

No. 647,675.

Patented Apr. 17, 1900.

J. S. KOCH.  
BALL CASTER.

(Application filed Feb. 5, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig: 1.

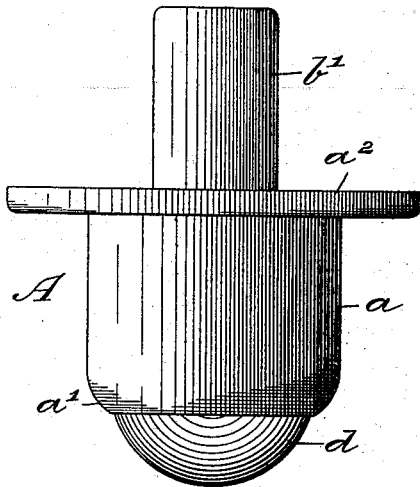


Fig: 4.

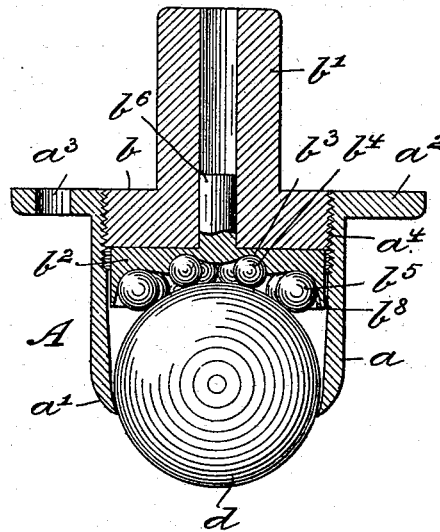


Fig: 2.

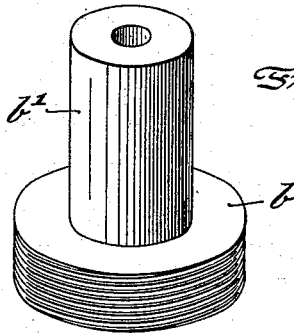


Fig: 3.

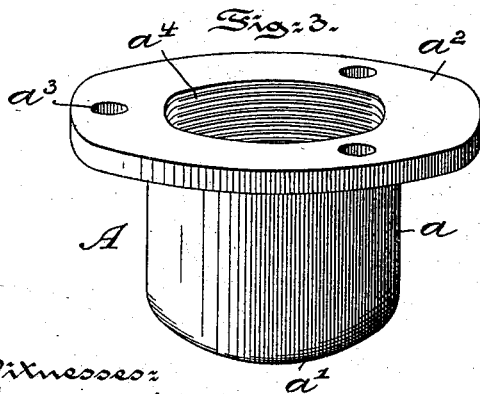
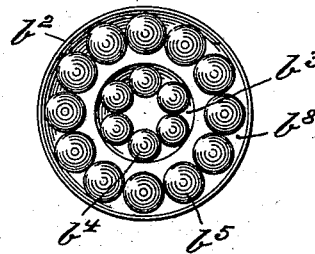


Fig: 5.



Witnesses:  
Thomas M. Smith,

Richard C. Maffett

Inventor:  
James S. Koch,  
J. Walter Douglas,  
Attorneys.

No. 647,675.

Patented Apr. 17, 1900.

J. S. KOCH.  
BALL CASTER.

(Application filed Feb. 5, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 6.

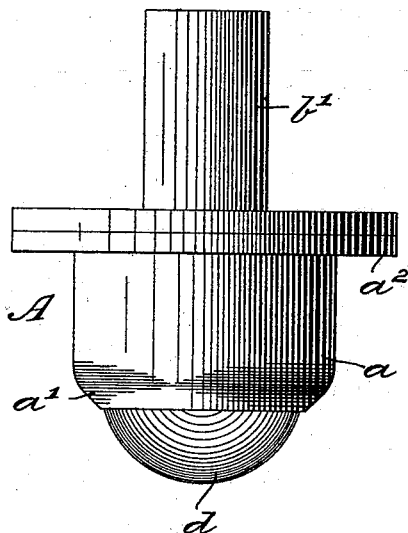


Fig. 8.

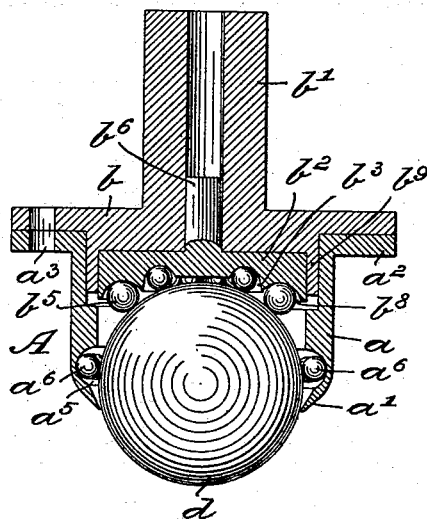


Fig. 9.

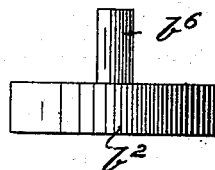


Fig. 7.

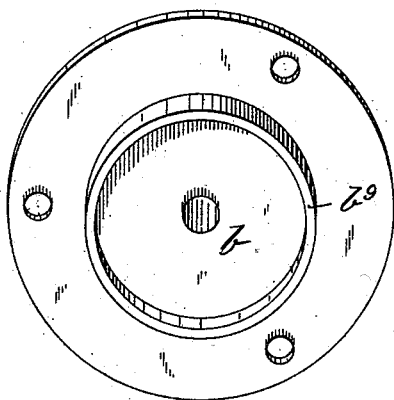
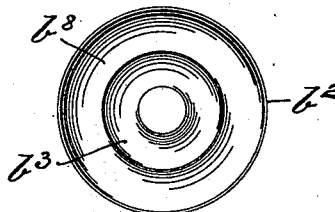


Fig. 10.



Witnesses:  
Thomas M. Smith,  
Richard C. Maxwell.

Inventor:  
James S. Koch,  
J. W. Allen, Attorney.

# UNITED STATES PATENT OFFICE.

JAMES S. KOCH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO CHARLES J. FOX, OF SAME PLACE.

## BALL-CASTER.

SPECIFICATION forming part of Letters Patent No. 647,675, dated April 17, 1900.

Application filed February 5, 1900. Serial No. 3,969. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES S. KOCH, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ball-Bearing Casters, of which the following is a specification.

My invention has relation to a caster of the ball-bearing type for furniture and other similar articles; and in such connection it relates to the particular construction of the caster proper and the arrangement of the ball-bearings within the caster proper for the caster-ball to travel in engagement therewith within the housing of the caster, so as to permit of the free revolution or movement of the caster-ball about and in contact with said ball-bearings without comparatively any friction and without the caster-ball becoming set against free movement thereof.

The principal object of my present invention is to provide a comparatively simple, durable, and effective non-frictional or ball-bearing caster for furniture and other similar articles in which the caster proper, with its parts for the reception and retention of the ball-bearings of the caster-ball, are so arranged as that the ball will be always properly poised and positioned to insure free movement of the ball about the ball-bearings and in contact with the peripheral surface of the same without possibility of the ball becoming set.

My invention, stated in general terms, consists of a ball-bearing caster when constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and characteristic features of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a front elevational view of a caster in one of the forms embodying features of my present invention. Fig. 2 is a perspective view of the upper threaded portion or shank of the caster adapted to be fitted into the leg of an article of furniture. Fig. 3 is a similar view of the caster-ball housing with its flanged seat for engagement

with an article of furniture. Fig. 4 is a vertical sectional view of the caster of Fig. 1 and in elevation the caster-ball seated on ball-bearings and held in the housing. Fig. 5 is an underneath plan view of the double-grooved seat of the caster with the balls which form the bearings for the caster-ball and mounted and adapted to travel in the grooves of the said seat by the action of the caster-ball in contact therewith. Fig. 6 is an elevational view of a slightly-modified form of caster embodying certain additional features of my present invention. Fig. 7 is a perspective view of the upper portion of the caster of Fig. 6, with its hollow shank and with its inner flange or rim. Fig. 8 is a vertical sectional view of Fig. 6, showing the internal arrangement of the caster and in elevation the caster-ball in contact with its ball-bearings within the housing therefor. Fig. 9 is an elevational view of the upper double-grooved ball-bearing seat and spindle for the engagement of the latter in the upper portion or shank of the caster-body, and Fig. 10 is an underneath plan view of Fig. 9.

Referring to the drawings, A represents the housing of the caster, consisting, in the construction and arrangement of the caster as illustrated in Figs. 1 to 4, inclusive, of a barrel or tube  $a$ , having a tapered lower end  $a'$ , as clearly illustrated in Figs. 3 and 4, and with an upper flange  $a^2$ , forming a seat for engaging the article of furniture or the like. The flange has openings  $a^3$  therein to permit of the insertion of screws or pins through the flange and into the article to which the caster is to be secured. The interior of the barrel  $a$  is threaded, as at  $a^4$ , for receiving and securing thereto the upper portion or member  $b$  with its hollow shank  $b'$ .

$b^2$  is a double-grooved seat located within the tube or barrel  $a$ , as clearly illustrated in Fig. 4. The seat  $b^2$  has two circular or concentric grooves or channels  $b^3$  and  $b^4$ , which are adapted to contain, preferably, two series of different-sized small balls  $b^4$  and  $b^5$ . The inner groove  $b^3$  is located above the plane of the outer groove  $b^4$ , so that the two series of balls in position in the circular or concentric grooves will occupy different planes with respect to each other, considered as to their se-

ries arrangement, as clearly illustrated in Fig. 4 of the drawings. The spindle  $b^6$  of the seat  $b^2$  extends centrally and upwardly into the hollow shank  $b'$  of the externally-threaded rear plate  $b$  of the caster, as clearly illustrated in Fig. 4, and the seat and its spindle are adapted to turn within the shank  $b'$  and the barrel  $a$ .

$d$  is the caster-ball, mounted in the housing, so as to freely turn or revolve in engagement with the two series of ball-bearings  $b^4$  and  $b^5$  beyond the center with the peripheral surface of the caster-ball  $d$  in the rotation or movement of the same with comparatively little or no friction and without said ball becoming set against movement due to extraneous or other causes brought to bear against the same, but always by reason of the character of the bearing-points, as well as the relation of such points to the caster-ball with an easy and practically frictionless action in any movement of the said caster-ball in connection with an article of furniture.

In Figs. 6 to 8, inclusive, the construction of the caster is the same as hereinbefore explained, with the exception that the seat  $b^2$ , as illustrated in Fig. 8, and the balls in the grooves located in different planes and contacting at different points with the peripheral surface of the caster-ball  $d$ , are slightly closer together, speaking of the same with respect to their series arrangement, and the periphery of which seat  $b^2$  is in sliding contact with the rim or projection  $b^9$  of the upper member  $b$ . The seat  $b^2$ , as shown, fits snugly against the surface of the upper member or plate  $b$ , and its spindle  $b^6$  fits into the hollow shank of the said plate  $b$ , whereby is afforded a slight range of rotary movement induced by the two series of balls  $b^4$  and  $b^5$ , contacting with the caster-ball  $d$ . In the construction of the outer barrel or tube  $a$  of the caster proper, near the lower end  $a'$  on the inner surface, is provided a groove  $a^5$  to form a seat for a series of small balls  $a^6$ , adapted to become a slight bearing point or surface for the caster-ball  $d$  in the direction of a point central to a line through the caster-ball  $d$  to thereby steady the same and at the same time to support the ball at three circumferential points or surfaces, and to thereby avoid jamming or setting through extraneous influences brought to bear upon the caster-ball  $d$  in action. By arranging the member  $b$  with a threaded plate and thread-

ing the interior of the lower member or housing  $a$  the two parts of the caster may be quickly and readily separated for the purpose of repairs, &c.

Having thus described the nature and object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A ball-bearing caster, comprising an upper member or plate provided with a hollow shank, a seat provided with a double-grooved face and with a spindle fitting into the shank of said plate, the grooves of said seat being arranged in different planes to each other, balls mounted in said grooves or channels, a caster-ball engaging said balls and a housing surrounding said parts and compassing a portion of said caster-ball, substantially as and for the purposes described.

2. A ball-bearing caster provided with an upper member or plate having a shank, a double-grooved seat for the reception of balls and having a spindle engaging the shank of said plate, a caster-ball adapted to engage with the balls in series of said seat, a housing provided with a groove near the lower end and provided therein with a series of balls adapted to contact with the periphery of said caster-ball, the construction and arrangement being such, that the balls of said seat and balls of said housing form three bearing points or surfaces for said caster-ball, substantially as and for the purposes described.

3. A ball-bearing caster provided with an upper member or plate with a hollow shank, a double grooved or channeled seat with a spindle, said seat engaging said plate and the spindle engaging in said shank and the grooves of said seat being arranged in different planes, balls of different sizes in detachable engagement with said grooves, a caster-ball adapted to peripherally engage said two series of balls, and a housing partially compassing said caster-ball and concealing said two series of balls forming the bearings for said caster-ball and the seat thereof, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JAMES S. KOCH.

Witnesses:

J. WALTER DOUGLASS,  
THOMAS M. SMITH.