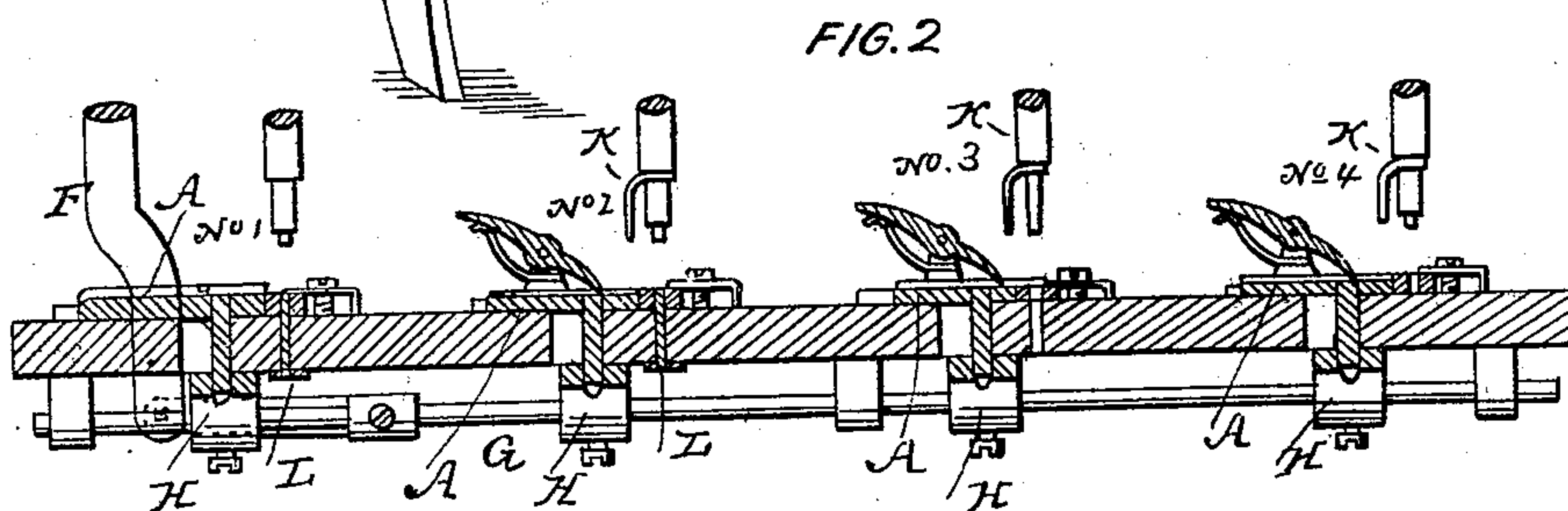
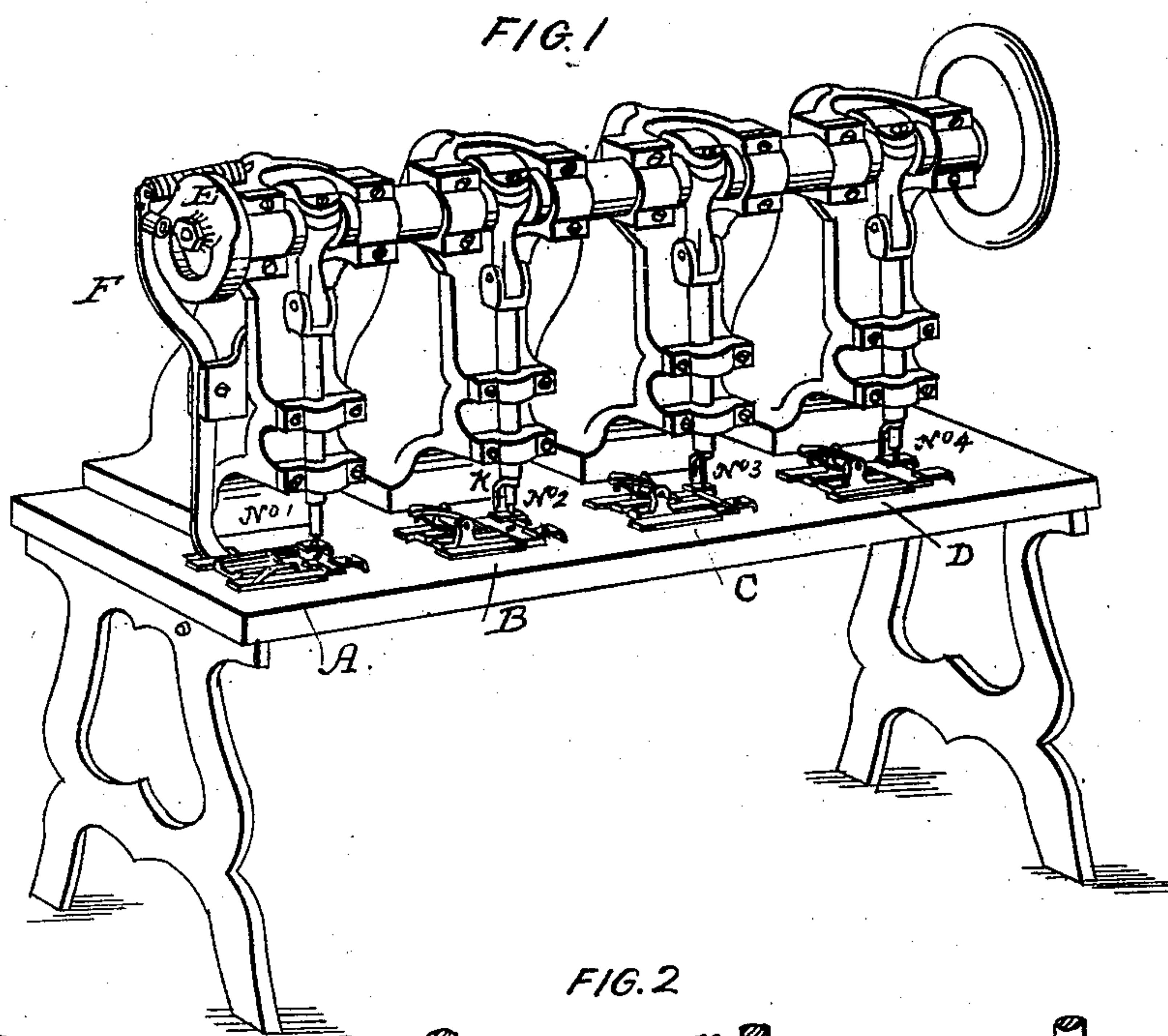


S. W. YOUNG.
Eyelet Machine.

No. 102,195.

Patented April 19, 1870.



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MESNE ASSIGNMENT, TO ELISHA DYER, OF SAME PLACE.

Letters Patent No. 102,195, dated April 19, 1870.

IMPROVED MACHINE FOR FORMING AND CUTTING EYELETS AND FOR THE PREPARATION OF STOCK FOR THE SAME.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, SOLOMON W. YOUNG, of the city and county of Providence and State of Rhode Island, have invented a certain new and useful Machine for Forming and Cutting Eyelets, and other similar articles, and in the preparation of metallic stock for use therewith from sheet metal.

My invention consists in the novel arrangement of a series of male and female dies, and in combining therewith certain novel feeding mechanism, resulting, as a whole, in a machine which is intended to perform, and does, in practice, accomplish the complete forming of a perfect eyelet, or other similar article, from a strip of sheet metal, and removes it therefrom without any necessity for an intermediate annealing of the metal during the process.

My invention further consists in preparing the strip of metal stock for use in the machine by removing a portion of the edges of the strip, so as to leave the remainder of the stock a series of disks or other desired forms, sufficiently connected at two of their sides to maintain the requisite continuity in the strip.

For the sake of complete illustration, my invention is described in connection with the manufacture of eyelets, and I do hereby declare that the following specifications, taken in connection with the drawings furnished and forming a part of the same, is a true description thereof, reference being had to the drawings.

Figure 1 represents, in perspective, one of my improved machines.

Figure 2 represents, in longitudinal vertical section, the platform of the machine, with feeding-devices more clearly shown.

In both figures respective parts are indicated by corresponding letters.

Figure 3 represents a strip of stock prepared by nicking its edges for use in the machine.

It will be observed that four dies are arranged upon the main shaft, so as to produce a vertical reciprocating movement, all arranged to move at the same speed and at the same time.

No. 1 is the preliminary forming-die, which first operates upon the metallic strip, making an imperfect cup or blank, with its upper edge slightly flaring.

No. 2 is the die which completes the cup-form and the upper flaring edge, the drawing or swaging being divided between dies 1 and 2.

No. 3 is a cutting-die, arranged to cut away the bottom of the cup.

No. 4 is the clearing or cutting-die, which removes the finished eyelet from the strip. The cutting-edges of the die operate just outside of the upper flaring

edge of the eyelet, which, thus finished, is forced through the female die and delivered below.

Partially successful attempts have heretofore been made in the construction of an operative machine having a series of forming or swaging and cutting-dies, mounted in a common head, to which a strip of sheet metal was fed by an intermittent movement. The respective dies were placed closely adjacent to each other, so that a single common feed-motion served for all the dies.

From the fact that sheet metal in a strip will not always draw uniformly, it is obvious that the respective dies should be at such distances apart as would admit of such bending of the strip as would admit of a surplus of longitudinal space to compensate for any inequalities which might occur in the drawing.

In consequence of this space between the dies, and the inequalities liable in the drawing, it is obviously essential that each die should be provided with a separate feeding-device, adjustable relatively to it in order to secure the accurate delivery of the strip to the die.

A represents the first feeding-device, which delivers the stock to the preliminary forming-die No. 1. It consists of a horizontal carriage fitted to slides arranged on a line corresponding with the line of the male dies or plungers.

In the bed of this carriage is a groove of a proper width and depth for receiving the strip of metal stock from which the eyelets are to be formed.

In nearly all practicable eyelet-machines heretofore constructed, in which dies have been arranged to more or less gradually form eyelets from a strip of sheet metal, it has been essential that the strip be annealed at some point between the dies.

This necessity has been partially obviated in my machine by having the forming or swaging commenced by die No. 1 and completed by die No. 2, and partially by using a metal strip especially prepared for the purpose, substantially as shown in the drawing, fig. 3.

The nicks or notches in the edges of the strip may be made of a shape as shown, or they may be (which is greatly preferable) of a form which would leave a series of disks or planchets sufficiently united together by portion of strip remaining between them to secure the advantages of the strip form for feeding, and yet to possess the advantage of being in the plate of a circular form closely corresponding with that of the finished eyelet.

It is a well-known fact that a disk of sheet metal can be more readily and perfectly swaged into a cup-form than could possibly be the case should a

square piece of metal be used instead, inasmuch as at each corner there would be a greater quantity or body of metal to draw from than there would be at the sides, and hence an unequal drawing would be the result, and the eyelet or other article would be liable to be cracked and warped out of the desired shape.

By making the sheet metal-strip of stock to approximate as nearly as possible to the form of disks, and yet maintain connection between them, and retaining the advantages of a continuous strip, the drawing or swaging is readily accomplished without requiring any intermediate process of annealing.

On the side of this carriage is a horizontal-acting spring-pawl, arranged to engage with the nicks in the edge of the stock.

On the left end of the driving-shaft of the machine is a cam, E, which engages with the upper end of a spring lever, F, the lower end of which, by means of a pivoted joint, is attached to the end of a feed-bar, G, extending the whole length of the machine in hangers beneath the platform.

To this bar G are attached longitudinally-adjustable dogs, H, which engage with pins descending through slots in the platform from the carriage A, and the other feeders to which said pins are attached. By the longitudinal movement of this feeding-bar to and fro the various carriages are operated.

B represents the second feeding-carriage. It delivers the stock, after having been partially formed, to the die No. 2, by which the shaping of the eyelet is fully completed.

This carriage is operated like the carriage A, already described. It is provided with a slot in its bed, into and along which the projections already formed in the stock are conducted.

It is also provided with a vertical-acting spring pawl, the finger of which is arranged to engage with the cavities in the stock made by the first dies during the forward movement of the carriage.

The necessity of this second feeding device B will be readily comprehended when it is remembered that a strip of metal stock of sufficient length to make, for instance, ten eyelets, becomes shortened, by the action of the die No. 1, fully one-fifth of the original length.

C represents a third feeding-device, which delivers the strip to die No. 3, by which the bottom of the cup is removed, thus completing the small end of the eyelet.

This feeder C is essentially like the last described, with the exception that its forward end laps over onto the female-die plate, with its upper edge at such a distance above the face of the plate as would be equal to the depth of the eyelet-cup already formed in the strip.

This carriage has a longitudinal groove in its bed, along which the strip of metal is conducted to the dies, the edges of the strip extending over and resting upon the edges of the groove, while the eyelet-cups are in the groove. Upon reaching the die the cup is thus held in a vertical position while the cutting is being effected, and secures uniform and desirable results.

The necessity of having a separate feeding-device with die No. 3 will be at once apparent upon consideration of the fact that by way of illustration the same length of strip containing twenty-two partly-formed eyelet-cups, as passed through dies No. 1, contains but twenty-one cups as shaped by the dies No. 2.

While it is true that these several feeding-devices are operated substantially by the same movement, and at the same time, and to the same extent of travel, it is to be remembered that the arrangement

of the spring pawl to engage with the forward inside-edge of the second eyelet-cup, next before the one being operated upon by the die, is of such a character as will admit of some slight variations, as, for example, it might engage with the top edge in one instance, and the bottom of the cup in another. In each case the forward movement would be just as positive.

There is still another advantage in this combination of a feeding device with each and every die. If, perchance, a flaw be in the strip of metal, and between the dies the strip should separate, the work could continue for a while, at least, without danger of clogging up and breaking the machine.

D represents a fourth feeding device, substantially the same as the one already described as feeder B. This feeder delivers the strip to die No. 4, by which the completed eyelet is removed from the strip.

Beneath the forming-plungers which operate with feeders A and B, are vertical spring-lifters L, which, working within the female dies, serve as clearers to drive the partially-formed stock upward free from the die, and thus admit of its advancement.

On three of the male dies or plungers are holding-fingers K, arranged to engage with the inside edge of the eyelet-cup in the strip next preceding the cup, being operated upon by the dies. It serves to hold the strip against any possible backward movement as the carriages return to take a fresh feed.

The operation of my machine is as follows:

The variations in the cam E having been arranged with proper relation to the main shaft and spring lever F, so that when the plungers or male dies shall be at their lowest point of descent, the feed-bar G shall be quickly moved to the left, and also so arranged that during the upward and downward movement of the plungers the feed-bar G shall move to the right or toward the dies, the machine is ready for operation.

The metal strip having been properly nicked, is delivered to feeder A, which, by engaging by its pawl with the nicks, conveys it forward by an intermittent movement to the die No. 1.

The spring punch L lifts the partially-formed blank up out of the die, and admits of the strip being set forward, nick by nick, until it arrives at feeder B, which delivers it to the die No. 2, where the forming is completed; thence to the feeder C and the die No. 3, and finally to the feeder D and cutting-die No. 4, which removes the finished article from the strip.

In preparing the machine for operation, care should be taken to have a greater length of strip between the several dies than the actual distance between them to compensate from time to time for the slight irregularities which are liable to occur in the swaging, as before explained.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The combination of the swaging-dies Nos. 1 and 2, the feed-carriages A and B, and the clearing-lifters L, substantially as shown and described.

2. The combination, with a series of dies and a series of feeding-devices, arranged substantially as herein described, of the cam E, spring lever F, feed-bar G, and adjustable dogs H, substantially as shown and described.

3. In combination with the die No. 3, for removing the bottom of the blank, the feed-carriage C, fitted to slide upon the face of the female die, provided with a longitudinal groove, and arranged so as to deliver the blanks in the strip of metal to the cutting-die in a vertical position, substantially as shown and described.

4. The improved machine for making eyelets and other similar articles from sheet metal, embracing, essentially, the swaging-dies Nos. 1 and 2, the cutting-dies Nos. 3 and 4, the feed-carriages A, B, C, and D, the lifters L, and fingers K, combined and operating substantially as shown and described.

5. The improvement in the preparation of sheet-metal stock for the manufacture of eyelets or other similar articles, which consists in cutting away por-

tions of the metal from the edges of the ribbon or strip, at regular intervals corresponding to the length of stock required for each eyelet or other similar article, thus forming a strip of partly-formed planchets or blanks, substantially as shown and described.

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