(No Model.)

E. PECKHAM.

VEHICLE AXLE.

No. 352,658. Patented Nov. 16, 1886.

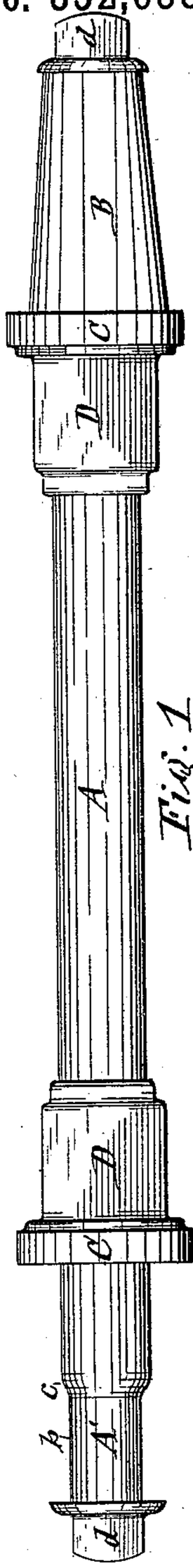

Fig. 1

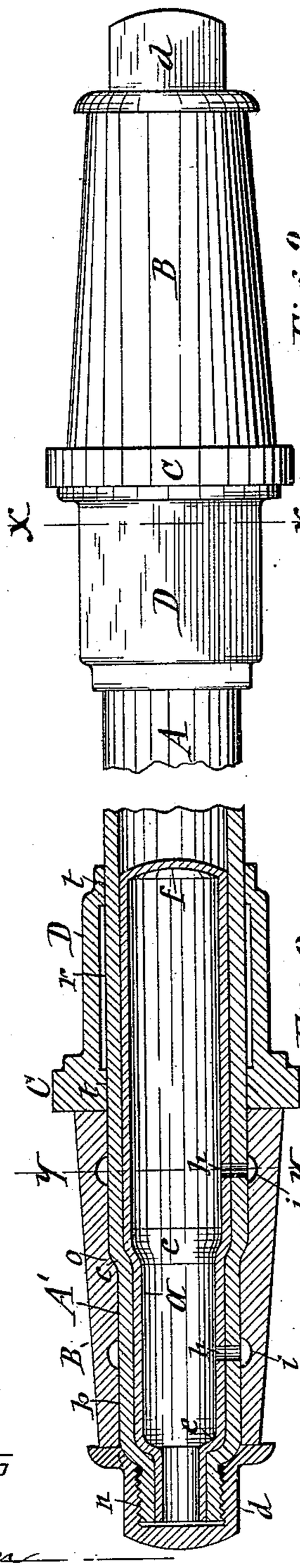

Fig. 2

Fig. 3

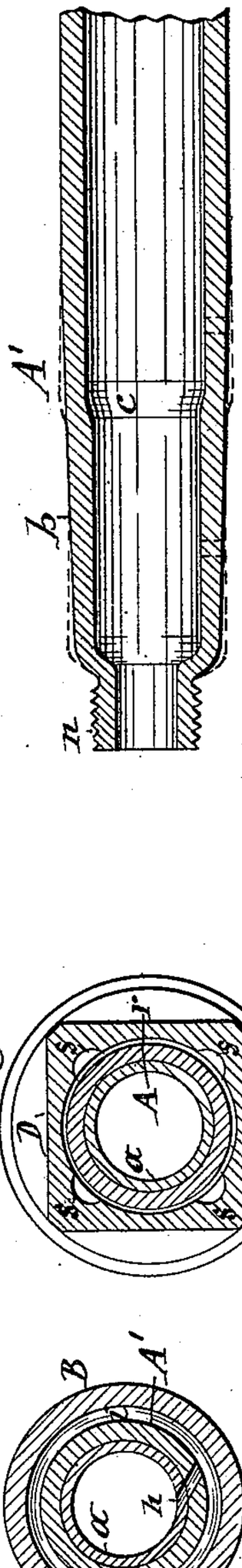

Fig. 6

Fig. 4

Fig. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

EDGAR PECKHAM, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE NATIONAL TUBE WORKS COMPANY, OF BOSTON, MASSACHUSETTS.

VEHICLE-AXLE.

SPECIFICATION forming part of Letters Patent No. 352,658, dated November 16, 1886.

Application filed March 31, 1886. Serial No. 197.357. (No model.)

To all whom it may concern:

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

This invention relates to vehicle-axles formed of metal tubing; and it consists, first, in an improved construction of the spindle of the axle; secondly, in an improved construction of the journal-box specially adapted for a self-lubricating axle; and, thirdly, in a novel construction of the spindle-collar and axle-bed formed in one piece and shrunk on the axle, all as hereinafter more fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a top view of my improved vehicle-axle. Fig. 2 is an enlarged top view of one end of said axle. Fig. 3 is a vertical longitudinal section of one end of the axle. Figs. 4 and 5 are transverse sections, respectively, on lines *x x* and *y y*; Figs. 2 and 3; and Fig. 6 is a longitudinal section of one end of the tubular axle tapered externally.

Similar letters of reference indicate corresponding parts.

A represents the main or central portion of the axles, and A′ A′ the spindles thereof, on which the wheels are mounted. This axle, with its spindles, I form in one piece from the metal tubing, and re-enforce the same by inside linings or bushings, *a a*, which extend from the outer extremities of the spindles to some distance beyond the inner ends of the spindles, as illustrated in Fig. 3 of the drawings.

Each of the spindles, together with its bushing, I compress circumferentially from the outer end part way back toward the inner end, as shown at *b*, and thus form at the intermediate portion of the spindle a circumferential offset, *c*, which may be utilized as a secondary shoulder for the wheel by forming the axial bearing of the box B with a corresponding offset, *o*. The offset *c* also serves to lock the bushing *a* in its position, so as to effectually prevent its outward movement from the axle. At the outer extremity of the spindle A′, I further circumferentially compress the axle with its inclosed bushing *a* to form a nipple, *n*, which I screw-thread externally for the reception of the wheel-retaining nut *d*. The lining in the nipple compensates for the weakening incident to the cutting of the thread on said nipple, and imparts ample rigidity to the nipple, while the compression forms another circumferential offset, which further guards against the movement of the bushing *a* outward from the axle, and at the same time forms a dam, *e*, for retaining oil in the cavity of the spindle, which latter is made to serve as a reservoir for lubricant by closing the inner end of the bushing back of the spindle, as shown at *f* in Fig. 3 of the drawings.

The lubricant is introduced through the contracted mouth in the nipple *n*, and is permitted to flow to the axial bearing of the journal-box B by channels *h h*, which are extended through the bottom of the spindle and inclined rearwardly, as shown in Fig. 5 of the drawings. Said disposition of the lubricant-channels causes the lubricant to be drawn from said channels during the rotation of the wheel when in its forward movement and obviates the danger of clogging said channels. The journal-box B, I provide internally with circumferential grooves *i i*, which communicate with the channels *h h* and serve to distribute the lubricant over the axial bearing.

In cases where the self-lubricating feature of the axle is not wanted the bushing *a* may consist of a solid piece of metal formed with the circumferential offset and with a circumferentially-reduced outer end portion, and the tube compressed around the said bushing. When it is desired to have the spindle A′ tapering, I first compress the outer end portion of the spindles, as hereinbefore stated. The compression may be effected by any suitable press and dies or swages in the manner well understood in the art, and after the spindle has thus its outer end portion partially reduced in diameter I cut, turn, or trim the exterior of the spindle to the requisite taper, as represented in Fig. 6 of the drawings. This latter operation may be effected either by applying the axle to a turning-lathe provided

with a suitable cutting-tool or by forcing the spindle endwise into a rotary hollow milling-tool, or by any other suitable and well-known means. It will be observed that by this process of tapering a spindle formed of a cylindrical tube I obtain a smoothly-finished exterior on the spindle without unduly cutting away the metal and impairing its stability. An axle-spindle thus formed has its interior composed of two cylindrical portions, the outer of which is of a smaller diameter than the inner portion, and is joined therewith by a circumferential offset; hence such a spindle may be also utilized as a lubricant-reservoir for lubricating the exterior of the spindle by providing it with lubricating-channels, as indicated by dotted lines in Fig. 6 of the drawings.

C denotes the usual spindle-collar, which is secured to the axle at the inner end of the spindle to serve as an abutment for the wheel-hub. Back of this collar is the axle-bed D, designed either for the attachment and support of the longitudinal springs, which are usually employed on heavy trucks, or for the attachment of a bolster, as may be desired. This axle-bed D must therefore be provided with a flat seat on its top and be firmly secured to the axle; and in order to accomplish the latter in a simple and effective manner I form said axle-bed integral or in one piece with the collar C and secure them on the axle, preferably by heating, and thus expanding them, and while in this condition slipping them onto the axle and into their requisite position, and then cooling and thus shrinking them on the axle.

Since it is essential to have the interior of the, parts C D of true circular form and smooth it often becomes necessary to turn or ream out the aforesaid parts, and in order to save time, labor, and wear of tools I form the interior of the combined parts C D with a recess, *r*, leaving comparatively narrow circumferential bearings *t t* at the ends, as shown in Fig. 3 of the drawings; and by providing said parts with additional recesses, *s s s s*, at the corners I save unnecessary weight of metal. In case the axle-bed D has to be placed some distance from the collar C, I make the former of a separate piece and shrink it on the axle, as hereinbefore described.

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

1. A tubular metallic axle having its spindles compressed circumferentially from the outer ends part way the length of the spindles, substantially as described and shown.

2. A tubular metallic axle re-enforced by a lining or bushing in the spindle, and the outer end portion of said spindle and its lining compressed circumferentially, substantially as set forth.

3. A tubular metallic axle provided internally with a dam back of the spindle, and having rearwardly-inclined lubricating-channels through the bottom of the spindle, substantially as described and shown.

4. In combination with the axle provided in the spindle with a lubricant-reservoir and with lubricating-channel through its bottom, the journal-box provided with circumferential grooves communicating with the aforesaid channels, substantially as described and shown.

5. A tubular metallic axle having the outer ends of its spindles compressed circumferentially, and screw-threaded externally for the reception of the wheel-retaining nut, and bushings on the interior of the spindles extending through the aforesaid compressed ends thereof, substantially as described and shown.

6. A tubular metallic axle having its spindles tapered externally and formed internally with cylindrical portions, the outer of which is of a smaller diameter than the inner portion and joined therewith by a circumferential offset, substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, this 19th day of March, 1886.

EDGAR PECKHAM. [L. S.]

Witnesses:

FREDERICK H. GIBBS,

C. BENDIXON.