May 29, 1956 D. W. SELBY 2,747,809

BOBBIN CHUCK

Original Filed Feb. 13, 1953

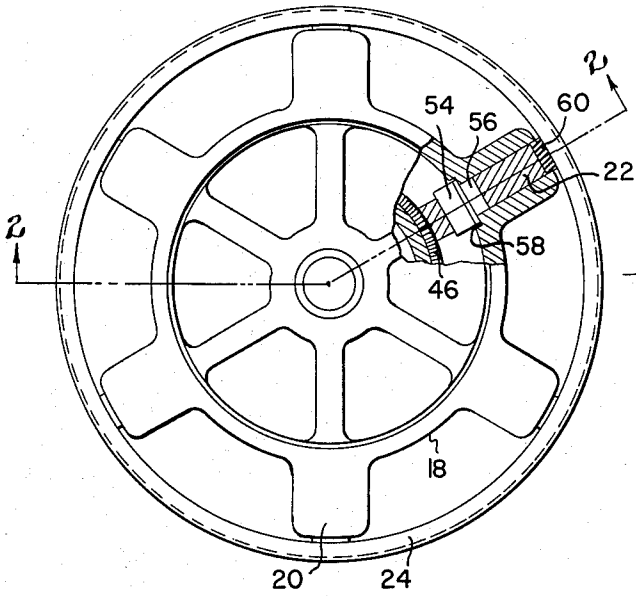


Fig. 1

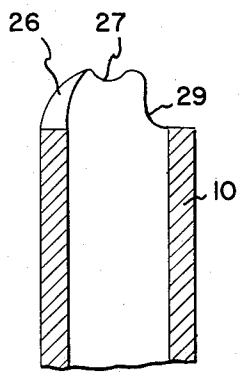


Fig. 3

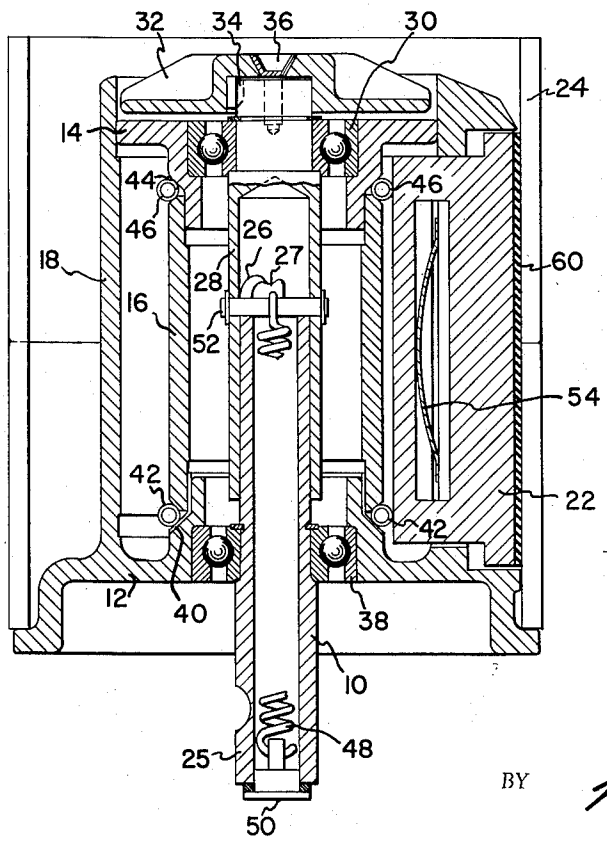


Fig. 2

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BOBBIN CHUCK

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Continuation of abandoned application Serial No. 336,694, February 13, 1953. This application January 6, 1954, Serial No. 402,431

4 Claims. (Cl. 242—72)

This invention relates to an expansible bobbin chuck or holder adapted to engage and grip a plurality of bobbin cores during winding.

This application is a continuation of my copending application Serial No. 336,694, filed February 13, 1953, now abandoned.

On the winding machines which customarily are used in the textile industry, filaments and yarns are ordinarily collected on sleeve-type cores supported removably on driven spindles. The core is turned by the spindle to provide the movement necessary for winding the filaments and yarns onto the cores. When a sufficient amount of yarn has been collected the package is removed and another sleeve-type core is placed on the spindle. In the operation of a modern textile plant there are many winding machines requiring frequent removal of yarn packages and replacement with empty cores. It is desirable, therefore, to be able to quickly disengage the fully wound package and replace it with an empty core.

Also, because of the large capital investment in winding machines, recent developments have permitted winding 2, 3, 4 or even more yarn cakes where only one was wound before. This plurality of yarn cakes can be wound on a single sleeve-type core which can be removed in the ordinary manner for further processing as may be required within the textile plant, or if no processing is required, shipped directly to the user. In any case, the plurality of cakes on the yarn package must be unwound individually to provide the desired yarn. Where only two cakes exist on a core, this can be conveniently done by first winding off the cake on one end, reversing the core on the holder and then winding off the cake on the other end. Where 3 or more cakes exist on a single core, unwinding of all but the end cakes becomes extremely difficult. Accordingly, it has been found that suitable unwinding performance can be achieved by cutting the sleeve-type cores into a plurality of narrower cores, each adapted to receive a single yarn end in the form of one package. The expansible holders of the prior art are not adapted to receive and releasably engage a plurality of narrow sleeve-type cores. Neither are these prior art bobbin engaging means adapted to permit the quick and easy removal of the plurality of cores without damage to the yarn cake.

It is an object of this invention, therefore, to provide a bobbin supporting device which will provide quick and easy removal of the yarn package. It is a further object to provide a spindle assembly on a yarn winding machine which permits the winding of a plurality of yarn cakes on a plurality of sleeve-type cores such that the resulting yarn packages can be quickly and easily doffed without damage to the yarn. It is also an object to provide a winding machine spindle assembly which maintains a package core in accurate axial alignment with the elimination of vibration. Other objects will appear hereinaftter.

I have found that the objects of this invention are accomplished by means of a novel bobbin chuck construction comprising a plurality of outwardly extending axial vanes for supporting a bobbin core, a chuck housing for supporting the vanes for inward or outward movement, a spindle for mounting the chuck on a winding machine provided with opposing annular heads for maintaining the housing in position on the spindle, and an inner vane support mounted on the spindle for adjusting the position of the vanes in or out. This inner support is provided with grooves of adjustable size, preferably of V-shaped cross-section, in which are placed resilient members which bear against the inner ends of the vanes to resiliently urge the vanes outward. The grooves are preferably formed at the junctions of an inner cylindrical member and the heads, and the separation of the heads is made adjustable to vary the size of the grooves. Resilient rings held in these grooves, and bearing against the vanes, are forced outward when the size of the grooves is reduced, thereby pressing the vanes against bobbin core or cores slipped thereon. The vanes are provided with inner spring members bearing against the inner surface of the chuck shell adapted to retract the vanes out of contact with the bobbin cores when the annular heads are moved apart to permit the resilient rings to move inward in the V-grooves.

In the drawings, which illustrate a preferred embodiment of the invention,

Figure 1 is an end view of the bobbin chuck with a portion of the shell broken away to show the vane construction,

Figure 2 is a cross-sectional elevation taken on the line 2—2 of Figure 1, and

Figure 3 is a cross-sectional detail of the cam end of a spindle element of the chuck.

In the figures, the illustrated embodiment of this invention is seen to comprise a central spindle assembly, including bobbin spindle **10**, with annular heads **12** and **14** mounted near the extremities, said heads being axially displaceable with respect to each other and forming V-shaped grooves of variable depth with a coacting bevelled cylindrical sleeve **16**. The chuck also comprises a housing, which conveniently is integral with one of the annular heads. The housing comprises a generally cylindrical shell **18** having radially protruding elements **20** which run axially the length of the housing and which serve as guide members for the protrudable and retractable vane elements **22**. The open valleys formed between protruding elements are an important feature of the invention in that they provide access for an operator's fingers to grasp the sleeve-like bobbin cores **24** when putting on or taking off these cores. This feature is particularly important in the doffing operation where it is essential that the yarn package be removed without touching the yarn cake.

Bobbin spindle **10** comprises a projecting element **25**, having an outer end adapted to be grasped by any of the conventional spindle-holding devices, and extending only part way into the assembly. The inner end has a cam end **26** as shown more clearly in Figure 3. The bobbin spindle is completed by slidably and rotatably telescoping a larger hollow spindle element **28** over member **25**. On the exterior end of spindle element **28** is mounted ball bearing ring **30** which in turn carries annular head **14** thereon. Mounted on the extreme outer end of spindle element beyond ring **30** is a handle **32** which is held rigid with spindle element **28** through key **34** and is secured to the end of spindle element **28** by set screw **36**. It is further seen that spindle member **25** has on it a ball bearing ring **38** which in turn supports the annular head **12** carrying the main chuck housing **18**. This housing is an aluminum casting, so formed as to provide annular head **12** with a bevelled surface **40** as one element toward forming a V-groove into which fits resilient

ring element 42. Annular head 14 likewise has a bevelled surface 44 to form another V-groove in conjunction with cylindrical sleeve 16 to hold resilient ring 46. Annular head 12 is urged toward annular head 14 by spring 48 within the spindle 10, which is connected to cap 50 at the outer end of member 25 and to pin 52 passing through spindle element 28 adjacent to the cam end of projecting member 25. When pin 52 bears against the lower parts 29 of this cam end 26, the spring 48 holds the annular heads 12 and 14 against the ends of cylindrical sleeve 16 and the resilient ring elements 42 and 46 are forced to rise in the V-grooves so as to bear against the vanes 22. This causes the vanes to move outward through the slots provided in protruding elements 20 of chuck housing 18.

In Figure 3 is shown a cross-sectional view of the cam end 26 of projecting member 25. When handle 32 is rotated so that pin 52 mounts to the top of cam 26 and falls into recess 27, the chuck is locked into the loading and unloading position wherein the vane elements are retracted out of contact with the sleeve cores. On turning handle 32 so that pin 52 falls into the lower portions 29 of the cam end, the spring 48 brings together the annular heads in co-action with sleeve 16 to cause the vanes 22 to move outward against cylindrical bobbin cores 24. In this position the cores are firmly anchored on the bobbin chuck to resist any forces which might tend to cause these cores and the bobbin chuck to be displaced, the one with respect to the other, either angularly or longitudinally, or both. Six vanes 22 are shown which slide radially in the slots in the longitudinal elements 20 of housing 18. Upon turning handle 32 so that pin 52 is resting in recess 27 of the cam end, the V-grooves at the ends of sleeve 16 are enlarged sufficiently to permit resilient ring elements 42 and 46 to fall back into these recesses. Vanes 22 then retract inwardly under the urging of leaf springs 54, the bow of which presses inwardly against the vane and the flat ends of which press outwardly against the chuck housing. Bobbin 24 is thereby released for doffing.

The elements of the vane construction are visible in the broken-away portion of Figure 1. Vane 22 contains a slot 56, into which is placed leaf spring 54, the flat ends of which are held by recesses 58 in housing 18 to secure the spring in position. Vane 22 may be composed of hard rubber, phenolic or other thermosetting resin, aluminum, magnesium, or similar light, strong metals. It is usually desirable to mount on the outer face of vane 22 a layer 60 of a resilient material such as rubber.

The device of this invention contributes markedly to the efficiency of winding operations through the ease with which is achieved both the putting on and taking off of bobbins. The additional feature which permits the doffing of a plurality of bobbin, each containing a separate yarn cake, without touching the yarn in the package, thereby avoiding damage to the yarn, also permits the winding of a plurality of yarn ends to individual sleeve-type bobbins on a single chuck, thereby markedly reducing the capital investment required per pound of yarn produced.

In the particular exemplification shown for this invention, the following construction materials are suitable for the various parts: steel for both spindle elements, the annular head 14, the springs, and the ball-bearing assemblies; aluminum for the chuck housing 18 together with its integral annular head 12 and longitudinal elements 20; thermosetting resins for handle 32 and sleeve 16; hard rubber for vanes 22; and steel springs or resilient rubber for rings 42 and 46. Although the particular materials described above are useful for the particular parts in this embodiment of the bobbin chuck of this invention, many other common materials of construction are suitable for use in the fabrication of many of these parts. The particular combination employed represents a suitable combination of mechanical strength and lightness, freedom from maintenance difficulties and continued operation at high speed.

The device of this invention is suitable for use with the usual driven spindles wherein the constant angular velocity produces an increasing thread-winding speed with increasing diameter of the yarn package, or it may be employed equally well in constant speed thread-winding operations wherein the bobbin and the subsequent yarn package are surface driven. The device of this invention is similarly applicable to other winding modifications.

Since many different embodiments of the invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited by the specific illustrations except to the extent defined in the following claims.

What is claimed is:

1. A bobbin chuck which comprises a plurality of radially extending axial vanes for supporting a bobbin core, a chuck housing for supporting said vanes for radial movement inward at the urging of resilient members extending between said housing and said vanes and outward against the inside of a bobbin core at the urging of resilient rings contained within said housing under the ends of said vanes and carried on a grooved member provided with V-shaped grooves of adjustable size for retaining said rings in position and for forcing said rings outwardly when the width of said grooves is reduced.

2. A bobbin chuck which comprises a spindle for mounting the chuck on a winding machine, said spindle having a hollow chuck-supporting element carrying a first annular head and slidably and rotatably telescoping over one end of a main spindle element carrying a second annular head, cam and spring means for adjusting the relative positions of said elements, a cylindrical sleeve surrounding said spindle and forming with each of said heads an annular V-shaped groove, said grooves being adjustable in size by changing the relative positions of said spindle elements, a resilient ring mounted in each of said grooves to be pushed outwardly when the size of said grooves is reduced in cross-section, a plurality of axial vanes resting on said rings and extending radially outward to form supports for sleeve-type yarn cores, and a shell extending between said heads and slotted to support said vanes, said vanes projecting outward through slots in said shell and being resiliently adjustable radially therein by adjustment of said spindle elements.

3. In a bobbin chuck comprising opposing annular heads spaced adjustably apart upon telescoping supporting elements therefor and a sleeve extending therebetween and overlapping reduced portions thereof so as to form therewith two circumferential grooves of width dependent upon adjustment of the head separation, each groove accommodating a resilient toroidal ring, the improvement comprising a cylindrical housing extending from attachment to one of the heads into slidable contact with the periphery of the other head to enclose the sleeve and the resilient toroidal rings and having at its periphery a plurality of radially protruding bosses slotted lengthwise and fitted with radial vanes urged inward by springs between the housing and the vanes to rest at each end of the inner edge thereof upon one of the resilient toroidal rings, the outer edges of the vanes protruding from the slotted bosses to receive a bobbin thereon.

4. In a bobbin chuck comprising opposing annular heads spaced adjustably apart upon telescoping supporting elements therefor and a sleeve extending therebetween and overlapping reduced portions thereof so as to form therewith two circumferential grooves of width dependent upon adjustment of the head separation, each groove accommodating a resilient toroidal ring, the improvement comprising an extension spring connecting the telescoping elements and effective to urge the supported opposing annular heads together, the telescoped end of one of the supporting elements being shaped as a cam co-acting with

a pin in the telescoped end of the other supporting element and having two pin-receiving depressions therein so as to establish outer and inner spacings of the annular heads corresponding to locked and unlocked positions of the bobbin chuck.

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