W. J. SLEFFEL.

MACHINE FOR MAKING NUTS.

APPLICATION FILED MAY 26, 1919.

1,400,244. **Patented Dec. 13, 1921.**

2 SHEETS—SHEET 1.

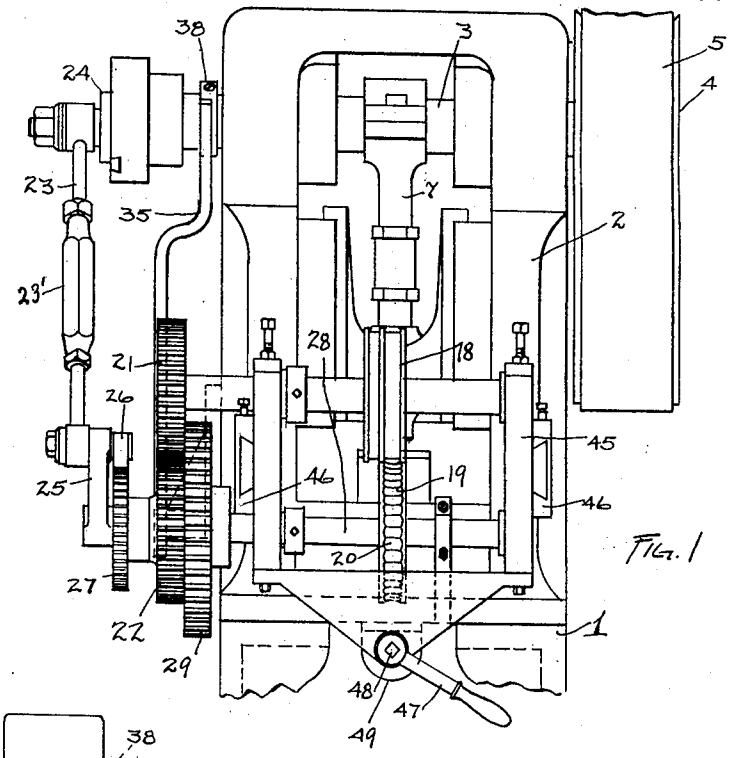


FIG. 1

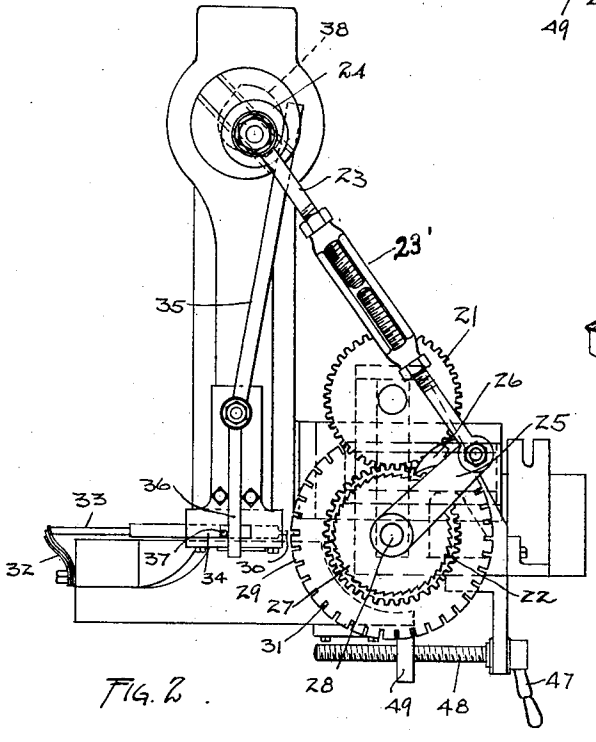


FIG. 2.

FIG. 5

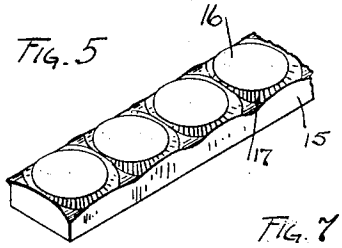
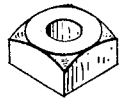


FIG. 7



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2 SHEETS—SHEET 2.

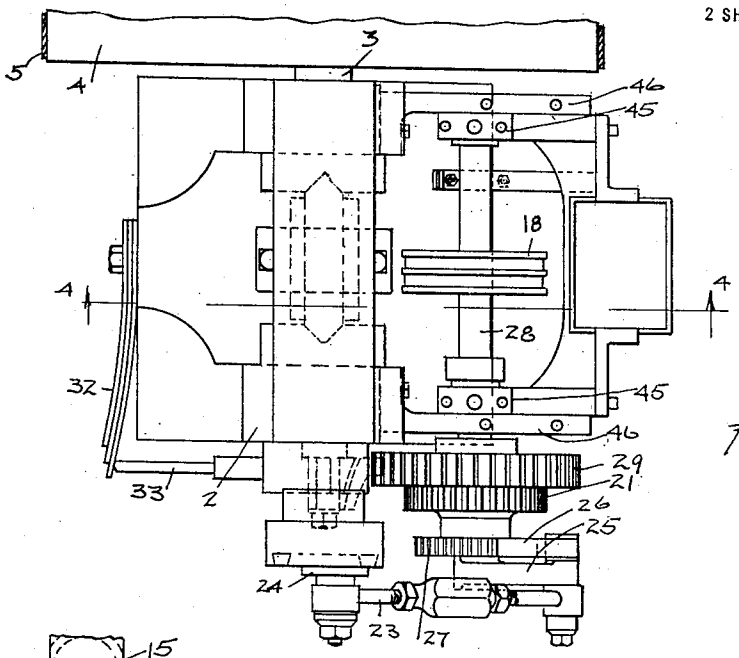


FIG. 3

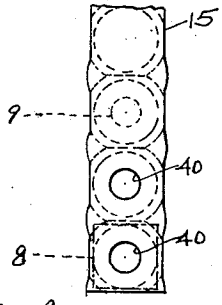


FIG. 6

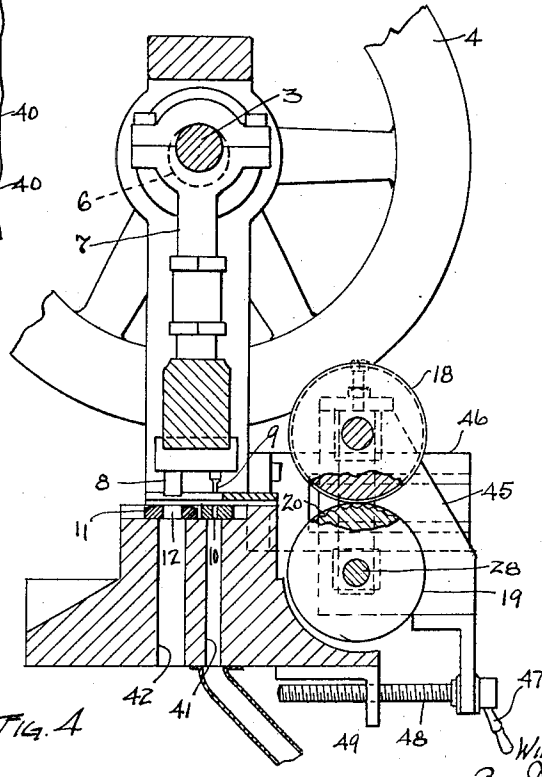


FIG. 4

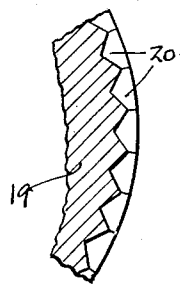


FIG. 8

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING NUTS.

1,400,244. Specification of Letters Patent. Patented Dec. 13, 1921.

Application filed May 26, 1919. Serial No. 299,753.

To all whom it may concern:

Be it known that I, WILLIAM J. SLEFFEL, a citizen of the United States, and a resident of Lakewood, county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Machines for Making Nuts, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating, as indicated, to machines for making nuts, is particularly concerned with an improved means for correlating the movement of the stock bar, which is partially pre-formed, with the movements of the punching means or dies. I have provided an improved mechanism for correlating and positively synchronizing the feeding of the stock bar with the operation of the punch and also for locking the stock bar in position during the operation of the punches thereon. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Figure 1 is a rear elevation of the machine; Fig. 2 is a side elevation of the same; Fig. 3 is a plan view; Fig. 4 is a section on the line 4—4, Fig. 3; Fig. 5 is a view in perspective of the bar of stock partially pre-formed; Fig. 6 is a plan view of the stock bar showing a part of the same after the punching operation and indicating the form and appearance of the finished nut when cut off; Fig. 7 is a view in perspective of such nut ready for tapping; and Fig. 8 is a partial sectional view on a larger scale, showing the contour of one of the feeding rolls.

The machine comprises a frame or bed 1, upon which is mounted a vertical extension 2, in which is borne a punch-operating shaft 3, driven by means of a sheave 4 and a suitable belt 5. The punch shaft 3 carries the usual eccentric 6 for operating a reciprocable punch member 7 which carries at its lower end two dies 8 and 9, of which the die 9 operates in conjunction with an opening 10 formed in a complementary die plate 11 mounted on the base of the machine, while the die 8 coöperates with a corresponding opening 12 in the die plate 11.

In the manufacture of some forms of nuts it has been the practice to pre-form a bar of stock in suitable machines into the shape shown in Fig. 5. In this figure there is shown a stock bar 15 which has been so handled as to produce a circular flat upper surface 16 and the curved crown 17, which are standard features of the ordinary nut. The bar when so formed has a series of equally spaced rounded projections on one surface, as shown in Fig. 5. Such a bar is fed into the present machine by means of two vertically alined rolls 18 and 19, the bar being fed with the rounded projections on the lower side. To receive these projections the roll 19 is formed with a continuous series of similar and equidistantly spaced recesses 20, which are shown in Fig. 8. This engagement between the projections on the pre-formed bar and the recesses in the lower roll 19 insures a mechanical and positive feed of the stock bar, which is controlled absolutely by the speed of rotation given to the rolls 18 and 19.

The two rolls 18 and 19 carry gears 21 and 22, respectively, in mesh with each other to insure the same driving speed on each roll. The means for operating the two rolls consist of a divided rod 23, connected by a turnbuckle 23′ whereby the length of the rod may be adjusted and said rod being operated by means of an eccentric 24 on the punch-driving shaft 3 and a link 25 pivoted to the lower end of the rod 23 and pivoted at its lower end about the center of the lower roll 19. Pivoted on the common axis to the rod 23 and the link 25 is a pawl 26 engaged in the teeth of a ratchet disk 27 attached to the shaft 28, on which the gear 19 is fixed. Rotation of the power shaft 3 for the punch carries the pawl 26 to the right (see Fig. 2) sliding the end of the pawl back over one tooth in the ratchet disk and then moving the lower end of the rod 23 forward by means of the engagement between the pawl and the teeth

on the disk. In this way the lower roll 19, and with it of course the geared power roll 18, are moved forward a distance equal to the length of one of the recesses in the lower roll, which brings the next circular projection on the stock bar forward into the position just vacated by the preceding one.

In order to prevent any accidental movement of the rolls and of the stock bar during the punching operation which might be caused by some looseness in the driving connections or between the pawl and the teeth of the ratchet disk I provide a positive lock in the form of a toothed disk 29, fixed to the shaft 28, and a locking key 30 which is slidably mounted to move in a horizontal position into and out of engagement with the recesses 31 of the disk 29. The key is moved forward by means of a series of superimposed leaf springs 32, which operate against the end of a rod 33 attached to the slide 34, which carries the key, while the key is disengaged by means of a bell crank lever 35, having its lower end 36 in contact with the pin 37 on the slide 34. The upper end of this lever 35 bears against, and is intermittently operated by a disk cam 38 carried on the power shaft 3.

In the operation of the machine a preformed bar of stock is started between the rolls 18 and 19, with the projections on the lower surfaces of the bar in engagement with the recesses 20 in the roll 19. Rotation of the power shaft feeds this bar of stock forward until the foremost nut portion is directly beneath the die 9 of the punch. As the punch descends the stock bar is locked against further movement by means of the key 30 operating in the slot in the disk 29, and the die 9 then punches centrally through the rounded projection on the bar, which is directly beneath it and forms an aperture 40 therethrough, which is shown in Fig. 6. As the punch is raised the bar is fed forward a distance equal to the length of the rounded projection, and the foremost rounded projection, with the hole punched therethrough, is brought directly beneath the punch 8 and over the opening 12 in the die plate 11. The next downward movement of the punch presses the finished nut, as shown in Fig. 7, through the opening 12 in the die plate 11, and trims off the pressed-out edge portion which has been formed because of the flow of metal upward during pre-forming of the bar in two connected nut blanks. The small pellets which are punched out of the center of the nut blanks by the die 9 are discharged through a chute 41, while the finished nuts ready for tapping are discharged through a similar chute 42 and collected in any suitable manner. When the machine is operated steadily there are nut blanks beneath both of the dies 8 and 9 upon the downward movement, these dies both being carried in the punch slide or member 7 and operated simultaneously.

The rolls 18 and 19, together with the gearing for driving the same are carried in a framework 45 which is slidable in the horizontal plane toward and away from the punching dies in the guides 46. Such a mounting for the rolls is very desirable in order to initially adjust the position of the rolls with respect to the dies in order to bring the foremost nut blank on the bar into exact alinement with the first operating die 9, this adjustment being secured by means of a lever 47 and threaded rod 48 attached thereto, which are adjustably mounted on a projecting flange 49 on the bed of the machine. It is necessary to make this adjustment only upon the initial setting up of the machine, or when the rolls and dies are changed to receive a larger or smaller size of stock bar, and once the bar is started through the punch no further adjustment is necessary.

When the rolls and dies are changed to operate upon a larger or smaller size of stock bar, the proper amount of feed in accordance with the size of the bar, can be secured by the replacement of the crank arm at 24 to provide a greater or shorter angular movement of the lever 25 and hence of the pawl 26, for each revolution.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivilent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a machine of the character described, the combination of punching means, means for feeding a prepared bar of stock through said punching means in synchronism therewith, and other means adapted to engage and lock said feeding means against movement during the operation of said punching means.

2. In a machine of the character described, the combination of punching means, means for feeding a prepared bar of stock through said punching means in synchronism therewith, and other means operable upon initial movement of said punching means, said other means being adapted to engage and lock said feeding means against movement during the operation of said punching means.

3. In a machine of the character described, the combination of punching means, means adapted to feed a bar pre-formed into a series of partially formed connected articles complementally to said feeding means step by step to successively bring such articles in position to be operated upon by said punching means.

4. In a machine of the character described, the combination of punching means, co-operating rolls having a die-shaped feeding surface adapted to engage and feed a stock bar having a preformed surface complemental to the surface of said feed rolls, to said punching means, and connections between said punching means and said rolls adapted to operate said rolls during the inoperative portion of the operation of said punching means.

Signed by me, this 23 day of May, 1919.

WILLIAM J. SLEFFEL.