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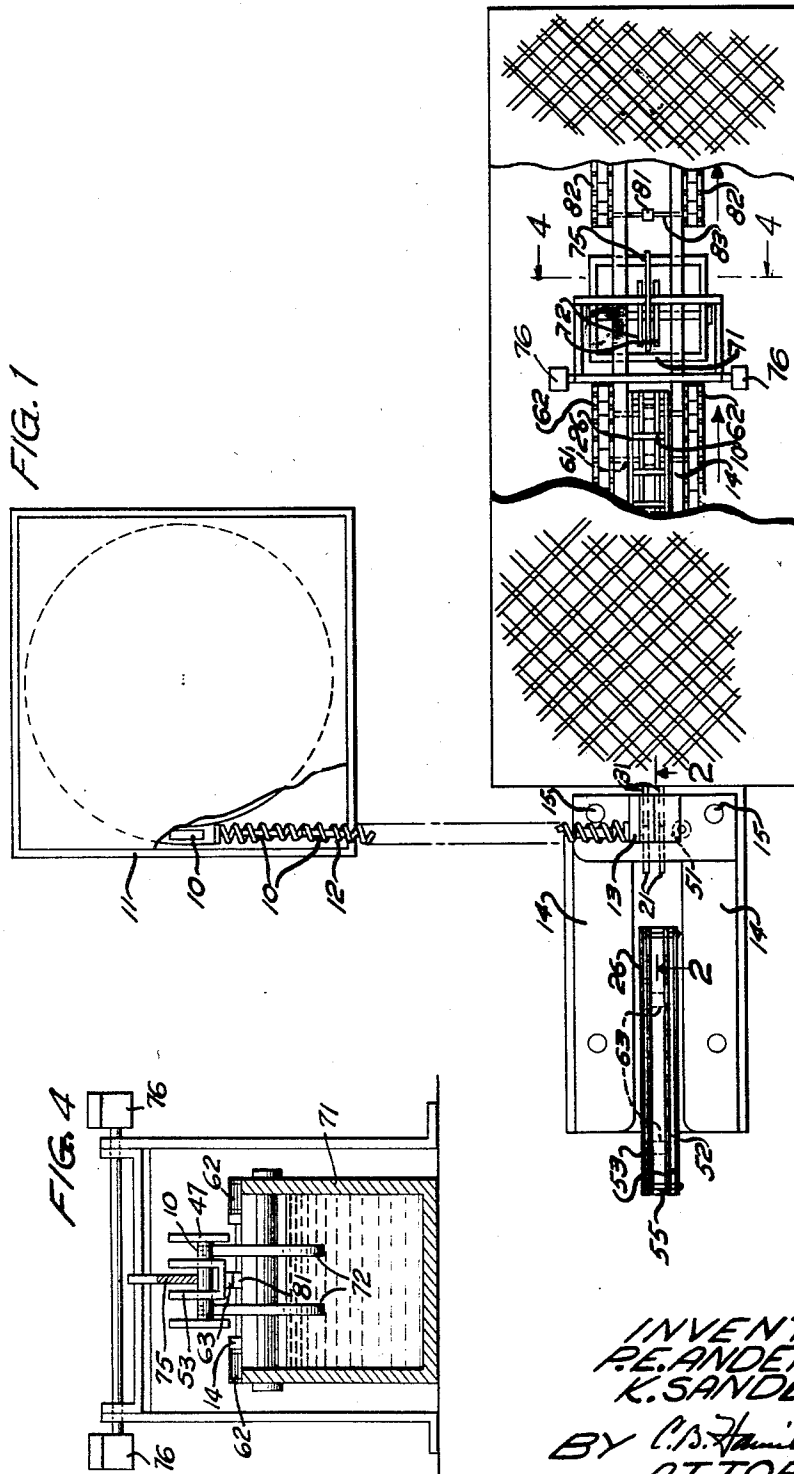
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ARTICLE FEEDING AND COATING DEVICE

Filed Dec. 21, 1954

2 Sheets-Sheet 1



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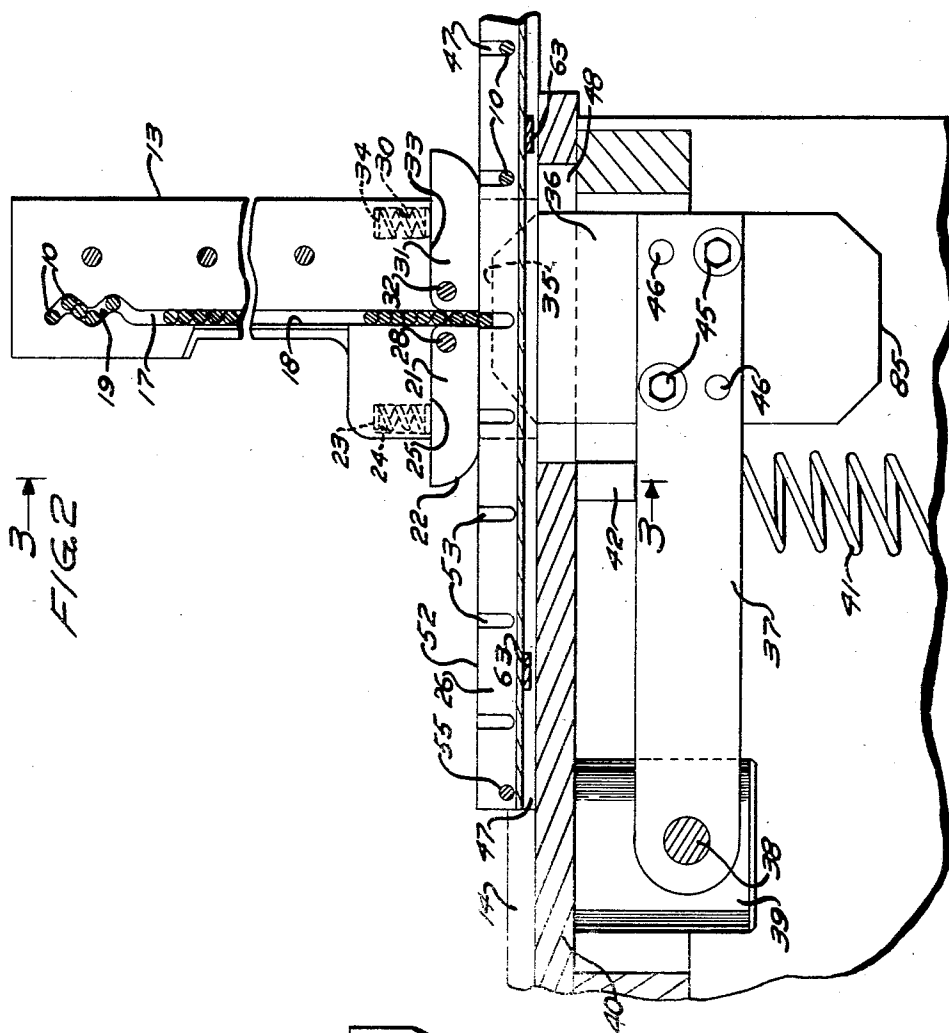
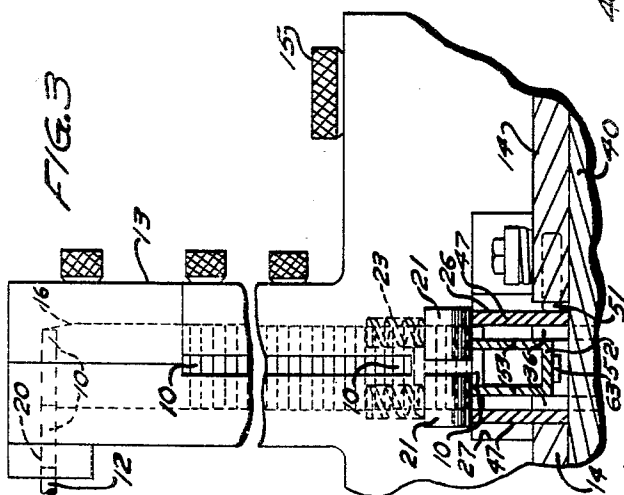
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ARTICLE FEEDING AND COATING DEVICE

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8 Claims. (Cl. 118—219)

This invention relates to article-feeding devices, and more particularly to apparatus for feeding rod-like carbon resistor blanks to a tinning or silvering device.

An object of the invention is to provide apparatus for feeding rod-like resistor blanks endwise to a horizontal position in the top of a vertically extending feed chute and loading slotted trays with the blanks from the chute.

Another object of the invention is to provide apparatus for loading rod-like articles horizontally into a vertical feed chute for feeding articles laterally through the chute while preventing cocking of the articles.

Another object of the invention is to provide apparatus for rapidly loading rod-like articles into slots in trays or racks.

A further object of the invention is to provide new and improved apparatus for preventing the feeding of rod-like articles from a chute when there is no article-receiving means at the end of the chute for receiving the articles.

An apparatus illustrating certain features of the invention may include a vertical feed chute in which the upper portion follows an undulating path for receiving rod-like articles in the upper end thereof in horizontal positions and for keeping the articles horizontal as they roll through the undulating path so that the articles do not lock or cock as they fall in the chute. A pair of supporting plate are positioned beneath the bottom end of the chute a distance slightly greater than the diameter of the rod-like article being fed through the chute, and a tray provided with slots for receiving the rod-like articles is moved past the article-supporting means and serves to receive one of the rod-like articles whenever a slot therein goes past the chute, whereby the tray is filled with the articles. Means also may be provided at the bottom of the chute releasable by the presence of the tray for engaging the articles in the bottom of the chute to prevent exit of these articles when no tray is present below the chute.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which

Fig. 1 is a top plan view, with portions thereof broken away, of an apparatus forming one embodiment of the invention;

Fig. 2 is an enlarged vertical section taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical section taken along line 3—3 of Fig. 2, and

Fig. 4 is an enlarged fragmentary side elevational view of the coating apparatus taken along lines 4—4 of Fig. 1.

Referring now in detail to the drawings, there is shown therein an apparatus for applying silver or tin to end portions of carbon coated ceramic resistors 10 which are pushed by a vibratory hopper 11 of a well known type through a substantially horizontal spring feed tube 12 to the top of a removable split storage chute 13 secured on laterally adjustable guide rails 14 by hand screws 15. The spring is open to permit debris to fall out of the spring.

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The chute 13 includes a slot 17 having a vertically straight lower portion 18 and an undulating or zig-zag upper portion 19, the upper end of which is designed to receive one of the rod-like resistors 10 in a horizontal position therein from an entrance passage or bore 20. A slightly sloping surface 16 forming a portion of the end wall of the slot 17 cams the blanks downwardly slightly to prevent the blanks thereat from being locked against that end wall of the slot by the blanks pushing that blank. The zig-zag portion 19 keeps the resistor blanks 10 in horizontal positions as they roll therethrough to the straight portion 18, thereby preventing cocking of the rod-like articles as they travel through the chute and keeping the blanks 10 horizontal.

A pair of clamping shoes 21 having tapered ends 22 and mounted on a pin 28 are urged in a counterclockwise direction, as viewed in Fig. 2, by compression springs 23 mounted in bores 24 in the chute 13 against a tray 26 when the tray is positioned in a passage 27 extending horizontally through the chute 13. Similarly, a second pair of clamping shoes 31 mounted rotatably on a pin 32 are limited by a stop 33 against which the shoes 31 are held when the tray 26 is under the shoes 31. Compression springs 34 mounted in bores 30 in the chute 13 urge the shoes 31 in a clockwise direction, as viewed in Fig. 2.

Whenever the tray 26 does not project under the slot, the shoes 21 or 31 or all these shoes pivot on the pins 28 and 32 and clamp the lowermost ones of the articles 10 therebetween to keep the articles from falling out from the bottom of the chute. However, whenever the tray 26 is slid into the passage 27 it pushes the shoes 21 and 31 against stops 25 and 33 to release the blanks 10 and permit the blanks 10 to fall downwardly through the lower end of the chute 13. The downward movement of the blanks 10 is limited by edges 35 of reversible blades 36 mounted on arms 37 mounted pivotally on a pin 38 secured to a bracket 39 fixed to a table top 40. The arms 37 are urged upwardly by compression springs 41 against a stop 42. The blades 36 are secured to the arms 37 by cap screws 45 and pins 46, and project upwardly through a slot 48 of the table top 40. The position of the stop 42 is such that the supporting edges 35 of the blades 36 are spaced from the chute 13 a distance just equal to the diameter of one of the blanks 10 so that each blank may be moved out from under a column of blanks and under the shoe 31 as the tray 26 is moved to the right as viewed in Fig. 2.

Each of the trays 26 includes a pair of side supporting plates 47 resting on their edges and slidable along the table top 40 between the guides 14, the righthand guide 14, as viewed in Fig. 3, including a spring-pressed plunger 51, which may have a roller on the end. Each tray 26 also includes a channel member 52 having slots 53 therein for receiving and carrying the rod-like blanks 10, and pins 55 at the ends of the plates 47 secure the channel 52 rigidly to the plates 47 with suitable spacer sleeves between the plates 47 and channel 52 providing clearance for the blades 36 as the trays are pushed to the right, as viewed in Figs. 1 and 2. Lugs 61 carried by chains 62 engage lugs 63 (Fig. 3) fastened to the bottom of the channel 52. As each pair of slots 53 moves under the chute 13 and the bottom end of the slot 17, the lowermost blank 10 drops into the slots 53 onto the supporting edges 35 of the blades 36, and the blanks are immediately carried away from the slot 17 after which the next blank drops into the succeeding pair of slots 53 and is likewise carried away.

Each tray 26 is pushed manually under the chute 13 until the foremost lug 63 thereon is picked up by one of the lugs 61 of the pair of chains 62, which pushes the tray over a tin or silver applying bath 71 having a pair of discs 72 rotated by suitable means (not shown) and

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which dip into molten silver or tin in the bath and then roll the ends of the blanks 10 projecting beyond the sides of the channel 52. The discs roll the blanks in the slots 53 to coat the end portions of the blanks 10 with the conductive metal. As each blank travels over the bath 71, a hold-down shoe 75 keeps the blank from rising out of contact with the discs 72, which rotate the blank, the shoe 75 contacting the central portions of the blanks and being counterbalanced by weights 76. After the tray 26 is pushed past the bath 71, lugs 81 carried by chains 82 and bridging support members 83 engage the lugs 63 (Fig. 3) and move the tray away from the bath 71 to the right, as viewed in Fig. 1.

The blades 36 may be moved from the arms 37 and reversed to present supporting cam surfaces 85, which are more widely spaced than the surfaces 35, uppermost on the arms 37 to convert the feeding device for use with blanks of longer length from the blanks 10, the portions of the blades 36 having the supporting surfaces 85 being spaced farther apart than the portions of the blades 36 having the surfaces 35, and trays similar to the trays 26 but wider are used to receive the longer blanks which then are fed through the chute which is expanded to accommodate the longer blanks by inserting shims between the halves of the chute.

Operation

Each tray 26 is pushed along the passage 27 and guide 14, and as the front end of each tray enters the passage 27, it pushes the pairs of clamping shoes 21 and 31 upwardly to the positions releasing the blanks 10 which fall from the bottom of the slot 17 into the slots 53 of the channel 52, which rapidly loads trays 26 with the blanks 10. The trays then convey the blanks past the solder or silver bath 71 and the discs 72 tin the ends of the blanks as the blanks are rotated by the discs 72. As each blank 10 is pushed horizontally into the slot 17, the camming surface 16 starts it down the slot, it falls laterally without changing from its horizontal condition through the zig-zag upper portion 19 of the slot 17 and drops while in a horizontal position into the straight portion 18 of the slot. Hence, the blanks are not cocked and do not become jammed as they travel through the chute.

The above-described apparatus rapidly loads the trays 26 with resistor blanks and carries the loaded trays 26 past the solder or silver bath 71, and the discs 72 turn the blanks to coat the entire peripheries of the end portions with tin after which the tray 26 is removed manually from the apparatus.

The above-described apparatus serves to prevent cocking of the rods in the chute so that the chute need not be kept filled up to the undulating or zig-zag portion, and the trays may be pushed under the chute as fast as desired. Also, the blanks 10 are automatically kept from falling out of the chute whenever there is no tray therebelow and are automatically available as soon as a tray is inserted under the chute.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the 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. An apparatus for feeding and coating articles, which comprises a table having a longitudinal trough therethrough, a tray slidable along the trough including a channel provided with a plurality of notches spaced along the sides thereof for receiving articles therein and a pair of side plates mounted in spaced relationship and extending longitudinally to the channel, a pair of article supporting blades mounted on said table and urged toward said tray to enter the portions of the tray between the sides of the channel and the side plates for limiting the entrance of articles into the notches in the channel, means

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for feeding rod-like articles into the notches in the channel continuously as the tray moves past a predetermined point, and a pair of applicator discs designed to have the tray travel thereover for coating the portions of the articles between the sides of the channel and the side plates.

2. An apparatus for feeding and coating articles comprising a table having a longitudinal groove therethrough, an article-receiving tray slidable in said groove, said tray including an upwardly facing U-shaped channel having notches spaced along the sides thereof for receiving the articles and a pair of side plates extending longitudinally and in spaced relationship to the channel, a chute having an undulated slot for feeding rod-like articles to said channel in a horizontal position, said chute mounted on and spaced from the table for allowing movement of the tray thereunder, a pair of applicator discs positioned to have the tray travel thereover for coating the portions of the articles between the sides of the channel and the side plates, and means for transferring the tray from beneath the chute to pass over the applicator discs.

3. An article-feeding device, which comprises a table, a tray having a plurality of spaced upwardly facing notches positioned therein mounted slidably on the top of the table, a chute mounted removably on the table and having a discharge portion positioned at a point spaced above the top of the table a distance equal to the height of the tray whereby as the tray is slid along the table top past the chute the notches therein receive the articles from the chute, a shoe forming a portion of the exit end of the chute, and means urging the shoe to a position for clamping articles in the exit portion of the chute to prevent exit thereof and to a position into the path of the trays whereby the shoe is swung out of the path of the trays as the tray is pushed past the chute and releases the articles from the exit end of the chute.

4. An article-feeding device, which comprises a table, a tray having a plurality of spaced upwardly facing notches positioned therein mounted slidably on the top of the table, a chute mounted removably on the table and having a discharge portion positioned at a point spaced above the top of the table a distance equal to the height of the tray whereby as the tray is slid along the table top past the chute the notches therein receive the articles from the chute, a blade for supporting the lowermost article in the chute at a level such that one article drops out of the chute at a time, a shoe forming a portion of the exit end of the chute, and means urging the shoe to a position for clamping articles in the exit portion of the chute to prevent exit thereof and to a position into the path of the trays whereby the shoe is swung out of the path of the trays as the tray is pushed past the chute and releases the articles from the exit end of the chute.

5. In an article-feeding device, a table having a longitudinal groove therethrough, an article-receiving tray slidable in said groove, said tray including an upwardly facing U-shaped channel having notches spaced along the sides thereof for receiving the articles and a pair of side plates extending longitudinally and in spaced relationship to the channel, a chute mounted on and spaced from the table for allowing movement of the tray thereunder, said chute having an undulated slot for feeding rod-like articles to said channel in a horizontal position, shoe members movably mounted on the chute, and adapted to move into the undulated slot of the chute, means for urging the shoe members downwardly into the path of the tray and into the slot to prevent egress of the articles, and camming surfaces on the shoe members adapted to be engaged by the tray to move said shoe members to permit egress of the articles from the slot into the tray.

6. An article-feeding device, which comprises a table, a tray having a plurality of spaced upwardly facing notches positioned therein mounted slidably on the top of the table, an article chute mounted on the table and having a discharge portion positioned at a point spaced above

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the top of the table a distance equal to the height of the tray whereby as the tray is slid along the table top past the chute the notches therein receive the articles from the chute, a shoe forming a portion of the exit end of the chute, and means urging the shoe to a position for clamping articles in the exit portion of the chute to prevent exit of the articles when a tray is not present thereunder and to a position into the path of the trays whereby the shoe is swung out of the path of the trays as the tray is pushed past the chute and releases the articles from the exit end of the chute.

7. An article-feeding device, which comprises a table, a tray having a plurality of spaced upwardly facing notches positioned therein mounted slidably on the top of the table, an article chute mounted on the table and having a discharge portion positioned at a point spaced above the top of the table a distance equal to the height of the tray whereby as the tray is slid along the table top past the chute the notches therein receive the article from the chute, a blade for supporting the lowermost article in the chute at a level such that only one article drops out of the chute at a time, a shoe forming a portion of the exit end of the chute, and means urging the shoe to a position for clamping articles in the exit portion of the chute to prevent exit of the articles when a tray is not present thereunder and to a position into the path of the trays whereby the shoe is swung out of the path of the trays as the tray is pushed past the chute and releases the articles from the exit end of the chute.

8. An article tray, comprising a channel provided with a plurality of notches spaced along the length thereof for receiving articles therein, a pair of side plates, means fastening the channel to and spaced from the side plates

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in an upwardly facing position, a pair of blades positioned below the tray and extending into the portions of the tray between the sides of the channel and the side plates for limiting the entrance of articles into the notches in the channel, and chute means positioned over the blades for feeding rod-like articles into the notches in the channels continuously as the trays move past a predetermined point.

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