

Aug. 19, 1952

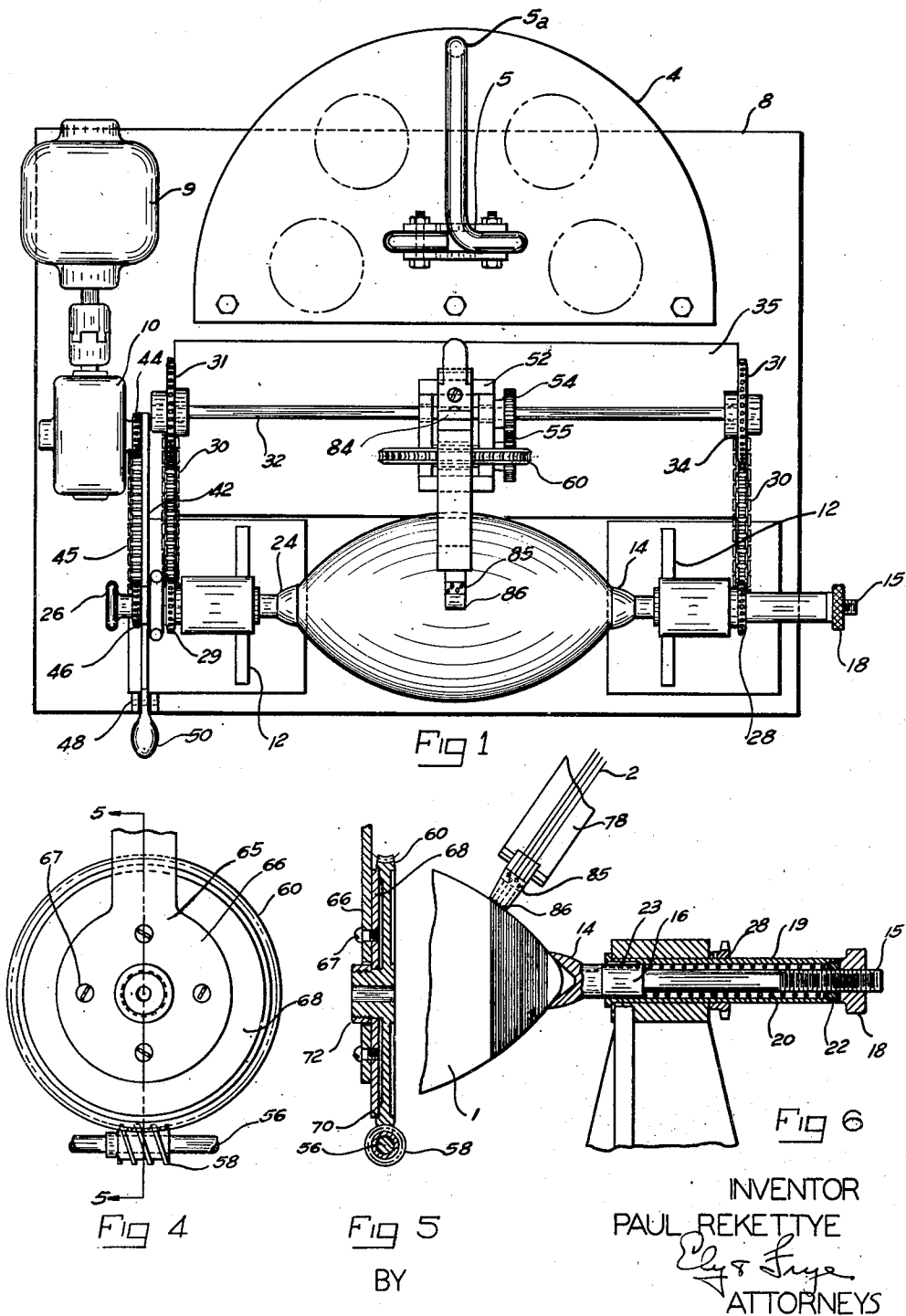
P. REKETTYE

2,607,540

MACHINE FOR WINDING PLAY BALLS

Filed Oct. 1, 1946

2 SHEETS—SHEET 1



Aug. 19, 1952

P. REKETTYE

2,607,540

MACHINE FOR WINDING PLAY BALLS

Filed Oct. 1, 1946

2 SHEETS—SHEET 2

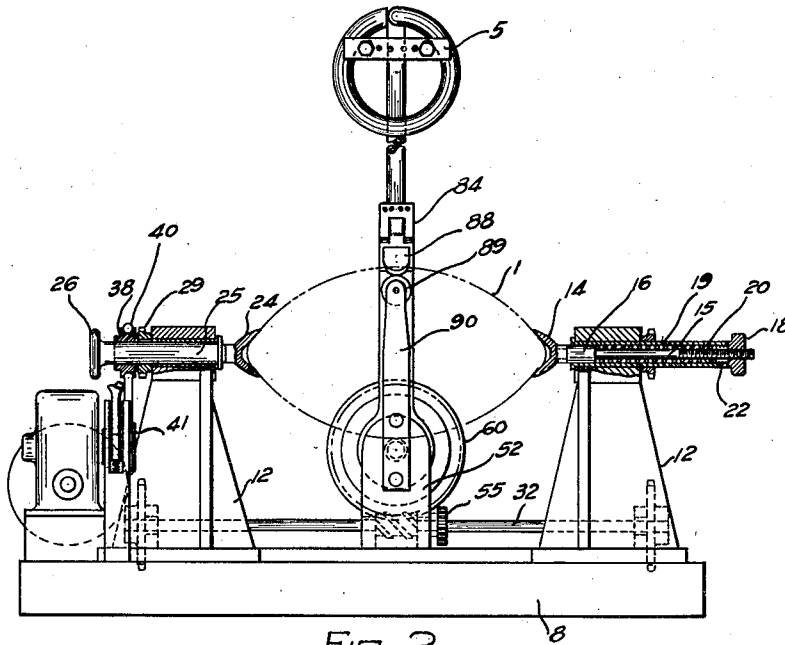


Fig 2

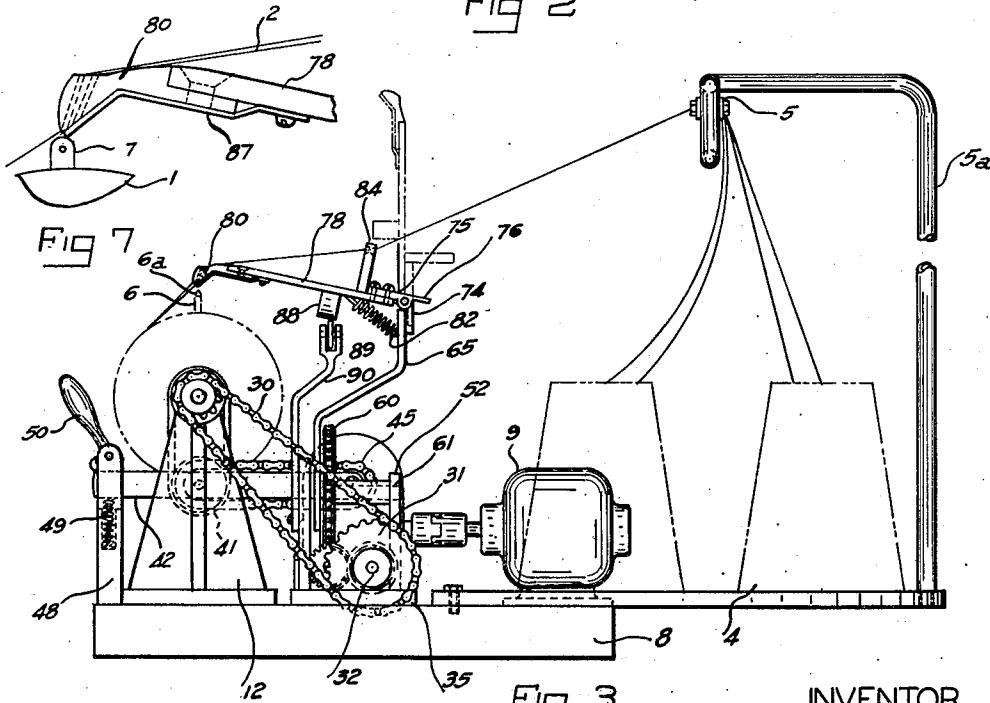


Fig 3

BY

INVENTOR
PAUL REKETTYE

Wey & Fayer
ATTORNEYS

UNITED STATES PATENT OFFICE

2,607,540

MACHINE FOR WINDING PLAY BALLS

Paul Rekettye, Akron, Ohio, assignor to The Sun Rubber Company, Barberton, Ohio, a corporation of Ohio

Application October 1, 1946, Serial No. 700,551

2 Claims. (Cl. 242-3)

1

The present invention relates to the art of manufacturing play or athletic balls in which a core or center composed of fabric and rubber is enclosed by a spiral wrapping of a reinforcing strand or strands which are designed to limit the expansion or growth of the ball.

The operation of wrapping ball centers is well known in this art, but prior mechanisms to apply the wrapping have been either so crude as to be inefficient, or so complicated as to make them unreliable and expensive to maintain and operate. As a result the general practise has been to wind a ball core by hand.

It is the object of the present invention to devise a simple and accurate machine for the application of multiple cord windings to centers of athletic balls. The machine which is shown and described herein is easy to operate and will cover a ball center more quickly and with a more evenly spaced accurate winding than is possible with previously known machines or methods.

In certain ball constructions the center or bladder is provided with a long valve stem by which the ball is inflated. One form of the machine shown herein provides means by which the winding operation will progress continuously in spite of the presence of a long protruding valve stem. In such cases means are incorporated in the machine to lift the cord applicator when the winding operation has reached that point.

In other types of footballs a short metal stem is provided and in such cases it is advisable to omit the means for lifting the cord applicator and simply let it ride up over the valve stem. If a cord piles up on the end of the valve stem the operator stops the machine momentarily and adjusts the cord which is out of position.

The machine shown herein may be set in operation and the winding will continue until the core is covered, requiring little attention on the part of the operator.

In the drawings there are illustrated the best known and preferred embodiments of the invention in the form in which it has been successfully employed in the winding of football bladders or centers. The drawing and description are not to be considered as limiting the invention to this specific mechanism as the invention is capable of modification, alteration or improvement within the scope thereof as set forth in the claims.

In the drawings:

Fig. 1 is a plan view of the machine.

Fig. 2 is a front view.

Fig. 3 is a side elevation showing the creel from which the multiple cords are supplied.

2

In the above views the machine is shown with the applicator raising mechanism and in the position when the cord applicator is at the center of a football in the plane of the valve stem and at the point in the operation when the applicator is raised to clear the stem.

Fig. 4 is a detail view looking at the front of the cord applying arm.

Fig. 5 is a vertical section on the line 5-5 of Fig. 4.

Fig. 6 is a fragmentary view of the machine showing the position of the arm shortly after the commencement of the winding operation.

Fig. 7 is an enlarged detail view showing the manner in which the applicator rides over a short valve stem without being otherwise lifted.

In the drawings the reference numeral 1 indicates a bladder or center of a football, this usually consisting of a rubber bladder and an outer ply or plies of a reinforcing fabric. This structure is usually given a partial cure so as to impart a permanent shape thereto and is coated with a cement which gives it a tacky surface to which the cords will adhere. The reinforcing cord layer in the form illustrated is composed of a plurality of separate cords of the usual or standard construction. In the drawings, these cords are indicated at 2 and are four in number. The cords are supplied from a creel, indicated at 4 and are led through guide plate 5 attached to the upper end of an upright 5a.

In Fig. 3 a long flexible valve stem is shown at 6. In Fig. 7 a short metal valve stem is indicated at 7. Either type of stem is known in the art. In case the valve stem 6 is employed, it is desirable to lift the applicator over the stem, and before the wrapping operation is started a small cone shaped, removable plug, indicated at 6a in Fig. 3 is inserted in the end of the stem to act as a divider so that the cords will pass to one side or the other of the stem and not be caught and held on the top of the stem.

The creel is attached to the bed plate 8 of the machine on which is also mounted the motor 9 which, through reduction gearing 10, drives the center and also the cord applicator or cord laying arm.

It is not necessary to cover the ends of the center as these portions of the ball are usually more heavily reinforced. The center is held by the end portions while it is rotated. For this purpose there is provided a chuck comprising two stanchions 12 at either side of the bed plate. In one of these stanchions, here shown at the right, is a cup shaped holder 14 which is mounted on

the end of a thrust rod 15 having an enlarged inner end 16 and threaded outer end, the latter being received in a nut 18. The rod is slidably mounted in a rotating sleeve 19 journaled in the stanchion. A spring 20 surrounds the rod and is located between the enlarged end 16 and a threaded collar 22 in the outer end of the sleeve. The portion 16 is keyed to the inner end of the sleeve as indicated at 23 (Fig. 6).

This arrangement permits the cup 14 to be moved outwardly for insertion and removal of the center 1 which is held at its other end in a second cup shaped holder 24. The holder 24 is mounted on the end of a shaft 25 journaled in the upper end of the left-hand stanchion 12. The outer end of the shaft is provided with a hand wheel 26 by which the operator may rotate the work when applying the cement or for inspection and correction of any imperfections in the winding.

The sleeve 19 and the shaft 25 are driven in unison to revolve the center during the winding operation. For this purpose a sprocket 28 is fixed to the sleeve 19 and a corresponding sprocket 29 is fixed to the shaft 25. These sprockets are connected by chains 30 to sprockets 31 on a main drive shaft 32 rotatably mounted in bearings 34 rising from a base plate 35 on the main bed plate 8.

Power to drive the mechanism is transmitted to a pulley 38 mounted on the outer end of the shaft 25. A belt 40 is trained over this pulley and around a second pulley 41 which is carried on an arm 42 pivoted at one end on the output shaft of the reduction gearing unit 10. A sprocket 44 at the reduction gear is connected by a chain 45 to a sprocket 46 mounted so as to rotate with the pulley 41. The outer end of the arm 42 is guided in the upper end of a post 48 rising from the bed plate 8 and is urged upwardly by a spring 49 against a rotatable cam lever 50 mounted in the upper end of post 48. In the position shown in Fig. 3 the belt is sufficiently loose so that no power is transmitted thereby to the rotating chuck holding the ball, and the ball may be rotated by hand, but when the lever 50 is turned downwardly, power is imparted to drive the operative parts of the machine.

The cords 2, after they leave the eye 5, are fed in an advancing spiral from the edge of one cup shaped holder to the edge of the other cup shaped holder so that all of the exposed area of the center is completely covered by a spiral winding in the instant case composed of four separate parallel cords. To perform this function there is provided a moving applicator which follows the contour of the center at a rate which will lay the cords smoothly and evenly and with regularly spaced convolutions over the surface of the center. In the machine shown the applicator moves from right to left as indicated in Fig. 6.

Midway of the bed plate 35 is located a housing 52 composed of vertical end and side members which constitute supports for the mechanism to be described. The main drive shaft 32 is journaled in this housing, and to the shaft is attached a drive pinion 54 which meshes with a second pinion 55, mounted on a supplemental horizontal shaft 56 carrying a worm 58 which meshes with a large worm gear 60 carried on a cross shaft 61 in the housing 52. Shaft 61 is located on an axis which passes substantially through the center of curvature of the inter-

polar element, or meridian, at the zenith of the ball center. The hub of the worm gear, as shown in Fig. 5, is provided with a smooth round surface and a threaded extremity.

The applicator which is indicated as a whole at 65 is formed at its lower end as a circular plate 66 which is attached by screws 67 to a driven disk 68 which fits snugly over the rounded portion of the hub on the worm gear 60, but may rotate thereon. The rim of the disk 68 fits within a rabbeted surface 70 on the adjacent face of the worm gear which acts as a driving disk. A threaded collar 72 on the extremity of the worm gear hub is forced against the inner edge of the disk 68 and holds the disk and worm gear in sufficiently close frictional engagement so that the two elements will rotate in unison unless the arm strikes an obstruction. This also permits the applicator arm to be moved manually without rotating the worm gear to any angular position, as in initially affixing the cords to the center at the start of the winding operation.

The main applicator arm 65 extends upwardly and rearwardly, as shown in Fig. 3, and to the upper end thereof is attached a bracket 74 to which is hinged a plate 75. A lug 76 is provided on the plate 75 which serves as a stop to hold the applicator arm in raised position when idle, as shown in Fig. 3. A horizontal pivotal arm 78 is attached to the plate 75 on the outer end of which is mounted the hand 80 by which the cords are guided and actually laid on the center. A light spring 82 is connected across the members 65 and 78 of the applicator arm to hold the hand with a yielding pressure against the surface of the center and supplement the weight of the arm. It also holds the arm in upright position when it is slightly past center.

The cords pass from the eye through holes in a plate 84 attached to the upper side of the arm 78 and thence through holes 85 in the hand 80 to the underside thereof. For convenience the holes 85 are staggered as shown in Figs. 1 and 6 so that the cords may be located in close proximity when applied to the ball center. From these holes 85 the cords pass to the underside of the hand where they are received in parallel closely placed grooves 86 which locate the cords on the ball center. A light spring 87 is attached to the underside of the applicator with its forward end over the holes 85. This spring exerts a light, yielding tension on the cords as they pass through the applicator and will yield if a knot is present in any cord. During the winding operation, except at the point where the applicator may be lifted in passing over the valve stem 6, the hand rests on the surface of the center, and as the cords are only partially embedded in the grooves 86, the cords are firmly pressed into adhesive relation with the surface of the ball. It will be noted that enough tension is placed on the cords to insure that they are evenly and smoothly applied.

Referring particularly to the form of the invention shown in Figs. 1 to 3, the underside of the movable section 78 of the applicator carries a cam member 88 which contacts and rides over a roller 89 on an arm 90 attached to the housing 52. This lifts the movable section 78 at the point when the applicator arm comes into alignment with the valve stem, and insures that there will be no stoppage of the arm at that point.

In the case of the valve stem 7, which is rounded as shown in Fig. 7, the arm rides up-

and over the valve stem, the inclined under surface of the hand causing the valve stem to raise the applicator as it passes beneath it. While in some cases cords may center themselves on the top of the valve, it takes only a moment for the operator to stop the machine and correct the condition. In many cases no stoppage is necessary. For this operation either the cam 88 or the roller will be removed.

The operation of the machine may be described briefly. The operator inserts a fresh ball center between the holders 14 and 24, while the arm 42 is in the position shown in Fig. 3 and the movable applicator arm is raised as shown in dotted lines. She then turns the center by the hand wheel 26 while coating the center with cement. She then takes the ends of the four cords as they depend from the hand and attaches them to the center at the edge of the cup 14 and allows the hand to rest upon the center. She then presses the lever 50 to start the machine in operation. As the center is turned by the shaft 32 the applicator arm moves across the work at a speed determined so that the cords are laid in a smooth and even manner with the convolutions in close contact over the entire exposed surface of the ball. When the applicator reaches the other end of the center the operator raises the lever 50 and the machine stops. She then cuts the cords at a point close to the ball, presses the loose ends down with her fingers and raises the applicator arm. The ball is then engaged with a hook at the valve stem and the chuck opened. The ball is now hung on a drying rack until the cement has dried sufficiently for the succeeding operations.

It will be seen that a very simple but extremely efficient machine has been devised which will apply a spiral wrapping to a ball center or the like in a very short time. The cords are applied to the center with sufficient pressure exerted either by the weight of the pivoted applicator arm or supplemented by the spring, the use of which is optional. The protruding valve stem presents no problem for the applicator arm either rides up over the valve or is lifted over the valve, depending upon the preference of the manufacturer.

While the machine is especially adapted for the application of spiral windings of cord on a football or similar athletic ball center, it is not restricted to such a narrow field, but may be extended to wider fields without the exercise of invention and without departing from the scope of the claims.

What is claimed is:

1. A machine for applying a spiral wrapping of cords to an ovoid foot ball center, provided

with a protruding valve stem, a chuck for holding the center at its opposite poles, means for rotating the chuck, a pivoted applicator resting upon the surface of the center, grooves on the underside of the applicator communicating with openings through the applicator, and in which the cords are partially embedded and by which they are held in contact with the center, frictional driving means operated in synchronism with the rotation of the chuck to advance the applicator in a plane parallel to the axis of the center, and cam means secured to the machine, located in the path of swing of the applicator, and adapted to lift the applicator over the valve stem without interrupting the operation of the machine.

2. A machine for applying a spiral wrapping of cords to an ovoid football center provided with a protruding valve stem, a chuck for holding the center at its opposite poles, means for rotating the chuck, an applicator resting on the surface of the center, grooves in the underside of the applicator communicating with openings through the applicator and in which the cords are partially embedded and by which they are held in contact with the center, a shaft, means for driving the shaft in synchronism with the chuck, a driving disk operated by the shaft, an arm in frictional contact with the disk and pivoted about an axis in a plane spaced from the interpolar axis of the ball center, said axes being mutually perpendicular, and the first-mentioned axis passing substantially through the center of curvature of an inter-polar element of the ball center surface, a pivoted connection between the arm and the applicator on an axis parallel to the axis of rotation of the ball, and cam means located in the path of swing of the applicator, and adapted to lift the applicator over the valve stem without interrupting the cord winding operation.

PAUL REKETTYE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
158,427	Manchester	Jan. 5, 1875
1,240,448	Hensley	Sept. 18, 1917
2,153,409	Bogoslowsky	Apr. 4, 1939
2,224,416	Voit et al.	Dec. 10, 1940

FOREIGN PATENTS

Number	Country	Date
610,438	France	of 1927 (Addition to 32,318)