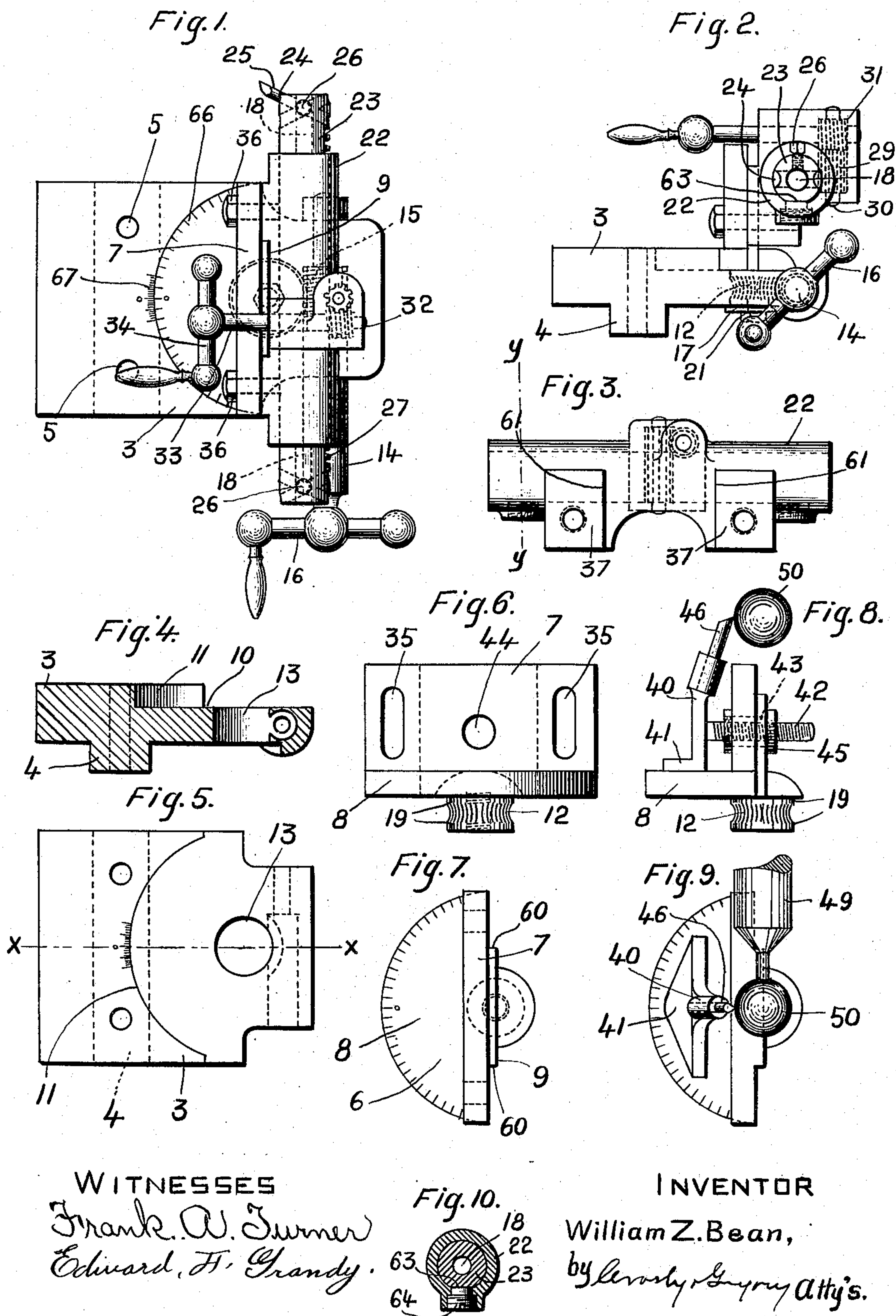


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ATTACHMENT FOR TURNING TAPERED WORK OR BALLS.
APPLICATION FILED JUNE 24, 1907.

923,757.

Patented June 1, 1909.



WITNESSES
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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR TURNING TAPERED WORK OR BALLS.

No. 923,757.

Specification of Letters Patent.

Patented June 1, 1909.

Application filed June 24, 1907. Serial No. 380,461.

To all whom it may concern:

Be it known that I, WILLIAM Z. BEAN, a citizen of the United States, and resident of West Medford, county of Middlesex, and State of Massachusetts, have invented an Improvement in Attachments for Turning Tapered Work or Balls, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object to provide a novel attachment for a lathe milling machine or other metal working machine by means of which tapered work and also balls and sockets can be easily and accurately turned or bored.

The attachment is adapted to be placed on the carriage of any ordinary engine lathe in place of the usual tool post or secured to the table of a milling machine, and by means of it a taper of any desired degree can be accurately turned or bored, and also either balls or sockets of any size can be formed.

I will first describe some embodiments of my invention, and then point out the novel features thereof in the appended claims.

Figure 1 is a plan view of the attachment removed from the lathe; Fig. 2 is an end view of Fig. 1; Fig. 3 is a side view of the sleeve for the tool-holder; Fig. 4 is a section through the base on the line $x-x$, Fig. 5; Fig. 5 is a plan view of the base; Fig. 6 is a front view of the turn-table which is supported on the base; Fig. 7 is a plan view of the turn-table; Figs. 8 and 9 show the device as arranged for turning balls. Fig. 10 is a section on the line $y-y$, Fig. 3, showing the tool holder in place.

My improved attachment, in the form herein shown, comprises as its essential elements a base adapted to be mounted on the carriage of any ordinary engine lathe, or secured to the table of a milling machine, a turn-table on the base, and a tool-holder supported by the turn-table and movable relative thereto. The base is designated by 3, and it is formed with the tongue 4 on its under side which is adapted to be received in the usual groove in the carriage of an engine lathe or in a vise or chuck supported on the table of a milling machine. Said base may be held in its adjusted position by means of bolts passed through openings 5 in the base. The base supports a turn-table 6, and in the present form of my invention, said

turn-table has the vertical portion or flange 7, and the horizontal semi-circular turn-table portion 8, the plane of the wall 9 of the vertical portion extending through the axis about which the turn-table turns. The semi-circular portion 8 of the turn-table rests on the semi-circular seat 10 formed in the base 3, the outer semi-circular edge of the portion 8 fitting the semi-circular wall 11 of said base. The turn-table has associated therewith a worm gear 12 which fits within an aperture 13 formed in the base, and by which said turn-table is turned. Said base carries an operating shaft 14 having a worm screw 15 thereon which meshes with the worm-gear 12, so that by turning the shaft 14 the turn-table may be turned about its axis. The shaft 14 is provided with a suitable handle 16 by means of which it may be operated. Said gear 12 may either be formed integrally with the turn-table or may be a separate gear secured thereto in any suitable way. In the drawings I have shown said gear as made integrally with the turn-table. Said gear is provided with two bearing portions 19 which accurately fit the sides of the hole 13 in the base. Said bearing portions have engagement with the walls of the hole serving to keep the turn-table accurately positioned and to form a bearing therefor. To prevent the turn-table from being lifted off from the base I have shown a screw-threaded stud 21 which screws into the gear 12, and between the head of which and the base 3 is confined a washer 17 which is larger than the gear and which overlies the bottom of the base.

The vertical portion 7 of the base carries a tool-holder support 22 which is in the form of a sleeve through which the tool holder 23 extends. The tool-holder has at either end apertures 24 for receiving a tool 25, said tool being held in the apertures by a set screw 26. I have shown two such tool-receiving apertures at each end of the tool-holder, said apertures being arranged at different angles to permit the tool to be set at different angles. The tool-holder is also provided with an axial tool-receiving hole 18 at each end into which a tool may be inserted. Said tool-receiving hole 18 intersects the tool-receiving holes 24 at a point beneath the set screw 26, so that each set screw 26 can be used to clamp a tool into either one of the three tool-receiving holes at the end of said tool-holder.

The tool-holder 23 is adapted for move-

ment longitudinally of the sleeve 22, and for giving it such longitudinal movement, I provide such tool-holder with gear teeth 27 on one side, with which meshes a pinion 29 on a shaft 30 supported in bearings formed on the sleeve 22. This shaft 30 has a worm-gear 31 thereon with which meshes a worm 32 formed on a shaft 33 supported in other bearings formed on the sleeve 22. The shaft 33 has a handle 34 by means of which it may be turned, and by operating said shaft the tool-holder 23 may be moved longitudinally of the sleeve 22 in either direction.

The sleeve or tool-holder support 22 may be secured to the vertical flange 7 of the turn-table in any suitable way. I have herein shown said vertical portion as having two slots 35 therein through which clamping studs 36 are adapted to pass, which studs are screwed into the bosses 37 formed on the sleeve 22. By this construction the sleeve may be adjusted vertically on the base, so as to bring the tool-holder and the tool carried thereby different distances above said base. This making of the tool-holder support capable of vertical adjustment is an important feature of my invention because it makes the device capable of use on lathes having different sizes. In order to properly turn a ball or a socket it is evident that the tool must stand in the horizontal plane of the axis about which the work turns, and by making the tool-holder support capable of vertical adjustment the tool may be readily adjusted to bring it into the proper vertical position.

The vertical flange 7 of the turn-table is formed with two shoulders 60 which are engaged by other shoulders 61 formed on the sleeve 22. These shoulders 60 and 61 serve not only to guide the sleeve 22 while it is adjusted up and down, as desired, but they also serve to take the strain to which the tool-holder is subjected and thus relieve the clamping studs 36 from such strain.

The tool-holder 23 is flattened along its underside, as at 63, as seen in Fig. 10; and the sleeve 22 carries two flat ended screws 64 which bear against the flattened portion 63 of the tool-holder. This construction serves to hold the tool-holder from turning in the sleeve, and by adjustment of the screws 64 any wear between the parts may be taken up.

To assist in setting the turn-table into any desired angular position I propose to place graduation marks 66 on the turn-table which cooperate with other graduation marks 67 formed on the base. By means of these graduation marks it is possible to set the turn-table into any predetermined angle quickly and accurately.

For turning tapered work, the turn-table will be turned to set the tool-holder at any angle corresponding to the angle it is desired to give the tapered work, and after the said turn-table has been thus set and the tool

properly adjusted, the taper may be turned by simply moving the tool-holder in the supporting sleeve 22 by means of the handle 34. A circular socket may be turned or bored by setting the carriage of the lathe so that the axis of movement of the turn-table will intersect the axis of rotation of the article in which the socket is to be turned, and then adjusting the tool-holder in the sleeve 22, so that the tool will stand a distance from the center of motion of the turn-table equal to the radius of the desired socket. When the parts are thus adjusted, the socket can be turned by simply rotating the turn-table on its center, while the work is being turned in the lathe.

By making the tool-holder a double-ended tool-holder, with provision for setting the tool at two angles at each end, the capabilities of the device are very much increased.

For turning balls, I may if desired use another kind of tool-holder from what is shown in Figs. 1 to 3, said tool-holder being shown in Figs. 8 and 9. This tool-holder comprises a tool-support 40 which has a foot 41 to rest on the semi-circular portion 8 of the turn-table and a screw-threaded stud 42 integral therewith, onto which is screw-threaded a sleeve 43 which is received in an opening or bearing 44 in the vertical portion of the turn-table. The sleeve is provided with non-circular portions 45 by means of which it may be turned, and by means of it the tool-holder 40 may be adjusted toward and from the axis of rotation. In using this form of tool-holder for turning a ball, said tool-holder is adjusted on the turn-table until the cutting edge of the tool 46 is a distance from the axis of rotation of the turn-table equal to the radius of the desired ball. The rod 49 from which the ball is to be turned is supported in a chuck in the lathe as usual, and as it rotates the turn-table is turned, thereby causing a ball 50 to be cut from the end of the rod, as shown in Figs. 8 and 9.

I have not described herein all embodiments of my invention, but have instead confined the description to the preferred embodiment.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an attachment for lathes, milling machines, etc., the combination with a base, of a turn-table on the base provided with a flange having a vertical face, means on the base to give the turn-table a feeding movement, a tool-holder support secured to the vertical face of said flange and capable of vertical adjustment thereon, a tool holder carried by said support, and means on said support to move the tool holder horizontally parallel to the face.

2. In an apparatus of the class described, the combination with a base, of a turn-table

mounted thereon, means on the base for turning said turn-table, a tool-holder support secured on the turn-table and capable of vertical adjustment thereon, a tool-holder carried by said support, and means carried by said support to feed the tool-holder horizontally relative to said support.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM Z. BEAN.

Witnesses:

LOUIS C. SMITH,
MARGARET A. DUNN.