July 4, 1967 R. M. STANFORD 3,329,043

DRILLING MACHINE FOR BOWLING BALLS

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Fig. 1

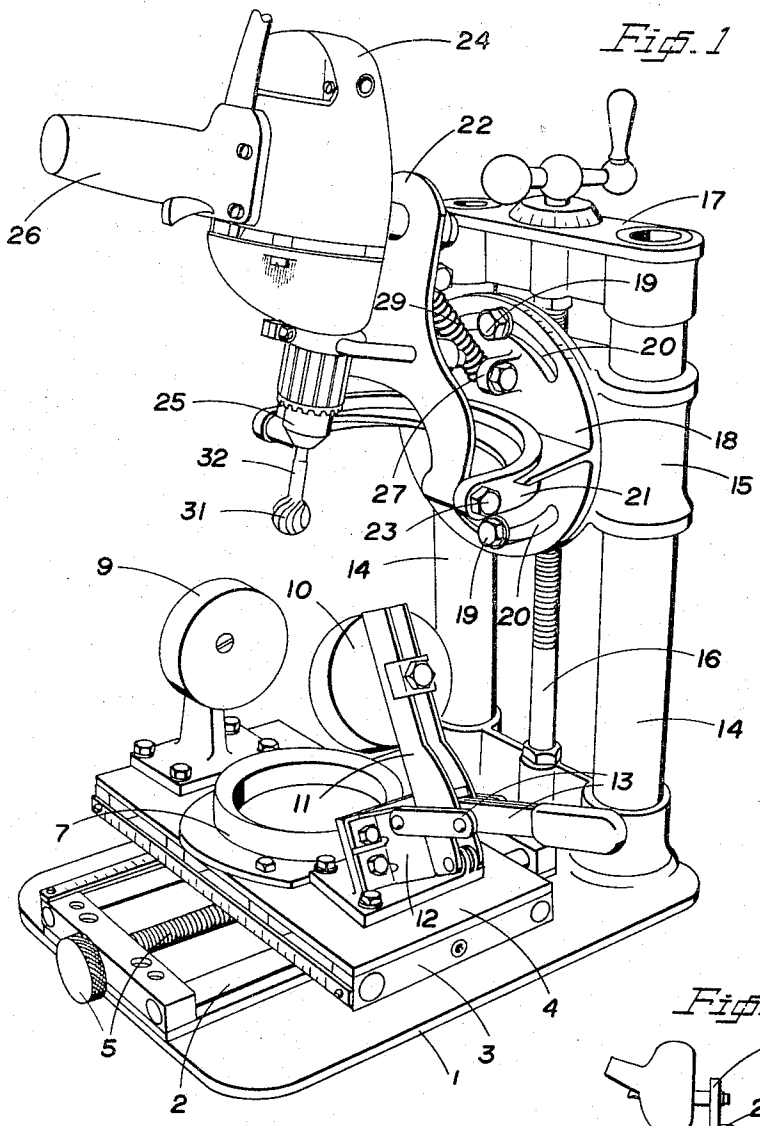


Fig. 7

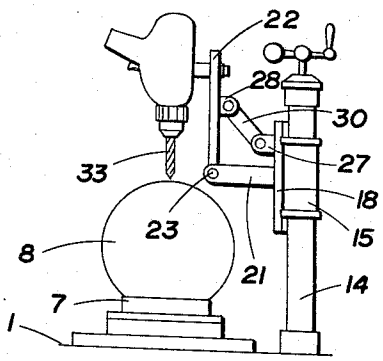
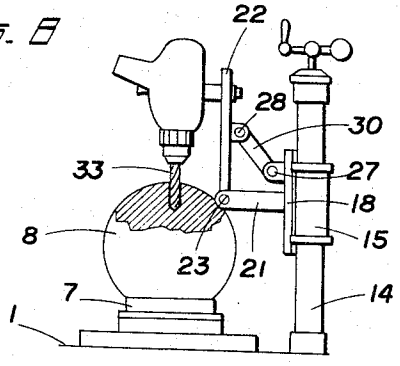


Fig. 8



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DRILLING MACHINE FOR BOWLING BALLS

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Fig. 2

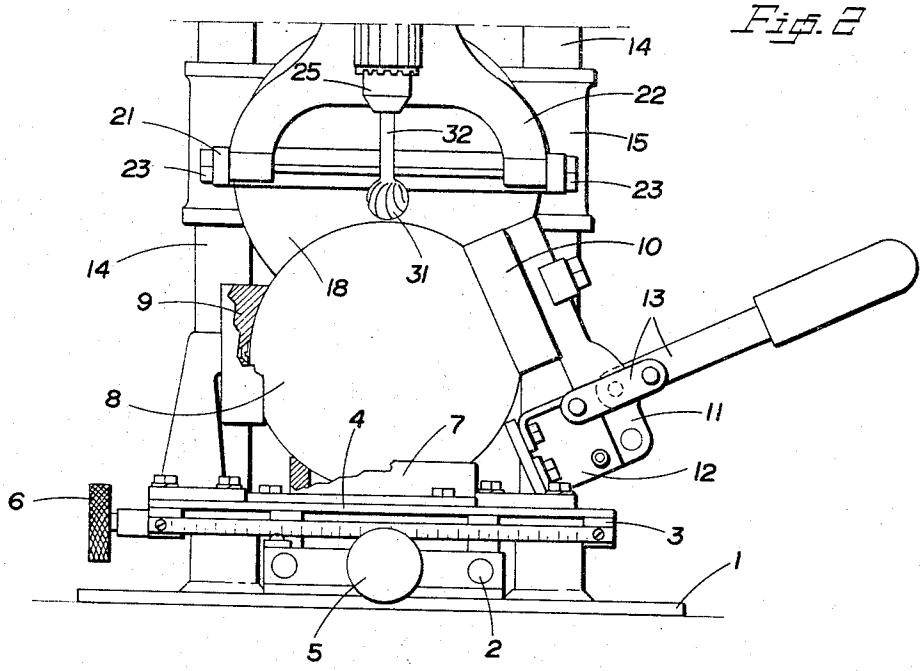


Fig. 3

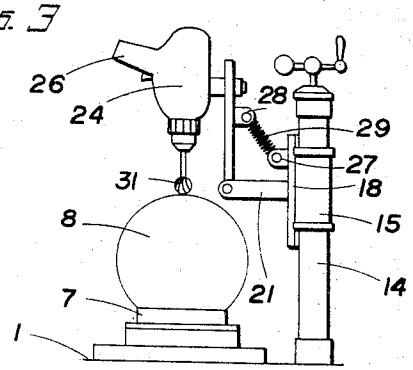


Fig. 4

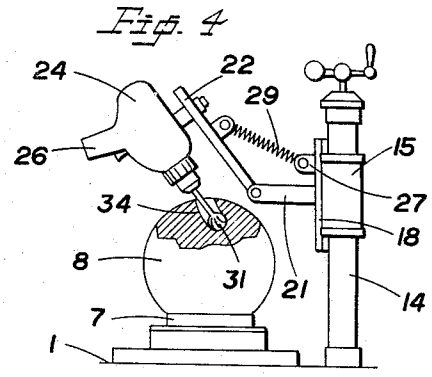


Fig. 5

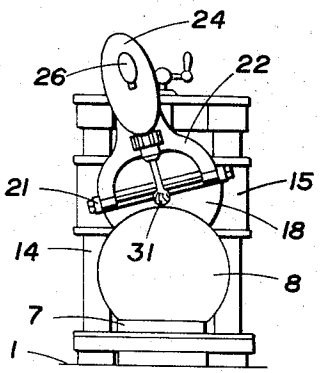
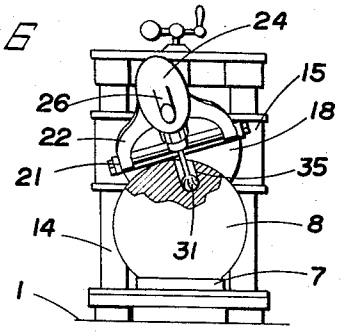


Fig. 6



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DRILLING MACHINE FOR BOWLING BALLS

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ABSTRACT OF THE DISCLOSURE

A machine for drilling finger and thumb holes in a bowling ball; the machine having ball clamping means, and drilling means arranged to drill holes in a clamped ball either radially or angularly thereof, and either straight or with a longitudinal curvature as may be desired.

As is recognized by expert bowlers generally, the positioning and form, as well as the size, of the finger holes in a bowling ball has a vital function in giving the bowler the proper feel so that he may hold and deliver the ball with the greatest accuracy and best effect.

In this respect the requirements of individual bowlers are different because of physical make-up, size and strength, and the style and coordination of the person.

Further, the higher the scoring average a bowler maintains, the more critical the fit to the hand becomes in drilling a bowling ball to suit the bowler's needs.

Additionally the pitch or angle—as well as the longitudinal form—of the holes is very important since these conditions have been found to be a vital factor during the release or delivery of the ball from the hand.

The major object of this invention, therefore, is to provide a combination bowling ball supporting and hole drilling machine which includes a drill unit arranged so that the finger holes may be drilled in the ball in the desired spaced relation, with any selected relationship to the radial planes of the ball, and in either straight or longitudinally curved form; all as an individual bowler may require to enable him to effectively grip and then release the ball so that it will roll out of his grasp with less chance of hanging or dragging.

Another important object of this invention is to provide a machine, for the purpose described, so constructed and arranged that the finger holes are formed in the bowling ball with the use of a standard electric hand drill; all such holes being drilled in a very short time, and the machine as a whole being simple, compact, and relatively lightweight, hence readily portable.

A further object of the invention is to provide a drilling machine for bowling balls which is designed for ease and economy of manufacture, and convenience of use.

A still further object of the invention is to provide a practical, reliable, and durable drilling machine for bowling balls and one which is exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

FIG. 1 is a perspective view of the improved drilling machine for bowling balls but shown before a ball is mounted thereon.

FIG. 2 is a fragmentary front elevation of the machine, partly broken away and in section, shown with a ball mounted in position to be drilled.

FIGS. 3 and 4 are side diagrams of the machine as arranged for drilling curved holes in or parallel to a radial plane of the ball; these diagrams showing the position of the drill at the start and finish of the drilling operation, respectively.

FIGS. 5 and 6 are front diagrams of the machine as arranged for drilling curved holes angled relative to a radial plane of the ball; these diagrams showing the position of the drill at the start and finish of the drilling operation, respectively.

FIGS. 7 and 8 are side diagrams of the machine as arranged for drilling straight holes; these diagrams showing the position of the drill at the start and finish of the drilling operation, respectively.

Referring now more particularly to the drawings and to the characters of reference marked thereon, the machine comprises a flat base **1** fitted with guides **2** for a compound rest **3** which includes a bed **4** selectively movable front to rear or side to side by means of feed or control screws **5** and **6**, respectively.

Secured on the bed **4**, which is of plate form, is a circular vertical-axis seat or ring-like locator **7** for a bowling ball **8**. Also mounted on the bed **4** on opposite sides of and above the locator **7** are transverse-axis ball engaging cups **9** and **10** which generally face each other; the cup **9** being rigid and disposed axially of a supported ball, while the cup **10** is disposed at a somewhat higher level and disposed at an angle radially of the ball.

The cup **10** is mounted on an arm **11** pivoted at its lower end on a rigid bracket **12** upstanding from the bed **4**. A suitable handle actuated, over-dead-center type of clamping device **13** is connected between the bracket **12** and arm **11**. This enables the cup **10** to be advanced toward the locator **7** and cup **9** to clamp the ball **8** between said cups, or to be retracted to permit a ball to be placed on or removed from the locator **7**. The cup **10**, being disposed at a downward angle, assures that the ball—when clamped in position—will at the same time be forced downward into said locator **7** and thus firmly held against movement.

Upstanding from the base **1** back of the compound rest are transversely spaced posts **14** on which a vertically adjustable slide **15** is mounted; the vertical position of the slide **15** being controlled by means of a manually actuated feed screw **16** journaled in and extending between the base **1** and a top plate **17** on the posts. The feed screw is operable from above the top plate **17**, as clearly shown in FIG. 1.

Mounted on the flat front face of the slide **15**—for rotative adjustment about a horizontal axis at right angles to the feed screw **16** and parallel to the bed control screw **5**—is a plate member **18** preferably in the form of a disc.

The disc **18** is held in any desired position of rotative adjustment about its axis by means of headed screws **19** threaded in the slide **15** and projecting through opposed arcuate slots **20** in said disc, as shown in FIG. 1; the heads of the screws normally clamping against the front face of such disc.

Formed with and projecting forwardly from the disc **18** is a generally C shaped, normally horizontal, transversely extending yoke **21** on the forward ends of which another but upstanding and forwardly facing yoke **22** is pivoted transversely at its lower ends, as at **23**, at a level approximately the same as that of the axis of rotation of said disc.

A vertical-axis electric motor **24** is secured on the front of the yoke **22**; the motor at the bottom having a downwardly projecting drill supporting chuck **25**. The motor also includes a forwardly projecting handle **26**.

Above the yoke **21**, the disc **18** is formed with a centrally located forwardly projecting ear **27**, while the back of the yoke **22** is provided with a centrally located rearwardly projecting ear **28** some distance above the ear **27**. A connecting element (either in the form of a tension spring **29** as shown in FIGS. 1, 3 and 4, or a rigid link **30** as shown in FIGS. 7 and 8) is adapted to extend be-

tween and to be detachably connected to the ears **27** and **28**.

When the machine is to be used with the spring **29** connected between the ears **27** and **28**, a ball-head drill **31** having a small diameter shank **32** is mounted in the chuck **25**, while a conventional twist drill **33** is employed when the machine is used with the rigid link **30** connected between said ears. In either instance, the tip of the drill is initially slightly below the level of the pivots **23**.

The motor **24** is normally maintained in substantially a perpendicular position by the spring **29** or by the link **30**, depending on which is in use.

In operation, with the spring **29** in use and acting on the yoke **22** and the motor **24**, and with the drill **31** in place, the bowling ball **8** is clamped on the locator **7** between the cups **9** and **10**. The compound rest **3** is then set to dispose the bed **4** with the ball **8** in the desired position below the drill.

Nextly, the slide **15** is adjusted by the feed screw **16** so as to bring the tip of the drill **31** into contact with the upper portion of the ball, as shown in FIG. 3. The operator then depresses the motor handle **26** and thus causes the yoke **22**, and the motor **24**, to swing downwardly about the yoke pivots **23** as an axis whereby the drill **31** forms a curved finger hole **34** in the ball, as shown in FIG. 4. The small diameter of the drill shank **32** relative to the hole forming ball-head maintains said shank out of substantial contact with the ball at the edge of the hole as the latter is drilled.

The above described curved form of finger hole extends radially of the ball in one direction, and if it is desired to drill a similar hole which is non-radial in said direction, the disc **18** is turned and set to dispose the motor and drill at the desired angle, as shown in FIG. 5. Thus when the motor and drill are pulled down by handle **26**, the hole **35**—non-radial in said one direction—will be formed, as shown in FIG. 6.

When it is desired to drill a straight hole in the bowling ball, the spring **29** is replaced by the link **30** which then maintains the motor **24** with its axis vertical; ball-head drill **31** being replaced by a twist drill **33**. With this arrangement, as shown in FIGS. 7 and 8, the motor **24** is held rigid with the slide **15** and the latter is lowered by means of the feed screw **16** to advance the drill into the ball.

From the foregoing description, it will be readily seen that there has been produced such a drilling machine for bowling balls as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the drilling machine for bowling balls, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

1. A drilling machine for a bowling ball comprising means to support a ball in a fixed position, a drill unit above the ball support means, the unit including a drill extending downwardly toward a supported ball, an upstanding mount back of the ball support means, and means securing the drill unit on the mount for downward swinging movement about a transverse axis spaced horizontally from the drill; said securing means additionally providing for rotative adjustment of the drill unit about a horizontal axis at right angles to said transverse axis.

2. A drilling machine for a bowling ball comprising means to support a ball in a fixed position, an upstanding mount back of the ball support means and including a plate member disposed in a transverse vertical plane, a first yoke on and projecting forwardly from said plate member, said first yoke having transversely spaced outer ends, a second yoke upstanding in front of the plate member and transversely pivoted at its lower ends on said outer ends of the first yoke, a motor and drill unit in front of and secured to said upstanding yoke above the ball support means, said unit including a drill extending downwardly toward a supported ball, and means between the said plate member and upstanding yoke yieldably holding the latter against forward and downward swinging movement.

3. A machine, as in claimed **2**, in which the last named means comprises a tension spring connected between the plate member and the upstanding yoke above the transverse pivotal axis thereof.

4. A machine, as in claim **2**, with a handle projecting forwardly from the front of the motor.

5. A machine, as in claim **2**, with means mounting the plate member for controlled vertical movement.

6. A machine, as in claim **2**, in which the plate member is initially separate, and means securing said plate member on the mount for rotative adjustment about a horizontal axis at right angles to the pivotal axis of the upstanding yoke and in substantially intersecting relation thereto.

7. A drilling machine for a bowling ball comprising a base, adjustable means on the base to support and releasably clamp a ball in a selected position, a pair of transversely spaced posts upstanding from the base back of said ball support and clamping means, a slide on and spanning between the posts, means to adjust the slide vertically on the posts, a vertical forwardly facing disc on the slide, the disc being normally fixed but selectively rotatively adjustable about its horizontal axis, a drill unit in front of the disc, said unit including a drill extending downwardly toward a supported ball, and means securing the drill unit on the disc for downward swinging motion about a transverse axis and for entry of the drill into the ball.

8. In a drilling machine for a bowling ball, a ball-supporting and clamping device comprising a horizontal ring-like ball-seating and locating member, circular cups disposed to engage a seated ball on opposite sides of and above said member, means mounting one cup in a fixed position, and means mounting the other cup for movement to and from the one cup so that the ball may be releasably clamped between said cups; said one cup being disposed to engage the ball in the horizontal axial plane thereof while the other cup is disposed to engage the ball radially with a downward slope to the center thereof.

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