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N. A. DE GRAND

2,572,991

BUSHING REMOVER

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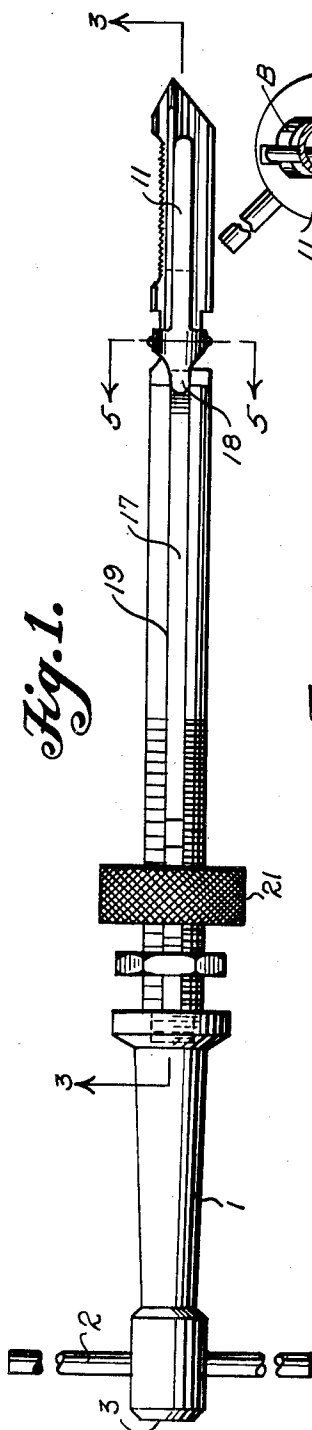


Fig. 1.

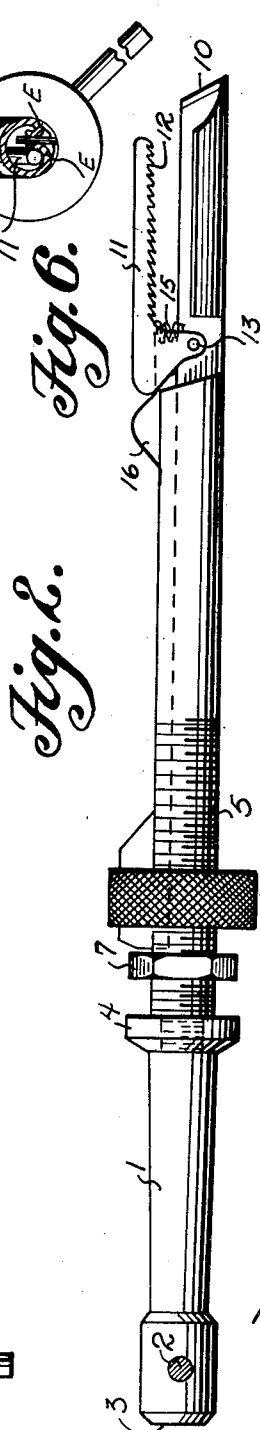


Fig. 2.

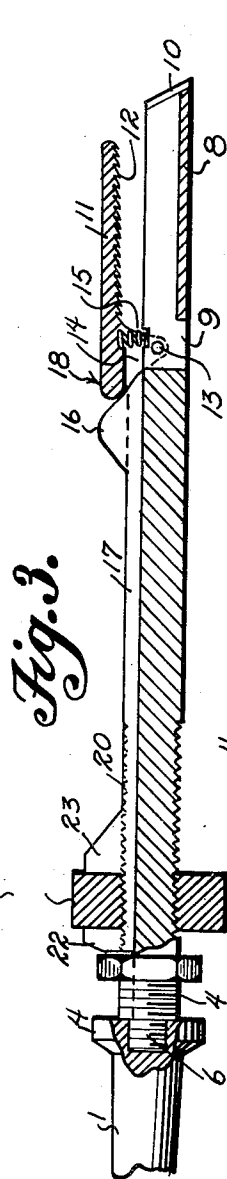


Fig. 3.

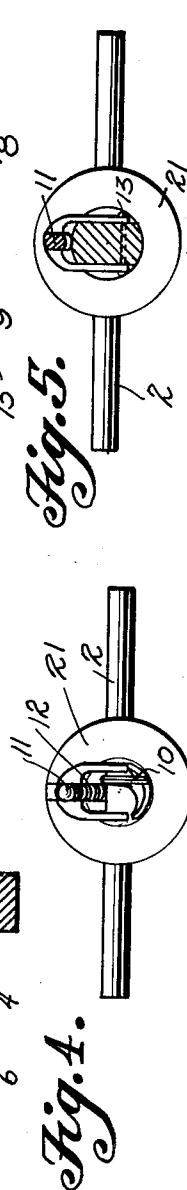


Fig. 4.

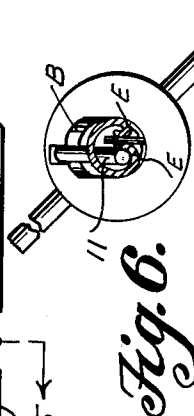


Fig. 5.

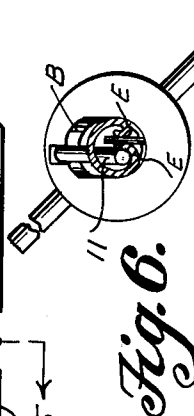


Fig. 6.

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UNITED STATES PATENT OFFICE

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BUSHING REMOVER

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1 Claim. (Cl. 294—104)

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My present invention relates generally to assembling and disassembling apparatus for use in metal working, and more specifically to an improved bushing remover of the hand manipulated type, that is designed for insertion into the end of a tube, sleeve, or bushing, for the purpose of first cutting or splitting the bushing, and then for removing the bushing from its surrounding enclosure.

The bushing cutter and remover of my invention includes a minimum number of parts that may be manufactured with facility at low cost of production, and these parts may be assembled with convenience to provide a reliable, efficient, and durable tool that is simple in construction and operation and proficient in the performances of its functions.

The invention consists in certain novel features of construction and combinations and arrangements of parts involving a cutting tool, gripping jaws, and means for activating these parts as will hereinafter be described and more particularly pointed out in the appended claim.

In the accompanying drawings I have disclosed a complete example of a physical embodiment of my invention wherein the parts are combined and arranged in accord with one mode I have devised for the practical application of the principles of my invention. It will however be understood that changes and alterations are contemplated and may be made in these exemplifying drawings and mechanical structures, within the scope of my claim, without departing from the principles of the invention.

Figure 1 is a plan view of a bushing cutter and remover in which my invention is embodied; and Figure 2 is a side view of this structure.

Figure 3 is a longitudinal sectional detail view as at line 3—3 of Fig. 1.

Figure 4 is a front end view of the tool; and Figure 5 is a vertical transverse sectional view at line 5—5 of Fig. 1; and

Figure 6 is a detail view showing the tool in operation as splitting and curling or rolling the bushing preparatory to removing it from its surrounding base.

In order that the general arrangement and utility of parts may readily be understood I have depicted in Fig. 6 one end of a cylindrical bushing B, which has been split by hammer blows on the tool to form curled or rolled edges E, E that are to be gripped by the tool preparatory to removing or withdrawing the bushing from its seat.

In carrying out my invention I employ a handle bar 1 having a cross pin 2, and a driving head

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3 for impact of hammer blows, and the inner end of the handle bar is provided with a socket head 4 in which a screw bar 5 is detachably threaded as at 6, and rigidly locked by a lock nut as 7. The handle bar is removable and interchangeable with other handle bars of varying length for use in adapting the tool to different positions of the bushing or work.

The front end of the screw bar terminates in a beveled edge and rectangular cutting blade or chisel 8 having a body that is concavo-convex in cross section, and channeled to form the fixed jaw of a grapple, and the fixed jaw is slotted or cut away as at 9 to reduce friction, preventing the tool from binding, as it cuts through and splits the wall of the bush, and to accommodate the curled or rolled edges E, E that are separated by the chisel edge or angular cutting edge 10 of the tool.

By hammer blows against the impact head 3 of the handle bar the sharp angular cutting edge or chisel is designed to cut into the bushing B and roll or curl upwardly the split edges E, E, as indicated in Fig. 6 so that these split edges may be gripped by the fixed jaw or chisel 8 in co-action with a movable jaw 11.

The movable jaw 11, which extends longitudinally of the tool, is provided with inner serrations or teeth 12 for rigidly gripping these edges E, E and it is pivoted at 13 in side arms 14 of the jaw which straddle the fixed jaw.

A spring 15 which is confined by the arms and interposed between the two jaws tends to separate the movable jaw from the fixed jaw as indicated in Figs. 2 and 3.

The movable resiliently opened gripping jaw is positively closed into gripping action against the edges E, together with the fixed jaw, and for this purpose a cam head or wedge 16 integral with a slide bar 17 coacts with a bearing head 18 at the rear end of the movable jaw.

The slidable cam bar 17 with its wedge or cam is reciprocally mounted within a longitudinally extending groove 19 of the tool or screw bar, and the rear or outer end of the cam bar is fashioned with screw threads 20 for co-action with a knurled traveling nut 21 that is threaded on the screw bar 5. This nut 21 is located between a rear lug 22 and a longitudinally spaced front lug 23 integral with the cam bar, and they form a notch to accommodate the nut which bears against the front lug for actuating the cam head, and bears against the rear lug for releasing the cam head from the movable jaw.

The nut is turned forwardly and rearwardly on the screw bar to reciprocate the cam bar, and the lugs provide stops for retaining the nut in adjusted position on the screw bar.

From this description taken in connection with my drawings it will be apparent that the tool may be employed as a chisel in splitting the bushing as described, then the movable jaw is closed to grip the split bushing, and by applying manpower to the cross pin 2 the bushing may be manipulated for loosening, and final withdrawal from its seat.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

In a bushing cutter and remover having a bar like body formed with a longitudinally extending groove and provided at its rear end with external screw threads and at the forward end with a fixed jaw and a reduced portion rearwardly of the fixed jaw, the improvement comprising a movable jaw, side arms on said movable jaw straddling the reduced portion and a pivot pin passing through the arms and reduced portion to pivotally mount the movable jaw with relation to the fixed jaw, a spring inter-

posed between the fixed jaw and movable jaw adjacent the pivot pin, a cam bar reciprocable in the groove of the bar like body, a cam on the forward end of the cam bar for coaction with the rear end of the movable jaw, a threaded actuating nut mounted on the threads on the bar like body, an operating connection between the cam bar and the nut and a pair of spaced lugs on the cam bar for bearing engagement on the opposite sides of the nut.

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