

No. 719,110.

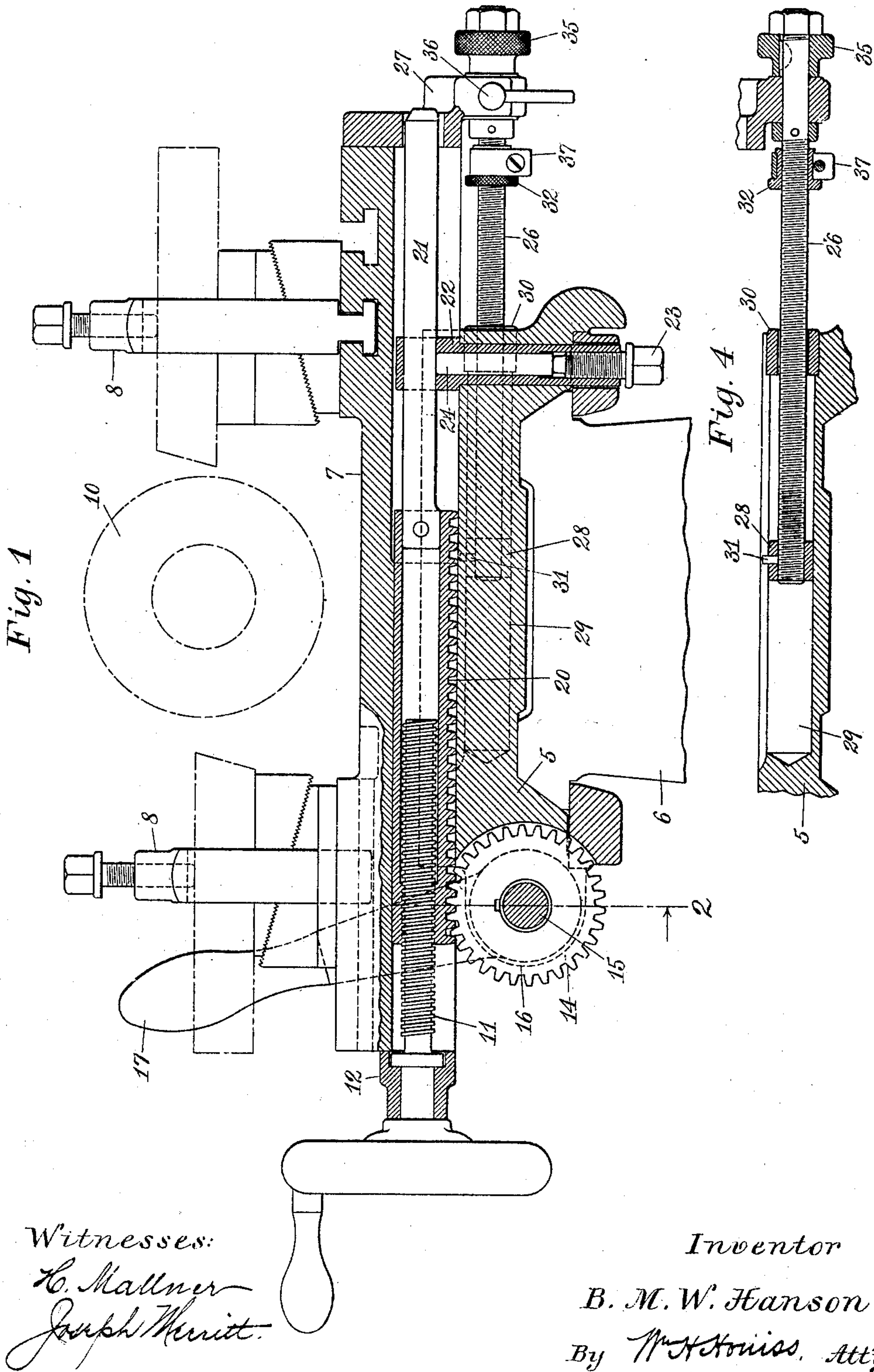
PATENTED JAN. 27, 1903.

B. M. W. HANSON.  
TOOL CARRIAGE MECHANISM.

APPLICATION FILED JUNE 5, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3

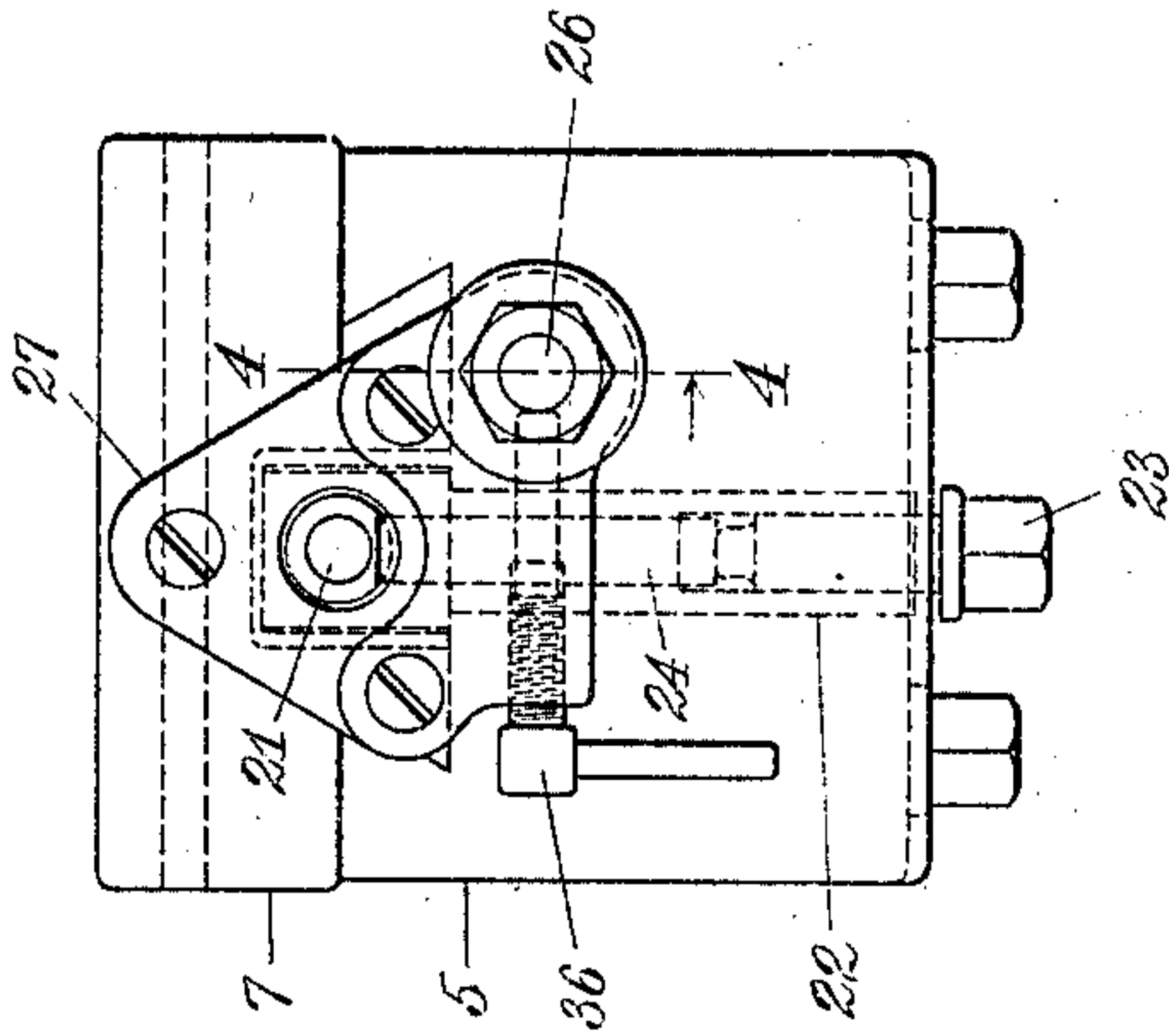
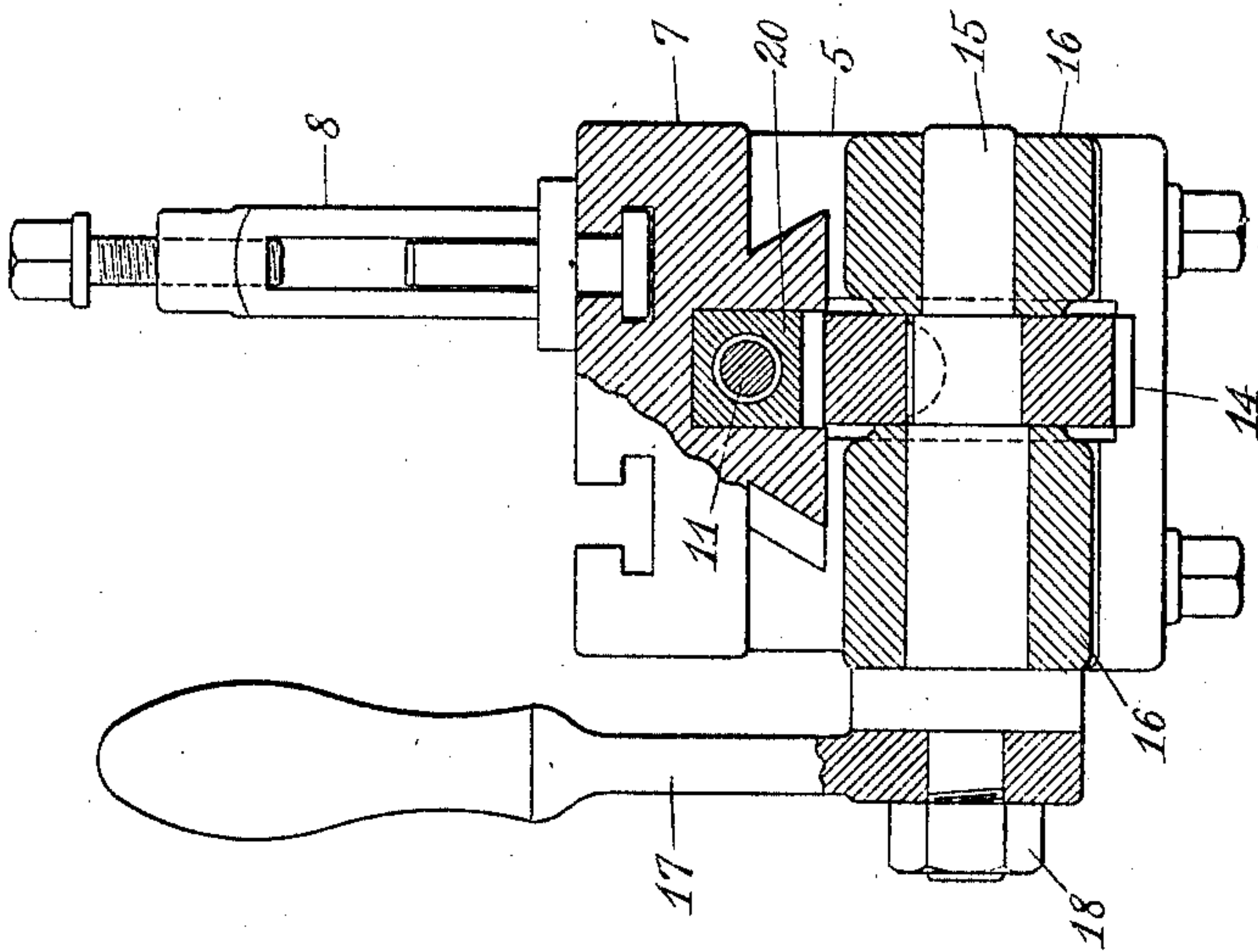


Fig. 2



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# UNITED STATES PATENT OFFICE.

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## TOOL-CARRIAGE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 719,110, dated January 27, 1903.

Application filed June 5, 1902. Serial No. 110,331. (No model.)

*to all whom it may concern:*

Be it known that I, BENGT M. W. HANSON, a citizen of Sweden, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Tool-Carriage Mechanism, of which the following is a full, clear, and exact specification.

This invention relates to improvements in means for operating tool carriages and slides of various kinds.

It comprises means whereby such slides or carriages may be utilized to advantage both in light and heavy work, the first permitting a quick movement of the slide, while the second requires a slower and more powerful movement.

The invention also comprises an adjustable stop device for limiting the extent of movement of the slide in one or both directions.

This invention is herein illustrated as applied to the tool-carrying cross-slide or carriage of a lathe or screw-machine.

Figure 1 of the drawings is a side view in section, taken longitudinally through the carriage and base. Fig. 2 is a front view in section, taken along the line 2 of Fig. 1. Fig. 3 is a rear end view of the tool slide or carriage, showing the adjustable stop device. Fig. 4 is a fragmentary side view in section, taken along the longitudinal center of the stop-screw.

The base 5, which is fitted to slide upon ways of the bed 6, and the tool carriage or cross-slide 7 is fitted in suitable guiding-ways upon the top of the carriage. Suitable tool-posts 8 or other clamping devices are mounted upon the top of the tool-slide, usually upon opposite sides of the spindle 10, which is indicated by dot-and-dash circles in Fig. 1 only. These tool-posts are thus disposed upon opposite sides of the spindle in order that two of them may be brought into operation upon the same or closely adjacent portions of the work and are brought into operation by movement of the tool-slide in opposite directions. All the parts thus far described are of the usual and well-known construction and arrangement. These tools carried upon the

tool-slide are employed for a great diversity of purposes. Sometimes they are used for taking a very light shaving cut upon the work or for cutting it off from the rod by means of a thin parting-tool. These require very little pressure, and therefore may and should be moved rapidly in order to economize time in the operations. On the other hand, these tools carried upon the cross-slide are frequently employed for wide or heavy cuts, requiring considerable pressure to feed them steadily to the work, thus necessitating a slow and powerful feeding movement. It has hitherto been customary in building such machines to provide the cross-slide either with a screw and nut or with a rack and pinion, according as the machine was expected to do light or heavy work, the screw being employed in the former case and the rack and pinion in the latter case, the slow and powerful screw movement being desirable for heavy work, while the quicker rack-and-pinion movement is more desirable for light work. In this invention I provide the same tool-slide with both of these moving agencies in a simple and inexpensive way, so that either the screw or the rack-and-pinion movement may be employed at will, according to the work to be done, the conversion from one form to the other being accomplished merely by tightening or loosening a single screw.

In the embodiment of this invention shown in the accompanying drawings the screw 11 is journaled in the hub or boss 12 appurtenant to or integral with the tool-slide 7, while the pinion 14, which is keyed upon the shaft 15, is journaled in the bosses or bearings 16 appurtenant to the carriage 5. The shaft 15 is provided with a handle 17, which is clamped upon the shaft by means of the nut 18, so that the handle may be set at any position most convenient for the operator. It is herein shown projecting upwardly; but it is commonly more convenient to the hand of the operator to have it turned downwardly. The screw 11 and the pinion 14 cooperate to move the slide 7 with relation to the carriage 5, being connected together by means of a combined nut and rack 20, which is preferably



square, as shown in Fig. 2, and is fitted in a longitudinal seat in the under side of the tool-slide 7. This combined nut-rack is bored longitudinally to receive the screw, the bore being threaded at a sufficient distance to form a suitable nut for cooperating with the screw. The under side of the nut-rack is provided with teeth, which engage with the teeth of the pinion 14, so that by turning the latter the tool-slide 7 will be correspondingly moved through the medium of the nut 20 and the screw 11. The angle of the spiral of the ordinary cross-feed screw is not great enough to rotate the screw by the longitudinal movement of the nut, so that no additional means are required for keeping the screw from turning when operating the tool-slide by the rack-and-pinion movement. On the other hand, however, it is desirable and usually necessary to provide means for clamping the nut-rack 20 in place when employing the screw for the cross-feed, since the end pull and push of the screw upon the nut-rack would otherwise turn the pinion instead of moving the slide. In order to thus secure the rack in place while employing the cross-feed screw, I provide the rack with an extension 21, which may be integral with the rack, but is preferably, as herein shown, a shaft fitted into the end of the bore of the rack in line with the screw and secured therein by means of a cross-pin. This extension-shaft 21 passes through a clamping-yoke 22, which is mounted in the carriage 5. The yoke is provided with a set-screw 23, which is tightened against the flattened under side of the extension 21, preferably through the medium of a plug 24. When the set-screw 23 is loosened, the nut-rack 20 is free to travel longitudinally in or with the cross-slide, according as it is moved by means of the screw 11 or the pinion 14; but when the screw 23 is tightened the nut-rack becomes, in effect, a part of the carriage 5, thus affording a firm basis for the screw 11 to push and pull against in operating the tool-slide.

My improved stops for gaging or limiting the movement of the tool-slide in both directions consist of a screw 26, which is journaled in a bracket 27, attached to or integral with the rearward end of the tool-slide 7. The inner end of the screw engages in the nut 28, which is fitted to slide in a longitudinal bore 29 at the back of the carriage, the end of the bore being closed by means of the bushing 30, which forms the stop for the movement of the slide in both directions, the nut 28 colliding with the inner end of the bushing 30 to limit the rearward movement of the slide, while the forward movement thereof is stopped by means of the nut 32 colliding with the outer end of the bushing 30. The nut 28 is prevented from turning by means of a pin or key 31, which slides in a longitudinal groove or keyway above the recess or bore 29, and in order to adjust this nut to the required position to serve as a stop the stop-screw 36

is turned, by means of its knob 35, until the nut 28 is moved to the required position, after which the screw 26 is secured from further turning by means of the screw in the bracket 27, as best shown in Fig. 3. The stop-nut 32 is also preferably provided with a knurled rod, as shown in Fig. 1, and that nut is preferably split, so that it may be clamped firmly upon the screw in its adjusted position by means of its clamping-collar 37. When it is desired to adjust only the nut 28, the set-screw 36 and the clamping-collar 37 are both loosened, and the latter is held from turning while the screw is turned to adjust the screw 28 to position. When it is desired to adjust only the stop-nut 32, the collar 37 is loosened and the nut 32 is turned to its required position and again clamped in place by means of the collar 37.

In the operation of this device the operator first determines whether he will use the feed-screw 11 or the rack-and-pinion movement. In the former case he secures the nut-rack to the carriage by tightening the set-screw 23. In the latter case he leaves the screw 23 loose, so that the nut-rack can readily be drawn forward and back with the tool-slide. Slight or temporary adjustments of the nut-rack with relation to the tool-slide 7 may be effected by holding the handle 17 with one hand and turning the screw with the other.

I claim as my invention—

1. The combination of a tool-carriage, a base therefor, a combined screw-nut and rack mounted intermediate the said parts for longitudinal movement, a pinion mounted in the base and engaging with the said rack, and means for clamping the rack to the base against longitudinal movement, comprising a yoke 22 mounted in the base and operably connected with the rack to permit the latter to slide freely, the yoke being provided with a screw for tightening the connection between the yoke and the rack.

2. The combination of a tool-carriage, a base therefor, a combined screw-nut and rack mounted intermediate the tool-carriage and the base for longitudinal movement, a pinion mounted on the base and engaging with the rack, a feed-screw mounted on the carriage and engaging with the screw-nut, and means for clamping the rack to the base against longitudinal movement, comprising a yoke mounted upon the base at the rearward side thereof, an extension appurtenant to the rack, fitted to slide through the yoke, and a screw for clamping the extension to the yoke.

3. The combination with a base and with a tool-carriage mounted to reciprocate thereon, of an adjustable stud for limiting the reciprocations of the carriage in both directions, comprising a stop-abutment appurtenant to one of said parts, a screw mounted for rotation on the other of said parts, and two stop-nuts fitted upon the screw, one of the said stop-nuts being provided with means for clamping it to the screw to turn therewith,



and the other of said nuts being provided with means for preventing it from turning with the screw.

4. The combination of a tool-carriage, a  
5 base upon which the slide is mounted, means  
for reciprocating the carriage, relative to the  
base, and an adjustable stop device for limit-  
ing the movements of the carriage, comprising  
an abutment appurtenant to one of the parts,  
10 a screw mounted for rotation on the other  
part, and extending through the said abut-  
ment, a nut clamped to the screw at one side  
of the abutment, a loose nut carried by the  
screw from the other side of the abutment,  
15 and means for preventing the loose nut from  
turning with the screw.

5. The combination with a base, and with  
a tool-carriage, mounted to reciprocate there-  
on, of an adjustable stop device to limit the  
20 movement of the carriage in both directions,  
comprising a stop-abutment appurtenant to  
one of the said parts, a stop-screw mounted  
for rotation on the other of said parts, a  
non-rotating stop-nut mounted upon one side  
25 of the abutment, a rotatable stop-nut fitted

upon the screw at the other side of the abut-  
ment, means for clamping the nut upon the  
screw, and means for clamping the screw in  
its bearing.

6. The combination with a base, and a tool- 30  
carriage mounted to reciprocate thereon, of  
an adjustable stop device for limiting the  
movement of the carriage in both directions,  
comprising an abutment appurtenant to the  
base, a stop-screw mounted for rotation upon 35  
the carriage, a non-rotating nut upon the  
screw at one side of the abutment, a rotata-  
ble nut upon the screw on the other side of  
the abutment, means for clamping and un-  
clamping the rotatable nut upon the screw, 40  
and means for clamping and unclamping the  
screw to and from its bearing in the carriage.

In testimony whereof I have signed my  
name to this specification, in the presence of  
two subscribing witnesses, June 3, 1902.

BENGT M. W. HANSON.

Witnesses:

H. E. BAILEY,

WM. H. HONISS.