No. 697,500. Patented Apr. 15, 1902.

H. LA CASSE.

MACHINE FOR GRINDING BEARINGS.

(Application filed Jan. 9, 1901.)

(No Model.) 2 Sheets—Sheet 1.

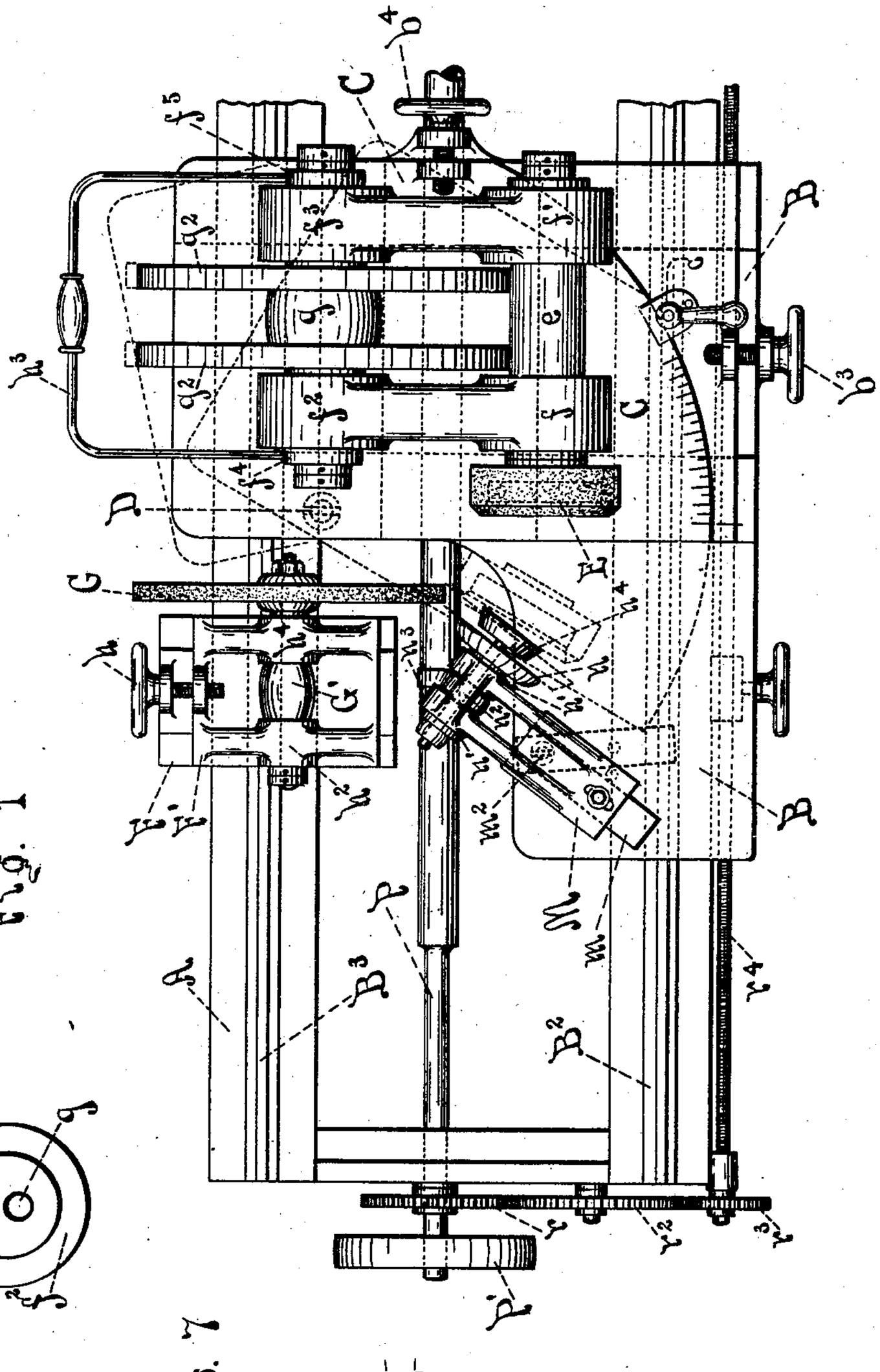

Fig. 1.

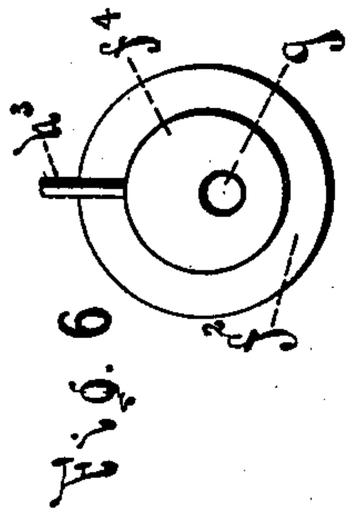

Fig. 6.

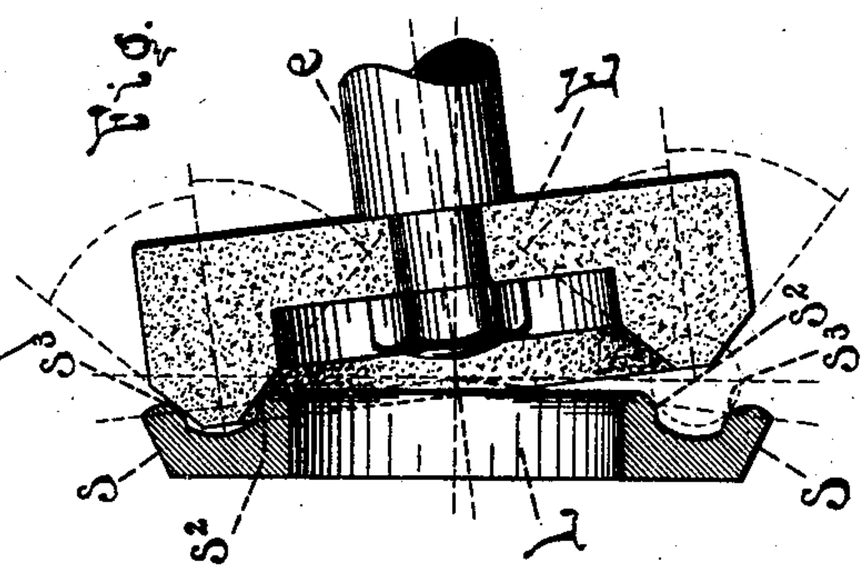

Fig. 7.

WITNESSES:

Henry D. Parker

Chas. G. Adams

INVENTOR

Henry La Casse,

BY

Frederick I. Allen.

ATTORNEY

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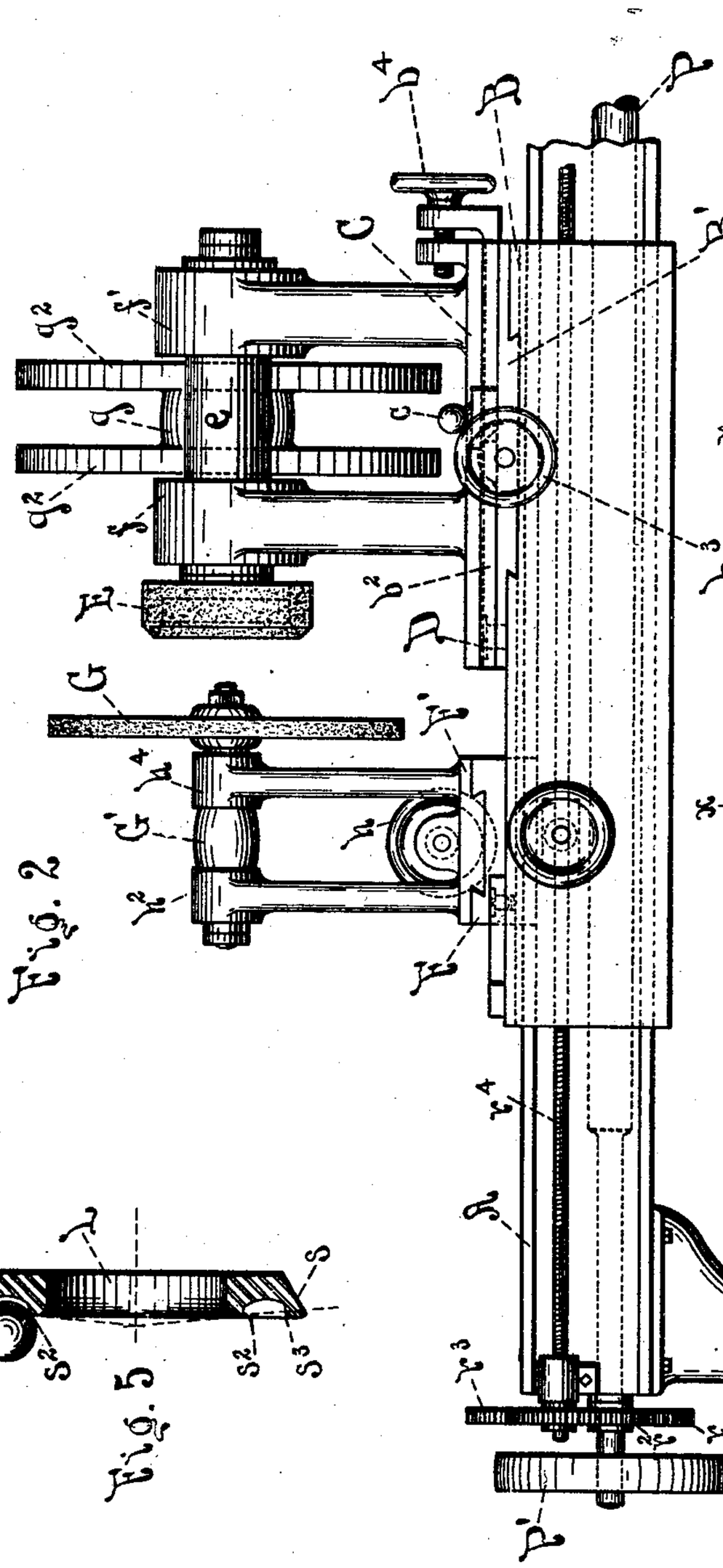

Fig. 2

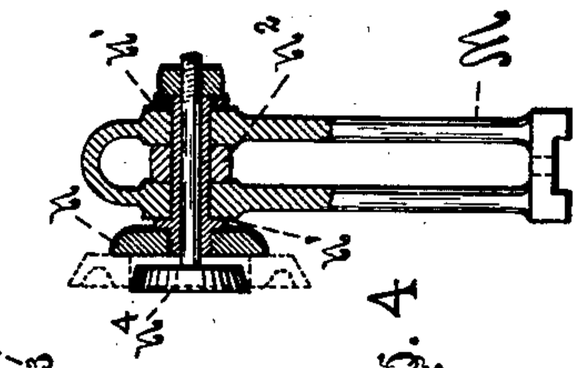

Fig. 4

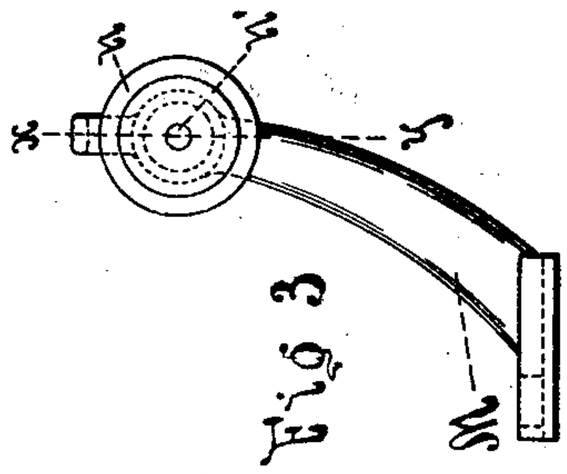

Fig. 3

Fig. 5

WITNESSES:

Henry D. Lassee.

Chas. G. Adams

INVENTOR

Henry La Casse,

BY

Frederick J. Allen.

ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY LA CASSE, OF AUBURN, NEW YORK.

MACHINE FOR GRINDING BEARINGS.

SPECIFICATION forming part of Letters Patent No. 697,500, dated April 15, 1902.

Application filed January 9, 1901. Serial No. 42,608. (No model.)

To all whom it may concern:

Be it known that I, HENRY LA CASSE, a citizen of the United States, and a resident of the city of Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Machines for Grinding Bearings, of which the following is a specification.

My invention consists in certain improvements in grinding-machines for ball-bearings.

In the drawings, Figure 1 is a plan of a machine containing my improvements. Fig. 2 is a side view thereof, the work-holding standard being removed. Figs. 3 and 4 are side and front views of the work-standard, Fig. 4 being partly in section upon the line $x\ y$ of Fig. 3. Fig. 5 shows a form of bearing which the machine is intended to grind. Fig. 6 is a detail of one of the eccentrics for moving the driving-shaft to or from its operative position, and Fig. 7 shows relations between the work and cup-wheel.

Similar reference-letters indicate like parts in the several figures.

A is the bed or frame of the machine, furnished with sliding ways B^2 B^3, upon which is supported the base B, which carries the swinging table C, which is pivotally secured at D, so as to permit it to be swung horizontally, as is indicated by dotted lines in Fig. 1. The table C is adjustable lengthwise by sliding upon a base b^2, being controlled by the hand-wheel b^4, and is adjustable crosswise by sliding upon a base B′, being controlled in this operation by the hand-wheel b^3. It carries the cup-shaped emery-wheel E, having a substantially V-shaped rim, whose shaft e is supported in bearings $f\ f'$ and receives power from the pulley g by means of the friction-pulleys g^2 g^2, which engage it. The friction-pulleys g^2 g^2 are supported in bearings $f^2\ f^3$, which are furnished with eccentric sleeves or cams $f^4\ f^5$, which are controlled by a handle h^3 to give the shaft g a slight movement to or from the shaft e, whereby the wheel E is started or stopped, as desired. Fig. 6 shows the details of one of the cams. A lock c serves to secure the swinging table in its adjusted position. Another base F supports another grinding wheel G, being furnished with a sliding carriage F′, controlled by the hand-screw h and furnished with bearings $h^2\ h^4$. Power is communicated to the wheel G from the drive-pulley G′. The bearing to be ground, Figs. 5 and 7, is supported upon a sliding carriage M, secured upon a slide m, pivoted upon the table B at m^2. Dotted lines in Fig. 1 indicate different positions which this slide may occupy. At the upper end of this carriage M the bearing L is secured by a suitable chuck $n\ n^4$, which is mounted in the bearings $n'\ n'$ and is actuated by means of the pulley n^2 from the pulley n^3 upon the shaft P. This shaft receives power from its pulley P′. The feed-shaft r^4 for the base B is actuated by the gear-train $r\ r^2\ r^3$ and moves the base B lengthwise the ways B^2 B^3, as desired.

The operation of the machine is as follows: The bearing being secured in place in the chuck $n\ n^4$ is rotated at comparatively slow speed. The outside surface s, Figs. 5 and 7, is ground by the wheel G, while the carriage B, moving lengthwise the frame A during the operation, causes the wheel G to operate equally at all points of such surface. At the same time the cup-wheel E, being swung into operative position, as shown by dotted lines in Fig. 1, grinds the surfaces $s^2\ s^3$, which are the points of engagement with the balls when in use. Adjustments for different diameters of bearing are obtained by shifting the position of the wheel G by means of the hand-screw h, and the cup-wheel E is adjusted for this purpose by shifting its supporting-table C upon its slides crosswise by the wheel b^3 and lengthwise by the wheel b^4. The angular adjustment of the cup-wheel E to the work is effected by swinging the table C upon its pivot D into proper position, as is indicated in Fig. 7, which is particularly intended to illustrate the application of this machine to a bearing in which the contact-points $s^2\ s^3$ for the balls are in an element of a low cone, as shown by dotted lines, connecting them in this figure, while the cup-wheel used for this purpose has its cutting-faces disposed at equal angles to its axis as therein shown. The lengthwise adjustment of the cup-wheel E by means of the hand-wheel b^4 enables the wear of this cup-wheel to be compensated by a single adjustment, since in operation this wear is found to be equal upon both cutting planes of this wheel, and the angles at which the surfaces

s^2 s^3 are ground do not change from the wear of the cup-wheel.

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

1. In a machine for simultaneously grinding two surfaces, the combination with a work-support, of a wheel having two grinding-surfaces disposed at equal angles to the axis of rotation of said wheel, said wheel rotating in a plane angularly disposed relative to the plane of the work.

2. In a machine for simultaneously grinding two surfaces, the combination with a rotating work-support, of a wheel having two grinding-surfaces disposed at equal angles to the axis of rotation of said wheel, said wheel rotating in a plane angularly disposed relative to the plane of rotation of the work.

3. In a machine for simultaneously grinding a plurality of surfaces, the combination of a wheel having a plurality of grinding-surfaces disposed at different planes to the axis of rotation of said wheel, said wheel rotating in a plane angularly disposed relative to the plane of the work, and adjusting means for varying the angles of the grinding-surfaces.

4. In a machine for simultaneously grinding two surfaces, the combination with a rotating work-support, of a wheel having two grinding-surfaces oppositely inclined relative to the axis of rotation of said wheel, said wheel rotating in a plane angularly disposed relative to the plane of rotation of the work, the angles of inclination of said grinding-surfaces to the axis of the wheel being equal.

5. In a machine for grinding two surfaces simultaneously, the combination with a rotating work-support, of a cup-shaped wheel rotating in a plane inclined relative to the plane of rotation of the work, said wheel having its rim provided with two inclined grinding-surfaces.

6. In a machine for grinding two surfaces simultaneously, the combination with a rotating work-support, of a cup-shaped wheel rotating in a plane inclined relative to the plane of rotation of the work, said wheel having its rim provided with two continuous inclined grinding-surfaces.

7. In a machine for grinding two surfaces simultaneously, the combination with a rotating work-support, of a cup-shaped wheel having its rim provided with two continuous oppositely-inclined grinding-surfaces, said grinding-surfaces being inclined at equal angles to the axis of rotation of said wheel.

8. In a machine for grinding bearings, the combination with a work-support, of a grinding-wheel having oppositely-inclined grinding-surfaces to dress the bearing simultaneously at two points and means for adjusting said grinding-wheel angularly relative to the work.

9. In a machine for grinding bearings, the combination with a work-support, of a grinding-wheel having oppositely-inclined grinding-surfaces to dress the bearing simultaneously at two points, means for adjusting said grinding-wheel angularly relative to the work, and means for adjusting said grinding-wheel longitudinally of the machine to compensate for wear.

10. In a machine for grinding ball-bearings, the combination with a suitable supporting-frame, of a grinding-wheel for dressing the outer surface of the bearing mounted on said frame, a table mounted on said supporting-frame, a work-support carried by said table, a grinding-wheel for dressing the inner surfaces of said bearing mounted on said table, and means for feeding said table and the instrumentalities mounted thereon past the first-named grinding-wheel.

11. In a machine for grinding bearings, the combination with a stationary grinding-wheel support, of a work-support, means for moving said work-support and work toward said grinding-wheel, and a second grinding-wheel in operative relation to said work-support and movable therewith.

12. In a machine for grinding bearings, the combination with a stationary adjustable grinding-wheel support, of an adjustable work-support, automatic means for moving said work-support and work toward said grinding-wheel, a second grinding-wheel in operative relation to said work-support, and movable therewith, and means for adjusting said second grinding-wheel angularly relative to the work.

13. In a machine for grinding the outer and inner surfaces of bearings, the combination with a stationary adjustable grinding-wheel support, of a grinding-wheel for dressing the outer surface of the bearing mounted thereon, a table movable relative to said grinding-wheel, a work-support adjustably mounted on said table, and a second grinding-wheel to dress the inner surfaces of the bearing adjustably mounted on said table.

14. In a machine for grinding the outer and inner surfaces of bearings, the combination with a stationary adjustable grinding-wheel support, of a grinding-wheel for dressing the outer surface of the bearing mounted therein, a table movable relative to said grinding-wheel, a work-support adjustably mounted on said table, a second grinding-wheel to dress the inner surfaces of the bearing adjustably mounted on said table, said grinding-wheel having two grinding-surfaces to act simultaneously on two bearing-surfaces, and automatic means for feeding said table and the instrumentalities carried thereby past the first-named grinding-wheel.

15. In a machine for grinding two surfaces simultaneously, the combination with a suitable work-support, of a cup-shaped grinding-wheel having a rim substantially V-shaped in cross-section.

16. In a machine for grinding two surfaces simultaneously, the combination with a suitable work-support, of a cup-shaped grinding-wheel having a rim substantially V-shaped in

cross-section, the sides of said rim being inclined at equal angles to the longitudinal axis of the wheel.

17. In a machine for simultaneously grinding three surfaces, the combination with a work-support, of grinding-wheels mounted in angular relation to said work, and means for adjusting said wheels to vary the angles thereof relative to the work.

18. In a machine for simultaneously grinding three surfaces angularly disposed relative to one another, the combination with a work-support, of a grinding-wheel adapted to dress two of said surfaces at the same time, a second grinding-wheel to simultaneously dress the third surface, and means for giving an angular adjustment to said grinding-wheels relative to the work.

19. In a machine for simultaneously grinding three surfaces angularly disposed relative to one another, the combination with a rotating work-support, of a grinding-wheel adapted to dress two of said surfaces at the same time, a second grinding-wheel to simultaneously dress the third surface, means for giving an angular adjustment to said grinding-wheels relative to the work, and means for moving the work past said second grinding-wheel.

20. In a machine for grinding bearings, the combination of a work-holding support, pivoted to swing horizontally, so as to admit of changing the angle of application of a grinding-wheel, as G, thereto, the grinding-wheel, G, and another grinding-wheel, as E, having two grinding-surfaces equally disposed to its axis of rotation, and mounted so as to admit of angular adjustment in the horizontal plane, to the work whereby three points may be ground at once, at chosen angles in relation to each other, substantially as described.

Signed at Auburn, in the county of Cayuga and State of New York, this 28th day of December, A. D. 1900.

HENRY LA CASSE.

Witnesses:
H. D. PARSELL,
GEORGE W. NELLIS.