

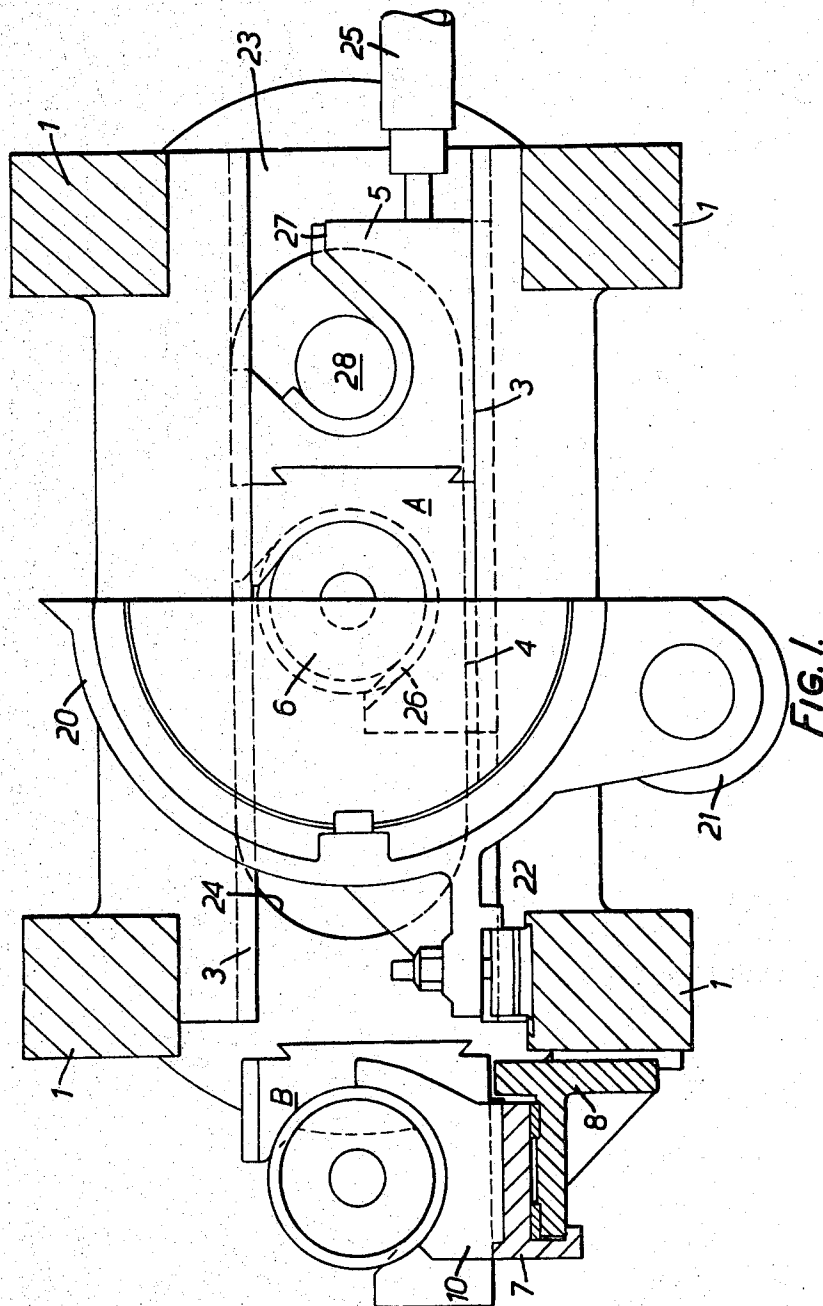
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R. K. VALKS ET AL

3,561,243

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2 Sheets--Sheet 1



INVENTOR
ROBERT K. YALKS
BY KEITH ROSS
Holcombe, Wetherill & Bricebois
ATTORNEYS

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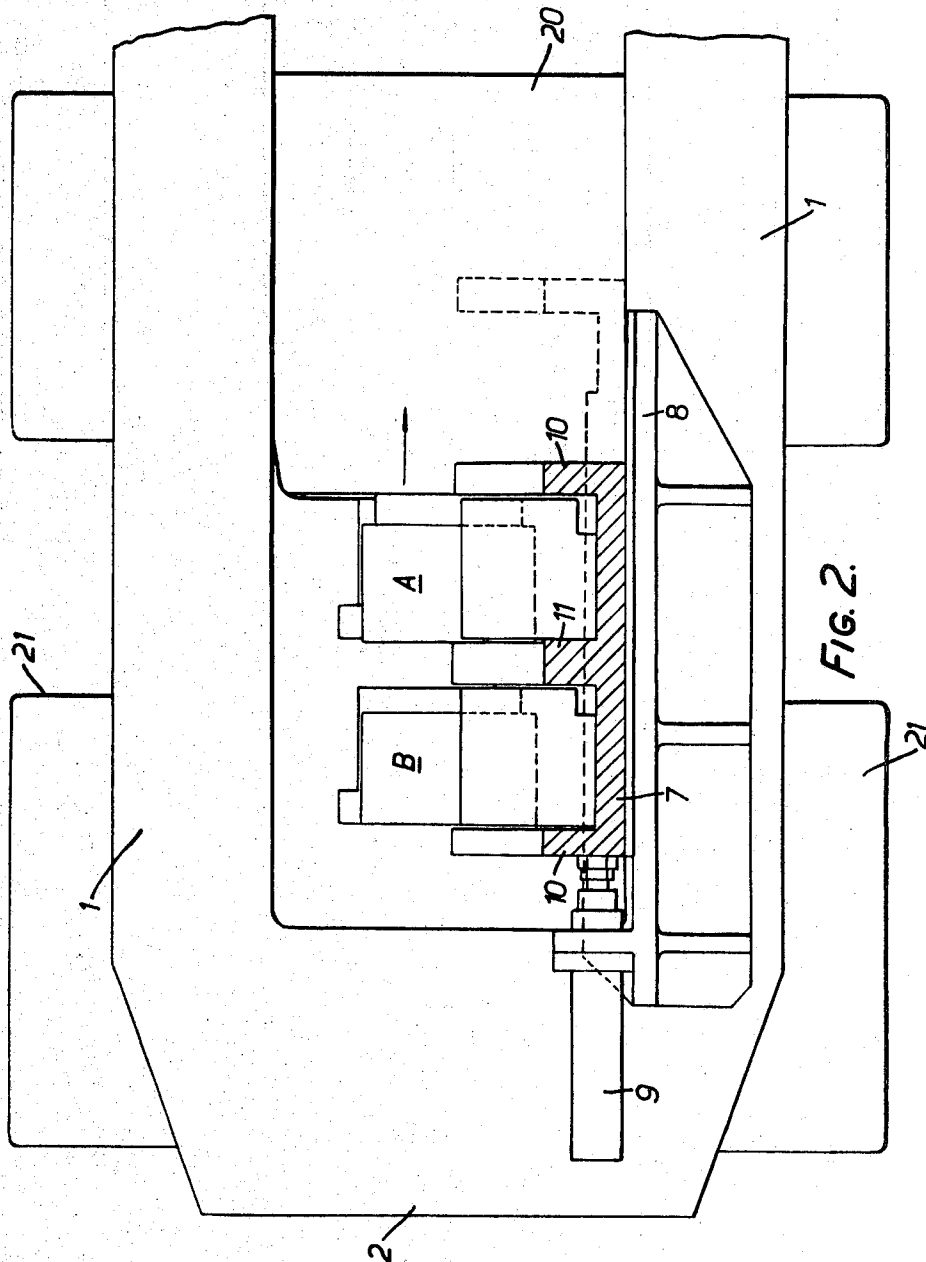
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EXTRUSION PRESS

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INVENTOR
ROBERT K. VALKS
BY KEITH ROSS
Holcombe, Wetherill & Brandeis
ATTORNEYS

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EXTRUSION PRESS

Robert Kenneth Valks, Penfield, N.Y., and Keith Ross, Sheffield, England, assignors to Davy and United Engineering Company Limited, Sheffield, England, a British company

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9 Claims

ABSTRACT OF THE DISCLOSURE

An extrusion press has its die supported in a holder which is releasably coupled to an anchor member to form an assembly. The assembly is displaceable relative to the platen in a direction normal to the longitudinal axis of the press and in order to remove the die and its holder, the assembly is slid across the face of the platen until the holder is in a position from which it can be displaced parallel to the axis of the press to release the die holder from the anchor member. Displacement of the die holder parallel to the axis of the press can cause a replacement die holder to be displaced into coupled relation with the anchor member.

This invention relates to extrusion presses and particularly extrusion presses for the extrusion of metals particularly steel. In the extrusion of metals a hot billet of the metal to be extruded is loaded into the billet container of the press and extruded through a die by the application of a high pressure to the billet. The hot metal passing through the die heats the die and causes the surfaces over which it passes to wear rapidly, with the result that the die must be removed periodically from the press for inspection or replacement with a new die. Furthermore, it is necessary to change the die each time the shape of the extrusion is changed, since the orifice of the die controls the shape. During the time taken to change the die in an extrusion press there is a complete interruption of the operation of the press and consequently it is desirable that the time taken to replace the die should be reduced to a minimum.

It is usual in extrusion presses for the die to be supported in a die holder and in such presses it is often more convenient to remove the die and its holder from the press and replace them with a replacement die holder rather than remove the die from its holder while the holder remains in the press.

According to the present invention an extrusion press has an assembly for supporting an extrusion die, said assembly comprising an anchor releasably coupled to a holder for the die and being slideable in a direction normal to the press axis between a first position in which the die holder is operatively positioned in the press and a second position in which the die holder is in a non-operative position and means for displacing the die holder when in the second position relative to the anchor member to uncouple the die holder from the anchor member.

It is convenient for the assembly to be slideable in the direction normal to the press axis in guides carried by the platen of the press. In the first position of the assembly both the anchor member and the die holder are positioned in the guides and in the second position the die holder is withdrawn from the guides while the anchor member remains positioned therein.

In the second position of the assembly it is convenient for the die holder to be supported by a device which is displaceable in a direction parallel to the press axis and

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said device may take the form of a carriage having first and second support regions located one behind the other in the direction of movement of the carriage for receiving the die holder and also a replacement die holder.

It is preferred that the anchor member is releasably coupled to the holder for the die by means of a dove-tail joint with the anchor member and the die holder provided with complementary parts of the joint and the joint so arranged that displacement of the die holder relative to the anchor member in the direction parallel to the press axis uncouples the holder from the anchor member.

In order that the invention may be more readily understood it will now be described, by way of example only, with reference to the accompanying drawings in which:

FIG. 1 is a lateral cross-section through an extrusion press looking towards the platen, with the right-hand side of the section taken between the container and the platen and the left-hand side of the section showing part of the container, and

FIG. 2 is a side elevation of the platen end of the press showing in section apparatus for changing the die holder of the press.

The extrusion press frame shown in the drawings is similar to that described and claimed in the complete specification filed in pursuance of our co-pending application No. 4,332/67 of which the press frame has columns and end members integral therewith, but the present invention is not restricted to such a form of press.

The press has an integral frame having four parallel square section columns 1 joined to a platen 2 at the back end. A billet container 20 which can hold a hot billet of metal to be extruded so that its axis lies along the longitudinal axis of the press is positioned between the platen 2 and a pressing ram, not shown, which is mounted in the front end of the press frame in known manner. The billet container 20 is movable to a limited degree parallel to the longitudinal axis of the press by a pair of piston and cylinder units 21 and the container is supported on slides 22 on the upper surface of each of the lower columns 1.

The platen 2 has a cavity 23 extending horizontally therethrough and connecting with an opening 24, at its back end. At the front of the platen upper and lower guides 3 are provided by the platen and the guides extend horizontally across the platen at right angles to the press axis. An assembly for supporting the die of the press and comprising a holder 4 for the die and an anchor member 5 is slidable in the guides 3. The anchor member and the die holder are releasably coupled together by means of a dove-tail joint with complementary parts of the joint provided on the die holder and the anchor member. The piston of a hydraulic or pneumatic piston and cylinder device 25 is connected to the anchor member 5 and serves to displace the anchor member and the die holder across the face of the platen in the guides 3. The die holder 4 has a U-shaped channel 26 parallel to the press axis, for supporting a die 6 and an intermediate bolster, not shown, may also be supported in the channel.

The guides 3 lead out to the side of the press to a device in the form of a carriage 7 supported on a platform 8 extending parallel to the press axis. The carriage is displaceable along the platform by means of a piston and cylinder assembly 9. The carriage 7 has two lateral end walls 10 and a middle lateral wall 11 so that it is divided into two compartments or regions each of which can accept a die holder complete with die.

When a die and its holder is to be changed, the holder 4 and the anchor member 5 are displaced along the guides 3 by the piston and cylinder device 25 from the position shown in FIG. 1 where the holder is in its operative position, i.e. in the position where the die supported by the

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holder is in alignment with the press axis, to a non-operative position where the holder is positioned in one of the compartments of the carriage 7. In this position the die holder 4 is withdrawn from the guides 3 but the anchor member 5 is still supported by the guides and the anchor member is still coupled to the die holder. The carriage 7 is then displaced along the platform 8 in the direction parallel to the press axis by means of the piston and cylinder device 9 and this displacement of the die holder supported on the carriage relative to the anchor member retained in the guides 3 uncouples the die holder from the anchor member.

When a die and its holder is removed from a press it is usual to replace them with a replacement die and holder and in the figures the die holder to be replaced is referred to as A and a replacement die holder and die are referred to by B. In order to replace die holder A and its die by die holder B and its die, holder A is moved from its operative position shown in FIG. 1 by means of the piston and cylinder device 25 until it is positioned in the leading compartment of the carriage 7 as shown in FIG. 2. The replacement die and holder B have previously been positioned in the second compartment in the carriage 7. The holder A is displaced from the guideways 3 into the vacant compartment of the carriage and the carriage is then displaced by the piston and cylinder assembly 9 to run the holder A out of its dove-tail engagement with the anchor member 5 to a position which is shown in broken lines in FIG. 2. This displacement of the carriage runs the holder B into dove-tail connection with the anchor member 5. The holder B and the anchor member are then displaced across the face of the platen until the die holder B is in its operative position in the press. Meanwhile the holder A and its die is removed from the carriage 7 and the latter is returned to its original position where a further replacement holder and die is placed in the appropriate compartment ready for the next change.

The anchor member 5 may, if desired, be provided with a U-shaped channel 27 extending parallel to the axis of the press for receiving a billet 28 prior to the billet being loaded into the rear end of the container by means of a billet loading apparatus extending through the opening 24 of the platen into the cavity 23. Such an arrangement for loading a billet into a container is described and claimed in the complete specification filed in pursuance of our co-pending application No. 13,677/67.

What is claimed is:

1. An extrusion press comprising

a platen,

guides on the platen,

a die carrier guided by said guides and displaceable in a direction normal to the extrusion axis of the press,

a guideway positioned at one side of the press and extending parallel to the extrusion axis,

a carriage displaceable along said guideway, said carrier comprising an anchor member and a holder releasably coupled to the anchor member, said coupling being released by relative displacement between the holder and the anchor member in a direction parallel to the extrusion axis,

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a die carried by said holder, and

means for displacing the die carrier between a first position in which the die is in alignment with the extrusion axis and a second position in which the die and holder are positioned above said carriage and the anchor member is supported by said guides, from which second position the holder is releasable from the anchor member.

2. An extrusion press as claimed in claim 1, in which a piston and cylinder device having one part thereof connected to said anchor member serves to slide said carrier in the direction normal to the extrusion axis.

3. An extrusion press as claimed in claim 1 in which said carriage has first and second support regions located one behind the other in the direction of movement of the carriage for receiving said die and holder and a replacement die and holder.

4. An extrusion press as claimed in claim 1 in which said carriage is displaceable by means of a piston and cylinder device.

5. An extrusion press as claimed in claim 1 in which said carriage is supported by and displaceable along said guideway, which comprises a platform.

6. An extrusion press as claimed in claim 1 in which the anchor member and the die holder are provided with complementary parts of a dove-tail joint which couples the holder and anchor member together; is arranged such that displacement of the die holder relative to the anchor member in the direction parallel to the press axis uncouples the holder from the anchor member.

7. An extrusion press as claimed in claim 1 in which said holder defines a slot for receiving the die or a die and bolster and the mouth of said slot is inclined to both the horizontal and vertical axes.

8. An extrusion press as claimed in claim 1 in which said anchor member defines a slot for receiving a metal billet to be extruded prior to the billet being loaded into the press container.

9. An extrusion press as claimed in claim 1 including fluid operated means for displacing the carriage along said guideway and wherein in the second position of the carrier the die and holder is supported by said carriage and from which second position the holder is releasable from the anchor member by displacement of the carriage along said guideway.

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RICHARD J. HERBST, Primary Examiner

60 A. L. HAVIS, Assistant Examiner