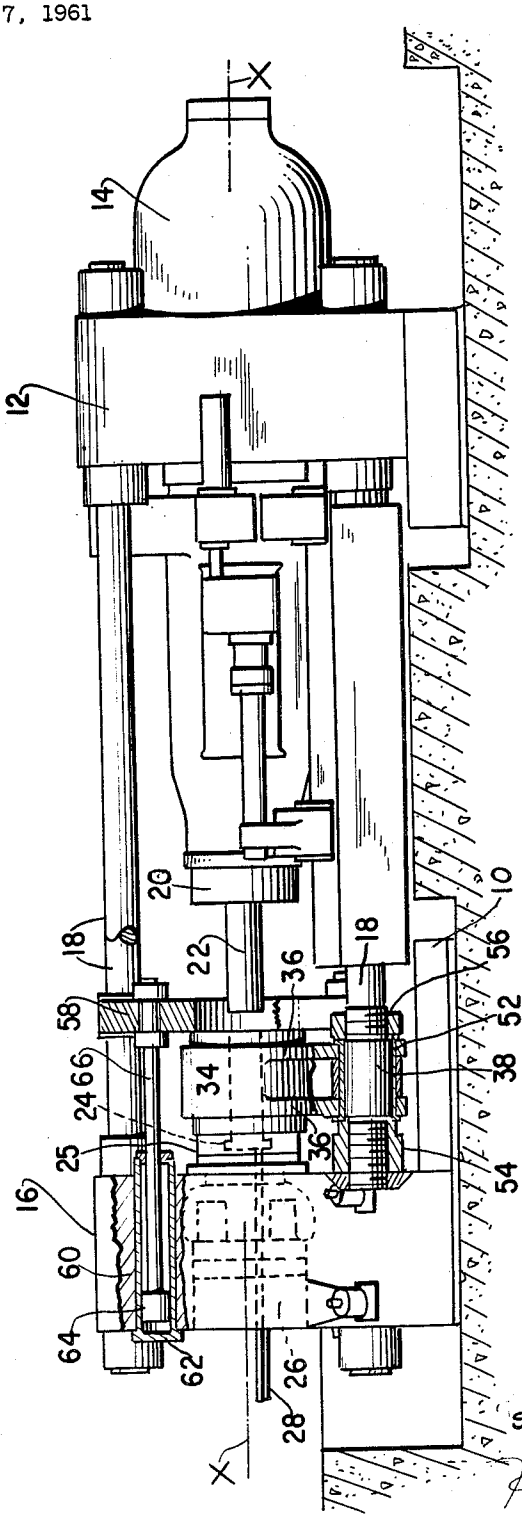
May 11, 1965 S. A. ROSENTHAL 3,182,479

EXTRUSION PRESS WITH TWIN CONTAINERS

Filed Nov. 7, 1961 3 Sheets-Sheet 1

Fig. 1



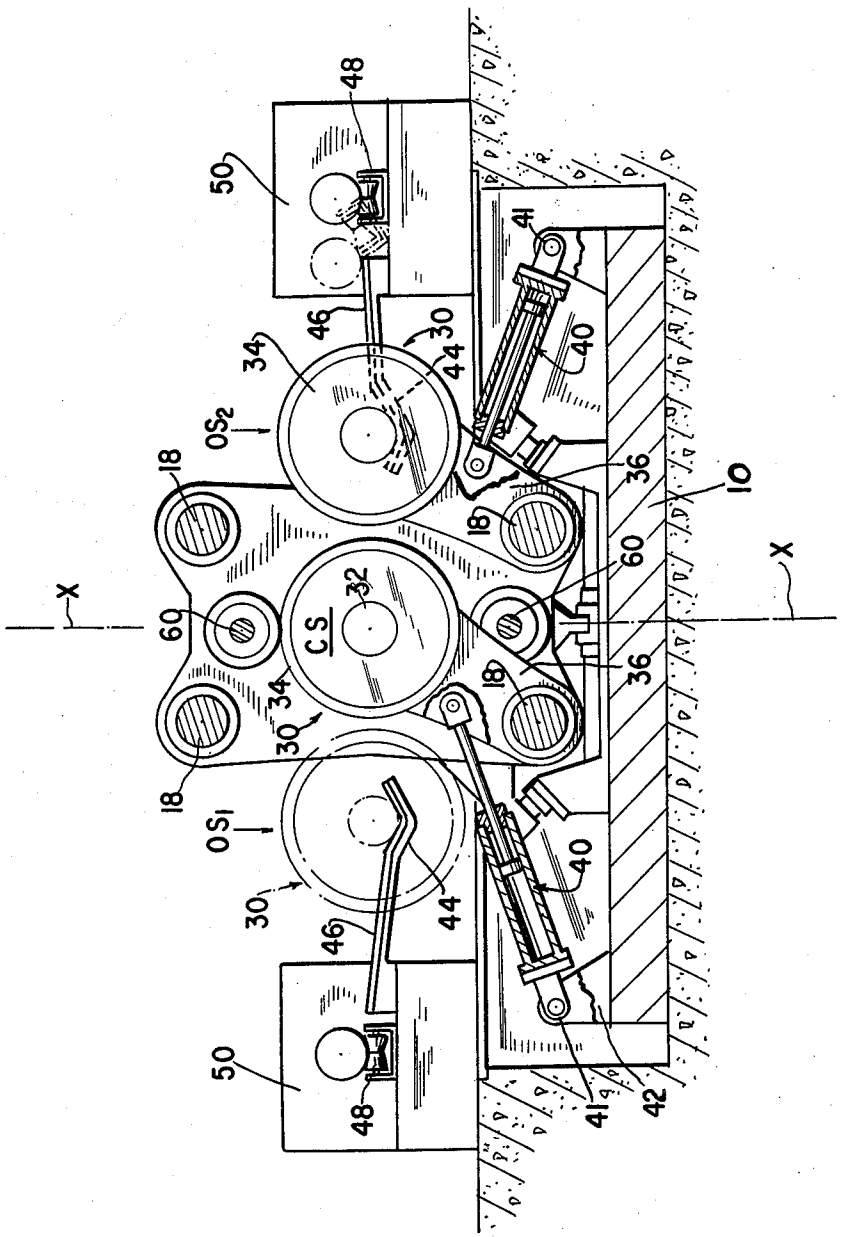
INVENTOR
SALLI ALFRED ROSENTHAL
BY
Hammond & Littell
ATTORNEYS

May 11, 1965 S. A. ROSENTHAL 3,182,479

EXTRUSION PRESS WITH TWIN CONTAINERS

Filed Nov. 7, 1961 3 Sheets-Sheet 2

Fig. 2



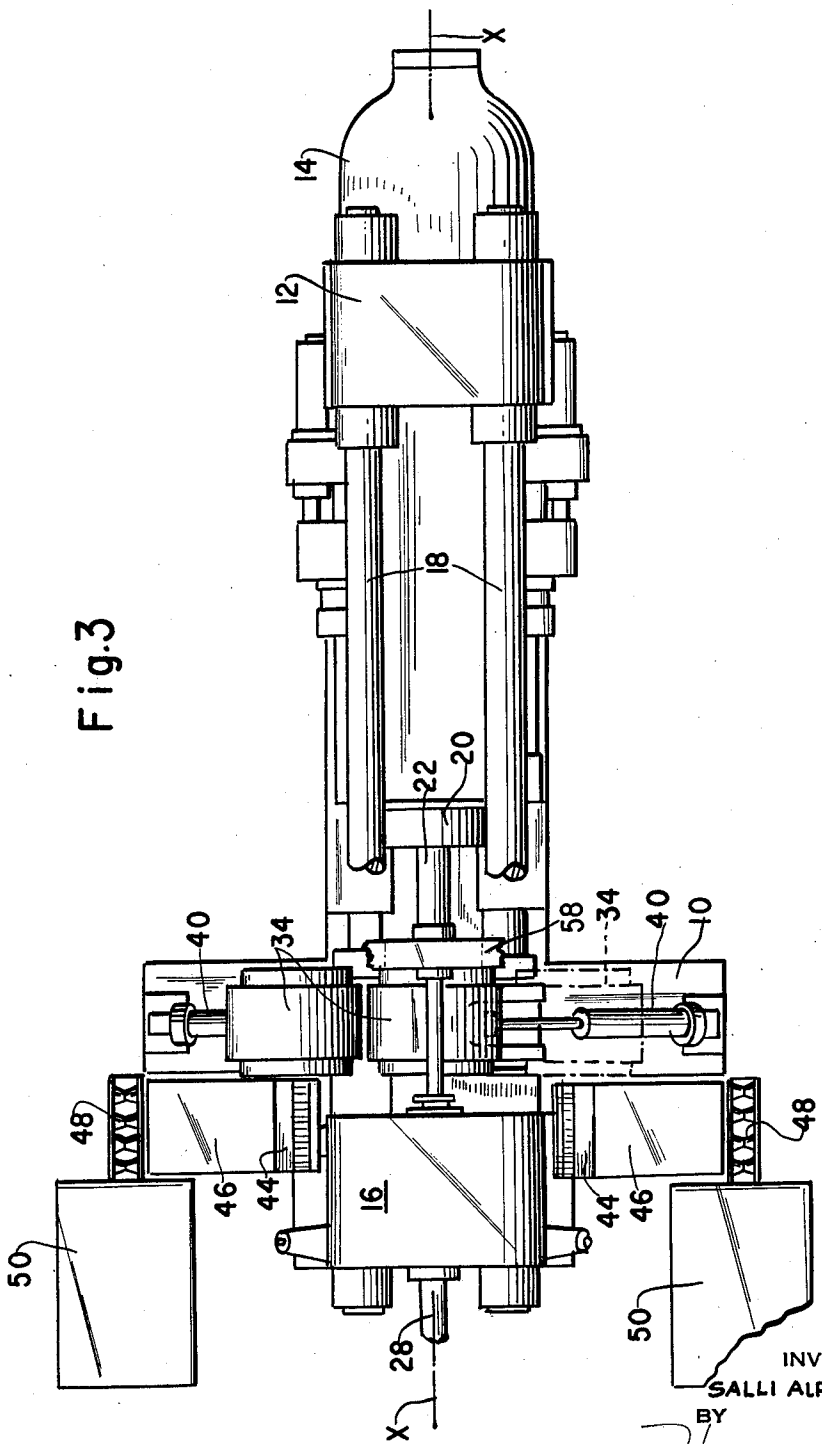
INVENTOR
SALLI ALFRED ROSENTHAL
BY
Hammond & Littell
ATTORNEYS

May 11, 1965 S. A. ROSENTHAL 3,182,479

EXTRUSION PRESS WITH TWIN CONTAINERS

Filed Nov. 7, 1961 3 Sheets-Sheet 3

Fig.3



INVENTOR
SALLI ALFRED ROSENTHAL
BY
Hammond & Littell
ATTORNEYS

United States Patent Office 3,182,479 Patented May 11, 1965

3,182,479

EXTRUSION PRESS WITH TWIN CONTAINERS

Salli Alfred Rosenthal, Poole, Dorset, England, assignor to The Loewy Engineering Company Limited, Bournemouth, England, a corporation of Great Britain

Filed Nov. 7, 1961, Ser. No. 150,780
4 Claims. (Cl. 72—263)

This invention relates to an extrusion press with twin containers.

It is known to provide in a metal extrusion press two separate billet containers which can be moved in and out of the axis of the press (which is the axis in which the extrusion force is applied to the billet and along which the extruded article is formed). While one of the two containers is in the press axis and thus in alignment with the other press tools such as the pressing stem and the die, the other container is at an outside station away from the press axis and in a position where auxiliary operations can readily be performed on that container. These auxiliary operations may include such steps as freeing the container from any residual billet metal or foreign matter, applying a cooling medium to the container and loading it with a fresh billet. Thus one of the two containers can be prepared for an extrusion operation while the extrusion of a billet is in progress at the other container. This results in a considerable saving of time and in a corresponding increase in the output of the press, particularly where auxiliary operations take up a considerable part of an entire press cycle.

It has been proposed to effect the movement of the containers in an extrusion press with twin containers by shifting them sideways relative to the press axis by a straight line movement. Such a press has then two outside stations situated on either side of the press axis, one for each container, and, further, an operating station situated in the press axis and common to both containers. In known presses of this type, the two containers were mounted together on a sliding carrier which was moved along guideways. These guideways, being near the working zone of the press, were apt to be covered with scale or other foreign matter which would fall off the billets on their entry into the container. This impeded the movement of the containers along the guideways and increased their wear. As the guideways were close to the working zone of the press, they were often exposed to intense heat, whereby they became distorted.

A further serious disadvantage resulted from the fact that the billets used in extrusion presses had generally a diameter which was slightly smaller than the bore of the container which received them. In horizontal presses the billets therefore had direct contact with the wall of the container bore only over a relatively narrow zone. This resulted in uneven cooling of the billets, as more heat was transferred from this contact zone than from the rest of the billet surface. Uneven cooling of a billet could easily result in an uneven flow of billet metal in the container during an extrusion operation. In the case of the extrusion of hollow articles, such as tubes, with the aid of a mandrel, the latter was apt to be deflected from its central position in the container towards the hotter part of the billet where the mandrel found less resistance. Deflection of the mandrel lead to the extrusion of eccentric hollow articles which were not acceptable.

In conventional single-container presses, the loading of a billet into the container is usually immediately followed by the expansion of the billet in the container bore by means of the pressing stem. There is, therefore hardly time, if any, for the billets to cool at their contact zones more appreciably than elsewhere. Conditions are different in horizontal presses with twin-containers where loading of the billets takes place outside the press

axis and where the containers are transferred from their outside stations to the press axis by a sliding movement. There the time during which the billets are in partial contact with a container bore is much longer and moreover the zone of contact between billet and container bore does not change.

It is an object of the present invention to provide a metal extrusion press with twin-containers which can be alternately moved in and out of the press axis and wherein the carriers for the containers are mounted in the press in a novel manner whereby the drawbacks of former presses with twin-containers are obviated.

According to the present invention, a container of a metal extrusion press with twin-containers which are arranged for alternate movement in and out of the press axis is pivotally supported in the press frame so that said container is moved in or out of the press axis by being oscillated along an arc of a circle which passes through this axis and through an outside station for said container, spaced from this axis.

Each of the two containers of the press has preferably its own pivotal mounting in the press frame which consists of a longitudinal shaft about whose axis the container is oscillated and of arms extending between said shaft and said container. The shaft may be stationary and formed by a tie rod of the press which connects the main parts of the press with each other. Alternatively the shaft may be a rocker shaft which may be supported in bearings, provided at some distance from the working zone of the press. In the case of presses having twin-dies which are alternately moved in and out of the press axis, the rocker shaft may be used for oscillating a die-carrier, arranged in front of or behind the press platen.

A common mechanism may be provided for oscillating both containers or alternatively these containers may be oscillated by separate mechanisms in which case suitable interlocks are provided in order to prevent a carrier from being moved into the press axis before the other carrier has cleared the way.

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

FIG. 1 is an elevation, partly in section of an extrusion press according to the invention,

FIG. 2 is a section along line 2—2 of FIG. 1,

FIG. 3 is a plan view.

The press shown in the drawings consist of bed plates 10 which carry at one end a crosshead 12 for a main cylinder 14 and at the other end a platen 16. The crosshead 12 and the platen 16 are connected to each other by four columns 18. Displaceable in the cylinder 14 by hydraulic power is a ram 20 to which a pressing stem 22 is attached. A die 24 is supported on the platen 16 by means of a plate 25. The platen has a tunnel 26 through which the extruded articles leave the press, to be received on a run-out table 28. The design of the press so far described is well-known.

Arranged in the space in front of the die 24 are two containers 30 which can be moved in a manner presently to be described from outside stations OS_1 and OS_2 arranged at both sides of the axis X—X of the press to a common central station CS in this axis. In the drawings, one container is shown in full lines at the central station CS and in dotted lines at its outside station OS_1; the other container is shown at its outside station OS_2.

Each of the two containers has a billet-receiving chamber in the form of a central bore 32. The containers may consist, as known, of a mantle or casing into which a liner is shrunk either directly or with a linerholder interposed between liner and mantle. Each of the containers 30 is housed in a carrier 34 to which a forked link 36 is attached. These links are pivotally mounted on the

lower columns 18 of the press by means of bearings 38 and they can be oscillated together with the two containers 30 about the columns by means of two hydraulic ram and cylinder units 40. These units are pivoted at 41 respectively to brackets 42, arranged on bed plate 10.

Each of the two containers 30 can thus be moved along the arc of a circle which passes through the axis X—X of the press and also through the two outside stations OS_1 and OS_2. In this way, the two containers are transferred from the outside stations to their common central station CS by a rocking movement.

Arranged at the outside stations are billet loading trays 44 to which billets are fed across aprons or chutes 46. The latter are in turn fed with billets through conveyors 48. These conveyors may be arranged at the discharge ends of heating means for the billets which are indicated in FIGS. 2 and 3 diagrammatically at 50 and which may be in the form of electric induction heaters. The billets are charged into the containers by billet pushers, not shown here.

Axially split sleeves 52 may be provided at the bearings 38 of the links 36 as shown in FIG. 1. The links are held against axial displacement on their respective columns 18 by means of bushes 54 and nuts 56, both threaded on the columns.

The containers 30 may be mounted in their carriers 34 in a manner similar to that shown and described in my copending patent application S.N. 850,254, filed November 2, 1959, now Pat. No. 3,083,827. Each of the containers is slidable relative to its carrier in an axial direction and held against rotation in its carrier by such means as longitudinal keys, not shown. The sliding movement is imparted to the containers by means of a crosshead 58 which is axially displaceable in opposite directions by means of two hydraulic cylinder and ram units 60 arranged on top of each other as seen in FIG. 2, each of these units comprising a cylinder 62 and a ram 64 with a rod 66. Movement of a container towards the die 24 causes these two parts to be brought into sealing contact with each other, with the die entering one of the container bores. Movement of the container in the opposite direction and away from the die clears the die face and exposes a part of the extruded article for discard-shearing purposes.

The pivotal mounting of the container 30 has the advantage of eliminating any guideways which would be exposed to scale and other foreign matter and which could become distorted by heat. The bearings of the links 36 and on the columns 18 are well protected. Another advantage of the invention consists in that during the oscillating movement of the containers during the transfer of billets from the outside stations OS to the central station CS, the zone of contact of the billets with the bore of the container is constantly changed whereby the adverse effects of uneven cooling of the billets are eliminated. Finally the oscillating movement of the containers renders it possible to make the billet loading trays 44 stationary as the billets are cleared from these trays through the oscillating movement of the containers.

The invention is capable of other embodiments than the one described above and shown in the drawings. Instead of pivoting the containers on the tie rods of the press, they may, for instance, be pivoted about separate pivots which may be formed either by stationary or by rocker shafts. Instead of moving the containers by hydraulic ram- and cylinder-units this movement may be effected by other means, for instance by electric motors and gears, in the case of rocker shafts being provided for the pivotal mounting of the containers. Instead of securing the container carriers against axial movement and making the containers axially movable relative to the carriers, the carriers themselves may be axially movable together with the containers.

I claim:

1. A metal extrusion press, having a frame including tie-rods, extending parallel to the press axis and two billet containers, one of said containers being adapted to move along the arc of a circle from an extrusion position in the press axis to a billet-loading position situated at one side of the press axis and the other of said containers adapted to move along the arc of a circle from the same extrusion position as the first container to a second billet-loading position at the opposite side of the press axis with respect to the first billet-loading position, separate means for transferring each container between the common extrusion position and its billet-loading position, said means including separate arms for each container adapted to be oscillated about two of said tie-rods, and power means for oscillating said arms.

2. A metal extrusion press, having two billet containers, one of said containers being adapted to move along the arc of a circle from an extrusion position in the press axis to a billet-loading position situated at one side of the press axis and the other of said containers adapted to move along the arc of a circle from the same extrusion position as the first container to a second billet-loading position at the opposite side of the press axis with respect to the first billet-loading position, means for transferring each container between the common extrusion position and its billet-loading position by oscillating each container about one of two stationary axes which are parallel to the press axis, and power means for oscillating said transfer means.

3. A metal extrusion press according to claim 2 having means for displacing said containers in a direction parallel to the press axis independently of said transfer means.

4. A metal extrusion press, having two billet containers, separate carriers for each container, means for holding each container against rotation for its carrier, means for displacing each container relative to its carrier in a direction parallel to the press axis, said carriers and said containers being adapted to move along the arcs of separate circles on their transfer from a common extrusion at opposite sides of the press axis and separate means for effecting this transfer, said means including arms attached to each of said carriers and adapted to be oscillated about two stationary axes which are parallel to the press axis, and power means for oscillating said arms.

References Cited by the Examiner

UNITED STATES PATENTS

2,376,654	5/45	Braendel et al.	29—34.4
2,720,407	10/55	Roux	207—1.1
2,728,453	12/55	Thweatt et al.	207—1
2,900,090	8/59	Sack	207—1.1
2,923,407	2/60	Billen	207—15

FOREIGN PATENTS

984,479	2/51	France.
1,163,770	4/58	France.
1,233,403	5/60	France.
542,045	1/32	Germany.

MICHAEL V. BRINDISI, *Primary Examiner.*

WILLIAM W. DYER, JR., CHARLES W. LANHAM, *Examiners.*