

[54] **BOBBIN ASSEMBLY**

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242/156.2, 56.9; 225/51, 79

[56] **References Cited****UNITED STATES PATENTS**

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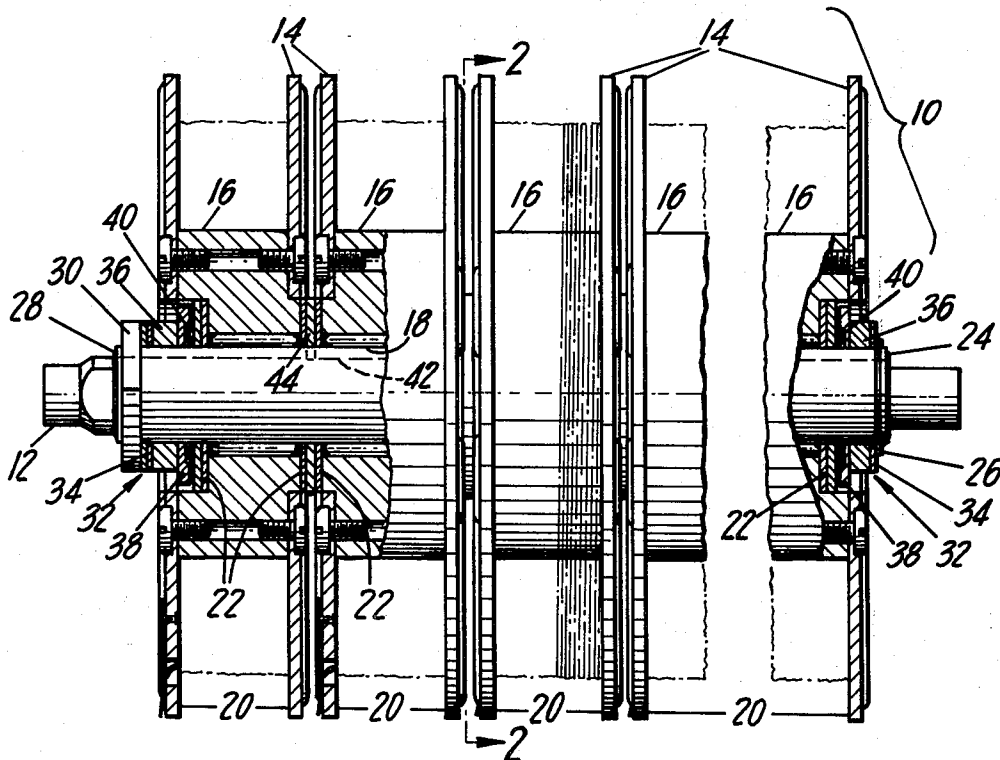
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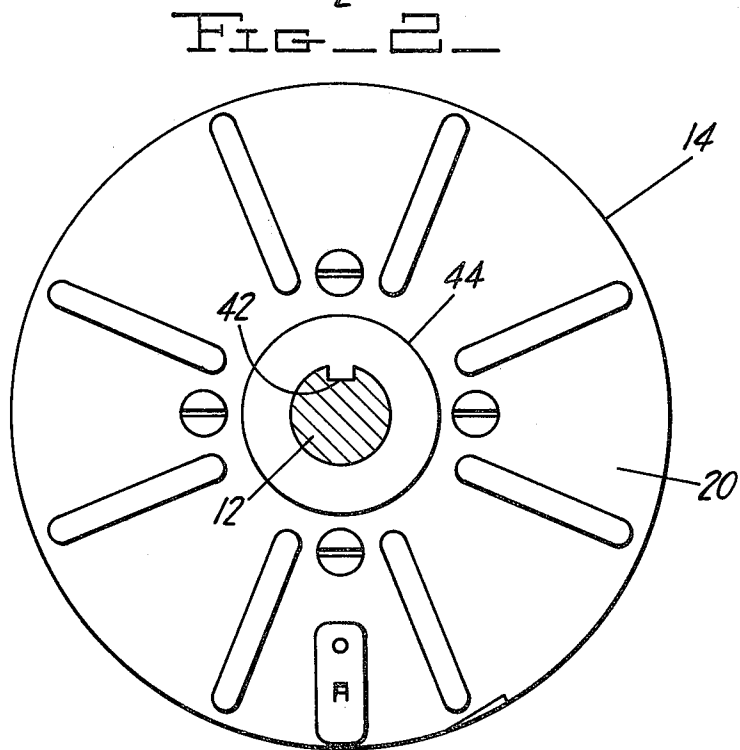
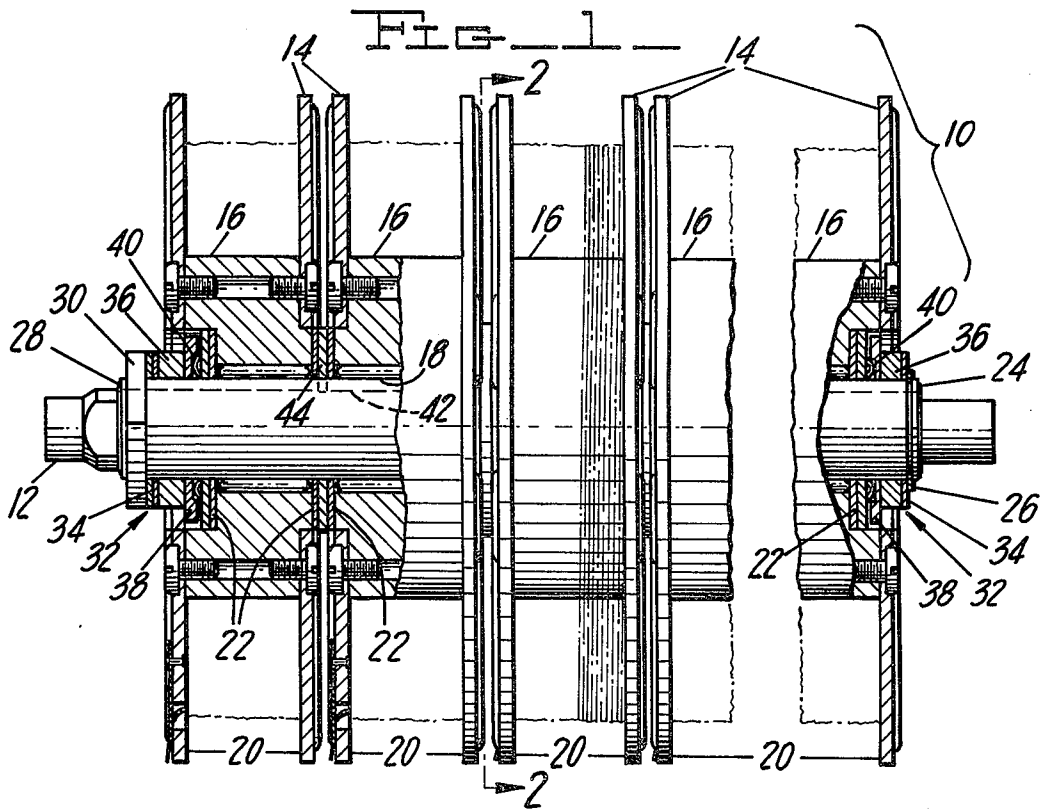
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[57] **ABSTRACT**

An improved bobbin assembly is of a type utilized in wire wrapping machines and includes a plurality of bobbins rotatably mounted on a shaft. The shaft has a longitudinal slot so that a keyed washer mounted on the shaft between adjacent bobbins will not rotate. The keyed washers transfer braking force applied at the ends of the plurality of bobbins to each bobbin therein independently of and unaltered by the rotation of adjacent bobbins. A low coefficient of friction for the sliding surfaces of the bobbins and the keyed washers allows the bobbins to operate at a relatively high braking force so that the weight of the bobbins does not significantly effect the operation of the assembly.

2 Claims, 2 Drawing Figures





BOBBIN ASSEMBLY**BACKGROUND OF THE INVENTION****1. Field of the Invention**

This invention relates to a bobbin assembly and, more specifically, to a bobbin assembly capable of providing equal braking force to each of the plurality of bobbins thereon while allowing independent movement thereof.

2. Description of the Prior Art

It has long been recognized in the use of large wire wrapping or winding machines that it is desirable to have a means whereby the wire being wound thereby will be supplied at a controlled resistance. To this end, various bobbin assemblies have been provided such as those disclosed in U.S. Pat. Nos. 3,168,995 and 3,109,605. It is generally the purpose of these prior art bobbin assemblies to provide a means whereby a controllable braking friction is applied to each of the bobbins within the assembly. However, the means utilized therein includes the requirement that the bobbins be alternately wound in opposite directions so that there is opposite rotation of adjacent bobbins as the wire is being supplied thereby. While generally satisfying the braking problem these prior art devices have necessitated a more complicated winding of the wire onto the bobbins of the assembly.

Further, with improved winding machines which do not directly rely upon the braking of the bobbins during winding, it is desirable to provide a braking force for the individual bobbins which is relatively small in magnitude and intended primarily to prevent the bobbins from continued rotation when the machine is deactivated.

SUMMARY OF THE INVENTION

It is therefor an object of the invention to provide a bobbin assembly having means for providing equal braking force to each of the bobbins therein.

It is a further object to provide a bobbin assembly of the type described in which all of the bobbins thereon can be initially wound with wire in the same direction.

It is another object to provide a bobbin assembly of the type described capable of being adjusted for a wide range of frictional forces to be applied to the bobbins.

To accomplish these and other objects of the invention a preferred embodiment thereof includes an improved bobbin assembly of the type utilized on wire wrapping machines which has a plurality of bobbins rotatably mounted on a shaft between retaining means at the ends of the shaft for applying an axial braking force to each of the bobbins through a plurality of friction washers located between adjacent bobbins for separation thereof. The improvement includes the friction washers being mounted for longitudinal movement along the shaft without rotation thereabout so that the braking force is transferred to each bobbin independently of and unaffected by the rotation of the other bobbins. The sliding contact surfaces between the bobbins and the friction washers have a relatively low coefficient of friction so that a higher braking force may be utilized to reduce the effect on the assembly of the weight of the bobbins in an axial direction during operation of the machine.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the preferred embodiment

which is partially sectioned to show various features of the invention.

FIG. 2 is a view of the embodiment as seen along line 2-2 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As seen in FIG. 1 the preferred bobbin assembly 10 primarily includes a shaft 12 with a plurality of bobbins 14 rotatably mounted thereon. Each bobbin 14 includes a core 16 about which the wire is initially wound. An opening 18 extending through the core 16 is adapted for slidably receiving the shaft 12 there-through. A pair of sidewalls 20 at each end of the core 16 retains the wire in alignment with the core 16 as it is collected thereon. The end of each bobbin further includes a brake washer 22 concentric with and encircling the opening 18. Each brake washer 22 has a surface having a low coefficient of friction, such as Teflon, the purpose of which will be explained hereinbelow.

In order to properly receive the plurality of bobbins 14, the shaft 12 includes a first end 24 having a retaining ring 26 and a second end 28 which is threaded to receive an adjusting nut 30. Generally, the retaining ring 26 and the adjusting nut 30 are adapted to retain the plurality of bobbins 14 therebetween on the region of the shaft about which they can freely rotate. However, to provide the required braking force, each end 24 and 28 of the shaft 12 includes a biasing means 32. Each biasing means 32 includes a number of elements which encircle the shaft 12 in a side-by-side manner from the end toward the center of the shaft. The biasing means 32 includes, in order, a spacing washer 34, a tension disc 36, a limit washer 38 and a spring washer 40.

It can be seen in FIG. 1 how a wide range of braking forces can be generated by the biasing means 32. Because of the spring constant of spring washer 40, initial compression of the biasing means 32 will result in compression of the spring washer 40 to cause it to generate the braking forces having the smallest magnitude. Further compression of the biasing means will cause a collapse of the spring washer until contact is made with the limit washer 38. Since the tension disc 36 is made of a hard resilient material such as rubber, it can be seen that continued compression of the biasing means 32 which will accordingly compress the tension disc 36 so that braking forces of higher magnitude will be produced.

From the description hereinabove it can be generally seen how the plurality of bobbins 14 are retained on the shaft 12 and how the biasing means 32 can be generally adjusted to provide a braking force for the bobbins. However, it is the primary feature of this invention to provide the bobbin assembly 10 with a means whereby the braking force will be equally applied to each bobbin 14 independently and unaffected by the rotation or movement of adjacent bobbins. Accordingly, as seen in FIGS. 1 and 2, an elongated slot 42 extends throughout the length of the shaft 12. A plurality of keyed washers 44 adapted to encircle and slide longitudinally along the shaft 12 without rotation thereabout are provided to transmit the braking force described hereinabove to each of the bobbins 14. By alternating the key washers 44 with the bobbins 14, it can be seen that each bobbin 14 makes identical sliding, braking contact with a pair of non-rotating keyed washers 44. Since the keyed washers 44 are capable of longitudinal movement along

the shaft 12, any force applied at the ends of the shaft 12 will be equally distributed to each bobbin 14.

To fully appreciate the features of the bobbin assembly 10 as described hereinabove, a further explanation of this operation is desirable. Because bobbin assemblies of this type are often used on rotating turntables of a cable winding machine, consideration must be given to the actual weight of each bobbin as it effects the total force applied to the other bobbins of the assembly. Providing the keyed washers 44 and the brake washers 22 with a Teflon coating allows a sufficiently large braking force to be applied to the bobbins 14 so that the weight factor is negligible. The low coefficient of sliding friction allows a greater force to be applied in the longitudinal direction without actually producing a sliding friction which would excessively restrict rotation of the bobbin.

Further, by utilizing spring washers 40 for the longitudinal force of lower magnitudes, contact will be maintained at each end of the plurality of bobbins 14 despite any tendency therein to shift during rotation of the turntable so that the longitudinal force will be continuously applied to each bobbin 14.

We claim:

1. An improved bobbin assembly of the type utilized on wire wrapping machines, wherein said improvement comprises:

- a shaft having a longitudinal slot therein extending between the ends of said shaft;
- a plurality of bobbins rotatably mounted on said shaft;
- a plurality of friction washers each of which is located between a pair of adjacent said bobbins for separation thereof, each said friction washer being keyed to said slot for longitudinal movement along said shaft without rotation thereabout;

retaining means at said ends of said shaft for applying an axial braking force to each of said bobbins, said braking force being transferred to each of said bobbins by said friction washers independently of and unaffected by the rotation of others of said bobbins in said assembly; and

sliding contact surfaces between said bobbins and said friction washers having a relatively low coefficient of friction so that a relatively large magnitude for said braking force may be utilized to substantially reduce an effect on the operation of said assembly by any force in an axial direction along said shaft which may be produced by the weight of said bobbins.

2. The improved bobbins assembly as set forth in claim 1, wherein said retaining means is adjustable to select the magnitude of said braking force on said bobbins and includes a pair of biasing members, a first of said biasing members is capable of providing said braking forces of lower magnitudes by undergoing a significant amount of deflection along the axis of said shaft to thereby insure said braking force will be applied to said plurality of said bobbins despite a tendency of said bobbins to shift axially along said shaft, and a second of said biasing means is capable of providing said braking forces of higher magnitudes with minimum deflection along said axis to thereby simplify adjustment.

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