(No Model.)

# E. MAERTENS.

## BALL BEARING FOR SPINNING AND TWISTING MACHINE SPINDLES.

No. 548,378. Patented Oct. 22, 1895.

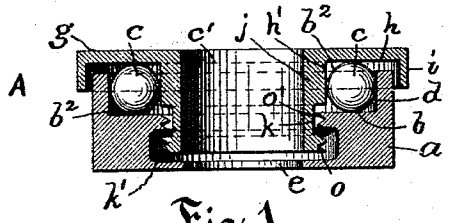


Fig. 1.

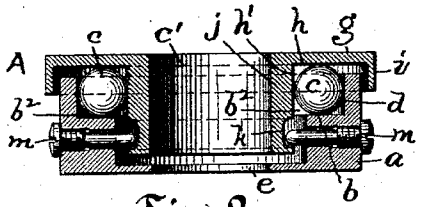


Fig. 2.

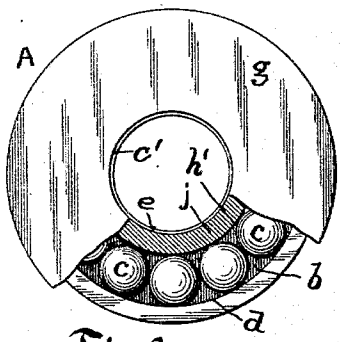


Fig. 3.

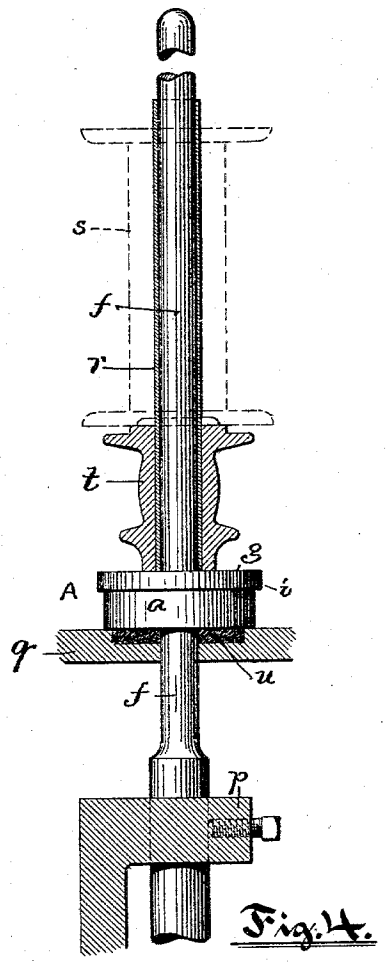


Fig. 4.

Witnesses.

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## BALL-BEARING FOR SPINNING AND TWISTING MACHINE SPINDLES.

SPECIFICATION forming part of Letters Patent No. 548,378, dated October 22, 1895.

Application filed July 30, 1895. Serial No. 557,567. (No model.)

*To all whom it may concern:*

Be it known that I, EMILE MAERTENS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Ball-Bearings for Spinning and Twisting Machine Spindles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ball-bearings adapted to support the sleeves or tubes which revolve around the dead-spindles of "cap" spinning and twisting machines employed in the manufacture of yarn, &c.; and it consists, essentially, in the combination of a stationary base member adapted to be mounted on the usual lifter-plate and arranged to receive a dead-spindle therethrough having two bearing-surfaces, one of which is a horizontal plane, the other surface being vertical and curved and at substantially right angles to the former, a rotatable cap member having a downward-extending central vertical sleeve arranged to freely receive the dead-spindle therethrough and capable of supporting and being rotated by the live-spindle, also provided with two bearing-surfaces, one of which is a horizontal plane arranged above and parallel with the horizontal plane of said base member, the other surface being vertical and cylindrical and at right angles with the horizontal planes and concentric with the said curved bearing-surface, thereby forming an annular space, a series of antifriction-balls mounted in said annular space and in contact with the said four bearing-surfaces, and means for preventing the base and cap members from accidental separation when assembled, all as will be more fully hereinafter set forth and claimed.

Ball-bearings for vertical shafts have hitherto been made comprising two concentric rings, one stationary and the other rotary, having bearing-surfaces concentric with each other and plane surfaces parallel to each other and at right angles to the concentric surfaces, and balls which are located in an annular space between said concentric and plane surfaces and which bear at diametrically-opposite points against and roll upon one pair of such surfaces and are retained in place by the other pair thereof. In ball-bearings of this class the ring members forming such bearings are kept concentric by mutual contact upon surfaces provided for the purpose. I am not aware, however, that a vertical ball-bearing has been made before my present invention in which both the two plane horizontal parallel surfaces and the concave and convex surfaces, constituting two concentric surfaces arranged at right angles to the plane surfaces, are utilized at the same time conjointly as bearing or rolling surfaces for the antifriction-balls, and in which ball-bearings said balls form the means by which the convex outer bearing-surface of the downward-projecting sleeve of the rotating cap-plate member is kept central and concentric with the inner or concave bearing-surface of the base member and the bore in the sleeve concentric with the dead-spindle, without any part of the revoluble part of said ball-bearing coming in contact with any part of the stationary base of said bearing or with the dead-spindle.

I am well aware that ball-bearings for spindles of spinning and twisting machines have been used prior to this present invention. Such former devices, however, required considerable attention, either to keep them properly lubricated or free from dust, lint, fly, and other dirt, which soon renders them inoperative to such an extent that the advantages, normally due to bearings provided with antifriction-balls, are materially lessened if not nullified, thereby requiring a correspondingly-increased amount of power for operating the spindles.

The object I have in view is to practically overcome the objections or disadvantages inherent in ball-bearings of the class referred to and to construct a bearing which is practically dirt-proof and which practically needs no lubrication.

In the accompanying sheet of drawings, Figure 1 is a transverse or cross-sectional view, enlarged, taken through the center of my improved ball-bearing. Fig. 2 is a simi-

lar view showing a modified form of the retaining or locking device. Fig. 3 is a plan view of the ball-bearing, portions being broken away to show its interior; and Fig. 4 is a side elevation in partial section showing the bearing combined with a mounted live tube and a dead-spindle and arranged substantially as in use.

A, again referring to the drawings, designates my improved ball-bearing as a whole and as arranged for the spindles of spinning and twisting machines. It is composed of a round base member *a*, having a horizontal or plane bearing-surface *b* for the antifriction-balls *c* to bear and roll upon, a curved vertical bearing-surface *d*, arranged at right angles to the former and upon which said balls also bear and roll, and at the bottom of said base member there is a central opening or hole *e*, adapted to receive and fit the corresponding portion of a dead-spindle *f*, and which, when mounted and in use, serves to maintain or hold said base member in a central or concentric position with respect to said dead-spindle. The bearing is further provided or composed of a revoluble cap-plate *g*, having on its under side a horizontal or plane bearing-surface *h*, parallel with said surface *b*, adapted in use to roll and bear upon the balls *c*. The cap-plate is provided with a downward-extending peripheral concentric rim *i*, overlapping the upper outer portion of the base member *a*. It is further provided with a central sleeve or annular downward projection *j*, its upper outer part forming a convex or cylindrical bearing-surface *h'*, formed at right angles to the said plane bearing *h* of the cap-plate. By means of said construction and arrangement of the members *a* and *g* it will be seen that the said four surfaces *b*, *d*, *h*, and *h'* form between them an annular space or chamber $b^2$, having a substantially square cross-section, said chamber being concentric with the center or hole *e*. The series of antifriction-balls *c*, located in the chamber $b^2$, maintain the cap-plate in position centrally, since the balls bear upon the said four surfaces simultaneously. The central bore or hole *c'*, formed in the said annular extension or sleeve *j*, is larger than the opening *e* of the base member, thereby maintaining said revolving cap-plate and sleeve out of contact with the dead-spindle *f*. The lower portion of the said annular projection *j* is provided exteriorly with a circumferential groove *k*, thereby forming a small outer flange at the lower end of it. This flange is screw-threaded, as at *o*, Fig. 1, and when in use extends a distance below the inwardly-extending flange *o'* of the base member *a*. The latter flange has a female thread forming the counterpart of the said thread *o*, as clearly shown.

In Fig. 2 the grooved portion *k* of the sleeve *j* is represented as adapted to freely receive the ends of screws *m* tapped into the base *a*. The object of this device is to prevent the cap member *g* from being accidentally lifted or separated from the base. In like manner the said screw-threaded flange *o'* prevents the cap-plate from lifting after the male thread *o* has been passed through the flange *o'*, or, in other words, the parts are assembled by inserting the sleeve into the base member and screwing the former into the latter until the threaded portion *o* passes into and is adapted to turn freely in a chamber *k'* formed in the base.

It will be apparent from the foregoing (see, also, Figs. 1 and 2) that no part of the revolving cap-plate and its sleeve is in contact with any part of the stationary base member, and that the balls have two points of contact with the stationary part of the bearing and two corresponding points of contact with the revoluble part of the bearing, and that the said revoluble part is kept perfectly concentric with the stationary part through the intermediary of the balls only, and that said stationary part is kept concentric with the dead-spindle by means of the hole *e* at the bottom of the base member, through which the dead-spindle *f* extends. It will also be noticed that there is a space or clearance around every part of the bearing except at the points of contact of the balls *c*.

In Fig. 4 my improved ball-bearing is shown as adapted to spindles of spinning and twisting machines—that is to say, the stationary or dead spindle *f* is adjustably mounted in a spindle-rail *p* and passes upward through the usual lifter-plate *q*. On top of the latter is located my improved ball-bearing A, said spindle also passing through it. A sleeve or live spindle or tube *r* is mounted to freely revolve around the stationary spindle and is arranged to carry a bobbin or spool *s*. (Shown by dotted lines.) The live-spindle has secured thereto at the bottom a belt-driven whirl *t*. The two latter revolve together in unison, as common, and rest directly upon and rotate the cap-plate member *g*, which in turn is supported by the stationary ball-carrying base *a*, the balls serving to hold the revolving cap-plate in position centrally, as before stated.

I prefer to interpose a lubricating disk or washer *u* of fibrous material between the under side of the bearing A and the lifter-plate, the latter being recessed for the purpose, as shown in Fig. 4. In some cases the bearing may be secured directly to the dead-spindle *f* without the intervention of the lifter-plate. In any event the base *a* of my improved ball-bearing is to be fixed or stationary, while at the same time the cap-plate *g* and sleeve *j* thereof are adapted to be rotated by and in unison with the live-spindle.

I claim as my invention—

1. As an improved article of manufacture, the hereinbefore described ball-bearing for spindles of cap spinning and twisting machines, the same consisting of a base member having a vertical hole therethrough adapted to receive and centralize the dead spindle and further having plane and curved bearing surfaces, a revoluble cap-plate capable of sup-

porting and being rotated by the live spindle having a central sleeve or annular projection adapted to receive but non-contact with the dead spindle and normally concentric therewith and also having plane and curved bearing surfaces oppositely located with respect to the said surfaces of the base member, a series of anti-friction balls in engagement with all of the said plane and curved bearing surfaces of the base and cap members, and means for preventing the accidental separation of said members, substantially as described.

2. In a ball-bearing of the class described, the combination of a stationary base member and a cap-plate member capable of supporting and being rotated by a live spindle or shaft, each having plane and curved bearing surfaces arranged with respect to each other to form an annular space substantially square cross-sectionally and concentric with such live spindle or shaft, a series of anti-friction balls located in said annular space and in engagement with all of said bearing surfaces, and means for preventing the accidental separation of the base and cap-members.

3. A ball-bearing, comprising a fixed or stationary base member having its upper portion arranged to form plane and curved bearing surfaces, as *b*, *d*, a revoluble top or cap member having a central sleeve extending downward into said base and also arranged to form plane and curved bearing surfaces, as *h*, *h'*, the said four surfaces capable of forming an annular concentric space, and a series of anti-friction balls rotatable in said space and engaging the said four bearing surfaces simultaneously.

4. In a bearing of the class described, the combination with the centrally apertured stationary base member *a* having ball-bearing surfaces, *b*, *d*, arranged at right angles to each other and a flange located below said surfaces provided with a female screw-thread, of the revoluble cap-plate *g* having ball-bearing surfaces *h*, *h'*, also arranged at right angles to each other and when in use opposite to said surfaces *b*, *d*, a downward extending sleeve *j* integral with the cap-plate having a peripheral groove *k* therein located normally contiguous to said screw-threaded flange, and having the lower end portion of said sleeve provided with a male screw-thread capable of being screwed completely through said flange, and a series of anti-friction balls in engagement with all of the said four bearing surfaces.

In testimony whereof I have affixed my signature in presence of two witnesses.

EMILE MAERTENS.

Witnesses:
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REMINGTON SHERMAN.