

No. 616,654.

Patented Dec. 27, 1898.

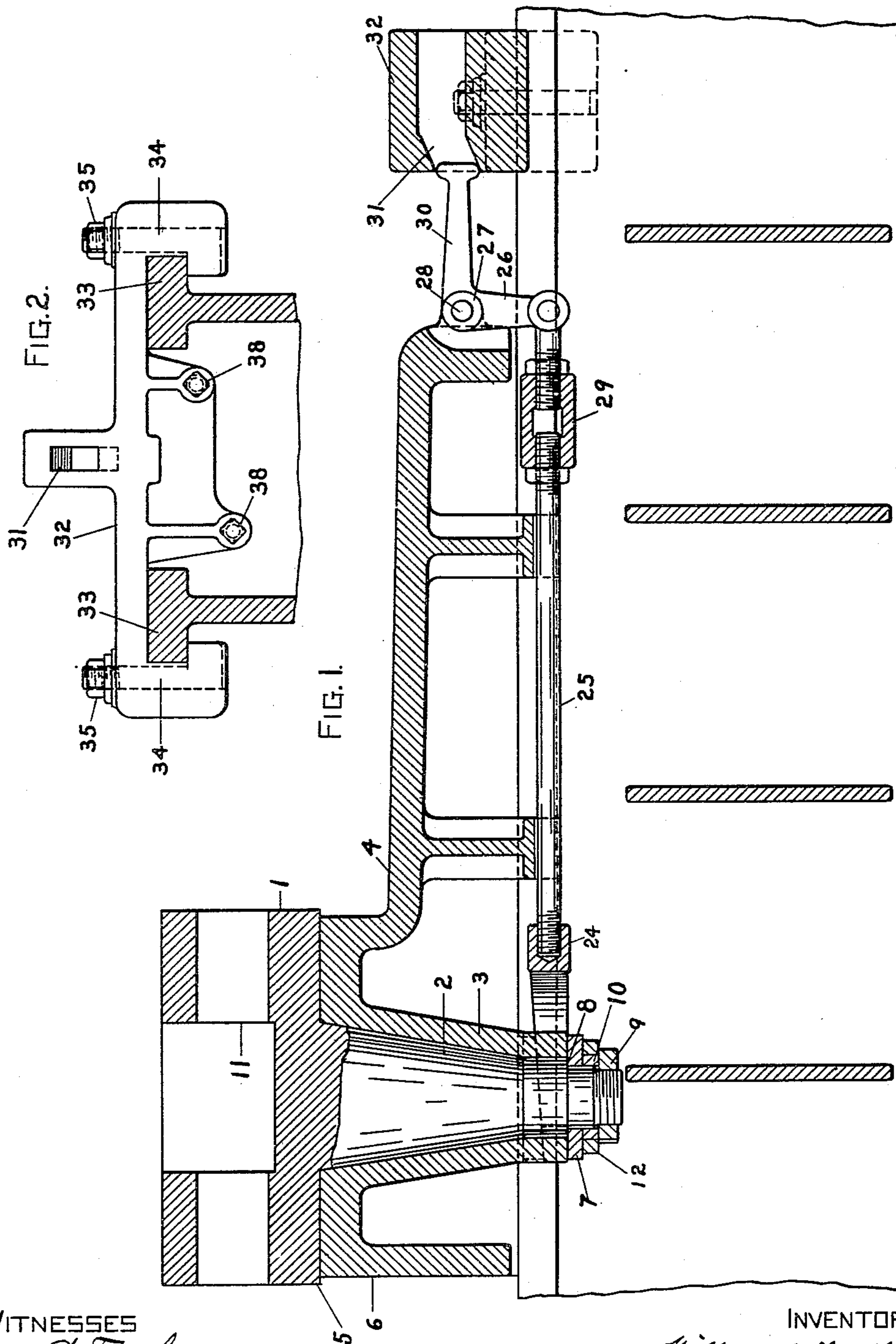
W. G. BURNHAM & J. PARKER.

SCREW MACHINE.

(Application filed Jan. 29, 1898.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES  
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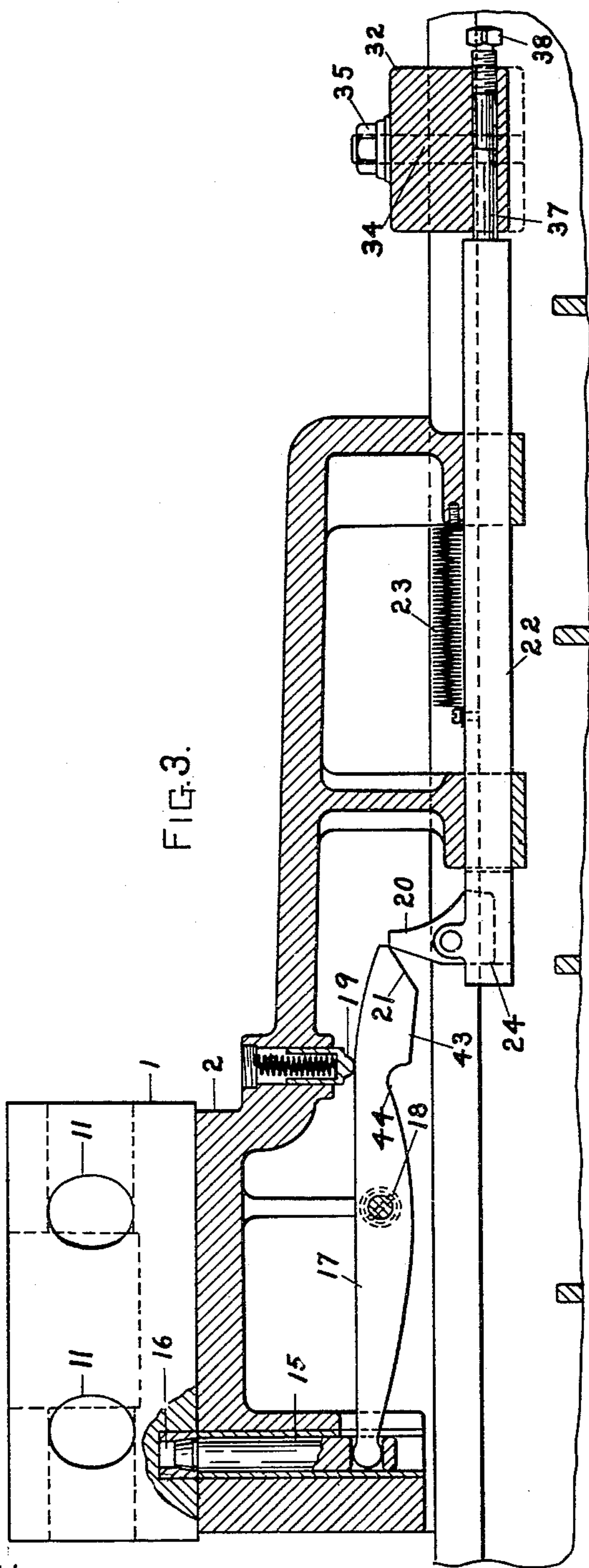


FIG. 3.

WITNESSES  
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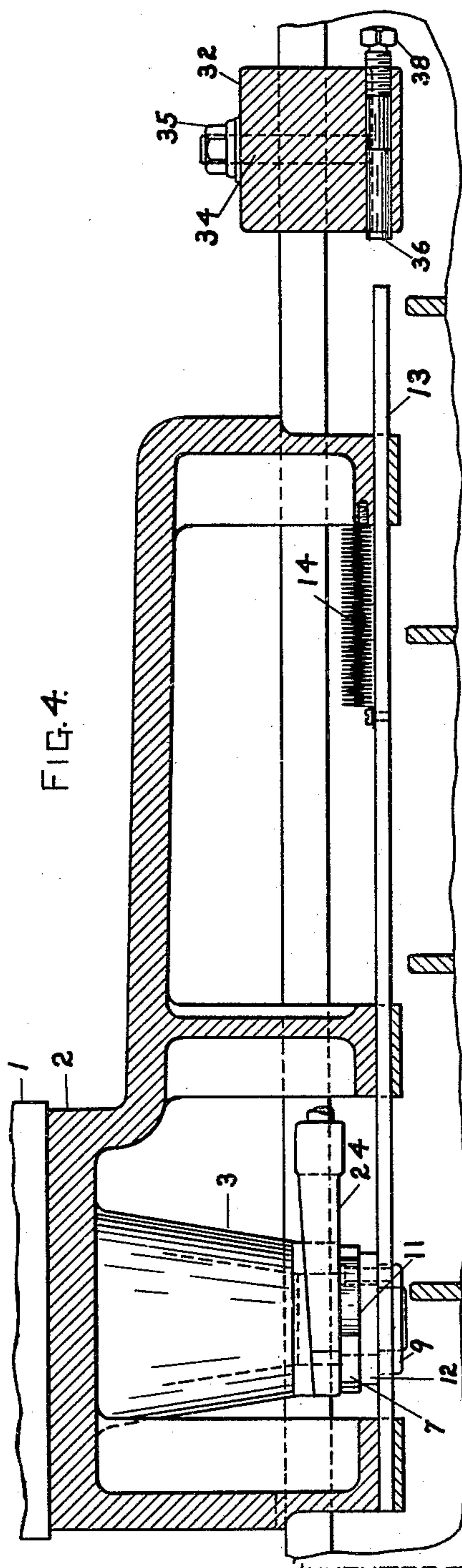


FIG. 4.

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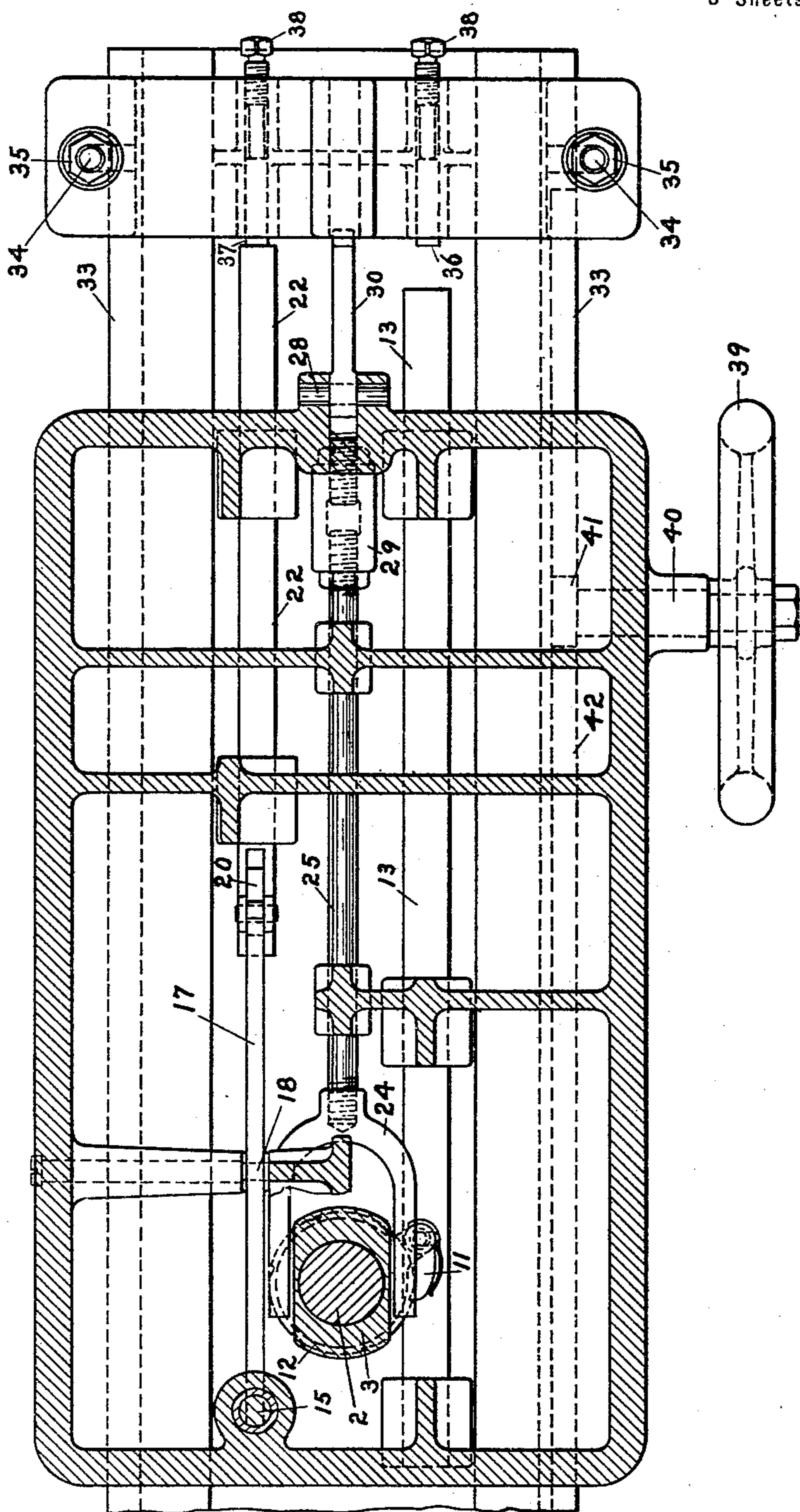
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FIG. 5.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## SCREW-MACHINE.

SPECIFICATION forming part of Letters Patent No. 616,654, dated December 27, 1898.

Application filed January 29, 1898. Serial No. 668,386. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM G. BURNHAM and JOHN PARKER, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Screw-Machines; and we do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The invention relates to that class of machines in which a series of tools are carried by a turret mounted on a turret-slide, the turret being given a partial revolution or indexed after each forward movement of the slide to bring the tools successively into position to operate upon the stock, which is held and revolved by means of a chuck.

One object of the invention is to provide simple and efficient means for automatically clamping the turret after it has been indexed, so that the turret will be rigidly held in position during the cutting operation of the tools carried thereby.

A further object of the invention is to provide a machine in which the turret is automatically clamped and in which the distance through which the turret-slide travels may be widely varied, thus permitting the tools to act through a long or short distance and also enabling the machine to act upon long and short articles without undue lost time in bringing the tools up to the work.

The improvements may be applied to machines in which the turret-slide is automatically reciprocated or to machines in which said slide is manually operated or to machines in which the slide is operated partially by power and partially by hand.

In the accompanying drawings so much of a screw-machine or turret-lathe is shown as is necessary to illustrate one embodiment of the present improvements.

In said drawings, Figure 1 is a central sectional view showing the means for clamping the turret. Fig. 2 is an end view of the adjustable block carrying the stops for operating the indexing mechanism and locking-pin and the cam for operating the clamp. Fig. 3 is a

sectional view showing the means for operating the locking-pin. Fig. 4 is a sectional elevation showing the indexing mechanism, and Fig. 5 is a sectional plan view.

Referring to the drawings, the turret 1 is provided with a depending shank or post 2, having a conical bearing-surface which is journaled in a conical bearing 3, formed in the turret-slide 4. The bottom 5 of the turret seats upon the turret-slide at 6, as is usual. The pivot shank or post 2 extends below the bearing 3 and has secured thereto, just below the end of the bearing, a collar or flange 7, which is held against a shoulder 8, formed on the post by means of a nut 9 on the end of the post and an interposed washer 10. The turret is provided with openings or sockets 11 for carrying a series of tools, and said turret may be given a partial revolution to bring the tools successively into operative position by any suitable mechanism. In the form shown the indexing mechanism is as follows: The flange 7 is provided with a series of ratchet-teeth corresponding in number to the number of tool-sockets in the turret, and said teeth are engaged by a spring-pressed pawl 11, pivoted on a pawl-carrying disk 12. The disk 12 is loosely pivoted on the bushing 10 and is held between the flange 7 and the nut 9. The pawl-disk is oscillated by a bar 13, which is mounted in the turret-slide and is connected to the pawl-disk by means of the pivot-pin of the pawl, which extends into a transverse slot in the bar, as shown in dotted lines in Fig. 5. A spring 14 acts to hold the bar 13 retracted, and said bar is operated to move the turret a partial revolution by means to be described.

The turret is locked in position after each indexing by means of a locking-bolt 15, which engages one of a series of holes 16 in the turret. The locking-bolt may be operated at the proper time by any suitable mechanism; but it is preferred to use substantially the mechanism shown. As shown, the bolt is forced toward the turret and is held in engagement with one of the holes 16 by a lever 17, pivoted to the turret-slide at 18 and acted on by a spring-pressed pin 19. The lever is rocked to withdraw the pin by means of a dog 20,



which engages an incline 21 on the end of lever 17. The dog 20 is pivoted in a bar 22, mounted in the turret-slide and held retracted by a spring 23. The dog 20 is held from rotation in one direction by the shoulder 24, but is free to rotate in the other direction. The bar 22 is operated to withdraw the bolt just previous to the indexing by means to be described.

In order that the tools may be rigidly held during the cutting operation, means are provided for clamping the turret to the turret-slide, and to save time and inconvenience to the operator it is preferred to operate this clamping means automatically, the turret being clamped after each indexing and before the cutting begins. The form of clamping device which is preferably used consists of a wedge which is forced between a shoulder connected with the turret and a fixed abutment, and thus rigidly connects the turret and turret-slide. In the form shown this wedge consists of a U-shaped piece 24, which straddles the pivot-post 2. The lower surface of the wedge rests on the flange 7, and the upper inclined surface engages inclined surfaces on the end of bearing 3, which bearing is cut away on each side of the pivot-post 2. The wedge may be forced between the abutment formed by the end of bearing 3 and the shoulder on the turret formed by the flange 7 by any suitable means and will press the turret firmly to its seat and rigidly clamp said turret to the turret-slide. It is preferred to operate the wedge by means of a cam mounted on the support on which the turret-slide reciprocates, which cam acts to withdraw the bolt as the turret reaches the indexing position and just before the indexing takes place. In the form shown the wedge is secured to the end of a rod 25, the other end of which is pivoted to one arm 26 of a bell-crank lever 27, pivoted at 28 to the turret-slide. The rod 25 is formed in two parts, one having a right and the other a left hand thread thereon, which threads are engaged by a coupling-nut 29. By turning this nut the position of the wedge may be adjusted. The other arm 30 of the bell-crank lever is constructed to enter a cam-slot 31, formed in a stationary block 32. As the end 30 of the bell-crank lever enters slot 31 the lever is rocked to withdraw the wedge and unclamp the turret, and as the end of said lever leaves said slot the lever is rocked to advance the wedge and clamp the turret.

In order that the point in the travel of the turret-slide at which the clamping and unclamping are effected may be varied in acting upon articles of different lengths, it is preferred to make the means for operating the turret-clamping means adjustable, and so far as this feature of invention is concerned the clamping means may be of any suitable form. In acting upon articles of different lengths the indexing mechanism and locking-bolt should be operated at different points, and in

order that the adjustment of the means for operating these mechanisms and the adjustment of the clamp operating means may be readily effected it is preferred to mount all of said operating means upon a single adjustable part. Accordingly with the forms of indexing, locking, and clamping means shown the block 32, in which the cam-slot 31 is formed, also forms a stop-block with which the ends of bars 13 and 22 engage in the backward movement of the turret-slide. This block is preferably mounted upon the bedways 33 on which the turret-slide is guided, and said block is held in adjusted position by bolts 34 and nuts 35. The block 32 is provided with stop-pins 36 and 37, which may be adjusted by screws 38. The turret-slide may be reciprocated by any suitable means either manually or automatically. In the drawings a hand-wheel 39 is shown secured to the end of a shaft 40, which carries a pinion 41, engaging a rack 42 on the bed. By turning this wheel the turret-slide may be moved on the ways in either direction.

The bars 13 and 22 and the lever 27 are so arranged that as the turret-slide is moved back the bar 22 first engages the pin 37, and further movement of the slide causes incline 31 to ride over the dog 20, thus withdrawing the locking-bolt. At the same time the end of lever 27 enters the cam-slot 31 and the wedge 24 is withdrawn and the turret unclamped. Further movement of the turret-slide brings the bar 13 against the pin 36 and the indexing mechanism is operated, the locking-pin being held withdrawn by the dog 20, which engages the straight portion 43 on lever 17. As the indexing is completed the recess 44 arrives over dog 20 and the locking-bolt is projected into one of the holes 16 and locks the turret. When the turret-slide starts forward, the dog 20 tips on its pivot to allow the end of lever 17 to pass, and as the lever 27 leaves the cam-slot 31 the wedge is forced forward to clamp the turret.

The block 32 may be adjusted along the bed so that the backward movement of the turret-slide after a tool has been disengaged from the stock need only be sufficient to operate the locking-bolt, clamp, and indexing mechanism. Moreover, since the turret-slide is mounted on ways formed on the frame instead of upon an adjustable bed the length of travel of the slide may be more widely varied.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination with a support, of a turret-slide mounted to reciprocate thereon, a turret on said slide, means for clamping said turret to said slide, and means adjustably mounted on said support for operating said clamping means, substantially as described.

2. The combination with a support provided with ways, a turret-slide mounted to reciprocate on said ways, a turret on said slide, means for clamping said turret to said slide,



and a block adjustably mounted on said support and provided with a cam for operating said clamping means, substantially as described.

5 3. The combination with a support provided with ways, a turret-slide mounted to reciprocate on said ways, a turret on said slide, mechanism for indexing said turret, means for clamping said turret, and an adjustable stop-  
10 block mounted on said support for operating the indexing mechanism and provided with a cam for operating the clamping means, substantially as described.

15 4. The combination with a support provided with ways, a turret-slide mounted to reciprocate on said ways, a turret on said slide, means for indexing and locking said turret, an adjustable stop-block for operating said means, means for clamping said turret to said  
20 slide, and means carried by said stop-block for operating said clamping means, substantially as described.

5. The combination with a turret, of means for clamping the same comprising a shoulder,  
25 a fixed abutment, a wedge between said abutment and shoulder, and means for operating said wedge to clamp the turret, substantially as described.

6. The combination with a turret-slide, of  
30 a turret mounted thereon, an abutment on said slide, a shoulder connected with said turret, a wedge between said abutment and shoulder operated by the movement of the turret-slide to clamp the turret to said slide, sub-  
35 stantially as described.

7. The combination with a support provided with ways, a turret-slide mounted to reciprocate on said ways, a turret on said slide, an abutment on the slide, a shoulder  
40 connected with the turret, a wedge between said shoulder and abutment, and a cam mounted on the support for operating said wedge, substantially as described.

8. The combination with a turret-slide, of  
45 a turret mounted thereon, an abutment on said slide, a shoulder connected with said turret, a wedge between said abutment and

shoulder, mechanism for indexing said turret, and means for automatically operating said wedge to clamp said turret after each index- 50  
ing, substantially as described.

9. The combination with a turret-slide, of a turret mounted thereon, an abutment on said slide, a shoulder connected with said turret, a wedge between said abutment and shoul- 55  
der, and means for automatically operating said wedge to clamp and unclamp said turret, substantially as described.

10. The combination with a turret-slide, of a turret thereon, an abutment on said slide, a shoulder connected with said turret, a wedge between said shoulder and abutment, and a stationary cam on said support for operating said wedge, substantially as described.

11. The combination with a turret-slide, of 65 a turret thereon, an abutment on said slide, a shoulder connected with said turret, a wedge between said abutment and shoulder, and an adjustable stationary cam for operating said wedge, substantially as described. 70

12. The combination with a turret, of a flange thereon, a clamping device engaging said flange, and means for automatically operating said clamping device to clamp and unclamp said turret, substantially as de- 75  
scribed.

13. The combination with a turret-slide, of a turret provided with a projecting post journaled in said slide, a flange on said post, clamping device engaging said flange, and 80  
means for automatically operating said device, substantially as described.

14. The combination with a turret-slide, of a turret provided with a depending pivot-post, a flange on the lower end of said post, 85  
a wedge between said flange and an abutment on said slide, and means for automatically operating said wedge, substantially as described.

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