Feb. 29, 1944. E. A. TERRELL 2,342,909

BOBBIN STRIPPER

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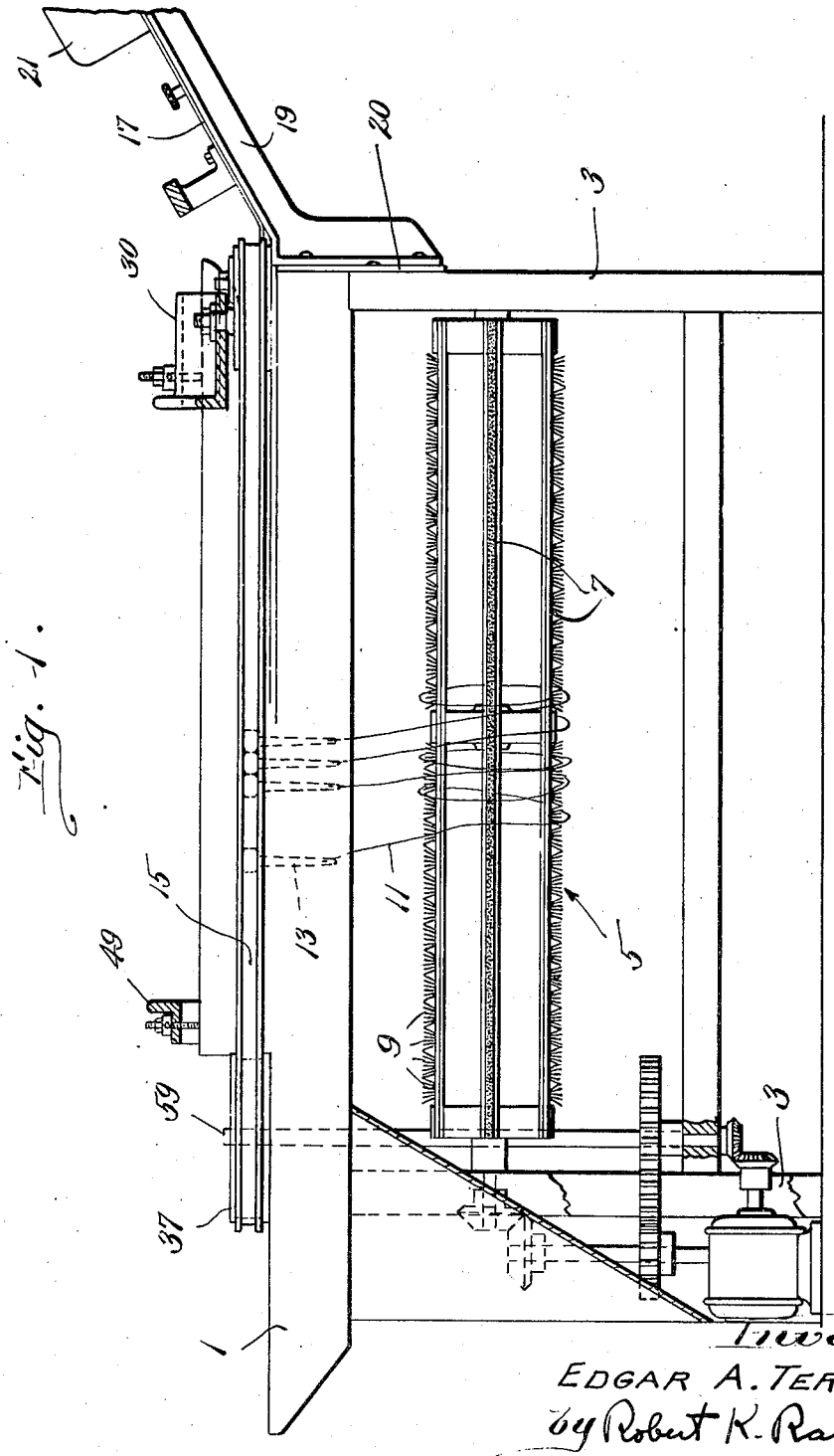


Fig. 1.

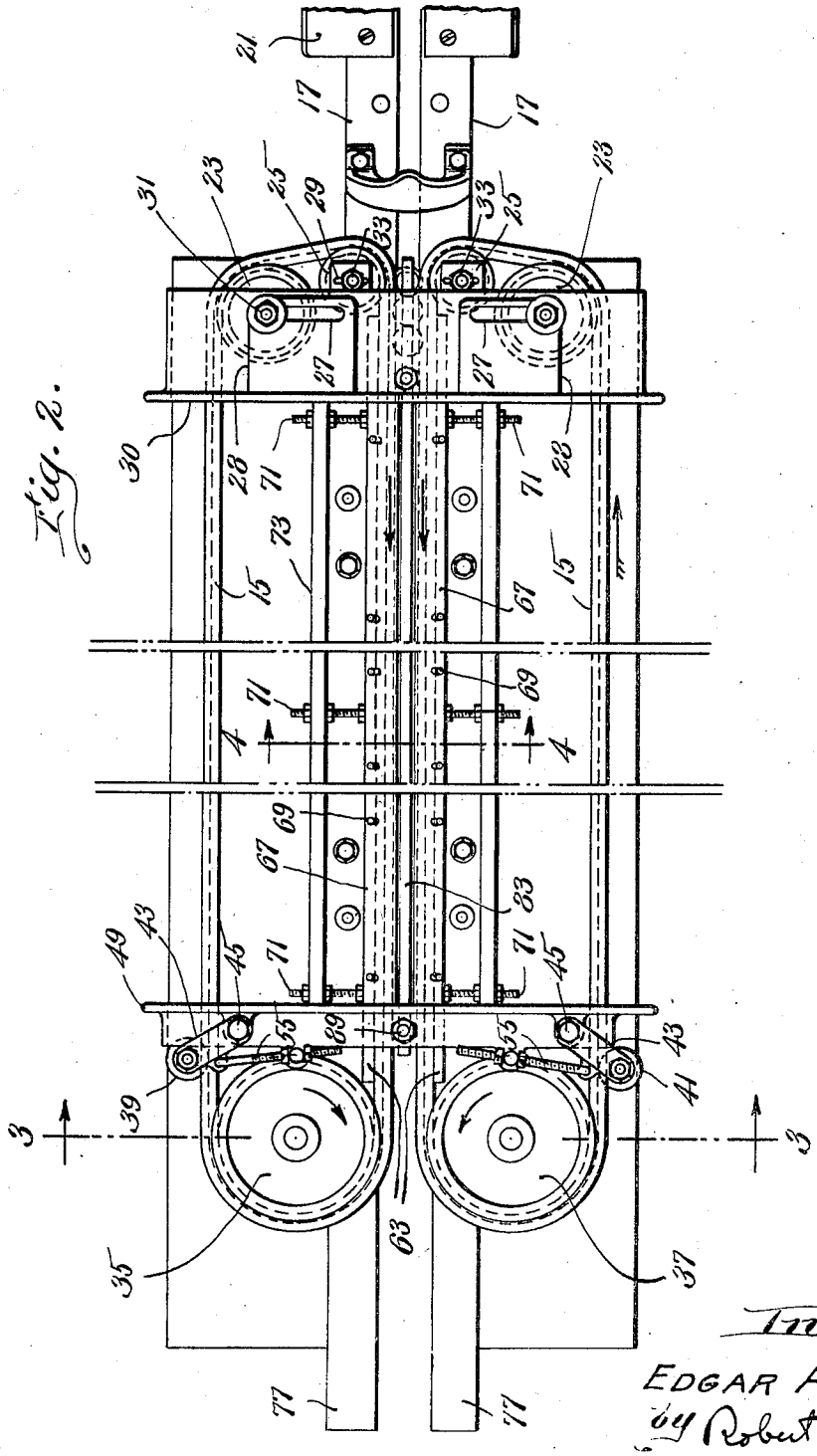
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Fig. 2.



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Fig. 3.

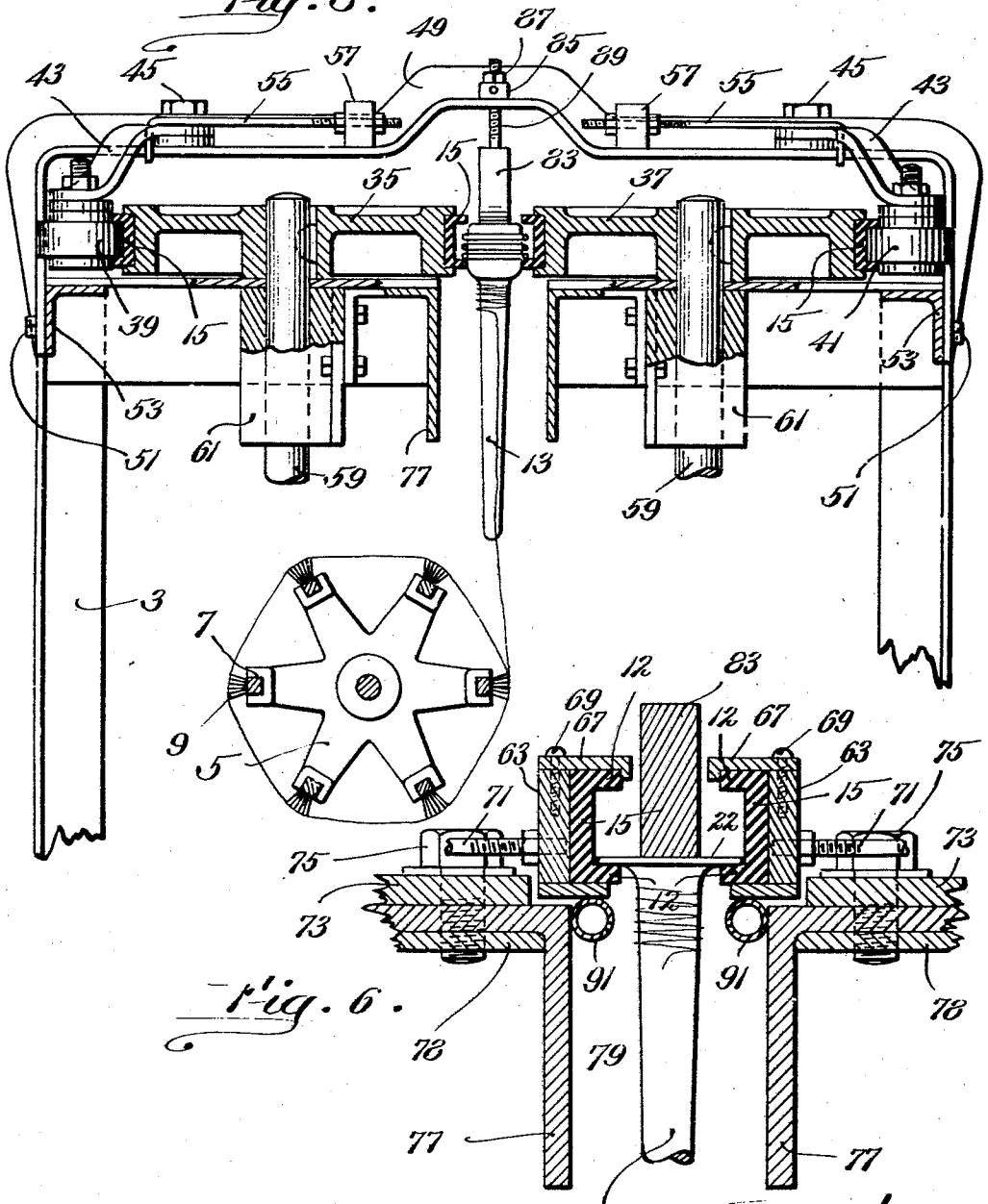


Fig. 6.

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Fig. 4.

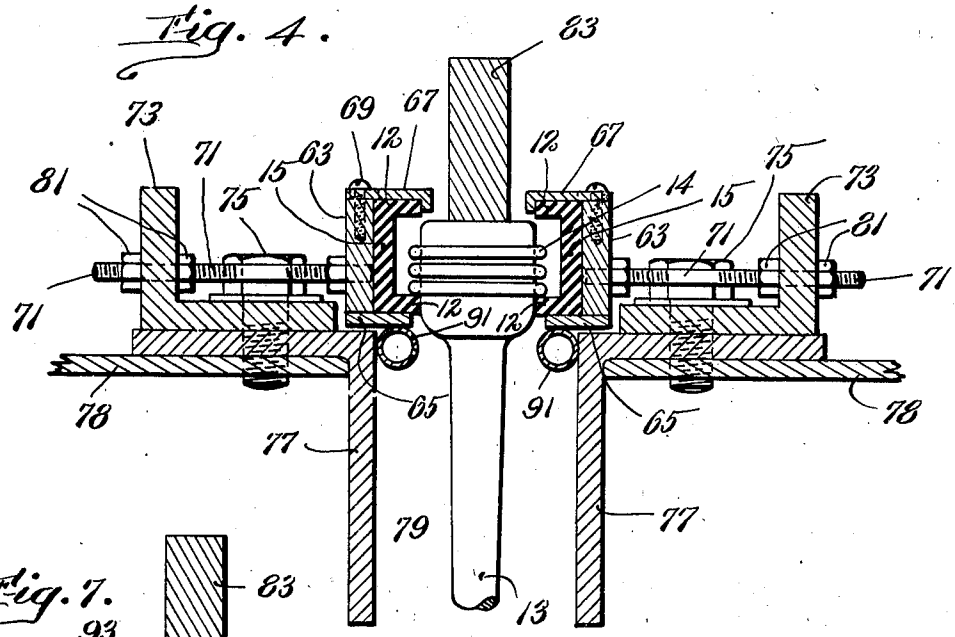


Fig. 7.

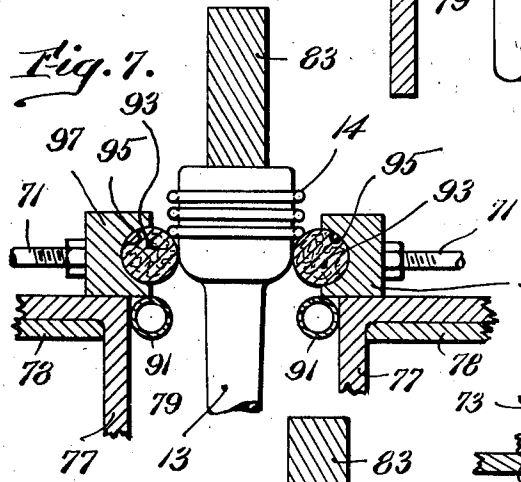


Fig. 5.

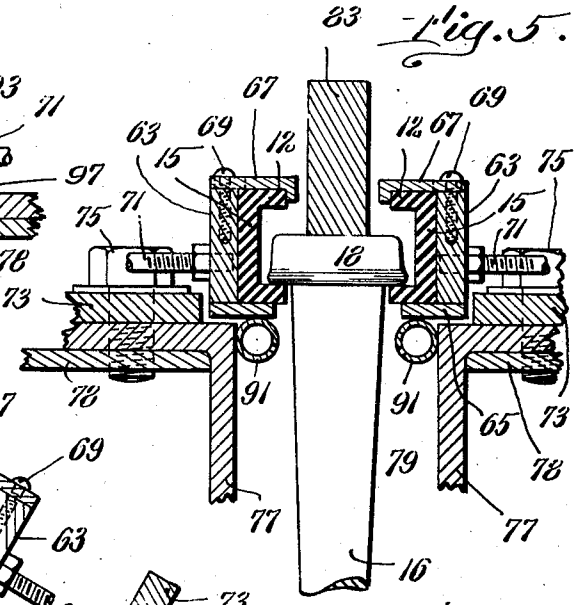
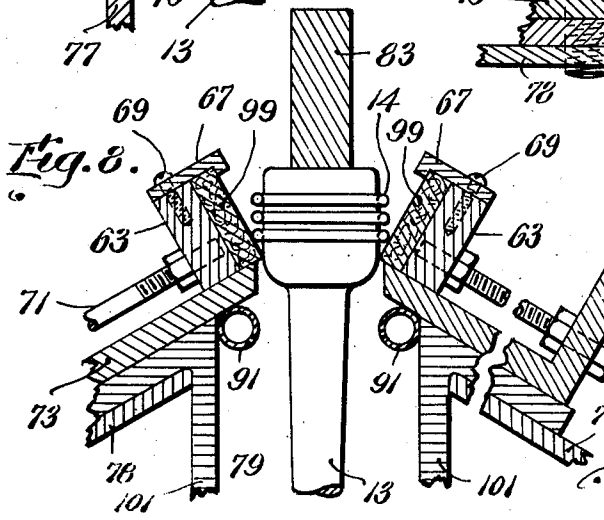


Fig. 8.



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UNITED STATES PATENT OFFICE

2,342,909

BOBBIN STRIPPER

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Application July 17, 1942, Serial No. 451,274

12 Claims. (Cl. 28—19)

The present invention relates to bobbin strippers of the type adapted to strip silk or rayon loom bobbins, which should be stripped without any mechanical contact with the yarn-carrying portions thereof, so that there will be no chipping or abrasion of such portions from this cause which could subsequently catch and fracture the delicate filaments of rayon or silk yarns when the bobbins are rewound and again put into use.

The invention has particular pertinence to bobbin strippers of the type shown in patent to L. Kleeb, Jr., No. 2,132,344, granted on Oct. 4, 1938. In such machine the bobbins hang by their head ends from tracks which are spaced apart a greater distance than the diameter of the bobbin heads but a less distance than the outside diameter of the wire rings fixed around the heads. While thus being wholly supported in pendent tip-downward relation by the engagement of their rings with such tracks, they are slid along the tracks by parallel runs of flat-surfaced concurrently-traveling belts yieldingly pressed toward each other with their faces parallel to grip frictionally the bobbin rings from opposite sides and thus to propel the bobbins one after another along the tracks while air-blasts and an unwinding cylinder engage and draw off the waste yarn left on the bobbin barrels.

The object of the present invention is to extend the usefulness of the Kleeb bobbin stripper to include the stripping of bobbins having other types of heads than that of the typical steel-ringed automatic loom bobbins which this machine was originally designed to handle. At present, in many instances, bobbins having metal-covered heads or metallic flanges in place of the elongated wooden heads encircled by steel rings, conventionally used in automatic looms, are frequently employed in silk and rayon looms. The feed belts used in the Kleeb machine are not appropriately designed to handle such bobbins, because the thin flanges do not afford sufficient area for proper gripping by the opposed belts, and the thin flanges both cut the surfaces of the belts and get between the bottom edges of the belts and the tracks beneath so that the belts ride over the flanges and fail to propel the procession of bobbins properly along the tracks.

To avoid these and other difficulties, and with the object of further improving and simplifying the construction and operation of bobbin strippers of this type, the invention comprises novel apparatus for stripping waste yarn from bobbins utilizing driven endless belts which themselves wholly support the bobbins between them because the space between them is less than the diameter of the heads of the bobbins, and thus carry the bobbins along in pendent tip-downward relation, in combination with means unwinding the waste yarn over the tips of the bobbins while thus supported and transported. To support and transport the bobbins in this manner, the belts are provided with flanges or other convex portions on their faces which engage the bobbins, or have flat faces disposed in downwardly-convergent relation to each other, so as to engage beneath the overhanging rings or flanges of the bobbin-heads, such inwardly protruding convergent portions being limited in their extent toward the bobbins so that they do not engage the yarn-carrying portions of the bobbins, though they extend far enough toward the corresponding part of the opposing belt so that the bobbin-heads cannot fall through between them. Though the belts are now given the new function of supporting and carrying the bobbins, they are still capable of handling the conventional bobbins having steel-ringed heads for which the Kleeb machine was designed, as well as the variously-shaped heads of other bobbins.

An illustrative embodiment of the invention is shown in the accompanying drawings in which,

Fig. 1 is a side elevation, and Fig. 2 a plan view, of a bobbin stripper having the improved bobbin-carrying devices.

Fig. 3 is a vertical transverse section on line 3—3 of Fig. 2.

Fig. 4 is a vertical transverse section on line 4—4 of Fig. 2, showing the manner of supporting and transporting the conventional automatic loom bobbin having a steel-ringed head.

Fig. 5 is a vertical transverse section similar to Fig. 4, showing the same structure supporting and transporting a bobbin with a different type of head.

Fig. 6 is a view similar to Fig. 5, showing the same structure supporting a bobbin having a thin radial metallic flange for its head.

Fig. 7 is a view similar to Fig. 4, showing the use of round belts to support and transport ringed bobbins.

Fig. 8 is a similar view showing the use of flat belts obliquely disposed to support ringed bobbins.

The bobbin stripping machine comprises a

top portion 1 supported on legs 3 in connection with which is mounted in bearings a constantly rotating reel 5 having lags 7 provided with tufts of bristles 9 so as to engage and entangle and thus draw off through its continued rotation the ends of yarn 11 extending down from bobbins 13 whose heads are engaged between spaced and parallel runs of the belts 15, all as in the machine of the Kleeb patent referred to. Just as in such machine, the bobbins are fed down an incline comprising tracks 17 mounted in spaced and parallel relation on similarly-disposed brackets 19 on transverse plate 20 mounted on the legs 3 of the frame, these tracks being provided with upwardly flaring plates 21 extending for some distance along the inclined tracks and forming a hopper guiding the barrels of the bobbins down into the space between the tracks. The bobbins gravitate down the incline to enter between the belts and thus to be propelled the rest of the way through the machine.

In accordance with the invention, the extreme lower ends of the tracks 17 are turned up into more or less horizontal relation to deliver the bobbins into the space between the parallel and concurrent runs of belts 15, at such elevation that the rings on the bobbin-heads or the flanges forming the bobbin-heads are slightly above the zone of the lower flanges or other portions on the belts which have the maximum degree of extent toward the opposing belt, so that such rings or flanges on the bobbins will rest on convex or otherwise inwardly-protruding surfaces extending lengthwise of the belts and traveling too close together to let the widest portion of the bobbin-heads drop down between them, and thus the bobbins will be supported and transported by the cooperating action of the two belts. In all forms of the invention except Fig. 8, the opposed belts are disposed in horizontal planes, each belt being carried around a large flanged idler pulley 23 at the outward corners of the machine at the feed end thereof mounted on a pad 28 in connection with a bridge 30 extending across the machine, and around an adjacent smaller flanged idler pulley 25, both pairs of which pulleys are adjustable at right angles to the line of travel of the bobbins by means of transverse slots 27, 29, in which the studs 31, 33, on which they are mounted for rotation are adjustably fixed. At the delivery end of the machine the belts are respectively carried on larger flanged pulleys 35, 37, and belt-tighteners 39, 41, are supplied, being rotatably mounted in the free ends of swinging arms 43 pivotally mounted at 45 on a bridge 49 extending across the top of the machine and secured at 51 to horizontal side members 53 of the machine frame. Tensioning links 55 having their downturned ends hooked in holes in lugs on the sides of arms 43 have screw-threaded extremities passing through studs 57 on bridge 49 and equipped with nuts at each side of such studs to vary the angularity of arms 43 and thus to take up on the belts. For the round belt of Fig. 7, the pulleys, idlers, and belt-tighteners have a half-round groove in their faces matching the section of the belt, instead of the rectangular grooves shown in Figs. 1 and 3 for the other belts having flat backs.

The belts are driven by pulleys 35, 37, and for this purpose these pulleys are fixed on the top ends of vertical shafts 59 rotating in bearings 61 in connection with the machine frame and driven simultaneously in opposite directions as shown by arrows in Fig. 2, by the means illustrated in Kleeb Patent 2,132,344, the belts preferably being caused to travel at equal speeds.

To guide the two concurrent runs of the belts which travel down the center-line of the machine so that they will follow precisely parallel paths, each belt travels in a closely-fitting guide from the time it leaves its idler pulley 25 until it has nearly reached driven pulleys 35, 37. In the case of the belts of rectangular section shown in Figs. 1 to 6 and 8, this guide comprises a vertical strip 63 extending from idler 25 to pulley 35 preventing the belts from spreading apart, a flange 65 of equal length affixed to the bottom edge of strip 63 to support the belt from below, and a cap-strip 67 applied to the upper edge of strip 63 by screws 69 and having a lip which inwardly overhangs the upper edge of the inward face of each belt to prevent such belt from tipping inward toward its adjacent and opposing belt. These guides are supported on studs 71 which are screwed into the outer face of each strip 63 at intervals throughout the latter's length and secured by lock nuts, the outer ends of these studs being threaded and received loosely in holes in the upright flanges of supporting members 73 of angle-section attached by cap-screws 75 to larger L-section structural elements 77 running throughout the length of the machine and defining between their vertical flanges the passageway 79 through which the pendent barrel portions of the bobbins travel in their passage through the machine. These members 77 are supported on plates 78 forming the top of the machine and themselves supported in suitable manner by the legs 3.

The outward end of each stud 71 is threaded and provided with a nut 81 at each face of member 73, by manipulating which nuts the spacing of the two belts with respect to each other is accurately adjusted to fit the diameter and type of the head of the bobbin which is to be stripped. Thus, in the case of the common steel-ringed automatic loom bobbin 13 shown in Fig. 4, the concurrent runs of the belts 15 are adjusted by movement of their guides through manipulation of nuts 81 until the lower flange of each belt, the flange supported by strip 65, is spaced from the corresponding flange of the other belt by an interval less than the outside diameter of the steel rings and approximately equalling the diameter of the bobbin head immediately adjacent the innermost ring, the ring nearest the fillet.

The type of belt indicated at 15 in Figs. 1 to 6 has special advantages in the way of its adaptability to bobbins having many different styles of heads. As clearly shown, it is of U or channel section with rectangular external and internal angles, with its flanges or ribs 12 extending laterally at top and bottom of one of its surfaces, preferably being made of rubber in the form of a continuous closed loop. Since the internal angles are right angles, and the surfaces presented by the interior faces of the legs of the U are flat and true, and by the method of their support in their guides are maintained with the bobbin-supporting surface of each belt at the same level as that of its opposing belt, the bobbins hang by their heads in exact vertical relation in pendent tip-downward relation from between the belts. This is true whether the belts are set to support the ordinary automatic loom bobbin 13 by engagement at diametrically opposite locations with the innermost ring of the plurality of steel rings 14 clamped

around its head, as shown in Figs. 3 and 4, or whether the type of bobbin 16 having a deep metal ferrule 18 shown in Fig. 5 is to be stripped, or whether the bobbin 20 having a thin, wide flanged head 22 as shown in Fig. 6 is to be handled. The interior faces of the legs of the U afford area support to the parts on the bobbin-heads which overhang them, instead of mere point contact as in the Kleeb patent.

Further to maintain the bobbins in the desired vertical relation as they are carried through the machine by the concurrently traveling runs of the two belts while the yarn is unwound over the tips of the bobbins, a hold-down bar 83, nearly as long as the guides 63, rests on the butts of the procession of bobbins, its flat under surface tending to make the butts of the bobbins conform thereto and thus to hold them against deflection out of their vertical relation either transversely or longitudinally of the machine, or at other intermediate angles, by the pull of the yarn being unwound over the tips of the bobbins. The height of bar 83 when not supported by bobbins traveling thereunder is adjusted by manipulation of collar 85 and nut 87 on the threaded portions of supporting rods 89 which extend through the horizontal flanges of bridges 39, 49, respectively, such rods 89 being fixed at their lower ends in the hold-down bar 83. The bar gravitates down until it rests on the bobbin butts when the latter are carried under it.

The ends of the waste yarn to be stripped from the bobbins are loosened as in the Kleeb patent aforesaid by jets of air projected through small holes provided at frequent intervals in the length of pipes 91 located at each side of passageway 79 immediately under portions 65 of the guides, the pipes being connected with a source of compressed air and the jets being directed obliquely downwardly and inwardly to impinge on the yarn bearing portions of the bobbins closely adjacent the heads, to free the leading ends of the waste yarn left thereon and to blow them down into engagement with the bristle-covered lags of constantly rotating reel 5, whereby the yarn is drawn off to leave the barrels of the bobbins clean and bare.

The use of belts having the special U-section of Figs. 1 to 6 to support and transport the bobbins during stripping is desirable because it permits the machine to handle efficiently bobbins having a variety of different types of heads; also, because when one flange of a belt thus shaped becomes worn in the course of long use the belt is easily inverted to provide a relatively fresh and unworn flange, without having to replace the belt. However, to provide against inability to obtain belts made of this material or in this special shape, I have devised alternative structures in which belts of standard round and flat sections and of alternative materials such as leather or fabric are employed. In these alternative embodiments, the belts have the same novel functions of wholly supporting and transporting the bobbins through the machine while being stripped, and are likewise adapted to operate satisfactorily with bobbins having various types of heads in addition to the steel-ringed head of the standard automatic loom bobbin 13. In the form of Fig. 7, belts 93 of round section are guided along and over the passageway 79 in accurately-spaced horizontal courses by means of half-round grooves 95 formed in guides 97 of the same length as guides 63, supported on the horizontal flanges of angle members 77 and adjusted toward and from each other as before by means of studs 71. The rest of the structure of the machine is or may be as previously described in connection with the embodiment of Fig. 1, except that as noted all pulleys, idlers, and belt-tighteners have their faces appropriately formed with V or half-round grooves to take belts 93. By proper adjustment of the spaced relation of guides 97, the belts 93 are positioned so as to travel in parallel and concurrent runs while spaced apart a distance approximately equal to the diameter of the head of bobbin 13, but less than the outside diameter of the steel rings 14 thereon. Thus the bobbins fed down the incline 17 settle between the belts until their head ends wedge between the portions on each belt of maximum convexity in the direction toward the opposing belt, and thereafter hang by the innermost ring 14 while carried through the machine and during the unwinding of the yarn by reel 5. Hold-down bar 83 contributes materially toward holding the bobbins in vertical relation although the nature of the support by the round belts is less stable than that of the first form of belt. Likewise, bobbins having other types of heads, notably the flanged type of bobbin 20, admit of being properly handled by transporting belts of this kind.

In the form of Fig. 8 flat belts 99 are guided in spaced and parallel concurrent runs with their opposing faces maintained in downwardly converging relation to support and transport the bobbins in pendent tip downward relation, the bottom edges of the belts being spaced apart far enough to avoid gripping the barrels of the bobbins with the wound masses of yarn thereon, but not far enough to permit the rings or flanges forming parts of the heads of the bobbins to pass through. Thereby the heads of the bobbins wedge between the downwardly converging belts, and are carried along thereby while the bobbins are being stripped.

In this embodiment, guides substantially equivalent in construction, function, and adjustment to those shown in Fig. 4 are employed, except that the supporting strip 65 of the latter figure is omitted and the belts are supported on the inward edges of angle members 73 of such figure. But to give the belts the desired oblique relation to each other, the belts travel in separate planes forming equal but opposite angles with respect to the vertical, this being attained through using angle irons 101 each having its flanges disposed at less than a right angle to each other, in defining the passageway 79 and in supporting the guide-supporting members 73. The pulleys, idlers, and belt-tighteners of Figs. 1 to 6 are employed, though mounted to rotate each in the plane of the circuit of its proper belt, the drives of the shafts 59, which are now disposed in convergent relation, being provided by bevel gears at their lower ends instead of the spur gears of the Kleeb patent. The remaining parts of the machine are as in the case of Fig. 1, except for such minor changes in the conformation of the top surface of the machine as are required by the changes in the planes of the two belts. As in the case of Fig. 7, bobbins fed between the concurrent runs of belts 99 settle between the belts until the rings or flanges of the bobbin-heads wedge between the opposing faces of the belts just above their points of maximum convexity or approach to each other. As before, the bobbins are kept from tilting to a troublesome degree out of their desired vertical pendent relation, by engagement of the flat bottom sur-

face of hold-down bar 83 with the butts of the bobbins. Adjustment of the spaced relation of the parallel runs of the belts by studs 71 adapts them to transport bobbins having different types of heads. All other machine parts are as in the Kleeb patent, or as desired.

While I have illustrated and described certain forms in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular forms shown, or to the details of construction thereof, but

What I do claim is:

1. Apparatus for stripping waste yarn from bobbins, having in combination a driven endless traveling surface having a flange engaging the bobbin-head to support and transport the bobbin in pendent tip-downward relation, and means unwinding the waste yarn over the tips of such bobbins while thus supported and transported.

2. Apparatus for stripping waste yarn from bobbins, having in combination driven endless traveling surfaces disposed in spaced and parallel relation, each having a flange engaging the bobbin-head and cooperating with the flange on the other to support and transport the bobbin in pendent tip-downward relation, and means unwinding the waste yarn over the tips of such bobbins while thus supported and transported.

3. Apparatus for stripping waste yarn from bobbins, having in combination belts having spaced and parallel concurrent runs, and having on their surfaces laterally protruding flanges by which the heads of the bobbins are supported, means driving the belts to cause them to transport the bobbins, and means unwinding the waste yarn over the tips of the bobbins while thus supported and transported.

4. Apparatus for stripping waste yarn from bobbins, having in combination a pair of belts each having a rib along its lateral edge, means driving the belts and maintaining a substantial portion of the length of each in spaced and parallel and concurrently-traveling relation to the other so that the ribs engage opposite sides of the heads of the bobbins and carry the bobbins along in pendent tip-downward relation, and means unwinding the waste yarn over the tips of the bobbins while thus carried along.

5. Apparatus for stripping waste yarn from bobbins, having in combination a pair of belts having spaced and parallel concurrent runs and convex surfaces on each belt extending toward the other belt in the concurrent runs and other surfaces above the said surfaces having a lesser extent toward the other belt whereby the concurrent runs engage and support the bobbins by their head ends in pendent tip-downward relation, means propelling the belts to cause them to transport the bobbins and means unwinding the waste yarn over the tips of the bobbins while thus supported and transported.

6. Apparatus for stripping waste yarn from bobbins, having in combination a pair of belts having spaced and parallel concurrent runs, each belt having a portion of its surface confronting the opposed belt in such runs which extends toward the opposed belt and a portion of such surface lying above the first-named portion which is more widely spaced from the opposed belt than the first-named portion, the belts wholly supporting and transporting the bobbins in pendent tip-downward relation through engagement with their heads, and means unwinding the waste yarn over the tips of the bobbins while thus supported and transported.

7. Apparatus for stripping waste yarn from bobbins, having in combination a pair of traveling belts having spaced and parallel concurrent runs, each belt having a surface presented toward the bobbins which extends both downward and inward toward the opposed belt in the concurrent runs to engage beneath a portion of the head of each bobbin so as to support and transport the bobbins in pendent tip-downward relation, and means unwinding the waste yarn over the tips of the bobbins while thus carried.

8. Apparatus for stripping waste yarn from bobbins, having in combination a pair of belts of circular section, means disposing the belts in spaced and parallel runs, means driving the belts concurrently in such runs to transport bobbins having their heads wedged between the belts and supported in this manner in pendent tip-downward relation, and means unwinding the waste yarn over the tips of the bobbins while thus carried.

9. Apparatus for stripping waste yarn from bobbins, having in combination a pair of belts, means propelling and guiding the belts in spaced and parallel concurrent runs and with their opposed faces maintained in downwardly-converging relation supporting the heads of the bobbins while the barrels hang below in tip-downward relation, and means unwinding over the tips of the hanging bobbins the waste yarn borne by the bobbins.

10. Apparatus for stripping waste yarn from bobbins, having in combination endless belts, means driving the belts and maintaining a substantial portion of the length of each belt in spaced and parallel and concurrently-traveling relation to the other belt so as to grip and wholly support and carry along bobbins introduced between them, and means unwinding the waste yarn over the tips of the bobbins while thus supported and transported.

11. Apparatus for stripping waste yarn from bobbins, having in combination driven endless belts wholly supporting the bobbins between them by engagement with the heads thereof and carrying the bobbins along in pendent tip-downward relation, and means unwinding the waste yarn over the tips of the bobbins while thus supported and transported.

12. Apparatus for stripping waste yarn from bobbins, having in combination belts of U-shaped section, means driving and guiding the belts so that a substantial length of each travels in proximate spaced and parallel relation to a corresponding length of the other and in the same direction, the lateral parts of the U-section of each belt extending toward the opposing belt throughout their proximate runs to engage and support one side of the head of a bobbin, whereby the bobbins are carried along such proximate runs, and means unwinding the waste yarn over the tips of the bobbins while thus supported and carried.

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