

# United States Patent

**[11] 3,603,440**

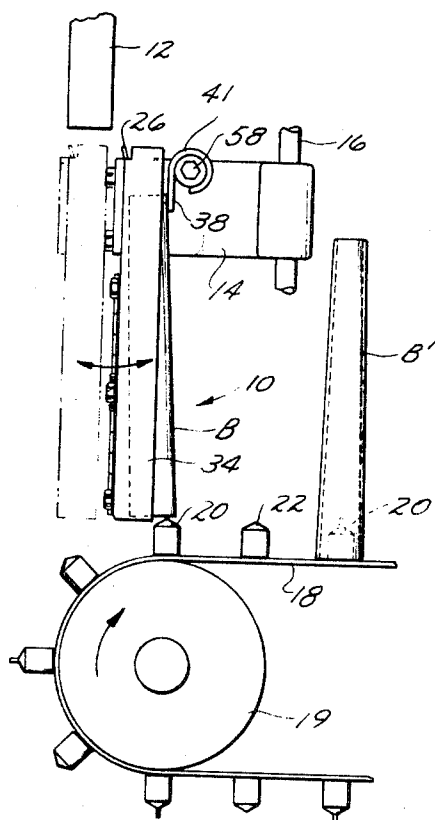
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|------|-----------|---------------------------------------------------------------------------------------------------------------|
| [72] | Inventors | <b>Lester W. Pray<br/>Clemson;<br/>Carey A. Glazener, Seneca, both of, S.C.</b>                               |
| [21] | Appl. No. | <b>865,943</b>                                                                                                |
| [22] | Filed     | <b>Oct. 13, 1969</b>                                                                                          |
| [45] | Patented  | <b>Sept. 7, 1971</b>                                                                                          |
| [73] | Assignee  | <b>Maremont Corporation<br/>Chicago, Ill.</b>                                                                 |
|      |           | <b>Continuation-in-part of application Ser. No.<br/>798,389, Feb. 11, 1969, now Patent No.<br/>3,531,016.</b> |

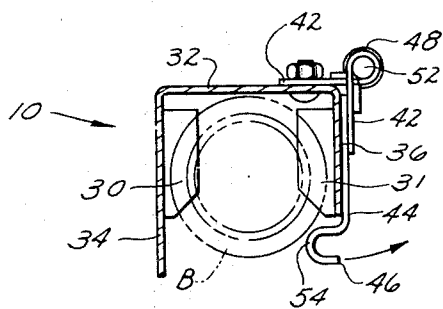
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|----------------------------------------------|---------|------------------------------|--------|
| [56]                                         |         | <b>References Cited</b>      |        |
|                                              |         | <b>UNITED STATES PATENTS</b> |        |
| 2,304,146                                    | 12/1942 | Brinton .....                | 53/313 |
| 3,212,620                                    | 10/1965 | Adams et al. ....            | 198/26 |
| <b>Primary Examiner</b> —Stanley H. Tollberg |         |                              |        |
| <b>Attorney</b> —Donald H. Feldman           |         |                              |        |

**ABSTRACT:** A bobbin tube cage for receiving bobbin tubes dropped therein, for moving tubes so received laterally in an upright position, and for depositing such tubes so moved onto conveyor pegs in an upright position is disclosed and, preferably, comprises an elongate rectangular structure having a substantially open fourth side, a bottom partially open between one or more inwardly directed flanges extending along the bottom from one or more of the facing closed sides, and in particular a guide means having a normally biased swingable gate means fixed for pivotable movement to and outwardly from one of the closed facing sides and having an inwardly directed arcuate convexity partially overlying the lower portion of the open side. The guide means also includes a guide plate fixed between the closed facing sides adjacent their top and across the open side, which guide plate extends downwardly a distance sufficient to somewhat overlap the top portion of a bobbin tube residing within the cage means.

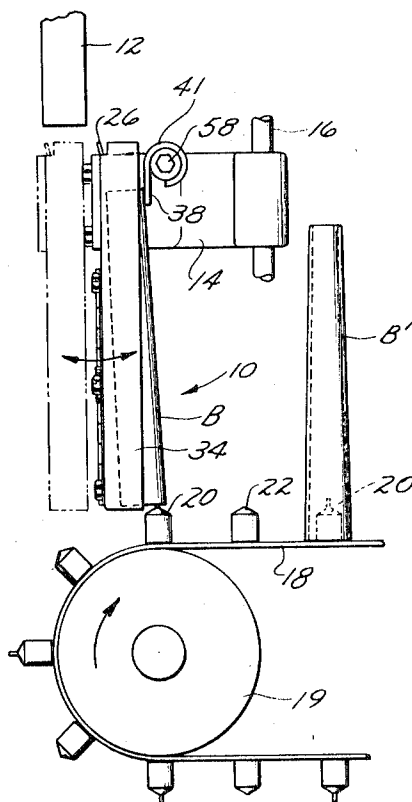
**[54] BOBBIN CAGE**  
**19 Claims, 3 Drawing Figs.**

|      |                 |                        |
|------|-----------------|------------------------|
| [52] | U.S. Cl.        | 193/43,                |
|      |                 | 198/26                 |
| [51] | Int. Cl.        | F16d 11/06             |
| [50] | Field of Search | 221/263;               |
|      |                 | 198/26; 53/313; 193/43 |

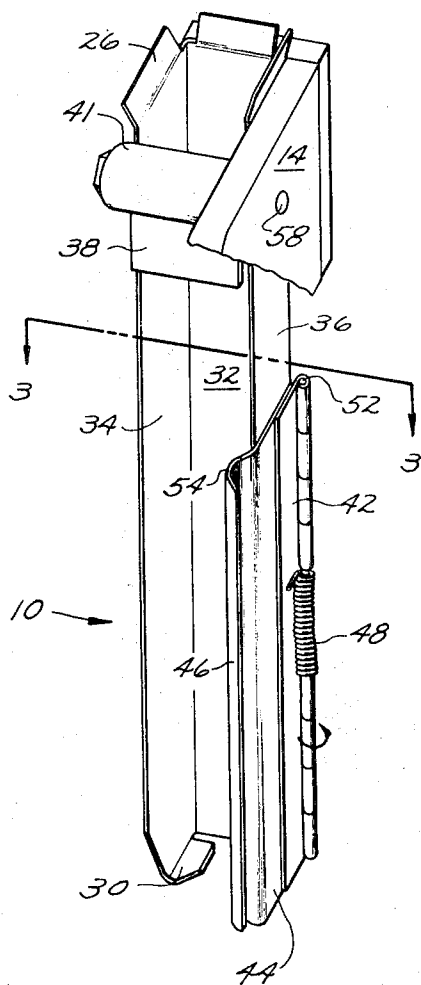




*Fig. 3*



*Fig. 1*



*Fig. 2*

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## BOBBIN CAGE

This invention is a continuation-in-part of copending and commonly assigned U.S. Pat. application Ser. No. 798,389, by Lester W. Pray, a coinventor herein, filed on Feb. 11, 1969 now U.S. Pat. No. 3,531,016 and entitled "Bobbin Orienting and Loading Apparatus."

## BACKGROUND OF THE INVENTION

The present invention relates to an improved bobbin tube cage means of the type generally useful in but not limited to a textile bobbin tube loading and orienting apparatus such as is disclosed in the aforesaid copending application.

In such apparatus, bobbin tubes fed from a bin are oriented in up-ended position and dropped through a shute to a laterally movable cage having an open side of such dimensions as to permit upstanding tube removal therefrom. The cage has a partially open bottom, whereupon lateral displacement from its bobbin tube receiving position beneath the shute to its tube discharge position directly above and close to a conveyor bearing tube-supporting pegs, such pegs may enter through the bottom opening of the cage and engage the inner wall of a tube therein, and with movement of the conveyor, urge the tube out of the cage, which tube once so removed and no longer supported by the cage bottom flanges may fall a short distance to the conveyor and thus seat itself upon the peg for subsequent movement on the conveyor in an upstanding orientation.

Several problems, however, present themselves through use of a tube cage. Among these is the difficulty of invariably receiving the tube within the cage in an upright nontilted position, since one side of the cage is open necessarily. Upon on-end falling into the cage, at times the rebound force with which the bobbin tube hits the cage bottom is often sufficient to either bounce the bobbin tube out of the open side prematurely, or at least to tilt the bobbin tube if it comes to rest on the cage bottom so that upon lateral movement of the cage to the conveyor position the pegs will not properly engage the tube causing tube toppling or jams or other difficulties. Further, if the tube is tilted, indeed it may be discharged through the open side during the rather abrupt lateral movement of the cage to the conveyor position, and so not be available for subsequent orienting or loading.

Thus it is to the remedy of these difficulties that the present invention is directed, such being an object. This and other desirable objects of the invention will become apparent from or are inherent in the following description and the appended drawings.

## SUMMARY OF THE INVENTION

In the present invention, the aforesaid difficulties in receiving a bobbin tube within the cage in an upright position, in maintaining the bobbin tube in such position during the lateral movement of the tube and cage to a position overlying a peg-bearing conveyor for transfer thereto, and in properly discharging the bobbin tube from the cage under the aegis of the receiving peg and its proper deposition thereonto are now virtually eliminated by the present construction. In this, a spring-biased gate along one side of the cage is provided wherein said side extends a distance less than the extension of its facing side, and the gate overextends the side a distance somewhat less than the extension of the facing side of the cage. Further, the gates, which is pivotable away from the side of connection, at its overextension thereto, is provided with an inwardly arcuate convexity which extends into the open side of the cage a distance sufficient to retain a bobbin within the cage. Yet further, there is provided near the top end of the cage a guide plate fixed across the open side of the cage extending downward to a length which extends below the topmost portion of a bobbin tube residing within the cage. The cross-sectional shape of the cage is such so as to be large enough to accommodate a bobbin tube in its on-end or upright

position vertically, and may be cylindrical, i.e. circular, or oblong, or rectangular, or polygonal, and in its preferred configuration is nearly rectangular, wherein there are three upstanding sides and an open forth side, the two facing sides being of different length, the aforesaid gate being joined to the outside of the shorter side to extend therebeyond to a distance somewhat less than that of the facing longer side, again in cross section lengths and distances. The reasons for such configuration, and for the various elements of the present cage construction will become clear in the following explanations and description of an illustrative embodiment thereof, which are to be read in conjunction with the accompanying drawings, in which:

FIG. 1 is a fragmentary side elevation of a bobbin tube loading apparatus including a cage according to the invention, the cage being shown in full lines in its tube discharge position above the peg-bearing conveyor and in phantom lines in its tube-receiving position below a bobbin tube delivery shute;

FIG. 2 shows the instant cage in enlarged front perspective, with the cage's supporting bracket partially broken away to disclose the underlying construction features of the cage; and

FIG. 3 is a horizontal section of the cage as shown in FIG. 2 taken substantially along line 3—3 thereof, a bobbin therein also being shown in phantom lines.

Referring more particularly to the drawings, the bobbin loading apparatus fragmentarily shown in FIG. 1 is generally of the type disclosed in the aforesaid copending application Ser. No. 798,389, and in this illustrative embodiment includes a bobbin cage 10 mounted by a bracket 14 for lateral pivotal movement with and about the axis of a vertical pivot shaft 16 between a phantom line position beneath tube discharge chute 12 and a solid line position immediately above one end of a continuously driven belt conveyor 18 entrained about a supporting roller 19 and having upstanding tube-supporting pegs 20, 22 thereon. As better shown in FIGS. 2 and 3, cage 10 has a flared open top 26, a partially open bottom including spaced tube supporting flanges 30, 31, three vertical walls 32, 34, 36 and an open side extending laterally between walls 34, 36 and vertically between top 26 and bottom flanges 30, 31 of cage 10. An upright tapered bobbin B (FIG. 1) dropped from shute 12 passes into cage 10 shown in phantom lines, downwardly past open top 26, comes to rest with its base supported upon cage bottom flanges 30, 31, its top supported from toppling by guide means plate 38, and is moved laterally with cage 10 about the axis of shaft 16 to the solid-line cage position overlying the end of conveyor 18. In such position, one of the alternate tube-support conveyor pegs 20 passing upwardly about the end of conveyor 18 projects through partially open cage bottom between flanges 30, 31 into the base opening of tube B, and urges tube B laterally along said flanges toward the open cage side, which open side then faces in the direction of conveyor movement. Upon such withdrawal of tube B from the open cage side, under the impetus of continued movement of peg 20 on moving conveyor 18, the tube drops downwardly to fully seat itself upon the peg and is advanced by conveyor 18, along with previously and similarly seated tubes such as that designated B' in FIG. 1, away from the loading apparatus as cage 10 is returned to its phantom line position for another cycle of operation. For reasons not presently relevant, tubes are not loaded by the apparatus upon the alternate and slightly shorter conveyor pegs or studs 22.

The above-described intended operation would be defeated, as noted previously herein, by inadvertent and/or improper discharge of a tube B from cage 10, during either the tube's entrance into, lateral movement with or withdrawal from the cage means. The present invention provides guide means as a part of said cage means, to be now described, for guiding and controlling each tube's entry into and withdrawal from cage 10, and for preventing its inadvertent discharge therefrom.

Such guide means includes a guide plate 38 fixedly mounted across the upper portion of the open cage side and a gate means associated with the lower portion of the open cage side

and mounted for pivotal movement between open and closed positions by a hinge 42 (FIGS. 2 and 3). Gate means in this embodiment comprises a flat plate 44 having a smooth and smoothly curved flange 46 internal therewith and somewhat overlying at least a portion of the open side so as to confine within a tube. One leaf of hinge 42 is bolted or otherwise rigidly secured to the exterior of rear cage wall 32, as indicated, or to a portion of side 36 adjacent wall 32, while the other hinge leaf mounts plate 44 for pivotal movement about the substantially vertical axis of a hinge pin 52 between open-gate and closed-gate positions. Resilient means, say in the form of a coil spring 48 encircling hinge pin 52, biases plate 44 to its closed-gate position, shown in FIGS. 2 and 3, wherein plate 44 overlies and abuts the exterior surface of cage side 36 and gate means flange 46 projects laterally inwardly therefrom in an arcuate convexity across at least part of the open cage side. The beveled upper end 54 (FIG. 2) of arcuate flange 46 slopes downwardly and toward the interior of cage 10 so as to deflect, if necessary, the base of any tube striking the same while dropping from shute 12 and into the central cavity of cage 10. During and after the tube's downward movement into cage 10 to the cage bottom, flange 46 prevents inadvertent discharge of the tube through the open cage side. In that connection, the distance between adjacent surfaces of flange 46 and cage side 34 is less than the diameter of at least the bobbin's larger base end (see FIG. 3), and the resiliency of said means, spring 48, is such as to maintain the gate closed during dropping entry of the tube and even during the abrupt pivotal movement of cage 10 from its phantom line and to its solid-line position of FIG. 1. As the base of tube B within cage 10 is then engaged by one of the conveyor pegs 20 and moved toward the open cage side however, gate plate 44 is urged by the engaged tube and pivoted outwardly against the biasing force of spring 48 to an open position, so as to permit controlled upright withdrawal of tube B through the open cage side. The smooth exterior surface and arcuate configuration of flange 46 produces a camming action facilitating such controlled withdrawal of tube B, and also eliminates any possibility of it being marred or snagged during its engagement with and passage by guide flange 46. To further maintain positive control over tube B during withdrawal through the open cage side and its engagement with gate flange 46, cage side 34 opposite the gate means projects outwardly in the direction of bobbin withdrawal to a point beyond the outermost extremity of flange 46 (see FIG. 3).

Forward tilting and possible toppling of the upper end portion of tube B, during its entry into and withdrawal as aforesaid from cage 10, are prevented by the guide means plate 38 extending across substantially the top full width of the open cage side adjacent cage top 26. As is shown in FIGS. 1 and 2, the upper edge of platelike guide 38 is preferably turned upon itself to form at its upper end an arcuate surface for deflecting into the cage means tubes dropping thereto from the shute. Guide plate 38 is secured by a blot 58 extending thereacross or therethrough and into bracket 14 for the purpose of fixedly mounting the guide plate in its illustrated position. The rolled upper edge of guide plate 38, as mentioned, presents a downwardly and inwardly sloping surface intended to deflect into cage 10 the base end of any tube striking the same while dropping from shute 12. The downward extent of guide plate 38 is such that its lower edge is disposed at an elevation below that of the upper end or tip of tube B supported upon cage bottom flanges 30, 31, but above that of a tube (such as the one designated B' in FIG. 1) fully seated upon an upstanding conveyor peg 20.

Guide plate 38 assists the gate means in preventing inadvertent discharge of a bobbin from the open side of cage 10 as the bobbin is dropped initially into the cage and thereafter is moved therewith to a position above conveyor 18. It will be appreciated that a tube, due to its narrow construction and notwithstanding the presence of the gate means, might at these times otherwise possibly tilt outwardly through the open cage side. Most importantly, however, guide means plate 38

prevents such forward tipping and possible toppling of tube B during withdrawal thereof from cage 10 by conveyor peg 20. Due to the vertically overlapped relationship between guide plate 38 and the upward end portion of tube B, the bobbin tube engages and is tilted rearwardly toward wall 32 by the guide plate during withdrawal from cage 10 even if the bobbin's natural tendency were to tilt forwardly. Excessive rearward tilting of tube B is prevented by rear wall 32 of cage 10 during tube withdrawal from the cage means by peg 20 and out of engagement with guide plate 38 upon movement of the tube base beyond bottom cage flanges 30, 31. In contrast to the forward tilting of bobbin B that is likely to produce toppling and consequential failure of the peg loading operation, the described controlled rearward tilting and guidance of the upper end portion of tube B greatly assists its proper withdrawal from the cage means and seating upon conveyor peg 20.

Although a specific embodiment of the invention has been shown and described, this was for the purposes of illustration only, and not for purposes of limitation, the scope of the invention being in accordance with the following claims. It will be appreciated that the aforesaid cage means for bobbin tubes may carry tubes with yarn or other fiber thereabout and thus such bobbins may be either "empty" or "full" for the purposes of this invention.

That which is claimed is:

1. A bobbin tube cage means comprising

an elongate cage member contoured to retain therein an upstanding bobbin tube and being formed with an opening fully along one side thereof of sufficient aperture to permit an upright bobbin tube bottom-seated within to pass laterally therethrough, said cage member also being formed with an open top of sufficient aperture to permit a bobbin tube to pass therethrough on-end and said member having a partially closed bottom sufficient to bottom seat and support a bobbin tube upright within said member; and

bobbin tube guide means for guiding passage of a bobbin tube on-end into said cage member, for retaining said bobbin tube upright wholly within said cage member and for guiding said bobbin tube for upright withdrawal from said member and through said side aperture.

2. Cage means of claim 1, wherein said guide means comprises

gate means pivotably biased and connected to said cage member so as to overlap said side aperture at least in part in a normally closed position for retaining said bobbin tube on-end within said cage member and swingably openable away from said side aperture under an opposing bias of said bobbin tube during its removal from said cage for camming said tube in an on-end orientation during said removal; and

guide plate means affixed across the top of said side aperture and extending downward at least to partially overlap the top of a bobbin tube contained within said cage member for retaining said bobbin within said cage member in an on-end orientation and for guiding entry of said bobbin into said cage member in said on-end orientation.

3. Cage means as in claim 2 wherein said gate means includes at its overlap of said side aperture an arcuate camming convexity directed inwardly of said cage member.

4. Cage means as in claim 3, wherein said convexity at the top of said gate means downwardly slopes for guiding said bobbin tube into said cage member.

5. Cage means as in claim 2, wherein said guide plate means includes at its top an arcuate surface for guiding said bobbin tube into said cage member.

6. In a bobbin tube loading apparatus

a laterally movable bobbin tube cage having an open top, a partially open bottom and an open side extending generally vertically therebetween, said cage being adapted to receive an upright textile bobbin tube dropped

through said open top thereof thereinto and to support said bobbin tube within said cage for movement with said cage upon said partially open bottom thereof,

tube-withdrawing means projectable through said partially open cage bottom and into the open base of said bobbin tube herein for withdrawing said bobbin in tube through said open cage side; said cage including

gate means carried by and movable with said cage and movable thereto between open and closed positions, said gate means including a portion overlying in said closed position thereof part of said open cage side to prevent inadvertent discharge therefrom of said bobbin tube deposited therein and moved therewith; and

biasing means for resiliently biasing said gate means toward said closed position.

7. A cage as in claim 6, wherein said portion of said gate means comprises a flange extending in said closed gate position laterally across at least part of said open side of the cage, said flange having a smooth curved convex surface thereon engageable by said bobbin tube during its withdrawal from said cage.

8. A cage as in claim 7, wherein said flange has at an upper end said convexity sloping downwardly and inwardly toward the interior of said cage when in the closed position of said gate means, for deflecting said dropped bobbin upon engaging the same into the interior of said cage.

9. A cage as in claim 6 which includes a pair of spaced opposed sidewalls defining therebetween said open cage side and a backwall jointed thereto and opposing said open cage side, and wherein said gate means comprises a substantially flat plate pivotally connected to said cage and having a flange integral with one edge thereof, said plate in said closed position being adjacent one of said sidewalls and said flange projecting laterally therefrom at least in part and at least part way across said open cage side.

10. A cage as in claim 9, including hinge means interconnecting said plate and said cage and mounting said plate for said pivotal movement thereof.

11. A cage as in claim 10, wherein said biasing means comprises a resilient means operatively attached to said hinge means for resiliently maintaining said plate in said closed position.

12. A cage as in claim 11, wherein said resilient means is a spring.

13. A cage as in claim 9, wherein the other of said sidewalls of said cage extends outwardly beyond the terminal edge of said one sidewall thereof.

14. A cage as in claim 6, further including a guide member associated with said open cage side and engageable during withdrawal of said bobbin tube outwardly therefrom with the upper portion of said bobbin tube for tilting said bobbin tube rearwardly during said withdrawal.

15. A cage as in claim 14, wherein said guide member comprises a plate extending across said open cage side, the vertical distance between said plate and said cage bottom being less than the height of said bobbin tube within said cage.

16. A cage as in claim 6, further including a guide member means extending across the upper portion of said open cage side and engageable with the upper portion of said bobbin tube during withdrawal thereof from said cage for preventing outward tilting of said bobbin tube during such withdrawal.

17. A cage as in claim 16, wherein said guide means is fixedly mounted across the upper portion of said open cage side and in cooperation with said gate means and said bobbin tube prevents inadvertent discharge therefrom of said bobbin tube as deposited therein and moved therewith.

18. In a bobbin-loading apparatus including a laterally movable bobbin tube cage having an open top, a partially open bottom and an open side extending generally vertically therebetween, said cage being adapted to receive an upright textile bobbin tube dropped through said open top thereof and to support said bobbin for movement with said cage upon said partially open bottom thereof, said apparatus including means projectable through said partially open cage bottom and into the base of the bobbin therein for withdrawing the bobbin forwardly through said open cage side, the improvement comprising:

guide-retaining means for preventing outward tilting of said bobbin tube during withdrawal thereof from said cage.

19. The improvement according to claim 18, wherein said guide-retaining means is mounted across the upper portion of said open side of said cage and whereby said bobbin tube engages and is tilted rearwardly by said guide-retaining means during withdrawal of said bobbin tube from said cage.

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**UNITED STATES PATENT OFFICE**  
**CERTIFICATE OF CORRECTION**

Patent No. 3,603,440 Dated September 7, 1971

Inventor(s) Lester W. Pray and Carey A. Glazener

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet "Attorney-Donald H. Feldman" should read -- Agent-Donald H. Feldman--.

Col. 1, line 66, "gates" should read --gate--.

Col. 3, line 4, "internal" should read --integral--.

Col. 3, line 56, "blot" should read --bolt--.

Col. 5, line 6, "herein" should read --therein--, and "in" should be deleted.

Signed and sealed this 29th day of February 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

ROBERT GOTTSCHALK  
Commissioner of Patents