B. M. W. HANSON.

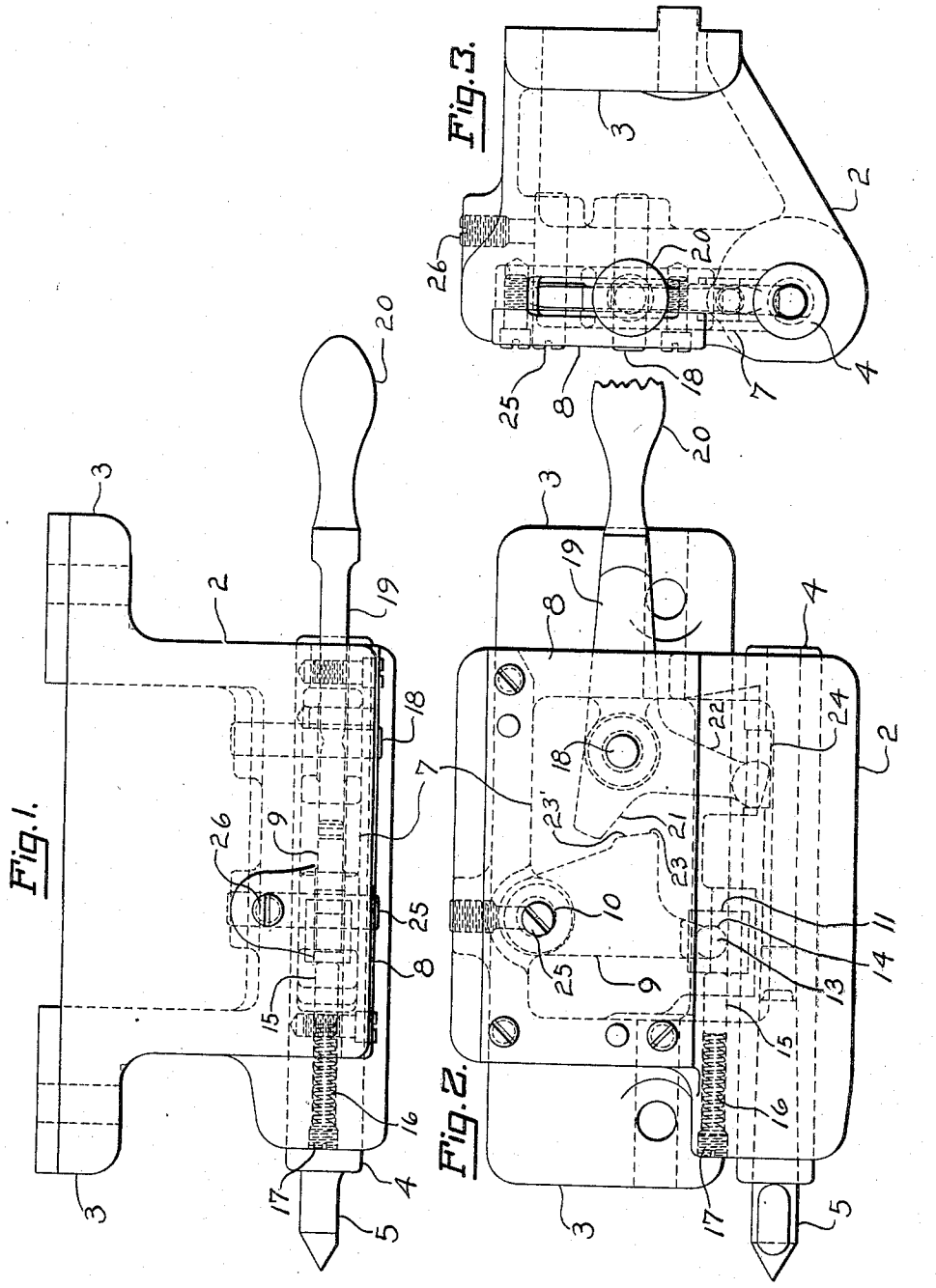
TAIL STOCK.

APPLICATION FILED JAN. 10, 1916.

1,202,997.

Patented Oct. 31, 1916.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

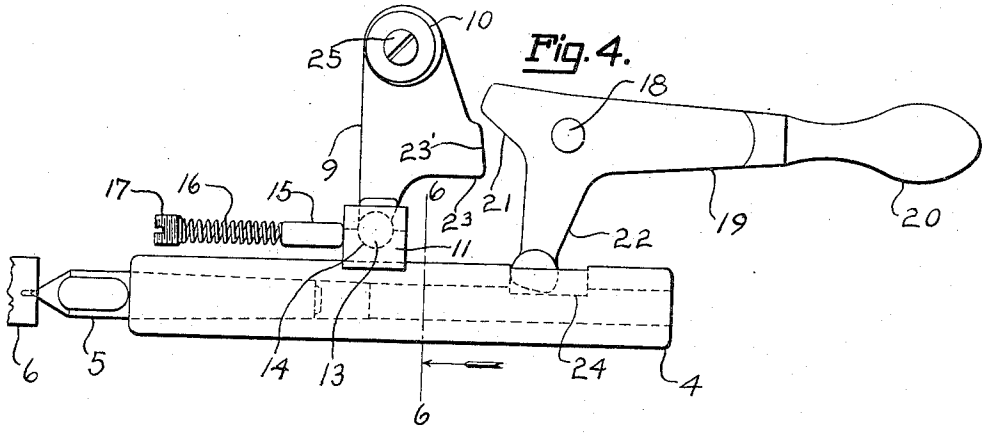


Fig. 5.

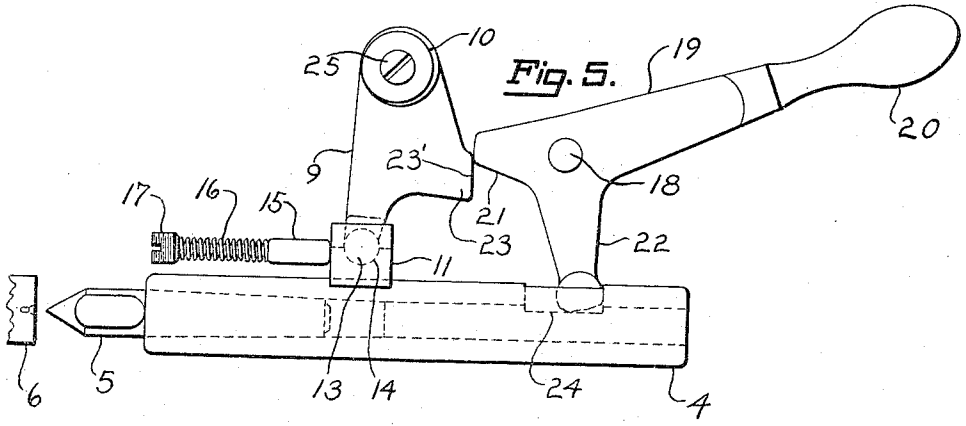
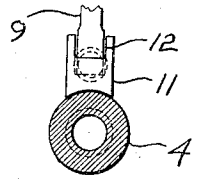


Fig. 6.



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TAIL-STOCK.

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To all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Tail-Stocks, of which the following is a specification.

This invention relates to what are known as tail-stocks.

One of the objects of the invention is the provision of means by which a center-carrying spindle or its equivalent can be automatically locked in operative relation and can be released at will.

Another object is the provision of means by which the spindle when released, can be drawn back from work holding position to free the work.

Another object is the provision of means by which such a spindle can be advanced, and when in the proper forward or work-holding position, automatically held or locked against accidental retractive movement.

As will be apparent it is not always essential in any one organization, that the several features be present.

In the drawings accompanying and forming part of the present specification I have shown in detail one convenient form of embodiment of the invention which I will fully set forth in the following description. I do not restrict myself to this showing; I may depart therefrom in several respects within the scope of the invention defined by the claims following said description.

Referring to said drawings: Figure 1 is a top plan view, and, Fig. 2 a front elevation of a tail-stock involving the invention. Fig. 3 is a view of the device as seen from the right in Fig. 2. Figs. 4 and 5 are views of certain of the operative parts dismounted from their supporting means and showing the center and coacting elements in the positions they occupy when the center is in its operative and inoperative positions respectively. Fig. 6 is a transverse section on the line 6—6 of Fig. 4, looking in the direction of the arrow.

Like characters refer to like parts throughout the several views.

The different parts are supported in some suitable manner for instance, by the body 2 shown as equipped with approximately duplicate flanges 3 adapted to be fastened as by bolting, to the framework of a lathe or other metal-working machine which may require a tail-stock. The supporting body 2 is shown provided with a spindle as 4, the lower part of the body having a longitudinal bore to receive said spindle for longitudinal sliding movement. In Fig. 4 the spindle 4 is assumed to be occupying its advance position, the center 5 rigid and movable therewith, fitting a cavity in the end of the work 6. In Fig. 5 the spindle 4 and hence the center 5 are supposed to have been drawn back, so that the work 6 can be dismounted and if necessary a new piece substituted therefor.

There is means for automatically locking the center 5 in a predetermined position which in the present instance is the operative or work holding relation of said center. This locking means as will be inferred can vary radically. That shown for this purpose will now be set forth. The body 2 is internally chambered as at 7, the chamber being covered by the removable face plate 8 suitably held in position as by several screws. In this chamber is mounted the swinging or oscillatory arm or lever 9 pivoted as at 10 to the roof of the chamber 7. The pivotal mounting of the arm or lever 9 is of peculiar nature as will hereinafter more particularly appear.

Fitting against the upper side of the spindle 4 between the ends thereof is a shoe as 11. This shoe is transversely curved to conform to the curvature of the spindle, the curved face of the shoe engaging the periphery of the spindle. The upper side of the shoe is slotted or notched as at 12 to present a bifurcation which receives the lower portion of the swinging arm or lever 9. The lower end of said arm or lever is circular as at 13 to present a journal portion or pivot, the shoe 10 inside the slot 12, having a semi-circular seat 14 to receive for rocking motion, this journal portion or pivot 13. The arm or lever 9 and the shoe 11 present a toggle, the dead center line thereof intersecting the center of engagement between the shoe and the spindle 4 and the center of motion of the arm.

There is means acting constantly against one of the members 9 and 11 to move the center of connection therebetween toward the dead center line, the consequence being that the shoe 11 exerts at all times (except when moved to releasing position as will hereinafter appear) a locking effect against

the spindle 4. The body 2 above the spindle 4 is bored to receive the plunger 15 constantly urged inward by the spring 16 surrounding the shank of the plunger and bearing at its outer end against the screw 17 threaded into the body 2. The spring 16, therefore, by pressing against the plunger or pin 15 causes the latter to act against the shoe or toggle member 11 thus tending to move the center of connection between the toggle members toward the dead center line of the toggle. As will be apparent the downward pressure of the shoe upon the spindle 4 is a very powerful one, being amply sufficient in fact to prevent any accidental endwise movement of the spindle and the center 5 carried thereby.

Pivotally mounted as at 18 in the chamber 7 is a lever 19, constituting a suitable manually-operable device for actuating the automatic-locking means to release the center 5. As shown the long arm of the lever is provided with a handle 20 at the outer extremity thereof and outside the chamber 7 so that it can be conveniently grasped as occasion may require. The inner portion of the lever has the branches 21 and 22 at an angle to each other, the branch 21 presenting a convenient means for moving the center-locking means to releasing position. As represented the arm 9 has a heel portion 23 disposed in the path of the arm 21. The lever 19 is shown as occupying its normal position in Fig. 4, the branch 21 thereof being above and out of contact with the cam heel portion 23. To effect the release of the center 4 the long arm of the lever 19 is swung up, thereby lowering the branch 21 thereof and causing said branch to enter and then ride along the cam face 23′ of the heel 23 as shown for instance in Fig. 5. This will result in rocking the arm or lever 9 forward and thereby shortening or flexing the toggle consisting of said parts 9 and 11, so that the pressure of the shoe or member 11 against the spindle 4 will be reduced to such an extent that said spindle can be moved longitudinally. In the present case it is moved to the right to permit the center 5 to release the work.

As shown the spindle 4 is notched as at 24 in its upper side to receive the free end of the branch 22. When the shoe 11 is in its normal or locking relation, the free end of said branch 22 is practically against the forward wall of the notch 24. When, however, the long arm of the lever is swung upward the branch 22 will be swung rearward and will be moved against the rear or outer wall of the notch 23 just about the time the shoe frees the spindle 4. It follows, therefore, that on further upward movement of the long arm of the lever the branch 22 will swing to the right to thereby draw back the now freed spindle 4 and its center 5 away from the work 6 as shown in Fig. 5. To mount the work the latter will be positioned with its longitudinal axis coincident with those of the two centers or with the axis of the center 5 if there be only one center present. When this is done the long arm of the lever 19 will be swung down to cause the branch 22 to pass away from the rear wall of the notch 24 and to engage the front wall of the notch. On the continued downward movement of the long arm of the lever and the forward movement of the branch 22 thereof, the latter will advance the spindle 4 so that the center 5 can be seated in the notch or opening in the work 6, in a solid, substantial manner. Just about the time there is a practically rigid relation between the center 5 and the work, the branch 21 now swinging upward will pass off the cam face 23′ of the heel 23 so that the toggle locking action hereinbefore described can take place to effect the locking and holding of the spindle 4 in the necessary advanced or work-holding position. It will be clear that the lever or arm 23 normally swings about a fixed axis. That part of the lever which is pivotally connected with the block 11 is forward or to the left of a perpendicular line intersecting said axis, when the shoe is in releasing position as shown in Fig. 5 for example. Therefore, as the shoe is moved toward this line, there is a powerful downward pressure exerted upon the shoe by the lever.

The journal portion of the pivot 10 is eccentric. The pivot has at one end thereof the slotted head 25, the slot of which can receive a suitable instrument such as a screwdriver so as to turn the eccentric portion of said pivot in its seat to thus raise or lower the lever or arm 9 and therefore regulate the relation between the same and the shoe 11 or the relation between said shoe and the spindle 4. When the pivot is adjusted it will be secured in its adjusted relation by the screw 26 tapped through the support 2 and adapted to engage the concentric portion of the pivot.

There is one important feature in connection with the invention to which I desire to call attention and that is that the locking means is constantly active. The result is that nothing is left to speculation or to the operator but is positive and certain, and the construction hereinbefore described in detail answers satisfactorily in this particular.

What I claim is:

1. The combination of a spindle, locking means for the spindle, a member operable at will for moving the locking means to releasing position and then drawing back the spindle when the locking means is released, and means to set the locking means in spindle holding position independently of said member.

2. The combination of a spindle, locking means for the spindle, a member operable at will for moving the locking means to releasing position and then drawing back the spindle when the locking means is released, and means tending constantly to maintain the locking means in spindle holding position independently of said member.

3. A device of the class described comprising a center-carrying spindle, spring actuated toggle means for automatically locking the spindle in a predetermined position, and manually operable means for acting against the toggle to effect the release of the spindle and to draw back the same when released.

4. The combination of a spindle, a member operable at will for advancing the spindle, locking means to hold the spindle in a predetermined advanced position, means for applying a constant locking effect to the locking means independently of said member, said member controlling the locking means and holding it in releasing position during the advance of the spindle and freeing the locking means when the spindle is in said predetermined advanced position to thus permit the locking means to be automatically set.

5. The combination of a spindle, locking means for the spindle, a member operable at will for retracting and advancing the spindle, means acting constantly to set the locking means in spindle holding position independently of said member, said member when operated to retract the spindle acting to release the locking means to free the spindle and maintaining it in the freed position until the spindle has reached a predetermined advanced position.

6. A device of the class described comprising a center carrying spindle, a member operable at will, connected with the spindle and adapted on one movement to retract the spindle and on the other to advance the spindle, locking means for the spindle, the manually operable member when acting to retract the spindle being adapted before it acts on the spindle to move the locking means to releasing position and being adapted on the other movement to advance the spindle and release the locking means when the spindle has reached a predetermined point, and means acting against the locking means to set the same independently of the action of the manually operable member.

7. A device of the class described comprising a center-carrying spindle, an oscillatory hand lever having a loose connection with the spindle, locking means, and means acting constantly against the locking means to set the same in locking relation, said lever on one stroke acting against the locking means to move the same to releasing position and to then draw back the spindle and on the other to advance the spindle and free the locking means when the spindle has reached a predetermined position, whereby the locking means will be set independently of the hand lever.

8. A device of the class described comprising a center-carrying spindle, toggle means for automatically locking the spindle in predetermined position, and manually operable means for acting against the toggle to effect the release of the spindle and to draw back the spindle when the same is released.

9. A device of the class described comprising a center-carrying spindle, a swinging arm, a shoe pivoted to the arm and bearing against the spindle, spring means acting against the shoe to thus cause the arm and the shoe acting as a toggle to lock the spindle in predetermined advanced position, and a hand lever adapted on one stroke to act against said arm and swing the same in a direction to cause the shoe to free the spindle and on the further movement of the lever to draw back the spindle, said lever on the opposite stroke thereof advancing the spindle and then releasing the arm whereby the shoe can lock the spindle in a predetermined advanced position.

10. A device of the class described comprising a center-carrying spindle, a swinging arm, a shoe pivoted to the arm and bearing against the spindle, the arm and shoe jointly constituting a toggle, spring means acting against one of the members of the toggle, and means to act against one of the members of the toggle to break the toggle and to thereafter draw back the spindle.

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

BENGT M. W. HANSON.

Witnesses:
W. M. STORRS,
C. M. GELLERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."