Feb. 2, 1943. T. A. RATKOWSKI 2,309,713

HAMMER FOR CENTRIFUGAL DEVICES AND THE LIKE

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Fig. 1

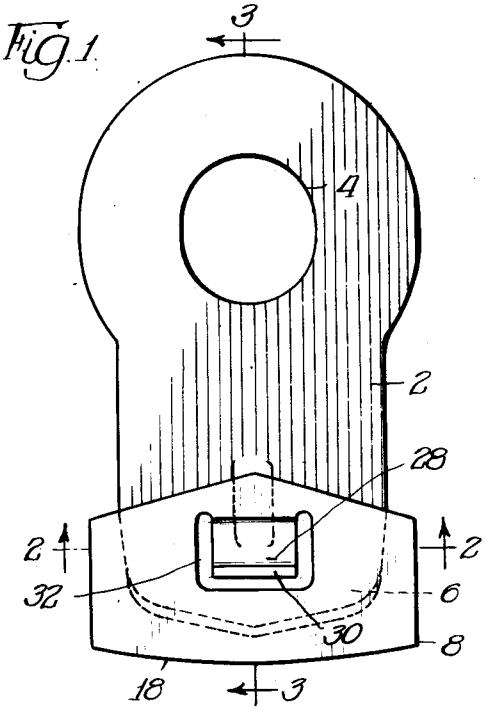


Fig. 2

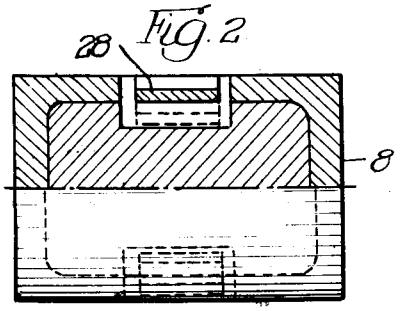


Fig. 3

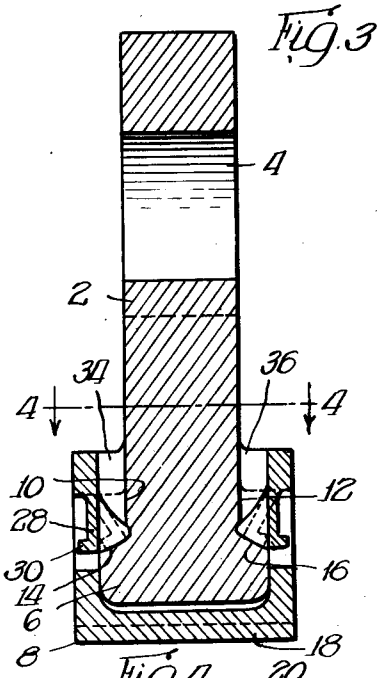


Fig. 4

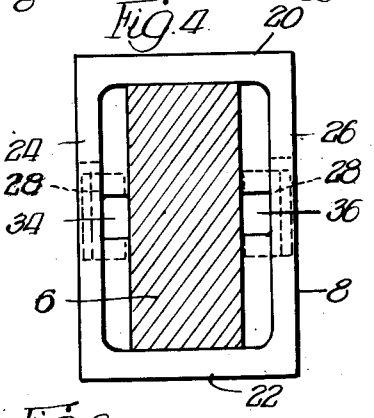


Fig. 5

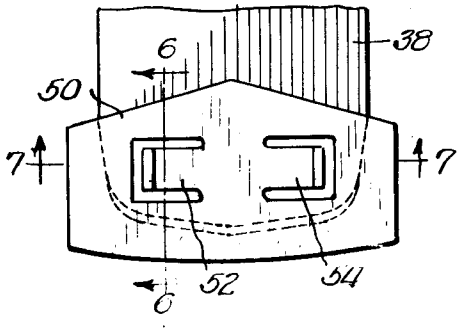
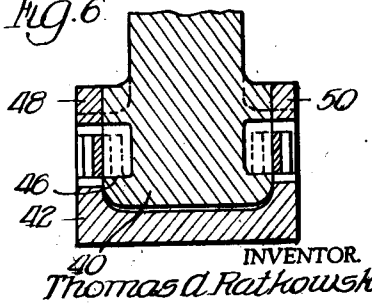


Fig. 6



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HAMMER FOR CENTRIFUGAL DEVICES AND THE LIKE

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Fig. 7.

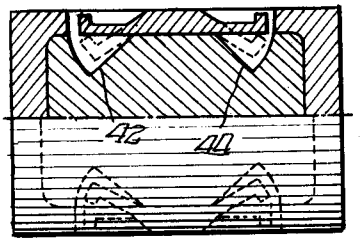


Fig. 8.

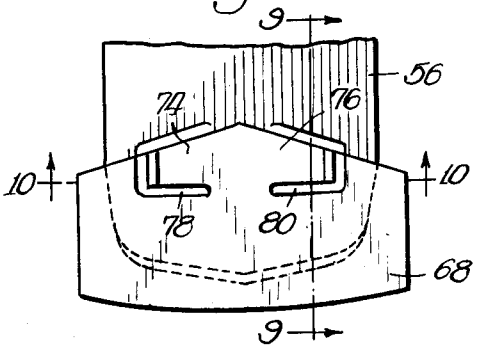


Fig. 9.

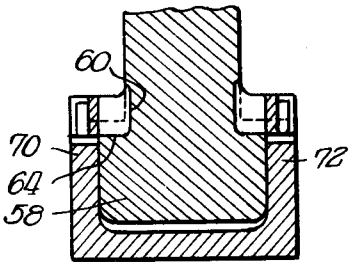


Fig. 10

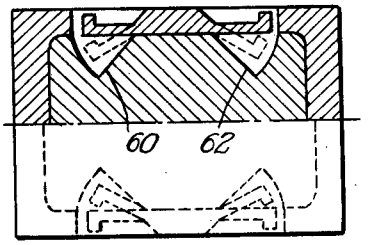


Fig. 11

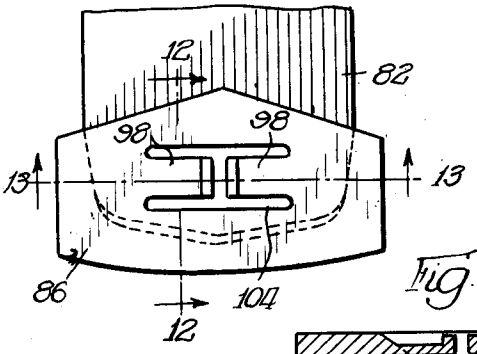


Fig. 12

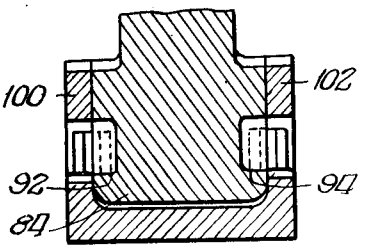
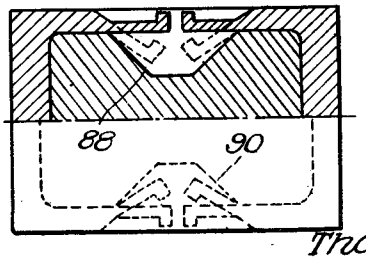


Fig. 13



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Patented Feb. 2, 1943 2,309,713

UNITED STATES PATENT OFFICE

2,309,713

HAMMER FOR CENTRIFUGAL DEVICES AND THE LIKE

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Application August 7, 1940, Serial No. 351,720

9 Claims. (Cl. 83—11)

The present invention relates to hammers for centrifugal devices, and more in particular to pulverizing hammers of multi-part construction having renewable tips or heads for use in such instrumentalities or mechanisms as mills and crushing or pulverizing machines of the centrifugal or rotary beater type.

Among the objects of the present invention is to provide a novel pulverizer hammer of multi-part construction having a replaceable tip or head which is particularly subjected to heavy duty and considerable wear, thus requiring renewal or replacement.

Another object contemplated by the present invention is to provide a novel pulverizer hammer having a tip or head renewable or replaceable as the same becomes so worn as to require such replacement in order to secure maximum performance and efficiency of the said device to which the same is attached.

As a further desideratum within the purview of the present invention, a novel pulverizer hammer characterizing the present contribution in the art embodies a tip or head of box or shell-like construction which can be readily and easily replaced as becomes necessary due to wear at a relatively low cost, the said structure also embodying as novel features means for effecting this removal of the worn tip or head and replacement by a new tip or head with ease and facility and at a low cost, thus eliminating expensive labor charges and loss of production when such renewal becomes necessary.

As a further object of the present invention, the same comprehends a pulverizer hammer construction embodying a replaceable tip or head which, because of the excessive wear and heavy duty to which the same is subjected, must be replaced or renewed from time to time in order to secure maximum performance of the centrifugal device of which the same is a component part, such renewable tip or head being of box or shell-like construction which permits of its fabrication at a relatively low cost and its ready replacement without loss of production and large installation costs.

More particularly, the present invention is directed to the construction of a multi-part pulverizing hammer having a replaceable tip or head into which the operating member therefor is stepped by relative movement between them in the direction of the axis of the said operating member and wherein novel means is provided for securing the two parts together to prevent displacement thereof. More particularly, the securing means within the purview of the present invention is embodied in part by a pliable portion formed on one of the members adapted to be bent or displaced with respect of said member into interlocking relation with a shoulder provided on the other of the said members.

The present invention further embraces within its scope novel securing means in the form of one or more pliable fingers struck-out from one of the walls of one of the members which can be bent into interlocking relation to a shoulder formed on the other of the said members to prevent relative axial displacement of the head with respect to the operating member on which the same is mounted.

The invention in its more specific aspect comprehends a head of box-like construction having opposite walls thereof provided with one or more pliable fingers struck-out therefrom which are bendable, when the tip or head is disposed in embracing relation to the operating member, into interlocking relation with one or more shoulders formed as walls of opposed lateral open-faced recesses provided on the operating member. More specifically, certain embodiments incorporating the principles of construction according to the present invention involve the use of pliable fingers struck-out from the walls of the embracing head or tip which are disposed axially with respect to the longitudinal axis of the hammer and which engage transversely extending shoulders of the operating arm such that said fingers, when bent into interlocking relation to said shoulders, act as pawls preventing axial displacement of the two members of the device. In other modifications, all in accordance with the present invention, the novel locking means takes the form of one or more pliable fingers struck-out from the walls of the embracing head or tip which are bent or displaced into the path of displacement of the two members for engagement with cooperating shoulders to prevent such displacement.

As another object of the present invention, the said structures above identified may embody slots or recesses communicating with the recesses into which the locking lugs or fingers are bent to provide suitable means accessible from the interior of the assembly to receive a tool to facilitate the disengagement of the fingers from the shoulders when it is desired to replace the worn tip or head by a new head.

The present invention also includes as an object the idea of providing the embracing tip

or head with a plurality of pliable fingers one or more of which may cooperate with a single shoulder provided as a part of the lateral opposed recesses formed in the operating member.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawings:

Figure 1 is a view in side elevation of a pulverizing hammer made in accordance with the present invention;

Figure 2 is a view partly in section and partly in plan taken substantially in the plane indicated as 2—2 of Figure 1 of the drawings;

Figure 3 is a view in vertical cross section taken in the plane represented by line 3—3 of Figure 1 of the drawings;

Figure 4 is a view in horizontal cross section taken in the plane represented by line 4—4 of Figure 3 of the drawings;

Figure 5 is a fragmentary view in side elevation of a modified form of pulverizing hammer also made in accordance with the present invention;

Figure 6 is a fragmentary view in vertical cross section taken in the plane represented by line 6—6 of Figure 5 of the drawings;

Figure 7 is a view partly in section and partly in plan taken in the plane indicated as 7—7 of Figure 5 of the drawings;

Figure 8 is a fragmentary view in side elevation of still another form of pulverizing hammer made in accordance with the present invention;

Figure 9 is a fragmentary view in vertical cross section taken in the plane represented by line 9—9 of Figure 8 of the drawings;

Figure 10 is a view partly in section and partly in plan taken substantially in the plane indicated as 10—10 of Figure 8 of the drawings;

Figure 11 is a fragmentary view in side elevation of still a further modified form of pulverizing hammer made in accordance with the present invention;

Figure 12 is a fragmentary view in vertical cross section taken in the plane represented by line 12—12 of Figure 1 of the drawings; and

Figure 13 is a view partly in section and partly in plan taken substantially in the plane indicated as 13—13 of Figure 11 of the drawings.

Referring now more in detail to the drawings, an embodiment selected to illustrate the present invention is disclosed in Figures 1 to 4, inclusive, as comprising an operating arm or head 2 formed at one end thereof with an opening 4 whereby the said arm may be conveniently mounted upon an operating shaft for a rotary device which may be disposed within a mill or crusher. The arm 2 is further formed at its other end with an enlarged part 6 which is stepped into a replaceable head 8 of box or shell-like construction by relative movement between the elements in the direction of the axis of the operating arm or member 2. The said end portion 6 is formed with lateral opposed facing recesses 10 and 12 provided with transversely disposed shoulders 14 and 16 to provide, in part, securing means for attaching the head 8 to the operating arm 2.

The replaceable head 8 is formed with a facing wall 18, opposed end walls 20 and 22 and the interconnecting side and laterally opposed walls 24 and 26. This head is of integral construction and of box-like proportions permitting of its ready fabrication at low cost and easily and readily assembled in operative relation to the operating arm 2 when desired, thus making replacement of a worn out head or tip convenient, the attachment being effected by novel securing or attaching means to be presently described.

In the present embodiment incorporating the invention, the lateral opposed side walls 24 and 26 are each provided with a finger 28 struck-out from the metal forming the same as indicated, the said walls being of material which is pliable permitting their bending inwardly into interlocking relation with the shoulders 14 and 16 to attach the head to the operating arm 2. As disclosed in the drawings, the said bendable fingers 28 are flanged adjacent their end as at 30 to provide suitable interlocking relation between the same and the said shoulders 14 and 16, the entire finger being provided by removal of metal as at 32 from the side walls of the replaceable head.

It is to be noted that in this modification the pliable fingers 28 are like pawls extending axially with respect of the operating member 2 and resisting displacement between the head 8 and operating arm 2 by thrust in their interlocking relation with the shoulders 14 and 16 of the opposed lateral facing recesses 10 and 12. In order to facilitate the replacement of a worn out head 8, the axially extending grooves or slots 34 and 36 are provided on each side of the operating arm 2 and in communication with recesses 10 and 12 which provide access to the pliable fingers 28 to admit a tool or operating device which can be inserted therethrough and into engagement with said pliable fingers to dislodge the same from their interlocking engagement with the shoulders 14 and 16 to remove the said head 8 from the arm, after which the said worn head may be replaced by a new head which is attached through the medium of pliable fingers 28 in engagement with the shoulders 14 and 16.

The embodiment of the invention above described provides an assembly wherein the head or tip which is particularly subjected to heavy duty and excessive wear in the pulverizing operation can be readily replaced at will without loss of production time and without incurring any great expense in making this adjustment to provide for efficient operation of the device. The replaceable heads are relatively light in weight, making this element of the assembly which must be replaced from time to time relatively inexpensive and one which does not involve any great amount of labor expense in its installation in operative association with the arm 2.

Figures 5 to 7, inclusive, disclose a modified form of construction for a pulverizing hammer made in accordance with the present invention, the same conforming in all of its essential respects to the construction shown in Figures 1 to 4, inclusive. In this embodiment, the operating arm 38 conforms substantially to the operating arm 2 except that the enlarged end part 40 to which the replaceable tip or head is connected is provided on each side thereof with opposed lateral facing recesses 42 and 44, thus providing a plurality of interlocking shoulders, such as 46, on both sides of the device. In this regard, however, it should be noted that in accordance with this disclosure, single lateral opposed recesses may be provided as shown in the embodiment of Figures 1 to 4, inclusive, of the drawings.

In the present illustration, the replaceable tip or head 42 is of box-like construction conforming

essentially to the tip or head 8 and is provided with the lateral opposed walls 48 and 50 each of which has the oppositely extending pliable fingers 52 and 54 struck-out from the wall and bendable across the path of displacement of the tip or head 42 with respect of operating member 38 into interlocking relation with the shoulders 46 of the recesses 42 and 44. These pliable fingers 52 and 54 are formed in the same manner as the pliable fingers 28 and are of similar formation but are horizontally disposed in respect of the axis of the device for movement into interlocking engagement with the shoulders 46. By providing a plurality of such interlocking means as disclosed in this embodiment, the replaceable head is effectively secured to the operating end of arm 38 to prevent displacement of the head in respect of the said arm, yet providing all of the advantages of the previously described embodiment in that assembly and disassembly of the structure involved can be readily effected at will and at low cost.

According to the present invention, further embodiments fall within the scope thereof such, for example, as shown in Figures 8 to 10, inclusive, wherein the operating arm 56 is of somewhat similar construction to operating arm 2 and which, at its operating end, is provided with an enlarged end part 58 formed with the opposed lateral facing recesses 60 and 62 on each side thereof forming the abutment shoulders 64.

In this embodiment, the removable tip or head 68 is of box or shell-like construction including the opposed walls 70 and 72 each of which adjacent its upper margin is formed with the oppositely extending pliable fingers 74 and 76 struck-out from the same much in the manner as shown in Figures 1 to 7, inclusive, except that in the present illustrative embodiment the pliable fingers are formed by the removal of metal as at 78 and 80 at the marginal edge of the said walls.

The pliable fingers 74 and 76 are bendable across the path of displacement of the removable head 68 with respect of the operating arm 56 and into interlocking relation with the shoulders 64 of the recesses 60 and 62, respectively, to secure the removable head 68 to the operating arm 56. In this form of construction, the provision of pliable fingers 74 and 76 adjacent the marginal edges of the walls 70 and 72 has the advantage that the said fingers are easily accessible when it is desired to remove a worn head and to replace the same by a new head. A further advantage is obtained by the provision of a plurality of fingers on opposed sides of the operating arm 56 to effectively interlock the head and arm.

Figures 11 to 13, inclusive, illustrate a further embodiment of the invention conforming in certain general respects to the embodiments of Figures 5 to 10, inclusive, and comprising an operating arm 82 having an enlarged operating end 84 embraced in stepped relation by a replaceable tip or head 86 movable into said embracing relation by relative movement therebetween in the direction of the axis of the device. The operating end portion 84 of arm 82 is provided with the lateral opposed facing recesses 88 and 90 forming the interlocking shoulders 92 and 94, respectively, on opposite sides of the arm 82, and each of which recesses is adapted to receive a plurality of pliable fingers, such as 96 and 98, which, in the illustrative example of the invention now being described, extend toward one another and are struck-out from each of the walls 100 and 102 of the replaceable head 86. These pliable fingers 96 and 98 are formed by the removal of metal as at 104 and correspond essentially to the pliable fingers of the hereinbefore described embodiment, the same being bendable inwardly across the path of displacement of the head 86 in respect of the operating arm 82 into interlocking relation with the shoulders 92 and 94 to effectively secure the head to the operating arm. These operating fingers are struck-out from the walls in spaced relation to the marginal portions thereof and accordingly conform substantially in that respect to the formation of the pliable fingers 52 and 54 of the embodiment disclosed in Figures 5 to 7, inclusive.

In accordance with the hereinabove described structure embodying the present invention, the replaceable tip or head 86 is effectively secured to the operating part 84 of the arm until the same becomes worn to a point necessitating its replacement, at which time the pliable fingers 96 and 98 can be readily removed from recesses 88 and 90 to permit removal of the worn head or tip and its replacement by a new head or tip which can be readily inserted in place and quickly attached to the operating arm by bending the fingers 96 and 98 inwardly across the path of displacement of the elements of the device.

While I have herein described and upon the drawings shown illustrative embodiments of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. A hammer for a centrifugal device, comprising an operating member having an enlarged shouldered end, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said end of said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said enlarged shouldered end having a laterally disposed recess having a shoulder, said head having a part bendable into interlocking relation with said shoulder to prevent relative axial displacement of said head with respect to said operating member, and said operating member having an axially disposed slot communicating with said recess for receiving a tool to disengage said part from its interlocking relation to said shoulder for removing said head from said operating member.

2. A hammer for a centrifugal device, comprising an operating member having an enlarged shouldered end, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said end of said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said enlarged shouldered end having laterally opposed open-faced recesses provided with shoulders, said head having opposed pliable fingers struck-out from opposite walls thereof and bendable into interlocking relation to said shoulders to prevent relative axial displacement of said head with respect to said operating member, and said operating member having lateral facing slots axially disposed and communicating with said recesses for

receiving a tool to disengage said fingers from their interlocking relation to said shoulders for removing said head from said operating member.

3. A hammer for a centrifugal device, comprising an operating member, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member having laterally opposed open-faced recesses provided with transversely disposed wall surfaces forming abutment shoulders, said head having opposed axially disposed pliable fingers struck-out from opposite walls thereof and bendable axially into opposed interlocking relation to said shoulders to prevent relative axial displacement of said head with respect to said operating member.

4. A hammer for a centrifugal device, comprising an operating member, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member having laterally opposed open-faced recesses provided with transversely disposed wall surfaces forming abutment shoulders, and said head having opposed transversely disposed pliable fingers struck-out from opposite walls thereof and bendable across the path of displacement of said head and operating member into opposed interlocking relation to said shoulders to prevent said displacement.

5. A hammer for a centrifugal device, comprising an operating member, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member having laterally opposed open-faced recesses provided with transversely disposed wall surfaces forming abutment shoulders, and said head having transversely disposed pliable fingers struck-out from opposite walls and in spaced relation to the marginal edges thereof and bendable across the path of displacement of said head and operating member into opposed interlock relation to said shoulders to prevent said displacement.

6. A hammer for a centrifugal device, comprising an operating member, an impact head having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member having laterally opposed open-faced recesses provided with transversely disposed wall surfaces forming abutment shoulders, and said head having transversely disposed pliable fingers struck-out from opposite walls and at the marginal edges thereof and bendable across the path of displacement of said head and operating member into opposed interlock relation to said shoulders to prevent said displacement.

7. A replaceable head for a pulverizing hammer, comprising a member of box-like construction having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall, and pliable fingers struck-out from opposed walls of said member and displaceable laterally to provide securing means for attaching said head to an operating member.

8. A hammer for a centrifugal device, comprising an operating member, an impact head member having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member being provided with a recess in at least one face thereof having a locking shoulder, and said impact head member having a wall portion bendable into interlocking relation to said shoulder to prevent relative axial displacement of said head member with respect to said operating member.

9. A hammer for a centrifugal device, comprising an operating member, an impact head member having a facing wall and upstanding opposed end and side walls forming a member of box-like construction provided with an open face in opposed relation to said facing wall into which said operating member is stepped by relative movement between said members in the direction of the axis of said operating member, said operating member being provided with a recess in at least one face thereof having a locking shoulder, and said impact head member having at least one finger struck from one of the walls thereof and bendable into interlocking relation to said shoulder to prevent relative axial displacement of said head member with respect to said operating member.

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