G. DOOLITTLE & E. A. CURTISS.

Vehicle-Axle.

No. 227,678 Patented May 18, 1880.

Fig. 1

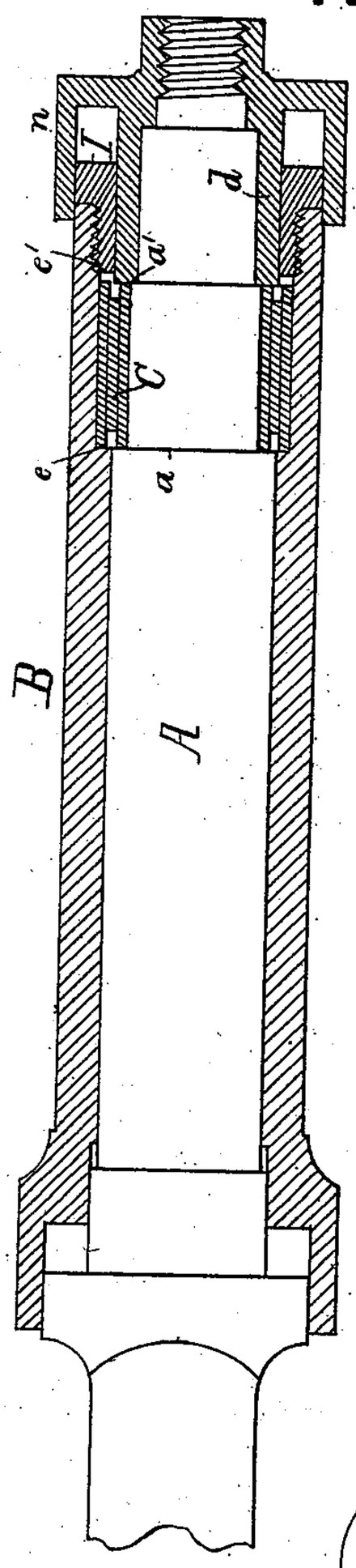


Fig. 4

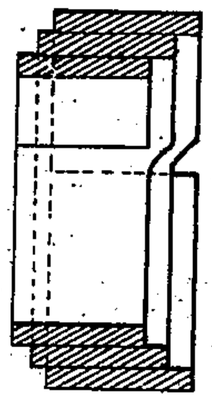


Fig. 2

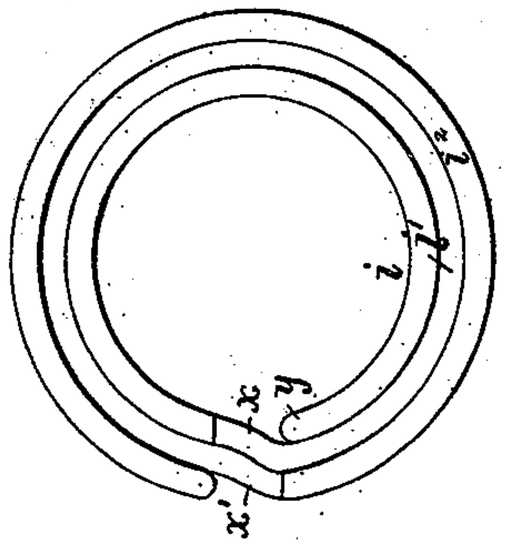
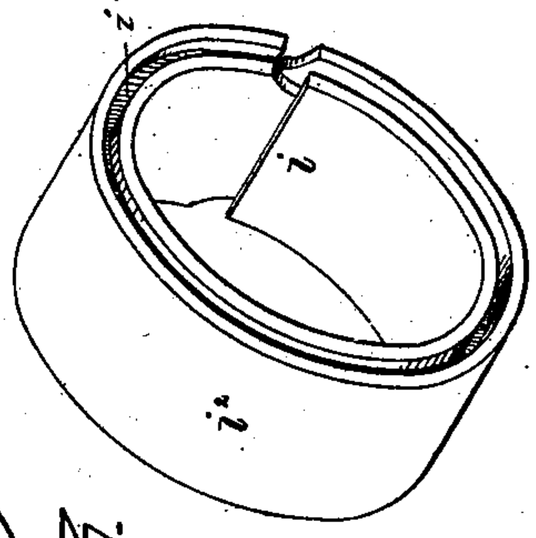


Fig. 3



Attest:

Courtney A. Cooper

William Paxton

Geo. Doolittle
E. A. Curtiss
By their attorney
Charles E. Foster

UNITED STATES PATENT OFFICE.

GEORGE DOOLITTLE AND EDWIN A. CURTISS, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO SAID DOOLITTLE.

VEHICLE-AXLE.

SPECIFICATION forming part of Letters Patent No. 227,678, dated May 18, 1880.

Application filed October 23, 1879.

To all whom it may concern:

Be it known that we, GEORGE DOOLITTLE and E. A. CURTISS, of Bridgeport, Fairfield county, Connecticut, have invented an Improved Axle and Box, of which the following is a specification.

Our invention relates to that class of carriage axles and boxes in which the box has bearings upon a spring arranged to permit a slight longitudinal motion of the box upon the axle; and our invention consists in the use of a spring of a peculiar form, and its arrangement so as to secure greater rigidity and durability than heretofore.

In the drawings, forming part of this specification, Figure 1 is a longitudinal section, showing a journal and box with our improvements; Fig. 2, an end view of the spring, (large size;) Fig. 3, a perspective view of the spring, and Fig. 4 a view showing a modification.

The axle A has the shoulders *a a'*, and the box B has two corresponding shoulders, *e e'*, and round the axle and between said shoulders lies the spring C. This spring consists of a flat bar of steel or other elastic metal, coiled to form the concentric annular layers *i i' i²*.

In order to obtain the annular form of each coil the plate is bent round in a circle until the first coil, *i*, is nearly complete, when it is bent abruptly outward at *x* opposite the inner end, *y*, and is then carried over this end outside the first coil, to begin the formation of the second coil, *i'*, and is again bent outward at *x'* at the completion of said coil, and so on, thus laying each coil in a circle, so that the inner coil, *i*, may bear throughout its entire edges on the shoulders *a a'*, and the outer coil, *i²*, throughout its entire edges on the shoulders *e e'*.

In order to secure greater depth to the shoulders *a a' e e'*, the portion of the strip forming the inner coil, *i'*, of the spring is reduced in width, so that the edges of the coils *i i²* project beyond the inner coil, as shown in Figs. 1 and 3. When the spring is thus arranged the thrust of the box in either direction longitudinally will carry the outer coils laterally, the coil *i* being confined between its shoulders *a a'*; but the resiliency of the spring will tend to restore the parts to their first positions when the pressure is removed or reduced.

Various constructions may be adopted to present the proper bearing-shoulders for the spring. One that we have found effective is shown in Fig. 1, in which the axle A is reduced to form the shoulder *a*, and again reduced to receive a sleeve, *d*, (the end which presents the shoulder *a'*,) the sleeve having a terminal hub threaded to receive a threaded projection of the axle, to which the sleeve is thus detachably secured.

The box B is recessed to form the shoulder *e*, and, further, to receive a hollow threaded gland, I, the end of which presents the shoulder *e'*. The spring can thus be placed in the box, the journal then introduced, and the sleeve *d* and gland I then applied and secured, so as to retain the spring in place, the further result being to secure the box on the axle.

To cover the joints and prevent the access of dust the sleeve *d* may be provided with a cylindrical flanged cap, *n*, which extends back over the end of the box, as shown. The single spring thus limits the movement of the box in both directions, with a spring-bearing in each, and also retains it upon the journal, but presents a much more rigid bearing than it is possible to obtain with an ordinary spiral spring.

It is not necessary to reduce the width of the inner coil, *i'*, of the spring, as it will be seen that the recess in the box may be deep enough to receive both coils, *i' i²*, when it will only be necessary to reduce the width at the point *x'*, to permit lateral play as the coil *i²* slides over the journal.

Two springs may be used; or the spring may be applied so as to limit movement in one direction only, or it may be coiled so that each coil may project beyond the others at the end, Fig. 4, like an ordinary volute spring, the coils being circles, however.

The spring is capable of use for many purposes where volute, spiral, and coiled springs have been applied—as, for instance, to support the bodies of carriages, railway-cars, &c., the outer coil having one bearing and the inner coil another.

We claim—

1. The combination, with the axle A and box B, of the spring consisting of a strip of

metal bent to form concentric annular coils, substantially as set forth.

2. The combination, with the axle, box, and gland, of the sleeve *d* and its flanged cap *n*, substantially as specified.

3. The spring consisting of a bar or plate of metal bent to form concentric coils, connected by the bends *x x'*, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE DOOLITTLE.
EDWIN A. CURTISS.

Witnesses:
GEO. C. STEWART,
HENRY F. VEIT.