July 10, 1928. 1,676,704

D. E. ODOM

SPRING HANDLING APPARATUS

Filed Jan. 25, 1927 3 Sheets-Sheet 1

Fig. 1.

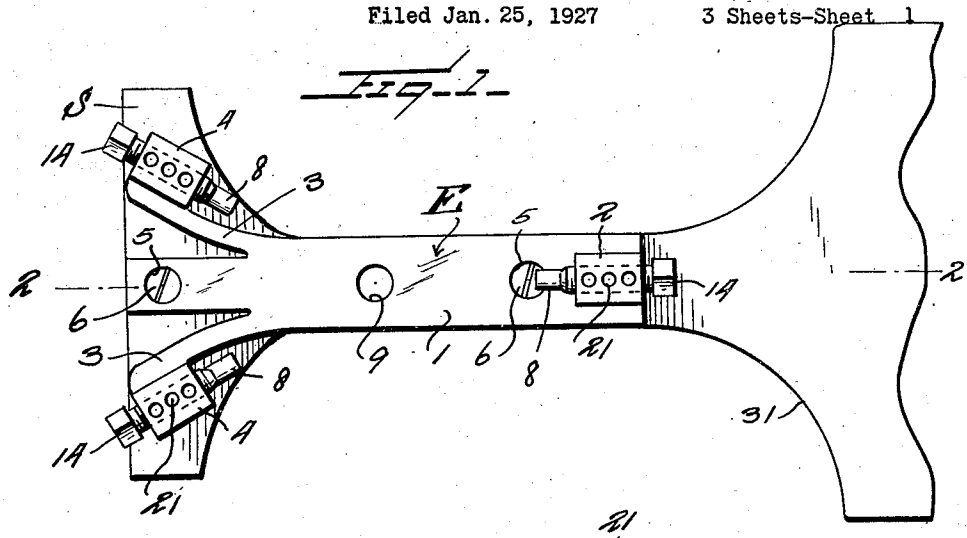


Fig. 2.

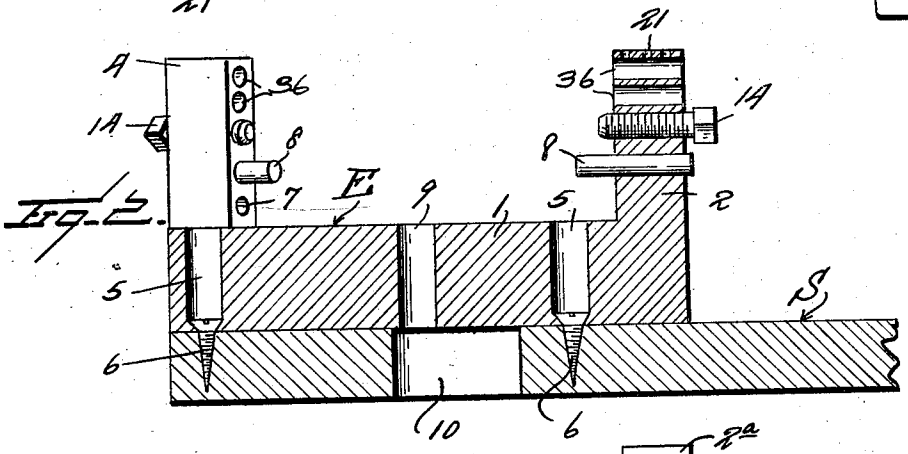


Fig. 4.

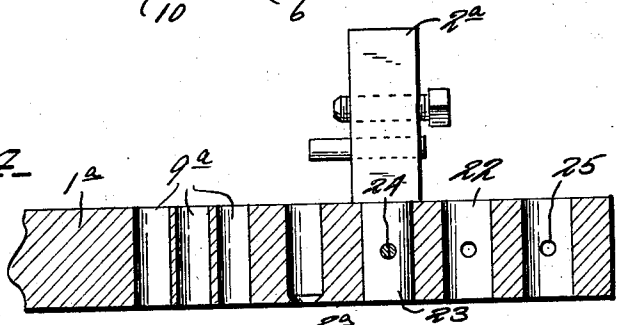
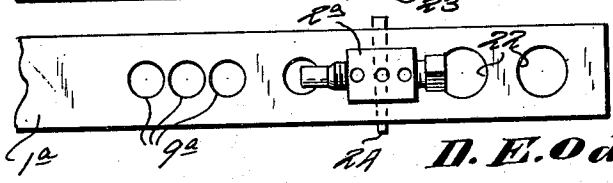


Fig. 3.



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SPRING HANDLING APPARATUS.

Filed Jan. 25, 1927 3 Sheets-Sheet 2

Fig. 7

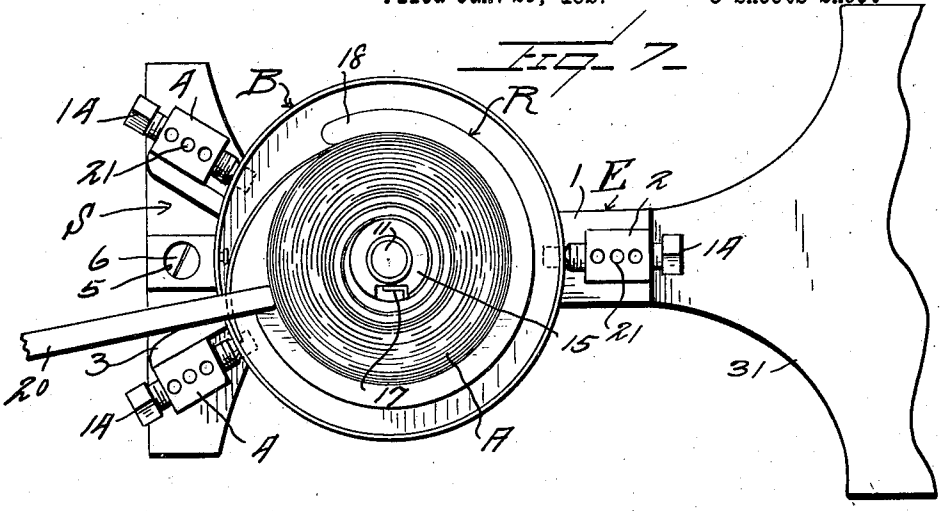
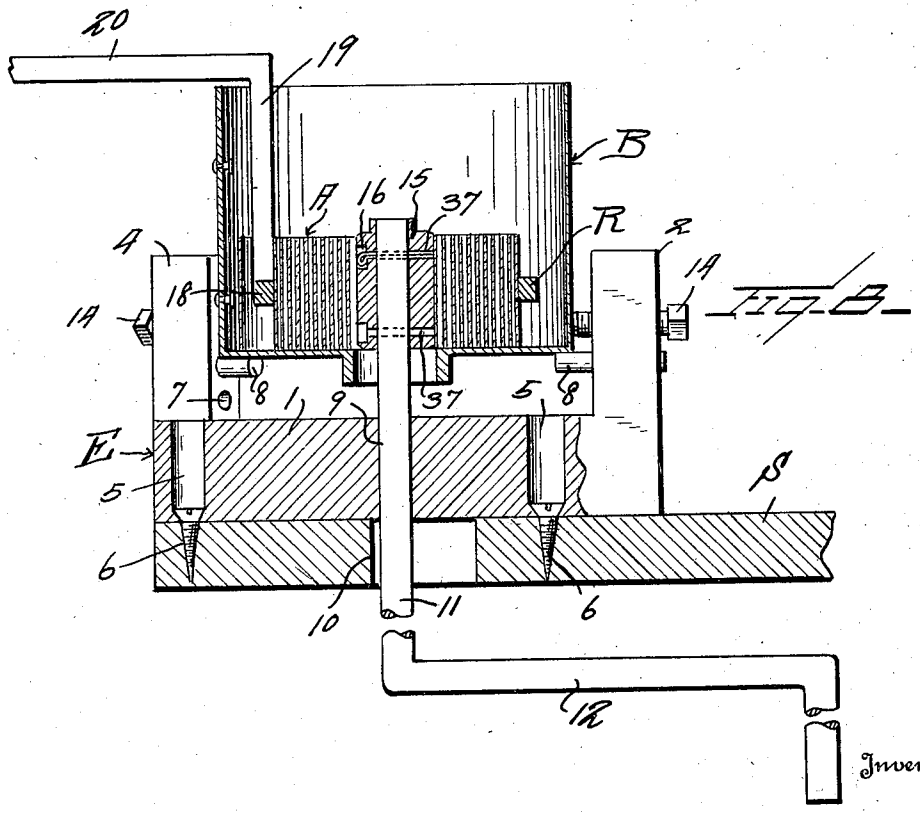


Fig. 8



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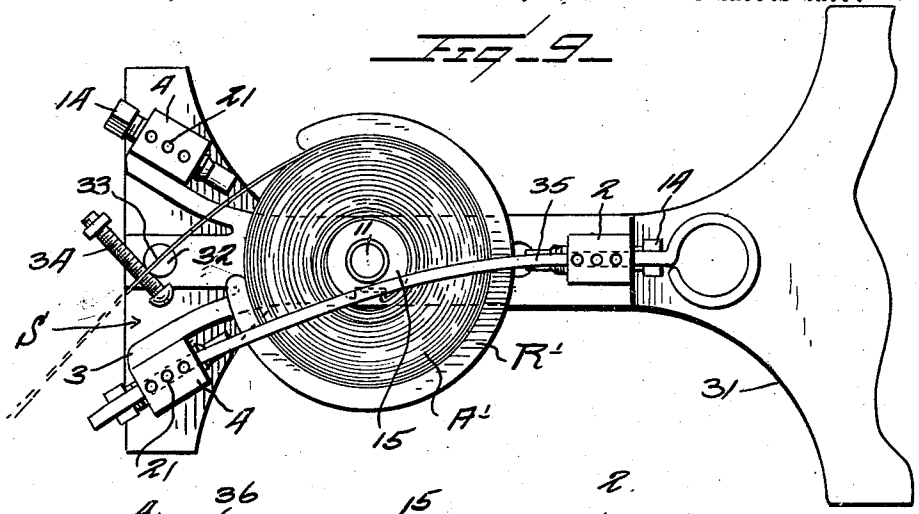
July 10, 1928. 1,676,704

D. E. ODOM

SPRING HANDLING APPARATUS

Filed Jan. 25, 1927 3 Sheets-Sheet 3

Fig. 9.



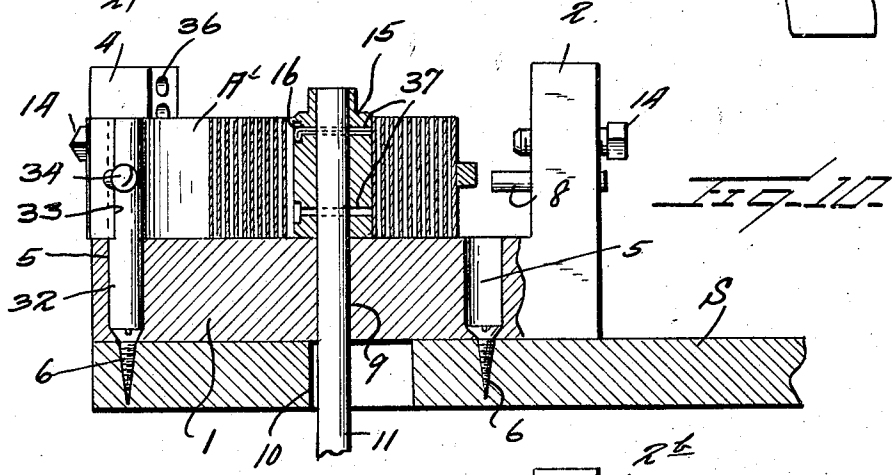


Fig. 10.

Fig. 6.

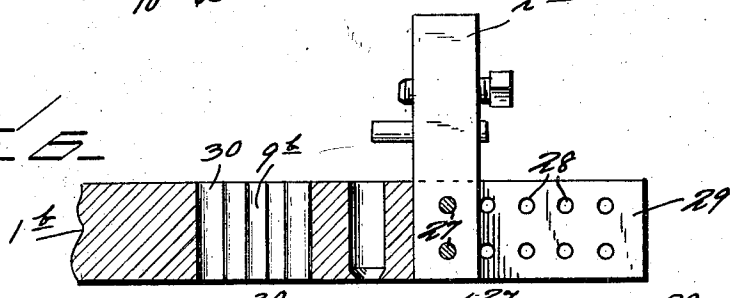
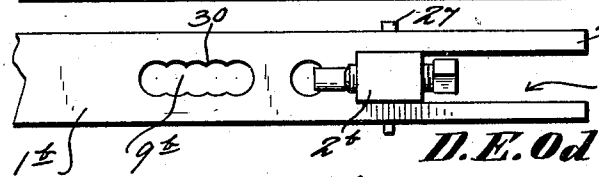


Fig. 5.



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Patented July 10, 1928. 1,676,704

UNITED STATES PATENT OFFICE.

DANIEL E. ODOM, OF BENNETTSVILLE, SOUTH CAROLINA.

SPRING-HANDLING APPARATUS.

Application filed January 25, 1927. Serial No. 163,418.

This invention relates to spring handling apparatus and has relation more particularly to an apparatus of this kind particularly designed for use in the handling of springs of a "clock" type such as is generally used in connection with the motors to furnish the power for sound reproducing machines and the like.

Primarily it is an object of the invention to provide an apparatus of this kind which, in addition to facilitating an initial winding of the spring of a "clock" formation, facilitates the workman applying to or removing the spring from working position and in a manner materially expediting such operation.

It is also an object of the invention to provide an apparatus of this kind which is adapted to facilitate the application within or removal from a barrel or drum as employed in various types of spring motors of a spring and in a manner substantially eliminating danger to the workman.

The invention also has for an object to provide an apparatus of this kind which can be employed with equal facility in connection with a single spring motor or with a motor employing a plurality of springs.

An additional object of the invention is to provide an apparatus of this kind embodying a holding element for a spring barrel or other spring carrying member, said element being so constructed to permit its use with such barrels or members of varying sizes.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved spring handling apparatus whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a view in top plan of the holding element comprised in my improved apparatus, an associated support being shown in fragment;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a fragmentary view in top plan illustrating a modified form of holding element;

Figure 4 is a sectional view taken lengthwise of Figure 3 with certain of the associated parts in elevation;

Figure 5 is a fragmentary view in top plan illustrating a further embodiment of holding element;

Figure 6 is a sectional view taken longitudinally through the structure illustrated in Figure 5 with certain of the parts in elevation;

Figure 7 is a view in top plan of the apparatus as herein embodied, with the spring under compression and a spring retainer applied thereto;

Figure 8 is a longitudinal vertical sectional view taken through the structure as illustrated in Figure 7 with certain of the parts in elevation;

Figure 9 is a view in top plan illustrating an assembly of my apparatus for winding a spring, the spring being shown in full wound adjustment with a spring retainer applied thereto, the travel of the spring during the winding operation being diagrammatically indicated by broken lines;

Figure 10 is a vertical sectional view taken lengthwise through the structure as illustrated in Figure 9 with certain of the parts in elevation.

As disclosed in Figures 1, 2, 7 and 8, my apparatus includes a holding element E comprising a base bar 1 of desired dimensions and which is provided adjacent to one end with an upstanding post 2 preferably integrally formed therewith. The opposite end portion of the base bar 1 is provided with laterally disposed diverging arms 3 provided adjacent their free extremities with the upstanding posts 4. The element E may be cast with the various parts hereinbefore referred to integrally maintained in desired assembled relation.

The base bar 1 adjacent its opposite ends is provided therethrough with the openings 5, the lower portions of which being restricted to facilitate the base bar 1 being maintained in fixed engagement with a suitable support S through the instrumentality of the headed members or screws 6. As is particularly illustrated in Figure 2, these screws 6 are inserted from above within the openings 5 and caused to have requisite engagement with the support S in a

manner to effectually hold or clamp the base bar 1 to such support S.

I do not wish to be understood, however, as limiting myself to the manner of attaching the holding element E and the parts formed therewith to the support S in the manner particularly illustrated in the accompanying drawings because under certain conditions it may be preferred that the holding element E be supported in a position with the bar 1 vertically disposed. For this reason the lower or inner end portions of the posts 4 have disposed therethrough an opening 7 through which a screw or other headed member may be directed for proper engagement with the support S or the like. It is to be noted that the free extremities of the arms 3 are substantially coplanar with the adjacent end of the bar 1, thus permitting the element E to be conveniently mounted with the bar 1 vertically disposed. Also, if preferred, the element E may be held in substantially a vertical position between the jaws of a conventional vise. When so supported the post 2 or one of the posts 4 is directly engaged between the jaws of such vise.

The posts 2 and 4 have disposed through their inner or lower portions at points equidistantly spaced from the bar 1 the pins 8, such pins being of a length to extend a desired distance inwardly of the posts. As is particularly illustrated in Figure 1, the pin 8 carried by the post 2 is directed lengthwise of the bar 1 while the pins 8 carried by the post 4 are disposed in lines converging toward an opening 9 disposed through the bar 1 in the central portion thereof. These pins are snugly engaged through their respective posts 2 and 4 yet upon sufficient impact imposed upon the extremities of the pins they may be readily extended or retracted with respect to the inner faces of the posts.

The inner extended portions of the pins 8 provide supports for a spring barrel or drum B. As herein disclosed this barrel or drum B is of a cylindrical type and of a character used in connection with a plurality of springs for supplying the requisite power for sound reproducing machines and the like.

The opening 9 in the bar 1, as illustrated in Figure 2, registers with an opening 10 provided in the support S thereby readily permitting insertion through the opening 9 and into the drum B of a mandrel 11. This mandrel 11 is of requisite length as the occasions of practice may necessitate and is provided with a crank 12 to facilitate the desired rotation of the mandrel. It is to be understood that the means for rotating the mandrel forms no essential part of my invention as any other means desired may be employed in lieu of such crank 12.

Presuming it is desired to remove a spring A from within a barrel B, the barrel with its contained spring or springs is rested upon the pins 8, after which the barrel or drum B is effectively gripped or held by the clamping members 14 threaded through the posts 2 and 4 at points above the pins 8 but preferably in close proximity thereto.

By having the posts 2 and 4 in the relative assembly as particularly illustrated in Figure 1, the desired clamping or holding of the barrel or drum B can be readily accomplished by the tightening of the member 14 threaded through the post 2 as the remaining two members 14 may readily constitute what may be termed stationary clamping contacts. Of course, if desired, these remaining members may be manipulated. It is also to be understood that the threaded members 14 disposed through the post 4 are adapted to be adjusted as may be necessary to compensate for the varying diameters of the barrels or drums B with which the element E may be employed.

After the drum B with its contained spring has been properly engaged with the element E, the mandrel 11 is inserted through the opening 9 into the barrel or drum B. An arbor 15 is then slipped upon the end portion of the mandrel 11 inserted within the barrel or drum B and keyed or locked thereto by a removable pin 16 or the like. The mandrel 11 is then longitudinally adjusted to cause the arbor 15 to have requisite engagement with the inner end portion of the spring A, such connection, as generally indicated at 17, being in a manner well known. The mandrel 11 is then rotated in a direction to tightly wind the spring A and after this spring A has been substantially fully wound it has engaged therewith a spring retainer R. This retainer R as disclosed in Figures 7 and 8 comprises an arcuate member 18 of a length in excess of a semi-circle but less than a complete circle, said arcuate portion 18 being of a radius approximately the radius of the spring A when substantially fully wound.

One end portion of the arcuate member 18 is continued by a perpendicularly related arm 19 terminating in an angularly disposed handle arm 20, said arm 20 being outwardly and substantially radially disposed with respect to the arcuate member 18. The arm 19 is of a length to readily permit the member 18 to be engaged with any one of the springs A which may be arranged within a barrel or drum B, it being understood of course that a lower or inner spring is not to be worked until after the spring or springs thereabove have been removed.

It is also to be understood that the mandrel 11 is of such a length to permit the end portion thereof extending within the drum or barrel B to be disposed a sufficient distance beyond the coacting spring A to permit the ready application or removal of

the arbor 15 with respect to the mandrel. While the pin 16 may be applied or removed in any manner preferred, I find it of especial advantage to provide pliers with relatively long jaws so that the desired handling of the pin may be accomplished without requiring the workman to directly engage such pin with his fingers.

After the spring A has been substantially fully wound by rotation of the mandrel 11 and the retainer member R applied, the mandrel 11 is moved endwise a distance to free the arbor 15 from the spring A to permit the removal of the pin 16 and the withdrawal of the arbor 15 from the mandrel 11. After the arbor 15 has been removed, the spring A may be readily lifted out of the barrel or drum B upon proper manipulation of the retaining member R and preferably by grasping the handle arm 20.

It is to be understood that before the spring A is lifted out of the barrel or drum B the outer end portion of the spring is disconnected from the wall of the barrel or drum B. No particular illustration or description in this connection is believed to be necessary as the same may be of any preferred character.

It is to be stated at this time that when the spring A is substantially completely wound it is of a diameter slightly less than the mean diameter of the arcuate member 18 to facilitate the application of the retaining member to the spring. It will be readily understood, however, that upon slight retrograde movement of the mandrel 11 the spring A will have a natural tendency to expand resulting in the arcuate member 18 having effective engagement.

The application of a spring within the barrel or drum B is reversed to that hereinbefore described with respect to the removal of the spring although it is believed well to mention that in order to remove the retaining member R it is necessary to further wind the spring A. After the member R has been removed, the spring A of itself will have a tendency to expand and during which time the mandrel 11 will rotate in reverse direction. During this reverse direction, however, the operator controls the speed of rotation by maintaining requisite hold upon the crank 12.

The upper faces of each of the posts 2 and 4 are provided with suitable recesses 21 in which the pin 16 may be selectively engaged when not in use and thus providing a means whereby the workman may readily locate such pin when he desires to lock the arbor 15 to the mandrel 11.

In view of the fact that there are spring barrels or drums materially differing in sizes, it is necessary to make provision for the requisite adjustment other than that which may be accomplished through the members or screws 14. In the embodiment of my invention as illustrated in Figures 3 and 4, the bar 1^a in an end portion thereof is provided with a plurality of longitudinally aligned openings 22 in which is adapted to be selectively inserted an extension 23 carried by the lower or inner end of the post 2^a. The post 2^a is held in desired adjusted position through the instrumentality of a pin 24 disposed laterally through the bar 1^a and the inserted extension 23. To facilitate the requisite application of the pin 24 each of the openings 22 is intersected by a restricted opening 25. The pin 24 as illustrated in Figure 3 is tapered although I do not desire to be understood as limiting myself in this particular.

In order to compensate for the varying selective positions of the posts 2^a the intermediate portion of the bar 1^a is provided with the longitudinally spaced openings 9^a all of which registering with the opening 10 in the support S. It is to be understood that the mandrel 11 will be selectively inserted through an opening 9^a in accordance with the position or adjustment of the post 2^a.

As illustrated in Figures 5 and 6, an end portion of the bar 1^b is provided with a longitudinally disposed slot 26 disclosed as being open at its outer end although this is not essential. The post 2^b is of a length to permit an end portion thereof to be snugly engaged within the slot 26 and held therein by the pins 27 selectively disposed through the longitudinally spaced openings 28 provided in the side walls 29 of the slot 26.

The intermediate portion of the bar 1^b is provided with an elongated slot 9^b adapted to register with the opening 10 in the support S. The side wall of the slot 9^b is formed to provide a plurality of spaced bearing surfaces 30 with which the mandrel 11 may be selectively engaged in accordance with the desired adjusted position of the post 2^b.

As is particularly illustrated in Figure 1, it is to be noted that the portion of the support S upon which the major part of the bar 1 is engaged is reduced in thickness from opposite sides, as indicated generally at 31. There may be conditions whereby it is preferred to first engage the barrel or drum B between the jaws of a conventional vise before either applying or removing a spring A. When this is done, the posts 2 and 4 are placed in overlying relation with respect to the barrel or drum B from above, said posts being outwardly thereof. By having this portion 31 of the support S reduced convenient visual access is had within the drum to facilitate the removal or application of a spring and this reduced portion 31 also permits the ready use of the retaining member R. When my improved apparatus is used in this manner, it

is preferred that the members 14 engage the wall of the barrel or drum B with the bar 1 substantially parallel with the jaws of the vise. By this manner of applying the apparatus the members 14 as engaged with the wall of the drum serve to counteract the tendency of the jaws of the vise to distort the wall of the barrel or drum or, in other words, when a cylindrical barrel or drum is employed, the application of the screws or members 14 serve to assure said wall of the barrel or drum being maintained substantially in true cylindrical formation, thus assuring effective application or removal of the spring.

When the apparatus is to be employed with barrels or drums of a fixed size and such barrels or drums are to be further held between the jaws of a vise, it is only necessary that the members 14 be initially adjusted in accordance with the size of such barrels or drums so that when clamping action of the jaws of the vise is imposed upon the drum the tendency of the drum to distort will be offset by the applied apparatus and at the same time resulting in the members 14 having requisite clamping action on the barrel or drum, thus resulting in the effective action of a five jaw vise instead of a two jaw vise.

My apparatus may also be employed to advantage in the winding of a stock spring or rewinding of a free spring. When used for such purpose a cylindrical member or bar 32 is inserted within either one of the openings 5 and free to rotate therein. This member or bar 32 is of a length when in applied or working position to extend a desired distance above or beyond the bar 1 and said extended portion is provided with a radial slot 33 open at its outer end and through which the spring A′ to be wound is adapted to freely pass. It will, therefore, be understood that this member or bar 32 serves as a guide to facilitate the requisite winding of the spring A′. The outer end of this spring is adapted to have disposed therethrough a stop member 34 which may be a stock bolt or its equivalent. This stop member contacts or abuts the member or bar 32 at the time the spring A′ is fully wound. In winding the spring A′ the mandrel 11 is inserted through the opening 9 and the arbor 15 is engaged therewith in the same manner as hereinbefore referred to. The inner end of the spring A′ to be wound is operatively engaged with this arbor 15 whereupon the mandrel 11 is rotated until the spring A′ has been fully wound. When fully wound the spring A′ has applied thereto a retaining member R′ of a type now generally used in the trade and which consists of an arcuate member of a length more than a semi-circle but less than a full circle and disposed on a desired radius.

In winding the spring A′ there is a liability of the same jumping away. To avoid this disadvantage I provide a rod 35 of requisite length which is adapted to be selectively disposed through the openings 36 in the upper portion of the post 2 and one of the posts 4, said rod 35 being disposed on such curvature to facilitate this assembly. When so applied the rod 35 is disposed over the spring A′ in close proximity thereto and provides an effective medium to resist any tendency of the spring A′ to jump away. It is to be understood that this rod 35 may be operatively engaged with either of the posts 4 as the workman may prefer. As is particularly illustrated in Figures 2 and 10 it is to be observed that each of the posts 2 and 4 is provided with a plurality of longitudinally arranged openings 36. This permits the desired placement of the rod 35 in accordance with springs of varying widths.

It is also to be understood that the member or bar 32 may be engaged within either of the openings 5. When employed in connection with the opening 5 adjacent to the post 2 the pin 8 may be readily moved through the post 2 to avoid offering any hindrance or obstruction to such mounting.

In the accompanying drawings I show the arbor 15 provided adjacent each of its ends with a radial opening 37 therethrough through each of which, if desired, a pin 16 may be inserted it being understood, of course, that the mandrel 11 will be provided with corresponding openings. In practice, however, I find that effective results can be obtained by the use of a single pin 16 as illustrated in the accompanying drawings.

From the foregoing description it is thought to be obvious that a spring handling apparatus constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. An apparatus for handling a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, and means arranged at one side of the base member for holding a spring closely adjacent thereto, said mandrel at the same side of the base member as the spring holding means being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being

provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

2. An apparatus for handling a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, said mandrel also having lengthwise movement through the base member, and means arranged at one side of the base member for holding a spring closely adjacent thereto, said mandrel at the same side of the base member as the spring holding means being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

3. An apparatus for handling a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, and means carried by the member and arranged at one side thereof for holding a spring, said mandrel at the same side of the base member as the spring holding means being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

4. An apparatus for holding a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, posts carried by the base member and projecting beyond one side thereof, means carried by the posts for holding a spring, said mandrel at the same side of the base member as the posts being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the base member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

5. An apparatus for handling a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, means arranged at one side of the base member for holding a spring closely adjacent thereto, said mandrel at the same side of the base member as the spring holding means being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring, and a retaining member engageable with the spring when sufficiently wound upon the mandrel.

6. An apparatus for applying a spring to or removing the same from a barrel for the spring comprising a base member, means carried by the base member at one side thereof for holding the barrel, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, said mandrel at the same side of the base member as said holding means extending within the barrel for engagement with the spring within the barrel to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

7. An apparatus for holding a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, posts carried by the base member and projecting beyond one side thereof, means carried by the posts for holding a spring, said mandrel at the same side of the base member as the posts being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the base member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring, and means for adjusting one of the posts with respect to the remainder.

8. An apparatus for holding a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, posts carried by the base member and projecting beyond one side thereof, means carried by the posts for holding a spring, said mandrel at the same side of the base member as the posts being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the base member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring, and means carried by the posts to limit the placement of the spring between the posts with respect to the base member.

9. An apparatus for handling a clock-like spring comprising a base member, a rotating mandrel disposed through said base member and projecting therebeyond in opposite directions, means arranged at one side of the base member for holding a spring, an arbor

detachably mounted upon the mandrel at the same side of the base member as the spring holding means, said mandrel being engageable with the spring to wind or unwind the spring upon required rotation of the mandrel, said mandrel at the opposite side of the member being provided with means for rotating the same thereby leaving the first named side unobstructed for the application or removal of the spring.

In testimony whereof I hereunto affix my signature.

DANIEL E. ODOM.