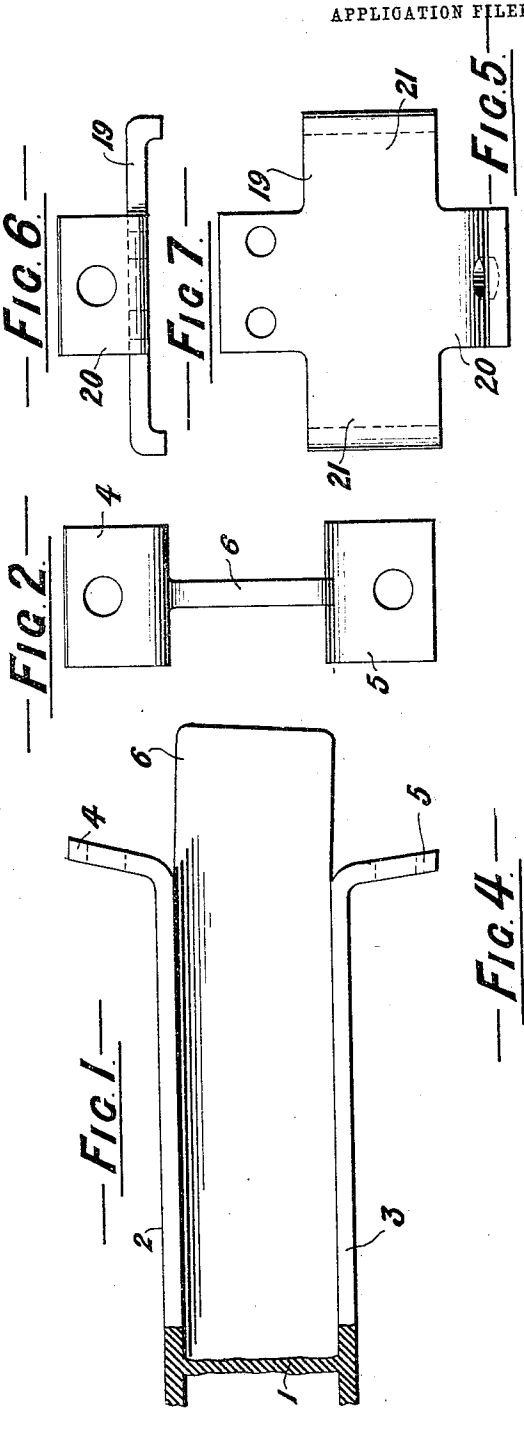
No. 784,383. PATENTED MAR. 7, 1905.

H. M. BUTLER.

AXLE FOR WHEELS OF ROAD VEHICLES.

APPLICATION FILED SEPT. 19, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 8.

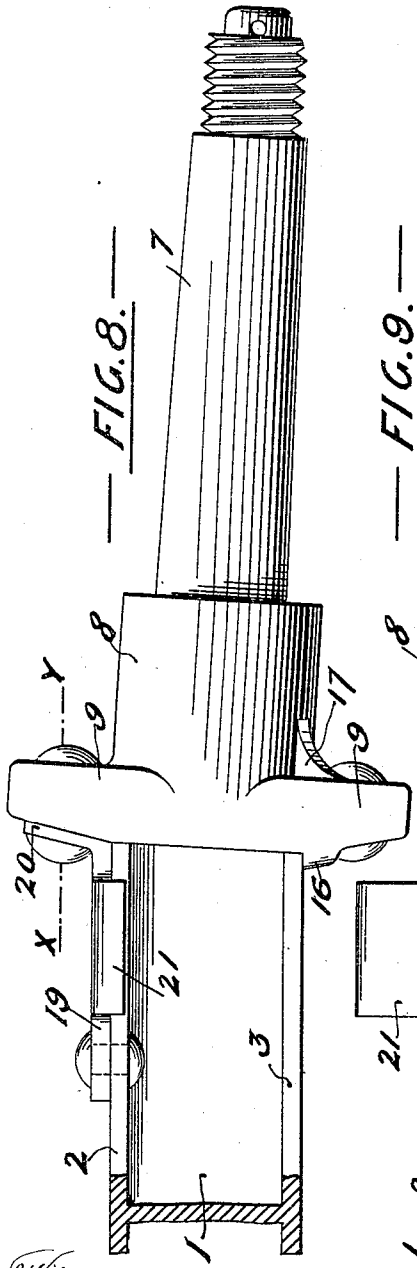


FIG. 9.

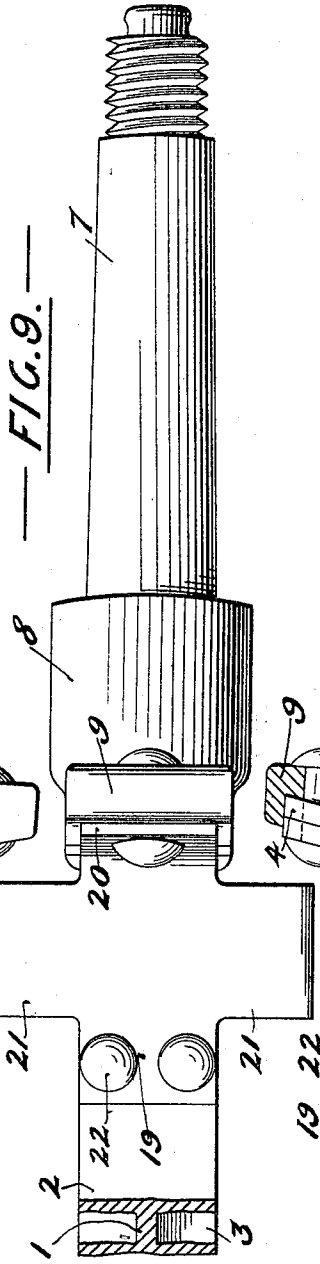
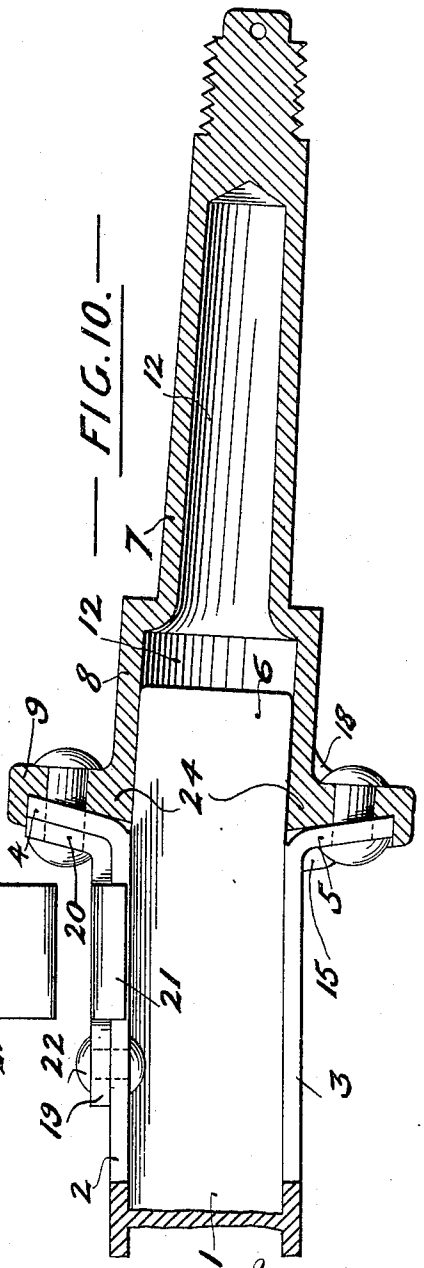


FIG. 10.



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UNITED STATES PATENT OFFICE.

HUGH MYDDLETON BUTLER, OF KIRKSTALL FORGE, NEAR LEEDS, ENGLAND.

AXLE FOR WHEELS OF ROAD-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 784,383, dated March 7, 1905.

Application filed September 19, 1904. Serial No. 225,032.

To all whom it may concern:

Be it known that I, HUGH MYDDLETON BUTLER, a subject of the King of Great Britain, residing at Kirkstall Forge, near Leeds, in the county of York, England, have invented certain new and useful Improvements in Axles for the Wheels of Road-Vehicles, of which the following is a specification.

This invention refers to an improved construction and combination of parts, as hereinafter claimed, composing an axle for the wheels of road-vehicles.

Commonly metallic wheel-axles, especially those employed for motor-driven road-vehicles, are constructed of solid iron or steel, the barrels upon which the wheels are to be mounted being forged in a piece with the bed—that is, with that span of axle extending between the said barrels. Tubular beds have been constructed, which although not so heavy as the ordinary solid axles of circular or square section, yet are expensive to make and also have the disadvantage of being of a form unsuitable for the ready attachment of brackets and other auxiliary parts. Now according to this invention I construct the bed of the improved axles of H-section metal, placed in such a position that the web is in a vertical plane and the flanges horizontal, or thereabout, and I construct the barrels separately and then attach the latter to the ends of the girder-bed, as I will now describe in greater detail with reference to the accompanying drawings.

Figure 1 shows in elevation, and Fig. 2 in end view, one end of the bed of an axle constructed of H-section metal prepared ready for the reception of the specially-constructed barrel which is to be attached thereto. Fig. 3 is a longitudinal elevation, Fig. 4 a left-hand end view, and Fig. 5 a right-hand end view, of a portion of a barrel constructed for attachment to the end of such a bed as is illustrated in the previous figures. Fig. 6 is a right-hand end elevation, and Fig. 7 a plan, of one of the flaps or plates which are fixed to the ends of the bed and to the barrels and to which the vehicle-springs are attached. Fig. 8 is an elevation of one end of the bed, showing the barrel attached thereto. Fig. 9 is a plan of the same, and Fig. 10 is a sectional elevation showing the parts connected and showing the construction of the barrel; and Fig. 11 is a section on the line X Y of Fig. 8.

Referring to Figs. 1 and 2, the H-section bar, which is preferably of rolled steel, is arranged so that its web 1 is vertical and its upper and lower flanges 2 3 are horizontal, or thereabout. The ends of the girder are then cut longitudinally, so that the ends of the upper and lower flanges 2 3, respectively at each end of the bed, can be turned up and down, as shown in the drawings, to nearly right angles to form ears 4 5, leaving a portion of the web projecting at each end of the bed, as at 6.

Referring to Figs. 3, 4, and 5, each barrel is formed from a single stamping or forging, consisting of the barrel proper, 7, with cylindrical enlargement 8 at its inner end, and flanges 9 formed on the end of the enlargement 8, thus producing the barrel with the enlargement 8 and the flanges 9 at the end of the said enlargement. The interior of the barrel is made hollow or tubular, as shown more particularly at Fig. 10, and this hollowing out may be effected by boring an aperture in the center from the flange end, but is preferably produced mainly by subjecting the barrel to a longitudinal punching or stamping operation during manufacture. The rear faces of the flanges are formed with two recesses—an upper one, 10, a lower one, 11, Fig. 4—the inner faces of these recesses preferably being inclined from the vertical plane toward the ends of the barrels. The face of the flanges of the barrel adjacent to the hollow 12 extending within the barrel is strengthened by webs 13 14, and 15 16 are clamping-tongues which are to be bent inward together when the several parts are brought into conjunction. 17 18 are strengthening-brackets further supporting and connecting the lower flange 9 of the barrel with the enlargement 8.

At Figs. 6 and 7 is shown a flap or plate 19, and one of such is to be connected to the bed and barrel of the axle at each end. These flaps are for supporting the springs of the vehicle, and the said flaps are made each with

an ear 20 to overlie the ear 4 of the bed, while it has extending wings 21, which serve as a support for the springs.

Such being the construction of the parts, they are then brought together by the projecting end 6 of the web 1 of the bed being inserted into the bore 12 of the enlargement 8 of the barrel 7, and, if so desired, the bore on each side of the inserted web projection 6 can be packed or filled in by any suitable material—say by blocks of hard wood. When so inserted, as shown in Fig. 10, the ears 4 5 become located within the upper and lower recesses 10 11 and in contact therein with the faces of the flanges 9 of the barrel. The flap 19 is then placed in position upon the top flange 2 of the bed, so that its ear 20 is in contact with the ear 4 of the upper flange 2 of the bed, and the three parts—namely, the two ears 4 and 20 and the flange 9—are riveted or bolted together, as shown, while similarly the ear 5 is secured to the lower flange 9 of the barrel, and then the clamping-tongues 15 16 are bent round to overlie the lower flange 5, giving an additional security to the connection between the flange 5 and the flange 9 of the barrel. The flap 19 is secured to the top flange 2 of the bed by rivets or bolts, as at 22. I generally calk or hammer the rib which is formed around the edges of the flanges 9 of the barrel over the edges of the upturned ears 4 and 5 of the bed where possible as a further support.

Obviously the ears 4 5 of the bed might be turned at right angles to the flanges 2 and 3; but by bending the said ears at less than right angles and forming their seating in the flanges, as shown at Fig. 10, I not only maintain the thickness of the ears at the corners without buckling, but I also provide the greater thickness of metal at the angle of the flanges 9 of the barrel, as shown at 24, Fig. 10, and generally the joint is strengthened thereby.

The illustrations, and in great part the description, refer to the connection of one of the barrels to one end of the bed; but it will be understood that at the other end of the bed a like flanged barrel is similarly connected.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web vertical and its flanges horizontal, the ends of the upper flange being divided from the web and bent upward and the ends of the lower flange being divided from the web and bent downward; of two similar barrels one for attachment to each end of the said bed, an axial bore at the inner end of each barrel to receive the projecting web end of the bed, and upper and lower flanges formed on the inner end of each barrel to which flanges the upwardly and downwardly bent ends of the bed-flanges are secured substantially as set forth.

2. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web vertical and its flanges horizontal, the ends of the upper flange being divided from the web and bent upward and the ends of the lower flange being divided from the web and bent downward; of two similar barrels one for each end of the said bed, each barrel having an axial bore extending from the inner to nearly the outer end of the barrel into the inner end of which bore the projecting web end of the bed enters, an upwardly-extending flange formed on the inner end of the barrel and a downwardly-extending flange also formed on the inner end of the barrel and recesses on the inner faces of both flanges to receive the upwardly and downwardly turned ends respectively of the flanges of the bed, and the means for connecting the said upwardly and downwardly turned flanges of the bed to the flanges of the barrel substantially as set forth.

3. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web vertical and its flanges horizontal, the ends of the upper flange being divided from the web and bent upward and the ends of the lower flange being divided from the web and bent downward; of two similar barrels one for each end of the said bed, an axial bore at the inner end of each barrel to receive the projecting web end of the bed, an upwardly-extending flange formed on the inner end of the barrel and a downwardly-extending flange also formed on the inner end of the barrel, a recess on the inner face of each of said barrel-flanges to receive the upwardly and downwardly turned ends respectively of the flanges of the bed, a flap-plate 19 secured upon the top of the upper flange of the bed at each end thereof, an upwardly-bent ear at the outer end of each flap-plate to overlie the upwardly-bent end of the flange of the bed, means for connecting the upwardly-bent flanges of the bed and ears of the flap-plate to the upwardly-extending flanges of the barrels and means for connecting the downwardly-turned flanges of the bed to the downwardly-extending flanges of the barrel substantially as set forth.

4. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web vertical and its flanges horizontal, the ends of the upper flanges being divided from the web and bent upward at inclinations toward the outer ends of the bed, and the ends of the lower flange being divided from the web and bent downward at inclinations toward the outer ends of the bed; of two similar barrels one for each end of the said bed, each barrel having an axial bore extending from the inner to nearly the outer end of the barrel, the inner end of which bore receives the projecting web end of the bed, an upwardly-extending flange formed on the inner end of the barrel, an inclined recess on the inner face of said

flange to receive the inclined upwardly-turned end of the top flange of the bed, a downwardly-extending flange formed on the inner end of the barrel, an inclined recess on the inner face of said flange to receive the downwardly-turned end of the bottom flange of the bed, and means for connecting the said inclined upwardly and downwardly turned flanges of the bed to the flanges of the barrel substantially as set forth.

5. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web vertical and its flanges horizontal, the ends of the upper flange being divided from the web and bent upward at inclinations toward the outer ends of the bed, and the ends of the lower flange being divided from the web and bent downward at inclinations toward the outer ends of the bed; of two similar barrels one for each end of the said bed, a cylindrical enlargement at the inner end of each barrel, upwardly and downwardly extending flanges formed on the inner end of the said enlargement, an axial bore extending from the inner end of said enlargement to nearly the outer end of the barrel to receive the projecting web end of the bed, an inclined recess on the inner face of the upwardly-extending flange to receive the inclined upwardly-turned end of the top flange of the bed, an inclined recess on the inner face of the downwardly-extending flange of the barrel to receive the downwardly-turned end of the bottom flange of the bed, means for connecting the said inclined upwardly and downwardly turned flanges of the bed to the flanges of the barrel and a clamping-tongue projecting from each side of the downwardly-extending flange of the barrel adapted to be turned over the rear face of the inclined flange of the bed to further secure the parts substantially as set forth.

6. In an axle for the wheels of road-vehicles, the combination of a bed of H-section metal having its web 1 vertical and its flanges 2, 3 horizontal, the ends 4 of the upper flange 2 being divided from the web and inclined upwardly and the ends 5 of the lower flange 3 being divided from the web and inclined downwardly, and a portion 6 of the web projecting beyond the upwardly and downwardly bent ends 4, 5; of two similar barrels one for each end of the said bed, a cylindrical enlargement 8 at the inner end of each barrel, upwardly and downwardly extending flanges 9 formed on the inner end of the said enlargement, an axial bore extending from the inner end of said enlargement to receive the projecting web end 6 of the bed, an inclined recess on the inner face of the upwardly-extending flange to receive the upturned flange 4 of the bed, an inclined recess on the inner face of the downwardly-extending flange of the barrel to receive the downwardly-turned bottom flange 5 of the bed, rivets connecting the flanges 4, 5 to the flanges 9 of the barrel, the edges of the flanges 9 being calked over the flanges 4, 5 of the bed, and a clamping-tongue projecting from each side of the downwardly-extending flange of the barrel and turned over the rear face of the inclined flange 5 of the bed, substantially as set forth.

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