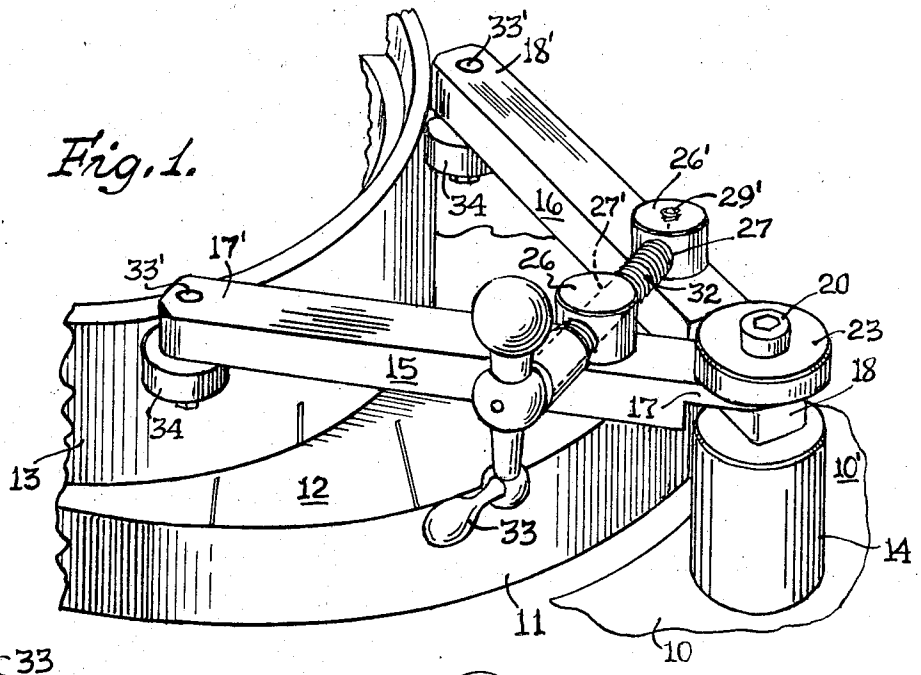
July 21, 1970 L. DAY ETAL 3,521,409

MECHANISM FOR ADJUSTING AND RETAINING A CONDITIONING RING UPON THE ROTATABLE HORIZONTAL LAPPING PLATE OF A LAPPING MACHINE

Filed Feb. 16, 1968

Fig. 1.



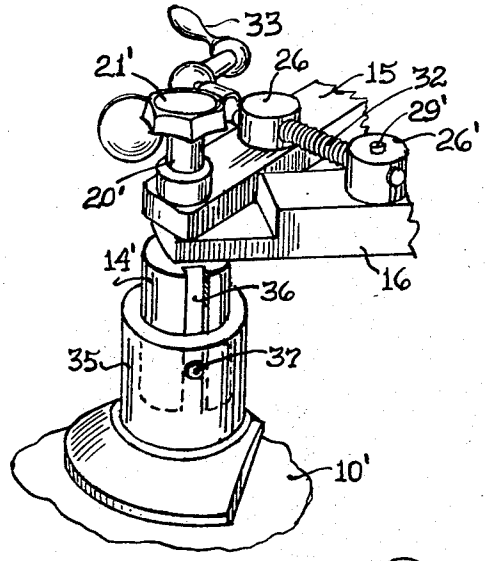


Fig. 3.

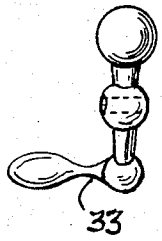
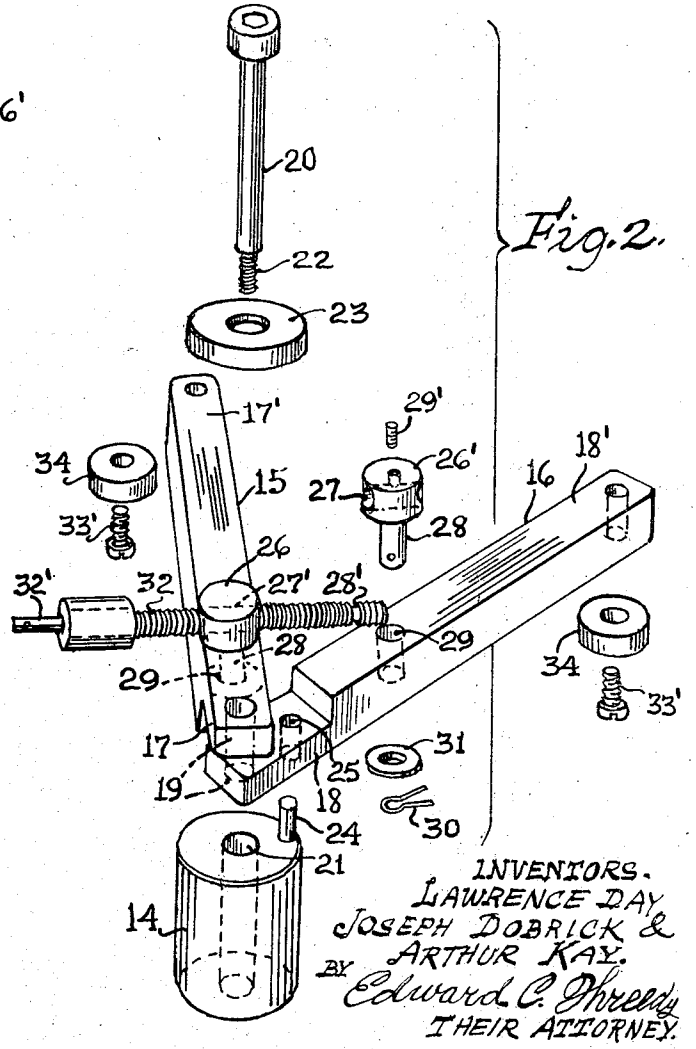


Fig. 2.



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MECHANISM FOR ADJUSTING AND RETAINING A CONDITIONING RING UPON THE ROTATABLE HORIZONTAL LAPPING PLATE OF A LAPPING MACHINE

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U.S. Cl. 51—129 7 Claims

ABSTRACT OF THE DISCLOSURE

A mechanism for holding and retaining a work holding and surface conditioning ring of a lapping machine, upon the surface of the flat horizontal rotatable lapping plate of such machine and for adjusting the ring radially with respect to the surface of such machine, either before or during the rotating of the lapping plate, to change the position of the surface contact between the ring and the surface of the lapping plate.

SUMMARY OF INVENTION

Our invention contemplates the employment of a pair of diverging arms, one of which is stationary and the other adjustable radially with respect to the stationary arm, together with means for effecting such adjustment. The arms diverge from a common axis and at their respective outer ends each carry a roller of hardened material which contacts the vertical outer surface of a conditioning ring and work holder supported upon the surface of the rotatable lapping plate.

Our present invention constitutes an improvement over that shown in our Pat. 2,895,261 dated July 21, 1959, granted on a conditioning ring holding apparatus for lapping machines. While the apparatus disclosed in such patent has proven satisfactory for the intended purpose, our present invention has certain advantages thereover. Among such advantages is the fact that the present invention provides a construction simpler than that shown in such patent and which affords, through manual adjustment either before or after the rotation of the lapping plate, positioning of the conditioning ring in a selected position upon such lapping plate, the construction requiring engagement of but two conditioning ring engaging rollers against the vertical outside wall of such rings. Furthermore, the conditioning ring retaining rollers and their respective supports may be adjusted relative to each other to accommodate conditioning rings of various diameters and to assure proper positioning of the ring in a selected position upon the lapping plate.

DESCRIPTION OF THE INVENTION

The preferred form of construction of our invention is shown in the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of a lapping machine showing our invention associated therewith;

FIG. 2 is a perspective view of the invention showing parts thereof in exploded relation with respect to each other; and

FIG. 3 is a fragmentary perspective view of a modified form of construction of our invention.

As shown in our aforementioned patent, a conventional lapping machine includes among other constructions, a casing or base **10** within and at the top of which is rotatably supported a flat lapping plate **11**, rotatably mounted and rotated in a horizontal plane by mechanism housed in the base **10**. Such mechanism is not here shown as it constitutes no part of this invention.

The plate **11** is made of suitable lapping material and supports on its lapping surface **12**, one or more conditioning rings **13**, one function of which is to maintain the lapping surface **12** in proper lapping condition. Such rings **13** also serve as work holders in a manner well known in the art. In the drawings only one of such rings is shown with its respective retaining mechanism.

Such mechanism in its preferred form of construction comprises a mounting post **14** secured to the top wall **10'** of the base **10** in a manner presently described. Arms **15** and **16** are arranged in diverging relation with respect to each other with outer end portions **17** and **18** arranged in overlapping relation with respect to each other. Such overlapping end portions **17** and **18** are provided with aligned openings **19** through which a headed bolt **20** passes and is projected through an opening **21** formed in the post **14**. The bolt **20** has a threaded end portion **22** which is threaded into a thread-bearing opening (not shown) formed in the wall **10'**. Between the outer end portion **17** of the arm **15** and the head of the bolt **20** is disposed a washer **23**.

The arm **16** is stationary with respect to the post **14** and is so held by a stud **24** carried by the post **14** and extending into a hole **25** formed in the outer end **18** of the arm **16**.

Carried by the arms **15** and **16** adjacent their outer end portions **17** and **18** are posts **26** and **26'**. The post **26'** has an opening **27** formed therein. Each of such posts is mounted on its respective arm for axial rotation by means of a stud **28** which passes through an opening **29** formed in each arm **15** and **16** and is restrained from withdrawal therefrom by means of a cotter pin **30** positioned beneath a washer **31**.

Threaded into the threaded opening **27'** of the post **26** is a screw shaft **32** having mounted on an end thereof a handle **33** for rotating the shaft **32**. The handle **33** is fixedly mounted on a reduced extension **32'** of the shaft **32**. The opposite end of the screw shaft **32** which projects through the opening **27** of the post **26'**, has formed therein a circular groove **28'** into which an end of a set screw **29'** carried by the post **26'** extends. By rotating the shaft **32**, the arm **15** may be adjusted relative to the arm **16**, the rotatability of the posts **26** and **26'** compensating for the change in the angular relationship of the arms **15** and **16**.

To complete the form of the invention shown in FIGS. 1 and 2, the outer end portions **17'** and **18'** of the arms **15** and **16** each have secured thereto by means of a screw **33'** a horizontally rotatable roller **34**.

In practice, as the lapping plate **12** rotates, rotation is imparted to the conditioning ring **13**. Should the ring **13** be not restrained, it would rotate with the plate **12**. As shown in FIG. 1, the rollers **34** are positioned with respect to the ring in a manner such as to restrain movement of the ring with the plate, while permitting the ring **13** to be rotated about its own axis and not along with the lapping plate. By adjustment of the arms **15** and **16** with respect to each other, the distance between the outer end of such arms may be compensated to accommodate rings of different diameters; also the position of the contacting surfaces between the conditioning ring and the lapping surface may be changed so as to maintain the lapping surface in a proper lapping condition.

The form shown in FIG. 3 is substantially of the same construction as that shown in FIGS. 1 and 2, except that in FIG. 3 the post **14'** is mounted in a socket **35** carried by the wall **10'**. In the post **14'** as shown in FIG. 3, there is a longitudinal groove **36** which receives a set screw **37** for securing the post **14'** in a vertical adjusted position with respect to the socket **35**. To facilitate this vertical adjustment, after loosening of the set screw **37**, the

bolt 20' is provided with a finger knob 21'. By this arrangement, the retaining rollers 34 may be adjusted vertically to properly engage the side walls of the ring 13.

The advantages of our invention over the prior art will be obvious from the foregoing description.

While we have illustrated and described the preferred form of construction for carrying our invention into effect, this is capable of variation and modification without departing from the spirit of the invention. We therefore do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A conditioning ring holding mechanism for a lapping machine which machine includes a base within which is arranged a rotatable circular flat lapping plate on which the conditioning ring is supported for rotation about its vertical axis by rotation of the lapping plate, said mechanism comprising

(a) a mounting post carried by the top wall of said base adjacent the peripheral edge of the lapping plate,

(b) a pair of diverging arms having overlapping corresponding end portions and extending over the peripheral edge of said lapping plate in spaced relation with respect thereto,

(c) a mounting bolt carried by said post and extending through openings formed in the overlapping end portions of said arms,

(d) means for holding one of said arms stationary relative to the post, the other of said arms being movable relative to said post and said one arm,

(e) means for adjusting said one arm relative to said stationary arm to vary the diverging position between said arms,

(f) and means carried by the opposite corresponding ends of said arms and engaging the side walls of said conditioning ring and cooperating with said arms to hold said ring on said lapping plate while being rotated by the latter.

2. The conditioning ring holding mechanism as defined in claim 1 wherein the means for holding one of said arms stationary relative to the post comprises a pin carried by said post and projecting into an opening formed in said one arm.

3. The conditioning ring holding mechanism as defined in claim 1 wherein the means for adjusting said one arm relative to said stationary arm includes a post carried by the arms adjacent their overlapping end portions, said posts having aligned openings formed therein, with one of said openings being a threaded opening, a screw shaft threaded through said threaded opening and having its end portion projecting into the other of said openings, a groove formed in said end portion of said screw shaft, and a set screw carried by the post into which the end portion of said screw shaft projects and projecting into said groove.

4. The conditioning ring holding mechanism as defined in claim 2 wherein the means for adjusting said one arm relative to said stationary arm includes a post carried by the arms adjacent their overlapping end portions, said posts having aligned openings formed therein, with one of said openings being a threaded opening, a screw shaft threaded through said threaded opening and having its end portion projecting into the other of said openings, a groove formed in said end portion of said screw shaft, and a set screw carried by the post into which the end portion of said screw shaft projects and projecting into said groove.

5. The conditioning ring holding mechanism as defined by claim 3 wherein the screw shaft is provided at one end with an operating handle.

6. The conditioning ring holding mechanism as defined by claim 1 wherein the means carried by the opposite corresponding ends of said arms comprises roller elements rotatable about a vertical axis and engaging the adjacent side wall of the conditioning ring.

7. The conditioning ring holding mechanism as defined by claim 1 wherein said mounting post comprises parts adjustably connected with respect to each other to vary the position of the means carried by the opposite corresponding ends of said arms to vary the position of engagement of said means with the said side walls of said conditioning ring.

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