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APPARATUS FOR LOADING BOBBINS INTO SHIPPING RECEPTACLES
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ABSTRACT OF THE DISCLOSURE

Apparatus for loading apertured shipping receptacles
with bobbins directly upon removal of bobbins from the
stripping station of a spinning frame or twister comprises
an endless belt which transports bobbins from the
stripping station to a loading station, a stand arranged to
support receptacles adjacent to the loading station, and
a loading unit which transfers bobbins from the conveyor
through the aperture and into the interior of the receptacle
on the stand.

The present invention relates to apparatus for manipu-
ulating bobbins. More particularly, the invention relates
to improvements in apparatus for removing and further
processing bobbins which are produced in spinning
frames, twisters or analogous textile machines.

When the bobbins are not manufactured and processed
in the same textile plant, the installation normally com-
prises a conveyor system which receives fresh bobbins
from the stripping device associated with a spinning
frame or twister, and such conveyor feeds bobbins to a
collecting station including a magazine or buffer for tem-
porary storage of bobbins. The contents of the magazine
are transferred into boxes, crates or other receptacles for
shipment to storage or to the processing plant. The trans-
fer of bobbins into and from the magazine consumes
much time and the bobbins are likely to collect dust or
other impurities.

Accordingly, it is an important object of the present
invention to provide a novel apparatus for manipulating
bobbins which are not used up in the same plant where
they are formed and to construct and assemble the ap-
paratus in such a way that the aforementioned magazine
may be dispensed with.

Another object of the invention is to provide an ap-
paratus which can transfer freshly formed bobbins di-
rectly from the spindles of a spinning frame or twister
into successive receptacles for shipment to storage or to
the next processing plant so that the likelihood of con-
tamination of bobbins is reduced to a minimum.

A further object of the invention is to provide an ap-
paratus for manipulating bobbins, preferably bobbins
which comprise expendable barrels, and to construct and
assemble the apparatus in such a way that it occupies
little floor space, that it can stack bobbins at the same rate
at which the bobbins are removed from spindles by
modern stripping devices, and that the bobbins can be
stacked with a high degree of accuracy.

An additional object of the invention is to provide
novel types of expandable shipping receptacles which
may be used in the above outline apparatus to receive stacks
of freshly formed bobbins.

Still another object of the invention is to provide the
above outlined apparatus with novel bobbin loading or
bobbin transferring means which can be used to introduce
bobbins into successive shipping receptacles.

A concomitant object of the invention is to provide a
novel method of manipulating bobbins immediately upon
withdrawal from a spinning frame or twister.

Briefly stated, one feature of my invention resides in
the provision of a method of loading shipping receptacles
with bobbins directly upon removal of such bobbins
from the doffing or stripping station of a spinning frame,
twister or another bobbin forming textile machine. The
method comprises the steps of conveying freshly stripped
bobbins seriatim along a predetermined conveyance
path from the stripping station on to a loading station,
placing an apertured shipping receptacle adjacent to the
loading station, and transferring the bobbins at the loading
station seriatim from the conveyance path through the
inlet aperture and into the interior of the shipping
receptacle which is adjacent to the loading station.

The barrels or tubes of the bobbins and the shipping
receptacles are preferably expendable and each shipping
receptacle is preferably provided with a single inlet ap-
erture through which one bobbin at a time can be fed into
its interior. Such inlet aperture may be sealed by a strip
or band of adhesive-coated material. In accordance with
a more specific feature of the invention, each shipping
receptacle may be dimensioned in such a way that it can
accommodate the unit output of a spinning frame or
another bobbin producing machine. Also, the width of
the internal space in a shipping receptacle preferably
exceeds only slightly the length of the barrel or tube in
a bobbin so that the bobbins in a loaded shipping recep-
tacle form a single stack in an array known as a multiple
quincunx formation.

The novel features which are considered as charac-
teristic of the invention are set forth in particular in the
appendix claims. The improved bobbin manipulating ap-
paratus itself, however, both as to its construction and
its mode of operation, together with additional features
and advantages thereof, will be best understood upon
perusal of the following detailed description of certain
specific embodiments with reference to the accompany-
ing drawings, in which:

FIG. 1 is a fragmentary side elevational view of the
loading station in an apparatus which embodies one form
of the present invention, a partially filled shipping recep-
tacle being shown with one of its side panels partly
broken away;
FIG. 2 is a side elevational view of a loading ship-
ning receptacle, with the inlet aperture sealed and with
a portion of one side panel broken away;
FIG. 3 is a vertical section as seen in the direction of
arrows from the line 3—3 of FIG. 2;
FIG. 4 is a bottom plan view of the shipping recep-
tacle shown in FIGS. 1 to 3;
FIG. 5 is a plan view of a cardboard blank which may
be transformed into a shipping receptacle for use in the
apparatus of FIG. 1;
FIG. 6 is a fragmentary top plan view of the apparatus
shown in FIG. 1;
FIG. 7 is a fragmentary side elevational view of the
loading station in an apparatus utilizing slightly different
shipping receptacles and a modified stand for such ship-
ning receptacles;
FIG. 8 is a top plan view of a loading member which
may be utilized in the apparatus of the present invention;
FIG. 9 is a side elevational view of the loading mem-
ber, further showing a portion of a shipping receptacle
which can be used in connection with such loading
member;
and
FIG. 10 is a fragmentary view of the upper side of the
bottom panel of the shipping receptacle shown in FIG. 9,
Referring first to FIGS. 1 to 6, particularly to FIGS.
1 and 6, there is shown an apparatus for manipulating
bobbins 14 which comprise expendable barrels or tubes

3,435,586
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The apparatus comprises a conveyer here shown as including an endless flexible belt 10 trained around several rollers of which only a driven roller 11 is actually shown in the drawings. The roller 11 is located at the discharge end of the conveyer and is driven by an electric motor 40. The upper stringer or stretch of the belt 10 extends lengthwise in front of a conventional spinning frame F (or a conventional twister) whose outline is indicated in FIG. 6 by phantom lines, as at 89. This upper stringer receives freshly formed bobbins 14 and feeds the flaps 31 of the bobbins from the spindles of the spinning frame F by means of a well known automatic stripping device which is installed at a stripping or doffing station ST shown in FIG. 6. It is clear that the conveyer including the belt 10, rollers 11 and motor 40 may be replaced by a roller conveyer or by any other suitable unit capable of transporting freshly removed bobbins seriatim along a conveyance path and on to the loading station E shown in FIG. 1.

Suitable lateral guide walls 41 are provided at a level above the upper stringer of the belt 10 to guide the bobbins 14 lengthwise along the conveyance path and to prevent them from leaving the channel 41a (FIG. 6). When the leading end of the barrel 14a on the foremost bobbin 14 reaches the discharge end of the belt 10, it engages a deflecting member 12 and automatically moves sideways (arrow B in FIG. 6) to enter an inclined chute 16 serving to direct successive bobbins to a loading member 19 having a chamber 19a in which bobbins may be transferred portion composed of two bifurcated scoops 18 provided on two parallel prongs 50. The loading member 19 resembles a two-armed lever and forms part of a loading or stacking unit 46 whose purpose is to introduce the bobbins 14 into a shipping receptacle 30 placed onto a support or stand 47.

In the embodiment of FIGS. 1 to 6, the stacking unit 46 is installed at the loading station E which is immediately adjacent to one end of the spinning frame F in which the bobbins 14 are formed. If the stacking unit 46 is so close to the spinning frame, it preferably forms therewith a stand 47 which can also include the stand 47. This ensures that the bobbins must cover a very short distance from the spindles of the frame F and into the interior of the shipping receptacle 30 so that they are less likely to accumulate lint, fly and other foreign matter which is present in such types of manufacturing plants. The loading member 19 is turnable about a fixed horizontal pivot 21 and its right-hand arm 49 (as viewed in FIG. 1 or 6) is rockable by a suitably configured cam 23 forming part of a drive which further includes an electric motor 42 and a belt and pulley transmission 42a. During each revolution of the cam 23, the scoops 18 of the loading member 19 move up and down as indicated by the double-headed arrow A. The motor 43 is caused to perform one full revolution at a time and is started by a switch 44 whose trip 43 constitutes a detector of bobbins and extends into the interior of the chute 16 so as to close the switch when depressed by a bobbin 14. In this way, the operation of the drive for the loading member 19 is synchronized with the feed of bobbins by the belt 10. The motor 42 comes to a halt in automatic response to completion of a full revolution. Such types of motor circuits are well known from the art and need not be shown here.

FIG. 1 illustrates the shipping receptacle 30 in partly filled or loaded condition. The delivery of bobbins 14 by the scoops 18 is continued until the shipping receptacle 30 is filled or until this shipping receptacle receives a predetermined number of bobbins. For example, the shipping receptacle 30 can be dimensioned in such a way that it can receive the unit output of the spinning frame F, namely, a number of bobbins 14 which corresponds to the number of spindles in the spinning frame.

The stand 47 comprises ground-contacting legs 48 which support a horizontal wall or platform 25 having a window 29 located in the pathway of scoops 18 to permit introduction of successive bobbins 14 through an inlet aperture 52 provided in the bottom wall 53 of the receptacle 30 (see FIGS. 2 to 5). The aperture 52 is the sole opening in the shipping receptacle 30 and can be closed by a door or flap 31 which is hingedly connected to the bottom panel 53. Such connection can be easily shown in FIG. 5 by a line 56 of perforations, with a crease or with an otherwise formed weakened portion which enables the flap 31 to pivot into the interior of the shipping receptacle 30 (arrow D). It is clear that the member 19 may be produced separately and is then hingedly connected with the bottom panel 53.

The operation is as follows:

When a freshly formed bobbin 14 reaches the discharge end of the channel 41a, its barrel 14a engages the deflecting member 12 and rolls onto the chute 16 to depress the trip 43 and to thus close the switch 44 in the circuit of the motor 42. The bobbin 14 then descends and automatically enters the scoops 18 at the exact moment when the scoops begin to move upwardly to pass through the window 29 and against the flap 31 which yields by pivoting into the receptacle about the hinge 60 and permits the bobbin to enter the interior of the receptacle. The scoops 18 are provided with aligned concave recesses 56 which receive the bobbins and ensure that the bobbins stay therein during transfer into the shipping receptacle. The bobbins roll out of the recesses 56 when the scoops 18 reach their upper end positions. The loading member 19 then returns to its original end position, as shown in FIG. 1 and is ready to receive the next-following bobbin 14.

The same procedure is repeated again and again until the shipping receptacle 30 is filled or until the receptacle receives a predetermined number of bobbins. When the scoops 18 are withdrawn from the window 29, the flap 31 comes to rest on a stop 27a formed by the platform 25 of the stand 47. This platform is formed with lateral abutments 26, 28 to properly locate the shipping receptacle 30 in such a way that the flap 31 registers with the window 29.

The shipping receptacle 30 is preferably an expendable box made of cardboard, paperboard, corrugated board or like readily available and reasonably inexpensive material. As shown in FIG. 5, the width of the internal space in the shipping receptacle 30 exceeds only slightly the length of a barrel 14a, i.e., this receptacle is intended to accommodate a single stack of bobbins 14. Before, the shipping receptacle 30 is preferably dimensioned in such a way that it can receive the unit output of a spinning frame F or a twister, namely, a number of bobbins which equals the number of spindles in such a textile machine. However, it is equally within the purview of the present invention to utilize shipping receptacles adapted to receive a number of bobbins which is less or a whole multiple of the number of spindles in a spinning frame. It is also clear that a shipping receptacle 30 can be dimensioned to receive two or more stacks of bobbins; in such an event, the shipping receptacle must be shifted with reference to the platform 25, the platform with a shipping receptacle thereon must be shifted with reference to the loading member 19, or the loading member must be shifted with reference to the shipping receptacle. The apparatus of FIGS. 1 to 6 preferably utilizes shipping receptacles whose flaps or doors 31 are just as large as is necessary to allow for introduction of one bobbin 14 at a time. Once loaded, the shipping receptacle 30 is removed from the stand 47 and its flap 31 is sealed, for example, by a strip or sheet of adhesive tape or by an adhesive-coated label 33 (see FIGS. 2 and 3) which may be used to carry the address of the recipient, to indicate the number and type of bobbins in the filled receptacle, or to carry other information.

FIG. 4 shows the shipping receptacle 30 in a bottom plan view, and FIG. 5 shows a cardboard blank 30A which may be transformed into the shipping receptacle of FIG. 4.
FIG. 7 illustrates the loading unit and the stand 147 of a modified apparatus. The shipping receptacle 130 has an inlet aperture 152 but is without a flap. Instead, the platform or wall 125 is provided with a hinged flap or door 35 which normally rests on the step ledge 127 and can be pivoted upwardly i.e., into the interior of the shipping receptacle to admit the scoops 18. The aperture 152 can be sealed by an adhesive-coated strip (not shown) after the shipping receptacle 130 is filled and subsequent to removal of the receptacle from the platform 125.

FIGS. 8 to 10 illustrate a preferred construction of the loading member 19 and of a shipping receptacle 30' which closely resembles the shipping receptacle 30 of FIGS. 1 to 6. The right-hand arm 49 (as viewed in FIG. 9) of the member 19 is preferably (but not necessarily) wider than the other arm which comprises two flat plate like prongs 50 provided with the aforementioned bobbin transferring portions or scoops 18 having recesses 56. The arm 49 cooperates with the cam 23 of the drive means for the loading member 19 and the flap 31' of the shipping receptacle 30' has two elongated parallel openings or slots 54, 55 which are only slightly wider than the prongs 50 so that, in the event a bobbin 18 in recesses 56, the scoops 18 could enter the shipping receptacle 30' without lifting the flap 31'. This flap will be lifted by a bobbin 14 to the position shown in FIG. 9 by phantom lines whereupon the flap is free to return to the solid-line position, either by gravity or under the weight of one or more bobbins which rest therein. This prevents escape of bobbins from the interior of the shipping receptacle 30'. The scoops 18 can be readily withdrawn through the slots 54, 55, regardless of the position of the flap 31'. The same procedure is repeated as often as necessary to fill the shipping receptacle. In the apparatus of FIGS. 1 to 6, the cam 23 is mounted directly on the output shaft of the electric motor 42.

In each of the illustrated embodiments, the shipping receptacle 30, 130 or 30' is supported in such a way that its inlet aperture is provided in the bottom panel, i.e., at a level below the top of the shipping receptacle. However, and though such mode of filling the shipping receptacle has been found to be particularly advantageous, other possibilities are not excluded; for example, the inlet aperture can be provided in a side panel and the scoops 18 or analogous bobbin transferring portions may be arranged to feed bobbins on the outside of a shipping receptacle, which are used for transport of bobbins to storage or to further processing plants. Furthermore, and since the number of manipulations to which the bobbins are subjected prior to entry into the respective shipping receptacles is greatly reduced, the bobbins are less likely to accumulate dust, moisture or other foreign matter which can increase further processing or affects the quality of the ultimate products. Still further, bobbins of the type wherein the upper ends of the barrels or tubes are provided with so-called overwindings are much less likely to be damaged than during manipulation in conventional apparatus.

Though it is equally possible to employ in the apparatus reusable shipping receptacles, expendable receptacles are often preferred because it is less expensive to discard a relatively cheap receptacle after a single shipment than to return such receptacles to the manufacturing plant.

For the same reason, the barrels or tubes 14c of the bobbins also preferably consist of a material which is cheap enough to justify discarding after a single use. Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of my contribution to the art and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is:

1. Apparatus for loading shipping receptacles with bobbins directly upon removal of such bobbins from the stripping station of a spinning frame, twister or an analogous bobbin forming machine, said receptacle being of the type having an inlet aperture and a door arranged to close the inlet aperture and being pivotable inwardly to permit introduction of bobbins, said apparatus comprising conveyer means for advancing bobbins from the stripping station to a loading station; a receptacle-supporting stand adjacent to the 18th stage to support receptacles in such position that the inlet aperture is located at a level below the top of the receptacle when the latter is supported by said stand, said stand comprising stop means for preventing outward pivotal movement of the door on the shipping receptacle when the latter is supported by said stand; a loading unit comprising transfer means movable against the door of the shipping receptacle on said stand to permit the door inwardly prior to introduction of a bobbin into such shipping receptacle.

2. Apparatus as defined in claim 1, wherein said conveyer means comprises an endless flexible element having a stretch extending along a portion of the bobbin forming machine from said stripping station toward said loading station to transport freshly formed bobbins supplied thereto by a stripping device which removes such bobbins from the spindles of said machine at said stripping station.

3. Apparatus as defined in claim 1, wherein the inlet aperture of the shipping receptacle which is supported by said stand faces downwardly and said stand comprises a platform having a window which registers with the aperture of the shipping receptacle on said stand.

4. Apparatus for loading shipping receptacles with bobbins directly upon removal of such bobbins from the stripping station of a spinning frame, twister or an analogous bobbin forming machine, comprising conveyer means for advancing bobbins from the stripping station to a loading station; a receptacle-supporting stand adjacent to said loading station and arranged to support receptacles in such position that an inlet aperture of a receptacle supported by said stand is located at a level below the top of the shipping receptacle when the latter is supported by said stand, said stand comprising a wall having a window registering with the inlet aperture of the shipping receptacle which is supported by said stand and a door hingedly secured to said wall and movable inwardly through the inlet aperture of the shipping receptacle on said stand; and a loading unit for transferring the bobbins from said conveyer means through the inlet aperture of and into the interior of the shipping receptacle which is supported by said stand, said loading unit comprising transfer means movable against the door of the shipping receptacle on said stand to permit the door inwardly prior to introduction of a bobbin into such shipping receptacle.

5. Apparatus as defined in claim 4, wherein said conveyer means comprises an endless flexible element having a stretch extending along a portion of the bobbin
forming machine from said stripping station toward said loading station to transport freshly formed bobbins supplied thereto by a stripping device which removes such bobbins from the spindles of said machine at said stripping station.

6. Apparatus as defined in claim 4, wherein said stand further comprises stop means for preventing outward pivotal movement of said door.

7. Apparatus for loading shipping receptacles with bobbins directly upon removal of such bobbins from the stripping station of a spinning frame, twister or an analogous bobbin forming machine, comprising conveyor means for advancing bobbins from the stripping station to a loading station; a receptacle-supporting stand adjacent to said loading station and arranged to support receptacles in such position that an inlet aperture of a receptacle on said stand is located at a level below the top of the receptacle, said stand comprising a wall having a window registering with the inlet aperture of the shipping receptacle supported by said stand; a door pivotable with reference to said window between an aperture-closing position and a second position within the interior of the shipping receptacle on said stand, said door having at least one opening therein; and a loading unit for transferring the bobbins from said conveyor means through the aperture of and into the interior of the shipping receptacle which is supported by said stand, said loading unit comprising a loading member having a bobbin-transferring portion movable into said opening without effecting movement of said door to second position, said door being movable into second position by bobbins on said bobbin-transferring portion.

8. Apparatus as defined in claim 7, wherein said conveyor means comprises an endless flexible element having a stretch extending along a portion of the bobbin forming machine from said stripping station toward said loading station to transport freshly formed bobbins supplied thereto by a stripping device which removes such bobbins from the spindles of said machine at said stripping station.

9. Apparatus as defined in claim 7, wherein said door is arranged to close in automatic response to complete transfer of a bobbin into the interior of the shipping receptacle on said stand.

10. Apparatus as defined in claim 9, wherein said stand is arranged to support shipping receptacles in such position that the inlet apertures of the shipping receptacles face downwardly and wherein said door is movable to closed position by gravity as well as under the weight of bobbins which might rest thereon, subsequent to transfer into the shipping receptacle on said stand.

11. Apparatus as defined in claim 10, wherein said loading member is a lever rockable about a fixed pivot axis and said bobbin-transferring portion comprises at least one scoop provided with recess means adapted to accommodate one bobbin at a time and to raise the bobbin therein from a lower level upwardly into engagement with said door and into the interior of the shipping receptacle on said stand.

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