United States Patent [19]

Brown et al.

[11] **3,831,423**

[45] **Aug. 27, 1974**

[54] **METHOD OF MAKING GOLF BALL MOLDS**

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[73] Assignee: **Acushnet Company,** New Bedford, Mass.

[22] Filed: **Jan. 26, 1973**

[21] Appl. No.: **326,900**

[52] **U.S. Cl.** ..... **72/358,** 76/107 R

[51] **Int. Cl.** **B21k 5/20**

[58] **Field of Search** ..... 72/358; 76/107 R

[56] **References Cited**

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941,032	11/1909	McCarthy	72/358
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2,026,337	12/1935	Yingling	76/107
2,058,395	10/1936	Atti	90/13.3
2,325,989	8/1943	Tryon	76/107
2,722,047	11/1955	Cousino	72/358
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Primary Examiner—Lowell A. Larson

Attorney, Agent, or Firm—Eyre, Mann & Lucas

[57] **ABSTRACT**

A method of making molds for the production of golf balls is disclosed. A hob is made of approximately the same dimensions as half of the finished golf ball and then a mold is formed from the hob.

5 Claims, 5 Drawing Figures

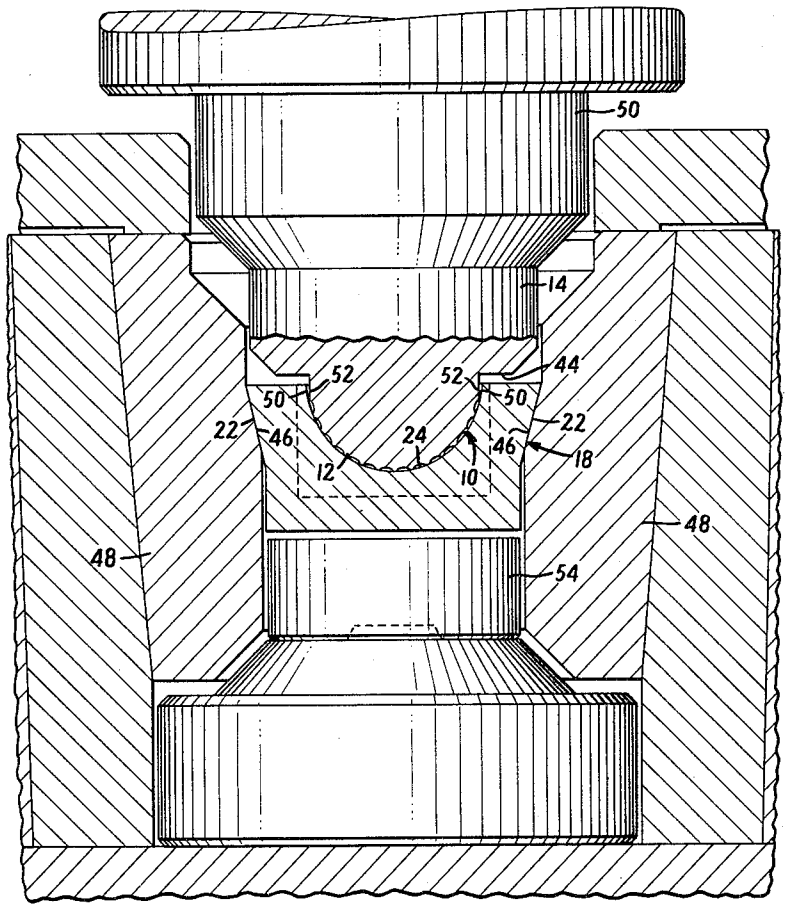


FIG. 1

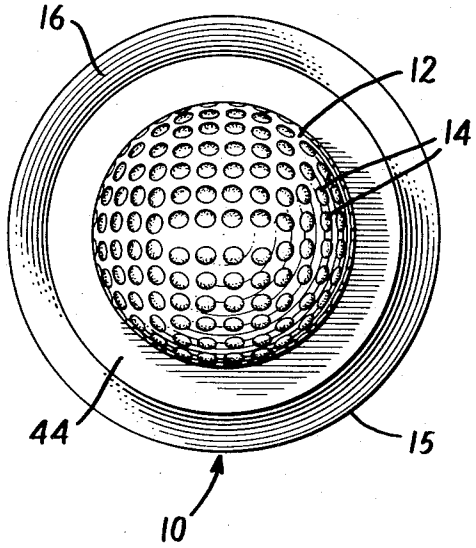


FIG. 2

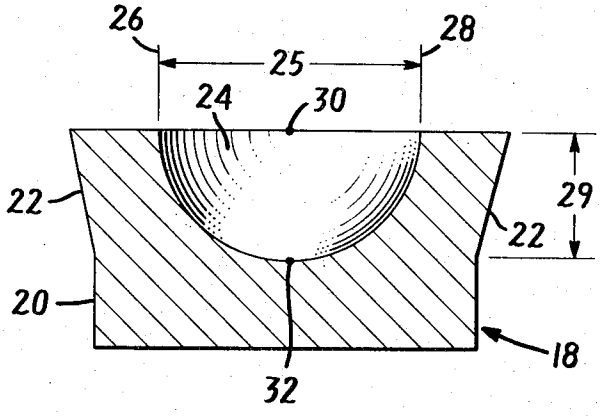


FIG. 3

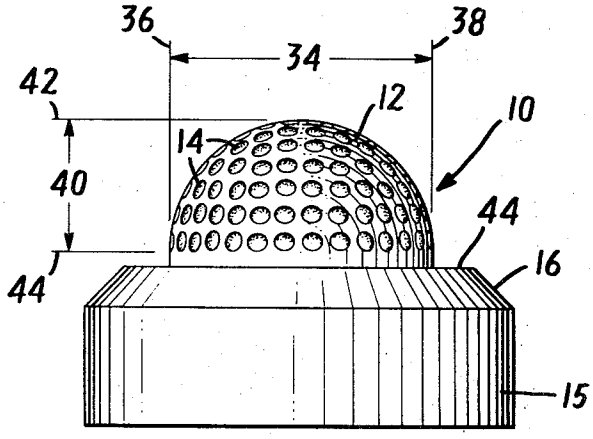
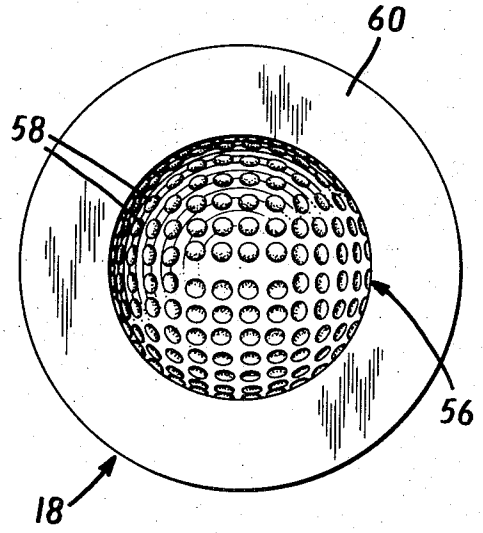


FIG. 5



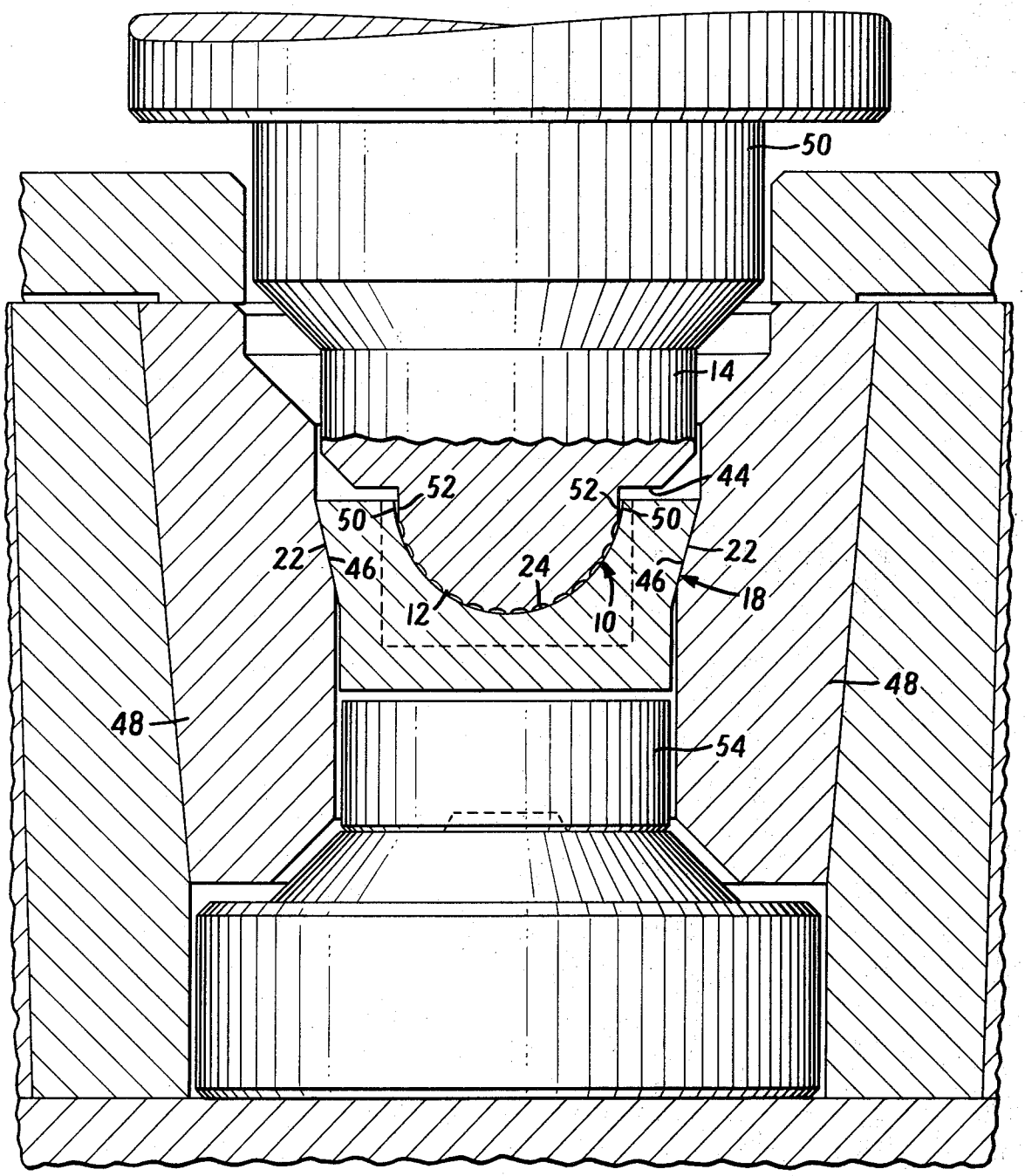


FIG. 4

METHOD OF MAKING GOLF BALL MOLDS

The present invention relates to a new and useful method of making golf ball molds.

Golf ball molds are used in the production of golf balls of both the wound and solid types. Normally two molds (an upper and lower) are used to make one golf ball and each of the molds is generally the size of one-half of the golf ball. When the two molds are mated, they will form a generally spherical interior with an equator at approximately the middle of the golf ball.

In the past, golf ball molds have normally been cut individually by machines as for example those disclosed in U.S. Pat. Nos. 2,058,395 and 2,767,622. The method according to these patents is time consuming since each mold must be cut individually. It would be highly desirable to be able to make a plurality of molds with only one cutting.

The applicant has discovered that a plurality of molds can be made with only one cutting by forming a hob which approximately corresponds to the dimensions of the finished, molded, unpainted golf ball. This hob can then be used to impress a plurality of mold blanks to make a plurality of golf ball molds. In addition to cost savings in both time and materials, the hobbing technique of the present invention is highly advantageous since a plurality of molds can be made having the same dimple pattern and configuration. This is especially important today since recognition has been made recently of the important factors of the aerodynamic configuration of golf ball dimples and their spatial relationship.

These and other aspects of the present invention may be more fully understood with reference to the drawings in which:

FIG. **1** is a hob for use in accordance with the present invention;

FIG. **2** is a mold blank in accordance with the present invention;

FIG. **3** is a side view of the hob of FIG. **1**;

FIG. **4** is an apparatus for making golf ball molds in accordance with the present invention; and

FIG. **5** is a golf ball mold made in accordance with the present invention.

In FIG. **1** is shown a hob **10.** The hob comprises an arcuate section **12** which is approximately one-half of a sphere. The arcuate section **12** is of substantially the same dimension as the finished, unpainted golf ball which is to be produced. It will be understood that since a golf ball will normally shrink when it is removed from a golf ball mold, the arcuate section **12** will generally be slightly larger than the desired size of the finished, unpainted golf ball. Arcuate section **12** has dimples **14** therein which again are substantially the same size as the dimples on the finished, unpainted golf ball but, again because of the shrinking, these dimples will usually be slightly larger than the dimples on the finished golf ball. The base of the hob **15** is preferably provided with a tapered section **16** to avoid sharp edges in the finished hob.

The formation of the hob itself does not form a part of the present invention. The hob may be made in known manner as for example by machining on a drill press with coacting horizontal and vertical tables. It is also possible to form the hob by hand or by the apparatus described in U.S. Pat. Nos. 2,058,395 or 2,767,622 by making the master to the shape of the hob rather than to the shape of the mold.

Referring to FIG. **2** there is shown in cross section a mold blank **18** for making a golf ball mold in accordance with the present invention. The blank comprises a base section **20** and a tapered sidewall **22.** The function of the tapered sidewall will be discussed hereinafter with respect to FIG. **4.** Cavity **24** is provided in the mold blank for receiving the golf ball hob. It has been found highly desirable for this cavity section to have a greater diameter than the diameter of the arcuate section of the hob and it has also been found highly desirable to have the mold of slightly less depth than the depth of the arcuate section of the hob.

The diameter and depth of the cavity and arcuate section are measured in the following manner. Referring to FIG. **2,** the diameter **25** of the cavity is taken at the equator from point **26** to point **28.** The depth **29** is a vertical line from point **30** which is in the center of the top of the cavity **24** to a point **32** which is directly below point **30** and will be the deepest part of the cavity.

Referring to FIG. **3,** the diameter **34** of the arcuate section of the hob is from the widest points at its equator **36** and **38.** The depth **40** of the arcuate section is a vertical line from the highest point of the hob **42** to the base of the hob **44.**

Referring to FIG. **4** there is shown the mold blank **18** with the hob **10** resting therein. Tapered sidewall **22** of the mold blank **18** bears against tapered sidewall **46** of the mold blank receiving member **48.** When pressure is applied to hob **10** by piston **50** from a power source (not shown) such as a hydraulic press, arcuate section **12** will press against cavity **24.** Continued application of pressure to hob **10** will exert force upon mold **18** and will result in pressure on tapered sidewall **22** of the mold blank **18** from tapered sidewall **46** of the mold receiving member **48.** This will cause the equator edge **50** of the mold blank to press against the equator edge **52** of the hob so that the dimples in the area of the equator will be fully impressed. Since the mold blank cavity is preferably of slightly less depth than the hob, the hob under the pressure from piston **50** will be forced into the mold blank to its base **44** and the dimples from the hob will be accurately impressed on the bottom of the mold. The mold will have a shape which is substantially a negative of the shape of the hob.

After the hob has thus formed the mold, the hob and mold are removed from the mold receiving member **48** suitably by means of a piston **54** which again may be activated by hydraulic means (not shown). The mold is then removed from the hob. Because of the difference in diameter of the equator of the mold and the hob, the mold will frequently just fall off the hob. Where the equator of the hob and the mold have been made of the same diameter or in other cases where the mold will not readily fall off the hob, the mold can be removed by heating around the tapered edge **22.** When this is necessary or desirable, it is of advantage to make the mold blank of a material having a higher coefficient of expansion than the coefficient of expansion of the hob but this is not an absolute necessity.

The mold may be heated during the forming process if desired but it has been found that this is not necessary, especially in the case where the equator of the mold is made of a greater diameter than the equator of the hob.

In the preferred embodiment of the invention the hob is made of through hardened steel and the mold is made

of brass. However, the selection of materials is not important to the present invention and it is only necessary that the hob be hard enough with respect to the mold that it will impress the desired configuration in the mold.

FIG. **5** is a top view of the mold blank **18** with the golf ball mold **56** impressed therein and the mold of FIG. **5** has come from treatment in the apparatus of FIG. **4.** The dimples **58** in mold **56** are protrusions and thus form indentations in the golf ball when the ball is molded. The body of the mold **60** will usually be substantially reduced in diameter when the mold is used for forming golf balls.

It will be understood that the claims are intended to cover all changes and modifications of the preferred embodiments of the invention, herein chosen for the purpose of illustration, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. The method of making a golf ball mold which comprises:

a. forming a golf ball hob having an arcuate section of substantially the same dimensions as the finished, unpainted golf ball to be formed from the golf ball mold;

b. contacting the arcuate section of the golf ball hob with the cavity of a golf ball mold blank having a cavity therein, said cavity having a depth less than the height of the arcuate section of the golf ball hob and said cavity having a diameter at its equator of greater dimension than the diameter of the arcuate section of the golf ball hob at the equator of the arcuate section;

c. applying pressure to cause a negative of at least the arcuate section of the golf ball hob shape to be imparted to the golf ball mold blank; and

d. separating the golf ball hob from the golf ball mold including expanding of the equator of the mold away from the equator of the hob.

2. The method of claim **1** wherein the equator of the golf ball mold blank is heated to cause it to expand.

3. The method of claim **1** wherein the golf ball mold blank is provided with tapered sidewalls.

4. The method of claim **1** wherein the golf ball mold blank has a higher coefficient of expansion than the coefficient of expansion of the golf ball hob.

5. The method of claim **4** wherein the golf ball hob is steel and the golf ball mold blank is brass.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,831,423

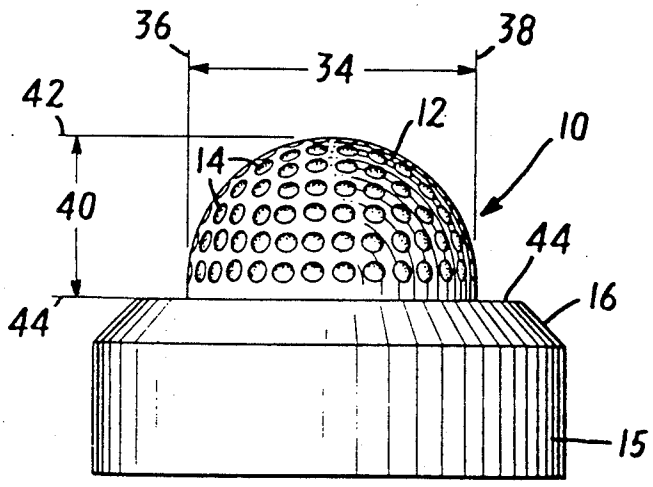
DATED : August 27, 1974

INVENTOR(S) : Robert A. Brown et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Fig. 3 is corrected as follows:

FIG. 3



Signed and Sealed this

Fifth Day of June, 1990

Attest:

HARRY F. MANBECK, JR.

Attesting Officer

Commissioner of Patents and Trademarks