June 2, 1942. V. H. HURT 2,285,334

WINDING MACHINE

Filed April 29, 1941 2 Sheets-Sheet 1

Fig. 1

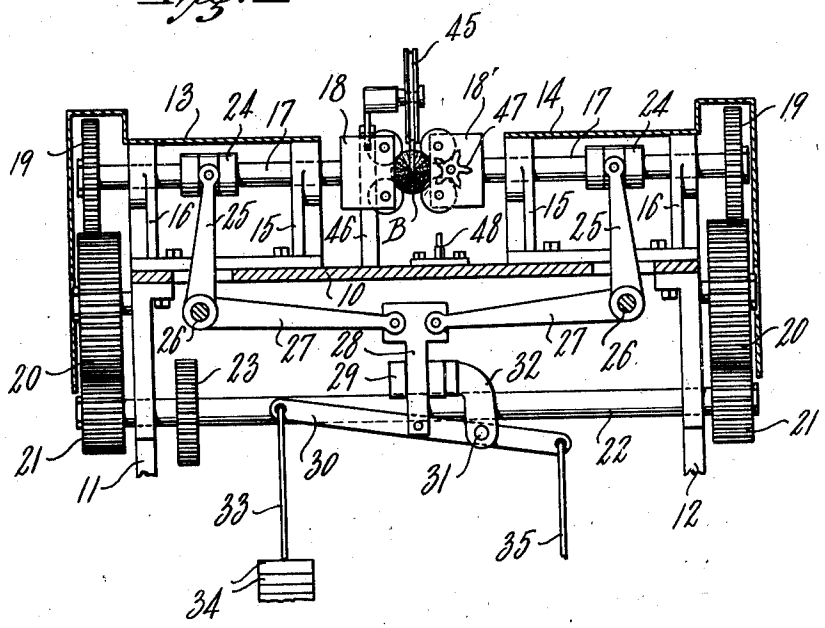


Fig. 4

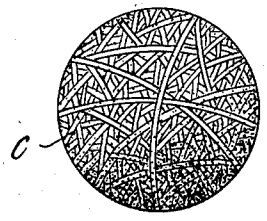
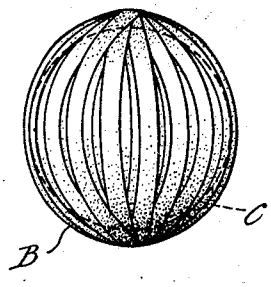


Fig. 5



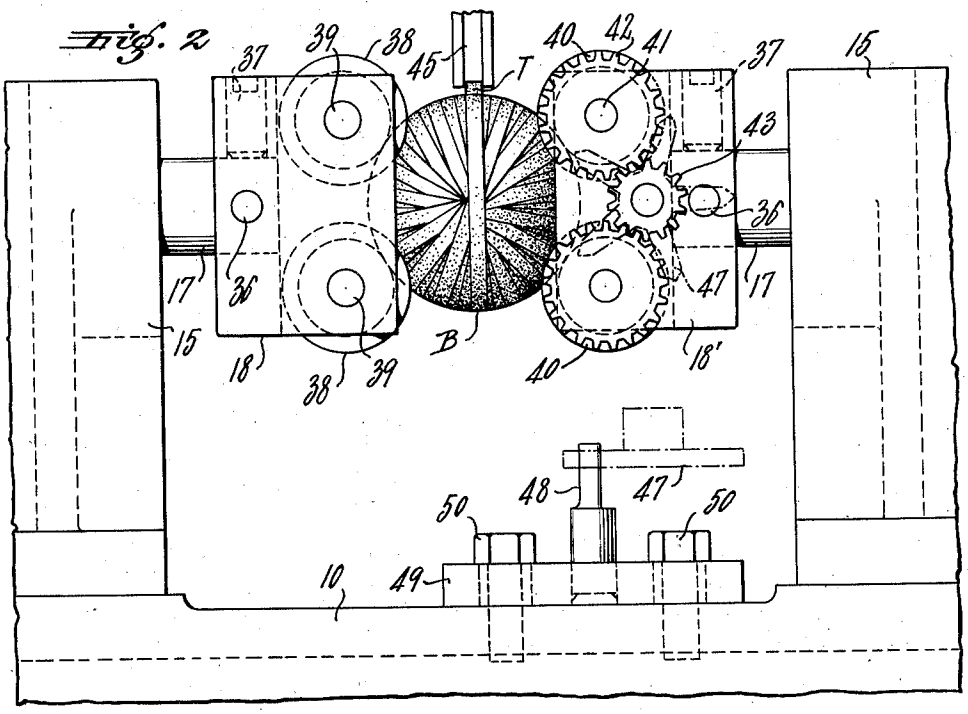
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Fig. 2



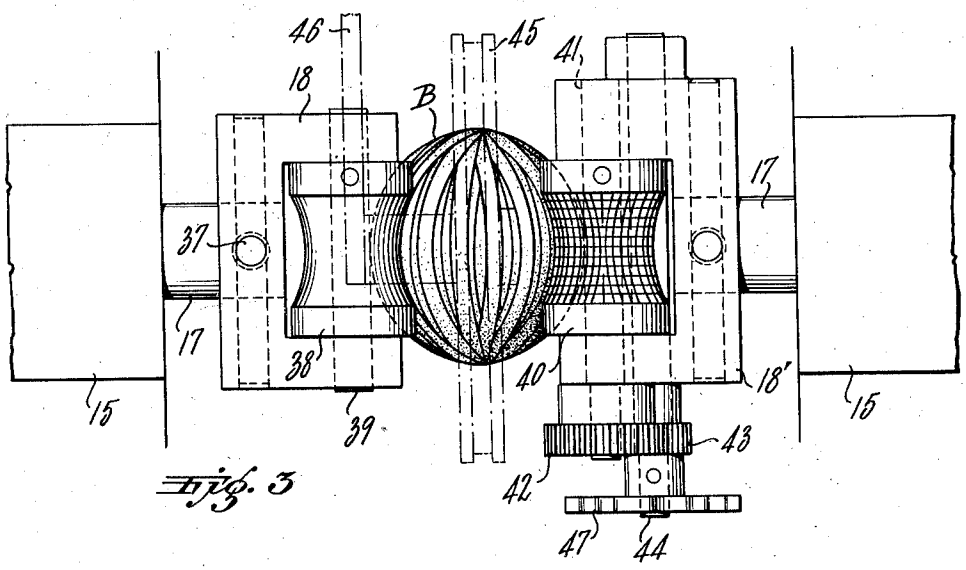


Fig. 3

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UNITED STATES PATENT OFFICE

2,285,334

WINDING MACHINE

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Application April 29, 1941, Serial No. 390,878

10 Claims. (Cl. 242—3)

This invention relates to winding machines, and more particularly to a ball winding machine adapted to deposit the windings more thickly at the poles of the ball than at the equator thereof.

In my application, Serial No. 390,877, filed April 29, 1941, Method of covering balls, there is disclosed and claimed a method of forming a seamless cover upon a ball body, which consists in winding a tape of plastic cover stock upon the ball body so as to deposit this covering material more thickly at the poles of the ball than at the equator, and then placing the covered ball in a spherical mold so that during the molding operation the excess cover forming stock at the poles will flow toward the equator.

The winding machine of the present invention has been designed more particularly to wind a cover forming tape of plastic material upon a ball body so as to deposit this material more thickly at the poles than at the equator, and thereby provide mechanism for carrying out one step contemplated by the method of my above mentioned application.

An important feature of the present invention resides in means for supporting a ball and rotating it about a fixed axis to thereby wind a tape or strand about the ball in a plane disposed at right angles to said axis, and in mechanism for rotating said ball during the winding operation upon a second axis lying in said plane, to thereby cause all windings to pass through the opposite poles of the ball and to be distributed as spaced coils about its equator.

A more specific feature of the present invention resides in a winding machine provided with a pair of cooperating heads provided with ball supporting rollers and with means for rotating at least one of these rollers to thereby turn the ball on an axis parallel to the axis of such roller so as to space the successively applied windings around the equator of the ball while causing them to lie one on top of the other at the poles.

A further feature of the present invention resides in a stationary member located near the ball rotating position and adapted to be periodically engaged by means upon a ball supporting head as the head rotates to thereby turn the ball periodically.

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with accompanying drawings which illustrates one good practical form thereof.

In the drawings:

Fig. 1 is a front view with parts in section of a ball winding machine embodying the present invention;

Fig. 2 on a larger scale is a front view of the ball supporting mechanism of Fig. 1;

Fig. 3 is a top plan view of the ball supporting heads;

Fig. 4 is a side view of a wound core or ball body of usual construction for a golf ball; and

Fig. 5 is a side view of an unfinished golf ball consisting of the ball body of Fig. 4 having a cover wound thereon in the form of an ellipse.

The ball winding machine of the present invention may for the most part be constructed in a well known manner to support and rotate at the same speed a pair of heads which cooperate to support and turn the ball, since the present invention resides more particularly in the construction and operation of the heads and associated parts to produce the cover winding operation herein described.

In the embodiment of the invention shown, the operating parts of the machine are supported by a bed plate 10 which is supported by the uprights 11 and 12. Upon this bed plate 10 are mounted the housings 13 and 14 which are positioned in spaced relation to each other, so as to provide a space between them in which the ball supporting heads may rotate. In each housing is mounted the bearing brackets 15 and 16 adapted to rotatably support in axial alignment with each other the shafts 17. At the inner end of one shaft is provided a ball supporting head 18 and at the inner end of the other shaft is provided the ball supporting head 18'. These shafts 17 are mounted for sliding movement towards and from each other to thereby move the head 18, 18' in and out of engagement with the ball B to be covered. In the present construction both shafts 17 are rotated at the same speed and the driving means for each shaft consists of a gear 19 keyed or otherwise rigidly secured to its outer end. Each gear 19 meshes with an idler gear 20 which meshes with and is driven by a pinion 21 rigidly secured to the power shaft 22 which may be driven by the gear 23. The gears 20 are relatively wide so that the gears 19 will remain in engagement therewith during the longitudinal sliding movement of the shafts 17.

Means is provided for yieldingly forcing the heads 18, 18' towards each other to thereby retain these heads in frictional engagement with the ball B to be wound, and to this end in the construction shown each shaft is provided with a grooved collar 24 adapted to have the groove thereof engaged by a bifurcated upper end por-

tion of an arm 25 which is rigidly secured to and extends upwardly from a rocking shaft 26 that extends transversely of the machine. Each of these shafts 26 has rigidly secured thereto a laterally extending arm 27, the outer ends of which arms are secured to the vertically sliding block 28 mounted for sliding movement in the fixed bracket 29. The lower end of this block 28 is secured by a pin or otherwise to the rocking lever 30 which is pivotally secured at 31 to a supporting bracket 32. To the longer end of this rocking lever 30 is secured the rod 33 which carries at its lower ends the weights 34, and to the shorter end of this lever is secured the rod 35 adapted to extend downwardly to a foot operated treadle, not shown. The construction is such that the downward pull of the weights 34 upon the lever 30 will act through the slide 28 to operate the rocking arms 25 and 27 to thereby force the shafts 17 towards each other, and when a downward pull is exerted on the rod 35 to rock the lever 30 upwardly this will force the shafts 17 apart to thereby disengage the heads 18, 18' from the ball. The mechanism so far described except for the heads forms no essential part of the present invention.

The novel mechanism of the present invention is best shown in Figs. 2 and 3 and will now be described.

The head 18 is shown as rigidly secured to one shaft 17 by a pin 36 and set screw 37 and this head is cut away adjacent the ball B as best shown in Fig. 3 to receive a pair of concave rollers 38 which are rotatably supported in the head 18 by the shafts 39. These rollers 38 constitute idler rollers and are provided with smooth concave faces adapted to engage and support the ball B during the winding operation.

The head 18' is rigidly secured to the other shaft 17 by a pin 36 and set screw 37, similar to the head 18 and this head 18' is provided with a pair of concave rollers 40 each of which has a serrated surface as shown to prevent slippage between these rollers and the ball B when these rollers are positively rotated in a manner to be described. Each roller 40 is rigidly secured to a shaft 41 journaled in the head 18', and each shaft 41 protrudes at one end from the head, to receive a gear 42 rigidly secured thereto. These two gears mesh with and are driven by a pinion 43 rigidly secured to a shaft 44 journaled in the head 18' approximately between the rollers 40. The arrangement is such that when the shaft 44 is rotated its pinion will rotate the gears 42 to thereby rotate the serrated rollers 40 and turn the ball B upon an axis disposed parallel to the shafts 41 and 44.

It will be seen that the mechanism so far described serves to support the ball B and rotate it about the fixed axis upon which the shafts 17 rotate so that if a tape or strand is delivered to the ball in a plane at right angles to this fixed axis it will be wound on the ball in successive coils. The tape T such, for example, as a thin tape or ribbon of gutta percha or balata approximately ¼'' wide may be supplied to the ball B under the desired tension by any suitable means such, for example, as the grooved wheel 45 which may receive the tensioned tape from a source of supply, not shown. This grooved wheel may be rotatably supported by any suitable means such as the bracket 46 extending upwardly from the bed plate 10 at the rear of the machine as shown in Fig. 1.

The present winding machine has been designed more particularly to wind a tape, strand or ribbon upon a wound core or ball body C such as shown in Fig. 4 and which may be of usual construction for a golf ball. This ball body C may be placed between the heads 18 and 18' to be supported and rotated thereby after the leading end of the tape T has been secured thereto, whereupon the machine may be started up to effect the winding operation.

It is desired, as above pointed out, to so wind the tape T upon the ball body C that an elliptical shaped cover will be formed thereupon as shown in Fig. 5. This is accomplished in accordance with the present invention by periodically rotating the shaft 44 to thereby turn the rollers 40 and shift the ball B through a small angle about an axis lying in the plane in which the tape is supplied to the ball. This periodic movement is secured in the embodiment of the invention illustrated by providing a star wheel 47 which is rigidly secured to a protruding end of the shaft 44 as best shown in Fig. 3 and which is positioned to cooperate with a fixed pin 48 that is rigidly secured to and extends upwardly from a bracket 49 secured in the desired position of adjustment to the bed plate 10 by the clamping bolts 50. In the construction shown the star wheel 47 has five projecting points arranged so that each time the head 18' rotates through a complete revolution one of these points will strike the pin 48 and turn the star wheel and its shaft 44 through an angle of 72 degrees. This will rotate the rollers 40 through a somewhat smaller angle to thereby turn the ball B through an angle of say from 15 to 20 degrees. The angle through which the ball rotates will decrease slightly as the ball increases in size.

The periodical rotation of the ball B by the star wheel 47 and other mechanism described will cause the successive windings of the tape T to be deposited one on top of the other at the opposite poles and disposed in spaced relation to each other at the equator of the ball as shown in Fig. 5 to thereby wind the cover forming tape in a thicker layer at the poles than at the equator and impart to the ball the elliptical shape shown in Fig. 5.

The ball is then ready to be placed in a spherical mold as described in my application above cited so that when the heated mold is closed the covering material will flow from the poles toward the equator to distribute the cover uniformly over the ball body C.

As above stated the angle through which the ball B is turned by the star wheel 47 upon each revolution of the heads 18, 18' will decrease slightly as the ball grows in size. This is desirable since it causes a distribution of the coils about the equator of the ball and prevents the coil from falling one on top of the other adjacent the equator in perfect register.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A winding machine comprising, means for holding a ball including means whereby the ball may be continuously rotated about a given axis, means for supplying a continuous element to the ball to be wound thereupon as the ball is rotated and disposed to supply said element in a plane at 90 degrees from said given axis, and mechanism including said ball holding means and a stationary member cooperating therewith for intermittently rotating said ball about an axis disposed at all times in said plane.

2. A winding machine comprising means for

holding and continuously rotating a ball about an axis, means for supplying an element to said ball to be wound thereon in a plane 90 degrees from said axis, and an independent fixed device intermittently cooperating with said ball holding and rotating means for rotating said ball about an axis in the winding plane.

3. A winding machine comprising a pair of opposed winding heads simultaneously rotatable on the same axis, a pair of ball-holding rollers in each head, means for guiding an extended cover element onto a ball held by said rollers and in a plane at a large angle to said axis, means for driving one pair of said rollers to turn them in the head, and an independent member fixedly mounted in the rotating path of a part carried by one of said heads for intermittently actuating said last means.

4. A winding machine comprising a pair of opposed winding heads simultaneously rotatable on the same axis, a pair of idler ball-holding rollers in one head, a pair of ball-holding rollers in the other head, a geared shaft for driving both said last rollers and projecting laterally from their winding head, a fixed member disposed adjacent the rotating path of said shaft adapted to contact means upon said shaft and turn the latter upon each revolution of the winding head, and means for supplying an extended cover element to a ball supported by said rollers in a plane 90 degrees from the winding head axis of rotation.

5. A winding machine provided with a pair of cooperating heads having ball supporting elements, means for rotating said heads at the same speed to rotate the ball about a given axis, means for supplying a continuous strand to the ball supported by said heads to be wound thereupon in a plane at right angles to said given axis, and means acting through said elements as the heads rotate to turn the ball solely about a single axis disposed in said plane, to thereby deposit the strand more thickly at the poles than at the equator of the ball.

6. A winding machine provided with a pair of cooperating heads having ball supporting elements, means for rotating said heads at the same speed to rotate the ball about a given axis, means for supplying a continuous strand to the ball supported by said heads to be wound thereupon in a plane at right angles to said given axis, and means acting intermittently through said elements as the heads rotate to turn the ball solely about a single axis disposed in said plane, to thereby wind the strand more thickly at the poles than at the equator of the ball.

7. A winding machine provided with a pair of cooperating heads having ball supporting rollers, means for rotating said heads to rotate the ball about a given axis, means for supplying a continuous strand to the ball supported by said heads to be wound thereupon in a plane at right angles to said given axis, and means for turning at least one of said rollers as the heads rotate to thereby turn the ball solely upon a single axis in said plane.

8. A winding machine provided with a pair of cooperating heads having ball supporting rollers, means for rotating said heads to rotate the ball about a given axis, means for supplying a continuous strand to the ball supported by said heads to be wound thereupon in a plane at right angles to said given axis, and means for turning at least one of said rollers as the heads rotate to thereby turn the ball on a single axis alone relative to said heads.

9. A winding machine comprising, means for holding a ball including means whereby the ball may be continuously rotated about a given axis, means for supplying a continuous strand to said ball as it is rotated and disposed to supply said strand in a plane at right angles to said given axis, and mechanism including said ball holding means for rotating said ball about a single axis alone relative to said holding means so as to cause all windings to pass through the opposed poles of the ball and to be distributed evenly about its equator.

10. A ball winding machine comprising, mechanism for supporting and rotating a ball upon a given axis, means for supplying a continuous element to a ball as it is rotated by said mechanism, and an independent fixed actuating device positioned to cooperate with a part rotated by said mechanism, whereby the ball is rotated continuously about said given axis and intermittently about a second axis disposed at 90 degrees to the fixed axis.

VICTOR H. HURT.