July 10, 1962 F. E. GALLOB 3,043,175

DEVICE FOR REPAIRING PLASTIC COATED BOWLING PINS

Filed April 2, 1959

FIG. 1

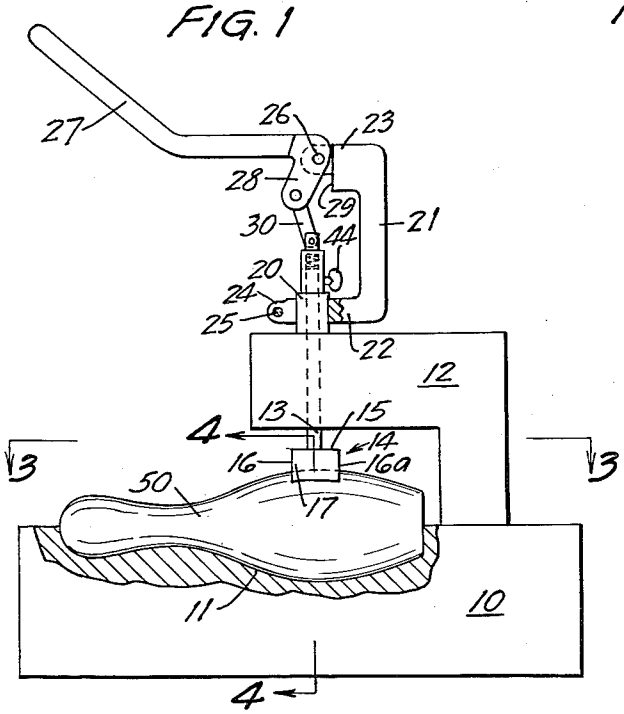


FIG. 4

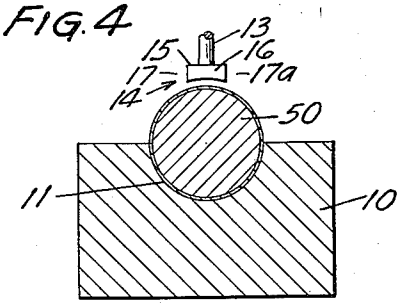


FIG. 2

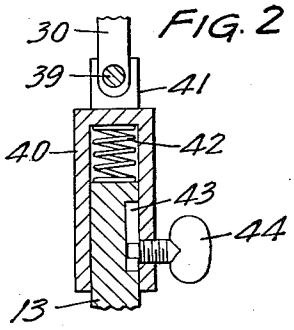


FIG. 3

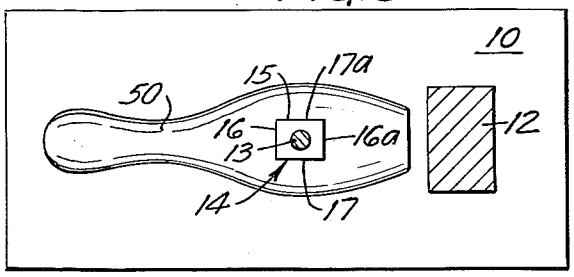


FIG. 9

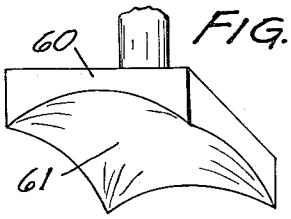


FIG. 8

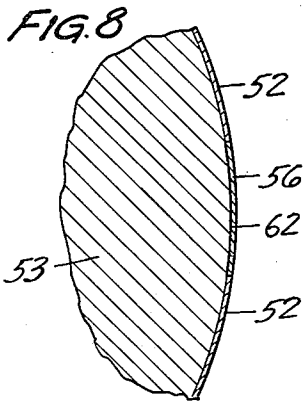


FIG. 5

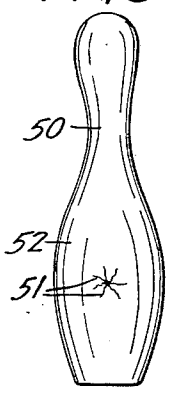


FIG. 6

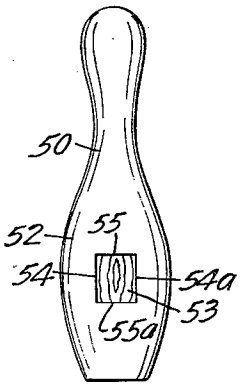
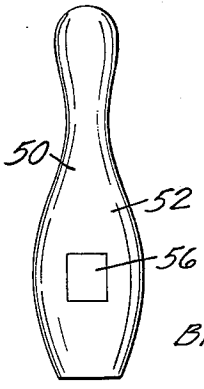


FIG. 7



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United States Patent Office 3,043,175 Patented July 10, 1962

3,043,175
DEVICE FOR REPAIRING PLASTIC COATED BOWLING PINS

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Filed Apr. 2, 1959, Ser. No. 803,788
3 Claims. (Cl. 83—6)

This invention relates to the repairing of bowling pins. More particularly it relates to a method of repairing plastic coated bowling pins the coatings of which have become worn or cracked, to a device for accomplishing such repairs, and to the repaired bowling pin.

Plastic coated bowling pins, which consist of a hardwood core or equivalent substrate covered with a tough white plastic coating of approximately 1/32–1/16 inch in thickness, represent the vast majority of the bowling pins used throughout America today. They are sanctioned for use in both organized league and tournament play by the American Bowling Congress (ABC). The useful life of such pins is limited. Although varying from lot to lot, many present day plastic coated bowling pins commence to become damaged or worn after being used in 800–1,000 lines or single games of bowling. Normally initial damage to the pins, through use, involves localized cracking or splitting of the plastic coating over the wooden substrate in the belly portion of the pin. Causes of this damage include ball against pin impact, the impact of the pins against one another, the impact of the pins against the kickback plate and other portions of the pin-setting machinery, and impact of the pins against the bowling alley itself.

The procedures of the present invention contemplate repairing the plastic coated pins soon after initial damage occurs.

Generally speaking, after initial rupture of the plastic coating, the damage to a pin through use increases and spreads rather rapidly. As this occurs the pin is first removed from "league play" and used only in "open bowling." Relatively soon thereafter it must be finally withdrawn from use altogether. By this time the majority of such pins are absolute scrap. The remainder of such pins may be in such condition that it is possible to send them to what might be termed a salvage and reclamation center. Here the pins are sorted and rebuilt by methods such as those taught in U.S. Patents Nos. 2,105,045, 2,202,675, 2,684,504 and which illustrate the extensive steps taken to renovate damaged bowling pins. Such cutting, kerfing, and drilling, tapping and injecting operations as are described in these patents obviously are expensive, and involve procedures, time and facilities that are beyond the scope of, and impractical to be adopted by, the individual bowling establishment proprietor. My observation has been that many of the pins so renovated do not regain the customary "pin action" and bounce, and may not be within the regulation weight limits for pins sanctioned for league play. Furthermore, such pins do not enjoy a useful life equivalent to that of the average new pin.

Hence, many bowling alley proprietors attempt to extend pin life through simpler procedures, such as by the use of paste-like hardenable cements to fill in the cracks and damaged areas of the pins. Although it represents the best method known to me prior to my invention, it had the disadvantages, inter alia, of requiring considerable time and effort. Generally this hand method requires repeated application of the paste, drying, and subsequent application of more paste to build up a layer of sufficient thickness to restore the exterior of the pin to its normal contour. Frequently sanding and finishing operations are required. Even then the repaired areas often are uneven. Additionally the repaired area on the

pin seems to pick up and retain dirt from the bowling alley more readily than the regular plastic coating, and the pin soon presents a mottled and spotted appearance that is objectionable.

Therefore it is an objective of the present invention to provide bowling establishment proprietors with a practical, relatively inexpensive and novel procedure for greatly extending the useful life or lineage of their plastic coated bowling pins.

A further objective is to provide repair means whereby the essentially normal contour of the pin is maintained, there is practically no alteration of the normal pin weight, the "pin-action" is retained (i.e., the liveliness in the way the pins bounce, often qualitatively indicated by the sound or "ring" of the wood when pins bounce against one another), and the pin is better appearing to the bowling customers.

Additional objectives are to provide repaired pins which have exceptional longevity, often doubling the useful life of a new pin before it must be salvaged or scrapped, a novel device for easily and simply effecting such a repair of a plastic-coated pin, and a novel method for patch-repairing plastic-coated pins.

The manner in which the above mentioned and other objectives and advantages are accomplished in accordance with the present invention will be apparent from the following description, taken in conjunction with the accompanying drawing, and in which:

FIGURE 1 is a side elevation partly broken away showing a preferred device for practicing the invention;

FIGURE 2 is an enlarged section showing a portion of the assembly of the device of FIGURE 1;

FIGURE 3 is a view taken along lines 3—3 of FIGURE 1;

FIGURE 4 is a sectional view taken along lines 4—4 of FIGURE 1;

FIGURES 5, 6 and 7 are side elevations of a plastic-coated bowling pin showing various stages of repair in accordance with the teachings hereof;

FIGURE 8 is an enlarged partial section showing an area of a pin which has been repaired in accordance with my invention; and

FIGURE 9 is a perspective view of a platen member which is used with my novel device during a part of the pin reparation procedure.

Referring now to FIGURES 1 to 4, wherein like reference characters refer to like parts in several views, an illustrative preferred device of my invention is shown wherein base **10** is provided on the upper surface thereof with a depression **11** conformed to the contour of a bowling pin. The depth of said depression is such that when a bowling pin is positioned therein, approximately one-half of the pin is exposed above base **10**. Beyond one end of depression **11** a right angular mount **12** is affixed to base **10**, the upper part of said mount extending over the belly portion of a bowling pin positioned in said depression. Preferably said mount is slidably positioned longitudinally with respect to the bowling pin. Thus the position of the cutting means, shortly to be described, which is supported on said mount, can, by adjusting the mount, be varied over the pin to be repaired. Movably extending vertically through the portion of mount **12** overhanging depression **11**, is reciprocal shaft **13**.

To the under end of shaft **13** is a rectangular cutter **14** having a flat upper or superior surface **15** and two pairs of parallel side walls **16** and **16***a* and **17** and **17***a*, respectively. The ends of the side walls of pair **16** and **16***a* adjoin perpendicularly the ends of adjacent side walls **17** and **17***a*. The bottom edges of said side walls terminate in sharp curved cutting edges so shaped that the rectangular cutting edge collectively defined by walls **16**, **16***a*, **17** and **17***a* conforms to the contour of that portion

of the belly of the bowling pin with which said cutter **14** comes into contact when shaft **13** is moved downwardly. The cutter **14** is removably affixed on the shaft, and preferably is not rigidly positioned when so affixed. Thus play exists permitting some independent movement of the cutter when it contacts a pin. Thereby some allowance is automatically made in cutter position for minor discrepancies or differences in the contour of the pins being repaired.

Mounted about the upper end of shaft **13**, so that said shaft is movable therein, is a cylindrical supporting post **20**. A generally U-shaped bracket **21** is fastened to post **20** so that the end members **22** and **23**, respectively, of said bracket are disposed horizontally. The bracket is affixed to post **20** at end member **22** by means of a split ring **24** affixed to end member **22**, said split ring extending about post **20**. The split ring is tightened about the supporting post by means of thumb screw **25**, which extends through the end closure members of said split ring.

To the upper end portion **23** of bracket **21** is pivotally fastened a handle **27** by means of pin **26** about which said handle pivots. Said pin extends through end portion **23** directly above shaft **13**. Handle **27** is provided with a fixed angular leg **28** which extends downwardly from the pivotally-fastened end thereof, as shown. Thus when handle **27** is raised and lowered about pin **26**, leg **28** moves back and forth arcuately, the lower end thereof thereby moving up and down with respect to base **10** as it travels. A shoulder stop **29** is provided in end member **23** of bracket **21** to limit the downward movement of handle **27**.

A toggle link **30** is pivotally connected at one end thereof to the lower end of leg **28** and at the other end to an adjustable connecting assembly affixed to the upper end of shaft **13**. It will thus be seen that as leg **28** moves arcuately in response to downward movement of handle **27**, toggle link **30** forces shaft **13** downwardly until the upper end of the toggle link and leg **28** are positioned directly in line between shaft **13** and pin **26**. As the handle **27** is further moved downwardly (leg **28** moving further in its arcuate path), the upper end of the toggle link is drawn upwardly just slightly before the upper portion of leg **28** bears against shoulder stop **29**. In this position, it will be appreciated that handle **27**, and thus shaft **13** and cutter **14** are "locked" into position until handle **27** is raised.

The distance which cutter **14** travels downwardly is adjusted so that the cutting edges thereof travel just enough to cut through the plastic coating of a bowling pin positioned in depression **11**. Referring momentarily to FIGURE 2, wherein the adjustable connecting assembly is shown, the lower end of toggle link **30** is movably connected through pin **39** to sleeve **40** at connecting lug **41** which forms the upper end of said sleeve. The latter is bored partially therethrough from the bottom end thereof. Disposed in the bore are spring **42** and the upper end of shaft **13**. The spring **42** is of such length that it is maintained normally under compression, and, hence, normally urges shaft **13** downwardly and out of sleeve **40**. On one side of the upper portion thereof which extends into sleeve **40**, shaft **13** is provided with a vertically extending longitudinal slot **43**. A thumb screw **44** threadably extends through the side of sleeve **40** and, when turned up tight, seats within and bears against the surface of slot **43**.

Thus the distance which shaft **13** and cutter **14** can move downwardly is determined by the position of shaft **13** within sleeve **40**. This position can be varied and adjusted by loosening thumb screw **44**, followed by sliding shaft **13** to a different position with respect to sleeve **40**, and then retightening said thumb screw **44**.

Referring again to the drawing generally, the manner in which a damaged bowling pin is repaired in accordance with my invention, is shown. A typical damaged pin **50** is shown in FIGURE 5 wherein an area of the plastic coating **52** of the pin contains many cracks **51** in the belly region of the pin. This is the initial area of failure in bowling pins perhaps 90% of the time as a result of the extensive ball to pin, and pin to pin contact in this area.

To be repaired a damaged pin is positioned in depression **11** after handle **27** is raised to an upward position to move cutter **14** out of the way. The pin is positioned with the cracked area uppermost. Handle **27** is then lowered so that the edges defined by walls **16**, **16***a*, **17** and **17***a* of cutter **14** pass through the plastic coating **52** in a continuous cut to define an enclosed area of predetermined dimensions and parameter, which area encompasses the damage being repaired.

The enclosed damaged plastic defined by the cut is then removed, for example, by inserting a sharp instrument under one edge thereof. Significantly, I have found that usually the area readily "pops" right out with but a single effort with the prying instrument. Apparently this is due to the fact that the plastic coating **52** is separated from the substrate by the continuous pounding the pin receives during use. Slight shrinkage of the substrate upon drying out of the pin may also contribute.

Upon removal of the damaged plastic portion an area of the wooden substrate **53** is exposed, defined by edges **54** and **54***a* and **55** and **55***a* of original coating **52** corresponding in size, respectively, with walls **17**, **17***a*, **16** and **16***a* of cutter **14**. The exposed substrate surface is then coated with a suitable bonding adhesive, such as "Hy-bond" type 80 contact adhesive. Then a preformed plastic insert or patch **56** (as shown in place in FIGURE 6) of the same dimensions and parameter as those of the plastic piece removed, is inserted in the recess defined by said edges **54**, **54***a*, **55** and **55***a* of the remaining original plastic coat **52**. The preformed plastic patch is preferably of about the same thickness as the original plastic coating.

A smooth-surfaced curved platen **60**, as illustrated in FIGURE 9, having the same under surface contour **61** as the belly portion of the bowling pin is then attached to shaft **13** in place of cutter **14**, and the bowling pin being repaired is inserted into depression **11** with the repaired area either upper-most (where it will be contacted by platen **60**) or lower-most (where it contacts the surface of depression **11**). Preferably the area covered by the platen is larger than the patch. After the patch has been positioned the handle **27** is lowered until the platen **60** is forced firmly against the pin surface. The patch is forced firmly into place at all points. Preferably the connecting assembly is so adjusted that platen **60** is "locked" properly into position against the pin with positive pressure applied against the repaired area. It thus remains until the adhesive agent cures or sets, thereby insuring a firm bonding of the patch to the wooden substrate.

As can be seen, the repairing process is simplified if two of my devices are used, one for "cutting" and one for "pressing." The connecting assembly of each need then be adjusted only once; and there need be no removal or substitution of the cutter and platen.

In addition to being shaped to the proper dimensions, the preformed plastic patch also can be previously molded to the desired contour of the bowling pin. The present invention lends itself equally well, however, to the use of flexible patches which have been simply stamped to the desired configuration from plane, i.e., flat, sheets. The latter type has the advantages of being readily mass produced by conventional stamping operations, and, hence, of being relatively inexpensive.

The preformed and precontoured patches are readily set in and bonded in place. However, where flexible plane patches are employed, even though initially not of proper contour to conform to the pin surface, they readily conform when the platen is brought to bear against the pin. Being so retained until the adhesive ma-

terial has set, the patch is then firmly and permanently held in place. In some instances it may be desirable to provide the platen 60 with an internal heating element. In such instance, the platen can be brought to bear against the patch, the latter being heat-formed to the proper contour. Of course, a suitable release material would cover the surface of the platen where heat pressing is employed to facilitate easy separation of the platen from the repaired pin surface.

The repaired pin resulting from my novel procedures is illustrated in FIGURE 8 wherein the plastic patch 56 is firmly adhered to wooden substrate 53 by means of thin adhesive film. 62. Where slight excess of adhesive is coated on substrate 53, the excess flows into any space between the abutting edge of original coat 52 and patch 56. Although, if desired the edges of the insert can be sanded lightly, usually this is entirely unnecessary.

Pins repaired by my novel method have been returned to play and withstood as many as 1,000 lines or more games of bowling without any failure of the patched area. I have found that there is essentially no alteration of the pin weight with pins thus repaired, normal "pin action" is retained, and because the patch soils in the same fashion as the original plastic coating (as compared with prior art paste-fillers which are differentially disposed to soiling) a better appearing pin is provided.

It will of course be apparent that there are obvious modifications that could be made of the shape of the coating-cutter here described, and substitutions for the preferred device described. However, it should be understood that such substitutions or modifications are within the spirit and scope of this invention, and that the particular forms illustrated place no limitation thereon except as defined in the appended claims.

What I claim is:

1. In a device for repairing plastic coated bowling pins having a damaged area in said coating, means for holding a damaged plastic coated pin, and means for cutting through said plastic coating around the damaged area on a predetermined enclosed parameter, said cutting means having a continuous downwardly extending cutting edge at least portions of which are concaved, said edge defining a compoundly curved contour corresponding to the surface at the belly portion of a bowling pin, and means for actuating said cutting means into a bowling pin retained by said holding means.

2. A device for use in repairing plastic coated bowling pins, comprising a base having a depression in the upper surface thereof conforming essentially to the contour of the lateral portion of a bowling pin, a platen having an under surface shaped to a compoundly curved contour corresponding with the surface at a belly portion of a bowling pin, means for positioning said platen above said belly portion of a bowling pin retained in said depression while permitting said platen to move toward and away from said depression and means for moving said platen toward and away from said depression.

3. A device for repairing plastic coated bowling pins having at least one damaged area in said coating, comprising a base having a depression in the upper surface thereof conforming essentially to the contour of the lateral portion of a bowling pin, a cutter having downwardly extending walls terminating in cutting edges, the cutting edges of adjacent walls adjoining to define an enclosed parameter with said edges being individually concaved and being disposed collectively to define a compoundly curved contour corresponding to the surface at the belly portion of a bowling pin, means for positioning said cutter above the belly portion of a bowling pin retained in said depression while permitting said cutter to move toward and away from said depression and means for moving said cutter toward and away from said depression.

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