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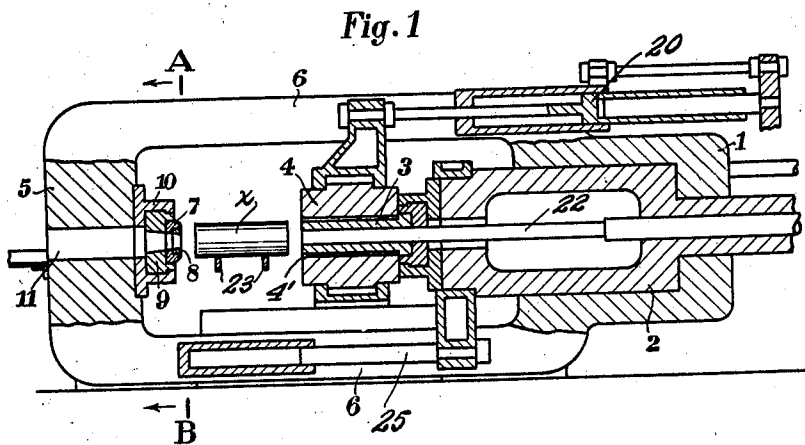
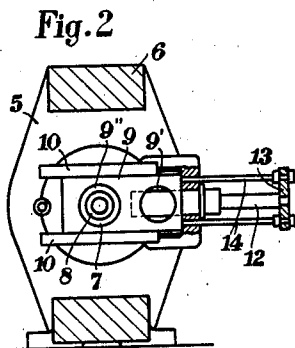
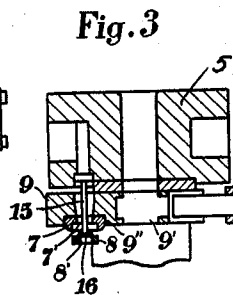
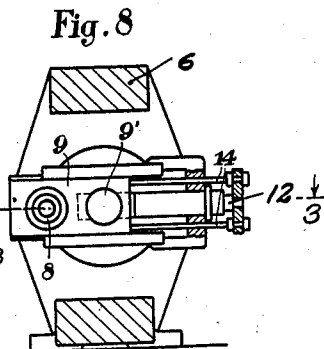
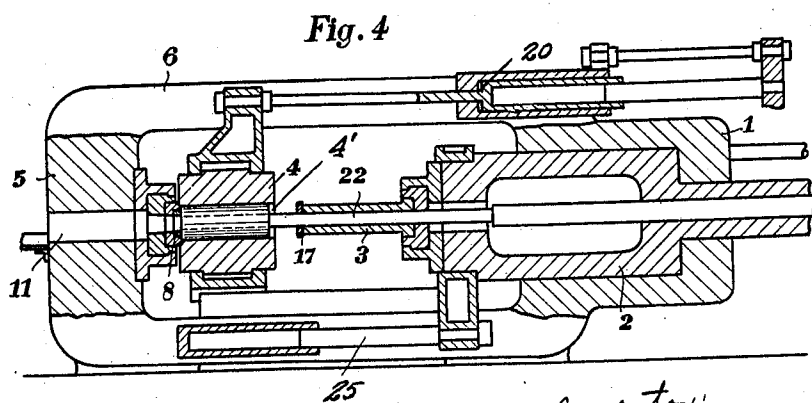
A. BORN

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EXTRUSION PRESS FOR THE PRODUCTION OF ROD OR TUBE SHAPED BODIES

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Inventor:
alfred Born
By Knight Bros.
attys.

UNITED STATES PATENT OFFICE

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EXTRUSION PRESS FOR THE PRODUCTION
OF ROD OR TUBE-SHAPED BODIES

Alfred Born, Magdeburg, Germany, assignor to
the firm Fried. Krupp Grusonwerk Aktien-
gesellschaft, Magdeburg-Buckau, Germany

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5 Claims. (Cl. 207—3)

The invention relates to an extrusion press of the kind having an adjustable receiver and removable press ram for the production of rod or tube-shaped bodies and refers more particularly to such extrusion presses in which the matrix is arranged on the stationary press cross-bar. Such presses have the disadvantage that the matrix is difficult of access. The matrix after each pressing operation must for this purpose enter the press which is tiresome and even dangerous. Further, the matrix as well as the matrix holder must be removed by hand if it is necessary to force out through the opening in the press cross-bar a block which has cooled too soon in the receiver. The chief object of the invention is to provide an extrusion press wherein the above disadvantages will be overcome.

According to the invention, in an extrusion press of the kind referred to, the matrix holder and matrix are adjustably mounted upon the press cross-bar. This arrangement has the advantage that the matrix holder after each pressing process can be moved sideways out of the press, when the matrix can be easily and conveniently inspected. The matrix holder is preferably carried by a bolt or slide and registers with the opening in the cross-bar of the press during the pressing process. The bolt or slide is provided with an auxiliary opening and by sliding the bolt endwise this opening can be moved to register with the opening in the press cross-bar whereby a block which has cooled too soon can be forced out of the receiver and through the openings in the bolt and press cross-bar. The pressing operation is considerably improved and also the output of the press increased by the invention, the matrix holder having previously to be first unlocked after the pressing process is finished and then drawn back through the opening in the press cross-bar in order to permit of the forcing out and cutting off of the block remainder in the receiver.

An embodiment of the object of the invention is shown on the drawings in the form of an extrusion press for the production of tubular bodies.

Figure 1 illustrates the extrusion press in vertical longitudinal section.

Figure 2 is a cross section through the press taken on the line A—B in Figure 1 with matrix bearing in elevation (the matrix being shown in the working position).

Figure 3 represents a horizontal longitudinal section through the press cross-bar and matrix holder on the line 3—3 of Fig. 8, the bolt carrying the matrix being shown moved to one side.

Figure 4 illustrates the position of the parts of the extrusion press after the mandrel rod is positioned adjacent the matrix preparatory to the advancement of the press ram.

Figure 5 shows the position of the parts at the conclusion of the pressing operation with a small remainder of the block still in the receiver.

Figure 6 shows the position of the parts at the time of ejection from the receiver of the remainder of the block with the end cut off from the extruded portion together with the shell portion.

Figure 7 shows the working position of the parts when a block which has cooled too soon is ejected from the press.

Figure 8 is a section on the line A—B of Fig. 1 but showing the bolt carrying the matrix in a position corresponding to Figure 3.

The extrusion press consists essentially of the press piston 2 in the press cylinder 1 with press ram 3, the movable receiver 4 and the press cross-bar 5 which is connected with a press cylinder 1 by a frame 6 forming a single unit therewith. On the press cross-bar 5 is arranged a matrix unit comprising the matrix holder 7 with the matrix 8. The matrix is in the example shown fixed on the bolt or slide 9 which is movable in the guides 10 on the press cross-bar. The bolt or slide 9 is provided with an opening 9' (Figure 2) which can be moved to register with the hole 11 in the press cross-bar 5 when a block in the receiver 4 not capable of being otherwise pressed out is to be forced by the ram 3 out of the receiver and into the bore 11 of the press cross-bar from which it is then removed. The bolt or slide 9 carrying the matrix holder 7 can, as may be seen in Figure 2, be moved by the press piston 12 by means of the cross-head 13 and the press rods 14. To release the matrix 8 from the matrix holder 7, the press piston 15 is used. (Figure 3): This piston carries at the head an interchangeable plate 16, the diameter of which is larger than the bore 8' of the matrix 8. By moving the press piston 15, the matrix 8 is then forced out of the matrix holder 7. If the matrix holder 7 is to be removed from the recess 9'' of the bolt then a plate is arranged on the press piston 15 having a diameter which is greater than the opening 7'. In Figure 1, the receiver 4 and the press ram 3 are shown in the initial position, that is to say, the block *x* to be pressed out is between the matrix 8 and the receiver 4, the receiver being movable by means of piston 20 in the same direction as the press ram 3. The block *x* is mounted upon movable carrier supports 23, and the supports recede as the receiver 4 slides to take up the block therein. In Figure 4, the receiver has been forced over the block, through which a hole was subsequently made by the mandrel rod 22 (Figure 5). The head of the press ram 3 carries the press disc 17. Figure 5 shows the position of the movable press parts after the pressing process is terminated. Figure 6 also shows the position of

the press parts after the pressing process is terminated, the press ram 3 having been drawn back into its initial position and a forcing out disc 18 having been applied to its head. By means of the press ram, on drawing back the receiver 4 into its initial position, the shell x'' formed in the receiver in the course of the pressing operation, and the block remainder still in the receiver 4 are forced out (Figure 6). The apparatus 19, which serves to cut off the block remainder is connected with a press piston 20 of the receiver 4 by the rod 21 so that the work and the cutting off device move uniformly. Since the cutting off device 19 moves together with the receiver, the cutting off operation may be executed any time during the rearward movement of the receiver after the pressing operation has been completed. This is possible since no relative movement between the receiver and the cutting device takes place. Since the actuating mechanism may be of any type desired, the same is merely indicated schematically in the drawings. If the block which is in the receiver cannot be forced through the matrix due to its having for any reason cooled too quickly, the bolt 9 carrying the matrix is moved sideways of the press so that the opening 9' comes in front of the bore 11 of the press cross-bar (Figures 3 and 8). The block which has become fixed in the receiver can then by using the full press pressure be forced by the press ram out of the receiver bore and into the bore 11 of the press cross-bar 5 from which it can then be easily removed, Figure 7. The matrix holder may be also rockably mounted upon the press chamber. The axis of rotation of the holder may be either above or below the axis of the press, and the path of the holder around this axis describes a concentric arc. The recess corresponding to 9', in that case, would be on the path of this arc, and the other elements of the assembly are correspondingly the same.

After the block x has been brought upon the movable carrier supports 23 between the receiver 4 and the matrix 8, the receiver 4 is shifted over the billet or block x by means of hydraulic pressure piston 20, simultaneously with the removal of the supports. Then the mandrel rod 22 is advanced by a hydraulic pressure piston (not shown) through the block until the head thereof reaches the bore of the matrix 8. The press ram 3 is now advanced by means of piston 2 into the bore 4 of receiver 4 and presses out the block x into a tube 26 (Fig. 5). The press ram 3, by means of hydraulic pressure piston 25, as well as mandrel rod 22, are then retracted to their starting position and the manufactured tube is cut from the remainder of the block x' . Now the receiver 4 is shifted over the press ram 3 by means of hydraulic pressure piston 20 (Fig. 6), after a full faced press disc 18 has been placed at the end of the ram. As the receiver 4 slides over the press ram, the remainder of the block x' together with the clinging shell x'' are ejected from the receiver (Fig. 6).

In the event that the block x becomes difficult to press on account of premature cooling, the extruded portion of the tube is cut off and removed, and the slide 7 is shifted, so that the opening 9' registers with bore 11 in press cross-bar 5 (Figs. 3 and 8). This opening is of the same size as bore 11 and corresponds with the diameter of the block x . By means of the press ram 3, it is possible to press the prematurely cooled block through the bore 9' of the slide holding the

matrix, and to remove the block therefrom. Then the movable parts of the press assume the position illustrated in Fig. 1.

What I claim is:

1. In an extrusion press, a reciprocable receiver for holding the block to be pressed, a reciprocating press ram movable coaxially with respect to said receiver, a matrix unit, a slide upon which said matrix unit is mounted, a cross-bar at one end of said press for receiving said slide, and means for moving said slide on said cross-bar in a plane perpendicular to the direction of movement of said press ram, said receiver being capable of a reciprocating movement to selectively advance and retract said receiver for positioning with respect to said slide.

2. In an extrusion press, a movable receiver for holding the block to be pressed, a reciprocating press ram movable coaxially with respect to said receiver, a matrix unit comprising a matrix and a holder therefor, a slide upon which said matrix unit is mounted, a cross-bar at one end of said press for receiving said slide, a piston in said cross-bar extending longitudinally of said press, means for moving said slide on said cross-bar in a plane perpendicular to the direction of movement of said press ram whereby said matrix unit is brought into alignment with said piston, and means associated with said piston for selectively releasing said matrix and said holder therefor from said slide.

3. In an extrusion press, a movable receiver for holding the block to be pressed, a reciprocating press ram movable coaxially with respect to said receiver, a matrix unit, a slide upon which said matrix unit is mounted, a cross-bar at one end of said press for receiving said slide, an aperture in said cross-bar normally in registry with said matrix unit, an aperture in said slide, and means for moving said slide on said cross-bar in a plane perpendicular to the direction of movement of said press ram for registering said last mentioned aperture with said aperture in said cross-bar.

4. In an extrusion press, a movable receiver for holding the block to be pressed, a reciprocating press ram movable coaxially with respect to said receiver, a matrix unit comprising a matrix and a holder therefor, a slide upon which said matrix unit is mounted, a cross-bar at one end of said press for receiving said slide, a piston in said cross-bar extending longitudinally of said press, an aperture in said cross-bar normally in registry with said matrix unit, an aperture in said slide, and means for moving said slide on said cross-bar in a plane perpendicular to the direction of movement of said press ram for registering said last mentioned aperture with said aperture in said cross-bar, and bringing said matrix unit into alignment with said piston.

5. In an extrusion press, a reciprocable receiver for holding the block to be pressed, a reciprocating press ram movable coaxially with respect to said receiver, a reciprocating mandrel rod disposed centrally of said press ram, a matrix unit concentrically disposed with respect to one extremity of said mandrel rod, and means for moving said matrix unit transversely to the direction of movement of said press ram and mandrel rod, said receiver being capable of a reciprocating movement to selectively advance and retract said receiver for positioning with respect to said matrix unit,

ALFRED BORN.