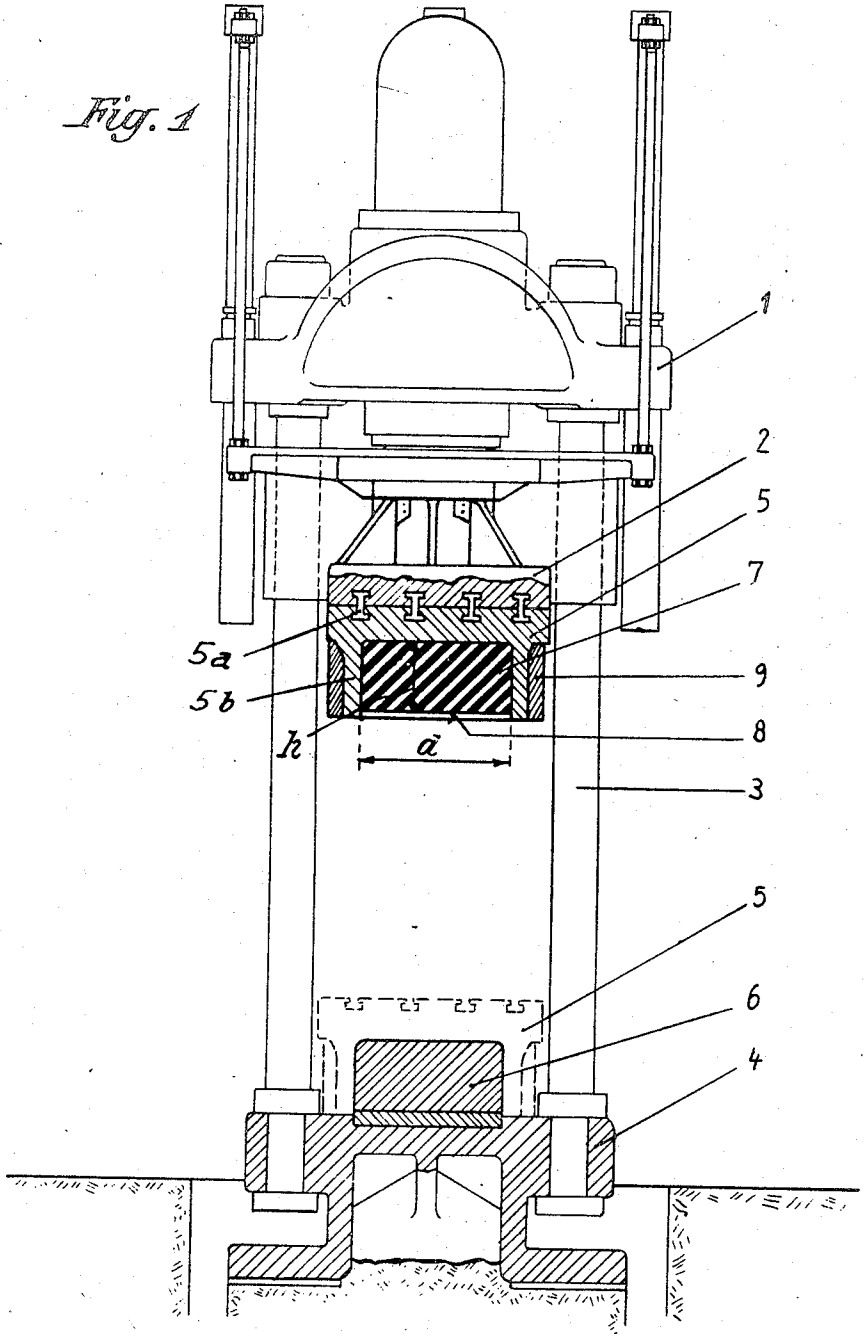
April 22, 1941. O. OECKL 2,239,339

PRESSING APPARATUS

Filed Oct. 11, 1938 2 Sheets-Sheet 1

Fig. 1



Inventor:
O. OECKL
By Pelton & Kilbourne
Attys

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PRESSING APPARATUS

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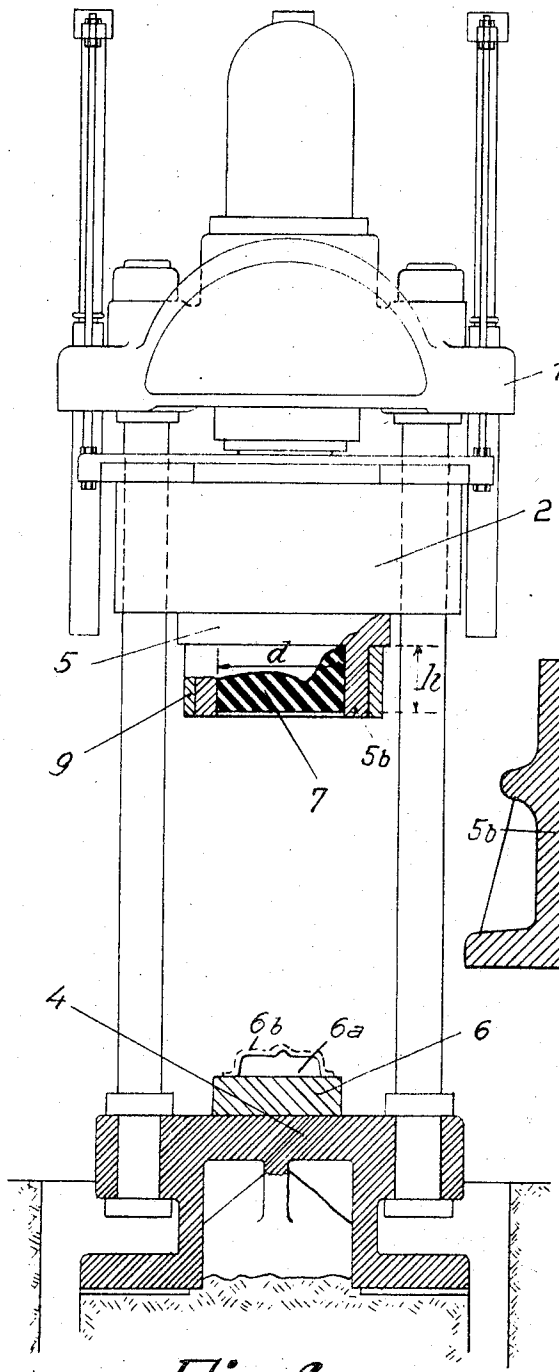


Fig. 2

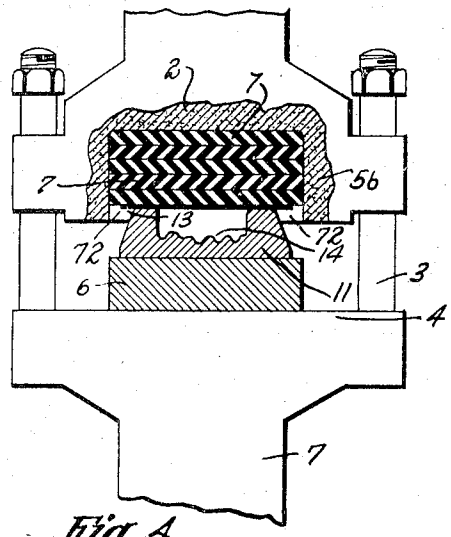


Fig. 4.

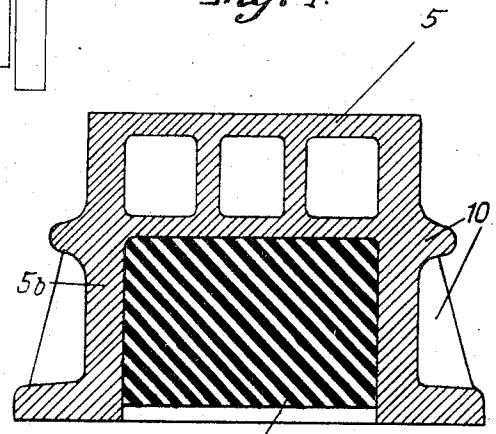


Fig. 3

Inventor:
O. Oeckl
By Blair Hilcamp
Attys

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UNITED STATES PATENT OFFICE

2,239,339

PRESSING APPARATUS

Otto Oeckl, Berlin-Schoneberg, Germany, assignor to the firm: Henschel Flugzeug-Werke Aktiengesellschaft, Schonefeld, Kreis Teltow, Germany

Application October 11, 1933, Serial No. 234,455
In Germany February 22, 1937

7 Claims. (Cl. 113—38)

The invention relates to the production of sheet meta. pressings, and a general object of the invention is to provide a novel press intended more especially for the production of deep and complicated pressings in a sharply defined and faultless manner.

More particularly, the invention, which is susceptible of realization in various embodiments, includes the following features:

(1) The use in one of the press parts of elastic yieldable solid material, such as rubber, with a diameter that preferably at the most is 5 times and on the average is 2.5 times its height, whereby pressures of at least 80 kg./cm.^{2} can be employed;

(2) The provision, in order that the elastic yieldable material may sustain the pressures employed, of means for preventing said material being pressed away outwardly over its lateral boundary and over the side opposite to the press surface;

(3) A method in which the actual pressing out of the sheet metal is performed at only a low speed.

Further features and objects of the invention will be more apparent to those skilled in the art from a consideration of the following disclosure of a number of embodiments illustrated in the accompanying drawings, in which:

Figs. 1 and 2 illustrate two embodiments in side elevation partly in section;

Fig. 3 shows a detail modification on a larger scale in section;

Fig. 4 illustrates another embodiment in elevation and partly in section.

Referring to Figs. 1 and 2, 1 indicates the press which can have any desired construction and operation. The press stamp 2 is guided on columns 3 mounted on the base-part or table 4 of the press. The press stamp terminates in a headpiece 5 connected therewith in an easily detachable manner, e. g. by means of I-shaped bodies 5*a*. The headpiece 5 has a deep chamber open at the bottom, which is packed nearly to its mouth with an elastic yieldable solid material 7 such as rubber or caoutchouc. The clear width of the chamber mouth and external dimension of the material 7, denoted by *d*, is in the ratio to the height *h* of the material 7 as 2:1. The maximum ratio of *d*:*h* in these presses should preferably not exceed 5:1. The other press part 6 of unyielding material is shown as a projection of the press table which fits exactly into the chamber of the headpiece 5 and serves as a carrier for the positive or negative die 6*a* secured thereto and the sheet metal 6*b* to be laid thereon. The walls 5*b* or the chamber, the rim of which projects somewhat beyond the working surface 8 of the cushion 7, are reinforced, e. g. by means of steel bands 9, in order to be able to utilise, in the pressing operation, a high press pressure of at least 80 kg./cm.^{2}, but generally and preferably 100 kg./cm.^{2} or more.

In operation, after placing the sheet metal 6*b* to be shaped on the die 6*a* carried by the projection 6, the press stamp 2 is moved downwards so that the walls 5*b* fit exactly around the projection 6 and form a rigid lateral boundary for the yieldable material 7, when this is pressed with high pressure (about 100 kg./cm.^{2}) onto the sheet metal. Thus, the material 7 bends itself, due to its flexibility, to the form of the matrix 6*a* more and more and correspondingly shapes the sheet metal 6*b*. The material 7 is in this way prevented from shifting and, by the complete utilization of the elasticity of the caoutchouc for the pressing operation, sharply pressed work-pieces are obtained.

If it is desired to use the press in the usual manner, the cushion 7 is removed from the headpiece 5 and the latter is transferred from the press stamp 2 to the base-part 4 of the press and placed over the projection 6, which fills out the chamber in the headpiece 5 and serves as the fastening device for the headpiece. This is shown in dotted lines in Fig. 1. The headpiece 5 in this position is now used as a press table on which, as well as on the press stamp 2, suitable swages may be secured for pressed products of any desired kind.

Fig. 2 illustrates a press similar to that illustrated in Fig. 1 (corresponding parts bearing the same reference numerals) in which the side walls 5*b* of the chamber are thickened and reinforced by steel bands 9. According to the modification shown in Fig. 3, the side walls 5*b* are reinforced by means of webs and flanges 10 which are integral with the chamber walls.

The invention renders possible the production of sharply profiled sheet metal shaped bodies of complicated construction and/or deeply hollowed form, without formation of folds, wrinkles or the like, when the matrix and the sheet metal laid thereon are pressed with slow pressing under high pressure against an abutment or counter-tool of elastic yieldable solid material, the surface dimension of which is larger than that of the sheet metal piece to be produced. The pressing speed is about 12 mm./sec. with an operating pressure of 80 kg./cm.^{2} and decreases correspond-

ingly with higher pressures; for instance, with a pressure of 200 kg./cm.² the speed is about 9 mm./sec. and with a pressure of 300 kg./cm.² is about 6 mm./sec.

The advantage of this method is that, in addition to preventing shifting of the yielding material laterally and from out of the mouth of the chamber, on the one hand the sheet metal is gripped on the edge of the matrix before the beginning of the shaping by means of the rubber cushion and is prevented from forming folds, and on the other hand the part of the yieldable material lying to the side of the projections of the matrix can shift towards both sides and thereby follow very well the course of the matrix shape. The method is particularly suitable for the production of sheet metal shapes with sharp angled edges and rib-like impressions; likewise, it also permits deep drawing.

In Fig. 4, **11** indicates the matrix which is secured to or merely laid on the press part **6** of unyielding material which enters and fits exactly into the chamber **12** of the press stamp **2**. **7** illustrates the elastic yieldable material which has such a surface dimension that it overhangs the matrix **11** or the shaped body to be produced from the sheet metal **13**, on all sides. **14** are rib-like impressions and **5***b* is the reinforced wall of the chamber.

The method of pressing just described can also be carried out with the use of shaping press punches or dies, in which case the sheet metal **13** must be laid on the yieldable abutment or counter-tool **7**.

I claim:

1. A press for the production of sheet metal stampings comprising, in combination, a press stamp, a press table having a projection, said press parts being movable towards and away from one another, an intermediate member provided on one side with a pressing surface and on its other side with an open-ended chamber dimensioned to fit over said projection, means for detachably connecting said member to said stamp, a cushion of resilient material adapted, according to one operation of the press for which the intermediate member is connected to the stamp, to be secured in said chamber for cooperation with a die placed on said projection, and said member being adapted, according to another operation of the press for which it is detached from said press stamp and said cushion is removed from the chamber, to fit over said projection and rest upon said press table, in which latter position cooperating dies or the like may be operatively related to the pressing surface of said member and to said press stamp.

2. A press for the production of sheet metal stampings as set forth in claim 1, in which the open-ended chamber has substantial depth and said cushion has a somewhat lesser depth than that of the chamber.

3. A press for the production of sheet metal stampings as set forth in claim 1, in which the cushion of resilient material is formed from a plurality of sheets of rubber-like material.

4. A press for the production of sheet metal stampings as set forth in claim 1, in which the cushion of resilient material is formed from at least one sheet of yieldable rubber-like material and at least one filler piece of unyielding material.

5. A press for the production of sheet metal stampings as set forth in claim 1, in which the open-ended chamber is of shape and size as to correspond to and thereby fit fully over the press table projection, whereby said projection serves as a fastening piece for the intermediate member when the latter rests upon the press table.

6. A press for the production of sheet metal stampings as set forth in claim 1, in which said member-connecting means connects the intermediate member in its position for said one operation of the press in direct contact with the working surface of the stamp.

7. A press for the production of sheet metal stampings as set forth in claim 1, in which reinforcing means for the walls of the open-ended chamber are provided.

OTTO OECKL.