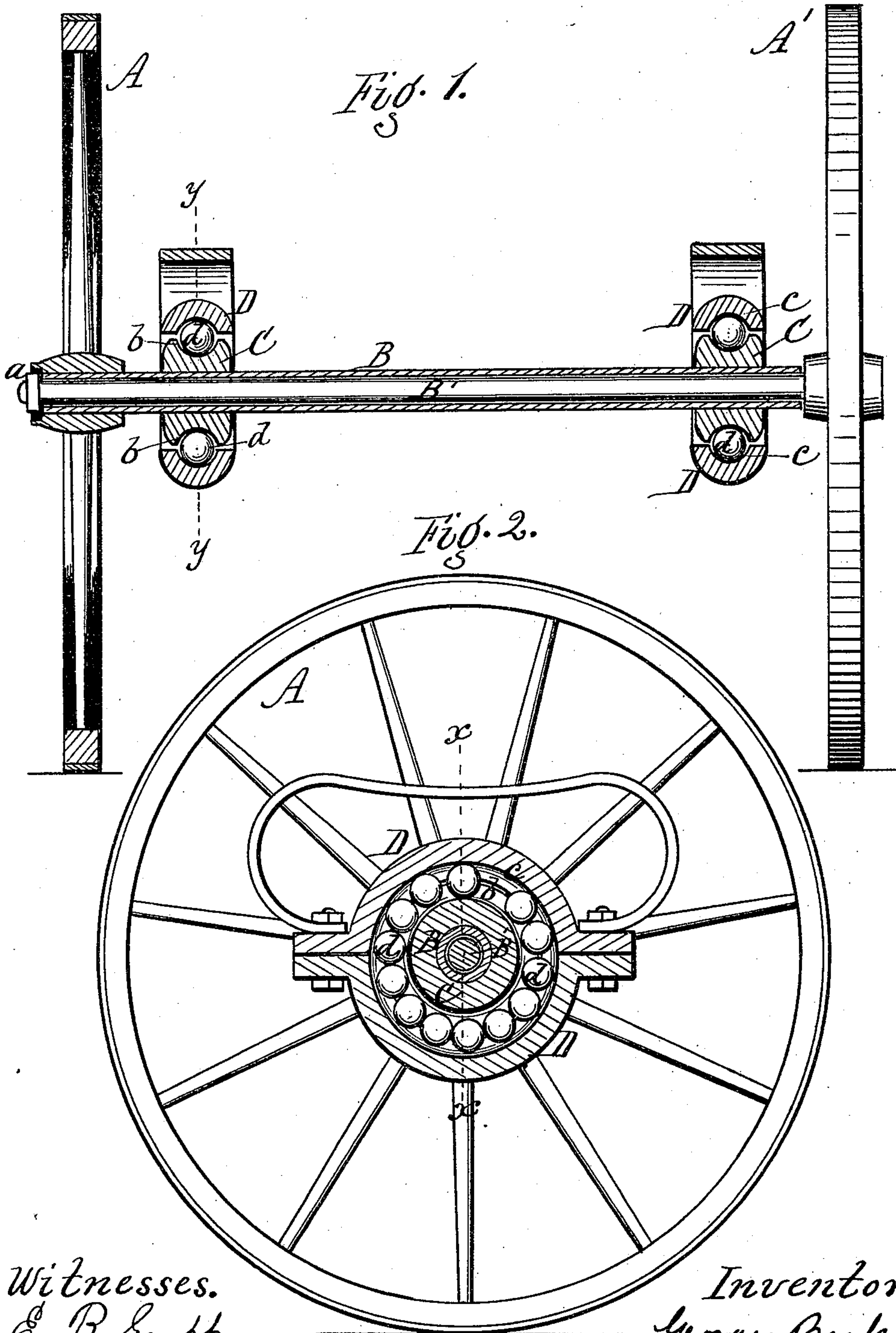


G. BECK.  
Vehicle-Axle.

No. 169,226.

Patented Oct. 26, 1875.



Witnesses.  
E. B. Scott.  
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# UNITED STATES PATENT OFFICE.

GEORGE BECK, OF CHARLOTTE, NEW YORK.

## IMPROVEMENT IN VEHICLE-AXLES.

Specification forming part of Letters Patent No. **169,226**, dated October 26, 1875; application filed July 9, 1875.

*To all whom it may concern:*

Be it known that I, GEORGE BECK, of Charlotte, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Axles for Carriages, &c.; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section in line *x x* of Fig. 2. Fig. 2 is a transverse vertical section in line *y y* of Fig. 1.

My improvement relates to compound or double-acting axles for allowing one wheel to move faster than the other in passing curves.

The invention consists in the combination, with such an axle, of a friction arrangement of peculiar construction, as hereinafter described, whereby the axles are made to turn with the wheels with the minimum amount of friction, while the axles allow one wheel to turn faster than the other in passing curves, as before specified.

A A' represent two of the wheels of a carriage, which may be either the front or hind wheels. The wheel A is made fast to one end of an exterior tubular axle, B, and the other wheel, A', is made fast to the opposite end of the interior axle B'. These axles pass one through the other, and are secured by a nut, *a*. This arrangement allows a free turning of each wheel and its axle independent of the other wheel and its axle, so that in passing curves either wheel may turn faster than the other without dragging or any undue friction, which would occur were both wheels made fast to a single axle.

I combine with this double axle the following frictional device: C C are two circular collars, secured fast to the outer axle at suitable distance apart, and provided each with an internal semicircular groove, *b*. D D are corresponding circular bearings or boxes resting around the collars, and provided each with a corresponding semicircular groove, *c*. In these grooves, between the two parts, are fitted loosely a series of balls or globes, *d d d*. The bearings D D rest loosely on top the balls and support the carriage-body, being attached to the lat-

ter by any suitable arrangement of springs or other devices. The bearings D D are, preferably, made in halves, bolted together, and the inner circle is somewhat eccentric to the circle of the collars C, so as to leave a greater width of the grooves at the bottom than at the top, by which means the balls at the sides and in the bottom do not receive the friction, but the latter all comes upon one or two balls at the top, as shown in Fig. 2. By this means the friction of the balls is greatly reduced, and they cannot crowd or grind together at the point where the weight comes, but are entirely free, except at the top. I have at least the space of one ball free in the circle of balls, so that no crowding can occur. The circle of the grooves *b c*, in cross-section, is somewhat wider than that of the balls, so that the latter bear in the grooves only at the center, leaving the sides of the grooves free of contact, as shown in Fig. 1.

In light carriages and wagons one of these frictional devices on each side is all that is required. In heavy wagons each collar may have a double groove and two sets of balls, and on railroad-cars or other heavy vehicles two collars on a side may be used—one on each side of the wheel.

The improvement is not only adapted to ordinary carriages and wagons, but also to railroad-cars, street-cars, and other vehicles.

In passing over level surfaces both wheels roll together, and the axles turn in unison, neither moving independently; but in turning curves one axle and its wheel moves independently of the other, thereby preventing dragging of the outer wheel.

In carriages I thus avoid the use of loose wheels and the necessity of removing and oiling the same, and the irregular and rattling action that always occurs with such wheels, especially when worn.

The whole friction is taken by the balls; and since these roll from their contact with a stationary and movable surface, they have no appreciable friction, and hence require no oiling. If desired, a small quantity of oil may be used; but it is not necessary.

I am aware that compound axles resting one within the other have been known in railroad-cars. I am also aware that friction-balls have



been employed to reduce friction. Such are not the equivalent of my invention.

What I claim as new is—

The combination, with the compound axle B B', of the collars C C' and boxes D D', formed with grooves *b c*, which are eccentric to each other and deepest at the bottom to receive the balls *d d*, and of larger diameter in cross-section than the balls, the whole arranged so that the balls receive friction at the top of the axle,

thereby preventing crowding and grinding of the balls in the groove, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE BECK.

Witnesses:

E. B. SCOTT,  
R. F. OSGOOD.