APPARATUS AND METHOD FOR MARKING SPHERICAL ARTICLES

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7 Claims. (Cl. 90—20)

This invention relates to methods and apparatus for marking substantial 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 use in 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 of some 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 the 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 iden 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;

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 arm 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 with respect to the drill bit. 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 spherical 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 with 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 inrollable relationship therewith, 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 inrollable relationship therewith, 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.

References Cited by the Examiner

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>421,374</td>
<td>2/90</td>
<td>Barr</td>
<td>90-20</td>
</tr>
<tr>
<td>506,089</td>
<td>10/93</td>
<td>Beeler</td>
<td>90-165</td>
</tr>
<tr>
<td>690,861</td>
<td>1/02</td>
<td>Hoy</td>
<td>40-327</td>
</tr>
<tr>
<td>1,057,762</td>
<td>4/13</td>
<td>Meuhleit</td>
<td>269-269 XR</td>
</tr>
<tr>
<td>1,377,988</td>
<td>5/21</td>
<td>Lambert</td>
<td>90-20</td>
</tr>
<tr>
<td>1,722,492</td>
<td>7/29</td>
<td>Brunner</td>
<td>308-189</td>
</tr>
<tr>
<td>2,408,491</td>
<td>10/46</td>
<td>Strickland</td>
<td>90-20</td>
</tr>
<tr>
<td>2,428,669</td>
<td>10/47</td>
<td>Hopkins</td>
<td>77-63</td>
</tr>
<tr>
<td>2,490,120</td>
<td>12/49</td>
<td>Ellison et al.</td>
<td>77-63</td>
</tr>
<tr>
<td>2,651,975</td>
<td>9/53</td>
<td>Soloff</td>
<td>77-63 XR</td>
</tr>
<tr>
<td>2,839,853</td>
<td>6/58</td>
<td>Giangreco</td>
<td>40-327</td>
</tr>
<tr>
<td>2,896,338</td>
<td>7/59</td>
<td>Petersen</td>
<td>35-46</td>
</tr>
</tbody>
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