May 5, 1959 R. D. BERG 2,884,748

METHOD OF AND APPARATUS FOR ASSEMBLING AND FILLING PLATENS

Filed Sept. 29, 1954 2 Sheets-Sheet 1

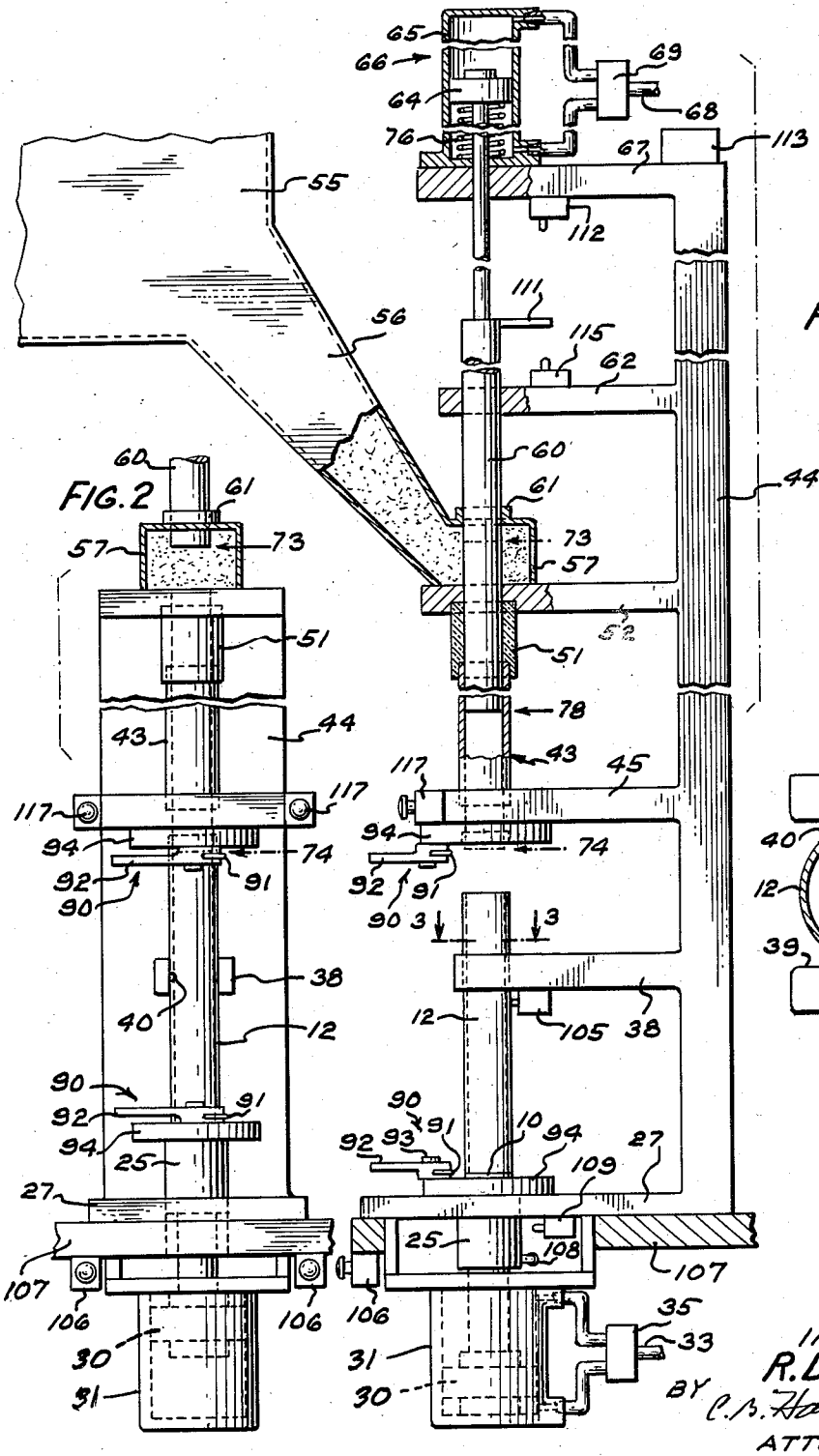

FIG. 1

FIG. 2

FIG. 3

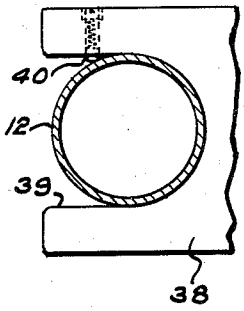

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FIG. 4

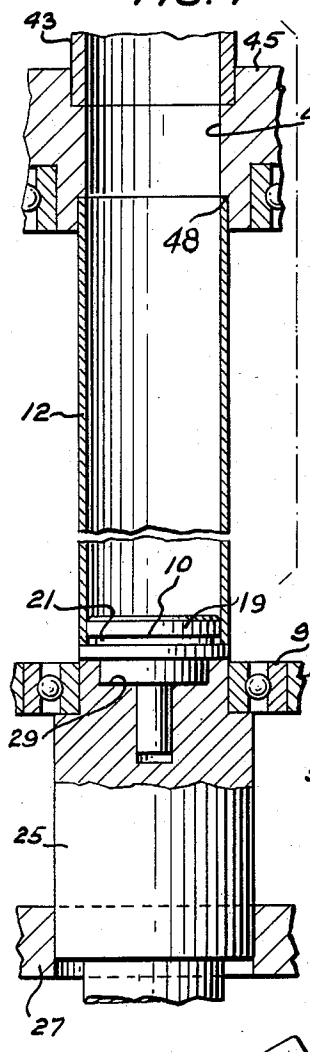


FIG. 5

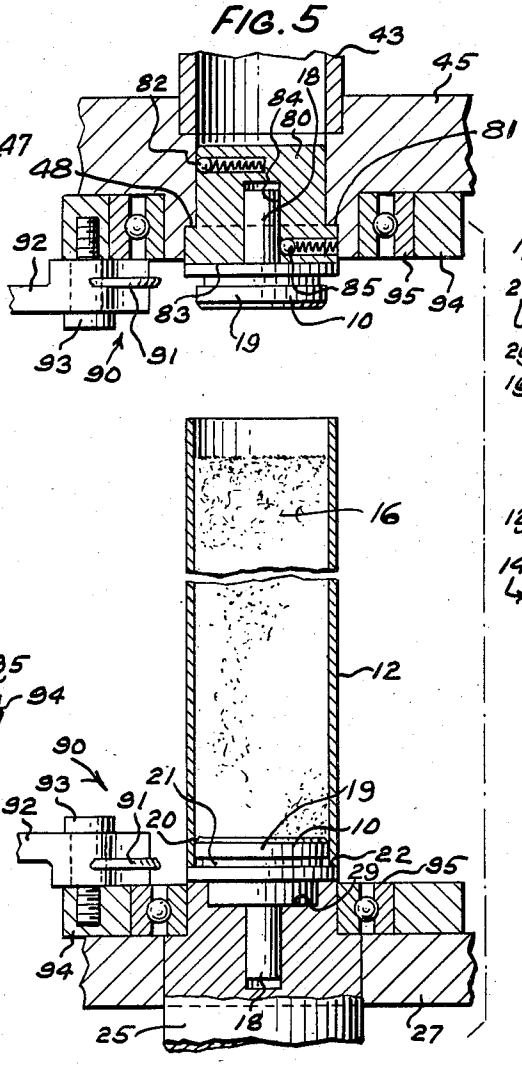


FIG. 7

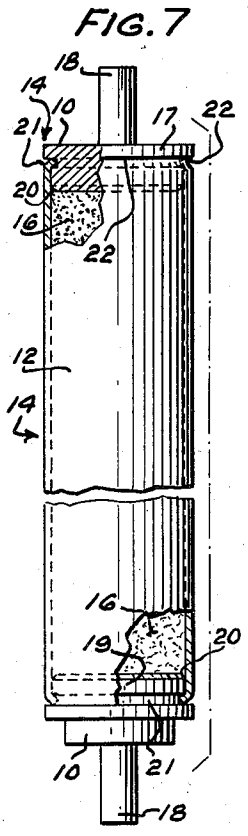
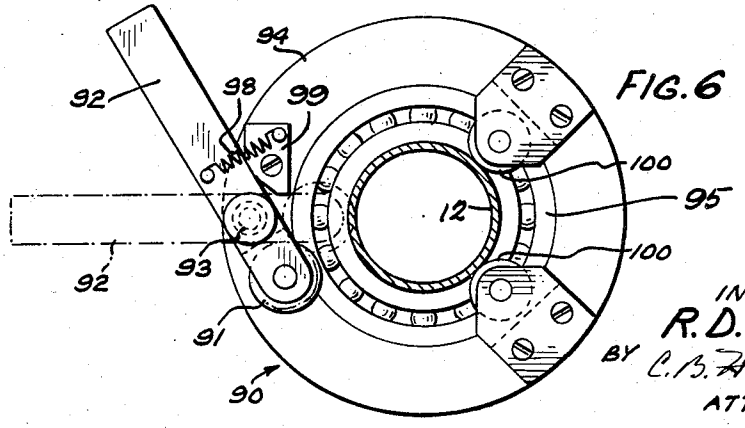


FIG. 6



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METHOD OF AND APPARATUS FOR ASSEMBLING AND FILLING PLATENS

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Application September 29, 1954, Serial No. 461,520

10 Claims. (Cl. 53—24)

This invention relates to a method of and apparatus for assembling and filling platens and more particularly for assembling the components of a platen and filling the platen with granulated cork.

Objects of the invention are to provide an efficient and effective method of and apparatus for assembling and filling platens.

A method and apparatus illustrating certain features of the invention for assembling a composite platen and filling it with granulated cork may include a plunger mounted for vertical movement and having a seat on the upper end thereof for receiving a platen end closure member or hub and a guide mounted above the plunger is adapted to releasably support the platen tube in vertical alignment with the plunger and with the lower end of the tube resting on the hub. The plunger is raised a predetermined distance to elevate the platen tube and engage the upper end thereof in a seat formed on the lower end of a stationary filling and metering tube and cause a portion of the hub to be pressed into the lower end of the platen tube. The filling tube depends from a hopper containing a supply of granulated cork and a ram movable in the filling tube has actuating means for raising the ram from a normal position within the filling tube to an upper position with the lower end of the ram spaced above the upper end of the filling tube to permit the granulated cork to flow into the platen tube and the filling tube and form a column of cork of a predetermined volume, after which the ram is moved downwardly to compress the cork into the platen tube. The plunger is then lowered and a spacer plug is inserted in the lower end of the filling tube and the other platen hub is inserted in a seat of the spacer plug after which the plunger is again raised to press the upper end of the platen tube over a portion of the upper hub, after which crimping tools mounted for revolving movement on the upper end of the plunger and the lower end of the filler tube are moved into engagement with the platen tube revolved through one revolution to crimp the ends of the platen shell into retaining grooves formed in the hubs to secure them to the platen tube.

Other objects and advantages of the invention will become apparent by reference to the following detailed description and the accompanying drawings illustrating a preferred embodiment thereof, in which

Fig. 1 is a side elevational view of the apparatus;

Fig. 2 is a fragmentary elevational view of the apparatus with parts thereof shown in different positions;

Fig. 3 is a fragmentary plan sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary vertical sectional view of the portion of the apparatus showing a hub and tube components of the platen in position therein;

Fig. 5 is a fragmentary vertical sectional view similar to Fig. 4 showing the hub and tube components of the platen in assembled relation therein;

Fig. 6 is a plan view of a portion of the apparatus indicated by the line 6—6 of Fig. 1 and showing the crimping mechanism for securing the platen tube and hub components together; and

Fig. 7 is an elevational sectional view of the assembled platen.

The present method and apparatus was designed for efficiently assembling a pair of closure members or hubs 10 to the ends of a tube 12 to form a platen 14 and to fill the interior of the platen with compressed granulated cork 16. Each of the hubs 10 comprises a cylindrical body member 17 having a centrally disposed stub shaft or trunnion extending from one end thereof and having a reduced cylindrical portion 19 adapted to be pressed into the end of the tube 12 and having a chamfered edge 20 and an annular groove 21 adjacent a ledge or shoulder 22 of the hub and into which the end of the tube is adapted to be crimped. The tube 12 has an internal diameter slightly less than the diameter of the cylindrical portion 19 of the hubs so that pressure is required to force the end of the tube over the portion 19 of the hub, and after the hubs have been pressed into the ends of the tube the ends of the tube are crimped into the annular grooves 21 to secure the hubs and the tube in assembled relation to each other.

The apparatus comprises a vertically disposed plunger 25 guided for vertical movement in an aperture in a horizontal frame plate 27 and having a recess therein forming a seat 29 for supporting a hub 10 with the cylindrical projection 19 extending upwardly. The plunger 25 is connected to a piston 30 reciprocable within a cylinder 31 which is mounted on the underside of the frame plate 27 and is connected by suitable pipe lines 33 to a supply of compressed air and is actuated thereby under control of a solenoid valve 35 for reciprocating the plunger 25 to and from a lower position shown in Fig. 1 and a raised position shown in Fig. 2.

The platen tube 12 is adapted to be positioned vertically on a hub 10 supported on the plunger 25 with the lower end of the tube in engagement with the chamfer 20 of the hub, and a stationary guide member 38 having a guide recess 39 therein and a spring pressed detent 40 for yieldably retaining the tube 12 in the guide recess serves to guide the tube 20 along a vertical axis in coaxial alignment with a filling and metering tube 43. The guide member 38 is fixed to a vertical frame member 44 which is integral with and extends upwardly from the horizontal frame plate 27 and has an integral horizontal frame plate 45 extending outwardly therefrom for supporting the filling tube at a predetermined position above the plunger 25. The lower end of the filling tube 43 fits in the upper counterbored portion of a bore 47 in the frame plate 45 which forms a portion of the filling tube and has a lower counterbore which forms a seat 48 for receiving the upper end of the tube 12 in coaxial alignment with the filling tube 43 and arresting its upward movement. The internal diameters of the filling tube 43 is the same as that of the platen tube 12. With a hub 10 supported in the seat 29 of the plunger 25 and with a platen tube 12 supported on the chamfered edge of the reduced portion 19 of the hub 10, the piston 30 is operated to raise the plunger 25 to its upper position which raises the hub and the tube until the upper end of the tube engages the seat 48 in the frame plate 45 and is arrested thereby as the plunger continues its movement to force the reduced end portion 19 of the hub into the lower end of the tube 12 and holds the tube and lower hub assembly in its elevated position.

The upper portion 51 of the filling tube 43 may be formed of transparent material which permits viewing the interior thereof and which is secured to a horizontal frame plate 52 formed integral with the vertical frame member 44. The feeding tube 43 forms a metering chamber, the upper end of which communicates with a

supply of the granulated cork 16 in a container which comprises a hopper 55 and a chute 56 with a laterally extending portion 57 disposed on the upper side of the frame plate 52. Suitable means (not shown) are provided for agitating the granulated cork within the hopper and the chute to maintain it in free flowing condition. The length of the filling tube 43 is substantially equal to the length of the platen tube 12 and together they receive and measure a predetermined amount of granulated cork which is to be compressed within the tube 12.

The granulated cork in the chamber flows into the filling tube 43 and into the platen tube 12 under control of a ram 60 which is slidable in the filling tube 43 and serves as a control valve for the flow of the granulated cork into the filling tube and also as a compressing element for compressing the granulated cork into the platen tube 12. The ram 60 is guided for vertical movement in the guide bushing 61 on a portion of the chute 57 and in an aperture in a horizontal frame plate 62 integral with the vertical frame member 44. At its upper end the ram 60 is connected to a piston 64 reciprocable within a cylinder 65 of a fluid actuator 66 which is mounted on a horizontal frame plate 67 and is connected to pipe lines 68 for supplying compressed air for actuating the piston under control of a solenoid valve 69. The fluid actuator 66 serves to raise the ram 60 to its upper position indicated by the arrow 73 (Fig. 2) with the lower end of the ram raised above the upper end of the feed tube 43 and the plate 52 to permit free flow of the granulated cork into the tube 43, and to force the ram 60 to its lower position with the lower end thereof extending into the upper end of the platen tube 12 as indicated by the arrow 74 for compressing the granulated cork into the platen tube 12. The solenoid control valve 69 is then operated to release the air pressure from both ends of the cylinder 65 and a spring 76 disposed between the piston 64 and the lower end of the cylinder 65 serves to return the ram 60 from its lower position to an intermediate position with the end of the ram disposed intermediate the ends of the filling tube 43 as indicated by the arrows 78 in which position the ram 60 serves as a valve to stop the flow of granulated cork into the feed tube 43.

After the cork has been compressed in platen tube 12 the plunger 25 is lowered to separate the upper end of the platen tube from the seat 48 and a spacer plug 80 (Fig. 5) is inserted in the lower end of the tube. The spacer plug 80 has an annular shoulder 81 engageable with the seat 48 in the bushing 47 for positioning the plug vertically where it is frictionally held by a spring pressed detent 82 mounted in the plug 80 and with the lower end face 83 of the plug positioned a predetermined distance below the seat 48. A central cylindrical recess 84 in the spacer plug 80 is adapted to receive the stub shaft 18 of a hub 10 which is frictionally retained therein in coaxial alignment with the filler tube and the platen tube 12 by a spring pressed detent 85 carried by the plug. With the spacer plug 80 in the lower end of the filling tube 43 and with a hub 10 supported in the spacer plug, the ram may be actuated to raise the partial assembly of the lower hub 10 and platen tube 12 with the compressed granulated cork therein to cause the upper end of the platen tube 12 to be pressed onto the reduced cylindrical portion 19 of the upper hub 10 as shown in Fig. 5 and with the end of the platen tube in engagement with the shoulder 22.

A pair of crimping tools 90 are mounted on the frame plate 45 at the lower end of the filling tube 43 and on the upper end of the plunger 25 for crimping the ends of the platen tube 12 into the annular grooves 21 of the hubs 10 to secure the hubs 10 to the ends of the platen tube. The crimping tools each comprise a crimping roller 91 rotatably supported at one end of a lever 92 which is pivotally mounted at 93 to a supporting ring 94 which is pressed over the outer raceway of a ball bearing 95. The inner race of one ball bearing is pressed onto the reduced end of the plunger 25 and the other ball bearing is pressed onto an annular portion of the frame plate 45 at the lower end of the filling tube 43. The lever 92 of each crimping tool is held by a spring in a normally inoperative position as shown in Fig. 6 with the crimping roller 91 in spaced relation to the tube 12 and the lever may be moved to an operative position against a stop 99 causing the crimping roller 91 to engage the end of the tube 12 and crimp a portion thereof. With a lever 92 in its operative position, pressure may be applied thereto to revolve the tool 90 about the tube 12 and cause the complete crimping of the end thereof into the groove 21 of the hub 10. A pair of backup rolls 100 are mounted on each of the supporting rings 94 for engaging the ends of the tube 12 and opposing the crimping pressure applied to the tube and the hub during the crimping operation.

An electrical control system is provided for effecting some of the operations of the apparatus automatically in a predetermined sequence and includes a normally open safety switch 105 mounted on the guide member 38, which switch is closed by a platen tube 12 being placed in position in the apparatus as indicated in Fig. 1. A pair of starting switches 106 supported under the forward edge of the table top 107 on which the apparatus is supported, is adapted to be engaged by both hands of the operator and actuated to close a circuit to the solenoid valve 35 to cause its actuation to effect movement of the plunger 25 from its lower position to its upper position to raise the platen tube 12 into engagement with the stationary seat 48 and to press a portion of the hub 10 into the lower end of the platen tube. An arm 108 carried by the plunger 25 actuates a switch 109 mounted on the underside of the frame plate 27 for closing a circuit to actuate the solenoid valve 69 in one direction to admit compressed air to the lower end of the cylinder 65 and effect the movement of the ram 60 to its upper position (Fig. 2), thereby permitting the granulated cork 16 in the hopper and chute to flow into the metering conduit 43 and the platen tube 12.

An arm 111 movable with the ram 60 actuates a switch 112 at the upper limit of movement of the ram 60, which switch 112 actuates a timer 113 for maintaining the ram in its upper position for a predetermined interval of time to insure the complete filling of the metering conduit 43 with granulated cork, and after the lapse of said time interval to actuate the solenoid valve 69 to a different position to admit to the upper end of the cylinder 65 and cause the ram 60 to move downwardly to its lower position to press the granulated cork in the metering conduit 43 into the platen tube 12 and compact it therein. As the ram 60 reaches its lower position, the arm 111 thereon actuates a switch 115 to close a circuit and effect the actuation of the solenoid valve 69 to another position for exhausting the compressed air from the upper and lower ends of the cylinder 65, whereupon the spring 76 raises the piston 64 and the ram 60 to their normal intermediate position as shown in Fig. 1.

In response to the actuation of the switch 115 the solenoid 35 is actuated to another position to cause the lowering of the ram 25 with the assembled platen tube 12 and hub 10 thereon from its upper position to its lower position. The spacer plug 80 is then inserted in the seat 48 and the upper hub 10 is seated in the recess 84 therein above the upper end of the platen tube 12, after which the starting switches 106 are manually closed to cause the plunger 25 to move from its lower position towards its upper position to move the platen tube 12 upwardly and press the upper end thereof over a portion 19 of the hub 10. During this operation the plunger 25 does not move upwardly to its upper position so that the arm 108 thereof does not engage the switch 109 and does

not effect the actuation of the ram **60**. With the platen tube **12** pressed onto the upper hub **10** and supported in this position the crimping tools are revolved through one turn to crimp the ends of the platen tube **12** in tight engagement with the hubs **10**, after which a pair of normally open switches **117** mounted on the frame plate **45** are manually closed to effect the actuation of the solenoid valve **35** and the return of the plunger **25** to its normal lower position with the completely assembled platen **14** thereon.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A method of assembling a pair of platen hubs to the ends of a platen tube to form a platen assembly and filling the platen with compressed granulated material which comprises placing a platen hub below and in coaxial alignment with a cylindrical metering chamber, placing one end of a platen tube on the hub and guiding it for movement toward the metering chamber, moving the hub and tube upwardly, arresting the upward movement of the tube when the upper end thereof communicates with the lower end of the metering chamber while continuing the upward movement of the hub to press a portion thereof into the lower end of the tube, filling the chamber and the platen tube with granulated material, pushing the material in the metering chamber into the platen to compress it therein, lowering the assembled platen hub and tube with the compressed material therein, stationarily supporting another hub above and in coaxial alignment with the platen tube, raising the assembled platen hub and tube to force the upper end of the tube over a portion of the other hub.

2. A method of assembling a pair of platen hubs to the ends of a platen tube to form a platen assembly and filling the platen with compressed granulated material which comprises placing a platen hub below and in coaxial alignment with a cylindrical metering chamber communicable at its upper end with a supply of said granulated material, placing one end of a platen tube on the hub and guiding it for movement toward the metering chamber, moving the hub and tube upwardly, arresting the upward movement of the tube when the upper end thereof communicates with the lower end of the metering chamber while continuing the upward movement of the hub to press a portion thereof into the lower end of the tube, establishing communication between the metering chamber and the supply of material to fill the chamber and the platen tube with granulated material, pushing the material in the metering chamber into the platen to compress it therein, lowering the assembled platen hub and tube with the compressed material therein, stationarily supporting another hub above and in coaxial alignment with the platen tube, and raising the assembled platen hub and tube to force the upper end of the tube over a portion of the other hub, and crimping the ends of the platen tube into tight engagement with the hubs.

3. In an apparatus for assembling and filling platens with granulated material, the combination of means for holding a supply of compressible granular material and having a cylindrical metering conduit depending therefrom for receiving the granular material by gravity, a seat on the lower end of said conduit for receiving and aligning the upper end of a platen tube having an inner diameter equal to that of said conduit, means for supporting said platen tube below said conduit and with the upper end thereof in engagement with said seat, a ram movable in said conduit for compressing the granular material therein into said platen tube, a pneumatic actuator for moving said ram to an upper position with the end thereof above said conduit to effect the flow of granulated material into the conduit and said platen tube and to a lower position with the end of the ram disposed below said conduit and partly into said tube for compressing the material into said platen tube, means including selectively operable valve means for directing compressed air to opposite ends of said pneumatic actuator to effect the actuating of said plunger from one position to another and for disconnecting the compressed air from said actuator, and spring means operable in response to the disconnection of the compressed air from said actuator for returning said ram from said lower position to a normal intermediate position with the end of the ram disposed in said conduit for preventing the flow of granulated material thereinto.

4. In an apparatus for assembling and filling composite platens, the combination of a filling tube for guiding granular material into a platen tube, a plunger mounted below and in axial alignment with said filling tube and having a seat for supporting a platen hub thereon, guide means for guiding a platen tube resting on a hub on said plunger for movement into engagement with the lower end of said filling tube, means removably secured to the lower end of said filling tube for supporting a hub therein above the upper end of said platen tube, means for raising and lowering said plunger to impart movement to a hub and the platen tube to effect the pressing of the hubs into the ends of said platen tube, a pair of crimping tools, means for revolvably mounting said crimping tools on the lower end of said filling tube and the upper end of said plunger, and means for actuating said tools to crimp the ends of the platen tube to said hubs.

5. In an apparatus for assembling and filling composite platens, the combination of a filling tube for guiding granular material into a platen tube, a plunger mounted below and in axial alignment with said filling tube and having a seat for supporting a platen hub thereon, guide means for guiding a platen tube resting on a hub on said plunger for movement into engagement with the lower end of said filling tube, means removably secured to the lower end of said filling tube for supporting a hub therein above the upper end of said platen tube, means for raising and lowering said plunger to impart movement to a hub and the platen tube to effect the pressing of the hubs into the ends of said platen tube, and crimping tools mounted on the lower end of said filling tube and the upper end of said plunger operable to crimp the ends of the platen tube to said hubs.

6. In an apparatus for assembling and filling composite platens, the combination of a container for holding a supply of granulated material and having a hollow metering member at the lower portion thereof; a plunger mounted below and in a coaxial alignment with said metering member and having a seat on the upper end thereof for supporting a platen hub; guide means for supporting a platen tube on said hub for vertical movement into engagement with said metering member; means for actuating said plunger to move the hub and the tube to an upper position to engage the upper end of the tube with said metering member and for pressing a portion of the hub into the lower end of said platen tube and holding the hub and tube in said upper position, a ram mounted for reciprocable movement in said hollow metering member; means for actuating said ram to a normal first position with the lower end thereof intermediate the ends of said metering member, an upper position with the end of the ram spaced above the end of the metering members, and a lower position with the lower end of the ram disposed below the lower end of said metering member; and control means operable in response to the movement of said plunger to said upper position for effecting the movement of said ram from said normal position to the upper position and for holding it in said upper position for a predetermined length of time to allow the granulated material to flow into the metering member and the

platen tube and for effecting the movement of the ram downwardly to said lower position to push the granulated material from the metering member into the platen tube and compressing it therein.

7. In an apparatus for assembling and filling composite platens, the combination of means for holding a supply of granulated material and having an open ended metering tube at the lower portion thereof; a plunger mounted below and in a coaxial alignment with said metering tube and having a seat on the upper end thereof for supporting a platen hub; guide means for supporting a platen tube on said hub for vertical movement into engagement with said metering tube, means for actuating said plunger to move the platen hub and the platen tube to engage the upper end of the latter with the said metering tube and for pressing a portion of the hub into the lower end of said platen tube and holding the hub and platen tube in said position, a ram mounted for reciprocable movement in said metering tube; and means for actuating said ram in a predetermined sequence to a normal position with the lower end thereof intermediate the ends of said metering chamber, an upper position with the end of the ram spaced above the end of the metering tube to allow the material to flow therein and into the platen tube, and a lower position with the lower end of the ram disposed below the lower end of said metering chamber to push the material from said chamber into the platen tube and compress it therein.

8. A method of assembling a pair of platen hubs to the ends of a platen tube to form a platen and filling the platen with compressed granular material which comprises placing a platen hub below and in coaxial alignment with a vertically disposed metering chamber, placing a platen tube vertically with one end thereof on the hub and moving the hub and tube upwardly, arresting the upward movement of the tube when the upper end thereof communicates with the lower end of the chamber while continuing the upward movement of the hub to press it into assembled relation with the lower end of the tube, filling the chamber and the platen tube with granular material, pushing the granular material from the chamber into the platen tube to compress it therein, lowering the assembled platen tube and hub with the compressed material therein, supporting another hub above and in coaxial alignment with the platen tube, raising the assembled platen hub and tube to force the upper end of the tube into assembled relation to the other hub, and crimping the ends of the platen tube into interlocking engagement with the hubs.

9. In an apparatus for filling tubular containers with compressed granular material, the combination of means for holding a supply of compressible granular material, a filling tube on said means having an upper end communicating with said granular material and having a lower end provided with a seat for receiving the open end of a container, means for supporting a container with the open end thereof against the seat of said filling tube, said filling tube having a cross section conforming to that of the tubular container and cooperating with said container to form a straight metering chamber uniform cross section for holding a predetermined quantity of compressible granular material, a plunger slidable in said filling tube, and means for moving said plunger from an upper position to a lower position partly in said container to push the compressible granular material from the filling tube and compress it in said container and for moving said plunger to an intermediate position for closing the upper end of the filling tube, said plunger in its upper position being spaced above the filling tube to permit the compressible granular material to flow thereinto.

10. In an apparatus for filling tubular containers with compressed granular material, the combination of a metering tube having a lower end provided with a seat for receiving the open end of a container, means for supporting said metering tube in an upright position, means for supporting a container with the open end thereof against the seat of said metering tube, said metering tube having a cross section conforming to that of the tubular container and cooperating with said container to form a metering chamber of uniform cross section for receiving a predetermined quantity of granular material, and means mounted on said supporting means and including a ram slidable in said metering tube for pushing the compressible granular material from said metering tube into said container to compress it therein.

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