(No Model.)

2 Sheets—Sheet 1.

A. I. JACOBS.

SWAGING MACHINE.

No. 514,147. Patented Feb. 6, 1894.

Fig. 2.

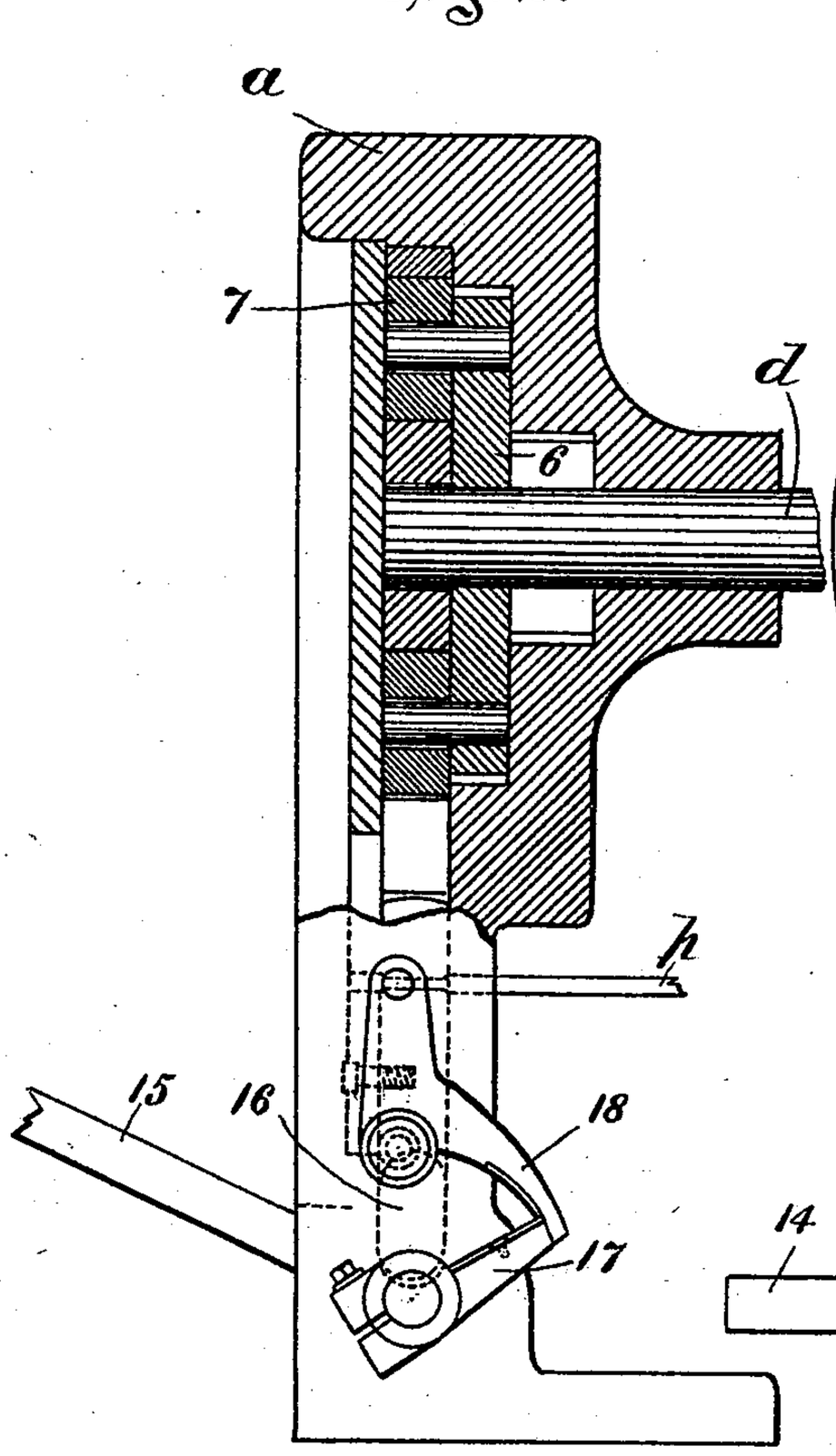
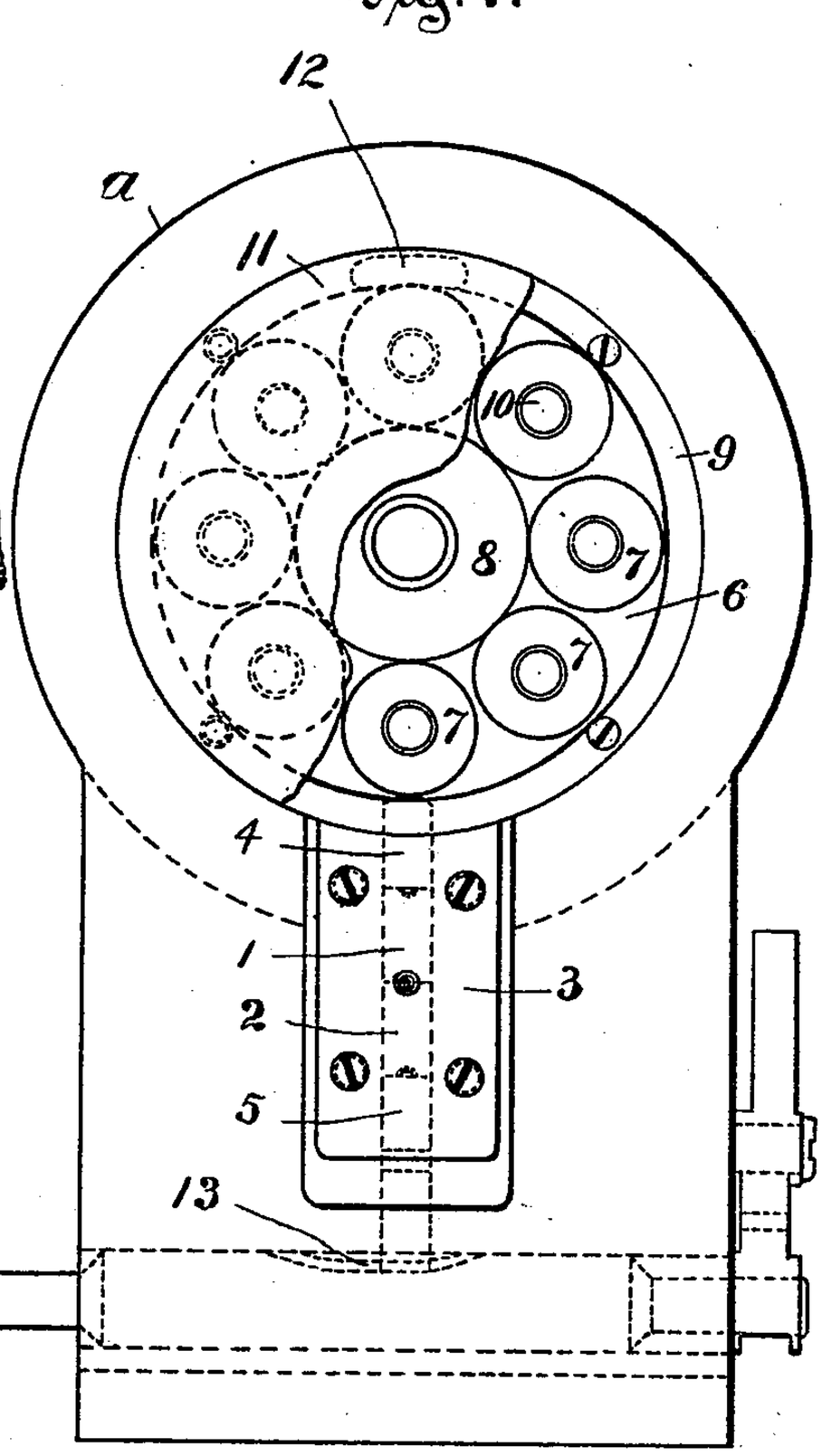


Fig. 1.



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Arthur B. Jenkins.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

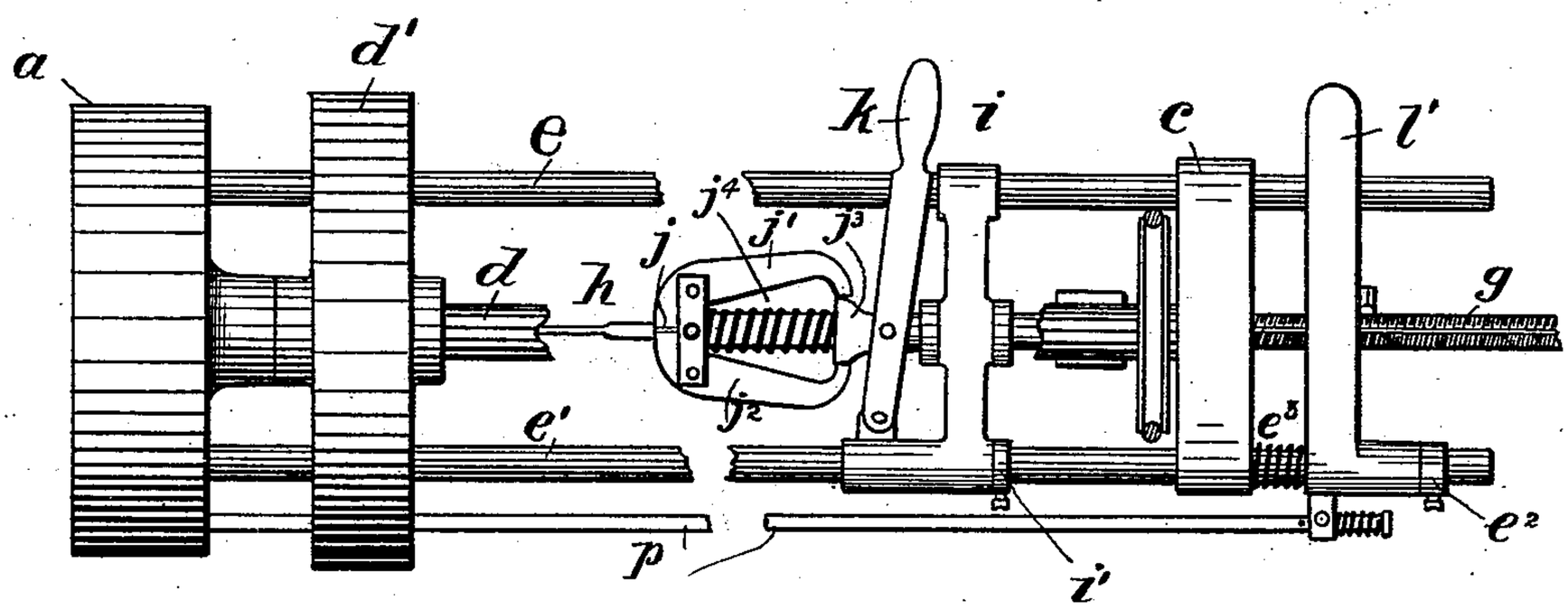


Fig. 4.

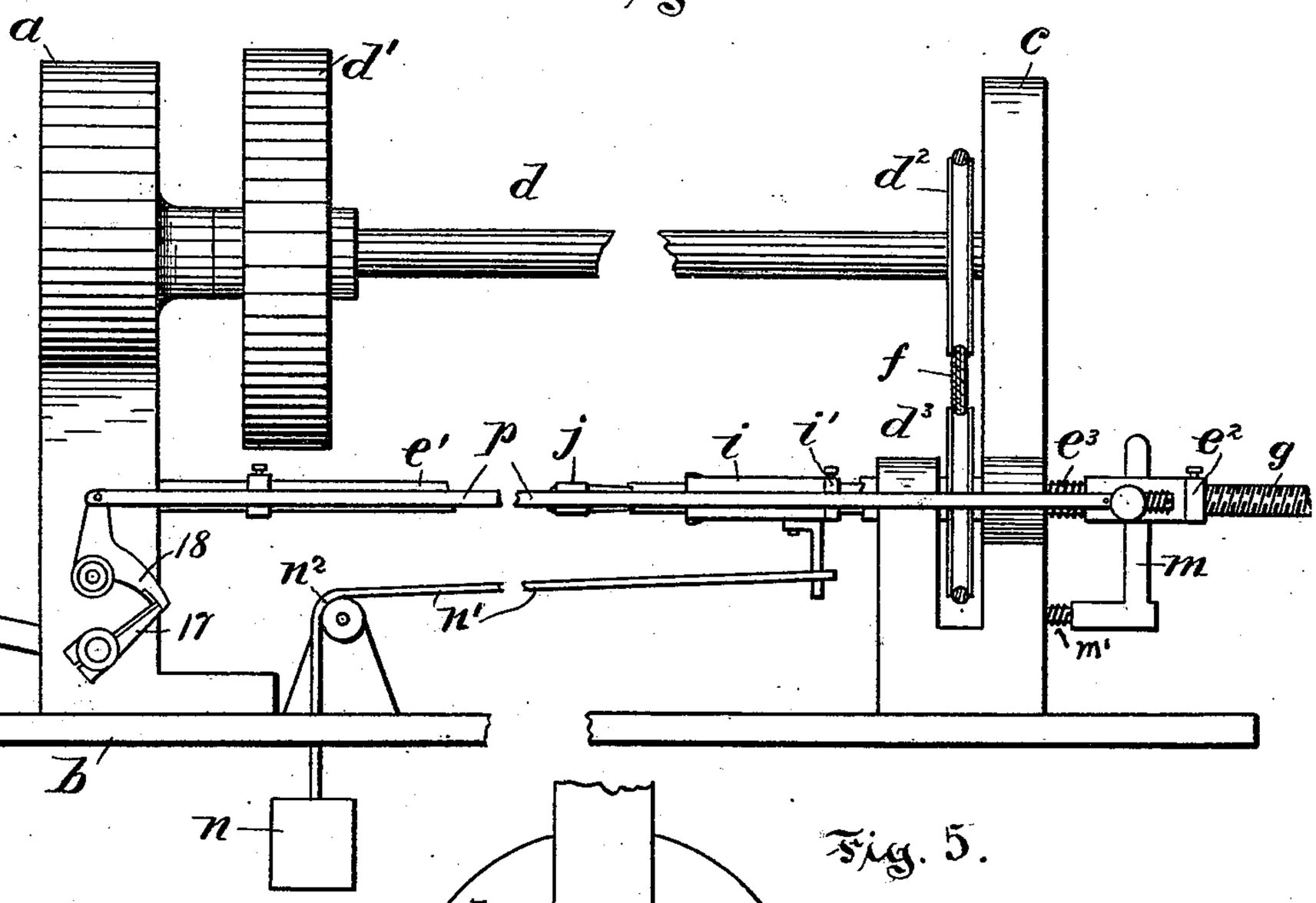
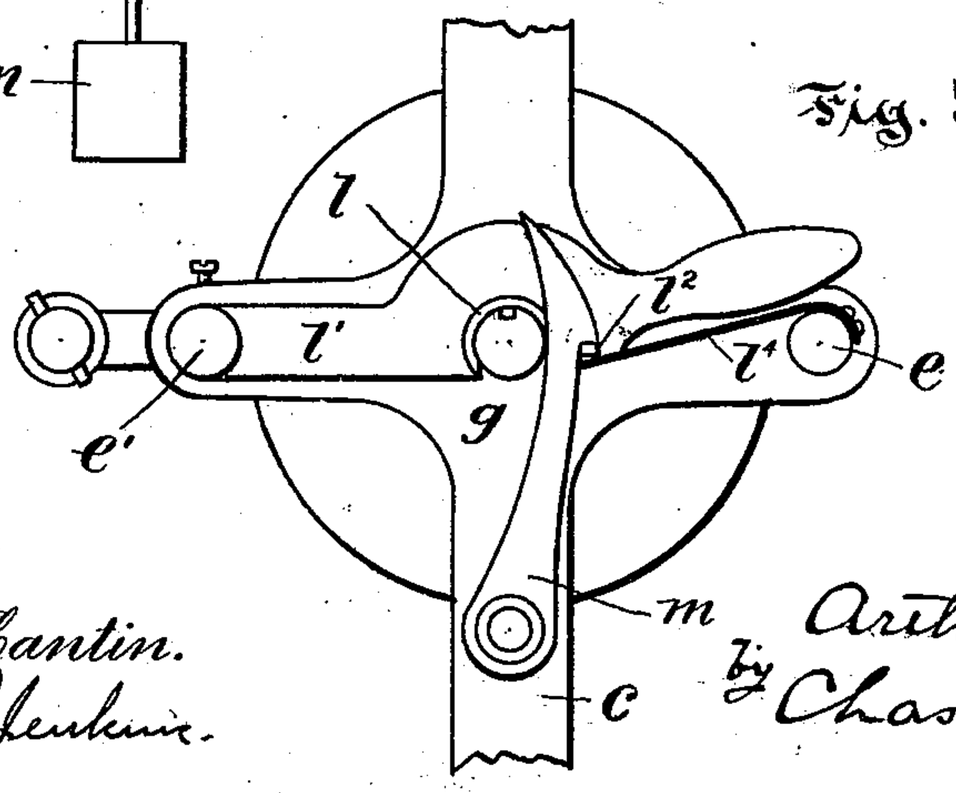


Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR I. JACOBS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE POPE MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS.

SWAGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 514,147, dated February 6, 1894.

Application filed September 5, 1892. Serial No. 445,110. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR I. JACOBS, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Swaging-Machines, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a machine for reducing metal in bars or wire to any desired diameter and to do this work with a comparatively small expenditure of power and with slight wear of the operative parts.

To this end my invention consists in the details of the several parts making up the machine as a whole and in the combination of such parts as more particularly hereinafter described and pointed out in the claims.

Referring to the drawings: Figure 1 is a detail front view of the head of the machine with part of the face plate broken away to show construction. Fig. 2 is a detail end view of the head with parts broken away in central section to show construction. Fig. 3 is a detail top or plan view of the machine with parts broken away. Fig. 4 is a detail side view of the machine with parts broken away. Fig. 5 is a detail view in elevation of part of the rear end of the machine.

In the accompanying drawings the letter *a* denotes the head of the swaging machine that is mounted on any suitable stand or support *b* in line with a standard *c*, a shaft *d* extending from the head to the standard and supported in suitable bearings. The guide rods *e e'* extend lengthwise between these parts *a* and *c* and serve to make up part of the frame of the machine on which certain operative elements are supported. Fast to the shaft *d* is a pulley d' by means of which the shaft is driven and a pulley d^2 connected by a belt *f* to a pulley d^3 serves as a means of transmitting the rotary movement of the shaft *d* to a sleeve to which the pulley d^3 is secured. This sleeve is splined to a feed screw *g* so that the screw is revolved with the pulley d^3 but is permitted a lengthwise sliding movement through the sleeve. This feed screw *g* is the main element in the feed mechanism by means of which a wire *h*, or other piece of metal, is drawn lengthwise between the dies that are borne in the head of the machine and a carriage *i* secured to the end of the feed screw is supported on the guide rods *e e'*. On the end of the feed screw beyond the carriage is a clamp *j* composed preferably of the jaws j' j^2 having levers extending back with inturned ends arranged to make contact with the wedge j^3 that has a sloping or cam surface and is connected to the wedge lever *k* that is pivotally supported on the carriage *i*. By swinging the lever forward and back the jaws of the clamp may be opened and closed. With the parts in position shown in the drawings the clamp is holding the end of the spoke or wire *h*. A spring j^4 interposed between the end of the wedge j^3 and a shoulder back of the head of the clamp operates to hold the clamp normally closed upon the work. The carriage *i* is secured to the feed screw by means that permit the latter to rotate freely in the socket through which it passes, but to move the carriage lengthwise with the lengthwise feeding movement of the screw. This lengthwise movement of the feed screw is effected by means of a nut *l* that is fast to a part of the lever l' and is mutilated or cut away on one side so as to permit it to be lifted out of or thrown into contact with the feed screw when desired. A spring latch *m* is pivotally secured to the standard *c* with its upper end held normally in a position that adapts the hooked end of the latch to engage the lug l^2 on the side of the lever whenever the latter is thrown downward so as to carry the nut into operative contact with the feed screw. This latch *m* is pivoted on a pin fast in the standard *c* and a spring m' coiled about the pin serves to hold the latch in position to engage and hold the lug l^2. This latch *m* is tripped automatically by the movement of the parts whenever the movement of the carriage *i* is arrested by the stop device i' that consists of a collar adjustably secured to the guide rod e'. The lever l' is mounted on the guide rod e' and held between an adjustable collar e^2 and a spring e^3, the latter being located between one side of the lever and the nearest face of the standard. When the sliding movement of the carriage *i* is arrested and the rotary movement

of the shaft g continued the lever l' will be drawn toward the standard and will pull the lug l^2 out from beneath the hook on the latch m and this allows the lever l' to be thrown up by the recoil of the spring l^4 and thus carry the nut out of engagement with the feed screw and stop its lengthwise movement. As soon as the nut is thus thrown out of engagement with the feed screw a counterpoise n acting through a flexible connection n' that passes over a pulley n^2 on the frame of the machine and is connected to the carriage or other part fast to the feed screw, operates to draw it forward so as to carry the clamp closely against the back of the head a in position to receive the end of a wire that is thrust between the dies.

The swaging mechanism proper comprises dies 1 and 2 supported in sockets in the head and having their operating faces turned toward each other. The dies are held in place by a face plate 3 that is secured to the head as by means of screws. The dies as shown are made reversible with operative parts on either end and with followers 4 and 5 interposed between the dies and the hammers on one side and a toggle on the other.

On the end of the shaft d a disk 6 is secured so that it turns with the shaft, and on this disk, that is located in a socket in the head, is supported a series of hammer rolls 7. These rolls are of a number sufficient to enable each two of the rolls to be located on diametrically opposite sides of a loosely mounted central roll 8. The socket 9 is of a diameter that will permit the rolls to be loosely arranged within the socket when lying edge to edge. The rolls are loosely supported on pins 10. They are held in place by means of a cover plate 11 secured in place by screws or other convenient fastening means.

In a position diametrically opposite to the dies or the follower there is arranged an abutment 12 with a bearing surface located in the line of movement of the rolls so that when one of the rolls encounters the abutment the roll diametrically opposite encounters the end of the follower (or of the die if the follower is not used) and forces the die downward upon the piece of metal held beneath its working face.

The disk 6 is turned with considerable rapidity and the rolls 7 are held outward by centrifugal force and in rolling contact with the wall of the socket that thus causes the rolls to turn so as to present each time a new surface to the abutment or to the end of the die. This arrangement of the parts insures a greater durability of the rollers.

The dies are rendered adjustable toward and from each other by supporting the lower die on a cam 13 formed on the surface of a shaft 14 that extends through a socket in the lower part of the head and is provided with a lever 15 by means of which this shaft may be rocked.

The toggle 16 interposed between the cam on the shaft and the under side of the die or of the follower serves as the means of translating the rocking movement of the shaft into a rectilinear movement of the die. The weight of the lever tends to turn the shaft 14 so as to drop the lower die, the dies being held close together only when the arm 17 on the outer end of the shaft is held by the trip 18 that is a bell crank lever pivoted to the side of the head.

The end of the arm 17 in the form shown rests in a notch or socket in the outer end of the trip 18 so that as soon as this trip is rocked by means of the rod p the arm 17 is released and the dies separate by the rocking movement of the shaft 14 due to the weight of the lever 15, or equivalent device.

The die separating mechanism is connected to the lever l' carrying the half nut which engages with the feed screw by means of a rod p so as to provide for the automatic release of the dies as soon as the feed screw has reached the end of its run. The rotary movement of the feed screw g causes the lever l' to move toward the standard as described as soon as the movement of the carriage i away from the dies is arrested, and this sliding movement of the lever l' toward the dies pushes the rod p and rocks the lever 18 to which it is connected. This rocking movement of the lever lifts the outer end of the arm 18 out of engagement with the arm 17 and permits the rocking movement of the shaft which allows the dies to separate automatically as hereinbefore described.

The abutment 12 that has been described is made of a material much harder and of greater durability than that of which the head is composed and it is preferably used for the purpose of increasing the wear and affording a more durable backing piece to sustain the force of the blow, the whole of which comes on the rolls and not upon the pins that support them. It is not essential that the abutment be used nor that it should project into the path of movement of the rollers as its office can be performed by providing a hardened bearing surface in the substance of the head or by lining the whole socket with a ring of durable material as hardened steel.

I claim as my invention—

1. In combination in a swaging machine a head having a roll socket, a shaft supporting a loosely mounted central roll within said socket, a series of loosely mounted hammer rolls arranged diametrically opposite each other on opposite sides of the central roll and with their periphery in rolling contact with the wall of said socket, and a reciprocating die having a part projecting into the path of movement of the hammer rolls, all substantially as described.

2. In combination in a swaging machine the head having a socket, a disk located in the socket and borne on a rotary shaft, a series of hammer rolls loosely mounted on the face of the disk on central supporting pins and ar-

ranged diametrically opposite each other on opposite sides of a loosely mounted central roller, and a reciprocating die arranged with an end projecting into the path of movement of the rollers, all substantially as described.

3. In combination in a swaging machine a head having a socket, a disk arranged within the socket and borne on the end of a rotary shaft, hammer rolls loosely mounted on the disk and arranged diametrically opposite each other on opposite sides of a loosely mounted central roller, the hammer rolls arranged to move in rolling contact with the edge wall of the socket, the reciprocating die with an end projecting into the socket in the path of movement of the hammer rolls and the cover plate secured to the head, all substantially as described.

4. In combination in a swaging machine the dies and percussive devices for operating them, the rotary and reciprocating feed screw bearing on its inner end a clamp, the clamp operating mechanism, the nut removably connected to the feed screw, the trip mechanism comprising the spring latch with a hooked end engaging a lug on the lever that supports the nut, the movable lever, the spring operating to hold the lever in engagement with the latch, the carriage borne on the feed screw and the stop device for arresting the movement of the carriage, all substantially as described.

5. In a swaging machine in combination with reciprocating dies, the die operating mechanism as described, the rock shaft bearing the cam and supporting the lower die, the trip arm borne on the rock shaft and the catch connected to the feed screw releasing mechanism whereby the dies are automatically separated at a predetermined time in the operation of the machine, all substantially as described.

6. In a swaging machine in combination with the reciprocating dies, the die supporting and separating mechanism as described, the die operating mechanism described, means for drawing the wire between the dies while they are in operation, the wire feed mechanism and the within described trip and stop mechanisms, all substantially as described.

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Witnesses:
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JOS. A. CANTIN.