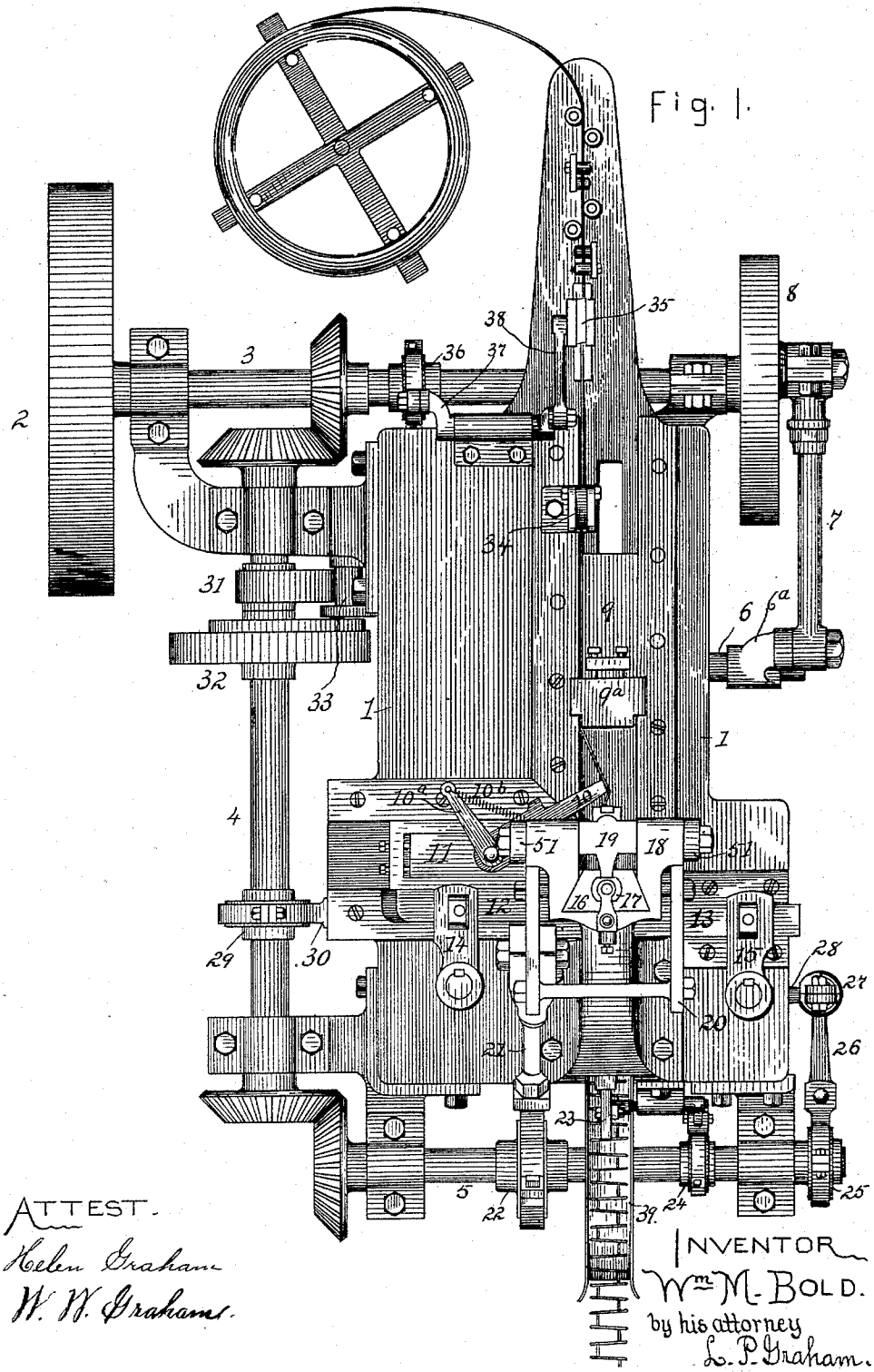
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W. M. BOLD.

MACHINE FOR FORMING ZIGZAGS.

No. 456,533. Patented July 21, 1891.

Fig. 1.



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Fig. 2.

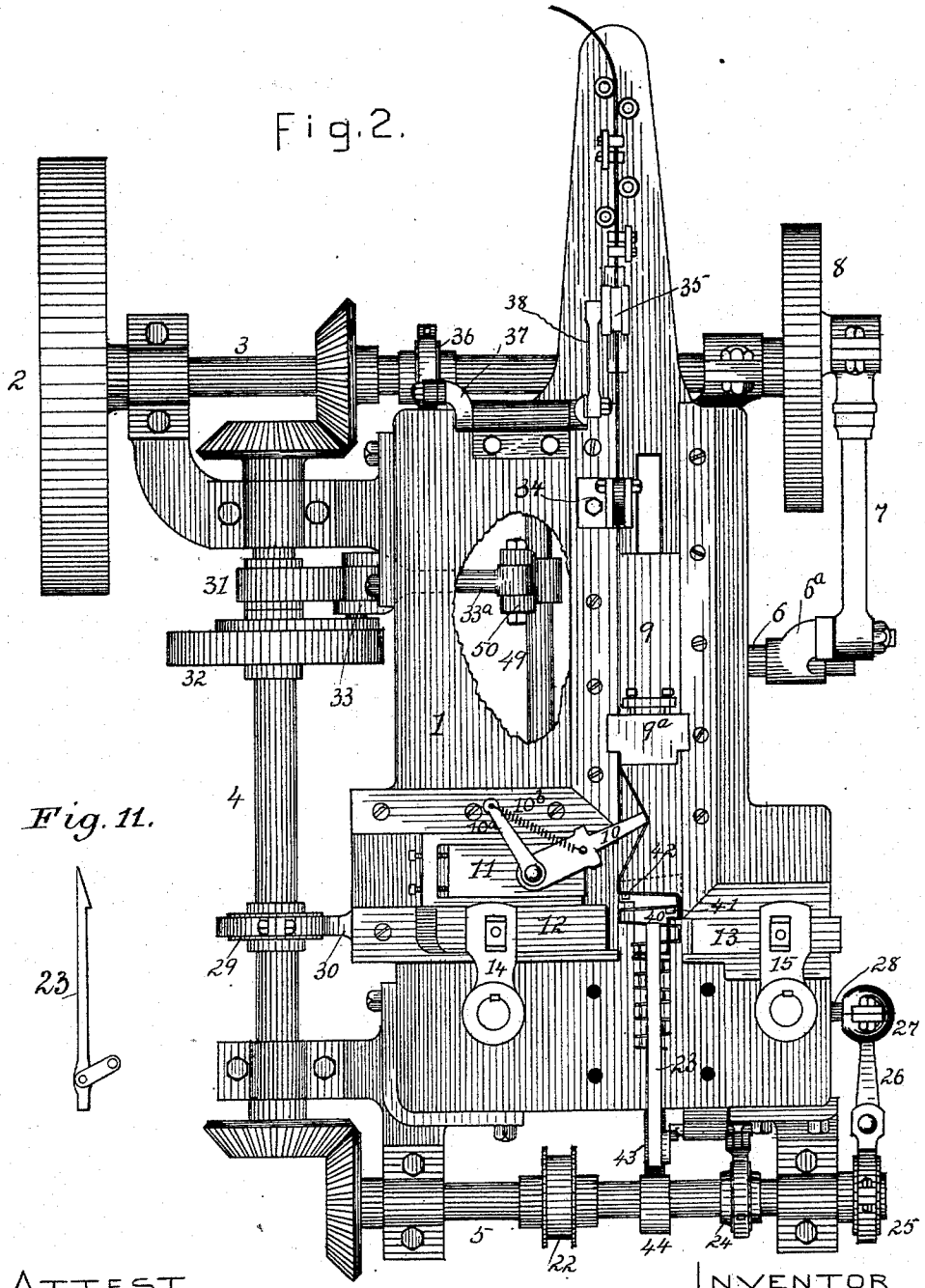


Fig. 11.

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Fig. 3.



Fig. 4.

Fig. 5.

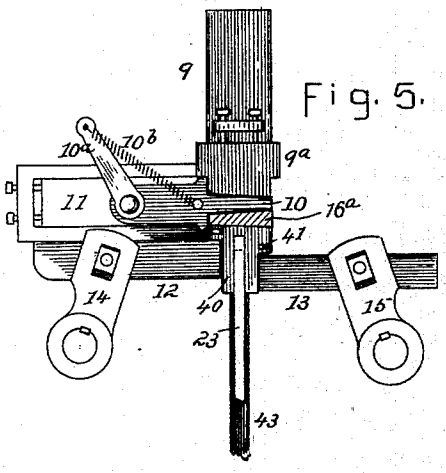


Fig. 6.

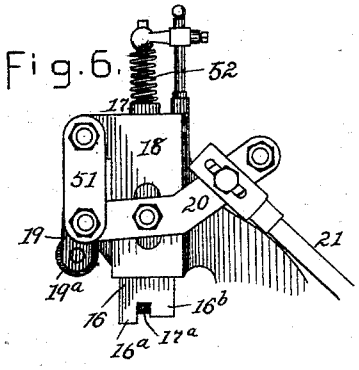


Fig. 9.

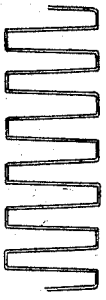


Fig. 10.



Fig. 7.

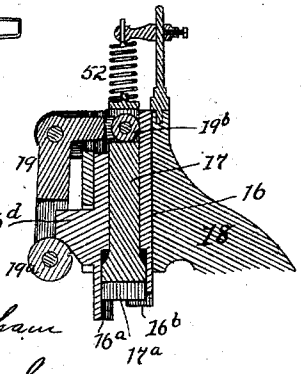
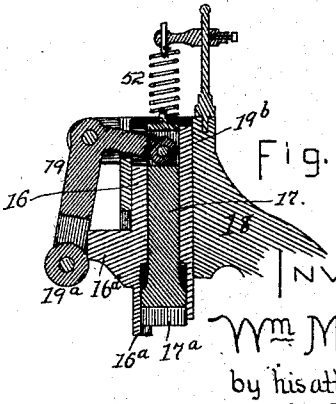


Fig. 8.



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by his attorney

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UNITED STATES PATENT OFFICE.

WILLIAM M. BOLD, OF DECATUR, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM T. WELLS AND CHARLES M. HURST, OF SAME PLACE.

MACHINE FOR FORMING ZIGZAGS.

SPECIFICATION forming part of Letters Patent No. 456,533, dated July 21, 1891.

Application filed January 12, 1891. Serial No. 377,540. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. BOLD, of Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Wire-Bending Machines, of which the following is a specification.

This invention consists in means for forming zigzags and in other means for bending the ends of the zigzags, and it is embodied and exemplified in the mechanism hereinafter described.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan of a machine embodying my invention and illustrating its practical use. Fig. 2 is a plan of the machine with parts omitted and other parts broken. Fig. 3 is an end view of the former on which the ends of the zigzags are bent. Fig. 4 is a plan of the parts of the machine that have horizontal motion and that are essential to the accomplishment of the desired result, such parts being shown in their respective initial or normal positions. Fig. 5 is a similar representation showing the different parts each at the termination of an operative throw, and also showing in section the vertically-moving die against which the zigzags are formed. Fig. 6 is a side elevation of the head in which the vertically-moving parts have bearings. Fig. 7 is a section through the head, showing the device used for actuating the presser-foot. Fig. 8 is a similar view showing how the presser-foot is actuated. Fig. 9 is a representation of a zigzag, and Fig. 10 shows the zigzag with its ends bent down and inward. Fig. 11 is a side view of the stopper-bar.

The bed-plate 1 may be of any suitable form, and it is of course suitably supported. The wheel 2 receives the power by which the machine is driven and imparts the same through shafts 3, 4, and 5 to the different movable parts. The rock-shaft 6 imparts motion to slide 9 by means of a rock-arm and link or otherwise, and it is actuated from shaft 2 through crank 8, pitman 7, and rock-arm 6^a. The slide 11 is actuated by shaft 49, (seen only in Fig. 2,) a rock-arm and link or other well-known equivalent being also used in this case. Motion is imparted to shaft 49 by means of cams 31 and 32, head 33, shaft 33^a, and rock-arm 50. Cam 31 throws the head in one direction and cam 32 returns it. The head is preferably supported on a rock-arm sustained from below. Slide 13 is moved by arm 15, the shaft of which extends through the bed-plate and is provided at its lower end with arm 28. Eccentric 25 on shaft 5 imparts motion to swinging shaft 26, and such shaft is connected with arm 28 by means of the ball-and-socket joint 27. The slide 12 is similarly actuated from shaft 4 by means of eccentric 29, straps 30, a swinging shaft, ball-and-socket joint, and a lower arm, which is secured to the shaft of arm 14. Owing to the direction of the action of the swinging shaft connected with the straps of eccentric 29 the lower arm lies under arm 14, instead of projecting at right angles thereto, as in the case of arms 15 and 28.

Motion is given to the vertically-moving parts by means of the rocking frame 20, shaft 21, and eccentric 22. The stripper-bar 23 is actuated from eccentric 24 by means of straps, rock-arm, and link, as indicated, and it has on its under side a catch to engage the wire and strip it off the former. The stop-pins 41 and 42 (seen in Figs. 2, 4, and 5) are raised and lowered by means of bar 43, which is actuated by cam 44. (Seen only in Fig. 2.) The wire-feed 35 is moved from shaft 3 by means of eccentric 36, cranked rock-shaft 37, and link 38. At 34 in Figs. 1 and 2 is seen a gripper that automatically prevents retrogression of the wire. The slide 11 has a swinging plunger 10, which is held normally deflected, as seen in Fig. 4, by means of spring 10^b, which connects with rigid arm 10^a or with some other relatively-immovable point connected with the slide. The vertical slide 16 has the die 16^a, the benders 16^b, one on each side of the former, and also has the cam projection 16^d. The shaft 17 works inside the slide 16, and it has the divided presser-foot 17^a, which straddles the stripper-bar and presses the wire against the former. The shaft of the presser-foot is actuated by the bell-crank lever 19, the end 19^a of which is adapted to cam projection 16^d, and the other end 19^b of which is adapted to the shaft of

the presser-foot. The spring 52 tends to return the presser-foot to its highest position after each depression.

With the parts disposed as seen in Fig. 4 the operation of forming the zigzags is as follows: The die 16^a is lowered to occupy the position shown in Fig. 5. The slide 11 is advanced, bringing the end of the plunger in contact with the wire. The die 9^a of slide 9 is simultaneously advanced, and the advancement of both slides is continued until the different parts occupy the relative positions shown in Fig. 5. The die 16^a is next raised, the slides 11 and 9 withdrawn, the stops 41 42 lowered, and the wire drawn along the former by the stripper-bar 23 until the newly-formed zigzag encounters the stops, which have in the meantime been raised to position. (See Fig. 2.) The zigzag so formed is laid across the former and at the next operation is bent over the same, as indicated in Fig. 3. As the slide 16 moves downward its cam projection strikes roller 19^a of the bent lever 19 and gives downward motion to the presser-foot sufficiently rapid to advance it beyond the benders 16^b, as seen in Fig. 8. This enables the presser-foot to engage the wire on the former and hold the same firmly during the subsequent action of benders 16^b and slides 12 and 13, the first of which turns the wire downward and the last two of which turn it inward, as shown in Fig. 3 by dotted lines.

I claim—

1. In machines for forming zigzags of wire, the combination of a die, a sliding former adapted to move to and from the die, and a reciprocating slide at right angles to the former, having a swinging plunger adapted to swing between the former and the die, as set forth.

2. In machines for forming zigzags of wire, the combination of a vertically-movable die, a sliding former adapted to move horizontally to and from the die, and a horizontally-reciprocating slide at right angles to the former, having a swinging plunger adapted to swing between the former and the die, as set forth.

3. In machines for forming zigzags of wire, the combination of a die, a sliding former adapted to move to and from the die, and a reciprocating slide having a swinging plunger normally held yieldingly oblique with reference to the direction of the motion of the slide and adapted to swing between the former and the die, as set forth.

4. In machines for making zigzags of wire, the combination of a die against which the zigzags are formed, a sliding former adapted to move to and from the die, a slide at right angles to the former, having a swinging plunger adapted to swing between the former and the die, movable stops adapted to temporarily impede the progress of the zigzags through the machine, and a stripper-bar adapted to act intermittently on the zigzags for the purpose of drawing them through the machine, as set forth.

5. The device for bending the ends of zigzags of wire, consisting in the combination of the former-block 40, the slide 16, having cam projection 16^d and benders 16^a, the shaft 17 of presser-foot 17^a, extended longitudinally through the slide, and the bell-crank lever 19, having one end bearing against the presser-foot shaft and the other end adapted to be actuated by the cam projection of the slide, as set forth.

6. The device for bending the ends of zigzags of wire, consisting in the combination of the former-block 40, the slide 16, having cam projection 16^d and benders 16^a, the shaft 17 of the presser-foot 17^a, extended longitudinally through the slide, the bell-crank lever 19, having one end bearing against the presser-foot shaft and the other end adapted to be actuated by the cam projection of the slide, and the reciprocating slides 12 and 13 on opposite sides of the former and adapted thereto, as set forth.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

WM. M. BOLD.

Attest:
I. D. WALKER,
L. P. GRAHAM.