

[54] SKEIN TIMER-DEVICE

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[57] ABSTRACT

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[58] Field of Search 226/198, 199, 19;
242/157.1

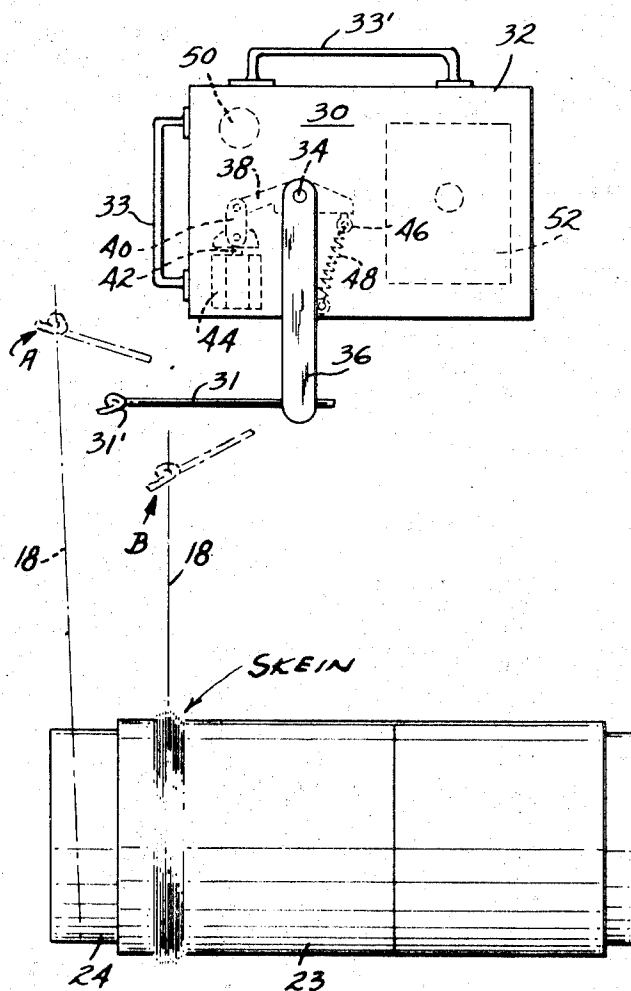
This is a device having strand guiding means at one position for guiding attenuated continuous glass fibers onto a rotatable mandrel at one location, and means for selectively moving the guiding means to a second position only for a predetermined period of time for guiding fibers onto the rotatable mandrel at another location for collecting thereon a skein of fibers.

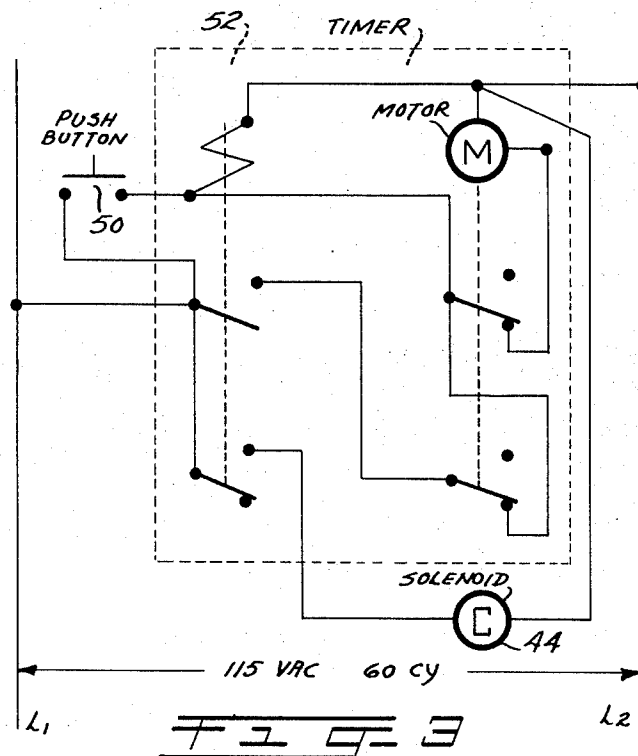
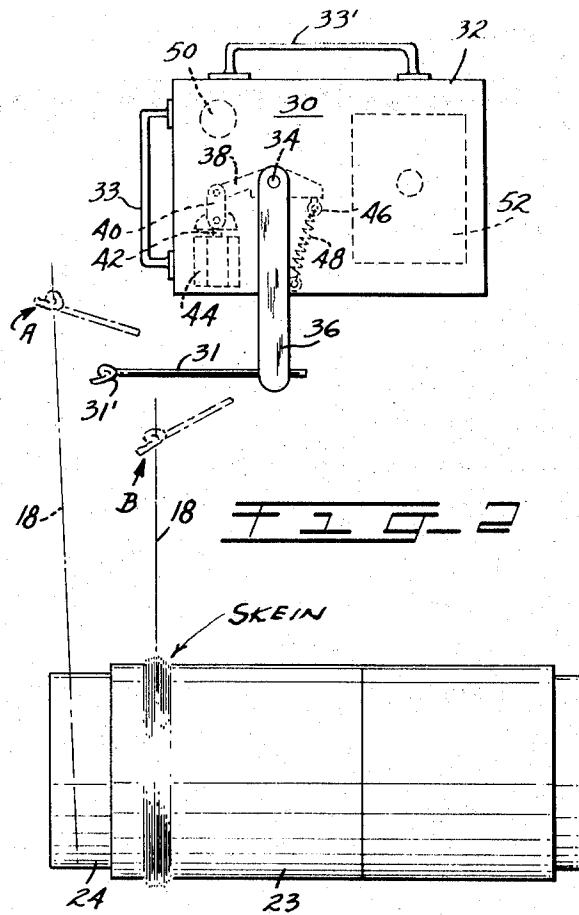
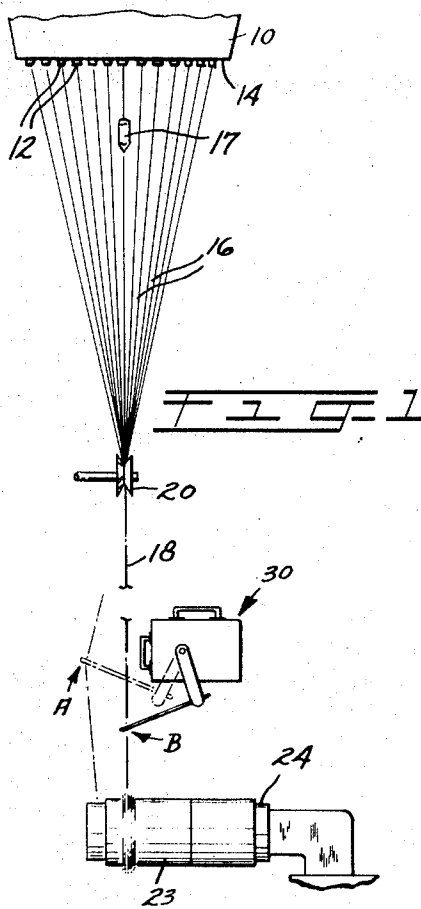
[56] References Cited

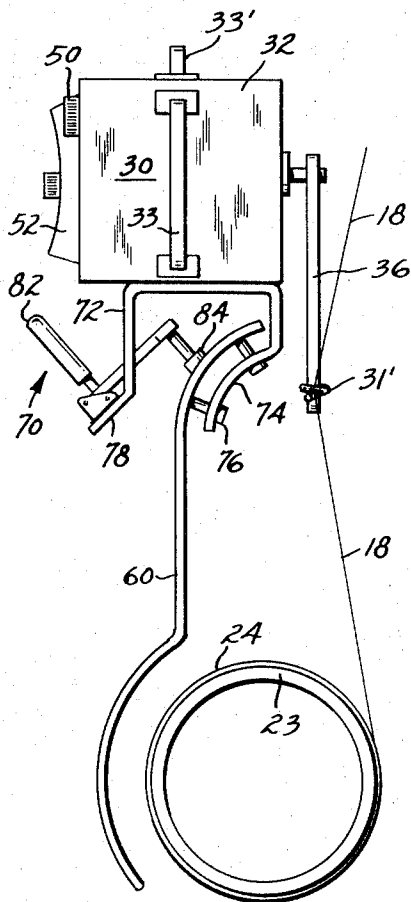
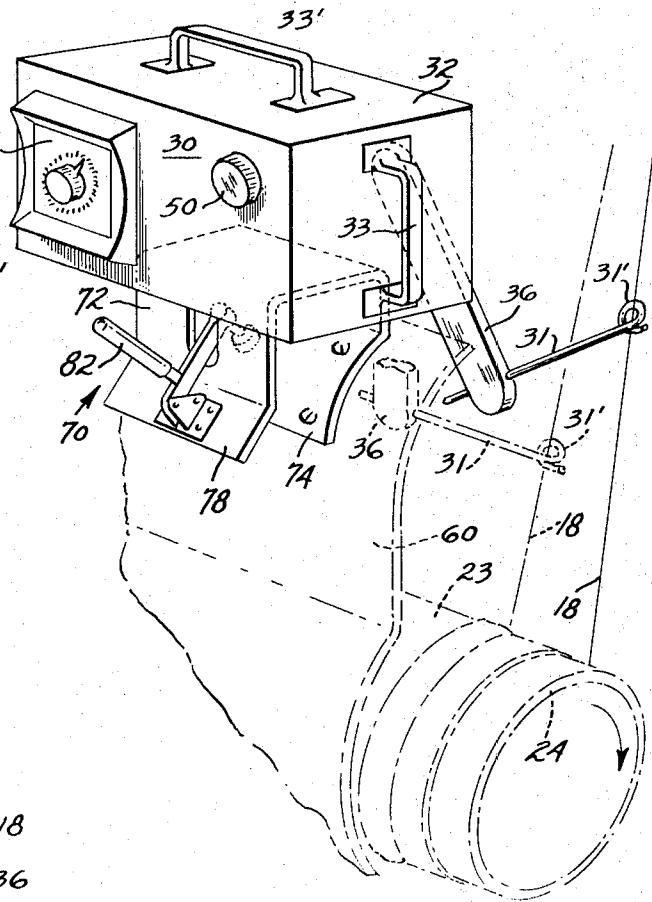
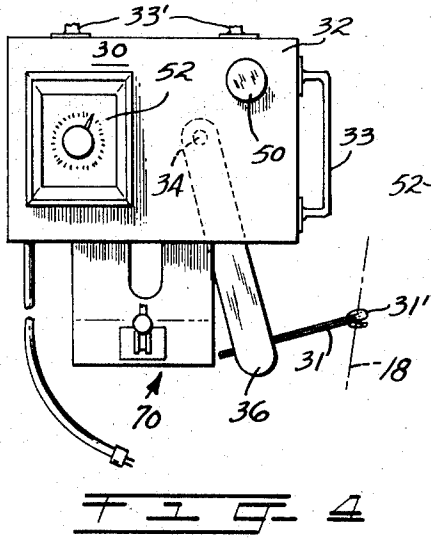
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5 Claims, 6 Drawing Figures







SKEIN TIMER-DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a device having selectively positionable guiding means for guiding a strand of continuous glass fibers or filaments into desired position on a rotatable mandrel whereon a skein of fibers is collected. The skein is collected as the fibers are being attenuated in continuous length from a bushing containing molten glass.

One method heretofore, for collecting a skein of fiber for quality control purposes, has been to manually operate a fiber guiding means, responsive to stop watch readings, for collecting the fibers on a separate portion of a rotatable mandrel. The fibers are thereafter removed and weighed. With glass density, number of individual filaments and rate of attenuation (ft./min.) all known, the average fiber or filament diameter can be calculated. This method lent itself to considerable human error particularly in relation to the timing of the collection. It is desired herein to provide an electric timer for operating a solenoid for moving mechanism including a strand guide means for guiding continuous fibers onto a rotating mandrel selectively at longitudinally spaced apart locations.

BRIEF SUMMARY OF THE INVENTION

It is an object of this invention to provide a movable guide means for guiding a strand of continuous glass fibers onto a rotatable mandrel at selected locations in a manner for collecting thereon a skein of fibers.

It is a further object of this invention to provide an electromechanical timer-device that is adapted to be used in conjunction with a winder for collecting a skein of glass fiber on a rotating drum over a predetermined period of time.

It is a still further object of this invention to provide an electro-mechanical device responsive to an electric timer for directing a strand of attenuated glass fibers to a location on a rotating drum for a predetermined period of time to define a skein of fibers.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the following detailed description of the preferred embodiment of the invention and the accompanying drawings in which:

FIG. 1 is a schematic view of apparatus for forming strands of glass fibers by attenuation of individual filaments and illustrating the invention in conjunction therewith;

FIG. 2 is a rear elevation of the invention shown in position for guiding a glass fiber strand to form a skein of fibers on a mandrel;

FIG. 3 illustrates the schematic wiring diagram for the device;

FIG. 4 shows a front elevation of the device;

FIG. 5 is a pictorial view of the device locked in position on the guard of a winding machine; and,

FIG. 6 is an end elevation of the device shown partly in cross section, in position on the guard of a winding machine.

PREFERRED EMBODIMENT OF THE INVENTION

Referring to the drawings in greater detail there is illustrated in FIG. 1 an arrangement in which the present

invention is adapted to be used. A bushing unit indicated at 10 is provided with a plurality of orifices 12, in its bottom will 14, from which molten glass is attenuated in filaments or fibers 16. These filaments are converged into one or more strands 18 at the converging pads or gathering rollers 20.

The filaments are treated with a liquid bonding agent or other treating material applied by a spray nozzle 17, or by a wet roller (not illustrated). The strand 18 is then wound on a cylindrical package support 23 which is removably carried on a rotatable mandrel 24 driven by an inverted motor inside thereof. In producing a package of fibers, the strand 18 is caused to move back and forth along the axis of the mandrel by a traversing device (not shown).

The present showing in FIG. 1 does not illustrate the production of a package, as indicated above, but rather a step of collecting a skein of fibers for monitoring fiber diameter.

This invention is in a device 30 having strand guide means selectively movable to positions A and B, as shown in FIGS. 1 and 2, for guiding strand 18 into a skein on a package support on mandrel 24.

In FIG. 2 there is shown in greater detail the components which make up device 30. There is shown a portable housing 32 in the form of a box having handles 33 and 33', and clamping mechanism on its base for the purpose of temporarily securing it to a portion of the winder machine guard. This clamp arrangement is not illustrated in FIG. 2, but will be described in detail later in reference to FIGS. 5 and 6.

Housing 32, as best illustrated in FIG. 2, carries electromechanical devices for causing the strand guide eye extension arm 31 to be moved to either position A or B. A shaft 34 is pivotally mounted in housing 32 and extends to the outside thereof where arm 36 is fixedly attached. Inside the frame, and adjacent the other end of shaft 34, a rocker arm 38 is also fixedly attached. A link 40 connects one end of arm 38 with plunger 42 of solenoid 44. The other end of rocker arm 38 is provided with an eye bolt 46 for receiving one end of tension spring 48. The other end of spring 48 is anchored to housing 32. Arm 36, in FIG. 2, is shown in an intermediate position between extreme positions A and B for purposes of illustration. Under normal conditions arm 36 is urged either clockwise or counterclockwise from the position illustrated. The housing also carries energizing push button 50 and timer 52. Their cooperative function will be described in detail later in the specification.

The outer end of extension arm 31 is provided with a pig tail guide eye 31' through which strand 18 is threaded for guiding onto mandrel 23.

Referring again to FIG. 2 where actuating mechanism is illustrated, it will be noted that movement of arm 36 is caused by the pull of tension spring 48 or selective action of solenoid 44. Spring 48 normally under tension, and with solenoid 44 deenergized, rotates shaft 34 and arm 36 in clockwise direction to move guide eye 31' to position A. Solenoid 44, when energized, has sufficient strength to override spring 48 and causes shaft 34 and arm 36 to rotate in a counter clockwise direction so as to move guide eye 31' to position B.

While solenoid 44 is deenergized, guide eye 31' is in position A and directs strand 18 onto the left hand extremity of mandrel 24; however, when solenoid 44 is energized guide eye 31' is moved to position B where

it directs strand 18 onto package support 23. Guide eye 31' is in position B only so long as solenoid 44 is energized. Once solenoid 44 again becomes deenergized, as for example at the end of a predetermined time cycle, guide eye 31' is returned to position A.

As previously indicated housing 32 also contains a push button starting switch 50 and timer 52. The schematic wiring diagram for the various components is shown in FIG. 3. Housing 32 is secured (temporarily) to a guard portion 60 of the winding machine in a manner so that guide eye 31' is normally urged to position A. Upon rotation of mandrel 24, strand 18 is drawn through guide eye 31' and onto mandrel 24 at one extremity thereof. When it is desired to collect a skein of fibers on package support 23, the operator sets timer 52 for the desired time (eg., 30 seconds) and pushes button 50, thereby energizing solenoid 44 and starting a motor in the timer. Guide eye 31' is caused to swing into position B for the preselected period of time where it directs strand 18 onto package support 23 until a skein of fibers is collected. Upon a lapse of the time set on timer 52, solenoid 44 is immediately deenergized and guide eye 31' swung back into position A by the action of tension spring 48. Thereafter, the skein of fibers thus collected in the predetermined time is removed for weighing. Since the glass density, number of individual filaments and rate of attenuation (ft./min.) are all known, the average diameters of the filaments can be calculated.

The mechanism contained by housing 32 is portable, and is adapted to be moved from one winding machine to another for the purpose of monitoring production at each bushing 10. FIG. 4, the front elevation of the device, shows push button 50 and timer 52 facing in a direction toward the back of a winder.

FIG. 5 pictorially represents the position of the device with respect to guard 60 on the winding machine and with respect to mandrel 24 upon which it is to direct strand 18. It will be noted that a clamp arrangement, indicated generally by the numeral 70, is provided on the base of housing 32. This is illustrated pictorially on FIG. 5 where it is received in cooperation with respect to a curved portion of guard 60, and in FIG. 6 where a partial cross-sectional view illustrates the various components. The clamping or holding device 70 will be only generally described for disclosing a method of securing housing 32 to a portion of the winding machine, because other method of attachment could be used to accomplish the same purpose. A support 72 having a cross-sectional shape as best illustrated in FIGS. 5 and 6 is secured to the underneath side of housing 32. One leg 74 is of arcuate shape to generally conform to the shape of guard 60. This leg is provided with a plurality of adjustable screws 76 which are adapted to bear against the guard on one side thereof. Another leg 78 is spaced from leg 74 and adapted to be positioned on the other side of the guard. Leg 78 supports a toggle clamp mechanism 80 having an operating lever 82 which upon pivotal movement causes a resilient head 84 at the end of a pivot arm to be urged against guard 60 in holding engagement thereagainst. Upon manual repositioning of lever 82, the clamping or holding engagement is relaxed for readjustment or removal of the device from the guard altogether.

When the housing is located or positioned on guard 60, care should be taken that guide eye 31' is disposed

opposite one end of mandrel 24 for guiding strand 18 thereonto. When solenoid 44 is energized and arm 36 is swung in the opposite direction, guide eye 31' should then be disposed opposite a portion of package support 23 for guiding strand 18 thereonto for collecting a skein of glass fibers.

After strand 18 is wound on the starting ring (i.e., left hand end of mandrel 24 shown on FIG. 2) and the winder has reached its running speed, the operator depresses push button 50. This, in turn, pulls in solenoid plunger 42 and moves rocker arm 38 for causing arm 36 and guide eye 31' to move to position B which is opposite the package support on the mandrel. As the solenoid is energized, the timer is activated. After the timer times out, power is removed from the solenoid, and spring 48 pulls rocker arm 38 and arm 36 in the opposite direction so that guide eye 31' is again in position A opposite the starting ring portion of mandrel 24. The operator now removes package support 23 having the skein of fibers thereon.

It will be appreciated that two solenoids could be used to swing arm 36 in both directions, thus replacing spring 48.

I have described a preferred embodiment of my invention. It is obvious that various modifications can be made therein without departing from the spirit of my invention. The breadth of my invention is defined by the claims which follow.

I claim:

1. A device for guiding a strand of glass fibers onto a rotatable mandrel of a winding machine to collect a skein of the strand comprising:

a strand guiding means located radially outward of the mandrel, said strand guiding means being movable between a first position where it guides strand onto the mandrel at a first location and a second position where it guides strand onto the mandrel at a second location which is spaced from the first location in a direction parallel to a longitudinal axis of the mandrel,

displacing means for displacing said strand guide means between the first and second positions, and actuating means for actuating said displacing means to effect movement of said strand guide, said actuating means including timer means for actuating said displacing means after a preselected period of time to effect movement of said strand guide from the second position to the first position after the skein has been collected, and starting means for simultaneously actuating said timer means and said displacing means to effect movement of said strand guide from the first position to the second position to commence collection of the skein for the preselected period of time.

2. The invention according to claim 1 wherein spring means normally resiliently maintain said strand guiding means in said first position and solenoid means is selectively energizable for displacing said strand guiding means to said second position.

3. The invention according to claim 2 wherein said solenoid means is energized for a preselected period of time by said timer means.

4. The invention according to claim 1 wherein solenoid means is adapted to displace said strand guiding means from said first position to said second position with said solenoid means being energized for a preselected period of time by said timer means.

5. The invention according to claim 1 wherein means resiliently restrains said strand guiding means in said first position and solenoid means is energized for moving said strand guiding means to said second position.

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