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| [21] | Appl. No. | 724,512 |
| [22] | Filed | Apr. 26, 1968 |
| [45] | Patented | Jan. 19, 1971 |
| [73] | Assignee | Leesona Corporation Warwick, R.I. a corporation of Massachusetts |

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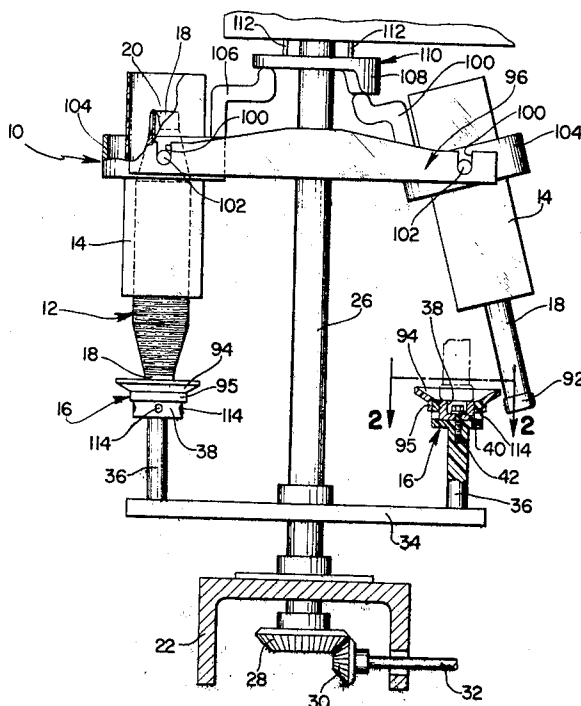
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[54] WINDING APPARATUS
15 Claims, 3 Drawing Figs.

[52] **U.S. Cl.**.....**242/129.51,**
279/1, 269/8, 242/130, 211/1
[51] **Int. Cl.**.....**B65h 49/00**
[50] **Field of Search**.....**242/46.2,**
46.21, 129.5, 129.51, 129.7; 211/(Mag. Dig.);
248/(Mag. Dig.); 57/58.76, 106, 107; 269/8;
279/1; 242/130, 130.2

ABSTRACT: A bobbin holder for magnetically holding bobbins in an operative position on a winding machine. A dish-shaped seat of the holder has a magnet which magnetically couples a magnetic end ring of the bobbin core to the seat. The bobbin core is ejected from the seat by tipping a bobbin receiving tube upon movement of the seat from an active or unwinding position toward a reserve position to receive a fresh bobbin. Air passages through the seat communicate with a hollow of the core and facilitate pneumatic end retrieval of the yarn.



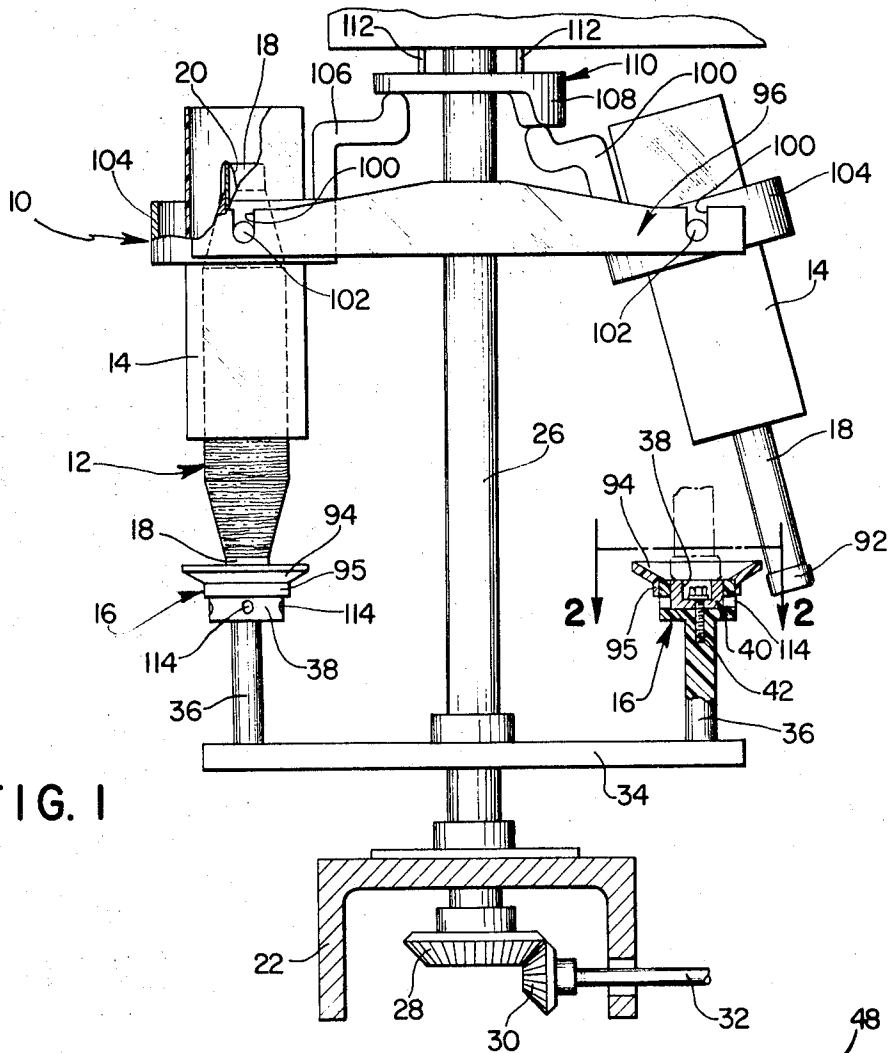


FIG. 1

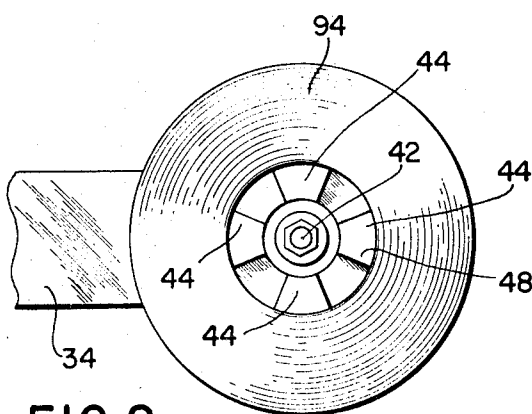


FIG. 2

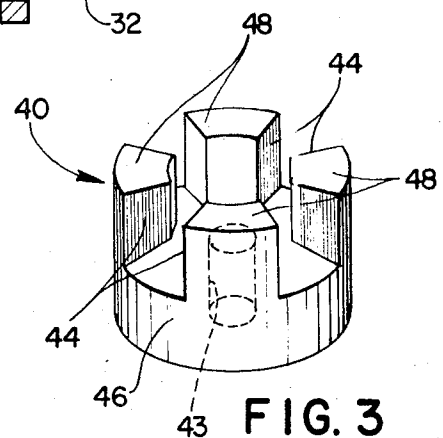


FIG. 3

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WINDING APPARATUS

This invention relates to winding machines and, more particularly, to a holder for yarn packages.

As used herein the term "yarn" means any sort of strand material whether textile or otherwise, and the term "package" means the product of a winding machine, whatever its form.

An environment for the invention is shown in a Leeson Corporation patent of Thomas E. Pitts and Carlton A. Steele, U.S. Pat. No. 3,048,349 granted Aug. 7, 1962. This patent discloses a holder or carrier for at least two yarn packages or bobbins. The holder is rotatable about a vertical axis to simultaneously transfer a fresh package from a reserve position to an active (unwinding) position and to eject a spent package previously in the active position. Mounted adjacent a pin-type seat for each package is a lift member which is raised to displace the package from its pin, and above each seat is a discharge member (in the form of a bobbin receiving tube) which is swung outwardly to eject the package from the holder. Both the lift and discharge members are cam operated during the rotation of the carrier. In loading fresh bobbins, a winding machine attendant drops the bobbin onto the seat in the reserve position and arranges the end of yarn in a suitable position for subsequent introduction into the winding operation.

Various other expedients are known for handling yarn packages on winding machines and include various means such as clamps for holding the bobbins on their seats during automatic end finding operations and subsequent unwinding of the yarn from the bobbin core. Such clamps are likely to damage the cores over a period of time and may grasp and thus prevent removal of the free end of yarn deposited in the hollow core or wound about the foot portion of the core. Depending on the type of automatic winding equipment being used, this results either in ejecting an others otherwise usable bobbin or in stopping operation of the affected winding station.

The invention, in brief, is directed to overcoming these difficulties and to providing a simplified and a more economical and serviceable mechanism, and particularly such mechanism providing automatic bobbin handling for winding machines. As a fresh bobbin is called for, it drops through a tube and onto a seat which includes a magnet for magnetically coupling the bobbin to the seat and thereby effectively preventing lifting of the bobbin from the seat during subsequent yarn end retrieval and unwinding operations. When it is desired to eject the bobbin core from the seat, the core is slid off of the seat by tilting the tube. Air passages are provided through the seat to facilitate pneumatic recovery of the yarn end of a fresh bobbin from the hollow core.

It is a primary object of this invention to provide a new and improved holder for a yarn package.

Another object is to provide a new and improved yarn package holder which magnetically couples the package to the holder. A related object is provision for facilitating removal of the bobbin from the holder. Still another related object is provision for the passage of air into a hollow core of the bobbin. A further related object is provision for ejecting the bobbin core from the holder.

These and other objects and advantages of the invention will be apparent from the following description and the accompanying drawing, in which:

FIG. 1 is a fragmentary, schematic elevational view of a portion of a winding machine and shows a bobbin holder between active and reserve positions, with parts broken away and removed for clearer illustration;

FIG. 2 is a fragmentary, enlarged top view taken generally along the line 2-2 in FIG. 1; and

FIG. 3 is an enlarged perspective view of a magnet shown in FIGS. 1 and 2.

With reference to FIG. 1, a bobbin holder 10 for a pair of bobbins is shown moving between reserve and active positions. At the left-hand side of FIG. 1 a fresh bobbin 12 is illustrated in position after it has been dropped through a tube 14 and onto a seat 16 while this seat was in the reserve position. A

hollow core 18 of the bobbin 12 is magnetically coupled to the seat 16 to prevent lifting of the bobbin from the seat during retrieval of a yarn end 20 from the hollow core and during subsequent unwinding operations. The right-hand portion of FIG. 1 shows an empty bobbin core 18, after unwinding of the bobbin at the active station, being ejected from its seat 16 by tipping the tube 14 to slide the core off of the seat whereupon it drops out of the tube to suitable receiving means (not shown).

More particularly, a winding machine includes a lower, channel-shaped frame member 22 and thereabove a housing 24, only a small portion being shown at the top of FIG. 1. A vertical shaft 26 is suitably journaled on the channel member 22 and the housing 24 and has its lower end fixedly secured to a bevel gear 28 which mates with a pinion 30 intermittently rotated by a drive shaft 32 responsive to the usual control system of an automatic winding machine to index a fresh bobbin 12 into the active position. Fixed to the vertical shaft 26 above the channel member 22 is a lower horizontal supporting arm 34 which carries a pair of the bobbin holding seats 16, one on either end of the arm.

Each seat 16 has a nonmagnetic pedestal 36 of nylon or similar material, suitably fixed at its lower end to the arm 34 with an upwardly facing socket 38 at its upper end. This socket receives a cylindrical, permanent magnet 40 (note FIG. 3) which is fixed therein in any suitable manner, for example as by a screw 42 passing through a vertical hole 43 the magnet and into the pedestal 36. The illustrated magnet 40 has four poles 44 extending upwardly from a base 46 and the top faces 48 of the poles 44 are preferably facially aligned in a horizontal plane so that a magnetic object resting on top faces 48 is magnetically coupled to the magnet 40.

Noting that FIG. 1 shows the bobbin holder moving between the reserve and active positions, when one of the seats 16 enters the reserve position a bobbin 12 is dropped through the tube 14, with automatically as through a chute or manually by a winding machine attendant. A magnetic ring 92 (FIG. 1) such as steel, on the end of the bobbin core 18 drops onto an annular flange 94 diverging upwardly and outwardly from the top of a cylindrical neck 95 about the socket 38. Thus, the ring 92 is guided onto the faces 48 of the magnet so that the ring 92, and therefore the core 18, is magnetically coupled to the magnet 40 which is part of the seat 16. It should be noted that the inner portion of the annular flange 94 is just slightly larger than the ring 92 to assure centering of the bobbin 12 on the seat 16, and overlies the upper edge of the socket 38 and is substantially even with the top faces 48 of the magnet.

An upper, horizontal supporting arm 96 is fixed to the vertical shaft 26 for rotation therewith. This arm is bifurcated at its outer ends 98 which have notches 100 to receive opposite horizontal pivot pins 102 of an annular collar 104. The collar 104 is rigidly secured to the tube 14 and upon rotation from the active position to the reserve position an upstanding cam finger 106 of the collar rides across a depending lobe 108 of an upper cam 110 which is concentric with the vertical shaft 26 and fixedly secured to the winding machine housing 29, as by spacers 112. Thus the tube 14 is pivoted to slide the core ring 92 off the magnet 40, up the flange 94 and thus off of the seat 16.

In order to facilitate pneumatic retrieval of the yarn end 20 from the hollow core 18, the seat 16 is provided with air passages which include apertures 114 in the sidewall of the socket 38, opening into the gaps between the poles 44 of the magnet 50.

While this invention has been described with reference to a particular embodiment in a particular environment, various changes may be apparent to one skilled in the art and the invention is therefore not to be limited to such embodiment or environment except as set forth in the appended claims.

I claim:

1. A yarn package holder for a package having a core, comprising, a support, magnetic seat means rigidly mounted on

said support for receiving the core and magnetically, rigidly coupling the core to said support, and surface means extending generally transversely outwardly about said seat means for guiding the core.

2. A holder as set forth in claim 1 in which said surface means substantially encircles and diverges outwardly from said seat means and therewith forms a generally dish-shaped receiver for guiding the core onto the seat means.

3. A holder as set forth in claim 2 in which said surface means where adjacent said seat means is substantially even therewith.

4. A holder as set forth in claim 1 in which said seat means includes means for the passage of air therethrough and to the core.

5. A holder as set forth in claim 1 in which said seat means includes a magnet, a receiver for said magnet, said receiver and said magnet having cooperating means for the passage of air through the receiver and magnet to the core.

6. A holder as set forth in claim 1 in which said seat means includes means for the passage of air therethrough and to the core.

7. A holder as set forth in claim 1 including package-handling means for removing the core from the seat, said handling means comprises a tube, and means mounting said tube for movement from a receiving position aligned with said seat means for guiding the core onto said seat means, to a discharge position out of alignment with said seat means for ejecting the core from the seat means.

8. A holder as set forth in claim 7 in which said tube is above said seat means in said receiving position for downward passage of said core through the tube and onto said seat means, and said seat means is vertically stationary and constructed for sliding movement of the core thereon as said tube moves to said discharge position, whereby the core drops from the seat means and out of said tube.

9. A holder as set forth in claim 8 in which said core has a longitudinally extending passage therethrough and a magnetic ring concentrically secured to an open end of the core, said seat means includes a magnet having an upwardly facing face portion for facially receiving said ring, a nonmagnetic member having an upwardly opening socket receiving said magnet and having a surface substantially encircling and diverging upwardly from said face portion and therewith forming an upwardly opening generally dish-shaped seat for receiving the ring, said surface where adjacent said face portion being substantially even with the face portion to facilitate said core sliding thereacross, and said member and said magnet having cooperating means for the passage of air through the member and the magnet and into the hollow of the core.

10. A yarn package holder for a package having a core, comprising, a seat for receiving the core, said seat including retaining means for receiving and magnetically coupling the core to the seat and including magnetic means to receive the core, and said seat further including a surface diverging outwardly from and substantially encircling said magnetic means for guiding the core, and said surface and said magnetic means forming a generally dish-shaped seat for receiving the core.

11. A holder as set forth in claim 10 in which said surface where adjacent said magnetic means is substantially even therewith.

12. A yarn package holder for a package having a core, comprising, a seat for receiving the core, said seat including retaining means including a magnet for magnetically coupling the core to the seat, and said seat further including a receiver for said magnet, said receiver and said magnet having cooperating means for the passage of air through the receiver and magnet to the core.

13. A yarn package holder for a package having a core, comprising, a seat for receiving the core, said seat including retaining means for magnetically coupling the core to the seat, package handling means for removing the core from the seat and including a tube, and means mounting said tube for movement from a receiving position aligned with said seat for guiding the core onto said seat, to a discharge position out of alignment with said seat for ejecting the core from the seat.

14. A holder as set forth in claim 13 in which said tube is above said seat in said receiving position for downward passage of said core through the tube and onto said seat, and said seat is vertically stationary and constructed for sliding movement of the core thereon as said tube moves to said discharge position, whereby the core drops from the seat and out of said tube.

15. A holder as set forth in claim 14 in which said core has a longitudinally extending passage therethrough and a magnetic ring concentrically secured to an open end of the core, said retaining means includes a magnet having an upwardly facing face portion adapted to facially receive said ring, said seat includes a nonmagnetic member having an upwardly opening socket receiving said magnet and a surface substantially encircling and diverging upwardly from said face portion and therewith forming an upwardly opening generally dish-shaped seat for receiving the ring, said surface where adjacent said face portion being substantially even with the face portion to facilitate said core sliding thereacross, and said receiver and said magnet having cooperating means for the passage of air through the receiver and magnet and into the hollow of the core.

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