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E. VAN BEVER
ADJUSTABLE ARBOR

2,518,508

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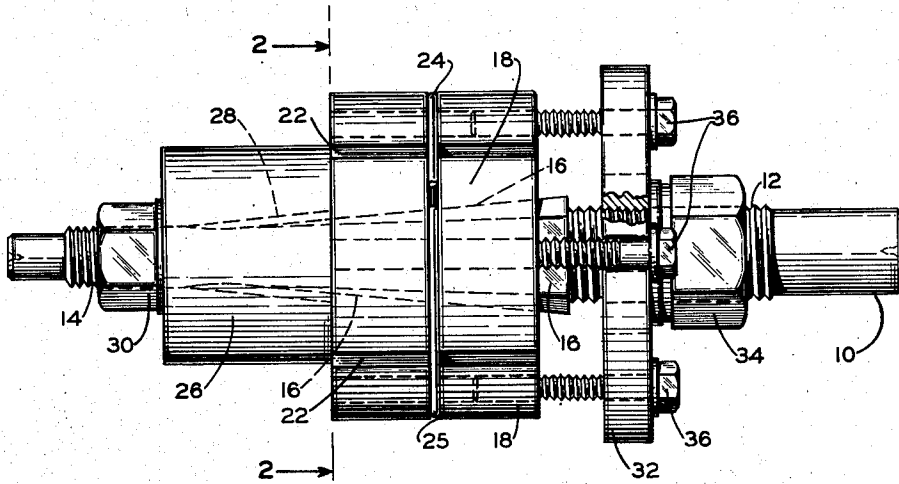


FIG. 1

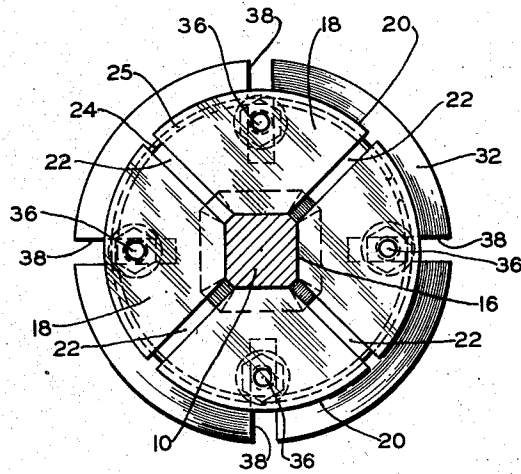


FIG. 2

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2,518,508

ADJUSTABLE ARBOR

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Application August 9, 1945, Serial No. 609,915

2 Claims. (Cl. 82-44)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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This invention relates to arbors or mandrels and more particularly to an adjustment means for arbors or mandrels of the expansible type such as are commonly used in supporting workpieces on lathes and the like for turning, grinding, and polishing operations.

It is an object of the present invention to provide an expansion arbor which is especially useful in supporting long workpieces or workpieces having only partial internal bores therein, i. e., bores which do not extend through the workpiece.

It is another object of the invention to provide an expansion type of arbor with a primary, universally operable, expansion adjustment means and a secondary, truing or centering, individually operable, adjustment means.

It is a further object of the invention to provide a tool of the above character that is comprised of a few, simple, and inexpensive parts arranged to be easily assembled and which may be readily adjusted to accommodate workpieces of different internal diameters.

With the above and other objects and features in view, the invention will now be described with reference to the accompanying drawings which illustrate a preferred embodiment of the invention and will be pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of the improved arbor, certain parts being broken away for clearness, and

Fig. 2 is a sectional elevation taken on the line II-II of Fig. 1.

The arbor or mandrel comprises a shaft 10 threaded adjacent to the opposite ends as at 12 and 14. Between the threaded sections, the shaft is formed like a truncated pyramid by four, tapering, slabbled sides 16 extending longitudinally of the shaft. Each side 16 has mounted thereon for longitudinal sliding movement, a segment 18, the internal face of which is formed on an angle corresponding to the angle of the taper of the side.

The external faces 20 of the segments are curved widthwise and together, in complement, provide a cylindrical, workpiece, engaging surface broken only by the clearance spaces 22 provided between the segments to permit of their being adjusted longitudinally along the sides 16. The segments are yieldingly held in assembled relation on the shaft 10 by a split retainer ring 24 of spring stock. The ring 24 encircles the segments and fits within aligned annular grooves 25 provided in the external faces 20. The depth of the grooves 25 is sufficient to receive the ring

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with clearance between the periphery of the ring and the faces 20.

The length of the segments is substantially less than the length of the tapered sides 16. Hence, by moving the segments as a group, bodily, along the sides 16 against the direction of the taper, the diameter across the faces 20 may be increased and by moving the segments in the direction of the taper the diameter may be decreased. In this manner the arbor is adjusted to support workpieces that have bores of different internal diameters.

The means for making the primary, universal adjustment of the segments 18 comprises a spacing collar 26 having a tapered bore 28 that accommodates with clearance the left end of shaft 10. A nut 30 threaded on the portion 14 of the shaft may be turned on the threads to force the collar 26 against the segments to move them, uniformly as a group, further outwardly or the nut may be backed off to permit the segments to be drawn closer together under the action of the spring 24.

The means for making the individual or secondary adjustment of the segments 18 comprises a disk or plate 32 threadedly mounted upon the threaded section 12. The plate 32 is arranged to be secured in adjusted position in spaced relation away from the larger end of the tapered section of the shaft 10 by a lock nut 34. Each segment 18 has threaded in its end lying opposite to the end that is engageable by the collar 26, a cap screw 36. The shanks of the cap screws 36 pass with clearance through spaced slots 38 provided in the plate 32. Consequently, when the collar 26 is moved toward the right to expand the segments as above described, this movement is not interfered with by the screws 36, the latter merely sliding idly through the slots 38 during such movement. When, however, it is desired to true up or center a workpiece, this may be readily effected by individually adjusting the segments 18. This is done by letting off and taking up on the appropriate screws 36, the cap of the taking up screw bearing against the outer surface of plate 32 for this purpose.

The slight increment of movement of the segment or segments necessary for the truing up operation is permitted by the yield of spring 24.

Apart from the advantages derived from the use of the tool in effecting a very fine degree of adjustment in truing or centering workpieces, the tool has been found extremely useful in mounting relatively long workpieces or workpieces having only partial bores. In the latter instances, a primary or approximate adjustment

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of the segments to the internal diameter of the bore of the workpiece is made by turning the nut 30. The tool is then inserted within the bore. Now, even though the nut 30 is inaccessible either because of the length of the workpiece or because the bore does not extend therethrough, the final gripping adjustment may be readily effected by taking up on each of the screws 36.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalty thereon or therefor.

Having described my invention what I claim as novel and desire to protect by Letters Patent of the United States is:

1. An expansion arbor comprising a body portion of truncated pyramidal shape having threaded shaft extensions on either end thereof, a plurality of segments mounted for longitudinal sliding movement along the faces of said body portion, a resilient ring for maintaining said segments in position on said faces, means associated with the threaded shaft extension on the smaller end of said body portion operable universally to move said segments along said faces, a plate adjustably secured to the other threaded shaft extension in spaced relation with said body portion, a plurality of cap screws, each of said screws being threaded into one of said segments and passing with clearance through spaced slots in said plate, the heads of said screws being in contact with the face of said plate furthest removed from said segments to move each of said segments individually.

2. An expansion arbor comprising a body portion of truncated pyramidal shape having threaded shaft extensions on either end thereof, a plurality of segments mounted for longitudinal

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sliding movement along the faces of said body portion, a resilient retaining ring maintaining said segments in position on said faces, a nut and spacing collar associated with the threaded shaft extension on the smaller end of said body portion operable universally to move said segments along said faces, said retaining ring in cooperation with the shape of said body portion tending to maintain said segments in contact with said spacing collar regardless of the direction of adjustment of said collar, a plate adjustably secured to the other threaded shaft extension in spaced relation with said body portion, said plate having a plurality of spaced slots about the periphery thereof, a plurality of cap screws, each of said screws being threaded into one of said segments and passing with clearance through one of said spaced slots in said plate, the heads of said screws being in contact with the face of said plate furthest removed from said segments, whereby said segments may be moved individually toward said plate gradually to increase the diameter of said arbor.

EDMOND VAN BEVER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
465,075	Grantland	Dec. 15, 1891
480,435	McGraw	Aug. 9, 1892
1,919,239	McFall	July 25, 1933

FOREIGN PATENTS

Number	Country	Date
9,302	Great Britain	1887

Certificate of Correction

Patent No. 2,518,508

August 15, 1950

EDMOND VAN BEVER

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 25, for "threadedly" read *threadably*; column 3, line 22, after the word "resilient" insert *retaining*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of November, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.