

No. 782,239.

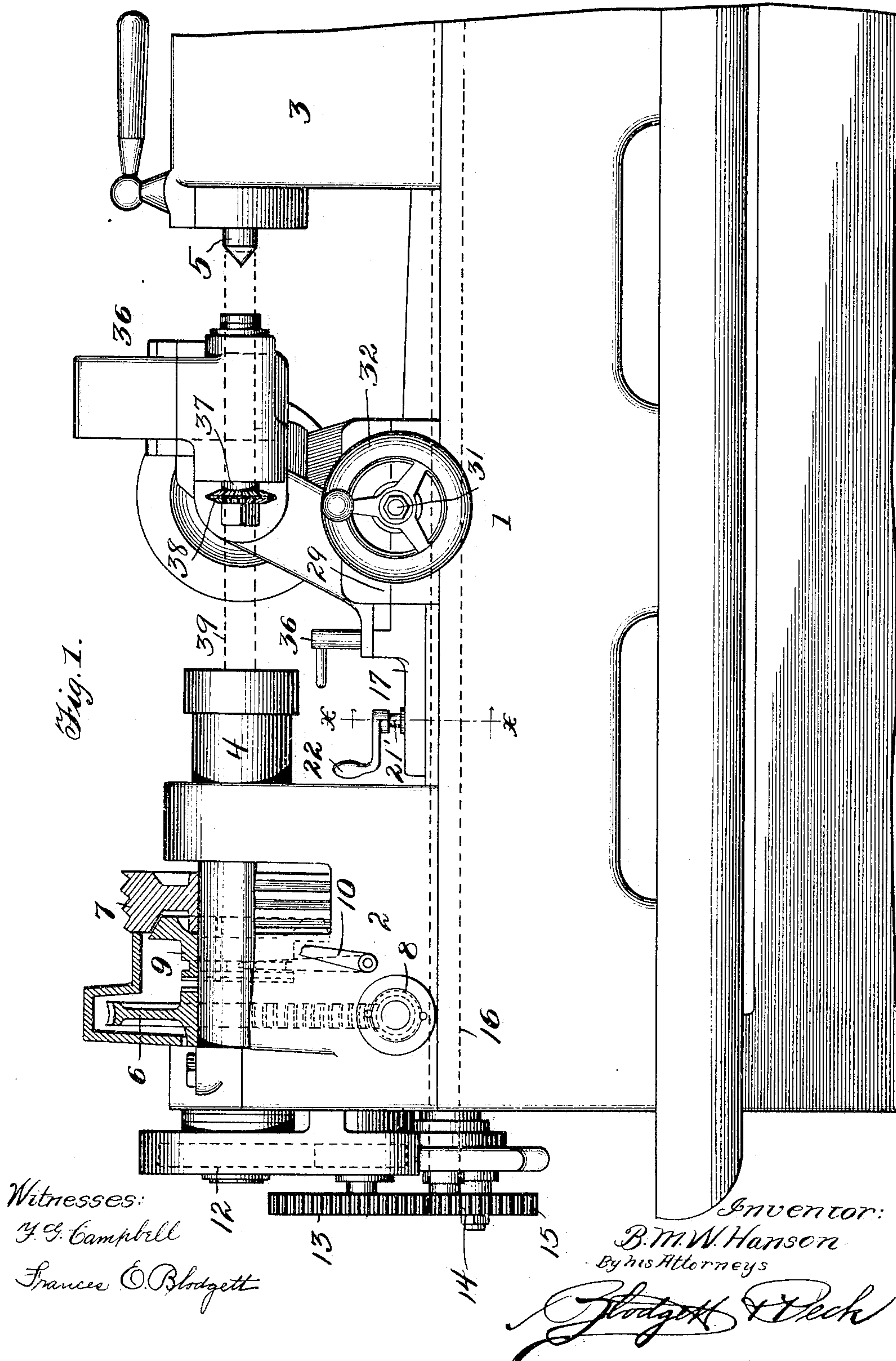
PATENTED FEB. 14, 1905.

B. M. W. HANSON.

SCREW FEED MECHANISM FOR METAL WORKING MACHINES.

APPLICATION FILED NOV. 29, 1902.

2 SHEETS—SHEET 1.



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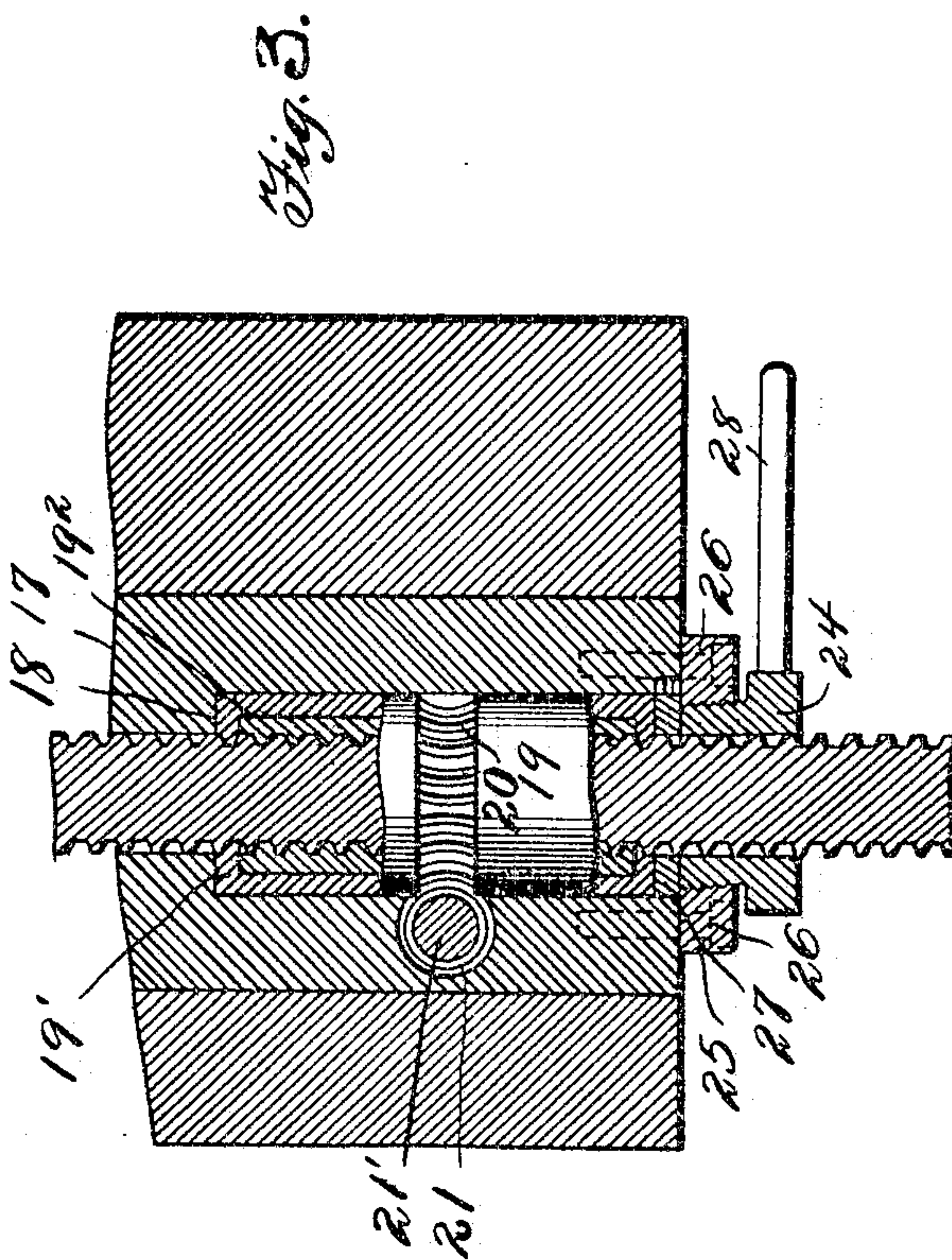
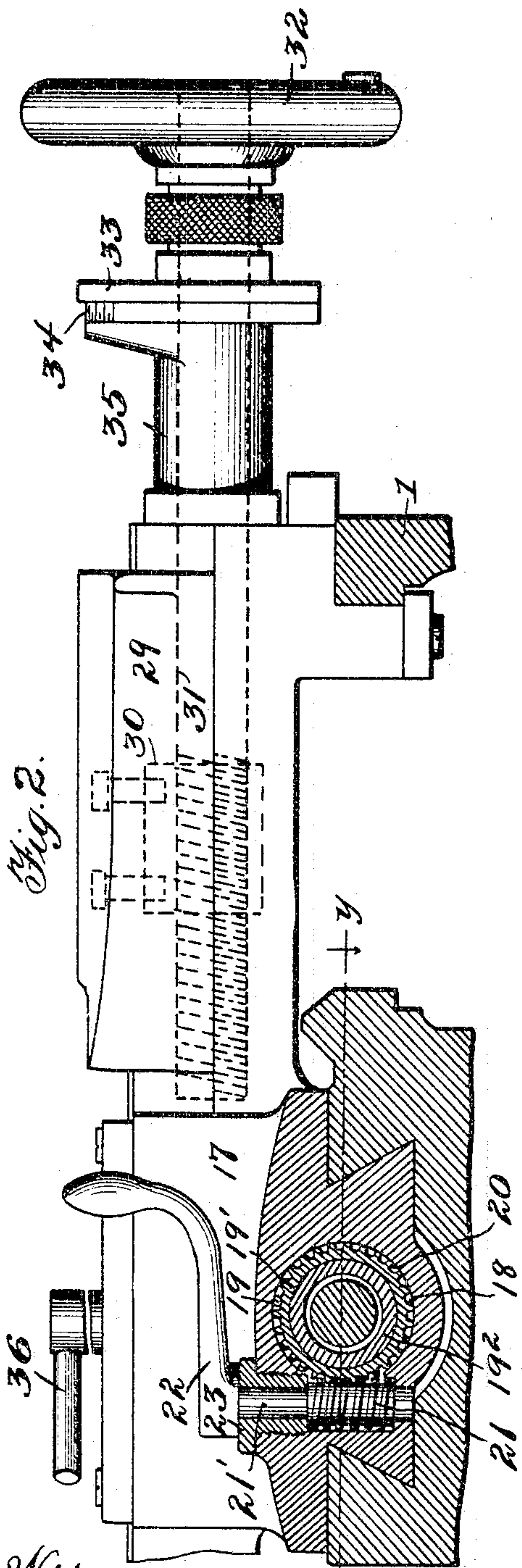
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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SCREW FEED MECHANISM FOR METAL-WORKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 782,239, dated February 14, 1905.

Original application filed July 12, 1902, Serial No. 115,337. Divided and this application filed November 29, 1902. Serial No. 133,179.

To all whom it may concern.

Be it known that I, BENGT M. W. HANSON, a citizen of Sweden, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Screw Feed Mechanism for Metal-Working Machines, of which the following is a specification.

My invention relates to feed mechanisms for metal-working machines, and is shown applied to a machine for manufacturing spiral products from metal, although it is not limited to such use.

One object of the invention is the provision of means whereby the carriage on which the tool is mounted may be reciprocated in either direction by either automatic or manual devices.

Another object of the invention is the provision of devices mounted on the carriage for actuating the lead-screw by hand when it is desired to set the cutter or change its position independently of the automatic action of said lead-screw.

Another object of the invention is the provision of a carriage provided with a recess for the reception of a nut of peculiar construction and of means movable with said carriage for manually actuating the nut.

In the present machine the carriage is automatically advanced and retracted by means of a lead-screw engaging a nut of said carriage, said lead-screw being driven by a train of gearing involving change-gears, so that the desired speed may be imparted to the screw. It is frequently necessary to adjust the carriage along the bed of the machine independently of the automatic action of the lead-screw to set the cutter in proper position to commence its work or reset said cutter in its correct location should it have for any reason been withdrawn, and by the provision of my improvements these results may be easily and readily effected, as will be hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation of a metal-working machine with my improvements applied thereto. Fig.

2 is a section on line *xx* of Fig. 1, and Fig. 3 is a horizontal section on line *yy* of Fig. 2. Like characters refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the frame or bed of the machine, which may be of any approved construction. Upon this bed are mounted a head-stock and a tail-stock 3, and journaled in the head-stock is a tubular spindle 4, carrying a chuck-spindle 4', while in the tail-stock is mounted the usual adjustable center 5 for supporting the rear end of the work. For rotating the chuck-spindle in opposite directions any desired means may be employed; but I have shown for this purpose a worm-gear 6 and a pulley 7, the latter being driven by multiple belts received in grooves in its periphery, and the worm-gear being actuated by a worm 8, to which power may be applied in any desired way. Both the worm-gear 6 and pulley 7 are loose upon the spindle, and either may be connected thereto when desired by a shiftable clutch 9, splined to the spindle and controlled by any desired means—as, for instance, a pivoted lever 10. (Shown in Fig. 1.) Keyed to the end of the spindle 4 is a gear 12 for driving a gear 13, the latter engaging a change-gear pinion 14, which meshes with a gear 15, secured to the end of a lead-screw 16.

Mounted upon ways of the bed is a carriage 17, having a chamber 18 for the reception of a feed-nut 19 of peculiar construction. This feed-nut consists of a shell 19', open at its ends to permit the passage of the lead-screw, and a lining or nut proper, 19", of Babbitt or equivalent antifriction metal, molded upon said feed-screw, and consequently accurately fitting the thread thereof. On its periphery this shell 19' is provided with a worm-wheel 20, the teeth of which engage a vertical worm 21 on a shaft 21', journaled in the carriage, and having a lever 22 secured to its upper end for turning said shaft, said lever being secured to the upper end of the shaft just above a tubular screw 23, threaded into the carriage, as illustrated in Fig. 2. As will be observed from Figs. 2 and 3, the smooth shell 19' of the

nut 19 is of a diameter but slightly less than that of the inclosed chamber 18 of carriage 17, so that it practically fills the same and is supported firmly at all points of its periphery against chattering or lost motion, and, as will be seen by Fig. 2, the screw 23, surrounding the worm-shaft 21', closes the chamber in which said shaft operates. In this way the feed-nut and its operating-gearing are protected and inclosed against the entrance of dust, dirt, or other foreign matter, and the lead-screw where it passes through the nut is also protected.

For locking the nut securely in its seat, so that it will not turn therein during the rotation of the lead-screw, any suitable means may be employed; but shown for this purpose is an externally-threaded sleeve 24, working in a nut 25, attached to the carriage by screws 26, the end of the sleeve bearing against a washer 27 in contact with the shell and the head of said sleeve being provided with a lever 28 for turning purposes. As will be obvious, when the sleeve 24 is turned to force the washer against the nut said nut will be locked in its seat against rotation and will consequently cause the carriage to be actuated by the lead-screw. Should, however, it be desired to make an independent adjustment of the carriage for any purpose, the sleeve 24 will be released, and then by grasping the handle 22 and turning worm-shaft 21' the nut may be rotated upon the screw in either direction until said carriage is brought to the desired position.

Fitted in transverse ways of the carriage 17 is a slide 29, carrying a nut 30 for the reception of a screw 31, mounted in bearings of said carriage and provided with a hand-wheel 32, by which it may be turned when it is necessary to adjust said slide, said screw carrying a micrometer-head 23, coöperating with graduations 34 on the head of one of the bearings 35, through which the screw passes to facilitate precisionized adjustment and the slide being clamped to its ways to hold it rigidly in place after an adjustment has been made by a lever-screw 36, as shown in Fig. 1.

Carried by the transverse slide 29 is an adjustable cutter-frame 36', which may be of the construction shown in my application filed July 12, 1902, Serial No. 115,337, of which the present case is a division, and journaled in this frame is a rotary shaft 37, to which a milling-cutter 38 is secured. Here, however, it is distinctly to be understood that my present invention is not restricted to any particular cutter-frame nor to any specific kind of tool, for frames carrying tools different from that illustrated may be mounted upon the slide as substitutes for the construction shown without departure from the invention.

In the operation of my improved feed mechanism stock 39 is inserted through the tubular chuck-spindle 4' until its end is received

upon the center 5, and said stock being grasped by the chuck the clutch is shifted to lock the continuously-rotating worm-gear 6 to said spindle, thus setting the latter in motion and rotating the stock. Carriage 17 having been reciprocated by the means described to bring the cutter to the desired position with relation to the work and the slide 29 having been adjusted to cause the cutter to engage such work, the sleeve 24 is turned to lock the nut in its seat, and consequently prevent the same from rotating with the lead-screw and thus stripping or injuring the teeth of the worm-wheel 20 and worm 21. Reciprocation of the carriage at a speed governed by the gear-train for actuating the lead-screw now takes place, the cutter operating upon the work until the given length of thread or spiral it is desired to form has been made.

Suitable stop or knock-off mechanism—for instance, that shown in my application aforesaid—may be employed for automatically controlling the operation of the carriage; but it constitutes no part of my present invention.

Changes may be made in the form and proportions of the parts and mechanism different from that shown may be utilized to drive the lead-screw without departure from the invention.

Having thus described my invention, what I claim is—

1. The combination, with a carriage having a chamber, of a nut inclosed by said chamber; a screw working in the nut; a device in said chamber at one end of the nut; and means for applying pressure to said device to force the nut against the end wall of the chamber and thus lock it against rotation.

2. The combination, with a carriage having a chamber, of a nut mounted in said chamber, said nut having a gear; a washer bearing against one end of the nut; a screw for applying pressure to the washer; a gear on the carriage and in mesh with the gear of the nut; and means for manually actuating said carriage-gear when the nut is released.

3. The combination, with a chambered carriage, of a screw; a nut; means for applying pressure to an end of the nut to lock it in the chamber of the carriage; means for rotating the screw; and means for manually operating the nut when the pressure upon the same is relieved.

4. The combination, with a carriage having a chamber, of a nut mounted in and inclosed by said chamber and having a peripheral gear; a lead-screw working in the nut; a spindle; means for locking and releasing the nut; gearing for actuating the lead-screw; and means on the carriage for rotating the nut when released.

5. The combination, with a tool-carriage having a recess, of a nut seated in and inclosed by said recess and having a peripheral

worm-wheel; means for applying end pressure to the nut to lock it in position; a worm journaled in the carriage and in engagement with said worm-wheel, the shaft of said worm
5 having a handle; a sleeve threaded into the carriage, and through which the worm-shaft passes, and a screw with which the nut engages.

6. The combination, with a carriage having
10 a chamber, of a nut mounted in said chamber; an internally-threaded plate secured to the carriage adjacent to the opening of the cham-

ber; a tubular, externally-threaded screw in engagement with the thread of said plate; a lead-screw passing through the bore of the
15 tubular screw and engaging the thread of the nut; and means for actuating said screw.

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

BENGT M. W. HANSON.

Witnesses:

H. E. BAILEY,

GEO. E. BUTLER.