

(No Model.)

2 Sheets—Sheet 1.

W. A. ROBERTSON.
LATHE FOR RELIEVING TAPS.

No. 521,510.

Patented June 19, 1894.

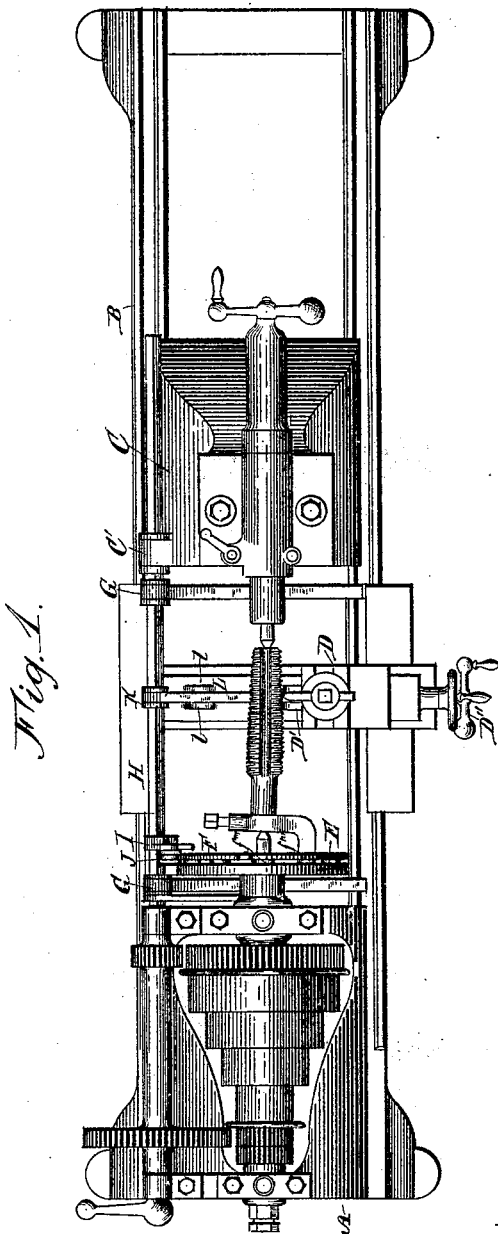


Fig. 1.

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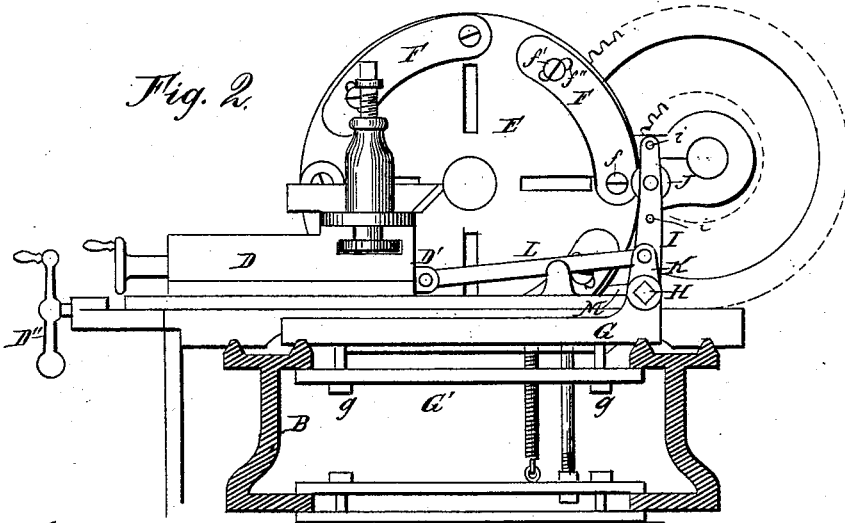


Fig. 2.

Fig. 6.

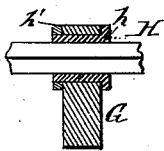


Fig. 4.

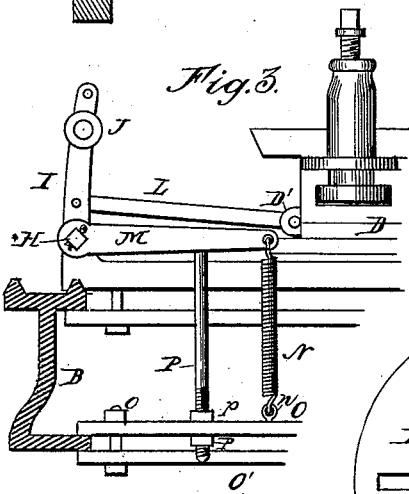
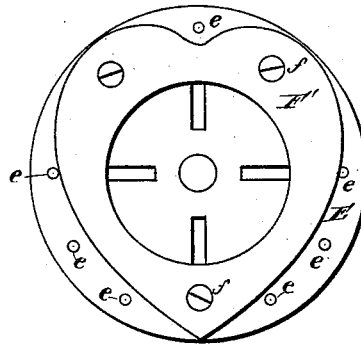


Fig. 3.

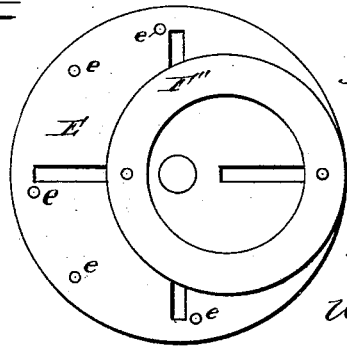


Fig. 5.

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UNITED STATES PATENT OFFICE.

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LATHE FOR RELIEVING TAPS.

SPECIFICATION forming part of Letters Patent No. 521,510, dated June 19, 1894.

Application filed March 13, 1894. Serial No. 503,402. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. ROBERTSON, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Lathes for Relieving Taps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to lathes for turning irregular forms, and more particularly metal turning lathes, with more special reference to the work of relieving taps. Though the mechanism is capable of being used for the production of many varieties of irregular forms. The particular mechanism by which this result is accomplished will be hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a device embodying my invention as applied to an ordinary iron turning lathe. Fig. 2, Sheet 2, is an end elevation as seen from the tail-stock end of the lathe, the lathe bed being in section. Fig. 3, is a similar fragmentary view from the opposite side of the operative parts there shown. Fig. 4, is an elevation of a face-plate with a heart-form attached thereto. Fig. 5, is a similar view showing a circular form attached to a face-plate eccentrically. Fig. 6, is a transverse section of one of the bearings for the square bar carrying the levers hereinafter to be described.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A designates the head-block of an ordinary lathe; B the bed; C the tail-stock; and D the tool-carriage. These are of the usual construction and need not be particularly described. The face-plate E does not differ especially from those in common use, except as it is provided with suitable holes for the attachment of cams or forms F, which will be hereinafter more fully described.

The apparatus which forms the subject of this invention is described as follows: To the ways of the lathe are connected bearing-blocks G G, which are provided with suitable

notches on the under side, to engage with said ways, and are connected thereto by clamp bars G' G', bolted to the bearing-blocks by suitable cap-screws *g g*. In the upwardly extending portions of these bearing-blocks at the back side of the lathe are mounted revoluble sleeves *h*, which are provided with a square central hole, to admit, with a sliding fit, the square bar H. In the case of lathes in ordinary use, this construction is suitable and necessary; but where the device is applied to new lathes, the latter may be provided at the head and tail-stock, with a projecting lug C', which is similarly provided with a sleeve to receive the bar. In this case the bearing-blocks may be dispensed with altogether, or one or more of them may be used intermediate of the head and tail-stock, and thus serve as a steady-rest for the bar.

The device is more specially applicable to lathes provided with a compound tool-slide D, since this construction admits of one portion of the tool-slide being used with its regular screw feed, while in the other portion the screw-feed may be disconnected, as by the use of the common split nut, or by simply loosening up the crank D". The back end of the disconnected part of the slide should be provided with lugs D'. Between these lugs is neatly fitted a bar L, which extends backwardly, and connects with a short crank arm K, mounted to slide freely on the bar H. Near the face-plate is fastened to the bar a longer upwardly extending crank arm I, provided with a flange traveler J. The location of this traveler may be changed by means of holes *i i*, and the movement of the carriage varied accordingly, as will hereinafter more clearly appear. On the same bar, between the face-plate and the head-block, is mounted another crank arm or lever M, which is provided with a spring N, connecting it with a transverse bar O, connected with the lathe bed by a clamp bar O', the lower end of the spring engaging with an eye *n*. Under this lever M is mounted an adjustable post P, the lower end of which is threaded and provided with suitable nuts *p p*. The action of this spring, as will be seen, tends to throw the crank arm I inwardly, while the post serves to limit such inward movement

of the arm, thus preventing the traveler J from moving so far inwardly toward the center of the face-plate as to catch on the cams and interfere with the action of the machine.

5 The device is shown as in use in connection with a tap mounted between the centers of the lathe in the usual way, the purpose in this case being simply to relieve the tap after having been cut and fluted in the usual
10 way. The tap shown has four flutes, and corresponding thereto the face-plate is provided with four cams F F. It is to be understood, however, that any number of cams may be used that may be desired, to correspond
15 with any desired number of flutes of a tap, or the corresponding parts of any other piece of work. For this purpose it is but necessary to provide a suitable number of holes in the face-plate *ee*, and make the cams of suitable
20 length. It will be seen in Fig. 1 that the cams are separated a little distance from the face-plate by washers or thimbles *f''*, thus leaving a space between the cams and the face-plate for the inner flange of the traveler
25 J. These cams are made adjustable by means of a slot *f''*, through which passes a tightening screw *f'*. The other end of the cam is pivotally secured to the face-plate by a screw *f*.

The operation of the device will now be
30 readily understood. As the face-plate revolves, the arm I is carried a limited distance back and forth by the cams F F, or more strictly speaking, is carried outwardly by said
35 cams, and is moved inwardly through the action of the spring N, a reciprocating motion being thereby given to the tool-slide D. As these cams coincide with the threaded portions of the tap, it will be seen that the thread
40 tool, which barely touches the tap at its (the tap's) cutting edge, is drawn inwardly a slight distance as the tap revolves, thus relieving the tap at all of its four sides. It is to be understood that this work is done after the tap
45 is cut and fluted, consequently the tap being adjusted with proper relation to the cams, the relieving thereof is done with perfect accuracy. As the tool carriage moves, following the thread on the tap, a crank arm K
50 slides along on the bar coincidentally with the movement of the carriage. In practice it is found that ordinarily this is done without any cramping on the part of the arm K, since there is comparatively little side pressure on the tool, and this, with no other connection
55 of the arm than a snug fit of the connecting bar L in the lugs D'. Where considerable side pressure is brought to bear upon the tool, however, the bar L may be steadied near its connection with the arm K by suitable guides *ll*.

60 It is to be understood that I do not consider that the forms shown in Figs. 4 and 5 will be duplicated in the work, these being shown simply as illustrative of other uses to which the device may be applied. As the
65 arm I moves in the arc of a circle on the bar H, it is, of course, impossible to exactly reproduce in the work the same form as that

attached to the face-plate. In practice I mount on a mandrel a form of the exact shape desired in the work, cause it to travel in connection with the traveler J, and by means of
70 a suitable style, or other marker, trace on the face-plate the form of the desired cam to be attached thereto, this form being made and applied to the face-plate, the original cam or
75 form is of course, exactly reproduced.

In Fig. 6 the particular construction of the sleeve *h* is shown. This is provided with a flange, integral with the sleeve at one end, and at the other end the sleeve is provided
80 with a ring *h'*. The convenience of this device will be readily seen. By this means it becomes possible to completely finish a tap without any hand labor. The tap is turned
85 on a lathe in the ordinary way; then taken to the milling machine and fluted; then brought back to the lathe and relieved, when it is ready to be tempered.

Having thus described my invention, I claim—

1. The combination with a lathe substantially as described of cams mounted on its face-plate and separated a short distance therefrom by intermediate washers or thimbles, a flange traveler mounted on an upwardly extending arm, connected with a rectangular rock-shaft, suitable bearings for said rock-shaft, a crank arm mounted to slide freely on said rock-shaft, and a bar connecting said crank with the tool-slide, and means for holding said traveler in contact with the
90 cams, substantially as and for the purpose set forth.

2. In a lathe the combination with its face-plate of adjustable cams corresponding in number to the sides of the work designed to be
105 turned, a crank arm provided with a suitable traveler adapted to ride on the outer faces of said cams, means for retaining the same in contact with said cam surfaces, a rock-shaft on which said arm is mounted, a crank thereon and a connection of said crank with the tool-slide, substantially as and for the purpose
110 set forth.

3. The combination with a lathe substantially as described of one or more cams mounted on the face-plate, a rock-shaft, bearing blocks adapted to retain said rock-shaft, a crank arm or lever, with a traveler connected therewith, adapted to ride on the said cams,
120 a crank connection of said rock-shaft with the tool-slide, a spring connected with an arm extending from said rock-shaft to draw the traveler into contact with the cams, and a stop to limit the inward throw of said traveler.

4. In a lathe the combination of a faceplate provided with one or more cams mounted thereon, the rock-shaft H, angular in cross section, the arm I suitably fixed thereto, and provided with a traveler moving on the surface of said cams, the crank K adapted to slide on said rock shaft, connecting rod or bar L, bearings *h h*, and the bearing blocks G G,
130 substantially as and for the purpose set forth.

5 In a lathe the combination with the face plate provided with one or more cams of the rock-shaft H, the traveler J and its arm I connected with said rock-shaft, crank K adapted to slide on said rock-shaft, connecting bar L, lever M, spring N, and adjustable post P, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. ROBERTSON.

Witnesses:

GIRVIN HALEY,
L. M. MARTINEK.