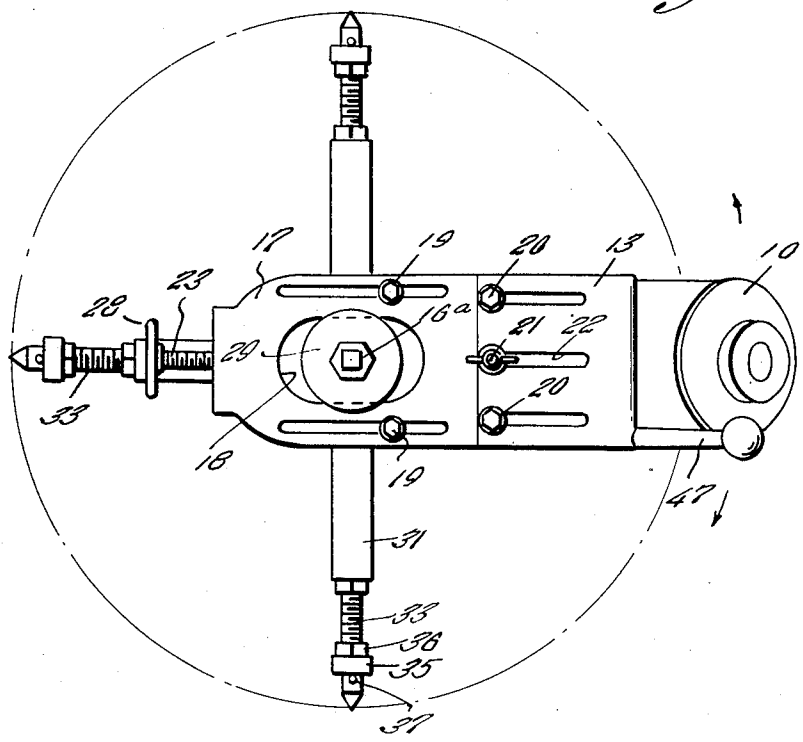
Nov. 7, 1933. H. B. MOORE 1,933,677

GRINDING MACHINE

Filed March 2, 1933 3 Sheets-Sheet 1

Fig. 1.



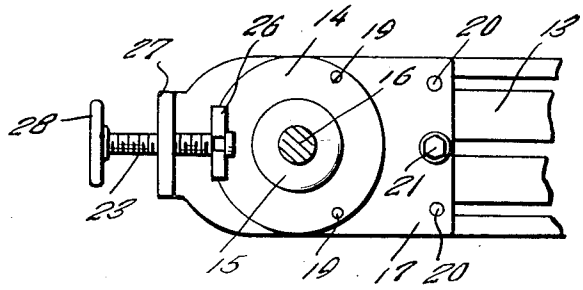


Fig. 5.

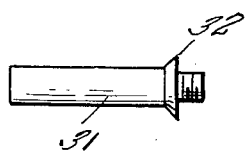


Fig. 10.

Inventor

H. B. Moore

By Clarence A. O'Brien

Attorney

Nov. 7, 1933. H. B. MOORE 1,933,677

GRINDING MACHINE

Filed March 2, 1933 3 Sheets-Sheet 2

Fig. 2.

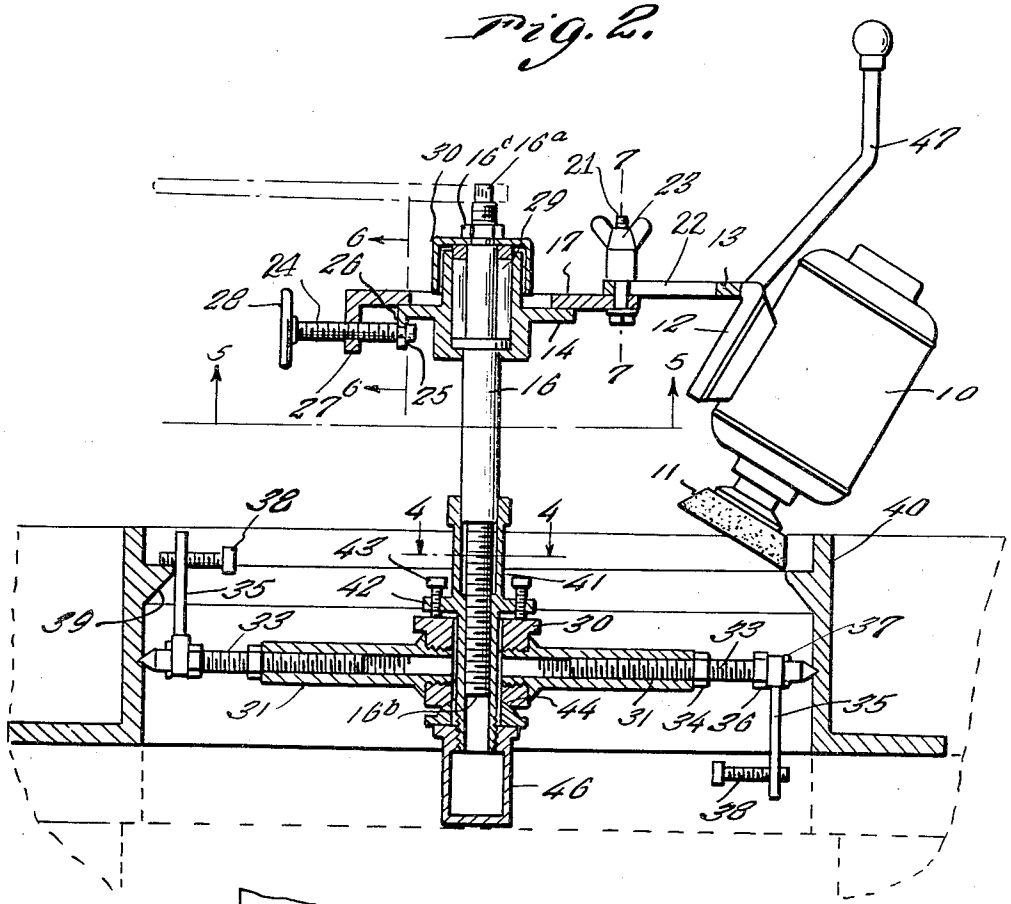
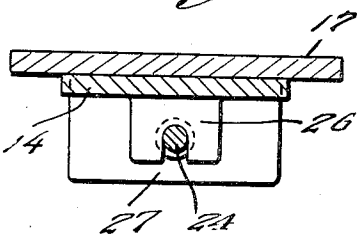


Fig. 6.



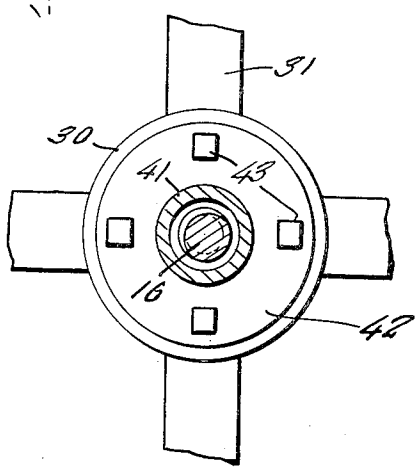


Fig. 4.

Inventor

H. B. Moore

By Clarence A. O'Brien

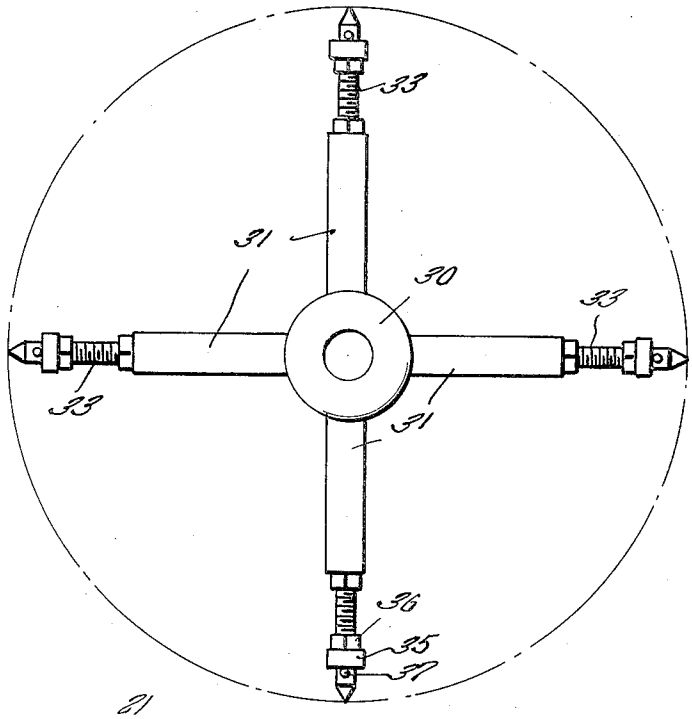
Attorney

Nov. 7, 1933. H. B. MOORE 1,933,677

GRINDING MACHINE

Filed March 2, 1933 3 Sheets-Sheet 3

Fig. 5.



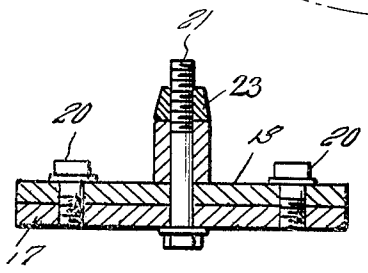
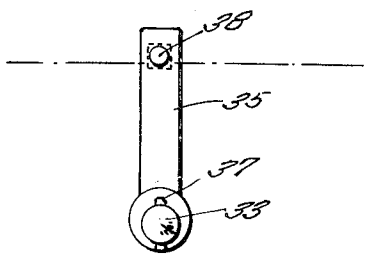


Fig. 7.

Fig. 8.



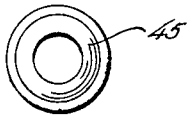


Fig. 9.

Inventor

H. B. Moore

By Clarence O'Brien

Attorney

Patented Nov. 7, 1933 1,933,677

UNITED STATES PATENT OFFICE

1,933,677

GRINDING MACHINE

Harry Ballard Moore, Rocky Mount, N. C.

Application March 2, 1933. Serial No. 659,421

5 Claims. (Cl. 51—245)

This invention relates to grinding machines, and although it may be used for other purposes, it is particularly intended for use to grind off the top of the usual manhole casing cover seat provided at the upper edge of the casing.

Further, the invention comprehends the provision of a portable machine whereby manhole casings and covers therefor may be expeditiously ground or polished to permit the cover to seat accurately within the manhole casing.

The invention, together with its numerous objects and advantages, will be best understood from a study of the following description taken in connection with the accompanying drawings, wherein:—

Figure 1 is a top plan view of the grinding machine.

Figure 2 is a vertical sectional elevational view thereof, showing the device in operative position on a manhole casing.

Figure 3 is a plan view of a support forming part of the invention.

Figures 4, 5, 6 and 7 are sectional elevation views taken substantially on the lines 4—4, 5—5, 6—6 and 7—7, respectively, of Figure 2.

Figure 8 is an elevational view of a suspension element forming part of the support shown in Figure 3.

Figure 9 is a plan view of a hemi-spherical joint member, and

Figure 10 is a plan view of a tubular arm forming part of the aforementioned support.

Referring to the drawings by reference numerals, 10 is a motor of any suitable kind, such as an electric motor, the shaft of which carries an emery or other grinding wheel 11. In the present instance, the wheel 11 is preferably frusto-conical, as shown.

The motor 10 is fastened to the arm 12 provided on one end of a plate or section 13 forming part of an adjustable bracket, and in the present instance the arm 12 depends from the plate or bracket section 13 at an acute angle thereto.

The aforementioned adjustable bracket includes a plate or section 14 that is provided with a hub 15 journaled on one end of a post 16. A plate 17 is provided with an elongated opening 18 receiving one end of the hub 15, and plate 17 is caused to rotate with the plate 14, and to shift laterally relative to the plate through the medium of suitably arranged bolt and slot connections 19, (see Figure 1). Slidably engaged with one end of the plate 17 is the aforementioned plate or section 13, there being suitable bolt and slot connections 20 provided between the plates or sections 13 and 17, whereby the plate 13 is constrained to shift longitudinally of the plate 17. The plate 17 is also equipped with the bolt 21 uprising therefrom and operating in a slot 22 in the plate 13, and a wing nut 23 is engaged with the bolt 21, and when screwed home against the plate 13, will serve to secure the latter at the desired adjustment.

A screw device is provided for shifting the plate 17 relative to the plate 14 and in the present instance, such device consists of an adjusting screw 24 having at one end a swivel connection 25 with a depending flange 26 provided on one end of the plate 14, and a screw threaded connection with a depending flange 27 provided on the free end of the plate 17. On its free end the screw 24 is provided with a hand wheel 28 and obviously by properly rotating the screw 24, a shifting of the plate 17 and associated parts relative to the plate 14 may be readily accomplished.

Arranged in the hub 15 of plate 14, and disposed about the inner end of the post 16, are roller bearings 29 and disposed over the upper end of the hub is a cap 30. The uppermost end of the standard 16 is threaded and extends through an aperture in the crown of the cap 30. A nut 16c is engaged with said end of the post 16 in a manner to secure the cap in position. The head post 16 also has an upper squared end portion 16^a for the application of a wrench or other suitable tool thereto, as suggested in Figure 2, for rotating the standard.

For supporting the device, there is provided what may be termed a spider or supporting frame, the same including a hub 30 provided with radial threaded apertures into which are screwed the threaded ends of tubular arms 31, which latter are provided adjacent their threaded ends with shoulders 32 to engage the periphery of the hub when the threaded ends of the tubular arms are screwed home. Pointed screw threaded shanks 33 have screw threaded engagement with the arms 31 and lock nuts 34 are provided to secure the shanks 33 at the desired adjustment. Adjacent the pointed end thereof, each shank 33 has pivotally connected thereto a suspension arm 35 that has the end thereof engaged with the shank 33 confined between a nut 36 and a retaining pin 37. At their free ends, the suspension arms 35 have screw threadedly engaged therewith bolts 38 for engaging the seat 39 of a manhole casing 40, in a manner clearly suggested in Figure 2. The bolts 38 thus engaged with the seat 39 will pendently support the spider

or supporting frame within the casing 40 until the shanks 33 have been screwed outwardly to engage their pointed ends with the wall of the casing, after which the screws 38 are retracted, permitting the arms 35 to swing to the position suggested at the right of Figure 2, so as not to interfere with the grinding operation.

The hub 30 accommodates in a swivel manner, one end of a thimble 41 which is screwed onto the threaded end 16^b of the post or standard 16. It will be noted that the end of the thimble 41 received in the bore of the hub 30 is of considerably less diameter than the diameter of said bore so as to permit movement of the thimble in all directions relative to the hub.

Intermediate its end, the thimble 41 is provided with a circular flange 42 and adjusting screws 43 work through the flange 42 and engage the upper end of the hub 30 so that by manipulating the screws 43, the post 16 may be readily brought into true perpendicular position. In this connection, it will be noted that at the lower end thereof, the hub 30 is provided with a hemispherical socket 44, with which is engaged a hemi-spherical joint member 45 that is disposed above the lower end of the thimble 41, and the aperture in the member 45 is of a diameter corresponding substantially to the diameter of the bore of the hub 30. At said lower end, the nipple 41 is also provided with a dust cap 46 that is screw threadedly engaged with said lower end of the nipple, and when screwed home, the cap 46 will urge the hemi-spherical portion of the coupling member 45 into proper seating engagement with the socket 44, thus providing a universal joint between the nipple 41 and the hub 30, facilitating universal movement of the post 16 upon proper manipulation of the screws 43.

In the use of the device, the supporting frame or spider is first lowered into the casing 40, with the arms 35 held upwardly and the screws 38 advanced, so as to engage the seat 39 for suspending the supporting frame or spider within the casing. Next, the shanks 33 are threaded outwardly relative to the arms 31 to engage the points of the shanks with the wall of the casing; after which the screws 38 are retracted, permitting the arms 35 to fall to an out-of-the-way position, being supported in said position pendently above the shanks 33. The screws 43 are then properly manipulated for setting the thimble 41 absolutely perpendicular. Next, by applying the wrench or other suitable tool to the squared end 16^a of post 16 and rotating the post, a raising or lowering of the post may be effectively accomplished for vertically adjusting the same. All necessary adjustments of the plate or section of the bracket carrying the motor 10 are next made as may be required for placing the grinding disk 11 in proper position with respect to the work. The motor is then started and the grinding wheel rotates in contact with the top of the seat 39. The bracket carrying the motor 10 may be turned to carry the wheel or disk 11 around the whole circumference of the seat 39, this being conveniently done by means of a handle 47 carried by and attached to the bracket plate or section 13. To cover the complete width of the seat 39, bracket plate or section 17 carrying the plate 13, which in turn carries the motor 10, may be shifted laterally with respect to the post 16 by turning the screw 24.

I have found, that in actual practice, by having the motor carrying arm 12 disposed at an acute angle, and also in having the disk 11 frusto-conical, that a grinding of the seat 39, for its entire width, can be effectively accomplished even up to and within the corner formed at the junction of the seat 39 and the wall of the casing 40.

The device is capable of use for grinding manhole covers and also the ends of any cylindrical or other hollow circular articles.

While the preferred form of the invention has been herein shown and described in detail, it is to be understood that I am fully aware that numerous changes may be made therein without departing from the spirit of the invention, and accordingly, it is to be understood that I am intending to limit myself only by the requirements of the prior art and the scope of the appended claims.

Having thus described the invention, what is claimed as new is:—

1. In combination, a supporting device provided with means to secure the same to a circular body to be operated on, and within the said body, a post uprising from the supporting device, a universal connection between the post and the supporting device, means for securing the post in fixed vertical position relative to the supporting device, a longitudinally adjustable bracket mounted on the post to revolve about the post as an axis, a motor mounted on the bracket, and a surface finishing element fixed to the motor shaft.

2. In a grinding machine, a post, a bracket mounted on the post to revolve about the post as an axis, a motor mounted on the bracket, a surface finishing element having a driving connection with the motor; and a supporting device for the post provided with means for receiving one end of the post, and also having radially adjustable arms to secure the supporting device to an annular piece of work, and suspension means engaged with the arms for pendently supporting the device from the work prior to a fastening thereof.

3. In a machine of the class described, a support provided on its under side with a concave socket, and a vertical opening extending upwardly from the socket through the support, a tool carrying post having a member provided on one end thereof loosely fitting within the said opening, a hemi-spherical joint member engaging said socket and having an opening therethrough for accommodating the lower end of said member, a cap screw threadedly engaged with the lower end of said member and bearing against said hemi-spherical joint member for engaging the latter with said socket, a flange on said member, and adjusting screws threadedly engaged with the flange and having bearing contact with the top side of the support for retaining said post perpendicular to the support.

4. A manhole casing cover seat grinder comprising a supporting structure, means carried by the supporting structure to loosely suspend the latter within the manhole casing, other means carried by the supporting structure for positively supporting said structure within the manhole casing against casual movement, a thimble, a universal connection between said thimble and supporting structure and including means to positively secure the thimble in a position perpendicularly to the supporting structure, a post having an end screw threadedly engaged with the thimble, a bracket mounted on the post to revolve about the latter as an axis, a motor mounted on the bracket at an angle to the perpendicular

and a frustro-conical surface finishing element fixed to the motor shaft.

5. A manhole casing cover seat grinder comprising a supporting structure, means carried by the supporting structure to loosely suspend the latter within the manhole casing, other means carried by the supporting structure for positively supporting said structure within the manhole casing against casual movement, a thimble, a universal connection between said thimble and supporting structure and including means to positively secure the thimble in a position perpendicularly to the supporting structure, a post having an end screw threadedly engaged with the thimble, an extensible bracket mounted on the post to revolve about the latter as an axis, a grinding wheel carried by the bracket and revoluble therewith, means to rotate the wheel, and a handle on the bracket to revolve the latter.

HARRY BALLARD MOORE.