Jan. 15, 1963 J. M. ERNST 3,073,597

BOWLING PIN

Filed July 14, 1958

FIG. 1

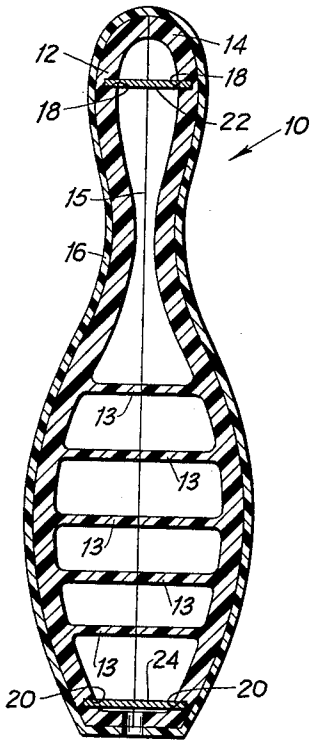


FIG. 4

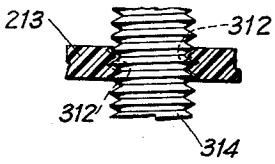


FIG. 2

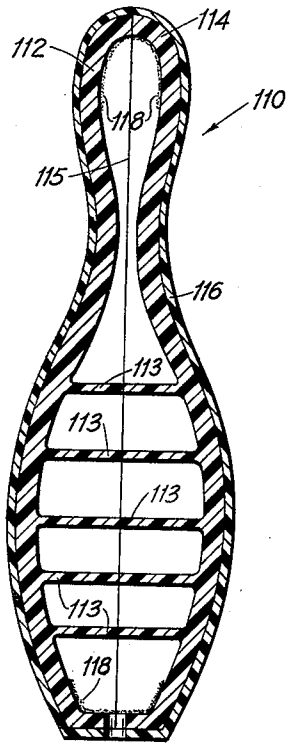
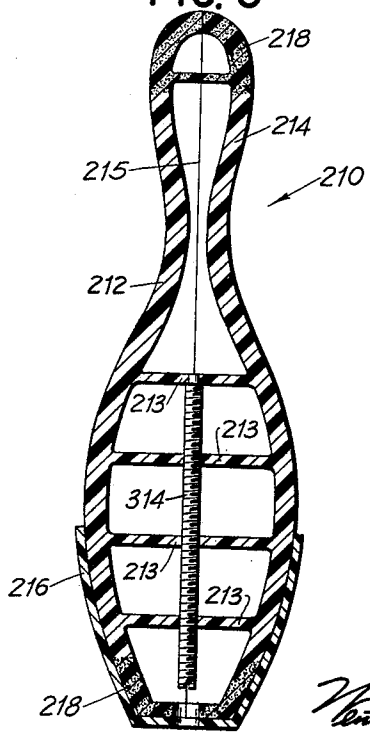


FIG. 3



INVENTOR
JOHN M. ERNST

BY

ATTORNEY

United States Patent Office

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BOWLING PIN

John M. Ernst, Shelby, Ohio, assignor to American Machine & Foundry Company, a corporation of New Jersey

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13 Claims. (Cl. 273—82)

This invention relates to bowling pins, and more particularly to bowling pins so constructed that it is possible to detect their movement and whether the pins are fallen or standing after the rolling of each ball.

This invention relates generally to improvements in bowling pins, which may be of the same general type as those disclosed in a copending application for patent of which I am coinventor with George A. Gruss and Harold W. Martin, for Bowling Pins and Method for Making Same, Serial No. 722,704, now Patent No. 3,025,061, filed March 20, 1958.

In the present invention, the plastic bowling pins disclosed are provided with coatings of metallic paint or adhesive applied to selected portions of the interior or interior surface of the pins, or suitable metallic inserts located in selected portions of the pins. The metallic coatings of paint or adhesive are applied to the pins before the core elements thereof are secured together. Suitable metallic paint and metallic adhesive are readily available and contain finely divided magnetic or non-magnetic metals suspended in the carrier vehicle of the paint or adhesive. In a modified form of the invention, a selected metal ring or metal parts can be molded into the core elements or in selected portions thereof. The invention further contemplates the provision of the desired metal characteristics as by the addition of finely divided metallic powder or suitably sized pieces or particles of metallic substance to the plastic material from which the pin elements are to be formed.

The metallic additives or constituents, such as, the coatings or inserts referred to above, preferably are located in the head, and butt portions of the pins such that in the use of the pins in the game of bowling, these metallic characteristics can coact with suitable detecting devices in order to produce the desired signals requisite for the spotting and respotting of the pins. When bowling pins embodying the invention are used with bowling pin spotting machines, the detecting devices can be located in the pin spot positions in the bowling alley floor. Pins embodying the present invention find particular use with the systems disclosed in the copending application by Milton Sanders and Howard S. Halpern for "Systems for Detecting Pin Wobble and Pin Presence Machine," filed April 4, 1957, having Serial Number 650,634, now Patent No. 2,980,424, and in the copending application by Carl J. Zaander titled "Control Mechanism for Bowling Pin Spotting Machines," filed October 18, 1957, Serial No. 690,981, now Patent No. 2,980,425.

Magnetic metallic substances can be used, if desired, to provide means for effecting the removal of pins from the pin deck of a bowling alley during the respotting cycle of the associated bowling pin spotting machine by using a selectively operable electromagnetic respotting device to engage and lift and respot pins provided with such magnetic metallic substances.

In another modified form of the invention, means is

provided for varying the weight of the pin in accordance with the desires of the particular bowler.

It is, therefore, an object of the present invention to provide a composite bowling pin having metallic substances secured thereto.

It is an added object of this invention to provide a composite bowling pin provided with members coacting with the detecting devices of a pin motion or pin presence control mechanism of a bowling pin spotting machine.

It is an object of one form of the present invention to provide a plastic bowling pin having metal inserts in the head and butt ends thereof, for use with the detecting device of a pin wobble and pin presence control mechanism for a bowling pin spotting machine.

It is an added object of a modified form of the present invention to provide a composite plastic bowling pin with metal adhesive on the inside thereof adjacent the head and butt portions thereof, for use with the detecting device of a pin wobble and pin presence control mechanism for a bowling pin spotting machine.

A further object of the present invention is to provide a plastic bowling pin comprising two opposed core sections having a circumferential cover, the core sections provided with metallic members molded therewith, adjacent the head and butt ends thereof, for use with the detecting device of a pin wobble and pin presence control mechanism for a bowling pin spotting machine.

Another object of the present invention is to provide a plastic bowling pin having a head end provided with a metallic substance for use with a magnetic respotting member of an automatic bowling pin spotting machine.

An added odject of the present invention is to provide a bowling pin having means for varying the weight of the pin in accordance with the desires of the bowler.

Another object of the present invention is to provide a bowling pin having an elongated member insertable along the central axis of the pin to vary the weight thereof in accordance with the desires of the bowler.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

FIG. 1 is a cross sectional view of a plastic pin provided with metal inserts in accordance with the present invention.

FIG. 2 is a cross sectional view of a plastic bowling pin provided with metallic adhesive in accordance with a modified form of the present invention.

FIG. 3 is a cross sectional view of a plastic bowling pin having metallic elements molded therewith in accordance with another modified form of the present invention.

FIG. 4 is a detailed view of a portion of the pin shown in FIGURE 3.

Referring to FIGURE 1, the pin **10** embodying the preferred form of the present invention comprises plastic core halves **12** and **14**, having reinforcing ribs **13** and provided with a circumferential plastic cover **16**. Core halves **12** and **14** and cover **16** may be produced by any suitable method. Preferably, these members are produced as disclosed in the above-referred co-pending appli-

cation, Serial Number 722,704 of which I am co-inventor. Therefore only so much of a disclosure thereof as is necessary for a complete understanding of the present invention is included herein.

As described in my co-pending application Serial Number 722,704, core halves **12** and **14** are preferably formed separately and bonded along their respective marginal rims, forming the vertical seam **15**. Before joining core halves **12** and **14**, each half is provided with an upper notch or slot **18** in the head end thereof and a lower notch or slot **20** as shown in FIGURE 1. Notches **18** and **20** of core half **12** are positioned to be aligned with their opposite number on core half **14** when those halves **12** and **14** are bonded together.

As core halves **12** and **14** are brought together for bonding, an upper metal insert **22** is positioned in notches **18** and a lower metal insert **24** is positioned in notches **20** as shown in FIGURE 1. After core halves **12** and **14**, with metal inserts **22** and **24** therein, have been joined, circumferential plastic cover **16** is applied to the exact dimension of a conventional bowling pin, producing a finished plastic pin embodying metal inserts in the head and butt portions thereof. Pin **10** thus produced is usable with a pin motion or pin presence detecting device of a bowling pin spotting machine or with a magnetic spotting and respotting unit thereof.

Referring to FIGURE 2, pin **110** embodying a modified form of the invention, comprises plastic core halves **112** and **114** having reinforcing ribs **113** and provided with a circumferential plastic cover **116**. Core halves **112** and **114** and cover **116** are preferably produced as core halves **12** and **14** and cover **16** of the preferred embodiment and as disclosed in my co-pending application Serial Number 722,704. Core halves **112** and **114** are preferably formed separately and bonded along their respective marginal rims, forming the vertical seam **115**. Before joining, the inner surface of each core half **112** and **114** is coated with a metal adhesive or paint **118** adjacent the head and butt portions of pin **110** as shown in FIGURE 2. Adhesive **118** may be compounded of any suitable material such as powdered iron or aluminum paint.

After core halves **112** and **114**, with the metal adhesive coated thereon, have been joined, circumferential plastic cover **116** is applied thereto to the exact dimensions of a conventional bowling pin, producing a finished plastic pin having a metallic coating on the inside thereof. Pin **110** thus produced is usable with a pin motion or pin presence detecting device of a bowling pin spotting machine or with a magnetic spotting and respotting unit thereof.

Referring to FIGURE 3, pin **210**, embodying another modified form of the invention comprises plastic core halves **212** and **214** having reinforcing ribs **213** and provided with a circumferential plastic cover **216**. Core halves **212** and **214** and cover **216** are preferably produced separately as core halves **12** and **14** and cover **16** of the preferred embodiment and as disclosed in my co-pending patent application Serial Number 722,704. However, in producing core halves **212** and **214**, in order to incorporate the desired metallic characteristics of the invention metallic elements or filings **218** are added to the molten plastic adjacent the head and butt and portions thereof. Thus, the metallic characteristics are formed integrally with core halves **212** and **214**.

Core halves **212** and **214**, with the metallic elements **218** molded therein, are bonded along their respective marginal rims forming vertical seam **215**. Next, circumferential plastic cover **216** is applied thereto to the exact dimensions of a conventional bowling pin, producing a finished plastic pin embodying molded metal elements in the head and butt portions thereof. Pin **210** thus produced is usable with a pin motion or pin presence detecting device of a bowling pin spotting machine or with a magnetic spotting and respotting unit thereof.

To produce a set of balanced bowling pins, wherein the weights and locations of centers of gravity of each pin of the set is substantially identical with the other pins of the set, the reinforcing ribs **13** of pin **10**, or ribs **113** of pin **110** or ribs **213** or pin **210**, (see FIGURE 3) may be provided with threaded central apertures **312** (see FIGURE 4). As shown in FIGURE 3, an elongated threaded rod **314** of predetermined desired weight is inserted through the butt end of the associated pin **210** and threaded in apertures **312**, thus being secured axially therein. Thus the exact weight of sets of pins can be controlled by using rods **315** of different lengths to impart the same characteristics of weights and positions of centers of gravity to each pin of the set.

What I claim is:

1. A composite bowling pin comprising a pair of hollow plastic opposed sections of generally uniform thickness and having longitudinally disposed, matching edge portions each opposed section being provided with an integral rib portion, said sections abutting and secured to each other throughout the extent of the matching edge portions, said rib portions abutting and secured to each other throughout the extent of their matching edges, metallic elements located adjacent the head and butt portions of said sections to provide said pin with characteristics for detecting pin motion and/or pin pressure on a bowling alley after the rolling of a ball therealong.

2. The invention as defined in claim 1 wherein said sections include a plastic cover integrally extending completely peripherally around the outside and throughout the heights of said sections.

3. The invention as defined in claim 2 including an elongated insert of selected weight removably secured in said sections along the longitudinal central axis thereof.

4. A composite bowling pin comprising a pair of hollow plastic opposed sections of generally uniform thickness and having longitudinally disposed, matching edge portions each opposed section being provided with an integral rib portion, said sections abutting and secured to each other throughout the extent of the matching edge portions, said rib portions abutting and secured to each other throughout the extent of their matching edges, at least one metal insert located adjacent the head and butt portions of said sections, said inserts providing said pin with means for detecting pin motion or pin presence on a bowling alley after a ball has been rolled therealong.

5. The invention as defined in claim 4 wherein said metal inserts include flat sheet sections supported transversely in said sections adjacent the head and butt portions thereof and said pin includes a plastic cover integrally extending completely peripherally around the outside and throughout the heights of said sections.

6. The invention as defined in claim 1 wherein said metallic elements include a mixture of powdered iron and epoxy resin applied to the inner circumferential surfaces of said sections adjacent the head and butt portions thereof and said pin includes a plastic cover integrally extending substantially completely peripherally around the outside and throughout the heights of said sections.

7. The invention as defined in claim 1 wherein said metallic elements are formed of metallic adhesive applied to the head and butt portions of said sections.

8. The invention as defined in claim 1 wherein said metallic elements comprise metallic adhesive.

9. The invention as defined in claim 1 wherein said metallic elements are molded integrally with the head and butt portions of said sections.

10. The invention as defined in claim 1 wherein said metallic elements are formed integrally with the head and butt portions of said sections.

11. The invention as defined in claim 10 wherein said metallic elements include powdered iron added to the head and butt portions of said sections while in a molten state and said pin includes a plastic cover integrally extending substantially completely peripherally around the outside and throughout the heights of said sections.

12. The invention as defined in claim 1 including means

for selectively varying the weight of said pin comprising an elongated insert of selected weight removably secured along the longitudinal central axis of said pin.

13. The invention as defined in claim 1 wherein said ribs are provided with centrally positioned threaded apertures and an elongated threaded rod of selected weight removably secured in said apertures and located along the longitudinal axis of said pin whereby the weight and position of the center of gravity of said pin may be controlled.

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