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R. P. ELLIOTT.
CENTERING DEVICE.
FILED DEC. 11, 1920.

Fig. 1.

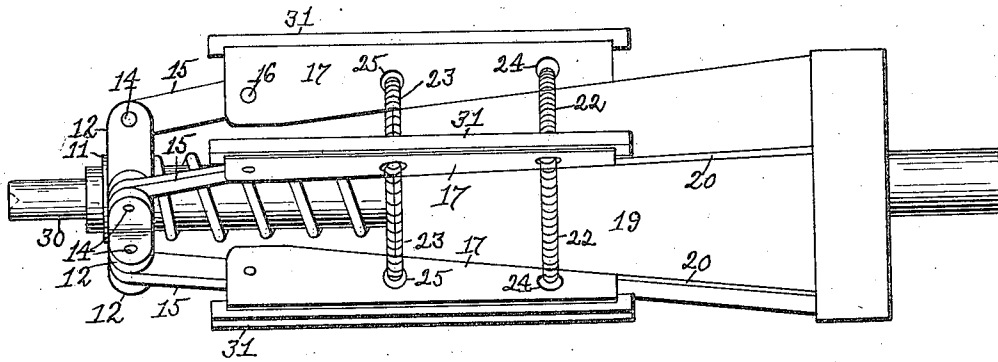


Fig. 2.

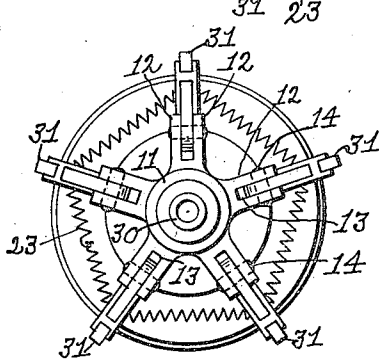
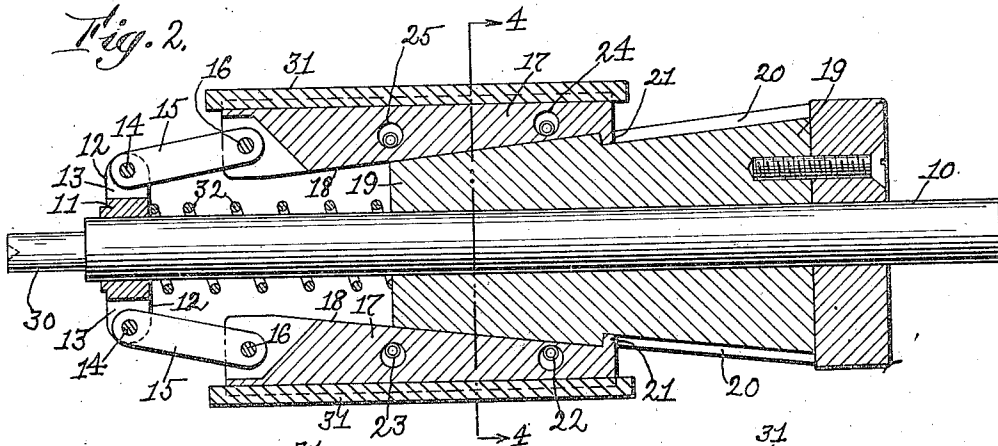


Fig. 3.

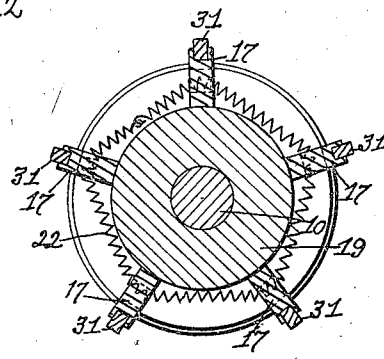


Fig. 4. Inventor:
Richard P. Elliott

by Jas. H. Churchill, Atty.

UNITED STATES PATENT OFFICE.

RICHARD P. ELLIOTT, OF LEXINGTON, MASSACHUSETTS.

CENTERING DEVICE.

Application filed December 11, 1920. Serial No. 430,000.

To all whom it may concern:

Be it known that I, RICHARD P. ELLIOTT, a citizen of the United States, residing in Lexington, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Centering Devices, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention relates to a centering device for centering one or more ring-shaped articles by their interior surfaces.

The objects of my invention are to provide a device which may be inserted inside one or more articles which are ring-shaped, the holes of which may or may not be true circles, and which may or may not be of the same diameters, to bring and maintain the interior surfaces of said rings to approximately a common axis until said articles can be secured in such position to be machined.

It is often necessary to machine ring-shaped castings on their interior surfaces. Such castings are more or less rough, of unequal diameters, and out of round. In such cases it is practically impossible to center and hold a number of such castings by their outside circumferential surfaces and bring their inside surfaces to a common rotative axis.

It is a common expedient to hold ring-shaped articles, either rough or finished, by side pressure.

Usually enough extra material in the ring-like object is provided to make up for the inequalities in diameter and out of roundness and the inability to bring such surfaces to an approximate common diameter.

My device is capable of overcoming such difficulties, and in its preferred form is provided with a plurality of expanding members which are provided with yielding means for engaging the interior surfaces of the ring-like objects to be brought to a common axis.

In the drawings—

Figure 1 is a side view of a centering device embodying the invention in its expanded position; Figure 2 a longitudinal sectional view of the device shown in Fig. 1; Figure 3 an end view taken from the left

hand end of Figure 1; and Figure 4 is a cross section through line 4—4, Figure 2.

The embodiment of my invention shown herein consists of the straight cylindrical arbor 10 having mounted thereon and removably secured thereto the spider 11 having five radiating arms 12, provided with slots 13, and the pivots 14, to which are pivoted the five links 15 which are provided with the pivots 16, by means of which they are pivoted to radially movable expanding members or bars 17. The bars 17 are provided with tapering inner surfaces 18 adapted to contact with the sliding tapering member 19, which has formed in its periphery at one end grooves 20 to receive the inwardly projecting points or lugs 21 on the bars 17 which fit in and slide in the slots 20. To maintain the bars 17 in contact with the sliding bar 19 there are provided coil springs 22 and 23 which pass through the holes 24 and 25 formed in said bars; the ends of the springs 22 and 23 being brought together and fastened so that their action will hold the bars 17 in contact with the sliding member 19. As a means of supporting the centering device, I provide the portion 30 on one of its ends to fit into a suitable recess in the holding chuck which may be used in conjunction with my device.

In using my device it is customary to provide a hole true with the rotative axis of the chuck to receive the end 30 of the arbor 10, and to support the other end of the arbor 10 in such manner that the axis of said arbor will coincide and be in a straight line with the rotative axis of the arbor or whatever it is that supports the chuck, not shown, which holds the articles to be centered. Suitable yielding or elastic means may be secured to the bars 17. In the embodiment of my invention I prefer to use high grade rubber strips 31. These strips are inserted in grooves in the outside edges of the members 17 and are machined by suitable means, such as grinding, so that they will be exactly concentric with the axis of the arbor 10 and run true therewith.

While in this embodiment I have described a rubber strip, I find that a good hard felt or similar substance may be used; also that I may use a tightly coiled spring inserted in said groove so as to leave the major portion of the body of said spring

projecting to contact with the surfaces to be centered. Any of such elastic or yielding substances may be used which are suitable for the devices to be used in conjunction with the articles to be centered.

The articles to be held are usually inserted in the receptacle in which they are to be secured, with sufficient space at their peripheries to allow them to be adjusted to bring the inside surfaces to a common axis. Thereafter, the member 19 is pushed to the left, as shown in Figure 2, to expand or push the bars 17 radially outward to contact with the objects to be centered. If two of the objects of different diameters happen to be located side by side, the one of the smaller diameter will be pressed into the yielding surfaces 31, while the yielding surface in contact with the next article, which is larger, will remain in its normal position and will touch such larger article and center it approximately concentric with the axis of the shaft 10. Where there are lumps or projections on the interior surfaces, provided they do not come between the members 31 and happen to contact with any one of the yielding surfaces 31, they are embedded in such yielding surface in such manner as to allow such article to be adjusted and centered to bring its interior surface to a common axis, or approximating the axis of the arbor 10. When all such articles which it is desired to center are brought to a common axis, they are secured in such position by side pressure, whereupon the centering device is removed by taking the pressure off the right hand end of the member 19 to allow the spring 32 to move said member 19 to the right and permit the arms 17 to move inwardly and away from the interior of the surface of the articles to be centered, and thereafter to be taken out so as to permit of the desired machining operation, whereby the inner circumferences of the hollow objects, such as rings, may be ground or otherwise treated to provide them with inner circumferences of the same diameter.

From the above description, it will be observed that the centering device is provided with yielding members which engages the inner surface of the ring-shaped object or objects, and yields locally under the influence of said objects, and one embodiment of the invention is herein shown but it is not desired to limit the invention to the particular construction shown.

What I claim is—

1. In a centering device of the character described, in combination, a sliding tapering member provided with longitudinally extended grooves in its outer surface, tapering bars engaging said members and having portions fitted into said grooves, said tapering bars being movable radially by longi-

tudinal movement of said tapering member, yielding means for maintaining said tapering bars in contact with said tapering member, and yielding members carried by said tapering bars and arranged to engage the inner surface of the object to be centered.

2. In a centering device of the character described, in combination, a longitudinally movable member, a radially movable member co-operating with said longitudinally movable member to be moved thereby into engagement with the ring-like object to be centered, and a yielding member arranged with relation to said radially movable member to be engaged thereby with the inner surface of said ring-like object.

3. In a centering device of the character described, in combination, a yielding member for engagement with the inner surface of a ring-like object to be centered, and means for moving said yielding member radially with relation to said ring-like object.

4. In a centering device of the character described, a member for engaging the inner surface of a ring-like object to be centered and capable of yielding locally to enable a plurality of ring-like objects of different diameters to be centered with relation to a common axis, and means for moving said member with relation to said ring-like object.

5. In a centering device of the character described, an arbor, a tapering member mounted thereon, expanding members provided with tapered inner surfaces in engagement with said tapering member, one of said members being movable with relation to the other to effect movement of the expanding members radially with relation to said arbor, and yielding members carried by said expanding members and arranged substantially concentric with said arbor.

6. In a centering device of the character described, in combination, an arbor, an expanding member provided with an outer surface for engagement with the inner surface of a ring-like object and capable of yielding under the influence of said ring-like object to permit the latter to be substantially centered with relation to said arbor, and means for moving said expanding member with relation to said object.

7. In a centering device of the character described, in combination, an arbor, a tapering member mounted on said arbor to move longitudinally thereon, a plurality of tapering bars co-operating with said tapering member and movable radially, means for movably connecting said tapering bars with said arbor, yielding members carried by said tapering bars at their outer surfaces, a spring mounted on said arbor for moving said tapering member in one direction, and means for moving the tapering bars radially

toward said shaft when said tapering member is moved longitudinally on said arbor by said spring.

5 8. In a centering device of the character described, a member for engaging a surface of a ring like object to be centered and capable of yielding locally to enable a plurality of ring like objects of different diam-
10 mon axis, and means for moving said member with relation to said ring like object.

9. In a device for centering a plurality of ring like objects of different diameters

with relation to a common axis, a plurality of yielding members arranged axially with
15 relation to the ring like objects to engage a surface thereof and permit the said objects to be individually centered with relation to said common axis, supporting members for
20 said yielding members, and means for moving said supporting members with relation to said ring like objects and said common axis.

In testimony whereof, I have signed my name to this specification.

RICHARD P. ELLIOTT.