Dec. 10, 1957 R. M. INGHAM, JR 2,815,914

COUNTER

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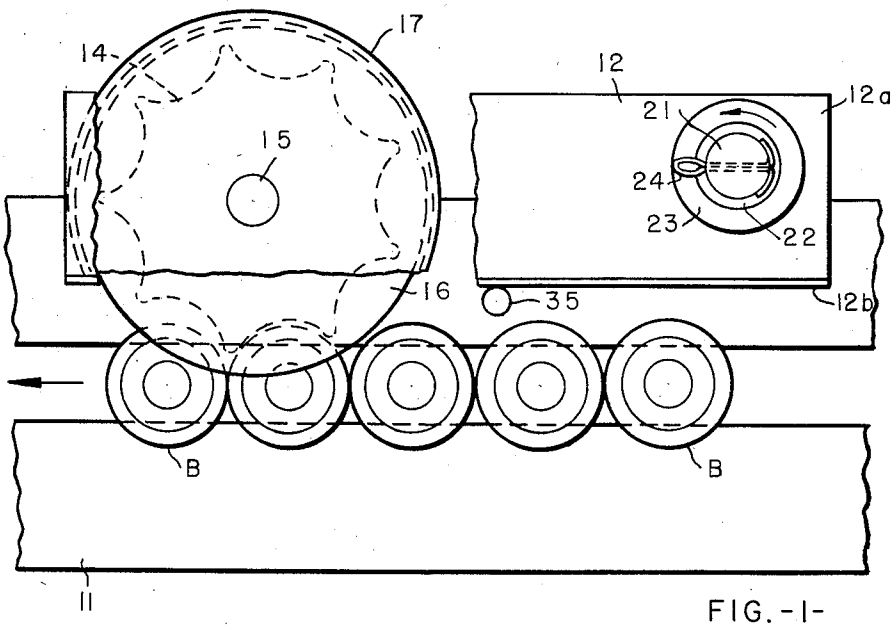


FIG.-1-

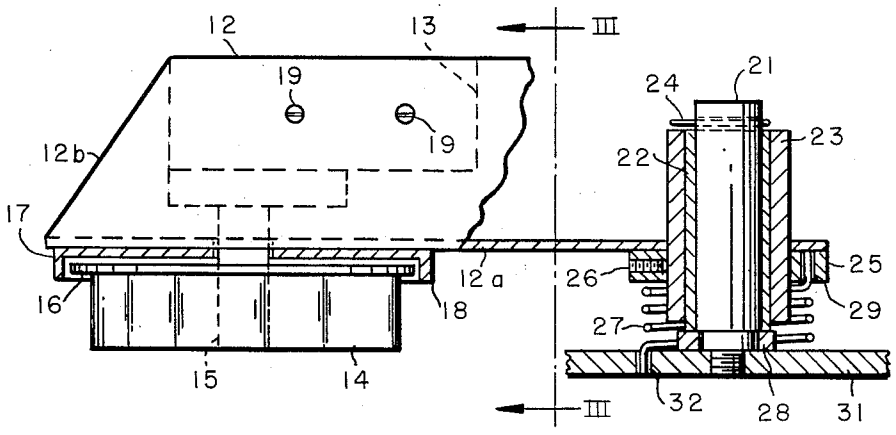


FIG.-2-

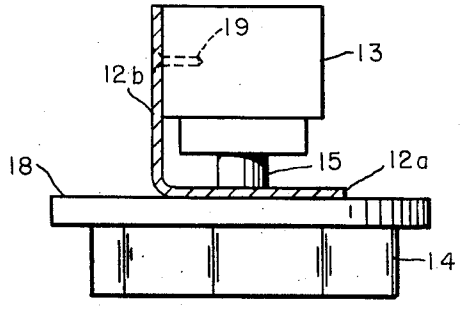


FIG.-3-

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2,815,914

COUNTER

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This invention relates to counters employed in textile machinery, and more particularly to an improved bobbin counter for use in a bobbin cleaning machine.

In bobbin counters previously employed in bobbin cleaning machines, clogging of the counter actuating mechanism with loose yarn has been a constant source of trouble, with resultant inaccurate counts being recorded by the counter.

It is, therefore, an object of this invention to provide an improved bobbin counter which will not be subject to yarn clogging and consequent intermittent "breakdown" due to such clogging.

A further object of the invention is to provide a mounting and actuating apparatus for a bobbin counter in which the collection of yarn waste in the moving parts of the actuating apparatus is substantially eliminated, and wherein the actuating apparatus is nevertheless moved away from the bobbin path when misaligned bobbins are encountered, in order not to damage the bobbins.

A preferred embodiment accomplishing these objects takes the general form of a star wheel affixed to the shaft of a counter, with mounting means for holding the star wheel against a stream of bobbins as they issue from the conveying belts of the cleaning machine. The mounting is provided with a spring biasing arrangement such that should a bobbin feed through the machine horizontally, or otherwise askew, instead of vertically the star wheel may be moved away from the bobbin as it passes, thus avoiding damage to the bobbin and/or star wheel and other parts. Of major importance is the provision of a star wheel arrangement employing a string or yarn guard such that entanglement or winding of waste or other yarn onto the star wheel and its shaft is virtually eliminated.

Still other objects and many attendant advantages will be apparent from the following detailed description of a preferred physical embodiment of the invention, taken in conjunction with the accompanying drawings wherein:

Figure 1 is a fragmentary plan view, partially broken away for clarity, of a bobbin cleaning machine with the preferred embodiment of my invention mounted thereon.

Figure 2 is a side elevation view of the embodiment of Figure 1, wherein parts of the device are shown in section.

Figure 3 is a view in section taken along line III–III of Figure 2.

Referring to the figures of the drawing, the numeral **11** designates the spaced apart rails of a conventional bobbin cleaning machine, the remaining parts of which are not shown since such machine per se does not constitute a part of this invention. Pivotally mounted adjacent one of the rails **11** is an arm bracket **12**, on the vertical side plate **12***b* of which is mounted as with suitable screws or bolts **19** a counter registry mechanism, generally indicated at **13**, of conventional construction and a bobbin-actuated star wheel **14** for actuation of the counter registry mechanism as bobbins B move in the slot formed between rails **11** and past the star wheel, with their upwardly protruding heads sequentially engaging the concave segments of the star wheel.

Arm bracket **12** is suitably pivotally supported adjacent to rail **11** as by a stud **21** threadedly secured at one end to the frame **31** of the bobbin cleaner. The stud **21** extends within a suitable bearing **22** in a bushing **23** secured, as by welding, onto the arm bracket **12**, the stud being removably held within the bearing **22** and bushing **23** as with a cotter pin **24** fastened into a transverse bore in the free end of the stud.

Suitably secured about the extending portion of bushing **23** beneath the lower plate of arm bracket **12** is a collar **25** which is held against rotation relative to bushing **23** as by a set screw **26**. A torsion spring **27** surrounds the remaining extended portion of bushing **23**, and has its two ends engaged one in an anchor aperture **32** formed in the frame **31** and the other in an anchor aperture **29** formed in the face of collar **25**. Alternatively, the torsion spring ends might suitably be fastened to or engaged with protruding pins one each on collar **25** and frame **31**, or, if desired, a suitable angular bias of arm bracket **12** might be provided by a tension spring or compression spring arrangement, as will be apparent to those skilled in the art.

The lower end of sleeve bearing **22** rests upon a washer bearing **28** made of suitable wear-resistant material, which in turn rests upon, and if desired may be suitably secured to the frame **31**. The torsion spring **27** is arranged and tensioned to provide a counterclockwise bias of arm bracket **12**, as seen in Figure 1, and thus resiliently biases star wheel **14** toward and partially into the path of bobbins B moving along between rails **11**. However, in order to prevent the star wheel **14** from completely entering the path of the bobbins and thus possibly damaging them and materially impeding their progress between rails **11**, there is provided a stop post **35** on the rail **11**. Preferably the stop post **35** is disposed in a position such that it is engaged by the side plate of the arm bracket **12** when the star wheel is in the position as shown in Figure 1, which is the normal operating position, and in which position the bobbin heads do not completely "bottom" in the recesses of the star wheel as they pass by. This arrangement prevents undue stress being exerted against the bobbin heads as well as the opposite rail **11** during bobbin passage.

Star wheel **14** is rotatably mounted on arm bracket **12** through a shaft **15**, fixedly secured to the star wheel **14**, and which is freely rotatably journaled in, or (as shown) passes through a suitable aperture in, the bottom plate **12***a* of arm bracket **12**. The shaft **15** is preferably the actuating shaft of counter registry mechanism **13**, and, as such, extends into and is suitably connected to the internal mechanism (not shown) of the counter registry mechanism such that passage of each bobbin B past star wheel **14** causes registry of one count on counter registry mechanism **13**. It will be apparent that the particular external or internal gearing arrangement between star wheel **14** and the registry portion of counter registry mechanism **13** will be dependent upon the number of concave bobbin registering segments which are provided around the periphery of star wheel **14**. In the instant example, there are nine concave bobbin registering segments, and thus the counter registry mechanism **13** should register one count for every 40° of rotation of star wheel **14** and connecting shaft **15**.

As stated supra, previous bobbin counters have been unsatisfactory in operation due to the bobbin sensing and counter actuating mechanism becoming clogged with waste yarn which collects in the exposed moving parts and prevents relative movement thereof, with the result that such devices reach a state of inoperativeness within a short time after operation is initiated.

In order to prevent such clogging and resultant inoperativeness in my improved bobbin counter, the lateral face of star wheel **14** adjacent to the arm bracket **12** has formed

integrally thereon (as shown), or suitably attached thereto, a round disc 16 having a slightly larger (e. g. one-fourth inch) diameter than the outer diameter across the tips of the star wheel. A cupped yarn cover 17 having an internal diameter only slightly larger than the diameter of disc 16 is secured in any suitable manner, as by welding, to the face of the bottom plate 12*a* of arm bracket 12, and has an annular lip or rim flange 18 extending down around and enveloping the outer periphery of disc 16, with the axially lower or outer end of the lip or rim flange 18 lying in substantially the same plane as the lower face of disc 16.

Dependent upon the size and type of yarn, waste, or other material which may be encountered by the star wheel 14 and shaft 15 the clearance between the star wheel disc 16 and the inner circumferential surface of the cup lip 18 of cover 17 may be suitably varied to fit the particular circumstances; however, I have found that a clearance of 1/64 to 1/32 inch is satisfactory for normal operation when staple yarn, such as cotton, etc., is on the bobbins.

It will be apparent from the foregoing description that with this arrangement substantially no yarn can become wound on shaft 15 of the star wheel 14, and that smooth and continuous operation of the counter will be effected. This feature of my invention is of major importance, and renders counter devices arranged according to this teaching highly effective where previous devices have quickly become inoperative.

While I have shown one preferred embodiment of my invention, it will be apparent to one skilled in the art that modifications thereof may be made without departing from the scope and spirit of the invention. It is, therefore, to be understood that my invention is not to be limited by this specific embodiment, but only by the scope of the appended claims.

Having thus described my invention, I claim:

1. In an apparatus for conveying bobbins having yarn thereon, a bobbin counter comprising a movably mounted support, counter registry means mounted on said support, said counter registry means having a rotatable actuating shaft, a bobbin-actuated star wheel secured to said shaft, said star wheel and the body of said support having a circular disc and a cup-shaped cover complementary to the periphery of said disc, said disc and cover being each secured to a separate one of the adjacent sides of said support body and said star wheel.

2. In an apparatus for conveying bobbins having yarn thereon, a bobbin counter comprising a pivotally mounted arm, counter registry means mounted on said arm, said counter registry means having a rotatable actuating shaft,

a bobbin-actuated star wheel secured to said shaft, said star wheel and the body of said arm having a circular disc and cup-shaped cover complementary to the periphery of said disc, said disc and cover being each secured to a separate one of the adjacent sides of said arm body and said star wheel, said disc having a diameter at least as large as twice the radial distance from the center of said star wheel to its tips.

3. In an apparatus having a bobbin counter according to claim 2, said disc being larger than twice the radial distance from the center of said star wheel to its tips.

4. In an apparatus for conveying bobbins having yarn thereon and including a slotted conveyor, an improved bobbin counter apparatus comprising an arm having an aperture therein and being pivotally mounted at one side of said slot, resilient means normally biasing the free end of said arm toward said slot, counter registry means secured on said arm and having an actuating shaft extending through said aperture, a star wheel secured onto said shaft on the side of said arm opposite from said counter registry means, said star wheel having a circular disc on its side thereof adjacent said arm, and a cup-shaped cover having an annular rim flange thereon secured on said arm concentric with said disc and having the internal annular periphery of its rim flange substantially complementary to and closely fitted over the external annular periphery of said disc.

5. In an apparatus for conveying bobbins having yarn thereon and a bobbin counter according to claim 4, further comprising a stop member in the path of movement of said arm, said stop member being disposed at a point in said path whereby said star wheel is held against complete movement into the path of said bobbins in said slot.

6. A counter for objects, particularly adapted for operation in the presence of waste, lint and the like, comprising a movably mounted support, counter registry means mounted on said support, said counter registry means having a rotatable actuating shaft, an object-actuated star wheel secured to said shaft, said star wheel and the body of said support having a circular disc and a cup-shaped cover complementary to the periphery of said disc, said disc and cover being each secured to a separate one of the adjacent sides of said support body and said star wheel.

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