

Feb. 13, 1923.

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E. J. KROEGER.
MACHINE FOR GRINDING BATTERY JARS.
FILED JUNE 26, 1918.

2 SHEETS--SHEET 1.

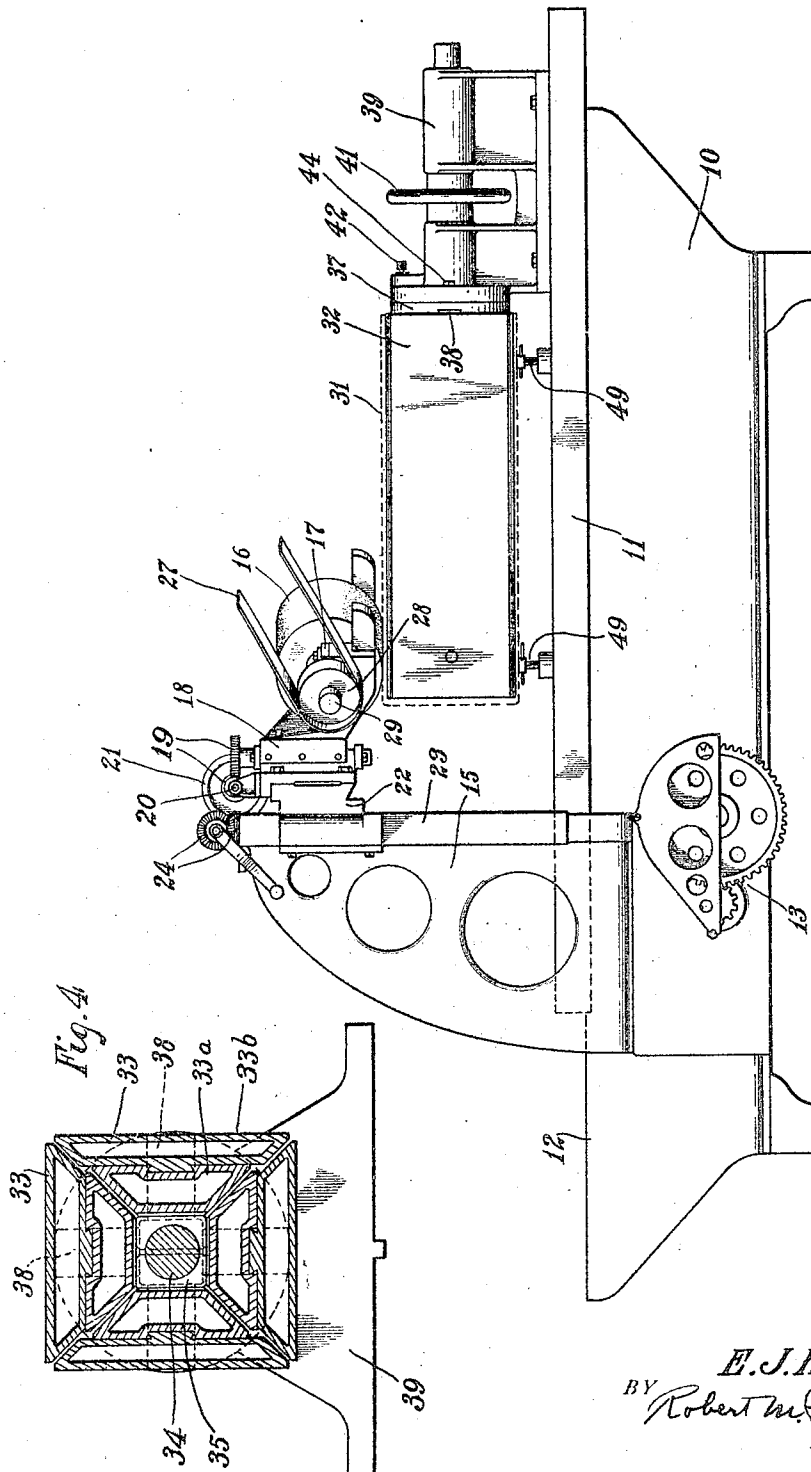


Fig. 1

Fig. 4

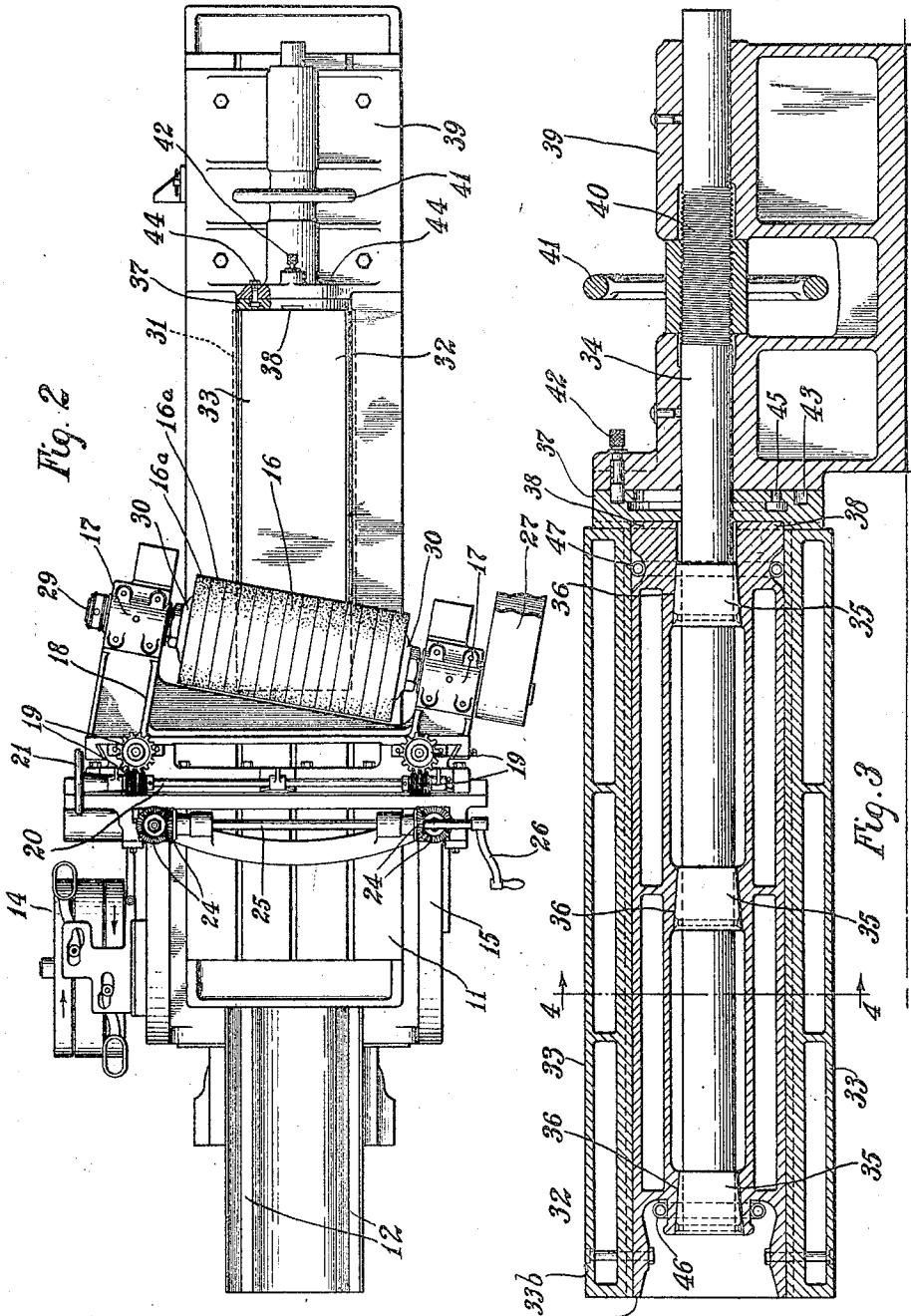
INVENTOR.
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BY *Robert M. Pierson*
ATTORNEY.

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UNITED STATES PATENT OFFICE.

EDWIN J. KROEGER, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MACHINE FOR GRINDING BATTERY JARS.

Application filed June 26, 1918. Serial No. 242,001.

To all whom it may concern:

Be it known that I, EDWIN J. KROEGER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Machine for Grinding Battery Jars, of which the following is a specification.

This invention relates to machines for grinding the external surfaces of hard-rubber battery jars, and especially the larger sizes such as are used for submarine vessels, in order that a number of jars in a battery may fill an allotted space in a containing chamber or rack with very small tolerance. My object is to enable the grinding operation to be quickly and accurately performed.

Of the accompanying drawings,

Fig. 1 is a side elevation of a jar-grinding machine constructed according to my invention.

Fig. 2 is a top plan view thereof.

Fig. 3 is a longitudinal section of the work-supporting mandrel.

Fig. 4 is a cross section of the latter on the line 4—4 of Fig. 3.

In the drawings, 10 is the fixed base of the machine, and 11 is the movable bed or platen mounted to reciprocate horizontally on guide-ways 12 on said bed and provided with suitable driving and automatic reversing mechanism partly shown at 13, 14 in Figs. 1 and 2. 15 is an arch or standard for supporting the grinding wheel 16 which is journaled in bearing 17 on a slide 18 adapted to be moved vertically to perform the finer adjustments of the grinding wheel by means of suitable gearing shown partly at 19 and including a transverse worm shaft 20 and hand wheel 21. The said slide is superposed upon a slide 22 which travels on guides 23 on the standard 15 and is movable vertically to perform the larger adjustments of the grinding wheel by means of gearing partly shown at 24 and including a transverse shaft 25 having a crank handle 26 at one end. The grinding wheel is rapidly rotated by means of a belt 27 and pulley 28.

The grinding wheel 16, as indicated in Fig. 2, is made up of a series of separate disks 16^a of suitable abrasive material, clamped together on the shaft 29 by means of end plates 30, and together forming a cylindrical grinding surface of suitable length to take in the entire width of the

work without any cross-feed. In order to insure a smooth surface on the work free from marks or raised portions at the joints between the disks 16^a, the shaft 29 of the grinding wheel is slantingly disposed at a slight departure from a right angle with reference to the direction of travel of the work-supporting bed 11.

The jar 31, which is represented by broken lines in Figs. 1 and 2, is supported on an internal-gripping expansible chuck or mandrel 32, comprising four jaw plates 33 adapted to grip the work by engaging the inner surfaces of its four side walls, an arbor 34 having three pyramidal wedges 35 engaging complementary wedge surfaces 36 on the jaw plates, and a rotatable end plate 37 having radial sliding engagement with the jaw plates by means of dovetail guides 38. The arbor 34 is supported in the two arms of a standard 39 bolted on one end of the traveling bed 11, and is provided with a screw thread 40 engaging a hand-wheel nut 41, which is held from axial movement between said arms for the purpose of adjusting the arbor longitudinally. The end plate 37 is registered in any one of four rotative positions by means of a spring bolt 42 on the standard 39 engaging apertures 43 in the plate, and is adapted to be rigidly clamped in any of these working positions by means of bolts 44 (Fig. 2) occupying a circular T-slot 45 (Fig. 3) in said plate 37. Each jaw plate is conveniently made in two sections dovetailed and bolted together, the inner section 33^a bearing against the wedges 35, and the outer section 33^b engaging the work. A movement of the arbor 34 to the right as viewed in Fig. 3, produced by rotation of the hand-wheel nut 41, expands the mandrel 32 against the work, and, when said arbor is moved in the opposite direction, the mandrel is contracted by a pair of annular coiled springs 46, 47 embracing the inner jaw-plate members 33^a.

A pair of leveling screws 49, 49 interposed between the bed 11 and the work assist in supporting the weight of the mandrel with the jar thereon and adjusting the work to a truly horizontal position.

In the operation of my invention, the jar 31 to be ground is slipped over the mandrel 32 while the latter is collapsed and withdrawn from under the grinding wheel

by a movement of the bed 11 to the right, and said mandrel is then expanded to grip the work by moving the arbor 34 to the right by means of the hand-wheel 41. The 5 face of the jar to be acted on is registered parallel with the grinding wheel by placing the bolt 42 in one of the apertures 43, the work is leveled by means of the screws 49 and the end plate 37 is clamped by means 10 of the bolts 44. By the reciprocation of the bed 11, the work is then moved back and forth under the grinding wheel 16, and a true surface is ground thereon by means of said wheel. The opposite surface may then 15 be ground by turning the mandrel to bring it into proper position, and when the desired width of jar is obtained between said surfaces, the other two surfaces may be ground in like manner.

20 I claim:

1. A machine for grinding storage-battery jars comprising an expanding rotatable mandrel for insertion within the jar, having a series of jaws for engaging the inner 25 sides of the jar walls, means for operating said jaws, means for fixing said mandrel in different predetermined rotary positions for presenting the several sides of the work to be ground, an abrasive wheel adapted to 30 grind the sides of a jar supported on said mandrel, and means for imparting a relative feed motion to said mandrel and wheel longitudinally of the mandrel.

2. In a machine for grinding storage-battery jars, the combination of an abrasive 35 wheel, a mandrel support having a relative longitudinal feeding movement with respect to said wheel, an expansible inside-gripping

mandrel mounted on said support and including an axially-adjustable central arbor 40 having a series of wedges, a support for said arbor, means for adjusting said arbor axially of the support, a series of gripping jaws radially adjustable by means of said wedges, a rotary end plate having radial 45 guides for said jaws, and means for clamping said end plate to said support in positions successively presenting the different side faces of the work to the action of said grinding wheel. 50

3. In a machine for grinding storage-battery jars, the combination of a horizontal inside-gripping expansible work-supporting mandrel, means for supporting said mandrel by one end, a leveling screw adapted 55 to engage the under side of the work, an abrasive wheel, and means for imparting a relative feeding movement to said mandrel and wheel.

4. In a machine for grinding storage-battery jars, the combination of a reciprocating bed, an expansible, projecting, work-holding mandrel mounted thereon and adapted to be fixed in different predetermined rotary positions for presenting the 65 several sides of the work to be ground, a grinding-wheel shaft mounted transversely and obliquely with respect to the path of movement of said work holder, and a cylindrical grinding wheel mounted on said 70 shaft.

In testimony whereof I have hereunto set my hand this twenty-first day of June 1918.

EDWIN J. KROEGER.