

March 19, 1957

F. EBEN ET AL

2,785,594

VERTICAL HYDRAULIC PRESS

Filed July 20, 1954

2 Sheets-Sheet 1

FIG. 2

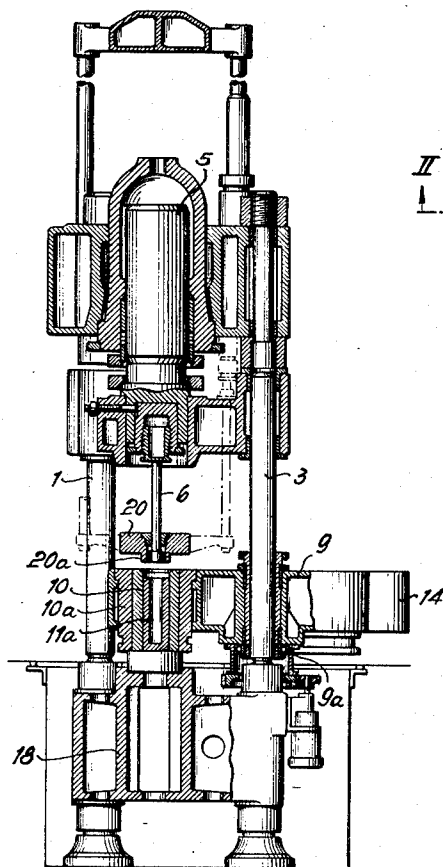
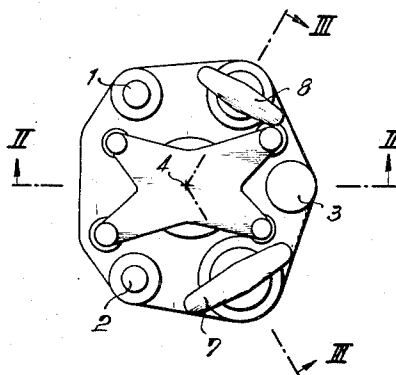


FIG. 1



INVENTORS

F. Eben

W. Hofmann

By *Glasco & Downing* *Attorneys*
ATTYS.

March 19, 1957

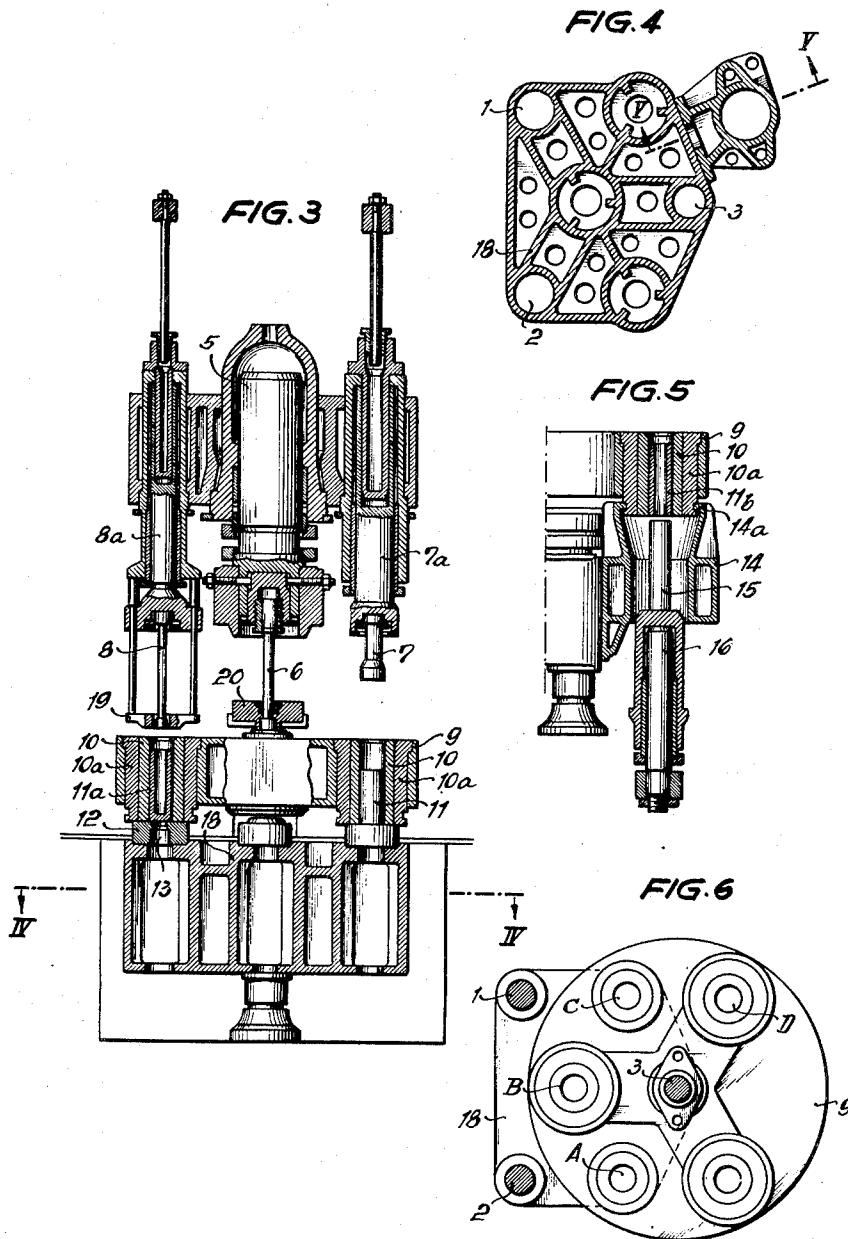
F. EBEN ET AL

2,785,594

VERTICAL HYDRAULIC PRESS

Filed July 20, 1954

2 Sheets-Sheet 2



INVENTORS

F. Eben

W. Hofmann

By *Glossner & Downing, Seattle*
ATTYS.

1

2,785,594

VERTICAL HYDRAULIC PRESS

Franz Eben, Dusseldorf, and Wilhelm Hofmann, Dusseldorf-Oberkassel, Germany, assignors to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Application July 20, 1954; Serial No. 444,566

Claims priority, application Germany August 1, 1953

1 Claim. (Cl. 78—42)

In order to carry out a plurality of successive operations use is made of presses for the treatment of a work-piece in which the individual parts of the tools such as mandril, container, die, etc. are capable of effecting different movements relatively to one another. The work-piece itself thereby remains substantially stationary.

The invention solves the problem of subjecting the work-piece to a number of successive treatments by means of a different construction of press.

According to the invention, the press is provided with three plungers, which are preferably actuated together, and with a turntable carrying the work-pieces in moulds, containers or the like, whereby the work-pieces are mounted on the turntable at a distance which corresponds to the distance of the plungers such that the work-pieces present on the turntable can be treated in succession by the several plungers of the press.

In order to be able to release the pressures, the press table is supported at least in the working range of the plungers that are on the press table. The press table itself may be provided with additional devices, such as bottom plates for containers and the like, which become operative during the operation of the plungers.

A preferred form of construction of the press according to the invention consists of a three-column press which is known per se. In the case of such a press the turntable is rotatable around one of the three columns in order to obtain favourable constructional relations. Further, this construction enables three plungers to be arranged especially favourably, namely in such a way, that one plunger lies in the central axis of the three columns, whilst the axes of the two other are preferably at the same distance from the central axis as the columns. In that case, three column axes and two plunger axes lie along a circle in the centre of which lies the axis of the third plunger.

Such a press can be used with special advantage for the production of perforated ingots, more particularly steel ingots. In the production of perforated steel ingots which are for instance further treated in extrusion presses, the lubricant used is glass. If in the production of such perforated ingots use is made of presses in which the work-piece is treated without any substantial change of position by different movements of plungers, mandrils and the like, difficulties are encountered, due to the fact that the lubricant penetrates between the tool parts which have to be moved relatively to one another. Since the glass adheres to the walls of the tools after cooling, it can be removed only with difficulty, whereby the further operation of the press is impeded. These difficulties do not arise when use is made of a press according to the invention for the said purpose, since the lubricant which escapes reaches only such positions where it is not detrimental or where it can be easily removed.

A press for the production of perforated steel ingots can be suitably constructed by using the first outer plunger for upsetting, the second one, which lies in the centre,

2

for perforation and the third plunger, which lies outside on the other side, for shearing off the bottom of the work-piece. In this way the advantage is gained at the same time, that the plunger or the pressure cylinder which has to exert the large pressures, namely the perforating plunger, lies in the centre axis of the press so that the pressures which arise during the operation of the said plunger are taken up uniformly by all the three columns. The pressures which are exerted by the upsetting and the shearing off plungers can be taken up without difficulties by the three columns, since these pressures are substantially smaller than those exerted by the perforating plunger.

In a press according to the invention intended to be used for the production of perforated steel ingots, it is an advantage to provide additionally a device for expelling the ingots which have been perforated and sheared off. This device can be provided in such a position under the press table that the expelling of a completed work-piece can be effected during the upsetting or shearing off, or perforation of other ingots.

In such a press the perforating plunger and/or the shearing off plunger is preferably associated with a cross-piece which is capable of moving independently of the plunger and which serves as a guiding for the plunger and/or as a scraper during the return movement of the plunger. In its lowest position this cross-piece is suitably centered in the container.

The accompanying drawings show, by way of example, a hydraulic press provided with three parallel plungers and an ejecting device.

Referring to the drawings,

Figure 1 is a plan view of the press;

Figure 2 is a section along the line II—II in Figure 1;

Figure 3 is a section along the line III—III in Figure 1;

Figure 4 is a section along the line IV—V of Figure 3;

Figure 5 is a section along the line V—V of Figure 4;

and

Figure 6 is a plan view of the turntable.

The press comprises three columns 1, 2, 3. The perforating piston 5 lies with the perforating plunger 6 on the central axis. Along the arc comprising the columns 1, 2, 3 lie the axes of a plunger 7 intended for the upsetting of the work-piece and of a plunger 8 intended to shear off the bottom of the perforated work-piece. The plungers 7 and 8 are actuated by pistons 7a and 8a respectively. Around the column 3 there is rotatably mounted a table 9 on ball bearings 9a. This table accommodates container holders 10a for the containers 10 in corresponding recesses. Figure 3 shows a work-piece 11 in the container; the same has the shape it possesses after it has been upset by the plunger 7. Figure 2 shows the work-piece 11a with the shape it has received after it has been perforated by the plunger 6. The left side of Figure 3 shows the work-piece 11a in the position and shape which it possesses before the shearing off by the plunger 8. It lies over a bottom piece 12 which rests on the press table 18 and which is provided with a central bore 13 so that the plunger 8 can eject or shear off the bottom of the perforated piece 11. To the actual press table there is connected a table 14, into which a plunger 15 can be introduced from below, which plunger is actuated by a pressure piston 16. The plunger 15 serves to eject the completed perforated bottomless work-piece 11b (Figure 5). The work-piece is thrown out upwards, so that it can be conveyed away over the floor. It will be seen from Figure 6, which is a plan view of the turntable 9, that the work-piece which is in the position A lies under the upsetting plunger 7; the work-piece which is in the position B lies under the perforating plunger 6, viz. in the central axis 4 of the press, the work-

3

piece which is in the position C lies under the shearing off plunger 8; and the work-piece which is in the position D lies over the table 14 which serves to throw out the work-piece. Thus, when the turntable turns around, the work-piece travels successively to the positions A, B, C, D. Before the position A, there is sufficient space available on the turntable for cleaning the containers and for inserting a fresh ingot to be perforated. As can be seen from Figure 5, the table 14 is provided with claws 14a which engage in corresponding recesses of the container holder 10a, in order to hold the container in this position against the pressure of the ejecting plunger 15.

In order that the perforating plunger 6 and the shearing off plunger 8 shall not take along the work-piece or the container during the upward movement, cross-pieces 19, 20 are provided, which can be moved independently of the plungers. These cross-pieces are placed on the containers 10 during the return movement of the plungers 6 and 8. They serve at the same time to guide the plungers 6 and 8, and for this purpose they may be constructed in such a way that they are secured in their lowest position in the containers 10. The cross-piece 20 is for instance provided with an annular flange 20a, which is pushed into the container 10. This flange may serve at the same time to smooth the upper surface of the work-piece 11a which spatters upwards during the perforation. This is possible when the cross-piece 20 is pressed downwards only with a force which is small as compared with the force that is exerted by the perforated plunger during the perforation. However, the cross-piece 20 serves at the same time for providing the work-piece 11a with a smooth upper surface.

The actuation of all the cylinders may be effected in

4

such a way that they are automatically operated simultaneously. However, it is possible to actuate the plungers successively in order to avoid any possible overloading of the columns. The actuating means may be coupled with the movement of the turntable and with the operation of the cross-pieces.

We claim:

A three-column hydraulic press for the production of pierced steel ingots, comprising: three vertically movable plungers, three hydraulic pistons, one for each plunger, a turntable rotatable about one of the three columns of the press, and molds carried by the turntable and adapted to accommodate work-pieces, the molds being all at the same radius from the axis of rotation of the turntable and being spaced apart by equal angles, and the plungers being so arranged that as the turntable rotates, three adjacent molds simultaneously become co-axial with the three plungers.

References Cited in the file of this patent

UNITED STATES PATENTS

795,121	Heinderich	July 18, 1905
1,293,833	McGary	Feb. 11, 1919
1,555,897	Winder et al.	Oct. 6, 1925
2,362,054	Denison	Nov. 7, 1944
2,382,041	Ernst	Aug. 14, 1945
2,449,365	Bober et al.	Sept. 14, 1948
2,556,010	Swanson	June 5, 1951

FOREIGN PATENTS

547,951	Great Britain	Sept. 18, 1942
672,965	Germany	Mar. 13, 1939