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1,663,367

C. H. BROWN

PROCESS OF REPAIRING TOOLS

Filed Sept. 2, 1926

Fig. 1

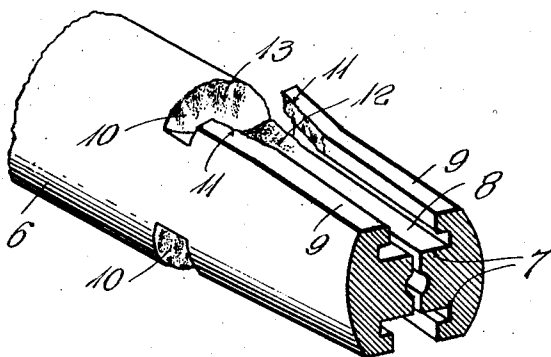


Fig. 2

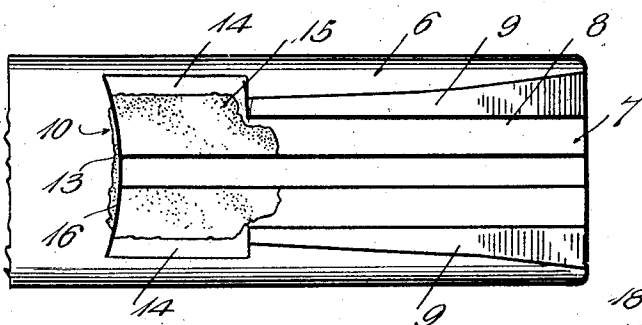


Fig. 3

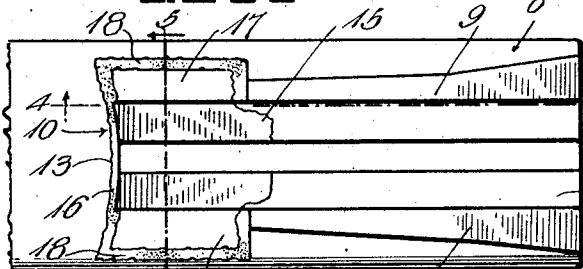


Fig. 5

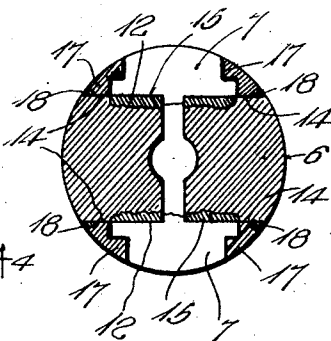
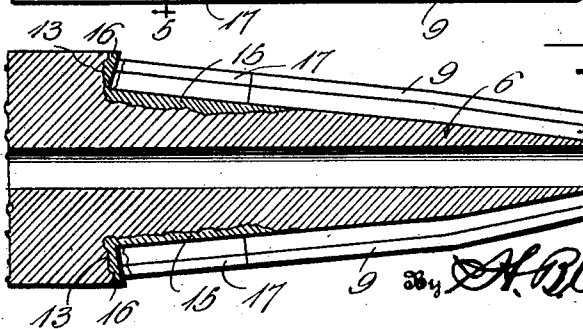


Fig. 4



Inventor

Charles H. Brown

H. B. Wilson & Co.

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES HENRY BROWN, OF BRECKENRIDGE, TEXAS.

PROCESS OF REPAIRING TOOLS.

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The invention relates to tool repairing processes and has reference primarily to the repairing or underreamers, used in well drilling for enlarging the size of the hole under the casing, so that the latter may be lowered. A commonly used underreamer embodies a main body having at its lower end a pair of channel shaped guides for the reaming cutters, and at the upper ends of these guides, the body is provided with bumping shoulders with which the cutters are engaged during the reaming operation. Due to the irregular cross section of the bodies of this general type of reamer, it is necessary that they be constructed from comparatively soft steel, so that the strains set up in their heat treatment, will not cause them to break. This in turn, causes them to wear badly on their cutter-engaging surfaces, particularly at the bumping shoulders and the upper ends of the guideways, and the undercut ridges along the edge portions of these guideways, very often expand or break and cause loss of cutters into the well. It is the object of my invention to provide a new and improved process for the repairing of such guideways, and the invention is of such a nature that a repaired reamer will be much more durable than a new one constructed under the present day methods.

With the foregoing in view, the invention resides in the novel subject matter herein-after described and claimed, the description being supplemented by the accompanying drawing.

Figure 1 is a sectional perspective view of a portion of an underreamer illustrating the manner in which the cutter guides are often injured.

Fig. 2 is a fragmentary side elevation showing the guide ridges, adjacent the bumping shoulder, cut away, and this view also illustrates the manner in which the cutter-engaging surface between said ridges and the bumping shoulder are built up with molten metal to compensate for wear which has here taken place.

Fig. 3 is a view similar to Fig. 2 but illustrating the built up metal portions finished flush with the intact portions of the aforesaid cutter-engaging surface and bumping shoulder, and this view also illustrates a pair of ridge sections welded to the body, in place of the ridge portions which were injured.

Figs. 4 and 5 are respectively a longitudinal

and a transverse sectional view on the correspondingly numbered lines of Fig. 3.

In the drawing above briefly described, the numeral 6 designates the body of an underreamer, said body having a pair of longitudinally disposed, channel-shaped guides 7 at its lower end for the usual underreaming cutters (not shown). Each guide 7 comprises a flat cutter engaging surface 8 and a pair of undercut ridges 9 along the longitudinal edges thereof, and at the upper end of said surface 8, a bumping shoulder 10 is provided. Due to the necessity of machining this shoulder, in the manufacture of the tool, it is necessarily spaced above the upper ends of the ridges 9. This, and the relatively soft steel from which the body 6 must be formed, necessarily produce weak upper ends for the ridges 9, and these ridges become badly injured and often broken. Moreover, the upper portion of the surface 8 and the shoulder 10 become badly worn. In Fig. 1, injured end portions of the ridges 9 have been indicated at 11; 12 denotes a badly worn portion of the surface 8, and 13 denotes a worn portion of the shoulder 10.

To repair the injuries 11—12—13, I break, chip, file, grind or machine the injured upper portions of the ridges 9 away, substantially flush with the intact portion of the surface 8, as indicated at 14. Then, with appropriate molten metal, I build up the worn portions 12 and 13 as indicated at 15 and 16. This having been done, I machine or otherwise finish the built up portion 15 so that it is flush with the intact portion of the surface 8, and I similarly machine the built up portion 16. Then, I substitute two pre-formed ridge sections 17 for the removed portions of the ridges 9, as seen in Fig. 3. These ridge sections are of a length to extend entirely to the bumping shoulder 10 and when initially applying them, they are held in proper position by suitable clamping means (not shown). Then, at 18 I weld the ridge sections 17 to the body 6, and during this welding operation, I include the welding of the ridge sections to the intact portions of the ridges 9, and the welding of said sections to the bumping shoulder 10.

All of the metal used in making the repairs, is preferably of such nature that it may be tempered after the tool reaches the repaired condition shown in Figs. 3, 4 and 5, and the tempering is preferably done to such a degree that the new metal will possess

a greater degree of hardness than that originally used in the construction of the cutter guides. This, and the integral joining of the ridge sections 17 to the bumping shoulder 10, produce a tool which even though it has been repaired, will be stronger and more durable than the original tool.

I have met with much success in the actual practice of my invention, using the steps herein illustrated and described. While this disclosure represents the preferred form of the invention, it is to be understood that within the scope of such invention as claimed, variations may be made.

I claim:

1. A process of repairing a tool of a type having a body formed with a guiding surface for a movable member, a bumping shoulder at one end of said surface, and parallel undercut guide ridges at two edges of said surface terminating in spaced relation with said bumping shoulder; said process comprising the steps of substituting for end portions of said ridges toward said bumping shoulder, a pair of pre-formed ridge sections and disposing ends of said ridge sections against said bumping shoulder, and welding said sections in place, including a welding of said sections to said bumping shoulder.

2. A process of repairing a tool of a type having a body formed with a guiding surface for a movable member, a bumping shoulder at one end of said surface, and parallel undercut guide ridges at two edges of said surface terminating in spaced rela-

tion with said bumping shoulder; said process comprising the steps of building up worn-away portions of said bumping shoulder and surface with molten metal, finishing the surfaces of such metal, substituting for worn or broken end portions of said ridges toward said bumping shoulder, a pair of pre-formed ridge sections and disposing them in contact with said bumping shoulder, and welding said ridge sections in place, including a welding of said ridge sections to said bumping shoulder.

3. A process of repairing a tool of a type having a body formed with a guiding surface for a movable member, a bumping shoulder at one end of said surface, and parallel undercut guide ridges at two edges of said surface terminating in spaced relation with said bumping shoulder; said process comprising the steps of building up worn-away portions of said surface and said bumping shoulder with molten metal, finishing the surface of such metal, substituting for worn or broken end portions of said ridges toward said bumping shoulder, a pair of pre-formed ridge sections and disposing them in contact with said bumping shoulder, welding said ridge sections in place, including a welding of said ridge sections to said bumping shoulder, and tempering the finished built up portions and the ridge sections.

In testimony whereof I have hereunto affixed my signature.

CHARLES HENRY BROWN.