

Feb. 23, 1965

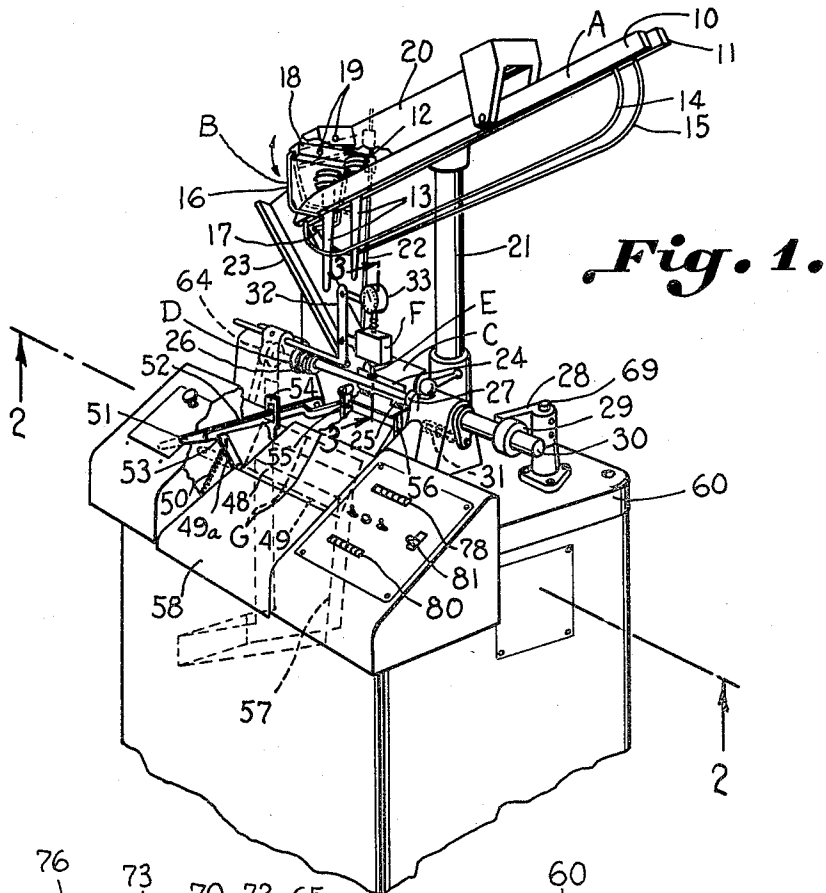
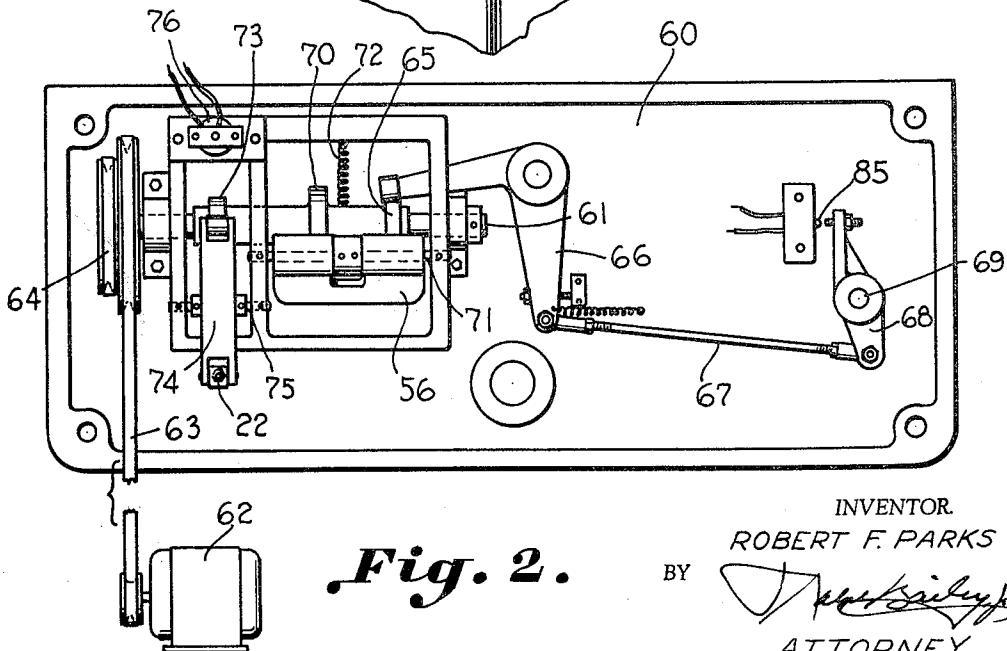
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3,170,573

BOBBIN TESTER

Filed May 8, 1962

2 Sheets-Sheet 1



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Fig. 3.

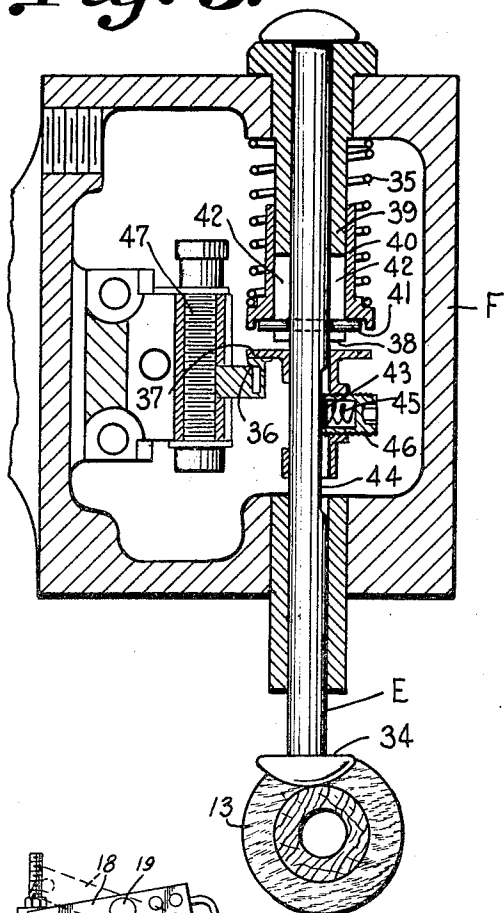
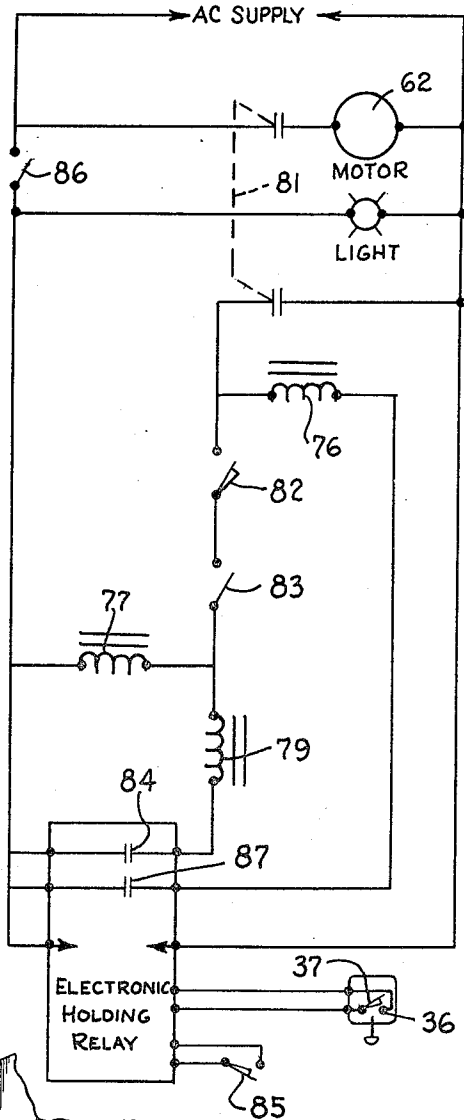


Fig. 5.

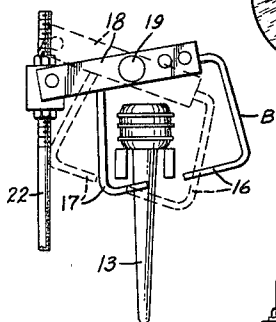


Fig. 4.

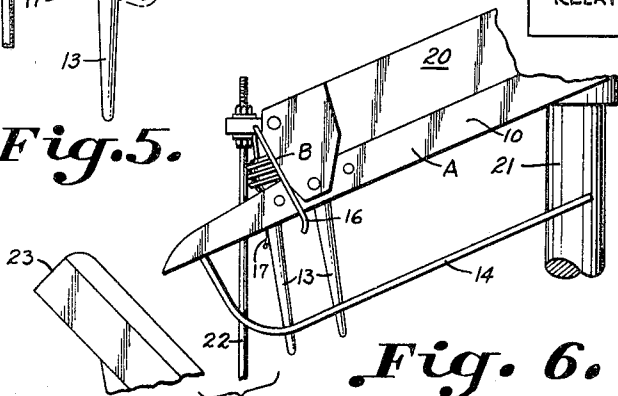


Fig. 6.

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BOBBIN TESTER

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2 Claims. (Cl. 209—88)

This invention relates to textiles and more especially to a device for separating reasonably straight bobbins from those which have an excessive departure from a straight longitudinal axis.

During spinning and weaving, it is important that bobbins be reasonably straight. This is especially true of weaving where broken filling occurs as a result of uneven tension being applied to the yarn as it is fed from the bobbin and through the shuttle eye. The elongated blade of a wooden bobbin is readily susceptible of warping as a result of the various temperature and humidity conditions to which they are subjected in textile mill operations. Heretofore bobbins have been tested by dial indicators and the like applied to a rotating bobbin where operators read the range of the fluctuation of the indicator and if excessive discard the bobbin being inspected. This process is slow and due to the size variations between bobbins there is no reliable norm from which variations may be easily computed. In each such case, therefore, it is necessary that the operator subtract the minimum from the maximum reading. Such a problem present difficulties when encountered by a bobbin maker who wishes to set high production standards and is almost insurmountable under difficult mill conditions. It is desirable, therefore, to provide a means for automatically computing the departure of a bobbin from straight, without regard to size, and which will automatically sort good from bad bobbins. Efforts have been made to provide an automatic device of this type using a light beam to operate photoelectric cells when excessive departure from straight occurs. This however, is subject to many inaccuracies such as distortion due to lint accumulations, optical difficulties and distortion from stray sources of light so that it is difficult to get consistent results.

Accordingly it is an important object of this invention to provide a fast, accurate means for testing the relative straightness of textile bobbins.

Another object of this invention is to provide a device for automatically testing the physical dimensions of a textile bobbin for sorting out those having excessive "run out" or excessive departure from their longitudinal axis.

Another important object of this invention is to provide a bobbin tester capable of determining excessive run out without the use of master gages and without regard for the size of the bobbin tested.

Another object of the invention is to make possible the accurate testing and sorting of bobbins in a textile mill to improve the weaving and spinning operations of the mill.

Still another important object of the invention is to provide a bobbin tester capable of accurately and positively testing a large number of bobbins and quickly sorting those suitable for a particular operation from those which are not.

The construction designed to carry out the invention

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will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein in an example of the invention is shown and wherein:

FIGURE 1 is a perspective view illustrating a bobbin tester constructed in accordance with the present invention,

FIGURE 2 is an enlarged sectional view taken on the line 2—2 in FIGURE 1,

FIGURE 3 is an enlarged sectional view taken on the line 3—3 in FIGURE 1,

FIGURE 4 is a schematic circuit diagram illustrating the various electrical components of the bobbin tester illustrated,

FIGURE 5 is an enlarged end elevation of the feed station looking from the left-hand side of FIGURE 1, and

FIGURE 6 is an enlarged side elevation of the feed station looking from the left-hand front portion of FIGURE 1.

The drawings illustrate a preferred embodiment of a bobbin testing machine constructed in accordance with the present invention in which a storage means A is provided for positioning the bobbins to be tested in the form of a gravity feed chute. Means B in the form of cam operated linkage is provided for releasing the bobbins one at a time from the storage means A in a predetermined timed sequence into a tray C which is advanced and retired by cam action. A driven chuck D, opened by cam operation, receives each bobbin one at a time from the tray C and rotates each bobbin about its longitudinal axis. A spring biased plunger E is urged against an intermediate portion of the bobbin during rotation of the bobbin for operating a pair of electrical contacts included in the sensing head F. These contacts are closed responsive to a predetermined increment of movement of the plunger during rotation of the bobbin. Guide means G including a trap door separate those bobbins which permit movement of the plunger sufficient to close the contacts, preferably by moving responsive to such closing of the contacts. Preferably, the cams for operating the means B releasing bobbins, the tray C and the opening of the chuck D are driven by a single shaft. The retiring movement of the tray C operates mechanism for closing the trap door G.

Referring more particularly to FIGURE 1, the storage means A may include a hopper (not shown) feeding bobbins into the gravity feed rack which includes the inclined opposed rails 10 and 11. The butts 13 of the bobbins ride upon the upper surface of the rails while the blades 13 depend therefrom and are provided with guide rails 14 and 15.

The feeding linkage B includes a pair of fingers 16 and 17, one on each side of the rails, being spaced and inwardly projecting. The fingers are carried one adjacent each end of a link 18 pivoted as at 19 to a support 20 which aligns the rails 10 and 11 upon their standard 21. The link 18 is oscillated upon its pivot 19 by the rod 22 which is raised and lowered in timed sequence as explained below. It will be observed that the finger 17 normally retains the lowermost bobbin butt, upon movement to dotted line position, releases same while the fin-

ger 16 restrains the next succeeding bobbin against movement until the fingers are returned to normal position when such next bobbin is then restrained by the finger 17.

An inclined guide 23 feeds bobbins from the chute A into the tray C which then advances to position the bobbin in the chuck D. A bobbin is aligned within the tray by resting upon the back surface of a partition 24. The partition 24 is spring biased rearwardly by springs 25 toward an ultimate raised position. Thus when the bobbin is received by the chuck the partition 24 is lowered by pressing against the bobbin as the tray retires rearwardly as explained below.

The chuck D includes a driven headstock 26 and a tailstock 27 which is moved to the right in FIGURE 1 to open the chuck to receive a bobbin. Such movement is accomplished by action of the arm 28 against the collar 29 carried by the shaft 30. The shaft 30 is spring biased by the spring 31 to normally urge the shaft 30, carrying the tailstock, toward the left to close the chuck and confine a bobbin therein for rotation.

The plunger E is carried by the sensing head F by a bracket 32. The bracket may also carry a dial indicator 33 to register the movement of the plunger E by contacting the upper end of the plunger. Referring to FIGURE 3, it will be noted that the lower head 34 of the plunger E is resiliently urged upon an intermediate portion of the blade 13 of the bobbin. The bobbin is never advanced beyond the center of the head 34 because of inaccuracies which may be introduced as will be appreciated after understanding what follows. Therefore, the bobbin is preferably stopped as illustrated before advancement to the center.

The spring 35 within the sensing head F normally urges the plunger E downwardly. The sensing head F includes a fixed contact 36 and a second contact 37 carried in frictional engagement with the plunger E. When the plunger E is axially raised by a bobbin, during the bobbin's first one-half revolution within the chuck D, the plunger E will at some time have been raised to the maximum height possible by that particular bobbin. During this time the contact 37 is engaged by the lower surface 38 of the sleeve 39. The sleeve 39 is fixed while the slide 40 is raised against the force of the spring 35. The pin 41, which passes through the plunger E, is engaged within vertical opposed slots 42 within the fixed sleeve 39. Upon reaching such maximum height a position of the contact 37 upon the plunger E is established by the friction disc 43. The friction disc 43 is carried within a keyway 44 and is pressed therein by the spring 45 within the threaded element 46 to prevent turning of the contact 37 on the plunger. If at any time upon a complete revolution of the bobbin there is a departure from maximum height sufficient for the contact 37 to engage the fixed contact 36 a circuit is made as described below and that bobbin is separated as having excessive run out. The position of the fixed contact may be adjusted by turning the threaded element 47.

The guide means G for separating the bobbins is in the form of a trap door 48 which is pivoted as by pin 49 and normally urged toward raised position (as shown in dotted lines) by the spring 50 attached to the arm 49a. The door 48 is normally held closed by a pair of pivoted arms 51 and 52 each having projections 53 adjacent their free ends for engaging the arm 59a. Upon closing of the contacts 36 and 37 a solenoid plunger 54 is raised freeing the arm 49a and allowing the spring 50 to raise the door. It will be noted that the arm 52 is pivotally connected as at 55 to the tray carriage 56. Thus upon rearward movement of the tray, projection 53 of the arm 52 engages the arm 49a to close the door. The trap door, when open, guides the bobbins into a suitable chute 57. Normally, the bobbins pass across the plate 58.

It will be noted that a base 60 supports most of the elements described above. Below the base 60, various

driving means are carried. A cam shaft 61 is driven by the motor 62 through the belt 63. The shaft 61 drives a belt 64 for turning the chuck D. The cam 65 through the bell crank 66, the rod 67 and the arm 68 turns the stub shaft 69 carrying the arm 28 for opening the tailstock 27. The free end of the arm also closes a micro switch 85 described below. The cam 70 retires the tray carriage 56 (which is pivoted at 71) against the spring 72. The spring 72 operates to advance the tray. The cam 73 oscillates the arm 74 about its pivot 75 to raise and lower the rod 22 for releasing bobbins in proper timed sequence.

Referring now to the circuit diagram of FIGURE 4, it will be noted that the motor 62 is connected across an A.C. supply through a double pole single throw switch 81. The switch 81 closes the circuit to the motor 62 and to the reject solenoid 76 which operates the plunger 54 operating the bobbin guide means G. The solenoid 77 operates the counter 78 while a reject solenoid 79 operates a counter 80 for totalizing rejected bobbins. The micro switch 82 operates the total bobbing counter solenoid 77 through a suitable toggle switch 83. The micro switch 82 (not shown in FIGURE 1) is preferably positioned immediately above the headstock 26 to be closed by contacting the bobbin only when a bobbin is in the chuck D. The reject solenoid 79 is operated through the toggle switch 83 and contacts 84 in the electronic relay. The micro switch 85 resets the electronic relay and, from the cam 65, times the checking of the bobbins so that the solenoids 76, 77 and 79 operate only while a bobbin is in the chuck D. The contacts 87 of the electronic relay close the circuit to the reject solenoid 76. The switch 86 closes the circuit to the electronic holding relay and the pilot light indicates when the relay circuit is energized. The electronic relay is of a standard type employing a thyratron tube which is normally cut-off biased. The closing of contacts 36 and 37 result in a biasing of the tube for conduction and results in the closing of contacts 84 and 87 in the relay.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A bobbin testing machine including, a gravity feed rack for positioning bobbins to be tested, a driven cam shaft, means driven by said cam shaft releasing bobbins one at a time from said storage means, a tray receiving said released bobbins one at a time moved responsive to the cam shaft, a chuck opened to receive a bobbin from the tray responsive to the cam shaft rotating each bobbin about its longitudinal axis, a spring biased plunger urged against an intermediate portion of the bobbin during rotation of the bobbin, a pair of electrical contacts closed responsive to a predetermined increment of movement of the plunger during rotation of the bobbin, guide means movable responsive to the closing of the contacts, counting means actuated by a bobbin in the chuck for totalizing the bobbins tested, counting means operated by the closing of the contacts indicating the number of bobbins separated, a first chute normally receiving bobbins from the chuck, and a second chute opened by said guide means receiving bobbins from the chuck.

2. A bobbin testing machine including, a rack for positioning bobbins to be tested, means releasing bobbins one at a time from said rack in a predetermined timed sequence, guide means receiving bobbins from said rack, a movable tray receiving said bobbins from said guide means, support means receiving a bobbin from the tray and rotating the bobbin about its longitudinal axis, a spring biased plunger urged against an intermediate portion of the bobbin during rotation of the bobbin, said plunger being mounted for axial movement substantially

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at right angles to the longitudinal axis of the bobbin, a pair of electrical contacts closed responsive to a predetermined axial traverse of the plunger during rotation of the bobbin, one of said contacts being fixed and the other contact being carried in frictional engagement with the plunger, means engaging the contact carried by the plunger to limit its movement away from the fixed contact thus establishing the traverse necessary to close the contacts, guide means operable responsive to the contacts separating those bobbins which cause axial traverse of the plunger sufficient to close the contacts from those which do not cause axial traverse of the plunger sufficient to close the contacts, and means operable to adjust the guide means after operation responsive to the contacts.

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