A. B. LANDIS.

THREAD CUTTING MACHINE.

APPLICATION FILED MAR. 4, 1910.

1,017,889.

Patented Feb. 20, 1912.

4 SHEETS—SHEET 1.

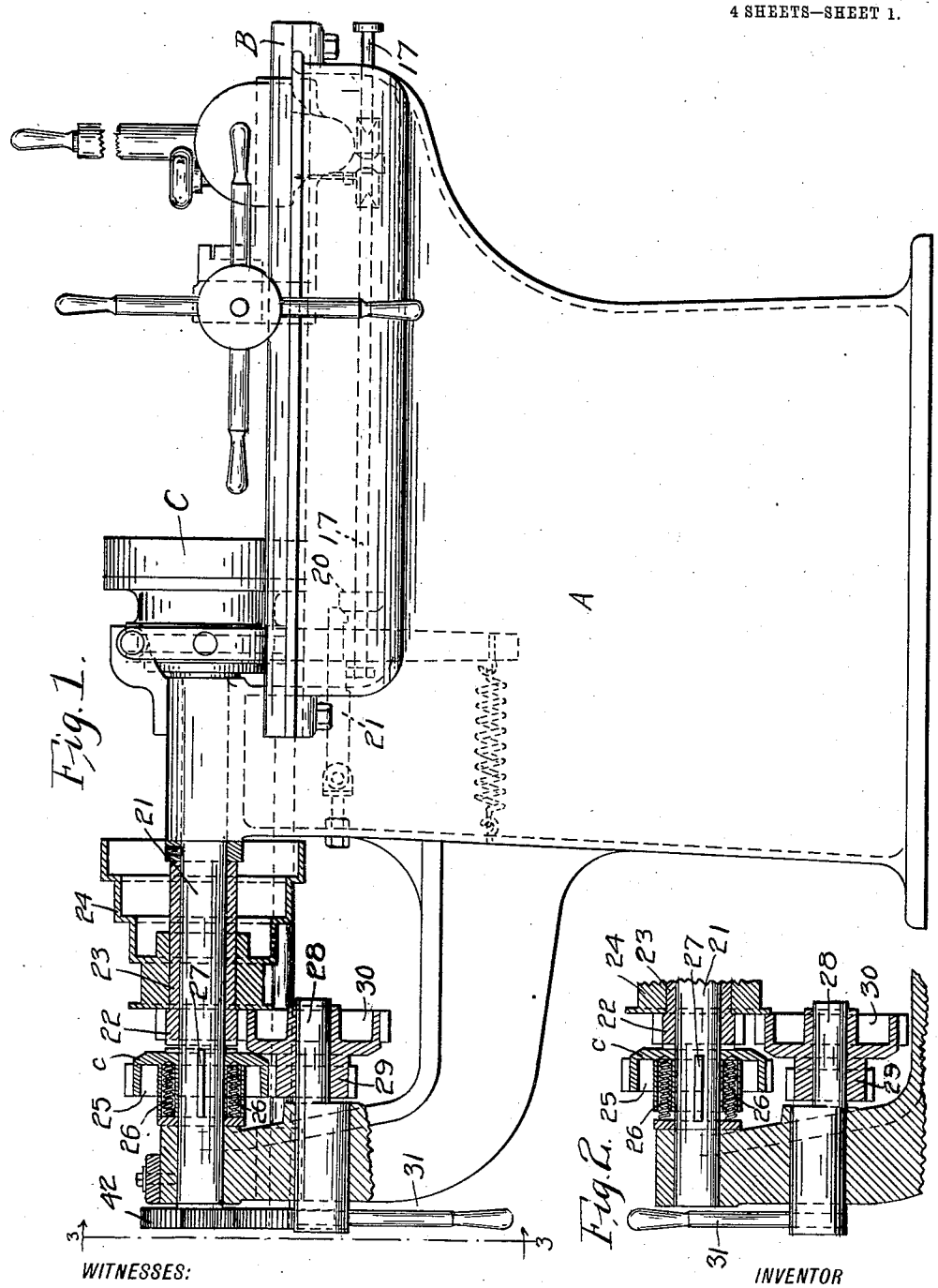

Fig. 1.

Fig. 2.

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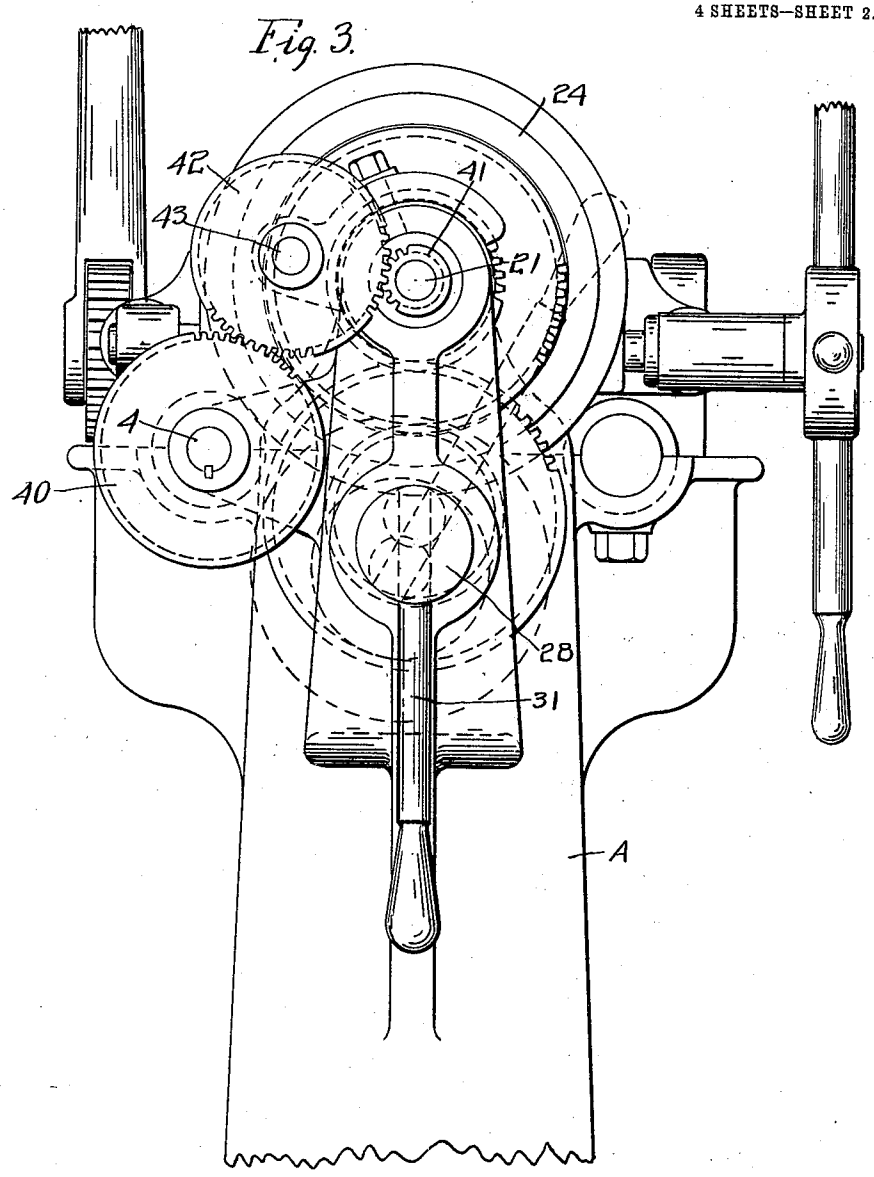
Fig. 3.



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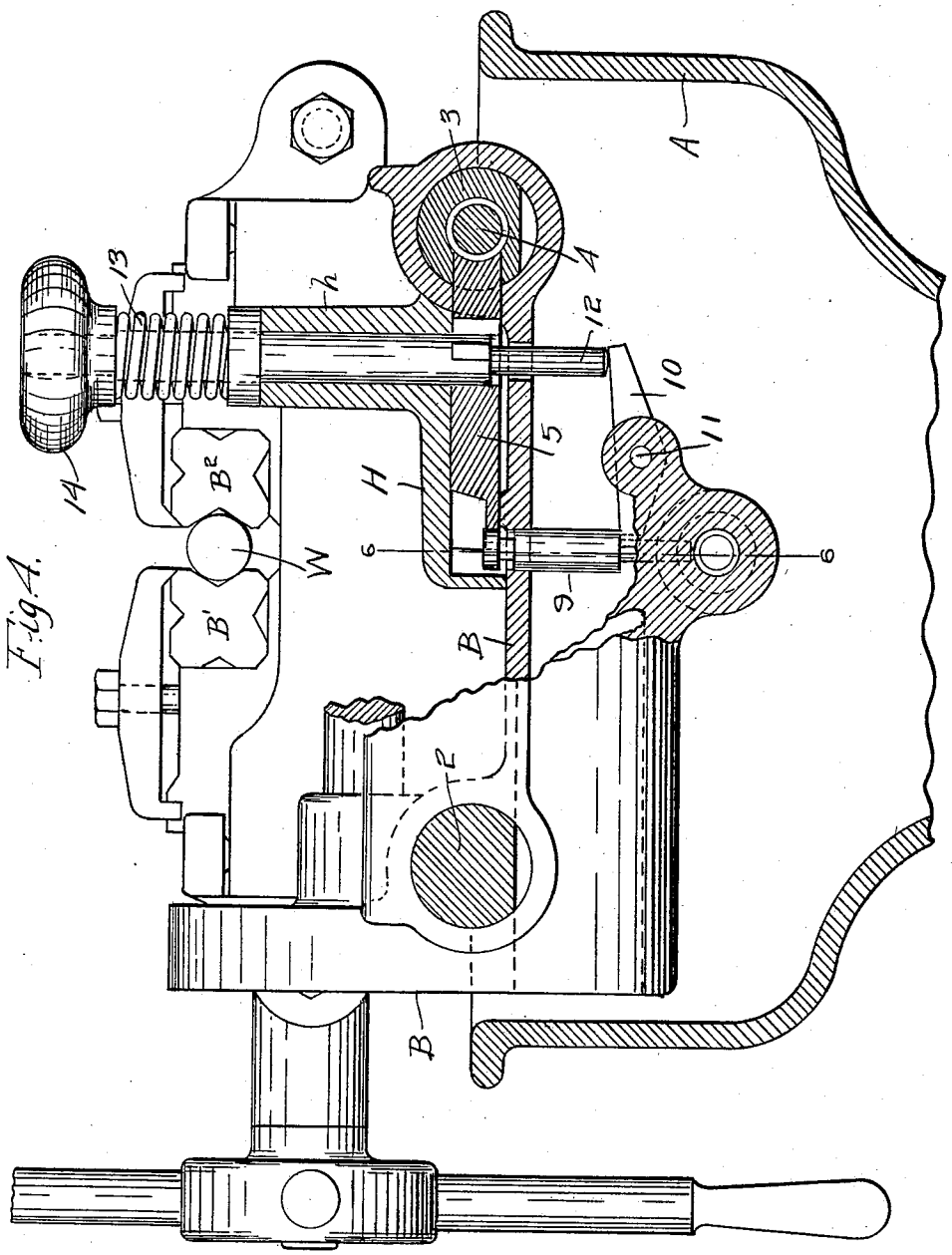

Fig. 4.

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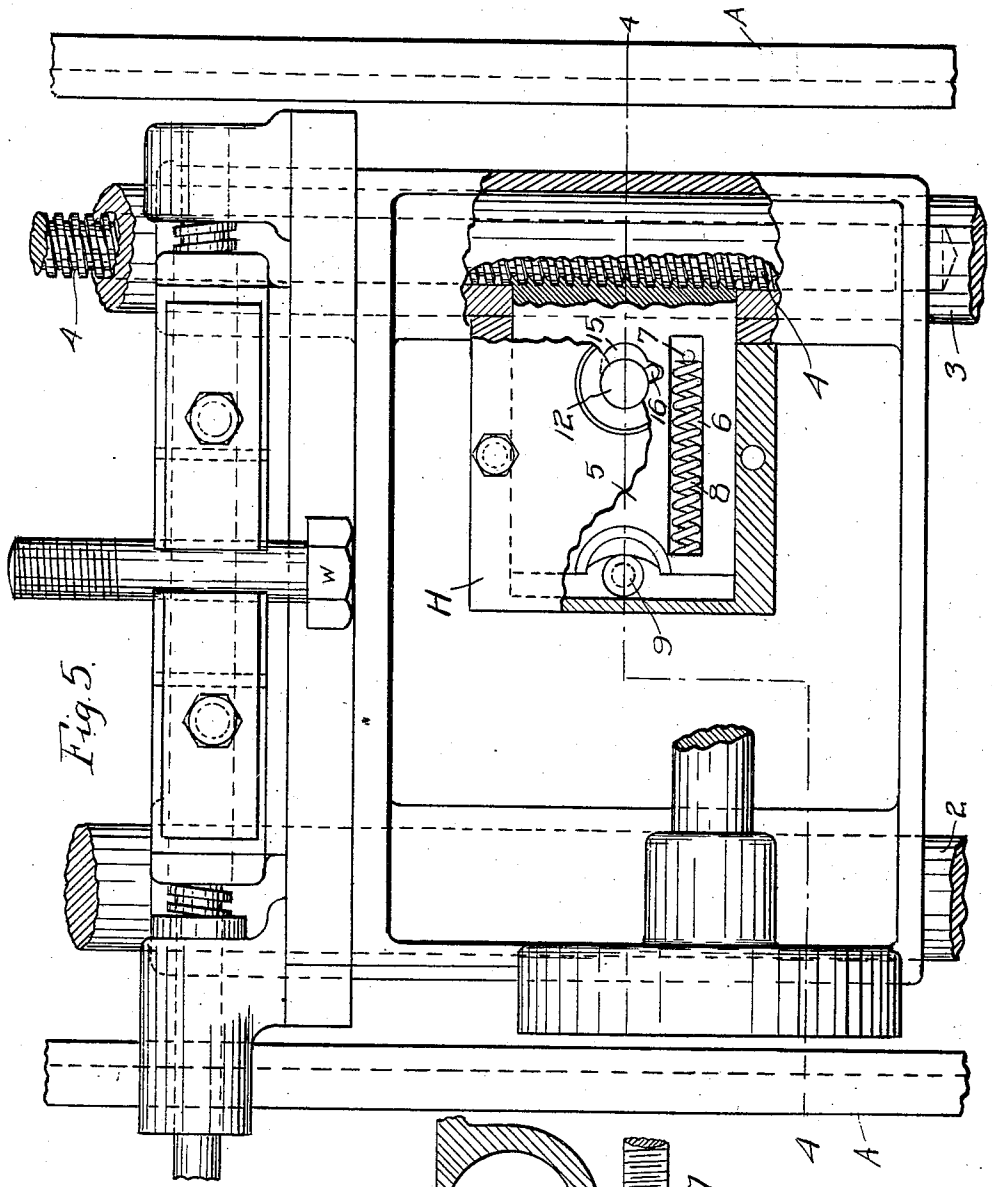

Fig. 5.

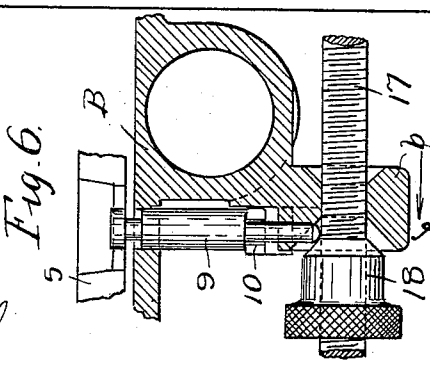

Fig. 6.

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UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

THREAD-CUTTING MACHINE.

1,017,889. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed March 4, 1910. Serial No. 547,251.

To all whom it may concern:

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Thread-Cutting Machines, of which the following is a specification.

My said invention consists in various improvements in the details of construction of screw-cutting machines whereby a positive feed is provided for the work carriage, and quickly and conveniently operated differential gearing is provided for the cutter-head drive, and other advantages secured in the details of construction, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a machine of the character mentioned, the portion thereof illustrating the cutter-head drive mechanism being shown in central section, Fig. 2 a view similar to a portion of Fig. 1 showing said drive mechanism in reverse position, Fig. 3 an end elevation as seen when looking in the direction indicated by the arrows from the dotted line 3—3 in Fig. 1, Fig. 4 a cross section on the dotted line 4—4 in Fig. 5, Fig. 5 a top or plan view of a portion of the work carriage with a portion of the casing surrounding the feeding mechanism broken away to illustrate the parts more clearly, and Fig. 6 a detail section on the dotted line 6—6 in Fig. 4.

In said drawings the portions marked A represent the bed of the machine, B the frame of the work carriage and C the cutter-head.

The principal parts of the frame and carriage are of the general construction heretofore employed by me and the cutter-head C is one of my well known construction, or may be of any approved construction. These parts, therefore, will not be described in detail, but only given such incidental description as may be necessary to a clear understanding of the features to which my present invention particularly relate.

The carriage frame B is mounted to slide upon longitudinal rods or guide-bars 2 and 3 which are located within the outer edges of the bed A, said bed being of sufficient width to extend beyond the edges of the carriage to receive the cuttings and oil drippings within its confines during the operation of the machine, as shown and described in my application No. 482,800 filed March 11, 1909. The clamping jaws B′ and B², between which the work W is secured, as well as the means for adjusting and regulating said jaws to hold the work, are also preferably of the same structure and arrangement as shown in said application. One of the bars 3 on which the carriage is mounted to slide is, however, formed hollow, or with a longitudinal perforation, and contains a screw-threaded shaft 4, which is mounted in bearings on the frame A and formed with its inner end screw-threaded and mounted to rotate in said bar 3, being provided on its outer end with a gear 40 and geared to a gear 41 on driving shaft or spindle 21, through an intermediate gear 42 on a counter-shaft 43. The inner side of said guide-bar 3 is formed with a slot which cuts into the perforation containing the screw-shaft 4. A sliding nut or plate 5 is mounted in an appropriate housing H on the frame of carriage B and is adapted to project through said slot. It is formed on its adjacent edge with screw-threads which engage with the threads of said screw-shaft. Said plate is formed with a transverse slot 6 and a pin 7 is secured in the frame B and projects up through said slot near the inner end thereof. A coiled spring 8 is mounted between said pin and the outer end of said slot and normally holds said plate rearwardly to hold its inner edge out of engagement with screw-shaft 4. The sliding nut 5 is of considerable width and rectangular in form, as shown, its straight edges fitting snugly between the sides of the housing, forming rigid ways and serving to guide the carriage and the work truly to the die. A plunger 9 is mounted to slide in a perforation in the frame B adjacent to the rear edge of said plate 5. Said plunger is formed with a circumferential groove near its upper end thus forming a head thereon with a neck between said head thereof and its main body. The edge of said plate adjacent to said plunger is slightly recessed and cut down to a thickness which will readily slide into said groove which is of a depth, which, when said plate slides rearwardly to engage therewith, will free the threads on its inner edge from the threads of the screw-shaft. Said plunger 9 is formed with a shoulder near its lower end under which a forked inner end

of a lever 10 engages. Said lever 10 is mounted on a pivot 11 and its other end is directly beneath the lower end of a spring mounted plunger 12 which is adapted to contact therewith. Said spring mounted plunger 12 is mounted to slide in a socket *h* on the top of the housing H, being normally held upward by a spring 13 and provided on its upper end with a knob 14. Said plunger projects through a perforation 15 in plate 5 and is provided with a wing, or detent, 16 upon one side which is adapted to engage with a notch in one side of said perforation 15.

The lower end of plunger 9 is in line with a screw-trip rod 17, which is secured on the bed A and provided with an adjustable nut 18 with a tapered inner end, which, when the carriage reaches the appropriate point, contacts with the lower end of said plunger and raises it to release the top, or head, thereof from engagement with the rear edge of said plate 5. As soon as said plunger rises so that the rear edge of the plate can slide back into the groove, spring 8 will expand to slide said plate backward and disconnect the carriage from the feeding screw-shaft 4. When it is desired to reëngage said plate the operator turns the knob or handle 14 in the appropriate direction and, through the connection between the wing 16 on the side of plunger 12 and the notch in the side of perforation 15, throws said plate forward so that the screw-threads on its inner edge will engage with the screws on said feeding screw-shaft. As soon as plate 5 is slid forward a sufficient distance so that its rear edge will clear the head of plunger 9 said plunger will fall by its own weight into the position shown in Fig. 4 with the shoulder near its lower end resting upon the top of the forked end of lever 10 and its head behind the edge of the plate to hold it into engagement with the feed screw-shaft 4. When it is desired to release the feed shaft from engagement with the carriage at any point before the nut 18 is reached it can be done by pressing on knob 14 which will force down plunger 12 and operate through lever 10 to raise plunger 9 to permit plate 5 to slide back out of engagement as before described.

The screw-rod 17 is provided with a collar 20 near its inner end adapted to operate a latch 21 controlling the die opening mechanism, but this mechanism being like that shown in my previous application need not be particularly shown or described herein. During the cutting operation arm *b* of frame B slides over rod 17 in the direction indicated by the arrow in Fig. 6, and immediately after tapered nut 18 operates to raise plunger 9 said arm contacts said nut and slides rod 17 to trip the die opening mechanism and stop the work. It will thus be seen that the feeding of the carriage is stopped at the appropriate point in relation to the opening of the die for releasing the work.

The cutter-head C is mounted upon a shaft or spindle 21 on which a gear wheel 22 is loosely mounted provided with a long sleeve 23 on which is rigidly mounted a cone driving pulley 24. A gear 25 is slidably mounted by means of a spline 27 on said shaft 21 adjacent to gear 22 and on the adjacent face of each of said gears 25 and 22 is formed a clutch-part. Coiled springs 26 are mounted in sockets in the hub of said gear 25 and bear at their rear against a suitable washer located against the adjacent face of the bearing and normally tend to force said clutch-parts into engagement. A cam stud shaft 28 is mounted adjacent to and parallel with shaft 21 and is provided with a cone gear having gear faces 29 and 30 of different sizes. Gear 30 is adapted to mesh with gear 22 on shaft 21 while gear 29 is adapted to mesh with gear 25 on the same shaft. Gears 22 and 25 are of different diameters and gears 29 and 30 of correspondingly different diameters, the small gear 29 being adapted to mesh with the large gear 25 and the small gear 22 with the large gear 30. The adjacent vertical sides of the two large gears 25 and 30 are formed with tapered outside corners, as shown in Figs. 1 and 2, and which, when the cam-shaft 28 is turned as shown in Fig. 1, will contact, the tapered corner of gear 30 operating upon the tapered corner of gear 24 to slide said gear 25 rearwardly, compressing the springs 26 and bringing the gears 22 and 30 into engagement and also gears 25 and 29. When in such engagement the drive will be transmitted through the small gear 22 and the large gear 30 and then through the small gear 29 and the large gear 25, and driving shaft 21 operated at slow speed. When it is desired to drive at high speed the operator, by means of lever 31, throws cam-shaft 28 to the position shown in Fig. 2, which disconnects gears 29 and 30 from gears 25 and 22 and at the same time throws gear 30 downwardly so that its tapered face adjacent to gear 25 drops out of contact therewith, permitting the springs 26 to expand and force the clutch-part on the face of gear 25 into engagement with the clutch-part on the adjacent face of gear 22 and thus drive shaft 21 directly from the driving pulley and at high speed. This change of speed thus requires but a single movement of a single lever and is quickly and easily accomplished.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a screw cutting machine the combination of the frame the cutter-head, means

for operating said cutter-head, a work carriage mounted to travel upon guides or tracks on said frame, said tracks, one of which is formed hollow with a slot through one side thereof, a screw-shaft mounted in said hollow track, a sliding nut mounted in a housing on said carriage and adapted to engage with said screw-shaft, means for operating said screw-shaft, and means for operating said nut to engage or release said screw-shaft, substantially as set forth.

2. In a thread cutting machine the combination of the frame, the cutter-head, means for operating said cutter-head, a work carriage mounted on tracks on said frame, said tracks, one of which is formed with a longitudinal perforation, and also with a slot through one side, a screw-shaft mounted in said longitudinal perforation, means for driving said screw-shaft, and means mounted on said carriage and adapted to project through said slot for engaging and releasing said screw-shaft, substantially as set forth.

3. A thread cutting machine comprising a work carriage mounted to be positively fed by a screw, said screw, means for driving said screw, a sliding nut mounted on the carriage for engagement with said screw, and means for sliding said nut in relation to said screw to engage therewith, means for normally holding said nut away from said screw, and a plunger with a two-size bearing for locking and releasing said nut, substantially as set forth.

4. A thread cutting machine comprising a frame, a cutter-head embodying a die, means for operating said cutter-head, a work carriage, means for sliding said work carriage rearwardly, and a positive forward feed for said work carriage comprising a screw-shaft, means for operating said screw-shaft, a nut carried by the carriage and adapted to move into or out of engagement with said screw-shaft and a single means for releasing said nut and opening the die, substantially as set forth.

5. A thread cutting machine comprising a frame, a cutter-head, means for operating said cutter-head, a work carriage, means for sliding said work carriage rearwardly, and a positive forward feed for said work carriage comprising a screw-shaft, means for operating said screw-shaft, and a nut mounted in a housing on said carriage and arranged to slide into or out of engagement with said screw-shaft, a spring for normally holding said nut out of engagement with said screw-shaft, a vertical plunger mounted to slide in a bearing in said frame adjacent to the rear edge of said nut and formed with a groove near its upper end adapted to receive said rear edge when the nut is disengaged from said screw-shaft, means for elevating said plunger at a predetermined point in the work to receive the rear edge of said nut in said groove, and means for sliding said nut in the reverse direction to engage said screw-rod when desired, substantially as set forth.

6. A positive feed for the work carriage of thread cutting machines comprising a screw-shaft mounted in a longitudinal perforation in one of the tracks on which said carriage is mounted, said track, said carriage, means for driving said screw-shaft, a nut mounted in a housing on the carriage with threads formed on one edge and adapted to engage with the threads of said screw-shaft, a spring for throwing said nut out of engagement with said screw-shaft, means for holding said nut into positive engagement with said screw-shaft, and a trip for releasing said holding means mounted to be adjusted to operate said holding means at a predetermined point, substantially as set forth.

7. A positive feed for the work carriage of thread cutting machines comprising a screw-shaft, means for operating said screw-shaft, a sliding plate or nut mounted in a housing on said carriage, said carriage, means for holding the threaded part of said nut into positive engagement with said screw-shaft, means for throwing said nut out of engagement with said screw-shaft when said holding means is released, means for releasing said holding means operated by the travel of the carriage at a predetermined point, and means for throwing said nut into engagement with said screw-shaft when desired, substantially as set forth.

8. A positive feed for the work carriage of thread cutting machines comprising a screw-shaft, means for operating said screw-shaft, a threaded part mounted to slide in a housing on the carriage and adapted to be shifted into or out of engagement with said screw-shaft, said carriage, means for holding said threaded part into positive engagement with said screw-shaft during a predetermined period, means for releasing said holding means, and means for reëgaging said threaded part with said screw-shaft, substantially as set forth.

9. A positive feed for the work carriage of a thread cutting machine comprising a screw-shaft mounted in a longitudinal perforation in one of the tracks on which said carriage slides, said track formed with a slot in one side thereof, a threaded part mounted on the carriage, and means for throwing said threaded part into or out of engagement with said screw-shaft, substantially as set forth.

10. A positive feed for the work carriage of thread cutting machines comprising a gear mounted in a hollow track, said track formed with an opening in one side, a movable gear carried by the carriage adapted

to engage therewith, and means for throwing said gear out of or into engagement with the gear in said track, substantially as set forth.

11. A positive feed for the work carriage of thread cutting machines comprising a screw-shaft, means for operating said screw-shaft, a threaded part on the carriage adapted to move into or out of engagement with said screw-shaft, a spring for forcing said part away from said screw-shaft, means for forcing said part toward said screw-shaft, a holding device for securing said part into engagement with said screw-shaft comprising a sliding plunger formed with a groove to receive the rear edge of said sliding part when said plunger is elevated from its holding position, an adjustable trip arranged to engage with said plunger and elevate the same when the work reaches a predetermined point, and a connection with a hand operated part for disengaging said plunger by hand when desired, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Washington, District of Columbia, this 2d day of March, A. D. nineteen hundred and ten.

ABRAHAM B. LANDIS. [L. S.]

Witnesses:
J. D. YOAKLEY,
E. W. BRADFORD.