

[54] **BOBBIN WINDING DEVICE FOR SEWING MACHINE**

[72] Inventor: **Silvano Perlino**, Pavia, Italy

[73] Assignee: **Necchi, S.p.A.**, Pavia, Italy

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[56]

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*Primary Examiner*—Stanley N. Gilreath

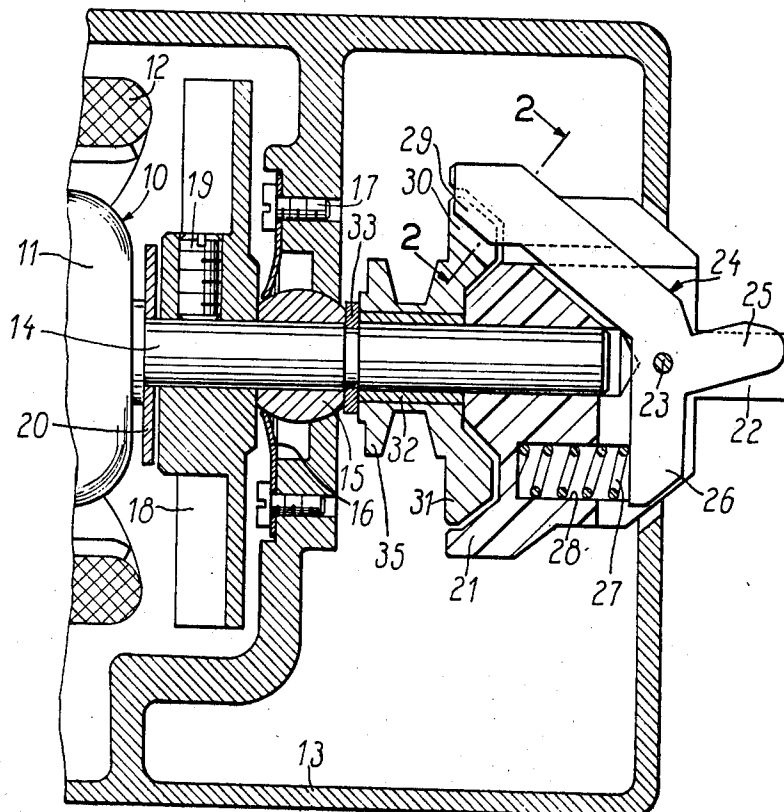
*Attorney*—Stevens, Davis, Miller & Mosher

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**ABSTRACT**

A bobbin-winding arrangement for sewing machines including a means for uncoupling the motor drive shaft from the machine's normally driven elements.

**4 Claims, 2 Drawing Figures**



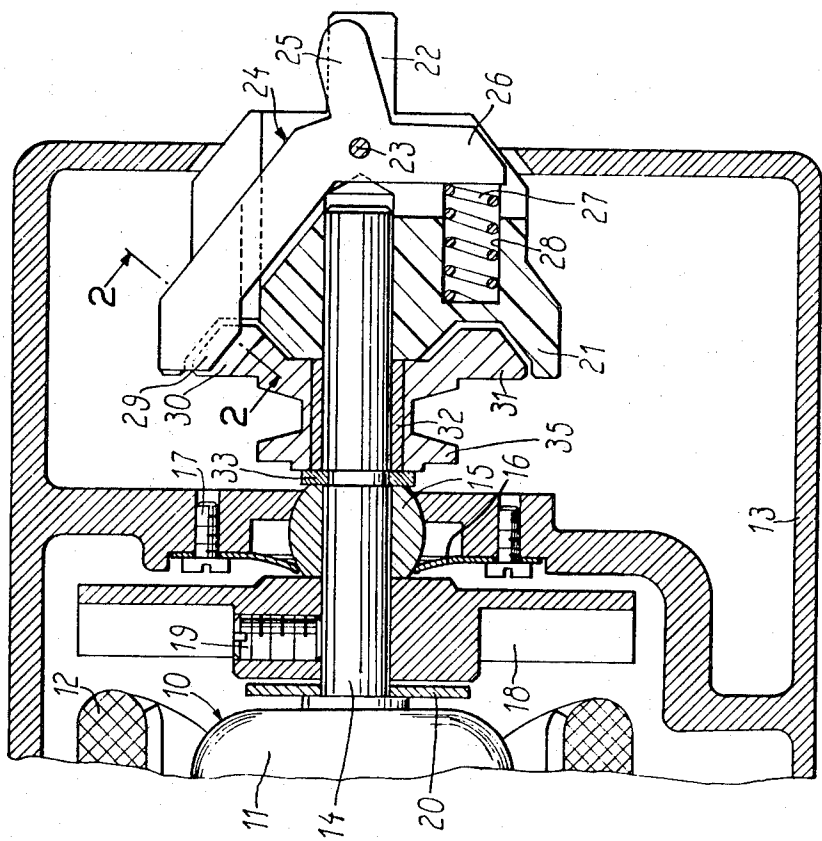


FIG. 1

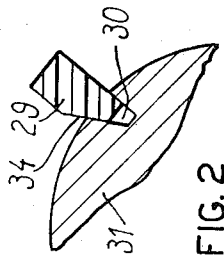


FIG. 2

## BOBBIN-WINDING DEVICE FOR SEWING MACHINE

This invention relates to a bobbin-winding arrangement in sewing machines according to which the machine's main driven parts are disconnected from the machine's motor during the bobbin-winding operation.

An object of the invention is the realization of a simple, reliable, and inexpensive means whereby the foregoing arrangement may be realized.

Another object of the invention is the realization of a bobbin-winding arrangement whereby the external accessible bobbin-winding elements are effectively insulated electrically from internally located drive elements for said winding elements.

Other objects are those which are inherent in the arrangement disclosed herein.

Generally, the objects of this invention are realized by reducing to a minimum the number of individual parts required for establishing a driving relationship between the machine motor and the winding pin upon which the bobbin is mounted during the rethreading thereof and, further, certain of those parts are made of insulating material instead of electrically conductive metal. Specifically, said winding pin constitutes part of an insulator element which itself serves to selectively couple or uncouple the motor shaft relative to the machine's main driven parts.

A practical embodiment of which will now be described in detail with reference to the accompanying drawing, wherein:

FIG. 1 is a partial view in section of bobbin-winding device according to this invention; and,

FIG. 2 is an enlarged partial detail view of certain parts taken from FIG. 1.

The power means for the machine's driven elements is the electric motor 10 which includes rotor 11 and stator 12, said motor being supportingly mounted within a frame 13 which also constitutes part of the machine bed. The motor shaft 14 is rotatively supported in said frame 13 by bearing means such as spherical bushing 15 which is seated in circular plate 16 which in turn is secured to frame 13 by screw means 17. A fan impeller 18 and a shoulder ring 20 are mounted on the motor shaft, the impeller rigidly being held by setscrew 19 whereby it rotates integrally with the shaft.

The bobbin-mounting means comprises a body 21 of generally cylindrical shape rigidly mounted on the end of motor shaft 14 and entirely within the confines of frame 13 excepting for an outwardly projecting pin portion 22 which is easily accessible to the machine operator. A lever 24 is pivotally mounted within a slotted portion of said body 21 about a pin 23, said lever being normally resiliently biased in one pivotal sense by a spring means 27 extending axially within a bore 28 of said body 21 and bearing against one arm 26 of lever 24 whereby a tooth-shaped end 34 of another arm 29 is normally biased into engagement with a notch 30 in a circumferential flange 31 of pulley 35. Said pulley is freely rotatably mounted about motor shaft 14 by means of bushing 32 but rotative driving force is normally transmitted from the shaft to the pulley by virtue of the tooth 34 engaging the pulley flange 31 within its outer peripheral notch 30. Said pulley is connected by a belt, not shown, to the machine main drive shaft which in turn drives the respective sewing elements of the machine. Element 33 merely constitutes a spacer ring separating bushing 15 from pulley 35.

A bobbin, not shown, may be fitted onto pin 22 and thereby be rotated together with body 21 for the purpose of rethreading said bobbin. However, the fitting of the bobbin onto pin 22 necessitates the downward displacement of arm 25 of said lever 24, said arm normally projecting radially beyond the outer circumferential periphery of pin 22 as is illustrated in FIG. 1. Since the three lever arms 25, 26, and 29 are all rigid with one another, such downward displacement of arm 25 occurs against the urging of spring 27 and is accompanied by a corresponding pivoting of arm 29 to an extent whereby tooth 34 is withdrawn completely from within notch 30. The pulley 35 is thereby uncoupled from motor shaft 14 so that the pulley is not driven while a bobbin is mounted on pin 22.

In order to provide effective electrical insulation between the bobbin and the other working parts which are connected to the motor, body 21 and lever 24 are both of nonconductive material such as a plastic. In this regard, the required strength of tooth 34 is considerably larger diameter than that of shaft 14 thereby reducing the tangential force at the outer periphery of flange 31 for each value of torque on the shaft 14. In other words, the larger the diameter of flange 31 relative to the diameter of shaft 14 and the greater is the mechanical advantage of the coupling arrangement so that various parts may be made of weaker materials than would be the case if such mechanical advantage were not present. Specifically, lever 24 may now be of plastic while heretofore it commonly was of steel.

In order to assure a perfect coupling free of slack, which causes noise and excessive wearing of parts, between lever 24 and pulley 35, tooth 34 and notch 30 are complementarily trapezoidal in section, as shown in FIG. 2. This configuration and the action of spring 27 combine to assure that tooth 34 is always firmly and fully inserted into notch 30.

Various details presented herein relative to a particular embodiment of realization of the inventive concept are clearly only illustrative and not limitative of the scope of applicability of said inventive concept, it being within the purview of one skilled in the art to resort to various changes, substitutions, etc., without departing from the spirit and scope of said inventive concept. For example, the pulley 35 could easily be replaced with a toothed gear. In this instance, the gear would also include the circumferential flange 31 and the notch 30 which notch would still be positioned at a radius from the rotational axis of the rotary drive member 35, which is greater than the radius of the circumference along which the rotary drive member 35 engages the driven element of the machine, not shown. In the case of a gear, such radius would be the pitch radius of the gear teeth while in the case of the shown pulley, such radius would be the radius of the pulley belt groove.

What is claimed is:

1. A sewing machine having a bobbin-winding device, comprising: an electric motor having a drive shaft, a rotary drive member for transmitting power from said shaft to the sewing elements of the machine, said member being freely rotatably mounted about said shaft and comprising a circumferential surface portion adapted to drivingly engage a power-transmitting element and a coupling portion radially projecting to a considerable extent beyond the outermost radius of said surface portion, a body of electrically insulating material mounted on said shaft for integral rotation therewith, said body being adapted to receive a bobbin thereon and to rotate same integrally with said shaft while insulating the bobbin electrically from said shaft, a lever also of electrically insulating material pivotally mounted on said body and arranged to engage said coupling portion to transmit driving torque from said shaft to said rotary drive member, said lever being arranged to be actuated by a said bobbin to disengage from said coupling portion when a bobbin is mounted on said body, the radius from the axis of said shaft at which said lever engages said coupling portion being greater than the corresponding radius at which said rotary drive member engages a power-transmitting element connected to the machine sewing elements so that the forces transmitted through said lever to said rotary member are smaller than those transmitted from said rotary member to the sewing elements of the machine.

2. The machine of claim 1, said lever being automatically responsible to removal of a bobbin from said body to reengage said rotary member.

3. The machine of claim 1, said rotary drive member-coupling portion comprising a radially extending projection having a notch therein, said lever having a tooth engageable in said notch, said notch and tooth being complementarily trapezoidal in cross section.

4. The sewing machine of claim 1, said rotary drive member being a belt pulley having opposed flanges defining therebetween a belt groove which constitutes said circum-

ferential surface portion, said coupling portion comprising a radially outwardly extending projection from a one of said flanges.

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