E. S. INGRAHAM.

RISE AND FALL MOTION FOR RIVET MACHINES.

APPLICATION FILED JULY 17, 1908.

919,435. Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

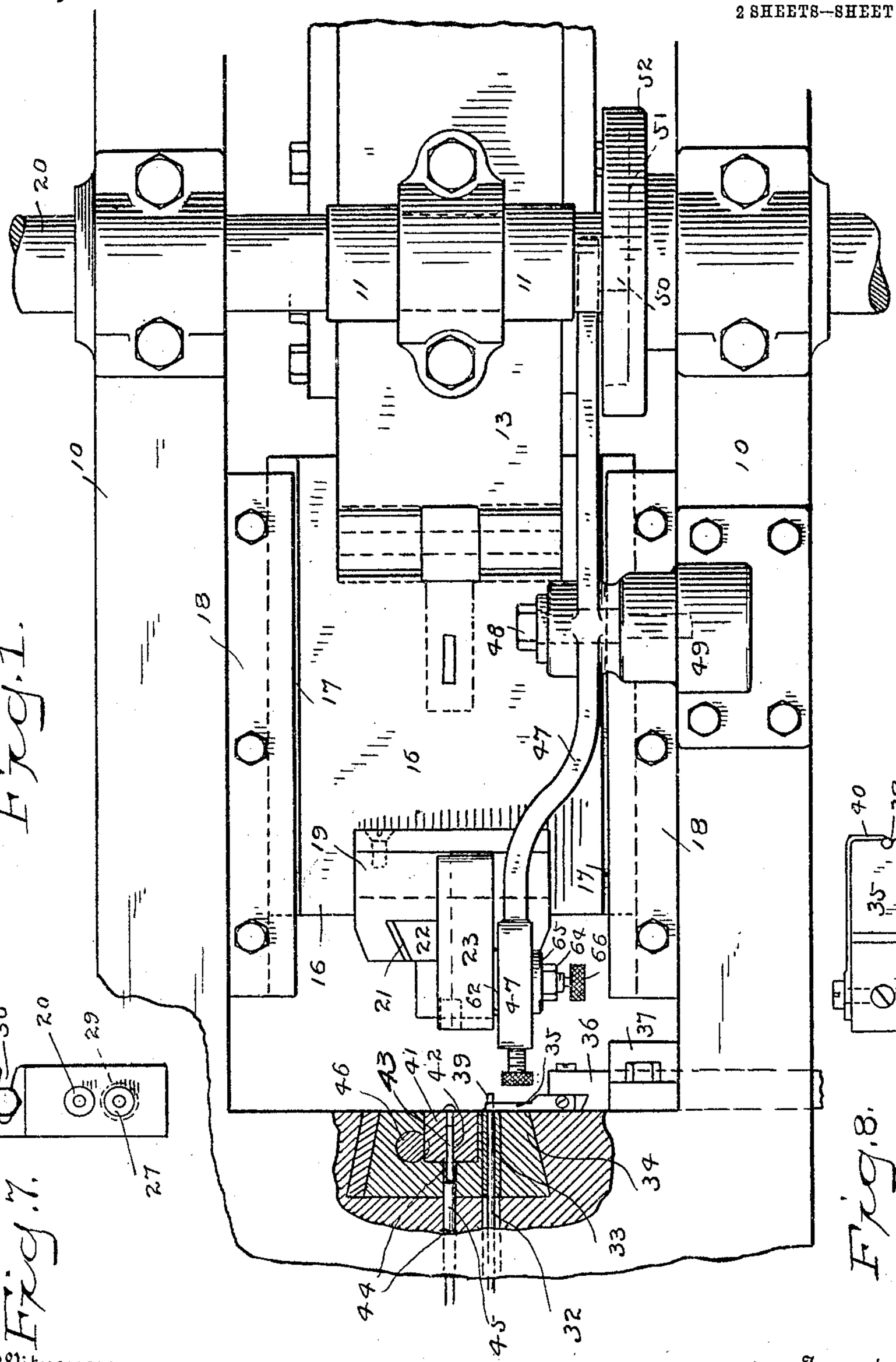

Fig. 1.

Fig. 8.

Witnesses:

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S. W. Atherton.

Inventor

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By Attorney

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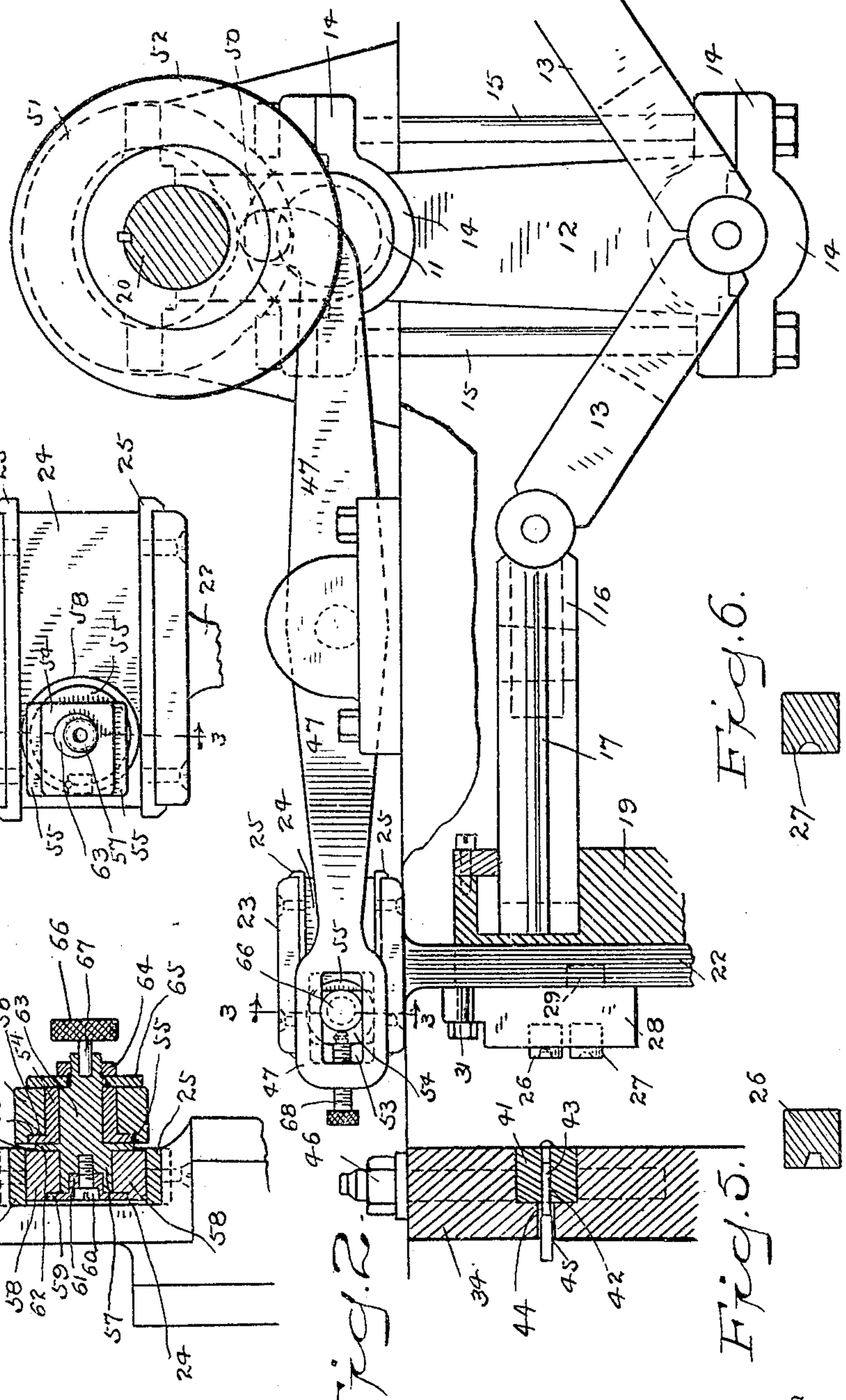

Fig. 4.

Fig. 6.

Fig. 3.

Fig. 2.

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWIN S. INGRAHAM, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE BLAKE AND JOHNSON COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

RISE-AND-FALL MOTION FOR RIVET-MACHINES.

No. 919,435. Specification of Letters Patent. Patented April 27, 1909.

Application filed July 17, 1908. Serial No. 443,972.

To all whom it may concern:

Be it known that I, EDWIN S. INGRAHAM, a citizen of the United States, residing at Waterbury, county of New Haven, State of Connecticut, have invented a new and useful Rise-and-Fall Motion for Rivet-Machines, of which the following is a specification.

This invention has for its object to produce a simple and novel rise and fall motion, so called, for rivet machines which will materially reduce the cost of the machine, will be strong and durable, easy to adjust and all parts of which shall be on the top of the machine.

With these and other objects in view I have devised the simple and novel rise and fall motion of which the following description in connection with the accompanying drawings is a specification, reference characters being used to indicate the several parts:

Figure 1 is a plan view of a rivet machine with my novel rise and fall motion applied thereto, the rivet die and die block being in horizontal section; Fig. 2 a view partly in vertical section, the framework being removed; Fig. 3 a section on an enlarged scale on the line 3—3 in Figs. 2 and 4, looking in the direction of the arrows; Fig. 4 a detail elevation of the carrier head detached; Fig. 5 a section of the first header detached; Fig. 6 a section of the second header detached; Fig. 7 a detail elevation showing the means for lateral adjustment of the header block; and Fig. 8 is a detail view of the cutter detached.

10 denotes the framework which may be of any ordinary or preferred construction, and 20 a shaft journaled on the framework and which is provided with a crank 11 on which a link 12 is pivoted.

13 denotes a toggle whose arms are slotted to receive the link and are pivoted at the lower end thereof, the boxes 14 of the crank pin and toggle pin being connected by tie rods 15. The rear arm of the toggle is pivoted to a fixed portion of the machine, not shown in the drawing as the construction is in common use and specifically forms no portion of the present invention. The forward end of the toggle is pivoted to a slide or gate 16 provided on its edges with ribs 17 which slide in ways 18 bolted to the framework. At the forward end of the slide or gate and rigidly secured thereto is a block 19 having in its forward side vertical ways 21 which receive a dove-tailed slide 22. At the upper end of the slide is a carrier head indicated by 23. The carrier head is provided with a longitudinal groove 24 on the upper and lower sides of which are hardened bearing plates 25.

26 denotes the first header and 27 the second header which are carried by a block 28 pivoted to slide 22 as at 29, see dotted lines Figs. 2 and 7. At the upper end of the header block is an arc slot 30 through which a bolt 31 passes. Lateral adjustment of the headers may be effected by loosening bolt 31 slightly and oscillating the header block, the bolt being tightened up again to lock the block and with it the headers in place.

The wire to be operated upon may be fed to the machine in any ordinary or preferred manner. I have shown the wire, which is indicated by 32, as fed to the machine through a quill 33 seated in a die block 34 which is rigidly set in the framework. The feeding mechanism is not illustrated, as specifically it forms no portion of the present invention. Rivet blanks are cut off as the wire is fed forward by means of a cutter 35 carried by a slide 36 which reciprocates in a guide 37 bolted to the framework. The cutter is provided at its forward end with a socket 38 which receives the severed blank, indicated by 39, the blank being retained in the socket by a spring 40 shaped to partly cover the socket.

41 denotes the rivet die which has a hole 42 through it.

43 denotes the ejecting pin which lies partly in hole 42 and partly in a larger hole 44 in the die block and in the framework of the machine.

45 denotes a plunger which reciprocates in hole 44, the forward movement of the plunger causing the ejecting pin to eject a finished rivet and the backward movement of the plunger permitting the next rivet blank to force the ejecting pin backward until the limit of movement of the plunger is reached, the ejecting pin serving as a stop for the inner end of the blank during the heading operation, as will presently be fully explained.

The rivet die is retained in place in the die block by means of a bolt 46.

47 denotes a lever fulcrumed on a stud 48 which engages a hub 49 upon the framework. At the rear end of the lever is a roller 50 which engages a cam groove 51 (see dotted lines Figs. 1 and 2) in the face of a disk 52

upon the shaft. At the forward end of the lever is a slot 53 in which is a block 54 having on its inner side flanges 55 which engage corresponding recesses 56 in the inner face of the lever. This block carries an eccentric stud 57. The block, and with it stud 57, is adjustable laterally in slot 53 by means of a screw 68 which engages the end of the lever and the inner end of which is rotatably connected to the block.

58 denotes a hardened roller mounted to rotate on the stud and retained in place thereon by a washer 59 and screw 60. The washer is shown as recessed into the inner face of the roller and as provided with a central hub 61 which is socketed in the end of the stud, the screw passing through the washer and engaging the stud. The outer face of the roller bears against a flange 62 on the stud. The portion of the stud 57 which passes through block 54 is eccentric to the portion on which the roller is journaled and is specifically indicated by 63. The outer end of the stud, which is concentric with the portion on which the roller is journaled, is threaded and is engaged by a nut 64, a washer 65 being interposed between the nut and the outer end of block 54 and the lever.

66 denotes a finger piece having a shank 67 which is secured in the outer end of the stud with a drive fit.

The function of the eccentric stud is to give vertical adjustment to the carrier head and with it slide 22, the header block and the headers, relatively to the end of lever 47. To effect this adjustment nut 64 is loosened and the stud rotated by means of the finger piece as much as may be required to raise or lower the headers, it being obvious that when the stud is rotated the eccentric portion thereof will raise or lower the carrier head, which is locked in position after adjustment by tightening up the nut.

The operation is as follows: At the instant the forward motion of the wire ceases the cutter moves forward and severs the blank which is retained in socket 38 by the spring and is carried forward into alinement with rivet die 41. At this instant the plunger will have reached the limit of its backward movement. The crank will draw the toggle upward which will move the gate, block 19, slide 22 and the header block and headers forward. As the toggle approaches the horizontal position the first header will reach the blank and the outer end of the blank will pass into the recess in the header and the header will force the blank forward into hole 42 in the rivet die, the inward movement of the blank continuing until it has forced the ejecting pin into engagement with the plunger which will be at the extreme of its backward movement, the ejecting pin serving as a stop for the rivet during the double heading operation, the first portion of which is performed by the first die at the instant the toggle reaches the horizontal position. The instant the blank is seated in the header and rivet die the cutter will move backward out of the way, the spring yielding and releasing the blank. Continued movement of the crank will draw the toggle upward past the horizontal position to the reverse of the position shown in Fig. 2, the effect of which will be to draw the gate, block 19, the header block and headers back to approximately the position shown in Fig. 2, although it should be understood that the toggle will be bowed upward instead of downward as in Fig. 2. In practice the length of the link may be such that the toggle will not bend or bow upward as far as it bends or bows downward, and consequently the gate will not move as far toward the right, as seen in Fig. 2, prior to the second heading operation as it does prior to the first. It will be readily understood that during the forward and backward movements of the gate, block 19, the header block and headers just described, roller 58 will travel backward and forward on bearing plates 25. During the backward movement of the gate and headers the left end of lever 47 will be swung upward through the engagement of the roller at the rear end of said lever with the cam groove in disk 52, the effect of which will be to raise carrier head 23, slide 22 and the header block and headers, the slide moving upward in the ways in block 19. This movement places the second header in alinement with the partly headed rivet in the rivet die. As the toggle moves downward from its upwardly bowed position toward the horizontal position again, the gate, block 19 and the header block and headers will be moved forward again and the second header will complete the heading operation of the rivet in rivet die 41. As the toggle bends or bows downward past the horizontal position toward the position shown in Fig. 2, the gate, headers, etc., will be moved backward. As soon as the second header has moved away from the completed rivet the plunger will move forward and cause the ejecting pin to eject the completed rivet which will drop down into a convenient receptacle. An instant later the plunger moves backward again. During the backward movement of block 19, carrier head 23, slide 22 and the headers, the left end of lever 47 will be swung downward through the engagement of the roller at the rear end of said lever with the cam groove in disk 52, the effect of which will be to lower carrier head 23, slide 22 and the header block and headers, the slide moving downward in the ways in block 19. This movement places the first header in alinement with the new blank. At the next forward movement of the gate, headers, etc., a new blank will be held in position by the cutter and spring and the

first header will engage the new blank, force said blank into the rivet die, the ejecting pin being in position to serve as a stop again, and will perform the first heading operation. These operations are continuously repeated, each rotation of the shaft causing sufficient wire to be fed forward to make a rivet blank which is cut off by the cutter and carried to the rivet die and there released, after which the cutter moves backward again, and after the double heading operation causing the ejecting pin to eject the finished rivet. Timed to correspond therewith during the rotation of the shaft, the gate and header block are moved forward with the first header block in position to perform the first heading operation, then moved backward and raised to place the second header in position to perform the second operation, and then moved backward and lowered again, leaving the first header in position to perform the first heading operation on a new blank at the next forward movement of the gate and headers.

Having thus described my invention, I claim:—

1. In a machine of the character described, the combination with a horizontal slide, of a block carried by said slide and having vertical ways, a slide mounted in said ways and having first and second headers, and having horizontal ways at its upper end, a lever having a roller engaging said ways, and means for simultaneously vibrating the lever and reciprocating the horizontal slide.

2. In a machine of the character described, the combination with a longitudinally reciprocating block, headers and a slide in the block by which the headers are carried, of a carrier head on the slide which is provided with a groove, a roller engaging said groove, a lever and a stud by which the roller is carried and which is provided with an eccentric portion engaging the lever, whereby rotation of said stud in the lever will adjust the slide and headers vertically, and means for actuating the lever.

3. In a machine of the character described, the combination with a longitudinally reciprocating block, headers and a slide in the block by which the headers are carried, of a carrier head on the slide which is provided with a groove, a lever having a slot at its outer end, a block in said slot, a roller engaging the groove in the carrier head, and a stud on which the roller is mounted and which is provided with an eccentric portion engaging the block carried by the lever.

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

EDWIN S. INGRAHAM.

Witnesses:

G. C. SAMSON,

LOUISE E. GUINAND.