March 18, 1930. F. CARL 1,750,702

WHEEL PULLER

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Fig. 1.

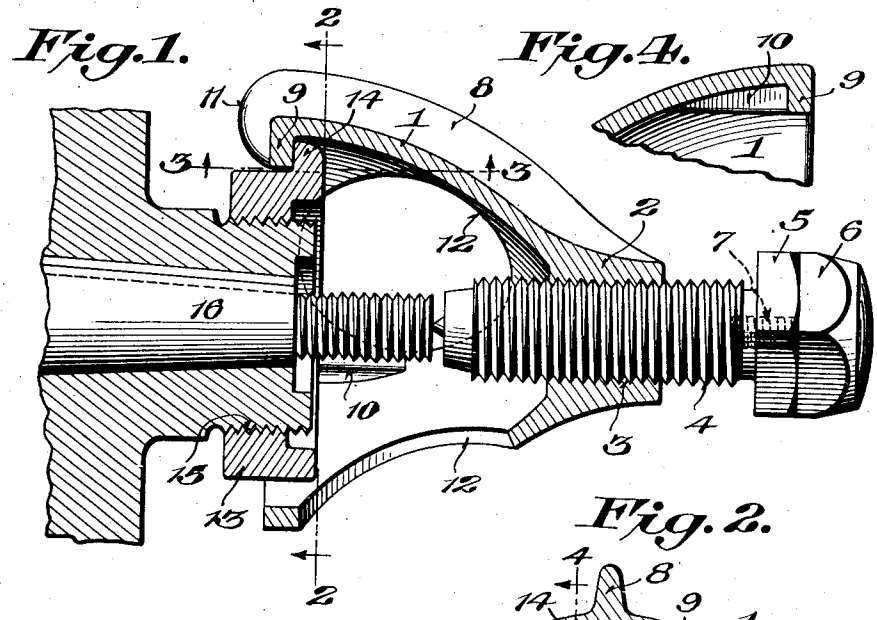


Fig. 4.

Fig. 2.

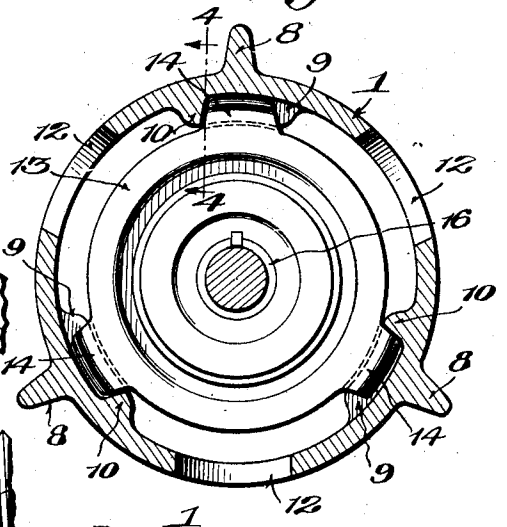
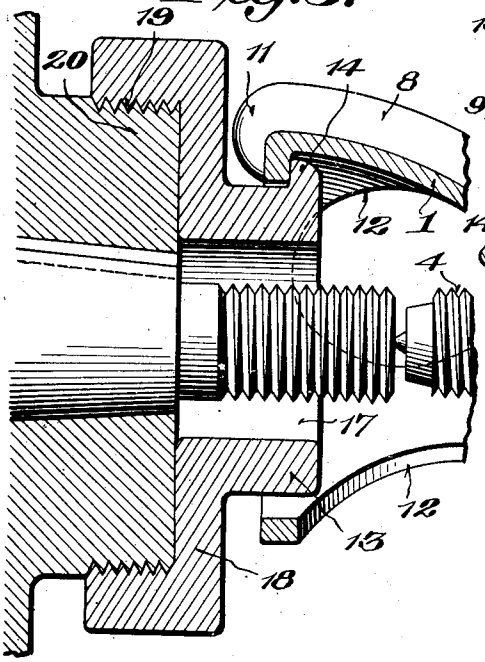


Fig. 5.



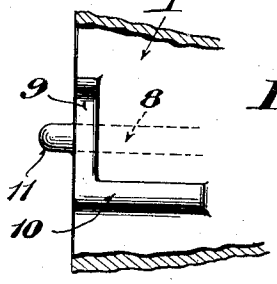


Fig. 3.

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Fig. 6.

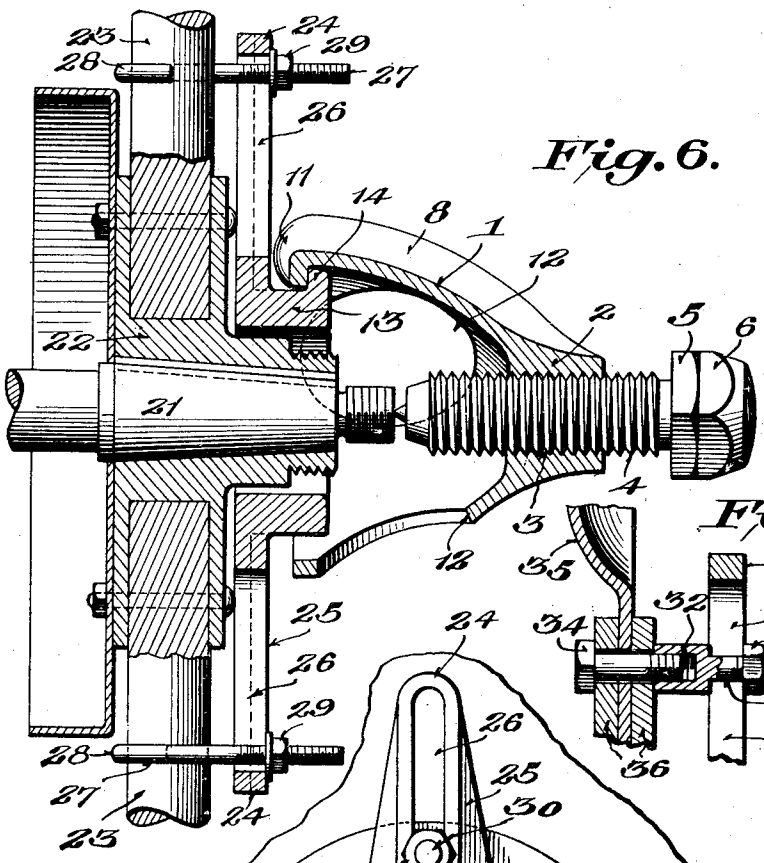


Fig. 8.

Fig. 7.

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UNITED STATES PATENT OFFICE

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WHEEL PULLER

Application filed October 16, 1925. Serial No. 62,894.

This invention is an improved wheel puller, and the prime object thereof is to adapt a single device for pulling wheels of different sizes and of different types.

In carrying out my invention, I employ a pulling device of adequate size and strength, and also provide a plurality of adapters, one for each size and type of wheel to be puller, each adapter being constructed for convenient connection with a wheel and with a single pulling device.

The present invention consists in the combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it of course being understood that changes in the form, proportion, size and minor details may be made, within the scope of the claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a longitudinal sectional view of a wheel puller, embodying the features of the present invention and applied in operative position to the hub of a wheel.

Figure 2 is a cross-sectional view on the line 2—2 of Figure 1.

Figure 3 is a fragmentary sectional view on the line 3—3 of Figure 1.

Figure 4 is a detail fragmentary sectional view on the line 4—4 of Figure 2.

Figure 5 is a fragmentary longitudinal sectional view, similar to Figure 1, and showing a modified form of adapter for use in connection with a wheel of materially greater size than that illustrated in Figure 1 of the drawings.

Figure 6 is a view similar to Figure 1, and showing the use of another form of adapter for connecting the pulling device to the spokes of a wheel.

Figure 7 is a front elevation illustrating the manner of using the adapter shown in Figure 6 in connection with a disc wheel.

Figure 8 is a detail sectional view taken through one of the arms of the adapter and the disc wheel shown in Figure 7.

Referring at first more particularly to Figures 1 to 4 inclusive, it will be seen that the pulling member of the present invention includes a cup-shaped member 1 having a thickened smaller end portion 2 provided with an axial screw-threaded bore 3 in which works a screw 4 provided at its outer end with a wrench head 5. A supplementary head 6 is secured against the outer end of the main head 5, by means of a screw-threaded stud or stem 7 received within a screw-threaded recess or bore in the outer end of the screw 4. The soft-metal supplemental head 6 is intended to receive the blows of a hammer or sledge struck against the outer end of the screw 4 as is the practice in the operation of the present device, and this supplemental head is replaceable, whereby damage to the permanent head of the screw 4 is prevented.

The hollow shell portion of the member 1 is preferably circular in cross-section, as best shown in Figure 2 of the drawings, and is strengthened and reinforced by ribs 8, preferably three in number extending longitudinally of the member 1 from end to end thereof and disposed equidistant around the device. At the open end of the member 1 and in alinement with each rib 8, there is a shoulder 9 within the member 1 and extending circumferentially thereof and at opposite sides of the rib 8. Leading from one end of the shoulder 9 there is an abutment 10 on the interior of the member 1 and extending a suitable distance inwardly thereof. Each rib 8 has a lateral terminal 11 in the form of a finger extending across the outer side of the shoulder 9. It will of course be understood that the parts 8, 9, 10, and 11 are cast integral with the member 1 and cooperate to strengthen and reinforce said member in a very simple and efficient manner. In view of the strength imparted to the member 1 by the reinforcing elements, the walls of said member 1 may be relatively thin, and the amount of metal employed in the member 1 may be reduced by providing said member with relatively large openings 12, each opening being located midway between a pair of adjacent ribs 8, whereby a skeleton construction is provided.

In cooperative relation with the puller

member 1, and separable therefrom, is the adapter member 13, the body portion of which is circular and of a size to be received within the open end of the puller member 1. This adapter is provided with a plurality of radial lugs 14, there being one lug for each shoulder 9 of the puller member 1, as best illustrated in Figure 2 of the drawings. The diameter of the circle, in which the outer ends of the lugs 14 lie, is slightly less than the internal diameter of the larger open end portion of the puller member 1, whereby the adapter may be received within the open end of the puller member with the lugs 14 disposed between the respective adjacent shoulders 9, after which the puller member 1 is rotated upon its axis until stopped by engagement of its abutments 10 with the respective lugs 14, which will bring the latter in rear of the shoulders 9, whereby the adapter and the puller are engaged.

In the embodiment shown in Figure 1, the adapter 13 is provided with a screw-threaded portion 15 for engagement with the screw-threaded portion of the hub of a wheel, which screw-threaded hub portion normally carries a hub cap as in standard motor vehicle practice.

In using the device as illustrated in Figure 1, the hub cap, not shown, is removed from the wheel hub, and the adapter 13 is applied to the screw-threaded part of the hub. The puller member 1 is then assembled with the adapter in the manner hereinbefore described, and the screw 4 is set up tightly against the outer extremity of the axle or wheel spindle 16, from which it is desired to remove the wheel. By alternately turning the screw 14 and striking blows against the outer end thereof with a sledge or hammer or the like, the wheel hub will be loosened from its snug frictional engagement with the spindle sufficiently to permit the ready removal of the wheel.

In the form shown in Figure 5, it will be seen that the adapter 13 is provided with a smooth axial bore 17, and is also provided with an external circumferential enlargement 18, in rear of the lugs 14, and this enlargement is provided with a screw-threaded socket 19 larger in diameter than the external diameter of the body portion of the adapter, and designed to receive the screw-threaded portion of a wheel hub 20 of greater diameter than that to which the adapter of Figure 1 is applicable. The body portion and the lugs 14 of the adapters of Figures 1 and 5 are identical in size and relation in order that they may be properly and conveniently assembled with one and the same puller member 1, whereby a single puller member may be employed for pulling different sizes of wheels.

For pulling some types of wheels, it will be desirable to connect the adapter to the spokes of the wheel instead of the hub thereof, and provision for this manner of connection has been shown in Figure 6 of the drawings, wherein 21 designates a wheel spindle carrying a hub 22 from which radiate spokes 23. The adapter 13 is provided with a series of radial arms 24 disposed in angular relation in accordance with the standard practice with respect to wheel spokes. Each arm 24, as best indicated in Figure 7, is braced by webs 25 at opposite sides thereof. A slot 26 extends radially throughout the major portion of the length of each arm. The body of the adapter is provided with a smooth axial bore of a diameter large enough to fit over the projecting portion of the wheel hub 22 after the hub cap has been removed. Certain or all of the arms 24 are connected to the wheel spokes in the manner shown in Figure 6, and this connection consists of a screw-threaded shank 27 extending through the slot in one of the arms 24 and provided at one end with a hook 28 to engage about the adjacent spoke, there being a nut 29 upon that end portion of the shank which projects outwardly through the slotted arm. The nut 29 is set up tightly against the arm 24 so as to rigidly connect the latter with the spoke. With the adapter connected to the spoke, in the manner just described, the puller member 1 may be associated with the adapter and the wheel pulled in the manner hereinbefore described.

To adapt the device for use in connection with disc wheels, the armed form of adapter is employed, but instead of the hooked fastenings 27, there is provided a fastening device 30 in the form of a screw-threaded shank extending through a slotted arm and provided at its outer end with a nut 31 and at its inner end with an internally screw-threaded socket 32. In using this form of the device, certain of the nuts 33 employed on the bolts 34 to clamp the central portion of the disc wheel 35 between the hub plates 36, are removed, and certain of the screw-threaded sockets 32 are screwed upon the bolts 34, after which the nuts 31 are turned down against the arms 24 so as to rigidly connect the latter with the disc wheel. With the arms thus connected to the disc wheel, the latter may be removed by manipulation of the pulling device in the manner hereinbefore described. By having the screw-threaded shank portion 30 of the same diameter as the hub plate bolts 34, the nuts 33 of the wheel may be employed upon the shank members 30 in lieu of separate nuts.

From the foregoing description it will be understood that, in accordance with my invention, I employ a single pulling device which includes the member 1 and the screw 4, and I provide a plurality of adapters, having identical means for connection with the pulling device, but differing otherwise in ac-

cordance with wheels of different sizes and of different types, whereby a single pulling device may be employed to pull wheels of different sizes and of different types.

In the form of the adapter shown in Figure 5 of the drawings, it will be seen that there is clearance between the open end of the pulling member and the enlargement 18 of the adapter for convenience in assembling the parts and to permit of the necessary endwise play or looseness of the adapter on the pulling member when a blow is struck against the head of the screw 4 such as will loosen the wheel and pull the same outwardly on the axle spindle. The same thing is true in the form of the device as shown in Figure 6, as there is clearance between the open end of the pulling member and the arms 24.

What is clamed is:

1. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adapter provided with means for detachable connection with a wheel, one end of the adapter having a plurality of external lugs distributed equally around the adapter, the external diameter of the lugged portion of the adapter being less than the internal diameter of the open end of the pulling member so as to be received within the latter, and the pulling member having internal lugs spaced equally around the pulling member and disposed to be engaged with the rear faces of the lugs on the adapter, and reinforcing abutments extending longitudinally upon the interior of the pulling member and disposed for engagement with corresponding ends of the lugs on the adapter.

2. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, circumferentially disposed lugs within and at the open end of the pulling member, there being abutments extending longitudinally inward from corresponding ends of the lugs, external ribs extending longitudinally of the pulling member and across the outer faces of the lugs, and an adapter having a longitudinal bore and provided with means for detachable connection with a wheel, said adapter also being provided with external lugs capable of being received within the open end of the pulling member and within the seats defined by the lugs and shoulders of said pulling member.

3. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adapter provided with means for detachable connection with the pulling member, said adapter also having substantially radial arms, and means associated with the arms for detachably connecting the latter with a wheel.

4. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adapter provided with means for detachable connection with the pulling member, said adapter also having substantially radial arms, and means associated with the arms for detachably connecting the latter with a wheel, said last mentioned means being adjustable longitudinally of the arms.

5. A wheel puller comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adaptor provided with means for detachable connection with the pulling member, said adaptor also having substantially radial arms, connecting means associated with the arms for detachably connecting the latter with a wheel, and means whereby said connecting means is adjustable longitudinally of the arms.

6. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adaptor provided with means for detachable connection with the pulling member, said adaptor also having substantially radial slotted arms, and means associated with the arms for detachably connecting the latter with a wheel, said last mentioned means having shanks received within the slots and adjustable longitudinally thereof.

7. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adaptor provided with means for detachable connection with the pulling member and substantially radial arms provided with longitudinal slots, shanks extending laterally through said slots and having retaining elements at one end thereof, and also having means at the opposite ends thereof for detachable connection with a wheel.

8. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end, and an adaptor provided with means for detachable connection with the pulling member and substantially radial arms provided with longitudinal slots, shanks extending laterally through said slots and having retaining elements at one end thereof, and also having means at the opposite ends thereof for engagement with the hub plate bolts of a disc wheel.

9. A wheel puller, comprising a hollow pulling member open at one end and having a feed screw extending through its opposite closed end and an adaptor provided with means for detachable connection with the pulling member and substantially radial arms provided with longitudinal slots, shanks extending laterally through said slots and having retaining elements at one end

thereof, and also having internally screw threaded sockets at the opposite ends thereof for engagement with the hub plate bolts of a disc wheel.

10. A wheel puller, comprising a pulling member having a feed screw extending therethrough, the outer end of the feed screw having a polygonal wrench head, and a soft metal replaceable head member conforming in shape to the polygonal shape of the wrench head and having a screw threaded stud received within a screw threaded recess in the outer end of the wrench head.

FREDERICK CARL.