No. 637,320. Patented Nov. 21, 1899.

C. E. BILLINGS.

MACHINE FOR NURLING METAL.

(Application filed May 5, 1899.)

(No Model.)

Fig. 1.

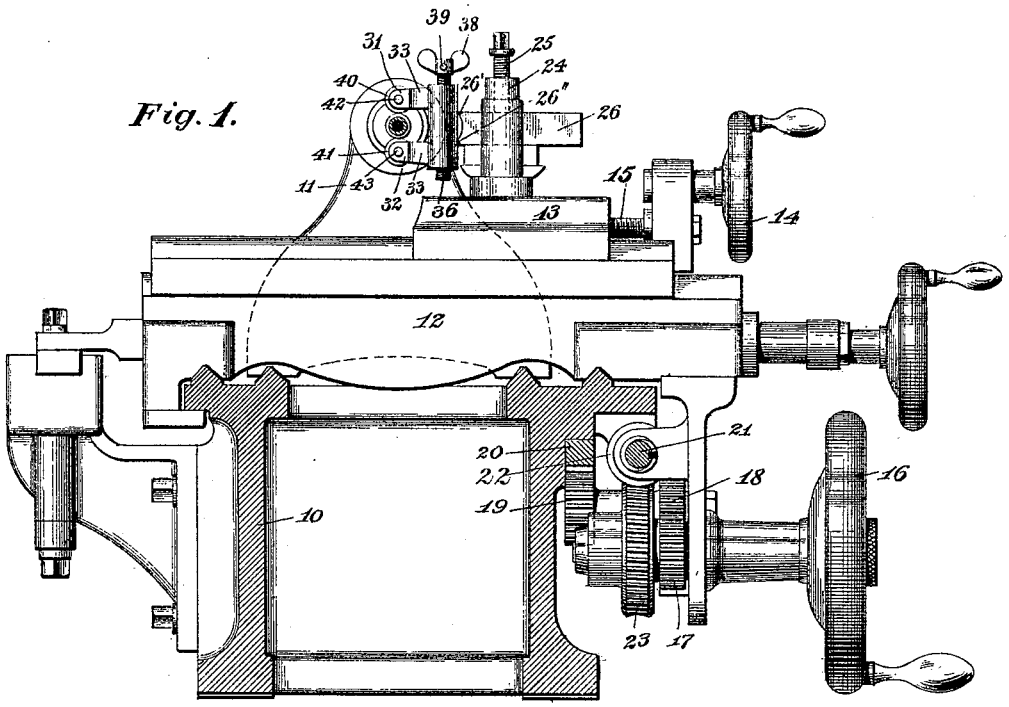


Fig. 2.

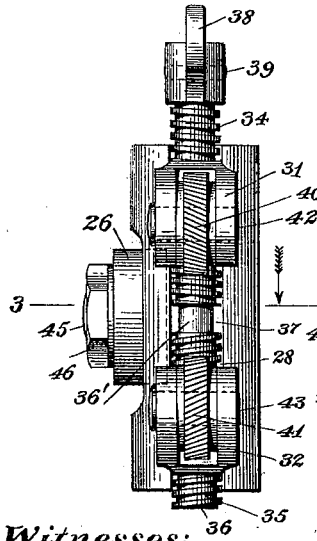


Fig. 3.

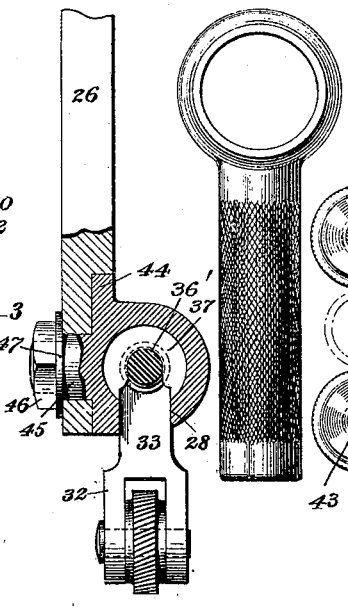
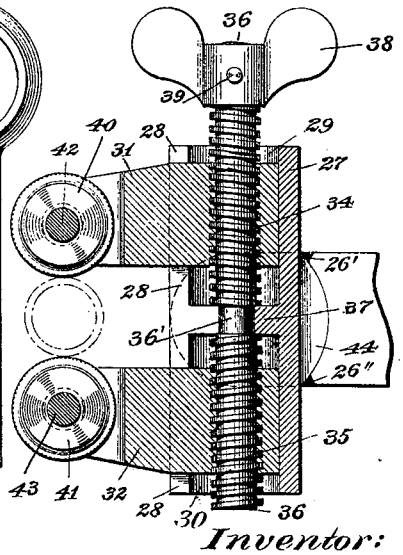


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR NURLING METAL.

SPECIFICATION forming part of Letters Patent No. 637,320, dated November 21, 1899.

Application filed May 5, 1899. Serial No. 715,709. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BILLINGS, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Nurling Metal, of which the following is a specification.

This invention relates to metal-working machines, and more especially to those which are generally known as "nurling-machines" employed for indenting or roughening the outer surfaces of cylindrical or other forms of bodies; and my invention has for its object the provision of a machine of the character described the tools of which may be held in the tool-post of a lathe and automatically fed along the work without danger of springing or bending the same during the nurling operation.

A further object of my invention is to so arrange the nurling wheels or rolls that they may center themselves relatively to the work vertically while they are properly positioned laterally by the movement of the tool-slide on the rest without necessitating a fine adjustment of the rolls in the tool-post, as will be hereinafter described.

In the drawings, Figure 1 represents a cross-section of a lathe-bed having my invention applied thereto in position to be employed on a body supported in alinement with the tail-stock spindle. Fig. 2 is a front view of the nurling-tool. Fig. 3 is a horizontal section on line 3 3 of Fig. 2. Fig. 4 represents a longitudinal vertical section of the tool, and Fig. 5 a piece of metal having its surface knurled by the tool.

Similar characters designate like parts in all the figures of the drawings.

In the drawings, 10 designates the bed of a lathe, 11 the tail-stock, 12 the slide-rest supported on ways on the bed, and 13 the tool-slide adjustable on said slide-rest by the hand-wheel 14 and screw 15, said slide-rest being adapted to be moved longitudinally on the ways by the hand-wheel 16, connected through a pair of gears 17 18 with a pinion 19 in engagement with the rack 20, or said rest may be moved by the lead-screw 21 and worm 22 in engagement with a worm-gear 23, which may be clutched to the pinion 17, all the elements so far enumerated being of well-known construction. Adjustably held on the tool-rest 13 is a post 24, adapted to receive tools of various kinds, a nurling-tool constructed according to my invention being illustrated, having its shank clamped in place by the screw 25.

The construction of my improved nurling-tool is particularly shown in Figs. 2 to 4, inclusive, and embodies a shank portion 26 and a head portion 27 for supporting the nurling-rolls. The head portion 27 consists of a cylinder or block of other form slotted at its front end, as at 28, and provided with recesses 29 30, said recesses being adapted to receive the arms 31 and 32, the neck portions 33 of which (see Fig. 3) are made to fit the slot 28, as above referred to, and said arms are shown threaded and adapted to be engaged by the right and left hand threads 34 and 35, respectively, of a screw 36, having a reduced portion 36′ engaged by a lug 37, which is formed in the head 27, (see Figs. 3 and 4,) so that by these means the arms 31 and 32 may be caused to approach or move away from each other, according to the direction in which the screw 36 is rotated, for which purpose a thumb-piece 38 is provided, said thumb-piece being attached to the screw by a pin 39. The outer ends of the arms 31 and 32 are bifurcated to receive the nurling-rollers 40 and 41, respectively, which are journaled on studs 42 and 43.

In order to obviate the difficulty of adjusting the nurling-tool in the post 24 so that both of the rollers 40 and 41 may bear against the work with equal pressure, means are provided whereby said rollers will automatically adjust themselves relatively to the blank to be knurled. Said means may be variously constructed, but as shown consist of a rocking connection between the head 27 and shank 26. By referring to Fig. 3 it will be observed that the head 27 is provided with a flange 44, carrying a stud 45, which projects through an aperture in the forward end of the shank 26 and which is held in rocking relation to said shank and in position thereon by a nut 46 bearing against a shoulder 47, whereby a swinging movement of the head is permitted, such movement being limited by the stop-faces 26′ 26″. (See Fig. 4.)

From the foregoing it is evident that it will not be necessary to center the nurling-tools relatively to the work, since by virtue of a rock-joint between the head and shank the rolls are permitted to move bodily in a vertical arc, so that when the distance between said rolls corresponds to the size of the work to be knurled the lateral advancing movement of the tool-slide 13 until the axis of the work and the centers of the rolls coincide will cause the rolls to center themselves relatively to the work and to engage the surface thereof at diametrically opposite points and with equal pressure without any liability of springing the same.

Various means may be employed for retaining the nurling-rolls in proper adjusted position relatively to each other, and in some cases when the work is of irregular shape the adjusting-screw may be dispensed with and other means for holding the rolls in contact with the work substituted therefor.

While a particular form of rocking joint is illustrated and described by means of which the nurling-tools may be automatically adjusted to the work, yet it is distinctly to be understood that the invention is not limited thereto, but includes within its scope any suitable form of connection whereby the result set forth may be accomplished. It is also distinctly to be understood that the invention is not necessarily restricted to a pair of nurling-tools, as in operating upon some kinds of work a single tool may be employed with good results.

Having thus described my invention, what I claim is—

1. The combination with means for supporting the work, of a pair of nurling-tools located upon diametrically opposite sides of the work; and means for so supporting said tools that they will automatically adjust themselves to the work.

2. The combination with means for supporting the work, of a pair of nurling-tools located upon diametrically opposite sides of the work; a device on which said nurling-tools are mounted, said device being adapted to be received in the tool-post of a lathe; and means mounted at one end of said device for so supporting the nurling-tools that they may be automatically adjusted to the work.

3. The combination with means for supporting the work, of a tool-post mounted on the slide-rest of a lathe; a pair of nurling-tools located upon opposite sides of the work and carried by a device having a shank adapted to be clamped in said tool-post; and means for so supporting the nurling-tools in said device that they may be automatically adjusted to the work.

4. The combination with means for sustaining the work, of a slide-rest; a tool-post mounted thereon; a head having a shank secured in said tool-post; a pair of nurling-tools mounted in said head; means for adjusting said tools toward and from each other; and a device carried by the head and adapted to have a rocking movement in the shank.

5. In a machine of the class specified, the combination with means for supporting the work, of a tool-post; a head having a shank supported in said tool-post; a pair of nurling-tools mounted for adjustment toward and from each other on said head; and means whereby the head may have a rocking movement in its support to enable the nurling-tools automatically to adjust themselves to the work.

6. A tool consisting of a head having a shank; a device carried by the head and adapted to have a rocking movement on said shank; a pair of nurling-tools mounted on the head; and means for adjusting said tools toward and from each other.

7. A tool consisting of a chambered head having a shank connected thereto by a swinging joint; a pair of nurling-tools supported by arms mounted in chambers of the head and passing through a slot therein adjacent to such chambers; and means for adjusting said nurling-tools.

8. A tool comprising a chambered head; a shank on which said head is mounted for rocking movement; screw-threaded arms mounted in the chambers of the head and extending through a longitudinal slot adjacent to said chambers; nurling-tools carried by the arms; and a right and left hand screw for adjusting said arms.

9. A tool consisting of a chambered head having a longitudinal slot in one of its walls; a shank or support to which said head is connected by a rocking joint; threaded arms mounted in the chambers of the head and projecting through the longitudinal slot of said head; nurling-tools carried by the arms; and means for adjusting said arms toward and from each other.

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