H. WATKEYS.

Car-Axle.

No. 214,069. Patented April 8, 1879.

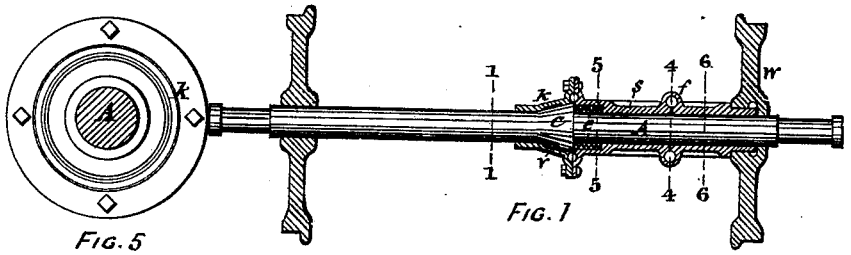

FIG. 1

FIG. 5

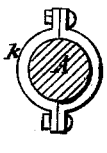

FIG. 6

FIG. 7

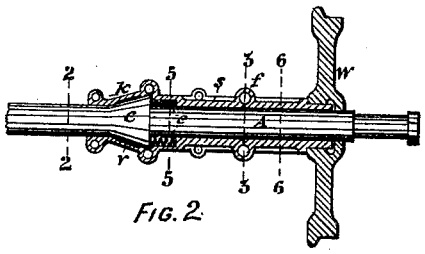

FIG. 2

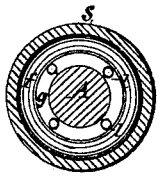

FIG. 8

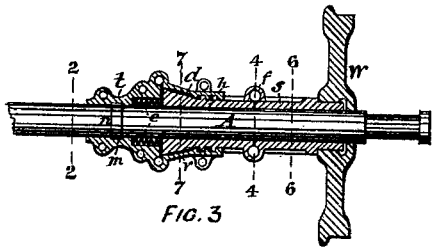

FIG. 3

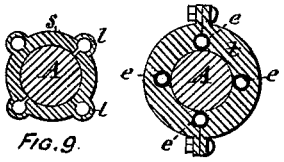

FIG. 9

FIG. 10

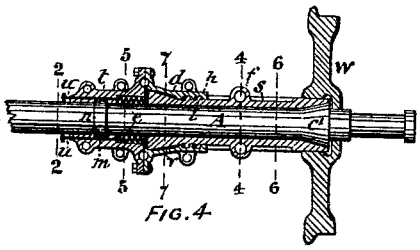

FIG. 4

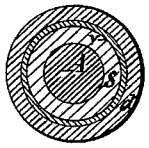

FIG. 11

WITNESSES:

A. Wood

C. Bendixen.

INVENTOR:

Henry Watkeys

per E. Laass, Atty.

UNITED STATES PATENT OFFICE.

HENRY WATKEYS, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN CAR-AXLES.

Specification forming part of Letters Patent No. **214,069**, dated April 8, 1879; application filed February 4, 1879.

To all whom it may concern:

Be it known that I, HENRY WATKEYS, of the city of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Car-Axles, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to car-axles having their wheels arranged to revolve independent of their respective fellow wheels; and it consists essentially in the hereinafter-described novel means of automatically depriving the said wheels of the capability of independent rotation when traversing straight tracks, and releasing the same when traversing curves.

It also consists in improved means of securing to the axle a sleeve fitted loose thereon; and it furthermore consists in a novel construction and combination, with a sleeve fitted loose to an axle, of longitudinal hollow ribs on the body of the sleeve, whereby the same is re-enforced and provided with a combined reservoir and distributer of the lubricant, all as hereinafter fully described.

In the accompanying drawings, Figures 1, 2, 3, and 4 are longitudinal sections of an axle, showing my invention, illustrating various forms of its detail construction, and Figs. 5, 6, 7, 8, 9, 10, and 11 are transverse sections, respectively, on lines 1, 2, 3, 4, 6, 5, and 7.

Similar letters of reference indicate corresponding parts.

A denotes an axle having fixed to one of its ends one of the wheels. The other wheel is rigidly attached to a sleeve, *s*, fitted to the axle A. This sleeve I brace against inward thrust by an abrupt abutting shoulder rigidly secured to the axle A at the rear end of the sleeve, and allow it partial outward movement, which I limit by male and female tapering or conical bearings connected respectively with the two wheel-bearing members A and *s*, and arranged at such angles relative to the line of the axle that when either of the said members is forced inward the said bearings separate and release each other.

By means of a spring or springs, *e*, arranged to act against the rear end of the sleeve, the latter is forced toward the end of the axle, thereby forcing one tapering bearing within the other, and by the friction of the same preventing the wheel from rotating on the axle. This result can be produced by various arrangements of the said bearings, as is demonstrated in Figs. 1, 2, 3, and 4 of the drawings. In Figs. 1 and 2 the axle is provided at the rear end of the sleeve with a conical enlargement or rearwardly-tapering collar, *c*, and the sleeve is made to embrace the said collar by a correspondingly-tapered extension, *k*, which may either consist of a separate piece bolted onto the end of the sleeve proper, as shown in Fig. 1, or cast on a sleeve formed of longitudinal sections, as illustrated in Figs. 1, 6, and 7 of the drawings. The rear end of the sleeve proper is provided with recesses, in which are placed springs *e*, exerting their resilience against the abrupt end of the tapering collar *c* and the end of the sleeve proper, and thus forcing the sleeve toward the end of the axle. This outward movement of the sleeve is limited by the tapering bearings at the rear. The angle of the taper of said bearings is such as to produce sufficient adhesion of their contiguous surfaces to prevent the sleeve from revolving on the axle, and thus deprive the wheel of its independent rotary motion, and cause it to be carried over ordinary obstructions on a straight track by the momentum of the two wheels combined. In its passage around curves the pressure of the outer rail against the flange of either wheel produces a strain toward the center of the axle, and the friction of the flange of the wheel against the rail exceeding that of the tapering bearings causes the latter to separate and automatically release the sleeve from its circumferential confinement. The wheels being thus allowed to revolve independent of each other the inequality of the lengths of the two sides of the curve is overcome without the strain incident to axles with fixed wheels. The same result is produced by forming the tapering bearings of a flaring enlargement of the rear end of the sleeve *s* and a correspondingly-tapered forward extension, *d*, of the rear collar, *t*, embracing the enlarged end of the sleeve, as shown in Figs. 3 and 4 of the drawings. This collar is composed of two or more longitudinal sections clamped to each other and to the axle by bolts passing through lugs on the exterior of the sections, as best seen in Fig. 10 of the drawings, or by other suitable means,

and is further secured against lateral displacement by an enlargement, *n*, of the axle fitted to a corresponding recess, *m*, in the collar. The springs *e* are arranged in recesses in the collar, and act against the end of the sleeve as in the first-described construction. In every case the requisite play is allowed between the adjacent ends of the sleeve and shoulder of the rigid collar to produce the release of the tapering bearings when subjected to excessive lateral strain, as before described.

In order to render the springs easy of access for repairs or renewal, the collar *t* is divided transversely at the end of the sleeve, as shown in Figs. 7 and 4 of the drawings, the parts being firmly secured to each other by bolts, as shown in Fig. 5 of the drawings. To facilitate the fitting of the tapering bearings and reduce the cost of construction, and at the same time enhance the durability of the same, I provide the interior of the extension *d* of the collar *t* with a cavity, *r*, and after applying it to the sleeve I fill the cavity with melted Babbitt or other suitable metal.

By means of set-screws *u*, inserted through the rear end of the collar and acting upon the end of the spring *e*, the tension of the latter is adjusted. As a means of additional security against excessive outward strain of the wheel, I provide the extension *d* of the collar *t* with one or more internal circumferential grooves, *h*, and the sleeve *s* with a corresponding number of external flanges, *i*, engaging the grooves *h*, which construction is applicable to sleeves on car-axles generally. If deemed expedient, an additional friction-clutch may be arranged at the outer end of the axle, as shown in Fig. 4 of the drawings, by providing the axle thereat with a rearward-tapering collar, *c'*, similar to that shown at the rear end of the sleeve in Figs. 1 and 2, and providing the outer end of the sleeve with a correspondingly-flaring internal enlargement.

f is a circumferential cavity in an enlargement of the center of the sleeve, and from the said enlargement toward opposite ends of the sleeve are extended longitudinal hollow ribs *l l*, which brace the sleeve, and at the same time form reservoirs and distributers of the lubricant.

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

1. The combination, with a car-axle composed of separate wheel-bearing members, of a coupling loosely connecting the said members one to the other, with a lateral play between them, and having at the shoulder which restrains the outward movement of said members a friction-clutch arranged to circumferentially confine the same, and a spring or springs arranged to force the wheel-bearing members to their extreme outer position, substantially as set forth.

2. The combination, with a car-axle, of two wheels mounted on separate axial supports, a coupling loosely connecting said supports one to the other, with a lateral play between them, and restraining their outward movement by male and female tapering or conical bearings or shoulders connected with the axial wheel-supports and their coupling, and a spring or springs arranged to force the axial wheel-supports toward opposite ends of the axle, all constructed and arranged to automatically confine the wheels circumferentially one to the other when traversing straight tracks, substantially as set forth and described.

3. The combination, with a car-axle having its wheels arranged to revolve independent of each other, of a friction-clutch actuated by a spring or springs, and arranged to automatically confine the wheels circumferentially one to the other when traversing straight tracks, and release the same when traversing curves, substantially as specified.

4. The combination of the axle A, provided with a tapering collar, and the sleeve *s*, fitted to the taper of said collar, and maintained thereon by a spring or springs, substantially in the manner described, for the purpose set forth.

5. The combination of the sleeve *s*, having at the rear end the flaring enlargement, and the collar *t*, secured to the axle, and having the tapered forward extension, *d*, embracing the enlarged end of the sleeve, substantially as described and shown.

6. The combination, with the sleeve *s*, provided with the enlarged end, of the collar *t*, composed of longitudinal sections secured to each other and to the axle, substantially in the manner described.

7. The combination, with the sleeve *s*, provided with the flaring enlarged end, of the collar *t*, having the extension *d* fitted to the end of the sleeve, and being divided transversely and provided at the shoulder adjacent thereto with recesses for the springs *e*, substantially as described and shown.

8. The combination of the sleeve *s*, provided with the circumferential flanges *i*, and the collar *t*, rigidly attached to the axle, and having the forward extension, *d*, provided with internal grooves, *h*, engaging the flanges of the sleeve, substantially as described and shown, for the purpose set forth.

9. The sleeve *s*, re-enforced and provided with combined reservoirs and distributers of the lubricant by the longitudinal hollow ribs *l l* on the body of the sleeve, substantially as described and shown.

10. The combination, with the sleeve *s*, applied to the axle in the manner described, of the spring *e* and adjusting-screw *u*, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two attesting witnesses this 3d day of February, 1879.

HENRY WATKEYS.

Witnesses:
C. BENDIXEN,
A. WOOD.