W. D. SPENCER.

Caster.

No. 210,218. Patented Nov. 26, 1878

Fig 1.

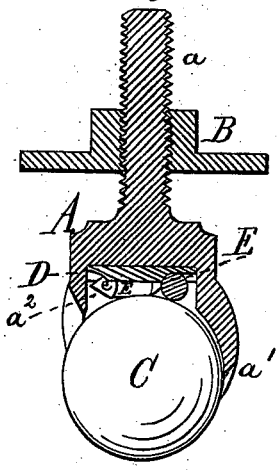


Fig 2

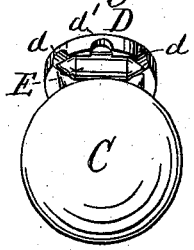


Fig 3.

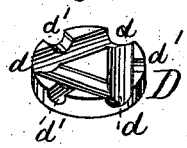
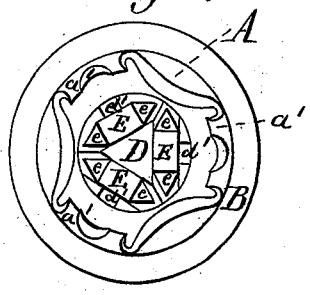


Fig 4.



Witnesses:

J. P. Theodore Lang

Theodore Lang

Inventor:

William D. Spencer.

by

Mason, Fenwick & Lawrence.

UNITED STATES PATENT OFFICE.

WILLIAM D. SPENCER, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO HIMSELF AND HENRY S. LEONARD, OF SAME PLACE.

IMPROVEMENT IN CASTERS.

Specification forming part of Letters Patent No. **210,218**, dated November 26, 1878; application filed October 5, 1878.

To all whom it may concern:

Be it known that I, WILLIAM D. SPENCER, of Middletown, in the county of Middlesex and State of Connecticut, have invented a new and useful Improvement in Casters for Furniture, which improvement is fully described in the following specification and annexed drawings, in which latter—

Figure 1 is a vertical central section of my improved caster. Fig. 2 is a perspective view of the spherical roller or ball and its cylindrical counter-bearings used in my caster. Fig. 3 is a perspective view of a bearing-plate used for the said counter-bearings. Fig. 4 is an inverted plan view of my caster with the ball removed.

The nature of my invention consists, first, in a plate provided with three triangularly-arranged grooves, which intersect each other, in combination with three triangularly-arranged rollers, which are shorter than the grooves, and a ball of a caster, the said parts being arranged in the caster-bowl, as hereinafter described.

My invention consists, second, in three oblong rollers, which are shorter than the grooves in which they slide and turn, made with conical ends, and caused to operate in pairs in a manner similar to miter friction gear-wheels, said rollers being applied in a triangular manner in intersecting grooves of a bearing-plate of a ball-caster in such a manner that the revolution of the ball of the caster in one direction causes two of the rollers to slide and revolve, while the effect upon the other roller by the ball is to cause it to revolve in an opposite direction to that in which the other two revolve.

By my invention the liability of the rollers cramping the ball is avoided, and whenever the ball changes its direction of revolution the respective rollers change their position; and although a different one from the first mentioned may be caused to revolve with the ball, two rollers will always be receding from it in a longitudinal direction, and at the same time revolving in a reverse direction to the single roller which is revolving toward the ball.

My invention avoids the necessity of providing the rollers with journals, and is different in its results from a ball closely fitted in a semi-spherical socket, inasmuch as the rollers are always presenting both a rolling and sliding friction-surface to the ball during the constant changes of direction of rotation which the ball necessarily undergoes while the article of furniture to which the casters are applied is being moved. The rollers are also cheap, being made of hard wire-metal.

In the drawings, A represents the caster-bowl, having a shank, *a*, and springy claws, as at a^1. The shank *a* is provided with a screw-thread, and fitted to a plate-nut, B, which is adapted to be fastened to furniture-legs by means of screws, or by other well-known means.

By screwing the bowl A higher or lower in the nut B it may be speedily adjusted to match with the other casters of the same piece of furniture, and thus level the piece of furniture to which they may be attached.

The claws a^1 fit so close around the ball C of the caster that it will not drop out of the bowl; but with a slight force the ball may be withdrawn from or reinserted into the claws, owing to the springy action of the claws.

Above the ball C, in a suitable recess, a^2, of the bowl, an anti-friction device is inserted. This anti-friction device consists of a disk, D, having three cylindrical bearings, *d*, which form an equilateral triangle, and three rollers, E, with conical ends *e*, as shown in Fig. 4. The rollers E are of such length that they do not touch each other when in a normal position in the bearings *d*; but when caused to slip longitudinally by the movement of the ball the conical ends *e* bear against each other.

The ball C is fitted loosely into the cup A, and, when at rest, is kept in a central position by the triangular arrangement of the rollers E, and thus only bears against the extreme lower ends of the claws a^1, as seen in Fig. 1.

When the caster is moved the ball C revolves around its center, and, in consequence of the triangular arrangement of the rollers E, its axis is always precisely or nearly parallel with one of the said rollers, which roller then revolves in a direction opposite that of the ball. The remaining two rollers during such action are caused to move in the same direction as the first one, and, their axes of

revolution not being parallel with that of the ball, they are pushed longitudinally in the direction of their divergency toward the first roller until their conical ends *e* meet with those of the first roller, and thus work in unison, like bevel-wheels. Whatever direction the caster is moved to, the roller which is nearest parallel to the axis of revolution of the ball assumes forthwith the functions of the first roller, and the remaining two follow suit, as described.

As the friction of the ball and rollers is very slight and as there is no friction between the ball and interior of the caster-bowl, and as the ball only impinges upon the extremities of the claws a^1, this caster has so far proved the most yielding and least wearing caster of its class.

In order to reduce the friction of the rollers against the roller-plate, the outer bearing-surfaces of the same may be reduced by cutting a transverse notch, *d'*, between the periphery of the roller-plate and each bearing *d*.

By making the roller-plate D and rollers E removable, I enable unskilled persons to repair a worn-down caster by simply removing the roller-plate, rollers, or ball and substituting new parts.

If the claws a^1 should wear so much as to give the ball too much play in the caster-bowl, the ball may be removed, and the claws a^1 slightly bent together until the reinserted ball is found to be held more steadily.

It will be observed that when the ball C is in place the plate D and rollers E maintain such a relation to it as compels the ball in its revolutions to only impinge against the bowl of the caster at the extreme end of its claws a^1.

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

1. In a ball-caster, the combination of the plate D, having three triangularly-arranged grooves, *d*, the oblong rollers E, made shorter than the grooves, the ball C, and cup A, substantially as and for the purpose described.

2. In a ball caster, three oblong rollers, arranged in a triangular manner in three intersecting grooves, and made shorter than the grooves of the bearing-plate in which they move, and having their ends cone-shaped, substantially as and for the purpose described.

WM. DENISON SPENCER.

In presence of—
HENRY M. SMITH,
A. CAMPBELL.