

E. REYNOLDS.

SCREW-TAP.

No. 170,398.

Patented Nov. 23, 1875.

Fig. 1

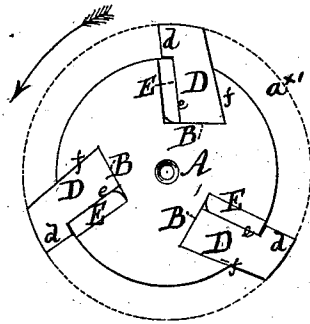


Fig. 2.

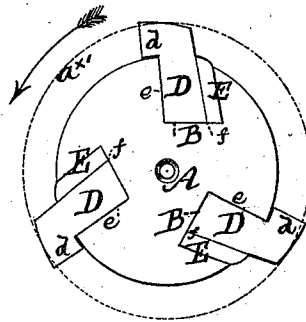
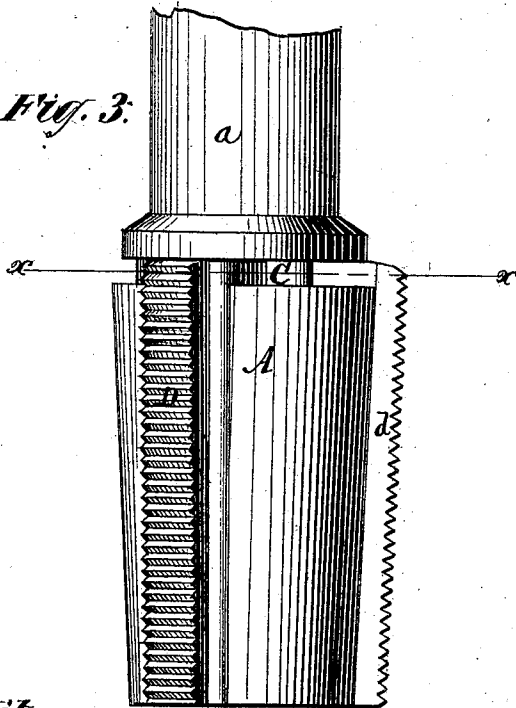
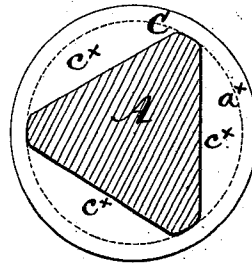


Fig. 3.



Witnesses
John Becker.
Fred Wayne

Fig. 4.



Edwin Reynolds
by his Attorney
Brown & Allen

UNITED STATES PATENT OFFICE.

EDWIN REYNOLDS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SCREW-TAPS.

Specification forming part of Letters Patent No. **170,398**, dated November 23, 1875; application filed October 30, 1875.

To all whom it may concern:

Be it known that I, EDWIN REYNOLDS, of Providence, in the county of Providence and State of Rhode Island, have invented certain Improvements in Screw-Taps; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in taps for cutting internal screw-threads; and it consists in a novel construction of the cutters and the stock which carries them, and a novel combination and arrangement of the cutters and stock with relation to each other, whereby the cutters are made to always present a sharp cutting-edge, with any desired amount of clearance, and provision is made for sharpening the cutters when worn; and whereby, also, the cutters are provided with a perfectly true bearing-surface and the proper positions of the respective threads are insured.

In carrying out my invention I construct the stock with longitudinal grooves for the reception of the cutters, and a transverse groove, against the nails of which the inner ends of the cutters bear. The longitudinal grooves may be of dovetail or approximate form in their cross-section. The transverse groove may be near the shank or inner end of the stock, and is perpendicular to the axis of said stock; and the longitudinal grooves terminate in said transverse groove, the inner side of which forms a perfectly true bearing-surface for the inner ends of the cutters, and insures the proper positions of the respective threads. The cutters are each formed with a projecting or overhanging edge, which may be ground down in order to sharpen the faces of the cutters when they become worn.

The portion of the cutter beyond which the edge projects constitutes what may be called the shank of the cutter. This portion is narrower than the longitudinal groove, and the cutter is held in place in the groove by means of a key inserted with it. The cutters are first placed in the longitudinal grooves, with the keys on that side of each cutter which is under the overhanging edge. They are then turned in a lathe, so that their surfaces will form arcs of circles concentric with the axis of the stock, and the threads are cut on them, after which they are removed and tempered,

and are then ready for use. When the cutters are inserted in the stock for use, the keys are placed on the opposite sides, so that the projecting edges will overhang the surface of the stock instead of the edges of the keys. By this arrangement the cutting-edge of each cutter is placed beyond the circle of its former position, and its rear edge nearer to the center, or inside of said circle, thus presenting a sharp cutting-edge and any desired amount of clearance, the amount depending on the thickness of the key or the distance the cutter is moved from the first position.

The accompanying drawing illustrates the manner of carrying out my invention.

Figure 1 is an end view, showing the cutters and keys inserted in the stock in the first position. Fig. 2 is a similar view, showing the cutters and keys in the second position. Fig. 3 is a side view of the stock and cutters. Fig. 4 is a transverse section, taken in the line *x x* of Fig. 4.

The stock A is provided with a shank, *a*, of the usual or any suitable form, for insertion into a holder or carrier. In the surface of the stock a number of longitudinal grooves, B, are provided, for the reception and retention of the cutters, which grooves are of approximate dovetail cross-sectional form, or wider at the bottom than at the top. These longitudinal grooves may have a radial direction—that is to say, they may be so constructed that lines radial to the center of the top may pass centrally through said grooves; but I prefer to construct said grooves so that one side, *e*, of each shall be radial, or nearly so, to the center of the cutter-stock A, and the other side, *f*, tangential to a circle concentric to said center, in which case the general direction of these grooves may be said to be tangential, or laterally inclined, as may be understood by reference to Figs. 1 and 2. The cutters are so placed in the grooves that they have an inclination from the center outward in a forward direction—or, in other words, they incline toward the direction in which the tap rotates when at work, as may be seen in said Figs. 1 and 2, in which the direction of rotation is indicated by arrows.

Near the shank or inner end of the stock is a transverse groove, C, which runs entirely

around the surface exactly perpendicular to the axis of the stock. This groove is formed by first turning it in a lathe to a depth about equal to that indicated by the dotted line a^* in Fig. 4, and then cutting the metal therefrom so as to form segmental spaces c^* , the straight or flat bottom of each of which is on a line with the bottom of one of the longitudinal grooves B. By this means the cutters are provided with a firm and perfectly true bearing-surface for their inner ends, and as the rear or inner side of the groove C and segmental space c^* are exactly perpendicular to the axis of the stock A, the proper positions of the threads on the cutters are insured. These objects may be accomplished in other ways, as, for example, by drilling or boring holes at the points of junction of the longitudinal grooves with the transverse grooves, or by cutting out the metal at such points to a width and depth only equal to that of the longitudinal groove. But the form and manner herein described are convenient and economical in construction, and serve the desired purpose. If desired, the rear side of the groove, which forms the bearing-surface, may be at a right angle with the face of the cutter. The cutters D are formed with their faces about equal in width to the longitudinal grooves; but their bodies, or what may be called their shanks, are thinner or narrower than said grooves, and are provided with keys E of such thickness that when placed beside the cutters the two together fit snugly and firmly in the grooves. The face of the cutter being wider than the body or shank, one edge d projects beyond said body or shank, so as to overlap the key E, as shown in Fig. 1, or the surface of the stock, as shown in Fig. 2, according to the side on which the key is placed. The cutters, thus constructed, are placed in the grooves of the stock, with the keys E on the same side with the projecting edges d , so that said edges will overlap the keys, as shown in Fig. 1. The stock is then turned in a lathe so as to impart to the face of each cutter a curvature forming an arc of a circle drawn from the center of the stock, as indicated by the dotted line a^{**} in Fig. 1, and the threads are cut in said faces, after which the cutters are removed from the stock and tempered, and are then ready for use. When the cutters are inserted in the stock for use the keys E

are placed on the opposite side of each shank, so as to cause the projecting edge d to overlap the surface of the stock, as shown in Fig. 2. By this arrangement the shank is brought nearer to a radial position with relation to the axis of the stock, in consequence of which the cutting-edge of the cutter is placed beyond or outside of the original circle, of which its face formed an arc, while its rear portion is placed inside of said circle, which circle is indicated by the dotted line a^{**} in Fig. 2, thus presenting a sharper cutting-edge with a greater amount of clearance than could be obtained if the cutters remained in the first position. The amount of clearance, and the angle presented by the cutting-edge are governed by the thickness of the key or the distance which the cutter is moved from its first position. By constructing the cutter with the overlapping edge d an important advantage is obtained in addition to that above described. When the cutting-edge becomes worn the overhanging edge d is ground down so as to sharpen the cutting-edge, without interfering with the main body or shank of the cutter.

This invention is equally applicable to taps for cutting both right-hand and left-hand threads by forming the overlapping edge d on either side, according to the direction in which the tap is to rotate.

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

1. A cutter for screw-taps, provided with an overlapping edge, d , whereby the face of the cutter is made wider than its body or shank, and provision is made for sharpening the cutting-edge, substantially as herein described.

2. The combination of the grooved cutter-stock, the cutters laterally movable in the grooves of said stock, and the reversible keys or locking-pieces, the whole combined and operating substantially as herein described.

3. The combination, with the removable cutters, of the stock A, provided with longitudinal grooves B and a transverse groove, C, substantially as and for the purpose herein described.

EDWIN REYNOLDS.

Witnesses:

JOHN T. HENTHORN,
NATHL. G. HERRESHOFF.