July 3, 1951 A. F. WNUK 2,559,207

EXTRUDING PRESS

Filed July 24, 1946 3 Sheets-Sheet 1

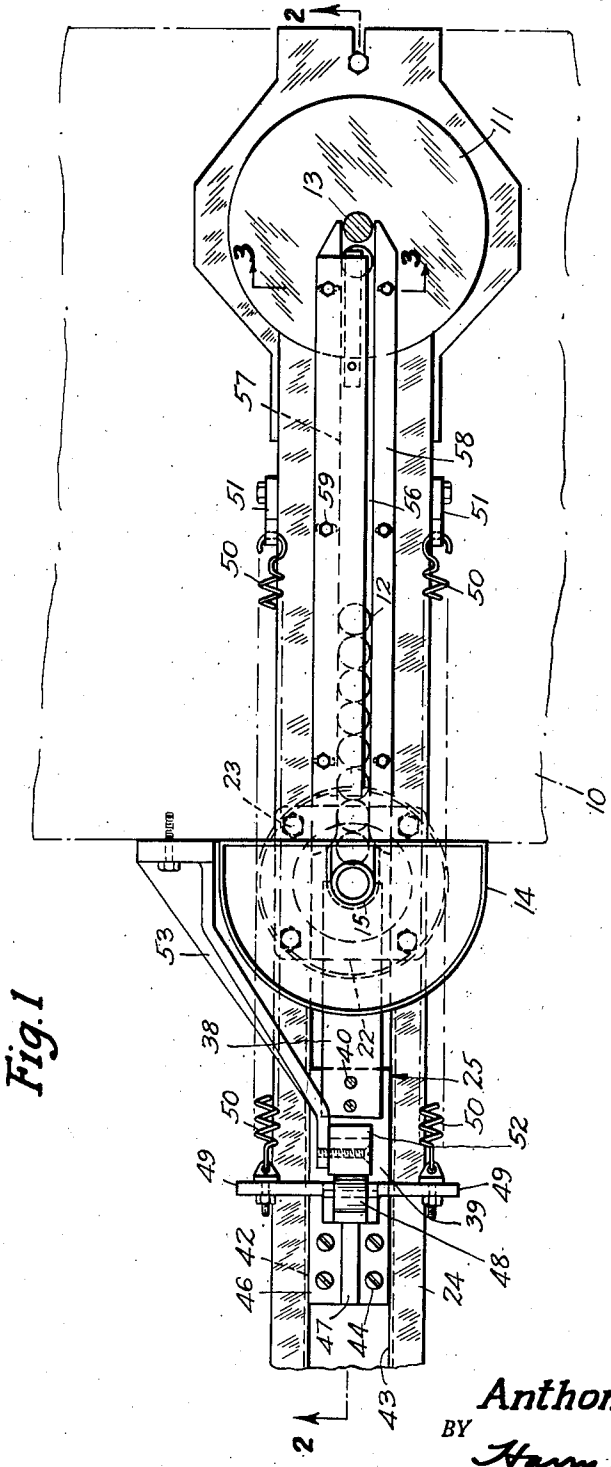


Fig. 1

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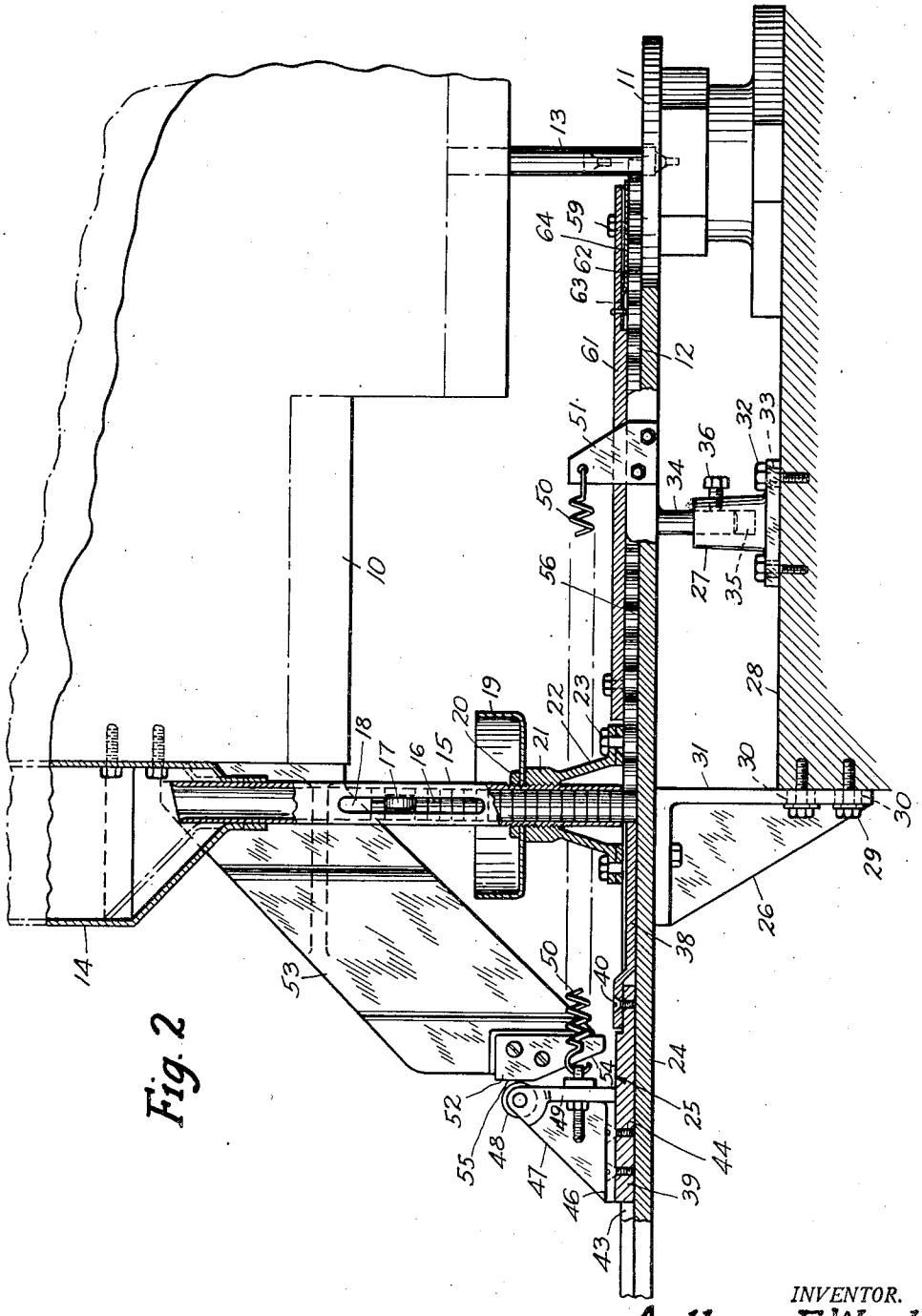


Fig. 2

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Fig. 3

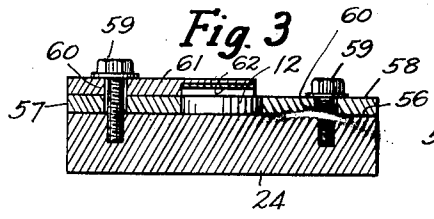


Fig. 4

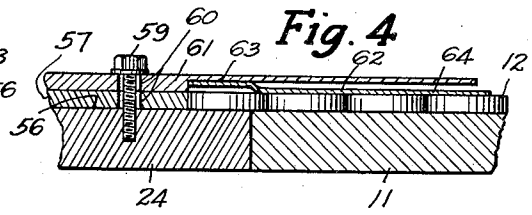


Fig. 7

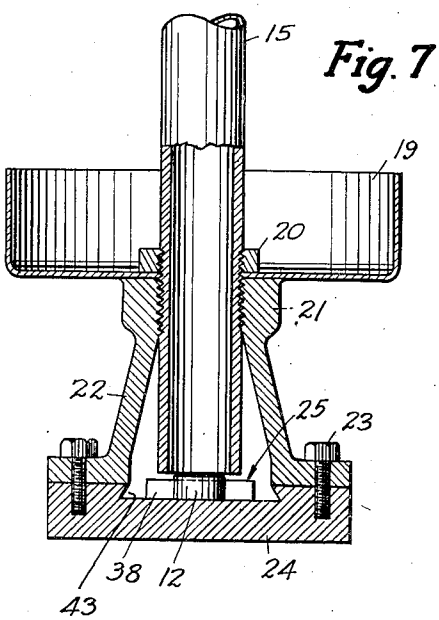


Fig. 6

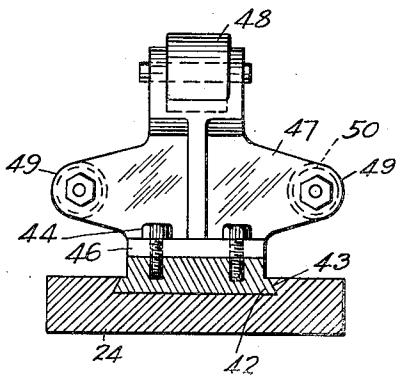
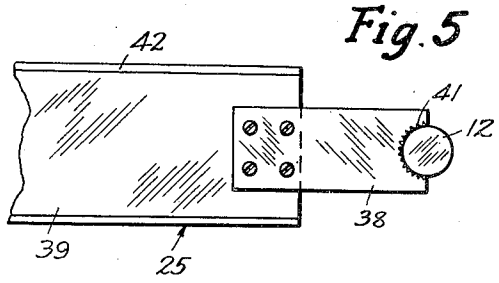


Fig. 5



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UNITED STATES PATENT OFFICE

2,559,207

EXTRUDING PRESS

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Application July 24, 1946, Serial No. 686,015

4 Claims. (Cl. 207—6)

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This invention relates to presses for extruding slugs into collapsible tubes by impact extrusion and particularly to the means for feeding the slugs successively into the die.

In that type of slug feeding mechanism wherein a slug-holding hopper is secured to and reciprocated with the crosshead of the press, the slugs are agitated sufficiently to enter a slug tube, from the bottom of which one slug at a time is removed and transferred to the fixed female die of the press. Owing to the necessity for removing the extruded tube from the male die or punch after the extruding operation and the need for sufficient space in the machine for that purpose, the hopper and its delivery tube cannot be arranged closely enough to the dies to feed the slugs directly thereinto, and consequently the slug must be moved a substantial distance by separate mechanism into the die in timed relation to the reciprocation of the cooperating punch. Since the press operates at relatively high speed, correspondingly timed movement of the successive slugs to the die has been accomplished by relatively fast moving reciprocating mechanism operated by connections to moving parts of the press.

Considerable difficulty has been experienced with such slug feeding mechanism by reason of the momentum attained thereby and imparted to the slug, frequently causing failure of the mechanism to deliver the slug accurately to its exact required position in the die by overrunning or underrunning the die. Such delivery failure results in the cutting of the slug in two by the reciprocating punch with consequent waste of time and material and danger of damage to the press parts and dies.

I have found that by decreasing substantially the speed of transfer of the slugs and the length of the transfer, not only is dependable and accurate transfer obtained, but the transfer mechanism can be substantially simplified with resulting economies and wear on the mechanism greatly reduced.

The invention therefore contemplates the provision of simple and dependable slug transfer means having a relatively short and slow movement for removing a slug from a pile or stack of such slugs and advancing the slug part of the way toward the die, the remaining advance of the slug being obtained by the movement of the succeeding slugs.

The invention further contemplates the provision of slug transfer mechanism including a removable slide, operated positively in one direction by a cam to move the slug just enough to clear the delivery tube of the slug hopper, whereby the speed of the slide may be maintained at a minimum and the slug may be advanced by succeeding slugs finally to drop accurately and dependably into its correct position in the die.

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The invention further contemplates the provision of a slug runway from the delivery tube to the die, the runway being adjustable to receive slugs differing in diameter, and of means cooperating with the runway for insuring the delivery of the slug in its correct position to the die.

The invention further contemplates the provision of an overflow cup on the delivery tube adapted to receive slugs mispositioned in and rolling out of the tube and likely to interfere with the proper operation of the mechanism.

The invention further contemplates the provision of slug feeding means readily interchangeable with similar means to adapt the press to make tubes of different sizes from slugs of correspondingly different sizes.

The various objects of the invention will be clear from the description which follows and from the drawings, in which

Fig. 1 is a top plan view of the slug delivery and transfer mechanism showing in dash-dot lines the adjoining part of the press to which the mechanism is applied.

Fig. 2 is a vertical sectional view of the mechanism taken on the line 2—2 of Fig. 1 showing in dash-dot lines the uppermost positions assumed by the adjoining parts of the press.

Fig. 3 is a similar fragmentary sectional view taken on the line 3—3 of Fig. 1 of the delivery end of the runway for the slugs.

Fig. 4 is a longitudinal vertical sectional view thereof.

Fig. 5 is a fragmentary top plan view of the removable and replaceable slug transfer slide.

Fig. 6 is a side elevational view and vertical cross sectional view combined of the support for the cam roller and the outer end portion of the transfer slide.

Fig. 7 is a vertical cross sectional view of the slug delivery pipe and of the overflow cup together with the support therefor.

In the embodiment of the invention shown by way of example, the extruding press may be of any of the usual types having a reciprocating cross-head 10 reciprocated by any suitable mechanism toward and from the relatively fixed but quickly removable and replaceable female die

11 which is provided with a suitable die cavity into which a disc-like slug 12 is delivered when the cross-head is at or near the top of the up stroke thereof shown in dash-dot lines in Fig. 2. The punch 13 carried by the cross-head for quick replacement and reciprocated therewith is of the usual type adapted to enter the die 11 thereby to extrude the slug into a tube around the punch on the down stroke, and to carry the tube with it on the up stroke out of the die to ready the die for the reception of the next slug.

Secured to the cross-head 10 and reciprocating therewith is the removable and replaceable slug hopper 14 in which the slugs are agitated to some extent during such reciprocation. The upper end of the removable and replaceable delivery tube 15 is inserted into the hopper and is open to receive the slugs which normally accumulate in a horizontal position in the tube to form a stack as 16 (Fig. 2). Occasionally however, one of the slugs as 17 instead of lying flat in the stack, may stand on edge, in which position it cannot be advanced by the transfer mechanism later to be described. A slot as 18 is therefore made in the tube for access by the operator to the mispositioned slug, the operator manually turning the slug into its correct position in the stack. Should the mispositioned slug roll out of the upright slot 18, it might reach the press mechanism and interfere with the proper operation thereof. The overflow cup 19 is therefore provided to catch such rolling slugs. Said cup is mounted on the tube 15 below the slot 18 and is secured in place by the nut 20 screwed on a threaded portion of the tube and coacting with the sleeve 21 of the support 22 on which the cup rests to hold the cup and the tube in position. The base of the support 22 is suitably secured as by the bolts 23 to the fixed plate 24 which serves a guide for the transfer slide 25 and which is adjustably supported by the brackets 26 and 27.

Adjustment of the plate 24 is sometimes required to insure the transfer of the slugs in precisely the proper direction from the bottom of the tube 15 to deposit the slug in the die. For this purpose, the bracket 26 is secured to the frame 28 of the machine by bolts as 29 passing through oversized holes as 30 in the bracket 26 and thereby permitting limited but sufficient adjustment of the bracket in all directions in the plane of the face 31 of the bracket to accomplish the desired adjustment. Similarly, the bracket 27 is secured to the frame by the bolts 32 passing through slots or oversized holes 33 in the base thereof. Vertical adjustment of the plate 24 is obtained by inserting the pin projection 34 thereof loosely into the upright hole 35 of the bracket 27 and securing the pin in its adjusted position by the set screw 36. It will now be seen that the plate 24 may be pivotally adjusted about the pin 34 in a horizontal plane and also raised or lowered to permit removal of th bottom slug from the stack 16, and to permit the alignment of the runway of which the plate forms a part, with the tube 15 and the die 11.

The transfer slide 25 for removing the slug from the stack and inserting the removd slug into the runway is made preferably in two parts. The inner part 38 is removably secured to the outer part 39 as by means of the screws 40 (Figs. 1 and 5) and terminates at its inner end in a serrated semi-circular edge 41 of the same diameter as that of the slug which the slide part 38 is intended to advance. The serrated edge serves to break any oil seal which may be formed between the edge and the slug, which seal might otherwise adhesively secure the slug to the slide and cause retraction of the slug on the return movement of the slide 25.

Obviously, by the use of slugs and dies of the proper sizes, the press may be adapted to make tubes of various sizes. The female die and punch being removable and quickly replaceable by another set thereof, to change the press over to make tubes of another size, there remains only the need for the substitution of different slug feeding parts dimensioned to transfer slugs of the other size. Such parts include the slide part 38, the hopper 14 and the delivery tube 15, while the remaining parts of the transfer mechanism may remain in place except as will be explained hereinafter.

The outer slide part 39 is provided with dovetailed side edges 42 (Fig. 6) fitted into the dovetailed guide groove 43 of the plate 24 and slides in said groove a distance in each direction slightly greater than the outer diameter of the tube 15 or a distance approximately equal to said diameter to insure the proper engagement of the slide part 38 with the lowermost slug of the stack and also to insure the advance of said slug enough to completely clear the tube. The mechanism for reciprocating the slide to advance the slug will now be described.

Secured to the slide part 39 as by the screws 44 passing through the base 46 thereof, is the roller bracket 47 carrying the cam roller 48. To the projecting arms 49 of the bracket are secured the left ends (as viewed in Fig. 1) of the springs 50, the other ends of which are secured to fixed parts as 51 of the slug runway, whereby the roller 48 is pulled against the cam 52 in the direction effective to move the bracket 47 and the slide 25 and to advance the slug when permitted by the cam to do so. The cam 52 is secured replaceably to the bracket 53 which is in turn fixed to the cross-head 10 and reciprocates therewith. Consequently, in changing the machine over to operate on tubes of a different size, the cam 52 may if desired be replaced by another similar cam giving the required throw to the slide and a corresponding slide part similar to the part 38 substituted. If desired, the cam 52 may have a throw equal to the maximum movement of the transfer slide in which case replacement of the cam may be avoided. The cam 52 is provided with an inclined edge 54 meeting the upright edge 55 of the cam and having a horizontal component equal at least to the desired throw. It will now be seen that downward movement of the cross-head 10 withdraws the bracket 47 and the slide 25 to carry the edge 41 of the replaceable slide part 39 to the left of the tube 15 and to a point adjacent said tube. This permits the stack 16 which normally rests on the slide to drop until the lowermost slug of the stack rests on the plate 24 preparatory to the advance of said lowermost slug. On the upward movement of the cross-head, the springs 50 become effective to move the bracket 47 and the slide secured thereto to the right, carrying the edge 41 into engagement with the lowermost slug and advancing said slug to a point on the other side of the tube and adjacent to said tube, while the remainder of the stack rests on the slide. As this operation is repeated, a row of slugs accumulates in the runway, the entire row being advanced as a unit in the runway through a distance equal to the diameter of the slug on each complete reciprocation of the slide. When the runway is filled with slugs up to the female

die, each reciprocation of the slide forwards the right hand end slug slowly into the die to deposit it accurately thereinto ready for extrusion.

The construction of the runway is such that it may readily be adjusted to guide slugs of different diameters and to control the movement of the row of slugs so that no overturning of the slugs or overshooting of the die can occur, it being understood that the slug cannot undershoot the die because of the positive movement imparted to the row of slugs by the addition of a slug to one end of the row, thereby causing the entire row to move exactly the diameter of the slug on each reciprocation of the slide and the punch. The plate **24** is preferably extended toward the right past the tube **15** (as viewed in Figs. 1 and 2) and up to or near the die **11** to form the bottom of the runway, but as seen in Figs. 3 and 4, the dovetail groove **43** of the plate is omitted and the upper surface of the plate is flat as shown at **56**.

Separate transversely spaced plates as **57**, **58** form the sides of the runway and are adjustably secured to the upper surface **56** as by the screws **59** passing through transversely extending slots **60** in said side plates. The distance between the inner edges of said plates is adjusted to the diameter of the slug to be transferred. To prevent the slugs from rising in the runway, a cover **61** is removably secured to one of the plates as **57** and is wide enough to cover the greater part of the row of slugs, but exposes enough of the slugs (see Fig. 1) to permit the operator to inspect them.

Means are provided to control and resist the movement of the end slugs of the row and to brake said movement to prevent overshooting of the die. As best shown in Figs. 3 and 4, said means comprises a sheet spring **62** having one free end portion **64** thereof in pressed contact with the upper faces of the slugs and the other end portion **63** thereof secured in a suitable groove in the under face of the cover, the groove extending the length of the spring to allow the spring to flex to a limited extent. The spring keeps the slugs from vibrating in the runway and while not retarding the movement of the slugs, acts as a brake against such free movement or momentum of the slugs as might cause them to overrun the die. Hence only movement of the row is imparted to the end slugs, which are maintained in their proper flat positions by the spring until the end slug drops into the die cavity.

It will be seen that I have provided a feed mechanism well designed for interchangeability of the parts thereof to accommodate slugs of different diameters particularly in a press wherein the die and punch are readily changeable, that the mechanism is simple in construction, having few parts moving through relatively short distances and at relatively slow speed thereby avoiding excessive wear thereon, and that the movement of the slug may be accurately controlled and the slug fed dependably into its correct position in the die.

While a certain specific embodiment of the invention has been shown and described herein, changes may obviously be made therein without departing from the spirit of the invention defined in the appended claims:

I claim:

1. In an extruding press, a fixed upright slug-delivering pipe adapted to hold a stack of slugs, a horizontally reciprocating slide for advancing one slug at a time from the bottom of the stack to a predetermined point spaced from the stack a distance greater than the stroke of said slide, said stroke being slightly greater than the diameter of the pipe, a horizontal runway between the stack and said point, in which runway the slugs advanced by the slide accumulate in a row and slide as a unit on the addition of a slug to the beginning of the row by the slide, a pin depending from the runway and a bracket pivotally supporting the pin whereby the runway is adjustable about the pin in a horizontal plane, serrated means at the end of the slide for preventing oil-adhesion of the slug to the slide, and a spring brake in the runway arranged to engage and to resist movement of a plurality of slugs nearest said point to prevent the last slug of the row from overrunning said point.

2. The extruding press of claim 1, the means for preventing oil-adhesion of the slug to the slide comprising a generally concave end on the slide, said end having a plurality of triangular notches therein each meeting the adjacent notches at said concave end to provide spaced apart parallel edges for engaging the slug.

3. The extruding press of claim 1, the spring brake comprising a cover for the major part of the runway extending from one side toward the other side and past the middle of the runway and a sheet spring having one end part secured to the under side of the cover and the other end part free and biased toward the bottom of the runway to engage the upper flat faces of the slugs at the end of the row and thereby pressing the slugs downwardly against the bottom of the runway.

4. The extruding press of claim 1, the pipe having a slot therethrough, and a circular cup concentrically surrounding and carried by the pipe below the slot and of sufficient diameter to receive and retain slugs dropping out of the slot and thereby preventing damage to such slugs and preventing such slugs from interfering with the operation of the press, the cup having a central aperture therein, and the pipe passing through the aperture and being externally threaded above and below the aperture, and clamping means on the pipe above and below the bottom of the cup and cooperating with the threaded part of the pipe to clamp the cup to the pipe.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,352,194	Hooker	Sept. 7, 1920
1,652,032	Lynch	Dec. 6, 1927
1,792,865	Prussing	Feb. 17, 1931
1,981,490	Witte	Nov. 20, 1934
2,096,245	Heinze et al.	Oct. 19, 1937
2,166,209	Friden	July 18, 1939