Nov. 8, 1927.

1,648,189

L. OTTINGER

TOOL

Filed July 29, 1924

Fig. 1.

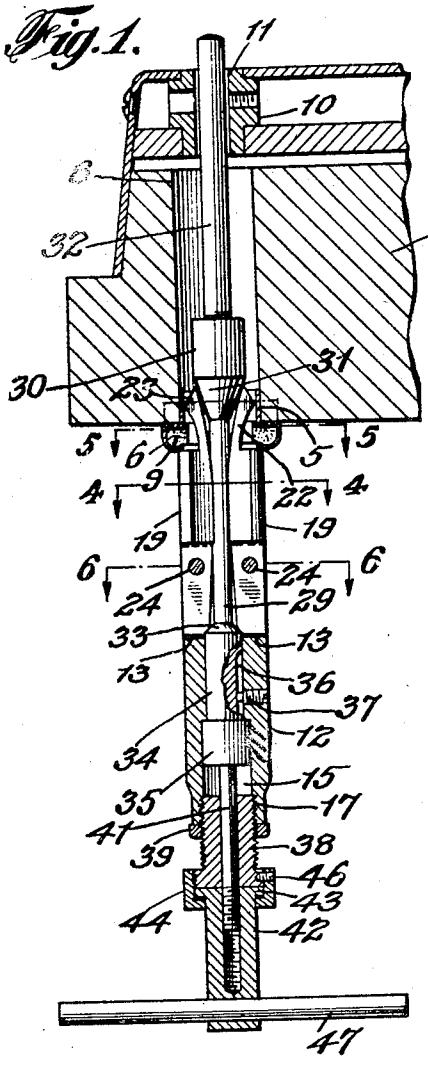


Fig. 3.

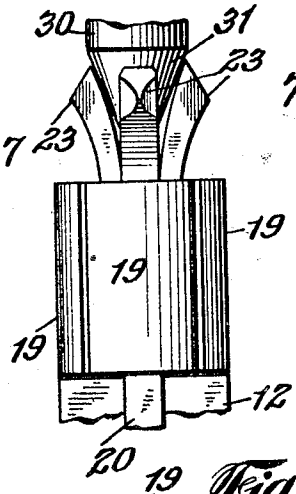


Fig. 4.

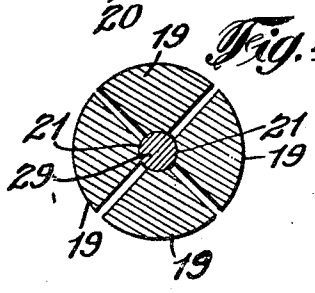


Fig. 5.

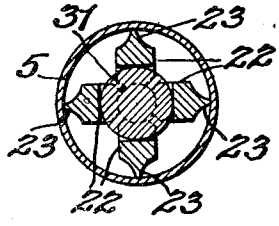


Fig. 6.

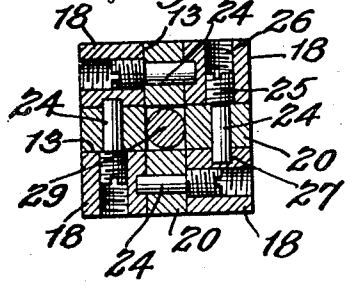
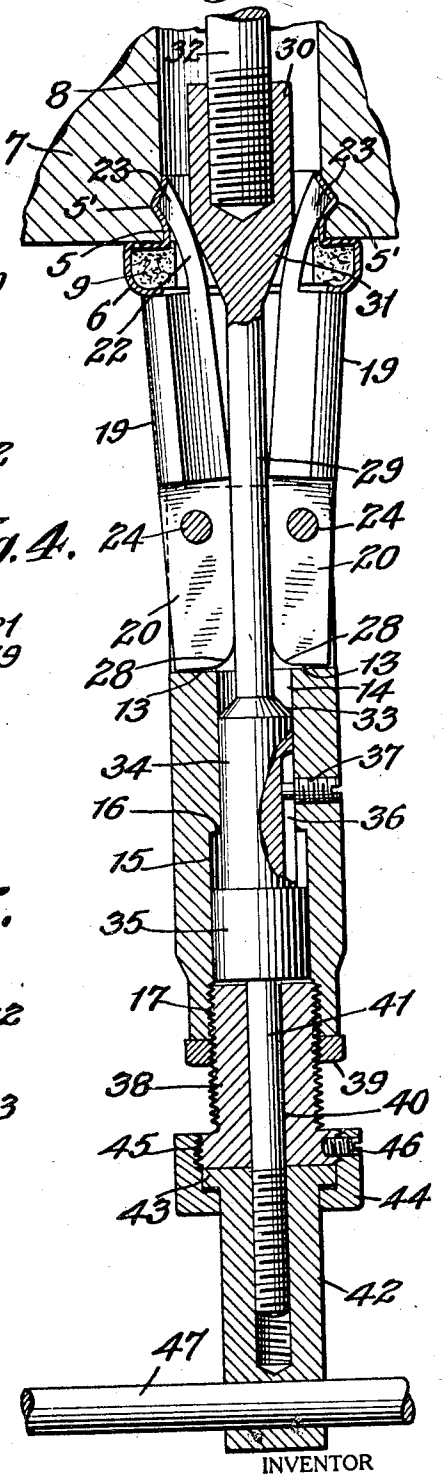


Fig. 2.



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UNITED STATES PATENT OFFICE.

LEON OTTINGER, OF NEW YORK, N. Y.

TOOL.

Application filed July 29, 1924. Serial No. 728,991.

This invention relates to tools and more particularly to an improved tool for easily, accurately and rigidly securing a latch handle bearing member to a door structure.

It is the primary object and purpose of my present invention to provide a tool especially designed for the purpose of attaching or securing latch handle bearings to automobile doors whereby the use of screws and analogous attaching devices for such bearings are dispensed with. More specifically, I provide, in the present embodiment of the invention, a simply constructed and easily operated tool for attaching or securing a combined bearing and escutcheon member such for instance as is illustrated in my pending application for patent, Ser. No. 696,426, filed March 3, 1924, to the door structure at the outer end of the latch handle opening therethrough. This combination bearing and escutcheon member consists primarily of a sheet metal sleeve, one end of which is inserted into the latch handle opening. The tool as herein disclosed includes a plurality of relatively movable elements adapted to be positioned within said sheet metal sleeve and manually operable means for relatively moving said tool elements to bend spaced parts of the sleeve wall into interlocking engagement with the door structure whereby said bearing sleeve is rigidly and permanently fixed to the door.

It is another general object of the invention to provide a tool for the above purpose which may be operated with ease and facility, is positive and reliable in its action, not liable to get out of order and can be produced at relatively small cost.

With the above and other objects in view, the invention consists in the improved tool and in the combination, construction and arrangement of its several parts as will be hereinafter more fully described, illustrated in the accompanying drawing and subsequently incorporated in the subjoined claims.

In the drawing wherein I have shown one simple and practical embodiment of the invention and in which similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a horizontal sectional view through a portion of the door structure and my improved tool, showing the latter arranged in operative position with respect to the latch handle bearing member engaged in the outer end of the handle opening;

Figure 2 is a similar view on an enlarged scale showing the positions of the tool elements after they have been operated or expanded and the latch handle bearing member permanently fixed to the door structure;

Figure 3 is a fragmentary detail elevation of the tool;

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a similar view taken on the line 5—5 of Figure 1; and

Figure 6 is a horizontal section taken on the line 6—6 of Figure 1.

In the equipment of automobile doors with latches, it has heretofore been the practice in the art to provide, at the outer end of the transverse opening through the door structure, a latch handle bearing member consisting of a cast metal bushing threaded into the handle opening. For reasons, fully stated in my co-pending application, bearing members of this type are relatively expensive, and considerable time and skill must be expended in properly attaching and securing the bearing member in place. It also frequently happens that the opening through the door is not accurately centered with the rollback and in such cases the solid metal bushing offers considerable frictional resistance to the free turning movement of the latch handle. I have succeeded in overcoming these difficulties by providing a latch handle bearing member as shown in my prior application and which consists, in its preferred form, of a one-piece sheet metal sleeve 5 having an enlarged hollow annular head 6 formed on one end thereof to surround the latch handle opening 8 at the outer face of the door 7 and subserve the purpose of an escutcheon. Within the hollow annular head 8 the annular bearing element 9 of felt or other compressible material is secured.

Upon the inner side of the door structure 7, a suitable latch, partly illustrated in Figure 1 of the drawings, is secured, said latch including the usual actuating rollback 10 having the handle receiving bore 11. It is the intent in the manufacture of such automobile doors to accurately bore the opening 8 therethrough so that when the latch is applied the bore 11 of the rollback 10 and the

opening 8 will be coaxially centered with respect to each other. Not infrequently, however, due to carelessness, either in applying the latch to the door structure or in boring the opening 8, such exact coaxial alignment of the rollback bore and said opening is not obtained and the axis of the opening 8 may extend at a slight angle with respect to the axis of the bore 11. Furthermore, as shown in Figure 1, the opening 8 may extend through the door structure at an angle of other than 90° with respect to the outer face of said door.

In applying the sheet metal bearing and escutcheon member, the end of the sleeve 5 which has an outer diameter approximately equal to the diameter of the opening 8, is inserted into the outer end of said opening until the inner side of the annular head 6 contacts with the door face. This bearing member is then permanently fixed in position by means of my improved tool which, in its preferred embodiment, is of the following construction:

The tool body 12 is preferably, though not necessarily, of rectangular form and one end of this tool body is provided with the longitudinally extending slots 13 disposed in rightangular intersecting relation to each other. The body 12 is further formed with a longitudinal bore 14 communicating with said slots at one of its ends and having its other end counterbored or enlarged as at 15 to provide an internal annular shoulder 16. The counterbore 15 at the end of the tool body is threaded as at 17 for a purpose which will be presently disclosed.

By the provision of the slots 13 there is thus formed on the end of the tool body the spaced arms 18 of rectangular form in cross section. With these arms a plurality of relatively movable tool elements are connected, each of said elements having a body portion 19 of segmental form in cross section and a reduced longitudinally extending shank 20 at one end of said body portion. At the inner edge or apex of the body portion 19, the longitudinally extending concave face 21 is formed and said body portion is provided at its other end and at the inner side thereof with a longitudinally projecting arm 22. This arm may be of any suitable form, but as herein shown, is slightly curved or flared outwardly and at its extremity is provided with a spur or tooth 23 of suitable form or shape.

As clearly shown in Figures 2 and 6 of the drawing, the shank portions 20 of the tool elements are arranged in the slots 13 between the spaced arms 18 of the tool body, said tool elements being disposed in diametrically opposite relation to each other and each of the shank portions having an opening therethrough to loosely receive a pivot pin 24 which at one of its ends is provided with a threaded head 25 for engagement in the threaded opening 26 of one of the arms 18, while the other end of said pin is seated in a recess 27 provided in the side face of an opposed arm 18. The shank 20 of each of the tool elements at the inner end thereof is formed with a convex cam face 28.

The actuating means for the pivotally mounted tool elements consists of a rod 29 having a part of relatively small diameter extending between the several tool elements and with which the concave faces 21 of said tool elements engage in the normal position of the parts. This rod at the outer end of said portion of small diameter terminates in an enlarged interiorly threaded portion 30 which is connected with said small diameter section of the rod by a tapering or conically formed portion 31 which constitutes an actuating cam for the several tool elements. With the internally threaded end 30 of said rod a rod 32 may be connected and is adapted for loose engagement through the bore 11 of the rollback 10 to support the weight of the tool while the active portions of the tool elements are arranged in proper position within the sheet metal bearing sleeve 5. However, this rod 32 is not essential and may be omitted if desired. At the other end of the rod section 29 which extends between the tool elements, a second conical or tapered cam portion 33 is provided and connects said portion of the rod with the part 34 thereof of relatively larger diameter which is slidingly engaged in the bore 14 of the tool body. This part 34 in turn at its other end has an enlarged head 35 slidingly engaged in the counter-bore 15. The part 34 of the rod is provided with a longitudinally extending keyway 36 receiving the inner end of the screw 37 which is threaded in the tool body and thus prevents turning or rotative movement of the rod relative to said tool body. A threaded member 38 is engaged with the thread 17 in the end of the tool body so that the distance between the end of this member and the annular shoulder 16 determines the possible extent of longitudinal movement of the actuating rod 29 in either direction. A lock nut 39 threaded upon the member 38 against the end of the tool body secures said member in its adjusted position. This member has a longitudinal bore 40 loosely receiving the stem 41 projecting from the head 35, the end portion of said stem extending beyond the member 38 being threaded to receive the internally threaded cylindrical nut 42. This nut is provided with an annular flange 43 on the end thereof opposed to the member 38 and is loosely confined for rotative movement relative to said member by the coupling element 44 which is threaded upon the diametrically enlarged end of the member 38 as at 45 and fixed against turning movement relative

thereto by a suitable set-screw 46. An operating handle 47 of any desired form is fixed to the other end of the nut 42.

In the use of my improved tool, as above described, after the sleeve 5 has been inserted in the outer end of the opening 8 in the door, as shown in Figure 1, the nut 42 is turned until the cam part 33 of the rod 29 engages against the convex cam surfaces 28 of the tool elements so that said tool elements are moved to the position shown in Figure 1 of the drawings wherein the inner faces 21 of the body portions of said elements are substantially engaged upon the periphery of the rod 29. In this position of the tool elements, it will be observed that the diameter of a circle touching the points of teeth 23 is slightly greater than the internal diameter of the compressible bearing element 9. Thus it is necessary to apply considerable pressure to force these points or teeth through said bearing element and within the inner end of the sleeve 5 to the position shown in Figure 1 of the drawing, wherein the ends of the body portions 19 of the tool elements bear against the outer side of the escutcheon head 6 on said sleeve. The rod 32 being positioned through the bore of the rollback 10 serves to support the weight of the tool during this positioning of the tool elements. The body of the tool is firmly grasped so as to maintain pressure against the escutcheon head 6 and hold the edge thereof at its inner face in tight contact against the face of the door at all points around the opening 8. The nut 42 is then turned in the proper direction by means of the handle 47 and the rod 29 is moved from the position shown in Figure 1 to that illustrated in Figure 2 of the drawing.

In this movement of the rod 29, it will be evident that as the conical cam portion 31 of said rod is drawn between the inner flaring or convex surfaces of the arms 22 of the tool elements, said arms are forced outwardly, the tool elements rocking freely upon their respective pivots 24. Under this expanding pressure, the points or teeth 23 on the arms 22 force the metal sleeve wall outwardly at diametrically opposite points to provide the protuberances 5' therein which are firmly embedded in the wood structure of the door and effectually prevent any possibility of the sleeve working loose and moving outwardly through the latch handle opening 8. This expanding movement of the tool elements is limited by contact of the enlarged part 35 of the rod 29 with the end of the element 38. By now reversing the rotation of the nut 42, the rod 29 is shifted in the opposite direction and when the conical cam part 33 thereof rides upon the cam surfaces 28 of the shanks 20 of the respective tool elements, said elements are again rocked upon their pivots 24 and positively returned to their normal positions, the arms 22 of said tool elements moving inwardly as the conical cam portion 31 of the rod moves outwardly between said arms. Thus the points of the teeth 23 of the arms are disengaged from the wall of the bearing sleeve and said arms may then be withdrawn through the compressible bearing element 9. The latch operating handle may now be easily and quickly fitted in position through the bearing element 9 and connected with the rollback 10 and since said bearing element is composed of compressible material, it will automatically accommodate itself to any misalignment between the axis of the opening 8 and the axis of the latch handle, thereby providing a proper bearing support for the handle at the outer face of the door while reducing frictional resistance to a minimum.

By means of my improved tool it will be apparent that such sheet metal bearing members may be very quickly fixed to the door structure with the assurance of a definitely accurate relation between said bearing element and the latch rollback. It will be seen that I have avoided the use of springs or other non-positive and easily breakable parts for returning the tool elements to normal position and provide a positively acting cam means for this purpose so that the positive simultaneous disengagement of the points or spurs 23 of the tool elements from the wall of the sheet metal bearing element is assured.

From the foregoing description it will be seen that I have referred to the attachment of the bearing member by means of my improved tool to a door structure of wood. However, it is evident that the same tool, with slight modifications in the form of the arms 22 and the bits or points 23 thereof, may be employed for attaching and securing such a sheet metal bearing member to a metal door structure. In such case, the end of the metal sleeve might be bent or flanged over at diametrically opposite points by suitably formed bits or teeth on the ends of the arms 22 upon the inner side of the sheet metal door structure and forced into recesses formed in the edge of the opening in the door. Since the necessary changes in the tool to permit of such application of the bearing member to a metal door could be readily made by the skilled mechanic, they are not herein illustrated in detail. It will further be understood that though I have herein referred to a simple and satisfactory means for actuating the individually movable tool elements, this actuating means as well as the detail construction of the tool body and the manner of mounting the tool elements therein might be exemplified in various other alternative structures. Accordingly, I reserve the privilege of resorting

to all such legitimate changes in the form, construction and relative arrangement of the several parts as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. A tool of the character described comprising a body having longitudinally extending intersecting slots in one end thereof and a longitudinal bore, an actuating member axially movable in said bore and projecting beyond said slotted end of the tool body, a plurality of tool elements having reduced shanks at one of their ends pivotally mounted in said slots for radial movement relative to the tool body, the other end of each tool element being provided at the inner side thereof with a longitudinally projecting arm inclined outwardly with relation to the actuating member, one end of said actuating member projecting beyond said arms and having a cam surface adapted to engage the inner faces of said arms upon axial movement of said member in one direction to radially expand said tool elements, said actuating member being also provided with a second cam surface to coact with the shanks of said tool elements upon an axial movement of said member in the opposite direction to move the outer ends of the tool elements inwardly, and means mounted upon the tool body for manually operating said actuating member.

2. A tool of the character described comprising a tool body having longitudinally extending intersecting slots in one end thereof and a longitudinal bore, an actuating member axially movable in said bore and extending beyond the slotted end of the tool body, a plurality of tool elements pivotally mounted intermediate of their ends in said slots for radial movement relative to the tool body and projecting longitudinally from the slotted end of said tool body, the outer end of each of said tool elements being provided at the inner side thereof with a longitudinally extending arm, the inner faces of said arms being disposed in divergent relation to each other and each arm terminating in an expanding tooth adapted for engagement with the wall of a sheet metal bushing, said actuating member projecting beyond said arms and having a conical surface adapted to coact with the diverging faces of said arms in the axial movement of said member in one direction to move said tool elements radially outward, said actuating member having a second conical surface to coact with the inner ends of said tool elements upon axial movement of said member in the opposite direction to move the outer ends of the tool elements inwardly, and means mounted upon the tool body for operating said actuating member.

3. A tool of the character described comprising a tool body having longitudinally extending intersecting slots in one end thereof and a longitudinal bore, an actuating member axially movable in said bore and extending beyond the slotted end of the tool body, a plurality of tool elements pivotally mounted intermediate of their ends in said slots for radial movement relative to the tool body and projecting longitudinally from the slotted end of said tool body, the outer end of each of said tool elements being provided at the inner side thereof with a longitudinally extending arm, the inner faces of said arms being disposed in divergent relation to each other and each arm terminating in an expanding tooth adapted for engagement with the wall of a sheet metal bushing, said actuating member projecting beyond said arms and having a conical surface adapted to coact with the diverging faces of said arms in the axial movement of said member in one direction to move said tool elements radially outward, the inner end portions of the tool elements having longitudinally extending inner edges adapted for bearing contact with the actuating member to limit the outward movement of the tool elements and each of said tool elements at its inner end being provided with a convex face, said actuating member having a second conical surface to coact with said convex faces on the inner ends of said tool elements upon axial movement of said member in the opposite direction to move the outer ends of the tool elements inwardly, and means mounted upon the tool body for operating said actuating member.

4. A tool of the character described, comprising a tool body, a plurality of tool elements pivotally mounted intermediate of their ends in said body, an actuating member axially movable through the tool body between said elements and having spaced cam portions adapted to coact with the opposite ends of said elements to rock said elements in relatively opposite directions upon their respective pivots, means for limiting the axial movement of said actuating member in each direction, and operating means for said actuating member mounted upon the tool body.

5. A tool of the character described, comprising a tool body, a plurality of tool elements radially movable in said body, an actuating member for said tool elements axially movable in said body and having spaced cam parts to coact with said elements and operating respectively to radially move said tool elements in relatively opposite directions, means for limiting the axial movement of said actuating member in each direction, and operating means for said member mounted upon the tool body.

6. A tool of the character described, comprising a tool body, diametrically opposed

tool elements pivotally mounted intermediate of their ends in one end of said body, an actuating member axially movable through the tool body between said elements and having spaced cam parts, said tool elements at one of their ends being provided with longitudinally extending arms adapted for engagement within a tubular bearing element, one of the cam parts of said actuating member adapted to coact with said arms upon the axial movement of said member in one direction and force the same outwardly to expand the wall of said bearing member at spaced points, the other cam part on said actuating member adapted to coact with the other ends of said tool elements upon the movement of said member in the opposite direction to disengage said arms from the wall of the bearing member, means for limiting the axial movement of said actuating member in each direction, and operating means for said member mounted upon the tool body.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

LEON OTTINGER.