Sept. 14, 1937. A. L. LEE 2,093,149

MINE CAR HUB CAP

Filed June 27, 1935

Fig. I

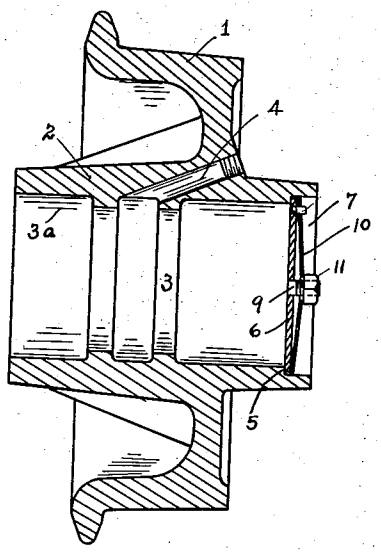


Fig. II

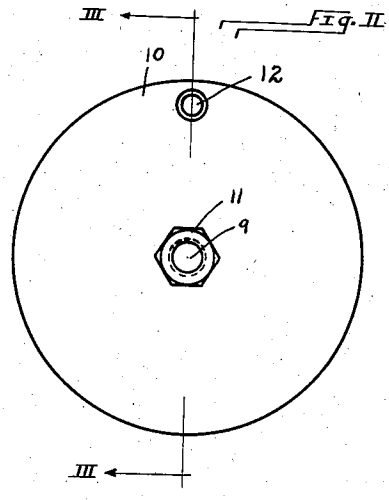
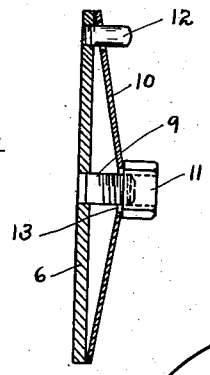


Fig. III



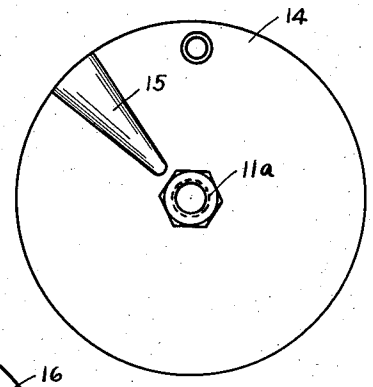


Fig. IV

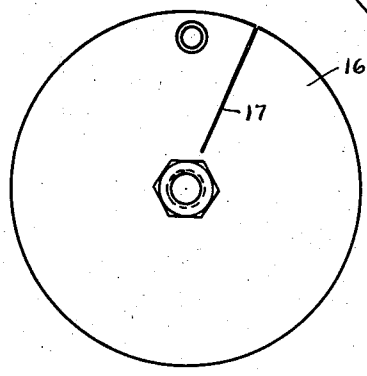


Fig. V

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MINE CAR HUB CAP

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2 Claims. (Cl. 295—1)

This invention relates to a hub cap for mine and industrial cars.

The hubs of mine car wheels must necessarily be closed, in order to prevent the entry of dirt, and to prevent the escape of lubricant. At one end of the hub there is mounted a roller bearing, which closes the hub opening at that end. At the other end the hub cap is positioned. It is usual practice to bolt such hub cap at the open end of the mine car hub, or to position the hub cap in a groove formed interiorly of the hub bore. Both these modes of securing the hub cap in position require special operations, which are disadvantageous to the extent that they increase the cost of manufacturing mine car wheels, the selling price of which is very closely limited.

The object of my invention is to provide a hub cap for mine and industrial car wheels, which may be mounted at an unspecialized region of the hub bore, thus permitting the bore of the hub to be finished throughout by a lathe set up for machining the bore interior, without changing tools or changing the lathe set up during the machining operation.

In the accompanying drawing Fig. I is a cross-sectional view through a mine car wheel of the form disclosed in my prior Patent No. 1,983,177, showing the hub cap of this invention in position therein.

Fig. II is a front elevation of the hub cap of my invention, showing the hub cap on an enlarged scale.

Fig. III is a cross-sectional view through the hub cap, taken on the central plane III—III of Fig. II.

Fig. IV is a front elevation of my hub cap, showing a modification therein.

Fig. V is a front elevation of the hub cap, illustrating a further modification in its structure.

Referring to Figs. I to III, inclusive, of the drawing, reference numeral 1 designates a mine car wheel, having through the hub 2 thereof a bore 3. As shown in Fig. I, a lubricating port 4 leads from the exterior of the wheel to the hub cap bore. As shown in Fig. I, the end 3*a* of the hub cap bore, lying to the left, is open, but it is to be understood that in finishing the wheel this opening is closed by a roller bearing of suitable type.

The end of the hub cap bore, opposite that to which a roller bearing is to be fitted, has therein a shoulder 5, against which the hub cap seats. The hub cap comprises a rigid plate 6, which is of a diameter to have a loose sliding, or "sloppy," fit in the region 7 of the hub cap bore lying exteriorly of the shoulder 5. Because of the slight tolerance provided by the fit between the periphery of the rigid plate 7 and the hub cap bore in the region 7, the hub cap may be readily positioned in the bore. Welded, or otherwise rigidly mounted at the center of plate 6, is a threaded post 9, which passes through an outwardly bowed spring plate 10. A nut 11, mounted to run on threaded post 9, bears against the outer face of spring plate 10, in the central region of the spring plate.

It will be noted in Fig. III that, for mounting, the effective diameter of the spring plate 10 is equal to the diameter of the rigid plate 6. When, however, the hub cap has been placed in position in the region 7 of the hub cap bore, with the plate 6 abutting the shoulder 5 therein, the effective diameter of the spring plate 10 is increased, firmly to engage the spring plate to the surface of the hub cap bore. This is done by running nut 11 down on threaded bolt 9, thus decreasing the bow of spring plate 10 and expanding its effective diameter.

As shown, rigid plate 6 has welded, or otherwise rigidly secured, thereto a second post 12, which projects through a slightly over-size opening 13 in the spring plate 10. This post 12 provides a grip on the hub cap to prevent it from turning as the nut 11 is run down on the post 9 to expand spring plate 10. As shown in the drawing, post 12 is of simple and solid structure. It may desirably, however, be made as a fitting for the introduction of lubricant into the bore 3 of the hub. As so made, it performs a double function, being useful as a holding post, and also permitting the elimination of port 4 for conducting lubricant to the hub cap bore. The elimination of this lubricant port 4 is of general desirability, in that its elimination as a consequence eliminates the operation of boring and tapping the port.

As the hub cap is so mounted, spring plate 10 engages rigid plate 6 firmly to the shoulder 5 in the hub cap bore, and provides a seal against the leakage of lubricant from the hub cap bore,

Referring to Fig. IV of the drawing, that figure of the drawing shows a slight modification in the structure of the spring plate 14 therein shown. Spring plate 14 corresponds generally to spring plate 10, as shown in Figs. I to III inclusive, but is so formed as to facilitate and emphasize the expansion of the spring plate diameter under pressure exerted thereon by nut 11*a*. The modification consists in a scalloped region, or fold, 15, which is deflected outwardly from the remaining surface of the spring plate. This scallop, or fold, 15 is of greatest width and height at the pe-

riphery of the spring plate, and decreases uniformly in height and width toward the center of the spring plate. As shown, but one scallop 15 is formed in the spring plate, but, if desired, the spring plate may be formed with two or more similar regional deformations.

In Fig. V of the drawing, spring plate 16, otherwise identical with spring plate 10, is slit from its periphery to a point adjacent the center of the spring plate. This slit 17, two or more of which may, if desired, be provided, similarly to scallop, or fold, 15 of Fig. IV, facilitates and increases expansion in the effective diameter of the spring plate.

It should be explained that neither the slot, or slots, 17, nor the region of the over-size hole 13 through the spring plate, permit any substantial leakage of lubricant through the hub cap. This is for the reason that, in order to escape from the bore of the hub, it is necessary for lubricant to escape through the very restricted zone provided by the loose fit of rigid plate 6 in the hub cap bore, working around shoulder 5 in its progress, to pass through the closely adjacent surfaces of the rigid plate 6 and the spring plate adjacent the peripheries of both, and to find exit through the opening provided by the oversize hole 13, or the slot 17. In use of the hub cap, I have observed no escape of lubricant.

The hub cap of my invention provides a firm, lubricant-tight, closure at the end of the hub cap bore of a mine car, or industrial car, wheel usually occupied by a hub cap. Because of the structure of my hub cap, its mounting may be performed without the use of bolts, a locking ring, or other means requiring special machining operations. Additionally to the economy in manufacture thus effected by use of my hub cap, I have found it more efficient in service than hub caps for the same purpose previously employed. As an additional advantage of my hub cap, it may be noted that it is removable from one wheel and insertable in another, since the slight differences in diameter, or irregularities in the region of hub cap bores in which it may be positioned, does not prevent the formation of a firm mounting and seal by its insertion. It thus differs substantially from such deformable closures as are necessarily destroyed by their removal from mounted position in a wheel.

I claim as my invention:

1. For insertion in the bore of a wheel hub to serve as a closure therefor, a hub cap comprising a rigid element of initially fixed diameter, a resilient circular plate bowed away from the rigid element, and means carried by the said rigid element connecting the resilient circular plate thereto and arranged to bear against the outer surface of the resilient plate adjacent the center thereof to force the said resilient plate centrally toward the said rigid element thereby to increase the effective diameter of the resilient plate, the said resilient plate being scalloped in at least one region to facilitate and increase the expansion in effective diameter produced by pressure adjacent the center of the resilient plate.

2. For insertion in the bore of a wheel hub to serve as a closure therefor, a hub cap assembly comprising a flat rigid circular plate of fixed diameter, a circular resilient plate radially scalloped in at least one region bowed away from the said rigid plate and normally having a diameter not substantially exceeding the diameter of the rigid plate, and means interconnecting the said rigid plate and the said resilient plate and arranged to bear against the outer surface of the said resilient plate to exert pressure thereon adjacent the center of the resilient plate and by the exertion of pressure on the resilient plate to expand the effective diameter thereof and cause peripheral projection of the resilient plate beyond the periphery of the rigid plate; whereby the resilient plate by peripherally exerted pressure against the surface of the hub bore engages the hub cap assembly therein.

ARTHUR L. LEE.