Oct. 19, 1937. E. HEINZE ET AL 2,096,245

SLUG FEED STOP MECHANISM FOR COLLAPSIBLE TUBE PRESSES

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Fig. 1.

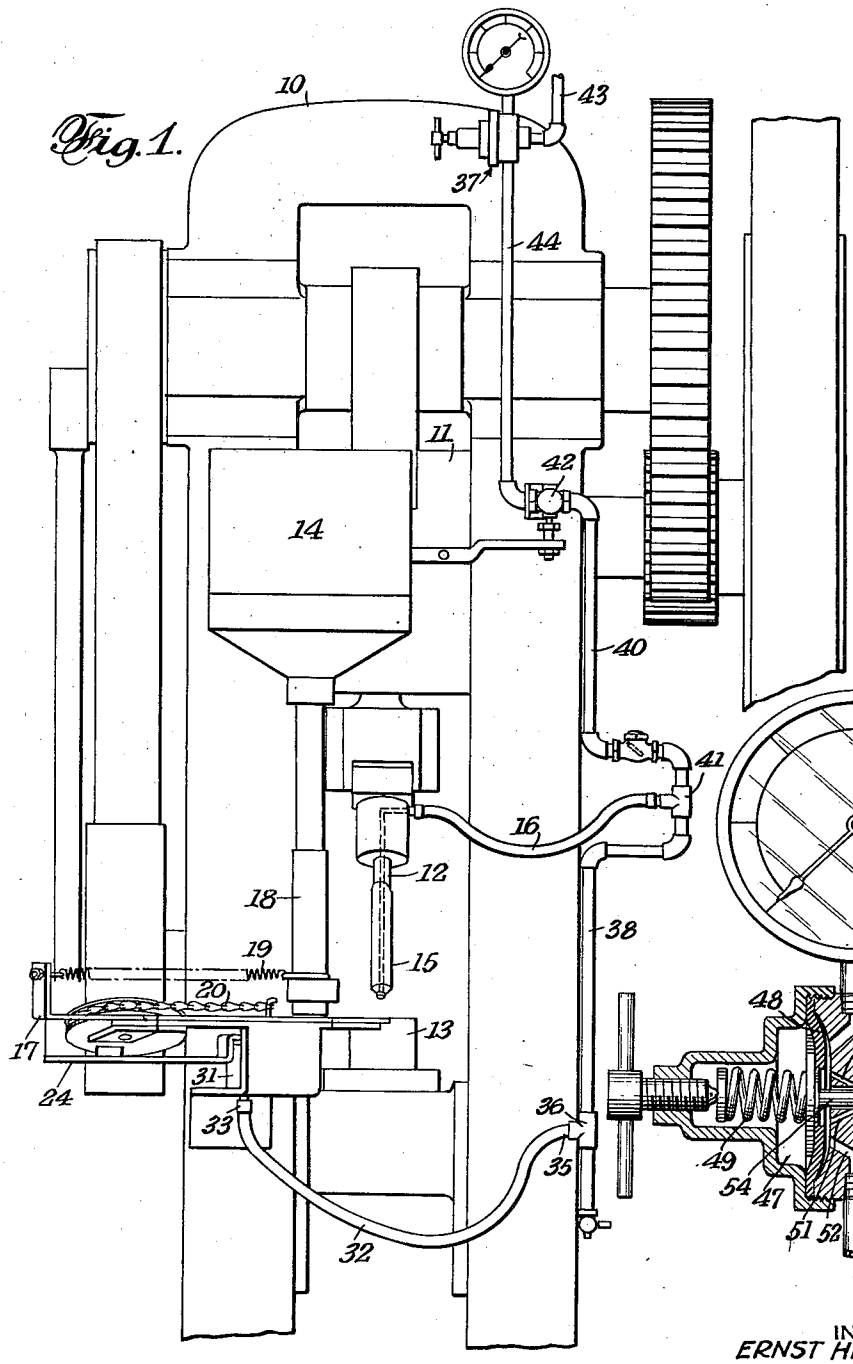
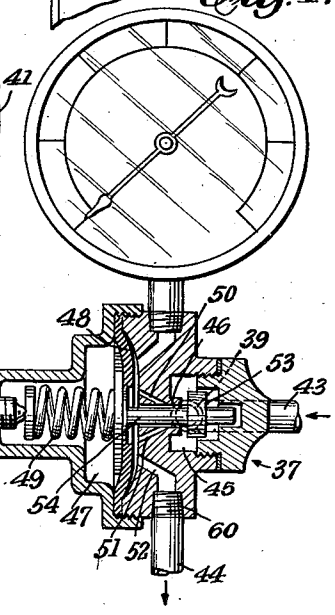


Fig. 4.



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Fig. 2.

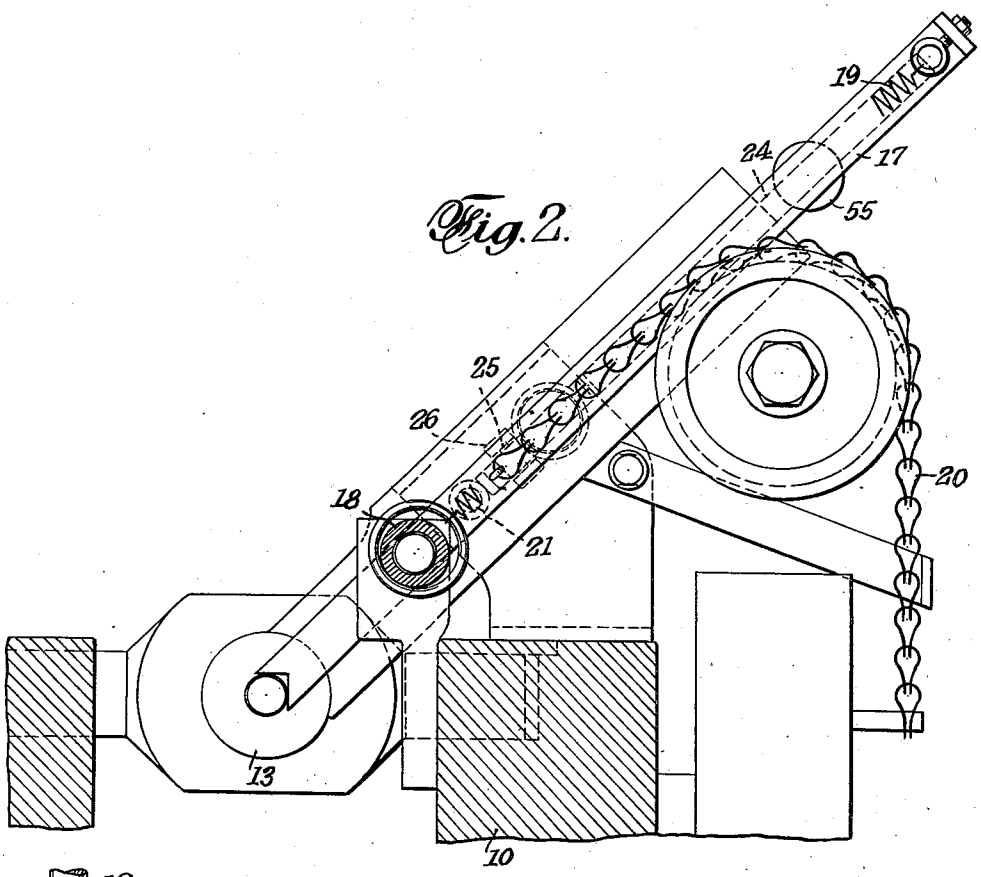
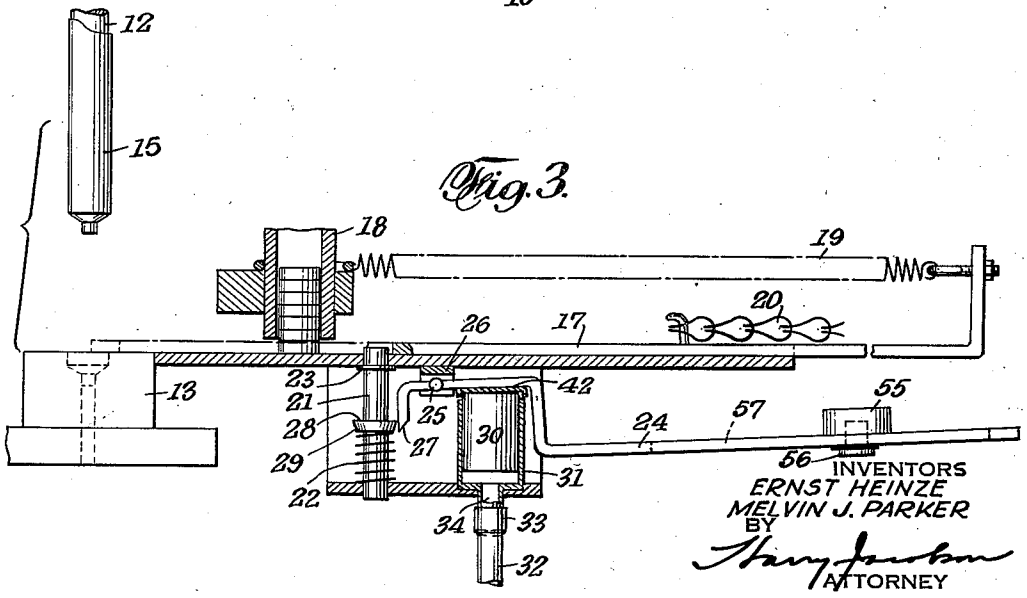


Fig. 3.



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SLUG FEED STOP MECHANISM FOR COLLAPSIBLE TUBE PRESSES

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Application January 2, 1937, Serial No. 118,730

9 Claims. (Cl. 207—9)

This invention relates to machines for extruding collapsible tubes from soft metal slugs, and particularly, to the means for preventing the further feeding of slugs into the machine should the blast of air customarily used for discharging the extruded tube from the machine fail to perform its function.

This invention is an improvement over the structure shown in the prior application of George W. Temple for patent for Collapsible tube extruding press, filed November 30th, 1935, Serial No. 52,294.

In said prior application, a stop is interposed in the path of the slug feeding slide to prevent the further feeding of slugs should the tube remain on the plunger or male die instead of being blown off therefrom. While the structure is adequate for this purpose, it fails to provide for the independent testing of the blow off and other operating means of the machine, but permits the sometimes undesired feeding of slugs whenever the machine is operated, even if only for testing purposes.

This invention therefore contemplates the provision of means for maintaining the slug feeding means inoperative, after having been rendered inoperative by the failure of the machine to discharge an extruded tube, and until again made operative by the deliberate manual setting thereof.

This invention further contemplates the provision of trigger means, releasable automatically when the tube is not blown off the plunger or male die, to stop the feeding of slugs regardless of the operation of the remainder of the machine, said trigger means being manually settable into position to permit slugs to be fed to the extruding point of the machine, when the machine is operated.

Our invention further contemplates the provision of means for normally maintaining the pressure upon the trigger means substantially constant regardless of variations in the air pressure in the main supply line.

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

Fig. 1 is a front elevation of part of an extruding machine to which our invention has been applied.

Fig. 2 is a top plan view and partial horizontal section of the same showing particularly the slug-feeding means and the means for preventing feeding of the slugs when the tube is not blown off the male die.

Fig. 3 is a vertical section of the mechanism shown in Fig. 2, showing the trigger means in detail.

Fig. 4 is a vertical section of the diaphragm valve for controlling the air pressure exerted on the trigger means.

In the practical embodiment of our invention which we have illustrated by way of example, the frame 10 supports the various operating instrumentalities, including the reciprocating cross head 11 which carries the male die 12 and reciprocates said die into and out of the female die 13. Since the means for reciprocating the cross head is well known as is the means for carrying the male die 12 into a discharge position thereof, wherein the tube may be discharged or blown off the male die without interference by other parts of the machine, such mechanism need not be described in detail, reference being made to said prior application for a full description of said means. Suffice it to say that any suitable mechanism may be used to carry the lower end of the male die 12 into the comparatively shallow female die 13, into which a slug has been fed by the slug feeding mechanism from the hopper 14, and thereby to cause the slug to be extruded in the form of an elongated tube 15 on the male die. Said suitable mechanism may also withdraw the male die with the tube thereon and oscillate the male die, into a position for discharge of the tube 15 by a suitable air blast supplied through the pipe 16 and through the male die in the customary manner.

The slugs supplied to the hopper 14 are piled in horizontal position in the slug tube 18 and are removed, one at a time from the bottom of said tube, by a suitable reciprocating feed slide 17. The spring 19 connected at one end to a projection of the feed slide and at its other end to a stationary part of the machine, serves to operate the slide in its slug forwarding movement, while the chain 20 connected at one end to the slide and at its other end to a moving part of the machine, serves to retract the slide and to extend the spring 19. Interposable in the path of movement of the slide is the upright pin 21 suitably supported for vertical reciprocation and urged upwardly by the spring 22 coiled thereabout. A suitable collar 23 near the upper end of the pin, limits the extent of the upward movement of the pin.

Means are provided for normally maintaining the pin 21 in its lowermost position and out of the path of movement of the feed slide 17, whereby normal operation of the machine may proceed

in the customary manner. Said means comprises the trigger lever 24, pivoted as at 25 to the stationary bracket 26, and terminating in the bevelled trigger edge 27. Said edge normally rests upon the upper surface 28 of the preferably conical pin collar 29 which is secured to the pin 21, and thus maintains the pin in its lowermost position against action of the spring 22. On the other side of the pivot 25 from the edge 27, is arranged the piston 30, operating in the cylinder 31 into which compressed fluid is admitted by means of the preferably flexible pipe 32. One end 33 of said pipe is connected to the inlet 34 of the cylinder while the other end 35 of the pipe is connected to the T-connection 36 of the pipe 38. The pipe 38 communicates with the pipe 16 and with the fluid supply pipe 40 by means of the T 41. A uniform pressure control valve 37 is arranged in the main air supply line between the pipes 43 and 44.

To transmit movement of the piston 30 to the trigger lever 24, a suitable plate or disc as 42 may be secured to the under side of said trigger lever in position to be engaged and raised by the upper end of the piston, when said piston is moved by the excess air pressure admitted into the cylinder 31. This occurs when the tube 18 is not blown off the plunger 12 by the air pressure admitted through the pipe 16. In such case, the compressed air which would ordinarily be exhausted through the open end of the plunger 12 is instead transmitted through the pipe 38 and thence through the pipe 32 to the cylinder 31 wherein it acts against the piston 30. The piston thereupon is raised, raising the right-hand part of the trigger lever 24 and removing the trigger edge 27 from the collar 28. The spring 22 is thereby freed to raise the pin 21 into the path of the feed lever 17, thereby preventing feeding movement of the lever until the pin 21 has been manually depressed and the trigger edge 27 again set on top of the collar 28.

In the position of the parts shown in Fig. 3, operative movement of the feed lever having been prevented, the machine may first be stopped to remove any tubes which may not have been blown off the plunger 12 and thereby to free the air passage of said plunger. The machine may then be started and slowly operated to make sure that it operates properly insofar as all of the other mechanisms are concerned, except the feed lever. When it has been ascertained that the machine operates properly, the pin 21 may be re-set manually and held by the trigger lever 27 in its inoperative position wherein slug feeding movement of the feed lever is permitted.

It will be understood that a suitable valve as 42 is operated at the proper time to admit the compressed fluid at a predetermined pressure into the pipes 16 and 38, as at the time when the tube is to be blown off the plunger. It will also be understood that normally there may be fluctuations in the pressure of the air admitted into the pipe 43 of the supply line. In order that such fluctuations may not normally operate the piston 30 and release the trigger, the control valve 37 is provided, said valve serving to maintain the normal pressure on the piston 30 at or below a predetermined minimum insufficient to operate said piston.

Said valve may be of any type designed for this purpose but as shown, (Fig. 4), in said valve is provided an inlet chamber 45 communicating with the pipe 43 through the inlet 39. The axial opening 46 in said valve communicates with the inlet chamber 45 and with the diaphragm chamber 47 in which is arranged the diaphragm 48 held down by the adjustable spring 49. Suitable passages as 50, 51 communicate with the opening 46 and with the diaphragm chamber 47. A discharge passage 52 leads from the diaphragm chamber to the valve outlet 60 leading to the pipe 44. Secured to the diaphragm 48 at one end and to the valve member 53 at its other end, is the rod 54 adapted to reciprocate in the axial opening 46.

It will be seen that compressed air entering the inlet chamber 48 through the inlet opening 39 passes through the passages 50 and 51 and acts against the diaphragm 48 tending to raise said diaphragm against the action of the spring 49. The compressed air acting on the diaphragm, when permitted to do so, passes through the passage 52 into the pipe 44. Should the pressure in the inlet chamber 45 exceed the amount required in the pipe 44, the diaphragm 48 is raised by the excess pressure against the action of the control spring, thereby carrying the valve member 53 closer to the inlet end of the opening 46 and cutting down the volume of air entering said opening. In this way the volume of air passing into the pipes 44, 40, 16, 38, and 32 and into the piston cylinder is controlled and variations in the pressure in the pipe 43 does not cause material variations in the pressure on the piston.

It will be seen that by the provision of a separate or independent stop pin 21 for the feed lever, it becomes possible to cut off the feed of slugs into the dies while operating the remaining parts of the machine for testing and other purposes.

It will also be seen that so long as the pin 21 is in its raised or operative position, operation of the machine inadvertently, does not cause the extrusion of the tubes on the plunger 12, thereby avoiding the possibility of damaging the parts under certain conditions.

When it is desired that the feed-stopping means be rendered inoperative, the pin 21 need merely be pushed downwardly manually against the action of the spring 22 until the upper surface 28 of the conical member 29 passes the bevelled trigger edge 27, whereafter the trigger lever by its re-engagement with the member 29, maintains the pin 21 in its inoperative position aided by the adjustable weight 55 on the trigger lever 24. Said weight is set to the proper position on the trigger lever and there held by the screw 56 operating in the lever slot 57, so that a predetermined amount of air pressure only will raise the piston 30, and when the air pressure is released, mere depression of the pin 21 a sufficient distance will re-engage the trigger lever with the collar 29.

While we have shown and described certain specific embodiments of our invention, we do not wish to be understood as limiting ourselves thereto, but intend to claim our invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

We claim:

1. In a press for extruding collapsible tubes from slugs, means for feeding slugs into extruding position including a reciprocating feed plate, a plunger for successively extruding the slugs into tubes at said position, air blast means for dismounting the extruded tube from the plunger, and means for preventing feeding operation of the slug feeding means on the failure of the air blast means to dismount a tube from the plunger, comprising a spring-pressed pin, a trigger-lever normally maintaining said pin out of the path of the feed plate, and a trigger-lever-releasing member responsive to the air blast means to

release said pin from the trigger lever for movement into the path of the feed plate while the tube is on the plunger, said pin being manually retractible out of the path of the feed plate into its inoperative position and into engagement with the trigger lever.

2. In a slug feeding mechanism for collapsible tube extruding presses, a feed plate, a movable stop pin, a spring urging the pin into the path of the plate, and means for normally maintaining the pin out of said path comprising a pivoted trigger-lever in removable operative engagement with the pin, and an air pressure responsive member arranged to rotate the lever into its pin-releasing position when the air-pressure on the member exceeds a predetermined amount.

3. A slug feed stop for collapsible tube extruding presses comprising a movable stop pin, a spring urging said pin into feed-stopping position, a trigger lever acting normally against the spring to maintain the pin out of feed-stopping position, and air pressure responsive means adapted to move the lever out of its normal position to release the pin including an air-pressure control valve.

4. A slug feed stop for collapsible tube extruding presses comprising a movable stop pin, a spring urging said pin into its operative position, trigger means operatively connectable to and disengageable from the pin for normally maintaining the pin in its inoperative position, and air-pressure responsive means operatively connectable to the trigger means to release the pin when the air-pressure thereon exceeds a predetermined amount.

5. In a slug feed stop for collapsible tube extruding presses, a spring-pressed stop pin, a conical collar on the pin, a trigger engaging said collar, and air pressure responsive means to disengage the trigger from the collar when the air pressure thereon rises above a predetermined amount.

6. In a slug feed stop for collapsible tube extruding presses, a spring-pressed stop pin, a releasable trigger normally maintaining the pin in its inoperative position, means for adjusting the releasing action of the trigger, and air-pressure responsive means for releasing the trigger.

7. In a slug feed stop for collapsible tube extruding presses, a spring-pressed stop pin, a releasable trigger normally maintaining the pin inoperative, and air pressure responsive means movable independently of the pin and operatively connectable to the trigger for releasing the trigger.

8. In a press for extruding collapsible tubes, a plunger, fluid-pressure means for dismounting an extruded tube from the plunger, movable means for feeding slugs to the plunger, and means responsive to fluid pressure and operatively connected to the fluid-pressure means for preventing slug-feeding movement of the feeding means when an extruded tube remains on the plunger, said fluid pressure responsive means including a trigger, a stop member releasable by the trigger, and fluid pressure responsive means for releasing the trigger and means for controlling the fluid pressure on the fluid pressure responsive means.

9. In a press for extruding collapsible tubes, a plunger, fluid-pressure means for dismounting an extruded tube from the plunger, movable means for feeding slugs to the plunger, a spring-pressed pin interposable in the path of said movable means, a trigger normally maintaining said pin inoperative, and fluid pressure responsive means for operating the trigger to release the pin when an extruded tube remains on the plunger.

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