(No Model.) 2 Sheets—Sheet 1.

A. NACKE.

SCREW CUTTING DEVICE.

No. 264,471. Patented Sept. 19, 1882.

Fig. 1.

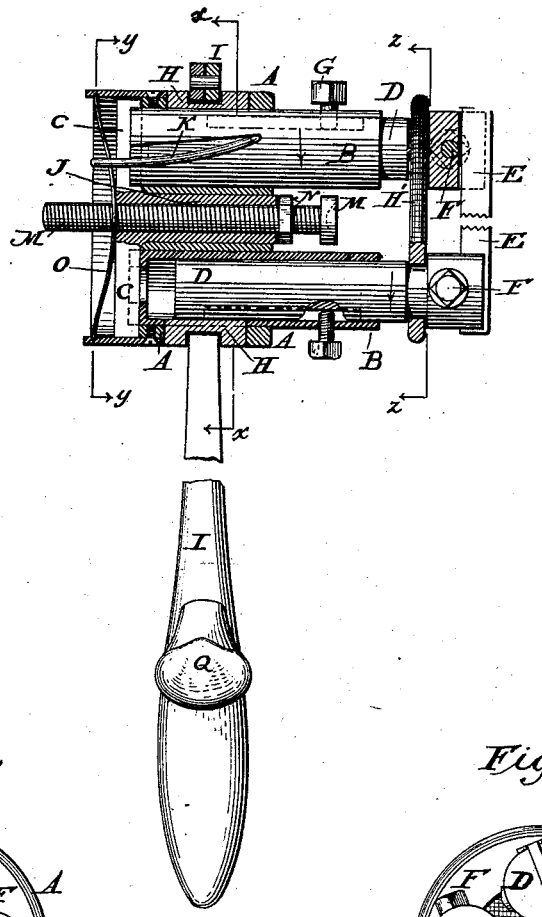


Fig. 2.

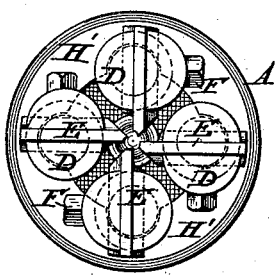
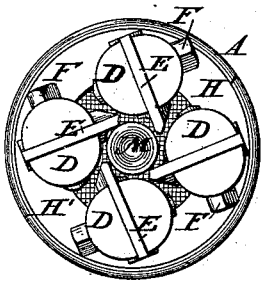


Fig. 3.



Attest.
Sidney P. Hollingsworth
Wm. H. Shipley

Inventor.
Arnold Nacke
By his attorney
Philip T. Dodge.

(No Model.)

2 Sheets—Sheet 2.

A. NACKE.

SCREW CUTTING DEVICE.

No. 264,471. Patented Sept. 19, 1882.

Fig. 4.

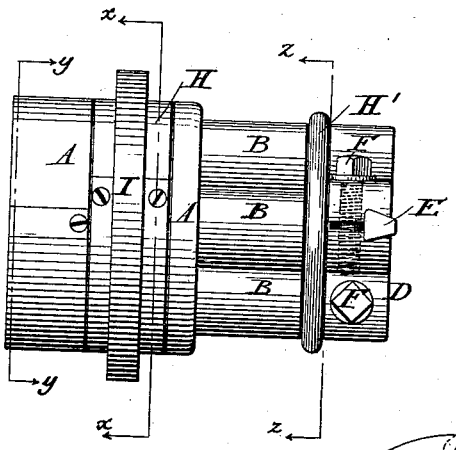


Fig. 6.

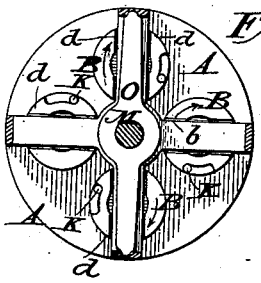


Fig. 5.

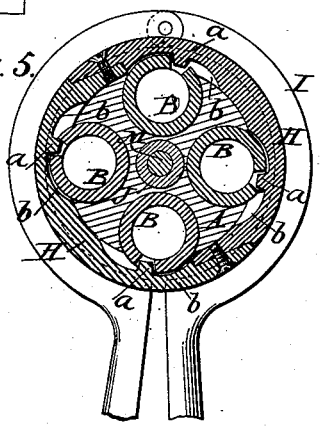
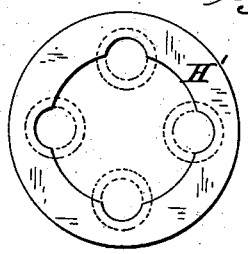
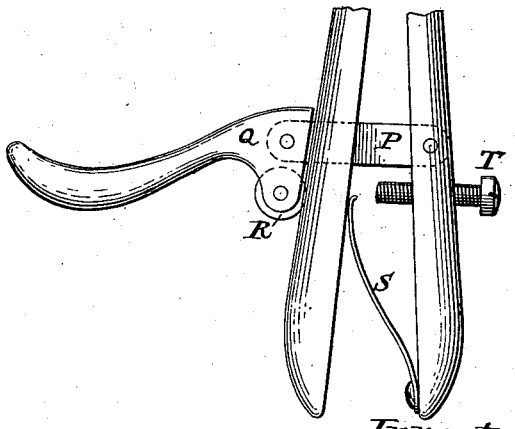


Fig. 7.





Attest.

Sidney P. Hollingsworth.

Wm H. Shipley

Inventor.

Arnold Nacke

By his attorney

Philip T. Dodge

UNITED STATES PATENT OFFICE.

ARNOLD NACKE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO LEDIG & HERRLEIN, OF SAME PLACE.

SCREW-CUTTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 264,471, dated September 19, 1882.

Application filed April 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, ARNOLD NACKE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Screw-Cutting Devices, of which the following is a specification.

The principal object of this invention is to provide a screw cutting and "frasing" tool which will automatically open and release the screw as soon as a thread of the proper length has been formed thereon, which may be opened, closed, and operated without checking its rotation, and which may be used with equal facility upon a rotating mandrel or in a stationary position in connection with a revolving chuck or equivalent device to rotate the article to be threaded.

To this end the invention consists essentially in the combination of the body, the rotary arbors or cutter-supports mounted therein and having cutters attached to their ends, a loose ring operating to rotate the arbors within the body, and a friction device to control the rotation of the ring; also, in peculiar means for locking the arbors in an operative position; in a construction of the arbors, whereby they are adapted to be elongated or extended to adapt them to adjust the device for cutting screws of different lengths; in the peculiar arrangement of devices for automatically unlocking or releasing the cutters upon the completion of the screw, and in minor details, hereinafter described.

Referring to the accompanying drawings, Figure 1 represents a central longitudinal section through my improved tool; Fig. 2, a front end view of the same, with the cutters in an operative position. Fig. 3 is a similar view, with the cutters thrown open. Fig. 4 is a side view; Fig. 5, a section on the line *x x;* Fig. 6, a cross-section on the line *y y;* Fig. 7, a section on the line *z z.*

A represents a cylindrical body, in which are seated the rear ends of four tubular shafts or sleeves, B, lying parallel with the axis of the body and arranged at equal distances around the same, these sleeves being intended to support cutters, as hereinafter explained. The sleeves B are each fitted closely and firmly within the body A, but permitted a limited rotation therein. In each sleeve B, I secure the rear end of a shaft or arbor, D, the forward end of which is divided transversely to receive the chasing or screw-cutting tool E, which is secured in place by means of a screw, F, passed transversely through the end of the arbor, so as to compress the same upon the cutter.

For the purpose of securing the arbors rigidly within the sleeves B, but at the same time permitting their longitudinal adjustment in relation thereto, I secure each arbor by means of a set-screw, G, inserted through the side of the sleeve and bearing in a longitudinal groove in the arbor, as clearly shown in Fig. 1. These screws compel the sleeves and arbors to rotate together, but admit of the arbor being moved forward and backward in relation to the sleeve, in order to adapt the device for cutting threads differing greatly in length.

For the purpose of giving additional support to the arbors at their forward ends, particularly when extended, a ring, H′, (shown detached in Fig. 7,) is mounted upon their forward ends and seated in annular grooves therein, as represented in Fig. 1. This ring, moving forward and backward with the arbors, serves to give them a direct and rigid support at their forward ends under all adjustments.

In order to impart the rotation to the sleeves B, as well as to keep them in place against end motion, the body A is provided with a circumferential groove, in which is seated a ring, H, encircling the four sleeves B, and provided on its inner surface with four lips or studs, *a*, arranged to enter corresponding notches or recesses formed in the respective sleeves, B, as clearly shown in Figs. 1 and 5, so that by revolving the ring H in relation to the body A the studs *a* are caused to revolve the sleeves B, and thereby swing the inner ends of the cutters together, as represented in Fig. 2, for operation, or apart, as represented in Fig. 3, to release the screw.

On reference to Fig. 5 it will be seen that the ring H has on its inner surface shoulders or stops *b* on each side of the studs *a*, these shoulders being designed to encounter the outer surfaces of the sleeves B, as shown in

Fig. 5, and thereby limit the movement of the ring and the rotation of the sleeves within the body, the motion of the sleeves being limited ordinarily to less than a fourth of a revolution. The sleeves B are turned in one direction to open the cutter-jaws by means of springs, hereinafter explained. In order to turn them in the opposite direction for closing the jaws while the entire tool is rotating, I provide a friction-clamp, I, consisting of two hand-levers having semicircular ends united by a pivot, these levers being clasped around the outside of the ring H and seated in a peripheral groove therein, as clearly represented in Figs. 1 and 5. When the levers are opened they permit the entire chuck, including the ring H, to revolve freely; but upon closing the levers together they are caused to engage upon the outside of the ring H with sufficient friction to retard its rotation, whereupon the rotation of the body within the ring causes the sleeves B to be turned forward in reference to the ring, which revolves them through the studs *a* upon their own axes.

Through the center of the body A, I extend a longitudinal sliding hub or sleeve, J, bearing on its rear end four radial arms, *c*, designed to enter transverse grooves or notches, *d*, formed in the rear ends of the sleeves B, as shown in Figs. 1 and 6, for the purpose of locking the sleeves or cutter-supports against a rotary motion when the cutters are in an operative position.

To the respective arms *c*, I secure four spring-arms, K, which bear in inclined grooves or seats formed in the rear ends of the rotary sleeves, as in Figs. 1 and 6, the springs tending to revolve the sleeves in the direction indicated by the arrow in Figs. 1 and 6, to open the cutters.

For the purpose of moving the hub or sleeve J and its arms *c* forward, so as to enter the grooves in the sleeves when the cutters are brought to an operative position, I mount in the rear of the body a transverse spring, O, bearing at the center against the sliding sleeve and seated at its ends in notches within the body.

In order to provide for the automatic release of the rotary sleeves and their cutters, I mount centrally within the sleeve or hub J a screw, M, provided with a jam-nut, N, by which it may be secured against accidental movement. The forward end of the screw M is exposed centrally in the forward part of the tool in position to be encountered and forced backward by the entrance of the threaded screw, upon which the tool operates. The rod or screw, acting against the screw M, forces the sleeve J backward, carrying its arms *c* out of the notches in the rotary sleeves, which are immediately turned to open the cutters by means of the springs K.

In place of the screw M, a longitudinal adjustable rod, held by a set-screw or any equivalent adjustable device, may be employed. It is preferred to provide the screw at its forward end with the head arranged to revolve loosely thereon, to prevent the screw M from being moved by the friction to which it is exposed.

As a convenient means of closing and holding the clamping-arms I, I attach to one of them a link, P, which is passed through a slot in the other arm and pivoted to one end of a small thumb-lever, Q, this lever being in turn provided with a roller, R, so that when turned downward the roller and link will serve to close the two arms together and hold them.

A spring, S, is applied between the two arms to force them apart when released, and a screw, T, seated in one of the arms to bear against the other and serve as a stop to prevent the arms from being closed around the chuck so firmly as to endanger the breakage of the parts when the chuck is rotated and the clamp held at rest.

The operation of the device is as follows: The body of the chuck is applied to a face-plate, mandrel, or other ordinary device whereby a rotary motion is imparted thereto. The parts stand normally in the position represented in Fig. 3, with the inner ends of the cutters swung outward away from each other in such manner as to afford a wide opening for the introduction of the blank or rod to be threaded between them. When the cutting action is to be commenced the attendant closes the arms I together upon the ring H with sufficient pressure to retard its motion, whereupon the body of the chuck turns forward slightly within the ring. This rotation of the body within the ring causes the lips *a* of the latter to rotate the sleeves B and cutter-supporting arbors E sufficiently to swing the ends of the cutters inward toward each other to an operative position, as shown in Fig. 2. At this instant the spring O forces the central sleeve or hub, J, forward and causes its arms *c* to lock into the grooves in the rear ends of the sleeves or cutter-supports, thereby locking them firmly against a rotary motion in an operative position. The parts remain in this position, the body of the ring H revolving within the clamping-arms I until the threaded rod or screw, entering between the cutters into the tool, bears against the forward end of the screw M, whereupon it forces the screw and its supporting-sleeve J backward, carrying the arm *c* out of the notches in the sleeves, which are thereby released. The instant that the sleeves are thus unlocked the springs K revolve them in such manner as to swing the cutters apart and release the completed screw.

It will be understood that after the cutters are closed in position to commence operations the pressure of the clamping-arms I upon the ring may be diminished or entirely released, as the cutters will have little or no tendency to swing open.

It will be observed that under the construction described I am enabled to give the body of the tool a constant rotation and to cut one

screw after another without checking or diminishing its speed. This fact enables me to save a great amount of time which is ordinarily expended in opening and closing and stopping and starting cutting-tools of the ordinary construction, and consequently gives to my tool a capacity of production far greater than that of the tool in common use.

It will also be observed that by making the cutters adjustable radially within the arbors, the arbors adjustable lengthwise in the supporting-sleeve, and the stopping-screw adjustable lengthwise with respect to the tool, the latter may be adjusted to thread screws of different sizes and of widely different lengths.

The essential feature of the invention consists in combining with a rotary body, having movable jaws therein, a ring or equivalent for opening and closing the jaws and means whereby said ring may be operated without stopping the chuck; and it is manifest that the details may be modified in many respects, which will suggest themselves to the skilled mechanic, without changing materially the mode of action or departing from the limits of my invention.

It will be perceived that the rotary sleeves and the arbors or spindles therein serve jointly as cutter-supports, the two parts being combined in order to permit the adjustment of the screw.

It is obvious that when it is unnecessary to make the device adjustable each sleeve and its spindle may be made entirely in one piece.

While I have described my device as being applied for use upon a rotary spindle or mandrel, it may be used with equal facility upon a stationary support, in which case the rod or blank to be threaded will be rotated by any suitable means. This adaptability of my device for use upon a stationary or rotary support, as may be required, constitutes one of its most valuable features.

As hereinbefore stated, my tool is adapted not only for screw-cutting purposes, but for "frasing" purposes, by which is meant the burnishing or ornamenting of metallic surfaces. When thus employed the screw cutting or chasing devices E will be replaced by frasing-tools, having their operating faces or ends constructed in any ordinary forms familiar to those skilled in the art.

Having thus described my invention, what I claim is—

1. The combination of the body, the rotary arbors or cutter-supports mounted in the body, the cutters attached to and rotating with said arbors, the loose ring operating to rotate the arbors within the body, and a friction device, substantially as shown, to control the rotation of the ring.

2. In combination with the body, rotary sleeves supporting the cutter-spindles, the ring mounted loosely on the body and provided with the studs *a* and shoulders *b*, to co-operate with said supporting-sleeves.

3. The combination of the body, the cutters, the rotary cutter spindles or arbors, the spindle-supporting sleeves, the external grooved ring operating to turn the sleeves, and the clamping device seated in the grooved ring, as described.

4. In a screw-cutter, the combination of the body, the loose ring, the rotary sleeves mounted in the body and controlled by the ring, and the arbors or spindles provided at their forward ends with cutters and having their rear ends mounted within and adjustable longitudinally in relation to the sleeves, substantially as described, whereby the device is adapted for threading screws of different lengths.

5. In combination with the body, the sleeves, the adjustable arbors or spindles mounted in the sleeves, and the sustaining ring or plate mounted upon and around the forward ends of the arbors.

6. The body and the rotary cutter-supports therein, in combination with the sliding hub provided with arms adapted, as described, to lock the cutter-supports against rotation.

7. In combination with the body, the rotary cutter-supports therein, the sliding hub, its arms *c*, the spring O, arranged to urge the hub forward, and springs applied to rotate the cutter-support when released, substantially as shown.

ARNOLD NACKE.

Witnesses:
FREDK. BREITINGER,
F. L. BREITINGER.