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SEWING MACHINE

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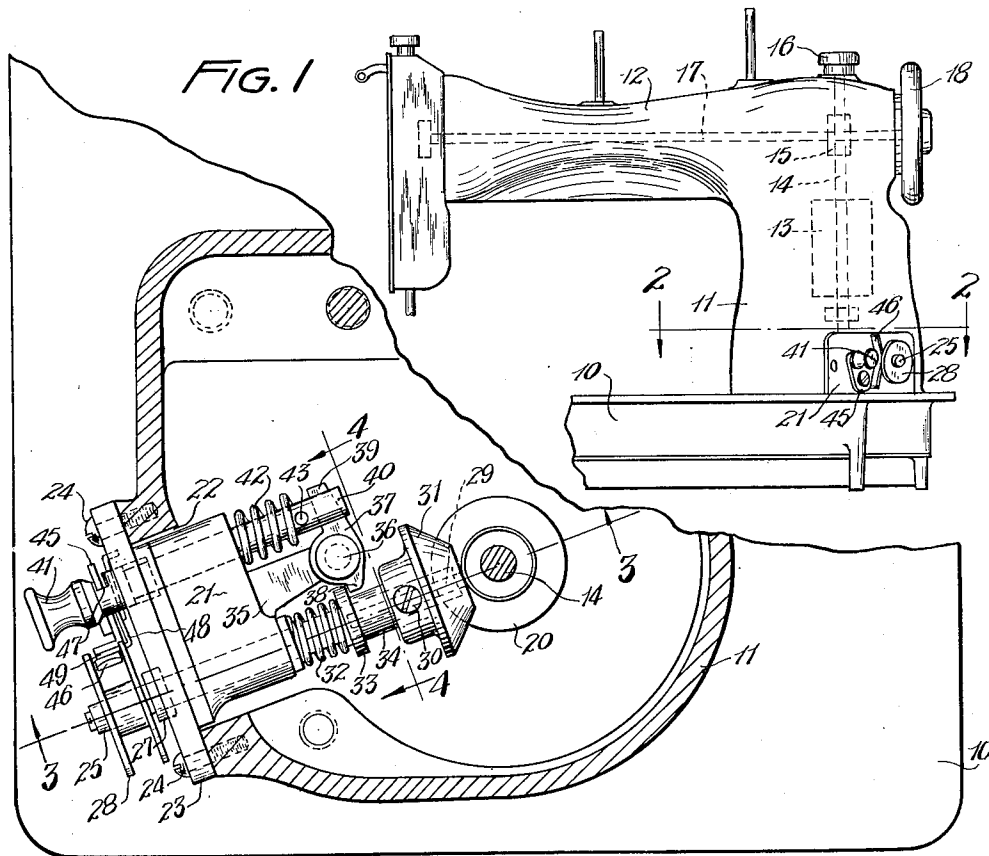


FIG. 2

FIG. 5

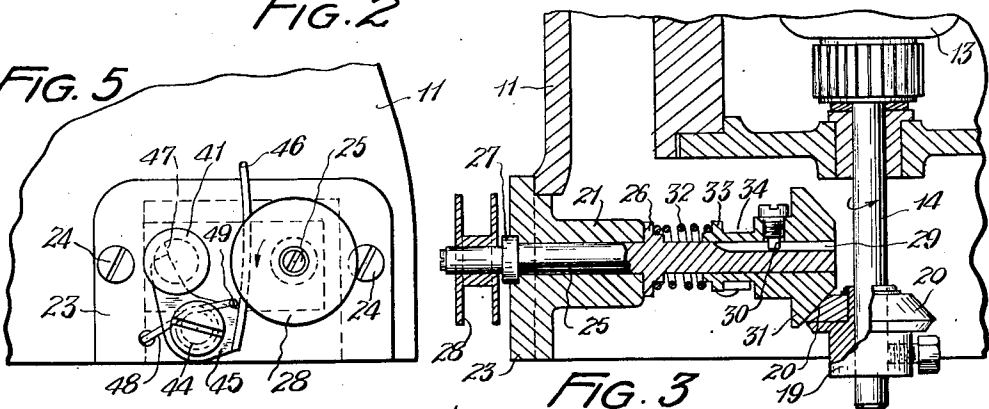
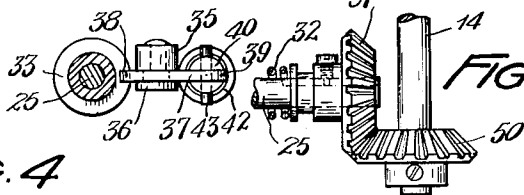


FIG. 4



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SEWING MACHINE

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3 Claims. (Cl. 112-218)

This invention relates to improvements in sewing machines, and has to do principally with a bobbin winding mechanism and means for driving it from the power shaft of the machine.

5 One of the objects of the invention is the provision of a bobbin winding mechanism which shall be largely enclosed within and concealed by the machine head, in order to enhance the appearance of the machine and to protect the mechanism.

10 Another object of the invention is the provision of a drive for a bobbin winding mechanism which shall be adaptable to use with a motor enclosed within the hollow arm of the sewing machine.

15 A further object is the provision of a bobbin mechanism which shall be made as a unit for convenience in servicing and replacement, as well as in assembly.

20 Still another object is the provision of means for automatically disengaging the bobbin winding mechanism when the bobbin has been filled to the desired degree.

25 Other objects and features of novelty will appear as we proceed with the description of that embodiment of the invention which, for the purposes of the present application we have illustrated in the accompanying drawing, in which

30 Figure 1 is an elevational view of a portion of a sewing machine head to which the invention is applied.

Fig. 2 is a transverse horizontal sectional view on a larger scale, the view being taken substantially on the line 2-2 of Fig. 1.

35 Fig. 3 is a fragmental vertical sectional view taken substantially on the line 3-3 of Fig. 2.

Fig. 4 is a detail sectional view taken substantially on the line 4-4 of Fig. 2.

Fig. 5 is a fragmental elevational view of the outer portion of the bobbin winding unit, and

40 Fig. 6 is a detail elevational view of a modification.

In Fig. 1 of the drawing we have illustrated a sewing machine head having a hollow base or bed 10 and a hollow arm or gooseneck comprising a 45 vertical portion 11 and a horizontal portion 12. Within the vertical portion 12 of the hollow arm there is an electric motor having a rotor 13 carried by vertical motor shaft 14 which extends for some distance above and below the rotor 13, and constitutes the power shaft of the machine. This 50 shaft may carry a worm 15 which may be clutched to or declutched from shaft 14 by any suitable means by manipulation of a knob 16 projecting through the top of the hollow arm, as indicated 55 in Fig. 1. The particular means for clutching

and declutching the worm gear 15 to the shaft 14 per se forms no part of the present invention, and hence need not be illustrated herein.

The worm 15 meshes with a worm wheel (not shown) carried upon a horizontal shaft 17 mounted in the horizontal portion 12 of the hollow arm. This shaft drives the needle mechanism of the machine, and may have a fly-wheel 18 secured to its rear extremity. The shuttle and the feed bar of the machine may be driven by suitable connections from the shaft 17, as will be readily understood, and as illustrated in our copending application above identified.

On the lower extremity of shaft 14 we mount a drive wheel 19, which is shown as comprising a 15 metallic hub with a flange and collar for holding a beveled friction disk 20, which we prefer to make of a hard grade of felt.

The bobbin winding mechanism is built as a unit, best shown in Fig. 2, which may be separately assembled and then placed in position in the machine. This unit includes a block 21 which is of a size to be inserted through an opening 22 in the hollow arm 11, and is provided with a flange 23 that abuts against a flat surface surrounding 25 the opening 22 and is secured to the hollow arm by means of screws 24 or the like. The block 21 has a relatively long journal therein which receives a spindle 25. About half way between the ends of spindle 25 there is an integral collar 26 30 which abuts against the inner surface of the block 21, while a second collar 27 is secured to the spindle 25 in position to abut against the outer face of the block, these collars holding the spindle against longitudinal movement. The outer extremity of spindle 25 beyond the collar 27 is of a proper size to frictionally receive a bobbin 28. Spindle 25 has a keyway 29 formed therein which slidably receives a stud 30 that is threaded into the hub of a drive wheel 31. In this instance the 40 wheel 31 is a beveled friction disk of metal, which is adapted to operatively engage the friction disk 20.

The wheel 31 with its elongated hub is slidably mounted on the spindle 25, being urged inwardly or toward the disk 20 by a coil spring 32 45 which bears at one end upon collar 26 and at the other end against a collar 33 on the hub of the wheel 31. Just forward of the collar 33 there is a peripheral groove 34. 50

In an intermediate position on the block 21 there is an inwardly extending bracket 35 in the outer end of which there is mounted a headed pin 36, and upon this pin behind the head thereof is pivotally mounted a lever 37. This lever 55

has a short arm 38 that is adapted to engage against the forward side of collar 33, and a long arm 39 which rests in a slot in the inner end of a plunger 40 that is longitudinally slidable in the block 21 and projects therethrough, being provided on its outer extremity with a knob 41, by means of which it may be moved lengthwise. A coil spring 42 surrounds plunger 40, bearing at one end against the block 21 and at the other end against a pin 43 mounted in the plunger. Spring 42, which is stronger than spring 32, tends to push the plunger 40 inwardly and thereby to rock lever 37 upon its pivot so as to cause lever arm 38 to move collar 33 outwardly or rearwardly against the action of spring 32, thereby withdrawing disk 31 from engagement with disk 20.

Upon the outer face of block 21, somewhat below knob 41, we mount a pin 44 having a smooth shouldered portion which oscillatably supports a flat metal trigger 45. At its lower end this trigger carries an upwardly extending arm 46 that is in the form of a metal strip and is preferably integral with the main part of the trigger, although arranged at an angle of substantially 90° thereto. This arm 46 is of a width to enter readily between the side walls or flanges of the bobbin 28. The upper part of trigger 45 is adapted to enter a notch 47 formed in the shank of plunger 40 behind knob 41. A coiled wire spring 48 surrounds the shank of the plunger, is anchored at one end in the block 21, and at the other end has an angular extremity 49 which presses upon arm 46 and tends to turn the trigger as a whole in a clockwise direction as viewed in Fig. 5. When the knob 41 is pulled outwardly to the position shown in Fig. 2, the trigger snaps into the notch 47 and holds the plunger thus retracted against the action of spring 42, which then permits spring 32 to shift the friction disk 31 into engagement with the disk 20.

In Fig. 6 we have shown a different form of driving connection between the shaft 14 and spindle 25 in which we use a bevel pinion 50 pinned to shaft 14, and a bevel pinion 51 meshing with pinion 50 and slidable upon spindle 25 in the same manner as in the case of the beveled friction disk 31.

Operation.—Normally the upper portion of trigger 45 rests against the base of knob 41, that is it is out of engagement with notch 47 and the spring 42 is acting to hold plunger 40 in its inner position, in which position the lever 37 is tilted to cause lever arm 38 to pull back drive wheel 31 against the action of the weaker spring 32, thereby effecting a disengagement of the bobbin driving mechanism. At such times there will ordinarily be no bobbin on the exposed end of bobbin spindle 25. Now, if the operator desires to wind a bobbin, he slips one onto the end of spindle 25, the arm 46 not interfering with this operation, since it is held to one side by the engagement of the trigger with the shank of the plunger 40. When the bobbin is in place on the spindle, and the thread started on the bobbin, the operator grasps knob 41 and pulls the plunger

40 outward against the action of spring 42 sufficiently to permit trigger 45 to snap into notch 47. As soon as the pressure of spring 42 upon lever 37 is relieved, spring 32 begins to act, so that as the knob 41 is withdrawn, the drive wheel 31 travels forward toward wheel 20, and by the time the trigger 45 springs into notch 47 the two drive wheels are in effective engagement. At the same time that the trigger 45 enters the notch 47 the arm 46 carried by the trigger enters the space between the flanges of bobbin 28. The operator now manipulates the motor rheostat to operate the motor at the desired speed and the bobbin turns with the spindle 25. The reeled thread upon the bobbin presently engages the trigger arm 46 and gradually deflects it toward the left in Fig. 5, until finally the trigger is lifted out of the notch 47 in the plunger, when the spring 42 draws the plunger inwardly and rocks lever 37 to retract drive wheel 31, thereby automatically disabling the winding mechanism when the bobbin is filled. There is nothing further for the operator to do except to withdraw the bobbin from the spindle 25. When the newly wound bobbin is properly positioned in the machine the operator manipulates the knob 16 to again connect the motor with the sewing machine, and work with the machine may be resumed.

Having thus described our invention, we claim:

1. In a sewing machine, a hollow casing, a power shaft therein, said casing having an opening through one wall thereof, a bobbin winding unit adapted to be inserted into or withdrawn from said opening as a unit, means for removably attaching said unit to the casing, a bobbin winding spindle journaled in said unit, and separable operative connections between said spindle and power shaft.

2. In a sewing machine, a hollow casing, a power shaft therein, said casing having an opening through one wall thereof, a bobbin winding unit adapted to be inserted into or withdrawn from said opening as a unit, means for removably attaching said unit to the casing, a bobbin winding spindle journaled in said unit, separable driving connections between said spindle and power shaft, and means mounted in said unit and projecting outwardly therethrough for making and breaking said driving connections.

3. In a sewing machine, a hollow casing, a power shaft therein, said casing having an opening through one wall thereof, a bobbin winding unit adapted to be inserted into or withdrawn from said opening as a unit, means for removably attaching said unit to the casing, a bobbin winding spindle journaled in said unit, separable operative connections between said spindle and power shaft, spring actuated means for disengaging said operative connections, and a trigger mechanism for releasing said spring actuated means, said mechanism comprising an element arranged to engage the reeled thread on a bobbin arranged on said spindle.

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