

Oct. 13, 1970

R. K. VALKS

3,533,265

EXTRUSION PRESS

Filed March 22, 1968

4 Sheets-Sheet 1

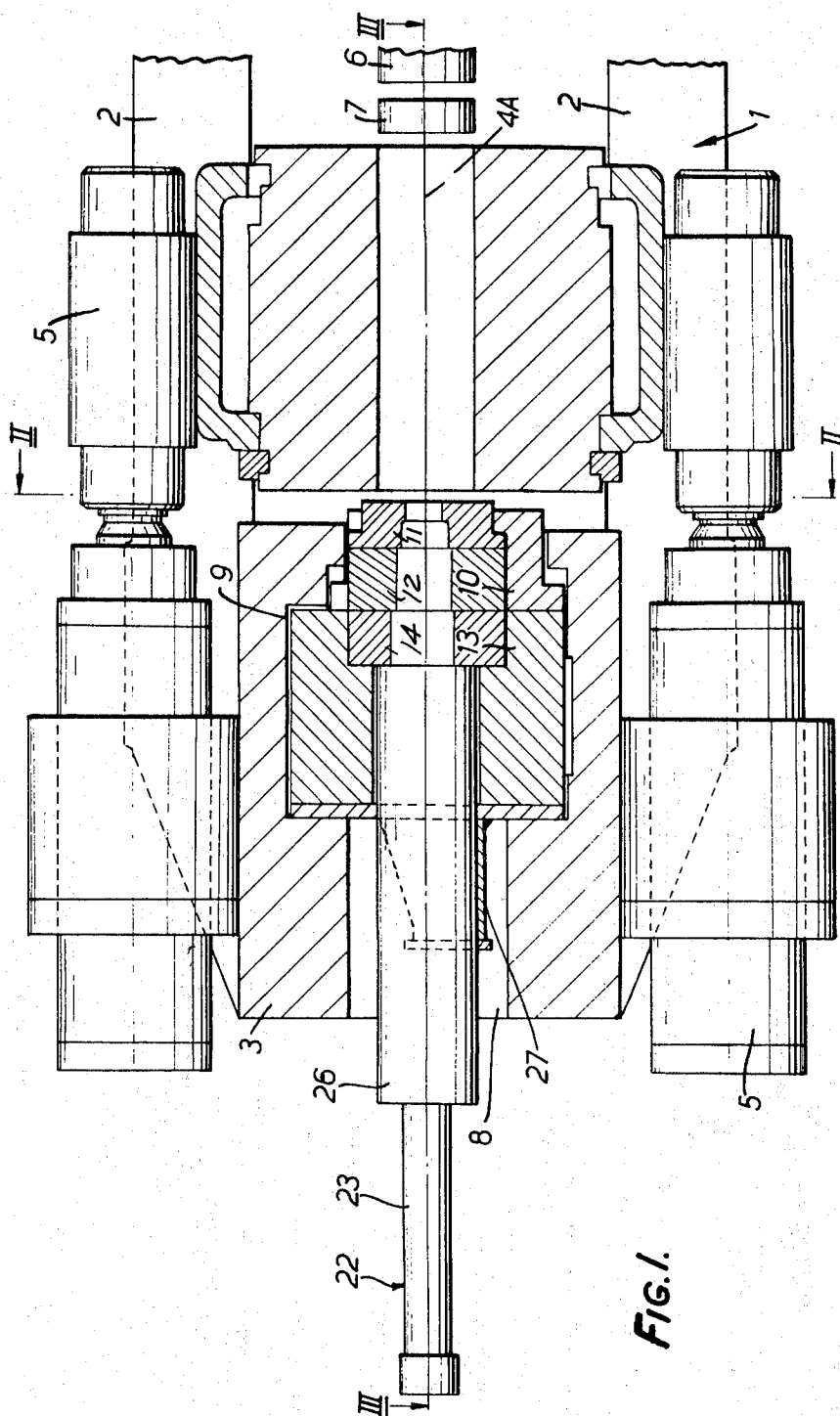


FIG. 1.

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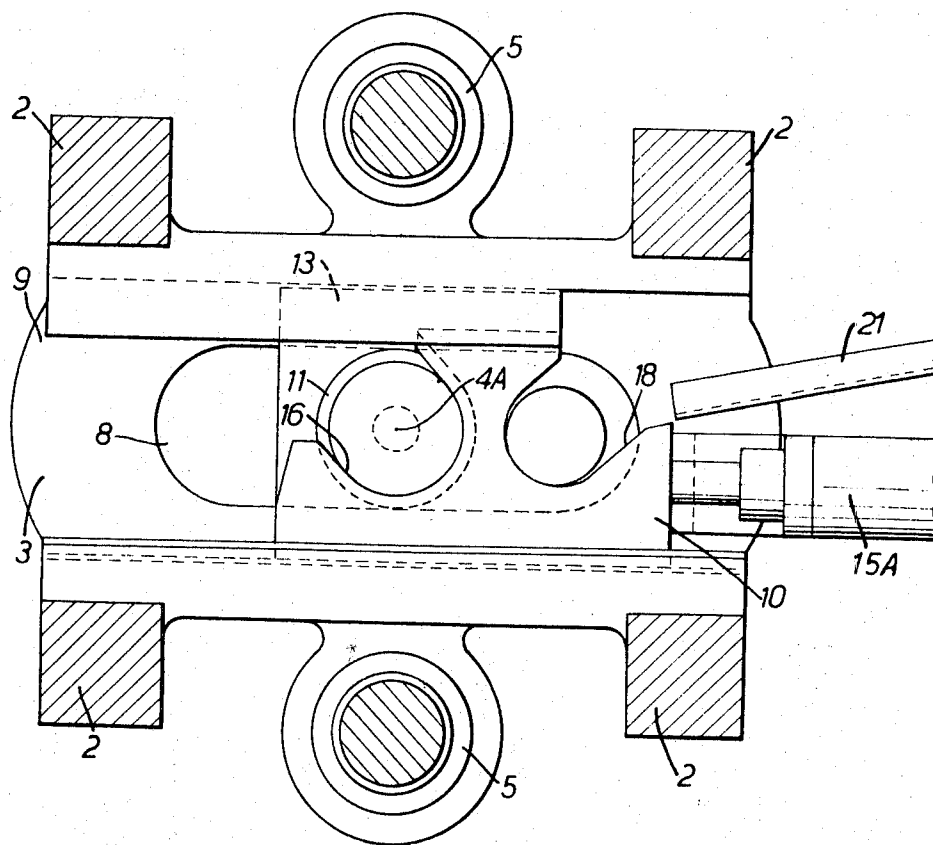


FIG. 2.

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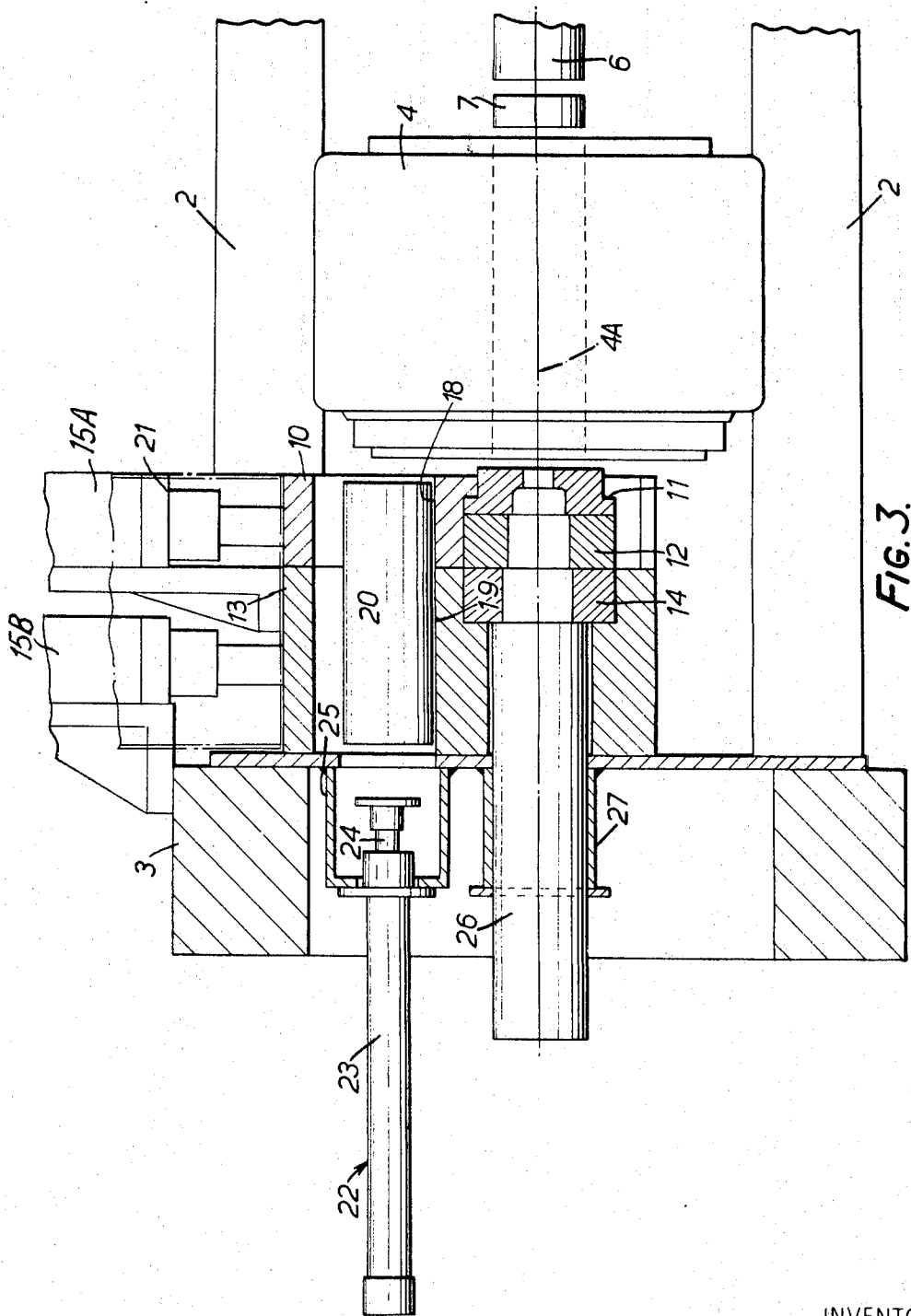
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Filed March 22, 1968

4 Sheets-Sheet 3



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EXTRUSION PRESS

3,533,265

Filed March 22, 1968

4 Sheets-Sheet 4

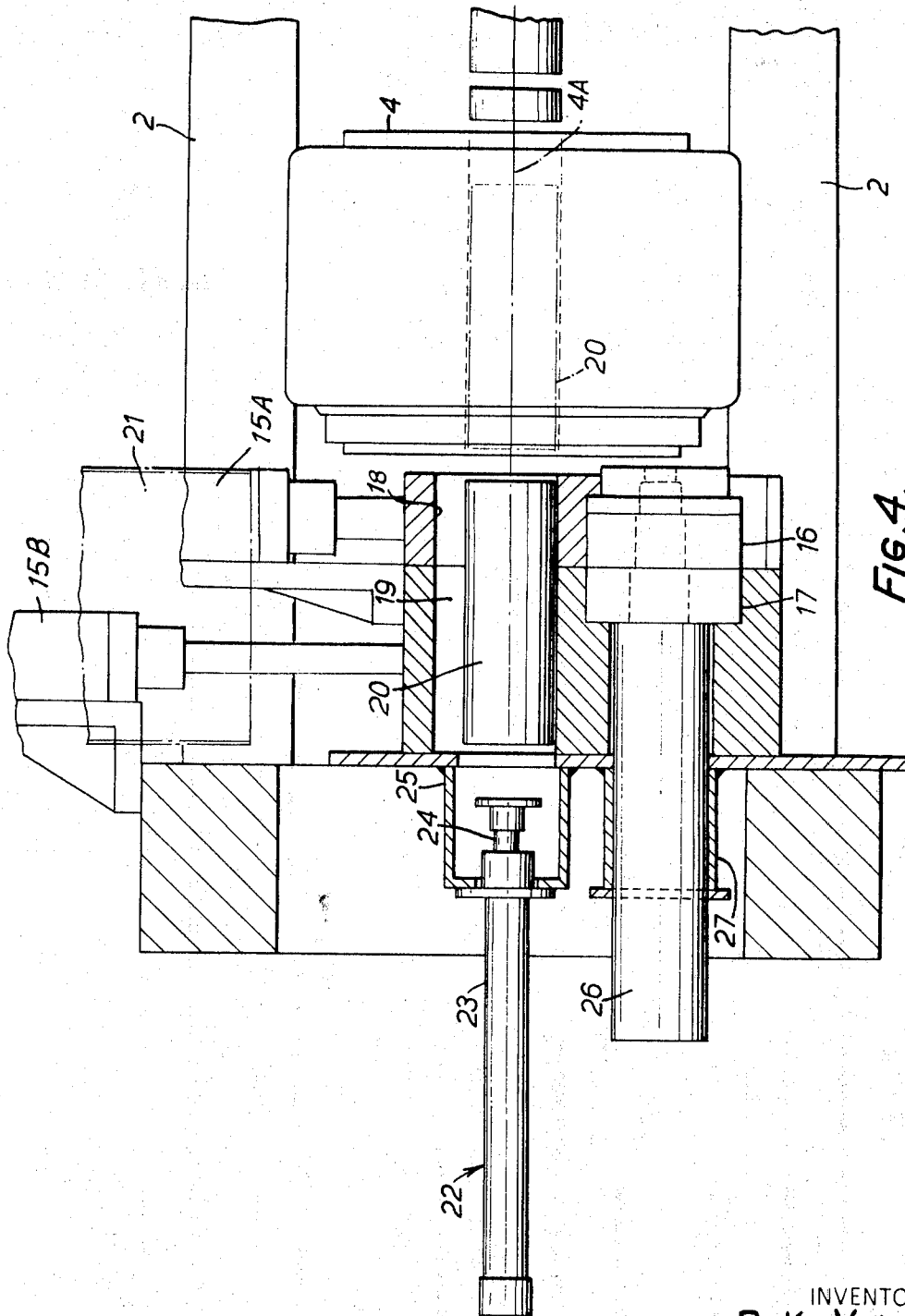


FIG. 4.

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3,533,265

EXTRUSION PRESS

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Filed Mar. 22, 1968, Ser. No. 715,221

Claims priority, application Great Britain, Mar. 23, 1967, 13,677/67

Int. Cl. B21c 33/00

U.S. Cl. 72—270

5 Claims

ABSTRACT OF THE DISCLOSURE

An extrusion press having means for inserting a billet into the rear end of the container through a cavity in the platen in order to shorten the length of the press and the stroke of the pressing stem. A slide for supporting the billet may be moved horizontally and normal to the press axis in the cavity.

This invention relates to extrusion presses.

An extrusion press has a pressing stem for pressing a billet within a container against a die, held against movement by a platen extending across the back end of the press. During the pressing the metal of the billet is forced through the die. Conventionally, to load a billet into the container, it is introduced down a tray to a position between the pressing stem and the forward end of the container. The pressing stem is then used to push the billet into the container ready for extrusion. It will be appreciated that the pressing stem therefore needs to have a sufficient stroke, and the press to be long enough, to allow this interposing of the billet.

It has also been proposed to load a container from a position between its back end and the die, but it is necessary then for the container to be movable through a stroke of at least the length of the billet, as well as for the pressing stem to have an appropriately long stroke.

According to the invention an extrusion press has means for loading a billet into the container through a cavity in the platen.

In a preferred form the invention provides an extrusion press having a press axis, a single container having an axis aligned with the press axis, a platen behind the container, a press stem in front of the container and billet loading means defining a billet support channel movable within a cavity in the platen between a first position in which the axis of the channel is aligned with the axis of the container and a second position in which it is remote from the first position.

Such a press does not require allowance to be made, in relation to its length and the pressing stem stroke, for the length of the billet to be loaded and considerable economy will be effected as is considered below.

Preferably the press has a support means in the platen cavity for supporting both a bolster and die assembly and a billet supporting channel, the support means being movable across the cavity to bring the bolster and die assembly, and the billet successively into alignment with the container.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

FIG. 1 is a longitudinal cross-section of the platen end of an extrusion press for the production of rod;

FIG. 2 is a section taken on the line II—II of FIG. 1;

FIG. 3 is a section taken on the line III—III of FIG. 1 showing the press in a working position; and

FIG. 4 is also a section on the line III—III of FIG. 1 but showing the press in a loading position.

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The press of which the platen end is shown is very similar to that particularly described in the provisional specification of our copending British application No. 4332/67.

The press has an integral frame 1 having four parallel square section columns 2 joined to a platen 3 at the back end. A billet container 4 which can hold a billet 20 so that its axis lies along the longitudinal axis 4A of the press, and which is movable to a limited degree parallel to that axis by a pair of piston and cylinder units 5, is positioned between the platen 3 and a pressing stem 6 with an associated pressing disc 7. The pressing stem is movable along the axis of the press through a stroke slightly greater than the length of the container by a piston and cylinder unit mounted in the front end of the frame 1 in known manner.

The platen has a cavity 9 extending horizontally therethrough and connecting with an opening 8, at its back end. Within the cavity 9 are located a pair of adjacent slides 10 and 13. The die slide 10 supports a die carrier 11 and an intermediate bolster 12 in a U-shaped channel 16 parallel to the press axis, and the bolster slide 13 supports a back or third bolster member 14 in a corresponding channel 17 normally aligned with channel 16. The die and bolster slides 10 and 13 are also provided with normally aligned U-shaped channels 18 and 19 respectively, running parallel to the press axis, for supporting a billet 20, which is fed to these aligned channels down an inclined tray 21 extending at right-angles to the press axis from a billet heating furnace (not shown). A billet loading unit 22 consisting of a cylinder 23 and a piston 24 extends through the opening 8 and is secured to the back end of the bolster slide 13 by a bracket 25 so that the unit is in alignment with the billet channels 18 and 19. Also attached to the back end of the slide 13 is a canister or guide tube 26 which is in line with the channel 17, the tube being secured to the slide by means of a bracket 27 similar to the bracket 25. The slides 10 and 13 are slidable horizontally normal to the press axis between a working position in which the die and bolsters are aligned with the press axis and a loading position in which the channels 18, 19 are aligned with the press axis, by means of independently operable piston and cylinder assemblies, one of which is indicated by reference numeral 15A and the other by reference numeral 15B.

The press operates as follows. The die and bolster slides 10 and 13 are firstly in the position shown in FIG. 3, i.e. in the pressing position with the die carrier 11, bolster 12 and back bolster 14 aligned with the press axis and the in-line billet channels 18 and 19 spaced from the axis in a billet receiving position at the bottom end of the tray 21. During this time extrusion can be taking place.

A hot billet from the furnace is allowed to travel down the tray 21 at the bottom of which it enters the channels 18 and 19.

When extrusion is stopped, the slides 10 and 13 are moved as a unit by their associated pistons and cylinders to bring the billet into alignment with the back end of the opening of the container 4. The effect of this movement is to shear the extrusion between the die carrier 11 and the container, and the discard is retained in the container. It will be appreciated that the guide tube will be carried, unrestricted by the platen, with the slides 10 and 13, but will only be displaced in a horizontal plane and the extrusion will thereby not be deleteriously bent. The container can then be moved slightly away from the platen by piston and cylinders 5 and the discard and pressing disc removed.

Having been brought adjacent to the container opening, as shown in FIG. 4, the billet is pushed into the con-

tainers by the billet loading piston 24 which is considerably smaller, and therefore needs far less power for operation, than the pressing stem 6. The piston 24 is then withdrawn and the slides 10 and 13 move back as a unit to bring the channels 16 and 17 into alignment with the press axis as shown in FIG. 3. Extrusion can then be recommenced after the container has been closed over the die. If desired the pressing disc 7 can be introduced into the container with the billet from the rear end of the container.

The advantages of such an arrangement over a conventional press are considerable. Since the billet does not enter the press between the container and the pressing stem, the press can be shortened by this distance. The pressing stem is not used to push the billet home into the container and can therefore have a shorter stroke allowing a less massive pressing stem unit to be used. The time in which the press is idle is brought to a minimum and indeed can in general be cut by about half in that a new billet can be loaded into the channels 18 and 19 whilst extrusion is proceeding and the comparatively light piston and cylinder unit 22 is quicker acting in pushing the billet into the container than the massive and slow moving pressing stem.

If required the piston and cylinder unit serving the slide 13 can be operated to shear the extrusion between the intermediate bolster 12 and the back bolster 14 for a long extrusion or for emergency clearing of the extrusion when part of the billet adheres to the container. To effect the shearing the die slide 10 is held stationary whilst the bolster slide 13 is moved. At this time the channels 18 and 19 must not contain any billet. Such a method and arrangement is new per se. If the capacity for this shearing action is not desired, then the slides 10 and 13 can be locked together and moved by a common piston and cylinder arrangement.

A die rotate mechanism can equally well be used instead of the die slide 10.

If the movement of the slides 10 and 13 is not used to shear the extrusion, then a conventional front cut shear which moves across the face of the die after the container has been retracted from the die can be employed.

The slides 10 and 13 can be formed with holes in the place of the channels 18 and 19. In this event, the tray 21 is positioned at the back end of the platen 3, i.e. on the exit side thereof, to lead to a short horizontal tray in alignment with the in-line holes in the slides 10 and 13. A piston and cylinder unit is provided in alignment with the horizontal tray to push the billet into the holes. The same unit can be used to advance the billet into the container in which case the unit will be secured to the slide 13.

Instead of the tray 21 any other appropriate form of billet transport arrangement can be used.

I claim:

1. An extrusion press having a press axis, a single billet container defining a through bore the axis of which is aligned with the press axis, a pressing stem displaceable along said axis into and out of one end of said container bore, a platen positioned adjacent the other end of the container bore, said platen defining on the side thereof adjacent the container a horizontal cavity extending normal to the press axis, said cavity being in communication with a horizontal elongated opening defined by the platen and extending to the side thereof away from the container, a slide carrying a die and providing a support for a billet, said slide being displaceable horizontally in said cavity between a first position in which the billet support is aligned with the press axis and a second position in which the die is aligned with the press axis and a hydraulic piston and cylinder device positioned in said opening with said cylinder carried by the slide to be displaced therewith and the piston aligned with the billet support whereby a billet on the support can be introduced by the piston and cylinder device into the container when the slide is in the first position.

2. An extrusion press as claimed in claim 1 in which the slide is in two parts arranged one behind the other, the part nearest the container carrying the die and a first bolster and the other part carrying a second bolster, and with both parts having a channel shaped billet support.

3. An extrusion press as claimed in claim 1 in which said billet support is a channel of U-section.

4. An extrusion press according to claim 1 in which the cavity in the platen opens at a side of the platen, and in the second position of the slide the billet support channel lies adjacent the end of a feed tray arranged to supply billets from a furnace.

5. A press according to claim 4 in which the feed tray extends in a direction substantially normal to the press axis.

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U.S. Cl. X.R.

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