Jan. 31, 1939. W. IRVEN 2,145,834

TUBULAR SHEET METALWARE MANUFACTURE

Filed April 16, 1936 2 Sheets-Sheet 1

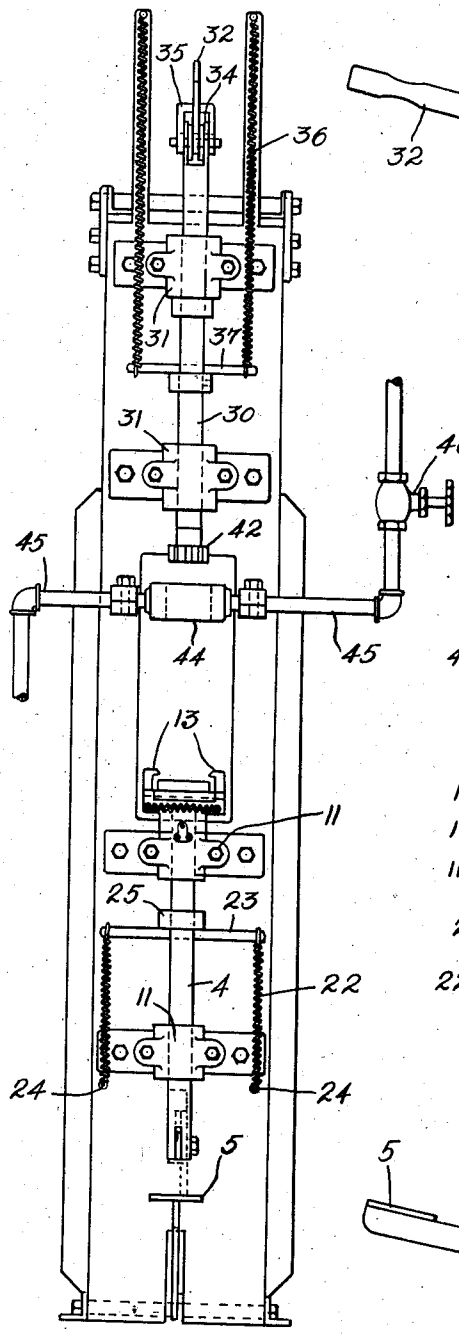

Fig. 1

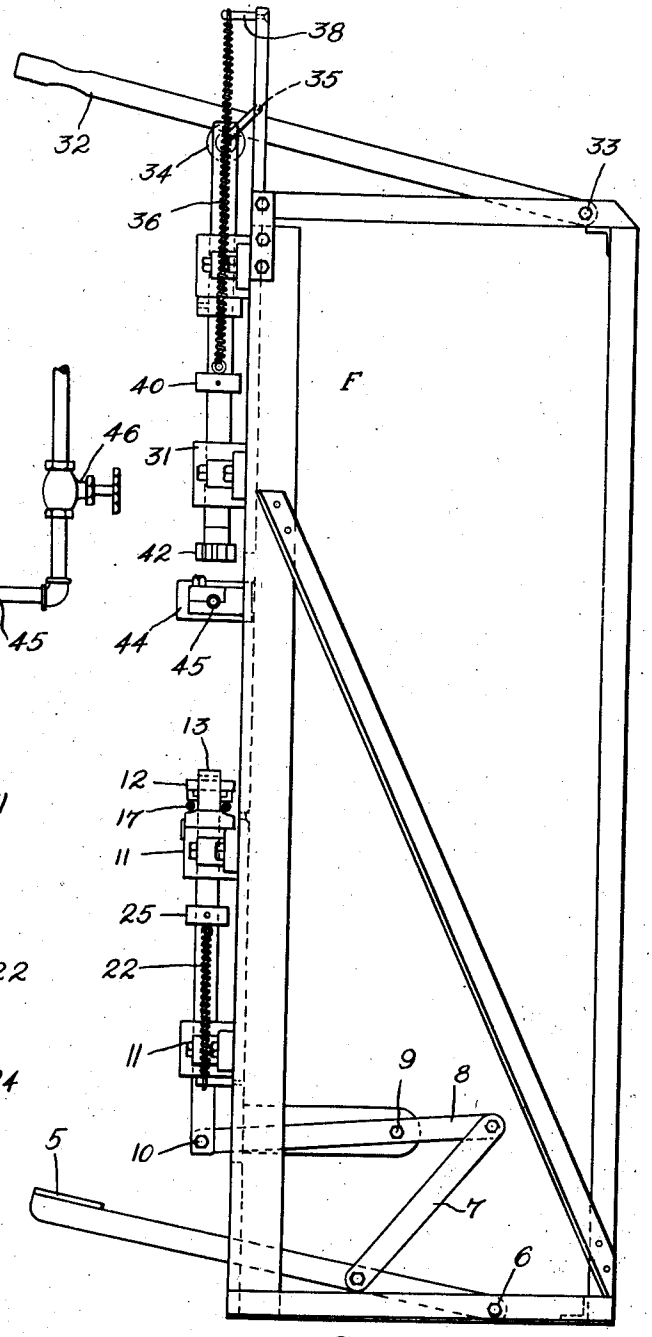

Fig. 2

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TUBULAR SHEET METALWARE MANUFACTURE

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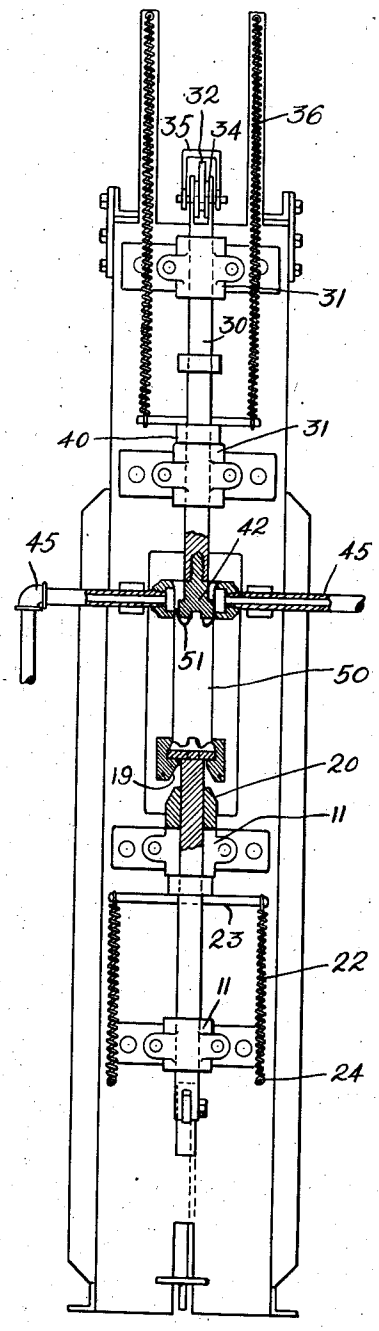

Fig. 3

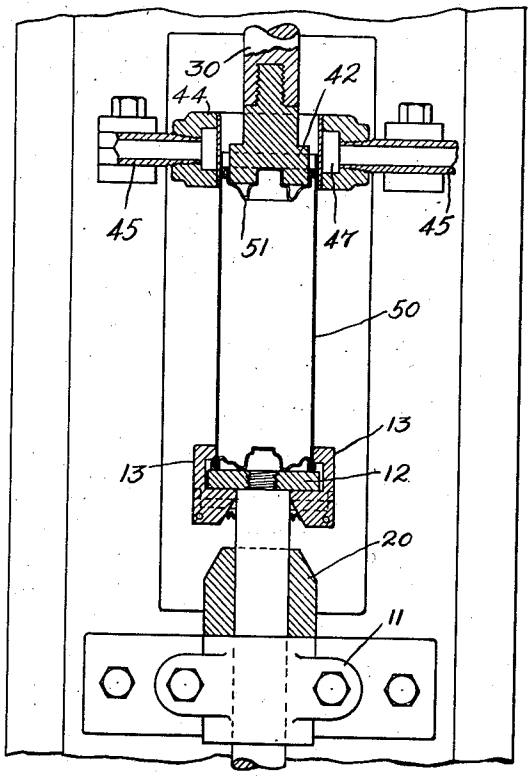

Fig. 4

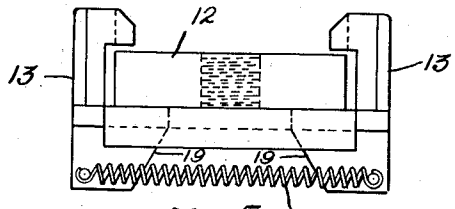

Fig. 5

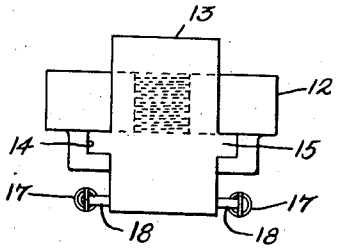

Fig. 6

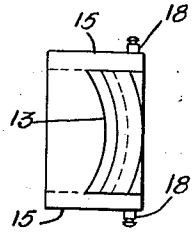

Fig. 7

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UNITED STATES PATENT OFFICE

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TUBULAR SHEET METALWARE MANUFACTURE

William Irven, Lakewood, Ohio, assignor to The Standard Oil Company (Ohio), Cleveland, Ohio, a corporation of Ohio

Application April 16, 1936, Serial No. 74,808

9 Claims. (Cl. 29—84)

This invention relates to sheet metal ware production; and it is among the objects of the invention to accurately and quickly provide tubular sheet metal articles with a close fitting slidable end. Other objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:—

Fig. 1 is a front elevational view of apparatus in accordance with the invention; Fig. 2 is a side elevational view; Fig. 3 is a view similar to Fig. 1, showing a blank in place and the parts in section; Fig. 4 is a similar fragmentary sectional view on enlarged scale; Figs. 5 and 6 are front and side elevational details, on still further enlarged scale; and Fig. 7 is a plan view of one of the clamp jaws thereof.

In its general aspects, the invention contemplates a frame support and opposed plungers with means for operating, and a heating collar. The frame F may be of any desired character, conveniently for instance angle iron frame element and face plates of more or less complete extent at the front thereof. Mounted on the frame is a plunger **4** having suitable operating means, mechanical or manual, and for instance conveniently comprising a foot pedal **5** pivoted at **6** to the frame and connected by a link **7** to a lever **8** which is fulcrumed at **9**, and connects at **10** to the lower end of the plunger **4**. Suitable bearings **11** on the frame support the plunger for reciprocative movement. On the upper end of the plunger is a head having a work support **12**, and laterally-opening clamping-jaws **13**, these being mounted conveniently for instance in slideways **14** in the head (see Figs. 5 and 6), the slideways receiving the projecting guide-fins **15** of the clamping-members such as to allow reciprocative movement thereof into clamping and unclamping position to engage the work-piece. Spring-means **17** connecting, preferably on each side, between lugs **18** on the clamping-members, serves to draw the clamping-members toward each other into relation with the work-support **12** which is fixed, as by screw-threaded engagement, to the upper end of the plunger **4**. The lower portions of the clamping-members **13** are tapered or beveled internally at **19**, to coact with a wedge cam **20** which is stationarily carried on the frame. With this, the clamping-elements **13** are spread apart into open position when the work support plunger **4** is in its lower position. Return to such lower or normal position may be assured by suitable means, gravity or spring means **22** connecting between arms **23** on the plunger and stationary points of fixation **24** on the face of the support frame. An adjustable collar **25** on the plunger is advantageous for exact regulation of the height to which the plunger and work support is thrust in operation.

In opposing relation to the lower plunger is another plunger **30** slidably mounted in suitable bearings **31** on the frame. The plunger **30** is reciprocatively moved by suitable operating means, mechanical or manual, conveniently for instance a hand lever **32** which is pivoted to the machine frame at **33** and which bears upon the top of the plunger **30** through the intermediary of a roller **34**, which is preferably grooved to receive the edge of the operating hand-lever **32**. Desirably, a stirrup or clevis **35** carried by the upper end of the plunger loops around the hand-lever **32**, preventing disengagement from relation with the plunger roller. Suitable return means, such as for instance spring means **36** serves to bring the plunger normally into elevated position. Such spring means may be attached to arms **37** on the plunger and to pins **38** carried by the frame. An adjustable collar **40** on the plunger serves to regulate the extent of its movement in working direction. Carried on the lower end of the plunger **30** is a head **42**, preferably by screw-threaded engagement with the plunger stem. Desirably, the plunger head **42** is castellated or provided with air ports, such as by being axially peripherally grooved, as shown particularly in Figs. 1 and 2, to prevent vacuum action in a draw-back stroke, and thereby insure separation of the plunger head from the sheet metal element which it has been operating upon. In the path of the plunger head **42** is a heating collar **44**, this being provided with suitable heating means of any convenient character, for instance steam-supply pipes **45** valve controlled at **46**, and an annular heat passageway **47** is thus presented effectively on the interior of the heating collar.

In operation, a cylindrical sheet metal article **50** is placed on the work support **12**, the latter being in its lower position, the jaws being open; and the plunger **4** carrying the same is raised by the operator pressing the pedal **5**, and as the jaws **13** leave the cam wedge **20** which up to this time

has held them apart, the clamping jaws seize onto the cylindrical article 50 and grip it tightly on the work head, the jaws 13 being undercut or stepped to accurately engage over the flange of the article. At the same time, the operator supplies a sheet metal piston blank 51 on the top of the heating collar 44; and the lower plunger having raised the upper end of the sheet metal article 50 into the heating collar, the operator pulls the hand lever 32 and thrusts the upper plunger downwardly, thereby forcing the sheet metal piston element 51 down into position in the tubular wall 50 in final position. Release of the handle 32 allows withdrawal of the plunger head 42; and release of the pedal 5 allows withdrawal of the work support head 12, the clamping jaws 13 gripping the cam flange strip the cam from the plunger 42 and heating collar 44, and as the clamping jaws 13 again lower into position over the cam wedge 20, the jaws are opened, and the operator removes the completed article 50, and places a new blank in position. Such sheet metal articles as for instance sheet metal containers on the order of grease cartridges are thus particularly advantageously prepared. Application of heat as indicated, to the upper portion of the cylindrical blank or can-like body permits of fitting the inserted piston element very closely, thereby particularly making possible a close and durable construction for use of the device in extruding lubricant contents, without back-leakage.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, a stationary wedge cam in the path of said jaws for opening them, spring means for closing said jaws, a foot pedal and link and lever for operating said plunger, spring means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, steam connections for heating said collar, a hand lever for operating said latter head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, a clevis in association with the roller to retain said lever in such groove, and spring means for returning said plunger and hand lever.

2. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, a stationary wedge cam in the path of said jaws for opening them, spring means for closing said jaws, a foot pedal and link and lever for operating said plunger, spring means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, a clevis in association with the roller to retain said lever in such groove, and spring means for returning said plunger and hand lever.

3. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, a stationary wedge cam in the path of said jaws for opening them, spring means for closing said jaws, a foot pedal and link and lever for operating said plunger, spring means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, and spring means for returning said plunger and hand lever.

4. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, a stationary wedge cam in the path of said jaws for opening them, spring means for closing said jaws, a foot pedal for operating said plunger, spring means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, and spring means for returning said plunger and hand lever.

5. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, a stationary wedge cam in the path of said jaws for opening them, spring means for closing said jaws, a foot pedal for operating said plunger, means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, and spring means for returning said plunger and hand lever.

6. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, means for opening said jaws, means for closing said jaws, a foot pedal for operating said plunger, means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank and having air-escape ports, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter

head, a roller on the end of said head-carrying plunger having a groove to receive the edge of said hand lever, and spring means for returning said plunger and hand lever.

7. In mechanism of the character described, a support-frame, opposed plunger carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally separable clamping jaws on said head, means for opening said jaws, means for closing said jaws, a foot pedal for operating said plunger, means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, a hand lever for operating said latter head, and means for returning said plunger and hand lever.

8. In mechanism of the character described, a support-frame, opposed plungers carried thereby, one having a head for forwarding a cylindrical sheet metal blank, laterally-separable clamping jaws on said head, means for opening said jaws, means for closing said jaws, a foot pedal for operating said plunger, means for returning the same, a plunger head on said other plunger for forcing a sheet metal piston element into said cylindrical sheet metal blank, a stationary heating collar in the path of said latter head and permitting its passage therein, means for heating said collar, and means for reciprocatively moving said latter head.

9. In mechanism of the character described, a support-frame, opposed plunger heads carried thereby, one for forwarding a cylindrical sheet metal blank and having laterally separable clamping jaws, means for opening said jaws, means for closing said jaws, the other said plunger head being adapted to assemble a piston element in said cylindrical sheet metal blank, a heating collar in the path of one of said plunger heads and permitting its passage therein, and means for reciprocatively moving said latter plunger head.

WILLIAM IRVEN.