

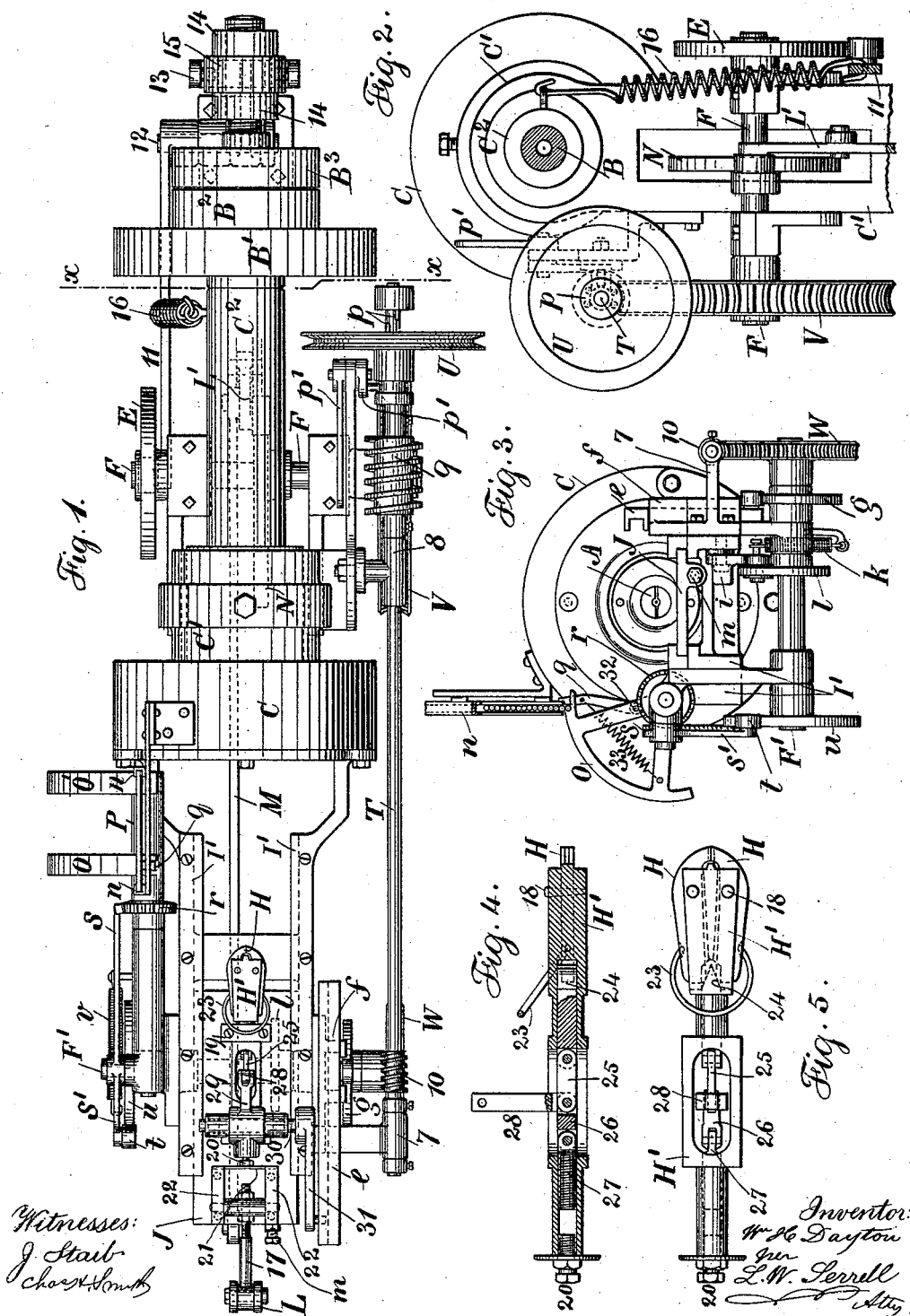
(No Model.)

3 Sheets—Sheet 1.

W. H. DAYTON.
MACHINE FOR SWAGING RODS, &c.

No. 492,575.

Patented Feb. 28, 1893.



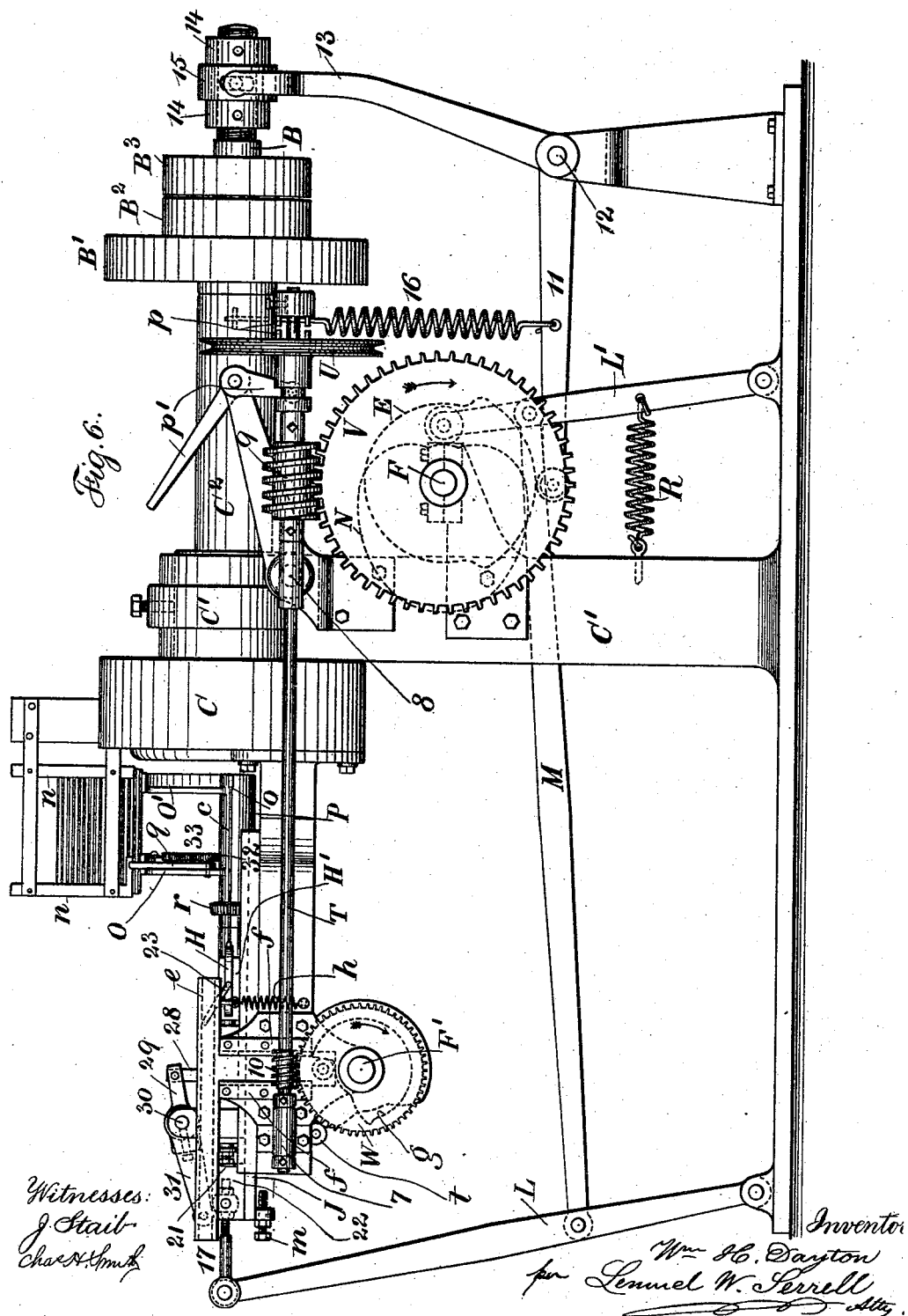
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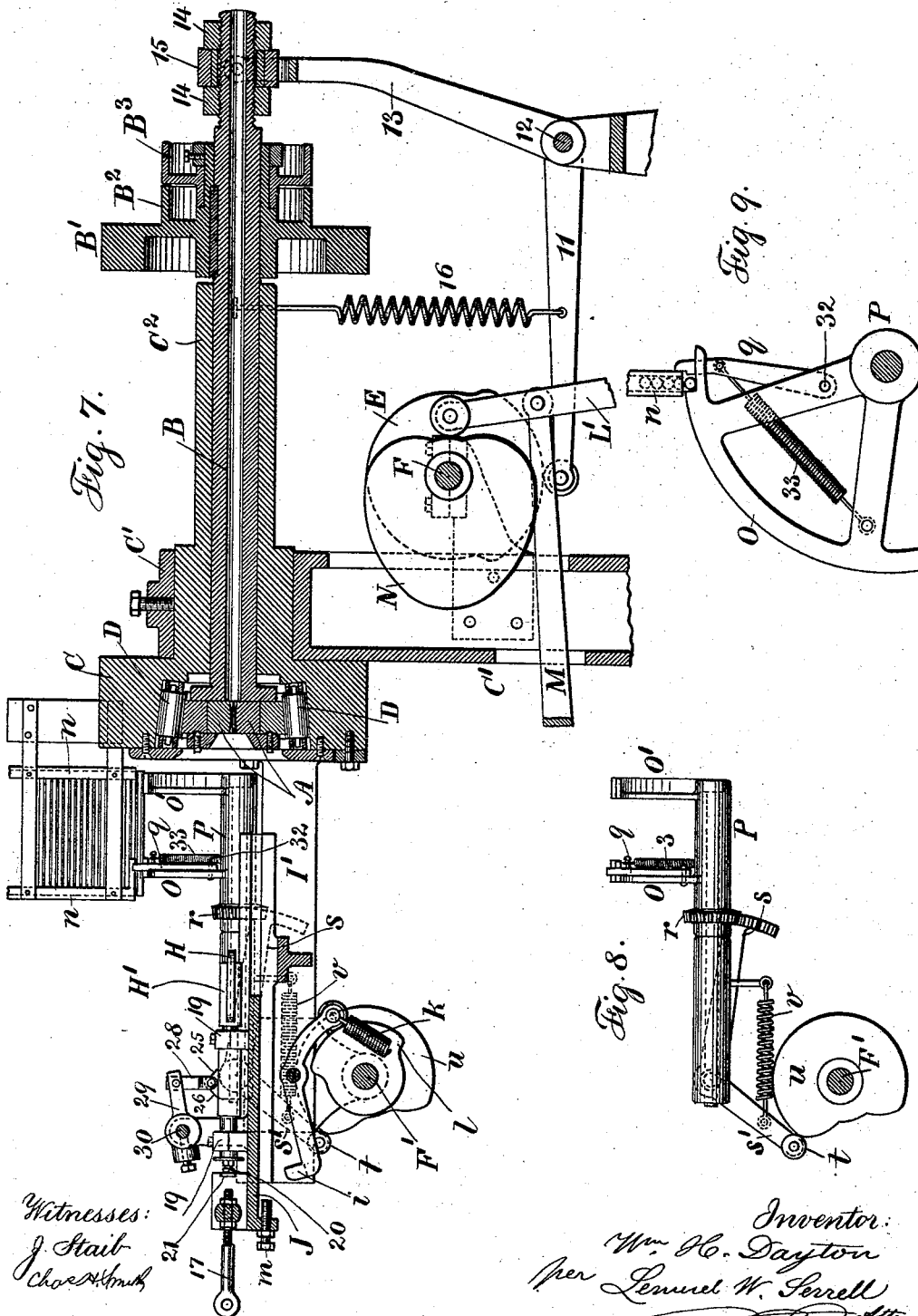
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MACHINE FOR SWAGING RODS, &c.

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Patented Feb. 28, 1893.



UNITED STATES PATENT OFFICE.

WILLIAM H. DAYTON, OF TORRINGTON, CONNECTICUT, ASSIGNOR TO THE
EXCELSIOR NEEDLE COMPANY, OF SAME PLACE.

MACHINE FOR SWAGING RODS, &c.

SPECIFICATION forming part of Letters Patent No. 492,575, dated February 28, 1893.

Application filed July 18, 1892. Serial No. 440,304. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DAYTON, a citizen of the United States, residing at Torrington, in the county of Litchfield and State of Connecticut, have invented an Improvement in Machinery for Swaging Rods and other Round Articles, of which the following is a specification.

In Letters Patent No. 474,548, granted to me May 10, 1892, a machine is represented in which there are dies in a cross mortise at the end of a revolving shaft, and wedges by means of which the dies can be opened or closed more or less during the swaging operation, thereby adapting the dies to the swaging of round articles that are larger at one place than at another.

The present invention is made with reference to the feeding of the blanks to the dies, and it is specially intended for the feeding of wires for making spokes for bicycle and other wheels, in which the end portions of the spokes are of larger diameter, so as to receive the screw threads by which such spokes are connected to the hub and felly respectively, and my present invention relates to the combinations of devices hereinafter set forth and claimed.

In the drawings Figure 1 is a general plan view. Fig. 2 is a rear elevation with the die shaft in section at the line *x x*. Fig. 3 is a front elevation with the pinchers removed. Fig. 4 is a longitudinal section of the pinchers. Fig. 5 is a plan of the same detached. Fig. 6 is a side view. Fig. 7 is a longitudinal section of the die shaft and the head of the same showing also the pinchers of the feeding apparatus. Fig. 8 is a detached view of the segment and rock shaft in the blank supplying device, and Fig. 9 is a detached view in larger size of the hopper and blank supplying sector.

The swaging dies A are in a slot across the end of the revolving shaft B, and there is a circular group of rollers D around the shaft and dies and within the shell C, and this shell C is part of or connected with a standard or frame C' that is adapted to supporting the parts of the machine, and there is a frame-work I' extending out from the shell C or

standard C' and in which are guide ways for the sliding bed J which is adapted to receive the pinchers H that are in line with the axis of the swinging dies and receive the blank that is to be operated upon.

The counter-shaft T runs longitudinally of the machine and is supported at its ends in bearings or boxes 7 and 8 and it is provided with a driving pulley U at one end, the belt of which preferably leads to a cone of pulleys, so that the speed of this counter-shaft T can be varied according to the work that has to be performed, it being understood that this counter-shaft T is revolved more slowly in proportion to the revolving shaft B when the reduction made by the swaging dies is heavy, and when the reduction is light the counter-shaft T can be revolved faster in proportion to the revolution of the shaft B; and I remark that it is advantageous to provide a fly wheel B' on the shaft B and a fast pulley B² and loose pulley B³, so as to adapt the apparatus to a belt for driving the shaft B, and it is advantageous to support the shaft B in a tubular extension C² from the standard C' or shell C.

Upon the counter-shaft T there are worm pinions 9 and 10, the pinion 9 rotating a wheel V upon a cross shaft F and the pinion 10 rotating a wheel W upon a cross shaft F', and upon these shafts there are cams for moving the parts of the apparatus as hereinafter described.

Upon the shaft F is a cam E properly shaped to give endwise motion at the proper time in bringing the dies nearer together or farther apart. I have represented the cam E as acting upon a lever arm 11 upon a rock shaft 12 with an arm 13 forked at the upper end and acting upon a collar 15 between the nuts 14 upon the tubular revolving shaft B, and in consequence of placing the rollers D at an inclination, as represented in Fig. 7, these rollers act to close the dies nearer together when the shaft B is moved backwardly and to allow them to open farther as the shaft B is moved forward, and it will be observed that the spring 16 acts to keep the lever arm 11 toward the cam E and to move the shaft B backwardly, and the cam E gives the move-

ment in the other direction and also regulates the action of the spring upon the respective parts.

In cases where wedges are made use of for regulating the opening between the dies, as seen in my aforesaid patent, the cam E will be employed for giving motion to the wedges endwise, the lever connections being arranged accordingly.

The sliding bed J which carries the pinchers H receives its motion from the lever L which is pivoted to the frame of the machine at the lower end and connected by a link 17 at the upper end to the sliding bed J, and there is a connecting rod M to a lever L' having a roller in contact with the cam N upon the shaft F, which cam N is so placed and shaped that the bed J, the pinchers and the blank, rod or wire to be acted upon are moved up toward the dies and the rod is passed endwise through the dies with the required speed as such dies are opened and closed by the action of the rolls D against the outer ends of the dies or die blocks as the shaft B is revolved, and according to the shape that is to be given to the article that is being swaged, so that the cams E and N will be varied. They are represented in the drawings as adapted to the swaging of spokes *c*, shown in Fig. 6, and the blank is to be held by the pinchers H and is passed in between the swaging dies A and projects behind them the proper distance and then the dies are gradually closed by the end movement before described, so that such dies are made to reduce the article to the required size, and the feeding is continued so as to make the middle portion of each spoke of uniform size or nearly so, and then the pinchers and bed are drawn back to a stop hereinafter described which arrests the backward movement of the bed and pinchers for finishing the surface of the conical or tapering portion of the spoke between the smaller and larger diameter near the first end thereof, after which the cam E causes the dies A to open and allow the spoke to be withdrawn.

If the spoke is to have an enlargement in the middle, or if a rod or wire is being swaged to produce a gradual taper, the shape of the cams E and N will be varied so as to adapt them to the article that is to be swaged.

Any suitable mechanism will be made use of for opening and closing the pinchers H at the proper time, and also for supplying the wires or blanks to such pinchers, but I prefer and make use of the devices herein described.

The pinchers H are pivoted at 18 within a sliding stock H' which may slide endwise beneath the cross bars or bearings 19, and at the rear end of the stock H' there is a screw 20 bearing against a spring 21 supported by the flanges or bearings 22 upon the bed J, so that this spring 21 allows a slight endwise yielding movement to the pinchers, so that they may act more efficiently in forcing the wire or blank along between the swaging dies A during the swaging operation, and there is

a spring 23 that acts to open the jaws of the pinchers, and a wedge 24 between the back ends of the pinchers to close such pinchers, and to the back end of the wedge 24 a toggle link 25 is connected, and there is a second toggle link 26 pivoted at its rear end to the adjusting screw 27, hence when the toggle links are brought down into line with each other, as shown in Fig. 4, the pinchers are closed to hold the blank, and when the toggle links are raised up into the position shown in Fig. 7, the pinchers are open for relieving the finished blank and for receiving another blank.

In order to actuate the toggle links 25 and 26, I employ a link 28 to a crank arm 29 upon a shaft 30 having an arm 31 with a pin that slides in the slotted bar *e* which has a vertical slide within the guide ways *f*, and at the lower end is a roller acted upon by the cam *g* shown by dotted line in Fig. 6, which can be shaped so that it lifts the slotted bar *e* for closing the pinchers and allows the spring *h* to draw down the slotted bar *e* for opening the pinchers, and the slotted bar *e* allows the pin upon the arm 31 to travel along in said slot during the time that the swaging operation is being performed, and the blank is held firmly by the pinchers.

I have represented the stop *i* in the form of a lever acted upon in one direction by a spring *k*, and in the other direction by a cam *l*, so that this stop *i* comes up in front of the adjusting screw *m* as the sliding bed J moves back, and this stop *i* arrests the further backward movement of the bed, regardless of the shape of the cam N, because the spring R is employed to move the parts and draw the slide bed J back, and the shape of the cam *l* is such that it allows the spring stop *i* to arrest the backward movement of the parts with the tapering portion *o* of the spoke *c* between the swaging dies A, so that such part is fully finished, and then the dies A are opened and the cam *l* draws down the spring stop *i* and the spring R acts upon the parts to complete the backward movement suddenly, at which moment the cam *g*, acting through the intermediate parts, opens the pinchers and the finished spoke is allowed to drop, and then another spoke is laid in between the jaws of the pinchers, and such pinchers are then closed and the operations before described are repeated.

The spokes might be placed in the pinchers H by hand, but I prefer to supply them automatically by any suitable device; I have however shown a rock shaft P upon which are sectors O O' that are sufficiently long for their curved surfaces to remain beneath the magazine *n* which is formed as a vertical trough or holder for the reception of the blank spokes or wires one above the other. Where the blank or wire is short, only one of these sectors need be employed, but I have represented two of such sectors so as to adapt the machine to blanks or wires for making spokes. This magazine *n* is suitably supported from the

head or shell C, and the sectors O O' are beneath the lowest wire or blank in the magazine, and upon reference to Figs. 3 and 9, it will be seen that the sectors O O' are cut away at such places that when the sectors are turned up into the position represented in these two figures, the bottom spoke in the range of spokes within the magazine will drop into the notch, and when the sectors are moved, the blank or wire will be carried out from the magazine, but all the other wires in the magazine will be supported by the curved surfaces of the sectors.

Upon the rock shaft P there is a bevel gear r , and upon the lever arm s there are gear teeth engaging the bevel gear r , and this lever arm s is connected with the lever arm s' with a roller t in contact with the cam u upon the second cross shaft F', and there is a spring v to press the roller t toward the cam u , and this cam u is shaped in such a manner that in acting upon the roller t the rock shaft P is rotated at the proper time to bring down a blank to the pinchers H and to return after the pinchers have grasped the blank ready for taking down a second wire or blank at the proper time, and there is a finger g pivoted at 32 to one arm of the sector O, and this finger is drawn toward the blank by a spring 33, but the end of the finger comes against one side of the magazine n so that the movement of the finger is arrested to allow the necessary space for the lowest wire or blank in the magazine to drop into the notches of the sectors O O', and as the sectors move and carry away the blank or wire, the finger g grasps such blank to hold it in place until the pinchers firmly engage the same, after which as the sectors return to their normal position as shown in Fig. 9, the finger g draws away from beneath the wire or blank in the pinchers in consequence of the pivot 32 of the finger being above the rock shaft P, and hence the end of the finger described an arc of a circle until its divergence causes the end of the finger to separate from the wire or blank as held by the pinchers, and the spring 33 returns the finger to the normal position shown in Fig. 9.

It is advantageous to provide a clutch at p for connecting the driving pulley U to the counter-shaft T and a lever p' for shifting the pulley to connect or disconnect the clutches and thereby stop or start the feeding mechanism of the machine; and it will be understood that when the feeding mechanism is stopped or thrown out of action, no harm results from the continuance of rotation of the swaging dies and their shaft.

I claim as my invention—

1. The combination with the swaging dies and the pinchers for grasping the wire blank to be swaged, of a revolving shaft and automatic mechanism therewith connected for moving the pinchers and the wire endwise between the dies, and automatic mechanism receiving motion from the revolving shaft for varying the point to which the dies are closed

upon the article, so as to automatically regulate the swaging action and the diameter of the article in different parts of its length, substantially as specified.

2. The combination with revolving swaging dies, of a magazine for holding the blanks or wires to be swaged, a rock shaft and sector and a finger for receiving and transferring the blank from the magazine, and pinchers for receiving the blank from the sector, mechanism substantially as specified for giving motion to the pinchers and to the sector, a back stop for determining the backward movement of the pinchers, and a cam for withdrawing the back stop automatically, substantially as set forth.

3. The combination with the pinchers and the mechanism for actuating the same, of a bed carrying the pinchers, a lever, connecting rod, spring and cam for moving the bed and the pinchers endwise, a back stop and adjusting screw for determining the position of the bed at the back movement, and a cam for automatically withdrawing the back stop at the proper time for allowing the spring to move the bed and pinchers, substantially as set forth.

4. The combination with the revolving shaft and swaging dies and rollers and a shell containing said rollers, of pinchers and the mechanism for actuating the same, a bed carrying the pinchers, a lever, connecting rod, spring and cam for moving the bed and the pinchers endwise, a back stop and adjusting screw for determining the position of the bed at the back movement, and a cam for automatically withdrawing the back stop at the proper time for allowing the spring to move the bed and pinchers, substantially as set forth.

5. The combination in a swaging machine of dies and means for revolving the same and for pressing the swaging dies toward each other, means for regulating the point to which the swaging dies are closed, a magazine for holding the wires or blanks to be swaged, pinchers and mechanism for opening and closing the same, and a sector, rock shaft, and finger for transferring the wire or blank from the magazine to the pinchers, substantially as set forth.

6. The combination with the revolving shaft and swaging dies, of a surrounding shell and an intermediate range of rollers, the surfaces of the rollers being slightly inclined, and mechanism substantially as specified for giving to the revolving shaft an endwise movement to regulate the swaging action of the dies, a magazine for holding the blanks to be acted upon, pinchers for holding the blank while being swaged, and mechanism, for moving such pinchers and the blank endwise between the dies, and a rock shaft and sector for transferring the wires or blanks one at a time from the magazine to the pinchers, substantially as set forth.

7. The combination with the swaging dies and revolving shaft carrying the same, of a

counter-shaft, driving pulley and clutch, worm pinions upon the counter-shaft, gears and cross shafts driven by such worm pinions, cams on the aforesaid shafts, levers and connections for giving an end motion to the revolving shaft and swaging dies, a sliding bed, pinchers carried by the same, a toggle and wedge for closing the pinchers, a lever and connections to the sliding bed for moving the same endwise by the action of one of the cams, a slotted bar raised and lowered by one of the cams for acting upon the toggle links and pinchers, and a back stop for regulating the movement of the sliding bed, one of the cams controlling the said back stop, substantially as set forth.

8. The combination with the swaging dies and revolving shaft carrying the same, of a counter-shaft, driving pulley and clutch, worm pinions upon the counter-shaft, gears and cross shafts driven by such worm pinions, cams on the aforesaid shafts, levers and

connections for giving an end motion to the revolving shaft and swaging dies, a sliding bed, pinchers carried by the same, a toggle and wedge for closing the pinchers, a lever and connections to the sliding bed for moving the same endwise by the action of one of the cams, a slotted bar raised and lowered by one of the cams for acting upon the toggle links and pinchers, a back stop for regulating the movement of the sliding bed, one of the cams controlling the said back stop, a rock shaft and sector and a magazine for holding the wires or blanks and gearing, and a lever acted upon by one of the said cams for carrying the wire or blank from the magazine to the holding pinchers, substantially as set forth.

Signed by me this 13th day of July, 1892.
WILLIAM H. DAYTON.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.