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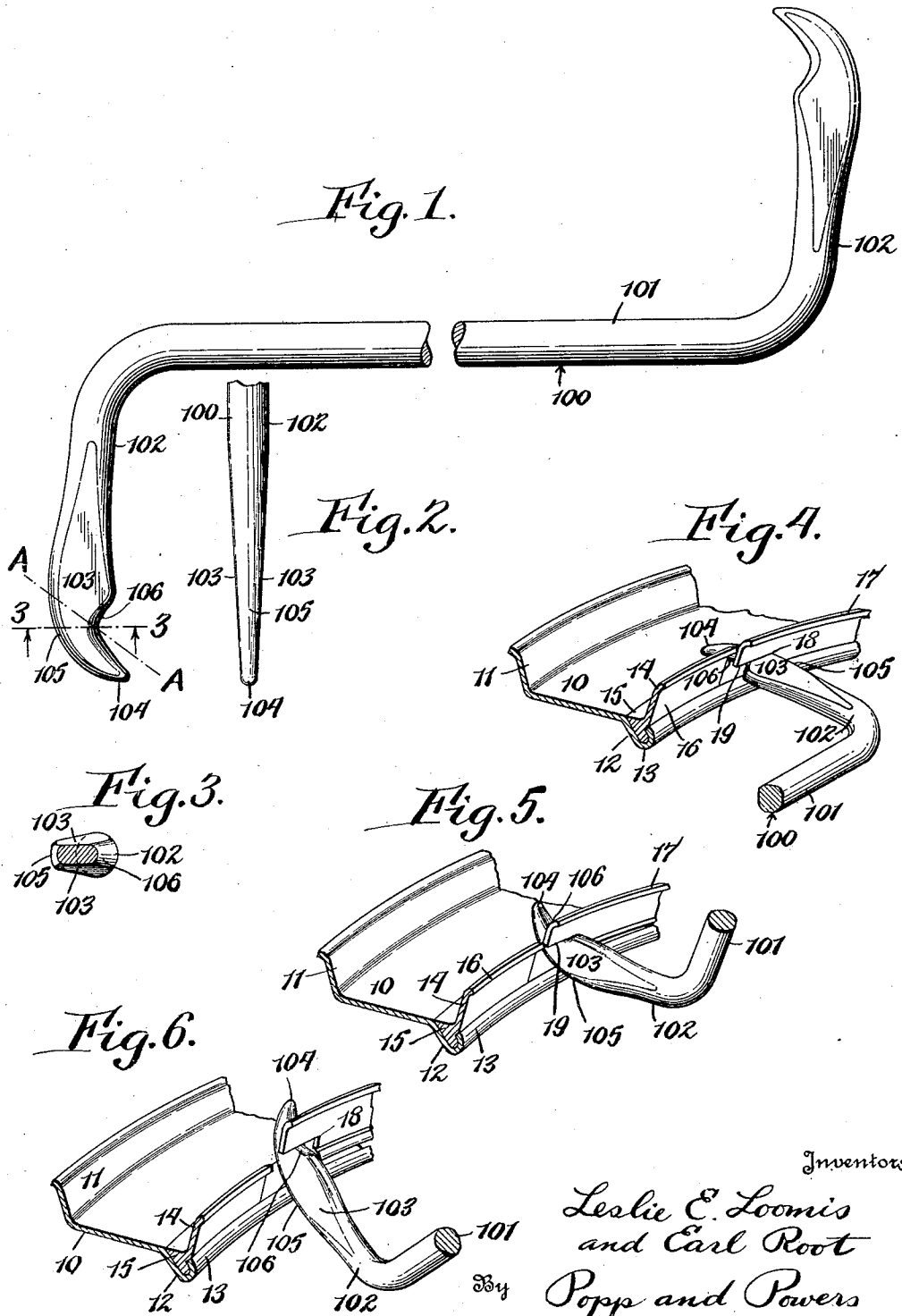
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RING LIFTER FOR AUTOMOBILE WHEEL RIMS

Filed May 31, 1930

2 Sheets-Sheet 1



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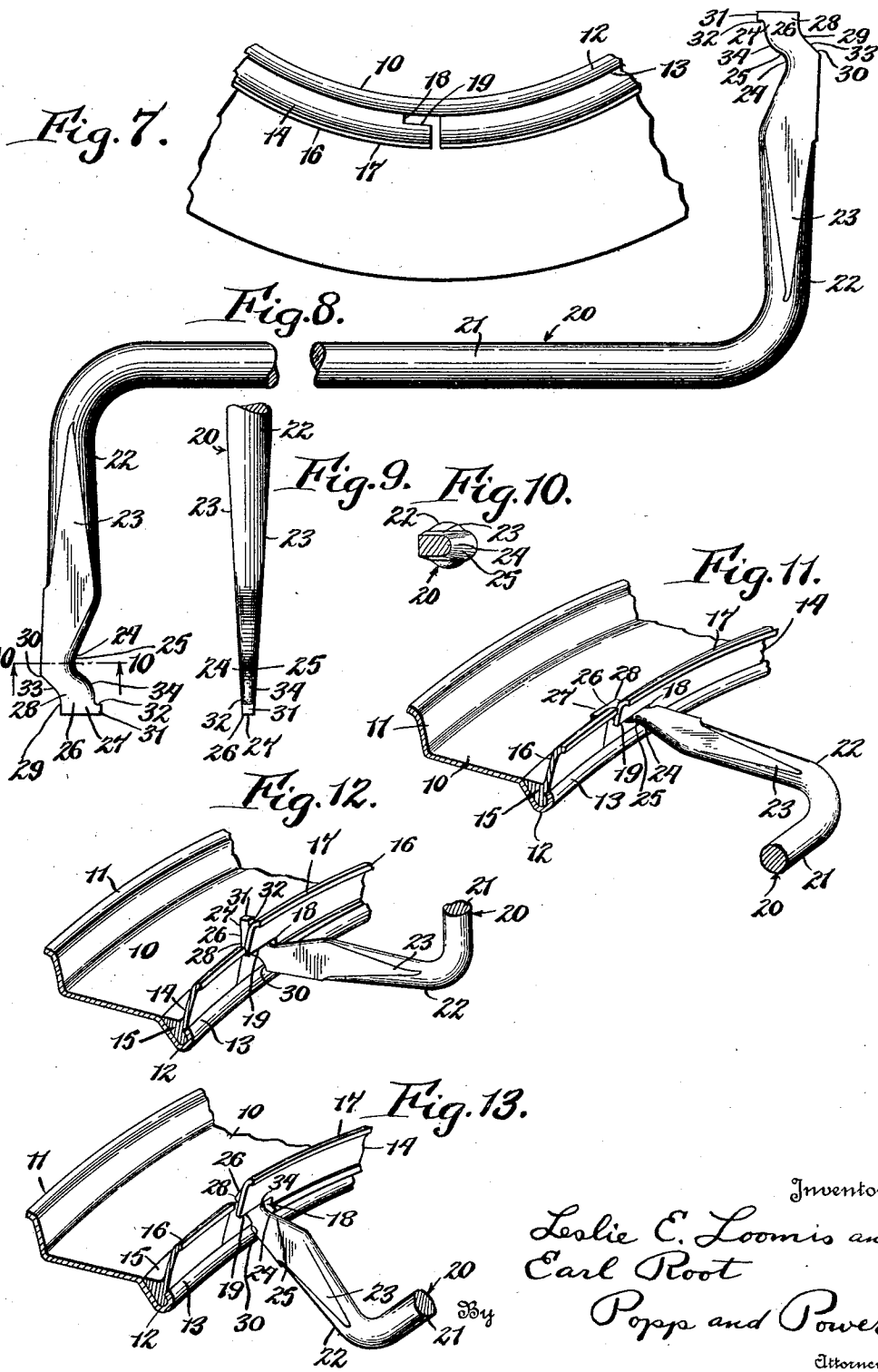
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UNITED STATES PATENT OFFICE

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RING LIFTER FOR AUTOMOBILE WHEEL RIMS

Application filed May 31, 1930. Serial No. 458,258.

This invention relates to a ring lifter for automobile wheel rims and more particularly to a tool which is adapted to be used in removing a split tire retaining ring from automobile wheel rims which ring is provided with a recess or notch at one of its ends for the purpose of the insertion of a tool between the rim and the ring and enabling that end of the ring to be wedged out of the channel of the rim in which it is normally arranged.

The principal object of this invention is to provide such a tool which is so formed that it can be easily inserted into the notch at one end of the split ring and between the rim and the ring and which is additionally provided with cam surfaces whereby by a simple manipulation of the tool the notched end of the ring is lifted free of the rim so that the ring can be removed. The tool is so designed that this operation can be affected with the minimum expenditure of time and effort and is also so designed that it will operate satisfactorily under all conditions, such as when the ring is badly rusted to the rim.

Another object is to provide such a tool which is of such form that the same tool can be operated on a wide range of the different sized wheel rims. By this means only one tool need be kept on hand in a garage to remove all split rings of both trucks and pleasure cars.

Another purpose is to provide such a tool which is made in the form of a single part which is compact and can therefore readily be stored away, which is inexpensive and requires no elaborate machining operations thereby permitting its production at low cost.

In the accompanying drawings:

Fig. 1 is a side elevation of the preferred form of ring lifter embodying the present invention.

Fig. 2 is a fragmentary end elevation thereof.

Fig. 3 is a section taken on line 3—3, Fig. 1.

Fig. 4 is a perspective view of a part of a rim having a ring thereon and showing a tool embodying the present invention inserted in

its initial position preparatory to lifting the ring.

Fig. 5 is a similar view showing the second position of the tool in lifting the ring and showing the ring partly lifted.

Fig. 6 is a similar view showing the final operation of the tool in lifting the ring preparatory to its removal.

Fig. 7 is a fragmentary side elevation of an automobile wheel rim showing the tire retained thereon by the form of ring which is adapted to be removed from the rim by the present invention.

Figs. 8-13 show a modified form of tool for lifting rings from automobile rims in which:

Fig. 8 is a side elevation of the modified form of ring lifting tool.

Fig. 9 is a fragmentary end elevation thereof.

Fig. 10 is a section taken on line 10—10, Fig. 8.

Fig. 11 is a perspective view of a part of a rim having a ring thereon and showing the modified form of tool inserted in its initial position preparatory to lifting the ring.

Fig. 12 is a similar view showing the second position of the modified form of tool in lifting the ring and showing the ring partly lifted.

Fig. 13 is a similar view showing the final operation of the tool in lifting the ring preparatory to its removal.

Similar reference numerals refer to like parts in each figure.

One form of the rim or ring in connection with which the present invention is adapted to be used is shown in Figs. 4-7. As there shown the rim 10 is provided on one side with a permanent flange 11 and at its opposite side is bent to provide a depressed annular channel 12. The outer end of the channel 12 is reversely formed as indicated at 13. The split retaining ring 14 comprises an annular inner part 15 which is received in the channel 12 and flange 16 which is generally the same form as the permanent flange 11 on the opposite side of the rim. One end 17 of the split ring 14 is undercut to form a recess or notch 18. The inner shoulder 19

of the notch 18 is arranged so that when the ring is in position on the rim 10 this shoulder 19 is outside of the reversely formed end 13 of the channel 12 so that a tool can be inserted between the shoulder 19 and the reversely formed end 13 of the channel 12 and thereby permit of wedging the end 17 of the split ring away from the rim 10 so that it can be removed therefrom.

The preferred form of ring filter embodying the present invention, as shown in Figs. 1-6, comprises an L or S-shaped bar 11 having a shank 101 and laterally projecting ends 102. These ends 102 are formed by bending the bar 20 and are preferably formed to project in opposite directions from the shank 101 so that the end not used forms a crank handle for the manipulation of the tool. Each of the ends 102 are identical in construction and operation and hence a description of one will be deemed to apply to both. It will be understood, however, that these ends can be made of different sizes so that the tool can be adapted for all ranges of automobile rims from the comparatively large and heavy rims of trucks to the relatively light and small rims of pleasure cars.

As best shown in Fig. 2 each of the ends 103 is tapered to provide flat converging faces 103 at its opposite ends which form a comparatively thin end for the tool and these flat faces are generally in the same plane as the ends and shank of the tool. At its outer end each end 102 of the tool is formed to provide a horn 104 which extends outwardly and laterally in the direction of the shank 101 of the tool. This horn is formed by the provision of an outwardly bulging rounded part 105 on the side of the end 102 away from the shank 101 and by the provision of a recess 106 on the side of the end 102 which is nearest to the shank 101. The bulging part 105 of each end of the tool is rounded, as best shown in Fig. 3, and the rounding at this edge of each end of the tool preferably merges into the flat faces 103 on opposite sides thereof. In the same manner the tool at each recess 106 is rounded to provide a cam face across this recess, this cam face preferably merging into the flat faces 103 at opposite sides of each end of the tool. The bulging outer edge or portion 105 of each end of the tool and the opposite recess 106 are preferably so formed that the horn is of tapering or somewhat bluntly pointed form as shown in Fig. 1.

In using this form of tool the end 102 selected is placed adjacent the notch 18 and the shank 101 of the tool is arranged tangentially of the rim. In this position the horn 104, with its tapering flat sides 103, can be forced into the notch 18 between the rim 10 and the shoulder 19, this initial position being illustrated in Fig. 4. In this inserted position the notch 106 of the end used is ar-

ranged under the shoulder 19 of the ring. It will be noted that even though the effective size of the notch 18 is comparatively small, as long as the end or point of the horn 104 can be inserted the end of the tool can be easily forced into the position shown in Fig. 4 by the application of pressure at the bend of the tool.

The tool is then rotated clockwise about the working end 102 as an axis to the position shown in Fig. 6. In this position the opposite or unused extension 102 of the tool can be used as a crank handle. In this operation the rounded edge or bulging part 105 and the rounded edge forming the notch 106 form cam faces which ride along the shoulder 19 of the ring and the reversely formed edge 13 of the channel 12 of the rim. Since the flattening of the sides of each end 102 provides a flattened end which is thinner than its dimension along the line 3-3, Fig. 1, as best shown in Fig. 3, it is apparent that this rotation of the tool necessarily lifts the notch end of the ring 14, this lifting being illustrated in Fig. 5.

The shank 101 of the ring lifter is then swung radially outward relative to the rim, or toward the axis thereof. In this operation the bulging portion 105 rides along the reversely formed end 13 of the channel 12 of the rim and the horn 104 moves toward the inner side of the ring 14, as best shown in Fig. 6. Since the oblique cross sectional dimension along the line A-A, Fig. 1 is greater than the dimension along the line 3-3 thereof, it is apparent that this action wedges the ring still further out of its retaining channel and this outward action continues until the notched end of the ring is free from the channel at which time the horn 104 engaging the inner side of the notched end of the ring forces it laterally outward free of the rim 10. It is apparent that in this position the ring is positively held out by the horn 104 of the tool and cannot accidentally snap back into position. In the modified form of the invention shown in Figs. 8-13 the ring lifter is similarly formed of an L or S-shaped bar 20 having a shank 21 and ends 22 which are formed by bending the bar 20 in opposite directions from the shank 21 so that the non-working end forms a crank handle for the manipulation of the tool. As best shown in Fig. 9 each of the ends 22 is tapered to provide flat faces 23 at its opposite sides which form a comparatively thin end for the tool, these flat faces being generally in the same plane as the ends and shank of the tool. At its outer end each end 22 of the tool is formed to provide a notch or recess 24, this notch being rounded so as to form a cam face 25 which forms a rounding continuation of each of the flat faces 23 of the tool, and this notch 24 also forming a foot 26 having a toe 27 and a heel 28. The

toe of this foot 26 is formed to provide an arch or rounded extension 34 which arch is also rounded in the same manner as the notch 24 and forms a continuation of the cam face 25. The heel 28 is provided with a notch 29 forming a shoulder 30, the shoulder 30 being arranged opposite to the notch 24 in a direction substantially parallel to the shank 21 of the tool. The notch 29 is provided with a sharp corner 33 at its opposite sides for a purpose which will presently appear and the tool 27 is also formed to provide a small oblong extension 31 which forms a shoulder 32, this shoulder 32 facing the shank 21 of the tool.

In using this modified form of the tool the tapered end of one of the end extensions 22 is first forced between the shoulder 19 at the notched end of the ring 14 and the reversely formed end 13 of the channel 12 of the rim. In this position, shown in Fig. 11 the shank 21 of the tool extends tangentially to the rim 10 and the shank 21 is so arranged that it extends in the same direction as the notched end 17 of the ring. In other words, the heel 28 of the end of the tool used, is arranged adjacent the end of the notch 18 and the toe 27 of the tool extends toward the opposite unnotched end of the split ring.

The tool is then rotated clockwise about the working end 22 as an axis to the position shown in Fig. 12. In this operation the opposite or unused extension 22 of the tool can be used as a crank. In this operation the square corner 33 of the heel 28 at the notch 30 engage or dig into the reversely formed end 13 of the channel 12 and prevent the tool from slipping. It is therefore apparent that when this tool is so turned the shoulder 19 of the ring 14 rides up on the rounded cam face 22 of the tool and since the distance between this cam face 25 and the notch 30 is substantially greater than the transverse thickness of the tool at the same place, the end 17 of the ring is wedged outwardly.

The shank 21 of the ring lifter is then swung radially outward relative to the rim or toward the axis thereof. In this position, as shown in Fig. 7, the shoulder 30 of the notch 29, engages the reversely formed end 13 of the channel 12 of the rim and the foot 26 forms a lever fulcruming about the shoulder 30 which lifts the notched end 17 of the ring free of the channel. In this operation the shoulder 19 at the notched end of the crank 14 rides up on the cam face 25 and along the arch 34 of the foot 26 and this movement continues until the end 17 of the crank is entirely free from the channel 12 after which the ring can be removed in the usual manner.

The shoulder 32 at the end of the toe 27 prevents the end 17 of the ring from passing beyond the end of the tool and thereby prevents the ring from snapping back into its position in the channel 12. It is apparent that by providing a tapered end to the tool

in the event that the space between the shoulder 19 at the notched end 17 of the ring 14 and the reversely formed end 13 of the channel 12 is comparatively small, so long as the end of the tool can be inserted, the tool can be forced into the notch 18 sufficiently to bring the notch 24 under the ring. This is possible because of the tapering of the end of the tool in the same manner as in the preferred construction.

From the foregoing it is apparent that both forms of the present invention provide a tool which can be easily inserted in the notch of the ring to be removed, and that by a very simple rotation of the tool and subsequent movement of the tool radially outward from the rim the tool completely frees the ring from the rim. This freeing of the rim, in both forms of the invention is effected entirely by cam faces so that the effort required is very small and at the same time a large amount of power can be applied in the event that the ring is rusted onto the rim. The tool is also simple to operate, is made in the form of a single part and is so formed that it is compact and can be produced at low cost.

It will also be particularly noted that in both of the forms of the invention the rounding 25 and 106 provides a shoulder at a side opposite from the horn at the end of the tool. It is apparent that this shoulder forms a stop shoulder for preventing the inward slippage of the tool when the tool is being forced downwardly in its last operation of removing the ring, this operation being illustrated in Figs. 5, 6, and 13.

We claim:

1. A tool for removing split rings of the character described from vehicle wheel rims, which rings are each provided with an undercut recess at one end, comprising a metal bar which is flattened at opposite sides at one end to fit said recess between said ring and rim when the flattened sides are arranged tangentially of said rim, said flattened portion being transversely notched at one side forming a reduced or hook portion and leaving a shoulder, and the tool at said recess being rounded to provide a cam face which merges into said flat faces whereby upon rotating said inserted tool the rounded cam face of said notch engages and lifts the end of said ring from said rim which becomes engaged in the notch between the hook and shoulder to prevent slipping and upon thereafter swinging said tool radially and toward the axis of said rim said extension engages said ring and displaces it laterally from said rim.

2. A tool for removing split rings from vehicle rims, which rings are each provided with an undercut recess at one end, comprising a metal bar formed to provide a handle and a laterally projecting end, said laterally projecting end being flattened to wedge

into said recess between said ring and rim when the flat faces of said extension are arranged tangentially of said rim, and said end being also notched at one edge to provide a pointed horn at the tip of said end, said notch being of rounding form in plan and also having its bottom rounded to provide a transverse cam face and an adjacent shoulder and the opposite edge of said flattened end being formed to provide an outwardly bulging portion whereby upon rotating the inserted end of said tool, the rounded cam face of said notch engages and lifts the end of said ring from said rim and upon thereafter swinging said end radially and toward the axis of said rim, said bulging portion rides along said rim, said ring rides up on said horn, said ring is wedged further from said rim and said horn also displaces said ring laterally from said rim.

In testimony whereof we hereby affix our signatures.

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