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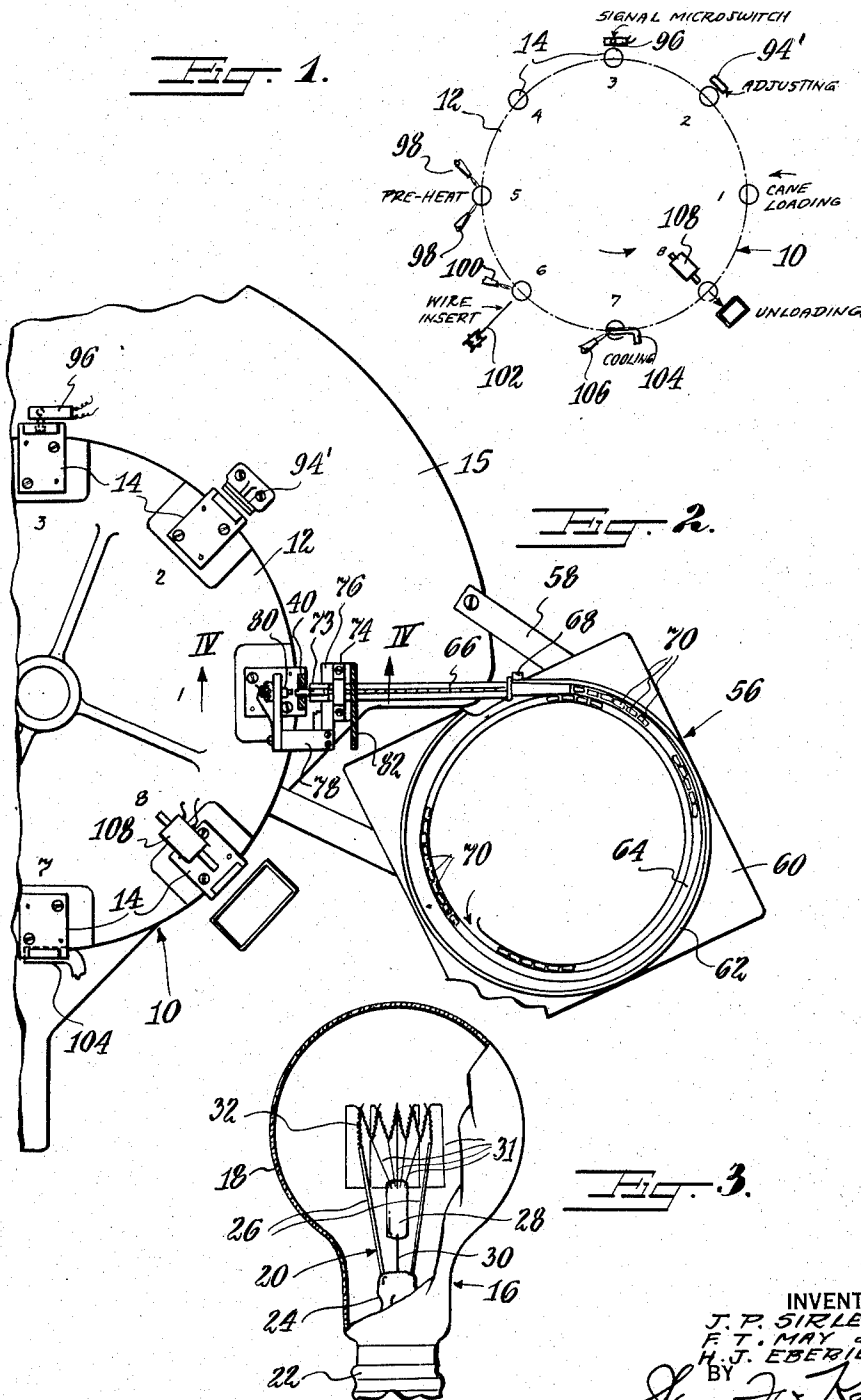
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AUTOMATIC CANE LOADING FOR SPUD INSERTING MACHINE

Filed June 25, 1953

2 Sheets-Sheet 1



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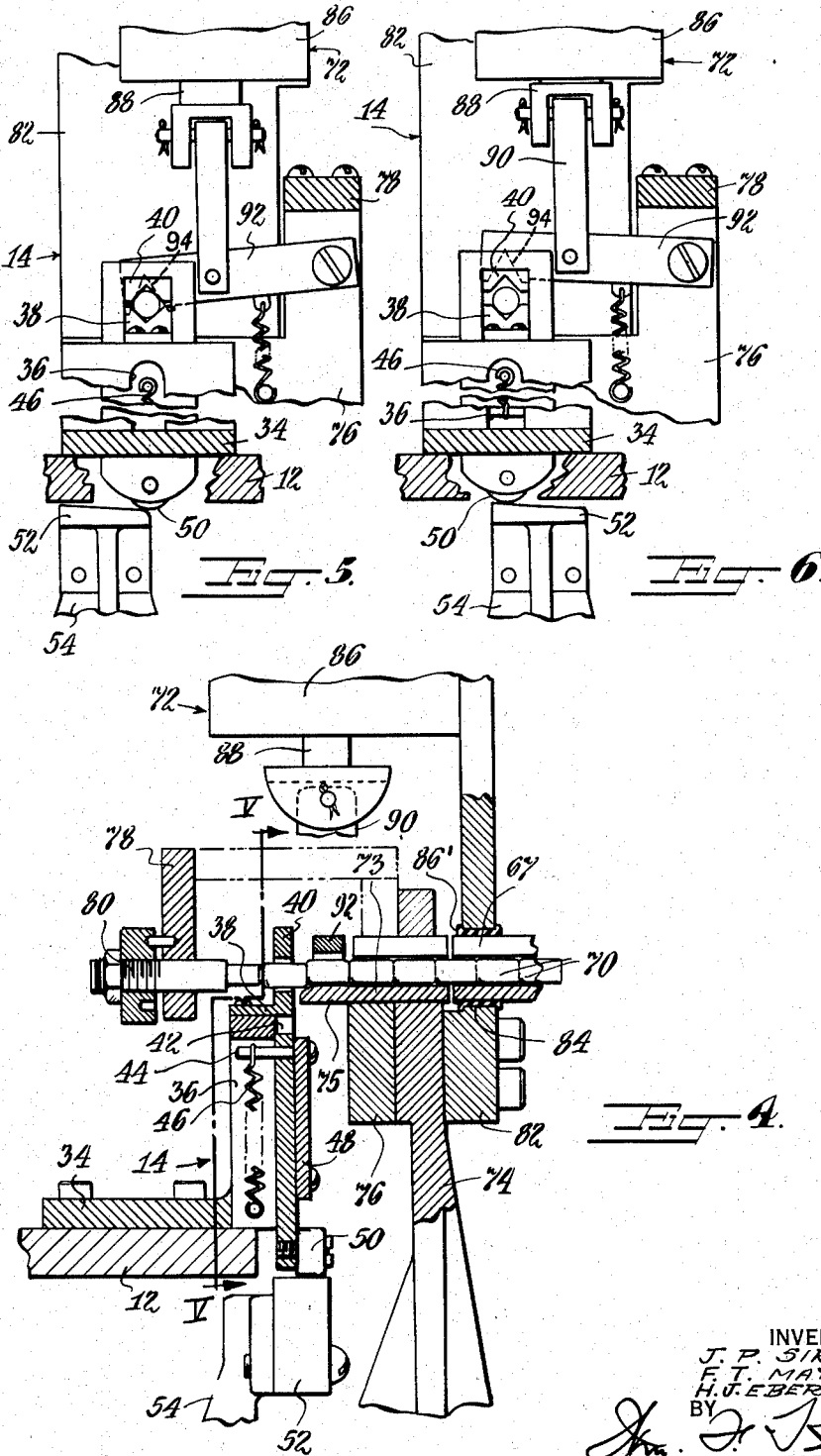
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AUTOMATIC CANE LOADING FOR SPUD INSERTING MACHINE

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The present invention relates to spud inserting machines and, more particularly, to an automatic vitreous cane loader for such a machine.

In the manufacture of multi-section filament incandescent lamps it is necessary to support the bends between sections of filaments with support wires projecting from a vitreous cane glass arbor. A spud or dummy lead extending from the other end of the cane projects into the press of a vitreous stem of the lamp.

In the past a machine for inserting the spud into the vitreous arbor has been loaded by hand at station "1" with pieces of cane. At station "2" or between stations "1" and "2" the cane is generally adjusted laterally in the jaws of the cane receiving head of the spud inserting machine. At station "3" a signal microswitch is engageable by a depending portion of an empty arbor head to sound an alarm. A pair of burners at station "5" may preheat the end of the cane to a plastic state preparatory to wire inserting. At station "6," an offset burner maintains the end of the cane in this plastic condition and an automatic wire feed and cut off device may sever and insert a predetermined length of wire into the now plastic end of the cane. At station "7" a soft fire anneals the inserted spud and arbor. A horizontal guide at this station supports the spud in a horizontal plane during the annealing or cooling of the arbor. At station "8" a solenoid actuated discharge device may push the now annealed spud and arbor from the jaws of the head of the spud inserting machine.

Hence, it has been found advantageous according to our invention to provide an automatic cane loader which eliminates manual loading of the cane into a spud inserting machine. Our cane loader comprises an open ended feeder provided with a helical track on its inner periphery, a guide tube extending from the top of the track, a solenoid operated cane release device adjacent the cane receiving jaws of a head of the spud inserting machine and a vibratory unit for vibrating the pieces of cane up the inclined helical track within the feeder bowl.

In addition we have provided an improved arbor head for the spud inserting machine having a normally closed pair of jaws comprising a fixed jaw and a spring loaded movable jaw. As a head of the spud inserting machine indexes into station "1," the cane loading position, a wheel on the movable jaw engages an inclined cam track thus raising the movable jaw to permit loading therein of a piece of cane by the cane loader of our invention.

In its general aspect the present invention has as its objective an automatic cane loader for a spud inserting machine.

An additional object is an improved head for a spud inserting machine which head is automatically opened at the cane loading station of the machine to receive a piece of cane.

Other objects of the present invention will become apparent to those skilled in the art to which it appertains as the description thereof proceeds.

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Referring to the drawings in which like numerals of reference indicate similar parts throughout the several views:

Fig. 1 is a diagrammatic plan view of an automatic spud inserting machine incorporating the automatic cane loader of our invention.

Fig. 2 is a plan view of station "1," the cane loading station, of a spud inserting machine and showing the automatic cane loader of our invention.

Fig. 3 is a side elevational view of an incandescent lamp partially cut away and showing the spud and arbor which have been assembled on the automatic spud inserting machine.

Fig. 4 is a vertical sectional view of an arbor head and the delivery end of our automatic cane loader in loading position at station "1," the cane loading station, on the lines IV-IV of Fig. 2, in the direction of the arrows.

Fig. 5 is a view similar to Fig. 4 along the lines V-V of Fig. 4 in the direction of the arrows, and showing the arbor jaws and cane release device in the closed position.

Fig. 6 is a view similar to Fig. 5 and showing the arbor jaws and cane release device in the open position.

Referring to the drawings and particularly to Fig. 1 an automatic spud inserting machine is designated by the reference numeral 10. The machine 10 has a rotatable turret 12 for carrying a plurality of arbor heads 14 which are indexable by conventional means on a frame 15 (Fig. 2) from station to station.

An incandescent lamp 16 (Fig. 3) of the multi-section filament type employed, for example, in vibratory service as a spotlight, may comprise generally an envelope or bulb 18, a filament mount 20 secured thereto and a base 22.

This mount 20 has a vitreous stem 24 provided with a press through which a pair of leading-in conductors 26 are sealed. An arbor 28, suitably of hard glass, may have a spud 30, inserted in one end. The other end of the spud 30 is embedded in the top of the press of the stem 24. A plurality of filament supports 31 project from the upper end of the arbor 28 for supporting the loops between sections of a filament 32. This filament 32 has its end portions secured in suitable clamps on the upper end of the lead-in conductors 26.

Heads

Each of the heads 14 (Figs. 4, 5 and 6) has a stationary jaw mounting plate or angle 34, which is secured by means of its horizontal portion to the turret 12. A center spring slot 36 is cut through its vertical portion. A stationary jaw 38 is carried by the vertical portion of the plate 34 (Figs. 4, 5 and 6) and also serves as a stationary guide for a movable upper jaw 40 which reciprocates in a pair of slide grooves 42 (Fig. 4) in the forward face of the plate 34. The upper jaw 40 reciprocates on the jaw 38 and in the grooves 42. A pin 44 (Fig. 4) projects inwardly from the middle portions of the movable jaw 40 into the slot 36 and carries the upper end of a jaw closing spring 46 thereon. The other end of the spring 46 is secured to the horizontal portion of the stationary jaw mounting plate 34 at the bottom of the center spring slot 36. A cover plate 48 (Fig. 4) affixed to the stationary jaw mounting plate 34, as by bolts, retains the movable jaw 40 in slidable engagement with the vertical portion of the plate 34. The lower portion of the movable jaw 40 extends below the stationary jaw plate 38 and carries a cam roller 50 thereon for engagement with, for example, a loading (or movable jaw operating) cam track 52 (Fig. 4) which is mounted by means of a bracket 54 on the frame 15 adjacent station "1," the cane loading station.

Cane loader

Adjacent station "1," the cane glass loading station, an automatic cane loader 56 of our invention (Fig. 2) is mounted by means of a bracket 58 on the frame 15. This loader 56 may comprise conventional vibratory means 60 on the bracket 58 for supporting and vibrating an open ended cane feeder bowl 62. This bowl 62 has a helical aligning or delivery track 64 on its inner side wall extending from the bottom of the bowl to a point on its upper edge adjacent station "1," the cane feeding station.

A two-section feeder (or guide) tube 66, having the outer end of an outer section 67 thereof (Fig. 4) supported by means of a bracket 68 upstanding from the outer side wall of the bowl 62, receives the cane 70 from the track 64 and delivers them, one by one as predetermined by a cane release device 72 (Figs. 4, 5 and 6), as hereinafter explained. The inner end of the outer section 67 of the feeder tube 66 is resiliently supported, as hereinafter explained. An inner section 73 of the tube 66 (Figs. 2 and 4) is carried by a bracket 74 upstanding from the frame 15 and is separated from the outer section 67 by a small amount of clearance.

It will be understood that the bowl 62 and the outer section 67 of the guide tube 66 are vibrated continuously by the vibratory means 60. This guide tube 66 (Fig. 2) has a longitudinal slot in its upper and bottom surface to permit the insertion of an instrument therein for the release of any jammed pieces of cane 70. The delivery end 75 (Fig. 4) of the inner section 73 of the guide tube 66 has its upper portion suitably cut away in the form of a lower jaw to permit cooperation with the cane release device 72, as hereinafter explained.

The guide tube mounting bracket 74 carries on its inner face a cane stop mounting bracket 76 (Figs. 2, 4, 5 and 6) of general right angle configuration. A cane stop supporting plate 78 carried by the upper portion of the cane stop mounting bracket 76 bridges the path of travel of an indexing head 14. The plate 78 (Fig. 2) extends vertically downward, parallel to the vertical portion of the bracket 76 and then horizontally forward adjacent the delivery end of the guide tube 66. An adjustable stop 80 (Fig. 4) extends or protrudes through the side wall of the horizontal portion of the cane stop supporting plate 78 directly opposite the delivery end of the inner section 73 of the feeder tube 66.

The guide tube mounting bracket 74 carries on its outer face a cane release solenoid mounting bracket 82 (Figs. 2 and 4) of the cane release device 72. This bracket 82 is provided with a guide tube hole 84 in which a suitable bushing 86, appropriately Micarta, supports the left hand end of the outer section 67, as viewed in Fig. 4, of the guide tube 66. A cane release solenoid 86 (Figs. 4, 5 and 6) having its operating plunger 88 (Fig. 5) pinned to a lever 90 (Fig. 4) is carried by the upper portion of the bracket 82 (Fig. 4). The lower portion of the lever 90 engages a spring biased cane release arm 92 (Figs. 5 and 6), suitably pivoted on the vertical portion of the cane stop mounting bracket 76. The outer or operating end of the cane release arm 92 is suitably notched to form a cane holding jaw 94 (Figs. 5 and 6) for engaging and restraining in its normally closed position a piece of cane 70 on the delivery end 75 of the inner section 73 of the guide tube 66.

It will be understood that the cane release solenoid 86 is actuated by a cam (not shown) on the cam shaft (not shown) of the spud inserting machine 10 at a predetermined time in the operating cycle.

Operation

As the head 14 indexes (Figs. 1 and 2) from station "8," the discharge station, into station "1," the cane loading station, the roller 50 on the bottom of the movable jaw 40 of the head 14 (Figs. 4, 5 and 6) rides upwardly on

the cam track 52 thus moving the movable upper jaw 40 upwardly with respect to the stationary jaw 38. The movable jaw 40 appropriately reaches the maximum point of its travel (Fig. 6) upon arrival at station "1." The cane release device cam (not shown) actuates the cane release solenoid 86, causing the plunger 88, the lever 90, and the cane release arm 92 to move upwardly and permit a piece of cane 70 to move radially inward into the now open jaws 38 and 40. The cane stop 80 on the mounting plate 78, as shown in Fig. 4, limits the radial movement of the cane 70.

At a predetermined time before the end of the operating cycle the cane release device cam (not shown) deenergizes the cane release solenoid 86, thereby causing the operating plunger 88, the lever 90 and the cane release arm 92 to move downwardly and to engage a piece of cane 70 to be delivered to the next indexing head 14 arriving at station "1."

Between station "1" and station "2," the cane adjusting station, roller 50 rolls off the cam track 52 thus closing the spring loaded jaw 40 on the cane 70 resting in the jaw 38. At station "2," an adjustable positioning shoe or track 94' (Figs. 1 and 2) mounted on the frame 15 laterally adjusts the piece of cane 70 to its final spud inserting position with respect to the jaws 38 and 40 (Figs. 1 and 2). It will be understood that if the head 14 is empty upon arriving at station "3," the detecting station, the roller 50 on the movable jaw 40, will depend a sufficient distance below the stationary jaw plate 34 to close a signal micro switch 96 mounted on the frame 15. The switch 96 is in an alarm circuit (not shown) which will notify the machine attendant of the empty head 14. At station "5," the preheat station, a pair of fixed stationary burners 98 (Fig. 1) preheat the outer end of the cane 70 to a semi-plastic condition. A burner 100 at station "6," the spud wire inserting station, maintains the outer end of the cane 70 in this plastic condition to receive a predetermined length of spud wire 102. This wire 102 is severed to the predetermined length required for a spud 30 and is inserted into the plastic end of the cane 70 by automatic means (not shown).

As the head 14 indexes into station "7," the annealing station, the now inserted spud 30 engages a horizontal support or guide 104 upstanding from the frame 15 to prevent deformation of the assembled cane 70 (arbor 28) and the spud 30 during the annealing thereof by a splash or annealing burner 106 (Fig. 1). Between station "7" and station "8," the discharge station, the roller 50 on the bottom of the movable jaw 40 engages a discharge or movable jaw operating cam track (not shown) similar to the loading cam track 52, which opens the jaw 40 to permit ejection therefrom of the now assembled cane 70 (arbor 28) and spud 30 by a solenoid activated discharge unit 108. The solenoid of the discharge unit 108 is actuated by a cam (not shown) in the same manner as the cane release solenoid 86.

Although a preferred embodiment of our invention has been disclosed it will be understood that modifications may be made within the spirit and scope of the present invention.

We claim:

1. Automatic apparatus for feeding articles to an article fabricating machine comprising: a feeder bowl provided with a helical delivery track on its inner side wall; a guide tube having a resiliently mounted section extending from said track and for providing frictionless movement of said articles on their longitudinal axis therealong, and a rigidly mounted section having a discharge end in registry with said resiliently mounted section, said rigidly mounted section extending adjacent to an article feeding station of said machine; means aligned with and located a distance substantially equal to the longitudinal axis of an article from the discharge end of said rigidly mounted section for restraining the forward movement of said

articles and maintaining the leading article in the delivery position; a cane release device on said rigidly mounted section adjacent the discharge end thereof for engaging an article supported in said rigidly mounted section and restraining said article; and vibratory means for continuously vibrating said feeder bowl and said resiliently mounted section for causing said articles to move frictionlessly along said track and said guide tube in a single line for delivery to said feeding station of said machine.

2. Automatic apparatus for feeding articles to an article fabricating machine comprising: a feeder bowl provided with a helical delivery track on its inner side wall; a guide tube having a resiliently mounted section extending from said track and for providing frictionless movement of said articles on their longitudinal axis therealong, and a rigidly mounted section having a discharge end in registry with said resiliently mounted section, said rigidly mounted section extending adjacent to an article feeding station of said machine, said guide tube being provided with means for permitting the insertion of an instrument and the removal of broken articles from said guide tube; means aligned with and located a distance substantially equal to the longitudinal axis of an article from the discharge end of said rigidly mounted section for restraining the forward movement of said articles and maintaining the leading article in the delivery position; a cane release device on said rigidly mounted section adjacent the discharge end thereof for engaging an article supported in said rigidly mounted section and restraining said article; and vibratory means for continuously vibrating said feeder bowl and said resiliently mounted section for causing said articles to move frictionlessly along said track and said guide tube in a single line for delivery to said feeding station of said machine.

3. Automatic apparatus for feeding articles to an article fabricating machine comprising: a feeder bowl provided with a helical delivery track on its inner side wall; a guide tube having a resiliently mounted section extending from said tracks and for providing frictionless movement of said articles on their longitudinal axis therealong, and a rigidly mounted section having a discharge end in registry with said resiliently mounted section, said rigidly mounted section extending adjacent to an article feeding station of said machine; means aligned with and located a distance substantially equal to the longitudinal axis of an article from the discharge end of said rigidly mounted section for restraining the forward movement of said articles and maintaining the leading article in the delivery position; a cane release arm pivoted on said rigidly mounted section adjacent the discharge end thereof for engaging an article supported in said rigidly mounted section and restraining said article, and means connected to said cane

release arm and operable to move the latter into and out of engagement with said article; and vibratory means for continuously vibrating said feeder bowl and said resiliently mounted section for causing said articles to move frictionlessly along said track and said guide tube in a single line for delivery to said feeding station of said machine.

4. Automatic apparatus for feeding pieces of cane to a spud inserting machine comprising: a feeder bowl provided with a helical delivery track on its inner side wall; a guide tube having a resiliently mounted section extending from said track and for providing frictionless movement of said pieces of cane on their longitudinal axis therealong, and a rigidly mounted section having a discharge end in registry with said resiliently mounted section, said rigidly mounted section extending adjacent to a station for feeding pieces of cane to said machine, said guide tube being provided with means for permitting the insertion of an instrument and the removal of broken pieces of cane from said guide tube; a stop aligned with and located a distance substantially equal to the longitudinal axis of a piece of cane from the discharge end of said rigidly mounted section for restraining the forward movement of said pieces of cane and maintaining the leading piece in the delivery position; a cane release arm pivoted on said rigidly mounted section adjacent the discharge end thereof for engaging a piece of cane supported in said rigidly mounted section and restraining said piece, and means connected to said cane release arm and operable to move the latter into and out of engagement with such article; and vibratory means for continuously vibrating said feeder bowl and said resiliently mounted section for causing said pieces of cane to move frictionlessly along said track and said guide tube in a single line for delivery to said feeding station of said machine.

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