

UNITED STATES PATENT OFFICE.

ELIJAH D. McDONALD, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO LAURIN DEWEY CLARK, OF LOS ANGELES, CALIFORNIA.

SELF-OILING TROLLEY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 778,793, dated December 27, 1904.

Application filed December 8, 1903. Serial No. 184,271.

To all whom it may concern:

Be it known that I, ELIJAH D. McDONALD, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Self-Oiling Trolley-Wheel, of which the following is a specification.

This invention relates to a novel construction of a trolley wheel and harp which provides for a supply of oil being carried by the harp and automatically fed to the axle; and the main object of the invention is to provide a device of the character described which is of simple and economical construction and effective and durable in use.

Another object is to provide a novel means for conserving the oil and repeatedly using it through the effects successively of centrifugal force and the force of gravity. In this connection I provide a tubular axle or axle-pin having ducts for the inflow and outflow of oil into and from the inside of the axle-pin, and I provide a trolley-wheel, with reservoirs carried thereby and rotating therewith and connected by means of one or more ducts, to receive oil from and to return it to the interior or to the exterior thereof.

Other objects and advantages of the device will appear in the following description.

Referring to the drawings, Figure I is a section on line I I of Fig. II. Fig. II is a section on line II II of Fig. I. Fig. III is a side elevation of the device, part being a section on line III III of Fig. I. Fig. IV is a perspective of a bearing-block. Fig. V is a perspective of a bearing-block spring. Fig. VI is a side elevation showing a form of detachable oil-box. Fig. VII is a partly-sectional view on line VII VII, Fig. VI.

1 designates the harp having a shank 2 for attachment to the trolley-pole. An oil-box 3 is formed in one cheek of the harp.

4 is a tubular axle-pin for the trolley-wheel 5, and one end of the axle-pin has a closed head slotted for a screw-driver, which is held in a boss 6 on the harp-cheek. The other end of the axle-pin 4 is closed by a capped plug 7, which is screwed into the end of the axle-

pin and is preferably slotted for a screw-driver, as shown. The pin 4 has an oil-inlet 8 through its wall which opens into the oil-box 3 and is also provided with distributing oil-ducts 9.

The trolley-wheel comprises a cupped hub 10, from which radiate arms 11, which support a rim 12, the latter having an inclined annular flange 13 on one side. A grooved tire 14, V-shaped in cross-section, encircles the rim 12 and is held in place thereon and against the flange 13 by screws 15. This allows the removal of a worn tire and a substitution of a new tire without the expense of renewing the entire trolley-wheel when worn.

16 designates bearing-blocks, preferably of lignum-vitæ, which are mounted within the hub 10 on the axle-pin 4 and which are held in place by a plate 17, which closes the hub 10, being fastened by screws 18, which take into the arms 11. Each bearing-block has pockets 19, which communicate by ducts 20 with the concave bearing-surface of the bearing-block. The bearing-blocks are pressed against the pin 4 by curved sheet-springs 21, as shown in Fig. II.

The axle-pin 4 is removably held in place by pins 22.

The oil-box 3 is filled with waste or other loose packing 24 and is provided with a screw-plug 23, which may be removed for the introduction of oil. The axle-pin 4 is likewise filled with packing 25, and the pockets 19 are also filled with packing 26. As the oil-box 3 is filled the oil works through the passage 8 into the axle-pin 4 and percolates through the packing therein and by capillary attraction works through the ducts 9 to the outer surface of the axle-pin, and as the bearing-blocks work on the axle-pin they distribute the oil, so that perfect lubrication is promoted. Oil is also sucked up by the waste in the pockets 19 from the axle-pin, assisted by the centrifugal force. The pockets 19 thus become cell-like reservoirs, which extend longitudinally of the blocks and are circumferentially located around the axle in such manner that one or more of them will be in position to permit oil

to escape by gravity onto the axle as soon as the wheel stops rotating. As soon as the trolley stops rotating oil from the pockets 19 percolates to the axle-pin both by gravity and
 5 capillary attraction. Thus there is a constant lubrication of the bearing-surfaces whether the trolley-wheel is rotating or not. With the high velocity which the wheel has when rotating centrifugal force acting on the oil
 10 quickly fills the pockets 19 full, and when the wheel stops rotating the oil slowly seeps back through the ducts 20 onto the axle-pin. The capillarity of the packing in the pockets 19 and the smallness of the ducts 20 cause a very
 15 much slower rate of flow of the oil in working back onto the axle-pin under the action of gravity than when it is working out under centrifugal action, and the flow is gradual and steady, so that flooding of the axle-pin with
 20 oil, which would result if the oil were merely confined around the axle-pin in a hollow hub of the wheel, is avoided. This is a very important feature, as the oil is thus conserved and made to perform its office of lubrication
 25 in the most effective and economical manner. It is obvious that the packing in the pockets could be dispensed with and that the small ducts would restrict the backward flow of oil to the axle-pin and accomplish the same end
 30 to a slightly less degree; but I prefer to employ the packing, as its retarding effect on the backward flow greatly promotes the even steady flow which is so desirable.

A preferred construction of the oil-box is
 35 shown in Figs. VI and VII, in which 30 designates the oil-box, having a ledge 31, which may be fastened to the harp by screws 32. An oil-duct 33 is drilled through the cheek of the harp, bringing the space within the oil-box
 40 30 into communication with the interior of the hollow pin. The box is constructed quite thin, as shown, and may extend the length of the harp-cheek, so that its capacity will be as great as possible. One oil-box may be ar-
 45 ranged on each cheek, as shown, and as they are thin, being little thicker than the harp-cheeks, they do not project sufficiently to cause any annoyance. Moreover, they give a much neater appearance to the pole than
 50 where the box is cast integral with the pole, as shown in Fig. I. The advantage of the form just described is that the box may be attached to any ordinary trolley-pole without
 55 requiring any material alterations of the pole or trolley.

What I claim is—

1. In combination, a harp having an oil-box, a tubular axle-pin in the harp and communicating with the oil-box, a trolley-wheel on the pin provided with a plurality of reservoirs, 60 each reservoir communicating through a small duct with the pin, whereby when the wheel is rotating oil is forced into the reservoirs by centrifugal action, but works its way slowly and gradually back to the pin when the wheel 65 is substantially at rest.

2. In combination, a harp having an oil-box, a tubular axle-pin in the harp and having a passage which communicates with the oil-box, the axle-pin having a series of oil-ducts, a 70 trolley-wheel comprising a cupped center portion, a pair of bearing-blocks in the cupped portion, resilient means for pressing the bearing-blocks against the axle-pin, the bearing-blocks having pockets and ducts which lead 75 from the pockets to the bearing-surface, and a plate confining the bearing-blocks.

3. In combination, a harp having an oil-box, a tubular axle-pin in the harp and in communication with said box, a removable plug in 80 one end of the axle-pin, the axle-pin having perforations intermediate its ends, a trolley-wheel on the pin having a recessed hub, bearing-blocks in the recess and in yielding engagement with the pin, each block being pro- 85 vided with an oil-reservoir adapted to be placed in intermittent communication with the perforations in the pin, and packing material placed respectively in the pin, in the oil-box and in each of the reservoirs. 90

4. In combination, a harp, a trolley-wheel, a bearing-block having a concave bearing-surface, and having a pair of pockets extending parallel therewith, and having oil-ducts which extend from the pockets to the bear- 95 ing-face, and suitable packing in the pockets.

5. In combination a wheel having a cupped hub, a tubular axle-pin, a pair of bearing-blocks within the hub, and a pair of curved sheet-springs within the hub respectively 100 pressing the respective bearing-blocks against the tubular axle-pin.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, California, 105 this 19th day of November, 1903.

ELIJAH D. McDONALD.

Witnesses:

GEORGE T. HACKLEY,
 JULIA TOWNSEND.