June 14, 1932. O. I. JUDELSHON 1,863,058

WINDING MACHINE

Filed Jan. 6, 1931

Fig. 1.

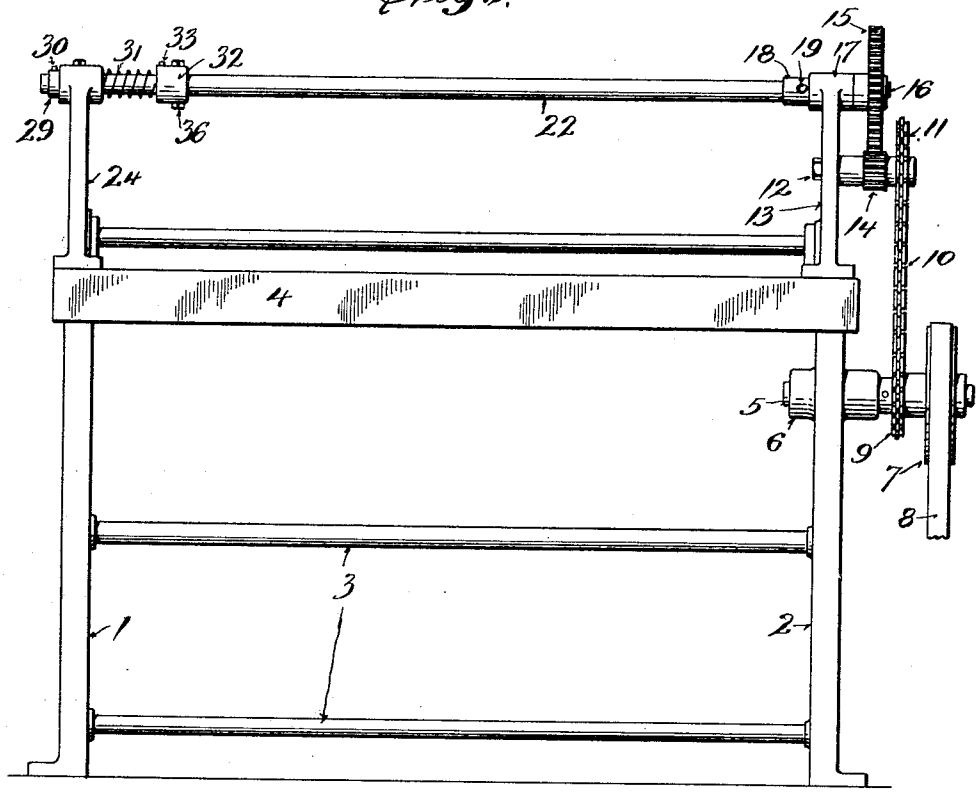


Fig. 2.

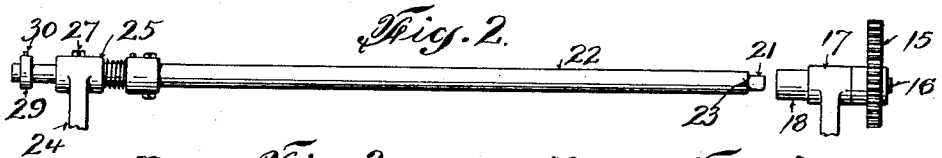


Fig. 3.

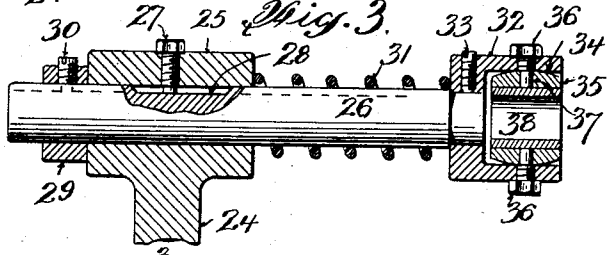


Fig. 5.

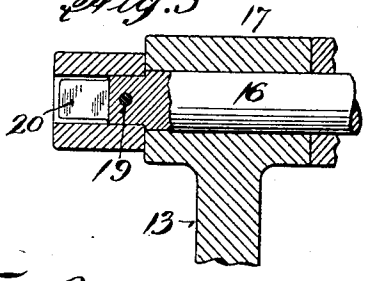


Fig. 4.

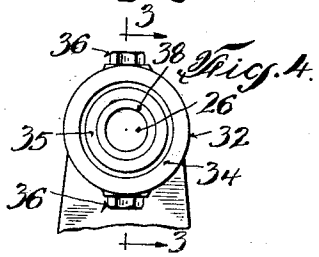
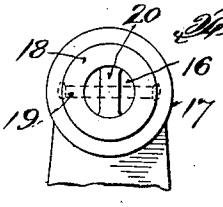


Fig. 6.



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UNITED STATES PATENT OFFICE

OSCAR I. JUDELSHON, OF PARK RIDGE, NEW JERSEY

WINDING MACHINE

Application filed January 6, 1931. Serial No. 506,893.

My present invention relates to machines for winding fabrics in superimposed layers upon a core but it will be apparent in the following detailed description of the invention, that it may be advantageously used in various other types of machines where problems are presented which the present invention is capable of meeting. The invention will be described as applied to a winding machine and from this description the applicability of the invention to other kinds of machines will be apparent.

Winding machines by means of which various fabrics are wound in superimposed layers on a core are commonly used, for instance, for winding long strips of fabric, often of several feet in width, upon a core of cardboard tubing, preparatory to placing the wound fabric on a cutting machine to cut it into a large number of coils of but a fraction of the width of the original body of wound fabrics. It is necessary that the shaft of the winding machine be made detachable in order that it may be removed, first for the purpose of receiving the cardboard or other tube thereover which is to constitute the core for the fabric coil; and, secondly, for the purpose of removing the body of fabric and its core from the shaft after the winding operation has been completed.

Thus, the shaft must be removed once and sometimes twice for each winding operation. Whereas it is not very difficult to remove the fabric shaft from the machine when it has no load on it, as when the shaft is to receive a core thereon, it is difficult to remove the shaft after the winding operation has been completed and it has the heavy body of fabric on it.

Several devices have been heretofore used for making the fabric shaft detachable from the machine but they have been difficult and slow to use, by the same person handling the body of fabric. The object of the present invention is to provide a chuck device for detachably holding the fabric shaft in the machine and which will permit the operator to remove the fabric and shaft from the machine after each winding operation, by the simplest of operations. The operator may grasp the body of fabric with both hands for the purpose of removing it from the machine and readily manipulate it to detach the fabric and fabric shaft from the machine without using either hand to release the shaft from the chuck. The chuck, in fact, may be caused to release the shaft by the manipulation of the latter, leaving the operator with the full use of both hands for manipulating the body of fabric, which latter also carries the core and the fabric shaft with it. The operator is thus not liable to drop the heavy body of goods while removing it from the machine and the removing operation, in addition to being less troublesome and less of a strain on the operator, makes it possible to remove the body of fabric from the machine in less time.

The operation of replacing the fabric shaft on the machine after it has been removed from inside the body of wound fabric, preparatory to another winding operation, is also simplified, and the operator may return the shaft to the chuck merely by manipulating the shaft itself. The present device, while accomplishing the results stated, is nevertheless capable of holding the fabric shaft and its load very firmly and securely so that the shaft will not be released by the chuck except when manipulated for that purpose; in other words, the shaft and its load will not be accidentally detached while the winding operation is being performed. The present device is also very simple, dependable and inexpensive.

In the drawing forming part of this application,

Figure 1 is an elevation of one form of winding machine referred to and to which my present invention has been applied,

Figure 2 is an elevation of the fabric shaft and the chuck members, showing the shaft during the operation of removing it from the chuck,

Figure 3 is a sectional view taken on the line 3—3 of Figure 4,

Figure 4 is an end elevation looking at the left hand end, of the parts shown in Figure 2,

Figure 5 is a vertical, sectional view of the parts shown at the right hand end of Figure 2, and

Figure 6 is an end view looking at the left hand end, of the parts shown in Figure 5.

The present invention is concerned only with the removable shaft and its chuck and only brief reference will be made to other parts of the machine.

In the drawing I have illustrated a simple winding machine having a frame composed principally of end standards 1, 2 which are connected rigidly with each other by tie rods 3 and by the beam 4 on which latter most of the operating parts are mounted.

There is a shaft 5 journaled in a long bearing 6 cast integral with the end standard 2, and it has a pulley 7 which is driven by a belt 8 operated from any source of power. The hub of this pulley has an integral sprocket 9 over which an endless chain 10 travels. This chain also trave's over the sprocket 11 which is revolvable on a shaft 12 mounted on a bracket 13 which latter is fixed on the beam 4 of the frame and extends upwardly to form a support for the parts at one end of the fabric shaft. The hub of the sprocket 12 carries a gear 14 which meshes with and drives a gear 15 which is mounted upon the shaft 16 which is journaled in a bearing member 17 on the upper end of the bracket 13.

The shaft 16 is revolvable in the bearing 17 but it is prevented from shifting axially in one direction by the gear 15 which abuts against one end of the bearing 17 and in the other direction by the sleeve 18 which abuts against the other end of this bearing. The shaft carries one part of the complete chuck for the fabric shaft.

This portion of the chuck consists in part of the sleeve 18 which surrounds one end of the shaft 16 and to which it is secured by the pin 19 passing through the sleeve and shaft. The end of the shaft 16 which projects into the sleeve 18 is provided with a slot 20 to receive therein the reduced and flattened end 21 of the fabric shaft 22.

This reduced end of the fabric shaft is adapted to slide into the open end of the sleeve 18 with the flattened projection 21 entering the slot 20 in the end of the shaft 16 so that one end of the fabric shaft is supported by the sleeve and the fabric shaft is compelled to revolve with the shaft 16 when the projection 21 engages in the slot 20. The shoulder 23 near the end of the fabric shaft is adapted to abut against the outer end of the sleeve 18 and, as above stated, the shaft 16 has no axial movement, at least in the form of the invention herein illustrated.

At the opposite end of the frame there is a bracket 24 mounted on the beam 4 and extending upwardly, parallel with the bracket 13. This bracket has at the top a bearing 25 in which a shaft 26 is mounted in axial alignment with the shaft 16 at the other end of the machine. The shaft 26 may slide horizontally in the bearings 25 but it is prevented from revolving therein by a screw 27 threaded through the bearing 25 and serving as a key in co-operation with the keyway 28 in the shaft 26 to prevent the latter from revolving. It is not absolutely necessary that the shaft 26 be prevented from revolving but it is desirable in order that the fabric shaft may be disengaged by the same angular movement each time.

The shaft 26 has a collar 29 fixed to it by a set screw 30 and this collar is adapted to abut against one end of the bearing 25 to limit the axial movement of the shaft in one direction, i. e., toward the opposite shaft 16.

There is a coiled spring 31 surrounding the shaft 26 and it is adapted to be compressed between one end of the bearings 25 and a head 32 which is mounted on the outer, free end of the shaft 26 and fixed thereto by a set screw 33. The purpose of this spring is to permit but resist the movement of the shaft 26 to the left in Figure 3.

There is mounted in the bore 34 in the outer or projecting end of the head 32 a gimble ring 35 which is pivotally held by the oppositely disposed pivot screws 36 which screw through the wall of the head 32 and have smooth, bearing ends extending into apertures 37 in the ring. The ring is thus mounted to turn or swivel on the pins 36 to a limited extent. It is preferable, though not necessary, that the ring swivel on a vertical axis as shown and the axis cannot change because the shaft 26 to which the head is secured is prevented from turning by the key 27 and keyway 28.

The ring 35 forms the bearing for one end of the fabric shaft 22 and it is preferably lined with a bushing 38 in which the fabric shaft revolves.

Operation

Assuming the fabric shaft is in position in the machine as shown in Figure 1, and it is desired to remove it from the machine to receive over it a core for the coil of fabric. Assuming that the operating mechanism is stopped, i. e., assuming that the source of power which drives the belt 8 is stopped, the fabric shaft may be removed as follows: The shaft is grasped by the hands of the operator who then presses the fabric shaft toward the left in Figure 1 or to the position shown in Figure 2.

This movement disengages the end 21 of the shaft from the end of the slotted shaft 16 and from the sleeve 18 and thus frees one end of the fabric shaft. During this axial shifting of the fabric shaft it presses on the head 32 and forces the latter, together with the shaft 26, toward the left, as shown in Figure 2, in order to permit one end of the fabric shaft

to be disengaged from the sleeve 18. When the parts are in the position shown in Figure 2 the fabric shaft may be turned because the bearing member, i. e., the ring 35, may turn on the pins 36 and this turning of the fabric shaft will carry the right hand end thereof out of alignment with the sleeve 18 and shaft 16. The fabric shaft may now be withdrawn from the ring 35 and this will complete its disengagement from the machine. While the fabric shaft was being pushed to the left, as shown in Figure 2, it pressed on the end of the shaft 26 and caused the latter shaft to shift in the bearing 25 against the resistance of the spring 31, so that the parts were moved back substantially as shown at the left in Figure 2. When the fabric shaft is disengaged from the ring 35 the shaft 26 moves forwardly again until the collar 29 rests against the bearing 25 as shown in Figure 3. A cardboard tube such as is used for the winding core for the fabric may now be slid over the fabric shaft, whereupon the latter with the core may be returned to the winding machine. For the return operation one end of the fabric shaft is inserted into the ring 35 while the latter is turned at an angle to the axis of the shaft 26 and then the fabric shaft is moved to a position approximately in line with the shaft 26 and it is pushed to the left to slide the shaft 26 in opposition to the spring 31 the same as during the removal operation.

When the end 21 of the fabric shaft has been moved back sufficiently to clear the end of the sleeve 18, the fabric shaft is straightened to lie in line with the axis of the shafts 26 and 16. The fabric shaft is then allowed to move to the right under the pressure of the spring 31, so that the flattened end 21 enters the end of the sleeve 18 and passes into the slot 20 of the shaft 16. The end of the strip of fabric which is to be wound is now attached to the core held on the fabric shaft and the source of power is started so that the operating force is transmitted through the several driving members 7 to 15 in Figure 1 and the shaft 16 is caused to revolve. The sleeve 18 and the slotted end of the shaft 16 revolve together and cause the fabric shaft to be revolved with them. The opposite or left hand end of the fabric shaft revolves in the bushing 38 because the shaft 26 does not partake of any revolving motion. After the fabric has been wound upon the core and around the fabric shaft to the point where a desired body or coil of fabric has been built up on the core, the body of fabric together with the fabric shaft may be removed from the machine in substantially the same manner as above described in connection with the removal of the fabric shaft alone. In removing the fabric and shaft the operator merely has to grasp the body of fabric and push it to the left to disengage the end 21 of the fabric shaft from the sleeve 18 and from the slotted end of the shaft 16 swing the fabric shaft with the ring 35 and then move the body of fabric with the fabric shaft until the latter disengages from the ring 35. It will be noted that in this operation the operator can use both hands to manipulate the body of fabric and that the release of the fabric shaft is controlled entirely through the manipulation of the body of fabric.

Having described my invention, what I claim is:

1. In a machine having a detachable shaft, the combination of spaced members adapted to receive a shaft therein and to support the shaft in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein, the other of said members having a pivotal sleeve for receiving the other end of said shaft whereby one end of the shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member, said supporting members being relatively movable axially.

2. In a machine having a detachable shaft, the combination of spaced members adapted to receive a detachable shaft therein and to support the shaft in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein and having means to engage the shaft for causing it to be revolved, the other of said members having a pivotal sleeve for receiving the other end of said shaft, whereby one end of the shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member, said supporting members being relatively movable axially.

3. In a machine having a detachable shaft the combination of spaced members adapted to receive the shaft therein and to support the same in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein and including a sleeve fitting around the end of said shaft, and a member having a driving engagement with said shaft, the other of said members being axially movable in relation to said first member and having a pivotal sleeve for receiving the other end of said shaft therein to form a bearing for the end of the shaft whereby one end of said shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member.

4. In a machine having a detachable shaft the combination of spaced members adapted to receive a shaft therein and to support the

shaft in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein, the other of said members being axially movable in relation to said first member and having a pivotal sleeve for receiving the other end of said shaft whereby one end of the shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member, and resistable means for urging said second shaft supporting member axially toward said first shaft supporting member.

5. In a machine having a detachable shaft the combination of spaced members adapted to receive a shaft therein and to support the shaft in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein, the other of said members being axially movable in relation to said first member and having a pivotal sleeve for receiving the other end of said shaft whereby one end of the shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member, and a spring for urging said second shaft supporting member axially toward said first supporting member.

6. In a machine having a detachable shaft the combination of spaced members adapted to receive a shaft therein and to support the shaft in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein, the other of said members being axially movable in relation to said first member and having a pivotal sleeve for receiving the other end of said shaft whereby one end of the shaft may be inserted in said sleeve while the latter is turned at an angle to the axis of the member by which it is carried and then turned with said sleeve into alignment with said first shaft supporting member, a spring for urging said second shaft supporting member axially toward said first supporting member, and means for limiting the axial movement of said second shaft supporting member by said spring.

7. In a machine having a detachable shaft the combination of spaced members adapted to receive the shaft therein and to support it in position to be revolved, one of said members being adapted to receive one end of the shaft axially therein, the other of said members including a shaft mounted in a bearing and provided with means for permitting said latter shaft to shift axially but preventing it from revolving in its bearing, a sleeve carried by said last mentioned shaft and means for pivotally mounting it thereon, said sleeve being adapted to receive the other end of said detachable shaft therein whereby one end of said detachable shaft may be inserted in said sleeve when the latter is turned at an angle to the axis of the second mentioned supporting member and then turned with said sleeve into alignment with said first shaft supporting member, and a spring for resiliently urging the shaft which carries said sleeve, axially toward said first shaft supporting member.

8. In a machine having a detachable shaft the combination of spaced members adapted to receive a detachable shaft therein and to be supported in a position to be revolved, one of said members comprising a shaft having a sleeve adapted to receive one end of the detachable shaft axially therein and having means for engaging and revolving the detachable shaft, the other of said detachable shaft supporting members including a shaft mounted to move axially toward the first supporting member, said latter shaft having a sleeve pivotally mounted thereon and adapted to receive the other end of said detachable shaft therein, and a spring for urging said second shaft supporting member toward said first shaft supporting member.

9. In a machine having a detachable shaft the combination of spaced members adapted to receive the shaft therein and to support it in horizontal position to be revolved, one of said members being adapted to receive one end of said shaft axially therein, the other of said members including a shaft mounted in a bearing and provided with means for permitting said latter shaft to shift axially but preventing it from revolving in its bearing, a sleeve and means for pivotally supporting it on said second mentioned shaft to rock on a vertical axis, said sleeve being adapted to receive the other end of said detachable shaft therein whereby one end of said detachable shaft may be inserted in said sleeve when the latter is turned at an angle to the axis of the second mentioned shaft and then turned with said sleeve into alignment with said first shaft supporting member.

Signed at the city, county and State of New York, this 17th day of September, 1930.

OSCAR I. JUDELSHON.