

# UNITED STATES PATENT OFFICE.

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## METHOD OF BUILDING UP BITS AND UNDERREAMER CUTTERS.

No. Drawing.

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*To all whom it may concern:*

Be it known that I, THOMAS M. SULLIVAN, a citizen of the United States, residing at Santa Paula, in the county of Ventura and State of California, have invented a new and useful Method of Building Up Bits and Underreamer Cutters, of which the following is a specification.

This invention relates to a new and improved method of building up bits and underreamer cutters such as used in drilling water, oil or gas wells. It is a fact well known to those skilled in the art that these tools soon become worn and chipped as a result of their impact against the hard rock being worked and, as a result of this wear and tear it becomes necessary to trim and consequently waste the material of the tool. In the case of underreamer cutters the wear is considerable and after repeated dressings these cutters become too short to expand properly although the shank portions are still usable.

It is an object of the present invention to build up these tools to their original size and shape so that they can be dressed and hardened to resist wear, thus prolonging the lives of the tools indefinitely.

In carrying out the process the bit or cutter is heated to a cherry red by subjecting the same to a slow heat. A layer of high carbon (tool) steel is then welded onto the tool by means of an oxy-acetylene torch. This steel is then hammered and reheated and another layer of tool steel is welded on as before. This process is repeated until the tool is brought to the desired shape and size. The tool is then reheated and allowed to cool slowly. After it is thoroughly cool

it is again reheated and hammered after which it is dressed and hardened as desired.

Instead of subjecting the tool to successive heat and building it up of separate layers it is to be understood that if preferred the building up can be accomplished with one heat, a sufficient amount of material being used to build up the tool to the proper size. After the tool has been allowed to cool it is reheated and dressed by hammering to a cutting edge, and thereafter hardened.

In practice it has been found that this method of building up tools of this character results in a considerable saving inasmuch as many tools that would otherwise be discarded because too small for further use, can remain in use.

What is claimed is:—

The herein described method of building up worn well drilling tools and the like which consists in slowly heating the tool to a cherry red, applying to the tool a layer of high carbon steel, welding said layer to the tool by the oxy-acetylene process, subsequently hammering and reheating the steel and applying thereto another layer of steel by the oxy-acetylene process, then reheating the tool and allowing it to cool, and finally again heating the tool, shaping it and hardening it.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS M. SULLIVAN.

Witnesses:

C. C. FULLER,  
H. L. PERRY.