

June 28, 1938.

O. E. STAPLES

2,122,219

HOBGING MACHINE

Filed Jan. 2, 1936

2 Sheets-Sheet 1

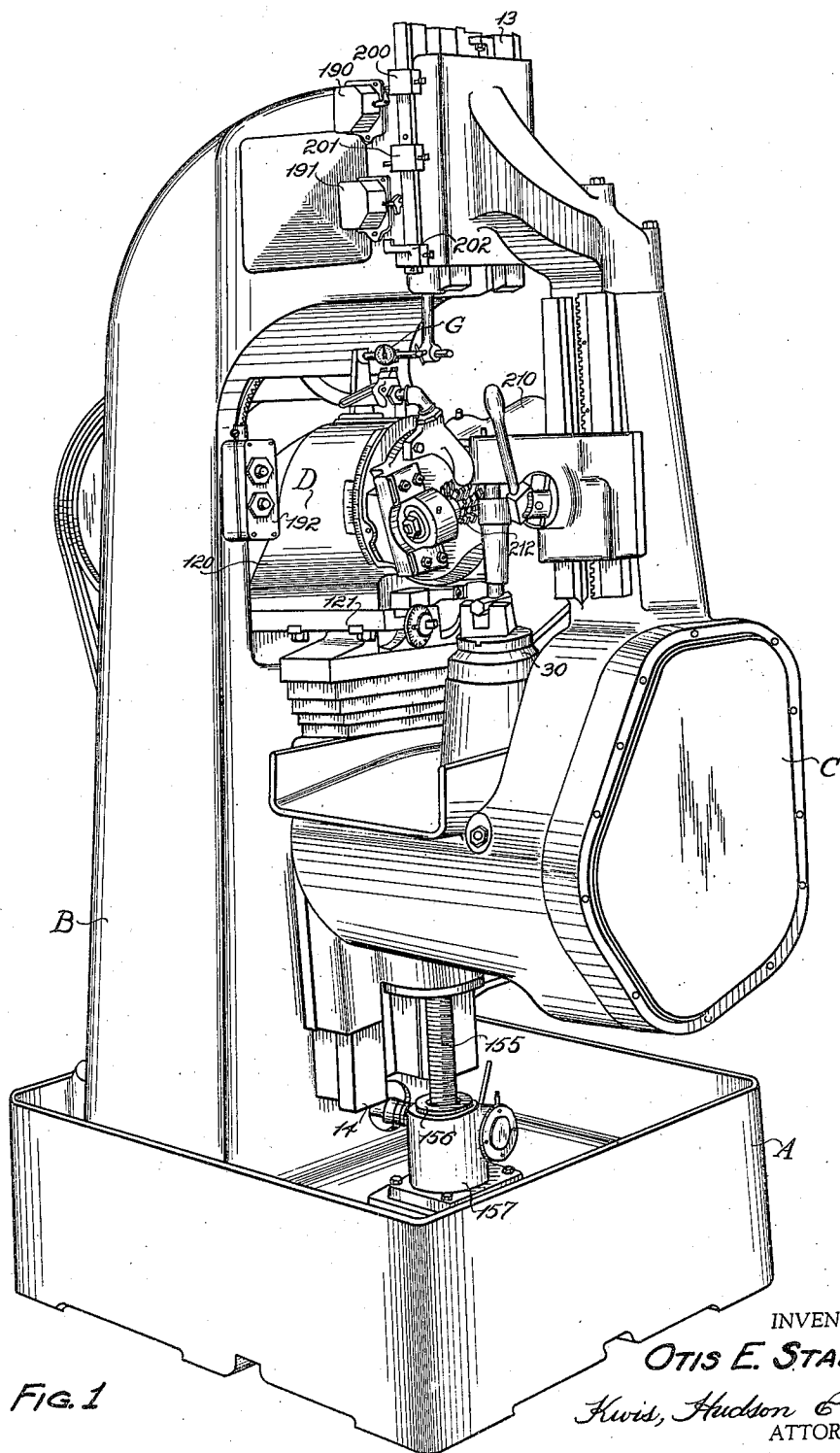


FIG. 1

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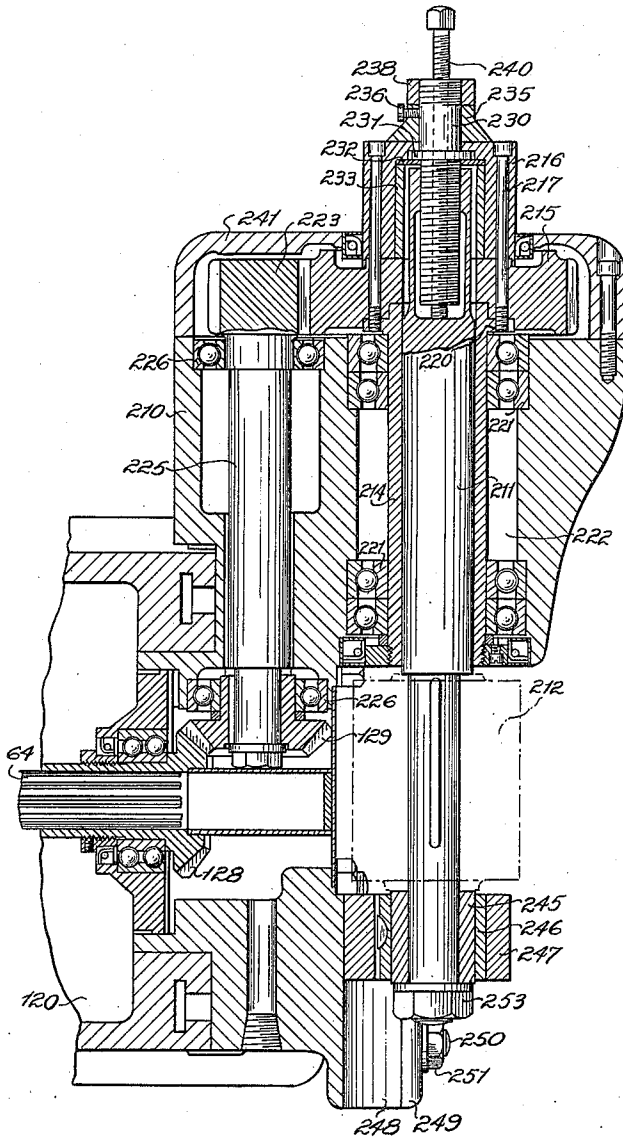


FIG. 2

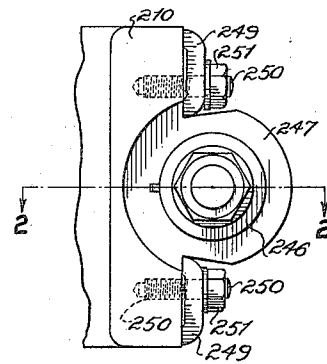


FIG. 3

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UNITED STATES PATENT OFFICE

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HOBBING MACHINE

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Application January 2, 1936, Serial No. 57,130

1 Claim. (Cl. 90—4)

The present invention relates to hobbing machines and more particularly to the tool or hob heads thereof.

An object of the invention is the provision of a novel and improved tool or hob head in which the tool or hob spindle can be accurately set in a predetermined position, or moved axially a predetermined amount.

Another object of the invention is the provision of a novel and improved hobbing machine in which the tool or hob spindle can be positively and accurately moved axially a predetermined amount, or set in a predetermined position. The advantages of such a machine will be readily appreciated by those skilled in the art to which the present invention relates. Suffice it to say that the present invention provides means for setting the hob in the various positions at which it produces the most accurate work, with a maximum amount of accuracy in a minimum amount of time.

Prior to the present invention the hob was usually set by the "cut and try" method, whereas in machines of the present invention, after the hob has been set initially it can be moved to the successive positions at which it produces the most accurate work quickly and efficiently.

The present invention resides in certain novel details of construction and combinations and arrangements of parts, and further objects and advantages thereof will be apparent from the following description of the preferred embodiment described with reference to the accompanying drawings, forming a part of this specification, in which similar reference characters designate corresponding parts throughout the several views, and in which

Fig. 1 is a perspective view of a hobbing machine embodying the present invention;

Fig. 2 is a section through the tool or hob head taken on a substantially horizontal plane through the spindle axis, and

Fig. 3 is a partial end view of the tool or hob head looking from the bottom as viewed in Fig. 2.

The present invention has special utility in hobbing machines of the type illustrated in a copending application of Frank H. Adams, Serial No. 729,118, filed June 5, 1934, entitled "Hobbing machine" and is shown herein as embodied in such a machine. Of course it is to be understood that the invention can be otherwise embodied, that the preferred embodiment shown is merely illustrative thereof, and that I do not wish to be limited to the particular construction shown.

Referring to the drawings, the hobbing ma-

chine shown therein is identical with that shown in the aforesaid application, with the exception of the tool or hob head, and a detailed description of the machine, with the exception of the tool or hob head, will not be given. The duplicate parts herein referred to are designated by the same reference characters and for a complete description of the remainder of the machine reference is made to the aforesaid application.

Briefly stated the machine shown is of general vertical construction, and comprises a frame B supported on a base A and provided with a work head C slidably supported on vertically spaced ways 13 and 14 formed on the frame B at the top and bottom thereof. The work head C carries a work spindle 30 rotatably supported therein and driven in predetermined timed relation to the rotation of the tool or hob spindle by the main drive motor of the machine in a manner already known to the art. The work head is moved vertically to advance the work to the tool or hob and then fed past the same at a reduced speed through the medium of a cooperating lead screw and nut 155 and 156, respectively. The lead screw 155 is rotatably supported in the work head and is driven at a relatively slow speed in predetermined timed relation to the rotation of the tool and work spindle from the work spindle drive. The nut 156 is rotatably supported in a bracket 157, bolted or otherwise secured to the base A, and is adapted to be rotated at a relatively high speed through the medium of a self locking worm and worm wheel drive by a reversible motor supported by the base A and positioned within the frame B.

The tool or hob head designated generally by the reference character D, comprises a tool or hob head slide 120 supported on horizontal ways 121 formed integral with the frame B intermediate the vertically spaced ways 13 and 14, and a tool or hob head housing 210 rotatably supported by the hob head slide coaxial with the main drive shaft 64 of the machine. The tool or hob arbor or spindle 211 is carried by the hob head housing 210 and is adapted to be angularly adjusted about a horizontal axis by virtue of the adjustable connection between the tool or hob head slide and the tool or hob head housing.

Both the main drive motor and the motor for driving the nut 156 are preferably three phase alternating current motors and the latter is reversible. The motors are controlled by upper and lower limit switches 190 and 191, respectively, and the start-stop push button switch 192. The limit switches 190 and 191 are operated and con-

trolled by adjustable stops 200, 201 and 202 carried by the work head C. A precision gauge designated generally by the reference character G is provided for accurately positioning the hob head axially of the work.

In the present instance, as clearly shown in Fig. 2, the tool or hob arbor 211, to the rear of the hob 212, is slidably supported in a sleeve 214, and projects therethrough towards the rear through a gear 215 and into a sleeve cap 216. The sleeve 214, gear 215 and cap 216 are bolted together as by bolts 217 and form a unit or tubular-like member closed at one end within which the tool or hob arbor 211 is slidably but not-rotatably splined. The bolts 217 project through suitable apertures in the gear 215 and sleeve cap 216, and are threaded into tapped apertures in a flange 220 formed integral with the sleeve 214. The sleeve 214, and in turn the aforesaid unit including the sleeve, gear and sleeve cap, are rotatably supported by anti-friction bearings 221 in a suitable aperture 222 in the tool or hob head housing 210 and the rear end of the tool or hob spindle is externally splined to the hob of the gear 215 by virtue of which connection it is driven in predetermined timed relation to the rotation of the work spindle through the gear 215 and pinion 223 continuously in mesh therewith. The pinion 223 is formed integral with a short shaft 225 rotatably supported in the tool or hob head housing 210 by anti-friction bearings 226, and driven from the main drive shaft 64 through the miter gears 128 and 129.

The tool or hob spindle 211 is adapted to be adjusted or moved axially within the sleeve 214, etc. for the purpose of setting the hob etc., by a threaded shaft 230 rotatably supported in the cap 216 and threaded into a tapped counterbore in the rear end of the spindle. Longitudinal movement of the shaft 230 is prevented by a flange 231 formed integral therewith and retained in a counterbore formed in the bottom of the cap member 216 by a washer 232 held in position by a spacer collar 233. A dial 235 provided with appropriate graduations and carried by the shaft 230 to the rear of the cap 216 provides means for quickly and accurately moving the spindle a predetermined amount or setting the same in a predetermined position. In the embodiment shown the dial 235 is detachably secured to the shaft 230 by a set screw 236 which permits the dial to be set at zero for any setting of the hob. After the spindle 211 is set, or in other words, the shaft 230 rotated to the desired position, the shaft 230 is secured in position by a jam nut 238 which, when tightened, securely draws the flange 231 in engagement with the bottom of the cap member 216. During operation the spindle 211, sleeve 214, gear 215 and cap 216 rotate as a unit by virtue of the bolts 217 and the splined connection between the spindle 211 and the gear 215. An elongated jam screw 240 projecting through the shaft 230 and having threaded engagement therewith is provided for taking up any possible lost motion in the threaded connection between the spindle 211 and the shaft 230. After the hob has been set and the shaft 230 secured in the desired position, the screw 240 is turned down until the lower end

thereof jams against the bottom of the aperture in the spindle into which the shaft 230 projects. The gears 215, 223 etc. are enclosed by a housing 241 bolted to the rear end of the housing 210.

The front end of the tool or hob spindle which is of reduced diameter is rotatably supported through the medium of a bushing 245 in a steady rest bushing 246 keyed in a steady rest or member 247 of general cylindrical shape. The member 247 has two slots or notches cut in opposite sides thereof by virtue of which it is retained in an elongated cylindrical groove 248 in the tool or hob head housing 210 by clamp members 249. The clamp members 249 are held in position and operated to clamp and release the member 247 by a plurality of studs 250 provided with clamp nuts 251, and are cut away underneath as clearly shown in Fig. 3 in such a manner that the one edge thereof engages the member 247, while the other edge is fulcrumed on the member 210. The hob is positioned on the reduced end of the spindle 211 and is clamped between the shoulder formed by the reduced portion, and the bushing 245 by a nut 253 threaded on the end of the spindle. When it is desired to adjust or move the tool or hob spindle the clamp nuts 251 are backed off the studs 250 and the member 247 is then free to slide in the groove 248 underneath the clamp members 249. After the hob has been set the clamp nuts 251 are again tightened.

From the foregoing description of the preferred embodiment of the invention, it will be apparent that the aforesaid objects of the invention have been accomplished, and that a hob head or hobbing machine has been provided in which the tool or hob spindle can be quickly and accurately set in a predetermined position or moved a predetermined amount as desired. While the preferred embodiment of the invention has been shown and described, it is merely illustrative of the invention and I do not wish to be limited to the particular construction shown which may be varied within the scope of the invention, and I particularly point out and claim as my invention the following.

I claim:

In a hobbing machine the combination of a tool or hob head housing, a tubular-like member closed at one end rotatably supported in said housing, a tool or hob arbor slidably splined in said tubular-like member and having a tapped aperture in the end thereof adjacent the closed end of said tubular-like member, means for rotating said tubular-like member, a cylindrical member having a tapped aperture extending therethrough threaded into said aperture in said tool or hob arbor, means for rotatably supporting said cylindrical member in the closed end of said tubular-like member, means for preventing longitudinal movement of said cylindrical member relative to said tubular-like member, a dial provided with suitable indicia secured to said cylindrical member, and an elongated bolt threaded in said tapped aperture in said cylindrical member with the lower end thereof engaging the bottom of said aperture in said tool or hob arbor.

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