April 12, 1966 R. ESCURSELL-PRAT 3,245,214

AUTOMATIC DEVICE FOR REMOVING FULL BOBBINS FROM CONTINUOUS SPINNING AND LIKE MACHINES

Filed Sept. 23, 1963 3 Sheets-Sheet 1

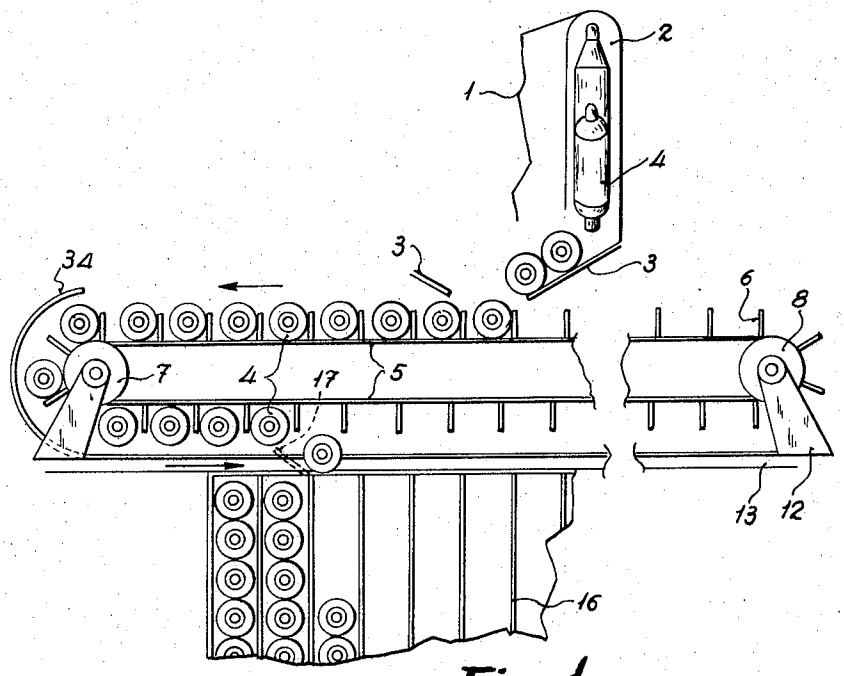


Fig. 1

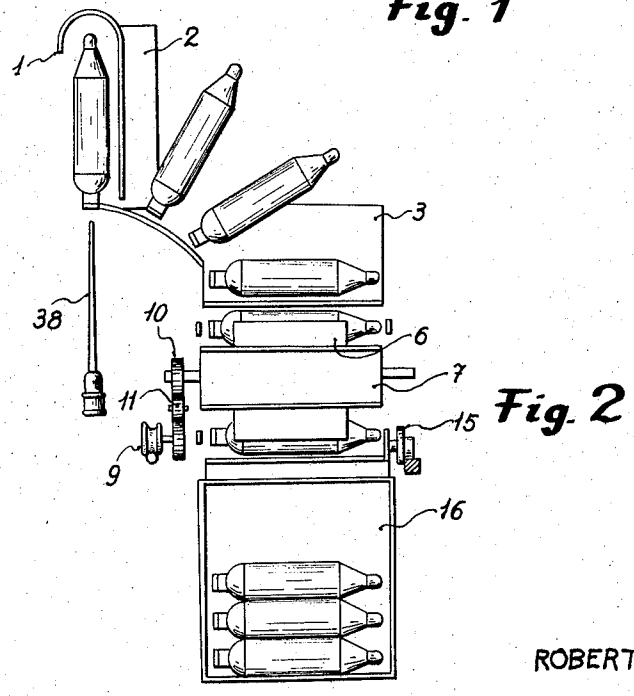


Fig. 2

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Filed Sept. 23, 1963 3 Sheets-Sheet 2

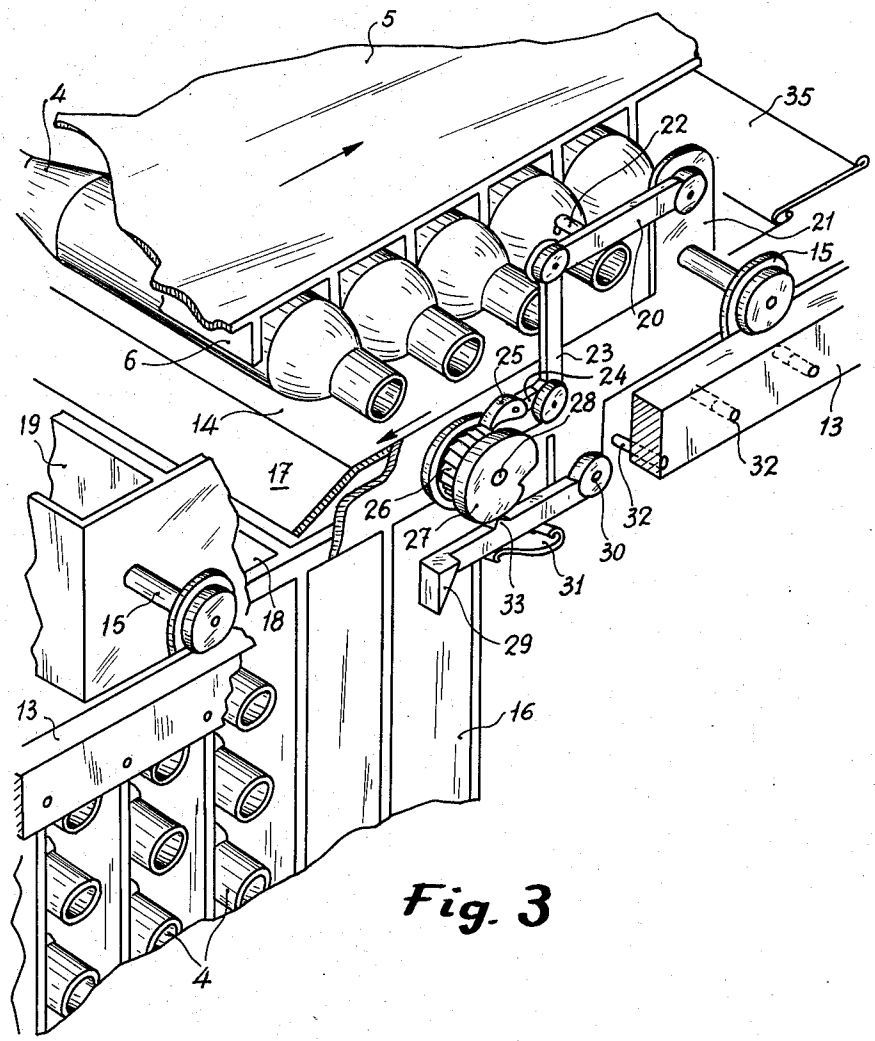


Fig. 3

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AUTOMATIC DEVICE FOR REMOVING FULL BOBBINS FROM CONTINUOUS SPINNING AND LIKE MACHINES

Filed Sept. 23, 1963 3 Sheets-Sheet 3

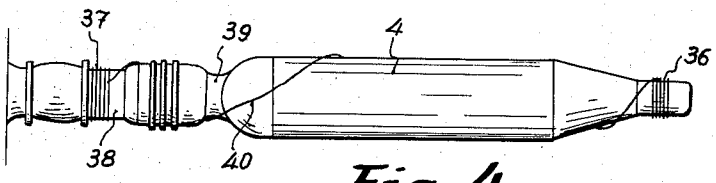


Fig. 4

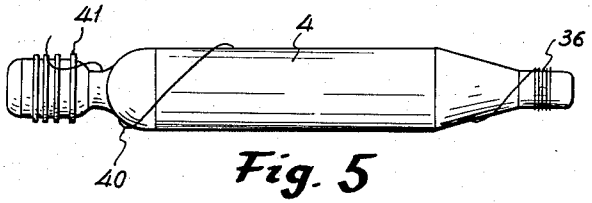


Fig. 5

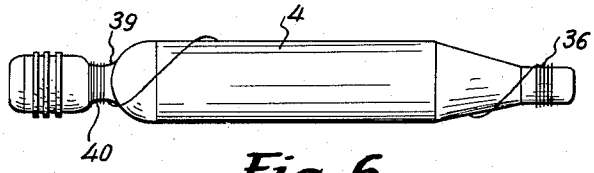


Fig. 6

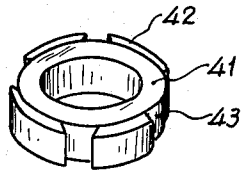


Fig. 7

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Patented Apr. 12, 1966

3,245,214

AUTOMATIC DEVICE FOR REMOVING FULL BOBBINS FROM CONTINUOUS SPINNING AND LIKE MACHINES

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Claims priority, application Spain, Sept. 25, 1962, 281,061
10 Claims. (Cl. 57—53)

The present invention relates to improvements in spinning and like machines and, more particularly, to devices for the mechanical and automatic removal of full bobbins from continuous spinning, twisting, or like machines. Hitherto, the operation of such machines has always been considered to be satisfactorily completed by simply allowing the removed bobbins to fall into a box after the thread has been cut. In all the machines proposed hitherto it has been necessary to withdraw by hand the bobbins which have fallen in a disordered manner into the containers which these machines carry, and to prepare them for further use. The bobbins may be used to feed automatic looms and boiling or other machines, both automatic and manual, including looms in which the weft cops are placed in a rotary feeder or in boxes which fulfill the same task, and balling machines in which the bobbins originating from the spinning machines are placed in a magazine provided for this purpose.

The ever increasing utilization of the above mentioned automatic machines, and on the other hand the final solution of the problem of automatic removal of the bobbins and their replacement by empty tubes by means of the device or apparatus according to U.S. patent specification No. 2,961,822, have revealed the necessity of eliminating labour between the discharge of the full bobbins from the continuous spinning machine and the ultimate utilization of such bobbins in subsequent automatic machines.

In order to do this, it has been necessary to comply with two conditions: firstly, the bobbins must have the end of the thread so placed that they can easily be used in the machine for which they are intended, and secondly, as the bobbins with the thread in the required condition are withdrawn from the continuous machine, they must be simultaneously placed by the changer apparatus in a continuous and ordered manner in boxes, the characteristics of which enable them to be used for the direct feeding of the aforesaid automatic machines.

According to one feature of the invention an auxiliary element is provided on the tubes of the bobbins for fixing the loose end of the thread before the subsequent movement and transport thereof.

According to another feature of the invention a device is provided which, when the bobbins are raised above the tips of their spindles, inclines them from their vertical positions into ordered, consecutive horizontal positions.

According to a further feature of the invention the bobbins, when they drop into the horizontal position, are disposed transversely on an endless belt having individual transverse compartmentes, one for each bobbin.

According to yet another feature of the invention the bobbins carried by the endless belt are discharged on to a horizontal platform on which they are drawn along by partitions forming transverse compartments on the belt, towards an opening through which they drop into storage boxes.

According to a still further feature of the invention the storage boxes are boxes of the type used in the previously mentioned automatic machines, with corresponding compartments.

According to yet another feature of the invention mechanical elements are provided which serve to ensure that the compartments are filled in an orderly manner with the exact required number of bobbins.

Finally, according to a still further feature of the invention all the elements necessary are arranged on the carriage on which the automatic bobbin doffing device is mounted, said carriage advancing on wheels running on rails mounted in the continuous spinning, twisting, or like machine, while the mechanism described briefly, and which will be described in detail below, depends mechanically on the movement of the carriage and derives its speed and rhythm from the movement of the carriage.

For the sake of greater clarity one form of device which makes it possible to carry the invention into effect will now be described with reference to the accompanying drawings which show only one preferred embodiment and which have no limitative character. The device will be constructed in each particular case so as to be suitable for the type of bobbins concerned, using the form, materials, and dimensions which are judged adequate, while any modifications which are thus made and also any which may be made as regards details of arrangement will not affect the essential character of the device, which will still be constructed within the scope of the invention as defined by the claims. In the drawings:

FIGURE 1 is a front view of the device as a whole,

FIGURE 2 is a side view in section,

FIGURE 3 is a detailed rear perspective view of the most important element of the device,

FIGURES 4, 5, and 6 show cops with different arrangements of the end of the thread and of the reserve,

FIGURE 7 is a view of a retaining ring for the thread-end.

Referring to the drawings, **1** represents the extractor bridges of an automatic doffing apparatus as described in U.S.A. patent specification No. 2,961,822.

At the cop outlet **2** of said apparatus there are arranged inclined planes **3**, which direct the full bobbins **4** to an endless belt conveyor (FIGURES 1, 2 and 3), which is provided with transverse separators **6** between which the bobbin **4** can be accommodated. This endless belt, which is arranged in a lower horizontal plane than the outlet for the bobbins, is supported and moved by two rollers **7** and **8**, one of which (the roller **7**) has movement imparted thereto by the moving wheel **9** of the changer apparatus, through gearwheels **10** and **11** (see FIGURE 2). The supports **12** on which said rollers **7**, **8** are rotatably mounted, one of which must be easily movable with the object of enabling the endless belt **5** to be easily tensioned, are supported by guide bars **13** which, in turn, are fast with the frame of the changer apparatus. In addition to supporting the rollers and their supports, and also the endless belt driven by the rollers, these guide bars serve as guides for a small platform or trolley **14** (see FIGURE 3) with wheels **15**, which serves to place the bobbins **4** in a suitable manner in boxes **16** intended for feeding a loom, baller or other automatic machine. For this purpose, said platform **14** is arranged below the endless belt **5** and at a suitable distance to ensure that it can move without obstruction and so that, by means of the transverse separators **6**, it can transport the bobbins **4** which are supported on said platform **14**.

At one of its ends, the platform **14** has an inclined ramp **17**, while beyond the latter there is a gap **16** of sufficient width to permit the passage of a bobbin **4** without difficulty, said gap **18** being defined at the side opposite the inclined ramp **17** by a vertical portion **19** of the platform, which at the same time serves as a support for the front wheels **15** of the platform. The inclined ramp **17** has to be located in successive positions corre-

sponding to the various compartments of the boxes 16 placed below it, as each of them is filled by the bobbins 4. In addition to being provided with the aforesaid wheels 15, the platform 14 therefore carries a lever 20 which is articulated on a member 21 projecting from the platform 14 and which carries at an intermediate point of its length, a projection 22 disposed in such a manner that the wide end of the bobbins 4 transported by the endless belt 5 will pass beneath it, thus producing an oscillating movement of the aforesaid lever 20 due to the difference in the height of the projection 22 when bearing against the end of a bobbin, as compared with its height when it engages between two successive bobbins in contact. This oscillating movement of the lever 20 is transmitted, by means of the connecting rod 23 which is pivotally connected to it, to a crank 24 which in turn has fixed to it a pawl 25, which transmits the aforesaid oscillatory movement to a ratchet wheel 26 fast with a notched disc or cam 27, this whole arrangement being freely rotatable on a shaft 28 which is also fixed in the side portion of the moving platform 14.

Against the bottom portion of the notched disc 27 there bears a stop lever 29 which is in turn pivotally mounted at 30, on the side of the moving platform 14. Said stop lever 29 is held firmly against the notched disc 27 by means of a spring 31. Normally, the stop lever 29 bears at its end against one of the bolts or projections 32 which are carried by the guide bars 13 on their inner surfaces at suitable distances to ensure that the positions defined by engagement against each of the bolts will correspond to the coincidence of the ramp 17 with a vertical compartment in the box 16.

Consequently, the ratchet wheel 26 must have as many teeth as bobbins 4 can be accommodated in each of the vertical compartments of the boxes 16, and consequently on each rotation of the ratchet wheel 26 and of the notched wheel 27, the stop lever 29 is raised away from the registering stop or projection 32, because the projection 33 at the upper part of the lever 29 penetrates for a moment into the notch in the disc 27 before dropping rapidly and striking or abutting against the following projecting bolt 32.

The moving platform 14 is displaced in the direction indicated by the action of a spring or weight (not shown in the drawing) which, by means of a cable, forces the platform 14 to perform the aforesaid horizontal movement relatively to the guide bars 13. The bars 13 serve at the same time to support the bobbins 4 from below when, during transport by the endless belt 5, they pass from the top to the bottom run of the latter. When passing around the driving roller 7, the bobbins 4 are held in position by the semi-circular guide 34 which prevents the bobbins 4 from leaving the belt 5, before passing to the bottom run where, as has been stated, they are supported on the guide bars 13. The support for the bobbins is formed by plates such as 35 linked by flanges, the first of them being linked to the moving platform 14, so that as the platform is moved said plates are opened out or unfolded so that, although the platform moves the bobbins away from the curved retaining plate 34, they are still supported from below by the aforesaid plates 35, which to begin with are superimposed but which, as the platform 14 moves away, come into a juxtaposed arrangement so as to form a continuous horizontal platform. As will be easy to understand, the plates 35 could be replaced by a roll of steel strip or by a band of plastic, rubber or the like of a width equal to the distance between the two guide bars 13, connected to the rear portion of the platform 14 and placed at the end of the curved plate 34 so as to be unrolled during movement of the platform 14 and to serve as a support for the bobbins 4, similarly to the case of the linked plates referred to above.

With regard to the boxes 16 into which the bobbins coming from the changer apparatus have to be deposited,

these will be located beneath the endless belt 15 by sliding in lateral guides which ensure that they assume the position which ensures perfect correspondence of each of their vertical compartments with the successive positions of the end of the inclined plane 17, as determined by the stops or projections 32 on the guide bars 13.

These boxes will have the characteristics, quality, dimensions, etc., given them by the various designers of machinery for the purpose of effecting the feeding of automatic looms, ballers, doubling machines and so on, with the special features required by the mechine to be fed in any particular case and as required for engagement with the guides for the boxes.

In all cases in which it is desired that the bobbins 4 (FIGURES 4, 5 and 6) should be used directly by the automatic machine (loom, baller, doubling machine, etc.) following the continuous spinning machine, the tubes or cores thereof must be of wood or other material which is completely seasoned, so as to withstand the deformations which may arise when it is desired to place the boxes, in the condition in which they leave the changer apparatus, in a twist setting system operating either by vaporization or by the action of a wetting agent. For this purpose, on completing the filling of the bobbin 4 on the continuous spinning machine, it will be preferable for a few turns 36 to be wound on the tip end for the bobbin rail to be lowered rapidly until a suitable quantity of thread has been wound on the base 37 of the spindle 38, this being done sufficiently rapidly to ensure that the minimum of thread 40' will be wound on the bobbin 4, with no turn at all wound on the zone 39, as is frequently done.

Once the bobbin has ben separated from the spindle 38 and the thread has been cut, all this being done by the changer apparatus, the bobbin is carried by the means mentioned to the box in question, the arrangement of the thread indicated being ideal for use in automatic machines; nevertheless, this system would suffer from the disadvantage of the possibility that the thread, which has been cut at the end of the bobbin and which extends to the winding 36 on the tip of the bobbin may, when left loose, give rise to the unwinding of the reserve winding 36 and conseqeuntly cause trouble in the automatic system for which it is intended. If, in order to avoid this possibility, the thread is wound on the portion 39 immediately following the base, then in order to separate the winding 36 serving for the automatic operation, the portion of thread which extends from the winding 36 to the winding on the bobbin-portion 39 must be broken, which is practicable only if the thread is very fine and of low strength.

In order that this process may be practicable in all cases, the method of positioning bobbins which has been described above includes also the method of preparation of the bobbins referred to, such that the thread is left in the form indicated above, that is to say, without being wound on the zone 39, and will not be left free to cause difficulties, as mentioned above. For this purpose there is provided, at the base of said bobbin 4, a ring on which one or more resilient clips (FIGURE 7) are mounted, into which the thread is introduced during winding on the base 37 of the spindle 38. A mouth 43 is provided, serving for easy entry or penetration and to retain the thread during subsequent manipulation, once it has been cut flush with the clip, while allowing it to pass out easily when forced to do so by the pull applied to the winding 36.

The position of the ring 41 in relation to the base of the bobbin tube will vary according to the characteristics of the latter, for example its dimensions and shape, but it will always be in the most suitable position for reliably effecting introduction at the moment of lowering the bobbin rail and so as to cause the minimum inconvenience from the point of view of the positions into which said

tube end has to pass (such as the position for engagement with the clips of the shuttle, for example).

Operation

The operation of the device, the characteristics of which have just been described, is as follows:

Before the continuous spinning machine is stopped, a portion of thread **36** is allowed to wind on the tip of the bobbin **4** which is leaving the extractor **2** of the changer apparatus, and at the same time this thread, which discords so as to be wound over the base **37** of the spindle **38** (FIGURES 4, 5, and 6), is clipped in the resilient clip **42** of the ring **41** (FIGURE 7), so that once the thread is cut by the changer apparatus it cannot spontaneously unwind. Thus perfect operation is ensured for the following automatic steps:

The bobbins having the thread disposed in the manner indicated above leave the changer and drop on to the inclined planes **3** and, owing to the shape of the latter, form a succession of bobbins which are introduced into the spaces between the pairs of adjacent separators **6** of the upper run of the endless belt **5**. The belt is driven under the notion of the movement of the changer apparatus itself, through the medium of the toothed wheels **10** and **11**, which receive the movement from the wheel **9** of said apparatus and transmit it to the roller **7** which moves the endless belt **5**. The belt **5** has, at the end of the inclined plane **3**, a number of compartments between adjacent separators which is slightly greater than the number of bobbins changed per unit of time.

As it moves, the belt **5** carries the bobbins **4** from the end of the inclined plate **3** and transfers them to the lower run of its travel, turning them through 180° about the roller **7** with the curved plate **34** meanwhile preventing the bobbins from leaving the belt. On arriving at the lower run, the bobbins are carried by the separators **6** on to the plates **35** (FIGURE 3), which together extend as far as the moving platform **14**, whatever the position of its travel which the latter occupies, because of the arrangement by which the said plates can be superimposed one upon the other. After passing over the plates **35**, the bobbins are transported in the same manner above the platform **14** and each of them produces an oscillatory movement of the lever **20** as it lifts the projection **22** carried by the latter, thus moving on the ratchet wheel **26** by one tooth for each bobbin which passes, by means of the connecting rod **23**, the lever **24** and the pawl **25**.

Each bobbin thus comes into position on the inclined plane **17**, over which they rapidly drop, being impelled by the separators **6** and falling through the gap **18** into the compartment **16** of the box, which is situated for that purpose below the gap **18**.

When the compartment which is being filled receives the last bobbin permitted by its capacity, the platform **14** is displaced relatively to the guide bars **13**, with its wheels **15** rolling on the latter, by the action of a cable which, by means of a weight or spring at its end, forces the platform to perform this horizontal movement. This is possible because the stop lever **29**, which previously held the platform **14** in position opposite the vertical compartment which was being filled, is lifted for a few moments, due to one rotation of the notched disc **27** being completed in consequence of the delivery to the compartment of a number of bobbins equal to the number of teeth on the ratchet wheel **26**. The lever **29** is raised owing to the fact that the top projection **33** on said lever passes for a moment into the notch, thus having the effect that the front portion of the lever is raised above the stop or bolt **32** previously engaged thereby. The platform then advances, through the action of the aforesaid weight and cable, but as the lever drops again because the notch of the disc **27** has rapidly passed out of engagement therewith, the lever strikes against the immediately following stop **32** and the platform **14** cannot pass the point determined by that stop until the ratchet wheel **26** has once again made another complete revolution, and so on until all the compartments of the boxes **16** have been filled.

The system indicated for effecting the advance of the moving platform could naturally be simpler, within the scope of the caims of the present specification, but the arrangement indicated is the one which practice has proved to be the most reliable. One such simplified system consists in that the element which effects the advance of the distribution platform is the endless belt itself, which then has a number of separators **6** which is an exact multiple of the number of bobbins which can be contained in each vertical compartment of the boxes. As will be readily understood, no other mechanism will then be necessary, apart from the stop pawl **29**, which will be raised every time the stops or references provided on the belt are passed. Nevertheless, as has already been indicated, this system suffers from the disadvantage (among others) that compartments may be left incompletely filled through failure to place all the bobbins in the respective boxes or because some spindles in the continuous spinning machine, owing to non-operation through belt failure or other similar occurrence, have failed to fill the corresponding compartments of the endless belt, thus leaving empty spaces in said compartments. Preference is therefore given to the system described above and shown in the drawings.

When the platform has reached the end position and all the bobbins have been discharged into the boxes, that is to say when the work of doffing all the bobbins has been completed, and before the apparatus is taken to another continuous spinning machine, the platform must return to its initial position.

What I claim is:

1. A device for removing full bobbins automatically from a continuous spinning or like machine and aligning said bobbins in a plural compartment box,

said device comprising,

a horizontal movable platform,

an endless movable belt having individual transverse compartments for said bobbins, said belt being positioned above said platform and having upper and lower runs,

means for transferring said bobbins from substantially vertically disposed positions to lower substantially horizontally disposed positions,

means for arranging substantially horizantally disposed bobbins transversely on said endless belt for discharge onto said horizontal platform,

said platform defining an opening for discharge from said platform of said bobbins to successive compartments of said plural compartment box during movement of said belt relative to said box.

means for controlling discharge of said bobbins to the respective compartments of said box to predetermine the number of said bobbins deposited in each compartment,

and means for controlling movement of said platform relative to said box.

2. A device in accordance with claim **1** and further comprising,

said platform being mounted on wheels for selective movement thereof,

and mounting rails depending from a bobbin spinning machine mounting said device.

3. A device in accordance with claim **2** and further comprising means for fixing loose thread ends on said bobbins, said last-mentioned means having a ring at the foot of each bobbin with at least one clip serving to hold loose thread ends after said bobbin is wound in said spinning machine.

4. A device in accordance with claim **2**, wherein the means for transferring the bobbins from vertically disposed positions to lower horizontally disposed positions comprises an inclined track serving to guide the feet of the bobbins for downward sliding movement while chang-

ing said bobbins from vertically disposed to horizontally disposed positions.

5. A device in accordance with claim 2 wherein said means for arranging substantially horizontally disposed bobbins transversely of said endless belt comprises an inclined plane over which said horizontally disposed bobbins roll.

6. A device in accordance with claim 2 and further comprising a drive roll positioned between said upper and lower run of said belt and,

a curved screen concentric with said drive roll for retaining said bobbins in engagement with said belt during movement of said bobbins around the drive roll between upper and lower runs of the belt.

7. A device in accordance with claim 6 and further comprising a carriage mounting said device, said carriage having a shaft with rotatable wheels thereon,

gear wheels mounted on said shaft,

said drive roll of said belt being driven by said gear wheels.

8. A device in accordance with claim 2 and further comprising a fixed horizontal guide means,

wheels mounting said platform for movement relative to said fixed horizontal guide means.

9. A device in accordance with claim 2 wherein said means for controlling movement of said platform relative to said box includes control means for moving said platform each time an individual compartment of said plural

compartments is filled, through successive distances equal to the width of the respective compartments of the box, and including a bobbin counter means for counting the number of bobbins delivered to each respective compartment.

10. A device in accordance with claim 9 wherein said bobbin counter comprises a pawl, a ratchet wheel and a stop lever,

said lever acting as means for being engaged by successive bobbins on said platform so as to actuate said pawl for controlling a ratchet wheel,

said ratchet wheel having a number of teeth equal to the number of bobbins which can be contained in a single compartment of said plural compartment box,

said ratchet wheel having a disc fixed therewith cooperating with said stop lever which retains the platform in position,

said disc being formed with a notch for permitting the stop lever to be displaced once during each complete rotation of said ratchet wheel so as to free said platform for movement relative to said box.

No references cited.

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