of the cogs K, on the sides of said wheel C, near its circumference, which cogs K mesh into a small bevel-pinion, L, which slides upon and revolves with the shaft M. The bevel-pinion L is made to slide backward and forward upon the shaft M, in connection with the backward and forward movement of the frame I and die-wheel C, by means of a part, N, of said frame I, which projects into a groove, O, in said pinion L, as represented in Fig. 2.

The bevel-pinion L is kept from revolving upon and made to revolve with the shaft M by means of a projection, P, extending so far along the shaft M as the bevel-pinion L passes in its forward and backward movements, said projection fitting into a groove or channel in said bevel-pinion L.

To the end of the driving-wheel shaft, opposite to the driving-wheel A, is attached a crank, Q, which, by means of the connecting-rod R, gives a backward and forward motion to the crank S, which crank S works loosely upon the shaft of the wheel T, which carries the radial arms U, for receiving the unheaded bolts.

The crank S may be made broad, as represented in Figs. 1 and 5, so that the lower part of said crank may be divided, so as to allow a ratchet-wheel, V, to be attached to the shaft W of the wheel T, within a recess formed by cutting away the middle of the lower part of said crank S. To the upper part of said recess is attached a pawl, A′, which catches into the teeth of said ratchet-wheel V, or said ratchet-wheel and pawl may be attached to the side of said crank S; but I prefer the manner first described, as giving a firmer support to the pawl and a more prompt movement to the wheel T.

When the crank S moves in a direction toward the die-wheel C the pawl A′ takes hold of one of the teeth of the ratchet-wheel V and turns it. To the side of the wheel T is at-

tached a system of cogs, B′, meshing into a small bevel-pinion, C′, firmly secured to the shaft M. The shaft M works in bearings attached to the side of the frame G of the machine. Thus by the action of the pawl A′ motion is communicated to the wheel T, which, in turn, by means of the cogs B′ and bevel-pinion C′, gives motion to the shaft M, and that, in turn, by means of the bevel-pinion L and cogs K, gives motion to the die-wheel C.

It will be observed that the wheel T and the die-wheel C revolve simultaneously, but in opposite directions, for while the wheel T revolves from right to left the wheel C revolves from left to right.

The dies D are made in two pieces. The main piece D has a longitudinal opening through it, the upper part of which is of the precise form of the intended heads of the bolts, while the lower part of said opening is enlarged, as seen in Fig. 3. It is also made with an annular projection, U′, as represented in the drawings, the object of which is hereinafter stated. The smaller piece *d* fits into the lower end of said enlarged opening in the form of a cap, said piece or cap *d* having an opening through it for the passage of the pin or stop D′. The pin or stop D′ is screwed into the die-wheel C, or may be secured by a jam-nut, is of such a length as to extend through the die, so that its end may be flush with the face of the die D when said die is close to the die-wheel C; and it is also of sufficient length to allow of its being screwed into the die-wheel C far enough to be strong and firm. Said pin or stop D′ is also furnished with an annular projection, *e*, fitting into the enlarged opening in the die D to prevent said die from dropping from the pin or stop D′ during the revolution of the die-wheel C.

The arms U of the wheel T are chambered, as represented in Fig. 3, to receive the bolt-holders E′, the blocks F′ and G′, the spring-pusher H′, and the lever I. The bolt-holders E′ fit over the ends of the arms U in the form of a cap, have an opening throughout their entire length large enough to receive the bolts intended to be operated upon, and extend nearly to the bottom of the main chamber of the arms U. The block F′ fits into the bottom of the main chamber of the arms U rests upon the circular shoulder there formed, as shown in Fig. 3, and leaves a space between the upper face of said block F′ and the foot of the bolt-holder E′. The block G′ is placed in a small chamber extending down from the bottom of the main chamber of the arms U, as represented in Fig. 3. Said block G′ rests upon one arm of the lever I′, against which it is held by the action of the spring-pusher H′, which presses against an annular projection, *f*, on said block G′. The lever I′ extends from the bottom of the lower chamber in the arms U, through an opening to the outside of the wheel T, as represented in Fig. 4. The inner arm of said lever I′ is held down against the bottom of the opening in which it works by the spring-pusher H′, acting upon the block G′ until the outer arm of the lever I′ is operated upon in the manner hereinafter described. The said lever I′ is pivoted to the wheel T, near the outer surface of the side of said wheel, as represented in Fig. 4. The lever I′ is operated by a cam-like projection, J′, attached to the side of the frame G of the machine, against which the projecting outer arms of the levers I′ impinge as the wheel T revolves.

To the end of the driving-wheel shaft B, projecting beyond the driving-wheel A, is attached a small crank, K′, which, by means of a connecting-rod, L′, gives a backward and forward motion to the crank M′, attached to the shaft N′.

To the shaft N′ are attached two cams, O′, each of which operates one of the jaws, P′, closing them, as represented in Fig. 1, when one of the arms, U, of the wheel T and one of the dies, D, of the die-wheel C come into line with each other, and opening them as the arm and die pass away from each other. Said jaws P′ close directly over the point where the ends of the arm U and die D come into contact, act as guides in keeping them exactly in the proper position, and at the same time securely supporting them while the pressure which forms the heads of the bolts is being applied. Said jaws P′, when opening, push against the annular projection U′ upon the die D, and force the die D off from the formed head of the bolt by shoving the die back upon the pin or stop D′, thus allowing the arm U and die D to revolve away from each other. Said jaws P′ are pivoted to the frame G of the machine at the point T′, as represented in Fig. 1.

To one of the jaws P′ is attached a spring, R′, which, as the die D and arm U are coming into line with each other, takes hold of the annular projection U′ of the die D and moves said die forward on the pin or stop D′, so that the said die may receive the unheaded end of the bolt before the pressure which forms the heads of said bolts is applied by the forward movement of said die-wheel C, as hereinbefore described.

It is not necessary that there should be the same number of dies upon the die-wheel C that there are arms upon the wheel T; but the gearing must be so arranged that when one of the arms U comes into a horizontal position one of the dies D shall come into the same position, so as to form the head of the bolt, as before described. There should be a water-trough placed under the die-wheel C, through which the dies D may pass in revolving, for the purpose of cooling the said dies. There should also be placed under the wheel T a water-trough, for the purpose of cooling the bolt-holders E′. This latter trough should be more shallow than the former one, first, because the receptacle for the headed bolts when expelled from the bolt-holders must be placed between the two troughs, and the sides of the latter trough must not rise so high as to interfere with the passage of said bolts from said bolt-

holders to said receptacle; and second, because less heat will be developed in the bolt-holders than in the dies, and consequently a less depth of water will suffice to cool them.

Operation: The machine being in the position represented in Fig. 1, an unheaded bolt with the end heated for heading is placed in the bolt-holder which is next above the horizontal one, and the machine is started. The first effect is to open the jaws P′, which forces the die D from the formed head of the bolt, and then the die-wheel C slides back by the action of the crank S′ of the shaft B. The pawl A′ now acts upon the ratchet-wheel V and causes the wheels T and C to revolve. This brings another arm and die into a horizontal position, the jaws P′ now close, the spring R shoves the die forward upon the pin or stop D′ to receive the unheaded end of the bolt, the crank S′ causes the die-wheel C to slide forward and form the head of the bolt, the jaws again open, force back the die from the head of the bolt, and so on continuously. At the same time that an arm and die come into position for forming the head of the bolt the revolution of the wheel T brings the outer end of the lever I′ of the preceding arm U into contact with the cam-like projection J′, which operates the lever and expels the bolt into the receptacle prepared for it.

I claim—

1. The combination of the jaws P′ or their equivalent with the dies D and the stop or pin D′, substantially as described, and for the purpose set forth.

2. The combination of the pawl A′ and ratchet-wheel V with the wheel T, cog-wheels B′, C′, L, and K, and shaft M, and the die-wheel C, substantially as described, for the purpose of giving intermittent rotary motion to the wheels C and T.

3. The combination of the lever I′ with the cam-like projection J′ and the wheel T, for the purpose of expelling the headed bolts from the bolt-holders E′, substantially as described.

4. The combination of the spring R′ with the jaws P′ and the dies D, substantially as described, and for the purpose set forth.

5. The combination of the jaws P′ or their equivalent with the dies D and bolt-holders E′, for the purpose of centering the heads of the bolts, substantially as described.

6. The combination of the sliding frame I, the die-wheel C, and the crank S′, formed on the shaft B of the driving-wheel A, as set forth.

JOHN WM. McDERMOTT.

Witnesses:

THOS. P. HOW,

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