Aug. 23, 1932. C. H. WARREN 1,873,515

END LOCATING DEVICE

Filed Nov. 3, 1930

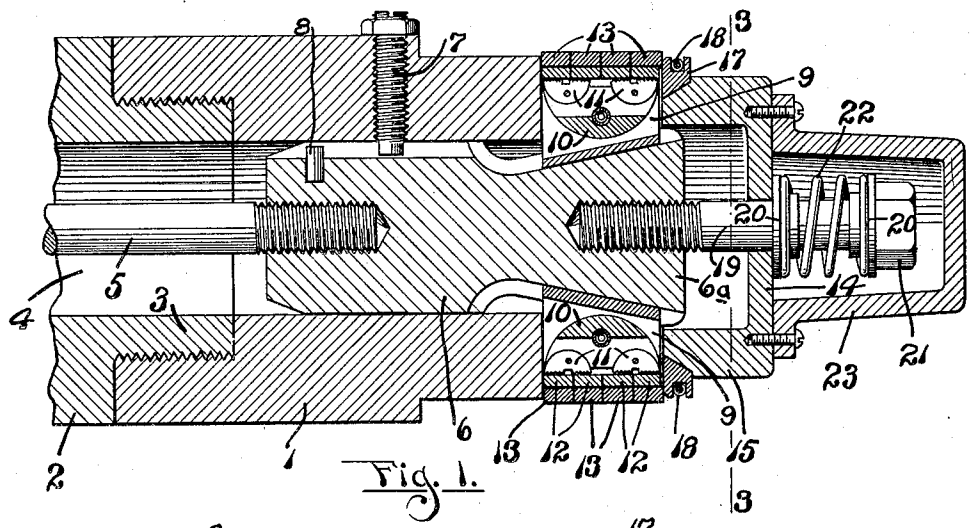


Fig. 1.

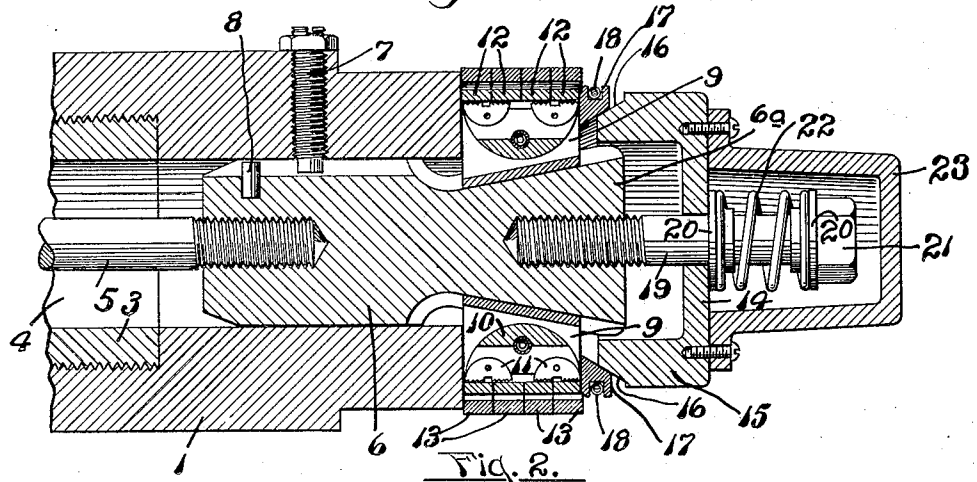


Fig. 2.

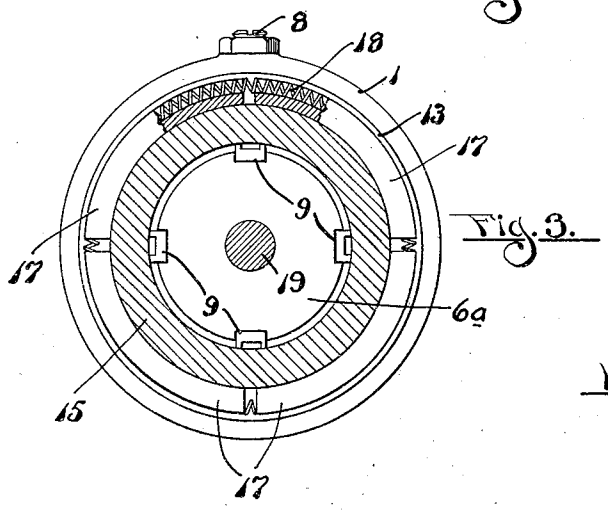


Fig. 3.

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UNITED STATES PATENT OFFICE

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END LOCATING DEVICE

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This invention relates to an end locating appliance which is designed for use with ring holding arbors of the character shown in my prior application, Ser. No. 482,479, filed September 17, 1930. The locating appliance which I have devised holds rings, ring castings, collars or other similar devices on the arbor securely, so that the same do not turn and slip under the action of cutting saws or other tools which may be used to split the same, or in any other machine operation which may be performed upon the ring castings or other articles which are located on the arbor.

It is a primary object and purpose of the present invention to construct a holding or locating appliance of this character which, when in operative position, will serve its purpose of holding the articles worked upon against movement but which can be readily released, permitting the articles which have been machined to be moved outward over the appliance and new ones placed in their stead, after which on return of the holding or locating appliance to its operative position the articles are held against rotative movement and against any movement over the head which they are permitted to have when the appliance is released. The invention further contemplates that the construction shall be of a simple, practical, durable and efficient character, one which is readily manufactured, and assembled with the arbor and one which performs the purposes for which it is designed in a thoroughly efficient manner.

An understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawing, in which,

Fig. 1 is a longtiudinal vertical section of an arbor equipped with the end locating appliance of my invention showing the same in operative holding position.

Fig. 2 is a like section illustrating the same in released position, and

Fig. 3 is a transverse vertical section substantially on the plane of line 3—3 of Fig. 1.

Like reference characters refer to like parts in the different figures of the drawing.

The construction of the arbor and the adjusting means used for properly holding the ring castings and compensating for unevenness and minor discrepancies in size is shown in my pending application above referred to; and this construction is reproduced to the extent necessary for understanding of the present invention used therewith. An arbor member 1 is used which in practice is attached to a rotatably mounted spindle 2, on a screw threaded reduced portion 3 thereof, the spindle and the arbor having longitudinal axle openings 4. Extending axially of the spindle 2 is an actuating rod 5 which is connected to a spreader 6 formed with an outwardly tapering head 6*a* at its outer end which is slidably mounted in the axial opening of the arbor 1. It is kept from rotation by a screw 7 passing through the arbor 1 into a groove cut lengthwise of the spreader 6 and is prevented from too far an outward movement by a stop pin 8, the path of movement of which is crossed by the inner end of the screw 7, as shown.

As described in the previous application, the outer reduced end of the arbor 1 is slotted at a number of points in each of which a shoe 9 is mounted, having an inner inclined side to bear against the tapered head 6*a* of the spindle. And each shoe 9 has a saddle 10 pivotally mounted therein each of said saddles carrying spaced apart rockers 11 around which are split expanding rings 12, over which the ring castings 13 are to be placed. Thus far the structure is the same as that described in my co-pending application above referred to.

The locating appliance is to be located at the outer end of and attached to the spreader 6 which has an axial interiorly threaded opening at its outer end. The appliance includes a cup shaped member or clamping head of circular form having a top 14 and inwardly extending annular sides 15 which are formed, adjacent their inner edges, with an annular inwardly inclined wedging surface 16 as shown in Fig. 2; and between this member of the appliance and the end of the arbor, four ring segments 17 of metal are located, grooved at their outer surfaces whereby a coiled spring 18 may be seated in all the

grooves and normally tend to draw the four members 17 together. The members 17 at their inner sides are inclined complementary to the inclination at 16 of the inner end of the clamping head, it being evident that when the clamping head is moved inwardly toward and over the projecting end of the spreader the members 17 are wedged apart and move radially outward with a consequent stretching of the spring 18. The outer edges of the segments 17 adjacent the ring castings 13 are beveled or rounded in order to facilitate outward movement of the segments.

A bolt 19, threaded at its inner end, passes through the top 14 of the head and screws into the outer end of the spreader 6. On the shank of the bolt are two spaced sleeves 20 having enlarged washer-like heads, one bearing against the outer side of the top 14 and the other against the inner side of the head 21 of the bolt. A heavy coiled compression spring 22 is located around the bolt shank between said members 20. Preferably, though not necessarily, the projecting end of the bolt and the spring thereon are covered by a housing cap 23 permanently secured to the head by screws as shown.

The rod 5 is adapted to be moved longitudinally through any suitable operating mechanism being moved to project the spreader 6 outwardly from the position shown in Fig. 1 to that shown in Fig. 2 usually through use of compressed air. When it is returned to original position it draws the head with it, bringing the inner edges of the sides 15 of the head in close proximity to the end of the arbor 1 and the saddles 10 carried thereby or until the outer faces of the segments 17 come against the annular shoulder shown joining with the outer portion of the inclined annular surface 16 on the head. This forces the segments 17 radially outward whereby the same are expanded so as to come against the outer edge of the outermost ring casting 13. A continued movement of the rod 5 and the spreader 6 pulls the bolt 19 with it, and compresses the spring 22 whereby the ring castings 13 are held very securely in place and with a force equal to the force of the compressed spring 22. The spring, while one of a strong construction, is yieldable enough to insure against any breakage of parts and is a compensating feature for any variations in the different widths of the ring castings 13.

With the construction in the position shown in Fig. 1 the ring castings 13 are clamped securely and machining thereof, as by splitting them, turning the same at their outer surfaces or the like is accomplished; after which the rings may be released by moving the actuating rod 5 outwardly whereupon the parts occupy the position shown in Fig. 2, the release of the ring segments 17 permitting their inward radial movement under the force of the spring 18. This releases the ring castings 13 and the same may be removed over the clamping head and replaced by others, after which the rod 5 is actuated in the opposite direction thereby clamping the ring castings against movement and holding the same during the machining operation thereon.

It is to be understood that the end locating device of this invention is of value in connection with a clamping device such as the internal clamp shown and described in which case the end locating device does not necessarily bear against the rings or article to be clamped with sufficient pressure to act as a clamp strong enough to hold the work while it is machined or the device may act in the nature of an end locating device and clamp in a structure where other clamping means is completely eliminated and the end pressure of the locating device is sufficient to clamp the work upon the mandrel while it is machined. The principle of operation of the device is valuable in either use inasmuch as it provides a means which permits removal of the work over it and is automatically expansible to serve its locating or clamping function.

The construction described as previously stated is of a very strong, durable, practical and efficient nature. It has proved very satisfactory in use. The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. An arbor having an axial opening therethrough, a member slidably mounted in said opening, a locating device connected with said member beyond the end of the arbor, including a head and radially movable devices around said head, combined with means on said devices and head for automatically moving said devices radially outward on movement of said member within the arbor in a direction to move said head toward the arbor.

2. In combination, an arbor having an axial opening therein and adapted to carry a ring-like member at one end thereof, a member slidable lengthwise of said opening in the arbor, a head located at and beyond the end of the arbor where said ring-like member is adapted to be mounted, said head having an inwardly inclined annular surface at its inner end, a plurality of arc-shaped segments around said head having inclined inner sides bearing against said annular surface and connections between said head and the member slidable in said arbor for moving said head toward the arbor and thereby simultaneously forcing said ring segments radially outward and against the outer end of a ring member located on the arbor.

3. In combination, an arbor having one end thereof adapted to receive a ring-like

member around it with one end of the member bearing against the shoulder of the arbor, a locating appliance located at said end of the arbor, including a head of less diameter than the inner diameter of the ring-like member adapted to be placed on the arbor, means for moving said head toward or away from the end of the arbor, radially movable members disposed around said head between it and the arbor, and means on said members and head for automatically moving the members radially outward and over and against the outer end of said ring-like member on movement of the head toward the arbor.

4. In a construction of the class described, an arbor having an axial opening therethrough and having one end thereof of a reduced outer diameter, a member slidably mounted in said opening through the arbor adapted to be moved back and forth, a head located at and beyond said reduced end of the arbor and formed at its outer surface and inner end with an annular inwardly inclined surface, a plurality of arc shaped segments having complementary inclined inner sides around and bearing upon said inclined surface on said head, means yieldingly holding said segments against the head, and means connecting said slidable member in the arbor with said head for drawing the head toward the arbor or releasing it to move away therefrom, whereby said curved segments are moved radially outward, there being an annular shoulder around the head between said inclined surface and the outer curved cylindrical surface of the head.

5. In combination, an arbor, a member mounted near the end of the arbor for sliding movements in the direction of the length thereof, a cylindrical head located at and beyond said end of said arbor formed at its inner end with an inwardly extending annular shoulder and an inwardly inclined annular wedging surface extending from said shoulder, a plurality of arc shaped segments having complementary inclined sides bearing against said annular inclined surface on the head and disposed between the end of the arbor and said shoulder, yielding means around said segments normally tending to move the same radially inward, a bolt passing through the head and connected to said slidable member, said bolt having a head at its outer end, and a coiled compression spring between the head of the bolt and said first mentioned head for the purposes specified.

6. A device of the class described comprising a cup-shaped head having cylindrical sides and a circular outer end, said sides adjacent their free ends having a radial inwardly extending annular shoulder from the outer side thereof, and an inwardly inclined annular surface extending from the shoulder to the free end of said sides, a rod having a head at its outer end passing through the first mentioned head, and a heavy coiled spring between the head on said rod and the outer end of the first mentioned head, as and for the purposes described.

7. In combination, an arbor having an end portion over which a cylindrical member is adapted to be placed for machining, a locating appliance located at and beyond said end of the arbor, means for moving said appliance toward or away from said end of the arbor, and means actuated by said locating appliance adapted to be moved radially outward therefrom on movement of the locating appliance toward the arbor to engage with the free end of said cylindrical member placed on the arbor and press thereagainst.

8. In combination, an arbor having an end portion over which a cylindrical member is adapted to be placed for machining, a locating appliance located at and beyond said end of the arbor, means for moving said appliance toward or away from said end of the arbor, means actuated by said locating appliance to be moved radially outward therefrom on movement of the locating appliance to engage with the free end of said cylindrical member placed on the arbor and press thereagainst with a strong yielding pressure.

In testimony whereof I affix my signature.

CHARLES H. WARREN.