C. H. KENDALL.
Vehicle-Axle.

No. 212,386. Patented Feb. 18, 1879.

Fig: 1.

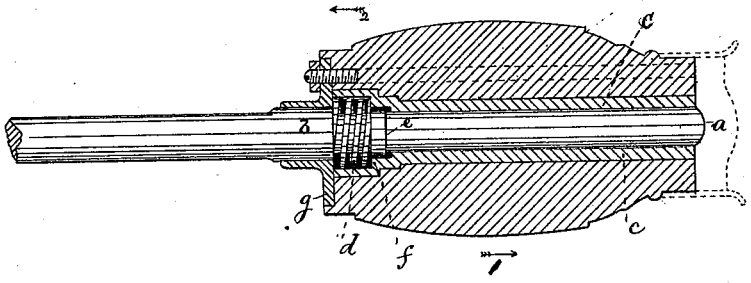
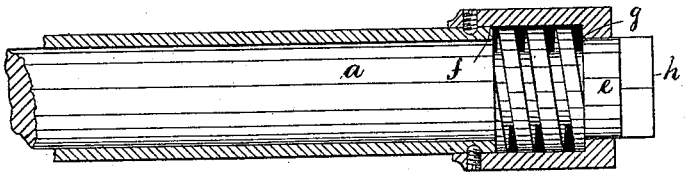


Fig: 2.



Witnesses.
N. E. Whitney.
Jos P. Livermore

Inventor.
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Attys

UNITED STATES PATENT OFFICE.

CHARLES H. KENDALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO B. S. PRAY, OF SAME PLACE.

IMPROVEMENT IN VEHICLE-AXLES.

Specification forming part of Letters Patent No. **212,386**, dated February 18, 1879; application filed January 8, 1879.

To all whom it may concern:

Be it known that I, CHARLES H. KENDALL, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Axles, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to improvements in axles, whereby the wheels and hubs may be so applied as to yield laterally in each direction on the axle-arms as the wheels in their rotation strike stones or rough portions of the road.

In numerous other axles two independent springs have been applied to the axle arm and box in various ways, and both of the said springs have been necessary to permit the wheel and hub to move in both directions without shock on the axle-arm. Numerous other axles and hubs have been provided with a single spring, to permit the hub and wheel to resist shock in but one direction.

The object of my invention is to prevent shock or blows between the axle and axle-box when the box and wheel move laterally in each direction, and to accomplish this desirable object by means of a single spring.

My invention may be carried out practically in several different ways, among which I shall illustrate some of the best ways known to me.

Figure 1 represents, in section, a hub and axle-box thereon, applied to an axle-arm provided with a single spring in accordance with my invention; and Fig. 2, a modification of the said invention, the single double-acting spring being applied at the front end of the axle and box.

The axle-arm *a*, in Fig. 1, is provided with a swell or shoulder, *b*. At the rear side of the box *c*, in front of the said shoulder *b*, is applied a helical spring, *d*, and the spring is held in contact with the shoulder by a collar, *e*, fixed upon the axle-arm. The diameter of the spring is in excess of the diameter of the shoulder or collar, and consequently a portion of each end of the said spring, held loosely between the said shoulder and collar, projects beyond the shoulder and collar far enough to meet at one end of the spring the shoulder *f* of the box, or the collar *g*, attached thereto or to the hub by suitable screws or screw-threads.

The collar *g* must be detached from the hub or box before the hub can be removed from the axle.

As the hub and box are moved in the direction of arrow 1, the double-acting spring seats itself against the collar *e*, and yields as its opposite end is acted upon by collar *g;* and when moved in the direction of arrow 2, the said spring seats itself upon the shoulder *b*, while its other end is acted upon by the shoulder *f* of the box.

It will be obvious from the foregoing description that one single spring is arranged to yield in both directions to the action of the axle-box and hub without jar or contact of solid parts.

In Fig. 2 the shoulder *f* of the axle-arm is made at or near the front end of the arm, and the axle-nut *h* has a collar, *e*, at the rear of it, and the axle-box *c* has a shoulder, *f*, and a collar, *g;* but the double-acting spring *d*, instead of being applied or fixed to the axle-arm, as in Fig. 1, is shown as being held by the axle-box.

I claim—

The combination, with an axle-arm and two collars or projections thereon, of a box applied to the arm, a collar located at one end of the box, and of a double-acting spring adapted to yield and prevent the box and axle from striking together when the box is moved to the right or to the left upon the axle-arm, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES H. KENDALL.

Witnesses:

G. W. GREGORY,

N. E. WHITNEY.