Oct. 27, 1959 S. TUNSTALL 2,910,555

BOBBIN SIGNAL

Filed July 5, 1957

FIG. 1.

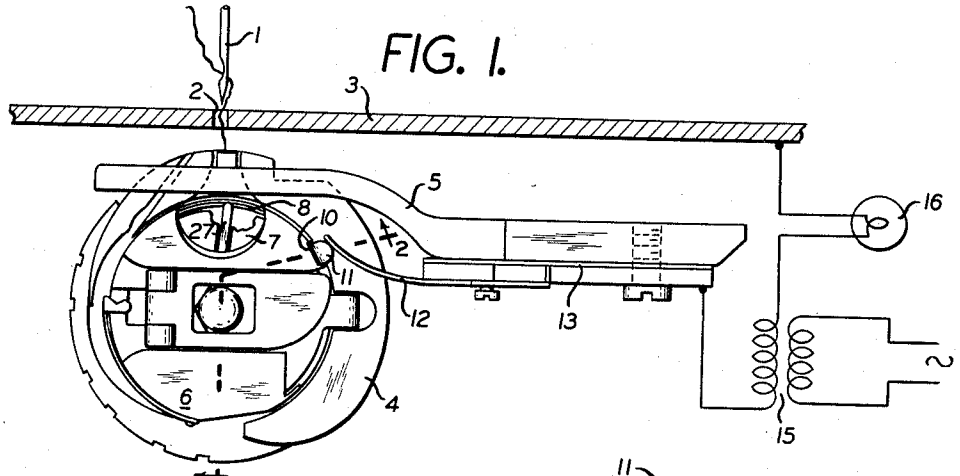


FIG. 2.

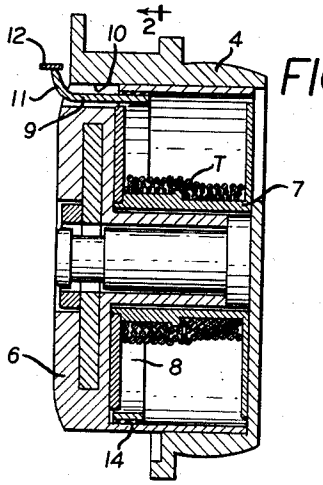


FIG. 3.

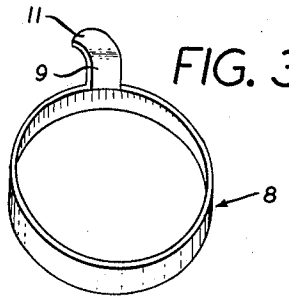


FIG. 6.

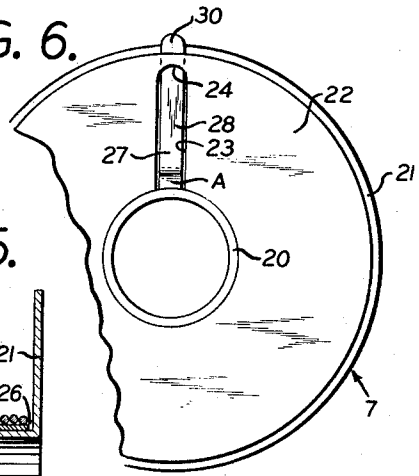


FIG. 4.

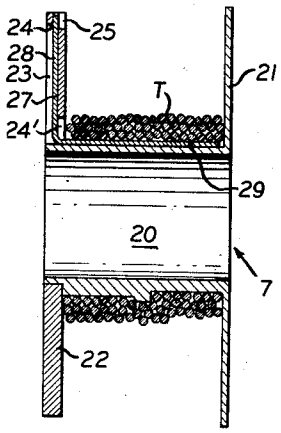
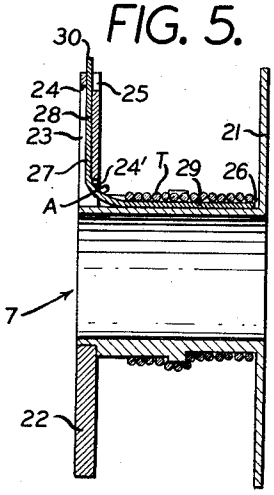


FIG. 5.



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BOBBIN SIGNAL

Spencer Tunstall, Whitestone, N.Y.

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3 Claims. (Cl. 200—61.15)

This invention relates to improvements in bobbin signals for indicating when a bobbin in a sewing machine is approaching exhaustion.

In my previous Patent No. 2,760,024, granted August 21, 1956, I disclosed a bobbin signal device, and the present disclosure is in some aspects an improvement on the device there disclosed.

It is an object of the invention to provide a bobbin signal device, comprising a contact element incorporated in the bobbin itself and in which the structure is simplified and made more rigid and reliable by comparison with previous structures.

A further object of the invention is to provide an improved contact device cooperating with the bobbin contact element for signalling approaching exhaustion of the thread.

A device embodying the invention in a preferred form will now be described with reference to the accompanying drawing and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

Fig. 1 is an elevation view showing the bobbin of the invention in place in the bobbin case and hook element of the sewing machine;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an isometric view of an element forming part of the structure shown in Fig. 2;

Fig. 4 is a section through the bobbin, showing the parts in the position occupied when a quantity of thread remains on the bobbin;

Fig. 5 is a section similar to Fig. 4, but showing the parts in the position occupied as the thread is becoming exhausted; and

Fig. 6 is a partly fragmentary end elevation view of the bobbin of Fig. 5.

Figs. 1 and 2 show parts of a generally conventional sewing machine, in which the needle **1** reciprocates up and down through an aperture **2** in a fabric support or bed plate **3** of the machine, and cooperates with a bobbin and associated structure below the plate **3** in the usual manner. The hook **4** is of generally conventional and known form and cooperates with a conventional position finger **5**. The hook **4** receives the bobbin case **6**, which, again, is a conventional structure except as hereinafter pointed out and this, in turn, receives the bobbin **7**. The case **6** is fitted with a contact ring **8** having the form shown in Fig. 3, which runs all around the inside of the case in alignment with one flange of the bobbin and has an extension **9** which passes out through an aperture **10** in the case and terminates in an angularly placed shoe or contact section **11**, which cooperates with a spring **12** to make connection to a signal circuit as later described. Spring **12** is fastened to the position finger **5** and insulated therefrom by a layer of insulating material **13** and the ring **8**, previously mentioned, is similarly insulated from the case **6** by insulating material **14**.

If the bobbin contact element as later described touches the ring **8**, a circuit will be established through power source **15**, shown in this case as a transformer, and signal element **16**, shown in this case as a light, through the bed **3** of the machine back through the hook and bobbin to the contact ring **8**, thus actuating a signal to indicate approaching depletion or exhaustion of the bobbin. The bobbin itself comprises a barrel section **20** and flanges **21**, **22**, flange **21** being of slightly greater diameter for reasons explained below. The flange **22** is formed with a radial groove or channel **23** in its outer face, extending from the barrel **20** to a point **24** close to the rim of the flange, and with a short radial groove or channel **25** in its inner face and at the rim of the flange. Adjacent the barrel **20** and in alignment with the radial groove **23** is an aperture **24'** and a groove **26** running axially of the barrel. A generally rectangular spring member **27** is fitted into the bobbin as shown in Figs 4–6, one leg **28** extending radially and being accommodated by grooves **23** and **25** as shown, and the other leg **29** extending axially and being accommodated by the barrel groove **26**. With spring **27** in the position of Fig. 4, the outer end of leg **28** does not extend beyond the rim or profile of the flange **22**, and the spring is held in the position of Fig. 4 so long as there is any appreciable quantity of thread T on the bobbin. If, however, the thread T is depleted to less than a single layer or so, the spring **27** will be permitted to assume its nature form, as indicated in Fig. 5, in which case a tip **30** of the spring protrudes beyond the rim of flange **22** and will make contact with the casing ring **8**, thus actuating the signal as mentioned above. The normal unstressed form of spring **27** is approximately as shown in Fig. 5, the two legs **28** and **29** tending to make an obtuse angle A with each other. As will be apparent, the extent of protrusion of the tip **30** of the radial leg of the spring may be controlled very nicely by the size of the aperture **24'**, which limits the extent of radial movement permitted. As previously mentioned, flange **21** is slightly larger in diameter than flange **22**. In consequence of this, it is not possible to insert the bobbin in its case in the wrong direction, i.e. with flange **21** opposite ring **8**, since flange **21** will strike this ring before the bobbin is fully inserted, if it is attempted to insert it in the wrong direction.

What is claimed is:

1. A sewing machine bobbin comprising a barrel and flanges, a spring contact element having a generally radial arm and a generally axial arm, the two said arms normally being at an obtuse angle to each other, the bobbin having a groove in a flange receiving the said radial arm, and means holding the axial arm circumferentially in position on the barrel, whereby the thread on the said barrel holds the said axial arm down against the barrel, forcing the two arms into substantially a right angle position with relation to each other, and removal of thread permits the spring of the axial arm to force the radial arm radially outwards for making contact and signalling exhaustion of the thread.

2. A sewing machine bobbin comprising a barrel and flanges, a spring contact element having a generally radial arm and a generally axial arm, the two said arms normally being at an obtuse angle to each other, the bobbin having grooves lying in substantially an axial plane and comprising a groove in the barrel receiving the said axial arm and a groove in a flange receiving the said radial arm, whereby the thread on the said barrel holds the said axial arm down against the barrel and within the groove, forcing the two arms into substantially a right angle position with relation to each other, and removal of thread permits the spring of the axial arm

to force the radial arm radially outwards for making contact and signalling exhaustion of the thread.

3. In a sewing machine, a bobbin, signal apparatus comprising a bobbin having a radially movable contact element in one of its flanges, a bobbin carrier having an insulated contact ring in position for surrounding the said flange and for engagement by the said contact element and means insulated from the carrier and machine frame for making electrical connection to the said

ring, the other said bobbin flange being of greater diameter than the inside diameter of the contact ring.

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