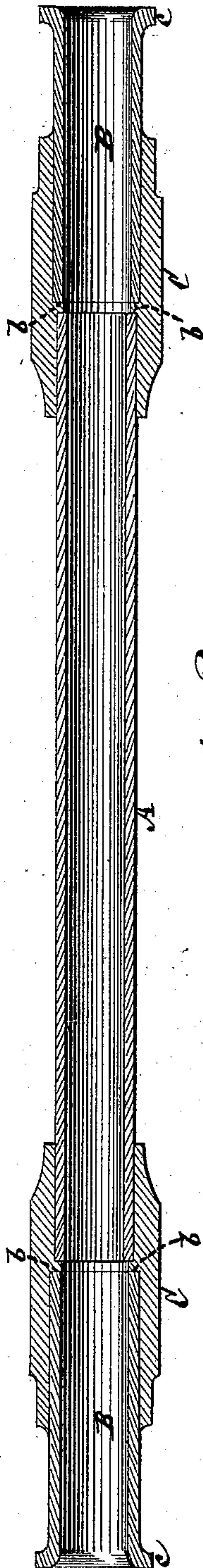


W. F. BROOKS.  
Car-Axle.

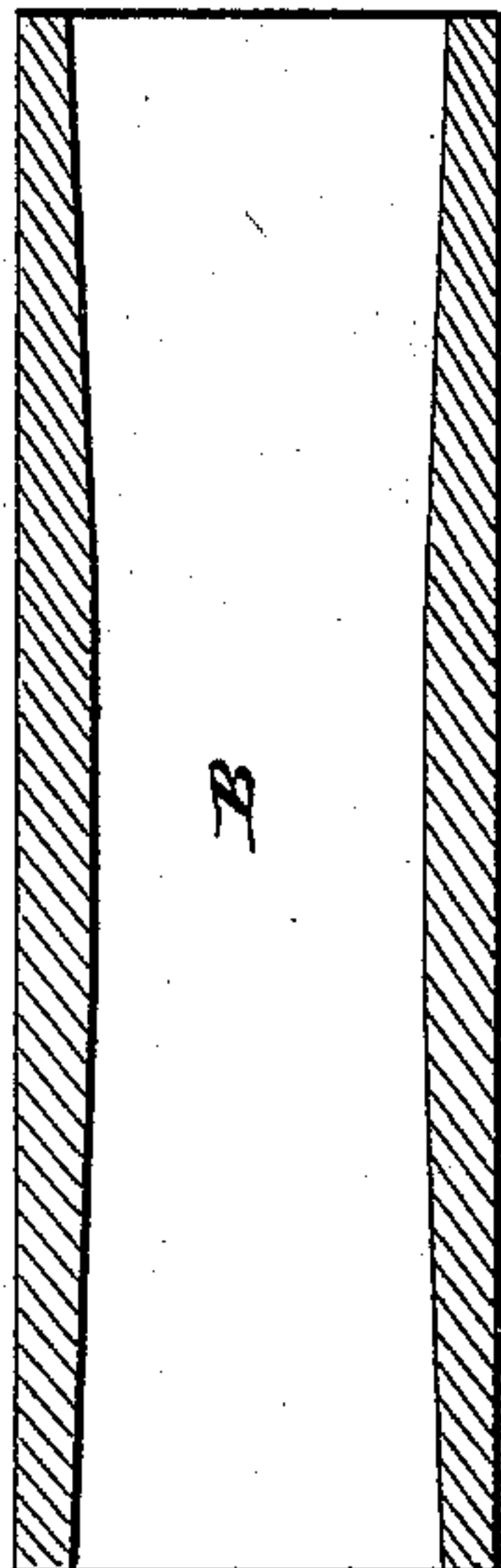
No. 198,870.

Patented Jan. 1, 1878.

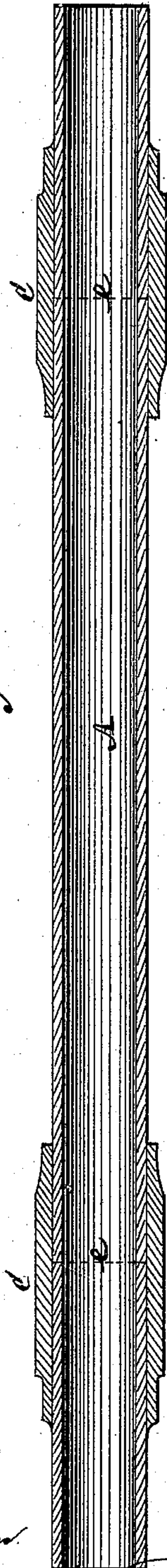
*Fig. 1.*



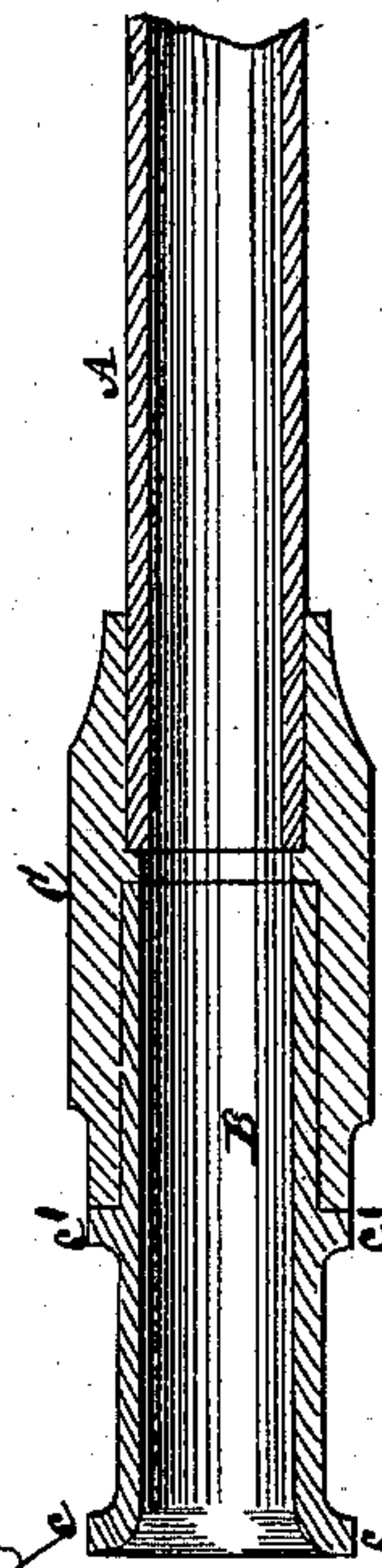
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



Witnesses

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# UNITED STATES PATENT OFFICE.

WILLIAM F. BROOKS, OF NEW YORK, N. Y.

## IMPROVEMENT IN CAR-AXLES.

Specification forming part of Letters Patent No. **198,870**, dated January 1, 1878; application filed September 21, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM FORMAN BROOKS, of the city, county, and State of New York, have invented certain new and useful Improvements in Hollow Car-Axles, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention consists in certain novel constructions and combinations of parts of a hollow car-axle, in which the wheel-bearing portions of the axle are composed of separate tubes shrunk or forced to their places on the main body and journal-portions of the axle, as distinguished from being welded thereon, and in which the journals themselves are hollow, whereby not only great convenience is afforded for making the journals larger than the body of the axle, and for separately repairing or replacing the component parts of the axle, but lightness is combined with strength to a greater extent than ordinary, and other advantages are obtained.

In the drawings, Figure 1 represents a longitudinal section of a hollow car-axle constructed in accordance with my invention. Fig. 2 is a longitudinal section, upon a larger scale, of a journal-tube portion of the axle detached, and Fig. 3 is a longitudinal section of a modified construction of the axle. Fig. 4 is a longitudinal section of another modified construction of either end of the axle.

Referring, in the first instance, to Fig. 1 of the drawings, the hollow car-axle there represented has its main body A and journal portions or ends B B composed of three metal tubes connected with each other by saddles or wheel-bearing tubes C C.

The journal-tubes B B may be of greater exterior diameter than the main or body tube A, which latter fits at its ends into the inner ends or portions of the wheel-bearing tubes C C, the outer end portions of which receive within them the inner end portions of the journal-tubes B B, an annular projection, *b*, in the saddles C C serving as a stop for the independent tubes when inserted within the saddles. These saddles or wheel-bearing tubes C C may be made of either wrought or cast metal, but cast metal will generally suffice, and they are bored or otherwise formed of differ-

ent diameters, on opposite sides of the interior annular projection *b*, to correspond with the body-tube and journal-tubes, when made of different diameters.

The construction of the interior of the saddles C C and exterior of the portions of the tubes A and B B, fitting therein, should be such that said parts may be fitted together, as described, when cold, or when the saddles are moderately heated, by end force or pressure applied to the tubes, and so that, supposing the saddles to have been moderately heated, and the journal and body tubes to be inserted in them cold, the shrinking of the saddles in cooling will securely hold them and the inserted tubes together and in their places.

The journal-tubes B B may be formed either with or without collars, *c c*, on their outer ends. Fig. 2 represents an independent journal-tube, constructed without an outer end collar, and made of greater thickness at or near its middle, and of a reduced tapering thickness from its inside toward its opposite ends or either of them, whereby said tube may be made lighter and of increased strength where there is the greatest strain; also whereby the withdrawal of the journal-tubes from the saddles is facilitated.

A hollow car-axle, constructed as described, provides conveniently for making the journals larger than the body of the axle; also, for the repair of the journals by removing the journal-tubes, which may be done by warming and expanding the saddles, and after which said tubes may be upset and turned up, and subsequently reversed and replaced, or new journal-tubes may be inserted in the saddles.

Fig. 3 shows the saddles or wheel-bearing tubes C C, as made of a uniform interior diameter, or nearly so, without an internal annular projection, and as combined with a single axle-body tube, extended through the saddles to form the journals; or the journal portions may be formed of separate tubes, as shown by dotted lines *e e*.

Fig. 4 represents the journal-tube B, at either end of the axle, as not only formed with an outer collar, *c*, but also with an inner collar, *c'*, instead of forming the inner collar of the journal on the outer end of the saddle or wheel bearing tube C. This provides for re-



placing the inner journal-collar, when necessary, by wear, by replacing the journal-tube B, without destroying or removing the saddle or wheel-bearing tube C.

I claim—

1. The combination of the tubular axle A and tubular journal B, of separate wheel-bearing tubes C, shrunk or forced to their places on the main body and journal portion of the axle, substantially as and for the purpose described.

2. The hollow saddles or wheel-bearing tubes, constructed with an interior annular projection or stop for the ends of the main body of the axle and ends of the journal-tubes to bear or rest against, substantially as specified.

3. The independent hollow journals or jour-

nal-tubes, constructed of a diminishing thickness and increasing interior diameter from or near its middle, to either or both ends of said tubes, essentially as shown and described.

4. The combination of the main tubular body portion A of the axle, the independent hollow journal-tubes B B, having a diminishing thickness from or near their middle, and increasing interior taper toward either end, and the saddles or wheel-bearing tubes C C, constructed with an annular interior projection or stop, b, the whole being fitted together, substantially as specified.

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Witnesses:

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