

May 1, 1945.

F. CZAPIEWSKI

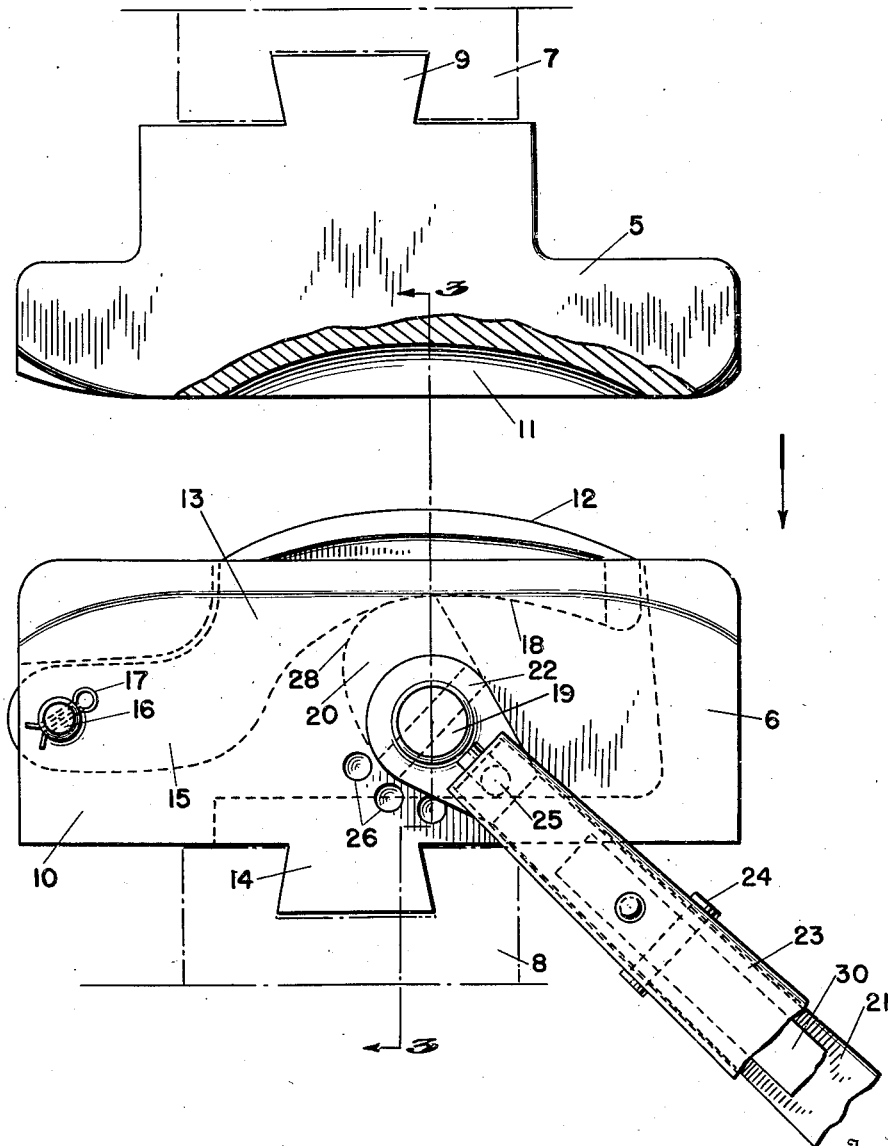
2,374,852

ATTACHMENT FOR SHEET METAL FORMING AND WORKING MACHINES

Filed March 7, 1942

2 Sheets-Sheet 1

Fig. 1.



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2 Sheets-Sheet 2

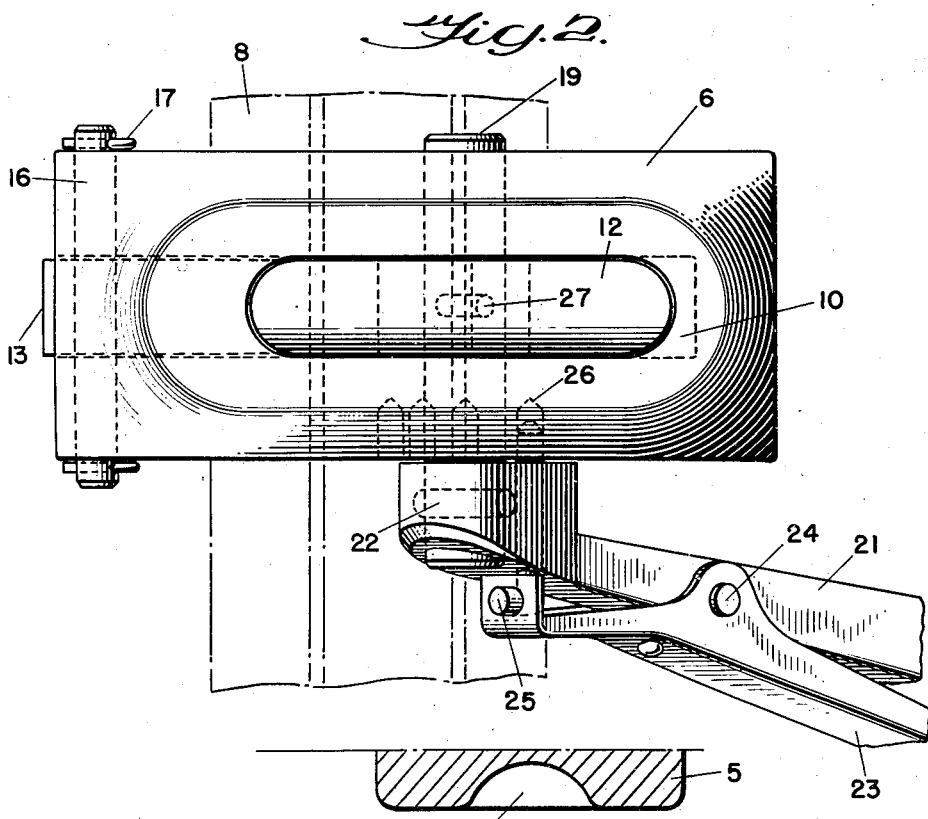
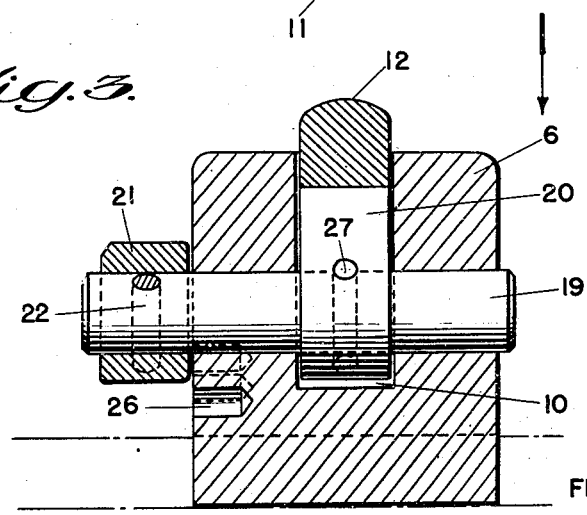


Fig. 3.



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ATTACHMENT FOR SHEET METAL FORMING AND WORKING MACHINES

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4 Claims. (Cl. 153—32)

This invention relates to apparatus for shaping metal, and more particularly to apparatus for shrinking metal during forming operations.

The present apparatus was developed in response to a growing demand for a single unit for use on a "Yoder hammer," or other similar machine, to perform the shrinking of a metal sheet on the edges as well as in the middle or central portions.

Heretofore there has been no apparatus which could accomplish this dual function, but it has been necessary to change the corresponding component parts each time it was desired to switch from an edge shrinking operation to a central shrinking operation.

It is obvious to those skilled in the art that such a change-over requires considerable effort to accomplish the proper alignment and results in a tremendous loss of time with its incident increase in cost of production.

The present invention is a self-contained unit and consists of two members, one of which serves as a peening member and is attached to the reciprocating ram of a "Yoder hammer"; and the other, serving as an anvil member, is attached to the tool post of the "Yoder hammer." By feeding sheet metal between these two members, an operator can produce double curvature shapes, remove wrinkles in previously formed pieces, or perform any of several related operations impossible with other metal working tools.

Further, the present invention is capable of performing its shrinking operation efficiently on various metals including stainless steels, as well as on aluminum alloys and, therefore, is of great importance to all industries working in sheet metal for various uses.

While my invention will be described in connection with a "Yoder hammer," it is to be understood that this means of description is only for the sake of clarity and that the apparatus can be used equally well on other machines of this type capable of reciprocal movement.

As is well known to those skilled in the art, a "Yoder hammer" is a motor driven, adjustable, eccentric apparatus which transmits hammer blows upon a fixed anvil. The speed of the blows is governed by the operator through a foot pedal. Peculiar to this machine is the spring action linkage which gives the hammer the flexible quality necessary for high speed reciprocative action.

It is, therefore, an object of the present invention to overcome the above difficulties and to provide an improved shrinking die which is capable of shrinking metal along the edges thereof as well as at any portion which does not contain an edge of the metal, i. e., an inner or central portion of the metal.

Another object of the present invention is to provide an improved shrinking die which is quickly adjustable to accomplish optimum ranges of shrinking.

5 Another object is the provision of a shrinking die which during forming operations will not leave an irregular surface on the metal being worked, but, at the most, will only result in a loss of polish.

10 A further object is to provide an improved shrinking die, which during forming operations will not produce wrinkles or folds in the metal worked.

15 A still further object is to provide a shrinking die which is easy to install, effective in operation and sturdy in construction.

Further objects and advantages of the invention will be seen from the following description, particularly when taken in conjunction with the accompanying drawings which form a part thereof.

In the drawings:

Figure 1 is a side elevational view, partly in section, of the present device.

25 Figure 2 is a top view of the bottom portion of the device shown in Figure 1, and

Figure 3 is a transverse sectional view taken along the line 3—3 of Figure 1.

30 For convenience of description, the present device may be considered as composed of two major component parts 5 and 6; part 5 hereinafter being referred to as the peening and die member, wedgedly affixed to the reciprocating ram 7 of a "Yoder hammer," for example; and part 6, hereinafter being referred to as an anvil member, wedgedly affixed to the tool post 8 of the "Yoder hammer." It is to be understood, of course, that the positioning of these members 5 and 6 on the reciprocating and stationary members of the
40 "Yoder hammer" can be reversed.

The peening and die member 5 is wedged into position on the reciprocating ram 7 of a "Yoder hammer," for example, by means of its dovetail portion 9 and has a concave recess 11 formed in the peening surface thereof which is adapted to receive the convex portion 12 of an adjustable forming head 13 hingedly affixed in anvil member 6, later to be described.

45 Anvil member 6 is wedged into rigid position on the tool post 8 of a "Yoder hammer," for example, by means of its dovetail portion 14 and is provided with an adjustable forming head 13 positioned in a chamber 10 of the anvil member 6. Forming head 13 has a convex head 12 which is so formed as to mate with the concave recess 11 formed in the peening surface of the peening and die member 5. Further, forming head 13 is provided with an arm 15, integrally connected
55 to the convex head 12, which is hingedly mounted
60

in anvil member 6 on shaft 16 which is carried by anvil member 6 and held in position by means of cotter pins 17 fitted into slots formed in the opposite ends thereof. Forming head 13 is further provided with a concave cam surface 18 substantially parallel to and positioned below the convex head 12. Shaft 19 is journaled in anvil member 6 and is actuated by handle 21 preferably secured thereto by means of a pin 22. Other suitable securing means may be used such as a key or similar securing means. Handle 21 is adjustably locked in selected position by a locking means comprising a spring 30 adapted to actuate lever 23 pivoted to handle 21 by pin 24, and a locking pin 25 carried by lever 23 which is adapted to be selectively positioned into index recesses 26 when aligned therewith. Cam member 20, rigidly affixed to cam shaft 19 by means of pin 27 (see Fig. 2), is adapted to work along cam surface 28 to displace forming head 13 commensurate with the predetermined movement of the handle 21.

Thus it will be seen that forming head 13 is adjustably carried by anvil member 6 so that the convex head 12 may lie flush with the peening surface of member 6 or may be protruded thereabove for cooperation with the recess formed in member 5.

The operation of the present device is as follows:

During forming operations, when it is desired to shrink a sheet of metal at any location other than on the edges, i. e., for instance, a middle portion thereof, that portion of the sheet which is to be shrunk is positioned between the anvil member 6 and the peening and die member 5; forming head 13 is raised to the desired position by manipulating handle 21 and its associated locking elements; the "Yoder hammer" is put into operation so that the metal is forced to flow up and into the concave recess 11 formed in the peening surface of peening and die member 5; the "Yoder hammer" is then stopped and forming head 13 is allowed to recede into its chamber 10 in anvil member 6 by releasing the locking means and actuating handle 21; the "Yoder hammer" is then started again and the sheet is pulled from between the anvil member 6 and the peening and die member 5, during which time the hump formed in the sheet by the operation next preceding is shrunk down to form a continuation of the surface of the surrounding portions of the sheet by means of the peening surface of the peening member impinging thereupon. Continuation of this operation on various portions of the sheet will result in the shrinking required in the desired forming of the sheet.

On the other hand, if it is desired to shrink the edges of a metal sheet during forming operations, the edges of the sheet are positioned between the anvil member 6 and the peening and die member 5; forming head 13 is raised to the desired position by manipulating handle 21 and its associated locking elements; the "Yoder hammer" is put into operation so that metal is forced to flow up and into the concave recess 11 formed in the peening surface of the peening and die member 5 and at the same time the sheet is drawn out from between the anvil and peening and die member, during which time the hump formed in the sheet is shrunk down to form a continuation of the surface of the surrounding

portions of the sheet by means of the peening surface of the peening member impinging thereon.

While I have described herein some uses of my invention, I wish it to be understood that I do not intend to limit myself thereby, except within the scope of the appended claims.

Therefore, it will be seen that I have provided an attachment for a sheet metal working and forming machine which accomplishes a function heretofore impossible to perform by existing metal working tools, i. e., the dual function of shrinking metal on the edges as well as in the middle or central portions thereof, by means of a single unit without the necessity of substituting several different attachments for the performing of the two operations.

I claim:

1. A device for flowing sheet material adapted to be attached to a reciprocating power hammer, including a peen member and an anvil member, said peen member having a concave recess formed therein surrounded by a flat peening surface, and said anvil member having a projecting forming head movably mounted therein, surrounded by a flat surface adapted to cooperate with the peening surface of said peen member, and means for extending said forming head from a retracted position within said anvil to a position extending beyond the surface of said anvil.

2. A device for flowing sheet material adapted to be attached to a reciprocating power hammer, including a peen member and an anvil member, said peen member having a concave recess formed therein surrounded by a flat peening surface, and said anvil member having a projecting forming head movably mounted therein surrounded by a flat surface, adapted to cooperate with the peening surface of the said peen member, means for extending the projection of the forming surface beyond the peening surface and means for locking said forming head in selected positions relative to said anvil member.

3. An attachment for a reciprocating power hammer for a sheet metal working and forming machine, including a peen member and an anvil member, said peen member having a concave recess formed in the peening end thereof surrounded by a flat peening surface, said anvil member having a convex-shaped forming head movably mounted therein, said forming head in said anvil aligned with the concave recess in said peen for cooperation therewith in forming sheet metal, and a forming head moving mechanism for fully retracting, and regulating the projection of said forming head relative to said anvil.

4. An attachment for a reciprocating power hammer for a sheet metal working and forming machine, including a peen member and an anvil member, said peen member having a concave recess formed in the peening end thereof surrounded by a flat peening surface, said anvil member having a convex-shaped forming head movably mounted therein, said forming head in said anvil aligned with the concave recess in said peen for cooperation therewith in forming sheet metal, cam means to regulate the extent of said forming head above the surface of said anvil, and means to lock said forming head in selected positions relative to said anvil surface.

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