

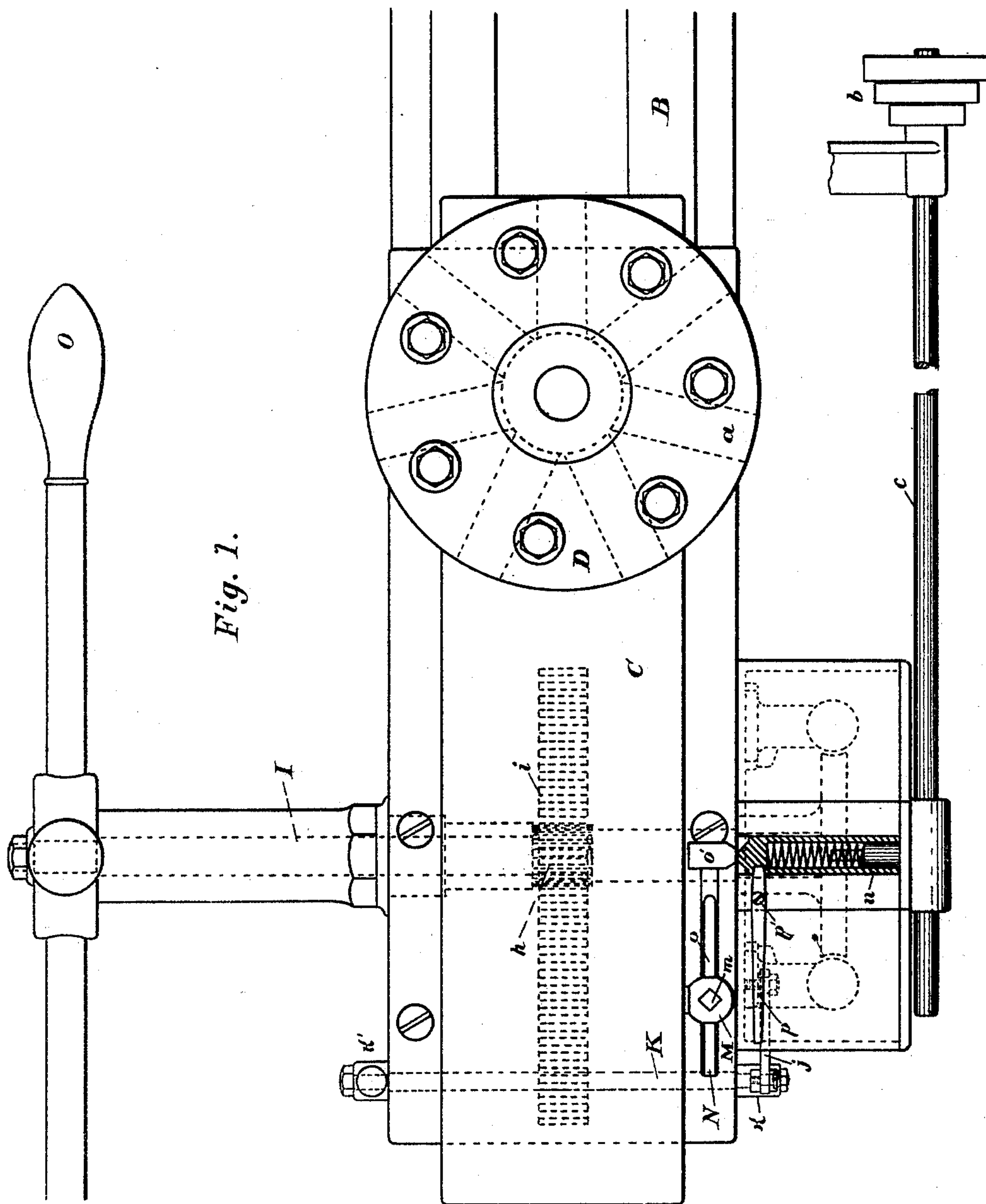
(No Model.)

3 Sheets—Sheet 1.

S. L. WORSLEY.
LATHE.

No. 497,851.

Patented May 23, 1893.



WITNESSES:

W. H. Thurston
S. J. Murphy.

INVENTOR.

Samuel L. Worsley

(No Model.)

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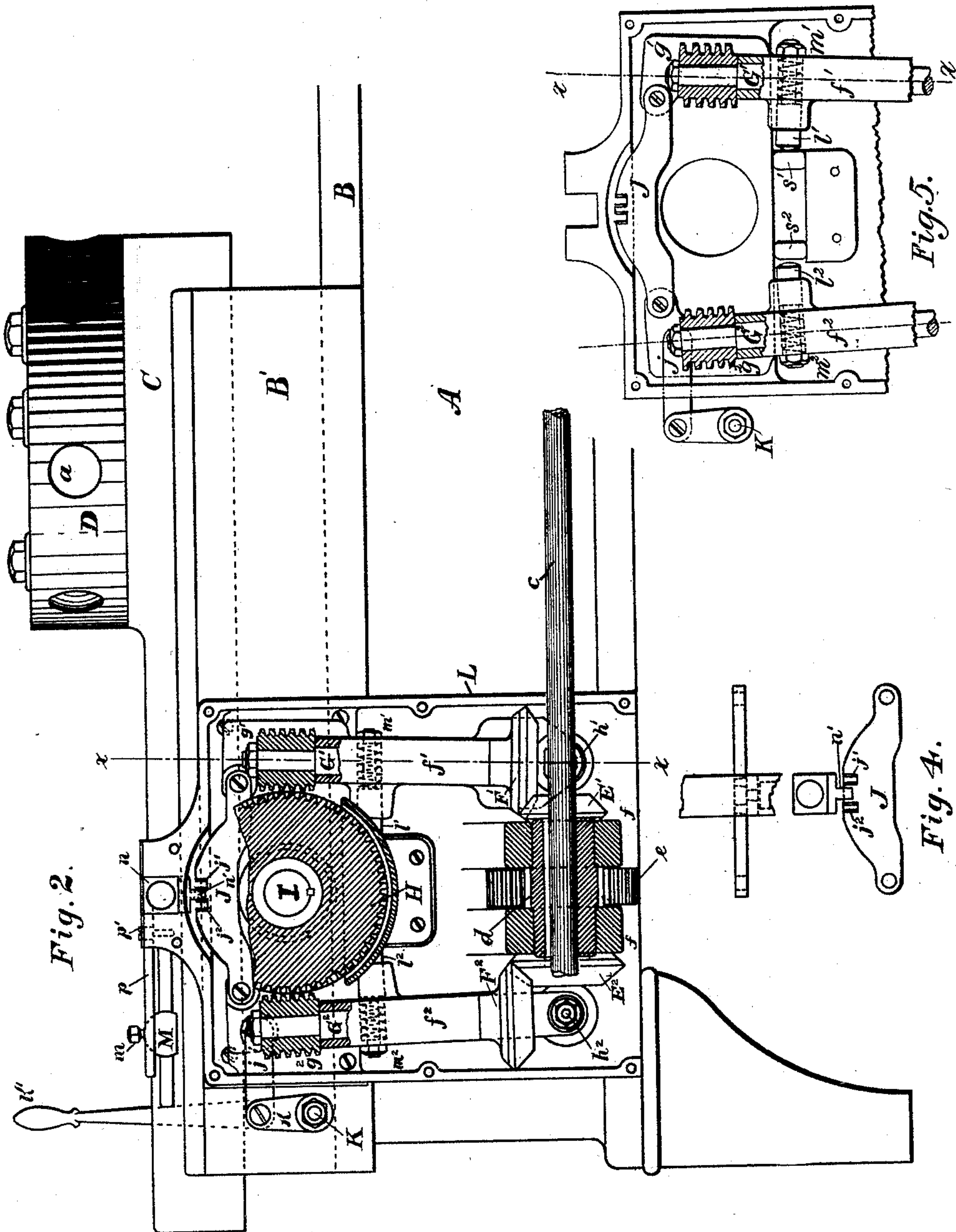


Fig. 2.

Fig. 4.

Fig. 5.

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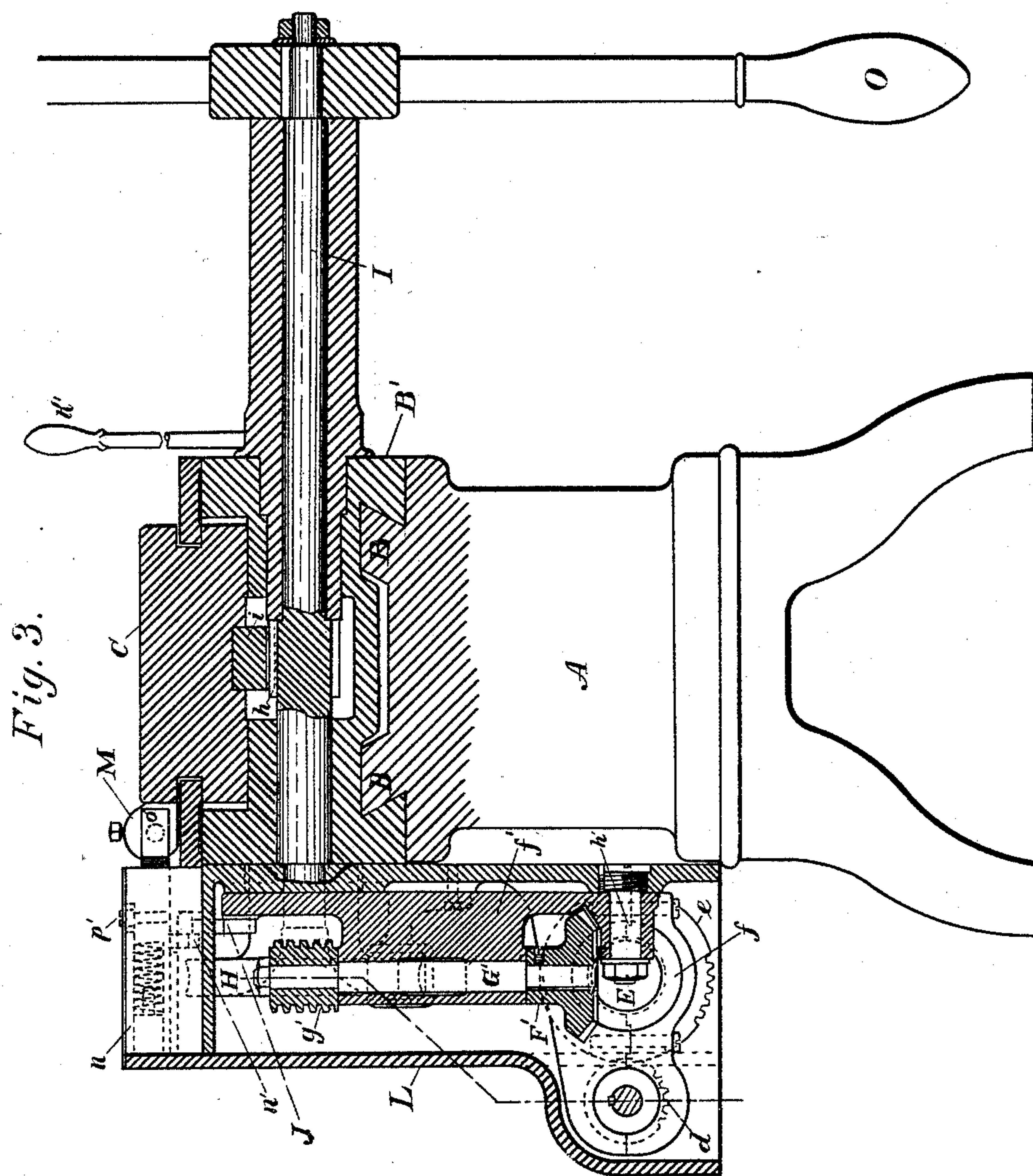
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UNITED STATES PATENT OFFICE.

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LATHE.

SPECIFICATION forming part of Letters Patent No. 497,851, dated May 23, 1893.

Application filed June 5, 1890. Serial No. 354,319. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. WORSLEY, of Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Lathes; and I 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.

10 The improvements hereinafter described relate more particularly to that class of lathes which are provided with turret-heads for holding a series of tools for operating successively upon the work.

15 It is desirable or advantageous in machines of this character to have a different rate of feed for the tool, according as it is making a heavy or a light cut, as, for instance, if a tool is making a heavy cut, it is desirable to feed it at a comparatively slow rate, whereas if the tool is making a light or a finishing cut, it may be advantageously fed at a considerably higher rate of speed, and thereby save time and also improve the quality of the work.

25 The purpose of the present invention is to provide different rates of speed for the feed of the turret-head, according as the tool is making a heavy or a light cut, and to that end the invention consists in certain mechanism and combinations of parts for communicating the power from the motor shaft to the sliding turret-head, whereby the latter may be moved up at one or the other of two different rates of speed as may be desired, and that without shifting the belt on the cone-pulley, and without any further manipulation than would be required in the old machine which had but one rate of feed.

Referring to the drawings, Figure 1 represents a top view of so much of a turret-head lathe as is necessary to illustrate the present invention, the headstock end of the machine being omitted in all the figures as unnecessary to be exhibited in this connection. Fig. 2 is a side view of the same, partly in section. Fig. 3 represents a transverse section on the line x, x , Fig. 2; and Fig. 4 is a detail showing the locking arrangement. Fig. 5 is a view corresponding to a portion of Fig. 2, with some of the parts removed to show certain features of construction.

A represents the frame of the machine, which may be constructed as desired. The frame is provided with the usual ways B, B. Mounted upon these ways is the turret slide 55 bed B' carrying the turret slide C which is adapted to slide toward and from the work to be operated upon, and which in turn carries the turret head D. The turret head is provided with a series of recesses a , as usual, 60 to receive the cutting or other tools. All this part of the machine is of the usual construction and requires no further description.

The mechanism for transmitting the power to feed the turret head forward during the operation of the machine is as follows: From the usual cone pulley on the main shaft at the head of the machine, not shown in the drawings, a belt extends to the cone pulley b on the end of the shaft c , which extends 70 lengthwise of the machine, as shown in Figs. 1 and 2. At its opposite end the shaft c is provided with a pinion d , which meshes with a spur gear e , as shown in Fig. 3. This spur gear e is secured to a short shaft E, which is 75 mounted in bearings f, f , as shown in Fig. 2. Each end of this short shaft E is provided with a bevel gear E', E^2 , the said bevel gears being of different diameters. The bevel gears E', E^2 , mesh with bevel gears F', F^2 , mounted 80 respectively upon two vertical shafts G', G^2 . The bevel gears F', F^2 , are also preferably made of different diameters, the object being to effect a difference in the speed of revolution of the two shafts G', G^2 , although, 85 if desired, the difference in the diameters of the bevel gears E', E^2 , may alone be relied upon for that purpose, or again only the bevel gears F', F^2 , may be of different diameters.

The shafts G', G^2 , are provided respectively 90 at their upper ends with worms g', g^2 , which lie upon opposite sides of a worm wheel H, with which the said worms g', g^2 , the one or the other, as may be desired, may upon proper manipulation be brought into engagement. 95 The worm-wheel H is mounted upon the pinion shaft I extending crosswise of the machine. The pinion shaft I is provided with a pinion h which engages with a rack i on the turret slide C to move the latter in one direc- 100 tion or the other. The shafts G', G^2 , are mounted in bearings f', f^2 , which are pivoted

at their lower ends by means of the pivot pins h' , h^2 , and so that said shafts may be swung upon said pivots to throw one or the other of the worms g' , g^2 , into engagement with the worm-wheel H.

The upper ends of the bearings f' , f^2 , are connected together by a connecting-bar J. This connecting bar is provided with two notches j' , j^2 , for the purpose hereinafter to be described. To the upper end of the bearing f^2 is also attached a link j , the other end of said link being connected with a rock-arm k on a rock-shaft K, which extends across the machine. The other end of the rock-shaft K is provided with an operating lever k' . As clearly shown in Fig. 2, the length of the connecting bar J is such as to hold both of the worms g' , g^2 , out of engagement with the worm-wheel H when the connecting bar is in its middle position.

In each of the bearings f' , f^2 , is located a spring-actuated plunger l' , l^2 , so constructed and arranged that the tension of the springs may be regulated by adjusting nuts m' , m^2 , as shown in Fig. 2. These spring-plungers are so adjusted that when the parts are in the position shown in Fig. 2, the ends of the plungers just touch against stops s' , s^2 , as shown in Fig. 5, the effect of this arrangement being to hold the parts in the position shown in Fig. 2, with both of the worms g' , g^2 , out of engagement with the worm-wheel H.

L represents a casing which incloses the mechanism hereinbefore described, as shown in Fig. 3. Mounted in the upper part of this casing L is a spring-actuated plunger or stop n , clearly shown in Fig. 1 and in dotted lines in Fig. 3, said plunger being provided at its end with a teat or projection n' , Figs. 2, 3 and 4, adapted to engage one or the other of the notches j' , j^2 , in the connecting bar J.

Secured to the turret-slide C, and projecting from the side thereof, is a clamp or holder M provided with a set or clamp screw m . In this holder M is mounted a bar N adapted to be adjusted lengthwise in said holder and to be held in its adjusted position by the set-screw m . The top of the bar N is preferably flattened as at o , to prevent it from turning in the holder. The bar N is provided at its end with a head or tripper o' , which tripper is adapted to engage and operate the spring-plunger n to disengage the teat n' from the notch in the connecting bar J with which it may happen to be engaged. A hand lever p is pivoted to the casing L by a pivot pin p' , the end of said lever engaging a slot formed in the plunger n , as shown in Fig. 1, whereby said plunger may be retracted, and the teat n' disengaged from one of the notches j' , j^2 , by hand when desired.

O is the capstan lever attached to the pinion shaft I at the end opposite to that at which the worm-wheel H is secured, for the purpose of moving the turret-slide by hand when the power driven mechanism is disconnected.

The operation of the mechanism above described is as follows: The turret slide C having been moved back by hand by means of the capstan lever O to its rearward position, and it being understood that the shaft c , with its pinion d , the spur gear e , the bevel gears and vertical shafts, with their worms g' , g^2 , are continuously rotating, the operator by means of the lever k' , which actuates the link j and connecting bar J, swings the pivotally mounted bearings f' , f^2 , upon their pivots until one or the other, as may be desired, of the worms g' , g^2 , is brought into engagement with the worm-wheel H, and transmits its motion thereto, and thus to the turret-slide C through the pinion shaft I, its pinion h and the rack i . This movement of the parts will bring the corresponding one of the notches j' , j^2 , in the connecting bar J into position to be engaged by the teat n' on the spring-actuated plunger n , which engagement of said teat with the notch will serve to hold the worm on the worm-shaft in operative engagement with the worm-wheel until the turret-slide in its travel causes the tripper o' on the bar N secured to said turret-slide to push back the spring-plunger n and thus release the teat n' from engagement with the notch in the connecting bar. When this happens, there being nothing to hold the worm on the worm shaft in operative engagement with the worm wheel, and the bearings for said worm shaft being pivoted, the revolution of the worm shaft will itself serve to throw its worm out of engagement with the worm wheel, but to facilitate said disengagement that one of the spring-plungers l' , l^2 , which is mounted in the bearing of the worm-shaft to be disengaged, the spring of which plunger will have been under tension, will also serve to return the parts to their normal position, and the two spring-plungers last referred to will serve to hold the parts in said normal position, and with both of the worm-shafts out of engagement with the worm-wheel, until one or the other of said worm-shafts is again thrown into engagement by the hand lever k' . It will be seen that by throwing the hand lever in the proper direction to engage the worm g' on the shaft G' with the worm-wheel H, a comparatively slow feed will be given to the turret-slide, whereas if the hand lever be thrown in the opposite direction, and so as to engage the worm g^2 on the shaft G^2 with said worm-wheel, the feed of the turret-slide will be relatively faster, due to the difference in the diameters of the bevel gears E' and E^2 and of the gears F' and F^2 , if the latter are also made of different diameters, as is preferred.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a turret-head machine, the combination of a turret slide, a turret head mounted on said turret slide, said turret head being provided with recesses for the reception of cutting or other tools, mechanism substan-

tially as described for communicating power from the motor shaft to feed said turret head at one or the other of two different rates of speed, and means substantially as described
 5 constructed to be operated while the machine is in motion for changing said feed from one to the other of said different rates of speed, substantially as set forth.

2. In a turret-head machine, the combination of a turret slide, a turret head mounted on said turret slide, said turret head being provided with recesses for the reception of cutting or other tools, mechanism substantially as described for communicating power
 15 from the motor shaft to feed said turret head at one or the other of two different rates of speed, and means substantially as described for automatically disengaging said power-communicating mechanism when the turret
 20 head has reached the limit of its travel under either of said different rates of speed, substantially as described.

3. The combination, with the turret-slide of a turret-head machine, of a worm-wheel mounted on a pinion shaft for operating said turret-
 25 slide, two worm-shafts, arranged one on each side of said worm-wheel, and mechanism substantially as described for driving said worm-shafts at different rates of speed, whereby
 30 said turret-slide will be fed at a correspondingly different rate of speed, according as the one or the other of said worm-shafts is thrown into engagement with said worm-wheel, substantially as described.

35 4. The combination, with the turret-slide of a turret-head machine, of a worm wheel mounted on a pinion shaft for operating said turret-slide, two worm-shafts, arranged one on each side of said worm-wheel, and adapted to be
 40 revolved at different rates of speed, and mechanism substantially as described for engaging one or the other of said worm-shafts with said worm-wheel to feed said turret-slide at one or the other of two different rates of
 45 speed as may be desired, substantially as described.

5. The combination with the turret-slide of a turret-head machine, of a worm-wheel mounted on a pinion shaft for operating said turret-
 50 slide, two worm-shafts arranged one on each side of said worm-wheel and adapted to be revolved at different rates of speed, and mechanism substantially as described for automatically disengaging the worm-shaft from
 55 the worm-wheel when the turret-slide has reached the limit of its travel, and for holding both of said worm-shafts out of engagement with said worm-wheel to permit said turret-slide to be moved back by hand, sub-
 60 stantially as described.

6. The combination of a worm-wheel, two worm-shafts mounted in pivoted bearings, arranged one on each side of said worm-wheel and adapted to be revolved at different rates
 65 of speed, a connecting bar connecting the bearings of said two worm-shafts, and a hand lever and connecting mechanism to swing

said bearings upon their pivots and engage one or the other of said worm-shafts with said worm-wheel for the purpose of revolving said
 70 worm-wheel at one or the other of two different rates of speed as desired, substantially as described.

7. The combination of a worm-wheel, two worm-shafts mounted in pivoted bearings arranged on opposite sides of said worm-wheel and adapted to be revolved at different rates of speed, a connecting bar connecting the bearings of said two worm-shafts, said connecting
 75 bar being provided with notches, and a spring-actuated plunger having a teat or projection adapted to engage one or the other of the notches in said connecting bar, and thereby hold the one or the other of said worm-shafts in operative engagement with said worm-
 80 wheel, substantially as described.

8. The combination of a worm-wheel, two worm-shafts mounted in pivoted bearings arranged on opposite sides of said worm-wheel and adapted to be revolved at different rates
 90 of speed, a connecting bar connecting said bearings and provided with notches, a spring-actuated plunger having a teat or projection adapted to engage one or the other of the notches in said connecting bar, and a tripper
 95 operating at the proper time to disengage the teat on said spring-actuated plunger from its notch in the connecting bar, and thereby enable the one or the other of the two worm-shafts which may at the time be in engage-
 100 ment with the worm-wheel, to be thrown out of engagement therewith, substantially as described.

9. The combination of a worm-wheel, two worm-shafts mounted in pivoted bearings arranged on opposite sides of said worm-wheel and adapted to be revolved at different rates of speed, a connecting bar connecting said bearings and provided with notches, a spring-actuated plunger having a teat or projection
 110 adapted to engage the one or the other of the notches in said connecting bar, a tripper operating to disengage the teat or projection on the spring-actuated plunger from its notch in the connecting bar, two spring-actuated
 115 plungers mounted one in each of said pivoted bearings, and stops therefor, said last mentioned spring plungers serving to facilitate the disengagement of the worm-shaft from the worm-wheel and to hold both of said worm-
 120 shafts out of engagement with the worm-wheel, substantially as described.

10. The combination, with the turret-slide of a turret-head machine, of a worm-wheel mounted on the pinion shaft which operates
 125 said turret slide, two worm-shafts mounted in pivoted bearings arranged upon opposite sides of said worm-wheel, a shaft for communicating motion to said worm-shafts and provided with bevel gears of different diameters
 130 to impart to each of said worm-shafts a different rate of speed from the other, a connecting bar connecting the pivoted bearings of said worm-shafts, a hand lever for moving

said connecting bar and swinging said bearings upon their pivots, notches in said connecting bar for engaging a teat or projection upon a spring actuated plunger to hold one
5 or the other of said worm-shafts in engagement with said worm-wheel, a tripper for disengaging said teat from its notch in the connecting bar, and spring actuated plungers mounted in the pivoted bearings of the worm-

shafts for holding both of said worm-shafts 10 out of engagement with the wheel when permitted to do so, whereby the turret-slide may then be moved back by hand, substantially as described.

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Witnesses:

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