March 7, 1933. A. N. EMMONS 1,900,233

TAIL STOCK FOR LATHES AND THE LIKE

Filed June 23, 1930

FIG. 1.

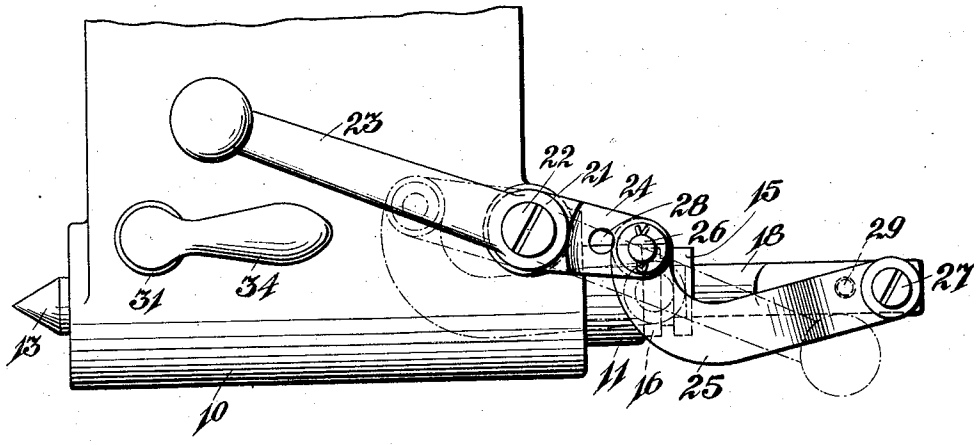


FIG. 2.

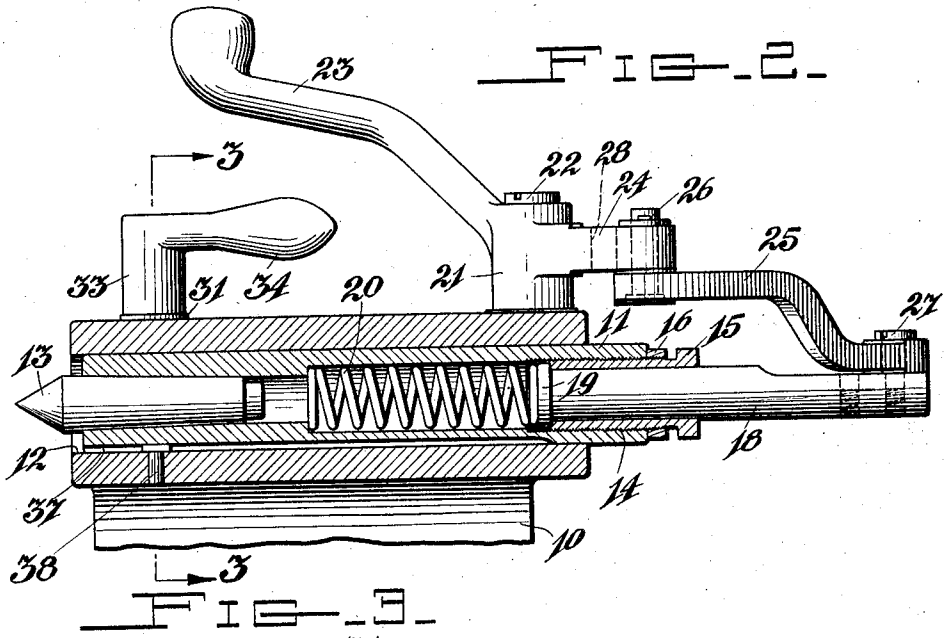
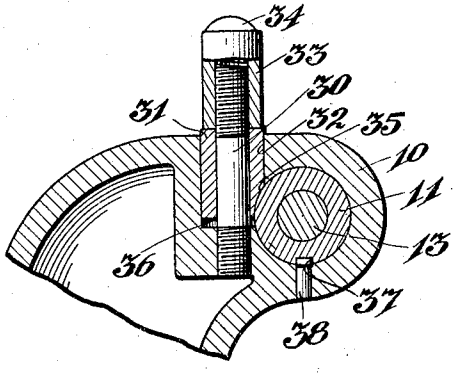


FIG. 3.



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Patented Mar. 7, 1933 1,900,233

UNITED STATES PATENT OFFICE

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TAILSTOCK FOR LATHES AND THE LIKE

Application filed June 23, 1930. Serial No. 463,004.

This invention relates to a new and improved tail stock for engine lathes, and has for its general object, an improved construction and arrangement of parts which is efficient in use and economical in manufacture.

More particularly, my invention relates to tail stocks in which a constant pressure is maintained against the work by the work center.

The ordinary tail stock used on engine lathes consists generally, in a supporting structure clamped or otherwise fastened to the bed of the lathe, and in which the center supporting spindle is moved horizontally by means of a screw operated by a hand wheel. With this construction, considerable time and effort is expended by the operator in moving the center into and out of engagement with the work. Also, in this type of construction, the amount of pressure applied against the work by the work center must be determined by the skill of the operator, and very often it happens that not enough pressure is created whereby undue play is permitted between the work and the center, thus reducing the accuracy of the work, or more often, too much pressure is exerted and the center is damaged because of the excess friction between the work and the center.

The inconvenience of manipulation and the inefficiency of this construction is obvious where the tail stock is used on the ordinary screw cutting engine lathe.

In the case of so-called production lathes where a great number of pieces of work of the same character are inserted between the centers of the lathe and operated upon, and then removed, such inefficiency and inconvenience is more pronounced.

By my invention, the spindle supporting the work center is moved horizontally into engagement with the work by a lever action instead of the turning of the conventional hand wheel. I do not claim the use of the lever action per se as new, as I understand tail stock spindles have heretofore been operated by a lever action as having draw-in collet chucks.

I do believe however, that the construction and action of my lever mechanism as will be explained in detail hereafter is new.

By my invention, I further provide means whereby a tension is created between the lever operating mechanism and the tail stock spindle, which tension holds the work center in engagement with the work under a predetermined fixed pressure.

For a more complete understanding of the nature and objects of my invention, reference will be had to the following detailed description, taken in connection with the accompanying drawing in which:

Figure 1 represents a plan view of the tail stock and tail stock spindle operating mechanism.

Figure 2 is a side elevation, partly in section of the tail stock.

Figure 3 is a sectional view taken on line 3—3, Figure 2.

Referring now to the drawing, 10 denotes the tail stock supporting structure which is clamped to the bed of the lathe in any suitable manner well known to those skilled in the art, whereby the tail stock may be moved horizontally along the bed of the lathe toward and from the head stock and clamped to the bed at any point depending upon the length of the work placed between the head stock center and the tail stock center.

11 designates the tail stock spindle which is slidably mounted in the bore 12 of the tail stock supporting structure. This spindle is ordinarily in alinement with the head stock spindle.

13 is the work supporting center carried by the spindle 11. The work center is tapered to fit a corresponding taper formed in the forward end of the spindle. The tapered bore in the spindle 11 is of such length as to accommodate the work center 13. The remainder of the spindle 11 is provided with a straight bore of somewhat larger diameter, the outer end of which is threaded, as indicated at 14. A cylindrical sleeve 15 is threaded into the rear portion of the spindle and carries a lock nut 16 at its outer end. A plunger 18 is slidable through the bore of the threaded sleeve 15, and has on its inner end a head 19 complemental with the bore

of the spindle and which engages the inner end of the threaded sleeve 15 when the plunger is in its outward position.

20 designates a coiled spring carried in the bore of the spindle 15, having one end abutting against the inner end of the bore, and the other against the head 19 of the plunger 18.

An angular lever 21 is secured at the rear end of the tail stock structure and on the upper side thereof by the bolt 22. One angle 23 of this lever 21 provides an operating handle, and the other angle 24 is connected to the plunger 18 by means of the link 25, by pins 26, 27. The link 25 is also angular in form. Additional holes 28, 29 are provided in the angle 24 of the lever 21, and in the plunger 18 respectively. These additional holes provide for various adjustments in the travel of the spindle 11. The pivot 22 for the lever 21 is located on the tail stock structure 10 and the one end of the plunger 18, this, together with the angular lever 21 and the angular link 25, provides a self locking toggle when the handle 23 assumes the dotted line position shown in Figure 1.

It will be noted that when the handle 23 is turned to the position shown in Figure 1, the plunger will slide through the sleeve 15, compressing the spring 20 against the spindle 11 causing it to slide through the bore 12 of the tail stock toward the head stock of the lathe. This movement takes place until the center 13 has come into engagement with the work, at which time, the spring 20 is further compressed, thereby establishing and maintaining constant pressure between the center 13 and the work. It is thus obvious that the pressure between the center 13 and the work can not exceed a predetermined maximum pressure, which pressure is produced by the spring 20. That this pressure may be adjusted to suit the needs of various types of work, the sleeve 14 can be adjusted relative to the spindle 11, and can be firmly secured in any adjusted position by means of the lock nut 16. Also, the travel of the spindle 11 may be adjusted by moving the pins attaching the connecting link 25 to the holes 28, 29.

In the event that an operation on a piece of work will consume a considerable period of time, and it is desired to have the tail stock spindle 11 rigidly secured to the tail stock, I have provided an efficient locking means. Located in the tail stock structure 10 and to one side of the spindle 11, is the stud 30, this stud extending through the top of the tail stock structure and at right angles to the axes of the spindle 11. A sleeve 31 is slidably mounted over the stud 30 and is permitted to freely slide in the bore 32 of the tail stock structure.

33 designates a nut threaded upon the upper end of the stud 30 and having a handle 34. The stud 30 is tightly screwed into the threaded bore of the tail stock structure. The sleeve 31 is slipped over the stud and the nut 33 screwed on the upper end of the stud. One side of the sleeve 31 is formed to coact with the periphery of the spindle 11 as at 35. The bore 32 is of such length that when the sleeve 31 is forced into engagement with the spindle 11 by tightening the nut 33, there is a small clearance as indicated at 36. It is obvious that, upon tightening the nut 33 the sleeve 31 has a sliding movement until the surface 35 thereof engages the spindle 11. Upon further movement of the nut 33, the sleeve 31 is forced securely against the spindle 11, thus locking it from any sliding movement in the bore 12 of the tail stock structure 10.

To prevent the spindle 11 from having any rotary movement in the tail stock structure, I have provided a slot extending lengthwise along the periphery of the spindle 11, as indicated at 37. A pin 38 extends through the lower portion of the tail stock structure and located directly under the axis of the spindle 11, projects through the bore 12 sufficiently to engage the slot 37. This feature of the construction is not new and I do not claim the same as part of my invention.

This invention is particularly efficient on lathes of the production type where a great many pieces of work of the same length are to be operated upon. In this instance, the tail stock structure 10 is secured to the bed of the lathe in such position, relative to the head stock center, that the work may be easily and readily inserted and removed from the lathe. The sleeve 15 and the link 25 are then so adjusted relatively that the correct pressure is created between the center 13 and the work when the lever 23 is turned to its locked position. With these adjustments made, the operator simply places the work on the head stock center with one hand, and turns the lever 25 to locked position with the other hand. This movement of the lever 23, as heretofore explained, projects the center 13 into engagement with the work under a predetermined pressure. It is obvious that my invention accomplishes two important results. First, the operator can quickly and readily move the center 13 into and out of engagement with the work; and second, the same predetermined pressure is always established between the center 13 and the work.

Having now described an embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A tail stock for lathes and the like having a horizontal bore, a work center spindle slidably mounted in said bore, said spindle being of substantially the same length as the bore and having a bore at one end for receiving a work center, a straight bore at the oppo-

site end, and a shoulder located between the bores, a sleeve mounted in the straight bore and adjusted axially of the spindle, a plunger slidably mounted in the sleeve and having a head portion slidable in the straight bore of the spindle, a spring acting between the head of the plunger and the shoulder between the bores, a manually operable lever associated with the tail stock, and motion transmitting connections between the lever and the free end of the plunger, whereby the plunger and the spindle are moved axially of the tail stock and locked in operative position upon operation of the lever.

2. A tail stock for lathes and the like having a horizontal bore, a work center spindle slidably mounted in the bore and being of substantially the same length as the bore, a work center secured in one end of the spindle, and the opposite end of the spindle being provided with a straight bore extending axially of the spindle and being formed with a shoulder at its inner end, a sleeve secured in the open end of said bore and being adjustable axially of the spindle, a plunger slidable in said sleeve and having an end portion extending outwardly beyond the sleeve and the tail stock, a manually operable lever associated with the tail stock, motion transmitting links connecting the lever and the free end of the plunger, whereby upon operation of the lever the plunger is moved axially of the bore of the tail stock, and a spring within the bore of the spindle and acting between the plunger and the shoulder of said bore.

3. A tail stock for lathes and the like having a horizontal bore and including a spindle slidably mounted in said bore and being provided with a work center at one end, and a bore at the opposite end, a sleeve mounted in the bore of the spindle and being adjustable axially thereof, a plunger slidably mounted in the sleeve and extending outwardly beyond the same, a spring acting between the plunger and the end of the bore of the spindle, a manually operable lever mounted on the tail stock, motion transmitting links between the lever and the plunger, whereby upon operation of the lever the plunger is moved axially of the bore of the tail stock, means for adjusting the amount of travel of the plunger relative to the movement of the lever, said adjustment being independent of the adjustment of the sleeve in the spindle.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 18th day of June, 1930.

ARTHUR N. EMMONS.