No. 834,877.

PATENTED NOV. 6, 1906.

W. D. ALLEN & G. A. JOHNSON.

AUTOMATIC CUTTING TOOL.

APPLICATION FILED DEC. 7, 1903.

2 SHEETS—SHEET 1.

Fig: 1

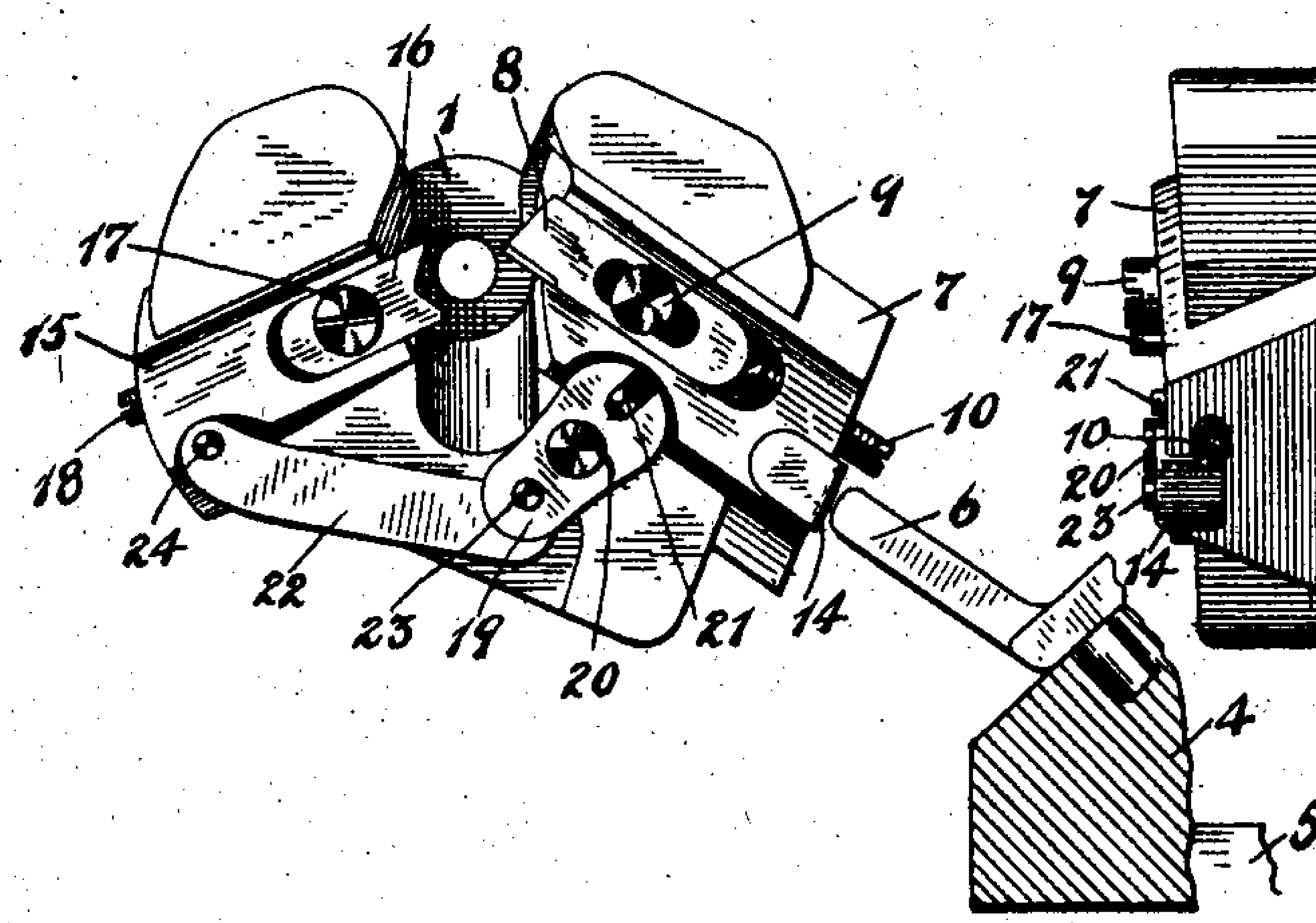


Fig: 2

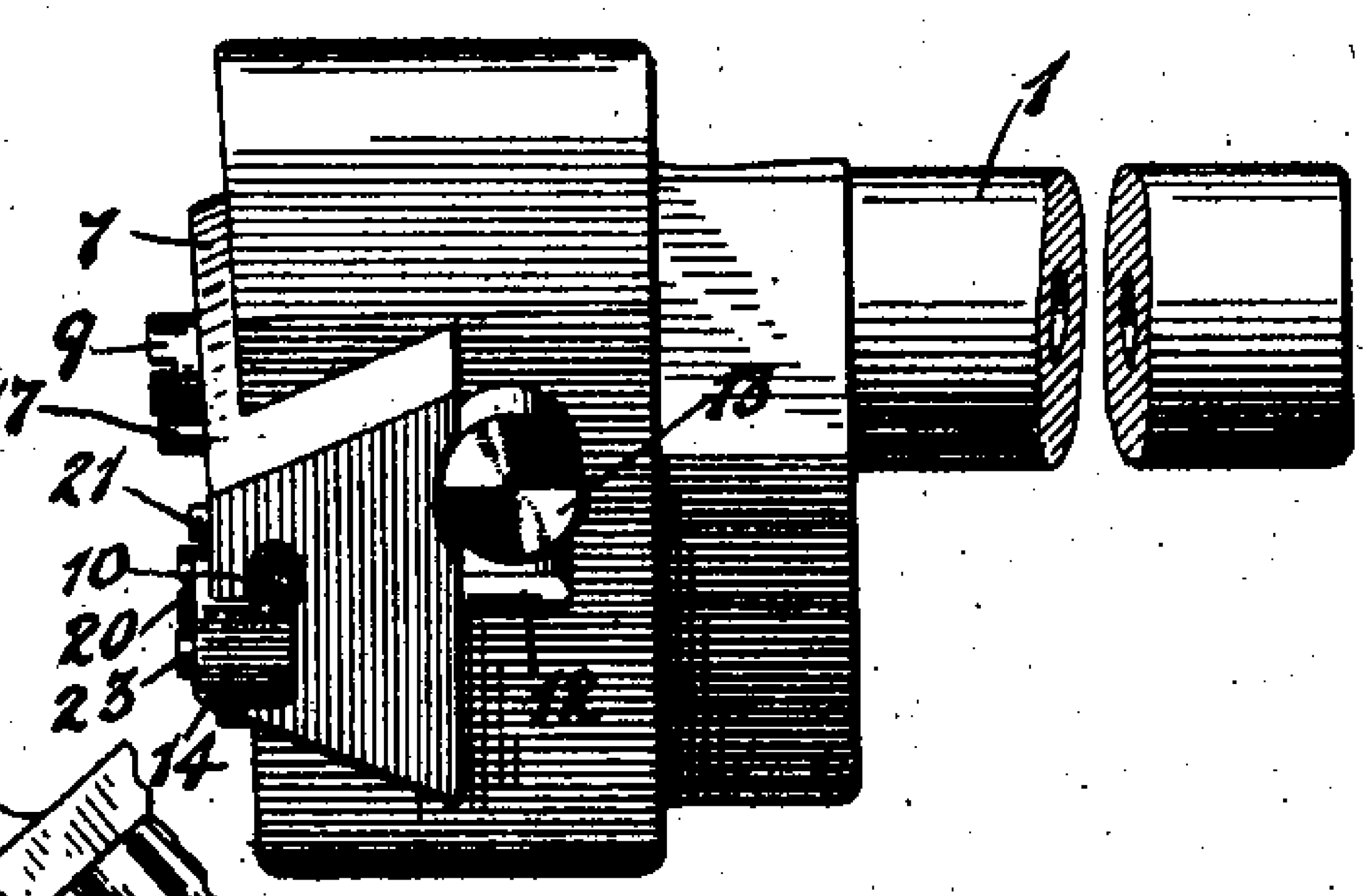
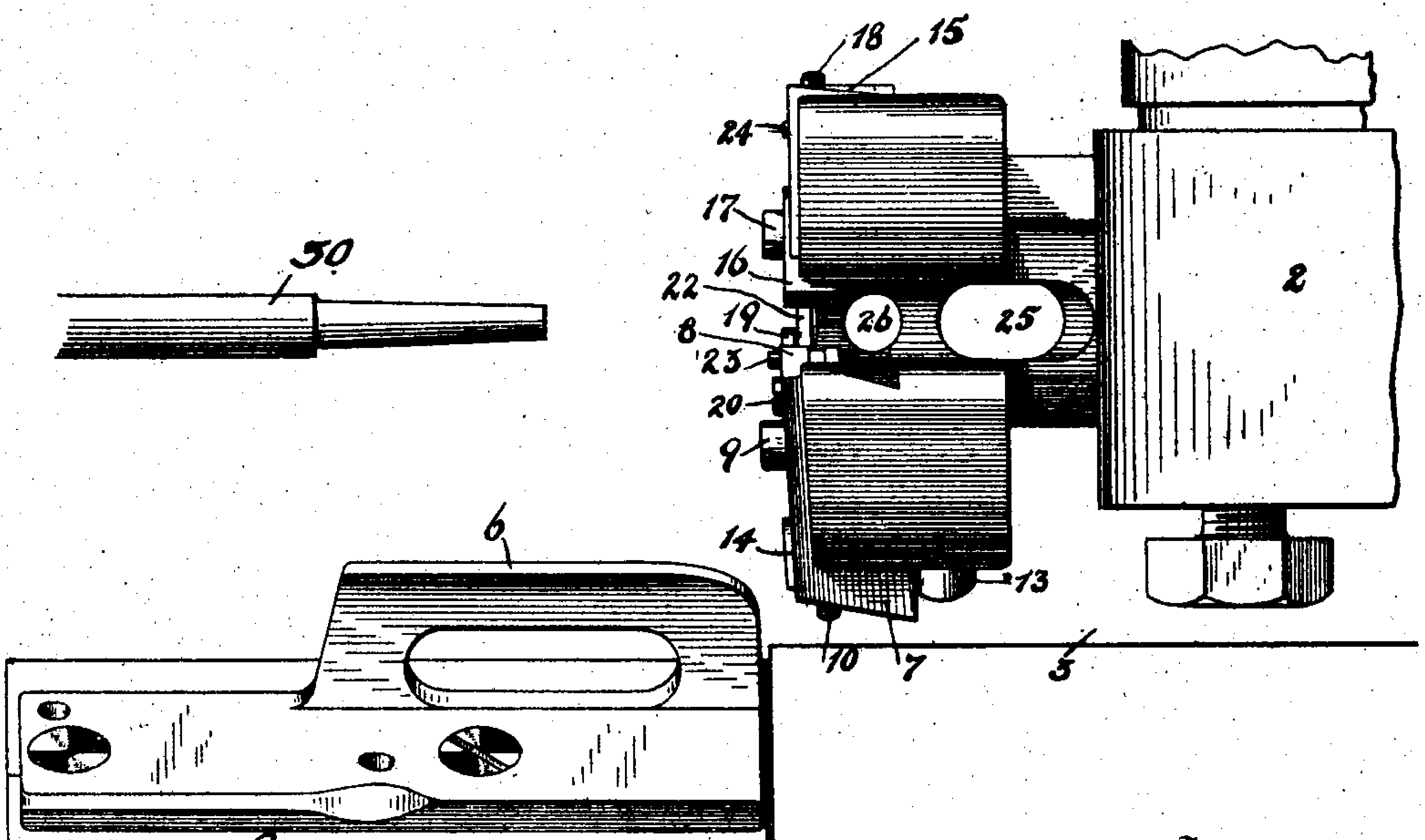


Fig: 3



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2 SHEETS—SHEET 2.

Fig: 4

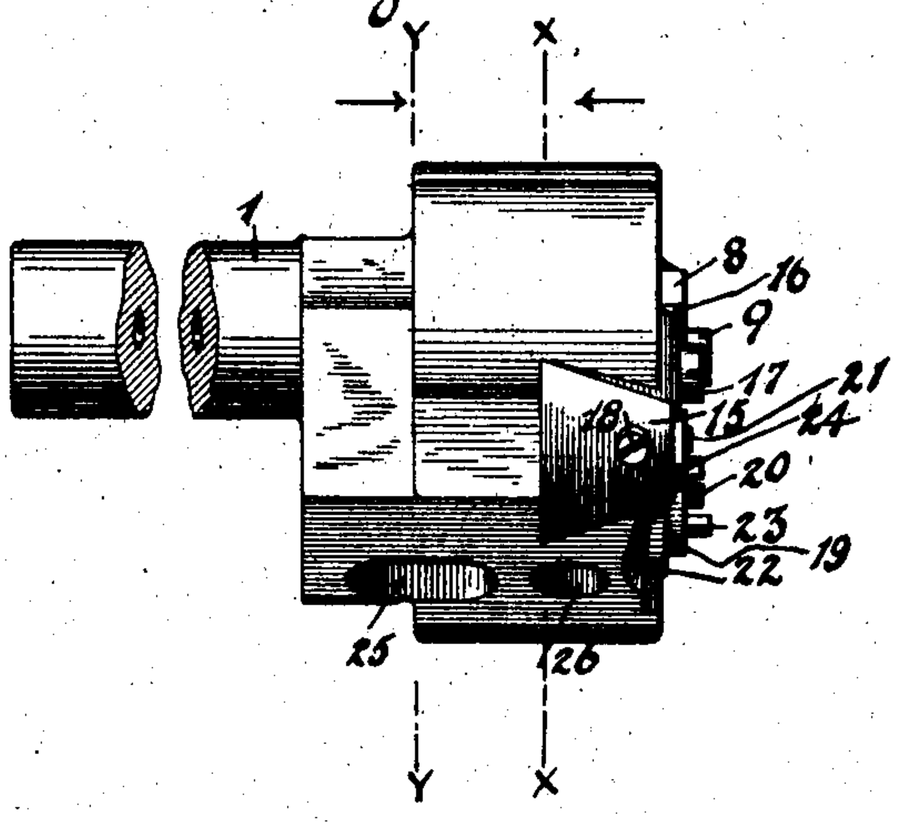


Fig. 5

SECTION ON-XX

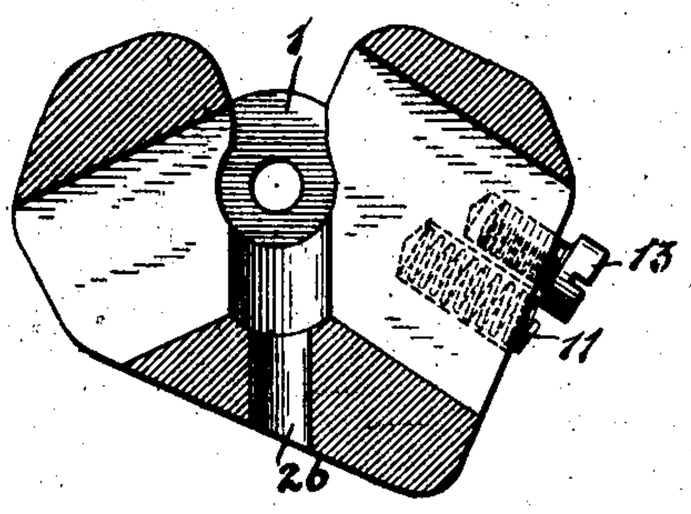


Fig: 6

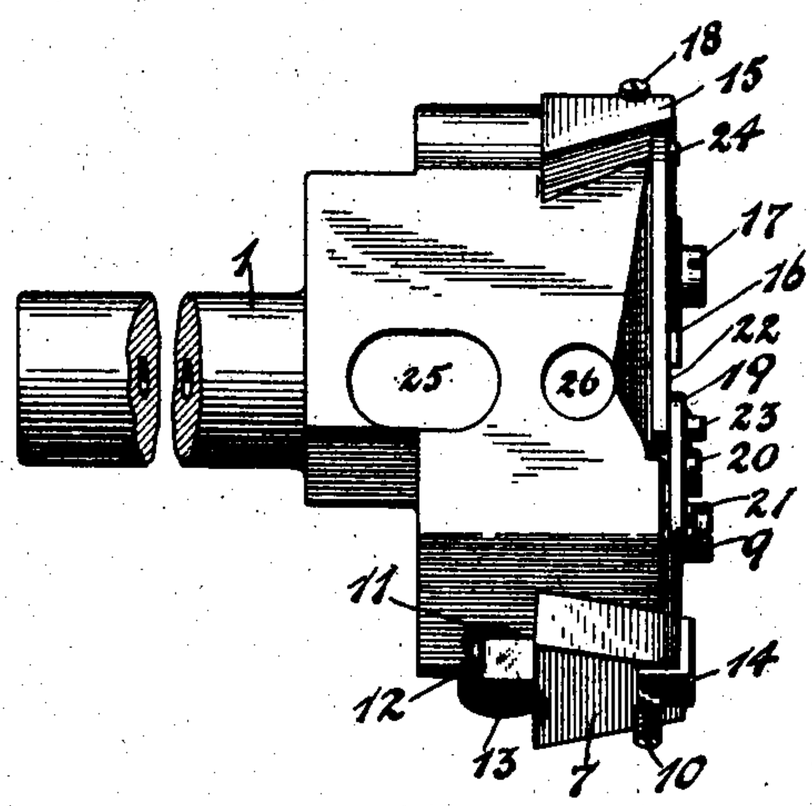
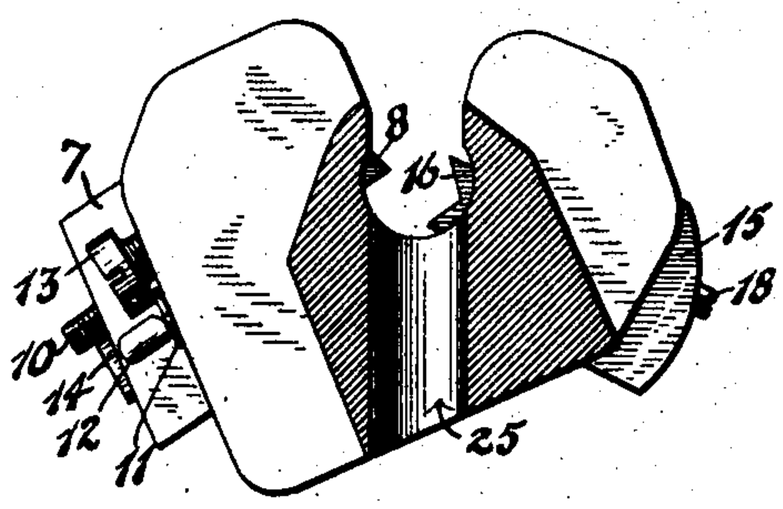


Fig: 7

SECTION ON-YY.



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UNITED STATES PATENT OFFICE.

WILLIAM D. ALLEN AND GUSTAVE A. JOHNSON, OF NEW HAVEN, CONNECTICUT, ASSIGNORS TO THE MARLIN FIREARMS COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

AUTOMATIC CUTTING-TOOL.

No. 834,877. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed December 7, 1903. Serial No. 184,038.

To all whom it may concern:

Be it known that we, WILLIAM D. ALLEN and GUSTAVE A. JOHNSON, citizens of the United States, residing at New Haven, in the county of New Haven, State of Connecticut, have invented certain new and useful Improvements in Automatic Cutting-Tools, of which the following is a full, clear, and exact description.

Our invention relates to improvements in tools, and particularly to a taper-cutting tool for automatic screw-machines. Constructions of this character are valuable only in so far as their operation is reliable. This depends not only upon the construction and cooperation of the parts, but upon their accessibility and freedom from likelihood of clogging during the operation, as well as the ease with which a lubricant may be applied. It is the object of this invention to construct a cutter of such a form, arrangement, and method of operation that the parts may be freely lubricated during the cutting operation and so that the chips will not clog up the tool and prevent its effective operation and to perfect the arrangement of cutter and abutment or saddle for the work, so that the operation may be reliable and efficient at all times, and so that the movement of the cutter may best conform to the angle of taper desired.

The invention consists in a tool which may be detachably mounted in a turret, as is common in tools of this character. The cutter itself is mounted in the body of the tool, so as to move toward and from a position tangential to the stock as it is fed toward the tool. We have provided a spring for normally forcing the cutter outwardly and a stop for limiting the outward movement. This stop also serves to effect an adjustment of the cutter toward the stock. A saddle or abutment is also provided to serve as a support for the stock during the cutting operation. This saddle is connected by a pivoted lever and link with the cutter, so as to approach and recede from the axial center of the tool as the cutter moves in its corresponding manner. Means are provided for effecting the initial position of the cutter and the saddle. This tool when in operation is carried by a turret, which is fed toward the head-stock of the machine, as is common in tools of this character, but is adapted to coact with a guide which has a suitable movement for effecting the proper movement of the cutter to give the desired taper. The mechanism for controlling the movement of the guide with which this tool coacts is shown more fully and claimed in our Patent No. 831,316, dated September 1, 1906.

This particular invention relates to the cutting-tool, and it will be more fully seen on an inspection of the accompanying two sheets of drawings, in which—

Figure 1 is an end elevation of the tool embodying the improvements of our invention, suggesting also in fragmentary details the cross-slide and guide for effecting the cutting movement of the cntter and the radial movement of the saddle. Fig. 2 is a side elevation of the tool. Fig. 3 is a plan view of the tool, suggesting fragments of the turret, having a horizontal axis at right angles to the direction of movement of the stock and the cross-slide with guide attached for coacting with the cutter. Fig. 4 is a rear view of the tool. Fig. 5 is a cross-section of the tool on the plane of the line X X, Fig. 4, looking to the left. Fig. 6 is a bottom view of the tool. Fig. 7 is a cross-section on the plane of the line Y Y in Fig. 4 looking to the right.

1 indicates the handle of the tool, which is adapted to be secured in a recess in the turret 2 in a method common in the art.

3 indicates the bed of an automatic screw-cutting machine, which extends from left to right and affords a guide for the turret-support as it is fed toward and away from the stock 30. The turret in this form of construction is mounted on a horizontal axis at right angles to the bed.

4 is a fragment of the front cross-slide which carries one of the cutting-off tools and also the guide for effecting the proper movement of the cutter. 5 indicates the bed of the cross-slide, and 6 indicates the guide.

7 is a block which fits closely in a guideway in the body of the tool and carries the cutter 8. This cutter is slotted and secured in place in the cutter-block by a screw 9. When this screw is loosened, the position of the cutter may be adjusted by the screw 10. The cutter-block is mounted so as to guide the

cutter in a line tangential to the surface of the stock which is to be cut and at the same time is inclined to the left slightly, as shown in Fig. 3, so as to perfect the cutting action and to enable the operator to cut with this tool up close to the head of a screw or like construction. This slight "forward" inclination, as it may be termed, is shown particularly in Figs. 3, 4, and 6. Although Fig. 5 is a cross-section on the line X X, the bottom of the guide for the block 7 is shown as if it were entirely in this plane. It really has a slight forward inclination. The block is normally held in the position shown in Fig. 1 by means of the spring 11, which engages a projection 12, carried by the block.

13 is an adjustable screw which takes into the block and, coacting with a shoulder on the block, affords a stop to prevent the outward retraction of the block and also to enable the operator to adjust the block against the action of the spring 11. If it should be desired to operate the cutter without the automatic tapering mechanism, the block is provided with a bearing member 14, of specially-hardened steel, so that it may coact with the guide 6.

15 is a companion block which is mounted to slide in a radial direction and carry the saddle 16, which forms an abutment or shoulder for the stock to hold it in place as a cutter is operated.

17 is a screw which passes through this saddle and secures it to the block.

18 is an adjusting-screw which may be employed to adjust the position of the saddle when the screw 17 is loosened.

The saddle-block is connected with the cutter-block, so as to move toward the center as the cutter advances and to be retracted from the center as the cutter is retracted, so as to afford an abutment or bearing for the stock at all times during the cutting operation. The cutter and the saddle, therefore, are caused to move in accordance with the taper desired. The cutter and the saddle-block are connected by the mechanism shown particularly in Fig. 1.

19 is a lever which is pivotally secured to the body of the tool by the screw 20.

21 is a pin carried by the cutter-block 7, which forms a means of connection between the lever and the cutter-block, the lever being slotted to afford a slight sliding engagement, since the block has a straight line movement and the lever rocks on its axis.

22 is a link which is connected to the rocking lever by the pin 23 and which engages a pin 24, carried by the saddle-block. The link and lever may both be removed readily by simply releasing the screw 20.

During the operation of a device of this character it is advantageous to afford ready means of very free lubrication. This we effect by cutting away the top of the body of the tool. We also provide for the ready escape of the lubricant, together with the chips and cuttings, through the two large outlets 25 and 26, as shown particularly in Figs. 3, 5, 6, and 7.

The operation of our invention is substantially as follows and will be readily understood by one familiar with the art of taper cutting. The stock is held against longitudinal movement and is rotated in any suitable manner. The turret is then advanced toward the stock with the tool in the proper position. When the bearing member 14 of the cutter-block engages the guide 6, which is carried by the cross-slide, the cutter is forced inwardly to the position which will effect the cutting of the stock into the smallest diameter of the taper desired, the adjustment being properly effected. The guide 6 is then allowed to recede gradually or move toward the front by means of suitable mechanism, as set forth in our other patent referred to, as the cutter continues toward the head-stock. This allows the cutter to recede and approach the largest diameter of the taper desired. The longitudinal movement of the turret, the stopping of it in its proper positions, and the feeding of the cross-slide, except the receding of the guide while tapering, is common to other constructions. As soon as the cross-slide moves sufficiently far the guide 6 is disengaged from the cutter-block and allows the spring to throw the cutter-block entirely out of engagement with the work. As the cutter approaches the stock the saddle in like manner follows up on the other side to correspond, so as to always afford a steady bearing. It will be noted in this particular that the cutting-point of the cutter 8 is always slightly in advance of the saddle 16, so that the bearing of the saddle comes upon a surface which has already been finished by the cutter. It will be apparent to those skilled in this art that our invention is susceptible of modifications or changes without departing from its spirit or scope.

This invention has been used on an automatic screw-machine and found effective. In such use the general operation of the machines is in no way different than with old devices except the slight receding movement of the cross-slide and guide while the taper is being cut.

What we claim is—

1. An automatic cutting-tool comprising a body portion, a cutter-carrying block slidably mounted therein, a spring for normally retracting said block and an adjustable screw taking into a tapped hole in said body and coacting with said block for advancing said block against the action of said spring.

2. An automatic cutting-tool comprising a body portion, a cutter-supporting block slidably mounted therein, a bearing member car-

ried by said block, a spring mounted in said body portion and coacting with said block to retract the same and an adjustable screw affording a stop against the outward retraction.

3. In a tool of the character described, the combination of a body portion having a plurality of guideways, a cutter-carrying block mounted to slide in one of said guideways, a saddle-carrying block mounted to slide in another of said guideways, operative means of connection between said blocks to cause them to approach and recede from the axis of said tool simultaneously, a spring for normally retracting said blocks and causing them to move away from the axis of said tool and adjustable means for limiting the outward retraction of said blocks.

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