

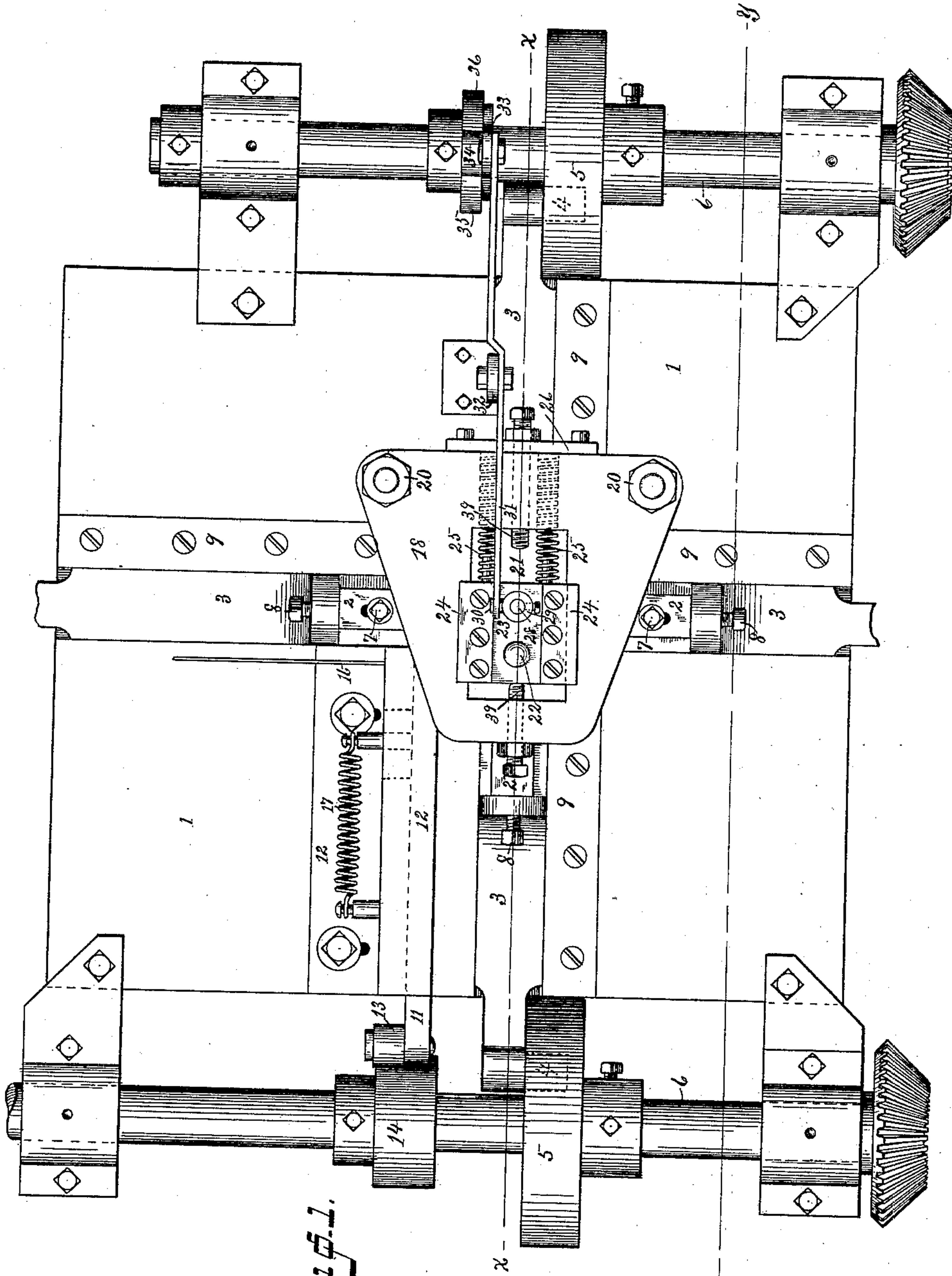
(No Model.)

2 Sheets—Sheet 1.

F. B. MANVILLE.  
WIRE FORMING MACHINE.

No. 409,643.

Patented Aug. 20, 1889.



WITNESSES  
C. M. Newman,  
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Fig. 1.

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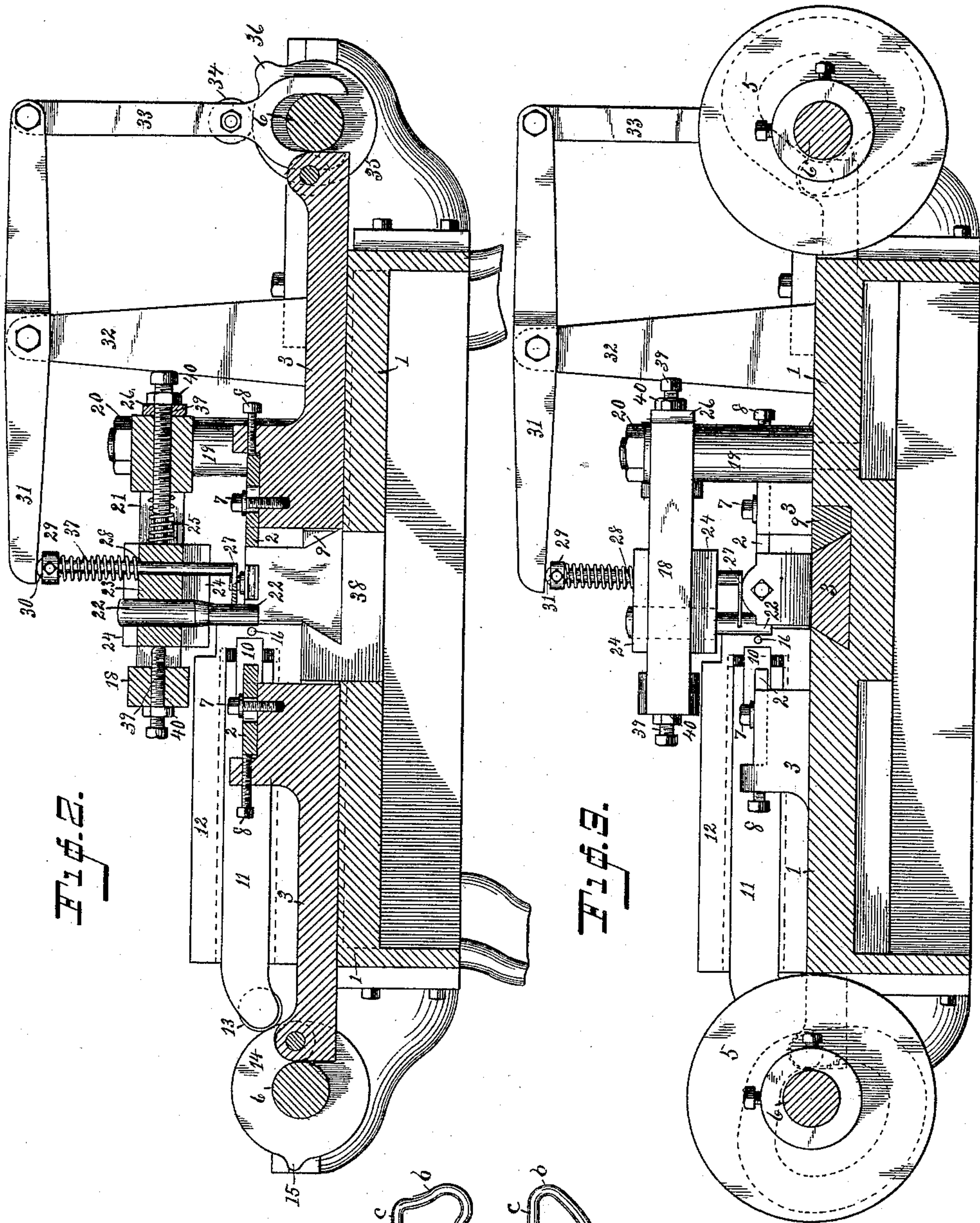
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Fig. 4.

Fig. 5.

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# UNITED STATES PATENT OFFICE.

FRANK B. MANVILLE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO BLAKE  
& JOHNSON, OF SAME PLACE.

## WIRE-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 409,643, dated August 20, 1889.

Application filed December 15, 1888. Serial No. 293,689. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK B. MANVILLE, a citizen of the United States, residing at Waterbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Wire-Forming Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of automatic wire-working machines which cut a piece of wire from a continuous length and form it to any desired shape by means of dies and the former acting simultaneously or successively.

In order to clearly illustrate the principle of my invention, I have illustrated it as applied to a machine for forming wire handles—as, for example, for drawer-pulls or chest-handles—the object being to greatly improve the construction and operation of the machine. This I accomplish by the use of a sliding former and by various improvements in the details of construction and the arrangement of the parts, which I will now describe, referring by numbers to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of a wire-forming machine, showing my invention applied thereto; Fig. 2, a cross-section on the line  $x x$ ; Fig. 3, a cross-section on the line  $y y$ , and Figs. 4 and 5 are views of different styles of handles formed by the machine.

It should be understood that the special shape to which the wire is formed has nothing to do with the principle of my invention, the shape of the article depending simply upon the shape of the dies, it being practical to form articles—for example, handles—to any required shape or to make them perfectly round, if preferred.

It has heretofore been found a serious inconvenience in using this class of machines that, in order to secure the necessary coaction of the cutter and dies, it was impossible to support the severed pieces of wire positively while they were passing into position to receive the action of the dies, the result

being that the severed pieces of wire frequently dropped out of the machine, and, furthermore, that the acting-surface of the side dies was off the center, the tendency being to weaken the dies and, moreover, cause them to bind in the slideways. My present construction and organization of the parts are such that the piece of wire severed by the cutter is held continuously between the first die and the former, and is not released until all the dies have acted, and, furthermore, that the side dies are so constructed that the acting-surface is central with the line of movement, so that there is no lateral strain or tendency to bind in the guideways.

1 denotes the bed of the machine, and 2 the dies carried by slides 3. At the rear ends of the slides are rollers, the positions of which are shown in dotted lines, as at 4. These rollers engage cam-grooves (also shown in dotted lines) in the faces of disks 5 upon shafts 6, there being, of course, an independent shaft to operate each die.

For convenience in illustration, I have shown two only of the die-operating shafts, and have not shown either the power-shaft or the connections through which power is transmitted from said shaft to the die-operating shafts. These being ordinary details of construction are wholly within the province of any skilled mechanic, and necessarily vary greatly in different machines. The dies are secured to the carriers in any suitable manner—as, for example, by bolts 7, passing through slots in the dies, and by stop-bolts 8, which pass through abutments on the slide and against which the rear ends of the dies rest, and by which they are adjusted. The edges of the slides are dovetailed, the recesses in the bed which receive them being undercut on one side, and the other side of the dovetail being engaged by a plate 9, bolted to the bed.

10 denotes a cutter which is carried by a slide 11, dovetailed to engage an angle-piece 12, adjustably secured to the bed. The rear end of slide 11 is provided with a roller 13, which bears upon the periphery of a disk 14 on one of the die-operating shafts. 15 is a lug projecting from the periphery of said disk, which engages the roller 13 at each revolution



of the disk and forces the slide and cutter forward, thereby severing from the continuous piece of wire, which I have denoted by 16, a piece of the required length to form the article that is being produced by the machine. I have shown no feeding mechanism for the wire, for the reason that special feeding mechanism is not a feature of my invention. Any ordinary feeding mechanism may be used. The roller upon slide 11 is held in contact with disk 14 by means of a spring operating in any suitable manner. In the drawings I have shown a coil-spring. (Designated by 17.) The ends of this spring are connected, respectively, to a pin upon the angle-piece and a pin upon the slide, which projects through a slot in the angle-piece.

18 denotes a table, which rests upon standards 19. The special manner in which this table is supported is of course immaterial. In the present instance I have shown both ends of the standards as reduced and threaded, the lower ends engaging the bed and the upper ends engaging the table, the latter being held in place by nuts 20. At the center of the table is a recess 21, extending through it.

22 denotes the sliding former, which is an important element of my novel construction. In the present instance I have shown the former as carried by a block 23, which slides in recess 21, said block being retained in position by plates 24, bolted thereto and extending over the edges of the recesses and resting upon the table, as clearly shown in Fig. 1. Block 23 and the former are returned to their normal position after the completion of the formation of each article, and retained there until the next forward movement takes place by any suitable mechanical means, which may be either positive or yielding—for example, a spring lever or cam. As these are well-known mechanical expedients within the province of any skilled mechanic, I have shown one way only of accomplishing the desired result.

25 denotes springs, which bear against block 23 and against the table. I have shown the inner ends of the springs as supported by pins projecting from the block and the outer ends lying in recesses in the table and resting against a plate 26, bolted to the outer side thereof. The forward and backward movements of the former and block 23, by which it is carried, are limited by means of stop-bolts 39, projecting inward from the ends of recess 21. These bolts are locked in position by check-nuts 40.

27 denotes the stripper, which is made of suitable shape to engage the former and remove the completed article therefrom. The stripper is provided with a shank 28, which extends upward through block 23, and is provided at its upper end with a collar 29, carrying a roller 30. A spring 37, surrounding the upper end of the shank and bearing against the upper side of the block and the under side of the collar, acts to hold the

stripper in the raised position. Other equivalent mechanism may of course be substituted for the spring to raise the stripper, if preferred.

31 is a lever pivoted to a standard 32, projecting upward from the bed. The forward end of this lever is adapted to be engaged by roller 30 upon the stripper-shank, said roller traveling along the under side of the lever when the forward movement of block 23 and the former takes place. At the outer end of this lever is pivoted a link 33, the lower end of which is bifurcated and embraces one of the die-operating shafts 6. 34 is a roller, journaled on a pin projecting from the link and engaging the periphery of a disk 35 on the said shaft 6. This disk is provided with a lug or projection 36, which engages roller 34 at each revolution of the disk, thereby raising the link and tilting lever 31, which forces the shank 28 of the stripper downward and removes the finished article from the former. The articles, when finished and removed from the former, drop down through an opening 38 in the bed of the machine and into any receptacle that may be placed to receive them.

It will of course be understood that the machine must be properly timed to cause the different parts each to act at the proper instant to produce the desired result without waste of power and without friction.

As the operative portions of the machine proper, specifically considered, have nothing whatever to do with my present invention, I have omitted them entirely from the drawings.

The operation of the several operative parts which coact in producing each article is as follows: The feeding mechanism (not shown) acts first and feeds forward the predetermined quantity of wire required to form an article. The first die moves forward and engages the wire, holding it firmly, but without pressure thereon, the wire lying in the groove of the die and resting against the former. By "first" die I mean the die at the left in the drawings. At this instant the cutter is driven forward violently and severs the piece of wire. The cutter is returned to its normal position at once by spring 17. The continued forward movement of the first die carries the sliding former forward until the limit of its movement is reached by contact of block 23 with one of the stop-bolts 39. The continued forward movement of the first die after the former has ceased to move bends the wire around the former and shapes the first side of the article, as at *a* in Figs. 4 and 5. While the parts are in this position the second and third dies advance inward simultaneously and form the second and third sides of the article, as at *b* in Figs. 4 and 5, these dies being the side dies, as seen in Fig. 1. An instant later the fourth die moves forward and forms the fourth side of the article, as at *c* in Figs. 4 and 5. This completes the



operation of forming the article. An instant later the dies open or retract simultaneously, the cam-grooves in the faces of disks 5 being so laid out as to produce this result. The instant the dies open springs 25 or other equivalent devices move the sliding former back to its normal position—that is, resting against the opposite stop-bolt 39. The stripper then acts to remove the completed article, and an instant later the feeding mechanism acts and carries forward the wire to form another article, and the first die moves forward and the cutter acts as before, it being of course understood that these movements take place with great rapidity and that a number of completed articles would be formed in less time than is required in describing the operation.

Having thus described my invention, I claim—

20 1. The sliding dies and the cutter, in combination with a raised table having a central opening, a block adapted to slide in said opening, and a former carried by said block toward which the dies act.

25 2. The sliding dies and the cutter, in combination with table 18, block 23, sliding in said table, a former carried by said block, stop-

bolts to limit the movement thereof, and springs 25, to return the block to its normal position after the dies have acted.

3. In a machine of the class described, the former, a sliding block by which it is carried, and a stripper having a shank 28 extending through said block, in combination with a disk having a lug 36 and a pivoted lever, one end of which engages said shank, and a link pivoted to the other end of said lever and carrying a roller engaging said disk, as and for the purpose set forth.

4. Block 23, the former carried thereby, and the stripper whose shank extends through said block and is provided with a roller 30, in combination with a lever against which said roller bears, mechanism, as a spring, acting to hold the roller in contact with the lever, and mechanism, substantially as described and shown, for tilting said lever to actuate the stripper.

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

FRANK B. MANVILLE.

Witnesses:

A. M. WOOSTER,  
ETTA F. PETTIT.