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I. L. CAMERON

3,566,659

HORIZONTAL EXTRUSION PRESSES

Filed Nov. 29, 1968

2 Sheets-Sheet 1

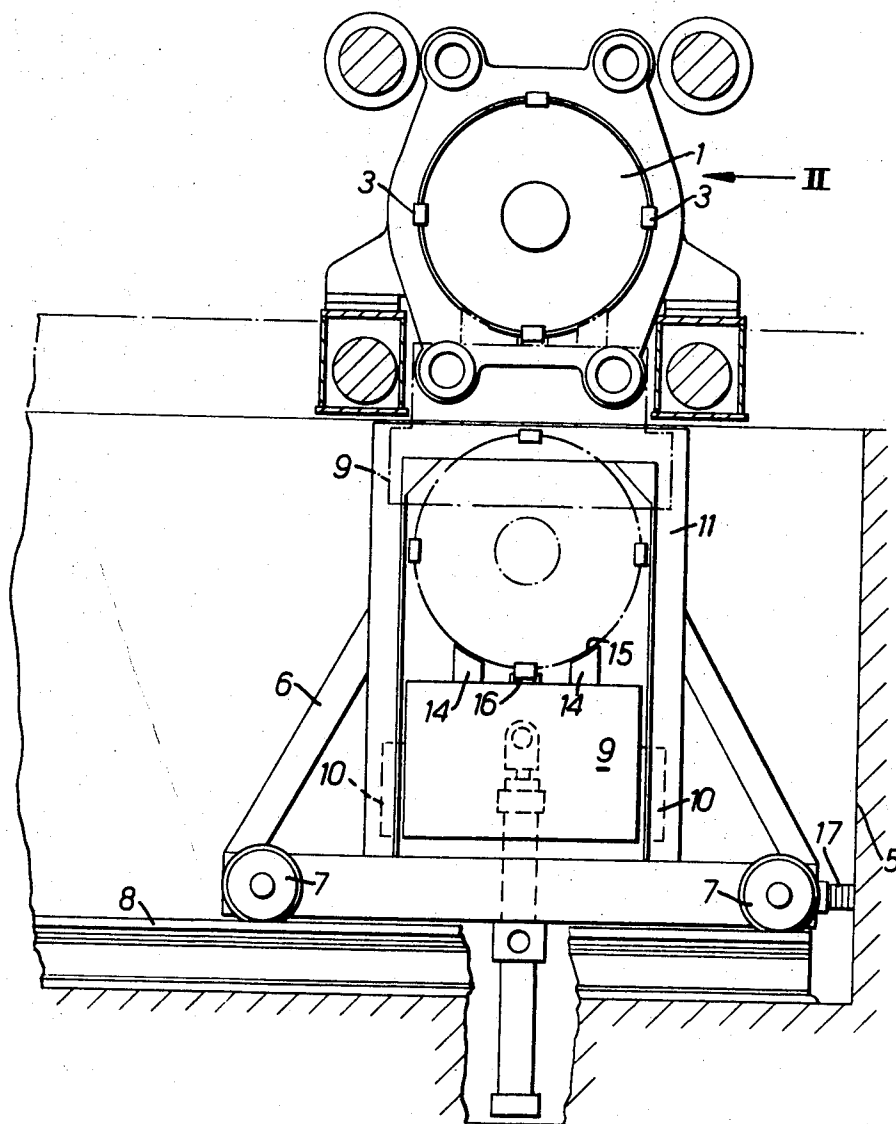


Fig. 1.

INVENTOR

BY

ATTORNEY

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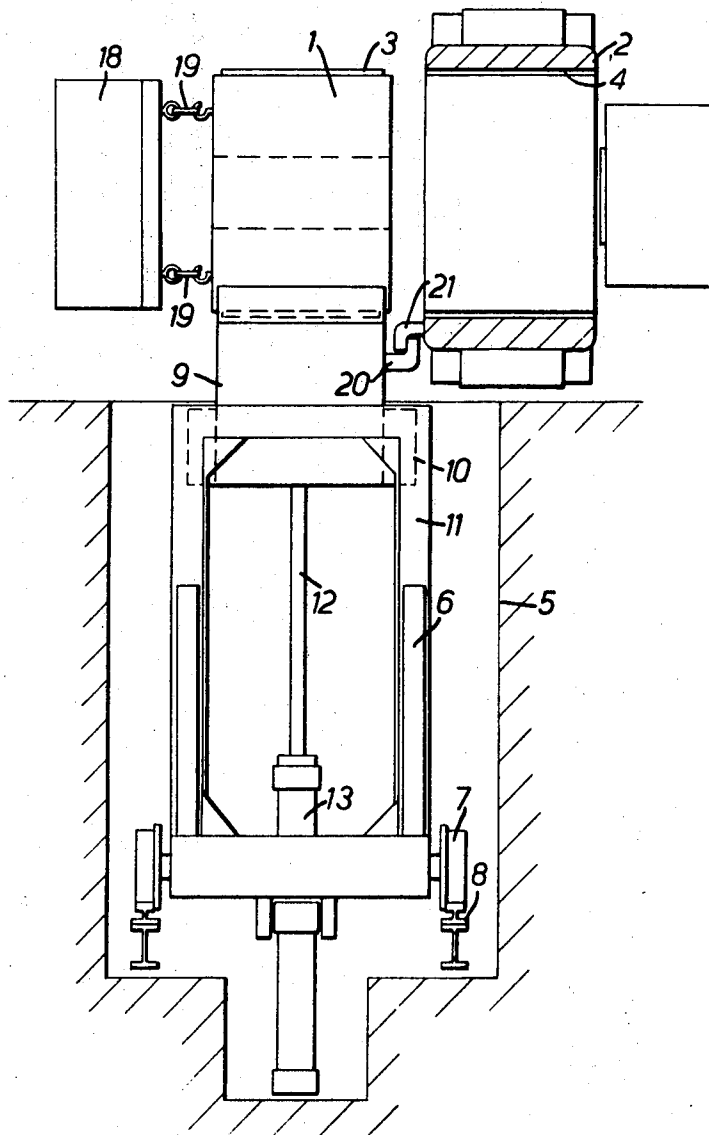


FIG. 2.

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HORIZONTAL EXTRUSION PRESSES

Ian Lewis Cameron, Blandford Forum, England, assignor to Fielding Plant Design Limited, Bournemouth, England

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8 Claims

ABSTRACT OF THE DISCLOSURE

A horizontal extrusion press including a transfer arrangement for the rapid and convenient removal of a press container and its replacement by another without recourse to the use of an overhead crane, the said transfer arrangement being brought into accurate location at the centre-line of the press and the container being axially slidably removed from its holder on to the transfer arrangement where it is supported. After removal from the holder, the container is next moved downwards below the press columns and then away from the press to an outside station.

This invention relates to horizontal extrusion presses and in particular to container transfer means therefor.

In a horizontal extrusion press it is necessary to change containers to enable billets of different dimensions to be used. It is essential for a viable installation that the changing of tools, including containers, be completed as quickly as possible, especially when the press is used for a production programme requiring frequent changes of containers having different bores.

In existing presses the container is normally removed by means of an overhead crane, the crane itself or another means being used to support the container during its axial movement out of the container holder. To load a new container into its holder is an even more difficult operation than container removal since the container is usually located by and supported on rectangular keys which are a close fit in both container and holder. The container to be located must therefore be brought accurately to the press centre line and accurately located relative to the container holder before it can be axially moved into the holder.

Using the above method necessitates the installation of a crane of much larger capacity than is required for any other production operation. This involves extra cost for the crane and for the crane supporting structure. Another disadvantage of using the shop crane is that whilst the container is being changed, other tool changes requiring the use of the crane cannot be made. Furthermore, a large crane would normally be much slower in use than a smaller one, resulting in the necessity for an additional product handling crane or loss of time when handling products.

Furthermore, in the case of a very large press excessive headroom is required for the removal of the container, its passage over the top of the press structure resulting in the provision of an overhead crane excessively high above the press for other purposes, and necessitating a building higher than is demanded for normal production purposes. In addition, excessive space for the storage of containers, stems and other tools may be required in the production shop, and frequent transference of large and heavy containers and tools between adjoining bays whilst production work is progressing may consequently constitute a nuisance to that work.

According to the present invention there is provided a horizontal extrusion press having transfer means for re-

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moving a press container from a container holder; said transfer means including a container receiving member, said member being transversely reciprocable with respect to the extrusion axis of the press between a first position, in which the container may be transferred from the press to the receiving member, and a second lower position, and transporting means for removing the container from the said lower position, said transporting means being transversely movable with respect to the extrusion axis of the press.

The receiving member may be permanently mounted in the transporting means. Conveniently the receiving member may be slidably mounted in the transporting means for movement between its two positions. The receiving member may be mounted on transversely orientated guideways secured to the transporting means. Preferably the receiving member may be vertically reciprocable and the transporting means horizontally movable.

The transporting means may be reciprocably movable between a first location in which the receiving member may be reciprocated between its two positions and a second location which is sufficiently remote from the extrusion axis to allow container changing to be facilitated.

The receiving member may be provided with container supporting surfaces which are arranged, in use, slidably to receive and to support the container during its removal from the container holder.

Relative axial movement between the receiving member and the container holder during transference of the container may be prevented by means of engageable hook means provided on the holder and the receiving member respectively.

Further according to the invention there is provided a method of removing a press container from a container holder of a horizontal extrusion press in which container transfer means are arranged to receive and support the container during its removal from the container holder including the steps of transversely moving the transfer means from a first position, in which the container is transferred, to a second lower position from which the container is moved by transporting means, which are transversely movable with respect to the extrusion axis of the press, to a location which is sufficiently remote from the extrusion axis to allow container changing to be facilitated.

The invention will now be described in more detail, by way of example, with reference to the accompanying drawing of which:

FIG. 1 shows a diagrammatic and elevation of a horizontal extrusion press, partly in section; and

FIG. 2 shows a partial side elevation of the press, partly in section, as seen along the direction of the arrow II in FIG. 1.

Referring to the drawing, the press includes a cylindrical container 1 mounted in a holder 2, the container being provided with rectangular keys 3 which slidably engage with correspondingly shaped guides 4 in the holder to ensure correct alignment of the container in the holder. Arranged in a pit 5 beneath the press is a container transfer arrangement consisting of a trolley 6, the wheels 7 of which ride along respectively horizontally disposed rails 8. The trolley is provided with a cradle 9 having lugs 10 which are arranged for sliding movement in four vertical guideways 11 mounted on the trolley. The cradle is secured to the end of the piston rod 12 of a hydraulic cylinder 13 mounted on the trolley, actuation of which provides reciprocal movement of the cradle within the guideways. This piston cylinder arrangement could, of course, be replaced by for example, a screw jack, a rack and pinion or a pulley system, etc. Two supports 14 are provided on the cradle each of which is formed

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with a curved surface 15, the radius of curvature of which is the same as the outside radius of the container body. A guide channel 16 is formed between the two supports which is adapted to receive one of the rectangular keys 3 when a container is positioned on the supports.

When it is required to perform a container changing operation the trolley 6 is traversed along the rails 8 until it abuts a buffer 17 mounted on the wall of the pit 5, in which position it is symmetrically disposed beneath the press as shown in FIG. 1. The cylinder 13 is then actuated to move the cradle 9 upward to the broken line position shown in FIG. 1. In this position the axis of the imaginary cylinder on which the surfaces 15 lie is co-linear with the extrusion axis of the press and consequently on axial withdrawal of the container from the holder, the lowest of the rectangular keys 3, will engage in the channel 16 whilst the outer surface of the container itself will be in nesting engagement with the surfaces 15. The orientation of the container will not be disturbed therefore, during transference from the holder to the cradle or, more pertinently from the cradle to the holder. Although there are various methods of withdrawing the container from the holder, in this example withdrawal is effected by attaching the container to a movable cross-head 18 by links 19 and using the return cylinders, not shown, of the press. To give stability to the trolley when pulling the container on and off the cradle a hook 20 formed on the cradle engages with a hook 21 formed on the holder 2, see FIG. 2. When the container has been transferred to the cradle the latter is lowered, by exhausting the cylinder 13, into its full line position shown in FIG. 1. The trolley is then traversed to a position away from the centreline of the press, such as a toolroom or toolstore, not shown, which may be located, for example, in an adjoining building. The container may then be removed and replaced by a different one, whereupon the above sequence of operations is reversed to insert the new container into the container holder.

To reduce the time cycle of the transfer arrangement two trolleys could be used, one of which is stationed at a point away from and at one side of the press and which can be traversed to the centreline of the press with a different container as soon as the trolley carrying the container that has just been used on the press has been moved from the centreline to a point away from and at the other side of the press.

An alternative method of transfer is achieved by installing a cradle which can only be moved up to and down from the centreline of the press, lateral movement being prevented. In this case, the trolley is traversible over the cradle and is formed so that the cradle may be raised or lowered there-through whilst the trough passage of the container is prohibited. Consequently, when a container has been transferred to the cradle and is being lowered it is deposited on the trolley, whereas the cradle is retracted through the trolley. Similarly, when a different container is brought into place above the retracted cradle, the latter is passed through the trolley to pick up the container and move it to its upper position. One or two trolleys may be used as in the previously described method.

An advantage of the transfer arrangement described above is that it facilitates rapid and accurate location of a container at the centreline of the press ready for axial movement into the container holder. Furthermore, it ensures rapid and convenient removal of one container from the press and its replacement by another without recourse

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to the use of an overhead crane which allows the latter to be used for other purposes whilst container changing is in progress.

An advantage of locating the transfer arrangement below the level of the press is that it provides a rapid and convenient means of container changing which does not result in the handling or storage of large and heavy tools within the production workshop, and consequently, a means of storing such tools within either a cellar beneath the production workshop floor or in an adjoining bay.

I claim:

1. A horizontal extrusion press having transfer means for removing a press container from a container holder; said transfer means including a container receiving member, said member being transversely reciprocable with respect to the extrusion axis of the press between a first position, in which the container is in alignment with the extrusion axis so that the container may be transferred from the container holder to the receiving member, and a second lower position, and transporting means for removing the container from the said lower position, said transporting means being substantially horizontally movable transversely with respect to the extrusion axis of the press.

2. A press as claimed in claim 1 in which the said receiving member is permanently mounted in the said transporting means.

3. A press as claimed in claim 2 in which the said receiving member is slidably mounted in the said transporting means for movement between its two positions.

4. A press as claimed in claim 3 in which the said receiving member is mounted on transversely orientated guideways secured to the said transporting means.

5. A press as claimed in claim 1 in which the said receiving member is vertically reciprocable and said transporting means horizontally movable.

6. A press as claimed in claim 1 in which the said transporting means is reciprocable movable between a first location in which the said receiving member may be reciprocated between its two positions and a second location which is sufficiently remote from the extrusion axis to allow container changing to be facilitated.

7. A press as claimed in claim 1 in which the said receiving member is provided with container supporting surfaces which are arranged, in use, slidably to receive and support the container during its removal from the container holder.

8. A press as claimed in claim 1 in which relative axial movement between the said container receiving member and the said holder during transference of the container is prevented by means of engageable hook means provided on the holder and the container receiving member respectively.

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CHARLES W. LANHAM, Primary Examiner

A. L. HAVIS, Assistant Examiner

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