Dec. 1, 1925. 1,563,355

J. C. FOX

REFLECTOR POLISHING MACHINE

Filed Dec. 7, 1923 3 Sheets-Sheet 1

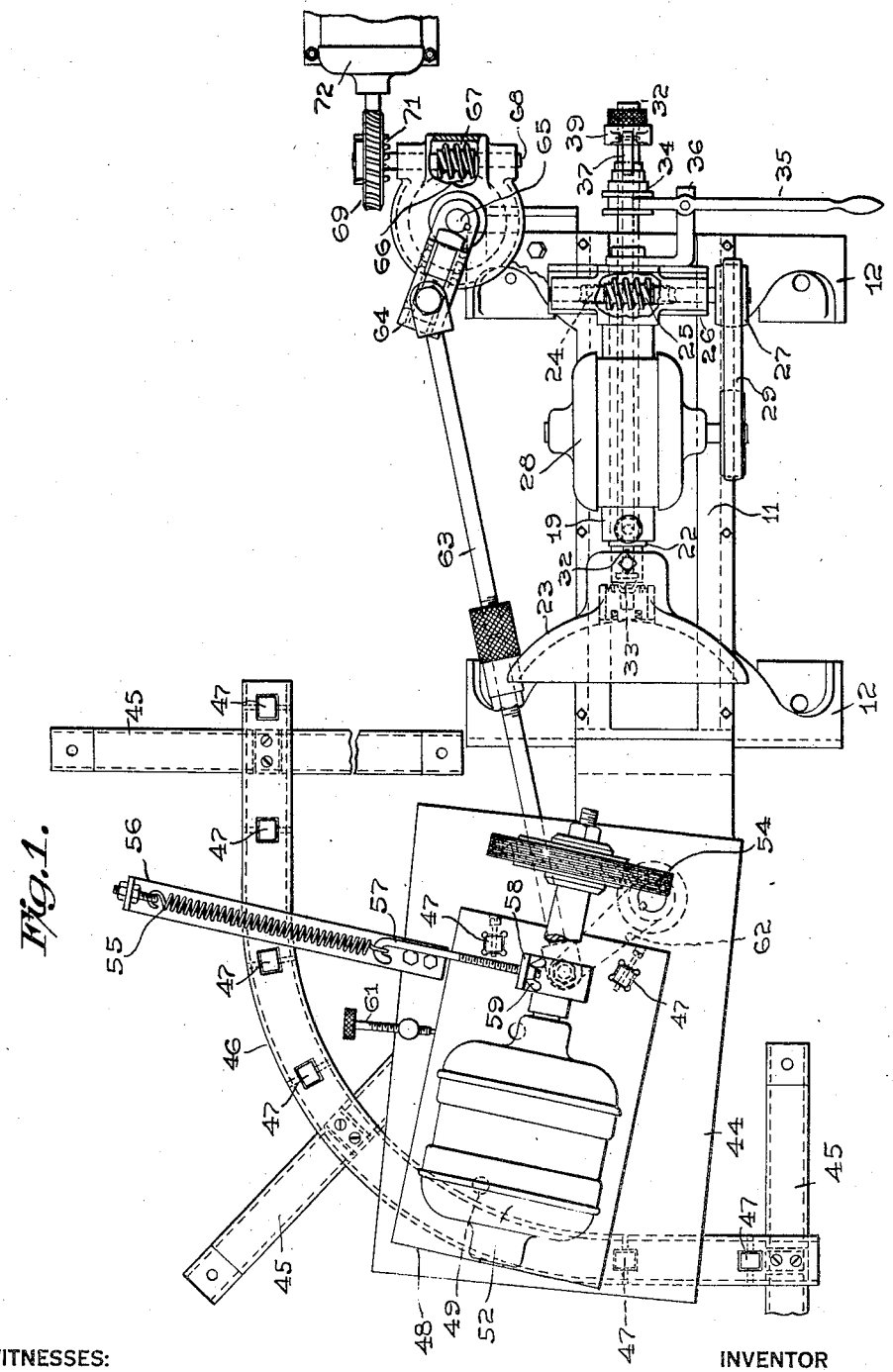


Fig. 1.

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Filed Dec. 7, 1923 3 Sheets-Sheet 2

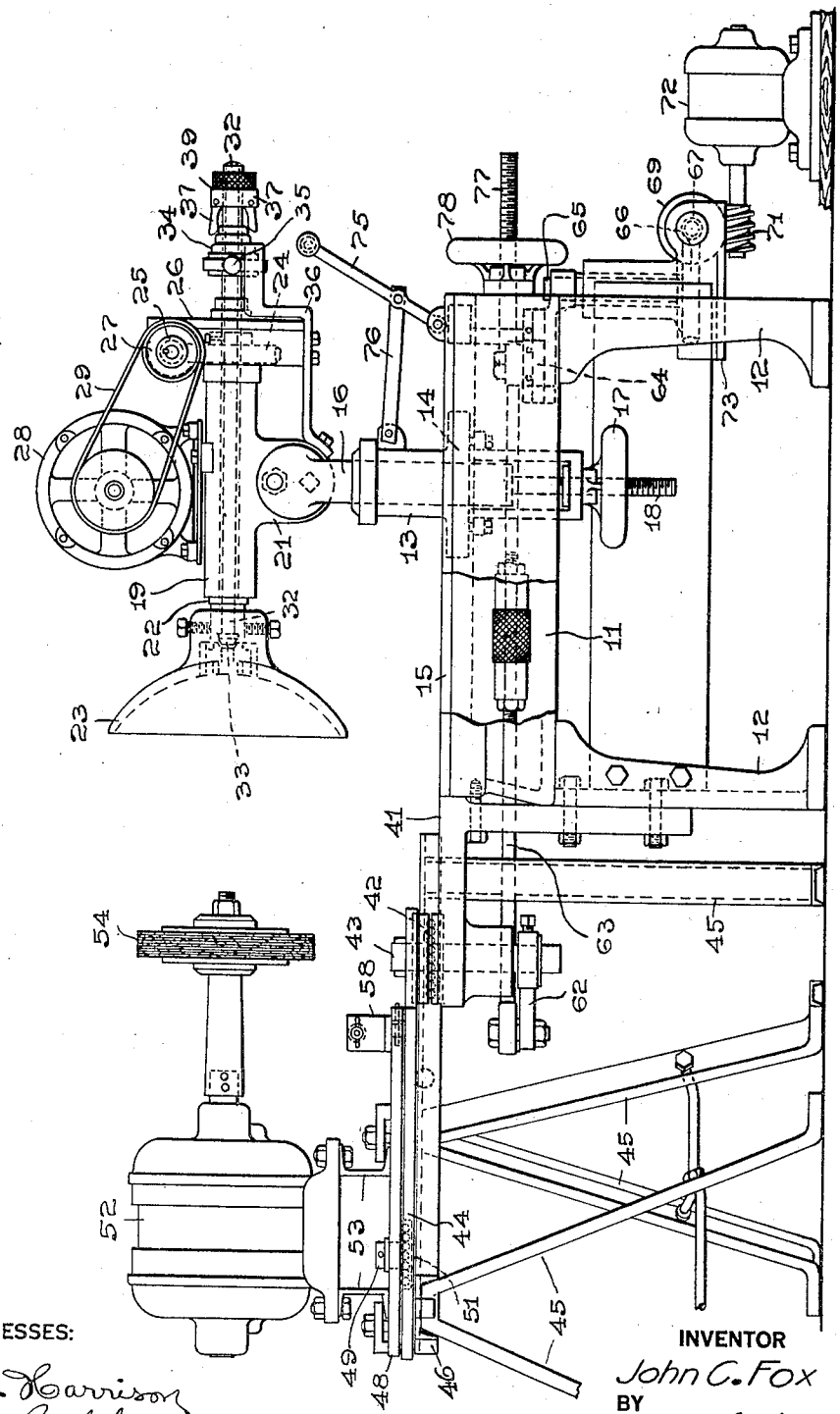


Fig. 2.

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Fig. 4.

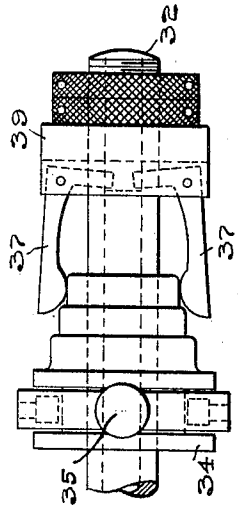


Fig. 5.

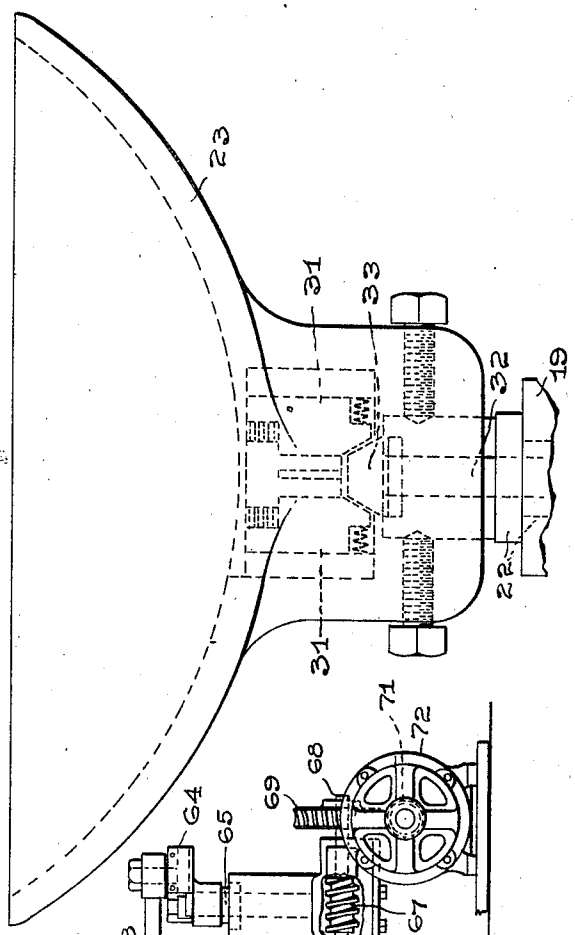
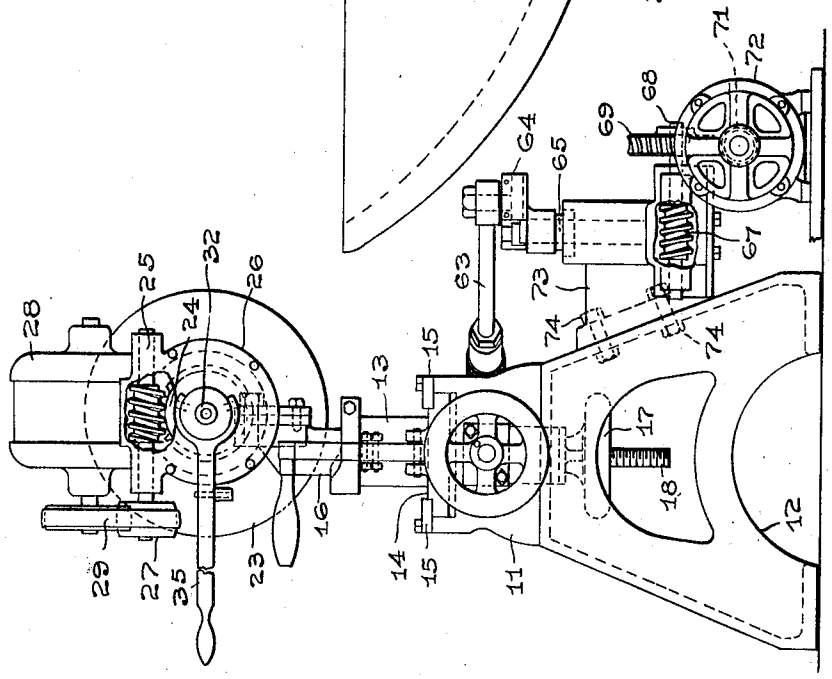


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN C. FOX, OF MANSFIELD, OHIO, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

REFLECTOR-POLISHING MACHINE.

Application filed December 7, 1923. Serial No. 679,072.

To all whom it may concern:

Be it known that I, JOHN C. FOX, a citizen of the United States, and a resident of Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Improvement in Reflector-Polishing Machines, of which the following is a specification.

My invention relates to polishing machines and particularly to machines for polishing the inner surfaces of concave metal reflectors.

The object of my invention is to provide a relatively simple and compact structure for polishing the inner surfaces of concave reflectors.

In practicing my invention, I provide a base upon which a chuck support is adjustably mounted. A chuck for holding the concave reflectors is mounted upon the said support and it is vertically adjustable relatively thereto and is also tiltable thereon. A motor is mounted upon said support and is effective to cause the chuck and a reflector held thereby to rotate around the axis thereof.

A base plate is pivotally associated with said chuck base and carries a motor-supporting plate that is pivotally adjustable thereon. A motor is mounted on said plate and carries a circular polishing brush. A spring member is associated with the base plate and the motor-supporting plate to yieldingly hold the latter against an adjustable stop whereby the proper pressure of the brush against the inner surface of the brush is obtained and wear of the brush is compensated.

A motor-operated means is operatively associated with the base of the chuck and is effective to cause the motor driven brush to oscillate around the pivot of the base plate whereby the entire inner surface of a concave reflector is operatively engaged by the brush and is polished thereby.

In the drawings,

Figure 1 is a top plan view of a device embodying my invention,

Fig. 2 is a view in side elevation thereof,

Fig. 3 is a view in end elevation thereof,

Fig. 4 is a partial view of means for actuating the chuck-clamping means, and

Fig 5 is a fragmentary enlarged plan view of a chuck.

A base for a chuck-supporting means and a chuck comprises a bed plate 11 that is mounted on a plurality of suitable supporting members 12, both the bed-plate and the supports being made relatively massive and heavy.

A chuck-support-aggregate is adjustably mounted on the bed plate 11, and comprises a member 13, of substantially tubular form, that is provided with integral laterally extending flanges 14 adapted to be located in suitable guide ways and provided in the bed plate 11. Clamping bars 15 are provided to operatively engage the upper surface of the flanges 14 and properly hold the member 13 relatively to the base 11, while permitting it to be moved back and forth thereon.

A chuck support 16 is fitted into the tubular member 13 within which it may be adjusted in a vertical direction by means of a hand wheel 17 operatively engaging a screw-threaded portion 18 provided on a lower end of the member 16. As any suitable means may be provided for effecting vertical adjustment of the member 16 relatively to the member 13, the details of construction are not further described, particularly as they form no part of my invention.

A horizontally extending portion 19 of the chuck support has an integral depending portion 21 operatively engaging the upper end of the member 16 and pivotally mounted thereon so that it may be tilted up or down relatively to the portion 16. The member 19 is of substantially tubular form and carries an inner tubular member 22 to one outer end of which a chuck 23 is suitably secured.

The chuck is of substantially bowl shape and is of such form and dimensions as to receive therein and hold, by means to be hereinafter described, a concave metal reflector, the inner surface of which is to be polished. The other end of the tubular member 22 has mounted thereon a worm wheel 24 that is operatively engaged by a worm 25 that is suitably mounted in a casing 26, supported by the member 19. A pulley 27 is operatively mounted on either an integral extension of the worm 25 or on a supporting shaft therefor, and is driven by an electric motor 28, that is mounted on the member 19, a belt 29 operatively connecting the motor pulley and the pulley 27.

Means for holding a concave reflector in its proper operative position within the chuck 23 may comprise expanding jaws 31, of any suitable or desired type, that are

actuated by a rod 32 extending through the inner tubular member 22, a member 33 of conical shape being provided to operatively engage the jaws 31 and force them outwardly against the inner surface of an axial opening provided in the concave reflector member.

Means for moving the rod 32 may comprise a collar 34, movably mounted on the tubular member 22, that is actuated by a handle 35 pivotally mounted on a support 36 that is secured to the depending portion 21 of the member 19. The movable collar 34 has a reduced end portion that is adapted to operatively engage two actuating arms 37, each of substantially L-shape, that are mounted on a fixed collar member 39, suitably secured on the rear end of the tubular member 22. The inner ends of the respective members 37, of substantially L-shape, operatively engage the rod 32 in a suitable groove provided therein in order to move it longitudinally relatively to the member 22.

While I have illustrated and described a specific embodiment of a holding means, I do not desire to be limited thereto, as any suitable or desired type of holding means may be employed so long as it is manually operable and is effective to securely hold a concave reflector member when located in its proper operative position within the chuck 23.

The base 11 is provided with an integral extension 41, of substantially L-shape, the outer end of which is of such shape as to receive a ball-bearing 42 and a pivot pin 43 extending therethrough. A base plate 44 has a portion of the ball-bearing 42 operatively associated therewith and is thereby pivotally operatively connected to the base 11. The outer end of the base plate 44 rests upon a plurality of supporting members 45, of substantially U-shape, to the top of which is secured a member 46, of substantially arcuate form and of channel section. A plurality of roller members 47 are suitably mounted in the member 46 upon which the base plate 44 may move with relatively little friction.

A motor-supporting plate 48 is mounted on top of the base plate 44 and is pivotally secured thereto by a pivot pin 49 and a co-operating ball-bearing 51 located therebetween. The pivot pin 49 is located at that end of the base plate offset to the pivot pin 43.

A motor 52 is secured to the top of the motor supporting plate 48 by suitable supports 53, which may be of any suitable or desired type to hold the motor shaft in substantially the same height as the axis of the chuck 23. A circular brush 54 is suitably mounted on and connected to the end of the shaft of the motor 52.

Means for yieldingly holding the motor-supporting plate against the inner surface of a concave reflector may comprise a spring member 55, one end of which is connected to a bar 56 that has one of its ends suitably mounted on the base plate 44. The other end of the spring 55 is connected to a hook member 57 that has its other end in operative engagement with a lug 58 mounted on the base plate 44.

The outer end of the hook member 57 may be provided with screw-threads, and a butterfly nut 59 may be mounted thereon to permit of adjusting the tension of the spring 55. A member 61 is mounted on the base plate 44 and permits of adjusting the movement of the motor-supporting plate relatively to the base plate 44. A plurality of roller bearings 47 may be provided in or on the base plate 44 to ensure that the motor-supporting plate may move freely relatively to the base plate under the action of the spring 55.

Means for oscillating the circular brush, the motor-supporting plate and the base plate relatively to the extension 41 and the base plate 11 may comprise a lever 62 that is suitably secured to the pin 43 which is, in turn, secured to the base plate 44 and has a fixed position relatively thereto.

At its outer end, the lever 62 is pivotally connected to a link 63 that may be made adjustable as regards its length and that has its other end connected to a lever 64 that is suitably fixedly secured to the top of a short-vertically extending shaft 65.

The lower end of the shaft 65 has mounted thereon a worm wheel 66 that is operatively engaged by a worm 67. The worm 67 is mounted on a shaft 68 that has also mounted thereon adjacent to the outer end thereof a worm wheel 69 that is operatively engaged by a worm 71 that is mounted on the end of the shaft of a motor 72. The shaft 65, the worm wheel 66 and the worm 67 are mounted in a suitable housing 73 that is suitably secured against one of the supports 12 by a plurality of bolts 74.

As it is desired to move the chuck and the chuck-support relatively to the base, an operating hand lever 75 has one end thereof pivotally mounted on the bed plate 11 and is connected to the chuck support by a link 76 that has one end pivotally connected to the lever 75 and the other end to the chuck support 13. The hereinbefore described construction of bed plate permits of easily and quickly moving the chuck, the motor and the chuck support relatively to the plate 11, toward and away from the circular brush by means of the hand lever 75.

Means for limiting the movement of the chuck and the parts immediately associated therewith toward the circular brush are provided and may comprise a substantially

horizontally extending shaft 77, the inner end of which is constructed as a stop for the lower part of the portion 13 when moved by the hand lever 75 toward the circular brush. As such mechanisms are well known, I have not deemed it advisable or necessary to illustrate or describe this in detail. A hand wheel 78 is provided on the outer screw-threaded end of the shaft 77 to permit of adjusting the position of the stop as may be suitable or necessary.

The center line of the shaft of the motor 52 is located in offset position in a vertical plane, relatively to the vertical plane of the axis of the chuck 23 in order to permit the proper operative position of the brush 54 relatively to the chuck 23 and to the reflector member located therein. This offset position may be varied as required by the relative dimensions of the brush 54 and the reflector member located in the chuck 23, by means of the spring member 55 and the stop member 61.

It may be noted also that the pivotal mounting of the motor supporting plate on the base plate is offset from the center line of the shaft of the motor 52.

The device embodying my invention thus provides a relatively simple and compact structure having a chuck within which a concave metal reflector member may be easily and quickly mounted and which may be so moved as to cause the inner surface of the reflector member to be operatively engaged by a rotating circular brush.

Means are provided by the device embodying my invention for rotating the chuck and the reflector member at a relatively low speed and for rotating the circular brush at a relatively high speed.

The circular brush together with parts of the mechanism operatively associated therewith are given an oscillating motion by means operatively associated with the base plate of the chuck to the effect that all of the inner surface of the reflector shall be operatively engaged by the circular brush and thereby become highly polished. All of the members are adjustable relatively to the other portions of the structure in order that various sizes of reflectors may be polished, various sizes of circular brushes be employed, and that wear of the circular brush may be easily and quickly compensated.

Various modifications and changes may be made without departing from the spirit and scope of the invention, I desire, therefore that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. In a reflector-polishing machine, in combination, a base, a rotatable chuck for holding a concave reflector the inner surface of which is to be polished, adjustably mounted on said base, a base plate having a pivotal mounting on said chuck base, a motor-supporting plate pivotally mounted on said base plate, a motor mounted on said motor-supporting plate, a circular brush on said motor, means on said chuck-base for moving said chuck toward said brush, and means operatively associated with said chuck-base for causing oscillatory movement of said base-plate, motor and brush around said pivotal mounting.

2. In a reflector-polishing machine, in combination, a base, a rotatable chuck for holding a concave reflector, the inner surface of which is to be polished, adjustably mounted on said base, a base plate having a pivotal mounting on said chuck base, a motor-supporting plate pivotally mounted on said base plate, a motor mounted on said motor-supporting plate, a circular brush on said motor, means on said chuck-base for moving said chuck toward said brush, means operatively associated with said chuck-base for causing oscillatory movement of said base-plate, motor and brush around said pivotal mounting and means associated with said base plate for yieldingly holding the peripheral surface of said brush against a reflector mounted in said chuck.

In testimony whereof, I have hereunto subscribed my name this 1st day of December 1923.

JOHN C. FOX.