Dec. 22, 1936. R. F. JOHNSTON 2,065,461

METHOD OF REMOVING CAVITIES FROM SHEET METAL

Filed April 16, 1934

Fig. 1.

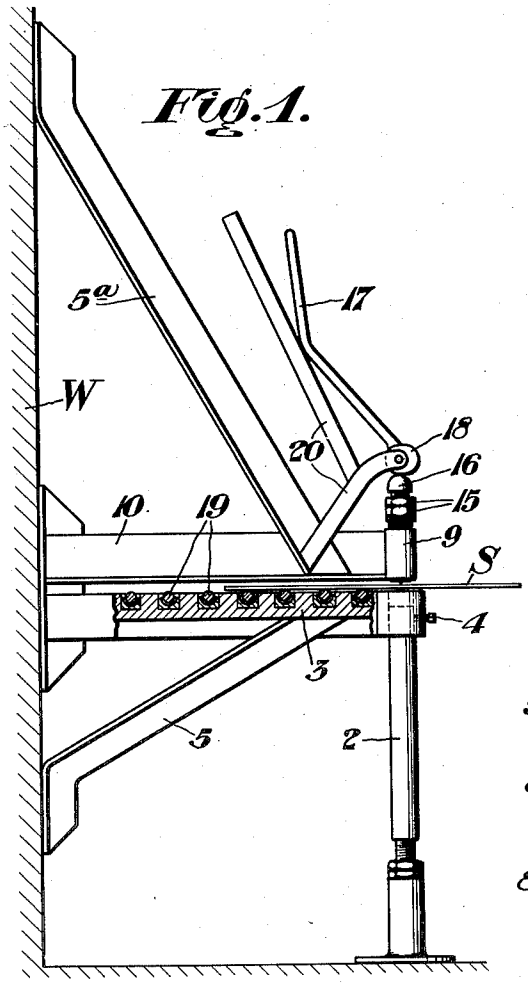
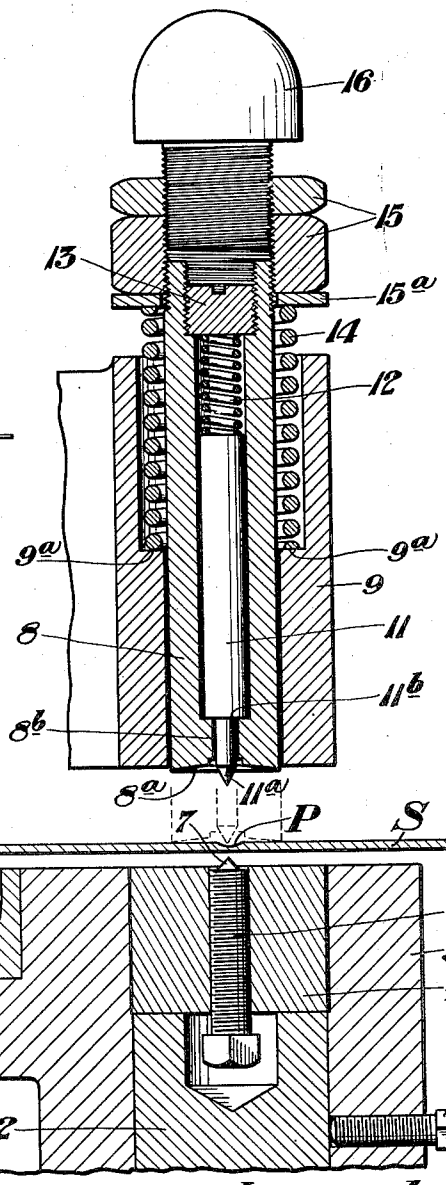


Fig. 2.



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METHOD OF REMOVING CAVITIES FROM SHEET METAL

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1 Claim. (Cl. 29—148)

This invention relates to a method of removing pits or cavities from sheet metal so as to provide at least one side surface of the sheet which may be polished to a high degree, and while not limited thereto the invention is particularly adapted for use in finishing alloy sheets, such as stainless steel.

In the manufacture of sheet metal, and especially those sheets on which it is necessary to provide at least one perfect side surface, such as for use in the manufacture of automobile bodies, automobile radiator shells and the like, great care and precaution must be exercised in order not to dent or mar the surface, and even when the utmost precaution is used some sheets will have there surfaces marred by dents or pits which prohibit such surfaces from being polished to a high degree.

Sheets having cavities in their surface are not prime sheets and to discard these sheets or to sell them as "seconds" entails a considerable loss to the manufacturer, especially when such sheets are composed of the expensive stainless alloys.

The present invention provides a method of removing the dents or pits from one side of the sheets so that substantially all sheets may be provided with a highly polished surface and may be sold as prime sheets, thus reducing the manufacturer's loss to a minimum.

In the drawing illustrating one form of apparatus for carrying out the method of my invention—

Figure 1 is a side elevation; and

Figure 2 is an enlarged fragmentary detail in section through the dent-removing head of the apparatus.

Referring more particularly to the drawing, the numeral 3 designates a horizontally extending table for supporting the sheet metal from which cavities are to be removed, which table is supported at its rear end on a wall W, or other suitable support, and at its forward end by an extension leg 2 and brackets 5. The extension leg 2 is locked in a recess in the forward end of the table 3 by a set-screw 4. An anvil or punch block 1 is mounted in the recess in the forward end of the table 3 above the upper end of the leg 2, and is provided with a centrally arranged adjustable punch 6. The upper end or operating point 7 of the punch 6 is preferably composed of hardened tool steel or a diamond so as to resist wear, and readily operate upon alloy sheets.

The table 3 is provided with anti-friction casters or rollers 19 which project slightly above its surface and on which the sheet being processed is adapted to ride. The punch point 7 is preferably slightly below the plane along the upper faces of the rollers 19, so that the sheet being processed may be readily moved over the punch.

A bracket 10 extends outwardly from the wall W spaced slightly above and parallel with the table 3, and terminates at its forward end in a sleeve-like terminal 9. The bracket 10 has its forward end supported by a bracket 5^a also extending outwardly from the wall. A circular die plunger 8 is mounted for vertical movement within the sleeve portion 9 of the bracket 10 and is normally urged upward by a coiled spring 14. The die 8 is provided with a central bore in which is mounted a centering pin 11 having a reduced point portion 11^a which projects through a reduced lower end 8^b of the bore in the die 8. The pin 11 is normally urged downwardly by a coiled spring 12, the tension of which is adjustable by a screw block 13. The lower face of the die 8 is preferably made concave, as at 8^a, forming a depression into which metal may flow or move when the sheet is forced against the punch 7.

The spring 14 which normally urges the die 8 upwardly is positioned between shoulders 9^a formed in the sleeve 9 and adjustable screw units 15 and washer 15^a. A semi-circular head 16 is mounted in the screw units 15 and is adapted to be engaged by a cam 18 carried by a lever 17 and mounted in a bracket support 20. When the lever 17 is moved forwardly by the operator the cam 18 is rotated so as to force the head 16 and its connected die 8 downwardly against the sheet being processed.

In carrying out the method of this invention the sheet S to be processed is supported on the table 3 and is moved between the die 8 and the anvil block 1 and its punch point 7. The operator will shift the sheet being processed over the casters or rollers 19 so as to locate a cavity to be removed under the pin point 11^a. In the drawing the cavity is indicated by the letter P. In order to correctly locate the cavity directly over the point 7 of the punch 6, the operator will move the lever 17 forwardly, thereby moving the die 8 and centering pin 11 downwardly until the point 11^a of the pin 11 enters the cavity to be removed. With the pin point 11 in this position the operator will continue to pull the lever 17 forward so as to cause the cam 18 to force the die 8 downwardly into engagement with the sheet S and further force the sheet downwardly against the punch point 7, thereby punching the metal immediately below the cavity P upwardly into the die 11, and the metal surrounding the cavity P will also be

removed upwardly into the concave lower face of the die 8 so that the cavity is filled with metal from the opposite side of the sheet and the metal immediately surrounding the cavity is slightly raised above the normal plane at the upper side of the sheet. This operation is continued for each cavity or pit in the upper side of the sheet, and after all of the cavities or pits have been filled in this manner the sheet will be removed from the apparatus of this invention and polished in any suitable polishing machine (not shown) so as to grind down the raised portions in the upper surface of the sheet formed by the operation of the punch 6 and the die 8, thereby providing a polished side of the sheet with a continuous smooth surface free from any indentations or cavities.

One feature of this invention is that since the apparatus is manually operated the pressure applied to the die may be regulated in accordance with the depth of each cavity to be removed which greatly facilitates the operation of the apparatus in the carrying out of the method.

What I claim is:

The method of removing a cavity from the surface of a metallic sheet which consists in displacing the surface of the cavity beyond the plane of the surface of the sheet said displacement being insufficient to place the opposite surface of the sheet in the plane of the first named surface thereof, and removing all of the displaced metal which is beyond the plane of the first named surface of the sheet.

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