

(No Model.)

G. J. S. COLLINS.
BALL CASTER.

No. 559,514.

Patented May 5, 1896.

Fig. 1

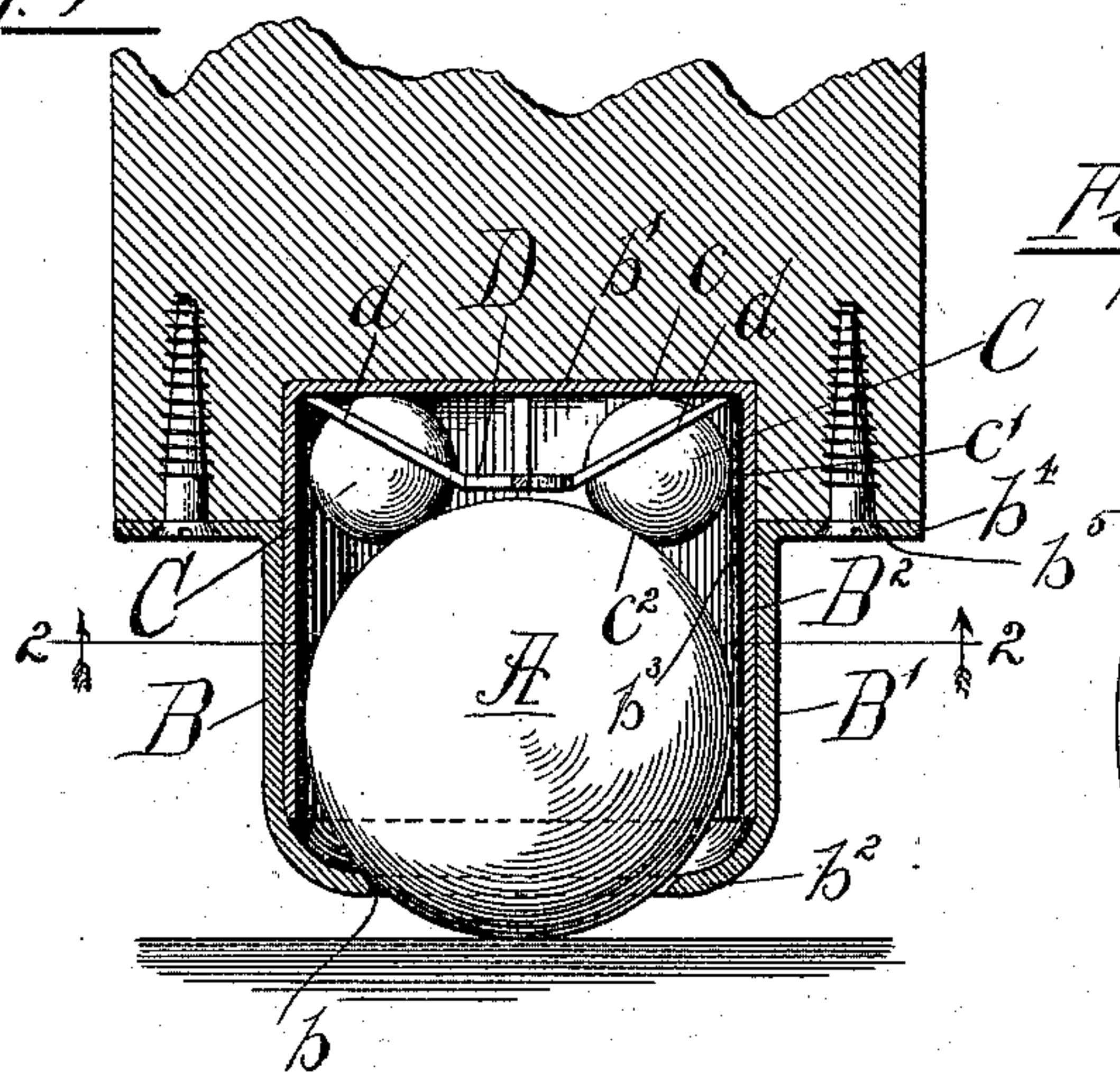


Fig. 2

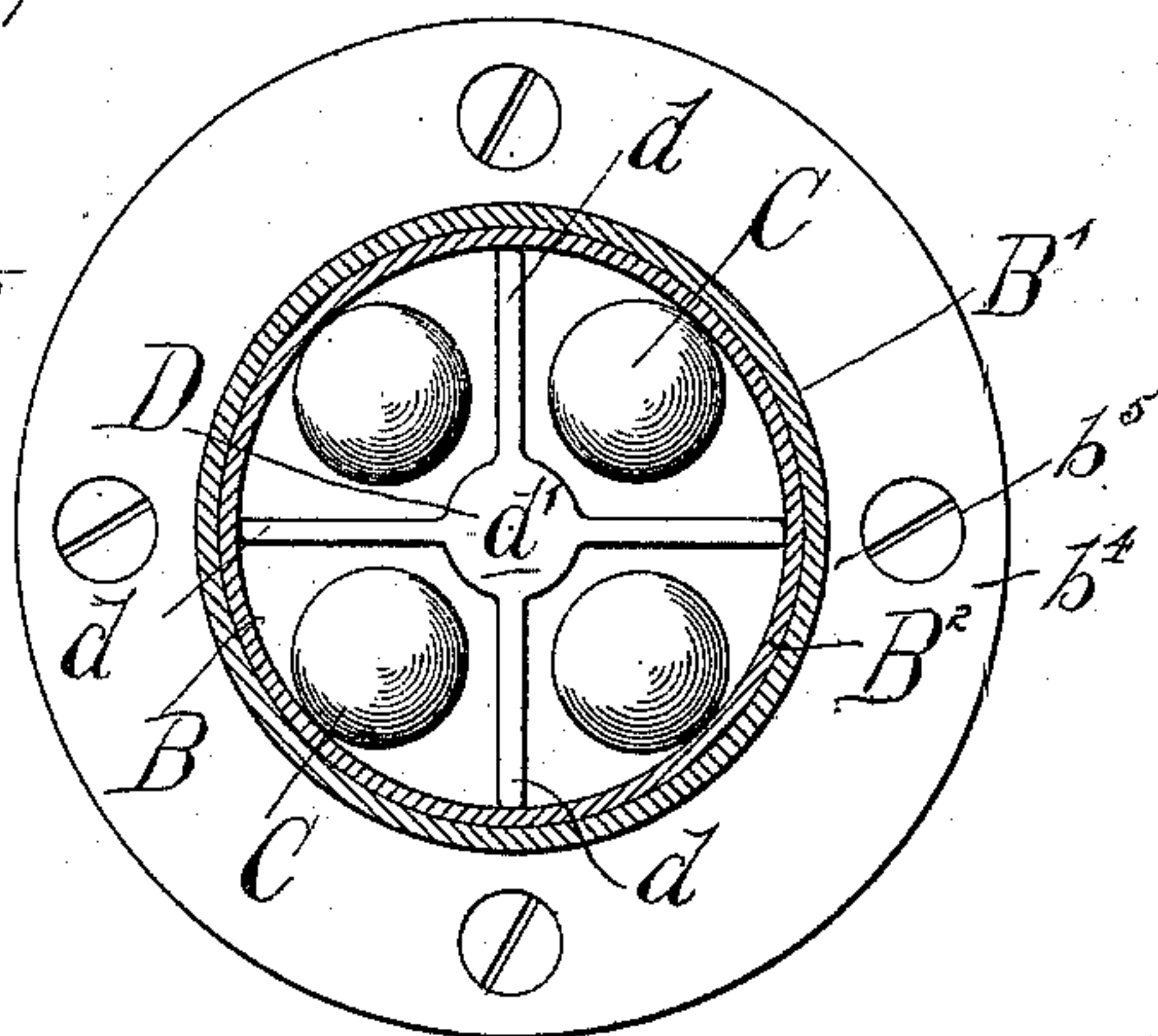


Fig. 3

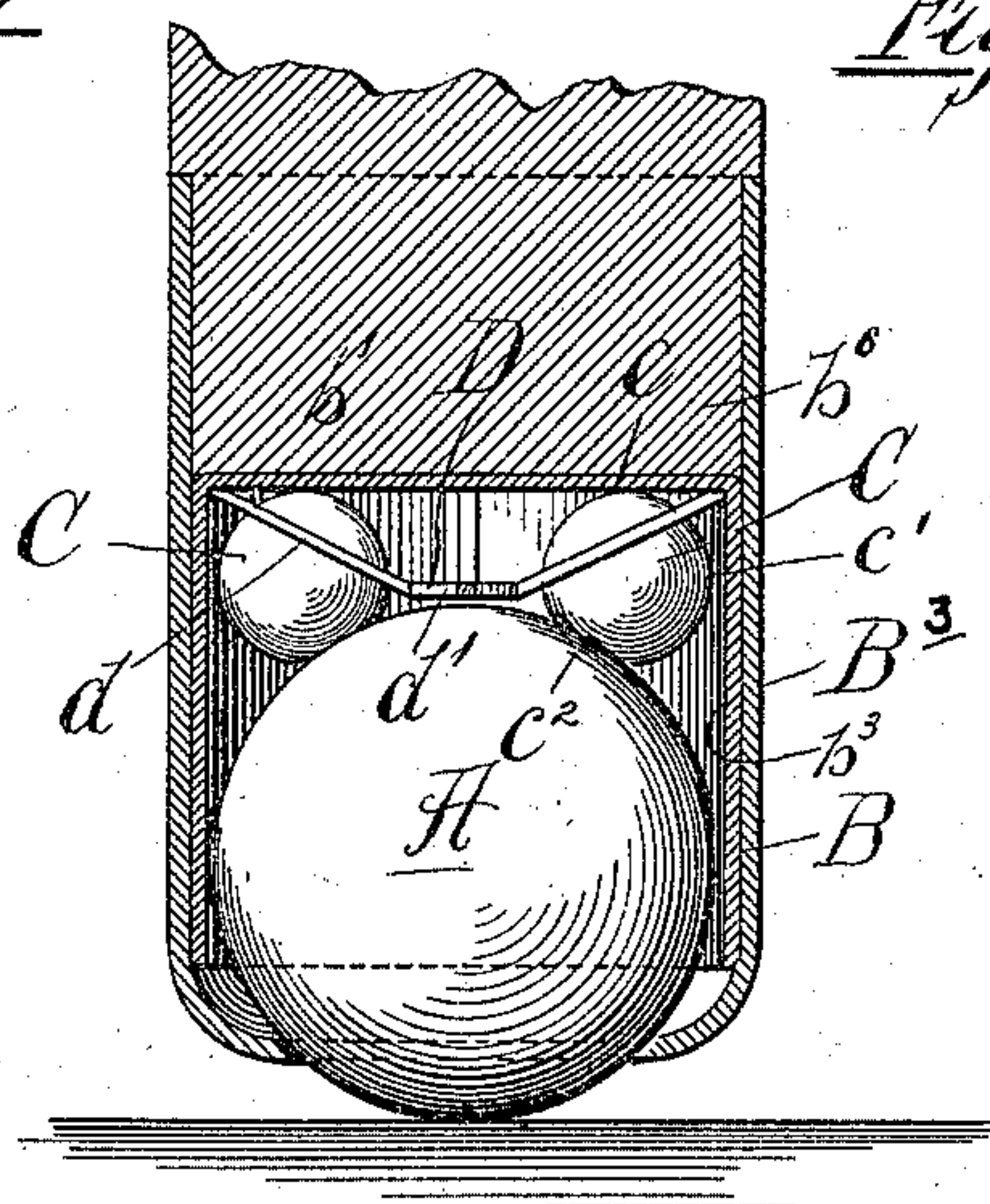
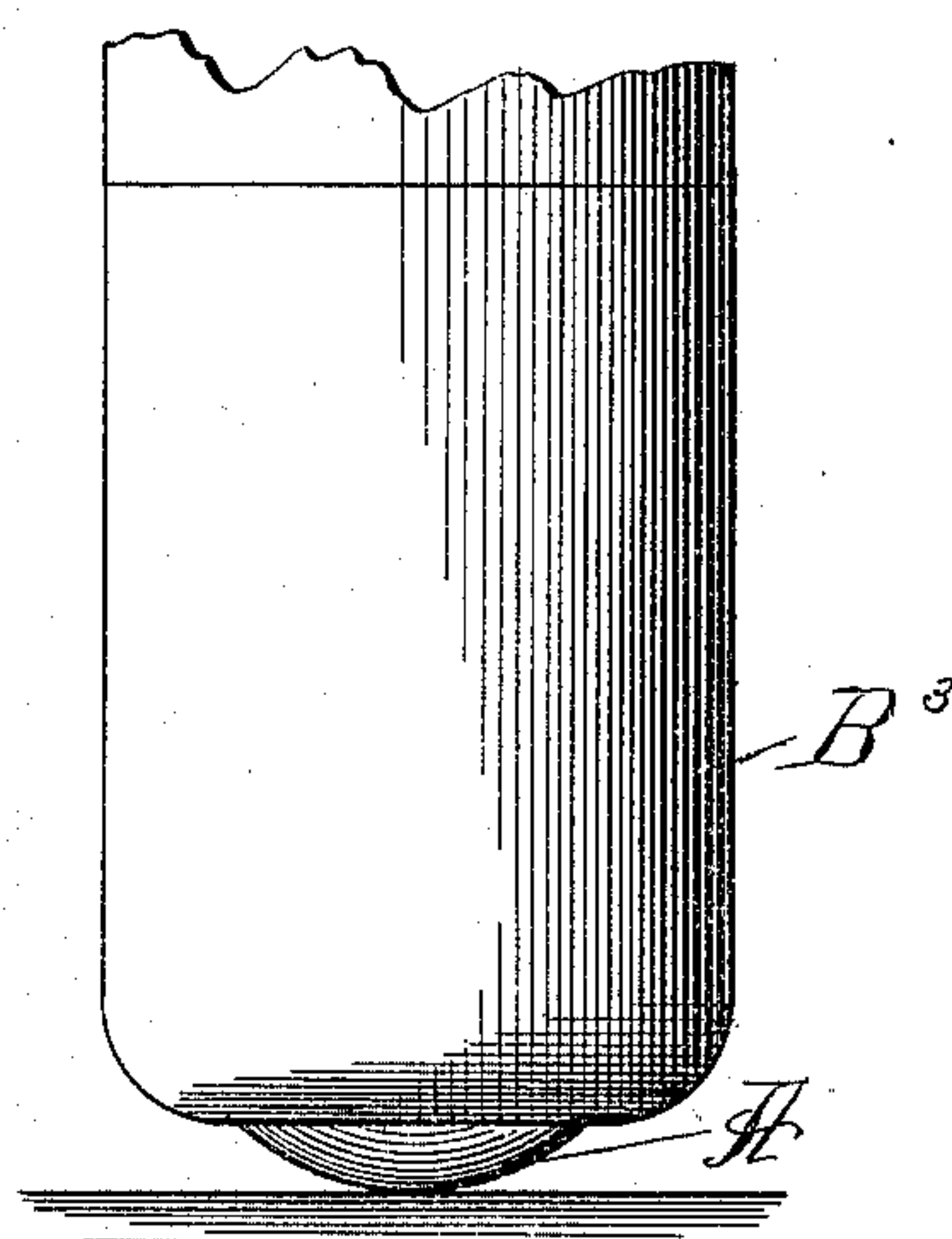


Fig. 4



Witnesses

L. Clinton Hamlin
John W. Adams

Inventor
George J. S. Collins

by *Dayton, Poles & Brown*
his Attorneys

UNITED STATES PATENT OFFICE.

GEORGE J. S. COLLINS, OF CHICAGO, ILLINOIS.

BALL-CASTER.

SPECIFICATION forming part of Letters Patent No. 559,514, dated May 5, 1896.

Application filed October 28, 1895. Serial No. 567,170. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. S. COLLINS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Casters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in casters for furniture, and refers more specifically to improvements in that class of casters in which the main supporting-roller is spherical and the bearings therefor are antifriction ball-bearings.

The object of the invention is to provide a simple and improved device of the character referred to, especially designed with reference to the formation of the parts thereof, exclusive of the roller-balls, from sheet metal, by means of stamping or drawing dies, whereby the caster may not only be more cheaply produced, but is at once stronger, neater in appearance, and more perfect than those heretofore made, as is common, by casting. At the same time the device embodies features of construction which render it more perfect in its operation, less liable to become clogged or inoperative, and which facilitate the assembly and application of the caster.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and will be readily understood, reference being had to the accompanying drawings, in which—

Figure 1 is an axial section of the caster, showing the supporting-roller and the roller ball-bearings in full lines. Fig. 2 is a horizontal section taken on line 2 2 of Fig. 1, and looking upward, the supporting-roller being removed. Fig. 3 is a view similar to Fig. 1, showing a modification. Fig. 4 is a side elevation of the caster shown in Fig. 3.

As shown in said drawings, A designates the spherical supporting-roller of the caster, which is loosely seated within a casing, (designated as a whole by B,) the lower end *b* of which is open, so as to allow the lower side of the ball A to protrude therefrom to rest directly upon the floor. The casing B is composed of two main parts *B'* *B''*, which are gen-

erally of tubular form and arranged to telescope one upon the other, the general form of the interior of the casing being cylindric, with a closed upper end *b'* and an inturned or contracted lower end *b''*. The upper closing end wall *b'* is shown in the present instance as being made flat and arranged horizontally, or at right angles to the vertical axis of the caster, and as forming the base or bearing part of the casing, through which the weight of the piece of furniture to which the caster is applied is transmitted to the supporting-roller A. The interior diameter of said casing B is slightly greater than the diameter of the ball A, and its depth is such as to provide a suitable space or roller-race within the angle between the upper end wall *b'* and the cylindric side wall *b''*, within which race are arranged a plurality of antifriction roller-balls C C, which rest in contact at their lower sides with the upper surface of the supporting-roller A and thus serve to transmit the weight from the base *b'* to said supporting-roller. Obviously, when thus constructed, weight brought upon the caster will hold the antifriction-balls outward against the circular inner side wall *b''* of the casing, and will also serve to hold the supporting-roller A centered within the casing and free from contact with any part thereof. It may also be noted that each of the roller bearing-balls C will have bearing contact at three points only—against the lower surface of the base *b'*, against the inner surface of the cylindric wall *b''*, and against the upper surface of the ball A, as indicated at *c* *c'* *c''*, respectively. It may be further noted in this connection that the arrangement is such that it is impossible for said roller bearing-balls to become wedged within the casing or to bind under any circumstances.

As an improved construction the number of balls arranged within the roller-race will be less than sufficient to completely fill said race circumferentially, four being shown in the present instance, and in order to keep said roller-balls spaced apart, so as to prevent their accumulation all at one side, a separating device D, having the form of a spider provided with a plurality of radially-extending arms *d d'* equal in number to the number of balls within the race, is arranged within the upper end of said casing. Preferably,

and as herein shown, said spider is formed of sheet metal stamped out in proper shape, the arms thereof being bent upwardly from the central body portion d' , so as to give the spider the form as a whole of a truncated cone, the height of which is substantially equal to the distance between the inner surface of the upper end wall b' and the top of the main supporting-roller. Usually in practice the said spider will be arranged loosely within the upper end of the casing, it being obvious that when the parts are assembled it will be impossible for the separating device to become displaced or the roller-balls disarranged, while at the same time it is free to rotate with the balls around the interior of the casing, thereby avoiding the friction which would result were said spider secured rigidly within the casing and the run of the balls thus positively limited.

As a preferred construction the inner member B^2 has the form of a plain cylindric cap closed at one end, and is conveniently formed, by means of suitable drawing-dies, in a well-understood manner, while the outer member B' is constructed to telescope upon the lower end of said inner member, the intumed lower end portion of the outer member serving to limit the extent to which the inner member extends within said outer member, as indicated clearly in Fig. 1. At its upper end the outer member B' is provided with a radial flange b^4 , provided with screw-apertures b^5 , spaced at intervals apart, by means of which the caster may be secured to the leg of the article of furniture. Said outer member B' is also conveniently formed of sheet metal struck into proper form by means of dies, the flange b^4 thereof being either formed integral or made separate and brazed thereto, as found convenient or desirable.

In applying the device to an article of furniture the bottom surface of the leg will be provided with a cylindrical recess of proper size and depth to receive that part of the inner member of the casing which protrudes above the annular flange b^4 , thus allowing the latter to rest in contact with the end surface of the leg, after which the screws will be inserted in an obvious manner. It may be noted in this connection that the inner member B^2 will ordinarily not be positively secured within the outer member of the casing, this being unnecessary, inasmuch as it will be held properly in place without additional securing means when the caster is attached to the article of furniture.

In Figs. 3 and 4 I have shown a modification more particularly designed for application to chair-legs or the like. In this case the outer member B^3 of the casing is unprovided with the radial flange b^4 , but is extended upward beyond the upper end of the inner member to form a socket b^6 , adapted to receive the entire end of the leg. In other respects the construction of the caster is the same as that previously described.

From the foregoing description it will be seen that I have provided an exceedingly simple, practical, and economical construction, and one possessing important advantages. The arrangement of the roller-balls whereby each ball is permitted to roll back and forth freely within a limited space is important, inasmuch as this action tends to keep the balls free from becoming clogged with anything which the large supporting-roller might pick up—such, for instance, as ravelings, pieces of gum, or the like—while at the same time the construction is such as to reduce the friction to a minimum. The assemblage of the several parts of the caster is accomplished with the greatest facility, inasmuch as the inner member forms a cup within which the several parts may be simply dropped into position one after the other and the outer member thereafter telescoped upon the inner member, thus completing the operation. By reason of the fact that the several parts are made by means of dies perfect uniformity is insured, while the finish of the article is very much superior to that of a cast article, and it may be nicked, lacquered, or otherwise provided with an embellishing finish without preparatory dressing or polishing.

While I have herein shown what I deem to be preferred embodiments of the invention, yet it will be obvious that the details of construction may be varied somewhat without departing from the spirit of the invention and without involving more than ordinary mechanical skill. I do not, therefore, wish to be limited to the precise details of construction shown, except as specifically claimed herein.

I claim as my invention—

1. A furniture-caster comprising a spherical supporting-roller, a casing within which said roller is arranged, an annular antifriction-roller-ball race in the upper part of said casing arranged concentric with the vertical axis of the latter, having a cylindrical wall at its outer side which confines the balls against radial or outward movement, a plurality of roller-balls arranged in said race, serving to transmit the weight brought upon the casing to said supporting-roller, and a movable ball-supporting device provided with parts arranged to project within said race, between each pair of balls therein so as to retain said balls at intervals apart, substantially as set forth.

2. A furniture-caster comprising a spherical supporting-roller, a casing within which said roller is arranged, an annular antifriction-roller-ball race in the upper part of said casing arranged concentric with the vertical axis of the latter, a plurality of roller-balls arranged in said race, serving to transmit the weight brought upon the casing to said supporting-roller, and a ball-separating device provided with parts arranged to project between each pair of balls within the race, arranged loosely within said casing, said ball-separating device being free to rotate with the

balls and unaffected by weight brought upon the caster, substantially as set forth.

3. A furniture-caster comprising a spherical supporting-roller, a casing within which said roller is arranged, an annular antifriction-roller-ball race in the upper part of said casing arranged concentric with the vertical axis of the latter, a plurality of roller-balls arranged in said race serving to transmit the weight brought upon the casing to said supporting-roller, and a ball-separating device having the form of a spider provided with a number of radial arms equal to the number of balls within the race, and arranged to project between each pair thereof, said ball-separating device being free to rotate with the balls and unaffected by weight brought upon the caster, substantially as set forth.

4. In a furniture-caster, the combination of a main spherical supporting-roller, a casing within which said supporting-roller is confined, said casing comprising two cylindrical drawn sheet-metal tubular members adapted to telescope one within the other, the outer one of said members being made open at both ends but contracted at its lower end to retain the supporting-roller therein, and the inner member being made of cup form or closed at its upper end, a plurality of roller-balls arranged within the inner end of the upper

member, a separate ball-supporting device arranged loosely within said casing and means for securing the caster to an article of furniture, substantially as set forth.

5. In a furniture-caster, the combination of a main spherical supporting-roller, a casing within which said supporting-roller is confined, comprising two drawn metal tubular members adapted to telescope one within the other, the outer member being made open at both ends but contracted at its lower end to retain the supporting-roller therein, and provided at its upper part with an exterior radially-projecting flange, and the inner member having a closed upper end, a plurality of roller-balls arranged within the upper end of said inner member, and a ball-separating device having the form of a spider provided with radially-extending arms arranged to extend between each pair of roller-balls, substantially as set forth.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 26th day of October, A. D. 1895.

GEORGE J. S. COLLINS.

Witnesses:

ALBERT H. GRAVES,
WILLIAM L. HALL.