This invention relates to a punching tool and has particular reference to a stripping punch with an integral stripper.

The principal object of the invention is to provide a compact punching tool that will do the same work of more complicated punches.

Another object is to provide a less costly resilient assembly for withdrawal of the punch after the punching operation is accomplished and which will stand up in service.

A further object is to provide a punching tool which is readily assembled.

These and other objects of the invention will appear hereinafter in connection with the following description of the drawing illustrating an embodiment of the invention.

In the drawing:

Figure 1 is a longitudinal sectional view of the punching tool of the invention with the punch in elevation and in retracted position.

Fig. 2 is a view similar to Fig. 1 with the punch in extended position.

Fig. 3 is a detail view of the lower portion of the punch being retracted from the work and showing the hold down of the work; and

Fig. 4 is a section taken on line 4—4 of Fig. 1.

Referring to the drawing, there is shown the punch 1 the upper end of which is disposed within the punch holder or ram 2 and removably secured thereto by the set screw 3 which is threaded into the ram and extends into an aperture provided therefore in punch 1. The lower end of the punch tapers to the punching head size desired.

The metal stripper member 4 surrounds punch 1 below ram 2 and is carried by and radially spaced from the punch. Member 4 is preferably in the form of a tube of substantial diameter and which is capable of holding a thin sheet metal work piece down evenly on all sides of the punch during stripping of the latter from the work piece.

The resilient member 5, which may be of rubber or similar material, is located in the space between punch 1 and tubular stripper 4. Member 5 extends downwardly from the upper end of stripper 4 to a line slightly beyond the middle of the stripper and is cemented or vulcanized to both tubular stripper 4 and punch 1 to operate integrally with them as will be described.

The punch has a greater cross-section in the portion embossed by member 5 and tapers to the punching head below member 5 as previously described.

The lower end portion of tubular stripper 4 projects slightly beyond punch 1 when the punching tool is assembled in order to engage the work piece 6 being punched before punch 1 engages the work piece during the working stroke of ram 2, and to leave work piece 6 after the punch has been withdrawn by the ram. This manner of assembly of tubular stripper 4 with punch 1 provides the tube as the hold-down element of the tool to hold work piece 6 tightly against die 7 upon retraction of punch 1 when the punching operation is completed.

The upper end of stripper 4 is spaced from ram 2 in order to provide clearance for movement of ram 2 downwardly to drive punch 1 downwardly through work piece 6, as illustrated in Fig. 2 of the drawing.

Figures 1, 2 and 3 illustrate the operation of the punching tool. In Fig. 1 the tool is shown at the start of a punching stroke as the lower end of stripper 4 engages the metal sheet or work piece 6 to be punched to hold the same tightly down against the die 7.

In Fig. 2, punch 1 has been driven through work piece 6 into die 7. In this position of the punch, resilient member 5 is distorted or offset downwardly, as shown in the drawing, since it is placed under tension by punch 1 moving downwardly through stripper tube 4.

When ram 2 is retracted, punch 1 is raised and resilient member 5, as shown in Fig. 3, tends to hold stripper 4 against work piece 6 to clamp the work piece tightly against die 7 so that the punch is retracted without burring or tearing the metal of the work piece.

By providing a structure in which the stripper normally extends beyond the end of the punch it is possible to build up a substantial working pressure on the stripper by reason of the distortion of the rubber at the time punch 1 engages the work piece. This construction insures a holding down of the work piece by the stripper until the punch is clear of the work piece during withdrawal of the punch.

The mechanism for the operation of ram 2 is not shown as it forms no part of the invention.

The assembly of the tool may be accomplished in a number of different ways. Under one method of assembly the resilient member 5 is assembled in the space between tubular stripper 4 and punch 1 and then vulcanized to both members simultaneously. The rubber or rubber-like material employed might also be extruded into place. Member 5 may also be prepared with cement and be cemented to both stripper 4 and punch 1 simultaneously. After assembly of the tool, as described, the upper end of the punch is then in-
sized in ram 2 and set screw 3 is threaded into
the aperture provided therefor.

The punching tool of the invention is a very
compact unit and the parts are readily assembled.
The integral feature of the assembly is accom-
plished by an inexpensive resilient member se-
cured to the other two parts of the punch.

Various embodiments of the invention may be
employed within the scope of the accompanying
claims.

I claim:

1. A punching tool for punching an aperture
in a workpiece, comprising a punch, a tubular
stripper surrounding the same in radially spaced
relationship thereto and having an end portion
projecting slightly beyond the lower end of the
punch, and a resilient rubber-like material dis-
posed in the radial space between the punch and
stripper and bonded to both of said members to
hold said stripper against the workpiece for strip-
ping said workpiece from the punch during re-
traction of the punch therefrom.

2. A punching tool for punching an aperture
in a metal workpiece, comprising a punch, a tubu-
lar stripper surrounding the same in radially spaced
relationship thereto and having an end portion
projecting slightly beyond the lower end of the
punch, and a resilient rubber-like mate-
rial disposed in the radial space between the
punch and stripper and bonded to both of said
members to form an integral unit thereof and
hold said stripper against the workpiece for strip-
ping said workpiece from the punch during re-
traction of the punch therefrom.

3. A punching tool for punching an aperture
in a metal workpiece, comprising a punch hav-
ing the lower end portion tapered to a punching
shape and the upper end secured within a punch
holder for operating the same, a tubular stripper
assembled around said punch in spaced relation
thereto and projecting beyond the punch at the
lower end and spaced from the work holder at
the upper end, and a resilient rubber-like mate-
rial confined between the tubular stripper and
punch above the tapered lower end portion of
the punch and bonded to each of said members to
integrate the same together and hold
said stripper against the workpiece for stripping
the workpiece from the punch during retraction
of the punch therefrom.

NEIL B. GRANBERG.

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