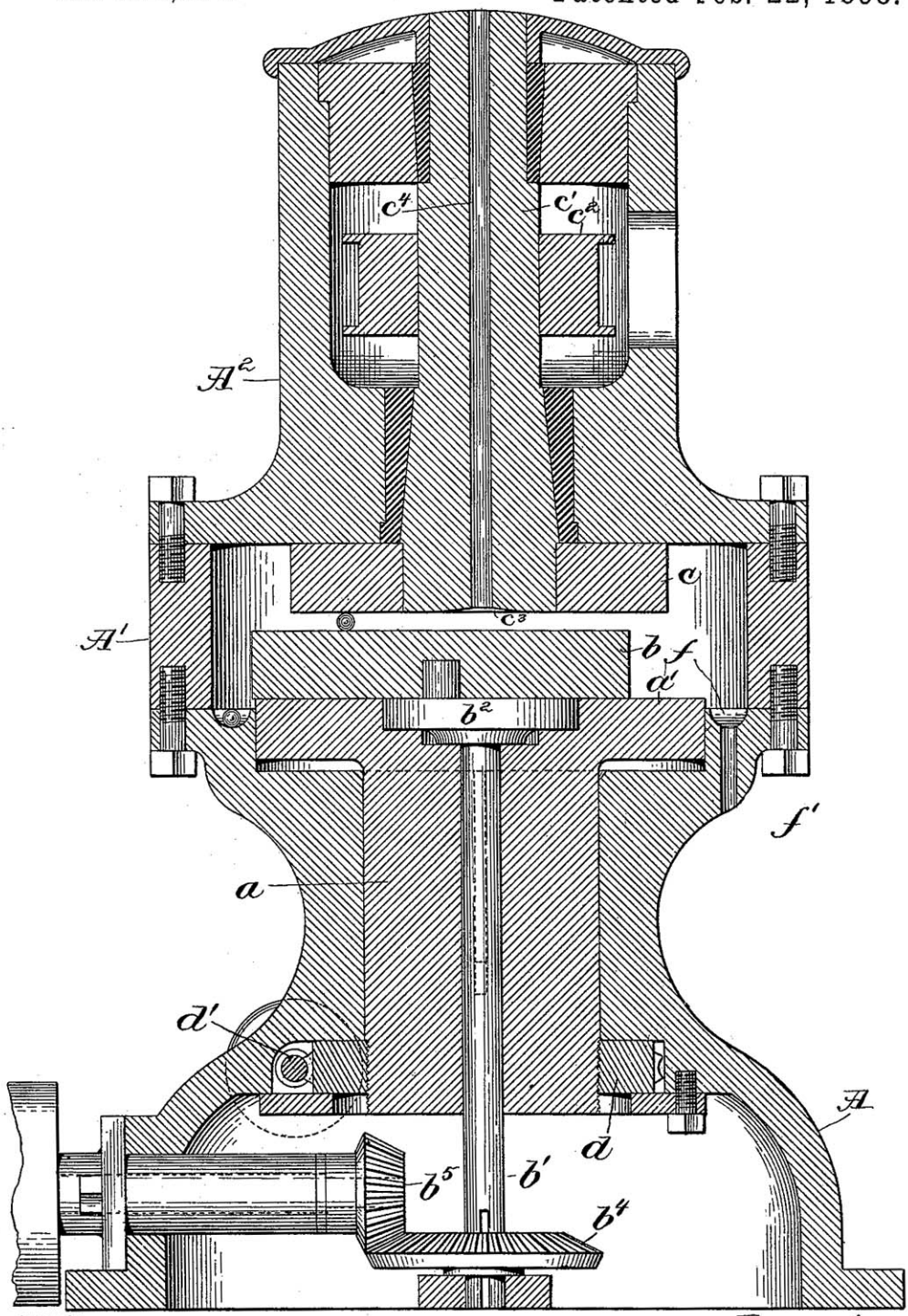
(No Model.)

E. RIVETT.

MACHINE FOR COLD ROLLING BALLS.

No. 599,634. Patented Feb. 22, 1898.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDWARD RIVETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO DAVID HUNT, OF SAME PLACE.

MACHINE FOR COLD-ROLLING BALLS.

SPECIFICATION forming part of Letters Patent No. 599,634, dated February 22, 1898.

Application filed May 5, 1897. Serial No. 635,116. (No model.)

To all whom it may concern:

Be it known that I, EDWARD RIVETT, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Machines for Cold-Rolling Balls, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

In the manufacture of metallic balls for ball-bearings and other purposes it is customary to turn or forge a ball-blank, the nearer spherical the better, and to then grind and polish the same, reducing it to a true sphere.

My present invention has for its object to construct a machine by which the more or less spherical ball-blanks may be reduced to spheres by pressure instead of by grinding, resulting in condensing the molecular structure of the ball to a considerable degree and in many ways improving it and avoiding waste.

In carrying out my invention I employ two disks located a distance apart corresponding to the diameter of the balls to be rolled and impart to one of said disks a rotary motion in a plane with the other, or rotary motion may be imparted to both of said disks, if desired. The acting face of one of said disks will be plane and the acting face of the other will likewise be plane with a central concaved portion. To introduce the ball-blanks, one of the disks will have a hole through it for the passage of the ball-blank, preferably at the center, thereby introducing the ball at the center of one of the disks, and said ball-blank will be rolled by the rotary action of the disks, and as they are rolled they will gradually work their way toward the edges.

The drawing shows in vertical section a machine for cold-rolling ball-blanks to reduce them to spheres.

The base A is shaped and adapted to receive and support a bushing *a*, having a flanged head *a'* at its upper end, which is made circular and enters a circular recess at the upper end of the base A. The top surface of the circular flanged head *a'* is flat and receives upon it and supports a disk *b*, which is formed with a plane upper surface. This plane-surfaced disk *b* serves as a table or bed on which the ball-blanks are rolled. The disk *b* may be stationarily supported or rotary motion may be imparted to it, and herein I have shown it as adapted to travel in a circular path, and as a means of thus moving it a vertical shaft *b'* passes up through the bushing *a*, which has fixed to its upper end a crank-disk b^2, the crank-pin of which enters a central hole formed in the under side of said disk *b*. The vertical shaft *b'* will be rotated by any suitable means—as, for instance, I may secure to the lower end of said shaft a beveled gear b^4, which is engaged by a beveled gear b^5, secured to a short power-driven shaft. It will be observed that as the shaft *b'* is rotated the crank-disk, which is fixed to its upper end, will cause the disk *b* to describe a circular path concentric to the axis of the shaft *b'*. The bushing *a*, which supports the disk *b*, is vertically adjustable, so that said disk may be held at different elevations, and as a simple form of adjusting device I have set a ring *d* into the lower part of the base A, which is internally screw-threaded, and the lower end of the bushing is externally screw-threaded, so that by turning said ring the bushing will be raised and lowered. To turn the ring *d*, I have formed upon its outer edge a series of teeth which are engaged by a worm *d'*, which is adapted to be rotated in either direction by hand.

A ring A' is superimposed upon the upper end of the base A, which incloses the disk *b* and also incloses another disk *c*, which is made substantially like it, and located a short distance above it and upon said ring A' the head A^2 of the main frame is supported. The disk *c* is fixed to the lower end of a vertical shaft *c'*, which has its bearings in the head A^2, and it is supported a short distance above the disk *b*, according to the diameter of the ball to be rolled, said distance being adjusted by raising or lowering the disk *b* by the adjusting device heretofore described. The vertical shaft *c'* has upon it a belt-pulley c^2, which receives a belt, by which said shaft is turned. As the vertical shaft *c'* is thus rotated the disk *c* will be rotated on an axis coincident with the axis of the shaft carrying it. The under face of the disk *c* is made plane to correspond with the plane upper face of the disk *b* except at the center, where it is slightly concaved, as at c^3. The ball-blanks, which are to be rolled between the disks *b c*, are introduced at the center—as, for instance, a

passage c^4 is provided through the vertical shaft c', which terminates at its lower end at the center of the disk c, which is also at the center of the concave portion c^3. The ball-blanks will be fed down said passage, and by reason of the concaved portion c^3 their entrance between the disks will be facilitated. The disk b describes a circular path in one direction and the disk c will be turned in the opposite direction. The ball-blanks of more or less irregular shape enter between the disks b c at the center, and as they gradually assume spherical form they will gradually work out between the plane faces of said disks until finally they pass from between said disks and fall into a race or groove f provided for them, from which they escape through the passage f'. By imparting a rotary motion to said disks b and c the ball-blanks will be rolled into spherical form much faster than if but one of said disks should have imparted to it such motion, yet I desire to include within the spirit and scope of this invention either or both disks having imparted to it a rotary motion.

While I have herein shown the two disks as having plane surfaces with the exception of a slight concavity at the center of one of them, I desire to be understood that my invention is not limited to such particular surfaces.

I claim—

1. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface with a central concavity, and means for imparting rotary motion to one of said disks, substantially as described.

2. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface and the other of which has a plane surface with a central concavity, and means for imparting rotary motion to one of said disks, substantially as described.

3. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface, and the other of which has a plane surface with a central concavity, and means for rotating the last-named disk on its axis, and means for moving the first-named disk in a circular path concentric to the axis of the aforesaid disk, substantially as described.

4. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface with a central concaved portion, and one of which has a hole through it for the introduction of the ball, and means for imparting rotary motion to one of said disks, substantially as described.

5. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them one of which has a plane surface with a central concaved portion and a central hole through it, and means for imparting rotary motion to said disk, substantially as described.

6. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface with a central concaved portion, and one of which has a hole through it for the introduction of a ball-blank, and means for imparting rotary motion to said disks in opposite ways, substantially as described.

7. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface with a central concaved portion and a central hole through it, and means for rotating said disk on its axis and means for moving the other disk in a circular path concentric to said axis, substantially as described.

8. In a machine for rolling ball-blanks, a plane-faced disk, means for moving it in a circular path and another disk located above it and having a plane face with a central concaved portion and a central hole, a shaft supporting said disk having a hole through it, and means for rotating said disk, substantially as described.

9. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, means for imparting a rotary motion to one of said disks, a shell or case containing said disks, a passage for the introduction of the ball-blanks leading to the center of one of said disks, a circular groove into which the rolled balls are delivered, and a passage leading therefrom for the exit of the rolled balls, substantially as described.

10. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface, means for rotating one of said disks on its axis, and means for moving the other disk in a circular path about said axis, a support for said last-named disk, and an adjusting device for said support, whereby the ball-receiving space between the disks may be varied, substantially as described.

11. In a machine for rolling ball-blanks, a pair of disks adapted to receive a ball-blank between them, one of which has a plane surface, unyielding supports for said disks, means for imparting rotary motion to one of said disks, and an adjusting device for one of said disks for adjusting it relatively to the other disk, to thereby vary the ball-receiving space for balls of different diameter, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD RIVETT.

Witnesses:
B. J. NOYES,
ARTHUR F. RANDALL.