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COMBINED EXTRUSION RESIDUE RECEIVER AND BILLET GUIDE
FOR METAL EXTRUSION PRESS

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COMBINED EXTRUSION RESIDUE RECEIVER AND BILLET GUIDE FOR METAL EXTRUSION PRESS

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ABSTRACT OF THE DISCLOSURE

This invention relates to an extrusion residue receiver means particularly having a billet guide associated therewith for the so-called double work center line type metal extrusion press having a preparatory-work center line in addition to the extrusion center line, wherein after the completion of extrusion and cutting of the extruded material, a billet container which is now on the extrusion center line is moved to the preparatory-work center line together with a novel combined residue receiving cup-shaped cover and billet guide where the extrusion residue and dust such as lubricant and scale remaining in said container are removed therefrom into said cup-shaped cover and a fresh billet is charged into said container aided by said billet guide.

This invention relates to an extrusion residue receiver means particularly having a billet guide associated therewith for the so-called double work center line type metal extrusion press having a preparatory-work center line in addition to the extrusion center line, wherein after the completion of extrusion and cutting of the extruded material, a billet container which is now on the extrusion center line is moved to the preparatory-work center line together with a novel combined residue receiving cup-shaped cover and billet guide where the extrusion residue and dust such as lubricant and scale remaining in said container are removed therefrom into said cup-shaped cover and a fresh billet is charged into said container aided by said billet guide.

In a metal extrusion press having a preparatory-work center line wherein, after extrusion, the movement of the container to the preparatory-work center line is followed by a series of operations including insertion, from one side, of a combined cleaner and extrusion pusher member into the container to effect removal of the extrusion residue and cleaning of the inner surface of the container and insertion, from the other side of, a fresh billet into the container, it happens that the dust such as scale and lubricant (e.g. glass powder) catering due to removal of the extrusion residue and cleaning of the inner surface of the container tends to adhere to the fresh billet so that the container and the resulting extrude material will receive scratches on their surfaces.

The present invention is intended to eliminate the aforementioned drawbacks and is characterized by the provision of a cup-shaped cover for receiving extrusion residue adapted to be advanced an detracted relative to the preparatory-work center line in such a manner that when it is advanced it abuts against one end surface of the container now positioned on the preparatory-work center line thereby to be ready for receiving therein the extrusion residue and dust and when it is retracted guide planes provided on the back surface of said residue receiving cover serve to guide a billet to be newly charged to allow the axial movement thereof.

The invention will be more fully described by reference to the accompanying drawings, in which:

FIG. 1 is a cross-section of the principal portion of a metal extrusion press incorporating an extrusion residue receiving means embodying the present invention;

FIGS. 2 and 3 are cross-sections taken along the lines II—II and III—III of FIG. 1, respectively;

FIG. 4 shows a certain phase of the operation of said means; and

FIG. 5 is a cross-section illustrating a container and an extrusion receiving cover in their engaged position.

The metal extrusion press shown in this embodiment comprises additionally a preparatory-work center line c—c disposed laterally of and parallelly with the extrusion center-line c—c. It has a single container 1 adapted to be reciprocably moveable between both center lines. When extrusion is being operated, the container 1 is maintained on the extrusion center line c—c as abutting against a die holder 2, and a billet 3 is thus extruded by a stem 4 through a die 2'. Upon completion of one extrusion, the container 1 is slightly retracted relative to its container holder 5 by the action of a piston 6 and the extruded material is separated from the remainder of the billet, namely, extrusion residue 7, movement of a cutting saw, the residue being left in the container together with a pusher disk 8. Subsequently, the container is moved by a suitable drive mechanism along a rail 9 extending in a direction normal to the extrusion direction onto the preparatory-work center line, where removal of the extrusion residue 7 and cleaning of the inner surface of the container is effected by advancing a residue pushing bar 10 and a cleaning member 11 fitted and rotating thereon. Thereafter, concurrently with retraction of the residue pushing bar 10 and cleaning member 11, a billet pushing bar 12, together with a piston 13, is advanced to the container side, so that a billet which is being newly charged is in front of the pushing bar 12 by means of a billet loader is charged into the thus cleaned container 1. Upon completion of these preparatory operations, the container 1 is moved along the rail 9 onto the extrusion center line c—c, to restore the conditions shown in FIG. 1 to be ready for the next extrusion.

An extrusion residue receiving means according to the present invention is installed on the aforementioned metal extrusion press. The principal component of the means is a cap-shaped, residue receiving cover 15, which has a lateral wall 17 surrounding the three sides thereof as shown in FIG. 3 and has a wall 18 only at the outer or rear side thereof as shown in FIG. 1, the inner side being open, a discharge lid 19 being attached to an opening 16 in the bottom. Integribly provided above the residue receiving cover 15 is a bracket 28, and by supporting the bracket 28 by a shaft 21 the residue receiving cover 15 is adapted to be swingable as a whole around said shaft 21 and through a travel arc of approximately 45°. The position at which the residue receiving cover 15 is to be located is in front of the position which the container 1 should occupy on the preparatory-work center line c—c as shown in FIG. 1. Thus, the cover 15 is so arranged that it may come into contact with this side of a spaced piece 23 secured to an opposing frame 22. Interposed between an arm 24 secured to said shaft 21 and a fixed part 25 is a swing drive means consisting of a cylinder 26 and a piston rod 27. Further, a lid opening and closing drive means consists of a cylinder 29 and a piston rod 30 is interposed between said bracket and the projection 28 of the lid 19. In addition, the aforesaid shaft 21 is horizontally carried in suitable bearings at some fixed parts of the press, and includes a support shaft for the lid 19. The upper surface of the residue receiving cover 15 is provided with a billet guide 33 having two angularly disposed plane members 32 making substan-
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3. Initially a right angle with each other. The billet guide 33 is so positioned that when the residue receiving cover 15 has swung downwardly around the shaft 21, the billet guide comes on the preparatory-work center line \( c' - c' \).

Since the container 1, which will come on the preparatory-work center line \( c' - c' \) after extrusion, is at a position as slightly moved to this side by the piston 6, so that the opening side of the residue receiving cover 15 faces against the front surface thereof (FIG. 5). At this time, said cover is correctly on the preparatory-work center line \( c' - c' \) as shown in FIG. 3, with the lid 19 closed. In this condition removal of the residue 7 and cleaning of the inner surface of the container are operated as mentioned above, whereupon the die 2', residue 7, pusher disk 8 and dust, all drop into the residue receiving cover 15, there being no possibility of their scattering. At this time if the residue receiving cover has a suction duct 34 connected thereto, the dust will quickly be sucked and removed therefrom. Then, a hydraulic pressure is introduced into the cylinder 26 to push the piston rod 27 so that an arm 24 is swung to downwardly swing the residue receiving cover 15, and then a hydraulic pressure is introduced into the cylinder 29 to cause the piston rod 30 to open the lid 19 (FIG. 4), whereupon the residue 7 and pusher disk 8 in the residue receiving cover 15 drop down through the opening 16.

During the operation of the afore-mentioned residue removal, a fresh billet 14 and a fresh pusher disk 36 are carried by a billet loader 35 from below onto the preparatory-work center line \( c' - c' \) and remain stationary on said center line. Then, as mentioned above, if the residue receiving cover 15 is downwardly swung, at the same time when the billet guide 33 thereon comes just on the preparatory-work center line (FIG. 4), the residue receiving cover 15 disconnected from the container 1, whereby when the billet pusher bar 13 together with the piston rod 13 are advanced the fresh billet 14 and pusher disk 36 on the billet loader 35 are straight forwardly advanced along the preparatory-work center line \( c' - c' \) to the container, and at this time the pusher disk 35 and billet 14 leaving the front end of the billet loader 35 come into contact with the two guide planes 32 of said billet guide 33 and thereby guided correctly into the container 1. Thereafter, the billet loader 35 is lowered and the residue receiving cover 35 is swung upwardly while closing the lid 19.

In addition, it is possible to supply a fresh pusher disk 36 alone to the billet guide 33.

According to the device of the present invention, since the end surface of the container is hermetically closed by the cap-shaped residue receiving cover when removal of the extrusion residue and pusher disk and cleaning of the inner surface of the container are operated, the dust cannot be scattered, thus preventing the dust from adhering to a fresh billet which has already been carried onto the preparatory-work center line by the billet loader.

Further, by disconnecting the residue receiving cover, which is movable, from the container after extrusion, changing of a fresh billet is allowed. And moreover, at this time the billet guide formed on said residue receiving cover automatically is moved to its proper position on the preparatory-work center line, so that charging of the fresh billet and pusher disk into the container takes place properly and smoothly.

What I claim is:

1. In an extruding press a combined billet guide and extrusion residue receiving means comprising a cup-shaped, extrusion-residue-receiving cover whose residue-receiving open side is adapted to be flushedly contacted with a billet container of the press on a preparatory-work center line on which and during removal of the extrusion-residue in the container and cleaning of the inner surface of the container are operated, means on said press operably connected with said extrusion-residue-receiving cover and with said billet container for reciprocally positioning them in a direction normal to the preparatory-work center line, and a billet guide provided integrally and directly on said extrusion residue receiving cover at such a location that when said extrusion residue receiving cover is moved away from the preparatory-work center line, the billet guide is moved to its proper operative position on said center line.

2. An extrusion residue receiving means as described in claim 1, wherein the extrusion residue-receiving cover is swingably supported by a shaft and is driven by a first cylinder and piston means through a travel arc of approximately 45° between its operative and non-operative positions.

3. An extrusion residue-receiving means as described in claim 1, wherein the extrusion residue-receiving cover is provided at a lower part thereof with a pivotally opening lid discharge member said lid member being driven by a cylinder and piston means to open and close said opening in timed sequence with the relative movement thereof between a closed position on the preparatory-work center line and a subsequent open position when moved therefrom, during an operation cycle of the extrusion press.

4. An extrusion residue-receiving means as defined in claim 1 wherein the billet guide is disposed directly on a lateral adjacent side of the cup-shaped residue-receiving cover in relation to the residue-receiving opening thereof.

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