G. J. COSTELLO.

LATHE.

APPLICATION FILED JAN. 25, 1909.

999,701.

Patented Aug. 1, 1911.

3 SHEETS—SHEET 1.

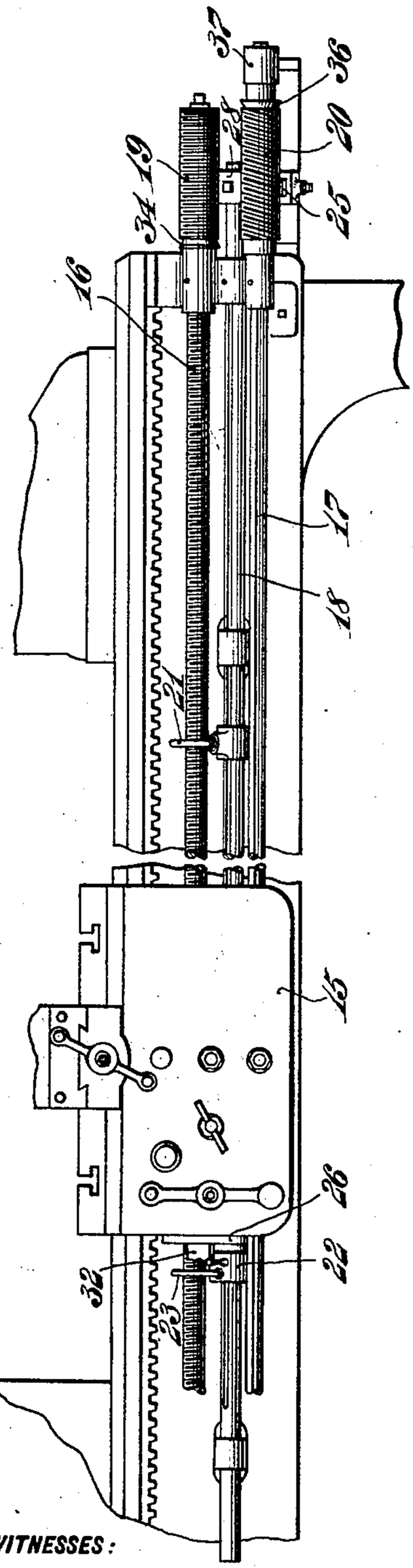


Fig. 1.

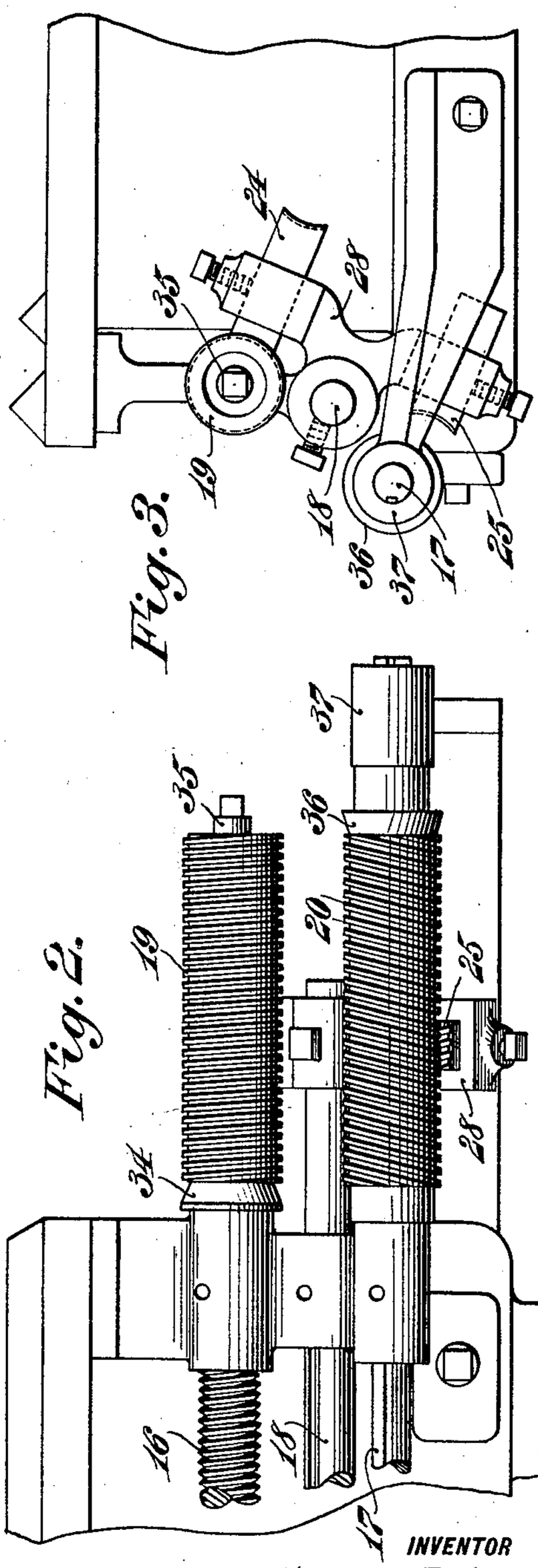


Fig. 3.

Fig. 2.

WITNESSES:

Jas. C. Wobensmith

Mae Hofmann

INVENTOR

George J. Costello,

BY

Thos. Woodall

ATTORNEY.

G. J. COSTELLO.

LATHE.

APPLICATION FILED JAN. 25, 1909.

999,701. Patented Aug. 1, 1911.

3 SHEETS—SHEET 2.

Fig. 4.

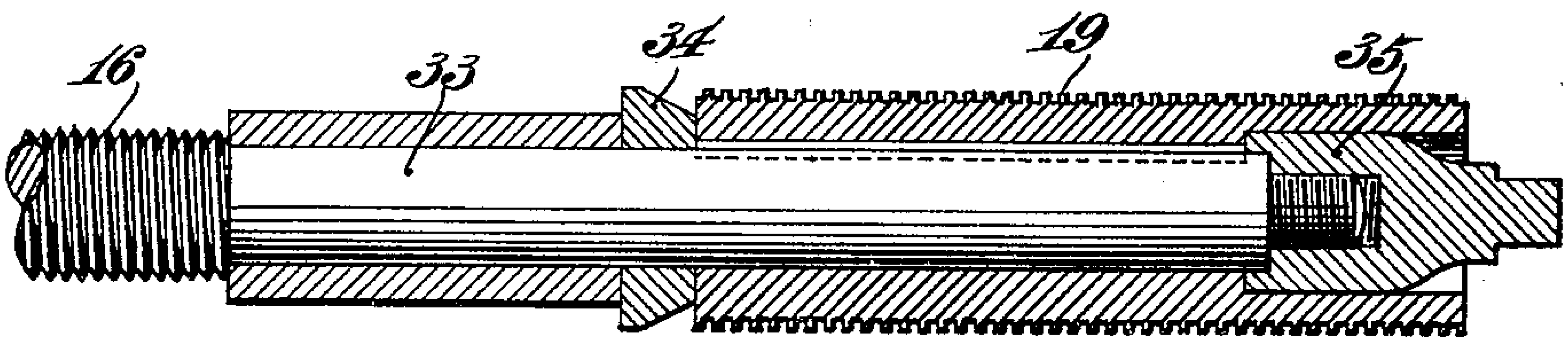


Fig. 5.

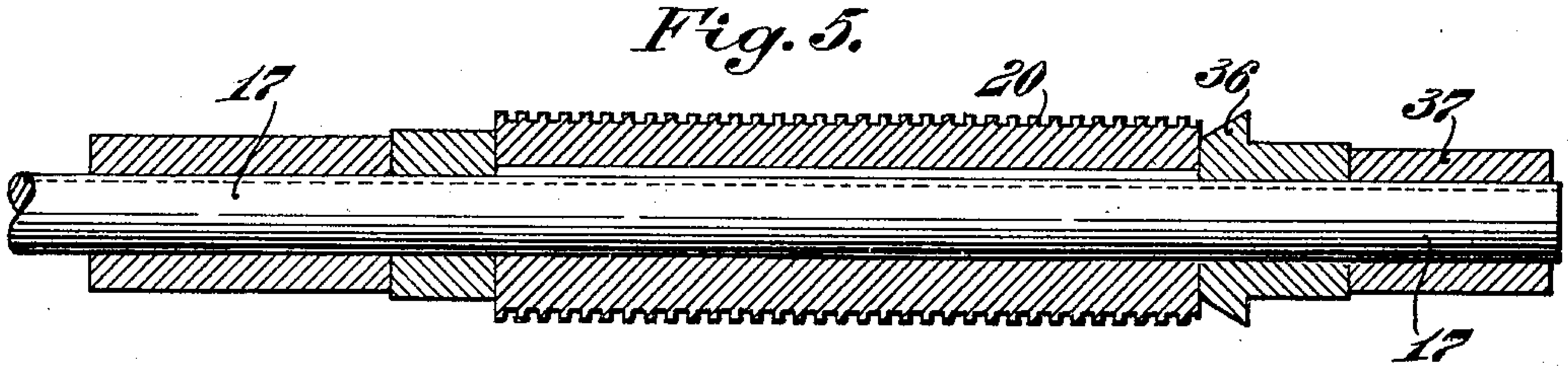
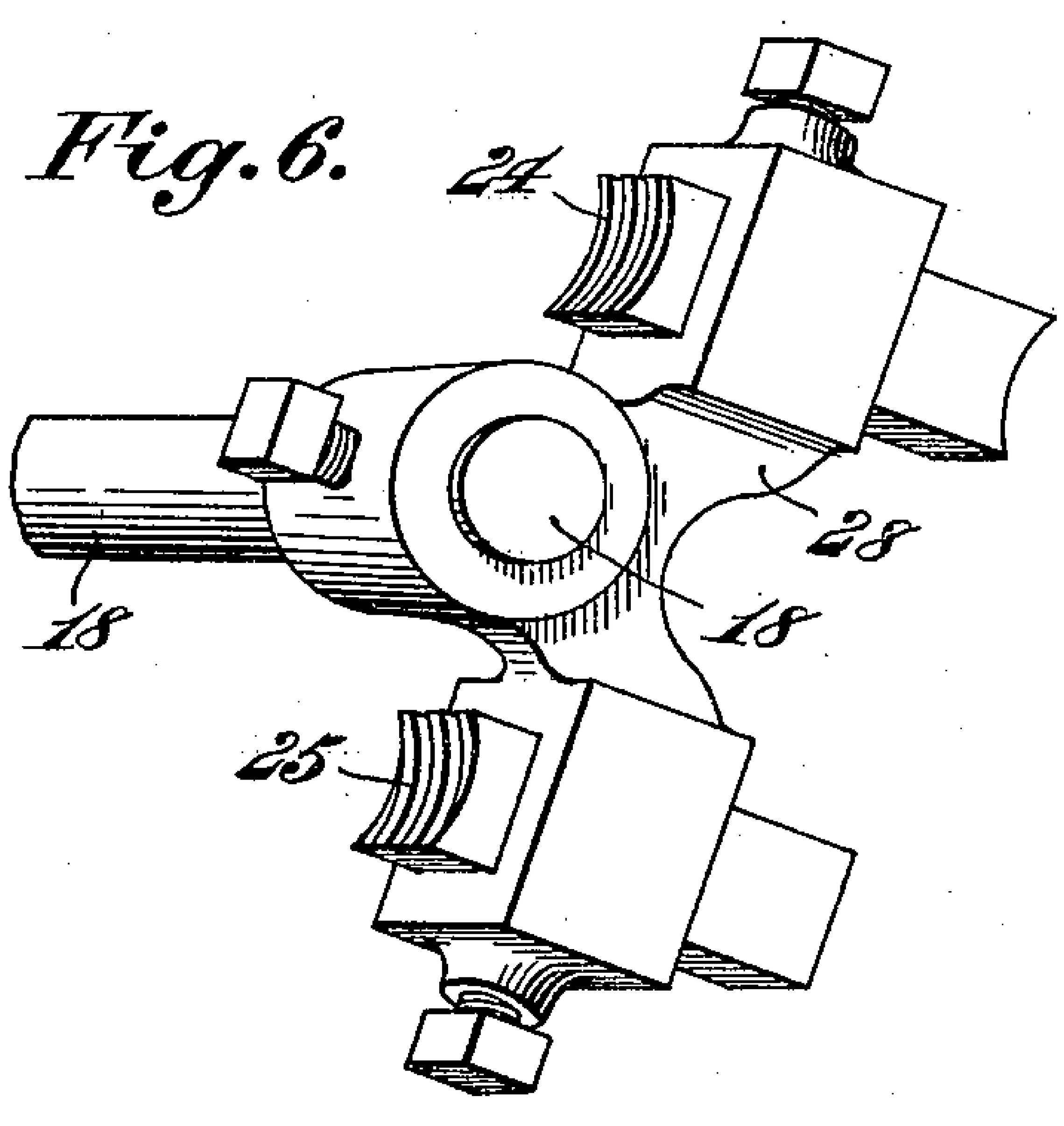


Fig. 6.



WITNESSES:

Jas. C. Wobensmith

Mae Hofmann

INVENTOR

George J. Costello,

BY

Jno. Gronendale

ATTORNEY.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. J. COSTELLO.

LATHE.

APPLICATION FILED JAN. 25, 1909.

999,701. Patented Aug. 1, 1911.

3 SHEETS—SHEET 3.

Fig. 7.

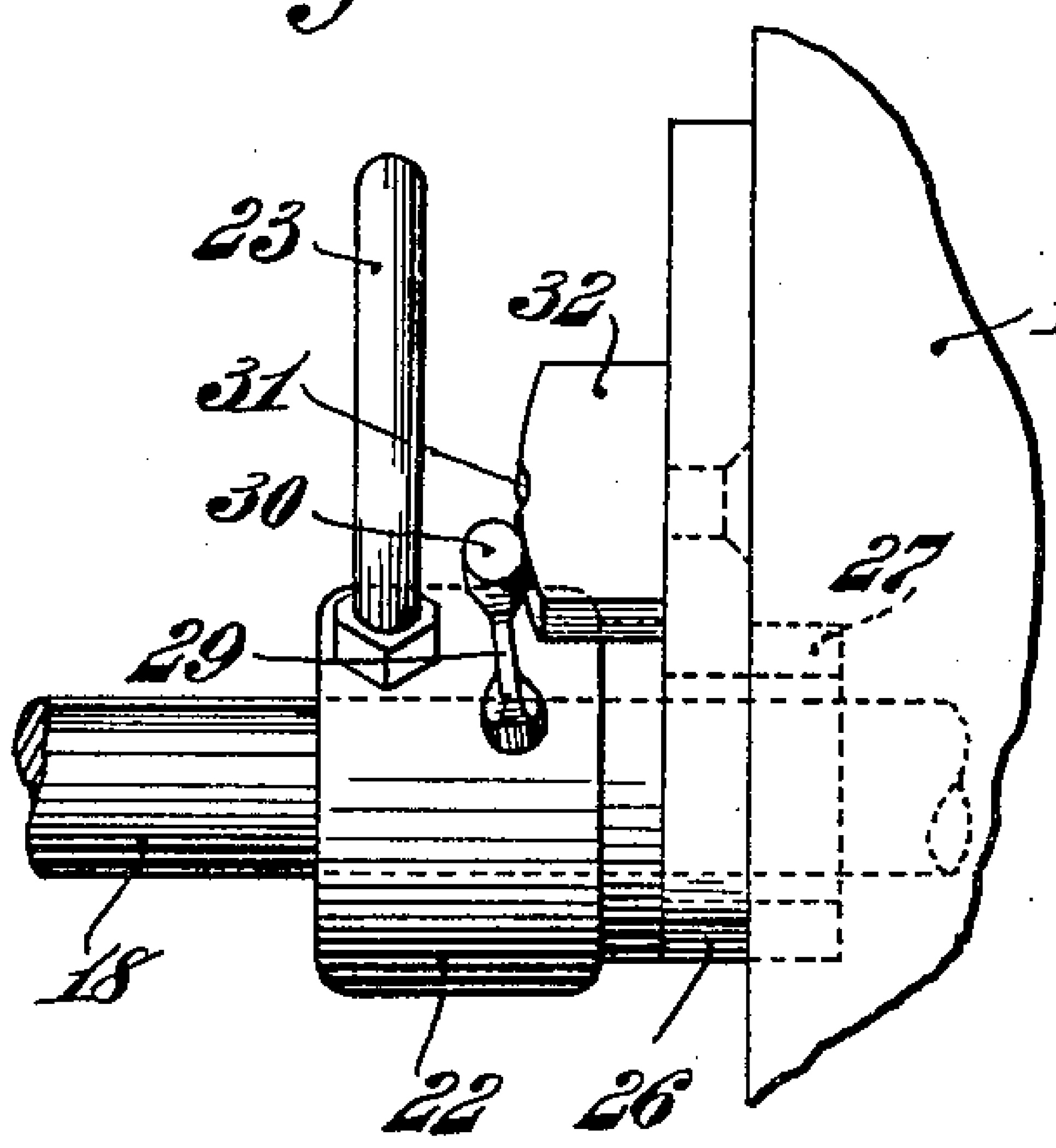


Fig. 8.

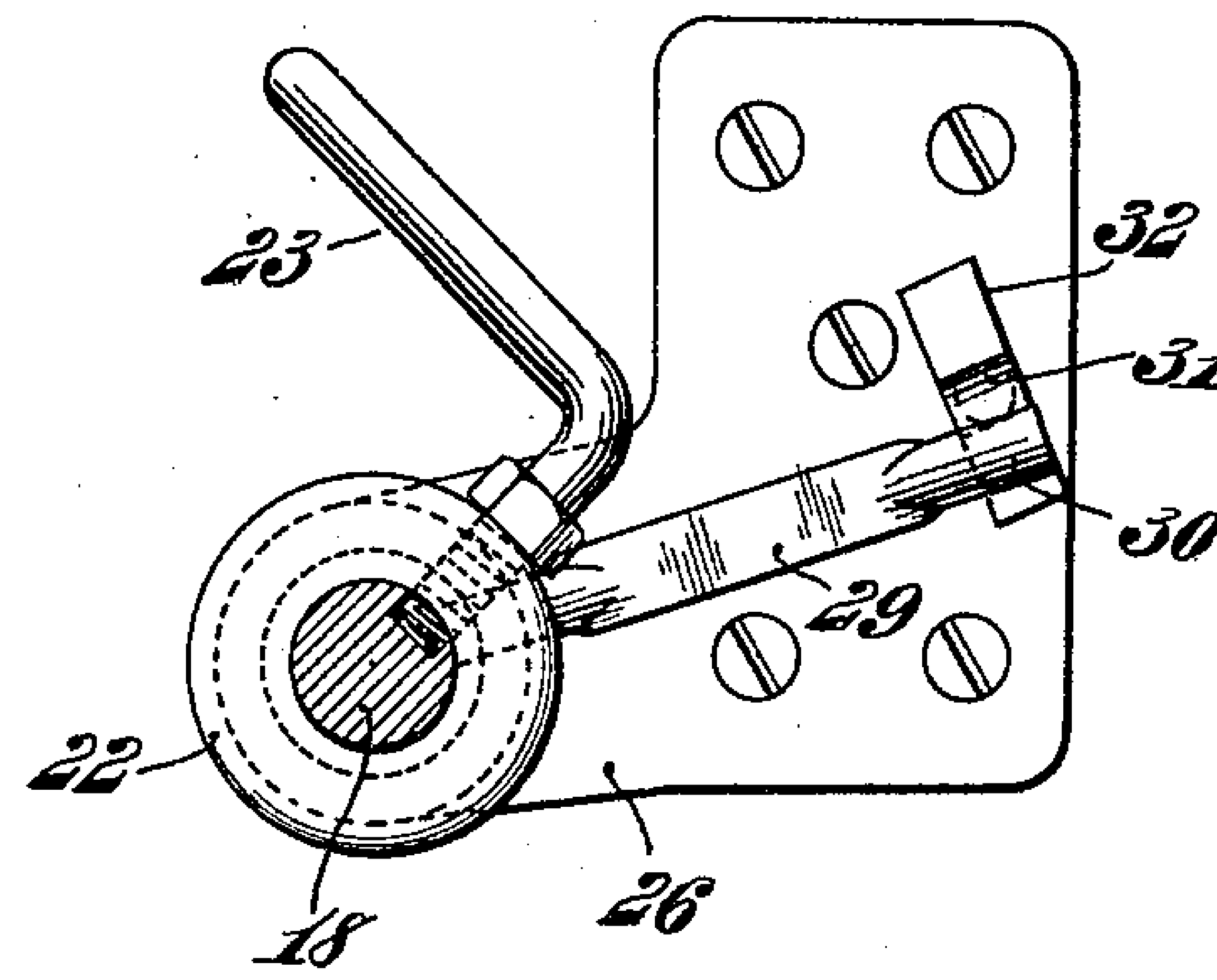
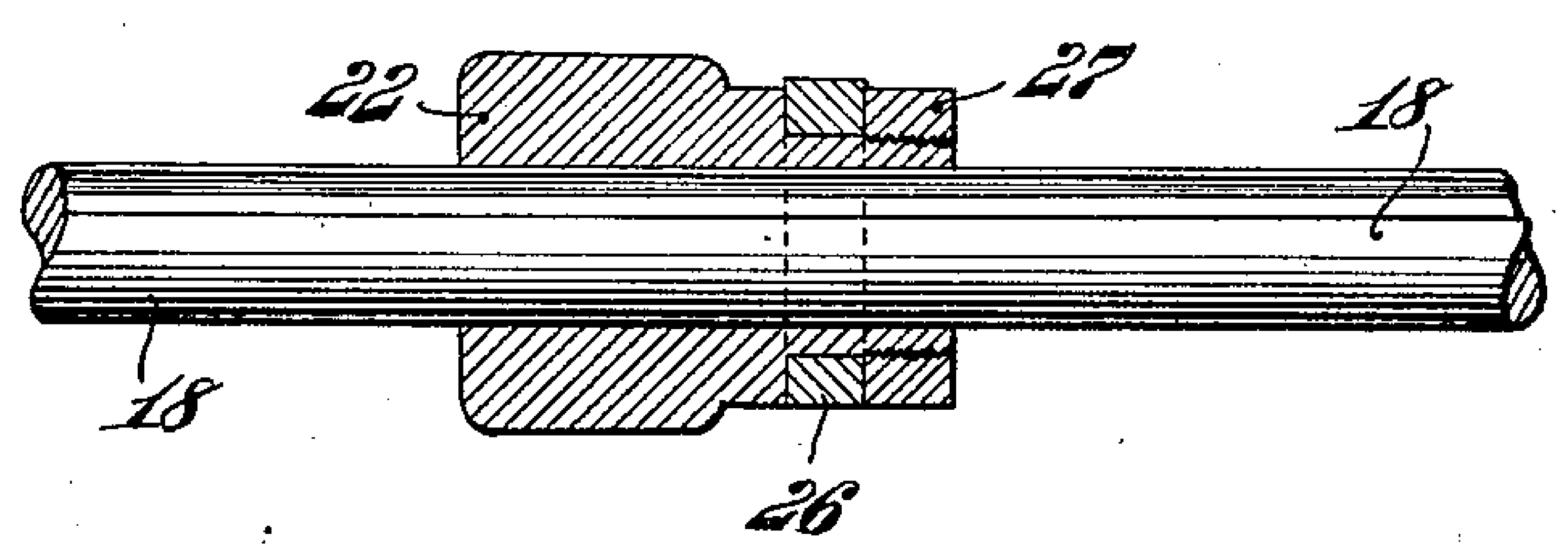


Fig. 9.



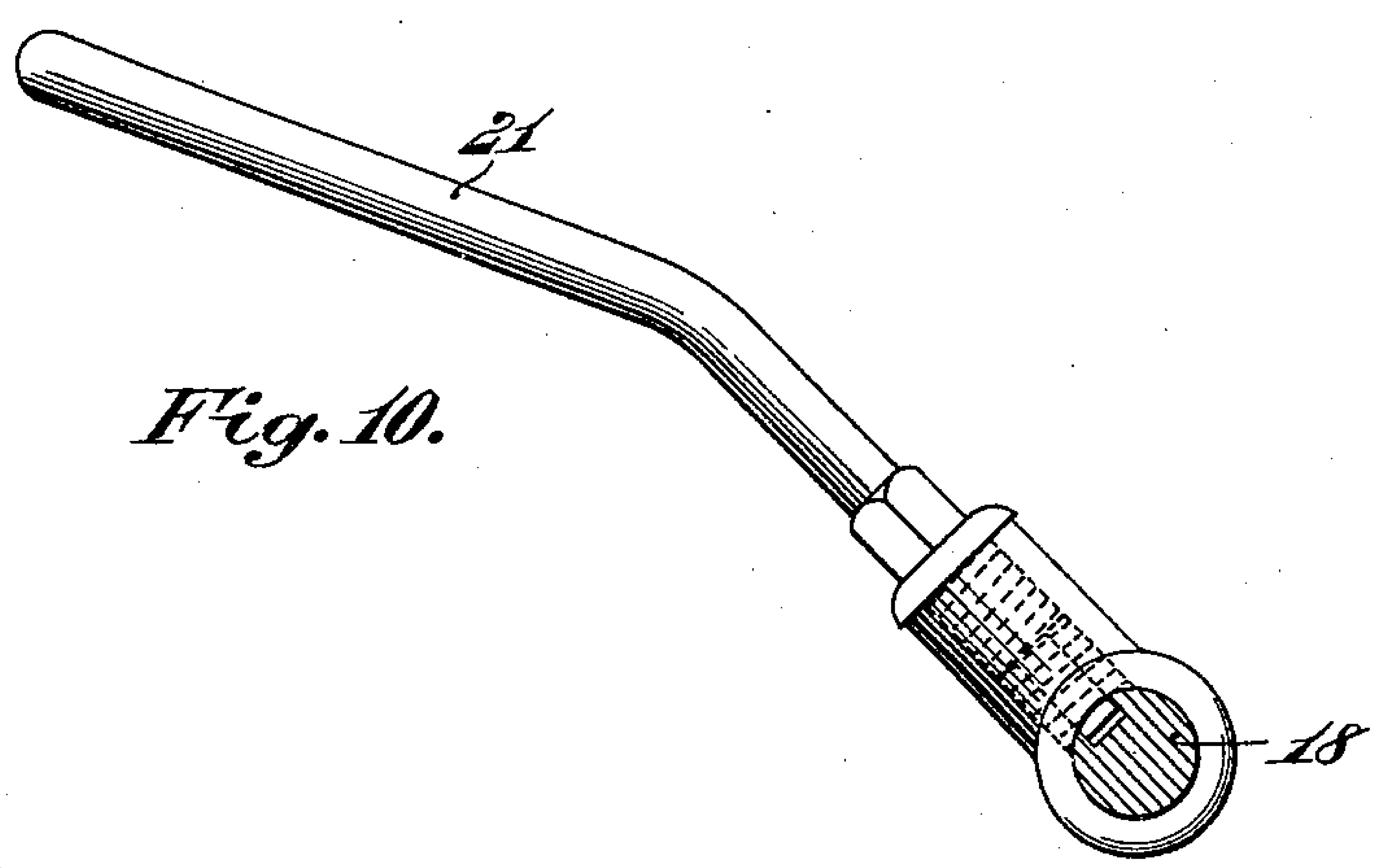


Fig. 10.

WITNESSES:

Jas. C. Wobensmith

Mae Hofmann

INVENTOR

George J. Costello,

BY

ATTORNEY.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE J. COSTELLO, OF PHILADELPHIA, PENNSYLVANIA.

LATHE.

999,701. Specification of Letters Patent. Patented Aug. 1, 1911.

Application filed January 25, 1909. Serial No. 473,969.

To all whom it may concern:

Be it known that I, GEORGE J. COSTELLO, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Lathe, of which the following is a specification.

My invention relates to improvements in screw cutting lathes.

The object of the invention is to provide improved means for actuating the tool carriage in either direction.

It is also the object of the invention to provide means for saving much of the time now commonly lost in the return of the carriage in the operation of screw cutting engine lathes. By the means employed on lathes as ordinarily found, the carriage is returned to the starting point at about the same rate of speed as it advances in the cutting direction, either by reversing the lathe or the carriage. By my improved means the carriage can be returned from fifteen to eighty times faster than it advances while the lathe continues to run in an onward direction.

My invention comprises improved means for actuating the carriage in the advance or cutting direction, and also improved actuating means for the quick return of the carriage to the initial position, said means being adapted to bring the carriage back to accurate register with the last cut of the tool, and also to return the carriage at a maximum speed, consistent with the speed of the lathe.

My invention also comprises improved means for communicating the actuation of the feed screw and return screw alternately to the carriage.

Referring to the drawings:—Figure 1 is a front elevation of a portion of the lathe showing my improved means. Fig. 2 is a similar view on an enlarged scale of the feed screw sleeve and return screw sleeve and associated parts. Fig. 3 is a side elevation of the parts shown in Fig. 2. Fig. 4 is a longitudinal section of the feed screw sleeve and supporting mechanism. Fig. 5 is a longitudinal section of the return screw sleeve and its supporting mechanism. Fig. 6 is a view in perspective of the half nuts and their supporting mechanism, which are adapted to coöperate alternately with the feed screw sleeve and the return screw sleeve. Fig. 7 is an elevation of the collar and set-screw for connecting the carriage with the actuating shaft. Fig. 8 is a side elevation of the same. Fig. 9 is a longitudinal section of the same. Fig. 10 is an elevation of the lever for rocking the actuating shaft.

Similar numerals refer to similar parts throughout the several views.

In the drawings, I show the parts of a standard screw cutting engine lathe in which the carriage is indicated by 15, the usual lead screw by 16, and the feed shaft by 17. In addition to these standard elements I provide an actuating shaft 18 journaled in suitable bearings between said lead screw 16 and the feed shaft 17. At the end of the lead screw 16 is provided a spindle 33 on which is supported the feed screw sleeve or leader 19, while near the corresponding end of feed shaft 17 is mounted the return screw sleeve 20, with left hand thread of coarse pitch. On the actuating shaft 18, I mount the yoke 28, secured rigidly thereto by a suitable set screw shown in Figs. 3 and 6. To the yoke are secured the half nuts 24 and 25, each suitably held in place by a set screw as shown in Figs. 3 and 6. These half nuts are suitably threaded to coöperate respectively with the threaded sleeves 19 and 20.

The shaft 18 is adapted to have a slight rocking movement, such actuation being given thereto by the lever 21. This rocking movement serves to bring either the half nut 24 in coöperation with the thread of feed screw sleeve 19, or the half nut 25, into coöperation with the return screw sleeve 20, as may be desired. On the collar 22, see Figs. 7, 8 and 9, which is keyed to shaft 18, is secured the spring 29, having a rounded end or knob 30, adapted to engage with the arc shaped surface of the stud 32, which is connected with the carriage 15. This stud 32 has an arc shaped bearing surface, with a recess 31 in the middle part thereof, so that, as the shaft 18 is rocked, the spring 30 will move along the arc shaped surface 32. In the middle position, with the knob engaged in the recess 31, the shaft is so held that the yoke will be in the neutral position with both half nuts out of engagement with their respective screws.

When the spring 30 has been carried to one end of the arc-shaped surface, one of the half nuts will be held securely in engagement with its coöperating threaded sleeve, and when the said spring has been

carried to the other end of the arc-shaped surface, the other half nut will be held in engagement with its coöperating sleeve. The arc-shaped surface of the stud is so formed as to coöperate with spring 30, to maintain the shaft in any of the several positions in which it may be left at rest. As a matter of convenience, the hand lever 21 is feathered in the shaft 18, so that it can be moved into any position most convenient for manual operation. The collar 22 is secured to the shaft 18 by the set screw 23, and serves as a connection for the bearing 26 secured to the carriage 15, so as to permit a free rotation of shaft 18 with respect to the carriage but to prevent longitudinal movement between said shaft and carriage. The nut 27 serves to secure the bearing 26 on the collar 22.

As clearly shown in Figs. 2 and 4, the feed screw sleeve 19 is mounted on the spindle 33 which projects from the lead screw 16, and is secured thereto between the conical bearing 34 and the nut 35. The beveled ring or sleeve 34 is provided to cause the disengagement of the half nut 24 from the screw 19 when it has reached the end of travel thereon. A similar beveled ring 36 is provided for the same purpose at the finishing end of the return screw 20, as clearly shown in Figs. 2 and 5. It is also to be noted that the outer end of shaft 17, beyond the return screw 20, is supported in journal box 37. It will be obvious that the thread of the return-screw-sleeve 20 must either be of opposite pitch to that of the feed-screw-sleeve 19, or else that said sleeves must be rotated in opposite directions.

The operation of my device is as follows: It will be noted that the feed screw sleeve, or leader 19, is simply slipped over the spindle 33 and is secured in place by the nut 35 threaded onto the end of the spindle 33. It is a simple matter to change this feed screw for another. In other words, any one of a large set may be used interchangeably with another, to secure any required work of the lathe. The collar 22 which is secured in any desired position to shaft 18, by the set screw 23, is so adjusted as to put the carriage in its initial position at any desired point along the lathe. The collar is then clamped tight to the shaft 18. The shaft 18 is then operated by the hand lever 21 to bring the half nut 24 into engagement with the thread of feed screw sleeve 19. This results in the actuation of the carriage 15 through actuating shaft 18 in exact relation to the thread of said feed screw sleeve. In this way the cutting of any desired thread is readily secured. Upon the completion of the travel of the cutting tool as secured by the feed screw sleeve 19, the shaft 18 is rocked in the opposite direction to bring the half nut 25 into coöperation with the thread of the return screw sleeve 20. The pitch of the thread of this sleeve may be quite coarse so that the carriage is returned to initial position much more quickly than it advanced. For example, if the lathe is run at high speed, the return of the carriage may be at least fifteen times faster than the advance. If the lathe is run at a moderately slow speed, the return may be at least forty times faster than the advance; and where the lathe is run at a very slow speed the return speed may be about eighty times faster than the advance. When it is not desired to utilize either of these screw feeds for operating the carriage, the shaft 18 is turned so as to bring the spring 29 with its end 30 into the notch 31 of lug 32, which holds the shaft in what is called the neutral position, with both half nuts 24 and 25 out of engagement with their coöperating screw leads. It will thus be seen that where a complete set of interchangeable feed screw sleeves 19 is provided, any desired sleeve may be mounted on spindle 33 to secure the desired cutting movement of the carriage. That is to say where the pitch of the thread of the feed screw sleeve is either the same as the thread to be cut or in some multiple relation thereto, there is no trouble in always returning the carriage in exact register with the last cut of the tool. This is a much simpler and less complicated method of securing the desired cutting movement of the carriage than by changing the train of gears, which operates the lead screw and feed shaft of the standard lathe, and the simple rocking of shaft 18 by means of the hand lever 21, is an extremely convenient way to secure the actuation of the carriage in either direction.

What I claim is:—

1. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve removably mounted on the lead-screw, a return-screw-sleeve on the feed-shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, and means to hold said rod in an intermediate position with both half-nuts disengaged.

2. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve removably mounted on the projecting free end of the lead-screw, a return-screw-sleeve on the feed shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, and means to hold said rod in an intermediate position with both half-nuts disengaged.

3. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve re-

movably mounted on the projecting free end of the lead-screw, a return-screw-sleeve on the feed shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, and means at the forward end of said feed-screw-sleeve and at the rearward end of said return-screw-sleeve to automatically disengage the respective half-nut therefrom.

4. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve removably mounted on the projecting free end of the lead-screw, a return-screw-sleeve on the feed shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, and beveled collars at opposite ends of said sleeves constructed and adapted to automatically disengage the respective half-nuts therefrom.

5. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve removably mounted on the projecting free end of the lead-screw, a return-screw-sleeve on the feed shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, means at the forward end of said feed-screw-sleeve and at the rearward end of said return-screw-sleeve to automatically disengage the respective half-nut therefrom, and means to hold said rod in an intermediate position with both half-nuts disengaged.

6. In a lathe, the combination with the usual carriage, lead-screw and feed-shaft, of a supplementary feed-screw-sleeve removably mounted on the projecting free end of the lead-screw, a return-screw-sleeve on the feed shaft, a manually-rotatable rod connected to the carriage, half-nuts mounted on said rod to engage said sleeves alternately, a beveled collar at the forward end of the feed-screw-sleeve and a beveled collar at the rearward end of the return-screw-sleeve, said collars being constructed and adapted to automatically disengage the respective half-nuts from said sleeves, and means to hold said rod in an intermediate position with both half-nuts disengaged.

7. In combination with a lathe, a feed screw, a half nut coöperating therewith, means for arbitrarily moving the half nut into engagement with the screw, and means for communicating the movement imparted by the screw to the half nut, to the carriage, and a beveled collar adjacent the finishing end of the feed screw, for automatically disengaging the half nut therefrom.

GEORGE J. COSTELLO.

Witnesses:
MAE HOFMANN,
JNO. P. CROASDALE.