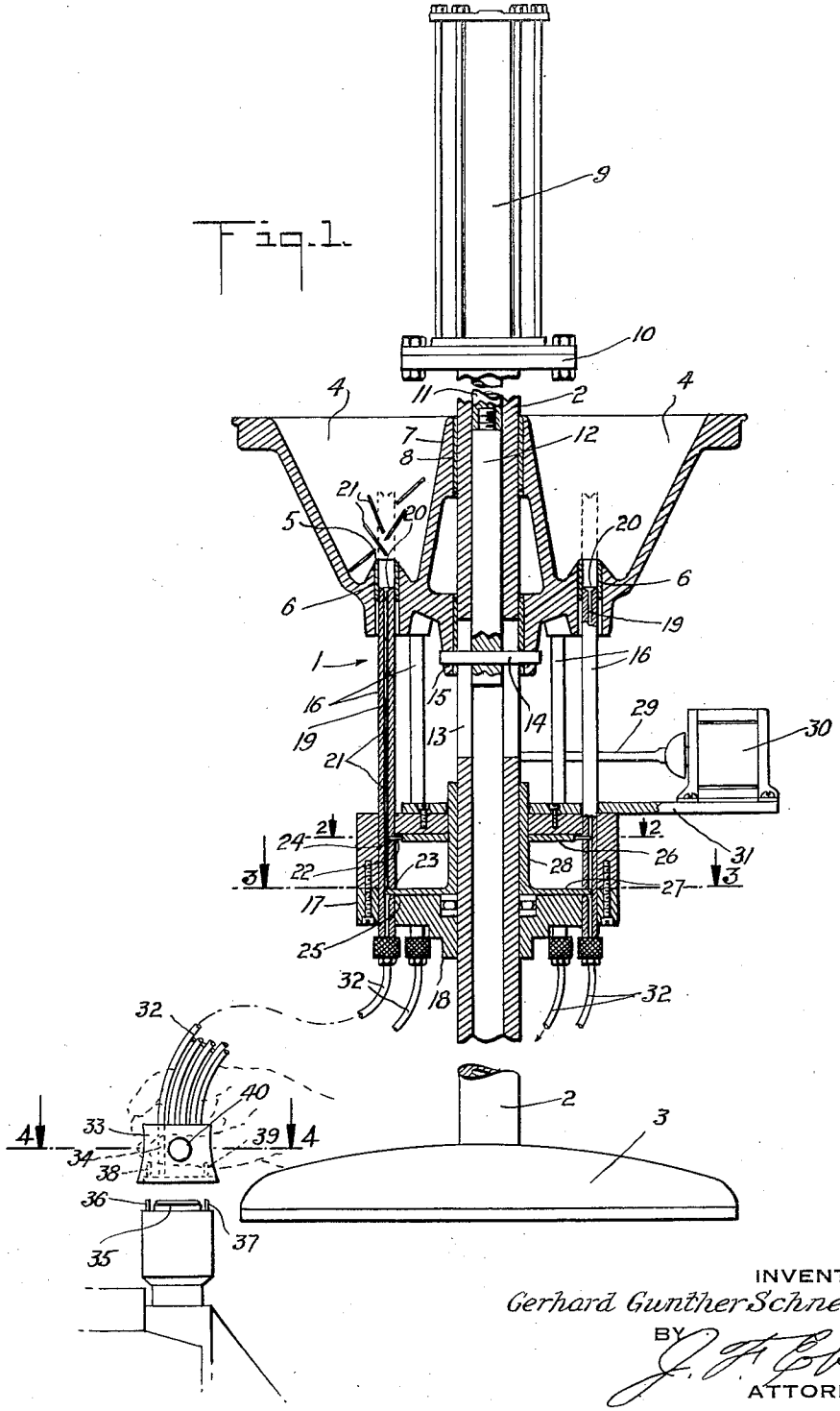
May 9, 1950 G. G. SCHNEIDER 2,507,185

PIN FEEDING MECHANISM

Filed Jan. 31, 1945 2 Sheets-Sheet 1

Fig. 1.



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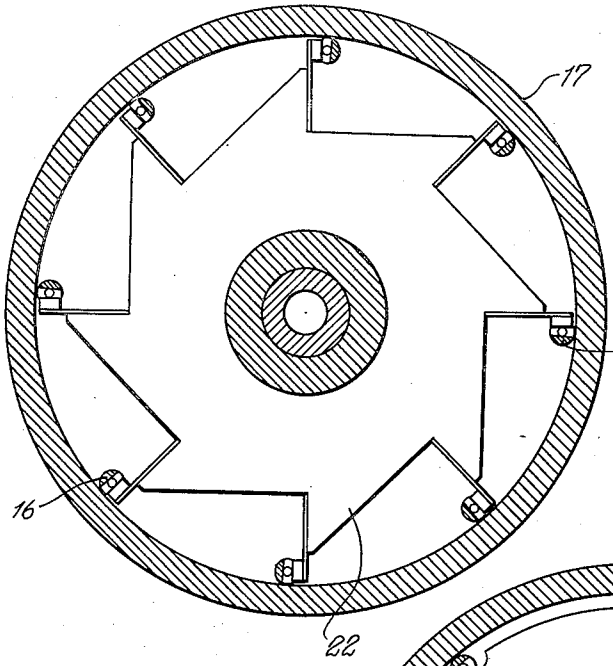


Fig. 2.

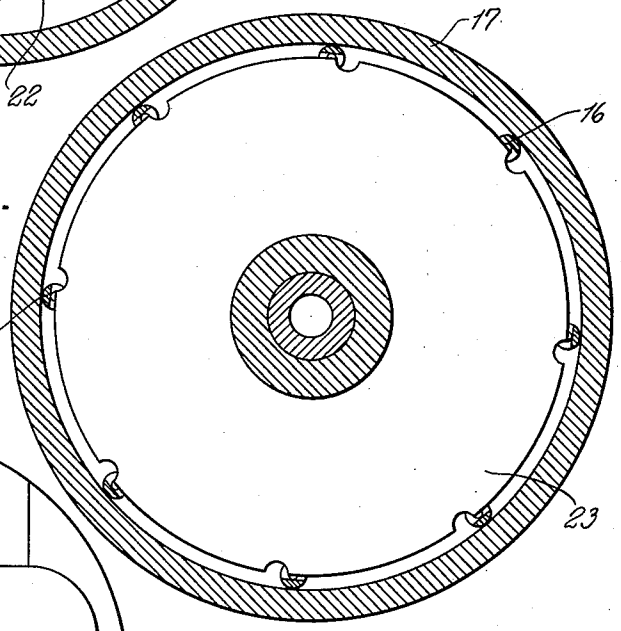


Fig. 3.

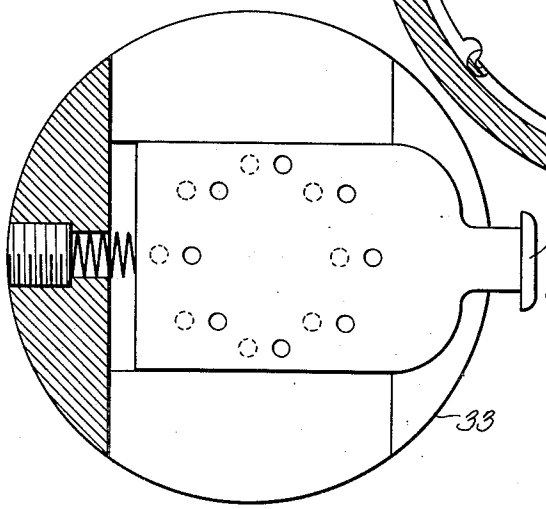


Fig. 4.

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UNITED STATES PATENT OFFICE

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PIN FEEDING MECHANISM

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Application January 31, 1945, Serial No. 575,525

5 Claims. (Cl. 10—162)

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The invention herein disclosed relates to a pin feeding mechanism for arranging pins in line and delivering the pins consecutively.

Although the pin feeding mechanism of this invention is suitable for feeding pins for various purposes, it is especially suitable for feeding contact plug-in pins to the molds of machines for forming the base of radio vacuum tubes of the type having a glass header through which such pins extend. Commonly such pins are placed in the molds manually and each machine, as now used and operated, requires several operators for this purpose. Some attempts have heretofore been made to provide a mechanism for automatically arranging and delivering such pins but none of these prior attempts have been satisfactory.

By the invention herein disclosed there is provided a pin feeding mechanism that includes means for holding a quantity of pins which are to be delivered in consecutive order and in a controlled manner, means for arranging the pins consecutively, and means for delivering the pins in a controlled manner. In one specific embodiment, the pin holding means consists of a receptacle or container, desirably in the form of a hopper, which is of sufficient capacity to hold a large quantity of pins. The hopper is filled with pins without any consideration as to their relation to one another and the pin arranging means effects a consecutive arrangement of the pins for the pin delivery means. Where as in the case of radio vacuum tubes, a plurality of pins arranged in a particular pattern are required, the pin delivery means may be provided with a delivery head that receives pins from a plurality of pin holding means.

Such a mechanism, constituting one specific embodiment of the invention is illustrated in the accompanying drawing and described in detail below from which description a clearer understanding of the invention may be had.

In the drawing,

Fig. 1 is a longitudinal sectional elevation of the machine embodying the invention.

Figs. 2, 3 and 4 are plan sections taken respectively along the section lines 2—2, 3—3, 4—4, of Fig. 1.

The mechanism illustrated in the drawing is especially suitable for delivering eight Loktal pins in a predetermined relation or pattern to the pin receiving openings of a mold on a machine 1. For this purpose, eight pin feeding mechanisms are mounted about a hollow standard 2 that is secured to and extends from a base

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3. The several pin feeding mechanisms are identical in construction and, therefore, only one will be described in detail, the one at the left of the figure.

Each pin feeding mechanism includes pin holding means which consists of a plural-section hopper 4. Each section is in the shape of a funnel and has an opening 5 through the lower end thereof which is desirably provided with an internal bushing 6. The several sections are formed as a single casting 7 and are arranged in equally angular spaced relation about the common central axis of the casting. This casting is bored axially and is provided with an internal bushing 8 through which the standard 2 extends. The casting is slidable on the standard so that it and the hoppers may be reciprocated vertically for a purpose that will hereinafter appear.

Pneumatic means are provided for effecting vertical reciprocation of the hoppers. For this purpose, a cylinder 9 is mounted above and axially aligned with the standard 2. The cylinder is secured to a flange 10 on the upper end of the standard. From the lower end of the cylinder, a piston rod 11 extends which is secured to a piston (not shown) within the cylinder. The piston rod at its lower end is secured to a rod 12 within and slidable in the standard 2. Intermediate the ends thereof, the standard 2 has a slot 13 extending diametrically therethrough and of a length somewhat greater than the stroke of the reciprocation of the casting 7. A transverse pin 14 extends through the rod 12, slot 13, bushing 8 and a hub 15 formed on the lower end of the casting 7. Thus, reciprocation of the rod 12 effects reciprocation of the casting 7 and in consequence, the hoppers 4. Suitable ports (not shown) are provided at each end of the cylinder and the admission and exhaust of air under pressure may be controlled by a rotating or oscillating four way valve (not shown) to effect, in a manner well known in the art, continuous reciprocation of the hoppers 4.

A pin receiving plunger 16 is secured on a circular bracket housing 17 having a hub 18 secured on the standard 2. The plunger extends through the bracket and the upper end thereof extends through the bushing 6 and into the lower end of the hopper 4. The plunger is held stationary while the hopper is reciprocated. An axial passage 19 is provided through the plunger. This passage is of such diameter that one pin at a time may be received in and fall through the passage. The upper end of the plunger has a conical

counter sink 20 therein connecting with the end of the passage 19.

When there are pins in the hopper and the hopper is reciprocated relative to the plunger, the end of the plunger agitates the pins. On each stroke, certain of the pins, one at a time, become arranged with the end thereof in the countersink 20. The agitation frees such pins and they drop, by the action of gravity, into the passage 19 through which they descend, longitudinally arranged and consecutively, in the manner of pins 21.

Stops or cams are provided for controlling the passage of pins through the plunger so that the pins are delivered one at a time. For this purpose, two vertically spaced, radially extending stops or cams are provided, a pin holding cam 22 and a pin release cam 23. A transverse slot 24 is provided in the plunger 16 for the pin holding cam 22 and a slot 25 is provided for the pin release cam 23. The cams 22 and 23 are formed on radial arms, which may be in the form of slotted disks, 26 and 27 respectively which extend from a hub 28 rotatably mounted on the standard 2 and partly within the bracket housing 17. The end of the hub 28 extends through the upper part of the bracket 17 and has a crank (not shown) thereon. The crank is connected to one end of a connecting rod 29 that is actuated by a solenoid 30. The solenoid 30 is mounted upon a plate 31 secured to and extending from the bracket 17.

The cams 22 and 23 are arranged such that when one is in position to block the passage through the plunger, the other is moved out of the passage so that the passage is free for the passage of a pin past the position of the cam. The solenoid is actuated periodically to oscillate the hub 28 and in consequence the cams so that the cams are alternately effective to stop a pin in the passage 19. The space between the cams is such that only one pin can be accommodated between the cams. In this way, pins are released or delivered one at a time. Desirably, the arrangement is such that the mechanism can be used with pins of different lengths. A solenoid is used to actuate the cams to provide a rapid action, in the nature of a snap action, so that the pin holding cam releases to the pin release cam one pin at a time. Upon actuation of the pin release cam to release position, the pin between the cams falls to the end of the plunger and so to the delivery means.

To the lower end of the plunger, there is secured one end of a flexible, spring wire tube 32 which receives the pins that pass through the plunger. The opposite end of the tube 32 is connected with a head or locating clutch 33 and in communication with a pin passage 34 therethrough. The clutch illustrated has eight pin passages, each of which is connected to a tube 32 extending from separate plungers. The pin passages of the clutch are arranged in a predetermined pattern in accordance with the pin receiving openings of a mold 35 of the machine 1. Locating dowels 36 and 37 cooperate with dowel openings 38 and 39 in the clutch to properly arrange the clutch for delivery of the pins. Desirably, the clutch is provided with a movable stop actuated by a button 40.

The locating clutch may be placed manually on the mold and the button release 40 actuated manually to release the pins in the locating clutch to drop into the pin-receiving openings in the mold.

It will be apparent that pins of different lengths may be fed from the different hoppers. This is important because three different lengths of pins are now used for a certain type base.

From the foregoing description of the embodiment of the invention illustrated in the drawing, it will be apparent to those skilled in the art that by this invention there is provided a mechanism for feeding pins consecutively and in a controlled manner; a mechanism that is comparatively simple in construction and reliable in operation, and that delivers pins in a predetermined manner.

It will be obvious that various changes may be made by those skilled in the art in the details of the embodiment of the invention illustrated in the drawing and described above within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A pin feeding mechanism especially suitable for feeding radio tube contact pins in a predetermined pattern to a mold for forming the base of a radio vacuum tube, which mechanism comprises in combination pin delivery means adapted to be positioned to deliver pins to a mold and including several flexible delivery tubes, several pin containers, one for each delivery tube, mounted about a vertical support, a vertically mounted plunger for each pin container with the upper end thereof extending into and slidably mounted in the container, the plunger having a passage therethrough and a conical countersink at the end thereof within the container, and having the lower end thereof connected to a delivery tube, actuating means connected to said receptacle for reciprocating said receptacle vertically with respect to said plungers and thereby to cause a plurality of pins to drop in end to end relation into each plunger passage, and means comprising a pair of cam members carried by and oscillatable around said vertical support, said cams extending through the walls of each plunger and being staggered with respect to the longitudinal axis of each plunger so that one cam acts as a pin-stopping cam and the other cam acts as a pin-releasing cam, and means for operating said cams in timed relation to said plungers to effect the discharge of individual pins from said plungers to said delivery tubes.

2. A pin feeding mechanism especially suitable for feeding radio tube contact pins in a predetermined pattern to a mold for forming the base of a radio vacuum tube, which mechanism comprises in combination pin delivery means adapted to be positioned to deliver pins to a mold and including several flexible delivery tubes, several pin containers, one for each delivery tube, mounted about a vertical support, a vertically mounted plunger for each pin container with the upper end thereof extending into and slidably mounted in the container, the plunger having a passage therethrough and a conical countersink at the end thereof within the container, and having the lower end thereof connected to a delivery tube, means for effecting relative movement between the plungers and the containers to align pins in a container with the passage through the plunger, and means actuated independently of said means for effecting relative movement between the plungers and containers for controlling discharge of pins from the plungers to the delivery tubes, the last-mentioned means including a pair of cams mounted on and oscillatable around said vertical support, said cams having

portions extending through the walls of each of said plungers and being spaced apart vertically the length of a pin, said cams being staggered with relation to the longitudinal axis of each plunger, and means to actuate said cams to cause a single one of each series of pins in a plunger to be discharged therefrom at a time.

3. A machine for distributing and assembling radio tube contact pins in parallel array within a mold, comprising a plural section hopper for receiving the pins, a fixed vertical standard passing centrally through said hopper, said hopper being vertically reciprocable on said standard, a plurality of hollow plungers each fixedly mounted on said standard beneath said hopper and with the upper end of each plunger slidably passing through an opening in the bottom of a corresponding section of said hopper, means to move said hopper downwardly on said standard to cause said plungers to protrude upwardly into the corresponding hopper sections and thereby to agitate the pins contained therein, said means also serving to raise said hopper to cause a plurality of said pins to fall end to end into the bore of each plunger, a pair of pin discharge control cams mounted adjacent the lower end of each plunger, said cams having portions extending through the side wall of each plunger, one cam acting as a pin stop cam and the other cam acting as a pin release cam, means to operate said cams in timed sequence to cause the discharge of only one pin at a time from the lower end of each plunger, and pin delivery means connecting the lower end of each plunger to said mold.

4. A machine according to claim 19 in which said cams are mounted for turning around said standard, said cams having an actuating solenoid also supported from said standard for rotating the cams respectively to their pin-stopping and pin-releasing positions.

5. A machine according to claim 19 in which said pin delivery means comprises a series of flexible tubes each connected at one end to the lower discharge end of a corresponding one of said plungers and connected at the opposite end to a common receptacle for said pins, said receptacle having a discharge control diaphragm and means to operate the diaphragm to allow all of the pins in the receptacle to be discharged simultaneously therefrom and into said mold, said receptacle being removable from said mold and having aligning means for aligning the pins in the receptacle with corresponding portions of said mold into which the pins are to be discharged.

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Certificate of Correction

Patent No. 2,507,185 May 9, 1950

GERHARD GUNTHER SCHNEIDER

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 35, and column 6, line 1, for the claim reference numeral "19" read *3*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of March, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.