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W. E. SHARP

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APPARATUS FOR PRODUCING BOLT NUTS

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Fig. 1.

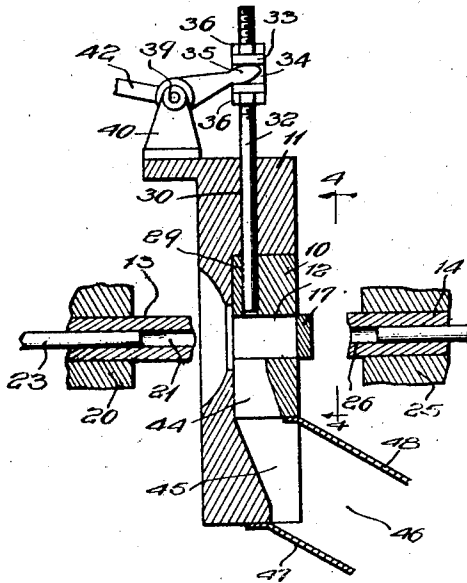


Fig. 2.

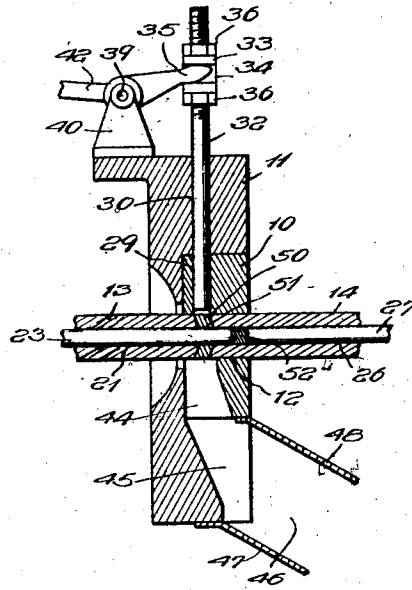


Fig. 4.

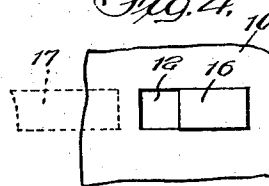
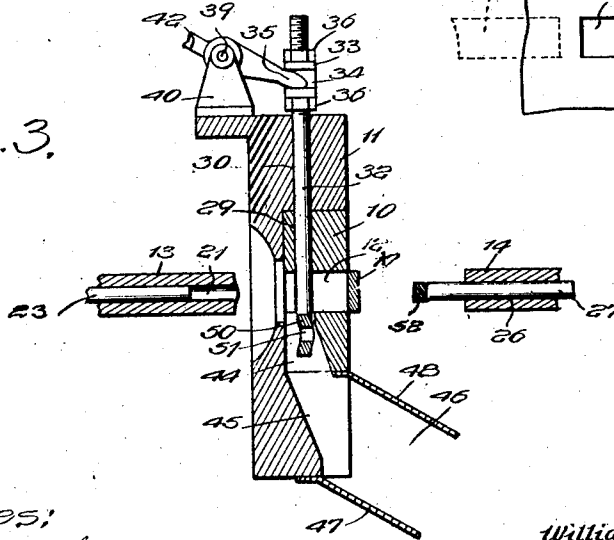


Fig. 3.



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APPARATUS FOR PRODUCING BOLT NUTS

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My invention relates to apparatus for producing bolt nuts and particularly to apparatus for producing nut blanks which are to be subsequently tapped.

5 The invention has, among its other objects, the production of apparatus of the kind described, which is convenient, compact, durable, efficient, and satisfactory for use wherever found applicable.

10 A particular object of the invention is to provide improved apparatus, of the kind described, which is adapted to form the blank, pierce the same, punch bolt-receiving apertures in the blank, and separate the nut blanks from the slugs stamped therefrom so that it
15 will not be necessary to have additional apparatus for separating the slugs from the blanks.

20 One form of the invention is embodied in apparatus adapted to sever predetermined lengths from bars of metal, to provide nut blanks and to then pierce such blanks to provide bolt-receiving apertures, the slugs stamped from the blanks being ejected from
25 the apparatus through a path separate and distinct from the path through which the blanks are ejected.

Many other objects and advantages of the construction herein shown and described will
30 be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described,
35 and more particularly pointed out in the claims.

In the drawing, wherein like reference characters indicate like or corresponding parts:

40 Fig. 1 is a fragmentary section taken through apparatus embodying the invention;

Fig. 2 is a section taken substantially on the same line as Fig. 1 but showing certain
45 parts of the apparatus in changed positions;

Fig. 3 is a section taken substantially on the same line as Fig. 1 but showing certain parts of the apparatus in positions wherein
50 they function to separately eject blanks and slugs from the apparatus; and

Fig. 4 is a section taken on line 4—4 of Fig. 1.

It will become apparent as the following description progresses that the apparatus shown in the drawing is subject to many
55 modifications, to enable it to produce nut blanks of different shapes, and that it may also be modified to form the nut blanks from different stock. Therefore, certain parts of the apparatus shown in the drawing are
60 merely illustrative, and the invention is not limited thereto.

Referring to the drawing, the reference character 10 designates a die block which is mounted in a frame 11 and is provided with an
65 aperture 12 aligned with a die 13 and a punch 14. As shown in Fig. 4, a stop 16 is fixed to the front face of the die block 10 so that one end of a bar 17 may be accurately registered with the aperture 12, the apparatus being
70 adapted to form nut blanks from the bar 17. The die 13 is slidably journaled in a member 20 forming part of the frame 11 and is provided with a central longitudinal bore 21 in which a plunger or ejecting tool 23 is slidably
75 journaled. Similarly, the punch 14 is slidably journaled in a member 25 forming part of the frame 11, the punch 14 being provided with a central longitudinal bore 26 in which a plunger or ejecting tool 27 is slidably
80 journaled.

Formed in the die block 10 and the frame 11 are aligned bores 29 and 30, respectively, in which a plunger 32 is slidably mounted, the plunger being disposed at an angle to the
85 longitudinal axis of the aperture 12. Adjustably mounted upon the outer end of the plunger 32 is a block 33 having a groove 34 which accommodates the free end of a lever
90 35. The means for adjustably mounting the block 33 upon the plunger 32 preferably comprises nuts 36 screw-threaded upon the plunger. The lever 35 or equivalent member is secured to a shaft 39 pivoted in a bracket
95 40 which is mounted upon the frame 11. The shaft 39 may be oscillated by any preferred means through the medium of a lever 42 which is fixed thereto.

Suitable mechanism (not shown) is oper- 100

actively connected to the lever 42 and, to the die and plunger, and the ejecting tools slidably journaled in the die and plunger to actuate them in the manner described below. It is not deemed necessary to show the mechanism for actuating these parts as the details thereof do not form a part of this invention.

Projecting into the bottom side of the die block 10 and communicating with the aperture 12 is an opening 44, the lower end of which communicates with an opening 45 provided in the frame 11. The opening 45 terminates in a chute 46 formed by plates, walls or partitions 47 and 48 which are secured to the frame 11.

The operation of the above described apparatus is substantially as follows: Assuming that the several movable parts of the apparatus are in the positions wherein they are shown in Fig. 1, the bar 17 is advanced until it abuts the stop 16 (Fig. 4) and the apparatus is then set in operation. The punch 14 then advances and severs a predetermined length of material from the bar 17 to form a blank which is advanced into the aperture 12 (Fig. 2) until it abuts the die 13, the die 13 being simultaneously advanced into the aperture 12. The punch 14 and the die 13 are adapted to impart or form a concavo-convex cross-section to the blank. As illustrated in Fig. 2, the blank is indicated at 50 in this figure. However, the invention is not limited to this feature. While the die and punch are imparting the concavo-convex cross-section to the blank 50, or immediately thereafter, the piercing member 23 is advanced to punch the bolt-receiving aperture 51 in the blank, the piercing member 23 being adapted to drive a slug 52 from the blank into the bore 26. The punch and die are then retracted into the positions wherein they are shown in Fig. 3, the ejecting member 27 lagging behind the die member 14 in such manner that it drives the slug 52 therefrom (Fig. 3). In some instances, I may prefer to hold the ejecting tool 27 stationary throughout the entire cycle of operations, as the relative movement between it and the punch will serve to eject the slug from the punch. During the time the die and punch are being withdrawn from the aperture 12, the plunger 32 is advanced into the aperture 12 to drive the blank 50 through the openings 44 and 45 into the chute 46. Of course, the apparatus is preferably so timed that the piercing tool 23 is withdrawn from the blank 50 before the punch and die are retracted and the plunger 32 preferably engages the blank during the initial portions of the return strokes of the plunger and die. This prevents the blank from adhering to either punch or die.

When the slug 52 is ejected from the bore 26 in the punch 14, it falls upon the plate, wall or partitions 48 and is guided thereby

into any suitable receptacle (not shown). The nut blanks ejected from the aperture 12 through the openings 44 and 45 and thence into the chute 46 preferably fall into another receptacle (not shown). This construction is advantageous in that it then becomes unnecessary to manually or otherwise separate the slugs from the blanks.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine of the kind described, means for cutting a nut blank from a bar and forcing it horizontally into a die block, punching mechanism arranged to punch a bolt-receiving aperture therein, and means for discharging the blank through a downwardly opening aperture in said block.

2. In a machine of the kind described, means for cutting a nut blank from a bar and forcing it into a die block to form concavo-convex surfaces thereon, punching mechanism arranged to punch a bolt-receiving aperture therein, and means for automatically separately ejecting the blank and the punched slug in different directions from the machine.

3. In a machine, a die block having an aperture therethrough, a punch, a die, a piercing tool, said punch, die and piercing tool being shaped and movable longitudinally in said aperture to form nut blanks with concavo-convex surfaces and having bolt-receiving apertures therethrough, and driven means movable transversely of said die-block for ejecting said nut blanks from the die-block.

4. In a machine, a die block having an aperture therethrough and an angularly disposed passage connecting therewith, a punch, a die, a piercing tool, said punch, die and piercing tool being shaped and movable in said aperture and being operably timed to form nut blanks with concavo-convex surfaces and having bolt-receiving apertures therethrough, and driven means movable transversely of said die-block for ejecting said nut blanks from the angularly disposed passage in the die-block.

5. In a machine, a die block having a longitudinal aperture therethrough, a punch, a die, a piercing tool, an ejecting tool mounted in said punch; said punch, die, and piercing tool being longitudinally movable in said aperture and being operably timed to form nut blanks, the piercing tool being adapted to punch slugs from the nut blanks to form bolt-receiving apertures therein, said eject-

ing tool being adapted to eject the slugs from the punch, said die block having a transverse aperture, and means movable transversely in said last mentioned aperture for ejecting said nut blanks from the die block.

6. In a machine, a die block having intersecting longitudinal and transverse apertures therethrough, a punch, a die, a piercing tool, an ejecting tool mounted in said punch; said punch, die, and piercing tool being movable in said longitudinal aperture and being operably timed to form nut blanks, the piercing tool being adapted to punch slugs from the nut blanks to form bolt-receiving apertures, and the said ejecting tool being adapted to eject the slugs from the punch, and a plunger movable in said transverse aperture for ejecting said nut blanks from the die block, and means forming independent paths through which the nut blanks and slugs are discharged from the machine.

7. Apparatus for manufacturing nuts comprising a die block with a longitudinal aperture therethrough and a transverse passage connecting therewith, a die adapted to reciprocate therein and a punch adapted to enter and reciprocate in said block to cooperate with said die and cut off a blank of metal from stock and force it against said die, a piercing tool adapted to reciprocate in said die and force a slug of metal from said blank into said punch, and a plunger for forcing said blank from the transverse passage in said die block.

8. Apparatus for manufacturing nuts comprising a die block, a die adapted to reciprocate therein and provided with a ridged forming face, a punch adapted to enter and reciprocate in said die block for cutting off blanks from stock, said punch being provided with a forming face mating with the forming face of the die, a piercing tool adapted to reciprocate in said die for perforating a nut blank by forcing a slug of metal into said punch, an ejecting tool reciprocating in said punch for ejecting said slug from said punch after withdrawal from said die block, and a plunger operating in said die block for ejecting said blanks from said block.

9. A machine comprising a die block with a longitudinal aperture therethrough, means for forcing pieces of metal into said aperture for forming nut blanks, means movable into said aperture for punching bolt-receiving apertures in said nut blanks, means for positively ejecting the blanks in a direction transverse to the axis of the blank forming means, separate means for ejecting the material removed from the blanks in punching said apertures axially of said forming means, and means for preventing said material from mixing with the apertured blanks.

10. Apparatus for forming nuts comprising a die block, means for forcing a piece of metal longitudinally into said block, means

for forming a longitudinal aperture therein and forcing the material removed into the first-mentioned means, and means for ejecting said blank transversely from said die block.

In testimony whereof, I have hereunto signed my name.

WILLIAM E. SHARP.

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