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3,332,275

DIE FOR METAL STAMPING MACHINE

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2 Sheets-Sheet 1

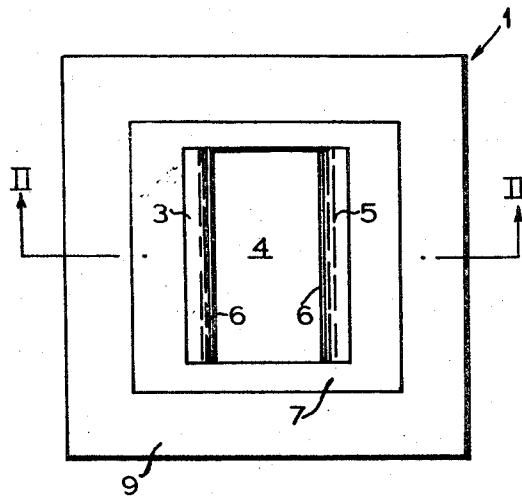


Fig. 1.

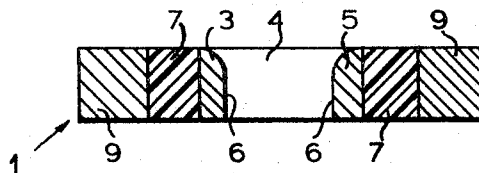


Fig. 2.

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1

3,332,275

DIE FOR METAL STAMPING MACHINE

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4 Claims. (Cl. 72-466)

The present invention relates to a stamping machine and in particular to a die for use in a metal stamping machine.

The stamping of sheet metal involves the use of a male punch and a female die. The metal to be stamped is placed between the punch and die and then the punch is lowered into the die to impart to the sheet of material the desired configuration. In order to obtain a specific configuration when punching sheet metal it is very important that the punch and die be constructed so that they have an exact shape and clearance relative to each other. Also, when stamping sheet material it is essential that the sheets being stamped be of the same thickness and the punch and die be accurately aligned in order to prevent wear on the faces of punch and die.

Thus, in view of the above considerations, the manufacturing of punches and dies for stamping machines can be both costly and time consuming.

It is the object of the present invention to provide a die for a stamping machine which decrease the need for exact punch and die clearance; allows for misalignment of the punch and die, and permits the stamping of a sheet of material of varying thickness throughout its area.

According to its broadest aspect, the present invention relates to a die for use in a stamping machine including a punch, said die comprising at least two aligned and co-operating die members each having a facing surface; said surfaces defining at least a part of a die cavity of predetermined size and configuration; elastic material associated with each said die member and located remote from said facing; and a member adapted to retain said die members and elastic material in co-operating relationship; the arrangement being such that, upon misalignment of said punch with respect to said die cavity, the elasticity of said material will permit said die cavity to compensate for such misalignment.

The invention will now be described in detail with reference to the accompanying drawings which show by way of example, two embodiments of the invention, and wherein:

FIGURE 1 is a plan view showing one embodiment of the invention;

FIGURE 2 is a cross section taken along line II—II of FIGURE 1;

FIGURE 3 is a plan view showing a second embodiment of the invention; and

FIGURE 4 is a cross section taken along line III—III of FIGURE 3.

With reference to the drawings, and in particular to FIGURES 1 and 2, the die, generally indicated at 1, includes a pair of aligned die members 3 and 5 each having a facing surface 6 defining a die cavity 4. An

2

elastic material 7, preferably an elastomer, is bonded to the edge of the die members 3 and 5. The die members 3 and 5 and the elastic material 7 are retained in co-operating relationship by retainer plates 9.

In operation, a punch (not shown) is located above the die 1 and a sheet of material, e.g. sheet metal, is placed between the punch and die 1. The punch is lowered into the die cavity 4 to impart to the sheet of material the desired shape defined by the face of the punch and the die members 3 and 5. If the punch is misaligned with the die cavity 4 the elastic material 7 will permit the die cavity 4 to compensate for the misalignment, i.e. one or both of the die members 3 and 5 is pressed against the elastic material 7 so that the die cavity 4 assumes the desired shape. The die members 3 and 5 have sufficient play to permit the stamping of sheet material when the punch and die are misaligned, or when the thickness of the sheet of material varies throughout its area.

The embodiment of the invention shown in FIGURES 3 and 4 of the drawings includes die members 13 and 15, each having a facing surface 16, which surfaces define die cavity 14. An elastic material 17, preferably an elastomer, is bonded to the edge 18 of the die members 13 and 15. Retainer plates 19 and 21 retain the die members 13 and 15 and the elastic material 17 in co-operating relationship.

Each die member 13 and 15 forms a single unit with the elastic material 17 and retainer plates 19 and 21 respectively. The units are mounted on a base plate 23 by means of screws 25 which pass through bores 27 in the retainer plates 19 and 21, and into aligned threaded bores 31, 33, 35 or 37 in the base plate 23. Thus, the die members 15 and 17 can be spaced various distances apart to vary the size of the die cavity 14 to accommodate a variety of punch sizes.

The operation of this embodiment of the invention is similar to that shown in FIGURES 1 and 2, except that the die facings 13 and 15 can be spaced apart on the base plate 23, their distance apart being determined by the size of the stamping to be made.

Obviously, the elastic material 7 or 17 can assume various configurations and can be of any desirable thickness depending on the amount of play required in the die facings. Preferably, the elastic material is bonded directly to the die members, but various other means for maintaining the elastic material in position can be employed. For example, when objects having a complicated shape are being made, or when close tolerances are required the die members would have to be heat treated after being fitted to the punch. In such instances, the steel facings cannot be pre-bonded to the elastomer, but could be connected to the elastomer by means of dowels.

We claim:

1. A die for use in a metal stamping machine including a punch, said die comprising at least two aligned and cooperating die members each having a surface facing the other die member; said surfaces defining opposite surfaces of a die cavity of predetermined size and configuration; elastomeric material associated with each said die member and located remote from said surfaces; and a member adapted to retain said die members and said elastomeric material in co-operating relationship; the arrangement

3

being such that, upon misalignment of said punch with respect to said die cavity, the elasticity of said elastomeric material will permit said die cavity to compensate for such misalignment.

2. A die according to claim 1 including means for varying the size of said die cavity to accommodate different sized punches.

3. A die according to claim 2 wherein said elastomeric material is bonded to said die members.

4. A die according to claim 3 wherein said elastomeric material is a synthetic material.

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4

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