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SPRING WINDER

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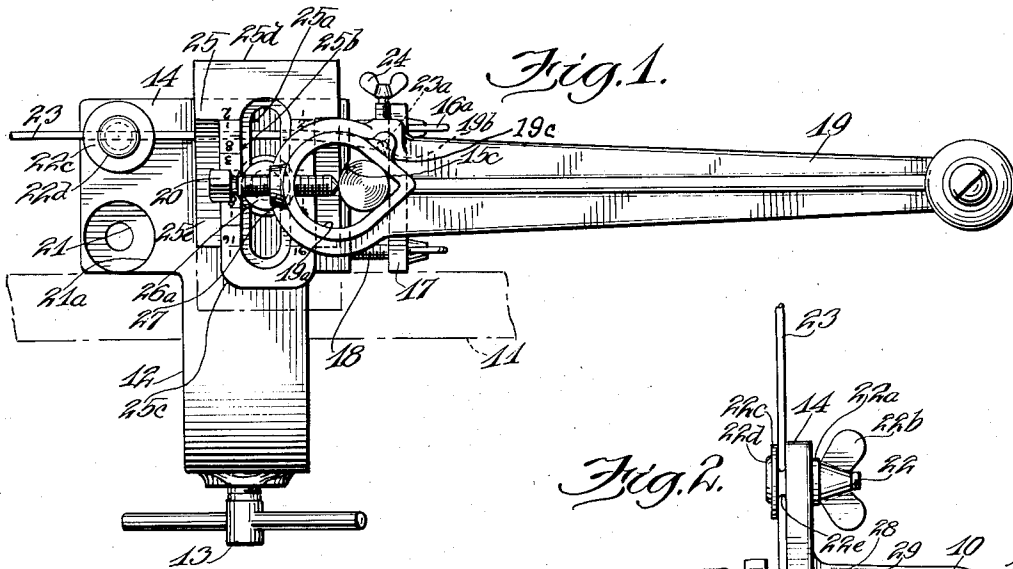


Fig. 1.

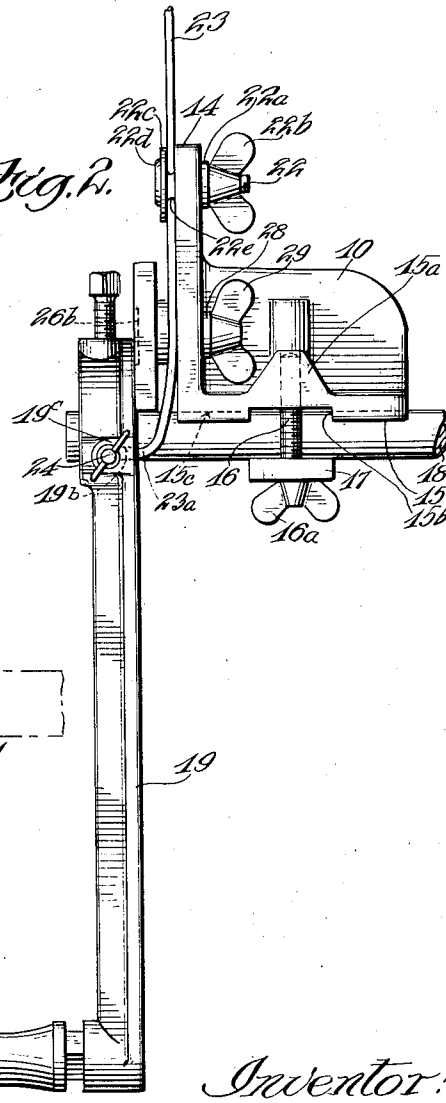


Fig. 2.

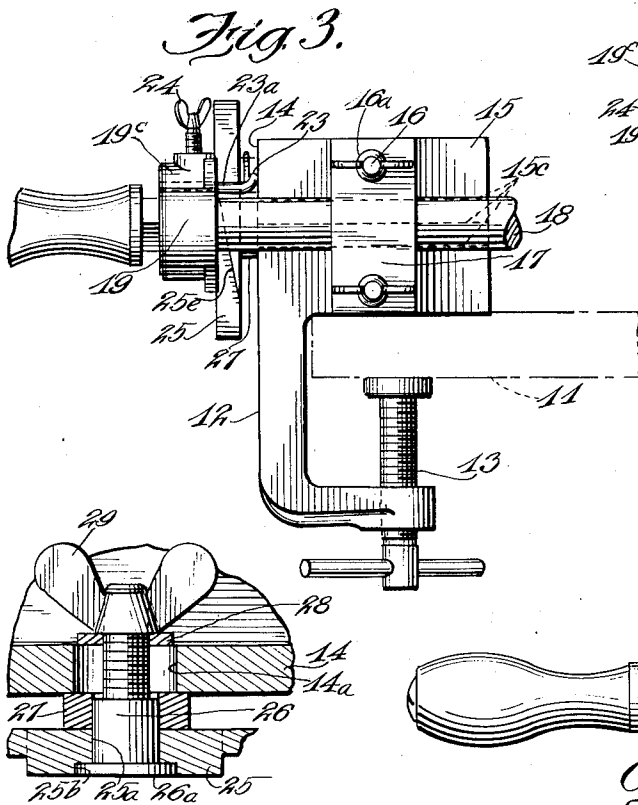


Fig. 3.

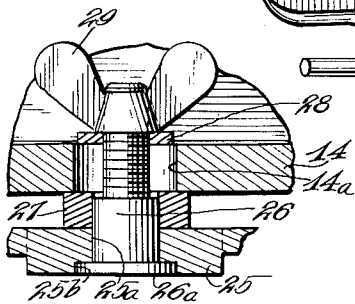


Fig. 4.



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SPRING WINDER

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2 Claims. (Cl. 153—64)

My invention relates to spring winders, and more particularly to those which are operated by hand, and has for its object to provide a machine which is of compact and rugged construction, and is suitable for both light and heavy springs.

Other objects will occur in the description to follow, reference being had to the accompanying drawing, in which

Fig. 1 is a front elevation of the winder showing the manner of its use;

Fig. 2 is a plan view;

Fig. 3 is a view from the right-hand side of Fig. 1; and

Fig. 4 is a fragmental and magnified plan section of a pitch gage connection.

Referring specifically to the drawing, 10 denotes the base of the winder, which is preferably of cast iron and designed for support on a bench, table or other horizontal object 11. The base is extended downwardly and provided with a clamp 12, operated by a screw 13 for securing the winder firmly to the bench or table. The base is also extended upwardly with a front wall 14 and a side wall 15, these walls connecting to form a right-angle, and the front wall being a continuation of the clamp 12. The one-piece development of the base with the formations mentioned lends the structure ample strength, rigidity and compactness for the purposes of its use.

The side wall 15 is thickened on its inner side, as indicated at 15a, and tapped to receive upper and lower horizontal thumbscrews 16 from the outside, these carrying a plate 17 behind the heads 16a. The plate is adapted to be advanced toward the wall 15 by the manipulation of the screws 16, and is sunken at 15b in its outer face to permit an extra amount of travel by the plate 17. The wall 15 is also sunken in its outer face with a horizontal V-groove 15c which is designed as a seat for a mandrel rod 18. The latter is pressed to its seat by the advance of the plate 17, and the extra travel of the latter—as previously mentioned—permits contact by the plate with a mandrel of a smaller diameter than the depth of the V-groove.

The mandrel 18 is typical of hand-type spring winders and receives a crank handle 19 on its front end. The aperture 19a in the handle is sufficiently large to receive mandrels of different diameters, and the mandrel is clamped to the crank handle by a set screw 20.

The mandrel is set at center height with relation to the wall 14, and the latter is made

with holes 21 above and below the center line for the selective application of wire-anchoring means, the frontal ends of the holes being enlarged with circular surface recesses 21a. The wire-anchoring means comprises a bolt 22 directed through either hole 21 to receive a washer 22a and wing nut 22b on the rear side of the wall 14. The shank of the bolt receives a washer 22c immediately behind the head 22d and then a diametrical perforation 22e of a size sufficiently large to receive the largest gage of wire for which the machine is suitable. A wire 23 is shown passed through the bolt 22, the latter being applied to the upper hole 21. By tightening the wing nut 22b, the bolt is drawn up to press and slightly flex the wire in the surface recess 21a, holding the same under tension.

The wire which has been secured by the tension bolt 22 passes along the wall 14 to a position opposite the hub of the crank handle 19 where it takes a short forward bend 23a to enter a cavity 19b in the said hub. The latter is reinforced at this point as indicated at 19c and receives a thumbscrew 24 directed into the cavity to clamp the said bend, so that the clockwise rotation of the crank handle will draw the wire and wind it around the mandrel accordingly. Similarly, when the tension bolt is positioned in the lower hole 21 the wire extends under the mandrel and may be wound in a counterclockwise direction.

To secure the desired spacing of the wire coils, an adjustable gage member, preferably called a pitch gage, is used. This device is a vertical steel plate 25 placed forwardly of the wall 14 and cut with a vertical slot 25a for the application of a bolt 26 to secure the plate to the said wall. The front end of the slot is enlarged with a facial cavity 25b in which the head 26a of the bolt lies flushly, the shank of the bolt being plain as it passes through the plate 25 and a washer 27 between the latter and the wall 14. Then the shank is somewhat reduced and threaded to pass through a horizontal slot 14a in the wall 14, receive a washer 28 bridging the slot, and then a wing nut 29. The plate can thus be secured to the wall 14, yet spaced amply therefrom to allow the passage of the wire 23 between the plate and the said wall.

The side portions of the plate 25 are tapered vertically from the frontal face to gradually meet the rear face, in the manner of a wood-chisel point. Between the tapered portions, the frontal surfaces of the plate adjacent the cavity

25b are inscribed in vertical order with graduations as indicated in Fig. 1. These progress, for example, from $\frac{1}{8}$ -inch to $\frac{1}{2}$ -inch, starting preferably from the rounded end-portion 25c of the plate and ending in the squared end-portion 25d for purposes of distinction. The graduations represent degrees of taper prominence; and while both tapers are in an identical plane, the lettering of one set of graduations is inverted relative to that of the other, to make either set readable when the plate is square-side-up, as shown, or round-side-up. A horizontal nick 26b is made in the face of the bolt head 26a to serve as an origin line relative to the pitch gage graduations, as indicated by dotted lines in Fig. 2.

It is now apparent that the plate 25 is used as a pitch-gage for the spring to be wound by spacing the coils as they are made along that tapered edge which is proximate to the mandrel 18; and the pitch or spacing of the spring may be varied by changing the height of the pitch-gage to lend the said edge a different degree of prominence, such changing being feasible when the wing nut 29 is released or removed.

To use the novel spring winder for making closely wound springs, such as of the expansion type, the pitch gage is adjusted laterally to allow ample clearance for the free and close winding of the wire on the mandrel; and the wire is anchored in the upper position, as shown, if a left-hand-wound spring is desired, or in the lower position if the spring is to be right-hand-wound. For compression or torsion springs, the same procedure is used at the beginning in order to make the end of the spring squared and the first two coils closely wound for rigidity. Then, a slight reverse movement of the mandrel is permitted to release the tension of the spring, the pitch gage then being moved into contact with the mandrel as shown. It is now seen that the coils of the spring will be spaced according to the prominence of the gage at the point of tangency with the mandrel.

For any type of spring, the removal thereof at the end of the operation is secured by releasing the thumb screws 24 and 16 which free the wire for the mandrel, so that by snipping off the final connection of the wire, the mandrel can be drawn forward by means of the crank handle 19 to leave the spring free for removal.

It will be seen that the novel spring winder is an article of rugged build and small size, giving it the strength to handle heavy work and enabling it to be attached or mounted where a small amount of room is available. The relation

of the anchoring point of the wire and the winding zone is so close and direct that the winding as heavy as $\frac{1}{8}$ -inch and even $\frac{1}{4}$ -inch is feasible by reason of the heavy construction of the machine and the favorable leverage of the crank handle 19, doing away with the necessity of using a machine type of winder for springs as heavy as the sizes mentioned. It is significant that the wire has a direct path from either anchoring position behind the pitch gage 25, so as not to interfere with or be impeded by the latter. The pitch gage is simply mounted and firmly attached at any vertical or lateral adjustment, and its adjusting means is in the rear and out of the way of the crank handle or its set screw 20. It must be noted that the frontal face of the pitch gage forms a backing for the crank handle and the successive coils of the springs as they appear in front of the gage, hence there should be nothing in the gage mechanism to interfere with the backing function of the gage and its immediate proximity to the crank handle. Further, it is seen that the friction securing means for the mandrel are of ample area to prevent any deviation in the position of the mandrel, and the thumb screw adjustment for this unit is out of the way of the crank handle, yet easily accessible for manipulation. Finally, it is apparent that the device is of a design which does not require extreme accuracy in any part except in the design and graduation of the pitch gage, so that expensive materials and methods of manufacture are not required.

I claim:—

1. A spring winder including a frontal wall, means for securing a mandrel across one end thereof, the wall being horizontally-slotted, a vertically-slotted pitch-gage opposite the wall, and attaching means between the pitch gage and the wall, said attaching means passing through the slots in these parts and being adjustable for vertical and horizontal changes in the position of the pitch gage relative to the mandrel.

2. A spring winder including a frontal wall, means for securing a mandrel across one end thereof, a pitch gage opposite the wall and having vertical and similarly tapered portions at its sides, and attaching means between the medial portion of the pitch gage and the wall, the pitch gage being rotatable about said attaching means to inverted position, whereby it presents a reversal of taper in the portion opposite the mandrel on each change of position.

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