

Oct. 31, 1944.

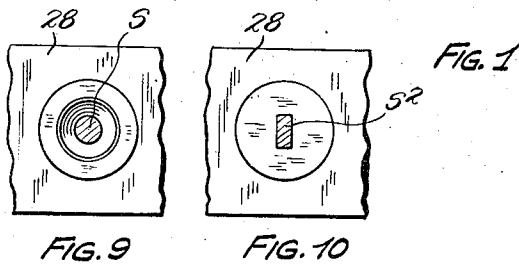
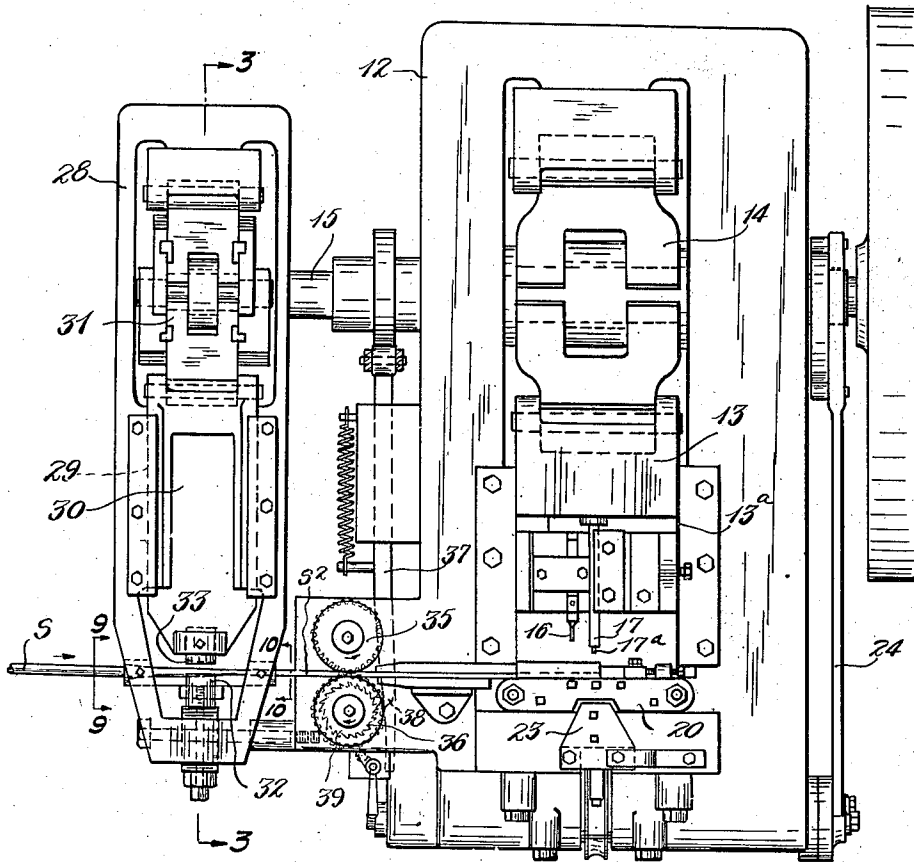
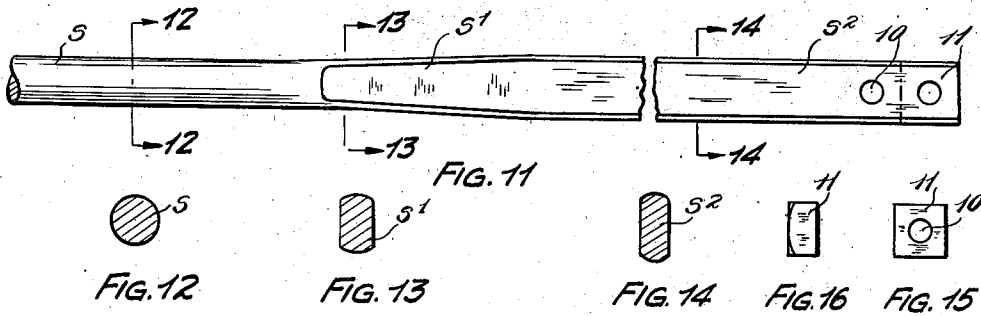
H. J. HOGUE

2,361,546

APPARATUS FOR MAKING NUTS

Filed July 10, 1942

3 Sheets-Sheet 1



INVENTOR.

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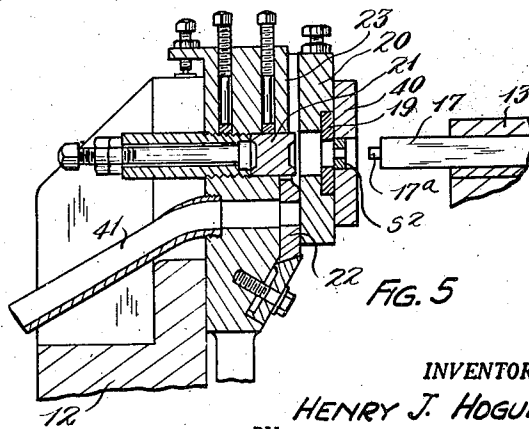
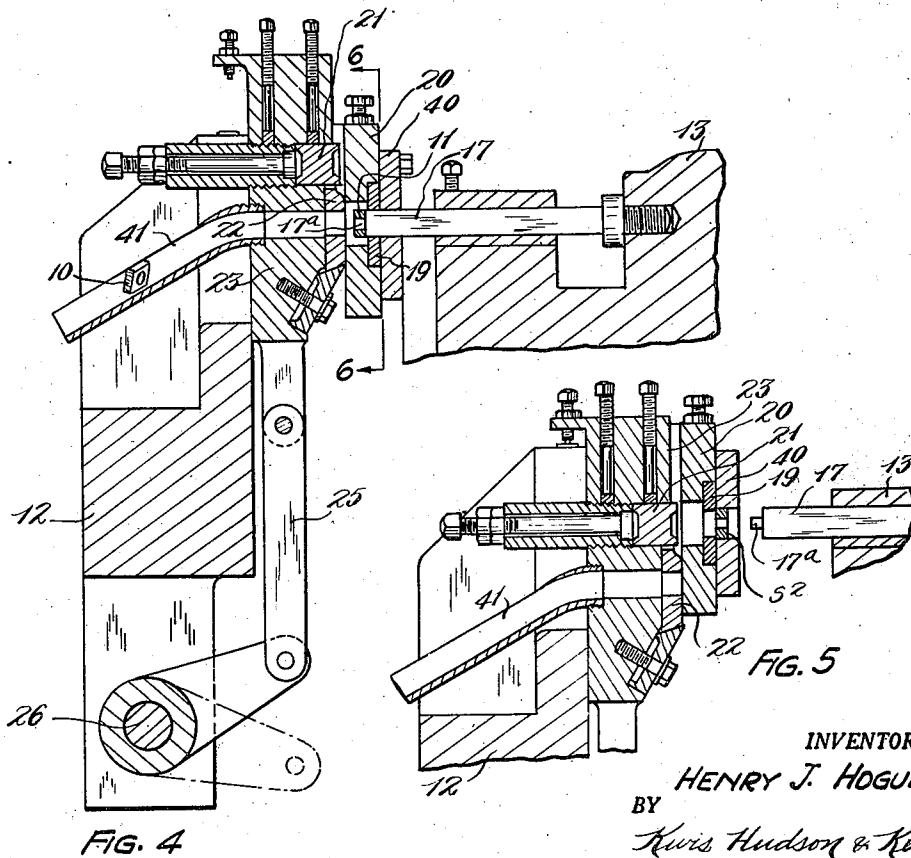
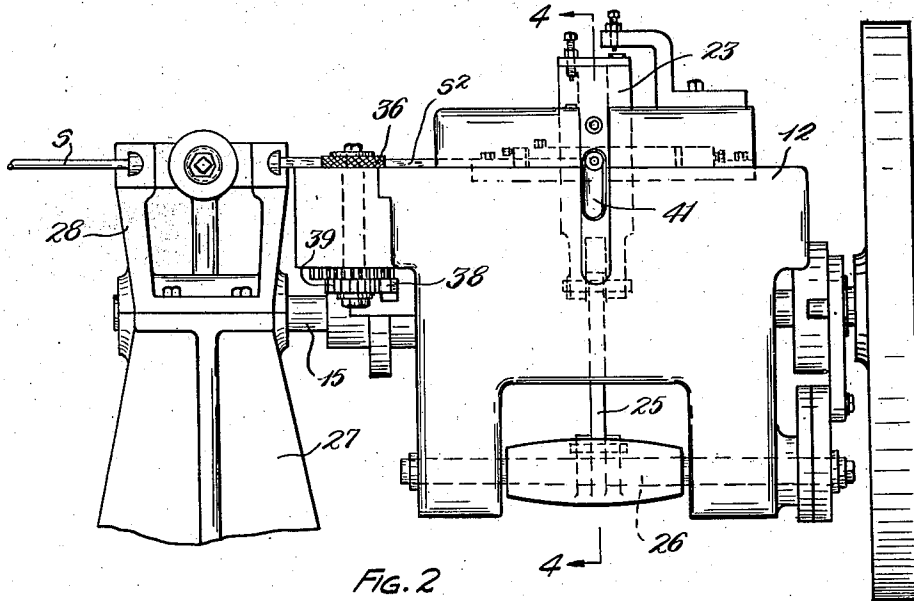
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**2,361,546**

# APPARATUS FOR MAKING NUTS

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**3 Sheets-Sheet 2**



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APPARATUS FOR MAKING NUTS

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3 Sheets-Sheet 3

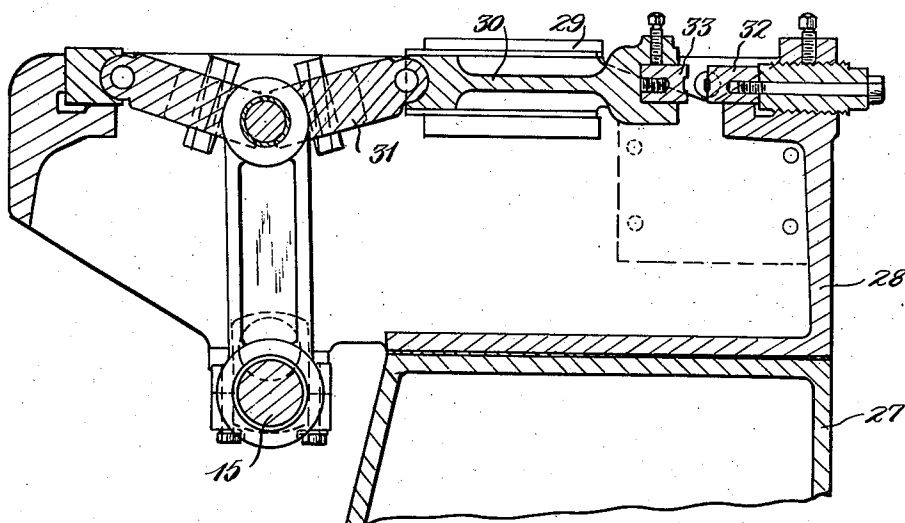


FIG. 3

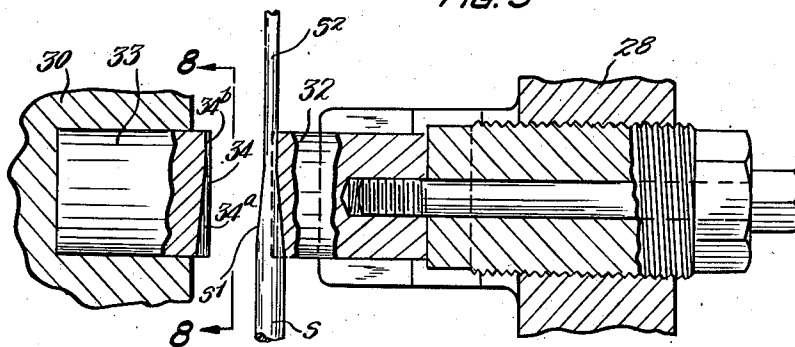


FIG. 7

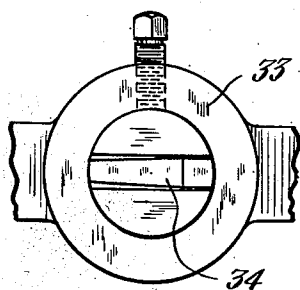


FIG. 8

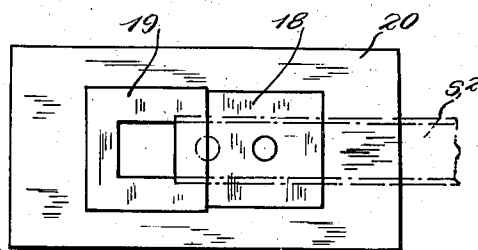


FIG. 6

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## UNITED STATES PATENT OFFICE

2,361,546

## APPARATUS FOR MAKING NUTS

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Application July 10, 1942, Serial No. 450,361

## 1 Claim. (Cl. 10—76)

This invention relates to the production of nuts or similar articles by cold working, and more particularly to an improved nut making machine of the type in which round stock is subjected to a flattening operation prior to the piercing and severing of the nut blanks.

An object of my invention is to provide a nut machine of this type having novel means for performing the stock flattening operation.

Another object of the invention is to provide an improved nut machine of this character in which the stock flattening means is of a simple but rugged construction and includes a reciprocable slide which is operated simultaneously with the main slide and from the same power shaft.

The invention may be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claim.

In the accompanying sheets of drawings,

Fig. 1 is a plan view of a nut machine embodying my novel stock flattening means;

Fig. 2 is an end view of the machine;

Fig. 3 is a longitudinal sectional elevation taken through the stock flattening means, as indicated by line 3—3 of Fig. 1;

Fig. 4 is a partial longitudinal sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a sectional view similar to Fig. 4 but showing the operating parts in a different position;

Fig. 6 is an elevational view looking toward the piercing and trimming dies of the nut machine, as indicated by line 6—6 of Fig. 4;

Fig. 7 is a plan view, with portions broken away, showing the stock flattening dies;

Fig. 8 is an end elevation of one of the flattening dies viewed as indicated by line 8—8 of Fig. 7;

Figs. 9 and 10 are fragmentary views taken, respectively, as indicated by lines 9—9 and 10—10 of Fig. 1 and showing the stock entering and leaving the flattening means;

Fig. 11 is an elevational view showing the stock after it has been flattened and pierced;

Figs. 12, 13, and 14 are cross-sections taken through the stock, as indicated respectively by sectional lines 12—12, 13—13, and 14—14 of Fig. 11;

Fig. 15 is a plan view showing a nut or nut blank produced by my improved machine; and

Fig. 16 is an edge view of the blank.

As I have already indicated in a general way, my improved nut machine is of the type in which rod stock or wire S is subjected to a flattening operation prior to its being fed to the nut forming

dies. The rod stock may be round stock, as shown in Figs. 11 and 12, which is flattened progressively while the stock is being advanced, as indicated by the tapered section S<sup>1</sup>. The flattened stock S<sup>2</sup> is fed to the dies of the nut machine where the holes or tap openings 10 are punched and the nut blanks 11 are severed from the stock in succession.

As shown in the drawings, my improved nut machine comprises in general a main frame 12 having a guideway 13a in which the reciprocating main slide 13 operates. The slide 13 may be reciprocated by means of toggle linkage 14 connecting the slide with a crankshaft 15 which extends transversely of the frame 12. Instead of the toggle linkage 14 the main slide can, of course, be reciprocated by any other suitable means such as the cam means shown in my earlier Patent No. 2,046,075, granted June 30, 1936.

The nut forming dies used in my machine may be similar to those heretofore used in nut machines of this type and may comprise punches 16 and 17 carried by the main slide 13 and piercing and trimming dies 18 and 19 carried by the stationary die block 20 and with which the punches 16 and 17 cooperate respectively. The nut forming dies may also include a chamfering die 21 and a finishing die 22 carried by a reciprocating head 23. The reciprocating head 23 is lowered and raised in timed relation to the operation of the slide 13 by movement transmitted from the crankshaft 15 through the links 24 and 25 and the rock shaft 26. As is customary in nut machines of this type, the reciprocating head 23 alternately shifts the chamfering and finishing dies 21 and 22 into position for cooperation with the punch 17 carried by the main slide 13.

The means for flattening the stock S prior to the feeding of the same to the dies of the nut machine constitutes an important feature of my invention. This flattening means is of a simple but rugged construction enabling it to render continuous service without breakdown or failure which is highly desirable in present day nut machines. This flattening means may be constructed as a separate device or attachment to be applied to an existing nut machine, but preferably is constructed or embodied in the nut machine as an integral part thereof. The flattening means comprises an auxiliary frame 28 having a guideway 29 in which a reciprocable slide 30 operates. The frame 28 is arranged adjacent the main frame 12 so that the guideway 29 extends substantially parallel with the guideway 13a in which the main slide 13 operates.

The frame 28 may be formed as a separate frame portion or member which may be connected with the main frame 12 by means of a common base 27 or, if desired, may be formed as an integral part of the main frame. The crankshaft 15, or an extension thereof, extends transversely of the frame 28 and is connected with the slide 30 to actuate the latter by means of the toggle linkage 31.

The flattening dies may comprise an anvil or stationary die 32 and a movable die 33 cooperating therewith and carried by the reciprocable slide 30. As shown in Figs. 7 and 8, the flattening dies 32 and 33 have complementary grooves 34 therein which extend across the opposed faces of the dies and in which the stock S is subjected to pressure for flattening and shaping the same. The grooves 34 are tapered in depth and width along the section 34a thereof which progressively changes the stock S from round to flat shape by forming on the stock the intermediate tapered sections S<sup>1</sup>. The grooves 34 also include a section 34b of substantially uniform depth and width by which the conversion of the tapered shape S<sup>1</sup> of the stock to the flat shape S<sup>2</sup> is completed.

The flattened stock S<sup>2</sup> is fed to the dies of the nut machine by means of a pair of intermittently operated feed rolls 35 and 36 which operate on the flattened portion of the stock and also serve to pull the stock through the flattening dies 32 and 33. The feed rolls 35 and 36 are operated intermittently so as to advance the stock when the flattening and nut forming dies are in their open or retracted position. The feed rolls may be driven from the main shaft 15 by means of a push rod 37 having a pawl 38 which cooperates with a ratchet wheel 39 mounted on the shaft of the feed roll 36.

In the operation of my improved apparatus the stock S moves intermittently between the flattening dies 32 and 33 where it is subjected to the intermittent action of these dies and is changed from round to flat shape. The flat stock S<sup>2</sup> is fed into a groove of a stripper plate 40 which locates the stock in front of the piercing and trimming dies 18 and 19. On each forward movement of the main slide 13 the punches 16 and 17 pierce the stock and cut off one of the nut blanks 11. The severed nut blank 11 is carried forward on the pilot 17a of the punch 17 and is forced through the die 19 which cooperates with the punch 17 in the cut-off operation and also trims the severed blank to the approximate shape and size desired.

At the time that the nut blank is severed from the stock, the chamfering die 21 is in alignment with the die 19, as shown in Fig. 5, and the severed nut blank while being carried on the pilot 17a is forced against the chamfering die by the advancing punch 17. Immediately follow-

ing the chamfering operation the punch 17 is partially retracted to disengage the blank 11 from the chamfering die 21, and at this time the head 23 is lifted to bring the finishing die 22 into alignment with the punch 17, as shown in Fig. 4. The punch 17 then continues its forward movement and forces the blank 11 through the finishing die 22 from which it is delivered to a suitable container by the chute 41. The return stroke of the slide 13 retracts the punches 16 and 17 to permit the stock to be fed forward for the next succeeding piercing and severing operation.

From the foregoing description and the accompanying drawings, it will now be readily seen that I have provided a nut machine having novel stock flattening means which is of a very rugged and durable construction and which is actuated in timed relation with the dies of the nut machine and from the same power shaft. It will be seen, furthermore, that the use of toggle linkage in actuating the flattening dies affords a very powerful and effective flattening action without incurring the bending and distortion of the various parts, which has caused frequent breakdown in flattening devices or attachments heretofore used with nut machines.

While I have illustrated and described my improved nut making apparatus in more or less detail, it will be understood, of course, that I do not wish to be limited to the particular apparatus and details herein disclosed, but regard my invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claim.

Having thus described my invention, I claim:

In nut making apparatus, a main frame, a reciprocating mechanism in said main frame for piercing and severing nut blanks, a power shaft rotatable in said main frame for actuating said reciprocating mechanism and having a lateral extension projecting beyond said main frame, an auxiliary frame contiguous to said main frame, a slide reciprocable in said auxiliary frame, cooperating flattening dies carried by said slide and auxiliary frame, cooperating feed rolls between said main and auxiliary frames and operable to intermittently feed stock to be flattened to said flattening dies and to advance the flattened stock to said reciprocating mechanism means for driving said feed rolls from said power shaft in timed relation thereto, said auxiliary frame having spaced side members with guide means thereon for guiding the stock across the auxiliary frame and between said flattening dies and toggle linkage connected with the extensor of said power shaft for actuating said slide in timed relation to said reciprocating mechanism and feed rolls.

HENRY J. HOGUE.