No. 631,109. Patented Aug. 15, 1899.

J. S. DETRICK & F. H. EASBY.

MACHINE FOR FINISHING NUTS.

(Application filed Jan. 14, 1899.)

(No Model.) 2 Sheets—Sheet 1.

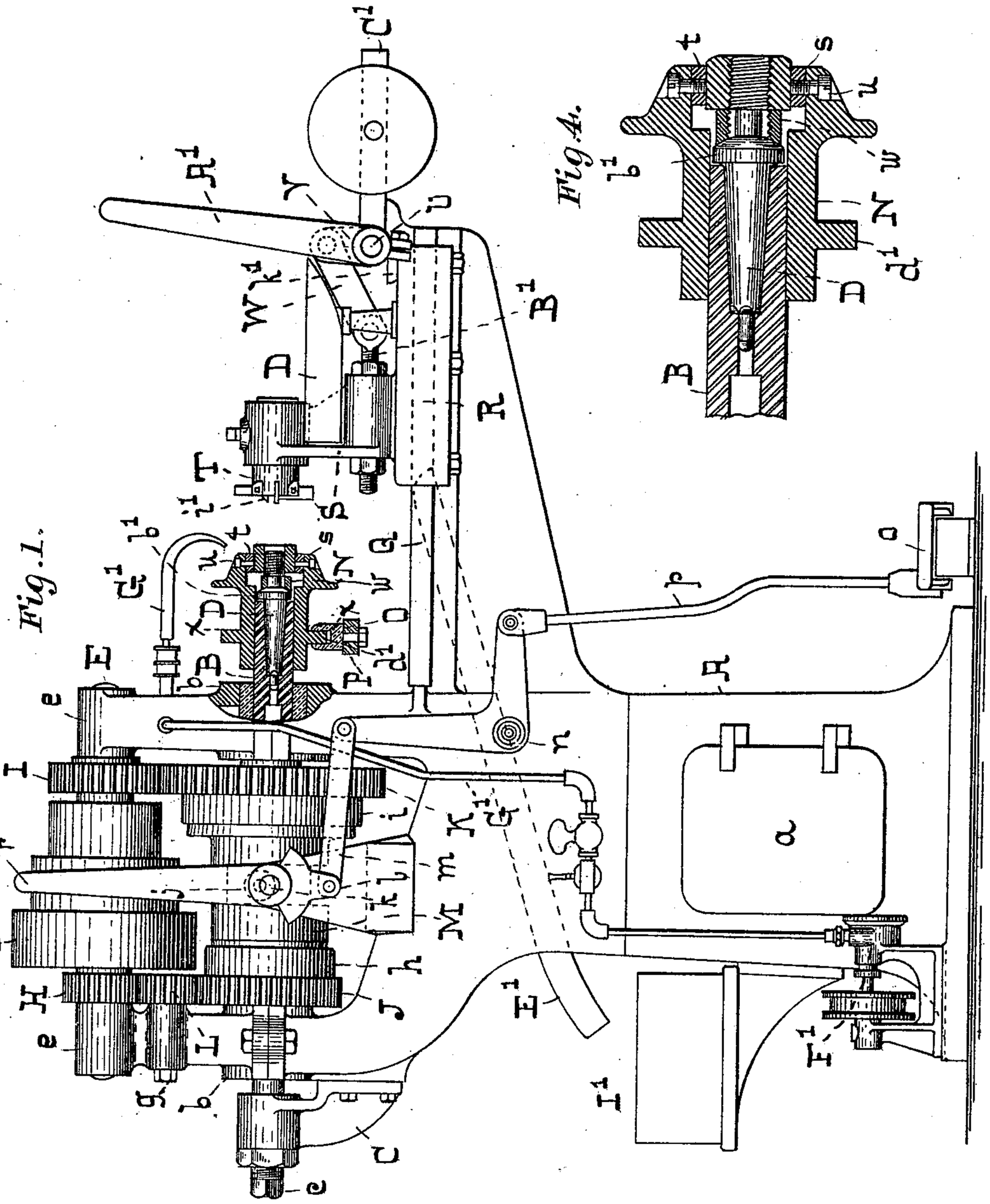

Fig. 1.

Fig. 4.

-WITNESSES-

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Fig. 2.

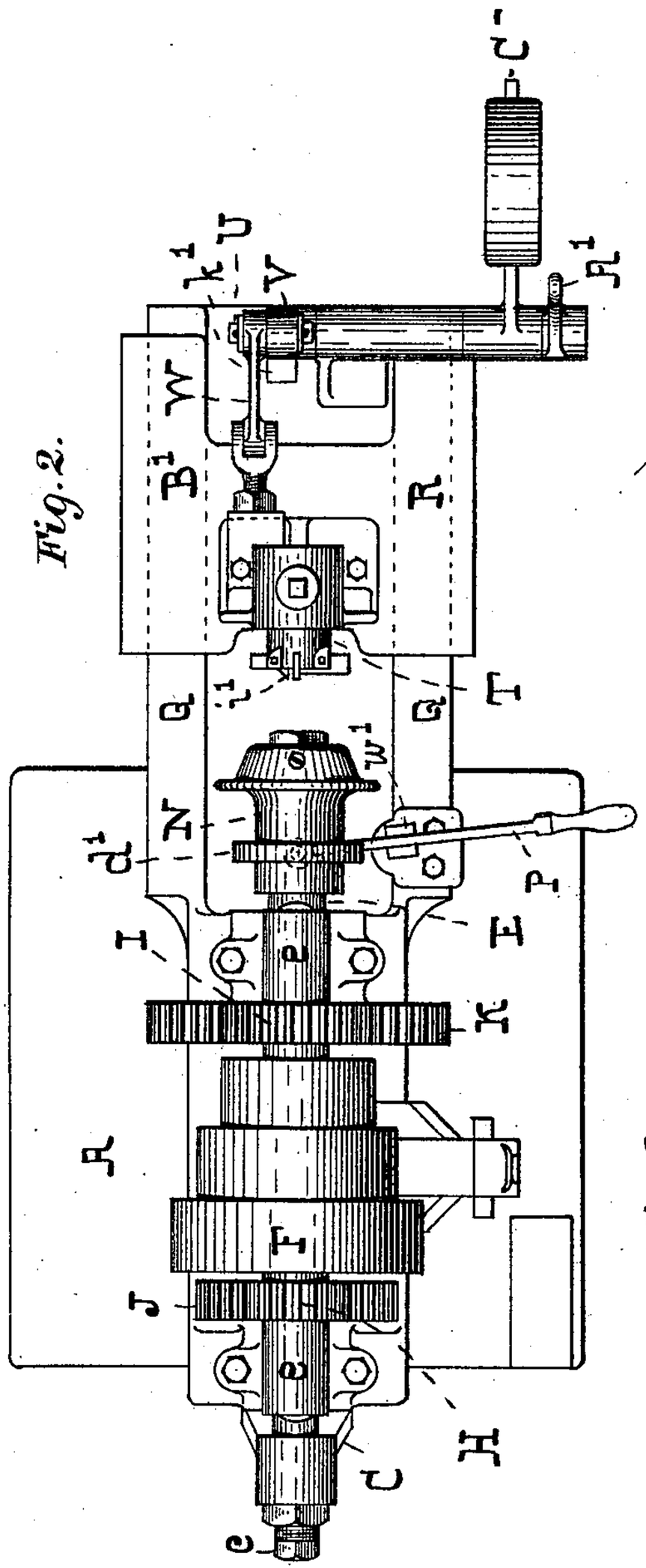


Fig. 5.

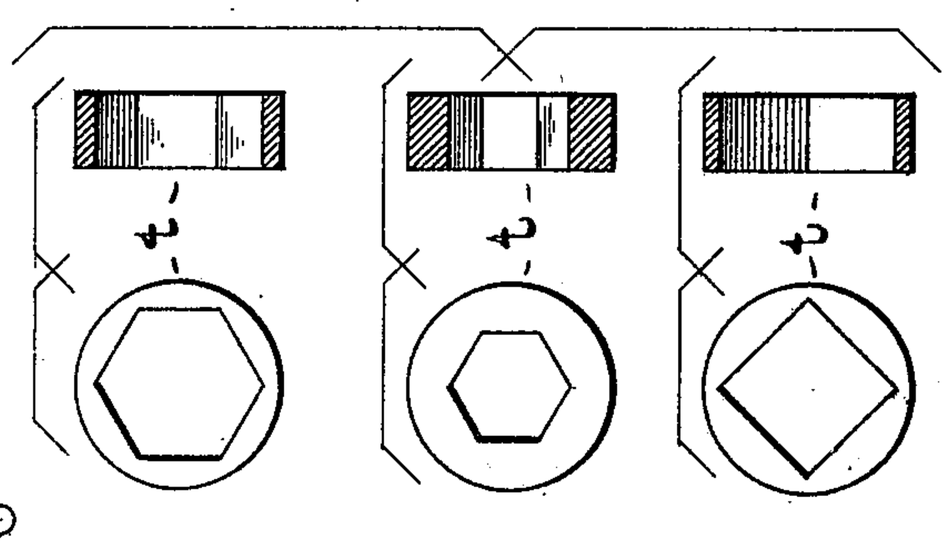
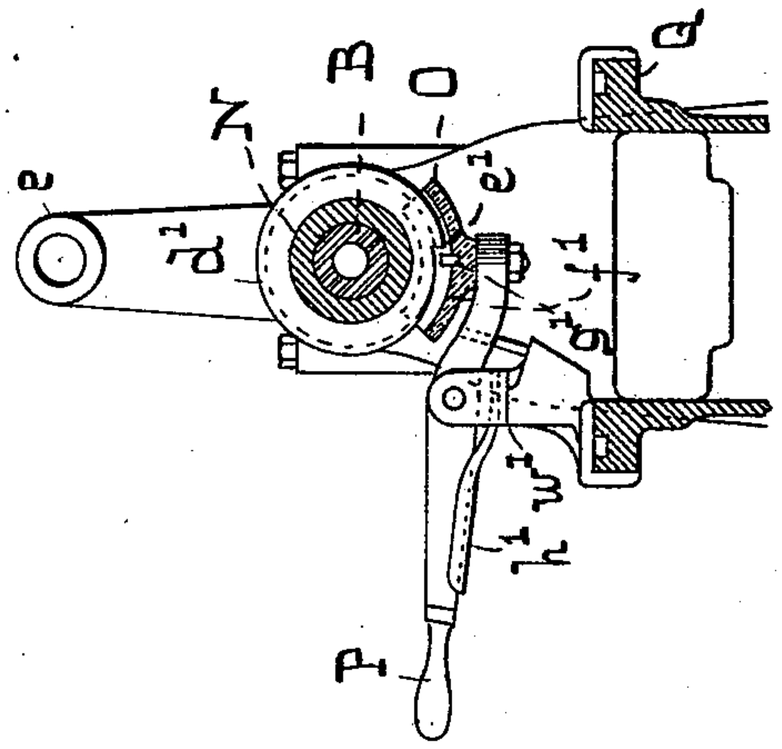


Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB S. DETRICK AND FRANCIS H. EASBY, OF BALTIMORE, MARYLAND, ASSIGNORS TO THE DETRICK & HARVEY MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR FINISHING NUTS.

SPECIFICATION forming part of Letters Patent No. 631,109, dated August 15, 1899.

Application filed January 14, 1899. Serial No. 702,161. (No model.)

To all whom it may concern:

Be it known that we, JACOB S. DETRICK and FRANCIS H. EASBY, of the city of Baltimore and State of Maryland, have invented certain Improvements in Machines for Finishing Nuts, of which the following is a specification.

In the description of the said invention which follows reference is made to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a partially-sectional side view of the improved machine. Fig. 2 is a top view of Fig. 1. Fig. 3 is a section of Fig. 1, taken on the dotted line *x x*. Fig. 4 is an enlarged sectional view of certain parts of the machine shown in Fig. 1. Fig. 5 is an enlarged view showing the face and a central section of three different bushings, any one of which may constitute an element of the machine, as hereinafter described.

Referring now to the drawings, A is the frame of the machine. It is made hollow and the lower portion thereof adapted as a receptacle for tools and such pieces of the machine as are not in use. It is provided with a door *a*.

B is a revoluble spindle supported in bearing-boxes *b* in the frame A. The rear end of the spindle bears against a thrust-screw *c* in a bracket C, and the front end is bored to receive a mandrel D, which is threaded at its outer end to receive nuts to be faced.

The mandrel D, together with certain parts of the machine adjacent thereto, is shown on an enlarged scale in Fig. 4.

The parts of the frame A which contain the bearing-boxes *b* are extended upward to provide bearings *e* for the driving-shaft E. On this driving-shaft is secured the cone-driving pulley F and the gear-wheels H and I, the former being the smaller of the two.

J and K are gear-wheels adapted to turn loosely on the spindle B with the latter K in mesh with the gear-wheel I on the driving-shaft E. The other gear-wheel J is driven from the gear-wheel H through the medium of the idle gear-wheel L, which turns loosely on a stud *g*. Owing to the interposition of the idle gear-wheel between the wheels H and J the gear-wheels J and K are revolved in contrary directions. The said wheels have friction-faces *h* and *i*, and on the spindle B and between them is a friction-clutch M on a feather, which may be brought in contact with either friction-face and so revolved in either direction, motion in both cases being communicated to the spindle B.

The means for sliding the clutch on the spindle B to stop or rotate the spindle in either direction consist of a roller *j* on an eccentric-pin *k*, projecting from an arm *l*, and a hand-lever *r*, extending from the hub of the arm. The roller and eccentric-pin, together with the groove in the clutch in which the roller rests, are only shown in dotted lines and that in Fig. 1. The clutch may also be operated by foot-power, through the medium of the link *m*, coupled to the arm *l*, the bell-crank *n*, and the treadle *o*, which is united to the bell-crank *n* by the rod *p*.

N is a chuck resting loosely on the spindle B, the enlarged end *s* of which is adapted to hold a bushing *t*, having a central hole of the same shape and size as the nuts to be faced. The bushing is held in place by screws *u*. Fig. 5 shows two views each of three bushings of different internal sizes.

The portion of the mandrel D situated between the thread and a collar *b'* is made smaller than the diameter of the mandrel at the root of the thread, and on it is placed an interiorly-threaded washer *w*, which after it has passed the thread of the mandrel becomes loose and falls of its own weight to the position shown in Fig. 1.

The inner face of the washer *w* is made spherical and concave, and the adjoining face of the collar *b'* has a similar form, but is convex. Consequently the washer may be moved over the rounded face of the collar a limited distance and made to assume a position slightly out of alinement with the axis of the spindle. By this arrangement a nut screwed against the washer will find a complete seat whether its contact-face is at a right angle with the axis or deviates from it. In other words, a nut whose face is not square with the axis will be seated just as firmly against the washer as one in which the face is true with the thread.

On the cylindrical portion of the chuck N

is a circular flange d', which is cut away at one side so as to form a shoulder e', (see Fig. 3,) and under this flange is placed a brake-shoe O, having a face f', corresponding in curvature with the flange. Within the shoe and extending transversely of it is a tooth g', which as the shoe is moved toward the flange and the spindle rotated in the direction necessary to unscrew a nut from the threaded mandrel D will engage with the said shoulder e', and thereby prevent the turning of the chuck. When the spindle is rotated in the opposite direction or that required to screw a nut onto the threaded mandrel, the shoe merely acts as an ordinary brake and offers but a limited resistance to the turning of the chuck. The motion of the brake-shoe toward and from the chuck is effected by a brake-lever P, having a spring h', which serves to yieldingly retain the shoe normally away or detached from the periphery of the flange on the chuck. The lever P is pivoted to the frame A at w' and is thereby adapted to be swung horizontally and used to slide the chuck longitudinally of the spindle B for a purpose hereinafter described. Beneath the chuck N are rails Q, which preferably constitute parts of the frame A, and on these rests a sliding carriage R.

S is a bracket erected on the carriage R. Its upper end is bored and serves as a bearing for a spindle carrying the cylindrical head T, to which are secured the cutters i', which finish the ends of the nuts.

For each different-sized nut there are preferably two cutter-heads, one for the top and the other for the bottom of the nut, and the former has three cutters, the first to square the face of the nut, the second to round the corners, and the third to slightly chamfer the threaded hole where it adjoins the face. The other head has only two cutters, one to face the bottom of the nut and the other to chamfer the extremity of the threaded hole.

It will be understood that we have described cutters adapted to finish nuts employed in general machinery; but special cutters may be employed, so as to vary the character of the work to almost any extent without affecting the other parts of the machine or the nature of the invention, of which the cutters in themselves constitute no part.

The carriage, with its bracket S, is moved longitudinally of rails Q by means of a shaft U, having at one end an arm V, connected to the bracket by a link W. The shaft U is turned or partially rotated through the medium of a hand-lever A'.

To admit of adjustment of the carriage relatively to the chuck, the link W is connected to the head of the screw B', which passes through the bracket S and has a locking-nut at each side of the bracket.

The extreme forward movement of the carriage affected by the hand-lever and its attachments, as described, is limited by the arm V coming in contact with a lug k', and the carriage is held yieldingly in its extreme backward position by a weighted lever C', as shown in Fig. 1.

D' is a tray (see Fig. 1) seated on the carriage R, in which the nuts to be faced are placed, and E' an inclined chute, into which the finished nuts fall as they are discharged from the chuck, as hereinafter described.

A portion of the frame of the machine above the tool-receptacle is used as a reservoir for lubricating-oil, from which the oil is drawn by means of a rotary pump F' and discharged through a pipe G' to the nuts while in the chuck. The surplus oil falls with the finished nuts to the chute E', a part of which is perforated, and returns thence to the reservoir, the nuts sliding down to the box I'.

Supposing the machine to be in operation with the mandrel revolving in the proper direction to enter a nut brought in contact with it and the tray D' supplied with unfinished nuts, the operator first moves the brake-lever P to the left, so as to throw out the bushing in the chuck beyond the end of the mandrel, and thereby admit of the insertion of a nut within the said bushing, the chuck at the same time being held from turning by pressing down the brake-lever, which applies the brake-shoe. The brake-lever P is then pushed to the right, which brings the end of the threaded mandrel in contact with the nut, and if the chuck is again held from turning or even checked in its rotation the nut will be entered on the thread of the mandrel. As soon as the nut is screwed up to the loose washer w, which accommodates itself to the nut, as shown in Fig. 4, it will rotate positively and in common with the mandrel. The nut is now in a condition to have its outer surface or top faced. The operator next moves the hand-lever A' to the left, which brings the cutters i' in contact with the nut, and the facing operation begins. The facing is continued until the arm V comes into contact with the lug k', when it is stopped, and the facing operation, as far as the top of the nut is concerned, is completed. The carriage R is then moved back to its original situation, or that shown in Fig. 1, and the position of the clutch reversed, so as to revolve the spindle and its mandrel, upon which the nut is tightly screwed, in the opposite direction. The brake is then applied, and the tooth g', engaging with the projection or shoulder e', further revolution of the chuck is prevented, and as the mandrel is still in motion the nut is unscrewed from it and falls to the chute e' and rolls down to the box I'. The direction of the revolution of the spindle and its mandrel is then reversed and another nut subjected to the facing operation described. It will be understood that so far only one end of the nuts has been faced and that it is necessary, if they are to be completely finished, that they should again be put through the machine in a reversed position and the other end faced.

It has been stated that the chuck is held from turning while a nut is being inserted in the bushing of the chuck, and this plan is generally observed, as the chuck has only a slight tendency to turn, and that owing merely to a slight friction between it and the revolving spindle; but, if desired, the clutch may be temporarily placed in a central position, when the spindle and chuck will remain stationary.

It will be understood that very little pressure applied to the brake-lever P will give sufficient friction to the brake-shoe to cause the nut to be screwed up to the washer *w;* but as in the facing operation the nut is screwed tightly against the washer considerable force is required to release it or to start it in the unscrewing direction. It is for this reason that we employ the tooth *g'* in connection with the projection or shoulder *e'*, which gives a positive hold of the chuck with the application of little force to the brake-lever.

We claim as our invention—

1. In a machine for facing the ends of nuts, the combination of a spindle with means to revolve it in either direction, a chuck placed loosely on the said spindle with devices whereby the same may be held stationary while the spindle is in revolution, a mandrel in the spindle having a threaded end which projects beyond the end of the spindle, a bushing situated within the chuck adapted to hold nuts, and a head carrying facing-cutters with mechanism whereby the said cutters may be brought into contact with the face of the nut held within the chuck, substantially as specified.

2. In a machine for facing the ends of nuts, a spindle with means to revolve the same in either direction, combined with a chuck situated on the said spindle adapted to turn loosely about the same and also to have a sliding movement, longitudinally thereof, combined with a brake mechanism whereby the revolution of the chuck may be prevented and the longitudinal movement of the same effected, substantially as specified.

3. In a machine for facing the ends of nuts, a spindle with means to revolve it in either direction, combined with a loose chuck situated on the spindle adapted to have a circumferential motion independently of the spindle and also a longitudinal sliding movement along the spindle, and mechanism to retard or stop the revolution of the chuck effected by friction between it and the revoluble spindle, substantially as specified.

4. In a machine for facing the ends of nuts, a spindle with means to revolve it in either direction, combined with a chuck which is loose on the spindle, having a flange, a shoe adapted to fit over the said flange, and mechanism to bring the said shoe into contact with the periphery of the said flange, and thereby retard or stop the revolution of the chuck, substantially as specified.

5. In a machine for facing the ends of nuts, a spindle carrying a threaded mandrel, with means to revolve it in either direction, and a loose nut-holding chuck adapted to receive nuts to be faced, having a flange which is notched or provided with a shoulder, combined with a shoe adapted to be brought against the circumference of the said flange having a tooth arranged to engage with the shoulder on the flange when the chuck is turned in one direction and thereby prevent the revolution of the chuck, substantially as specified.

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