

A. F. HUNT.  
METHOD OF AND MEANS FOR REPAIRING AXLES.  
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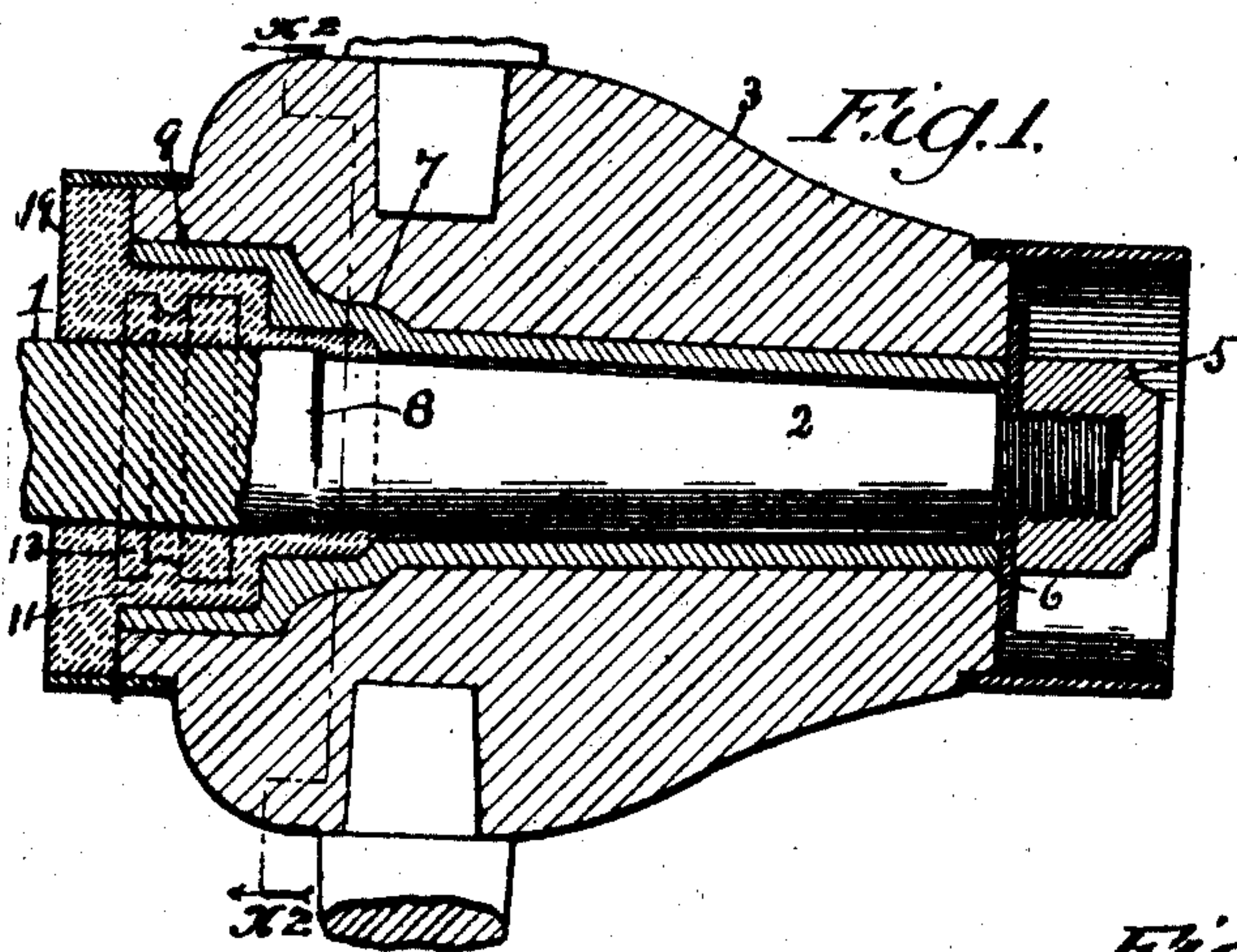


Fig. 2.

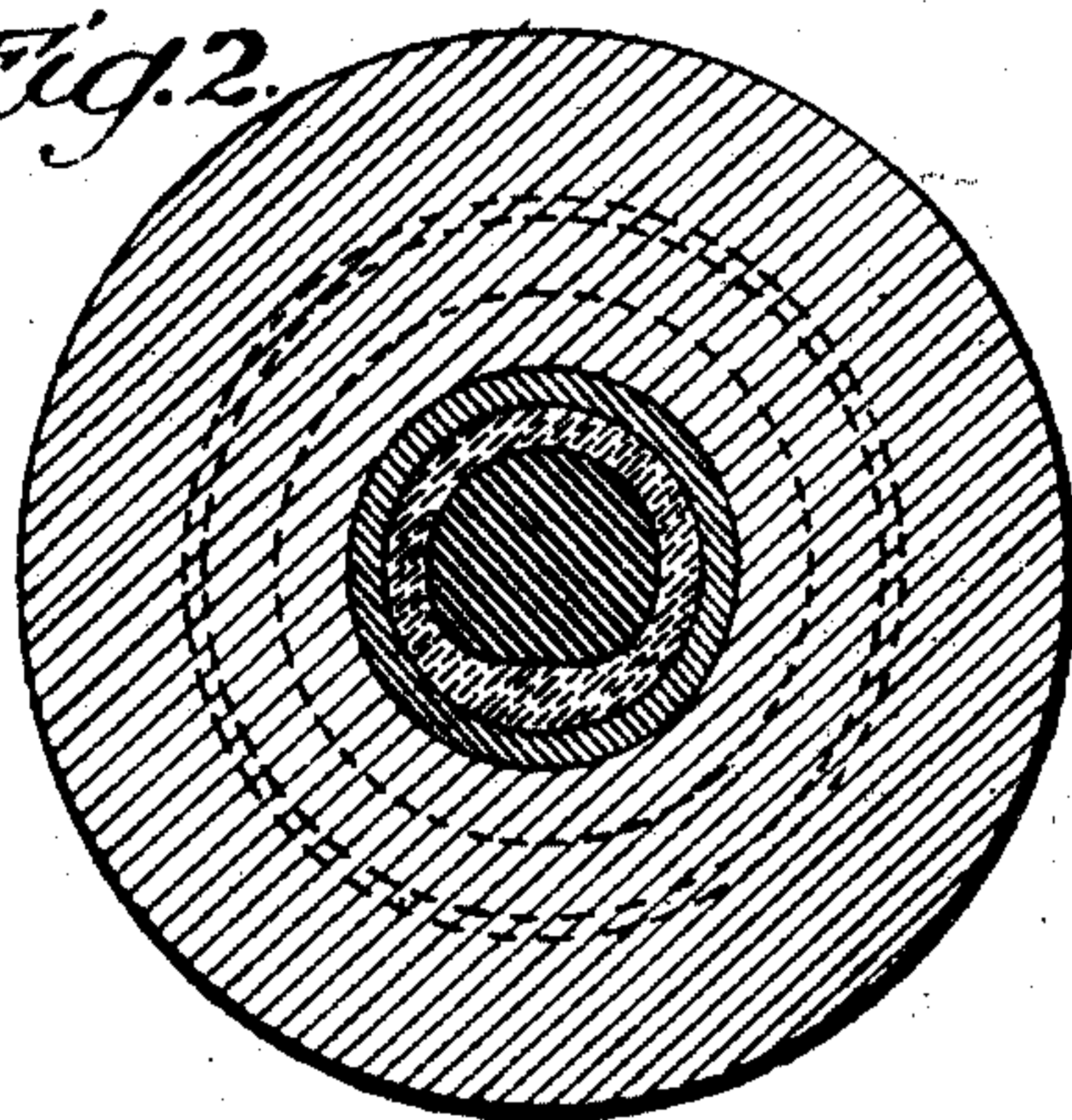
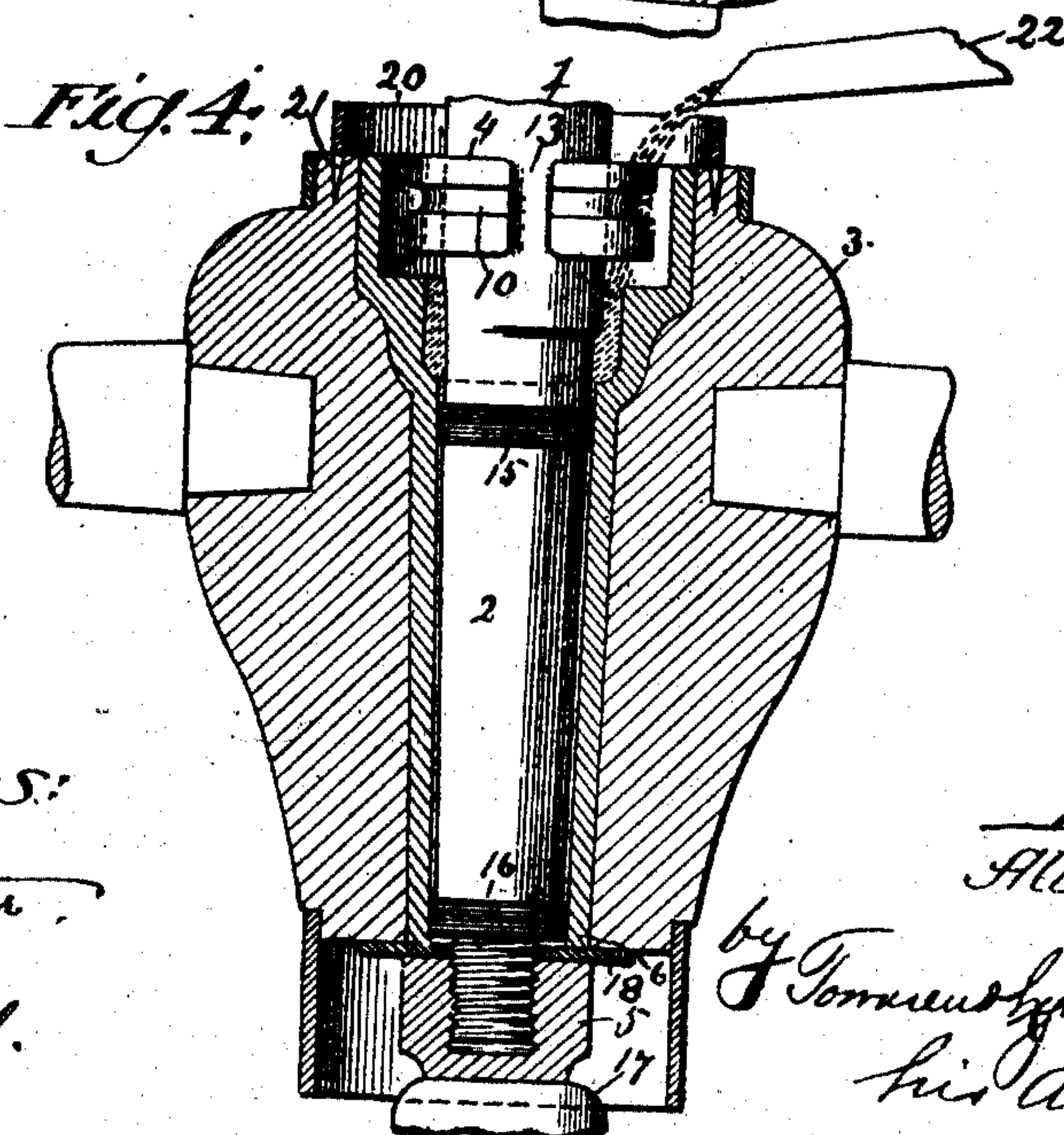
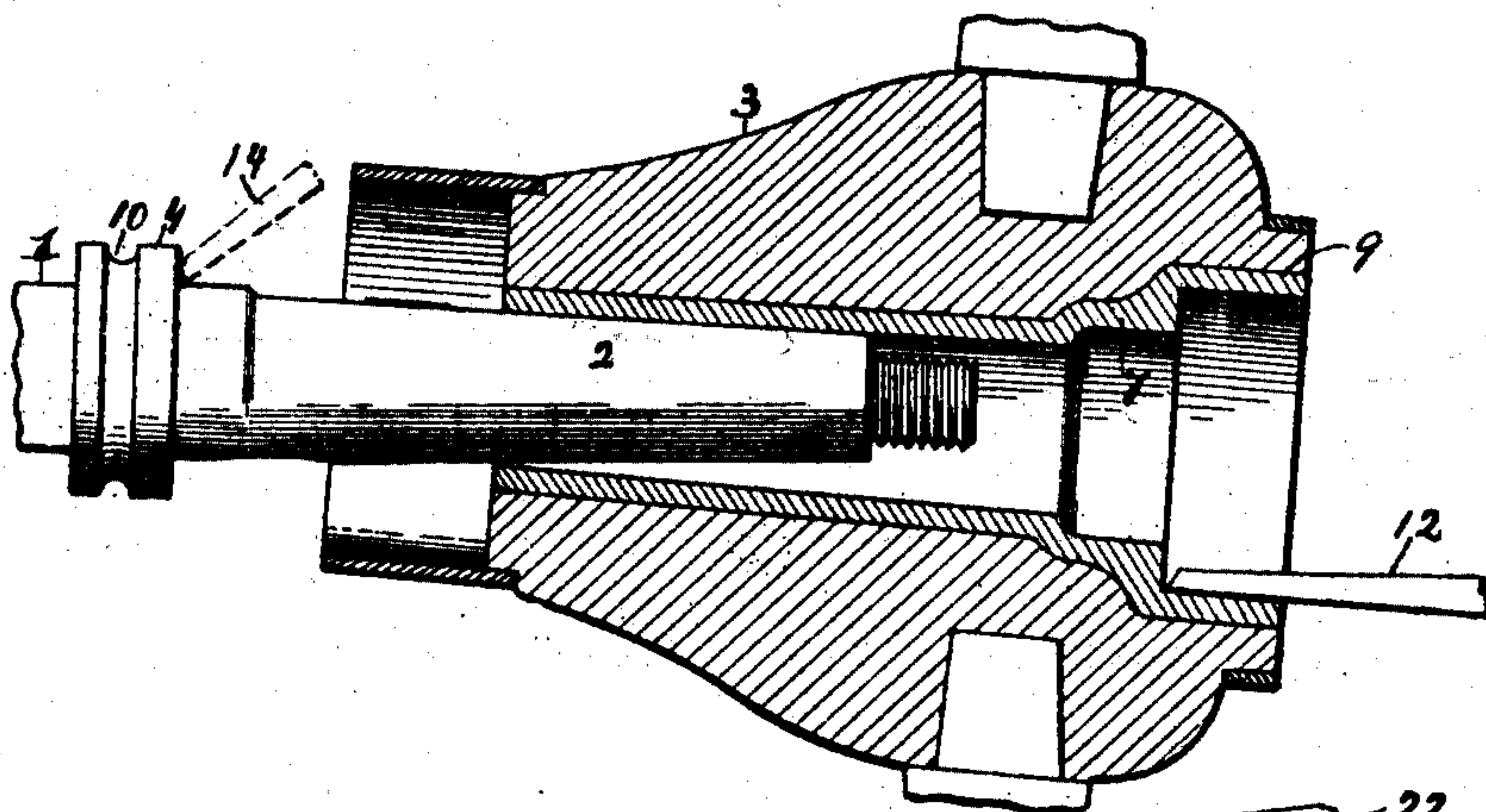


Fig. 3.



Witnesses:  
Lute S. Allen.  
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# UNITED STATES PATENT OFFICE.

ALBERT F. HUNT, OF SANTA MONICA, CALIFORNIA.

## METHOD OF AND MEANS FOR REPAIRING AXLES.

No. 928,519.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed August 31, 1908. Serial No. 451,107.

*To all whom it may concern:*

Be it known that I, ALBERT FRANKLIN HUNT, a citizen of the United States, residing at Santa Monica, in the county of Los Angeles and State of California, have invented a new and useful Improvement in the Method of and Means for Repairing Axles, of which the following is a specification.

10 This invention relates to repairing old and worn non-rotatable axles and especially those upon horse drawn vehicles, as buggies, wagons, &c.

15 It is a well known fact that after a vehicle having a non-rotatable axle has been used for any considerable length of time, the spindle becomes worn to such an extent on its underside and especially at the heel thereof or portion immediately adjacent to its inner end, and also the upper surface of its outer end to a greater or less extent, that the boxing which also wears upon its interior becomes so loose on the spindle that the rim or periphery of the wheel will have so much lateral play that it will not be as strong as desired, and it will also run crooked or out of true. This play or looseness between the spindle and the boxing of the wheel will permit sand and other foreign substances to enter between them and thereby cause the parts to wear much faster.

25 The object of my invention is to provide a means for filling this space between the wheel and the spindle in accordance with a certain method or process of doing the same, whereby the wheel will be as firmly secured upon its spindle as when new, and in addition to that the wearing surfaces will be increased and one of said surfaces will be of such a nature or character that the friction will be considerably decreased.

30 As is well known the greatest weight or pressure between a wheel and its spindle comes at the inner end of the spindle, and, consequently, the greatest wear comes upon the underside thereof at that point, but owing to the rotation of the wheel the interior of the hub or of the boxing will be worn substantially uniform relatively to its original axis, but its surface, and especially at its inner end where the greatest wear occurs, will become creased or grooved circumferentially to a greater or less extent. The box-

ing will also become worn at its ends, as also the shoulder of the spindle, which will permit of a greater or less amount of end movement of the hub upon the spindle. 55

I have found by practical experience that by applying an easily fusible anti-friction metal, as Babbitt metal, to the spindle in such manner as to be held against rotation and in sufficient quantity to fill the space between the spindle and the boxing, and especially at the inner end of the spindle, the wheel will be held as rigidly and will run substantially as true as it would when new, and the friction will be considerably decreased owing to the nature or character of the filling or bushing thus used, yet said metal will possess sufficient firmness or rigidity to withstand as great a weight or load as the original metal which it replaces. 60 65 70

The accompanying drawings illustrate the invention and form a part of this specification. 75

Figure 1 is a longitudinal, sectional view of one form of axle and spindle repaired in accordance with my invention. Fig. 2 is a transverse, sectional view of the same on the line  $x^2-x^2$  of Fig. 1. Fig. 3 is a longitudinal, sectional view of the end of an axle with the hub of the wheel thereon, showing the manner of truing the interior of the boxing. Fig. 4 is a similar view showing the manner of pouring the metal. 80 85

Referring more particularly to the drawings which are for illustrative purposes only and, therefore, are not drawn to any particular scale, 1 indicates one end of an ordinary axle having the usual spindle 2 at its outer end. Rotatably mounted on the spindle is a wheel of any desired pattern, the hub 3 of which is held against longitudinal movement upon the spindle by the shoulder 4 at its inner end and the usual nut 5 at the outer end. 90 95

Where the hub is provided with an ordinary boxing 6, as in the manner shown in the drawings, the boxing is enlarged toward its inner end, as at 7, to fit over the enlargement 8 of the spindle, and also, as at 9, to fit over the shoulder 4. The shoulder 4 is provided with the usual circumferential groove or channel 10. 100

When preparing the parts for the reception of the filling or bushing 11, which is 105



preferably formed from Babbitt metal, the wheel is removed from the spindle and, where no special appliances are convenient or desired, the wheel is reversed or has its hub turned end for end and is then slipped on the spindle as far as it will go and will permit of its being rotated. A tool 12 is then held against the inner surface of the boxing, as shown more particularly in Fig. 3, and the wheel rotated, preferably in the reverse direction to which it rotated when in actual use, which will cause the ridges and other uneven portions of said surface to be cut off so as to prevent their being embedded in the molten metal, which would thereby prevent the removal of the wheel after the metal had become cool. The spindle and the portion of the axle immediately adjacent to the shoulder is then cleaned from grease, paint, &c., and one or more notches 13 are formed in the shoulder 4, preferably by cutting the shoulder away on each flat side of the axle down to the surface of the spindle and the axle, as by a tool 14, and, if desired, the portion of the spindle that is to receive the metal may be coated with a flux or solution to cause the metal to adhere thereto. A few turns of adhesive tape or other suitable material are then wrapped around the spindle, as shown at 15 and 16, to cause the boxing to be centered thereon with its axis corresponding with the original axis of the spindle as nearly as possible. The layers of material, as 15, near the enlargement 8, are preferably placed adjacent to the end of the enlargement and form a tinker's dam, as it were, which will prevent the metal from flowing down between the boxing and the spindle in a thin sheet or feather edge. It will also prevent the escape of the air from the lower portion of the space between the boxing and the spindle up into the space to be occupied by the metal when the desired metal is poured in and causes said air to expand, which would have a tendency to blow the metal out or at least force it back and thereby prevent its forming the abrupt shoulder that is desired to be the most effective. The wheel is then carefully placed upon the axle and the vehicle is turned down upon its side with the wheel and the spindle to be repaired down upon or adjacent to the floor with the axle standing vertically, as shown in Fig. 4. To secure the best results the nut 5 for the end of the spindle is supported upon a block 17, which will permit of the hub being forced down with the outer end of the boxing against the nut or against a washer 18 thereon. The melted metal is then poured in at the top of the hub from whence it flows over the shoulder 4 and down through the notches 13 into the space between the boxing and the spindle and also into the groove 10 in the shoulder and almost

immediately cools and becomes hard and rigid. Where the hub band 18 projects beyond the end of the hub, as shown in Fig. 1, a cavity is formed which is also filled with melted metal that forms a flange 19 which extends back beyond the shoulder 4 and encircles the square or angular portion of the axle immediately adjacent thereto, and thereby assists in holding the filling or bushing against rotation upon the spindle. The flange will also act as a dust guard and will thereby prevent the entrance of dust or foreign substance into the boxing of the wheel, which would cause increased wear. Where the sand band terminates at the end of the hub, as shown in Figs. 3 and 4, a temporary band 20 is placed upon the end of the hub and preferably secured thereto, as by means of the prongs 21, which are driven into the hub, and thereby form a wall for retaining the metal to form the flange in the same manner as where the ordinary band of the hub is used. After the metal has been poured in this manner, the wheel is removed and the bushing or melted metal is trimmed up and all superfluous metal is removed, and especially that which is in the form of a feather edge, after which the spindle is oiled and also the wrapping is removed and the wheel replaced, and the wheel will be substantially as solid and rigidly supported as when manufactured, and its utility will have been increased by having increased the bearing surface and also by having made one of them of anti-friction metal.

By extending the flange back beyond the shoulder where it engages with the angular portion of the axle the bushing is held against longitudinal movement upon the spindle which is further augmented by the engagement of the metal with the groove in the periphery of the shoulder, and the rotation of the bushing is also prevented thereby as well as by the notches that were formed transversely in the shoulder and also by the flattened condition of the spindle caused by the wear.

Instead of using the old and worn boxing upon the repaired spindle, it is evident that a new boxing could be used equally as well and also that an entirely new wheel could be fitted to run with equally satisfactory results.

As the bushing becomes worn so as to permit movement, and especially longitudinally of the spindle, it can be easily tightened by placing washers between the nut 5 and the end of the boxing, and thereby crowding the hub and the boxing toward the shoulder at the inner end of the spindle and causing the end of the boxing and the hub to engage with said flange and thereby prevent said movement. In this manner the dust can be excluded from the interior of the boxing



very effectively, as it will be substantially impossible for it to get past the flange and into the boxing.

Having described my invention, I claim:

5 1. The herein described method of repairing axles which consists in providing the spindle of the axle with a temporary dam, placing the hub of the wheel on the spindle and then filling the space between the spin-  
10 dle and the hub at one side of said dam with melted metal, and allowing said metal to solidify to form a new journal surface.

2. The herein described method of repairing an axle bearing for a vehicle wheel, said  
15 axle having an enlargement, which consists in truing up the bore of the hub of the wheel to provide a smooth surface therein, placing the hub on the spindle of the axle and casting on to the spindle and between the spin-  
20 dle and the hub a fusible metal to form a new bearing surface, said metal being cast

over the enlargement on the spindle, whereby the said metal is held in position by said enlargement.

3. The herein described method of repair- 25  
ing axles, which consists in forming notches through the shoulder thereof, then providing the spindle with a temporary wrapping of flexible material intermediate its ends, then placing the wheel upon the spindle, and 30  
then filling the space between the inner end of the spindle and the boxing with melted metal and causing it to be immovably secured to the spindle and to said shoulder.

In testimony whereof, I have hereunto set 35  
my hand at Los Angeles, California, this 24th day of August, 1908.

ALBERT F. HUNT.

In presence of—

W. S. BOYD,

FRANK L. A. GRAHAM.