United States Patent [19]

Wallace et al.

[11] **3,838,826**

[45] **Oct. 1, 1974**

[54] **REMOVABLE CAPS FOR CRUSHER HAMMER ASSEMBLY**

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[73] Assignee: **Capeletti Bros., Inc.,** Hialeah, Fla.

[22] Filed: **Sept. 27, 1972**

[21] Appl. No.: **292,733**

[52] **U.S. Cl.** **241/197,** 24/294

[51] **Int. Cl.** **B02c 13/06**

[58] **Field of Search** 241/197, 294, 298, 308

[56] **References Cited**

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Assistant Examiner—Howard N. Goldberg
Attorney, Agent, or Firm—Clarence A. O'Brien; Harvey B. Jacobson

[57] **ABSTRACT**

A hammer assembly for an impact rock crusher and the like has a bartype hammer provided with an interlocking joint portion, and a number of impact members sufficient to form a continuous impact surface on the hammer. Each impact member is provided with an interlocking joint structure for selectively interlocking with the joint portion of the hammer. Preferably, the joint structure is a flared tenon, and the joint portion is a flared mortise dimensioned to mate with the tenon and form a dovetail joint. Recesses are formed in the tenon for receiving portions of a bolt and nut assembly which retains the tenon in the mortise. By arranging the mortises to extend in a direction of movement of the hammer, the impact member will be biased toward a seated position during an impact thereon so that the bolt and nut will be relieved of strain.

12 Claims, 9 Drawing Figures

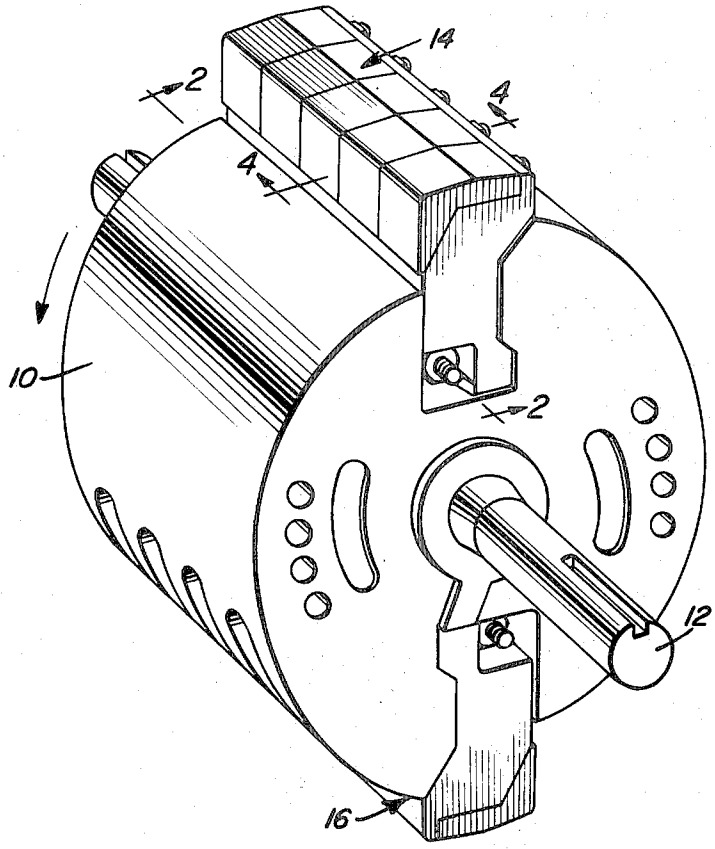


Fig. 1

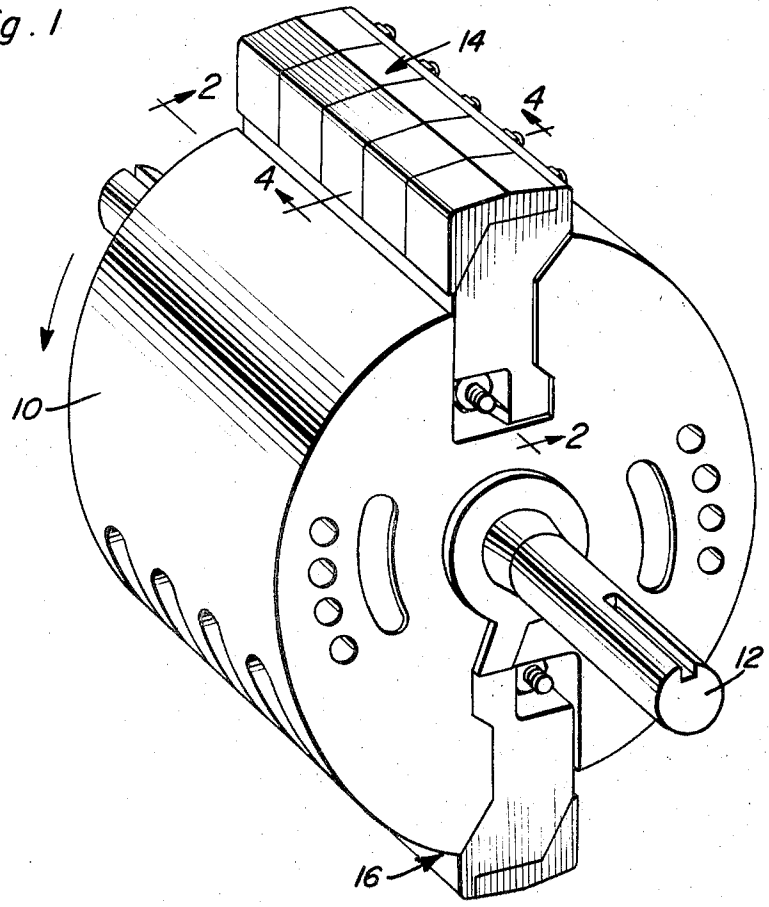


Fig. 2

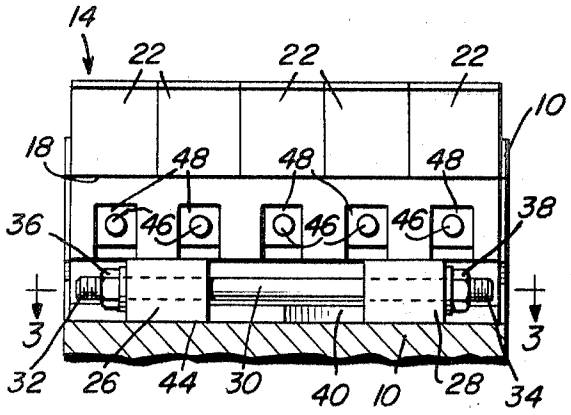


Fig. 9

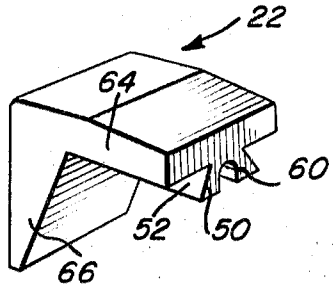


Fig. 3

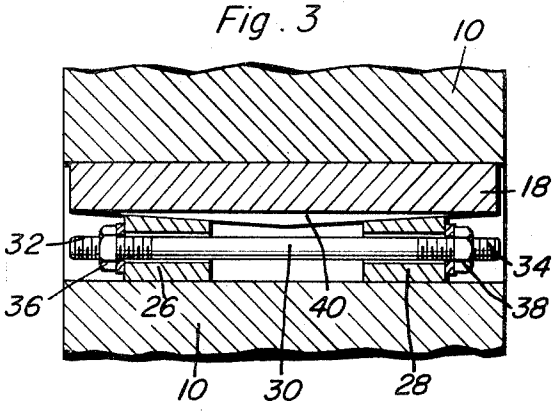
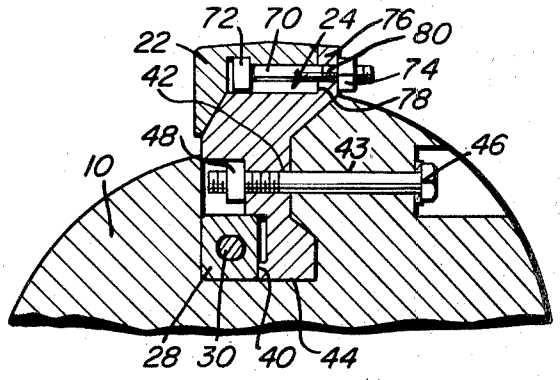


Fig. 4



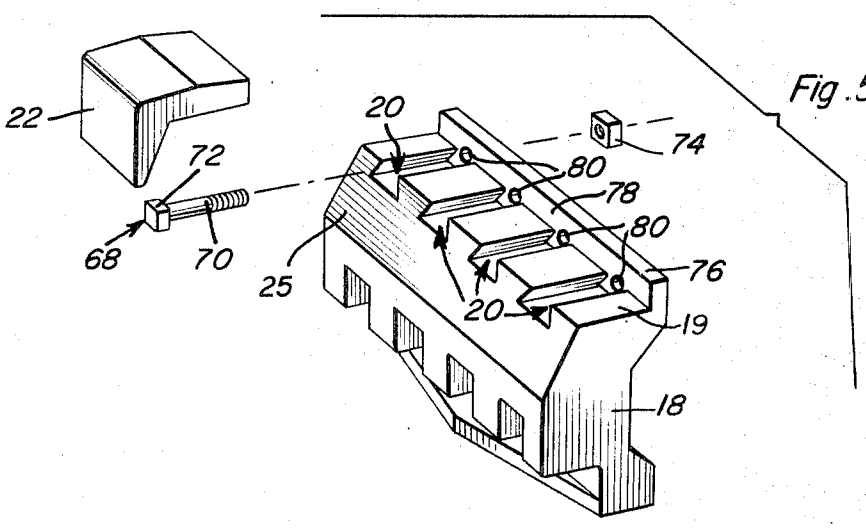


Fig. 5

Fig. 6

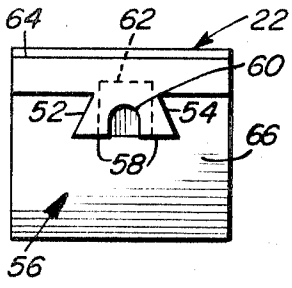


Fig. 7

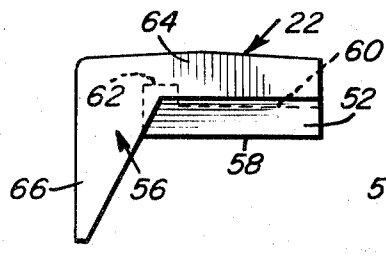
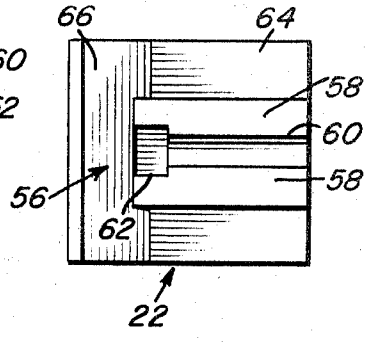


Fig. 8



REMOVABLE CAPS FOR CRUSHER HAMMER ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a crusher hammer assembly, and in particular to a removable impact member or cap for bar-type hammers of impact rock crushers and the like.

2. Description of the Prior Art

It is known to provide replaceable impact receiving inserts or caps on bar-type hammers used with impact rock crushers and the like. A typical example of the previously proposed arrangements for mounting these caps may be seen in U.S. Pat. No. 2,635,817, where the impact receiving members are guided by a tongue-and-groove arrangement extending the longitudinal length of the hammer bar and are retained in place by bolt and nut assemblies extending perpendicularly to the hammer bar. A drawback to this known arrangement, however, is that the tongue and groove does not provide a sufficiently rigid seat for the impact members during an impact thereon, resulting in overstraining and frequent breakage of the bolt and nut assemblies.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a hammer assembly particularly for impact rock crushers and the like, which has removable impact members mounted on the hammer in such a manner that an impact will tighten up the connection of the impact member and hammer and relieve stress and strain on a bolt and nut assembly retaining the impact member on the hammer.

It is another object of the present invention to provide a removable impact member for crusher hammers and the like which will tighten or seat against the hammer when subjected to an impact.

These and other objects are accomplished according to the present invention by providing a crusher hammer assembly having a hammer member provided with an interlocking joint portion, and an impact member provided with an interlocking joint structure for selectively interlocking with the joint portion.

According to a preferred embodiment of the present invention, one of the interlocking joint structure and the interlocking joint portion is a flared tenon, and the other is a flared mortise dimensioned to mate with the flared tenon and form a dovetail joint. Advantageously, the interlocking joint structure of the impact member is the flared tenon, and the interlocking joint portion of the hammer member is the flared mortise.

By arranging the mortise to be extending in a direction parallel to a direction of movement of the hammer member, the impact member will be seated into the closed-end of the mortise during an impact thereon, thus releasing strain from a bolt and nut assembly retaining the impact member on the hammer member.

When the hammer member is a bar-type hammer arranged for being mounted on a rotor of an impact rock crusher and the like, it is advantageously provided with a plurality of mortises extending perpendicularly to the longitudinal extent of the hammer, and a plurality of impact members each having flared tenons arranged in the mortises for forming a continuous impact surface on the hammer member.

A removable impact member according to the present invention advantageously preferably has a flared tenon provided with walls which diverge outwardly from a body portion of a body member comprising the impact member. These walls join with an outer surface provided with a recess arranged extending parallel to the diverging walls and a further recess communicating with the one recess. These recesses are arranged for receiving a bolt shank and one of a bolt head and a nut. In this manner, the impact member is retained on the hammer member.

The impact member may have two legs arranged substantially L-shaped, and have the bolt head or nut receiving recess arranged at the junction of these legs.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view showing a crusher rotor provided with hammer assemblies according to the present invention.

FIG. **2** is a fragmentary, sectional view taken generally along the line **2—2** of FIG. **1.**

FIG. **3** is a fragmentary, sectional view taken generally along the line **3—3** of FIG. **2.**

FIG. **4** is a fragmentary, sectional view taken generally along the line **4—4** of FIG. **1.**

FIG. **5** is an exploded, perspective view, with some parts removed, showing a hammer assembly according to the present invention.

FIG. **6** is a rear elevational view showing a removable impact member according to the present invention.

FIG. **7** is a side elevational view showing the impact member of FIG. **6.**

FIG. **8** is a bottom plan view showing the impact member of FIGS. **6** and **7.**

FIG. **9** is a perspective view showing the impact member of FIGS. **6** to **8.**

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** of the drawings shows an impeller or rotor **10** mounted on a shaft **12** and provided with a pair of hammer assemblies **14, 16** according to the present invention. Rotor **10** is basically of a conventional type commonly used on, for example, impact rock crushers. It is to be understood that hammer assemblies **14, 16** may be used with other suitable types of crusher rollers and the like. Since assemblies **14, 16** are constructed in an identical manner, only assembly **14** will be discussed in detail below.

While two hammer assemblies 180° apart are shown in FIG. **1,** other arrangements such as three assemblies 120° apart could be employed as desired.

Referring now to FIGS. **2** to **5** of the drawings, a hammer assembly **14** has a hammer member **18** provided with a first substantially planar surface **19** arranged facing outwardly transverse to a radial plane of rotor **10** and having a plurality of interlocking joint portions in the form of, for example, flared or double tapered wedge mortises **20,** and associated impact members **22** are provided with interlocking joint structure **24** (FIG. **4**) for selectively interlocking with the joint portion in

forming a dovetail joint. For a bar-type hammer as illustrated, a number of members **22** are provided sufficient to cover the leading side of member **18** and form a continuous impact surface. A second substantially planar surface **25** extends obliquely from surface **19** and toward rotor **10** and in a direction of rotation of rotor **10.**

A pair of wedges **26, 28** connected together by for example, a rod **30** having screw-threaded end portions **32, 34** threadingly engaged by nuts **36, 38** are provided for selectively retaining a hammer member **18** on rotor **10.** Hammer member **18** is provided with a double-inclined projection **40** and a plurality of apertures **42** arranged for alignment with bores **43** provided in rotor **10.** Wedges **26, 28** engage the inclined surfaces of projection **40** to hold member **18** in a keyed recess **44** provided in rotor **10.** Bolts **46** are arranged in apertures **42** and bores **43,** and nuts **48** are tightened down thereon to further rigidify member **18** in recess **44.**

FIGS. **6** to **9** show a preferred embodiment of impact member **22** according to the present invention. Interlocking joint structure **24** is for example, a flared or double-tapered wedge tenon **50** having walls **52, 54** diverging outwardly from a body portion of a body member **56** comprising member **22** to join an outer surface **58** provided with a recess **60** extending parallel to walls **52, 54.** A further recess **62** is arranged communicating with recess **60.** Body member **56** has two legs **64, 66** covering the leading side and top of member **18** and arranged substantially L-shaped, and recess **62** is arranged at the junction of these legs **64, 66.** Leg **64** forms the body portion from which tenon **50** extends.

A bolt **68** (FIG. **5**) has a shank **70** arrangeable in recess **60,** and a head **72** attached to shank **70.** A nut **74** is arrangeable in recess **62** for retention thereby in the axial direction of shank **70.** Alternatively, head **72** may be arranged in recess **62.**

As can best be seen from FIG. **5,** member **18** has on planar surface **19** a longitudinally extending, projecting portion **76** forming a wall **78** arranged enclosing an end of mortises **20.** This wall **78** is provided with an opening **80** in each mortise **20** for bolt **68** to pass through.

By having the mortises **20** arranged extending perpendicularly from portion **76** in a direction of movement of member **18,** as indicated by the arrow in FIG. **1,** they cooperate with tenons **50** for seating the impact members **18** during an impact thereon and relieving strain from the bolt **68.**

Impact members **22** may be used with all standard crushers, subject to suitable modification of the hammers.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A hammer assembly for a crusher, comprising, in combination:

a. a hammer member arranged for being mounted on a rotor of a crusher, and provided with a first substantially planar surface arranged facing outwardly transverse to a radial plane of the associated rotor, a second substantially planar surface extending obliquely from the first surface toward the associated rotor and in a direction of rotation of the rotor, and a projecting portion forming a wall arranged extending transverse to the direction of rotation of the associated rotor and radially outwardly from the first surface along an edge thereof spaced from the second surface;

b. an interlocking joint portion provided on the first surface and arranged extending perpendicularly from the wall to the second surface;

c. an impact member having a pair of joined legs arranged forming a substantially L-shaped body portion; and

d. an interlocking joint means provided on the body portion for removably interlocking with the joint portion, an outside surface of one leg of the body member arranged forming an impact surface for the hammer assembly.

2. A structure as defined in claim **1,** wherein one of the interlocking joint means and the interlocking joint portion is a flared tenon and the other is a flared mortise dimensioned to mate with the flared tenon and form a dovetail joint.

3. A structure as defined in claim **2,** wherein the interlocking joint means is the flared tenon, and the interlocking joint portion is the flared mortise.

4. A structure as defined in claim **3,** wherein the wall is arranged enclosing an end of the flared mortise and provided with an opening, and further including means arranged in the opening for retaining the tenon in the mortise.

5. A structure as defined in claim **4,** wherein the flared tenon has walls which diverge outwardly from the body portion and join with an outer surface provided with a recess for receiving the retaining means.

6. A structure as defined in claim **5,** wherein the retaining means is a headed bolt and nut, and a further recess is provided in said outer surface and arranged at the junction of the impact member legs in communication with the recess for receiving one of the bolt head and the nut.

7. A structure as defined in claim **6,** wherein the hammer member is provided with a plurality of flared mortises, and a plurality of impact members are arranged in the mortises for forming a continuous impact surface on the hammer member.

8. A structure as defined in claim **7,** wherein the hammer member is a bar-type hammer having a longitudinal extent and arranged for mounting on the rotor of the impact rock crusher, and the projecting portion extends longitudinally of the hammer member, with the mortises arranged extending perpendicularly from the projecting portion in a direction of movement of the hammer member for cooperating with the tenons and seating the impact members during an impact thereon and relieving strain from the associated retaining means.

9. A structure as defined in claim **8,** further including a pair of wedges connected together by a rod having screw-threaded end portions and nuts threadingly engaging the end portions, and wherein the hammer member is provided with a projection arranged for cooperating with the wedges and with at least one aperture for receiving a bolt, the wedges and bolt selectively

retaining the hammer member in a recess provided in the crusher rotor.

10. A structure as defined in claim **1**, wherein the hammer member is a bar-type hammer having a longitudinal extent and arranged for being mounted on the rotor of a crusher and is provided with a plurality of interlocking joint portions, and wherein a plurality of impact members is provided, each having interlocking joint means arranged in the interlocking joint portions for forming a continuous impact surface on the hammer surface.

11. A removable impact member for a crusher hammer, comprising a body member having a pair of legs arranged substantially L-shaped, one of the legs forming an impact surface and interlocking joint means provided on the other of the legs for selectively interlocking with a mating interlocking joint portion provided on an associated crusher hammer member, the interlocking joint means being a flared tenon having walls which diverge outwardly from a body portion of the body member and joint with an outer surface provided with a recess arranged extending parallel to the diverging walls and a further recess arranged at the juncture of the body member legs for communicating with said recess, said recess and further recess arranged for respectively receiving a bolt shank and one of a bolt head and a nut.

12. A structure as defined in claim **9**, further including the rotor, wherein said rotor is provided with means for mounting the hammer member.

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