R. L. WILCOX.

MECHANICAL MOVEMENT.

APPLICATION FILED FEB. 13, 1911.

1,036,047.

Patented Aug. 20, 1912.

5 SHEETS—SHEET 1.

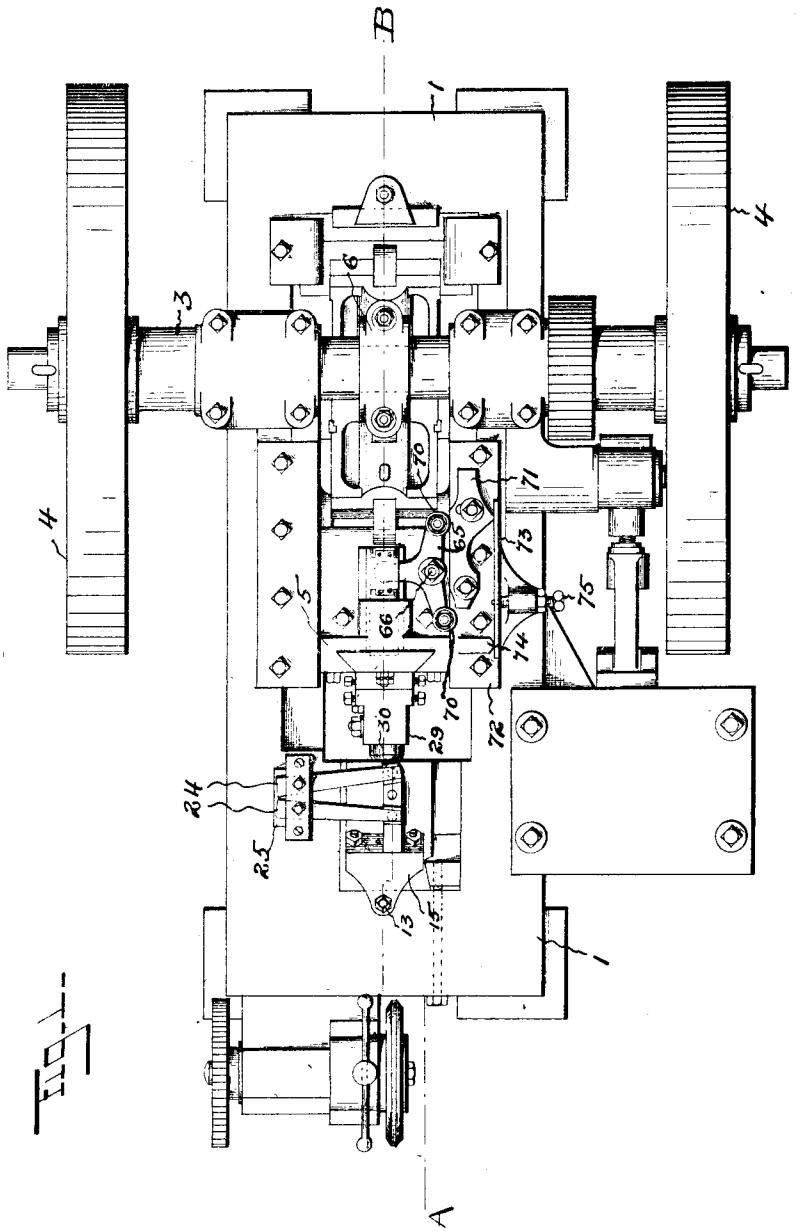

Fig. 1.

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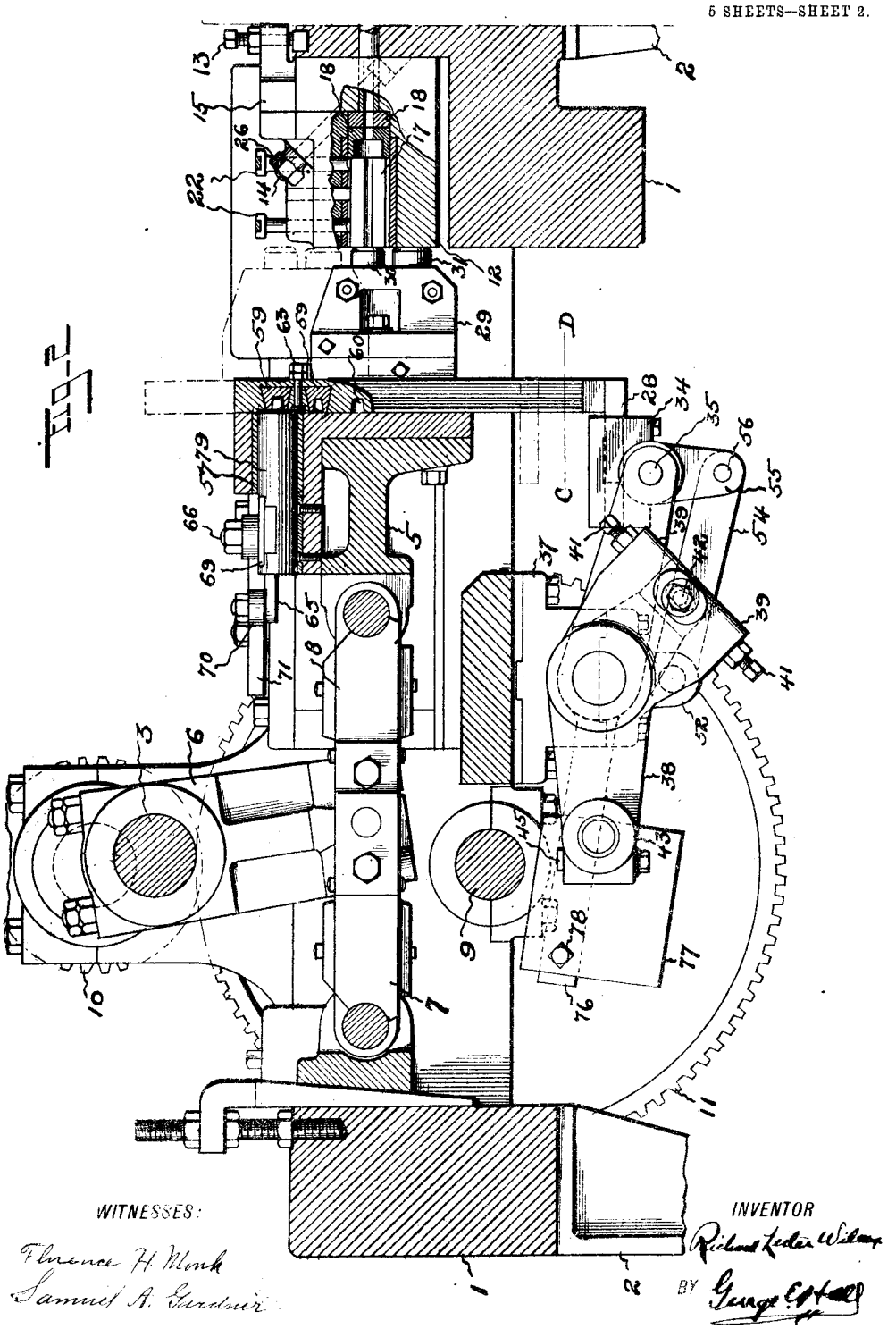

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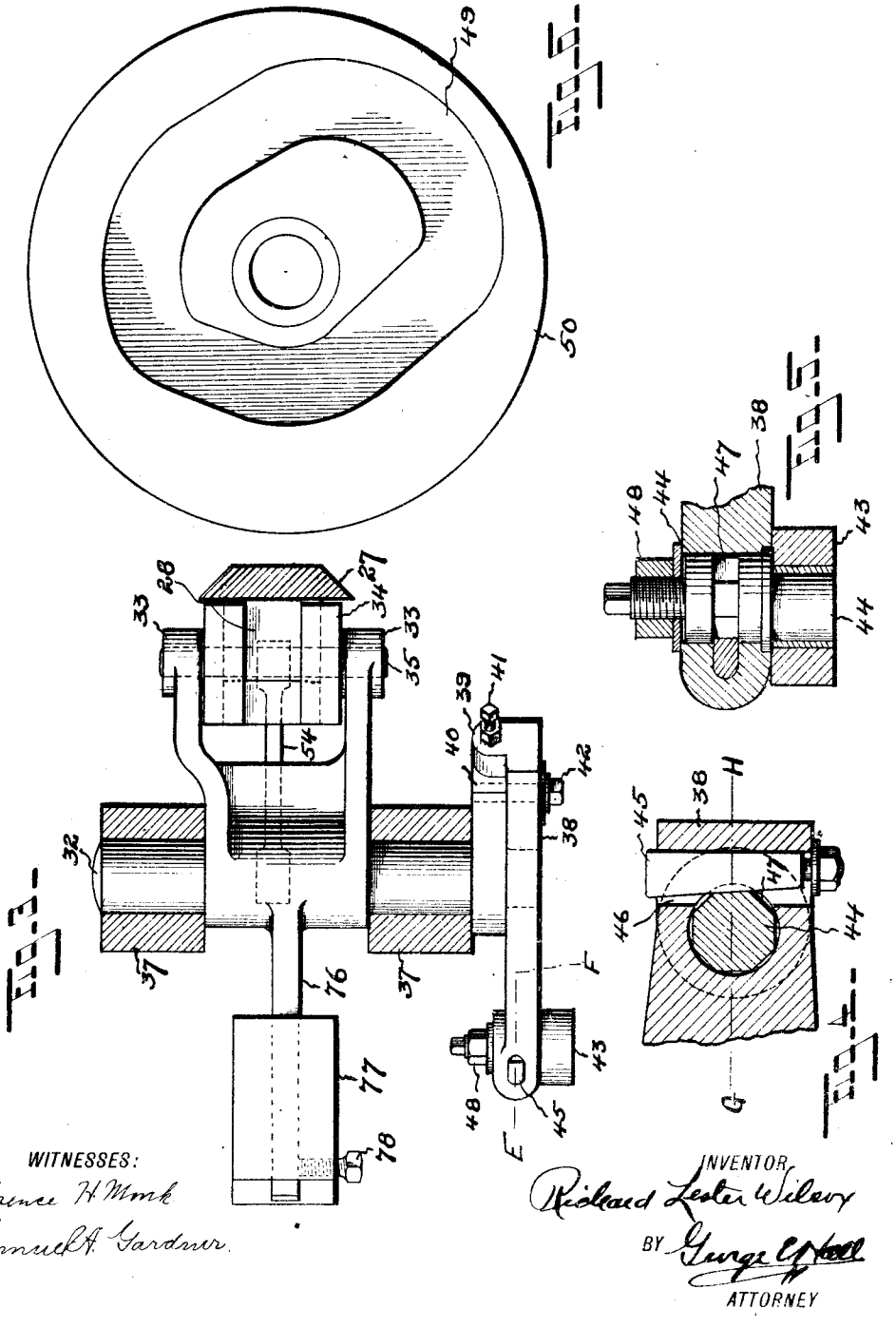

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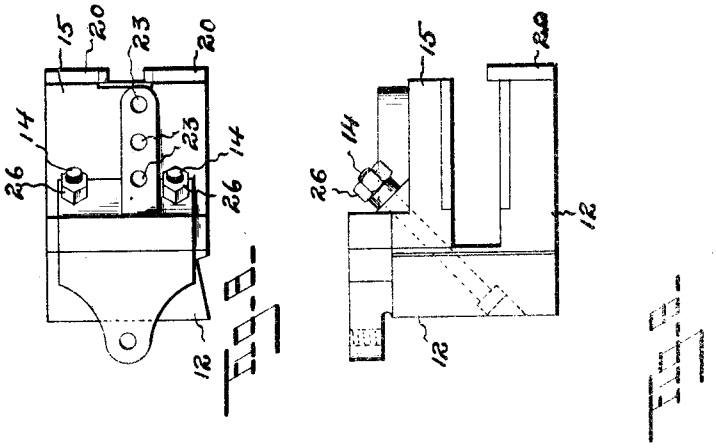

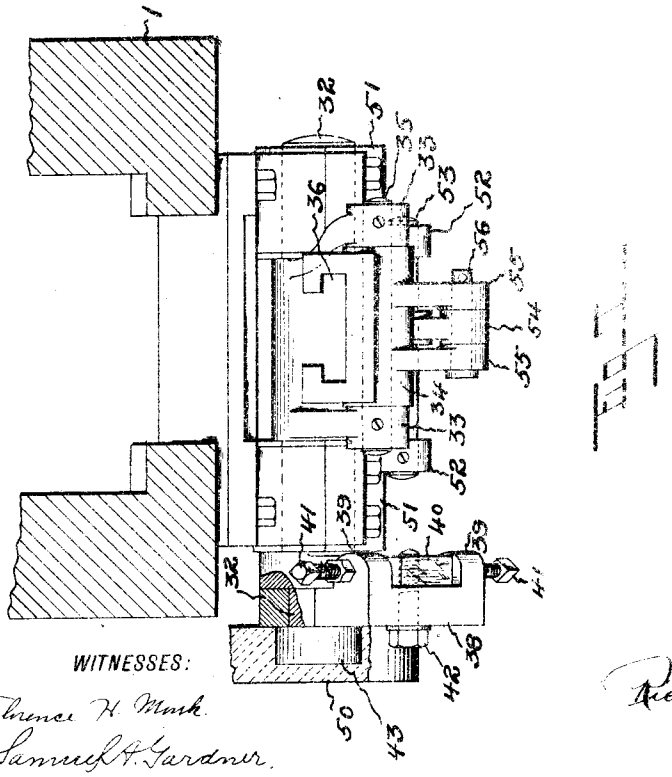

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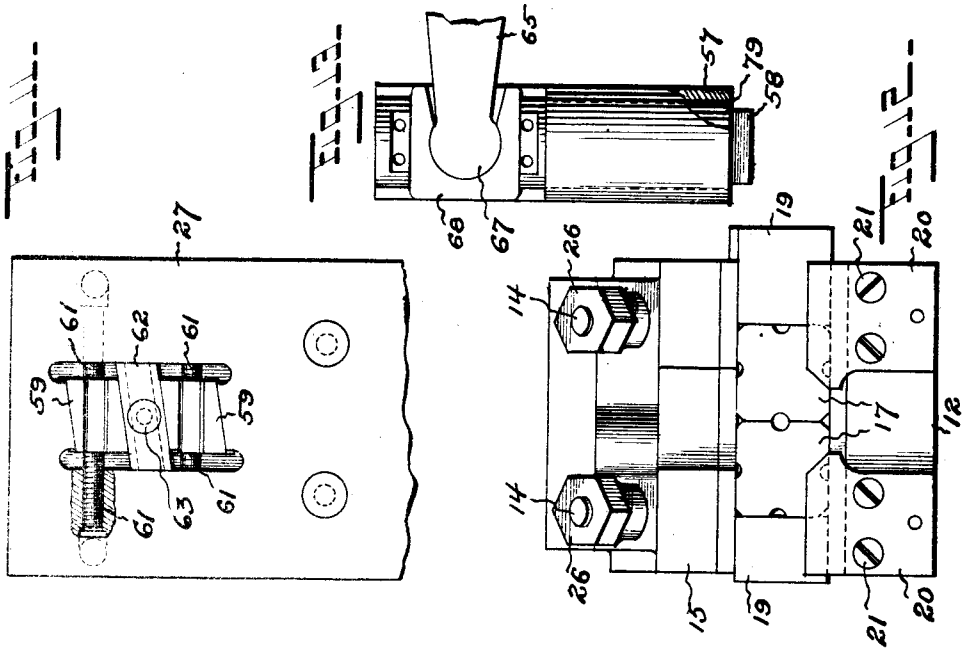
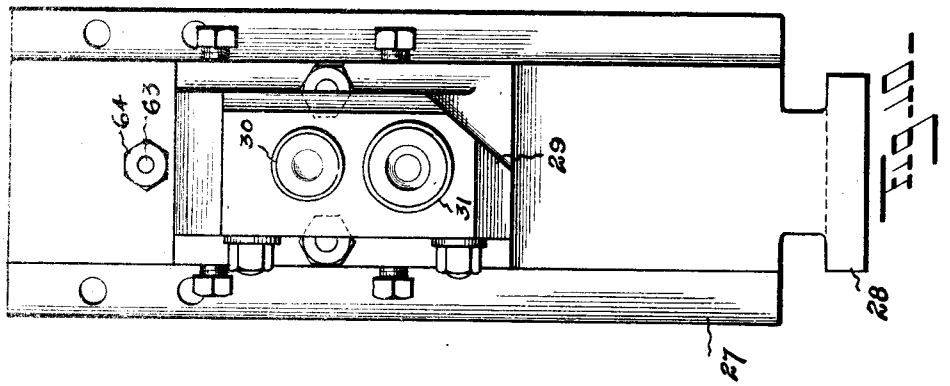
5 SHEETS—SHEET 5.





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UNITED STATES PATENT OFFICE.

RICHARD LESTER WILCOX, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MECHANICAL MOVEMENT.

1,036,047. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed February 13, 1911. Serial No. 608,393.

To all whom it may concern:

Be it known that I, RICHARD LESTER WILCOX, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful mechanical movements, having more particular reference to mechanism for operating a header of that type wherein a wire rod is automatically fed into the machine and cut off into pieces of predetermined lengths, one end of which is upset so as to form a head, and the whole, when completed, forming a bolt or rivet blank.

It is the object of my invention, among other things, to construct such a machine; means for operating the punch slide from a cam without cramping or tipping, so that the punches connected therewith will always occupy a horizontal position irrespective of the vertical position of the slide; means for adjusting the position of the slide in relation to the cam; means for locking the punch slide against movement while the punches are striking their effective blows; and to so construct and design all of the several parts that they may be economically constructed and readily assembled.

To these, and other ends, my invention consists in the mechanical movement, having certain details of construction and combinations of parts, as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures; Figure 1 is a plan view of a header embodying my invention; Fig. 2 is an enlarged sectional view thereof, upon line A—B of Fig. 1; Fig. 3 is a plan view of the slide operating mechanism, with the slide in section, upon line C—D of Fig. 2; Fig. 4 is an enlarged sectional view of the roll arm, upon line E—F of Fig. 3; Fig. 5 is a sectional view thereof, upon line G—H of Fig. 4; Fig. 6 is a side elevation of the slide operating cam; Fig. 7 is a front elevation of the slide operating mechanism, partly in section; Fig. 8 is a plan view of my new and improved die block; Fig. 9 is a side elevation thereof; Fig. 10 is a front view of the slide, with the punch holder and punches secured thereto; Fig. 11 is a fragmentary rear elevation of the slide; Fig. 12 is an enlarged front elevation of the die block, with the dies and other component parts connected therewith; and Fig. 13 is a detailed plan view of the locking bolt and mechanism connected therewith.

My invention is illustrated and described as applied to a three-blow machine, and in the practice thereof, I provide a bed 1, mounted upon suitable legs 2, in which is rotatably mounted the crank shaft 3 with the driving wheels 4 fixed thereon, and in which the gate 5 is slidably mounted, deriving its movement from said crank shaft through the pitman 6 and toggles 7 and 8, the former being connected with the bed and the latter with the gate. The timing shaft 9 is rotatable in the bed at a speed one-third of the crank shaft, being driven from a pinion 10 on said crank shaft, the teeth of which mesh into those of the gear 11 fixed on the shaft 9. While I have only shown a toggle actuated gate my invention is equally applicable to a machine having a crank actuated gate, or in fact with any reciprocating gate, irrespective of the manner by which its motion is derived. Lying within a pocket in one end of the bed 1 is a die block 12 that is vertically adjustable therein by means of the screw 13, and is formed in substantially the form of a figure L, in side elevation, as shown in Fig. 9, and secured thereto, by means of the bolts 14, is the cap 15. This cap, when secured in place, leaving an open space between the bottom of the die block and the underside of the cap, within which are mounted the dies 17—17, the backing blocks 18—18, and the filling blocks 19—19, all being held against endwise movement by the plates 20, secured by the screws 21. The arrangement and operation of the several dies and backing and filling blocks is as usual in this type of machine, and the dies are moved apart by the usual separators 22 that are slidably mounted in the holes 23 in the cap 15, and are normally moved downward by the pressure of the springs 24, which are secured at one end to the fixed block 25.

With the die block, as herein shown and described, access to the dies and blocks is conveniently and quickly had by simply loosening the nuts 26 upon the bolts 14 and

moving the cap away from the block 12, which is accomplished without disarranging the relative positions of the die block and bed of the machine.

Vertically movable in the gate 5 is the slide 27, having a laterally projecting lip 28 at its lower end, and upon the face of which is secured the punch block 29, having the punches 30 and 31 fixed therein. Movement is imparted to said slide through the rock shaft 32, rotatable in the journal boxes 37 fixed to the bed 1, and between the arms 33 of which the guide block 34 is mounted upon the fixed shaft 35, said guide block being grooved at 36 for the reception of said lip 28. Mounted upon said rock shaft is the roll arm 38, having the offset lugs 39 at one end, between which the arm 40, integral with the rock shaft 32, is adjusted, through the screws 41, and is secured in any of its adjusted positions by the bolt 42, and carrying at its opposite end a roll 43 that is mounted upon an eccentric stud 44 journaled in said arm. This stud is adjustably secured in said roll arm by a key 45 that passes through a key-way 46 and impinges against one of the several flat faces 47 upon said stud, the nut 48 securing said stud in its adjusted positions. The roll 43 projects into a groove 49 in the cam 50 which is fixed to the timing shaft 9. A shaft 53 is fixed in the ears 52, integral with the caps 51 of the journal box 37, and has a link 54 thereon that is secured between the arms 55 integral with the guide 34 by the pintle 56. As the cam 50 rotates, movement is imparted to the rock arm 32 through the roll arm 38, and a vertical movement to the slide 27 through the operative connection between the guide block 34 and the lip 28 upon said slide. The link 54 always holds the guide block 34 in a horizontal position, irrespective of the position of the rock arm, and during the reciprocation of the gate 5, the lip 28 moves in the groove 36 in said guide block. By this linkage connection the slide is capable of movement in two directions, at right angles to each other, without cramping or tilting, a common objection in heading machines heretofore made, which cramping and tilting moves the punches so that they are not in their proper positions when a blow is struck. To offset the weight of the slide 27 and punch block 29 which are upon one side of the rock shaft 32, I have provided a weight 77, which is shiftable upon an arm 76 upon said shaft, and secured in any of its adjusted positions by the screw 78. This counterweight reduces materially the wear occasioned by the movement of said slide and punch block, and provides for its easy operation, with the minimum application of power. The rotary adjustment of the cam roll 43 in connection with the arm 38 provides for a limited variation of the length of the stroke of the slide. The punch slide is locked while the blow is being struck, through the locking slide 79 that has a reciprocatory movement in the sleeve 57 mounted in the gate 5, and provided with a lip 58 on its forward end, which enters a groove in the locking blocks 59 and the groove 60 in the back of the slide. Said locking blocks are mounted in pockets which lie at a slight angle to the top and bottom of the slide, as shown in Fig. 11, are adjusted laterally in said pockets by the screws 61, and are secured in their adjusted positions by the key 62 that is secured by the bolt 63 and nut 64. The vertical position of the slide 27 is varied slightly by lateral adjustment of these blocks 59 within the slide so as to insure the registering of the axis of each one of the punches with that of the wire while being operated upon. A reciprocatory movement is imparted to the locking bolt 56 through the rock lever 65, pivotally secured to the gate 5 by the stud 66, said lever having three arms, one of which terminates in a head 67, that lies within a block 68 movable in one end of the locking bolt beneath the cap 69 and having cam rolls 70 upon the other two arms, which lie against a cam 71 mounted on the cap 72, fixed to the bed 1. Said cam has a slight lateral movement upon the cap by means of the spring 73, which bears at one end against said cam and at the other end against the lug 74, a screw 75 threaded through said cap forming a fulcrum, whereby the tension of the spring may be varied. As the gate 5 reciprocates, the rolls 70 ride upon the cam 71, and impart a rocking movement to the rock lever 65, and through which a reciprocating movement is imparted to said locking bolt, the operation of the locking bolt in relation to the slide being such, that when the slide is at rest and about to strike a blow, the lip 58 will enter the grooves 60 in either of the locking blocks 59 and hold said slide against vertical movement. The relation of the blocks 59 with the punches 30 and 31 is such that the lip 58 only engages with the grooves therein when a blow is being struck, that is, in the type of mechanism herein shown, during the first two horizontal movements of the gate, and the third movement, when no blow is struck, the lip enters the groove 60, which can, and usually is, much larger than that of the lip 58, as it is not important that the slide should now be held against a slight vertical movement.

The punch block 29 is constructed and secured to the slide 27 so that during the third forward movement of the gate, all of said punch block is above the line of the wire, and the entire space between the front of the slide 27 and the face of the dies is open,

so that a blank, of substantially the same length as said open space, can be readily ejected.

In operation, the wire is fed into the machine by any type of feeding mechanism (not herein shown), and is cut off into predetermined lengths by equally well known mechanism. The first forward movement of the gate brings the punch 30 in contact with the projecting end of the wire and upsets the end thereof, and the second blow completes said head, and at the third movement the finished blank is ejected beneath the punch block and drops out of the machine, thus two of the three movements striking an effective blow and the third being a miss while the blank is being ejected.

As previously mentioned, my invention may be used in a machine, wherein the punch strikes an effective blow at each forward movement of the gate, and the blank ejected between two of such blows, such action being accomplished by merely changing the shape of the cam 50 and the ratio of speed between the crank and timing shafts.

Minor changes and alterations can be made within my invention, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

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

1. The combination with a reciprocating gate; of a slide; a cam; means controlled by said cam for imparting movement to said slide within said gate at substantially a right angle to the path of movement of said gate; and auxiliary means for preventing the tilting or cramping of said slide within said gate during its movement.

2. The combination with a reciprocating gate; of a slide mounted in said gate so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a rock arm connection between said cam and slide; and means connected with said rock arm to prevent said slide from tilting or cramping during its movement within said gate.

3. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a rock arm; a guide block between said slide and rock arm; and means connected with said guide block for maintaining the same in a position substantially parallel with the path of movement of said gate irrespective of the position of said rock arm.

4. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a rock arm; a guide block between said rock arm and slide; and a link connected at one end to a fixed part and at the other end to said guide block.

5. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a rock arm; a shiftable connection between said rock arm and slide; a cam roll; and means for adjustably securing said cam roll to said rock arm, whereby the length of the stroke of the said slide is variable.

6. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a rock shaft; a connection between said rock shaft and slide that permits said slide to move with and within said gate; a roll arm; and means for adjustably securing said roll arm to said rock shaft.

7. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; a guide block, having a slidable connection with said slide; a rock shaft; a connection between said rock shaft and guide block that maintains said guide block in a position substantially parallel with the movement of said gate; a roll arm mounted on said rock shaft; and means for adjusting the relative position of said roll arm on said rock shaft.

8. The combination with a reciprocating gate; of a slide, having a laterally projecting lip thereon, mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a guide block, within which said lip is reciprocally movable; a rock shaft; a link connected with a fixed part at one end and with said guide block at the other end; a roll arm connected with said rock shaft; means for adjusting the relative position of said roll arm and rock shaft; a cam; a cam roll; and means for adjustably securing said cam roll to said roll arm.

9. The combination with a reciprocating gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; an operative connection between said cam and slide, whereby said slide is moved within said gate without tilting or cramping; and means for varying the length of stroke of said slide within said gate.

10. The combination with a reciprocating

gate; of a slide mounted in said gate, so as to have movement therein at substantially a right angle to the path of movement of said gate; a cam; an operative connection between said cam and slide, whereby said slide is moved within said gate without tilting or cramping; means for varying the length of the stroke of said slide within said gate; and means for varying the relative positions of said slide and cam.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD LESTER WILCOX.

Witnesses:

GEORGE F. BYAM,

CLIFFORD PETITJEAN.