April 20, 1965 B. GOLDSMITH 3,179,013

APPARATUS AND METHOD FOR MARKING SPHERICAL ARTICLES

Filed May 29, 1962

Fig. 1.

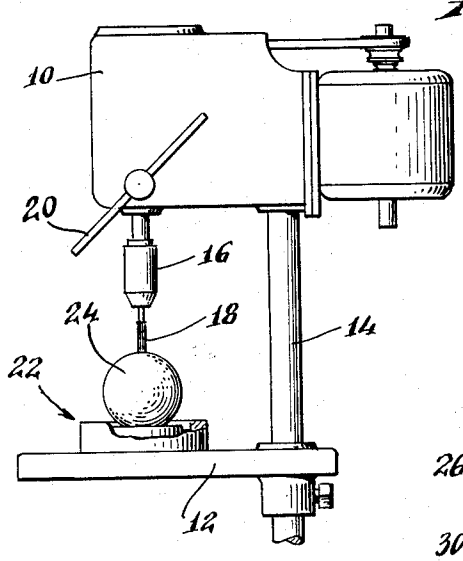
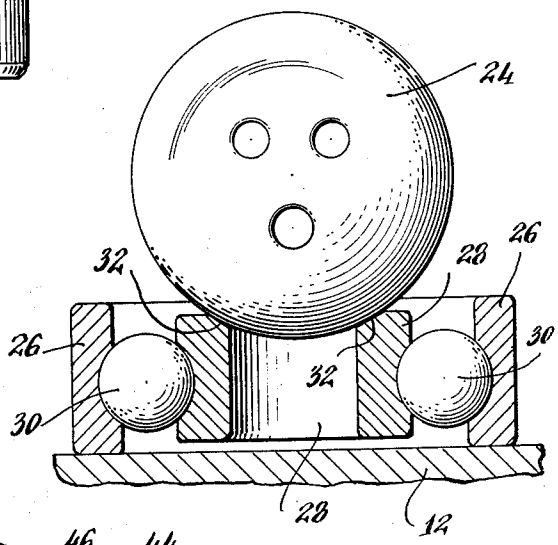


Fig. 2.



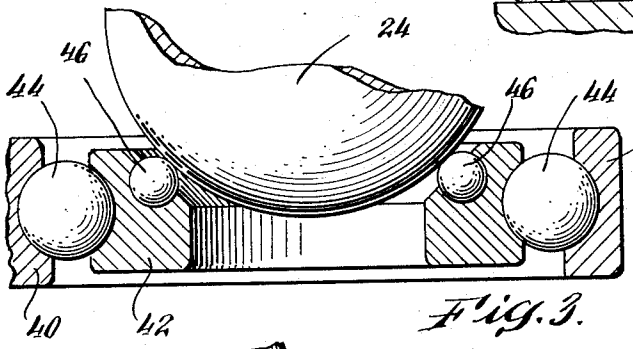


Fig. 3.

Fig. 4.

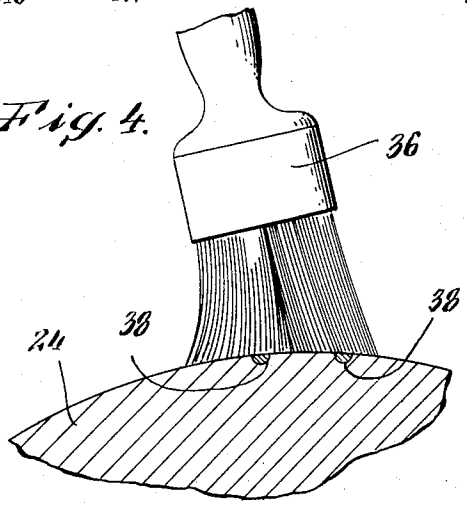


Fig. 6.

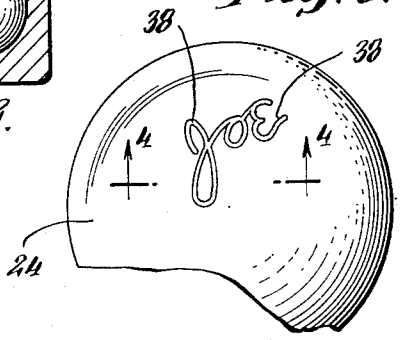
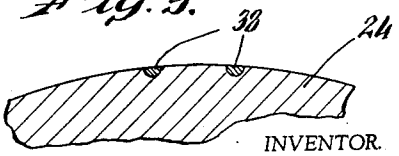


Fig. 5.



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APPARATUS AND METHOD FOR MARKING SPHERICAL ARTICLES

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This invention relates to method and apparatus for marking substantially spherical articles. More particularly, the invention relates to a work holder suitable for inscribing bowling balls and similar articles.

Skillful bowlers commonly purchase their own bowling balls on the basis of finger size and span and also to insure continued use of a ball of proper weight. Commercial bowling establishments also maintain a supply of bowling balls for the use of the general bowling public. As the ball returns of most bowling establishments do not differentiate the customer's personal ball from those owned by the establishment or other bowlers, most players desire some type of personalized marking to prevent the use of their own equipment by a bowler removing a ball from the common rack. Further, such markings prevent theft, aid identification generally, and also may be a source of personal pride and satisfaction if carefully and artistically executed.

It will be readily apparent that many difficulties arise in marking a curved surface such as that of a bowling or duck-pin ball. Most such difficulties arise from the problems involved in holding such an object in a fixed position while moving a suitable engraving tool over its surface. One way of overcoming such problems is to use a simple impression stamp. This however, does not allow a suitable range of freedom of expression and "personalizing." Neither does it allow a name, for example, to be engraved in script form.

It is therefore, the primary object of this invention to provide an improved fixture for inscribing a spherical article.

Another object is to provide such a fixture which allows a high degree of freedom of movement between the object to be marked and the inscribing tool.

Another object is to provide an improved method for marking a spherical surface.

Another object is to provide a spherical object having an inlaid design set into its surface.

Other objects, features, and advantages will be apparent from the following description, the appended claims, and the figures of the attached drawings wherein:

FIG. 1 is an illustration of a fixture constructed in accordance with this invention, shown in position for inscribing a bowling ball;

FIG. 2 is an enlarged cross-sectional view of the fixture of FIG. 1;

FIG. 3 is a cross-sectional view of another embodiment of a fixture of this invention;

FIG. 4 is a cross-section taken along 4—4 of FIG. 6 and illustrates one method useable to apply an inlay material to an inscribed article;

FIG. 5 is a view similar to that of FIG. 4 illustrating an article inscribed and inlaid in accordance with this invention; and

FIG. 6 is a view of a bowling ball marked in accordance with the invention.

Reference to FIG. 1 will disclose a drill press **10** of standard design including a work table **12**, a support **14**, a chuck **16**, a drill bit **18**, and a depth controlling arm **20**.

On work table **12**, the fixture **22** of this invention supports a bowling ball **24** in position beneath drill bit **18**.

The construction of fixture **22** is shown in more detail in FIG. 2. The fixture comprises a circular cylindrical outer bearing race **26** so positioned as to rest on table **12**. A cylindrical inner race **28** is positioned in rotating, concentric relationship with outer race **26** and is separated therefrom by a plurality of rotatable balls **30**. It should be noted that the lower surface of inner race **28** is positioned so as to be out of contact with table **12**. Also, the top inner edge **32** of race **28** is rounded or chambered to allow movement of a sphreical object thereacross without excessive friction or scratching of the surface.

The operation of the workholder of this invention will now be apparent from a consideration of FIG. 1. It should be noted that the center of the ball **24** to be marked is maintained at all times in direct alignment with bit **18**. For this reason, bit **18** advances along a radius of ball **24** and a proper setting of controlling arm **20** will cause the bit to penetrate into the surface a desired amount. The fact that bit **18** acts along a radius of ball **24** is an important advantage. First, the force of bit **18**, lying directly over the center of gravity of ball **24**, can form no turning moment which might otherwise tend to rotate ball **24**. Secondly, as the ball **24** is constrained to rotate about its own center which remains spatially fixed, the distance from such center to the closest part of the advanced bit will, itself, be the radius of a somewhat smaller but concentric sphere. Consequently, the depth of cut will remain constant.

After positioning the ball and bit as described above, ball **24** may be manually "rolled" within the confines of fixture **22**. In this manner, the surface of ball **24** is caused to move relative to bit **18** so that an inscription or design may be engraved on the surface. Upon completion, arm **20** may be unlocked, bit **18** raised, and ball **24** removed.

FIG. 3 illustrates a variation of the fixture shown in FIGS. 1 and 2. In this embodiment, an outer race **40** and an inner race **42** are separated by balls **44**. Article **24**, however, does not, in this instance, rest directly on the inner race but, rather, rests upon a circle of rolling balls **46** rotatably carried by race **42**. There must be at least three such balls **46**, but the maximum number is unlimited. This embodiment reduces the rolling friction encountered by ball **24** against the inner cylinder.

To inlay the inscription so formed, a material such as a paint or other hardenable fluid or plastic material may be inserted into the engraving. For example, as shown in FIG. 4, a brush **36** is employed to fill the engraved channels with a paint **38**, which may be of a contrasting color to that of ball **24**. Any excess may be wiped from the surface of the ball and the paint, or similar material, allowed to harden in the channels as shown in FIG. 5.

The finished article may be as shown in FIG. 6 which illustrates a ball **24** carrying on its surface a suitable inscription **38** formed in accordance with the invention.

Many other variations and modifications may be made in this invention without departing from the spirit and scope thereof. Accordingly, this invention is to be construed as limited only by the scope of the following claims.

I claim:

1. A work holding fixture for a spherical object which comprises a substantially cylindrical outer base member adapted to rest upon a primary supporting surface with its axis of revolution perpendicular thereto; a substantially cylindrical inner member concentric with said outer member and having a concave work supporting surface complementary to the outer spherical surface of said object at the upper terminus of its inner side; and a plurality of balls retained between said inner and outer members in rollable relationship therebetween, said inner member being rotatable against said balls and relative to said base member about said axis of revolution.

2. The apparatus of claim 1 wherein said work supporting surface comprises at least three substantially ball-shaped rollable members positioned along the circumference of a circle.

3. Article marking apparatus which comprises a primary supporting surface; a substantially cylindrical outer base member supported by said primary supporting surface with its axis of revolution perpendicular thereto; a substantially cylindrical inner member concentric with said outer member and having a concave generally spherical work supporting surface at the upper terminus of its inner side; a plurality of balls retained between said inner and outer members in rollable relationship therebetween, said inner member being rotatable against said balls and relative to said base member about said axis of revolution; rotatable bit means supported above said inner member and having its axis of rotation colinear with said axis of revolution; and means for advancing said bit means along said axis of revolution.

4. The apparatus of claim 3 wherein said work supporting surface comprises at least three substantially ball-shaped rollable members positioned along the circumference of a circle lying in a plane substantially parallel to said primary supporting surface.

5. Marking apparatus for a spherical article which comprises a substantially planar horizontal supporting surface; a substantially cylindrical outer fixture member supported by said supporting surface with its axis of revolution perpendicular thereto; a freely rotatable inner fixture member supported by said outer member, said inner member being provided with a concave substantially spherical article supporting surface on the upper terminus of its inner side, said article having a diameter greater than the internal diameter of said fixture member, whereby the center of said spherical article is positioned on said axis of revolution; rotatable bit means supported above said fixture member and having its axis of rotation colinear with said axis of revolution; and means for advancing said bit means along said axis of revolution and an inscribing distance into the surface of said spherical article.

6. The apparatus of claim 5 wherein said inner and outer members are separated by a plurality of rotatable balls positioned around the circumference of a circle.

7. An apparatus for inscribing a substantially spherical article which comprises a cylindrical outer base member adapted to rest upon a primary supporting surface with its axis of revolution perpendicular thereto; a cylindrical inner member concentric with said outer member and having a work supporting surface which comprises at least three substantially ball-shaped rollable members positioned along the circumference of a circle lying in a plane substantially parallel to said primary supporting surface; a plurality of balls retained between said inner and outer members in rollable relationship therebetween, said inner member being rotatable against said balls and relative to said base member about said axis of revolution; rotatable bit means supported above said inner member and having its axis of rotation colinear with said axis of revolution; and means for advancing said bit along said axis of revolution.

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