July 5, 1960 S. J. HAMLETT 2,943,586

BOBBIN WINDING MECHANISM

Filed Sept. 2, 1958

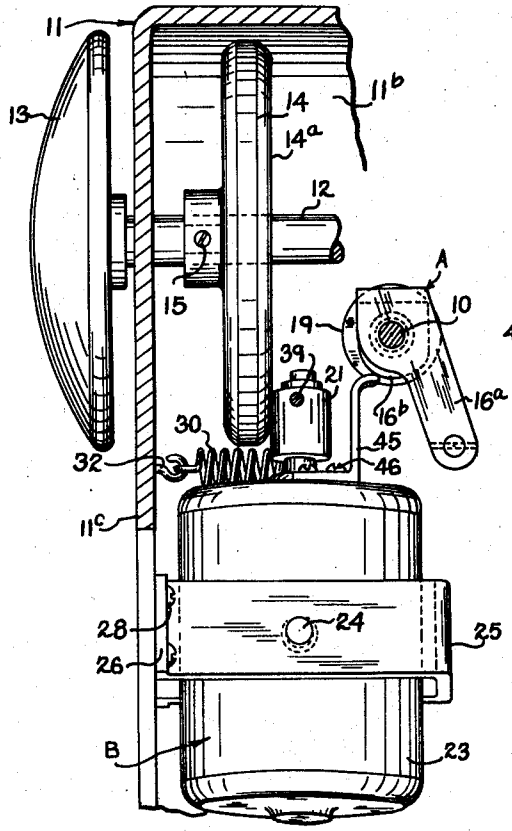


FIG. 1

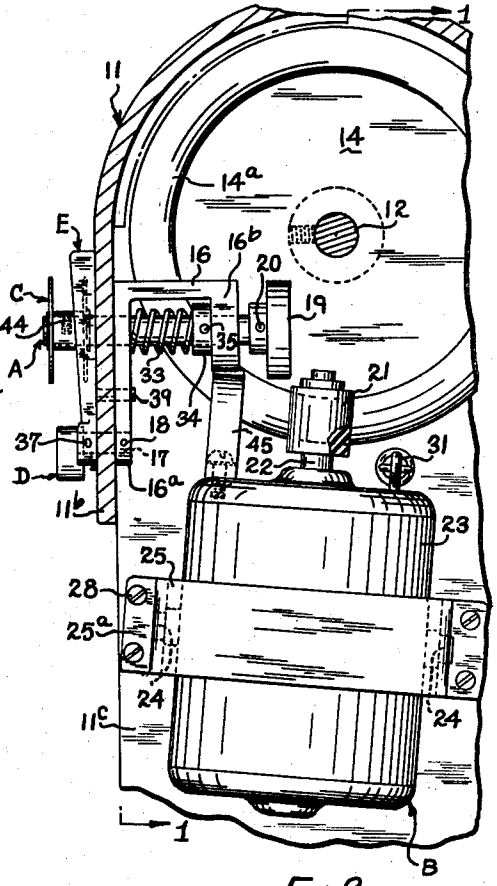


FIG. 2

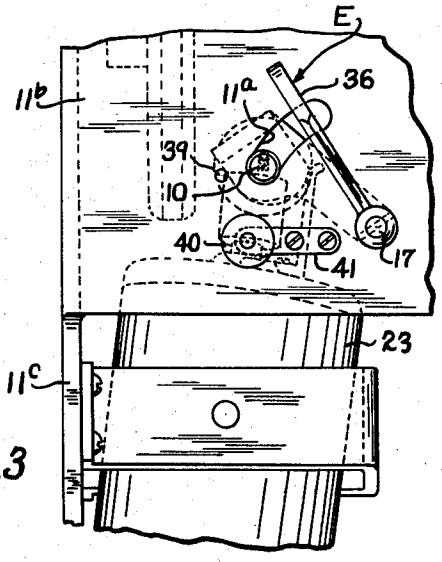


FIG. 3

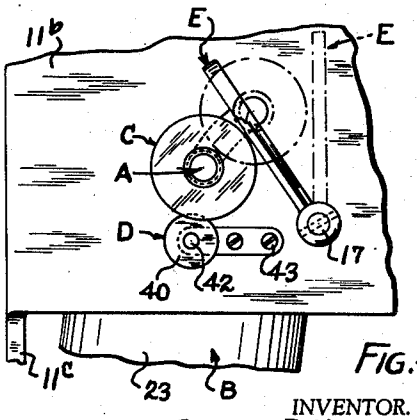


FIG. 4

INVENTOR.
SIDNEY J. HAMLETT
BY Hudson, Boughton, Williams, Davis & Hoffmann
ATTORNEYS

United States Patent Office 2,943,586 Patented July 5, 1960

2,943,586

BOBBIN WINDING MECHANISM

Sidney J. Hamlett, Parma, Ohio, assignor to White Sewing Machine Corporation, Lakewood, Ohio, a corporation of Delaware

Filed Sept. 2, 1958, Ser. No. 758,455

11 Claims. (Cl. 112—218)

The present invention relates to a sewing maching and, more particularly, to a novel and improved bobbin winder mechanism for such a machine.

One of the principal objects of the invention is to provide a bobbin winding mechanism that is simple in structure, efficient in operation, and can be mounted in the head of a portable sewing machine with only a minimum number of parts extending outside of the sewing machine head.

Another object is the provision of a bobbin winding mechanism as set forth in the preceding object and in which the drive for a main drive shaft is automatically disengaged during the winding of the bobbin.

Another object is the provision of a bobbin winding mechanism that is particularly adapted to be mainly mounted within the head of a sewing machine and especially where only a minimum amount of space is available for the mechanism, particularly as in a portable sewing machine.

Another object of the invention is to provide a novel bobbin winding device of the above-described type which is simple and rugged in design, efficient in its operation, and is inexpensive to manufacture.

Another object of the invention is the provision of a bobbin winding mechanism of the type described for preventing the overwinding of thread on a bobbin by disengaging the bobbin drive upon a predetermined amount of thread being wound on the bobbin.

A still further object of the invention is the provision of a bobbin winding mechanism provided with manual control means for enabling an operator to wind any amount of thread on a bobbin within the capacity thereof.

A still further object of the invention is the provision of a bobbin winding mechanism adapted to be almost entirely housed within the head of a sewing machine where space is at a premium, such as in a portable sewing machine, with only a minimum number of parts protruding outside the head and adapted to be driven by a pivotally mounted drive motor by manually swinging the motor out of engagement with the main drive shaft into driving engagement with the bobbin winding mechanism by means of a simple fingertip operated bobbin winding control mechanism.

The invention further resides in certain novel features of construction, combinations and arrangements of parts, and further objects and advantages of the invention will be apparent to those skilled in the art to which it pertains from the following description of the present preferred embodiment thereof described with reference to the accompanying drawing forming a part of this specification and wherein the same reference characters represent corresponding parts throughout the several views, and in which:

Fig. 1 is a fragmentary vertical sectional view substantially along line 1—1 of Fig. 2 showing a head of a sewing machine embodying the present invention and looking from the rear side of the sewing machine.

Fig. 2 is a fragmentary view, partly in section and

partly in elevation, of Fig. 1 as viewed from the right side thereof.

Fig. 3 is a fragmentary rear elevational view of the head of the machine showing a bobbin winding control lever moved to such a position that a drive motor is pivotally moved out of engagement with a drive wheel into engagement with a bobbin winding spindle drive wheel but with a bobbin not being shown; and

Fig. 4 is a fragmentary rear elevational view of the sewing machine head similar to Fig. 3 but with a bobbin shown mounted on a bobbin winding spindle and with the bobbin winding control lever shown in the same position as shown in Fig. 3, but with the control lever also shown in hidden outline for denoting the normal inactive position thereof.

The preferred embodiment of the invention shown in Figs. 1–4 of the drawings generally comprises bobbin supporting means A and driving means B, adapted to support and drive a bobbin C when the bobbin supporting means A is in one position, and to support but not drive the bobbin C when the bobbin supporting means A is in a second position; thread sensing frictional braking means D adapted to free the bobbin from its frictional driving engagement with the bobbin driving means B when a predetermined amount of thread is wound upon the bobbin; and manually operated bobbin winding control means E comprising a lever for moving and frictionally holding the driving means B in driving engagement with the bobbin supporting means A and holding the threaded portion of the bobbin C in engagement with the first thread sensing frictional braking means D when a predetermined or sufficient amount of thread fills the bobbin to enable the bobbin C to be automatically braked against the brake D, the spindle driving means B being also released when the control means E is positively released by the operator for permitting the operator to wind any amount of thread on the bobbin C up to and including a predetermined amount automatically controlled by the brake D.

The bobbin supporting means A is comprised of a spindle **10** projecting through an arcuate slot in a sewing machine head standard or housing wall **11** and, more specifically, through the arcuate slot **11***a* in a vertical rear wall **11***b* of the sewing machine in such a manner as to be disposed perpendicularly to a substantially vertical plane passing through the longitudinal axis of a main shaft **12** which normally extends longitudinally of the horizontal arm of the sewing machine head. A handwheel **13** is fixed on the end of the shaft **12**, which extends through a housing end wall **11***c*. A large diameter drive wheel **14**, having an annular side tread **14***a* of arcuate transverse contour, is rigidly secured to the shaft **12** just inside the housing end wall **11***c* with a setscrew **15**.

The bobbin supporting means A further comprises a substantially U-shaped spindle support bracket **16** having interconnected parallel legs **16***a*, **16***b*. The leg **16***a* is pivotally connected to a vertical rear wall portion **11***b* of the standard or housing **11** by means of a pivot pin **17** journaled in the wall **11***b* of the housing **11** and to which the support bracket **16** is nonrotatably connected in a conventional manner such as by a pin **18**, the spindle **10** being journaled in the oppositely spaced legs **16***a*, **16***b* of the spindle support bracket **16**.

The inner end of the spindle **10** is provided with a cylindrical driving wheel **19** with the edges rounded, which wheel **19** is fixed to the spindle **10** in a conventional manner such as by a transverse pin **20**. The spindle drive wheel **19** is adapted to be engaged by a cylindrical rubber friction drive roller **21** fixed to the upwardly extending end of a drive shaft **22** of an electric motor **23** controlled by a switch in the usual control circuit, not

shown, and forming the driving means B. The housing of the motor **23** has a pair of diametrically outwardly and oppositely projecting trunnions **24** with reduced outer ends journaled in parallel walls of a substantially U-shaped motor support strap **25**. The ends of the U-shaped support strap **25** terminate in outwardly and oppositely extended flanges **25***a* abutting the end wall **11***c* of the housing **11** and secured thereto by conventional means, such as screws **28**.

The driving motor means B is pivotally mounted in the motor support strap **25** and can be swivelled into engagement with the spindle drive wheel **19** but is normally biased into frictional driving engagement with the annular side tread **14***a* of the drive wheel **14** by means of a helical tension spring **30**. The spring **30** has one end secured to the motor **23** by means of a hook **31** and the other end secured to the end wall **11***c* of the housing **11** by means of a second hook **32** fixed thereto.

A helical compression spring **33** for cushioning the contact of roller **21** with the wheel **19** is disposed over an intermediate portion of the bobbin spindle **10** between the spindle support bracket legs **16***a* and **16***b* and at one end thereof bears against the leg **16***a* of the spindle support bracket **16** and at the other end thereof bears against a collar **34** fixed to the spindle **10** by means of a transverse pin **35** so as to normally urge the spindle to the right as seen in Fig. 2 with the collar **34** bearing against the spindle support bracket leg **16***b*. The helical compression spring **33** not only serves the function of acting as a cushion upon the engagement of the motor drive roller **21** with the spindle drive wheel **19** but also prevents the digging in or other harmful contact of the roller **21** with the spindle drive wheel **19**.

The manually operated bobbin winding control means E forms a finger tip control and is comprised of a lever **36** fixed to the pivot pin **17** by conventional means such as a transversely disposed pin **37** so that upon manually moving the lever in a counterclockwise direction, Figs. 3 and 4, the spindle support bracket **16** is caused to be moved an equal angular increment towards the thread sensing frictional braking means D until the arm **16***a* of bracket **16** strikes a stop pin **39** and the spindle **10** is in juxtaposition with the bottom of the arcuate slot **11***a*. The braking means D consists of a cylindrically shaped disk **40** rigidly secured to a substantially horizontally disposed mounting bar **41** by means of a roll pin **42**, the mounting bar **41** being secured to the front wall of the standard housing **11** with two screws **43**. The brake D is comprised of an assembly which is rigid throughout and has no relatively movable parts and the thickness or width of the cylindrical disk **40** is small enough to permit it to be inserted between the annular flanges of the bobbin C, which bobbin is conventional in construction.

The bobbin is adapted to be mounted on the outer end of the spindle **10** and is engaged by a mechanically engaging friction clutch consisting of a radially outwardly spring-pressed ball **44** situated in the spindle **10**. It is understood that the friction clutch, consisting of the spring-pressed ball **44**, will exert a predetermined amount of force against the inner surface of the cylindrical hub of the bobbin C and prevent the bobbin C from turning relatively to the spindle **10** unless a torsion brake is applied against the bobbin C and exerts sufficient force to overcome the frictional connection between the bobbin C and spindle **10** and thereby cause the bobbin C to turn relative to the spindle **10**.

Upon mounting the bobbin C upon the spindle **10** and looping thread therearound in a conventional manner, the lever **36** is pressed by the operator in a counterclockwise direction from the upper end of the arcuate groove **11***a* towards the lower end thereof, Figs. 3, 4. The spindle support bracket **16** is moved by the lever **36** in a counterclockwise direction so that the leg **16***b*, which is provided with a rounded or semi-circular peripheral cam surface, engages the curved tip of a substantially L-shaped cam follower **45**, having one leg rigidly secured to the motor **23** in a conventional manner such as by two screws **46**, and biases or swings the motor **23** on its trunnions **24** in support strap **25** away from the drive wheel **14** into driving contact with the spindle drive wheel **19**. The friction between the engaged cam surface of leg **16***b* and the cam follower **45** is sufficient to hold the bobbin winder driving wheel **19** in engagement with the rubber drive roller **21** without the operator having to hold down the lever **36**.

With frictional forces holding the manual control lever down, thread from a supply spool, not shown, builds up on the bobbin C until sufficient thread is wound on the bobbin C to engage the periphery of the brake **40**; and when the friction between the brake **40** and the thread exceeds the frictional grip or clutching forces exerted by the spring pressed spindle drive wheel **19** against the drive roller **21** or the spring-pressed ball **44** against the inner hub wall of the bobbin C, the clutch is disengaged. The bobbin C ceases to be driven by the motor **23** after the bobbin has been filled, due to the overriding action of the frictional drive connections. Preferably, the frictional driving connection between the bobbin C and the spindle **10** is stronger than the driving connection between the wheel **19** and the roller **21** so that the latter connection is the one which will slip when the bobbin is filled. So long as the lever **36** is in a down or bobbin winding position, the main drive shaft **12** cannot be driven by the motor **23**.

Upon the operator lifting the lever **36**, the bobbin C will be pulled away from the cylindrical disk **40** and the drive roller **21** will be swung completely out of contact with the spindle drive wheel **19** and biased back into engagement with the drive wheel **14** by means of the spring **30**. Simultaneously, the cam follower **45** will force the spindle support bracket **16** into the position shown in Fig. 1 where the cam portion of the leg **16***b* can rest on the tip of the cam follower **45**.

An important feature of the invention is that should the operating lever **36** remain down against the stop **39** the drive for bobbin spindle **10** will automatically slip and be essentially disconnected. The driving means B will be biased away from and out of engagement with the bobbin supporting means A and automatically biased back into engagement with the driving wheel **14** only after the operator has lifted the control lever **36**.

Another important feature of the invention is that the bobbin winding device is simple and easy to operate with the other components of the machine driven by the shaft **12** being automatically made inoperative during the bobbin winding process and with the drive motor remaining disengaged from the main drive shaft **12** after the bobbin winding process has been completed.

Furthermore, it is virtually impossible to inadvertently overwind a bobbin so that an excess amount of thread is formed thereon by virtue of the provision of the automatic braking arrangement adapted to disengage the drive upon a predetermined amount of thread being wound upon the bobbin.

While I have shown and described a specific embodiment in accordance with my invention, it is understood that the same is susceptible of many changes and modifications, as known to a person skilled in the art, and I intend to cover all such changes and modifications coming within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a sewing machine, a frame member, motor means pivotally supported by said frame member, spindle means rotatably supported by said frame member and for supporting and driving a bobbin, and means connected to said spindle means for selectively pivoting said motor means into and out of driving engagement with said spindle means.

2. In a sewing machine, a sewing machine frame member, motor means pivotally supported by said frame mem-

ber, spindle support means pivotally connected to said frame member, spindle means journalled in said spindle support means and adapted to carry a bobbin, and means for simultaneously urging said motor means into driving engagement with said spindle means and pivoting said spindle means.

3. In a sewing machine, a stationary member, motor means pivotally supported by said stationary member, spindle means rotatably supported by said stationary member and for supporting and driving a bobbin, and manually operated means connected to said spindle means for selectively pivoting said motor means into and out of driving engagement with said spindle means.

4. In a sewing machine, a stationary sewing machine frame member, motor means pivotally supported by said stationary member, spindle support means pivotally connected to said stationary member in proximity of said motor means, spindle means journalled in said spindle support means and adapted to carry a bobbin, and cam means connected to said spindle support means for simultaneously urging said motor means into driving engagement with said spindle means and pivoting said spindle means.

5. In a sewing machine, a stationary sewing machine frame member, motor means having cam follower means attached thereto and pivotally supported by said stationary member, spindle support means pivotally connected to said stationary member in proximity of said motor means, spindle means journaled in said spindle support means and adapted to carry a bobbin, and lever operated cam means engaging said cam follower means for urging said motor means into driving engagement with said spindle means and for pivoting said spindle means.

6. In a bobbin winder for a sewing machine, a stationary member, a support member pivotally connected to said stationary member, a first shaft rotatably mounted in said support member and adapted to have a bobbin disposed on one end thereof, drive means frictionally connected to said first shaft, a friction clutch connected to said one end of said first shaft and adapted to automatically engage the bobbin and form a driving connection between the bobbin and said first shaft, a second shaft supported by said stationary member in a position generally parallel to said first shaft, a thread sensing element rigidly secured to said second shaft, said thread sensing element having a frictional braking portion adapted to extend between the flanges of the bobbin mounted on said first shaft and frictionally engage the thread wound thereon so as to brake the bobbin against further rotation, and means effective to prevent pivotal movement of said support member relative to said braking portion and relative to said drive means when the braking portion frictionally engages thread wound on said bobbin, said friction clutch permitting rotation of said first shaft relative to the bobbin when the bobbin has been braked by said braking portion.

7. In a bobbin winder for a sewing machine, a stationary member, a support member pivotally connected to said stationary member, a first shaft rotatably mounted in said support member, a friction clutch connected to one end of said first shaft adapted to automatically engage a bobbin disposed on one end thereof and form a driving connection between the bobbin and said first shaft, a second shaft supported by said stationary support member in a position generally parallel to said first shaft, a thread sensing element rigidly secured to said second shaft, said thread sensing element having a frictional braking portion adapted to extend between the flanges of the bobbin mounted on said first shaft and frictionally engage the thread wound thereon so as to brake the bobbin against further rotation, and motor means pivotally secured to said stationary member for movement into driving engagement with said first shaft upon said bobbin being moved toward said thread sensing element.

8. In a bobbin winder for a sewing machine as set forth in claim 7, further comprising manually operated means for pivoting said motor means into engagement with said first shaft for driving the same.

9. In a sewing machine, frame means, a main shaft journalled in the frame means for driving the sewing mechanism, spindle means rotatably and pivotally supported by the frame means for driving a bobbin, motor means pivotally supported by the frame means for selectively driving the main shaft and the spindle means, and means for simultaneously pivoting the spindle means and urging the motor means into driving engagement with the spindle means and out of driving engagement with the main shaft.

10. A machine as defined in claim 9 in combination with a thread sensing element having a frictional braking portion adapted to extend between the flanges of the bobbin when the motor means drives the spindle means to frictionally engage the thread wound on the bobbin.

11. In a sewing machine, frame means, a main shaft journaled in the frame means for driving the sewing mechanism, spindle means rotatably and pivotally supported by the frame means for driving a bobbin, motor means supported by the frame means for selectively driving the main shaft and the spindle means, a thread sensing element having a frictional braking portion, means for pivoting the spindle means between a first position wherein a bobbin thereon is remote from the braking portion and a second position wherein a bobbin thereon is adjacent the braking portion to permit the braking portion to engage thread wound on the bobbin, and means operable to disconnect the motor means from the main shaft and to drivingly connect the motor means to the spindle means in response to pivoting of the spindle means from said first position to said second position, and to disconnect the motor means from the spindle means and drivingly connect the motor means to the main shaft in response to pivoting of the spindle means from the second position to the first position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,417,417	Ivandick	Mar. 18, 1947
2,758,558	Waterman	Aug. 14, 1956
2,838,020	Eriksson	June 10, 1958

FOREIGN PATENTS

177,045	Austria	Dec. 28, 1953