

March 16, 1926.

H. LUTZ

1,576,769

MACHINE FOR GRINDING ROLLERS

Filed May 29, 1919

3 Sheets-Sheet 1

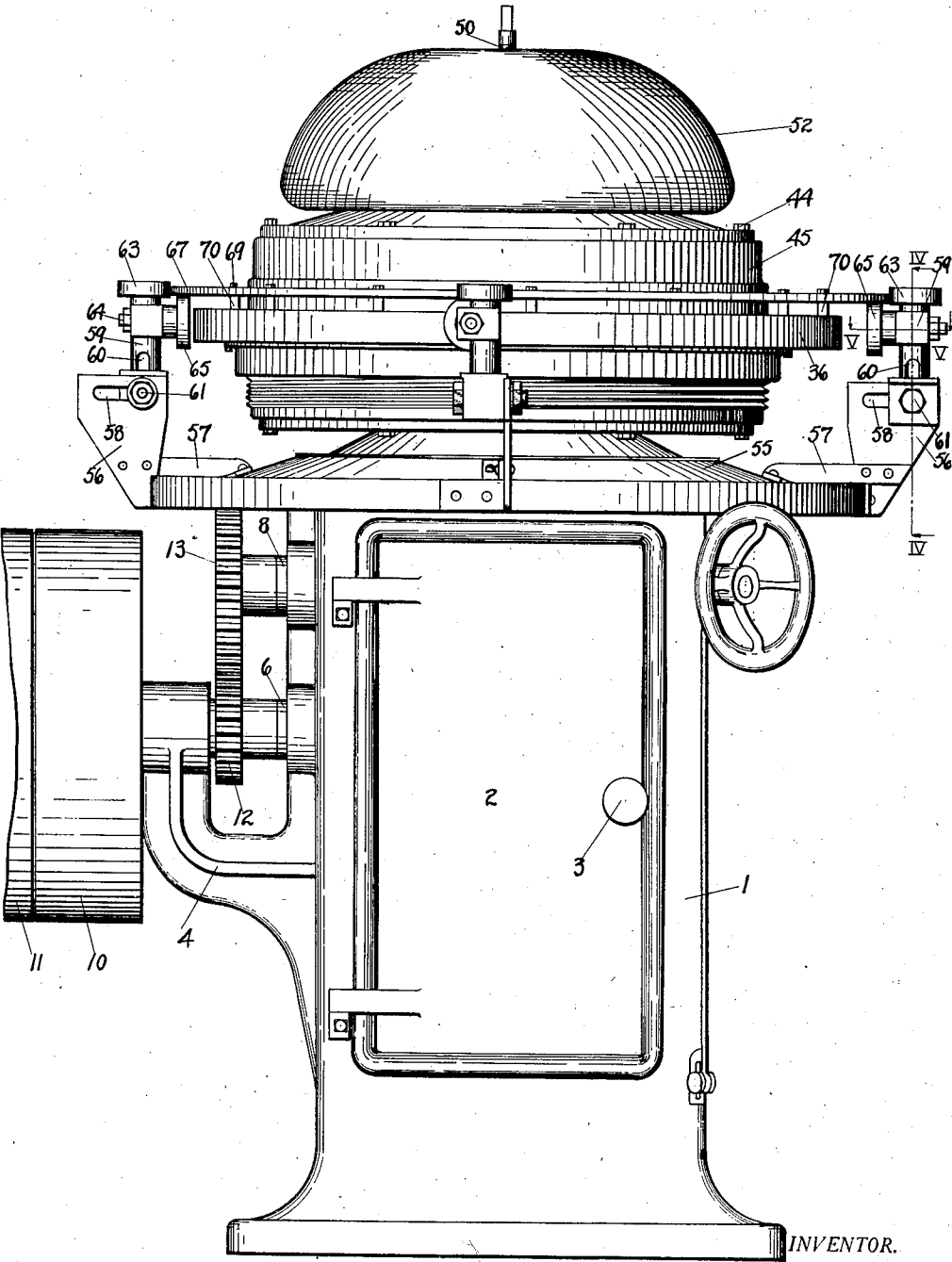


FIG. 1.

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3 Sheets-Sheet 2

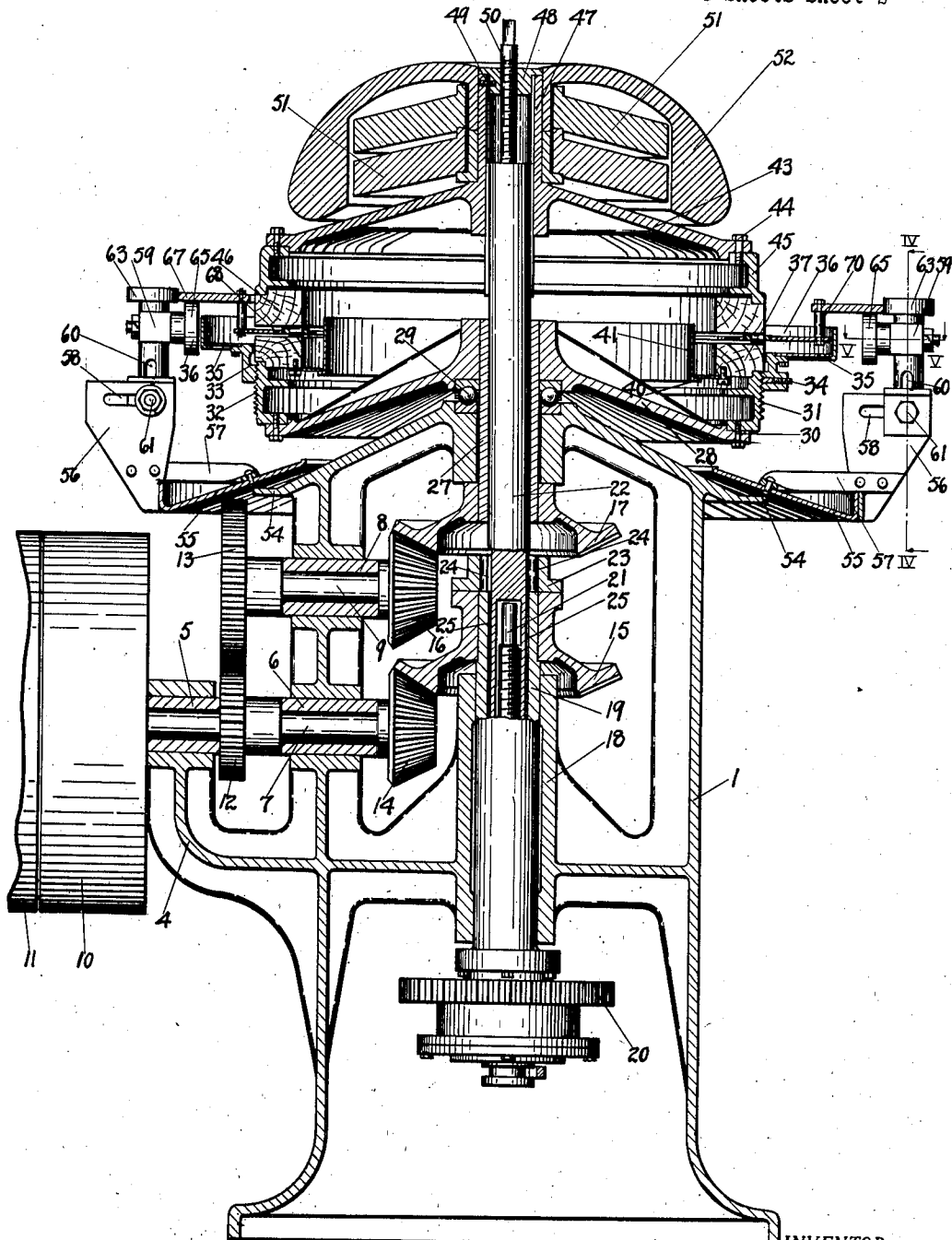


FIG. II.

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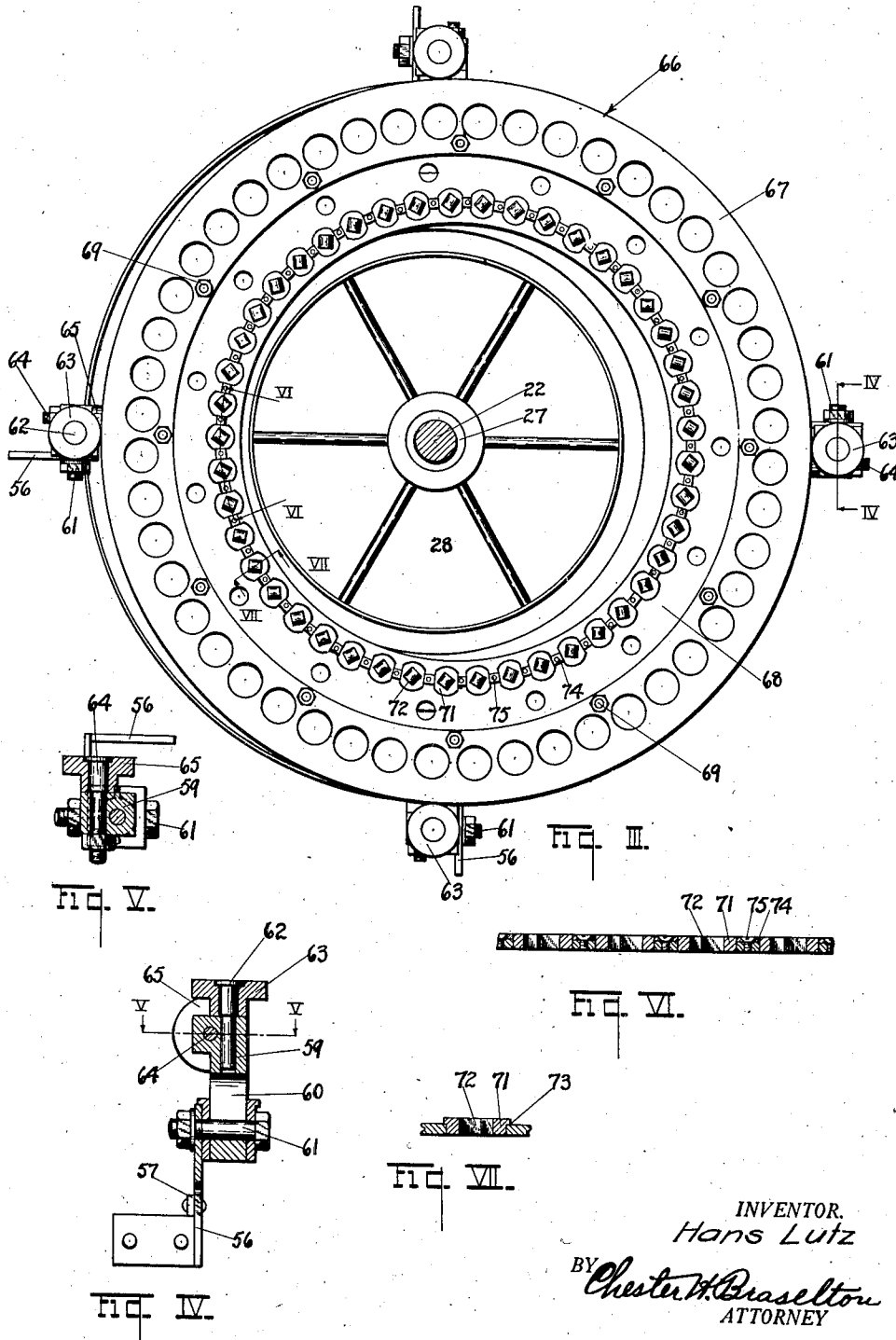
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE.

HANS LUTZ, OF ELMIRA, NEW YORK, ASSIGNOR TO THE WILLYS-MORROW COMPANY, OF ELMIRA, NEW YORK, A CORPORATION OF OHIO.

MACHINE FOR GRINDING ROLLERS.

Application filed May 29, 1919. Serial No. 300,713.

To all whom it may concern:

Be it known that I, HANS LUTZ, a citizen of the United States, residing at Elmira, county of Chemung, State of New York, have invented certain new and useful Improvements in Machines for Grinding Rollers, of which I declare the following to be a full, clear, and exact description.

This invention relates to machines for grinding rollers, particularly rollers which are adapted to be employed in connection with roller bearings.

The novel subject matter of this application is adapted to be employed in connection with a roller grinding machine of the type shown and described in my application, Serial Number 300,712, filed May 29, 1919.

As pointed out in my application above referred to, it has been found to be desirable in providing a mechanism for properly grinding and polishing the outer surfaces of bearing rollers, to employ a pair of oppositely rotating grinding members adapted to rotate in opposite directions at different speeds in such a manner as to bear against opposite sides of the rollers to be ground or polished, and in thus performing the grinding and polishing operation the uniformity and precision of the finished product is found to be greatly increased by providing means for suitably retaining the bearing rollers in position between the grinding surfaces, and mounting the retaining means in such a manner as to permit movement thereof in a path eccentric to the path of movement of the grinding members. It will be readily understood upon an inspection of the accompanying drawings, that by thus mounting the work retaining member in such a manner as to permit movement thereof eccentric to the path of movement of the grinding members the rollers which are to be ground and polished will be given a sliding movement across the grinding surfaces in an angular direction with respect to their longitudinal axes, this movement being combined with the rotative movement imparted to the rollers to insure the forming of the outer surfaces thereof in a uniform manner to produce a smooth cylindrical outer surface upon each roller.

One object of this invention is to provide an improved device of this character which is of simple construction and efficient in operation.

A further object of the invention is to provide an improved form of retaining means for properly retaining and positioning the rollers to be ground with respect to the grinding members.

A further object of this invention relates to economy of manufacture and details of construction as will hereinafter appear from the detailed description to follow.

The objects of the invention are accomplished in one instance by the devices and means described in the following specifications, but it is evident that the same may be varied widely without departing from the scope of the invention as pointed out in the appended claims.

A structure constituting one embodiment of the invention, which may be the preferred, is illustrated in the accompanying drawings forming a part hereof in which:

Fig. I is a side elevational view of the machine, showing the relative position of the work retaining member with respect to the operating part when the various parts of the mechanism are in operative position.

Fig. II is a vertical sectional view illustrating the relative position of the various parts of the mechanism with respect to each other.

Fig. III is a top plan view of the work retaining member, illustrating the same with respect to the position of the lower grinding member.

Fig. IV is a detail sectional view, taken along the lines IV—IV of Figs. I, II and III, and illustrating the position of the supporting and guiding rollers with respect to the standard.

Fig. V is a detail sectional view, taken along the lines V—V of Figs. I and IV.

Fig. VI is a detail sectional view, taken along the lines VI—VI of Fig. III, and illustrating the manner of securing the work holding members in position relative to the work retaining member or ring.

Fig. VII is a detail sectional view, taken along the lines VII—VII of Fig. III.

Referring to the drawings, similar reference characters designate corresponding parts throughout the several views, and the sectional views are taken looking in the direction of the small arrows at the ends of the section lines.

In the embodiment of the invention illustrated herewith 1 indicates a base frame

portion which may be formed in any desired manner as by being cast integral, or cast in sections formed in such a manner as to be capable of being readily assembled and secured together to produce the base frame portion. The base frame portion 1 is provided with one or more suitably positioned openings found therein for the purpose of permitting ready access to the operating part housed within the base frame portion of the machine and a cover 2 of suitable form is adapted to be hinged to the outer portion of the base frame, for closing the base portion of the casing thus preventing access of foreign matter thereto. When in a closed position the cover 2 may be secured in place by means of a suitable latch operated by the handle 3.

The frame portion 1 is provided with an offset outwardly extending arm 4 which is adapted to support the bearing sleeve 5 positioned in alignment with a similar bearing sleeve 6 carried by the main portion of the frame, and a shaft 7 is rotatably supported by the bearings 5 and 6 and extends within the inner portion of the base frame for a purpose to be hereinafter described. Positioned above the shaft 7 is a bearing sleeve 8 which is suitably supported by the main frame portion 1, and the bearing 8 supports a rotatable shaft 9 having one end portion thereof extending within the interior portion of the casing. A drive pulley 10 of the usual construction is mounted upon and firmly secured to the outer end portion of the shaft 7 in such a manner as to impart rotation thereto through the usual driving belt (not shown). An idler pulley 11, of the same diameter as the pulley 10, is mounted adjacent to the pulley 10 in such a manner as to permit the driving belt being forced thereon when for any reason it is desired to disconnect the operating parts of the mechanism from the power belt. Secured to the shaft 7 in any desired manner is a gear 12 which is adapted to mesh with a gear 13 firmly secured to one end of the shaft 9 in any well known manner.

The gears 12 and 13 are of different sizes and while in the embodiment illustrated herewith the gear 13 is of larger diameter than the gear 12, it is to be understood that these gears may be removed and others substituted therefor so as to increase or decrease the relative difference in the sizes of the gears as shown, or the gears may be transposed so that the gear carried by the shaft 7 will be of greater diameter than the gear carried by the shaft 9. By forming the gears 12 and 13 of different diameters one of the grinding members is driven at a greater speed than the other thus imparting to the work retaining member a rotative movement. Mounted upon the inner end portion of the shaft 7 is a bevel gear 14

which meshes with a bevel gear 15 for rotating the upper grinding member while in a similar manner a bevel gear 16 mounted upon the inner end of the shaft 9 meshes with a bevel gear 17 for rotating the lower grinding member. By reason of the fact that the shafts 7 and 9 rotate in opposite directions, rotation will be imparted to the grinding members in such a manner as to rotate the same in opposite directions.

The base frame portion 1 of the machine is provided with a vertically positioned bearing portion 18 within which is mounted a sleeve 19 the lower end portion of which carries a gear 20 adapted to be actuated for the purpose of rotating an upwardly extending threaded shaft 21 for the purpose of raising and lowering the vertical shaft 22 positioned within the sleeves 19 in a manner which is shown and described in detail in my application, Serial Number 300,712, filed May 29, 1919, but as this part of the mechanism has no bearing upon the present invention a detailed illustration and description of the same is believed to be unnecessary in this application. Rotatably mounted upon the sleeve 19 previously described is the bevel gear 15 which is adapted to be firmly secured to a collar 23 in any desired manner so as to secure simultaneous rotation of the collar 23 with the gear 15. The collar 23 is provided with oppositely positioned spines 24 which are adapted to be positioned within oppositely positioned grooves 25 formed in the vertical shaft 22, thus insuring rotation of the vertical shaft 22 at all times upon rotative movement of the gear 15, but permitting the vertical shaft 22 to be raised and lowered independently of any vertical movement of the gear 15. It will thus be apparent that the vertical shaft 22 is rotated upon rotation of the gear 15 while the construction and arrangement of the path is such as to permit the vertical movement of the shaft 22 whereby the same may be raised from the position shown in Fig. II, for the purpose of raising the upper grinding member and permitting access to the rollers which are being ground and polished. The bevel gear 17 is firmly secured to the lower end portion of the sleeve 27 which is rotatably mounted within the upper portion of the frame, and has firmly secured to the upper end thereof a dished plate 28 which is rotatably supported by the base frame through an anti-friction bearing 29. Firmly secured to the outer edge portion of the plate 28 by any suitable fastening means such as bolts 30 is an annular member 31 provided with an external thread 32 formed upon its outer circumferential surface, and a second annular member 33 is threaded upon the outer circumferential surface of the member 31 and adapted to be secured in a plurality of adjusted positions

relative thereto by means of a set screw 34. Secured to the upper face of the annular member 33 is an outwardly extending circular plate 35 provided with an upwardly extending flange 36 formed upon the outer edge portion thereof which is adapted to enclose and serve as a partial housing for the work retaining member in a manner which will be more fully described hereinafter. Mounted upon the upper end portion of the annular member 31 is a lower grinding member 37 formed of wood or other suitable material, and positioned upon the annular member 31 in such a manner as to be substantially concentric with the axis of rotation of the plate 28. Secured to the under surface of the grinding member 37 is an inwardly extending annular member 40 provided with an upwardly extending flange portion 41 which serves to partially enclose the work retaining member. The upper surface of the lower grinding member 37 is preferably treated with abrasives in such a manner as to render the upper surface capable of producing a grinding action when rotated in contact with the surfaces of rollers which are to be ground or polished.

Splined upon the upper end portion of the vertical shaft 22 is a dished plate 43, to the outwardly extending edge portion of which is secured by means of screws 44 or other suitable fastening means an annular member 45. Secured to the lower face of the annular member 45 is an upper grinding member 46 formed of wood or other suitable material the under surface of which is preferably treated with abrasives in such a manner as to give the same a grinding and polishing surface, the lower surface of the upper grinding member being so positioned as to extend adjacent to and cooperate with the upper grinding surface of the lower grinding member 37. The upper grinding member 46 is of circular form and is positioned in such a manner as to be substantially concentric with the axis of the vertical shaft 22. The dished plate 43 is provided with an upwardly extending central sleeve 47 within the upper end portion of which is positioned a cap 48 adapted to be retained in position therein by means of a suitable lock or set screw 49. Threaded within a central opening formed in the cap 48 is a set screw 50 the lower end portion of which bears against the upper end portion of the vertical shaft 22 for the purpose of adjustably securing the plate 43 in proper position upon the vertical shaft. One or more weights 51 are adapted to be carried by the plate 43 for the purpose of giving additional weight to the plate 43 so as to press the adjacent surfaces of the grinding members into engagement with the work to be ground or polished with a sufficient force to insure

proper action of the grinding surfaces thereon. A circular cover plate 52 is carried by the dished plate 43 and extends over and serves as a housing for the plates 51.

The top portion of the base frame is provided with an outwardly extending ledge 54 which supports an annular trough shaped member 55 adapted to be secured to the top portion of the base frame in any suitable manner. A plurality of upright standards 56, in the present instance four in number, are supported by the trough shaped member 55 being secured thereto by brackets 57. Each of the upright standards 56 has a main body portion thereof extending radially from the axis of the vertical shaft 22 and each of the main body portions is provided with a horizontally positioned slot 58 formed therein for a purpose which will be hereinafter described. Each of the standards comprise an upper portion 59 which is provided with a vertically extending slot 60 and the upper portion 59 of the vertical standard is secured to the base portion thereof by means of a bolt or other suitable fastening means 61 passing through the vertical slot 60 and the horizontal slot 58 formed in the lower portion thereof as clearly appears in Fig. 1. By means of the slots 58 and 60 the upper portion 59 of the standard is capable of adjustment vertically as well as in a radial direction relative to the vertical shaft 22. Within the upper portion of the member 59 is mounted a vertical shaft 62 upon which is rotatably positioned a guiding roller 63 which is adapted to rotate in a horizontal plane, and which serves to guide the work retaining member in a manner which will be hereinafter described. A horizontally extending shaft 64 is also carried by the member 59 and mounted upon the shaft 64 is a supporting roller 65 which is adapted to rotate freely in a vertical plane and serves as a means of support for the work supporting member.

The work supporting member 66 comprises a pair of annular rings of different diameter firmly secured together in such a manner as to prevent the movement of one of the rings independently of the other. The outer ring 67 has its inner edge portion secured to the inner ring 68 by means of a plurality of bolts 69, and the rings are spaced apart in such a manner as to retain them in different horizontal planes by means of spacing sleeves 70 positioned between the inner and outer rings and surrounding the securing bolt 69. The inner ring 68 is provided with a plurality of openings of similar size and shape which are arranged in a circular path, and each of which is adapted to receive a holding member 71 provided with a rectangular opening 72 extending therethrough and an outwardly extending lip portion 73 formed upon opposite sides

thereof and positioned in such a manner as to engage the upper surface of the ring 68 for the purpose of suitably retaining the holding member in position therein. A fastening plate 74 is preferably positioned between each of the holding members 71 and secured to the ring 68 by means of a screw 75 for the purpose of assisting in retaining the holding members 71 in position on the ring 68. In order to more readily accomplish this purpose the opposite end portions of the plate 74 may be slightly beveled so as to better engage the edges of the holding members 71 and thus prevent their removal upwardly from the ring 68. It will be noted upon reference to Fig. III of the drawing, that the holding members 71 are arranged in a circular path throughout the circumference of the ring 68 and that this circular path is concentric with the inner and outer edges of the ring 68 as well as the inner and outer edges of the ring 67.

It will be observed upon reference to Fig. II of the drawings, that the outer ring 67 is positioned above and spaced from the ring 68 in such a manner that the two rings occupy different horizontal planes, the lower ring 68 being positioned in such a manner as to extend between the adjacent surfaces of the upper and lower grinding members and be inclosed within the space formed by the flanges 36 and 41 as previously described.

The flanges 36 and 41 are so positioned as to provide suitable space for the ring 68 and to permit a suitable amount of eccentric movement on the part of this ring relative to the paths of movement of the grinding members. As illustrated in Fig. II, the ring 67 and the inner ring 68 carried thereby are supported upon the rollers 65 carried by the upright standard in such a manner as to permit free rotation of the rings 67 and 68, and the member 66 comprising the rings 67 and 68, is guided in a rotative movement by bearing against the rollers 63 which as previously stated are mounted in such a manner as to be capable of rotating freely in a horizontal plane. By reason of the fact that the upper portion 59 of the upright standard is adjustable both vertically and horizontally with respect to the lower portion thereof, it will be seen that these standards are capable of adjustment in such a manner as to insure the travel of the retaining member 66 in a path eccentric to the path of rotation of the grinding members, thus causing the rollers mounted within the openings 72 formed in the holding member 71 to be drawn across the surfaces of the grinding members during the relative rotation of the path, and insuring the production of a uniform and exact cylindrical surface upon the outer portions of the rollers.

From the above description it will be seen that when power is applied to the shaft 7 rotative movement will be imparted to the bevel gears 15 and 17 in such a manner as to rotate the same in opposite directions and at different speeds thus causing the rotation of the upper and lower plate 28 and 43 in opposite directions and at different speeds together with the grinding members carried thereby. The work retaining member 66 comprising the outer and inner rings 67 and 68, a portion of the inner ring extending between the adjacent surfaces of the grinding members, will be rotated by reason of the difference in speed of rotation imparted to the grinding members. The eccentric mounting of the retaining member 66 upon the rollers 63 and 65 result in the retaining member causing the rollers carried by the retaining member to be rotated in a path eccentric to the path of rotation of the grinding members. As the retaining member and the rollers carried thereby are given a rotative movement along a path eccentric to the path of movement of the grinding members each of the rollers will rotate about its longitudinal axis and also be drawn angularly across the adjacent surfaces of the grinding members. The upper portions 59 of the upright standards are capable of being adjusted vertically so as to support the work retaining member in a proper position to maintain the work in position to be operatively engaged by the adjacent grinding surfaces. The annular ring 33 is capable of adjustment relative to the annular member 32 so as to maintain the plate 35 in suitable position with respect to the work retaining member.

While I have shown and described in considerable detail a specific embodiment of my invention, it is to be understood that this showing and description is illustrative only and for the purpose of rendering my invention more clear, and that I do not regard the invention as limited to the details of construction illustrated or described, nor any of them, except insofar as I have included such limitations within the terms of the following claims, in which it is my intention to claim all novelty inherent in my invention broadly as well as specifically.

What I claim as new and desire to secure by Letters Patent is:

1. In a grinding machine, an upper grinding member, a lower grinding member, means for rotating said members in opposite directions, a roller retaining member having a portion thereof interposed between the adjacent surfaces of the grinding members, and means independent of the grinding members for guiding the retaining member in a path eccentric to the path of movement of the grinding member.

2. In a grinding machine, upper and

lower grinding members, means for rotating said members in opposite directions, a retaining member having a portion thereof between the adjacent surfaces of the grinding members, and means for engaging the outer edges of the work retaining member to guide the same in a path eccentric to the path of movement of the grinding member.

3. In a grinding machine, upper and lower grinding members, means for rotating said members in opposite directions, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members, and anti-friction means positioned exteriorly of the retaining member for supporting and guiding the same.

4. In a grinding machine, a frame, lower and upper grinding members, means for rotating said members in opposite directions, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members, and a plurality of fixedly positioned anti-friction members supported by the frame and engaging the outer edge of the retaining member for supporting and guiding the same.

5. In a grinding machine, a frame portion provided with upright standards, upper and lower grinding members, means for rotating said members in opposite directions, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members and having its peripheral portion beyond said grinding members, and means carried by said standards for engaging the said peripheral portion to thereby guide the retaining member in a path eccentric to the path of movement of the grinding members.

6. In a grinding machine, a frame portion provided with upright standards, upper and lower grinding members, means for rotating said members in opposite directions, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members and means carried by such standards and spaced beyond the peripheries of said grinding members for guiding and supporting the retaining member.

7. In a grinding machine, a frame portion provided with upright standards, upper and lower grinding members, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members, and vertically positioned rollers carried by said standards and guiding said retaining member in a path eccentric to the path of movement of the grinding members.

8. In a grinding machine having a plurality of grinding members, a frame portion provided with upright standards, a retaining member having a portion thereof extend-

ing between the adjacent surfaces of the grinding members, and horizontally positioned rollers carried by said standards and supporting said retaining member in position relative to the grinding members.

9. In a grinding machine, a frame portion provided with upright standards, upper and lower grinding members, a retaining member having a portion thereof extending between the adjacent surfaces of the grinding members, and vertically and horizontally positioned rollers carried by said standards for supporting and guiding the retaining member.

10. In a grinding machine, upper and lower grinding members, a retaining member comprising detachable inner and outer annular portions, means for rigidly securing the inner and outer annular portions of the retaining member together, and means engaging said outer annular portion for guiding the movement of the retaining member relative to the grinding members.

11. In a grinding machine, a roller retaining member comprising an inner annular portion and an outer annular portion, and means for securing said portions together in such a manner that they will occupy different horizontal planes.

12. In a grinding machine, a grinding member, a roller retaining member rotatably mounted adjacent thereto, adjustable grinding means for said retaining member, and a plurality of detachable roller holding members carried by said retaining member and each adapted to retain a bearing roller in substantially a horizontal position upon said grinding member.

13. In a grinding machine, a grinding member, and a roller retaining member provided with a plurality of detachable holding members arranged in a circular path, adjustable grinding means for said retaining member and each of said holding members being adapted to retain a bearing roller in substantially a horizontal position upon the grinding member.

14. In a grinding machine, a grinding member, and a roller retaining member provided with a plurality of removable holding members each of which is adapted to retain a bearing roller in substantially a horizontal position upon the grinding member, and peripheral guiding means for the retaining member.

15. In a grinding machine, a grinding member movable in a substantially circular path, and a roller retaining member provided with a plurality of detachable holding members each of which is adapted to retain a bearing roller in substantially a horizontal position with its longitudinal axis positioned at an acute angle with respect to an intersecting radius of the grinding member.

16. In a grinding machine, a grinding

member, a roller retaining member having a plurality of openings formed therein, holding plates positioned in said openings each plate being provided with an outwardly extending flange on one edge thereof for over-
5 lying one side of the retaining member, each plate being also provided with an opening for the reception of one of the rollers to be ground.

10 17. In a grinding machine, upper and lower grinding members, a retaining member having a portion extending between the grinding members, and a plurality of adjust-
15 ably mounted members spaced about the periphery of said retaining member for supporting said retaining member and guiding the same relative to the grinding members.

18. In a grinding machine, upper and lower grinding members, means for rotating
20 said grinding members in opposite directions, a retaining member comprising inner and outer annular portions, means for rigidly securing the inner and outer portions of

the retaining member together, and means for guiding the movement of the retaining
2 member relative to the grinding members.

19. In a grinding machine, upper and lower grinding members, means for rotating said grinding members in opposite direc-
30 tions, a retaining member having a portion extending between the grinding members, and anti-friction means for supporting and guiding the retaining member relative to the grinding members.

20. In a grinding machine, upper and
35 lower grinding members, means for rotating said grinding members in opposite directions and at different speeds, a retaining member having a portion extending between said grinding members, and means for guiding
40 the movement of the retaining member relative to the grinding members.

In testimony whereof, I affix my signature.

HANS LUTZ.