

June 30, 1953

W. T. GROVE

2,643,557

FIXTURE FOR SPHERICAL MEMBERS

Filed Sept. 27, 1949

3 Sheets-Sheet 1

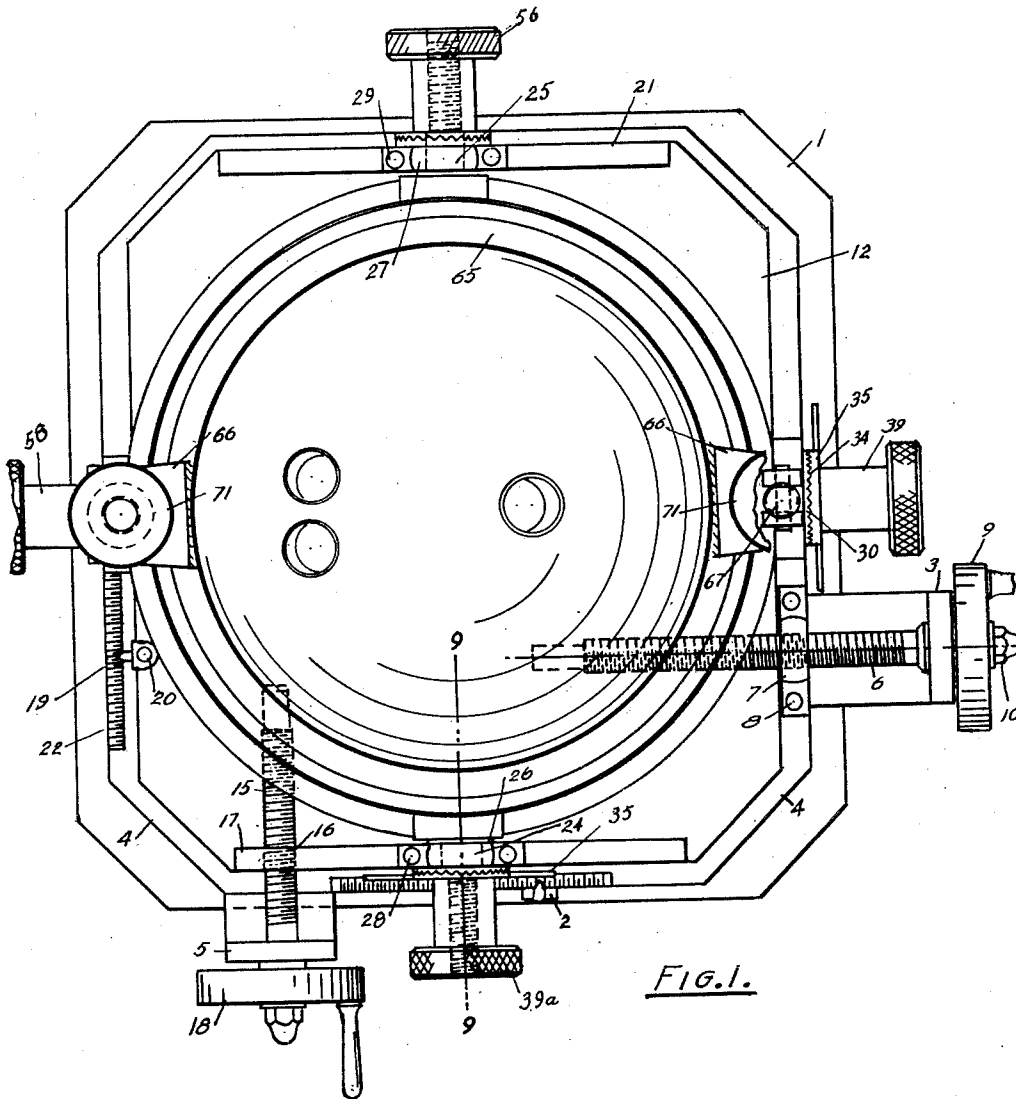


FIG. 1.

INVENTOR
Walter T. Grove
BY
Flourens Miller
ATTORNEY

June 30, 1953

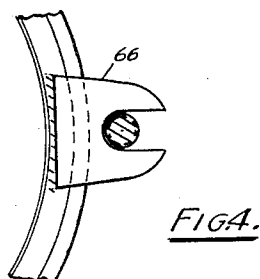
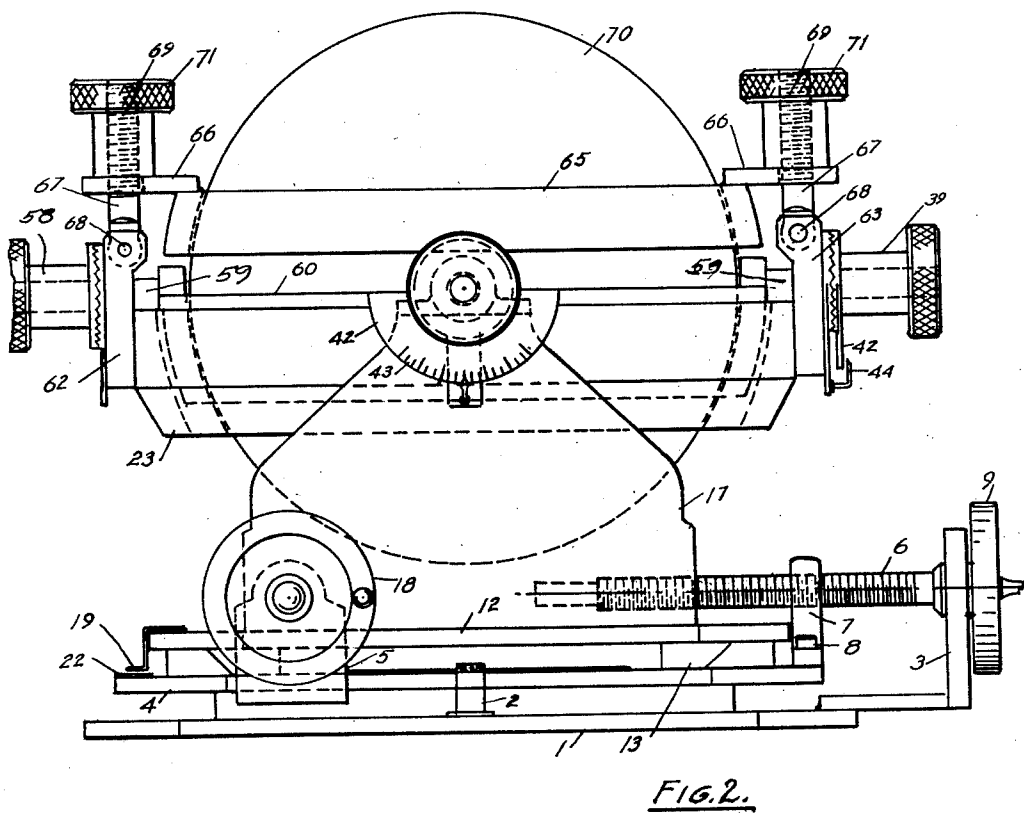
W. T. GROVE

2,643,557

FIXTURE FOR SPHERICAL MEMBERS

Filed Sept. 27, 1949

3 Sheets-Sheet 2



INVENTOR
Walter T. Grove
BY
Florian J. Miller
ATTORNEY

June 30, 1953

W. T. GROVE

2,643,557

FIXTURE FOR SPHERICAL MEMBERS

Filed Sept. 27, 1949

3 Sheets-Sheet 3

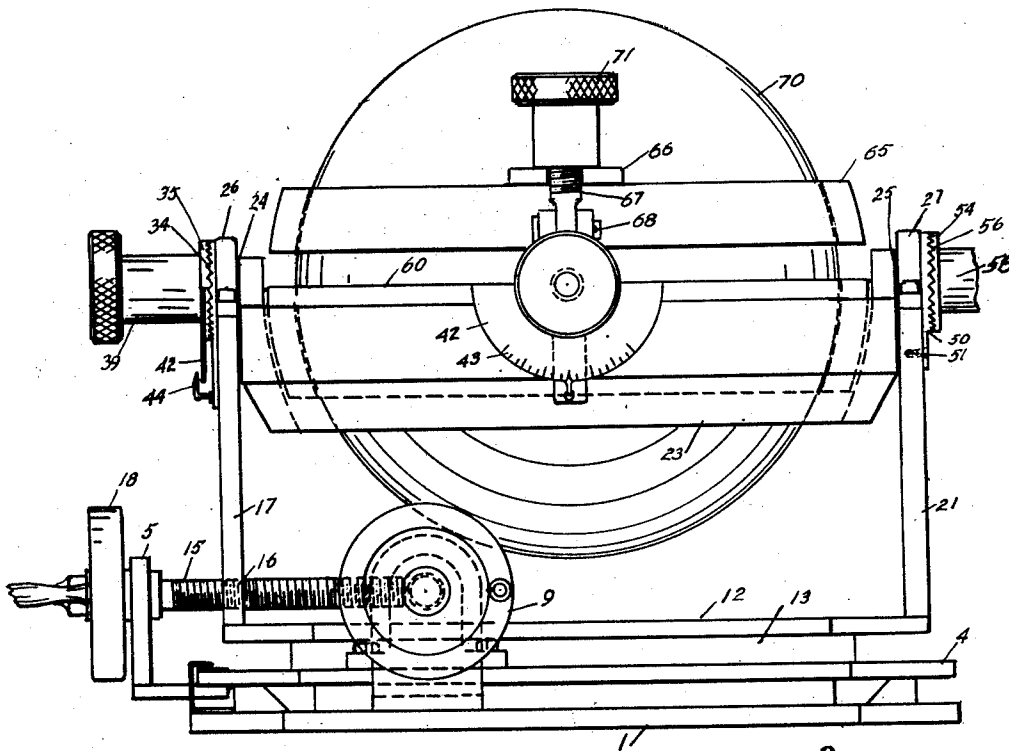


FIG. 3.

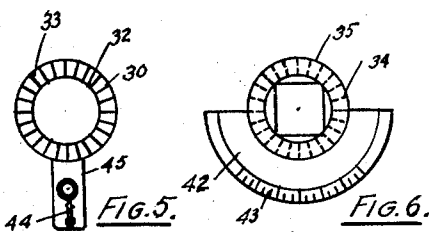


FIG. 5.

FIG. 6.

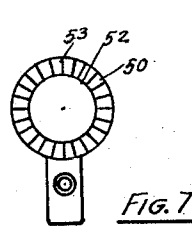


FIG. 7.

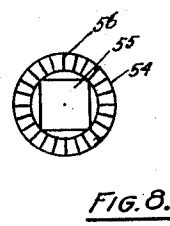


FIG. 8.

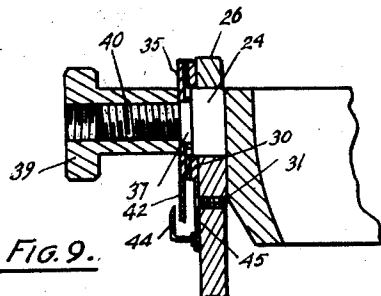


FIG. 9.

Inventor

Walter T. Grove

Norman J. Miller
Attorney

UNITED STATES PATENT OFFICE

2,643,557

FIXTURE FOR SPHERICAL MEMBERS

Walter T. Grove, Erie, Pa.

Application September 27, 1949, Serial No. 118,140

9 Claims. (Cl. 77-63)

1 This invention relates generally to fixtures for holding spherical members and it relates more particularly to a universally adjustable fixture for holding bowling balls for drilling the finger holes therein.

Fixtures heretofore devised for holding bowling balls required a new setup for the drilling of each finger hole. The layout of the distances between the finger holes is extremely difficult and it is also extremely difficult to drill the finger hole in a ball at the correct angle. No fixture for a bowling ball has heretofore been provided which permits all holes of the ball to be drilled after the bowling ball is clamped in the fixture, which permits universal movement of the bowling ball after clamping in the fixture and which permits one or more holes to be drilled of any size or depth, any angle, and any span without loosening the clamping ring.

It is, accordingly, an object of my invention to overcome the above and other defects in fixtures for holding a spherical member and it is more particularly an object of my invention to provide a fixture for holding a bowling ball which is simple in construction, economical in cost, economical in manufacture, and efficient in operation.

Another object of my invention is to provide a fixture for holding a spherical member which permits universal movement of the spherical member after it is clamped in the fixture and which has measuring means provided for measuring rotative movement of the spherical member in different planes.

Another object of my invention is to provide a fixture for holding a bowling ball for drilling finger holes therein which provides a clamping ring for clamping a ball therein wherein one or more finger holes may be drilled in the ball to any depth, any angle, any pitch, and any span without loosening the clamping ring.

Another object of my invention is to provide a bowling ball fixture which permits universal movement of the ball after it is clamped and which also permits linear movement of the fixture in directions normal to each other.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings, in which

Fig. 1 is a plan view of my novel fixture for holding a spherical member;

Fig. 2 is a side elevational view in one plane and Fig. 3 is a side elevational view in another plane of my novel fixture for holding a spherical member;

2 Fig. 4 is a fragmentary plan view of the bifurcated yoke on the clamping ring of my novel fixture;

5 Figs. 5 and 6 are side elevational views of interengaging locking collars disposed on two sides of my novel fixture at right angles to each other;

10 Figs. 7 and 8 are side elevational views of interengaging locking collars disposed on the sides of my fixture opposite the collars shown in Figs. 5 and 6; and

Fig. 9 is a fragmentary sectional view taken on the line 9-9 of Fig. 1 showing the locking collars in Figs. 5 and 6 in engagement.

15 Referring now to the drawings, I show in Figs. 1 to 9 inclusive a base plate 1 having upwardly extending, projecting portions 2 and an upwardly extending, right angled apertured bracket 3 welded thereon. The base plate 1 may be mounted on a conventional bed of a drill press or any other suitable machine tool. The base plate 1 has slidably supported thereon a plate 4 having an outwardly and upwardly extending, right angled apertured bracket 5. A feed screw 6 is journaled in the aperture of the bracket 3 and threadably engages an internally threaded bracket 7 secured to the plate 4 by screw bolts 8. The screw 6 has a hand wheel 9 mounted on the other end thereof and secured thereto by a nut 10.

25 A plate 12 is spaced upwardly from the plate 4 and slides on upwardly extending support members 13 on the plate 4 normal to the direction of movement of the plate 4. A feed screw 15 is journaled in the aperture of bracket 5 and it threadably engages a threaded aperture 16 in standard 17 mounted on the plate 12. It will thus be seen that by rotation of the handles 9, the feed screw 6 will rotate in the threaded bracket 7 causing the plate 4 to move in one direction in one plane. When the hand wheel 18 mounted on the feed screw 15 is rotated, the plate 12 is moved in a direction in a plane opposite from that of the plate 4. The plate 12 has a pointer 19 secured thereon by a screw 20 to register with graduations 22 on the plate 4 to measure the movement of the plate 12 with reference to the plate 4. Any suitable form of bed which may be moved in planes normal to each other may be utilized for carrying out my invention.

30 Vertically extending, spaced, parallel standards 17 and 21 extend upwardly on the plate 12 and are secured thereto. A circular rotatable support ring 23 has oppositely, outwardly extending stub shafts 24 and 25 journaled in the standards 17 and 21 and clamped therein by arcuate shaped clamps 26 and 27 secured to the

standards 17 and 21 by screw bolts 28 and 29. Lock collar 30 shown particularly in Fig. 5 has an aperture 32 through which the shaft 24 extends and it is secured to the standard 17 by screw 31. The face of the collar 30 has radially extending splines 33 for engagement with radially extending splines 34 on a collar 35. The collar 35 has a square aperture for engagement with a square portion 37 of shaft 24 and it is movable therewith. The collar 35 is secured by a handle 39 which is threadably engaged with the threaded end 40 of shaft 24. The collar 35 has a sector 42 with graduations 43 around the periphery thereof adapted to be registered with a pointer 44 on the depending portion 45 of collar 30. The shaft 25 on the other side of the ring member 23 has a collar 50 secured to the standard 21.

The stub shaft 25 on the opposite side of the ring 23 is constructed the same as the stub shaft 24 shown in Fig. 9. Collar 50 shown in Fig. 7 is secured to the standard 21 by a screw bolt 51. It has an aperture 52 through which extends the shaft 25 and it has a radially splined face portion 53. A collar 54 with a square axially extending aperture 55 is disposed on the square portion of the shaft 25 and it rotates with the shaft 25. The collar 54 has a radially splined face portion 56 for engagement with the splined portion 53 of the collar 50 to lock the ring member 23 at predetermined angular positions. The splines 56 on the collar 54 are forced into engagement with the splines 53 of the collar 50 by a handle 58.

A circular saddle 60 in the shape of a segment of a sphere has outwardly extending stub shafts 59 the same as the stub shaft 24 shown in Fig. 9. The stub shafts 59 on the saddle 60 are journaled in journals 62 and 63 secured by welding or any other suitable means to the outer side of the ring 23 at right angles to the stub shafts 24 and 25 on the ring 23. A collar 30 is attached to the journal 63 and engaging collar 35 and handle 39 have the same construction and operation as heretofore described for the same elements on shaft 24. Collar 50 attached to journal 62 and collar 54 movable with the shaft 59 on the saddle 60 and the handle 58 are identically the same in construction and operation as the same elements mounted on the shaft 25 of the support ring 23.

A circular clamping ring 65 in the form of a segment of a sphere has outwardly extending, bifurcated yokes 66 on opposite sides thereof for engaging pivoted screw members 67 pivoted at 68 on the upper end of the journals 62 and 63. Internally threaded, manually rotatable screw members 69 threadably engage the threaded bolt members 67 to secure the clamping member 65 on the upper side of a ball 70 seated in the saddle 60. The screw members 69 have an enlarged knurled head portion 71 so that they may be better grasped and tightened manually.

I will describe the operation of my fixture with reference to a bowling ball although it will be evident that any spherical member may be accommodated. In Fig. 1, I show a three fingered bowling ball clamped in my novel fixture. The centers are first laid out for the finger holes after which the ball is disposed in the saddle 60 and clamped therein by the ring clamp 65. The hand wheels 9 and 18 are then rotated so as to bring a center hole laid out on the bowling ball adjacent the point of a drill. The desired angle of the hole is determined, the handles 39 and 58 are loosened, and the ball 70 is rotated in two directions at right angles to each other until the

desired angle is obtained. This desired angle can also be obtained mathematically and the graduated sectors 43 may be utilized to position the ball 70 at the correct angle for drilling. The handles 39 and 58 are then rotated to lock the collars 30 and 42 and 50 and 54 respectively and the hole is drilled. After one hole is drilled, the drill is removed and the handles 39 and 58 are loosened and the ball 70 is rotated through two different planes to bring another one of the holes underneath the drill wherein the ball 70 is placed in a proper angular position by reference to the graduated sectors 43, the members 39 and 58 are tightened whereby the saddle 60 and ring 23 are locked, and the second hole may then be drilled. The same operation is performed for the third hole of the bowling ball 70.

It will be evident from the foregoing description that after the bowling ball 70 is clamped by the clamping ring 65, it is not necessary to release the ball 70 and all settings may be made simply, quickly, accurately, and easily by the manipulation of rotatable handles forming a part of the machine, without the use of any hand tools, and means are provided for measuring the angles through which the ball passes to ascertain the span, the angle to which the drill enters the ball, and all other essential measurements for accurately drilling a bowling ball. It will further be evident that any form of spherical member may be accommodated by my machine.

Various changes may be made in the specific embodiment of my invention without departing from the spirit thereof or from the scope of the appended claims.

What I claim is:

1. A fixture for holding a spherical member comprising spaced, vertically extending support members, a circular frame pivotally supported on said support members, a circular cradle for holding a spherical member, outwardly extending shafts on said circular cradle pivotally supported on said circular frame and rotatably movable at right angles to the rotative movement of said circular frame, a circular clamping ring hinged on said frame complementary to said cradle adapted to be disposed over the upper side of a spherical member seated in said cradle, a clamping member detachably connecting said cradle and said clamping ring in a locked position in relation to a spherical member in said cradle, and outwardly directing handles on the shafts on said circular cradle in said frame for rotating same.

2. A fixture as set forth in claim 1 wherein means are provided for locking said circular frame and said cradle in predetermined angular positions.

3. A fixture as set forth in claim 1 wherein said support members are movable in linear directions at right angles to each other.

4. A fixture as set forth in claim 3 wherein means are provided for indicating the linear movement of said support members.

5. A fixture for a spherical member comprising a base plate, vertically extending, spaced standards on said base plate, a circular support member having outwardly extending shafts journaled in said standards, a circular shaped saddle having outwardly extending shafts supported on said circular support member at right angles to the axis of the shafts extending outwardly from said circular support member, a circular clamping ring hingedly supported on said circular support member complementary to said saddle,

5

means for detachably securing said clamping ring to said saddle and in engagement with the upper side of a spherical member disposed in said saddle, means for locking said circular support member and said saddle in predetermined angular positions, and handles on said shafts for tilting said circular support member and said saddle.

6. A fixture as set forth in claim 5 wherein the shape of said saddle and said ring clamp is a segment of a sphere.

7. A fixture as set forth in claim 5 wherein locking means for said circular support member and said saddle comprises a fixed collar with radially extending splines and a collar rotatable with said circular support member and said saddle respectively having radially extending splines engaging the splines of said fixed collar.

8. A fixture as set forth in claim 7 wherein a pointer is associated with said fixed collar and a graduated sector is associated with said collar movable with said circular support member and said saddle to measure the angular movement thereof.

9. A fixture for a spherical member comprising a base plate, vertically extending, spaced standards on said base plate, a circular support member having radially outwardly extending shafts on opposite sides thereof journaled in said standards, a circular shaped cradle having the internal portion thereof in the shape of a segment of a sphere having radially outwardly extending shafts on opposite sides thereof supported on said

6

circular support member at right angles to the axis of the shafts extending outwardly from said circular support member a circular clamping ring supported on said support member having the internal periphery thereof spherical in shape and complementary to the internal spherical portion of said cradle, hinged fastening members on opposite sides of said circular support member for detachably securing said clamping ring in engagement with the upper side of a spherical member disposed in said cradle, means for locking said circular support member and said cradle in predetermined angular positions, handles on said shafts for rotating said circular support member and said cradle, and means for moving said vertically extending standards on said base plate in linear directions parallel to the outwardly extending shafts on said circular support member and said cradle.

WALTER T. GROVE.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
146,923	Love	Jan. 27, 1874
408,259	Pentz	Aug. 6, 1889
1,396,302	Wagner	Nov. 8, 1921
2,269,946	Lange	Jan. 13, 1942
2,278,314	Houchin	Mar. 31, 1942
2,349,394	Widdis	May 23, 1944
2,490,120	Ellison et al.	Dec. 6, 1949