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TWISTER DEVICE FOR USE IN A BALLING APPARATUS

Filed May 4, 1967

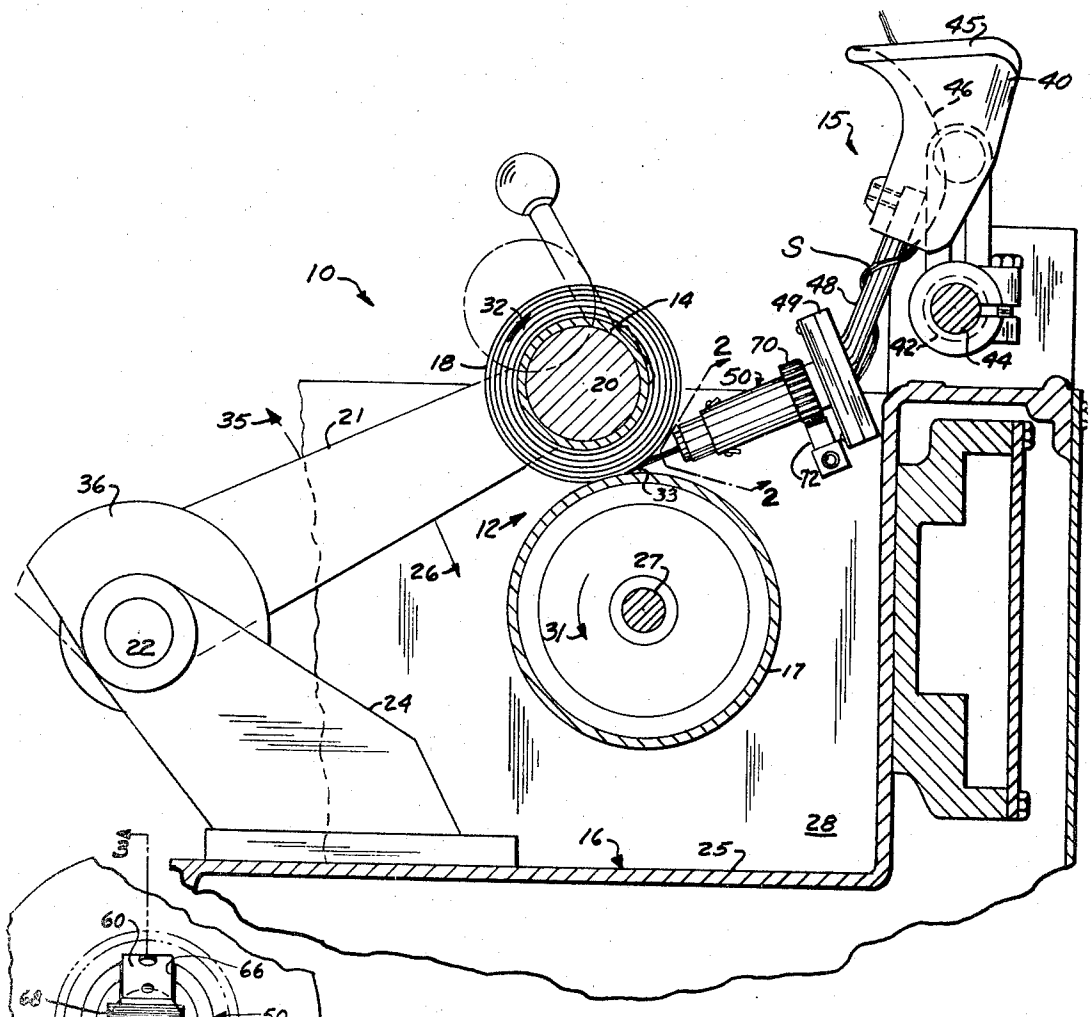


FIG. 1

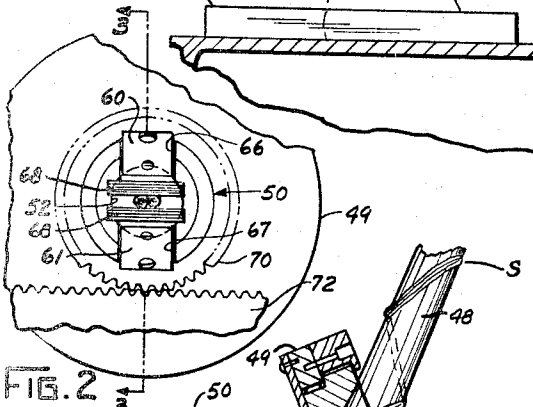


FIG. 2

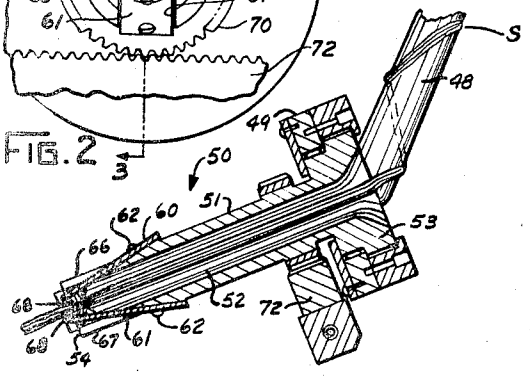


FIG. 3

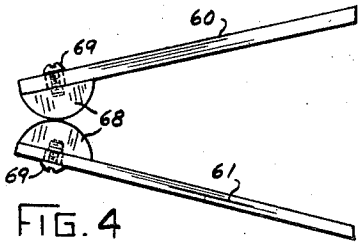


FIG. 4

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TWISTER DEVICE FOR USE IN A BALLING APPARATUS

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5 Claims

ABSTRACT OF THE DISCLOSURE

A twister device for imparting a twist to sliver being delivered to a balling mechanism is disclosed. The twister device includes a rotatable member having an opening therethrough through which the sliver passes and a pair of cooperable resilient fingers at one end of the member for frictionally engaging the sliver with a force such that the sliver will be twisted when the member is rotated but yet provide for ready passage of the sliver therebetween.

The present invention relates to a balling apparatus, and in particular to a twister device for imparting a twist to sliver being delivered to a balling mechanism of a balling apparatus.

An object of the present invention is to provide a novel twister device of a highly practical and economical construction for imparting a twist to sliver being delivered to a balling mechanism of a balling apparatus.

Another object of the present invention is to provide a new and improved twister device for imparting a twist to sliver being delivered to a balling mechanism, and which is of a construction and arrangement such that it is self-adjusting for sliver of different thicknesses or weights, thereby eliminating any need to change parts when balling sliver of different weights or thicknesses.

Yet another object of the present invention is to provide a new and improved twister device for imparting a twist to sliver being delivered to a balling mechanism and which is of a construction and arrangement such that it permits nipping the sliver at a location closer to the balling mechanism than known twister devices to thereby afford better control of the sliver being delivered to the balling mechanism.

A further object of the present invention is to provide a new and improved twister device for imparting a twist to sliver being delivered to a balling mechanism and which includes a hollow member which is adapted to be rotated and have one end disposed adjacent the balling mechanism and a pair of cooperable elements carried by the member at its one end which define a nip through which the sliver passes and which frictionally engage the sliver so as to impart a twist thereto when the member is rotated but yet provide for ready passage of the sliver through the nip.

A still further object of the present invention is to provide a new and improved twister device, as defined in the next preceding object, and wherein the cooperable elements are resilient fingers which are self-biased toward one another to define the nip through which the sliver passes and which are deflectable away from each other to be self-adjusting so that different weights or thicknesses of sliver can be accommodated without necessitating adjustment of any of the parts.

The present invention further resides in certain novel constructions and arrangement of parts, and other objects, advantages and novel characteristics thereof will be apparent from the following detailed description of the preferred embodiment of the present invention and in the accompanying drawings forming a part of the present

specification and in which similar reference numerals are employed to designate corresponding parts throughout the several views, and in which:

FIG. 1 is a fragmentary side elevational view with parts thereof shown in section of a balling apparatus embodying the present invention;

FIG. 2 is an enlarged fragmentary end elevational view of part of the apparatus shown in FIG. 1 and looking in the direction of the arrows 2—2;

FIG. 3 is a sectional view on a smaller scale taken approximately along line 3—3 of FIG. 2; and

FIG. 4 is an enlarged side elevational view of part of the apparatus shown in FIG. 1.

Referring to FIG. 1 of the drawings, a balling apparatus or machine **10** embodying the present invention is there shown. The balling apparatus **10**, except as noted below, is of the same construction as the balling apparatus or machine shown in U.S. Patent No. 2,757,876, issued Aug. 7, 1956, and only the parts of the balling apparatus which are essential for a clear understanding of the present invention are illustrated in FIG. 1 of the drawings. Resort may be had to the aforementioned patent for a complete description of the balling apparatus **10**.

The balling apparatus **10**, in general, comprises a balling mechanism **12** for wrapping sliver S around a cylindrical form or sleeve **14** to form a cylindrically shaped ball, a delivery mechanism **15** which is adapted to be reciprocated along the length of the form **14** for delivering the sliver S to the balling mechanism **12** and a frame means **16** for supporting the balling and delivery mechanisms **12** and **15**.

The balling mechanism **12** comprises a balling head **18** for rotatably supporting the cylindrical form **14** and a drive drum **17** engageable with the cylindrical ball being wrapped around the form **14** for rotating the ball. The balling head **18** comprises a support shaft **20** which is rotatably supported at the upper end of a support arm **21**, as viewed in FIG. 1. The support arm **21** at its lower or other end is pivotally connected to a stationary shaft **22** supported by a bracket **24**, which in turn is bolted or otherwise secured to the base **25** of the frame means **16**. The cylindrical form is adapted to be positioned or mounted concentrically on the shaft **20**.

The balling head **18** is pivotally movable about the axis of the shaft **22** and due to its inclined position will tend to move downwardly, as indicated by the direction of the arrow **26**, by reason of gravity and thus, maintain the cylindrical ball in engagement with the periphery of the driving drum **17**. The driving drum **17** is fixed to a drive shaft **27** having its opposite ends rotatably supported by spaced side walls **28** (only one of which is shown) of the frame means **16**. The drive shaft **27** is adapted to be rotated by a suitable drive means (not shown). The driving drum **17** is adapted to be rotated in the direction of the arrow **31** and due to the engagement between the periphery of the driving drum and periphery of the ball, it will rotate the ball in the direction of the arrow **32**. The peripheries of the drum **17** and the ball define a nip **33** therebetween through which the sliver S being delivered thereto is drawn.

The delivery mechanism **15** for delivering the sliver S to the nip **33** is adapted to be reciprocated back and forth in a direction parallel to the axis of rotation of the ball being formed on the form **14** so that the sliver is helically wrapped around the form **14** and with the radially adjacent layers of sliver being overlapping and helically wound in directions opposite to each other. As the diameter of the ball increases during the balling operation, the balling head will pivot upwardly about the axis of the shaft **22** in the direction of the arrow **35**. Suitable cooperably engageable friction clutch means located in a housing **36** and connected with the shaft **22** and the

lower end of the arm **21** are preferably provided for resisting upward movement of the arm **21** during the balling operation and thus, insuring that the balling head **18** maintains the ball in frictional contact with the surface of drum **17** at all times as it is gradually moved in the direction of the arrow **35** as the diameter of the ball increases.

The delivery mechanism **15** for delivering sliver to the nip **33** between the ball and the drum **17** comprises a sliver guide or trumpet **40** for receiving the sliver from a sliver processing machine or apparatus, not shown, and which is clamped to a sleeve **42** slidably supported by a shaft **44** having its opposite ends supported by the spaced side walls **28**. The trumpet **40** has an opening **45** therethrough defined in part by a smooth arcuate inner wall surface **46** for smoothly guiding the sliver as it passes through the trumpet **40**. The sliver upon passing through the trumpet is helically coiled or looped around an elongated bar **48** having one end secured to the trumpet and which at its other end supports an annular bearing housing **49**.

The sliver S upon passing around the bar **48** is twisted and guided for delivery to the nip **33** by a novel twister device **50**. The twister device **50** comprises an annular member **51** having a central through opening **52** therethrough. The member **51** at its upper or rearward end, **53** as viewed in FIGS. 1 and 3, is rotatably journalled in the bearing housing **49** via suitable roller bearings for rotation about its longitudinal axis, i.e., the axis of the central opening **52**. The member **51** has its forward end **54** located closely adjacent the nip **33** and serves to guide the sliver from the bar **48** through the opening **52** to the nip **33**.

The member **51** at its forward end **54** carries a pair of cooperable elements **60** and **61** which function to frictionally engage the sliver and to impart a twist thereto in response to rotation of the member **51** about its axis. The cooperable elements **60** and **61**, in the preferred embodiment, are resilient fingers having their rearward ends secured to the member **51** by screws **62** and which respectively extend through slots **66**, **67** at diametrically opposite locations in forward end **54** of the member **51**. The fingers **60** and **61** specifically are flat, resilient strips or members and each carries at its forward end a semicylindrical pin **68**. The pins **68** are secured with their flat side against the side of the strip member by screws **69** and with their cylindrical axes extending transversely of the direction of sliver movement. The pins **68** extend beyond the opening in the member **51**, as shown in FIG. 2, so as not to lose control of the stock when the member **51** rotates and reciprocates simultaneously.

The resilient fingers **60**, **61** are self-biased toward each other and with the pins **68** being in engagement with each other, as shown in FIG. 4, when no sliver is being passed therebetween. The pins **68** cooperate to define a nip extending transversely of the direction of sliver movement and diametrically of the opening **52** through which the sliver passes as it is being delivered to the nip **33** of the balling mechanism **12**. The fingers **60**, **61** are movable in a direction away from each other in opposition to the elastic forces tending to move them toward each other when sliver is being drawn therethrough by the balling mechanism **12**, the extent of this movement being dependent upon the thickness or weight of the sliver being balled. The spring fingers **60**, **61** function to frictionally engage the sliver S from opposite sides thereof with a force sufficient to cause the sliver to be twisted when the member **51** is rotated about its longitudinal axis but yet provide for ready passage of the sliver through the nip thereof.

The member **51** is adapted to be respectively rotated in opposite directions to twist the sliver S in opposite directions when the delivery mechanism **15** is linearly reciprocated through forward and return strokes along the length of the form **14**. To this end, the member **51**

carries a ring gear **70** intermediate its ends which is in meshed engagement with a stationary rack **72** suitably supported by the frame means **16**. When the delivery mechanism **15** is linearly reciprocated through its forward and return strokes, the member **51** thereof will also be linearly reciprocated. Linear movement of the member **51** will cause the same to rotate about its longitudinal axis due to the meshed engagement between the gear **70** and rack **72**. Since the member **51** is reciprocated through forward and return strokes, the member **51** will rotate in one direction during the forward stroke and will rotate in the opposite direction during the return stroke and thus, the twist imparted to the sliver will be in opposite directions during the forward and return strokes. The twists incorporated in the sliver are false twists which will disappear upon unwinding of the ball from the form **14**.

The delivery mechanism is adapted to be reciprocated through its forward and return strokes by reciprocating the sleeve **42** along the shaft **44** and by any suitable mechanism, such as by a mangle rack and pin arrangement, as shown in the aforementioned patent.

The advantages of the novel twister device **50** of the present invention are that it is of a more economical construction than known twister devices. Another advantage is that since the fingers **60**, **61** are resilient they are self-adjusting to accommodate different thicknesses and weights of sliver being delivered to the balling apparatus. This eliminates the need to change parts when different thicknesses of sliver are to be balled, as was usually the case in known twister devices. Moreover, the twister device **50** affords improved sliver control in that it provides for nipping the sliver at a location very close to the nip **33** between the ball and the drum **17**.

From the foregoing, it should be apparent that the hereinbefore enumerated objects and others have been accomplished and that a new and improved twister device for use for imparting a twist to sliver being delivered to a balling mechanism has been provided.

Having described my invention, I claim:

1. In a balling apparatus wherein sliver is adapted to be delivered to and wrapped around a rotatable elongated balling form, a member having an opening therethrough through which the sliver moves and which is disposed with one end thereof located adjacent the balling form, means for reciprocating said member along the length of said balling form and for rotating said member as the sliver moves therethrough, and means carried by said member for imparting a twist to said sliver, said means for imparting a twist to said sliver comprising a pair of resilient finger means which are secured at one end portion to said member and have opposite end portions which define a nip through which the sliver passes, said opposite end portions being resilently urged toward each other to maintain a substantially constant pressure against the sliver as the sliver passes through said nip to effect twisting thereof when said member is rotated but yet provide for passage of the sliver through said nip.

2. In a balling apparatus as defined in claim **1** wherein each of said opposite end portions of said resilient finger means includes an arcuate transversely extending surface which cooperates with the similar surface on the other finger means to form said nip, said nip being straight and extending through the center of the opening in said member to position the sliver centrally of the opening.

3. In a balling apparatus as defined in claim **2** wherein said nip is located at said one end of said member and is disposed immediately adjacent the balling form.

4. A device for imparting a twist to sliver being delivered to a balling mechanism comprising a member having an opening therethrough through which the sliver moves and which is adapted to be rotated and have one end thereof disposed adjacent the balling mechanism, and means carried by said member for imparting a twist to said sliver upon rotation of said member, said means

comprising a pair of cooperable surfaces which define a nip through which the sliver passes and which frictionally engage the sliver with a force such that the sliver will be twisted when said member is rotated but yet provide for ready passage of the sliver through said nip, said cooperable surfaces are on a pair of cooperable elements and at least one of said cooperable elements being biased toward engagement with the other of said elements, said cooperable elements including resilient fingers having one end secured to said member and their free ends cooperably engageable with each other to define said nip, said resilient fingers each including an elongated resilient member and an element having an arcuate peripheral surface supported at the free end of the resilient member, said elements being engageable with each other along a line extending transversely of the direction of sliver movement.

5. A device for imparting a twist to sliver being delivered to a balling mechanism comprising a member having an opening therethrough through which the sliver moves and which is adapted to be rotated and have one end thereof disposed adjacent the balling mechanism, and means carried by said member for imparting a twist to said sliver upon rotation of said member, said means comprising a pair of cooperable surfaces which define a nip through which the sliver passes and which frictionally

engage the sliver with a force such that the sliver will be twisted when said member is rotated but yet provide for ready passage of the sliver through said nip, said cooperable surfaces are on a pair of cooperable elements and at least one of said cooperable elements being biased toward engagement with the other of said elements, said cooperable elements including resilient fingers having one end secured to said member and their free ends cooperably engageable with each other to define said nip, said member having a pair of slots at its end adjacent the balling mechanism at diametrically opposite locations through which said resilient fingers extend.

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