Jan. 5, 1926. 1,568,768

J. S. REID

HUB AND CLOSURE STRUCTURE

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Fig. 1

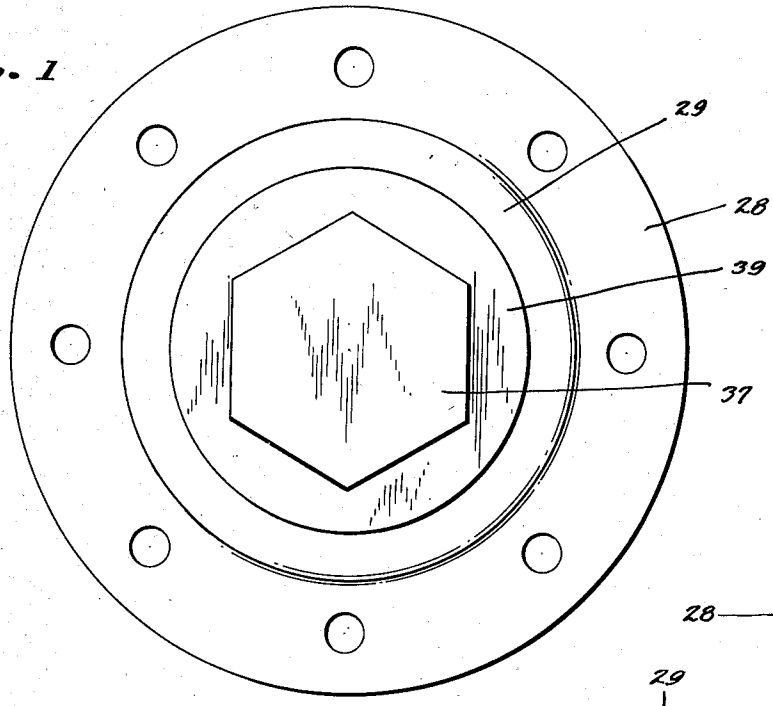
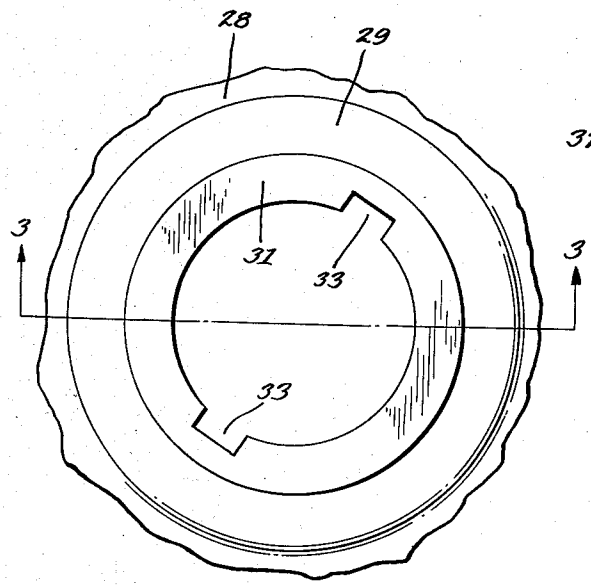


Fig. 2



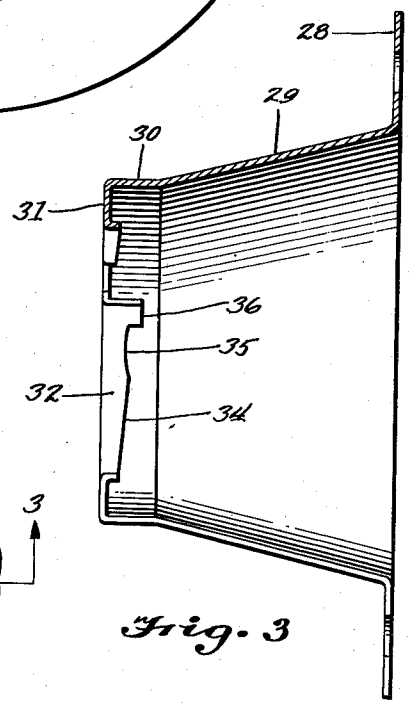


Fig. 3

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Fig. 6

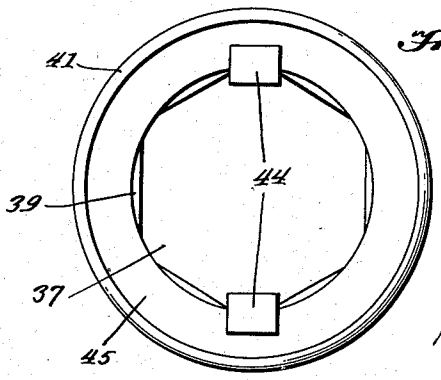


Fig. 4

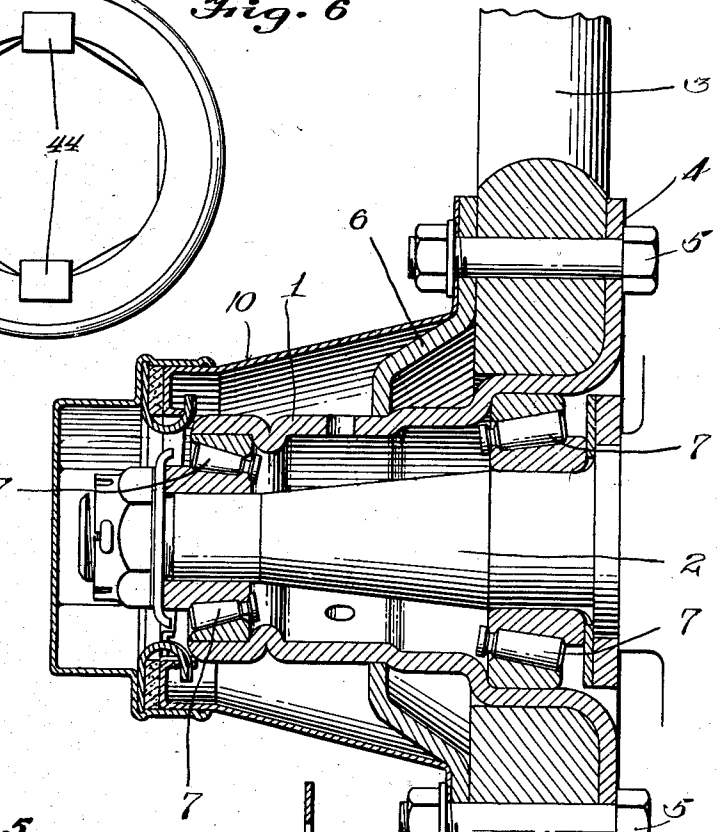
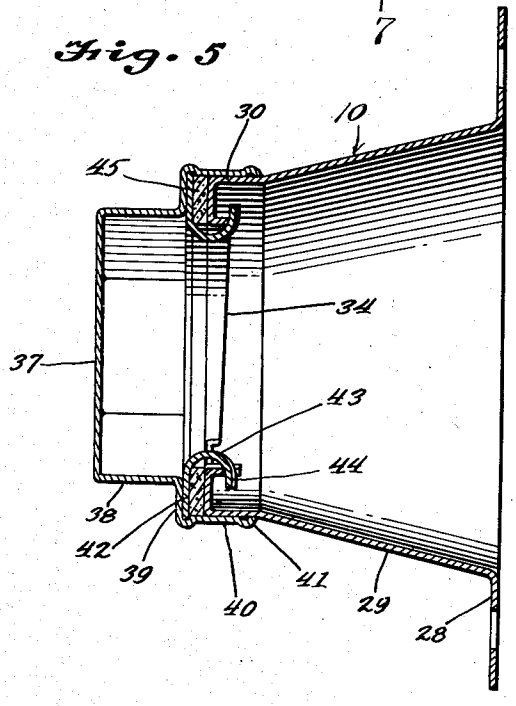


Fig. 5



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UNITED STATES PATENT OFFICE.

JAMES S. REID, OF CLEVELAND, OHIO, ASSIGNOR TO THE EASY-ON CAP COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

HUB AND CLOSURE STRUCTURE.

Application filed December 23, 1921. Serial No. 524,395.

To all whom it may concern:

Be it known that I, JAMES S. REID, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hub and Closure Structures, of which the following is a specification.

This invention relates to hub and closure structures for motor vehicle wheels.

More particularly, the invention relates to a new and improved closure structure, which is adapted for use with the hub of any suitable vehicle wheel; in which the closure cap member is easily and quickly applied and removed; in which the locking spring of the closure cap member is firmly secured to said member without the use of rivets, screws, or other separate securing means; in which the locking spring of the closure cap member possesses great yielding capacity, so that the gasket of said member is relieved of undue compression, thereby materially prolonging the life of said gasket; in which there are no threads to become worn or crossed; in which the closure cap member is securely locked when in fully closed position, so that it cannot jar off and be lost; and which is strong and durable, yet light and neat in appearance.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the drawings, which represent one suitable embodiment of the invention, Fig. 1 is an end view of the closure structure; Fig. 2 is a fragmentary end view of the closure shell member; Fig. 3 is a vertical sectional view of said closure shell member, taken on the line 3—3, Fig. 2; Fig. 4 is a vertical sectional view of the hub and closure structures; Fig. 5 is a vertical section view of the closure structure; and Fig. 6 is an inner face view of the closure cap member.

Referring to the drawings, and particularly to Fig. 4 thereof, the wheel hub structure may be of any suitable type or construction and in the embodiment here illustrated includes a substantially cylindrical member 1 which surrounds the vehicle axle 2 but terminates short of the outer end of said axle. Abutting the inner end portion of member 1 and arranged in proper spaced relation therearound are the wheel spokes 3, which are clamped to an inner, radial flange 4 of member 1 by bolts 5 and a perforated circular disc or plate member 6 sleeved upon said member 1.

Arranged between the outer and inner end portions of said axle and the surrounding member 1 are suitable anti-friction devices, such as the roller bearing structure 7.

Referring now to the closure structure, which is best shown in Figs. 4 and 5, said structure comprises a tubular shell member or container 10, enclosing the outer portions of the hub structure and terminating short of the outer end of the axle 2, and a cap member adapted for locking engagement with said shell member or container.

Said tubular shell member or container is provided with an integral outwardly extending annular base flange 28, which abuts against the annular base flange of the hub plate member, and is secured thereto by the bolts 5. Said shell member also comprises a tapering wall portion 29, a cylindrical end portion 30, an inwardly extending flange 31, and a backwardly extending flange 32. The flanges 31, 32 are provided with diametrically opposed recesses or cut out portions 33, two being shown, thus forming two backwardly extending substantially semi-circular flanges. The bottom or inner edges of these backwardly extending flanges are inclined, so as to provide cam faces 34, each of which is provided at diametrically opposite points with a dwell portion 35 and a projection or stop portion 36.

The closure cap member comprises a base 37 and a skirt including a hexagonal wall 38, an outwardly extending flange 39, and a cylindrical extension 40, said cylindrical extension being provided at its inner end with an annular bead 41.

Said closure cap member is provided with a locking spring, the annular base or securing portion 42 of which is firmly secured therein against the inner surface of the outwardly extending flange 39 by crimping a portion of the metal of the cylindrical extension 40 inwardly onto said base or securing portion. Said spring is provided with

diametrically opposed integral curved spring fingers 43 provided at their outer ends with foot portions 44. These spring fingers curve radially inwardly and outwardly in the form of return bends, so that the maximum amount of spring area is obtained between the base or securing portion 42 and the foot portions 44. The spring fingers 43 therefore possess great yielding capacity, yet at the same time do not interfere with the washer and lock nut on the outer end of the vehicle axle when the closure structure is secured to the hub of a vehicle wheel.

45 represents an annular gasket, preferably made of cork, which is held in said cap member by the curved spring fingers 43. When the cap member is in closing position, said gasket lies between the inwardly extending flange 31 of the shell member or container, and the base or securing portion 42 of the locking spring, and exerts yielding pressure therebetween, but due to the great yielding capacity of the spring fingers 43, the gasket is relieved of undue compression, thereby materially lengthening the life of said gasket.

To apply the cap member, it is fitted over the shell member or container, the cylindrical extension 40 snugly surrounding the cylindrical end portion 30 of the shell member. The curved spring fingers 43 are inserted in the recesses or cut out portions 33 and the cap member turned, the foot portions 44 of said spring fingers riding upon the cam faces 34 and securing said cap member to said shell member with gradually increasing pressure. The cap member may be turned until the spring foot portions 44 strike the projections 36_1 at which point said foot portions will rest upon the dwell portions 35 on the cam faces 34 so that there is no liability of said foot portions accidentally sliding back down the cam faces and the cap member jarring off. To remove the cap member it is only necessary to turn said member in the reverse direction, whereupon the foot portions 44 of the spring fingers will ride down the cam faces until said foot portions reach the recesses 33, whereupon said cap member may be bodily removed from the shell member.

Having described my invention, I claim:

1. In combination with the hub of a wheel, a shell member or container provided with spaced recesses and cam portions, and a cap member having a base and skirt, said skirt having secured thereto and spaced from said base a locking means comprising a securing portion and finger portions, said finger portions being bent radially inwardly and outwardly and having foot portions adapted to enter said shell recesses and engage said cam portions upon relative rotative movement of said members.

2. In combination with the hub of a wheel, a shell member or container provided with spaced recesses and cam portions, and a cap member having a base and skirt, said skirt having secured thereto and spaced from said base a locking spring comprising a securing portion and curved spring finger portions, said finger portions being bent radially inwardly and outwardly and having foot portions adapted to enter said shell recesses and engage said cam portions upon relative rotative movement of said members.

3. In combination with the hub of a wheel adapted to have an axle extend outwardly therefrom, a shell member secured to the wheel hub and terminating short of the axle end and adapted to leave the latter exposed, said shell member being provided with spaced recesses and cam portions, a cup-shaped cap member provided with a skirt, a locking spring secured to said skirt and comprising an annular securing portion surrounding said axle, and spring finger portions, said finger portions being bent radially inwardly and then longitudinally along the axle and then radially outwardly in the form of return bends and having foot portions at their outer ends adapted to enter the shell recesses and engage said cam portions upon relative rotative movement of said members.

4. In combination with the hub of a wheel and an axle extending outwardly therefrom, a shell member secured to the wheel hub and terminating short of the axle end and leaving the latter exposed, said shell member being provided with spaced recesses and cam portions, a cup-shaped cap member provided with a skirt, a locking spring comprising an annular securing portion surrounding said axle, and comprising also spring finger portions, said finger portions being bent radially inwardly and then longitudinally along the axle and then radially outwardly in the form of return bends and having foot portions at their ends adapted to enter the shell recesses and engage said cam portions upon relative rotative movement of said members, the skirt of said cap member being formed to non-removably abut the securing portion of said spring so as to hold said spring in place.

5. In combination with the hub of a wheel and an axle extending outwardly therefrom, a shell member secured to the wheel hub and terminating short of the axle end and leaving the latter exposed, said shell member being provided with spaced recesses and cam portions, a cup-shaped cap member provided with a skirt, a locking spring comprising an annular securing portion surrounding said axle and comprising also spring finger portions, said finger portions being bent radially inwardly and then longitudinally along the axle and then radially outwardly in the form of return bends and

having foot portions at their ends adapted to enter the shell recesses and engage said cam portions upon relative rotative movement of said members, the skirt of said cap member being formed to non-removably abut the securing portion of said spring so as to hold said spring in place, and an annular gasket lying adjacent the securing portion of said spring and locked in place by the arms of said spring and adapted to engage the end of said shell member.

In testimony whereof I hereby affix my signature.

JAMES S. REID.