

(No Model.)

P. NEAGLE.  
CAR AXLE.

No. 565,863.

Patented Aug. 11, 1896.

Fig. 1.

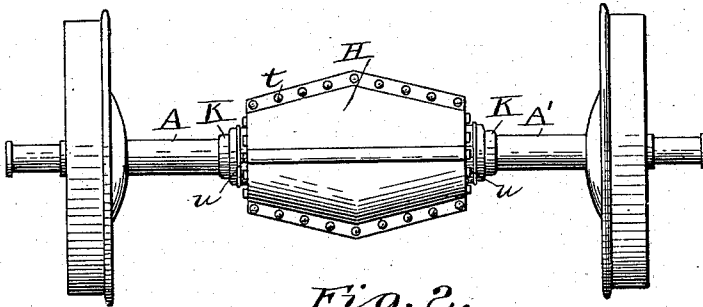


Fig. 2.

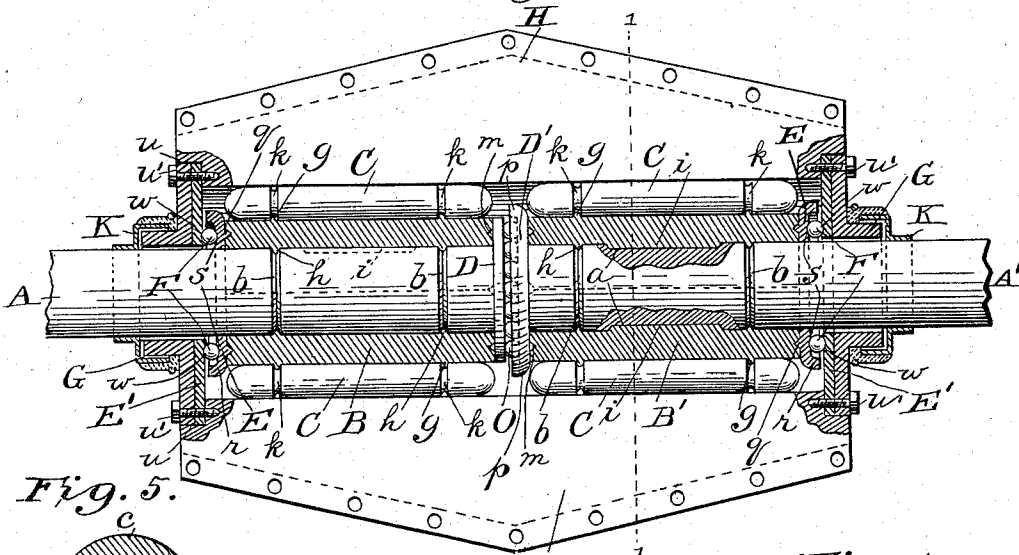


Fig. 5.

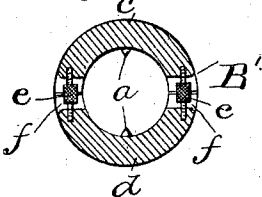


Fig. 6.

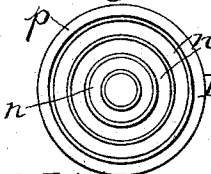


Fig. 3.

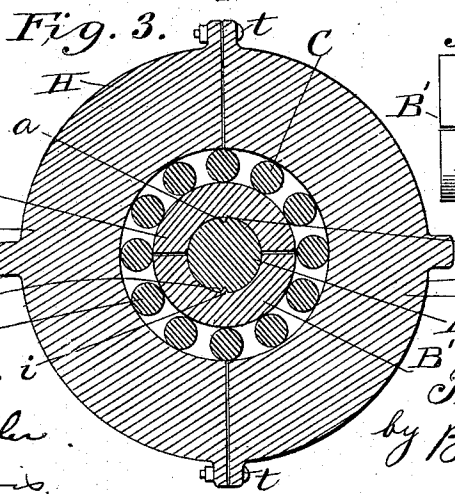
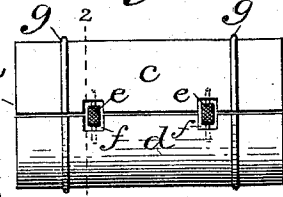


Fig. 4.



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# UNITED STATES PATENT OFFICE.

PICKENS NEAGLE, OF WASHINGTON, DISTRICT OF COLUMBIA.

## CAR-AXLE.

SPECIFICATION forming part of Letters Patent No. 565,863, dated August 11, 1896.

Application filed August 28, 1895. Renewed July 16, 1896. Serial No. 599,449. (No model.)

*To all whom it may concern:*

Be it known that I, PICKENS NEAGLE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Car-Axles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in car-axles, and more especially to divided or sectional axles.

The object of my invention is to provide a sectional axle which will allow the wheels thereon to revolve independently of each other to avoid the friction of the wheels on the rails heretofore so difficult to contend with in running around curves and at the same time not in any way weakening the axle.

My invention consists of a sectional axle with frictionless hard-metal bearings both transverse to and parallel with its axis of revolution, and means for clamping the two parts of the axle together, and also at the same time permitting free and independent movement of each part of the axle, so that the parts of the same can revolve either in unison or separately.

My invention further consists of the construction, combination, and arrangement of the several parts, as more fully hereinafter described and claimed.

In the accompanying drawings, which illustrate my invention, Figure 1 is a front elevation; Fig. 2, an enlarged central longitudinal section with the car-wheels omitted; Fig. 3, a cross-section on line 1 1 of Fig. 2; Fig. 4, a side elevation of one of the hard-metal sleeves and the means for securing the parts of the same together; Fig. 5, a cross-section on line 2 2 of Fig. 4; Fig. 6, a face view of one of the hard-metal bearing-plates.

I have shown my invention as applied to the axle of an ordinary set of flanged car-wheels; but it will of course be understood that I do not limit myself in this connection and may apply the invention to any form of axle used or adapted to be used with any of the well-known forms of wheels.

In the drawings, in which like letters of

reference denote similar parts in all the figures, A A' are the two parts forming the axle made of material which is of a more or less soft character.

*a* are longitudinal grooves and *b* circumferential grooves formed in the axle, as clearly shown in Fig. 2.

B B' are hard-metal fixed sleeves clamped on the inner ends of the axle, each made in two parts *c d* and fastened together in any suitable manner, but preferably by screw-couplings *e*, located in the apertures *f*.

*g* are circumferential ribs, as seen in Figs. 2 and 4, on the outside of the sleeves B B' near each end. *h* are similar ribs on the inside thereof, and *i* are longitudinal ribs, also on the inside of the said sleeves. The ribs *h* of the sleeves are adapted to engage the grooves *b* of the axle and prevent any longitudinal movement thereof, and the ribs *i* of the sleeves are adapted to engage the grooves *a* of the axle and prevent any lateral movement.

C are frictionless hard-metal rollers, provided near each end with shallow circumferential grooves *k*. These rollers revolve on the outer circumference of the sleeves and are prevented from having any longitudinal movement thereon by the ribs *g* of the sleeves engaging the grooves *k* of the rollers, thus maintaining the rollers in parallelism to each other and to the axis of revolution. The hard-metal sleeves B B' are provided for the purpose of forming a smooth and lasting bearing-surface for the rollers C and also to furnish means for maintaining the bearing of the ends of the parts of the axle firmly against the interposed balls.

D D' are hard-metal circular bearing-plates which abut against the inner ends of the axle and sleeves B B' and are held in place thereon by small pins or projections *m*. *n* are circular grooves in the inner faces of said bearing-plates D D', and O are frictionless balls which are held and move in said grooves. The number of these balls may be increased or diminished, as desired. The hard-metal bearing-plates D D' are provided between the ends of the axle for the purpose of furnishing a smooth, hard, and lasting surface for the balls O, which is necessary on account of

the ordinary car-axle being made of comparatively soft metal, not suitable for a bearing-surface. The circular bearing-plate *D'* is provided with a circular rim *p* for the purpose  
5 of preventing the displacement of the balls either from wear of the same or of their bearing-plates.

*E* are hard-metal circular bearing plates or rings which are located on the axle and abut  
10 against the inner ends of the sleeves *B B'* and are held securely thereon by means of small projections or pins *q*. *s* are circular grooves formed in the outer faces of the said bearing-plates. *E'* is another set of hard-metal circular bearing-plates, which encircle but do  
15 not touch the axle at any point, and *w* are circular grooves in said bearing-plates.

*F* are frictionless balls which are held between the bearing-plates *E* and *E'* in grooves  
20 *s* and *w*. These balls may be as numerous as is necessary to afford sufficient bearing-surface for the axle to secure the firmness and stability required.

*r* is an annular rim formed on the bearing-  
25 plates *E* for the purpose of preventing the displacement of the balls *F* either from wear of the same or of their bearing-plates.

*G* are collars surrounding but not touching the axle at any point and abutting against  
30 the outer faces of the bearing-plates *E'*.

*H* is a hard-metal casing surrounding the entire device and consisting of two symmetrical semicylindrical parts *H'*, which surround  
35 the two sets of rollers and bear upon them throughout their entire length and clamp them tightly, so as to make the parts of the axle inflexible in any direction. This casing *H* is held firmly together by a number of bolts and nuts *l*.

40 *u* are annular recesses in the ends of the casing *H*, in which are seated the bearing-plates *E'* and collars *G*.

*u'* are a series of screw-bolts which pass through the collars *G* and bearing-plates *E'*  
45 and are screwed into the casing, firmly securing said collars and plates to the casing and at the same time forcing the sleeves *B B'*, the bearing-plates *D D'* and *E E'*, and the two parts of the axle toward each other, and thus  
50 securely holding the balls *O* and *F* in place in the grooves in the said bearing-plates, and also preventing the parts of the axle from moving separately longitudinally.

*K* are dust-excluding caps, which may be  
55 of any desired kind.

By means of my invention the separate parts of the axle will be prevented from having any play whatever in any direction and at the same time will be capable of easy and  
60 entirely independent revolution, and the axle will be as rigid at its section or point of division as at any other point and will be equally as strong and firm as a solid axle.

The device when fitted to the axle of a car-  
65 truck will revolve with the axle while the car is on a straight track, and when in a curve it will allow such revolution of the two parts of

the divided axle as will compensate for the difference in speed between the two wheels.

To take up any wear, thicker plates may be  
70 substituted for the bearing-plates *E'*, or suitable washers may be inserted between bearing-plates *E'* and collars *G*.

All the bearings and the frictionless balls and rollers are made of hard metal.

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

1. A divided axle provided with a fixed sleeve on each section thereof and a surrounding casing, the ends of said casing inclosing  
80 the outer ends of the sleeves, and the frictionless rollers situated between the casing and the sleeves, substantially as described.

2. A divided axle having a fixed sleeve on  
85 each section thereof, the frictionless rollers thereon, the bearing-plates secured to the ends of said sleeves, the frictionless balls between said bearing-plates, the collars, and the inclosing casing, substantially as described.

3. In combination with a divided axle, the fixed two-part sleeve on each section thereof, frictionless rollers thereon, bearing-plates on the ends of said sleeves between the inner  
95 ends of the axle, frictionless balls between said bearing-plates, bearing-plates on the outer ends of the sleeves surrounding the axle, frictionless balls between said bearing-plates, the collars, and a two-part inclosing casing, substantially as described.

4. A divided axle having longitudinal and circumferential grooves, in combination with the two-part sleeves thereon provided on their interior with ribs adapted to fit and be retained in the grooves in said axle, and on  
105 their exterior with circumferential ribs, the frictionless rollers mounted on said sleeves and provided with grooves to receive the ribs on the exterior of the sleeves, the clamping-collars, and the inclosing casing, substantially as described.

5. A divided axle provided with longitudinal and circumferential grooves in combination with the two-part sleeves thereon provided on the interior with ribs adapted to fit  
115 and be retained in the grooves in said axle, and on its exterior with circumferential ribs, the frictionless rollers mounted on said sleeves and provided with grooves to receive the ribs on the exterior of the sleeves, bearing-plates  
120 secured to the inner ends of said sleeves, frictionless balls between said bearing-plates, the collars for clamping the bearing-plates and sleeves, and the inclosing casing, substantially as described.

6. A divided axle provided with longitudinal and circumferential grooves, in combination with the two-part sleeves thereon provided on the interior with ribs adapted to fit  
130 and be retained in the grooves on said axle, and on its exterior with circumferential ribs, the frictionless rollers mounted on said sleeves and provided with grooves to receive the ribs on the exterior of the sleeves, bearing-plates

secured to the inner ends of said sleeves, frictionless balls between said bearing-plates, the clamping-collars, and the two-part inclosing casing, substantially as described.

5 7. A divided axle provided with circumferential and longitudinal grooves in combination with the two-part sleeves provided with exterior and interior ribs, the interior ribs adapted to fit in said grooves, the screw-coupling for securing said sleeves together, the rollers having grooves in which the exterior ribs of the sleeves fit, the bearing-plates on the outer ends of the sleeves, the frictionless balls between said bearing-plates, the collars for clamping the sleeves and bearing-plates toward each other, and the inclosing two-part

casing to which said collars are secured, substantially as described.

8. A divided axle provided with a fixed sleeve on each section thereof, an inclosing casing, longitudinal frictionless rollers between said casing and sleeves, and the clamping-collars one on each end of the inclosing casing opposite the outer ends of the sleeves and rollers, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PICKENS NEAGLE.

Witnesses:

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