J. D. OLDS.

Hubs for Vehicles.

No. 148,973. Patented March 24, 1874.

Fig. 1.

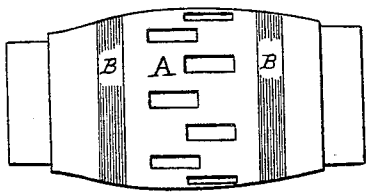


Fig. 3.

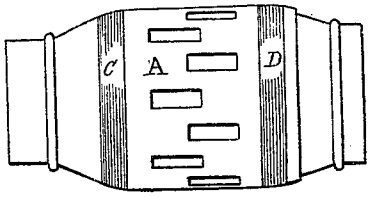


Fig. 2.

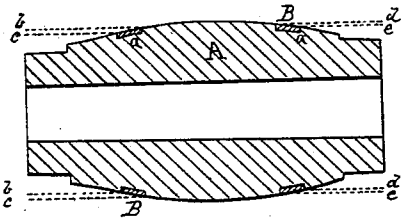


Fig. 4.

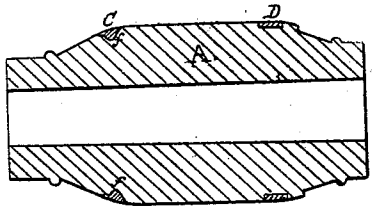


Fig. 5.

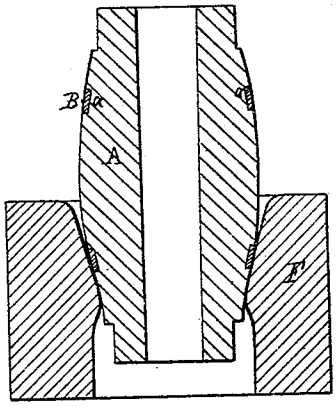


Fig. 6.

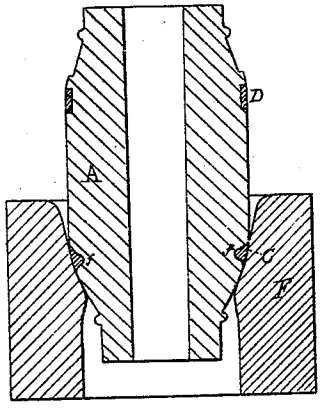


Fig. 7.

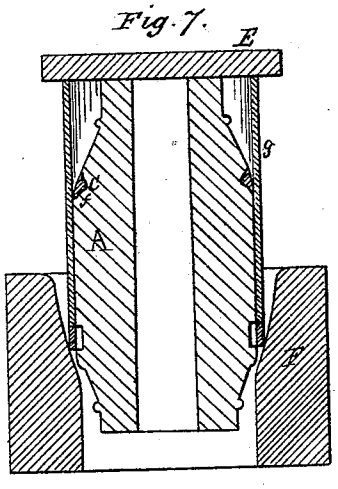
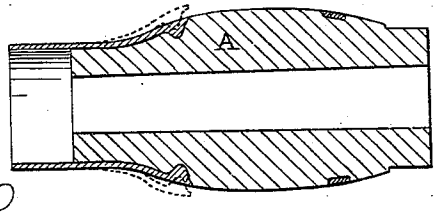


Fig. 8.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN HUBS FOR VEHICLES.

Specification forming part of Letters Patent No. **148,973**, dated March 24, 1874; application filed March 4, 1874.

To all whom it may concern:

Be it known that I, JOHN D. OLDS, of Fort Wayne, county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Carriage-Wheel Hubs.

My improvements relate particularly to so-called wooden hubs; and my invention consists in combining therewith one or more solid seamless metallic strengthening-bands, which occupy annular grooves in the periphery of the hub; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear and accurate description of my invention.

Referring to the drawings, Figure 1 represents a hub in side view embodying my invention. Fig. 2 represents the same hub in section. Figs. 3 and 4 represent, in side view and section, another style of hub with my improvements. Fig. 5 represents a die for setting the bands in hubs, Figs. 1 and 2. Fig. 6 represents a die for setting left-hand band in hub, Fig. 4. Fig. 7 represents a die for setting right-hand band in hub, Fig. 4. Fig. 8 represents a strengthening-band and hub-ring combined.

It is to be distinctly understood that the means for setting these bands as herein described constitute no portion of the invention which it is intended shall be covered by these Letters Patent, and that the mode of operation, as well as the means employed, are to constitute the subject of separate applications for Letters Patent.

In the drawings, A denotes the body of the hub, which differs in no essential particular from others well known and in common use. At any desired point between the mortise-line of the hub and its ends two annular grooves are cut by turning, as at *a*. The depth and width of these grooves may be varied; but, in practice, for light carriage-hubs, a groove, say, one-eighth of an inch deep and one-half inch wide, will meet ordinary requirements. The band B is of such dimensions that such a groove will be wholly filled by it with its peripherical surface flush with the surface of the wood, if a flush finish be deemed desirable, as is usually the case. These bands are preferably applied while cold, and may be composed of wrought-iron or steel, of cast or rolled brass, or of the so-called "malleable iron," which is cast and subsequently softened by annealing. They may be made of any thickness or width which could possibly be of practical value in this connection. It is important, however, that the metal employed should possess fair ductile properties, and be of such a character that it could not be unduly or injuriously weakened in its tensile capacity by the changes which it must necessarily experience during the process of setting the bands in the grooves.

In Fig. 1 the grooves *a* are cut on the tapering surface of the hub, and the bottom of the grooves correspond generally with the tapering or other outline of the periphery of the hub. The groove on the left hand, toward the point of the hub, has shoulders with edges at different distances from the axial line, and the space between the dotted lines *b* and *c* represents this difference; and it will be clearly seen that a band which will readily pass over the shoulder at *c* will abut with one edge against the inner shoulder of the groove with a bearing-surface fully equal to the distance shown between the dotted lines. The outline taper on the inner end or butt of the hub is not so abrupt as on the outer end or point, and, therefore, there is a less bearing for that band when applied in a manner as before stated, the difference being represented by the difference between the spaces between the lines *d* and *e* and *b* and *c*. In both cases, therefore, the band, preferably while cold, is to pass snugly over the outer shoulder of the groove, and abut with more or less bearing against the inner shoulder. Having been so adjusted, the hub, with the band, is placed endwise into a solid female die, which has an interior surface corresponding at one point, as nearly as it may be practicable to make it, with the exterior surface of that portion of the finished hub adjacent to the band. Such dies are shown at F in Figs. 5, 6, and 7, in section, with the hub and band in position ready for procedure. To the protruding end of the hub pressure is applied in a line with its axis by means of a press worked by hydraulics, levers, or screws, and having sufficient capacity, until the hub is made, to properly fill the

die, whereby the band is bodily upset, its diameter reduced, its width and thickness slightly increased, and made to engage with great pressure with the wooden portion of the hub embraced by it. The shoulder, against which the ring abuts, is not materially affected, for from the moment the ring commences to be reduced the extent of the bearing-surface with the shoulder is increased until the band is fully set.

In Figs. 3 and 4 two bands are shown of a slightly different character, but which embody the spirit of my invention. The band C on the outer end of the hub has a broad face, and is provided with an interior annular projection, as at *f*. In fact, this band C is the same as the band B before described, with a periphery of a slightly different character. Such a band would be applied in the same manner as before described, it having originally an internal diameter equal to the exterior diameter of the hub at the outer edge of the annular groove, and its bearing-surface would be against the inner edge of the groove, as before. When such bands are applied, the outer edge being thin, it will be an easy matter to ornament it by using a die prepared with that view for the setting operation.

It will be observed that the band D on the rear end of the hub in Fig. 4 is set at a point at which there is no tapering exterior, and consequently it presents no abutting shoulder with which the ring or band in its normal condition can engage for operation in the die. It is only necessary in such case to provide a temporary bearing-surface for the edge of the band, and this will be afforded by a tubular sleeve having a diameter equal to that of the hub, and a length equal to the distance between the end of the hub and the next adjacent edge of the groove to be filled. As illustrated in Fig. 7, the sleeve *g* has a bearing with the end of the hub against the end of the rest-block or driver E, and that both with the band must move together, or be held stationary, as the case may be, according to whether or not the die be stationary or movable. After getting the bands well started into the grooves, the sleeve can be removed and the setting operation completed, as in the case of the tapering hub.

In Fig. 8, I represent a strengthening-band, which merges into and forms a part of the hub-ring. It will readily be seen that the groove is filled in the same manner as before described, and that the hub is not only strengthened in like manner, but that the hub-ring is so attached that it can never work loose or be displaced. Such a hub would possess the desirable advantages which exist in any compound metallic and wooden hub.

When properly applied with dies of suitable size and form, the wooden portion of the hub is materially improved adjacent to these bands, because the fibers of the wood will thereby be condensed to a desirable degree. By the lateral expansion of the metal bands during the setting operation, the grooves are absolutely filled. The upsetting of the metal, which was originally soft, changes its character in hardening and condensing it.

In practice, it will be advisable to apply white lead and oil, or other similar matter, to the grooves, in order to positively insure tight joints and the exclusion of water, and the presence of such matter in moderate quantity will facilitate the setting operation as a lubricant.

By subjecting the hub to more or less compression adjacent to the band during the setting process, it will be seen that the wood will be mechanically condensed to a greater or less degree, and that the bands will secure and hold it in that condensed condition; and, for that reason, such hubs are less liable to "check" or "crack," for that evil is the result of contraction, and, as this contraction is anticipated by mechanical pressure applied with uniformity, as described, subsequent contraction, as a result of ordinary shrinkage, is practically impossible. In all cases, I deem it preferable to set the bands prior to mortising.

I am aware that hubs have heretofore been strengthened by metallic bands applied to their peripheries in various ways, and that a variety of means have been employed for securing them in position; also, that annular grooves in hubs have been filled with metallic wire, wrapped therein in continuous lengths upon a sheet-metal strip, forming a broken band, with the whole subsequently covered with solder. Such bands obviously differ from mine, as they are not solid nor seamless, and cannot be made to so compress the wood beneath them as to compensate for that inevitable subsequent shrinkage, which occurs in all cases. I am also aware that mortised metallic flanged bands have been driven upon the wooden centers of hubs, and secured in position by abutting the edge of one end of said flanged band against an annular shoulder, and by reducing the diameter of the edge at the opposite end, so as to cause it to abut against a shoulder formed by cutting an annular recess in the periphery of the hub. Such mortised bands are employed in so-called flanged wheels; and in such wheels no additional strengthening-bands are requisite, for it is by the mortised bands that all strain is borne, whether it be induced by the driving of the spokes or by subsequent use of the wheel. I am also aware that a mortised metallic shell has been heretofore combined with a wooden center constructed in two sections, and that these sections have been held in position within said shell by upsetting both ends of the shell against the outer ends of the two wooden sections.

My improved hub differs from any pre-existing one known to me in being strictly a wooden hub, and in having the strengthening-bands of solid seamless metal, set in annular grooves cut in the periphery of the hub, and made to fill and occupy said grooves, whereby the said wooden hub may be made of the mini-

mum size and of any required form, and yet possess the requisite strength, with positive security of the bands in position, and without any liability of their being loosened by subsequent contraction of the hub by reason of ordinary and usual shrinkage of the wood.

I therefore claim as new and desire to secure by Letters Patent—

A wooden hub strengthened by one or more seamless metallic bands, which occupy annular grooves in the periphery of the hub, substantially as described.

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Witnesses:
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