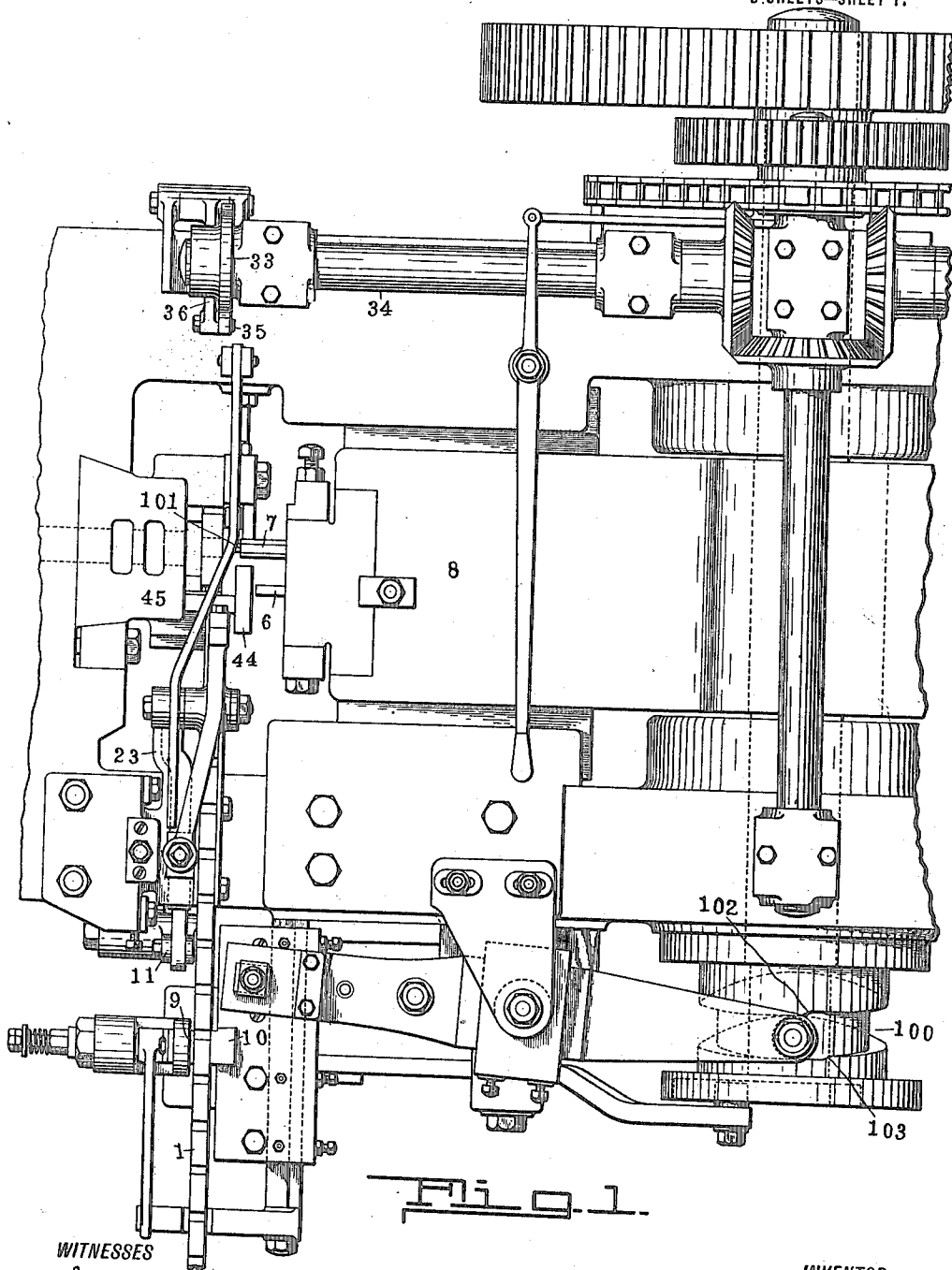


W. D. RIGNEY.
MACHINE FOR MAKING NUT BLANKS.
APPLICATION FILED APR. 21, 1915.

1,206,252.

Patented Nov. 28, 1916.
3 SHEETS—SHEET 1.



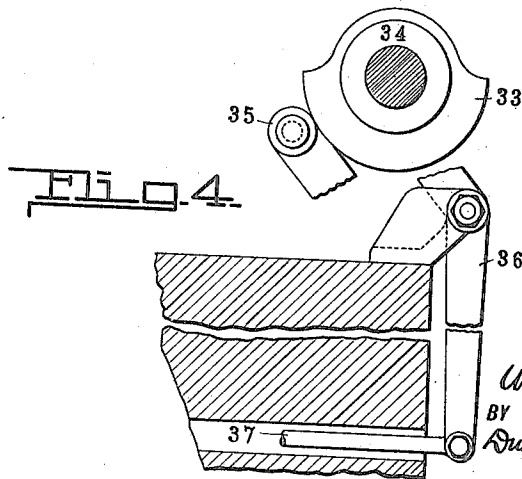
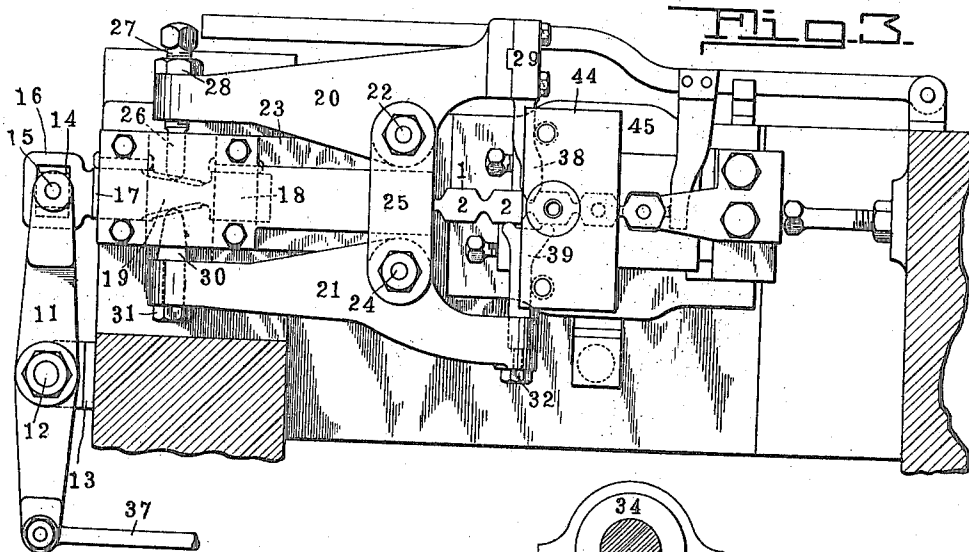
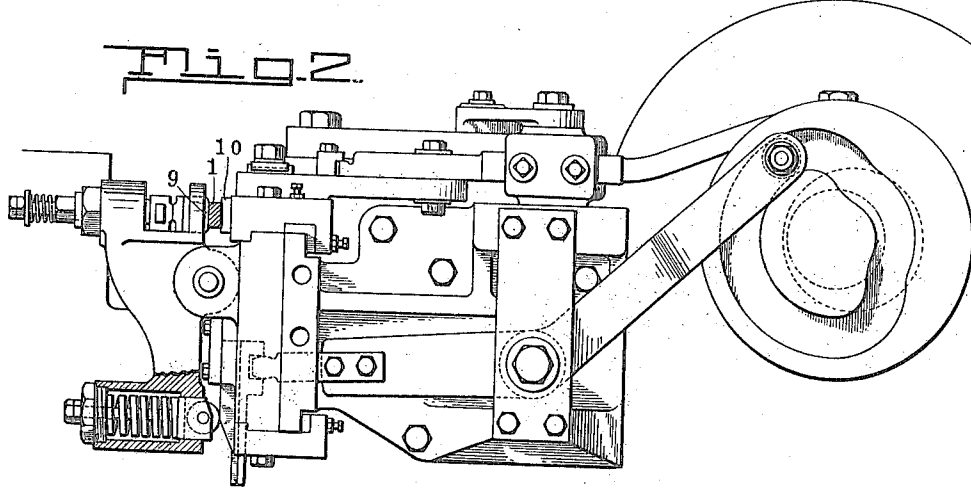
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3 SHEETS—SHEET 2.



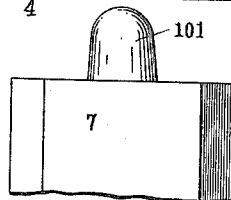
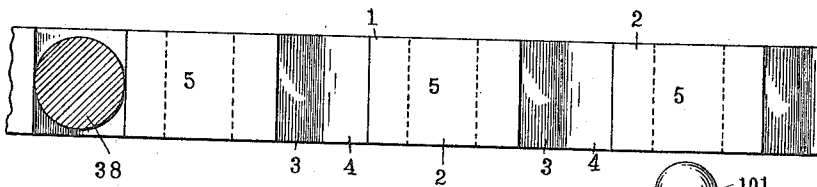
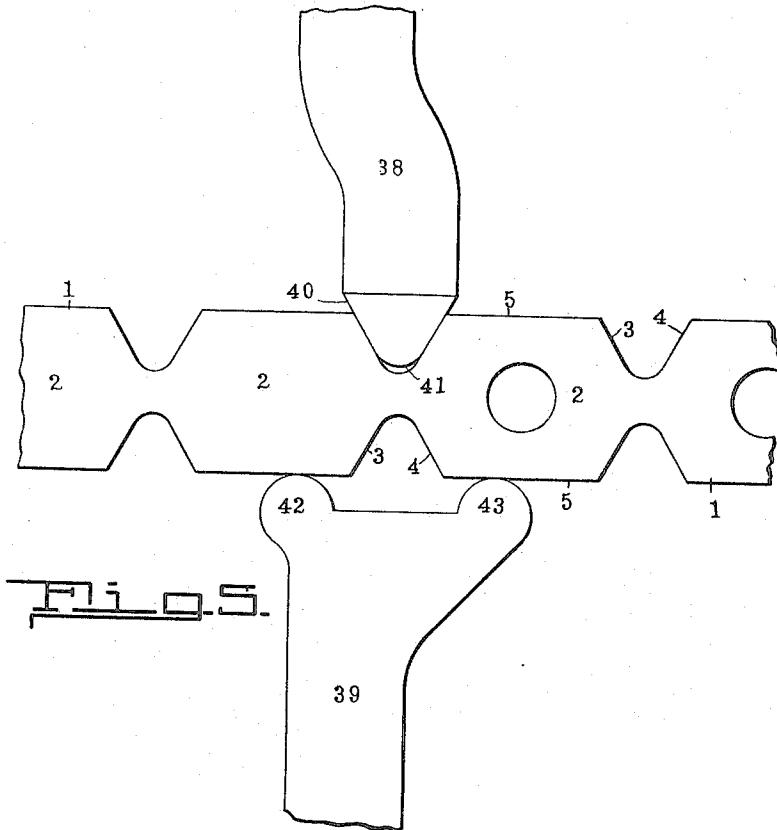
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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING NUT-BLANKS.

1,206,252.

Specification of Letters Patent.

Patented Nov. 28, 1916.

Application filed April 21, 1915. Serial No. 22,770.

To all whom it may concern:

Be it known that I, WILLIAM D. RIGNEY, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Machines for Making Nut-Blanks, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to nut-making machines, and with respect to its more specific features, to automatic machines of the character referred to for performing nut-blank-forming operations on a serrated stock bar.

One of the objects of the invention is the provision of practical means for positioning the sections of a serrated stock bar, one after the other, accurately, relative to the forming mechanism.

Another object of the invention is the provision of simple means for delivering a serrated stock bar to the forming mechanism, and whereby variation or inaccuracy in the shape of the serrated stock bar are provided for and the nut sections nevertheless accurately positioned for being operated upon by the forming mechanism.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of this invention, and wherein similar reference characters refer to similar parts throughout the several views, Figure 1 represents a plan of so much of the mechanism of an automatic nut-blank-making machine as may be required to support the disclosure of the invention; Fig. 2 represents a side view of the stock bar feeding mechanism, the same being partly in section for clearer disclosure; Fig. 3 represents a side view illustrating the alining members as associated in the machine; Fig. 4 is a detail view of a cam and certain operative connections for effecting movement of the

alining members; Fig. 5 is a diagrammatic view illustrating the serrated bar and the alining fingers in alining relation; and Fig. 6 is a plan view showing the upper face of the stock bar, the operative end of the shearing punch, and a horizontal section through one of the alining members.

The invention has to do more especially with the means for accurately setting successive, partly formed nut-blank sections of a stock bar relative to a mechanism adapted to operate upon said bar and perform a forming operation thereon, such as perforating the bar to form the tap opening, severing sections successively from the bar, etc., and inasmuch as the embodiment disclosed is associated with an otherwise known construction of machine, it will be conducive to clarity of disclosure to first explain so much of such machine as may be required to enable the invention to be clearly understood.

The invention is herein disclosed associated with a machine of the construction set forth in Patent No. 1,088,192, patented February 24, 1914. When employing partly pre-shaped, or serrated, stock bars in machines designed to automatically feed such bars to the forming mechanism, inaccuracies in the nut blanks which are the product of the machine result, by reason of non-uniformity in the stock bar. This non-uniformity may be due to several causes, as, for instance, the sections of the bar may vary in shape; there may be unequal distances between the serrations; the serrations may not all be uniformly disposed at the same angle across the bar, and one partly formed nut section of the bar may be changed in shape by the forming operation upon an adjacent section. To whatever reason the variation of the serrated bar from predetermined uniformity may be due, it is found that the ordinary feeding mechanism of automatic machines oftentimes disposes a serrated bar in such inaccurate position relative to the forming mechanism that the latter mechanism will perform its operation at a different portion of the bar from that at which said operation is designed to be performed. In Fig. 5 is shown one embodiment of a serrated nut bar designed to be utilized in an automatically operated machine adapted to form nut blanks from said bar. As distinguished from a plain surface

bar, a serrated stock bar possesses economic features which render it a very desirable piece of stock. The stock bar 1 is usually made of serrated form before being introduced into the nut-blank-forming machine, the serrations dividing the bar generally into successive imperforate nut blank sections 2, the oppositely inclined faces or walls 3 and 4 of the serrations being designed to be, approximately at least, in the plane of the sides of a completed nut blank, and in the present embodiment, said walls 3 and 4 make angles with the sides 5, which are ordinarily equal to the angles between similar sides of a hexagonal nut blank, the walls of the serrations extending transversely of the bar and in planes at an angle to the path of advance of the bar. Therefore, it will be noted that the same amount of material will provide a greater number of nut blanks from a serrated bar than from a plain surface bar.

Referring now more particularly to the otherwise known form of machine, in connection with which the invention is disclosed, there is provided a mechanism adapted to perform a nut-blank-forming operation on a stock bar, and, in the present embodiment, the stock bar employed is a serrated stock bar of the character and shape before referred to. Such bar comprises a plurality of nut sections 2, each section comprising a partially formed nut blank outlined in a bar of generally rectangular cross section. Upon the introduction of such a bar into the machine, the sections are designed to be first perforated at points situated symmetrically relative to the successive walls 3, 4 and 5, thus providing openings which are to be subsequently threaded, and the thus perforated sections are designed to be successively severed or sheared from the end of the bar after having been perforated. After such severing the nut may be finished in any approved manner.

In the machine illustrated, the mechanism adapted to perform the nut-blank-forming operation comprises a reciprocatory punch or punching mechanism, in the present embodiment two punches being disclosed, one 6, being a perforating punch and designed to form the openings or perforations in the nut sections, as before explained, and the other 7, being a hexagonal shearing punch designed to shear or sever successive perforated sections from the serrated bar. The punching mechanism disclosed is similar to that of the patent and comprises a reciprocatory punch head 8, carrying the punches 6 and 7, said head being operated to reciprocate the punches transversely of the line of feed of the stock bar by mechanism generally similar to that disclosed in the patent, the punches moving in lines fixed relatively to each other. The serrated stock bar is introduced into the machine in the manner ex-

plained in the patent in connection with the plain surface stock bar of the patent, and by mechanism similar to that disclosed in the patent the serrated stock bar is moved or advanced at intervals a predetermined distance toward the punching mechanism. It may be mentioned here that the initial feed of the stock bar is accomplished by a vise mechanism comprising the jaws 9 and 10, which, in their outer position, are caused to grip the stock bar and then move inwardly so as to move said bar a predetermined distance toward the punching mechanism. The shearing is effected while the vise mechanism is gripping the bar. The vise is advanced and retracted by a member having a cam or cam slot 100 of proper contour to effect the advance and retreat of the vise. The shearing punch 7 has an advance pilot, comprising a pin 101 having a tapering end, which pin enters the opening made by the perforating punch 6, and moves the bar slightly so as to adjust the section to be sheared. The cam slot 100 has an inclined face 102, to permit the vise to move to accommodate this adjustment. The shearing having been effected, the vise mechanism is caused to retract slightly so as to space the end of the bar from the side of the shearing punch. This retraction is positively accomplished by the face 103 of cam 100, if the vise should not remain in its adjusted position, due to the adjusting pin 101. After such slight retraction, which is accomplished without removing the bar from its generally advanced position, the vise releases the bar and thereafter moves outwardly, so as to assume position to grip a different portion of the bar, but preferably this release and outward movement are not effected until a setting mechanism has cooperated with the bar, as will be explained. By a continuation of the movements of the vise mechanism, as explained, the stock bar will be successively advanced at intervals toward the forming mechanism, in the present instance, the punching mechanism. As the construction and operation of the punching mechanism and the mechanism for initially advancing the stock bar are similar in all respects to that disclosed in the patent above referred to, except as just noted, it is unnecessary to further specifically describe either of these mechanisms, reference being made to the patent for a fuller and complete disclosure thereof.

This invention proposes a bar-setting mechanism, or means, preferably separate from the bar-advancing means hereinbefore described, to set the stock bar in accurate relation to the forming mechanism, being particularly designed to set the bar in alignment relative to the perforating punch and longitudinally of the path of feed of the bar.

The numeral 11 denotes a rocker which is adapted to be periodically actuated to interpose a centering cam between the ends of centering tongs, which, at their other ends, may operate to either advance or retract the stock bar, so as to change the advanced position of said bar which has been caused by the vise mechanism, or pilot pin, before referred to. The rocker 11 is pivotally positioned at its center by means of a pivot bolt 12, in turn mounted in a suitable stationary bracket 13 secured to the side of the main frame of the machine. At its upper end the rocker 11 is pivoted to a vertically sliding block 14 by means of a pivot bolt 15. This sliding bearing block 14 slides up and down (for the limited distance required to correct for the slight rise and fall of the upper end of the rocker 11) in a suitable bearing recess in the end 16 of the centering cam 17, thereby translating such cam. This cam comprises two end portions 17 and 18 which have a sliding bearing in suitable guideways in the main frame of the machine, and the intermediate portion 19 of the centering cam is wedge-shaped and its upper and lower inclined contact faces are grooved, so as to form suitable raceways for the contact fingers of the centering tongs. The tongs consist of two swinging arms 20 and 21 and the upper arm 20 is, by means of a pivot bolt 22, supported at an intermediate point by a standard 23 projecting from the frame of the machine. The other centering arm 21 is in like manner pivoted to a bolt 24, also secured to a suitable part of the main frame of the machine. The outer ends of the pivot bolts 22 and 24 are preferably secured together by means of a short heavy distance link 25, which is adapted to maintain the outer ends of the bolts in parallelism and prevent bending or displacement of said bolts under stresses of the centering mechanism. At its actuating end, the centering arm 20 carries the finger 26, which finger has a screw-threaded shank 27 and is screw-threaded through an aperture in the arm 20 and securely retained in place in a predetermined position by means of a lock nut 28. This arrangement enables the operator to readily set the finger 26 so as to accurately locate the arm 20 within suitable limits. At its forward end this arm 20 detachably carries a setting implement, to be hereinafter described, and which may be secured in place in any suitable manner, as by a block 29, which preferably is dovetailed on the end of the arm 20, so as to enable the implement to be shifted transversely. The companion arm 21 of the centering device also carries an actuating cam finger 30, which is retained in place by means of a nut 31, and at its forward end carries an implement secured in the corresponding end of the arm 32 by means of a nut 32.

The numeral 33 indicates a continuously driven rotary cam mounted on a cam shaft 34, which cam coöperates with a follower 35 on a rock lever 36, and through the instrumentality of the cam 33 the rock lever 36 and the connecting rod 37, reciprocation of the centering cam 17 occurs at predetermined times, said reciprocation resulting in causing the two implements hereinbefore mentioned to move toward and from the stock bar, the amplitude of movement of the implements being such as to cause the end of one implement to move into and out of a serration of the bar, and the end of the other implement to move into and out of contact with the opposite side of the bar.

It will be remembered that the vise mechanism is operated to retract the stock bar slightly after a section is sheared from the bar. Further advance of the stock bar for the length of a nut blank section is then in order, and this is effected by the vise releasing the bar and moving outwardly for a new grip. But before the vise releases the bar the setting implements before referred to are operated. In the present embodiment a pair of implements are employed, as indicated by the numerals 38 and 39. One object of these implements is to center a portion of the stock bar transversely of the axis of the perforating punch and of the path of feed of the bar, and another object is to slightly advance or retract the bar longitudinally of the path of feed of the bar, and relative to the axis of the perforating punch 6, which latter, it will be observed, is positioned so as to operate on the bar after a previously perforated section has been sheared therefrom. The cam 33 operates the cam 17 to cause the setting implements 38 and 39 to move toward and from each other and the stock bar between the intervals of advancing said bar, and the implement 38 is so shaped and constructed as slightly to change or vary the advanced position of the bar, either moving it a short distance forwardly or backwardly in the line of feed, dependent upon the position assumed by the serration with which it is designed to coöperate. This slight change occurs while the bar is in its advanced position, this generally advanced position being determined by the larger movement given the bar by the cam 100, as distinguished from the slight movement given or permitted by the faces 102 and 103. The implement 38 moves transversely of the stock bar, and has a bar-engaging face which is inclined to the direction of feed of the bar and also to the direction of movement of the implement, as indicated at 40.

In the present embodiment the operative face of the implement 38 is shaped to engage oppositely inclined walls of the serrations, and is preferably conical so as to tangentially engage the oppositely inclined

walls of one of the serrations at approximately the central portion of such walls. By this construction an implement is provided which, on movement in contact with and relative to a predetermined portion of a serrated bar, as for instance in contact with an inclined wall of a serration, moves said bar at an angle to the path of movement of the implement. The implement 38 is likewise positioned to contact with the serrated walls at a point substantially centrally intermediate the sides of the bar adjacent said walls, and as the implement face is curved or conical transversely of the face of a wall of a serration, the entire curved face of the implement does not contact with said wall, but, on the contrary, a portion of said face on each side of the contact point or line is thereby spaced from the wall of the serration, as will be clear from Fig. 6. By this construction and arrangement, if the serrations are not disposed across the bar at the same angle, the implement 38 will contact with the central portions of the successive serration walls, so as to position the bar by contact with portions which have a more uniform relation to the axis of the punch opening than have the ends of the serrations. And it will be perceived that the spacing of the face of the implement from the face of the bar on either side of the line of contact, permits the bar to be set longitudinally either forwardly or backwardly by this central contact, irrespective of the disposition of the ends of the serrations.

The setting implement 38 preferably comprises a cylindrical shank having the conical operative face 40, before mentioned, the lower portion of the cone being truncated, as at 41, so as to terminate short of the bottom of the serration when the implement has set the bar in position to be operated on by the perforating punch.

The coöperative implement 39 of the pair of setting implements moves into and out of engagement with the face of the stock bar opposite the face engaged by the implement 38, and preferably comprises a plurality of projections 42 and 43, spaced longitudinally of the bar so as to escape the serrations on this face, the projections having rounded bar-engaging faces. Preferably the implements 38 and 39 are so located relatively to each other that the former engages the bar on a line transversely of the bar intermediate said projections.

Operation: The operation of the mechanism will be largely obvious from the foregoing description, but a brief summary thereof will be given. The machine having been set in operation, the punches will be reciprocated so as to advance toward and recede from the path of the stock bar, and the vise mechanism will be reciprocated in and out so as to move or advance different

portions of a stock bar into position simultaneously opposite the two punches, and to then return to grip a different portion of the bar, the mechanism operating to release the grip on the bar at proper times. The construction and operation of so much of the machine are similar to that of the patent hereinbefore referred to, except in the respects before called to attention herein. The serrated stock bar is introduced into the machine, passing between the jaws 9 and 10 of the vise mechanism and between the setting implements 38 and 39. On the advance movement of the shearing punch the pilot 101 will enter a previously punched opening 80 in the nut section at the end of the stock bar, and if the bar is slightly off center, the pilot will slightly move the bar, so as to adjust the same in proper position for shearing, the inclined face 102 of the cam permitting the vise mechanism to slightly recede to accommodate such movement of the bar. In practice, before the end of the punch 7 has traversed the width of the bar, the end section will break off, and as soon as said section is thus sheared from the end of the bar, the face 103 of the cam will positively retract the bar a short distance so as to space the end of the bar from which the section has been severed away from the side of the shearing punch. This retraction of the bar is desirable, for the reason that the subsequent perforation of the bar by the perforating punch 6 tends to elongate the bar in the direction of the punch 7, so that were the perforating punch 6 permitted to punch the bar while the end of the bar was in contact with the side of the shearing punch 8, the strain on the perforating punch might be sufficient to cause its fracture. Also said slight retraction has a tendency to more accurately dispose a serration of the bar opposite the path of the setting implements 38 and 39. The said retraction having been effected, the cam 33, through the instrumentality of the operative connections between the latter cam and the setting implements, causes said setting implements to move toward the bar and the implement 38 to enter the serration which will have been disposed in its path. After the implement 38 has entered the serration, the vise jaws 9 and 10 are released and the vise moves outwardly to take a new grip on the bar. While the bar is thus free from the grip of the vise and is in what may be termed a "floating" condition, the implements 38 and 39 complete their movements toward the bar, and the inclined face of implement 38 will coöperate with the inclined wall or walls of one of the serrations and slightly advance or retract the bar so as to dispose the section to be perforated in proper relation to the axis of the perforating punch.

The axis of the perforating punch is fixed

and the implement 38, cooperating, as it does, with one wall of the serration, which wall is, in effect, practically coincident with a side of a completed nut blank, always dis-
 5 poses said serration wall at a substantially fixed distance and relation to the axis of the perforating punch, thus practically assuring that the perforation shall be properly positioned relative to said wall. This, in
 10 effect, properly locates said perforation relative to all the walls of that section of the nut bar which is then to be punched. The implement 39 cooperates with the implement 38 to support the bar, and tends to vertically
 15 aline the end of the bar with the perforating punch, the rounded projections of the implement 39 cooperating with the bar at either side of the serration therebetween. The bar is now set in proper alinement with the per-
 20 forating punch and it only remains to maintain it in alinement and to complete the perforating operation. This is accomplished partly by the centering implements, which maintain their contact with the bar, during
 25 the perforating, and partly, and mainly, by the clamping plate 44, which is moved transversely of the bar to clamp the same against the face of the die block 45. The construction and operation of this clamping plate
 30 are similar to that of the patent hereinbefore mentioned, to which reference is made for a fuller disclosure thereof. It will be observed that the operative end of the perforating punch is positioned in a plane to the
 35 rear of the operative end of the shearing punch, and this disposition is such that the perforating punch does not perforate the bar until the setting of the bar by the imple-
 40 ments 38 and 39 has been accomplished, as before explained. The perforating punch then operates on the bar, punching an opening therein, after which both punches are retracted, the setting implements move away
 45 from the bar, the implement 38 moving out of the serration, and then the vise mechanism advances the bar to present a new perforated section opposite the shearing punch and the section to be perforated opposite the
 50 perforating punch, whereupon the cycle of operations before explained is repeated. Thus, by the above described mechanism are accomplished, among others, the objects hereinbefore referred to.

As many changes could be made in the
 55 above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or
 60 shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is in-
 65 tended to cover all of the generic and spe-

cific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I 70 claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation 75 on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a pre-
 80 determined distance toward said forming means and separate means adapted to operate between the intervals of advance of said bar to vary the advanced position of said bar caused by said advancing means.

2. In an apparatus of the character de- 85 scribed, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means 90 adapted, at intervals, to advance said bar a predetermined distance toward said mechanism and to retract said bar slightly after the advance movements and separate means adapted to operate between said intervals of 95 retraction to vary the advanced position of said bar.

3. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation 100 on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said mech- 105 anism and to retract said bar slightly after the advance movements and separate means adapted to operate between said intervals of retraction and between said intervals of advance to vary the advanced position of 110 said bar.

4. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation 115 on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to move said bar relative to said forming means and means 120 adapted to slidingly contact said bar and thereby move said bar relative to said forming mechanism between the intervals of motion caused by said second mentioned means.

5. In an apparatus of the character described, in combination, mechanism adapted 125 to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to move said bar rela- 130

tive to said forming means and means adapted to slidably contact said bar and thereby move said bar relative to said forming means between the intervals of motion caused by said second mentioned means, said last mentioned means being movable transversely of said bar.

6. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to move said bar relative to said forming means and means adapted to slidably contact said bar and thereby move said bar relative to said forming means between the intervals of motion caused by said second mentioned means, said last mentioned means being movable transversely of said bar and comprising an implement, movable into and out of a serration in said bar, having a bar engaging face inclined to the direction of movement of the bar.

7. In an apparatus of the character described, in combination, a perforating punching mechanism, and means adapted to set a serrated stock bar in punching alignment relative to said punching mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said punching mechanism and separate means adapted to operate between the intervals of operation of said punching mechanism to vary the advance position of said bar relative to said punching mechanism.

8. In an apparatus of the character described, in combination, a punch, means adapted, at intervals, to advance a serrated stock bar a predetermined distance toward said punch, and separate means adapted to change the advance position of said bar caused by said advancing means and thereby set a predetermined portion of said bar in position to be operated upon by said punch.

9. In an apparatus of the character described, in combination, a punch, means adapted, at intervals, to advance a serrated stock bar a predetermined distance toward said punch, and separate means adapted to change the advance position of said bar caused by said advancing means and thereby set a predetermined portion of said bar in position to be operated upon by said punch, comprising an implement adapted to engage an inclined face of said bar.

10. In an apparatus of the character described, in combination, a punch, means adapted, at intervals, to advance a serrated stock bar a predetermined distance toward said punch, and separate means adapted to change the advance position of said bar caused by said advancing means and thereby

set a predetermined portion of said bar in position to be operated upon by said punch comprising an implement disposed to move against a face of said bar which extends transversely of the bar and at an angle to the path of advance of said bar.

11. In an apparatus of the character described, in combination, bar setting mechanism comprising a setting implement and means whereby a movement of said implement in contact with and relative to a predetermined portion of a serrated bar moves said bar.

12. In an apparatus of the character described, in combination, bar setting mechanism comprising a setting implement and means whereby a movement of said implement in contact with and relative to a predetermined portion of a serrated bar moves said bar at an angle to the path of movement of said implement.

13. In an apparatus of the character described, in combination, bar setting mechanism comprising a pair of bar centering implements adapted to move toward and from each other transversely of the bar to center said bar, one of said centering implements being adapted to contact with an inclined face of said bar and thereby move said bar at an angle to the path of movement of said bar-moving implement.

14. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement adapted to engage a face of the bar at a point intermediate the sides of said bar adjacent said face.

15. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement adapted to engage a face of the bar at a point substantially centrally intermediate the sides of said bar adjacent said face.

16. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted

to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a face curved transversely of the face of a wall of a serration.

17. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a face curved transversely of the face of a wall of a serration and longitudinally of the bar.

18. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement adapted to tangentially engage with approximately the transverse central portion of a wall of a serration.

19. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement adapted to engage oppositely inclined walls of the serrations.

20. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by

said advancing means, comprising an implement adapted to engage oppositely inclined walls of the serrations at points intermediate the sides of said bar.

21. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement adapted to engage oppositely inclined walls of the serrations at points substantially centrally intermediate the sides of said bar.

22. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a face curved transversely of the faces of oppositely inclined walls of the serrations.

23. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a conical face adapted to engage a wall of a serration.

24. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a conical face adapted to engage a wall of a serration, said conical face terminating short of the bottom of a serration when the bar has been set thereby.

25. In an apparatus of the character de-

scribed, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a face inclined to the direction of movement of the implement to engage said bar.

26. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising an implement having a face inclined to the direction of movement of the implement to engage said bar and to the direction of advance of said bar.

27. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising a pair of centering implements adapted to engage said bar on opposite sides, respectively, the engaging points of one of said implements comprising a plurality of projections spaced longitudinally of the bar.

28. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, comprising a pair of centering implements adapted to engage said bar on opposite sides, respectively, the engaging points of one of said implements comprising a plurality of projections having rounded bar engaging faces spaced longitudinally of the bar.

29. In an apparatus of the character described, in combination, mechanism adapted to perform a nut blank forming operation on a serrated stock bar, and means adapted to set said bar in position to be operated on by said mechanism comprising means adapted, at intervals, to advance said bar a predetermined distance toward said forming means and means adapted to operate between the intervals of advance of said bar to vary the position of said bar caused by said advancing means, said last mentioned means comprising a pair of centering implements adapted to engage said bar on opposite sides, respectively, the engaging points of one of said implements comprising a plurality of projections spaced longitudinally of the bar, and said other implement being disposed to engage said bar on a line transversely of the bar intermediate said projections.

30. In an apparatus of the character described, in combination, a pair of punches comprising a perforating punch, said punches being adapted to move in line fixed relatively to each other and to operate on a stock bar one after the other, means adapted to reciprocate said punches, and means adapted to move different portions of a stock bar into position simultaneously opposite said punches and permit retrograde movement of said stock during the advance movement of said punches and before said perforating punch punches the stock.

31. In an apparatus of the character described, in combination, a pair of punches comprising a perforating punch, said punches being adapted to move in line fixed relatively to each other and to operate on a stock bar one after the other, means adapted to reciprocate said punches, and means adapted to move different portions of a stock bar into position simultaneously opposite said punches and permit retrograde movement of said stock during the advance movement of said punches and before said perforating punch punches the stock, comprising a reciprocatory vise adapted to grip said bar and a cam adapted to reciprocate said vise.

32. In an apparatus of the character described, in combination, a pair of punches comprising a perforating punch, said punches being adapted to move in line fixed relatively to each other and to operate on a stock bar one after the other, means adapted to reciprocate said punches, and means adapted to move different portions of a stock bar into position simultaneously opposite said punches and permit retrograde movement of said stock during the advance movement of said punches and before said perforating punch punches the stock, comprising a reciprocatory vise adapted to grip said bar and a cam adapted to reciprocate said vise, said cam having a face adapted to positively

effect retrograde movement of said vise while the bar is gripped by said vise.

33. In an apparatus of the character described, in combination, a pair of punches comprising a perforating punch, said punches being adapted to move in line fixed relatively to each other and to operate on a stock bar one after the other, means adapted to reciprocate said punches, means adapted to move different portions of a stock bar into position simultaneously opposite said punches and permit retrograde movement of said stock during the advance movement of said punches and before said perforating punch punches the stock, comprising a reciprocatory vise adapted to advance the bar to position opposite the punches, and an implement movable transversely of the bar adapted to vary the longitudinal position of said bar caused by said vise.

34. In an apparatus of the character described, in combination, a pair of punches comprising a perforating punch, said

punches being adapted to move in line fixed relatively to each other and to operate on a stock bar one after the other, means adapted to reciprocate said punches, means adapted to move different portions of a stock bar into position simultaneously opposite said punches and permit retrograde movement of said stock during the advance movement of said punches and before said perforating punch punches the stock, comprising a reciprocatory vise adapted to advance the bar to position opposite the punches, and an implement movable transversely of the bar adapted, between the intervals of advance caused by said vise, to vary the longitudinal position of said bar caused by said vise. In testimony whereof I affix my signature, in the presence of two witnesses.

WILLIAM D. RIGNEY.

Witnesses:

E. BUNDSALL,
JOSEPH N. MARSHALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."