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3,150,762 9/1964 Tricini..... 198/33(RI)

OTHER REFERENCES

Syntron Company Catalog Code P Bulletin PF- 51365
(1964) P.4 and 9

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[54] **TOOLING FOR VIBRATABLE BOWL**
1 Claim, 7 Drawing Figs.

[52] U.S. Cl..... **198/33AA,**
198/220BC, 221/171

[51] Int. Cl..... **B65g 47/24**

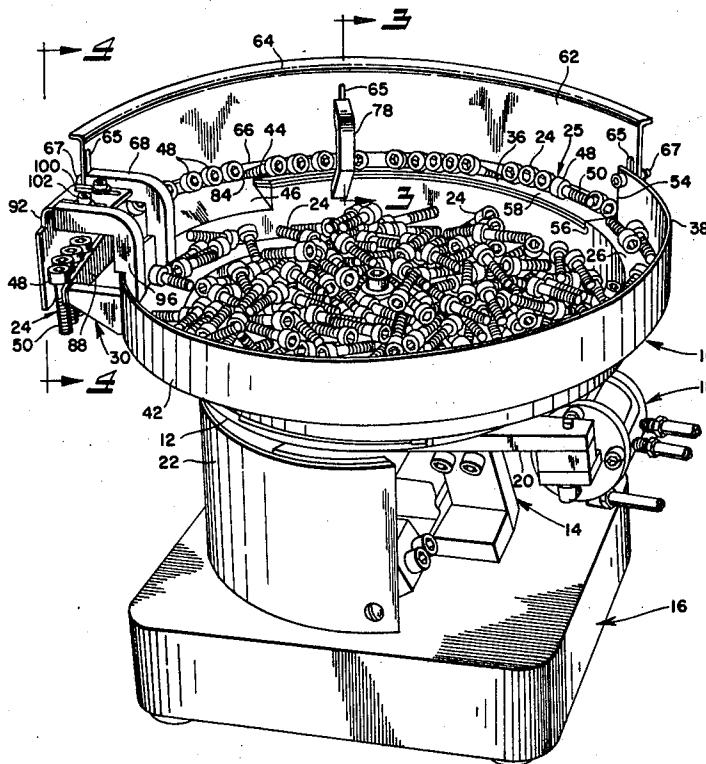
[50] Field of Search..... 221/167,
171; 198/33.R1, 220 (B40)

[56] **References Cited**

UNITED STATES PATENTS

2,799,383 7/1957 Spurlin..... 198/220(B40)
2,888,169 5/1959 Hausman et al. 221/167

ABSTRACT: There is provided, for use with a vibratable bowl adapted to feed parts from a supply of randomly disposed parts in said bowl, such parts being similarly geometrically configured and having an enlarged portion, e.g. a headed bolt, means coacting with a track portion of said bowl characterized by adjustability in an axial direction to define an axially adjustable slot adapted to receive a narrower portion of the part and to retain the enlarged portion and to guide the parts to a discharge gate which is characterized by adjustability in a radial direction. Thus, the bowl is adjustable to accommodate parts of varying sizes.



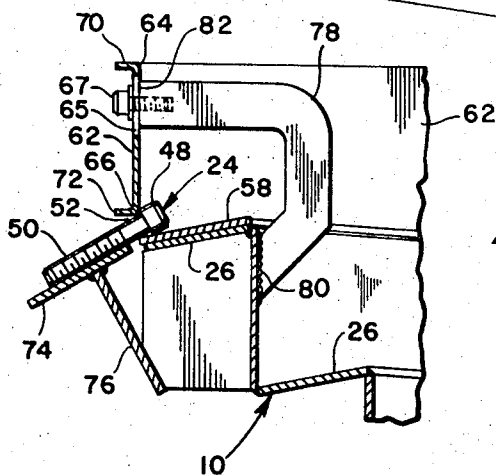
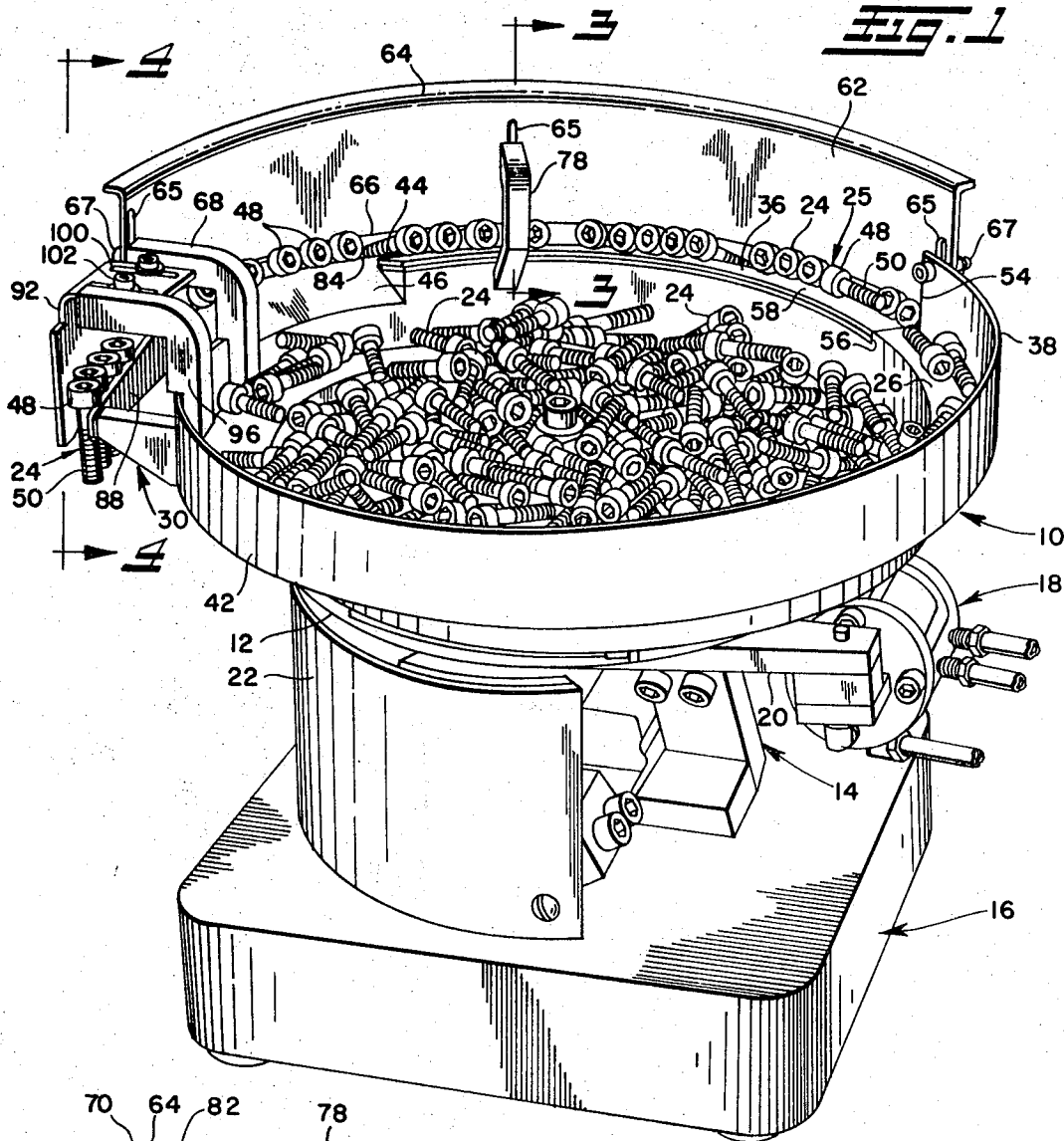


FIG. 3

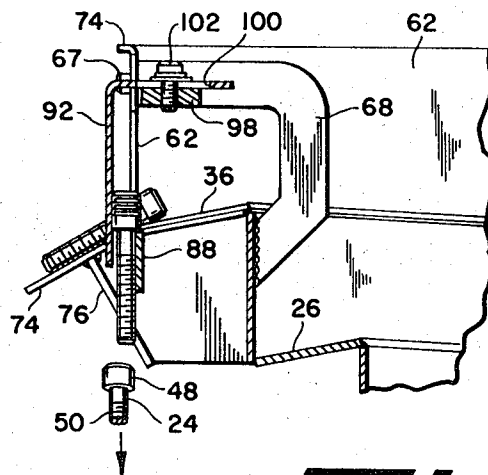
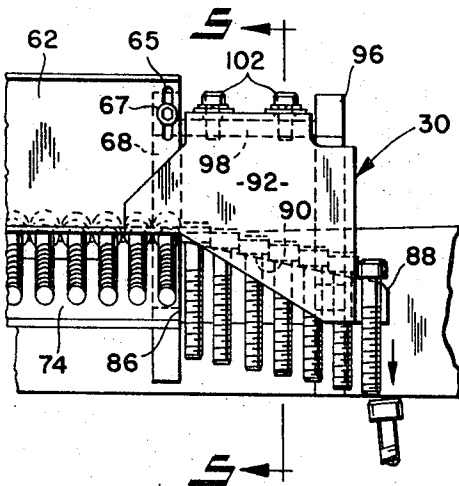
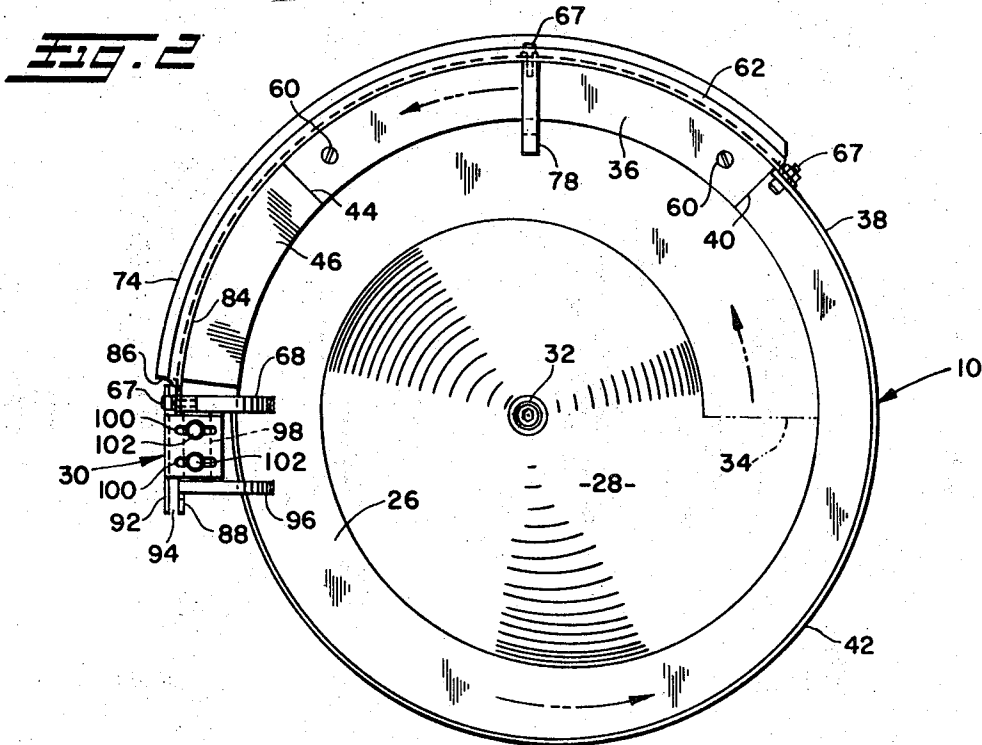
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SHEET 2 OF 3



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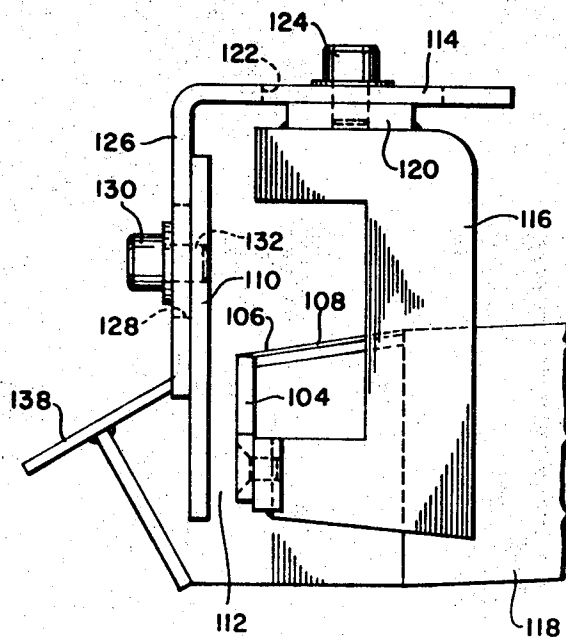


FIG. 6

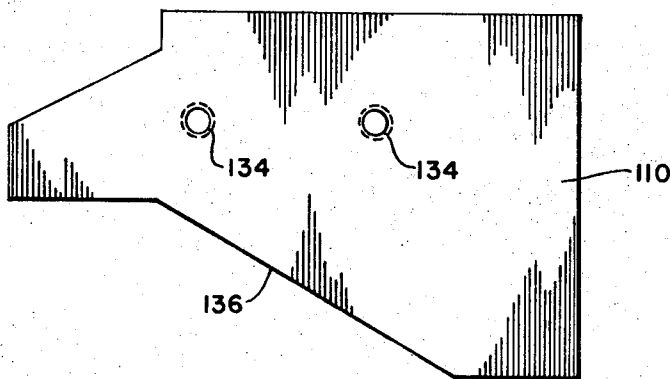


FIG. 7

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TOOLING FOR VIBRATABLE BOWL

BACKGROUND OF INVENTION

This invention relates as indicated to an improved bowl for feeding parts from a supply of such parts contained within the bowl, said bowl including means operatively connected therewith for orienting the parts and directing their path of travel to a discharge point. The improved device of this invention is characterized by means enabling the adjustment of coaxing elements whereby a single piece of apparatus may be made to accommodate a variety of sizes of parts.

Bowl-type parts feeders are well known. It has been customary in the past to provide a basic bowl structure characterized by a bottom, sometimes conically shaped to aid feeding, and an upstanding peripheral wall supporting a trackway which proceeds in an axial direction from the bottom to the upper rim of the bowl. A spiraliform bowl provides an inclined pathway which gradually moves radially outwardly with respect to the axis of the bowl. A cylindrical bowl provides an inclined pathway having each convolution disposed above the preceding one. Parts driven by vibratory means enter the trackway adjacent its lower extremity and because of the nature of the vibratory impulses imposed on the bowl, are where they are discharged into apparatus able to accept parts serially and in an oriented position. While a simple structure of the type just described might be found to be useful with certain parts of simple geometric configuration, the great bulk of parts which are handled in this manner require that other operations be performed on the parts while in transit from the bottom of the bowl to the upper rim of the bowl in order to select from those in transit only those which are properly oriented. To the accomplishment of this end, "tooling" is provided to perform various functions or operations upon the parts in transit within the bowl. Tooling for this purpose often becomes most elaborate but nevertheless highly efficient in insuring that the parts discharged from the bowl are properly oriented in all respects for utilization by subsequent machines or in subsequent operations.

Bowls which are tooled in this manner for automatic feeding and orienting of parts of predetermined geometric configuration and size have heretofore been limited by their ability to handle but a single size part. For example, parts which are handled very frequently by vibratory bowl feeding means include bolts and studs, bolt blanks, etc. characterized by portions which are enlarged relative to other portions. These products are, for example, produced in a variety of sizes. To accommodate a variety of sizes, the present invention provides tooling means which are adjustable, thereby rendering a given bowl structure more versatile with respect to its ability to handle parts of different sizes. Prior art devices have been handicapped in this respect by tooling to a predetermined part size. Thus, when a change in the part size occurred or was called for, a change in the bowl in its entirety or in the tooling of said bowl became essential. The present invention obviates this problem particularly with respect to headed bolts, studs, rivets, and other such parts which contain an enlargement.

BRIEF SUMMARY OF INVENTION

Briefly stated, the present invention provides a vibratable bowl adapted to impart motion to shaped articles of common geometric configuration, said motion being imparted along a predetermined axially progressing inclined pathway. Each article includes an enlarged portion and is selected from a supply of randomly disposed such articles in said bowl by means operatively connected with the bowl for orienting the articles and for constraining the path of travel thereof to a discharge gate. These means include a track portion and an adjacent upstanding wall portion spaced from the track in an axial direction to define an axially adjustable slot along the track of substantially uniform width. Means are provided for axially adjusting the width of the slot to allow escapement of a portion of each of the shaped articles, and to insure retention of the enlarged portion thereof. Discharge slot means are also

provided including a discharge rail portion for guiding and supporting coaction with the shaped articles and a parallel planar retainer or baffle member radially spaced from the rail portion a predetermined distance, which spacing is also adjustable. Thus, in preferred embodiments, adjustment may be made in a portion of the trackway where the parts are traveling in one spacial disposition by an adjustment in a direction parallel to the axis of the bowl, and in a second portion of the path where the parts are traveling in a different spacial disposition by a radial adjustment with respect to the axis of the bowl. These two simple adjustments enable utilization of bowls so equipped to handle a variety of sizes of parts.

BRIEF DESCRIPTION OF FIGURES

The invention may be better understood by having reference to the annexed drawings illustrating a preferred embodiment of the invention and wherein:

FIG. 1 is an illustration in perspective showing a vibratable parts feeding bowl equipped in accordance with the present invention mounted on a plate which is in turn mounted upon spring means secured to a base, and including pneumatic vibration-inducing means for driving the bowl to impart a vibratory motion thereto.

FIG. 2 is a top view of the apparatus shown in FIG. 1 and illustrates the spiral path traversed by the parts from the bottom of the bowl and including a track portion fitted with adjustable upstanding wall means, and showing a radially adjustable discharge gate.

FIG. 3 is a fragmentary cross-sectional view of the apparatus as it appears in the plane indicated by the line 3-3 in FIG. 1 and illustrating a means of supporting headed parts in transit through the track portion fitted with the adjustable upstanding wall.

FIG. 4 is a fragmentary side elevation of the discharge gate as it appears in the plane indicated by the line 4-4 in FIG. 1.

FIG. 5 is a fragmentary cross-sectional view showing the radially adjustable discharge gate as it appears in the plane indicated by the line 5-5 of FIG. 4.

FIG. 6 is a fragmentary cross-sectional view showing another form of radially adjustable discharge gate including a vertically adjustable rail guide member.

FIG. 7 is a plan view of the vertically adjustable rail guide member shown in section in FIG. 6.

DETAILED DESCRIPTION OF THE DRAWINGS

The apparatus illustrated in FIG. 1 embodies major components which have been previously described in the prior art and need not be reproduced herein. For example, with the exception of the tooling hereinafter more specifically described, the vibratory parts feeder bowl utilized to elevate parts from a supply of randomly disposed parts on the bottom of the bowl may be designed in accordance with the teachings of U.S. Pat. No. 3,280,964 dated Oct. 25, 1966. However, any parts feeding bowl whether cylindrical, spiraliform, or variations thereof, may be modified in accordance with the teachings of the present invention to achieve the beneficial results thereof.

Drive means are provided to impart a vibratory motion to the bowl. The nature of the drive means is not critical to the present invention. Accordingly, to impart vibratory motion to the parts feeding bowl, pneumatic drive means, which are preferred, electromagnetic drive means, or mechanical drive means may be employed. Reference may be had to U.S. Pat. No. 2,861,548 dated Nov. 25, 1958, for the details of a pneumatic free piston vibration inducing device which is particularly useful in accordance herewith.

The means by which the bowl is supported upon the springs which guide the apparatus in its oscillatory movement are also not critical to the present invention. However, a preferred leaf-type spring support system and base plate construction is shown in FIG. 1.

Referring now more particularly to FIG. 1, there is provided a vibratable bowl 10 securely mounted to a base plate 12

which is in turn mounted upon a leaf spring system generally indicated at 14. The springs are in turn securely mounted on a massive base 16. Pneumatic drive means generally indicated at 18 coact between arms radially extending from base plate 12, one of which appears in FIG. 1 and is identified as arm 20. This system provides the means for imparting oscillatory motion to the bowl. In a preferred embodiment drive means 18 is a free piston, pneumatically driven vibration-inducing device. Shroud 22 protects the spring guiding and supporting system beneath the bowl 10.

Referring now to FIGS. 1 and 2, there is here shown in both perspective and top plan view a bowl adapted to retain a supply of parts, e.g. headed bolts, in a central portion thereof, and having a trackway 26 spiraling upwardly and outwardly from the bowl bottom 28 along an inclined arcuate path to a discharge gate generally indicated at 30. As best shown in FIG. 2, the bottom 28 of the bowl 10 is desirably conically shaped or otherwise downwardly and outwardly sloped to aid in movement of the parts toward the periphery, and hence in position for entry onto the trackway 26. Bowl 10 is conveniently secured to the base plate 12 by means of a bolt 32 extending along the axis of the bowl.

The trackway 26 commences at a point indicated by the numeral 34. At this point, the track may desirably be considerably wider, for example twice as wide as the track adjacent the terminal portion 36 which is adjacent the marginal edge 38 of the bowl 10. As indicated above, the path of the track 26 is generally spiral and moves axially upwardly from the bottom of the bowl and radially outwardly. This track desirably decreases in width as it progresses up the sidewalls of the bowl to a transition point 40 at the beginning of a terminal track portion 36 of constant width. In order to improve stability of parts moving along the track 26, the surface of the trackway, as best shown in FIG. 1, is desirably sloped slightly downwardly and outwardly to aid in retention of parts on the trackway. Thus, the angle formed by upstanding wall 42 and trackway 26 is, for best results, less than 90°, for example 83°. Up to this point, the structure of the bowl differs little from vibratory parts feeding bowls heretofore used.

As previously indicated the terminal portion 36, which is a continuation of the track 26, and desirably progresses upwardly and outwardly in the same manner as the trackway 26, leads to a discharge gate 30. The width of the terminal portion 36 is conveniently constant over its arcuate course from the transition point 40 to the termination 44 of the article supporting surface. At the termination 44, the surface of the track 26 abruptly discontinues and is sloped downwardly and inwardly to provide a chute portion 46 for return of misaligned parts to the random supply of parts, such as bolts 24, contained within the central portion of the bowl 10. For example, if bolt 25 (FIG. 1) which is disposed on the terminal track portion 36 in a misaligned manner continues along the terminal portion 36 toward discharge gate 30 without the shank portion 50 falling through the slot 52, upon reaching the chute portion 46, it will be cascaded back into the central supply region of the bowl to await its turn for reentry onto the trackway 26.

The peripheral or upstanding wall 52 is conveniently integral with the trackway 26 either by being formed in the process of casting a bowl from a material, such as aluminum, or by welding the upstanding wall portion 42 to a previously fabricated trackway 26. The wall portion 42 functions to retain parts selected from the random supply on trackway 26, and terminates adjacent the upper edge of the bowl at terminal edge 54. At this point, the parts traversing the trackway 26 are generally in a position to have performed upon them a next succeeding orientation stop. In the case where the track width gradually decreases, as in the embodiment shown in FIGS. 1 and 2, parts, such as bolt 25, which lie crosswise of the track, will ultimately fall off the track 26 because the center of gravity of the part is located inwardly of the inner edge of the track. Thus, the parts are returned to the random supply, and only those parts susceptible to the further orientation pass beyond terminal edge 54 of upstanding wall 42.

In the preferred embodiment shown in FIG. 1, the trackway 26 is desirably offset slightly as at the shoulder 56 to receive a replaceable track liner 58 which may be secured in any manner to the track bed such as by flathead screws 60. (FIG. 2)

The terminal portion 36 is also desirably outwardly sloped, and in any event, to retain parts on terminal track portion 36, an adjustable wall 62 is provided. The wall 62 desirably has parallel upper and lower marginal edges 64 and 66, respectively. The adjustable wall portion 62 is fabricated with a curvature which desirably coincides with the curvature of the terminal track portion 36 to the entry into the discharge gate 30. An axially extending slot 52 is provided between the surface of trackway 26 and the lower marginal edge 66 of adjustable wall portion 62. The width of slot 52 may be preset to any predetermined dimension within the limits of adjusting means hereinafter described, and which is less than that which will permit escapement of an enlarged portion of the part being handled, such as the head portion 48 of bolts 24, but sufficient to allow escapement of the smaller portions, such as the shanks 50. Adjustment is conveniently effected in the embodiment illustrated by means of axially extending adjustment slots 65 at each end of adjustable wall section 62 and an intermediate slot 65 which cooperate with adjusting bolts 67 in turn fixed to a stationary member such as peripheral wall 42, L-bracket 68 adjacent the discharge gate 30 and fixedly mounted on bowl 10 and C-bracket 78 attached to bowl 10. Loosening of bolts 67 permits adjustment of the width of slot 52 by movement of wall 62 in an axial direction a desired amount and then resetting bolts 67 so as to prevent further axial movement.

Adjustable wall 62 is conveniently and desirably provided along its marginal edges 64 and 66, respectively, with radially extending flanges 70 and 72, respectively. For best results, it is desirable that the lower marginal edge 66 of the adjustable wall 62 shall be rounded as shown in FIG. 3 as will result by bending the marginal portion of the metal strip used to fabricate wall 62 to form the flanges 70 and 72. This is easily accomplished in the fabrication of the wall member by rolling, for example, and imparts a decided advantage to the wall member, particularly when it is to be used for the vibratory feeding of threaded members such as bolts where the threads extend along the shank to a point close to the head.

As shown in FIG. 3 and in FIG. 1, after the parts enter the terminal portion 36 of the trackway, the portions of the parts of smaller diameter or size are permitted to escape through the slot 52 and extend in a generally radially outward direction, whereas the enlarged portions of the parts, for example the heads 48 of the bolts 24, are retained, the width of the slot 52 being insufficient to permit escapement of such enlarged portions. As previously indicated, it is desirable to provide a track liner 58. Where the parts are moving with what is normally a sharp edge (for example the edge of the shoulder between the head 48 and the shank 50) in contact with the surface, a hardened surface is better able to withstand the wear encountered. Hence the track liner 58 is provided. It is replaceable when wear has progressed to a point that interference with part transport is encountered.

As indicated above, the shank portion 50 is permitted to escape through the slot 52 to become disposed in a generally radially outwardly extending position. It has been found through experience that elongated parts such as headed bolts are more rapidly transported in this position. There is a higher rate of orientation of parts in an apparatus of this kind, and less jamming of parts is experienced when disposed in the manner indicated. To aid in the support of the parts as they traverse the terminal portion 36, a track apron 74 is conveniently provided as a support for the outwardly extending portions of the parts in transit. The apron 74 is desirably downwardly inclined from the horizontal, and is geometrically configured to closely follow the contour of the terminal portion 36 of the trackway 26. The apron 74 is conveniently supported by any suitable bracket means such as a support arm 76 which is in turn secured to the body of the bowl 10.

A C-bracket 78 is conveniently provided as a guide for the adjustable wall 62 to aid in maintenance of its relative radial position with respect to the central axis of the bowl 10. A bracket 78 is secured by any suitable means to the peripheral wall 42, such as by a weldment 80 (FIG. 3). The free extremity 82 of the C-bracket 78 is dimensioned for disposition closely adjacent the adjustable wall 62 and serves to prevent radially inwardly directed displacement of the wall 62. Bracket 78 does not interfere with the passage of parts on the trackway because of its configuration and the location of its extremities. Such radial displacement of the adjustable upstanding wall 62 either outwardly or inwardly could result in jamming or improper feeding of parts.

As indicated above, the surface of the terminal track portion 36 terminates at 44 adjacent return chute 46. However, outer track edge 84 continues along the path of travel of the parts and provides a sharp edge for engagement of the heads or enlarged portions 48 of the bolts 24. The edge 84 terminates at the discharge gate 30. The apron 74 abruptly terminates at apron extremity 86 (FIG. 2). This allows the projecting shank portions 50 to swing downwardly as best shown in FIG. 4, and thereby dispose the parts with their longitudinal axes aligned in a position for utilization, and for entry into the discharge gate 30. Many parts are most conveniently utilized in subsequent operations in a vertical position, and for bolts being fed to a thread-rolling machine, for example, a vertical position is desired.

The discharge gate 30 of a preferred embodiment of this invention is best illustrated in FIGS. 4 and 5. Whereas the adjustment in the adjustable wall 62 is in an axial direction, the adjustment available in the discharge gate 30 is conveniently in a radial direction. To support the parts issuing from the track 26 and the terminal track portion 36, there is provided a rail 88 which is a straight line extension of the track edge 84. In the illustrated case of headed bolt parts, the shoulder portion between the head and the shank of the bolts 24 is engaged by the track edge 84 and in turn by the upper edge 90 of the rail 88. To prevent the parts from becoming disengaged from the rail 88, a baffle plate 92 is provided. The space between the rail 88 and the baffle plate 92 also defines a slot 94, the width of which is adjustable by radial movement of the plate 92. To support baffle plate 92, there are provided a pair of similarly configured brackets, one of which has previously been identified as the bracket 68, and the other of which is identified as the bracket 96. The brackets 68 and 96 are secured to the bowl 10 by any suitable means such as welding or bolting and serve to support between them crossmember 98. Parallel slots 100 are provided in the radially extending inwardly directed portion of L-shaped baffle plate 92. The slots 100 are dimensioned to receive settable bolts 102 which extend into the crossbar 98 in threaded engagement therewith.

Another form of discharge gate has also been found to be quite useful and expands the range of sizes of parts and is shown in FIGS. 6 and 7. The form of discharge gate here shown utilizes not only the characterizing radial adjustment of the type shown in FIGS. 4 and 5, but also an axial adjustment to support the parts issuing from track 26 and the terminal track portion 36. There is provided a rail 104 which is a straight line extension of the track edge 106 in the embodiment shown in FIGS. 6 and 7. To prevent parts from becoming disengaged from the rail 104, an adjustable baffle plate or rail guide 110 is provided. The space between the rail 104 and the adjustable baffle plate 110 defines a slot 112, the width of which is adjustable by radial movement of the bracket 114 which carries adjustable baffle plate 110. To support the bracket 114 there is provided a C-bracket 116 which is secured to the runoff portion of a bowl such as bowl 118 by any suitable means such as welding or bolting, and serves to support a crossmember 120. An elongated slot 122 in the upper surface of the bracket 114 is dimensioned to receive a settable bolt 124 which extends into crossmember 120 in threaded engagement therewith. Thus, by loosening bolt 124, the bracket 114 may be moved radially inwardly or outwardly as may be desired.

The depending arm 126 of bracket 114 provides a support for the adjustable rail guide 110. In like manner with bracket 114, the depending portion may be provided with one or two parallel elongated slots 128 adapted to coact with bolt 130 or a pair of bolts 130, the shanks 132 of which extend through the slot 128 and into threaded engagement with rail guide 110.

A suitable contour for the rail guide 110 is shown in the plan view of FIG. 7. Also shown are the threaded holes 134 adapted to receive bolts 130.

The addition of the vertically adjustable rail guide 110 with the contour shown simplifies the hardware and tooling required to extend the type of feeder shown in FIG. 2 to a much larger range of shank diameters and head shapes on bolt blanks, for example, than was heretofore possible in the absence of the addition of interchangeable discharge gates. The adjustable rail guide 110 being adjustable in a radial direction and having the contoured surface 136 which can be adjusted in an axial direction eliminates the need for extra hardware. The crucial areas of a fixed geometry of the type shown in FIGS. 4 and 5 becomes apparent when one considers that a considerable clearance may be required for a $\frac{5}{8}$ -inch diameter shank in order to permit the shank extending out at an inclined angle, as for example on apron 138, to pass from the end of the slot adjacent the apron 138 and fall into a vertical position for traverse of the discharge gate including slot 112. The envelope described by a point on the top surface of the shank as it follows a trajectory from an inclined position to a vertical position describes an opening through which a head of a small bolt at the other end of a size spectrum could easily fall. Thus, this opening must be closed in order to operate the equipment effectively with a small bolt as well as its being adaptable for use with a large bolt.

To operate the device, a supply of parts to be supported and oriented, such parts being similarly geometrically configured, for example headed bolts of uniform type length, shank diameter and head size, are disposed in the bottom of bowl 10 in random fashion. Air under pressure is supplied to the free piston vibration-inducing device 18. The piston, not shown, in vibration-inducing device 18 oscillates in a plane which is close to the plane of base plate 12 and along a path which is generally parallel to the plane of base plate 12. Frequency and amplitude of vibration may be controlled and adjusted in accordance with the teachings of U.S. Pat. No. 3,203,738 to obtain optimum feeding of the parts. The operation of the springs 14 and the base 16 under the impulses imparted by the drive means 18 is well understood and forms no part of the present invention. Under the influence of the vibratory motion imparted to the bowl 10, the parts are urged upwardly and outwardly along the track 26, some of the parts falling off of the track back onto the central supply. Those that continue along the trackway are generally positioned so that their longitudinal axes lie along the path of travel. At the termination 54 of the integral wall portion 42, the parts encounter an axially extending swing-out slot 52 following the outer marginal edge of terminal track portion 36. The width of the slot 52 has previously been adjusted and set to permit escapement of the shank portions 50 through the slot, but to prevent escapement of the enlarged head portions 48. The large percentage of parts entering the terminal track portion will undergo "swing-out" and will move rapidly with little or no jamming in a swung out position supported by the apron 74. Those few parts which do not undergo swinging out will be removed from the track and returned to the random supply of parts when such misaligned parts encounter the chute 46 just prior to the discharge gate 30. The continuation of the outer edge 84 of terminal track portion 36 leads directly to the upper marginal edge of the rail 88. The apron 74 terminates abruptly allowing the shank portions to swing by gravity into a vertical position. The discharge gate 30 which contains a straight track continuation section in the form of the rail 88 also contains the baffle plate 92 disposed parallel to the rail 88 and spaced therefrom a predetermined adjustable distance to define a slot 94. The width of the slot 94 is also preset pursuant to the dimensions of a given part so as to permit passage of the parts

through the gate without their becoming dislodged from the rail 88 until the free extremity of the rail 88 is reached. All parts exiting from this point are in a properly spacially oriented position for subsequent operations.

By setting the width of the slot 94 greater than the thickness of the smaller portion 50 of the articles being transported but less than the width of the enlarged portion 48, the articles 24 are retained upon the rail 88 such that they cannot fall off until they reach the exit as shown in FIGS. 4 and 5.

There has thus been provided improved tooling for vibratory bowl-type parts feeders whereby the range of sizes of parts which can be handled by a given bowl structure is greatly expanded over that which has heretofore been possible. For example, rivets and bolts having shank diameters of from about three thirty-seconds inch to five-eighth inch may be vibratorily transported and oriented in the same piece of apparatus, slot openings for both the axially extending slot 52 and the radially extending slot 94 being adjusted accordingly. Parts may be fed in oriented fashion such that from 200 to 800 oriented parts per minute may be accepted from the exit at the free extremity of the rail 88. The difficulties with alternate systems for arranging parts in this fashion include fewer number of parts per minute, a twisted track portion in order to effect a change in spacial disposition of the parts from near horizontal to the desired vertical, a tendency to jamming, etc. Twisted track portions heretofore used occupy considerable space and present a geometry which cannot easily be adjusted over a range of diameters. In the present apparatus, the swing out or apron portion is terminated abruptly and a baffle plate extended vertically engages the head and holds it in a position so that the head now rides on an inner track and is prevented from lateral movement away from the track by the baffle plate. Simple adjustments allow the apparatus to accommodate different sizes of parts.

I claim:

1. For use with a vibratable bowl adapted to impart motion along a predetermined axially progressing spiral path to shaped articles of common geometric configuration each including an enlarged portion and a shank portion, and defining a radially extending annular shoulder portion therebetween, and selected from a supply of randomly disposed such articles in said bowl; means operatively connected with said bowl for orienting the articles and for constraining the path of travel

thereof to a discharge gate, said means including a track portion having a fixed upstanding wall portion and an adjacent adjustable upstanding wall portion spaced from said track in an axial direction opposite the outer marginal edge of said track portion to define an axial slot along said track of substantially uniform width, and means for axially adjusting the width of said slot for escapement of a portion of each of said shaped articles and retention of said enlarged portion thereof, an outwardly extending downwardly inclined apron along the outer marginal edge of said track portion, means adjacent the discharge gate for returning to the random supply of shaped articles any articles no portion of which extends through said slot including an abrupt discontinuity in the inner marginal edge of the track and the balance of track portion prior to the discharge gate being downwardly and inwardly sloped, said discharge gate including:

- a. a vertically disposed single straight downwardly sloped planar rail tangentially continuing the outer marginal edge of said track and positioned and dimensioned to support said shaped article on its edge by the radially extending shoulder of said shaped article and to engage the shank portion;
- b. a generally L-shaped member having vertically disposed planar baffle plate portion and a horizontally disposed portion including elongated parallel slots, said baffle plate being radially outwardly spaced from and adjacent said rail to define a discharge slot having a width greater than the thickness of the shank portion and less than the thickness of the enlarged portion and being shaped to engage only the enlarged portion;
- c. a pair of C-shaped brackets secured to the fixed upstanding wall portion at spaced points adjacent the discharge gate and extending outwardly therefrom for supporting said baffle plate; and
- d. means for adjusting the width of said discharge slot in a radial direction including a spacer bar supported between said C-shaped brackets and bolts coacting in the slots between said horizontally disposed portion of said L-shaped member and said spacer bar, to allow movement of said baffle plate in a radial direction from said rail to permit said baffle plate to adjust the width of said discharge slot.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,578,142 Dated May 11, 1971

Inventor(s) Warren C. Burgess, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 24, after "are" insert "--carried along the inclined pathway toward the upper rim of the bowl--.

Column 3, lines 55 and 56, after "slot 52" delete "upon reaching the shank portion 50 falling through the slot 52"; line 59, change "52" to --42--.

Signed and sealed this 31st day of August 1971.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents