

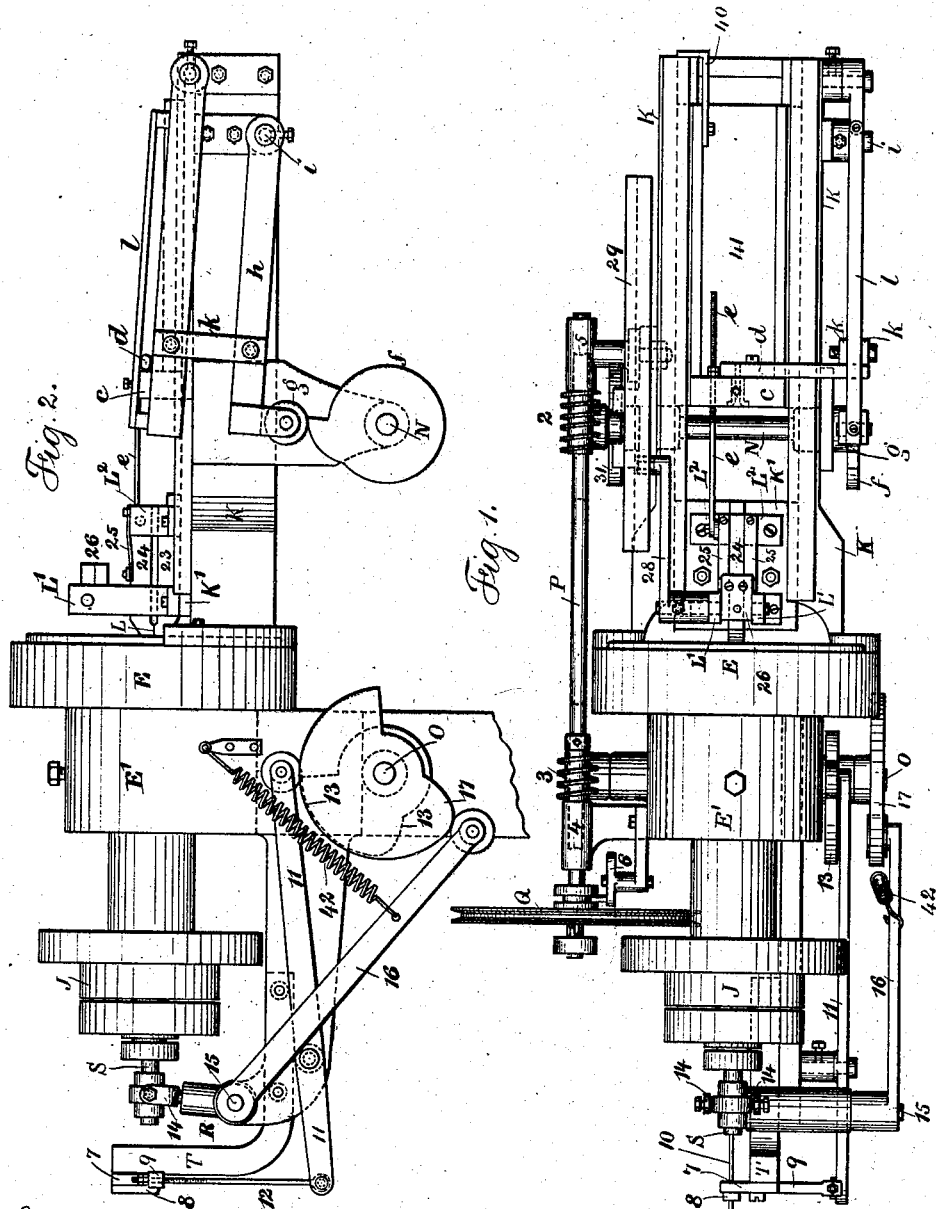
(No Model.)

3 Sheets—Sheet 1.

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

No. 492,576.

Patented Feb. 28, 1893.



Witnesses:  
J. Stair  
Chas. A. Smith

Inventor:  
W. H. Dayton  
per Lemuel V. Serrell

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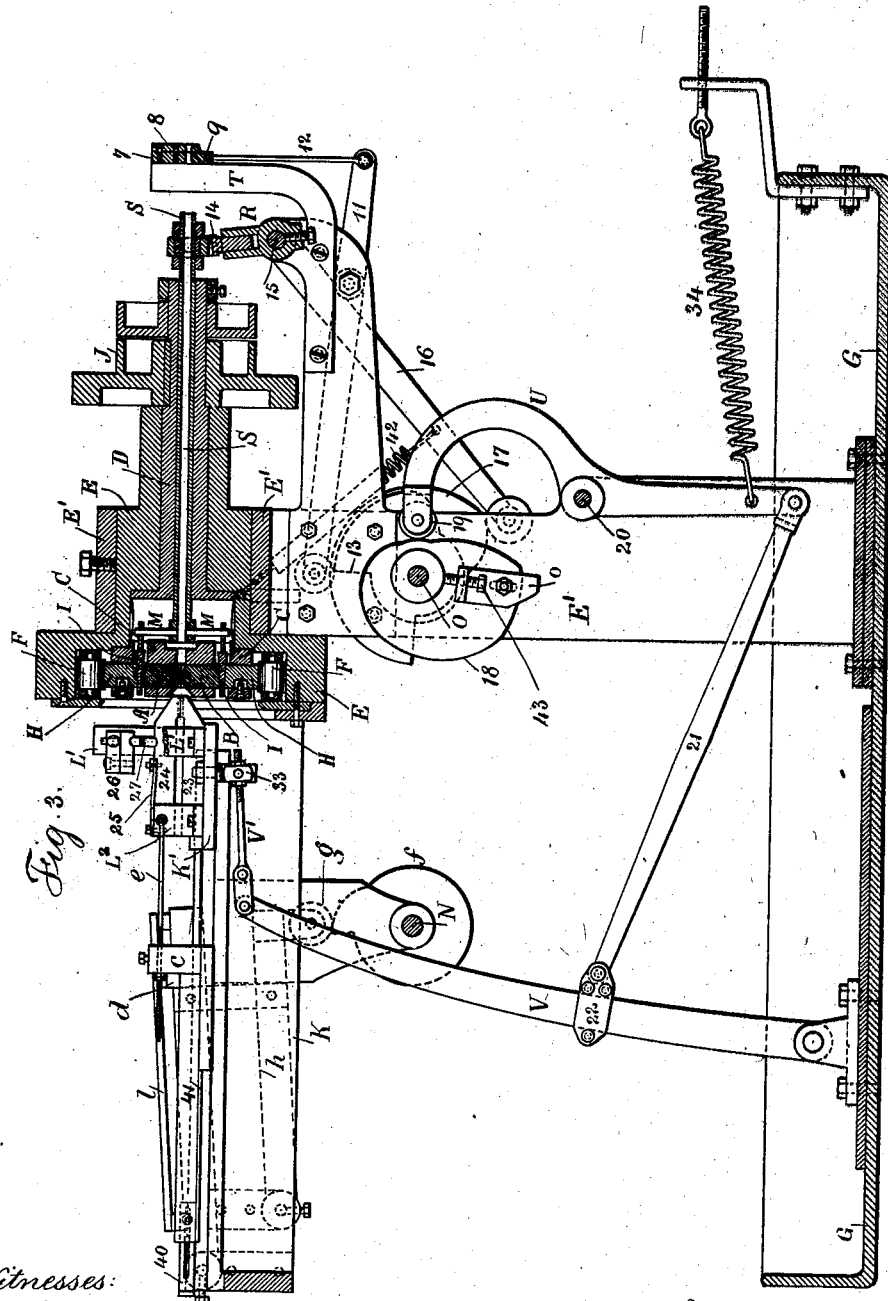


Fig. 3.

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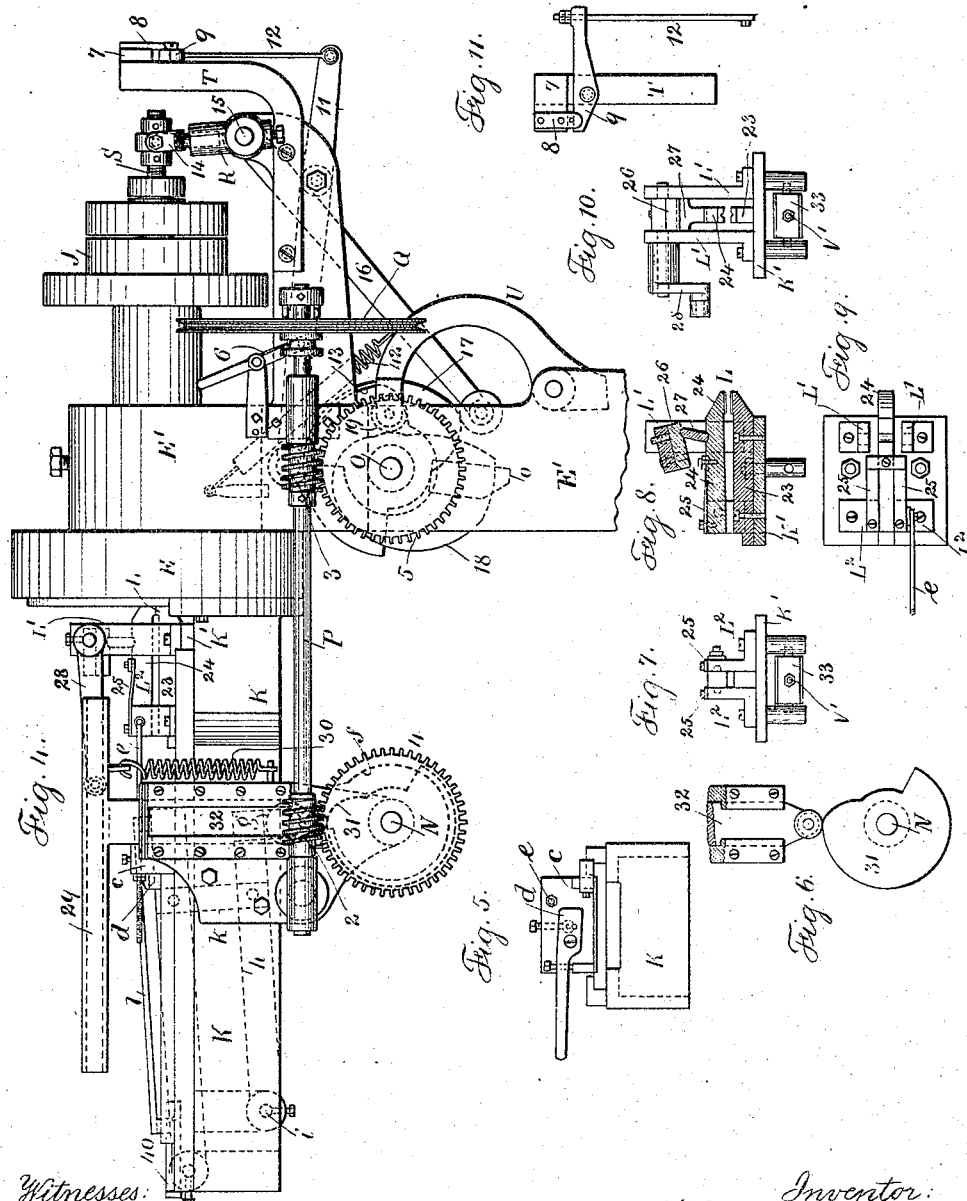
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Att'y.

# UNITED STATES PATENT OFFICE.

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

## MACHINE FOR SWAGING WIRE, &c.

SPECIFICATION forming part of Letters Patent No. 492,576, dated February 28, 1893.

Application filed September 21, 1892. Serial No. 446,373. (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 Wire and other Round Articles, of which the following is a specification.

This invention is especially intended for the swaging of wire in the manufacture of spokes for wheels, but is available in the manufacture of other round articles and especially those that can be made from a continuous wire. By the present improvement the wire or rod is passed in at one end of the machine and subjected to the swaging operation, and it is drawn along through the swaging dies as the proper reduction is accomplished and one or more complete articles are thus swaged, after which the articles are cut off successively and delivered from the machine.

In carrying out this invention any suitable swaging apparatus may be made use of, such for instance as that represented in Letters Patent No. 474,548, granted to me May 10, 1892, and the wire as fed into the machine is preferably passed through a straightener and the longitudinal movement is given to the wire by pinchers that grasp the partially or entirely finished blank and draw the same along together with the wire that is being swaged, and the wire is then held in a stationary position while the pinchers are opened and returned to the point of beginning to take a fresh hold, and the completed article is cut off and drops away from the machine.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation. Fig. 3 is an elevation from the opposite side to Fig. 2 and with the swaging mechanism and base in section and part of the pincher actuating devices removed. Fig. 4 is an elevation at the opposite side to Fig. 2, and Figs. 5 to 11 show details of the devices for actuating the pinchers and for holding and cutting the wire.

Any suitable swaging mechanism may be made use of for acting upon the wire, rod or other article. I have represented devices similar to those shown in my aforesaid pat-

ent No. 474,548, that is to say, the dies A B are in a cross mortise in the revolving head C of the actuating shaft D, and these parts are within and sustained by the shell E, and there is a circular range of rolls F within the shell E and there are die blocks H in line with the dies A B, and the wedges I I are between the dies and die blocks and they are held and connected in any suitable manner such as by the head or pins M with the adjusting tube S so that by an endwise movement given to this adjusting tube S the wedges act to cause the dies A B to come closer together or farther apart in the swaging operation, all of which is more fully described in the aforesaid patent.

The shell E is supported on a suitable standard E' upon a bed or base G, preferably in the form of a pan for catching oil, and the actuating shaft D is rotated by suitable means such as a belt to the pulley J, and the adjusting tube S receives its endwise movement in any suitable manner, such for instance as by the mechanism hereinafter set forth.

The frame K extends out from the shell E and the cross shafts N and O are supported by suitable bearings in the respective parts, and these shafts N and O receive their motion from the countershaft P, worm pinions 2 and 3 and gear wheels 4 and 5, and the driving pulley Q can be driven continuously by a belt and either connected to or disconnected from the countershaft P by a clutch, the parts being actuated by a suitable lever such as that shown at 6; and it is to be understood that the parts are so proportioned and the cams upon the respective shafts N and O so shaped, that one complete movement of the machine is effected by the entire revolution of the said shafts N and O, and the relative speed of these shafts N and O to the speed of the revolving head C and shaft D is such that the swaging dies will be opened and closed the required number of times to perform the swaging operation during the movements of the machine.

The wire or rod, or other article to be swaged is fed into the rear end of the tube S, and it is preferably subjected to a straightening operation by a revolving or other straightener, in order that such wire in passing

through the tube S may not be subjected to unusual strain or wear, but in some instances the straightening operation can be dispensed with.

5 I have not represented any straightener upon the drawings, but at T a bracket is shown extending to the rear and provided with a clamping plate 7, adjacent to which is a guide plate 8 with a hole through it for the  
10 free passage of the wire to be acted upon, and there is a clamp lever 9 that is brought into action at the proper time as hereinafter described, to hold the wire against the plate 7 during the return movement of the pinchers  
15 and while the wire is being cut off. A convenient device for actuating this clamp lever 9 is the lever 11, connecting rod 12 and a cam 13 on the shaft O, a portion of the surface of which is segmental and acts to hold the wire  
20 by the lever 11, and then to release the same as the swaging operation begins.

To give an endwise motion to the adjusting tube S I prefer to use lock nuts on the projecting back end of such tube, and a fork 14  
25 having a pivotal handle within a socket at one end of the lever R, which lever is pivoted at 15 upon the frame of the machine, and it is provided with an arm 16 to a cam 17 on the shaft O, so that by properly shaping this cam  
30 the adjusting tube S will be moved endwise at the proper time and either open or close the dies A B more or less or allow such dies to remain open without performing any swaging operation. Usually a spring 42 will be  
35 required for this lever 16 to draw it toward the cam 17.

Upon the cross shaft O is a cam 18, see Fig. 3, which cam acts against the roller 19 of the lever U pivoted at 20, and the connecting rod  
40 21 extends to the radius bar V the lower end of which is pivoted and the upper end connected with the pinchers, as hereinafter described, so as to give motion to such pinchers and carry the wire through the machine by a  
45 longitudinal movement given to such pinchers, and the connection 22 between the rod 21 and the radius bar V may be raised or lowered so that the leverage is changed and the distance which the pinchers are caused to  
50 travel varied without requiring a different cam 18; and I remark that this cam 18 should be a progressive volute or spiral so that the wire which is drawn along by the action of the pinchers may be acted upon with regu-  
55 larity by the swaging dies, or the shape of this cam may be varied according to the character of the article that is to be produced, so as to unify the swaging operation according to the extent of the reduction.

60 Upon the top of the frame K are slide ways for the base K' of the pinchers L, and these pinchers are of suitable construction, preferably with the lower jaw 23 stationary and the upper jaw 24 movable, and the same may be  
65 acted upon by springs 25 when not otherwise acted upon, and there are side frames L' upon the base K' that receive the pivoted rocker

26 between which and the upper jaw 24 of the pinchers is a toggle block 27, and the rocker 26 has an arm or lever 28 at one side  
70 with a roller at its outer end in the channel bar 29, so that when this channel bar 29 is raised the rocker is moved and the pinchers closed and firmly held upon the wire, and when the channel bar is drawn down, the  
75 parts assume the position represented in Fig. 8, and the pinchers are opened by the springs 25 so as to release the hold upon the wire.

I have shown a spring 30 to draw down the channel bar, and a cam 31 to act upon the lower  
80 end of the vertical member 32 of the channel bar, which vertical member is fitted in suitable slide ways upon the frame K, and the shape of the cam 31 is such that it raises the channel bar and closes the pinchers at the  
85 proper time or allows them to open to release the hold upon the wire as the channel bar descends.

The connection between the base K' upon which the pinchers L are placed and the radius  
90 bar V is to be of any desired character; I have shown the link V' as made with an adjusting screw passing through the pivoted block 33 that is connected by standards with the under  
95 side of the base K', so that the pinchers can be moved backward and forward by the action of the radius bar, connections and lever, and I have shown a spring 34 for giving motion to the lever U in one direction to keep the roller  
100 of such lever against the cam 18 and to move the lever V and its connected parts.

The operation of the respective parts thus far described, when employed in making wire spokes for wheels, is as follows:—The wire is  
105 passed through the swaging dies when the latter are open, and also through the pinchers sufficiently for such pinchers to grasp the same when closed, the swaging mechanism and other parts being in motion, and the wedges I, are moved endwise to bring the swaging dies to-  
110 ward each other and reduce the wire down to the proper size for the spoke, and at the same time the pinchers are moved along by the action of the cam 18 the proper extent to draw the wire along, and if the body of the spoke  
115 is to be parallel the wedges remain in the position to which they have been moved during the commencement of the swaging operation and the pinchers draw the wire through the  
120 swaging dies at the proper speed during the swaging operation, and when the necessary length has been swaged the wedges I are moved endwise, so as to allow the swaging dies to open more or less gradually, and they may open so as not to act upon the wire, or  
125 they may open sufficiently far for a slight swaging operation to be performed upon the wire where such wire is left sufficiently large to form the ends of the spokes. The clamping lever 9 is now brought into action to hold  
130 the wire, and the pinchers are opened to disconnect them from the wire, and they are moved back to the point of beginning ready to be closed upon the wire for the operations

to be repeated. These swaging operations may be performed and the wire may be cut off by hand in the proper lengths for each spoke, the wire being separated where it is left the largest in order that the ends of the spokes may be sufficiently strong for receiving the screw threads or other devices by which such ends are to be connected in the wheel; I however prefer to cut off the spokes automatically, and with this object in view the cutter plate *c* is provided upon which is pivoted a cutter *d*. Preferably there is a hole through both the cutter plate and the cutter and the separation is performed by a motion given to the cutter. This cutter plate *c* may be stationary in cases where the lengths of the spokes or other articles are such that the cutter will not interfere with the movement of the pinchers, but usually it is preferable to allow the cutter plate *c* to slide in the ways upon the frame *K*, such cutter plate being moved forward by the base *K'* acting against the same, and the cutter plate is drawn back by the rod *e* which is pivoted at one end to the frame *L* and is screw threaded and provided with nuts, and such rod *e* passes freely through a hole in the cutter plate, hence when the pinchers are closed and are drawing the wire along, the pinchers and cutter plate can move together, and when the pinchers have been opened and are sliding backwardly over the wire or spoke, the cutter plate *c* will not move until the nuts upon the rod *e* come in contact with such cutter plate and draw such cutter plate along with the pinchers as the latter are moved, and the cams are shaped in such a manner that the pinchers remain stationary while the cutting operation is being performed.

A convenient device for actuating the cutter *d* is represented in Fig. 2, in which the cam *f* upon the shaft *N* comes into action against the roller *g* upon the swinging frame *h* that is pivoted at *i* and connected by a link *k* to a slotted bar *l*, in the slot of which the lever handle of the cutter *d* is received, and when this slotted bar *l* is in its normal and level position, the cutter is out of action and the cutter can slide backward and forward upon the wire, and the parts are so timed that the cam *f* comes into action to separate the wire while the latter is quiescent, and by the nuts upon the rod *e* an adjustment can be effected, so that the wire will be separated at exactly the desired place; and I provide an adjustable stop 40 to arrest the movement of the cutter so that the inertia may not displace the same. This stop 40 is adjustably fastened to one of the slides that support the cutter and it comes into contact with the stationary bed or frame *K*; and it is advantageous to provide a pan in front of the cutter and between the slides, as at 41, into which the spoke as it is separated from the stock may fall.

I find it advantageous to have the cutter separate from the pinchers and to construct the pinchers and the actuating devices as

light as consistent with the proper strength, because with comparatively light pinchers and actuating parts, there is a small spring or yield that lessens the risk of the swaging dies by their gripping and revolving action loosening the hold of the spoke or wire in the pinchers.

By the foregoing description of this apparatus as adapted to the manufacture of wire spokes, it is not to be understood that the improvement is limited in this particular, but that the devices may be employed for swaging other articles, and the swaging action may be either continuous or intermittent.

I have described the present improvements in connection with a revolving swaging device, but it will be apparent that in cases where the device that is being manufactured is not circular, the improvements are available with any character of swaging device whether it revolves so as to act all around the circular article, or whether it may remain stationary and only act at opposite sides of the article being swaged. The cam 18 being a progressive incline or scroll gives motion to the pinchers through the intermediate lever connections, and according to the position of the pivotal connection 22 upon the lever *V* so that the pinchers will receive a greater or less movement during the time that the swaging operation is progressing, and this adapts the machine to different lengths of spoke, and upon this cam 18 is a movable toe *o* attached by a bolt in a slot, and adjusted by the screw 43, which toe can be set to project more or less at the end portion of the scroll of the cam, and this toe is to come into action after the dies have been opened, so that the wire may be moved along the desired distance between one swaging operation and the next to give the amount of material or stock necessary for the larger end portions or shanks of the respective spokes, and by setting this toe *o* farther out, a greater length of wire will be provided by the action of the levers on the pinchers, so that the amount of stock left for the reception of the screw threads or other connecting devices at the respective ends of the spokes will be increased, or the reverse when the toe is set inwardly.

Any suitable adjustable lever connections can be provided between the cam 18 and the pinchers, so as to vary the stroke or longitudinal movement given to the pinchers, and consequently the length of the spoke or other article that is swaged.

I claim as my invention—

1. The combination with the swaging mechanism of pinchers for grasping the article to be swaged, mechanism for giving motion to the pinchers to draw the article through between the swaging dies and a holding clamp for holding the article operated upon and mechanism for opening the pinchers and returning them to take a fresh hold for drawing through another length substantially as set forth.

2. The combination in a swaging machine, of dies for effecting the swaging, mechanism for actuating such dies, pinchers for holding the article to be acted upon, mechanism for opening and closing the pinchers and moving them longitudinally for drawing the article to be swaged through between the dies, substantially as set forth.

3. The combination with rotary swaging dies and mechanism for opening and closing the same, of pinchers for grasping the article to be acted upon, and mechanism for moving the pinchers and drawing the article along between the swaging dies, a clamp for holding the article when the pinchers are opened, and a cutter and mechanism for actuating the same to separate the swaged article from the wire or stock, substantially as set forth.

4. The combination in a swaging machine, of swaging dies, rotary mechanism for actuating such dies, a moving wedge or backing for varying the closing of the dies, pinchers and mechanism for opening and closing the same and for moving the pinchers longitudinally for drawing the article to be swaged along between the dies, a clamp for holding the material when the pinchers are opened, and a cutter for separating the swaged article, substantially as set forth.

5. The combination with swaging dies, of pinchers, mechanism for opening and closing the same and for moving them longitudinally and carrying the article longitudinally between the swaging dies, a cutter for separating the swaged article and a connection between the cutter and the pinchers, whereby the cutter is brought into position by the movement of the pinchers, substantially as set forth.

6. The combination in a machine for swaging wire spokes, of revolving swaging dies and mechanism for moving and regulating the action of said dies, pinchers and mechanism for opening and closing the same, a cam and variable lever mechanism for regulating the longitudinal movement given to the pinchers and varying the length of the spoke, substantially as set forth.

7. The combination with the swaging mechanism and mechanism for grasping the wire, of a revolving cam, adjustable lever mechanism intervening between the cam and the pinchers for varying the length of the article swaged, mechanism for opening the swaging dies and an adjustable toe for moving the pinchers and wire the desired distance between one swaging operation and the next, substantially as set forth.

8. The combination with the swaging mechanism, of the revolving shaft through which the wire to be swaged passes and which shaft carries the swaging mechanism, pinchers and means for opening and closing the same to grasp or relieve the wire, a cam and intervening connections to the pinchers for giving motion to such pinchers to move the wire between the swaging dies, a cutter plate and cutter movably supported upon the machine and a variable connection between the cutter plate and the pinchers for determining the position of the cutter, and mechanism for giving motion to the cutter, substantially as set forth.

9. The combination with the swaging mechanism, of the revolving shaft through which the wire to be swaged passes and which shaft carries the swaging mechanism, pinchers and means for opening and closing the same to grasp or relieve the wire, a cam and intervening connections to the pinchers for giving motion to such pinchers to move the wire between the swaging dies, a cutter plate and cutter movably supported upon the machine and a variable connection between the cutter plate and the pinchers for determining the position of the cutter, mechanism for giving motion to the cutter, and a clamp for holding the wire during the return movement of the pinchers, substantially as set forth.

Signed by me this 15th day of September, 1892.

W. H. DAYTON.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.