Dec. 19, 1933.

G. E. NICHOLSON

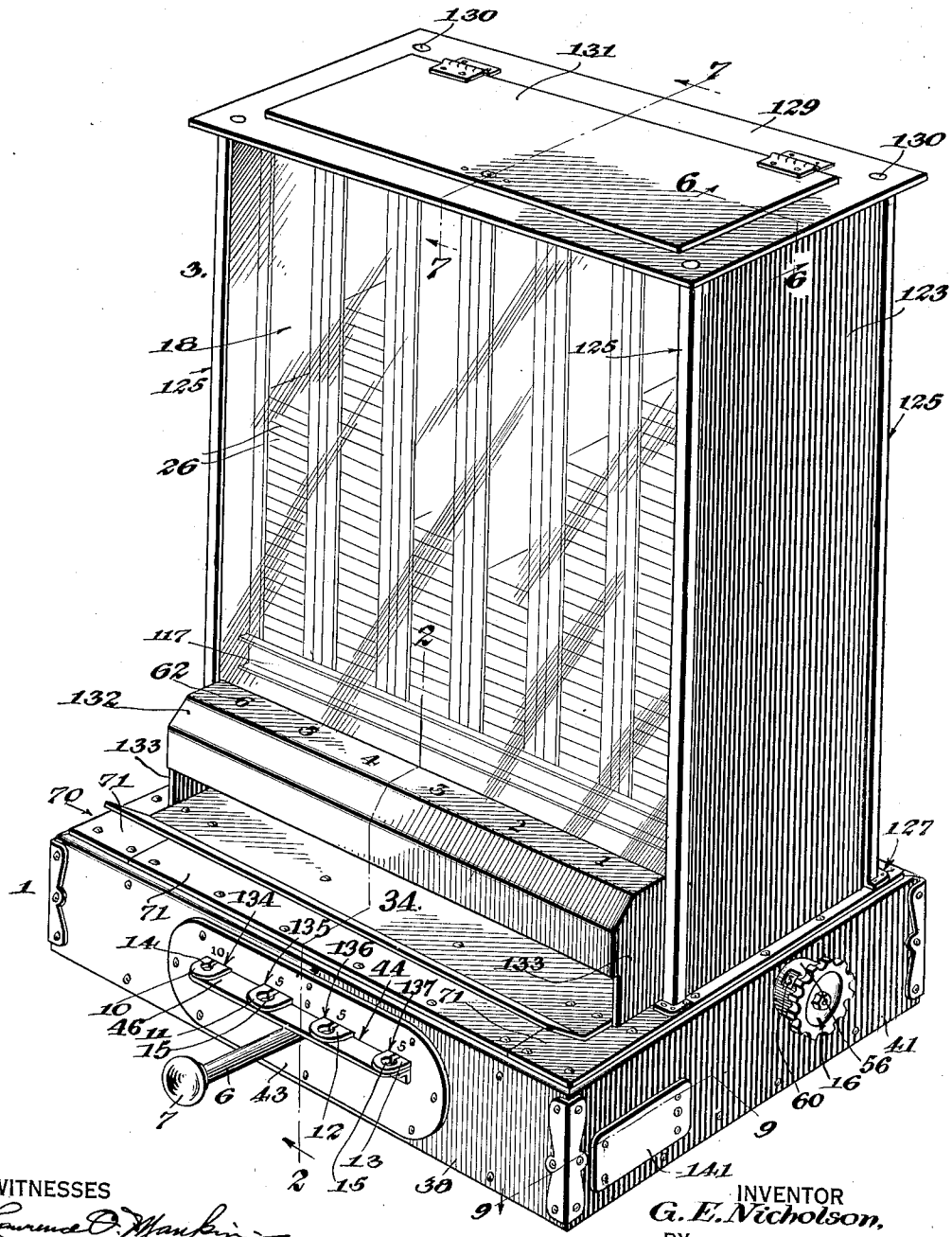
1,940,603

VENDING MACHINE

Filed May 27, 1929

8 Sheets-Sheet 1

Fig. 1.



WITNESSES

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VENDING MACHINE

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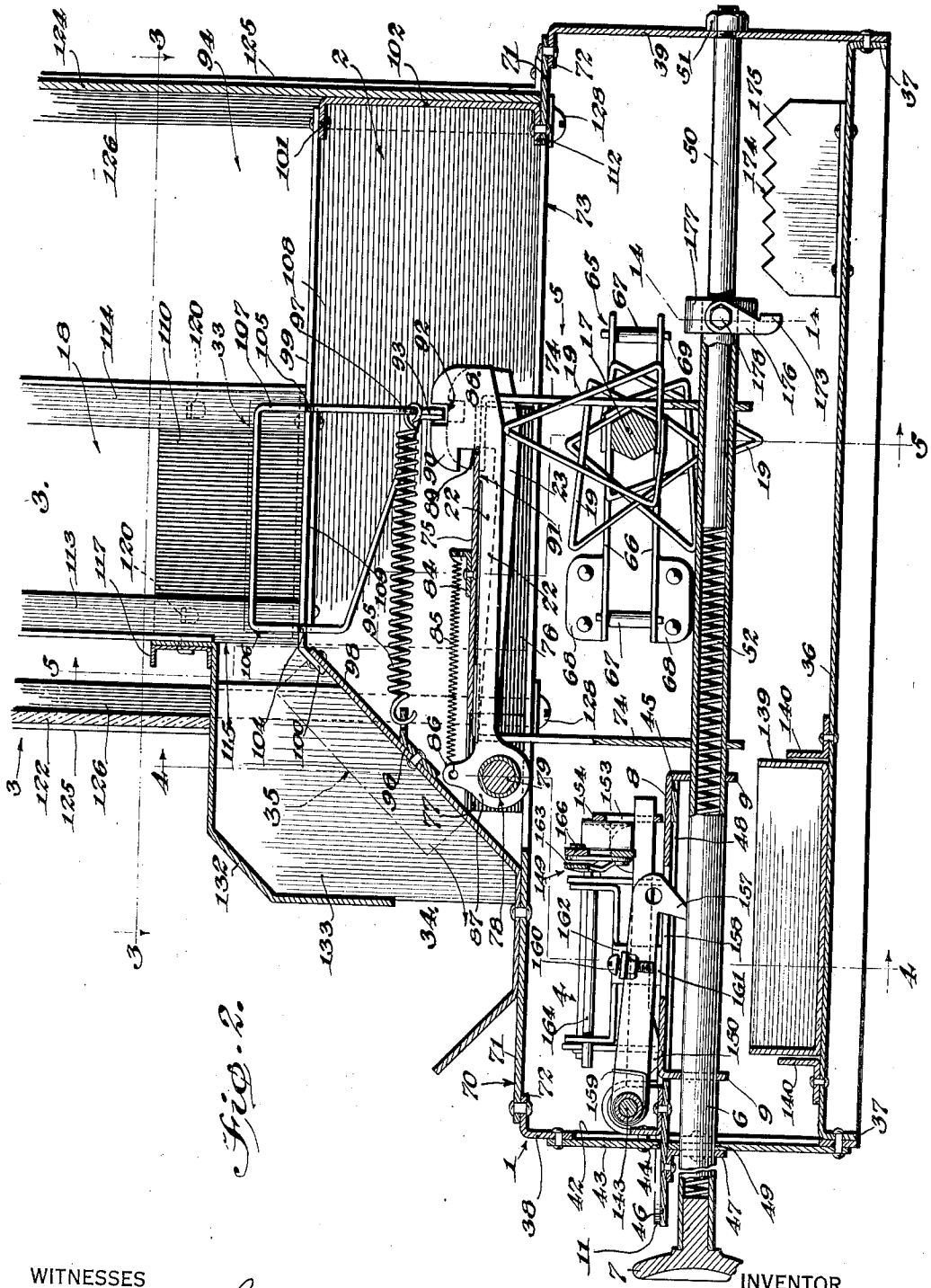


Fig. 2.

WITNESSES

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Dec. 19, 1933. G. E. NICHOLSON 1,940,603

VENDING MACHINE

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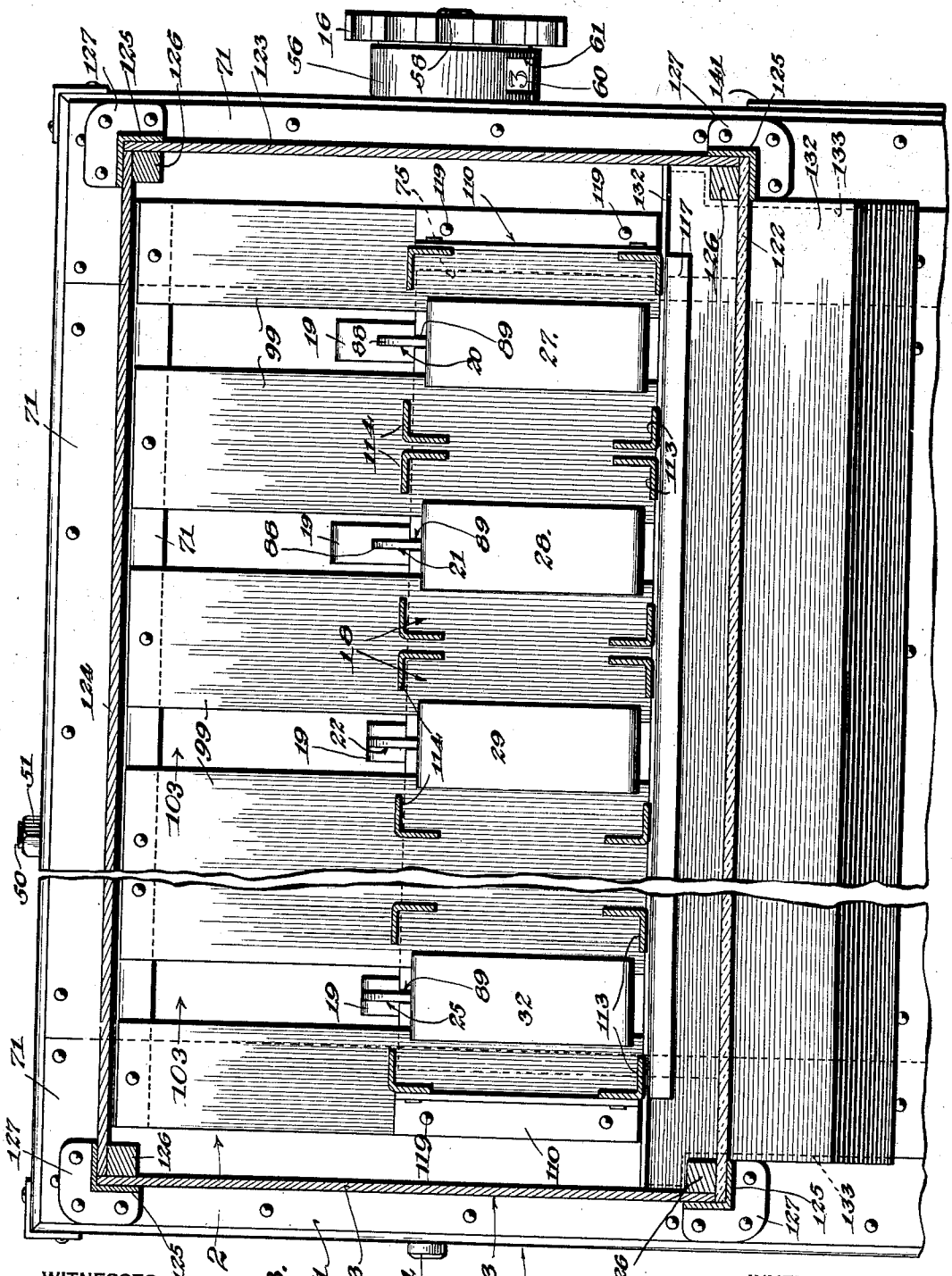


Fig. 3.

WITNESSES

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Dec. 19, 1933. G. E. NICHOLSON 1,940,603

VENDING MACHINE

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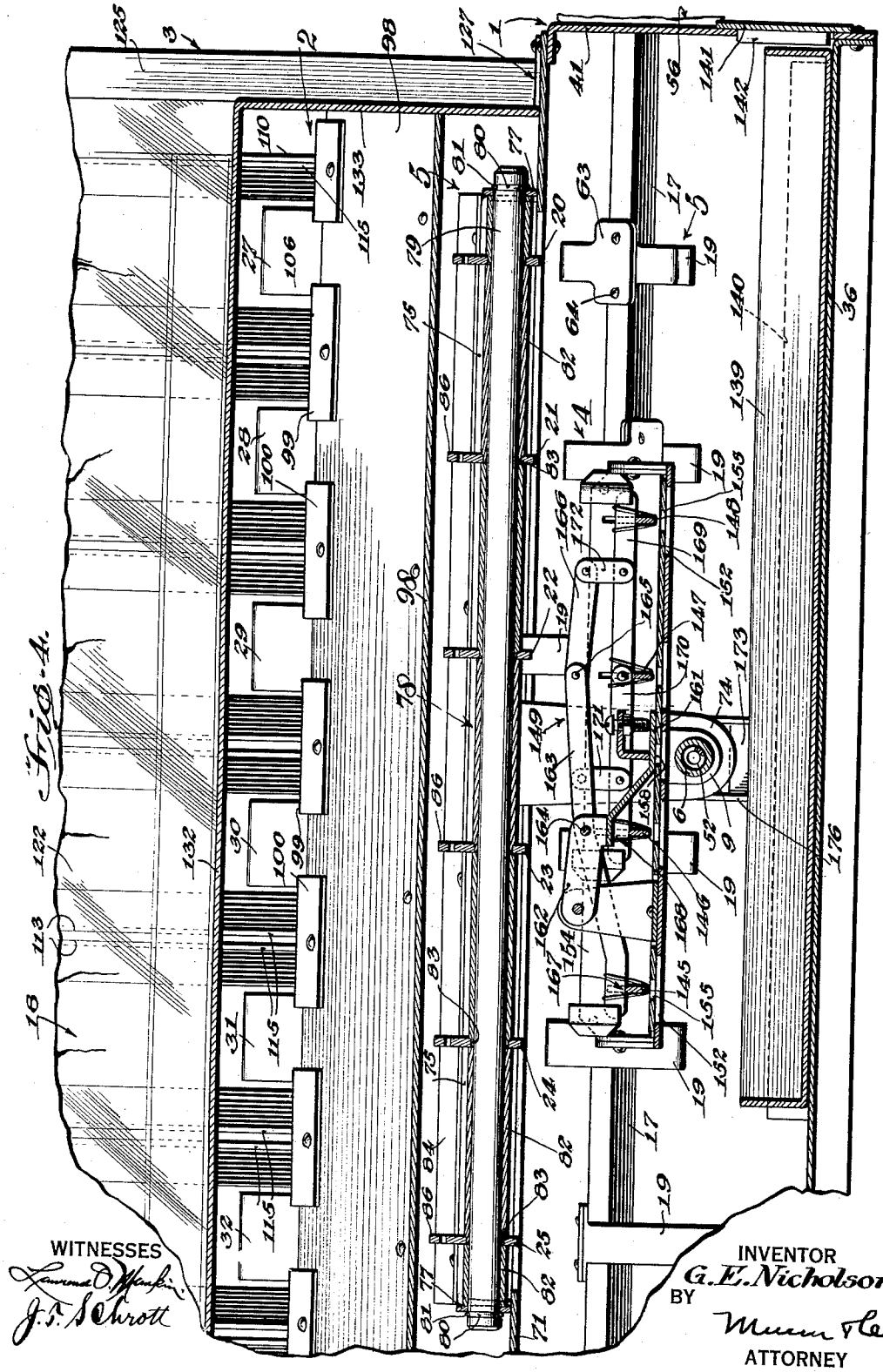


Fig. 4.

WITNESSES

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1,940,603

VENDING MACHINE

Filed May 27, 1929

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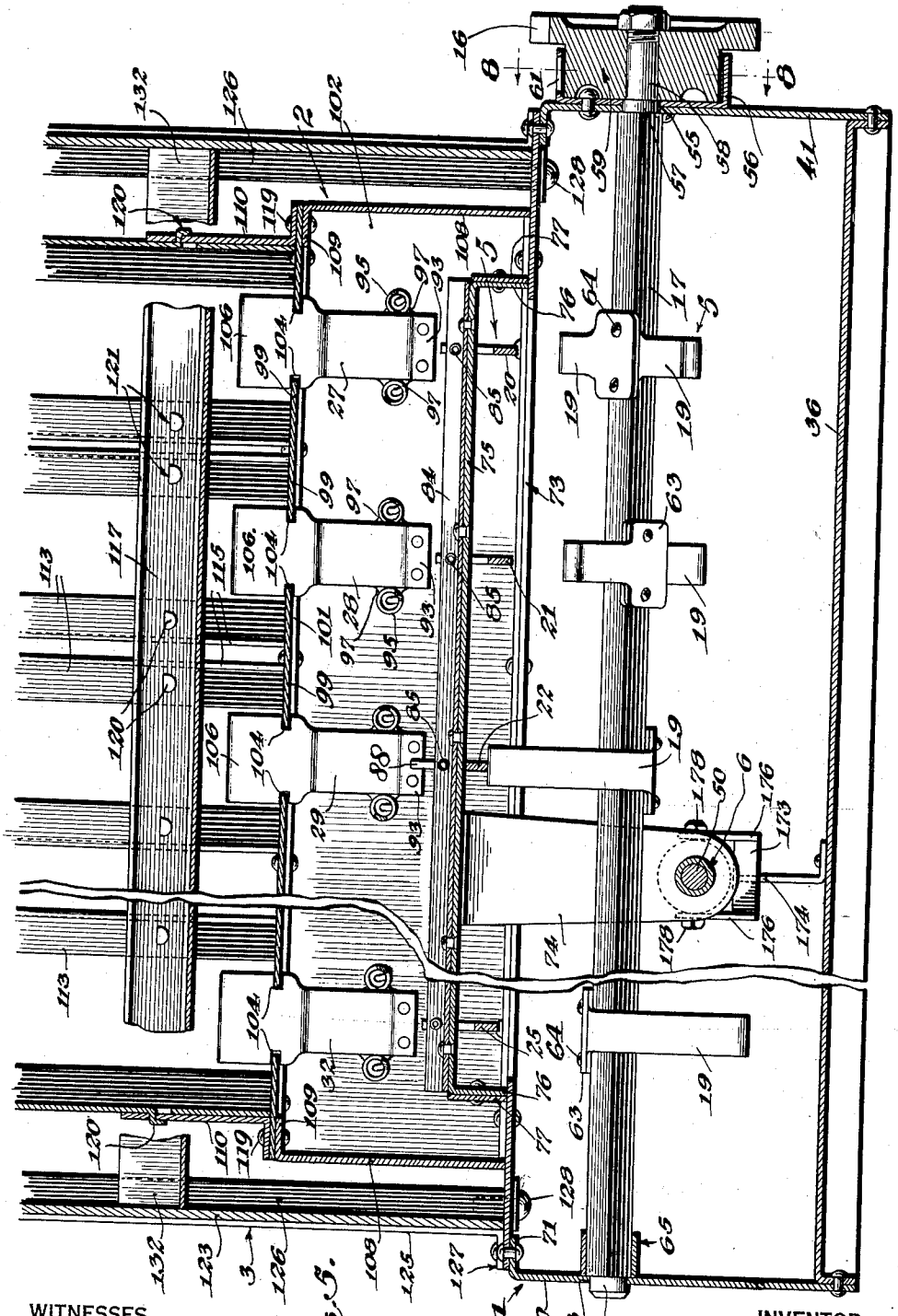


Fig. 5.

WITNESSES

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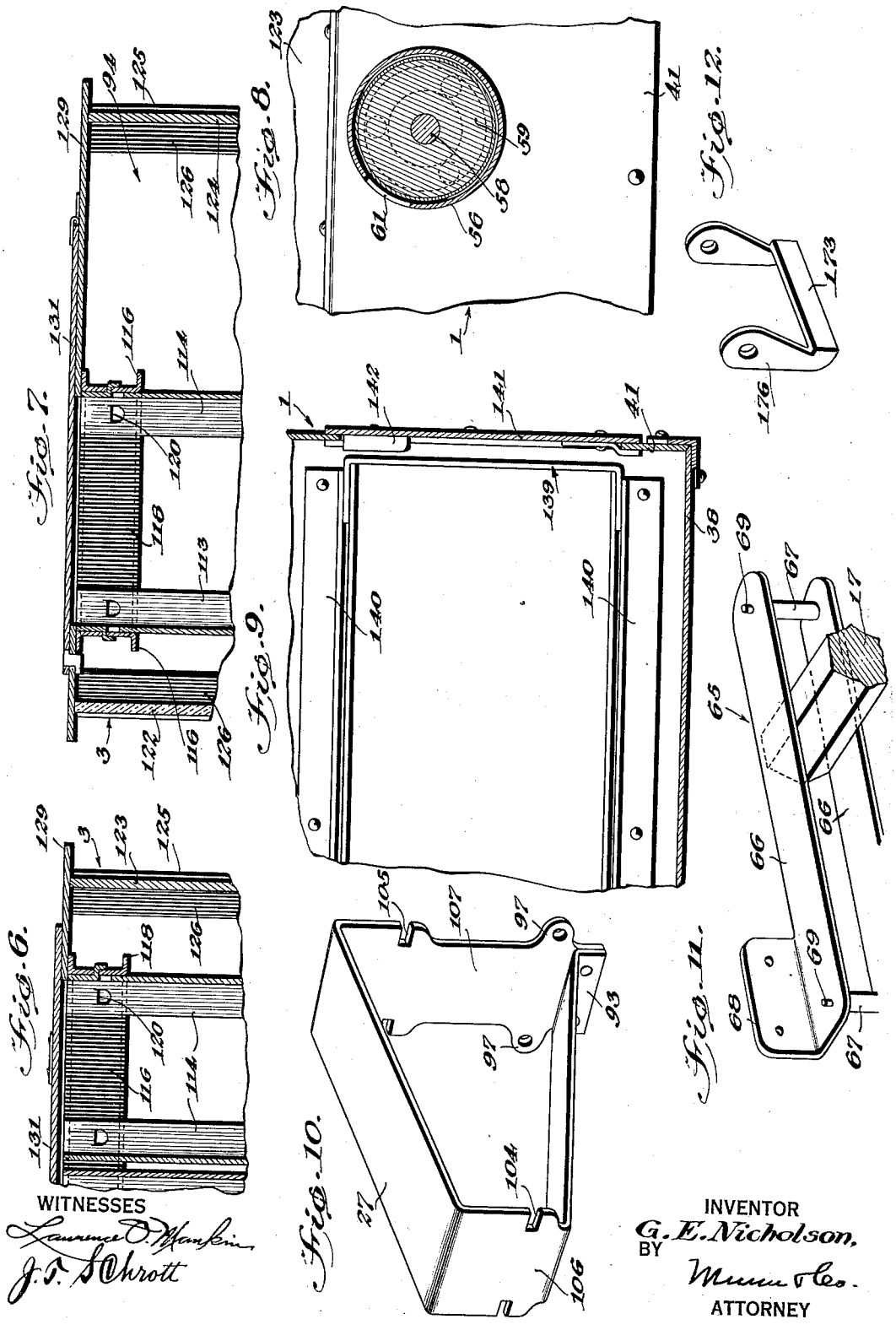
Munn & Co

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Dec. 19, 1933. G. E. NICHOLSON 1,940,603

VENDING MACHINE

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Fig. 16.

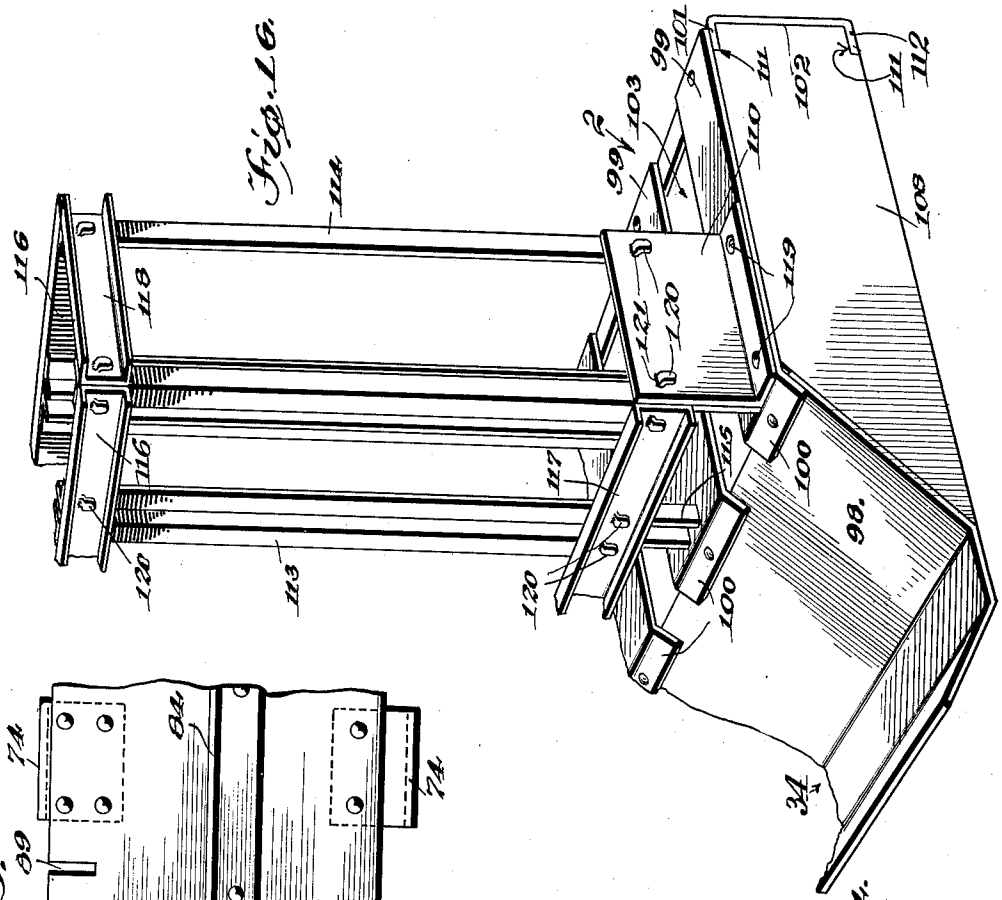


Fig. 13.

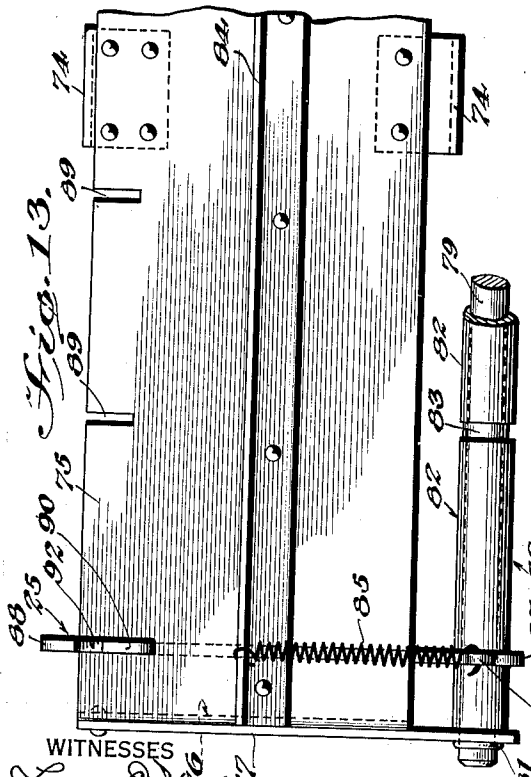


Fig. 15.

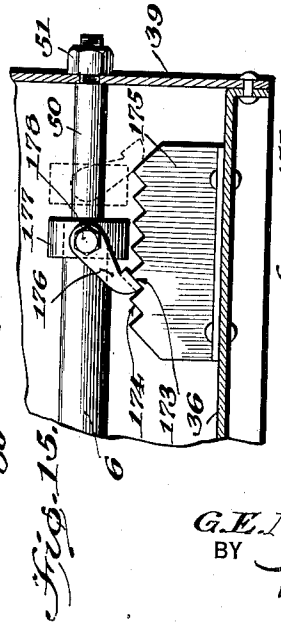
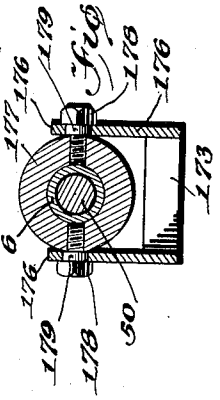


Fig. 14.



WITNESSES

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Dec. 19, 1933. G. E. NICHOLSON 1,940,603

VENDING MACHINE

Filed May 27, 1929 8 Sheets-Sheet 8

Fig. 19.

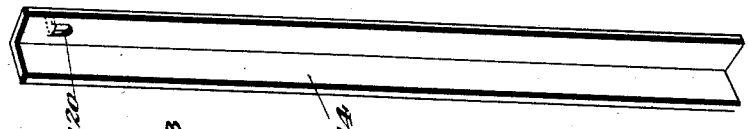


Fig. 17

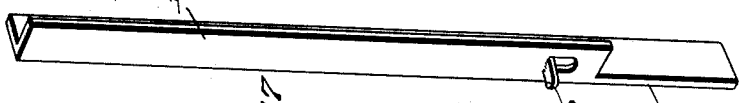


Fig. 20.

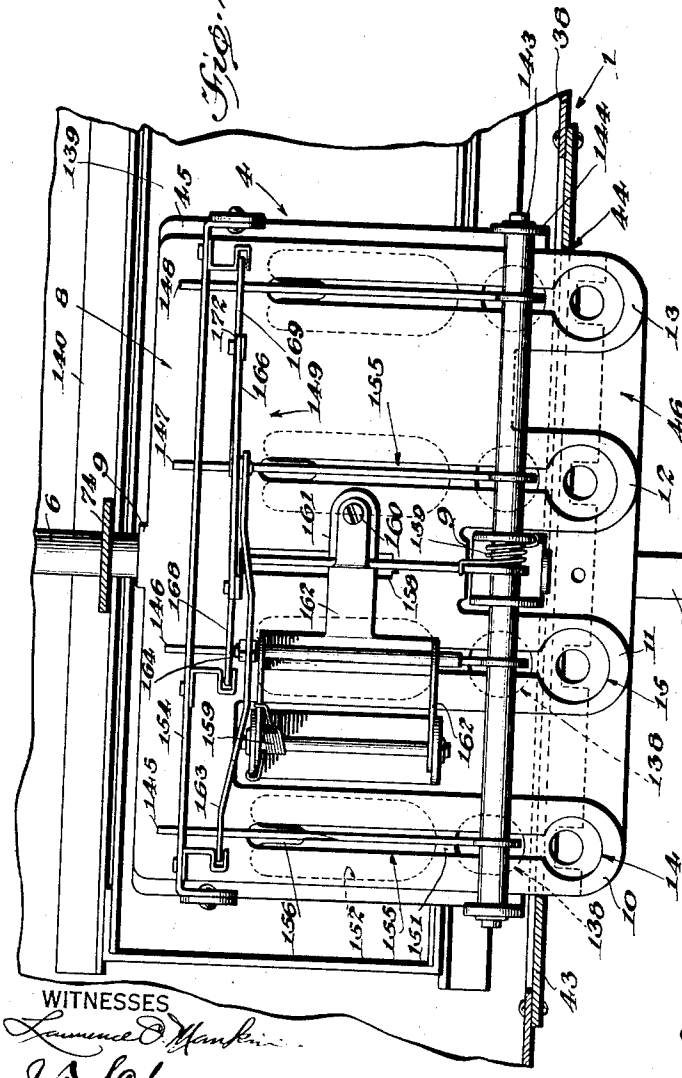
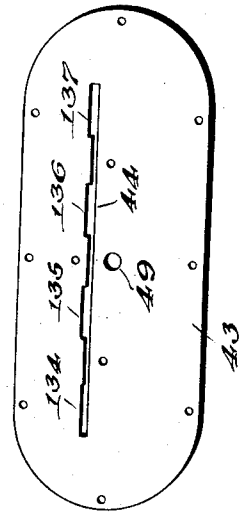


Fig. 18.



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Patented Dec. 19, 1933 1,940,603

UNITED STATES PATENT OFFICE

1,940,603

VENDING MACHINE

George E. Nicholson, Tulsa, Okla., assignor to Vending Machine Corporation of America, Tulsa, Okla., a corporation of Delaware

Application May 27, 1929. Serial No. 366,426

17 Claims. (Cl. 312—66)

This invention relates to improvements in vending machines and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide a vending machine which is capable of operation by such coins of designated multiples as the intending purchaser may possess in sufficient numbers to comprise the cost of the vendible article, so that a sale will not be lost nor will the purchaser be inconvenienced by his having coins of only one denomination.

Another object of the invention is to provide a vending machine which will protect both the intending purchaser and the vendor to the extent that the delivery of the article to the purchaser is insured before his money is dropped to an inaccessible point within the machine, and the vendor is guarded against the abstraction of an article by the placing of coins of an insufficient sum into the machine, or by the placing of mutilated coins into the machine, or through attempts to defraud the mechanism by seeking to repeat the operation with one set of coins.

Another object of the invention is to provide a vending machine which can be made to contain a wide variety of articles of merchandise from which the intending purchaser can indicate his selection and abstract the selected article by placing coins of available denominations of a sufficient sum in a single coin control which is common to all of the articles of merchandise.

A further object of the invention is to make possible a material reduction in the cost of manufacture of a vending machine by virtue of the fact that two or more columns of articles of merchandise are placed within the purview of a single coin control.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawings, in which:

Figure 1 is a perspective view of the improved vending machine,

Figure 2 is a vertical section taken on the line 2—2 of Figure 1,

Figure 3 is a horizontal section taken on the line 3—3 of Figure 2,

Figure 4 is a vertical section taken on the line 4—4 of Figure 2,

Figure 5 is another vertical section taken on the line 5—5 of Figure 2,

Figure 6 is a detail section taken on the line 6—6 of Figure 1,

Figure 7 is another detail section taken on the line 7—7 of Figure 1,

Figure 8 is a detail cross section taken on the line 8—8 of Figure 5,

Figure 9 is a detail horizontal section taken on the line 9—9 of Figure 1,

Figure 10 is a perspective view of one of the discharger slides,

Figure 11 is a detail perspective view of a portion of the multi-sided selecting shaft and the spring clip for holding it to its settings,

Figure 12 is a detail perspective view of the ratchet pawl,

Figure 13 is a detail plan view of a portion of the slidable selector plate, one of the selector fingers being shown, and the finger pivot being broken off,

Figure 14 is a detail cross section taken on the line 14—14 of Figure 2 showing the ratchet pawl and the sleeve by which it is mounted on the tubular plunger,

Figure 15 is a detail view of a portion of Figure 2 illustrating how the ratchet pawl will coact with the ratchet plate in preventing a premature return of the plunger,

Figure 16 is a detail perspective view of a portion of the internal framework,

Figure 17 is a detail perspective view of one of the container angles,

Figure 18 is a detail elevation of the front cover plate,

Figure 19 is a perspective view of one of the rear angle bars,

Figure 20 is a plan view of the coin control in particular, portions of the base being shown in section and the coin drawer also being shown.

This machine represents a development in semi-automatic vending apparatus in keeping with the comparatively recent departure from the cost of many articles of merchandise which could be purchased for the pre-eminent five cent piece. There are now many articles on the market which sell for fifteen cents, and this particular value is taken as an example for the exemplification of the principle of the vending machine.

As will be made apparent in the following description, this principle is capable of considerable expansion. It is often the case that the intending purchaser of a fifteen cent article will have coins of only one denomination in his possesion, with the result that if the machine were inflexible in its characteristic the vendor would lose a sale and the purchaser would be inconvenienced to the extent of having to go elsewhere to make his purchase. In other words, if the machine could be worked only by a dime and a five cent piece, and

the purchaser had only three five cent pieces in his possession the two foregoing disadvantages would be suffered at once.

However, it is one of the purposes of the machine to prevent these very things. The three five cent pieces will do as well to consummate the sale as would a dime and five cent piece in combination. The expansion of the principle recently alluded to, would comprise such an extension of the design that any multiples of coins up to a dollar value would be made to work the machine by inserting the proper combinations of coins. But all of this is more within the province of the coin control, and although enough of the latter is described in this application to give the reader an intelligent understanding thereof, attention being directed to the patent to G. E. Nicholson for Coin control, August 19, 1930, No. 1,773,632 for the details.

The various advantages of the vending machine are best enlarged upon as the description of the latter proceeds. Attention is directed to the drawings. In its general aspect the machine comprises a base 1, superbase 2, (Fig. 2), merchandise container 3, coin control 4, and selector mechanism 5. The coin control is located in the base 1 which for this and other purposes is made hollow. The selector mechanism 5 is located in the base 1 in part, but certain components thereof are situated in the superbase 2 which for this purpose is in communication with the hollow base.

Looking at the machine from the front one sees the protruding end of a tubular plunger 6 (Figs. 1 and 2) which has a button 7 in which the ball of the thumb may be inserted to exercise a push. This plunger has a coin plate 8 rigidly connected with it by means of a pair of lugs 9 into which the plunger is fitted and firmly secured in any known manner. The plunger and coin plate work together, and as the former is reciprocated the latter will be slid. Only a part of the coin plate protrudes at the front of the base 1 (Fig. 1), and that part is subdivided into a plurality of receivers successively designated 10, 11, 12 and 13.

The first of these has a hole 14 exactly the size of a dime. The remaining receivers have holes 15 exactly the size of a five cent piece. The placing of a dime in the hole 14 and a five cent piece in any one of the holes 15 will unlock the coin control 4 so that one complete inward push of the plunger 6 can be made. Should the intending purchaser not have a dime but have three five cent pieces, he can insert them in the holes 15 of the receivers 11, 12 and 13, and accomplish the same result. But before pushing in on the plunger he will bring the selector mechanism 5 into play.

The outer control of this mechanism resides in a selector knob 16. This is fixedly connected with a multi-sided selecting shaft 17 (Figs. 2 and 5). There will be as many sides to the shaft 17 as the machine possesses merchandise columns 18 (Fig. 1). A machine arranged to dispense six kinds of articles of merchandise would be equipped with a selecting shaft having six sides. On the same principle more or less varieties of merchandise may be handled by the machine. Any material increase in the number of such varieties would require an increase in the cross sectional size of the shaft 17 so that the peripheral surface may be sufficiently expansive to permit the formation of adequate flat places or sides.

Each of the sides is made the foundation of a lifter. The lifters are designated 19. They are shown triangular in shape, this shape combining simplicity and ease of manufacture with a performance of the necessary function. The lifters comprise open frames the bases of which are attached to the successive sides of the shaft 17, the application taking on the form of a spiral. Each of the lifters points in a different radial direction, and since the shaft has six sides it follows that the lifters are one-sixth of a circumference apart.

Thus it can be understood that by turning the knob 16 any one of the lifters will be successively brought into play as regards a series of selector fingers 20, 21, 22, 23, 24 and 25, (Fig. 4), upon which they operate. There is one finger for each of the lifters 19 and one finger for each of the columns 18. The articles of merchandise 26 are stacked upon discharger slides 27, 28, 29, 30, 31 and 32, (Fig. 4), and by a full movement of a particular slide first to the rear and then to the front of the machine, the nethermost article 26 will be lowered to the position 33 in Fig. 2 then discharged into a chute 34 as indicated at 35. The foregoing survey is intended to give the reader a general idea of the structure and operation of the machine. Neither is complete, and the detailed description of the structure will be followed by a more detailed description of the operation.

The base 1 comprises a bottom plate 36 which is peripherally flanged at 37 to provide places for the attachment by means of rivets or the like of a front end plate 38, rear end plate 39, left side plate 40 and right side plate 41. The first of these has a large opening 42 (Fig. 2) primarily intended for the introduction of the coin control 4 and its associated parts, but concealed by a cover plate 43 which is usually riveted in place and partially in common by those rivets that connect the front end plate with the flange 37.

A slot 44 in the cover plate 43 (Fig. 18) primarily contains a base plate 45 upon which the coin plate 8 is slidable. The base plate is both a support and guide for the coin plate. The latter and all its mechanism rest upon the base plate. Most of the base plate is concealed within the hollow base 1. The visible portion at the front of the cover plate 43 comprises and is herein known as a shelf 46. This shelf is secured to an angle bracket 47, and since this in turn is secured to the cover plate it follows that the base plate is afforded a rigid support upon the hollow base 1.

Guidance of the coin plate 8 is afforded by a slot 48 in the base plate 45 and which is traversable by one of the lugs 9. This lug contributes toward keeping the coin plate centered. The function is completed by the tubular plunger which has adequate bearings. One of these consists of a hole 49 in the cover plate 43. The other comprises a spindle 50 which is received by the inner end of the plunger. This spindle is secured to the rear end plate 39 in an immovable position by a nut 51. A spring 52 interposed between the inner end of the spindle and the plug of the button 7 tends to keep the plunger pressed forwardly.

A hole 53 (Fig. 5) receives the rounded trunnion 54 of the selecting shaft 17. Matching holes 55 in the right side plate 41 and an attached selector cup 56 receive a similarly rounded trunnion 57 near the opposite end of the selecting shaft. These trunnions constitute the bearings for the shaft. The latter trunnion terminates in a reduced and partially threaded spindle 58 upon which the knob 16 is fitted and secured in the

manner plainly shown in Fig. 5. The hub 59 of the knob fits in the cup 56 and abuts the shoulder of the trunnion 57 that the reduced spindle 58 provides. The position of the knob is thus limited as concerns the bottom of the cup.

Numerals 60 (Figs. 1 and 3) or other suitable legends are inscribed upon the periphery of the hub 59 to co-operate with a single sight opening 61 in the cup 56. There will be a number for each of the sides of the shaft 17. These will run from "1" to "6" to agree with the numerals 62 (Fig. 1) denoting the various columns 18. An intending purchaser wishing to buy an article in that column 18 designated by the numeral "3" will turn the knob 16 until the corresponding numeral appears at the sight opening 61. In doing this he will bring the successive lifters 19 into play against the respective selector fingers, the third one of which finally supports the finger 22 in the elevated position illustrated in Figs. 2 and 5.

If the purchaser had wanted an article from the column 18 designated "1" he would have turned the knob 16 until the corresponding legend (not shown) on the hub 59 had appeared at the opening 61, when the first lifter 19, reading from right to left in Figs. 4 and 5 would have stopped under the first finger 20 and held this in the elevated position. The same would have been true of the sixth finger 25 if the knob had been turned until the sixth legend had appeared at the sight opening.

Reference was made to the triangular shape of the lifters 19 as being due both to expediency and utility. Inasmuch as these are cams it is conceivable that they might be of some other shape, but being of the particular shape named they are readily constructed from strips or stamping of metal and bent to form. The base ends of each strip are enlarged at 63 (Figs. 4 and 5) to provide an adequate hold for screws 64 by which attachment is made to the shaft 17. While the lifters are composed of thin metal they, nevertheless, are quite rigid, this being largely due to their shape.

A spring clip 65 (Figs. 2 and 11) holds the multi-sided shaft 17 in its various settings. This clip comprises a pair of spring arms 66 which are separated by spacers 67 both at the free end and at the end where the spring clip is secured to the left side plate 40 by means of rivets passing through flanges 68 bent from said arms. Each of the spacers has pintles 69, those of the spacers at the free end of the clip riding loosely in holes in the spring arms so that limited yielding of the spring arms is permissible as the shaft 17 is turned. The spring arms bear against opposite sides of the shaft and keep the latter at its adjustments.

The top 70 of the base 1 is composed of a set of four plates or strips 71 which are riveted to the upper flanged ends 72 of the front, rear, left and right plates 38 to 41 inclusive in rectangular formation as plainly shown in Figures 1 and 3. This formation of the top leaves a large central opening 73 (Figs. 2 and 5) through which communication of the base 1 and superbase 2 is established. It is through this opening that a pair of legs 74 extends from the underside of a slidable selector plate 75, a portion of which and its appurtenances are shown in Fig. 13. The legs are riveted or otherwise secured to the plate and the legs in turn are fixedly secured to the tubular plunger 6 so that as the latter is reciprocated there is simultaneous movement of the plate 75 as well as the coin plate 8 previously alluded to. The side edges of the plate 75 are bent down at 76 and are secured to runners 77 which, in common with the bent down ends 76, ride upon the side top plates 71 in the manner shown in Figs. 2 and 5.

No guidance for the runners 77 is necessary at these points for the reason that the connection of the legs 74 with the plate 75 and the plunger 6 is perfectly rigid. The bearings of the plunger thus constitute the means for guiding the selector plate in its sliding rectilinear movements. Although no guidance occurs at the points of contact of the runners 77 and the flanges 76 upon the plates 71, yet these do serve as bearings which stabilize the selector plate in the lateral direction.

Pivotal carrying means 78 bridges the forwardly protruding ends of the runners 77 upon which it is mounted. The carrying means, although given this common designation, is really a composite structure. It consists of a shaft 79 which extends full length of the selector plate and slightly beyond the runners 77 by which it is carried as shown in Figs. 4 and 13. The extensions of the shaft are annularly grooved at 80 to receive spring rings 81 which retain the shaft. A plurality of sleeves 82 is assembled upon the shaft between the runners, the end sleeves being short and the intermittent sleeves being long to preserve the particular spacing of the selector finger series 20 to 25.

Each of the sleeves 82 with the exception of the short sleeve at the left (Fig. 4) has an annular reduction 83 to define what becomes an annular groove when the sleeves are assembled. Each of the selector fingers is fitted in place as the sleeves are assembled upon the shaft 79. The sleeves thus constitute both the bearings and spacers for the selector fingers. The fingers are capable of limited turning upon the common pivot 78 when actuated by the lifters 19, the extent of turning being seen in Fig. 2 by a comparison of the positions of the finger 22 and its companion 23.

A clip 84 secured lengthwise of the selector plate 75 and crosswise of the machine constitutes the anchorage for one end of each of a series of springs 85, the other ends of which are attached to lugs 86 upstanding from the hubs 87 of the selector fingers. It is these hubs that have circular holes which receive the annular reductions 83 or, in other words, which have bearing in the annular grooves which these reductions afford. The springs 85 tend to keep the heads 88 of the fingers down in respect to the selector plate 75, in engagement with the selector mechanism 5 and out of range of the discharger slides 27 to 32.

Each head 88 is received by a slit 89 of which there is a series in the rear edge of the selector plate 75 as partially shown in Figure 13. The heads are guided in their movements by the side walls of the slits. A projection 90 and a confronting step 91 limit the movements of a particular selector finger, the structure of all of the fingers being alike. Locking means comprising a notch 92 in the upper edge of the head and a lug 93 on the respective discharger slide which is received by the notch when the respective selector finger is raised by the companion lifter 19, makes connection between a particular discharger slide and the plunger 6.

A push on the plunger 6 under this condition will displace a given discharger slide from its column 18 into the space 94 of the container 3. The stack of articles will drop the distance of one article, and upon a release of the plunger the

spring 52 will push the latter out and replace both the selector plate 75 and the particular discharger slide so that the latter may push the article from position 33 to position 35 in Figure 2 within reach of the purchaser. The displacing action of each discharger slide will be against pairs of springs 95 (Figs. 2 and 5) which at the forward ends are attached to a spring clip 96 (Fig. 2) and at the rear ends to ears 97 on the sides of the slides.

A discharger front plate 98 provides a mounting for the spring clip 96 and bottom of the chute 34. To the latter end this plate is bent as shown, one of the panels being secured to the front plate 71 of the top 70. The upper edge of the plate 98 is the anchorage of a series of discharger guides 99 (Figs. 2, 3, 5 and 16). These guides are nothing more than parallel strips of metal, the front ends of which are bent at 100 (Fig. 4) to agree in inclination with that of the upper part of the front plate 98.

The rear ends of the guides 99 are secured to the upper flange 101 of a rear channel plate 102. The guides 99 are spaced at 103 (Fig. 16), and it is in one of these spaces that the discharger slide 27 (Fig. 10) which is here used as an example, has alined notches 104 and 105 in the pusher and rear ends 106 and 107 by which the edges of adjoining guides 99 are received so that the discharger slide can move back and forth as actuated by its finger 20.

As seen in Fig. 10, the discharger slide is composed of a strip or stamping of sheet metal bent into the appropriate form. The ends of the strip or stamping are riveted or otherwise secured together to compose the lug 93 previously referred to. It is with this lug that the notch 92 of the companion selector finger engages. The discharger slide is balanced upon its guides by the use of a pair of springs 95 on each side. The balancing of the spring pressure prevents any tendency toward binding of the slide upon its guides 99 which would result if the spring pressure were otherwise applied.

Side plates 108 complete the superbase 2. The front ends of these plates are cut at an angle. The inner portion of the front plate 98 derives its inclination by virtue of being applied at its widest extremities to the angled ends of the plates 108. Flanges 109 are bent in from the upper edges of the side plates to indirectly provide mounting for end column plates 110 (Figs. 2, 3, 5 and 16). The rear ends of the side plates 108 are recessed at 111 to receive the upper flange 101 of the channel plate 102 as well as the lower flange 112 of the latter. In effect, the recesses countersink the flanges so that the top and bottom of the channel plate 102 are flush with the corresponding edges of the side plates.

Reverting briefly to the selector fingers 20 to 25, it is to be observed that the nether edge of the finger 22 is parallel with the selector plate 75 when the finger is lifted to what may be known as the operative position in Fig. 2. It is important that this parallel relationship shall be established and preserved. The companion lifter 19 assumes the stationary position, and it is in respect to the apex of the triangular lifter that the finger 22 performs its sliding movement when the plunger 6 is actuated. If the nether edge of the finger were other than parallel with the plate 75 some deviation of the head 88 in respect to the lug 93 might result to the detriment of the operation. The head must maintain its grip upon the lug during the rearward and forward movements of the plunger.

The lower flange 112 of the channel plate 102 is riveted or otherwise secured to the rear top plate 71. The superbase 2 is thus firmly attached to the base 1, it being borne in mind that the front plate 98 is also riveted to another one of the top plates 71. The superbase is the direct support of the merchandise columns 18. These columns, although so designated, are somewhat intangible elements. The columns are actually spaces defined by sets of front and rear angle bars 113 and 114. The spaces which these bars define are rectangular according to the present showing, but it is conceivable that they may be so arranged as to generally define spaces of other than rectangular cross sectional shapes.

There is a distinction between the front and rear angle bars. The shape of the latter is preserved from top to bottom as shown in Fig. 19. The rear angle bars thus constitute backings for the articles 26 from top to bottom. But a portion of the front web of each of the front angle bars is cut away at 115 (Figs. 2, 4, 5, 16 and 17) producing a passageway through which the article is discharged by the respective slide. The angle bars 113, 114 are stood in confronting relationships so that the corners of the bars receive and provide guides for the corners of rectangular or substantially rectangular vendible articles 26.

This relationship is preserved by an arrangement of bracing which, together with the angle bars themselves, constitutes an internal framework as suggested by Figure 16. Top and bottom channel rails 116 and 117 extend crosswise of the machine while short top channel rails 118 extend lengthwise thereof. The top rails occur only at the sides of the remote columns 18. The brackets 110 are equivalent to bottom rails, and since these brackets stand upon the remote guides 99 and are secured to these guides by rivets 119 which extend clear through the flanges 109 of the side plates 108 it follows that the internal framework is firmly and rigidly mounted upon the superbase 2.

A simple yet most effective expedient is employed for the attachment of the various rails 116, 117 and 118 to the angle bars, and the angle bars to the brackets 110 in the shape of tongues 120 struck up from the angle bars at appropriate places. These tongues will register with slots 121 in the various rails and in the brackets and when inserted are forcibly bent down as shown in Figure 16. It is possible to make an extremely rigid connection in this way.

The container 3 comprises what might be known as the mercandise compartment. This is a cover for the various articles of merchandise stacked in the columns 18. It is subject to some variation in the mode of construction, but generally will comprise a glass panel 122, and metal side and rear panels 123, 124. These panels are assembled between outer corner brackets 125 and inner posts 126. The bottom ends of the corner brackets are flnaged at 127 to permit riveting thereof to the side top plates 71. The posts 126 also extend down to these plates to which they are secured by screws 128 which are driven thereinto from the undersides of these plates as shown in Figs. 2 and 5.

As a possible variation, the posts might be made long enough to extend to bottom plate 36, but inasmuch as screws would probably have to be driven in from the underside of the bottom plate the effectiveness of the connection would be less-

ened somewhat because an evil-minded person handy with a screw driver might cause trouble by seeking to take the machine apart. A cover 129 is secured to the upper ends of the posts as at 130 (Fig. 1). The devices thus indicated might comprise headed screw plugs with specially formed wrench sockets. A hinged lid 131 covers an opening in the cover through which the merchandise compartment is filled.

A hood 132 (Figs. 1 and 2) together with side members 133 complete the chute 34. The side members may extend down from and form part of the hood 132, or they may extend up from the front plate 98. In any event they define side closures which prevent anyone from gaining access to the merchandise from the sides of the chute. It is the top of the hood that is inscribed with the numerals 62 that denote the various columns 18.

Attention is again directed to the coin control 4. The slot 44 in the front cover plate 43 (Figs. 1 and 18) is straight along the bottom edge but the upper edge is interrupted to produce a series of recesses 134, 135, 136, and 137 which become rectangular openings when the base plate 45 is fitted in the slot to assume its projecting position. These openings are occupied by the receivers 10 to 13 inclusive and it is through these openings that the receivers disappear simultaneously when the plunger 6 is pushed upon. Any idle movement of the plunger will be reflected by an idle movement of the same degree of such one of the discharger slides 27 to 32 with which a companion selector finger may be connected by one of the lifters in the series 19 provided that the latter assumes a selecting position.

In other words, such adjustment of the knob 16 that brings a numeral 60 to view can be relied upon as having elevated one of the lifters 19 to an operative position beneath its companion selector finger. Inasmuch as a connection is thus established with the companion discharger slide it follows that this particular slide will be reciprocated to a slight degree when the plunger is reciprocated. However, this has no deleterious effect upon the mechanism because the extent of movement is not sufficient to permit even a slight displacement of the lowermost article.

The coin plate 8 is equal in gauge to the thickness of a new five cent piece and hence a new five cent piece will be flush with the top surface of any one of the receivers 11, 12 and 13 into which it may be inserted. The receiver 10 is ground down to the thickness of a new dime, and by virtue of the different thicknesses of coins that are intended to pass through the openings in the cover plate 43, the first of these openings will be smaller than the others as plainly indicated in Figs. 1 and 18. Thus if oversize slugs or mutilated coins are placed into the holes 14 and 15 it will become impossible to push the coin plate 8 in because an obstruction will be met with at the recesses 134 to 137. The various receivers fit these recesses exactly, and the machine cannot be operated if the disk in any receiver protrudes thereabove.

Undersize slugs will be discharged promptly at openings 138 in the base plate 45 immediately inside of the front end plate 38 as shown in Figure 20. Such slugs will fall upon the bottom 36 outside of the coin drawer 139. This drawer runs between guides 140 affixed to the bottom 36. The drawer slides through an opening in the right side plate 41 (Fig. 9) and a closure plate 141, equipped with a lock 142, closes the opening.

A shaft 143 (Figs. 2 and 20) supported by ears 144 on the base plate 45 provides the common pivot for a set of lift fingers 145, 146, 147 and 148. These fingers are associated with the respective receivers 10 to 13, and upon an inward push of the plunger 6 following the insertion of a coin in one of the receivers the respective finger will be lifted and actuate some part of a system of levers generally designated 149 (Fig. 4).

For this purpose each of the fingers has a shoulder 150 on the underside (Fig. 2). These shoulders are pointed, and the points may either be rested upon a narrow web 151 between the discharge openings 138 and the coin slots 152 or be suspended in nearly contacting positions with those webs by the engagement of the rear ends of the fingers with the bottoms of guide slots 153 in a fixed guide plate 154 at the rear of the base plate. The coin holes 14 and 15 communicate with long slots 155 in the receivers 10, etc., which slots are both occupied by the shoulders 150 and by ejector tongues 156 (Fig. 20) that are struck up from the base plate 45.

To repeat, a coin inserted in one of the holes 14 will ride under the shoulder 150 of the respective lift finger when the coin plate 8 is slid inwardly and thus raise the lift finger so that it in turn will actuate the lever system. However, a single coin will be capable of only a partial actuation of said system. The operation of the levers is cumulative, and it requires a compounding of the leverage, or in other words the operation of a number of the lift fingers to operate the system to such an extent that a locking hook 157 will be lifted out of range of a lock slot 158 longer than the hook is wide in the coin plate 8.

The shank of the hook is pivoted on the shaft 143 and is pressed down by a spring 159. The shank carries an adjustable contact screw 160 that is kept in contact with the tongue 161 of a lock release 162 by the spring 159. The spring also tends to keep the hook 157 within the slot 158 and as long as the hook remains in this slot it will be impossible to move the coin plate 8 back any further than the point of engagement of the front end of the slot thereby to loosely lock the plunger 6. The distance of travel thus represented enables an initial idle movement of the plunger to unlimber the discharger means and is not enough to bring any one of the coin holes 14, 15 within full registration with the coin slots 152.

The coin would rest upon the narrow web 151 and be thereby prevented from dropping through the slot 152. The purchaser will thus not lose his coin but if an undersize slug is placed into a coin hole it will fall through one of the discharge openings 138 in transit thereover. It is necessary to insert coins of a sufficient aggregate value in order to produce such a cumulative action of the lever system 149 as will raise the locking hook 157 completely out of the lock slot 158 in order that the coin plate 8 and plunger 6 may perform a complete inward stroke.

Connection of the lever system with the lock release 162 is made by an equalizer master bar 163 which is pivoted at 164 at a point exactly midway of the bar between its pivotal connection at 165 with a yoke 166 and its point of contact 167 upon the dime lift finger 145. Upon lifting of this finger by means of a dime the connection 165 will act as a fulcrum for the pivot 164 as the weight point, lifting the lock release 162 and ultimately the locking hook 157 approximately two-thirds out of the slot 158.

A pair of contact levers 168, 169 bridges the fingers 146, 147 and 148 in such a manner that the remote ends of these levers bear upon the remote fingers and the pivotal connection 170 bears upon the middle finger 147. These levers are connected with the yoke 166 by hangers 171, 172. The connections of the hangers 171, 172 with the yoke 166 and the levers 168, 169 are so proportioned that a lift of any individual finger 146, 147 or 148 as by means of one five cent piece in any of the receivers 11, etc., will produce precisely the same degree or approximately one-third of the lift of the locking hook 157.

Two five cent pieces will operate any pair of the fingers 146, 147 and 148 to lift the locking hook 157 slightly farther out of the slot 158 but not entirely out of the slot. The use of a dime in the receiver 10 and a five cent piece in any one of the receivers 11, 12 and 13 will result in such a cumulative leverage in the system 149 as will lift the hook 157 completely out of the slot 158 so that the foregoing complete strokes of the coin plate and the plunger 6 can be made.

A pawl 173 carried by the plunger 6, cooperates with the teeth 174 of a fixed rack plate 175 in preventing a premature return of the plunger as in the event of the purchaser's thumb slipping off of the button 7, and to prevent the loss of his money without receiving an article in return. Should the purchaser fail to push the plunger all the way back the first time, or should it slip out of his fingers as stated, the pawl 173 will catch upon the rack plate 175 in the manner illustrated by Figure 15, thus to hold the plunger in the partially depressed position. It is necessary to push the plunger all of the way back in order to secure a release of the pawl from the rack plate and to cause the pawl to assume the dotted line position in Figure 15, in which position it will merely drag over the teeth on the return motion.

The pawl has a pair of arms 176 that swing freely from the sides of a collar 177 that is secured to the inner end of the tubular plunger 6 by the same screws 178 which provide the pivotal mounting of the pawl. These screws are formed as shown in Fig. 14. When the points of the screws bight into the sides of the plunger the shoulders 179 will bear against the sides of the collar 177 and provide pivots upon which the pawl swings.

The operation is readily understood. The unit value of the articles 26 (Fig. 1) which it is desired to sell is fifteen cents. So far as the principle of the machine is concerned, this value might be ten cents, twenty cents, or in fact, any multiple of one dollar. The first act in the use of the machine will be to turn the selector knob 16 in either direction until that numeral 60 appears at the sight opening 61 which corresponds with the numeral 62 for the selected article in the columns 18. For example, if the intending purchaser has selected an article in the column denoted "3" he should turn the knob 16 until the corresponding numeral "3" appears at the sight opening 61.

This turning of the knob has the effect of lifting the head 88 of one of the selector fingers into engagement with the lug 93 of one of the discharger slides. In the illustration chosen the head of the selector finger 22 will be brought into engagement with the lug 93 of the discharger slide 29. The multi-sided shaft 17 carries the lifters or cams 19 by which the fingers are lifted as stated, and when the selection is finally made the shaft 17 will be returned in the adjusted position by the action of the spring clip 65 which presses down upon certain sides of the shaft as shown in Figures 2 and 5.

The same action will occur in respect to any other one of the selector fingers in the series 20 to 25, but only one of the fingers will be raised into locking engagement with its companion discharger slide. Thus it will be possible to release only one of the articles 26 from the machine at a time. This is due to the fact that each of the lifters 19 assumes a different radial position in respect to the selecting shaft, and obviously when one of the lifters is in the operative position beneath its companion selector finger the other lifters will stand out of range of the bank of fingers.

Now insert coins of an aggregate value of fifteen cents in the receivers 10 to 13. A dime and a five cent piece will have the same effect as three five cent pieces. The purchaser may possess the first two coins, but not the last three, and vice versa. In either case, a sale can be made, and neither the purchaser nor the vendor is placed at a disadvantage by virtue of the former not having the proper combination of coins. After insertion of the proper coins in the coin receivers the purchaser must push on the button 7. The selector plate 75 and its entire series of fingers 20 to 25 as well as the coin plate 8 partakes of each movement of the plunger 6 with which the button 7 is connected, but no other part of the coin control 4 moves with the plunger.

Assume that a dime has been inserted in the hole 14 and a five cent piece in one of the holes 15. The base plate 45 and its shelf 46 compose the bottom of the coin receivers. The recess is exactly equal in depth to the thickness of a new dime. The recesses 135 to 137 are exactly equal in depth to the thickness of a new five cent piece. Should a thicker slug be inserted in any one of the coin holes the edge of the slug would bind against the top of the respective recess and it would be impossible to push the plunger in.

The same would be true if a coin twisted out of shape were inserted in one of the coin holes. If an undersize slug is inserted in one of the holes it would be immediately dropped through a discharge opening 138 to one side of the money drawer 139. But assume that a good dime and a five cent piece have been inserted. An inward push on the button 7 will bring these coins under the shoulders 150 of the finger 145 and finger 146, (for example) causing these fingers to be lifted. The lift is applied to the lever system 149 and the left ends of the master bar 163 and the contact lever 168.

The lifting is simultaneous. The individual act of the finger 145 is capable of raising the locking hook 157 approximately two-thirds out of the lock slot 158. The individual action of the finger 146 is capable of lifting this hook approximately one-third out of the locking slot. The cumulative action of the two fingers is capable of raising the locking hook entirely out of the locking slot so that a complete inward movement of the plunger 6 and coin plate 8 is possible.

The coin plate must pass the hook or what amounts to the same thing, the hook must be raised high enough to let the front end of the slot 158 pass under the point of the hook. The limit of the inward movement of the coin plate 8 and consequently of the plunger 6 with its carried parts is raised by the engagement of the

front lug 9 with the rear end of the slot 48. This rear end offers a stop. The extent of movement thus represented completely displaces the discharger slide from the column 18 of the selected article. The discharger slide will move into the displacing space 94 (Fig. 2). The column of articles, formerly resting upon the discharger slide will drop the distance of the thickness of the article which is approximately the same as the height of the discharger slide above the guides 99.

The nethermost article will then assume the dotted line position 33 in Figure 3. Upon the return of the plunger 6 under the influence of the spring 52 and the return of the discharger slide under the influence of a pair of the springs 95 the nethermost article 26 will be pushed out of the column 18 into the chute 34 as indicated at 35. The nether-edge of the selector finger 22 rides upon the point of the selected lifter 19 during the inward and outward movements of the plunger.

This edge is parallel to the selector plate 75, and since the latter is parallel to the major axis of the plunger and travels in a plane parallel to said axis it follows that the head 88 will be maintained in one position in respect to the selected discharger slide 107 until another adjustment of the knob 16 is made. The foregoing parallel relationship of the nether-edge of the selector finger with the plate 75 is essential to the preservation of the locked engagement of the head 88 with the lug 93.

Reverting to the engagement of the front lug 9 with the rear end of the slot 48, the coins will have reached the coin slots 152 and dropped through into the money drawer 139 before that occurrence. The lift fingers 145 and 146 fall to their original positions upon the dropping through of the coins so that the locking hook 157 re-assumes its original position in respect to the coin and base plates 8 and 45. But it will now assume a position in front of the front lug 9 instead of at the rear as shown in Figure 2. The leading edge of the front lug is rounded where it joins the coin plate 8 and the rear edge of the hook 157 is beveled so that the hook will be temporarily raised when these parts meet upon the return of the coin plate, permitting the solid part of the plate next to the front lug 9 to pass under the hook and the latter to drop into the lock slot 158 where it belongs.

Assume that the purchaser has contrived a way of making the coins stick in the receivers so that a repeated operation of the machine would be possible by the use of the same coins. This purpose is circumvented by the ejector tongues 156. These project up into the long slots 155 and are situated at points agreeing with the end of the stroke of the coin plate 8. When the coins reach these tongues they will be forced out of the holes 14 and 15.

Every lifting action of the fingers 145 to 148 will produce some lift of the locking hook 157. The pivotal connection 164 of the lock release 162 with the master bar 163 becomes the weight point for any lever or combination of levers in the lever system 149. It is at this point where the ultimate lift is applied to in turn lift the locking hook 157 through the medium of the tongue 161 and the contact screw 160.

Although the coin control 4 is covered by the co-pending application mentioned above, yet it is not irrelevant to state that its particular construction makes it possible to employ an unlimited number of article columns 18 within reason in the vending machine. The coin control has a common association with the merchandise container or compartment 3, the single coin control being utilized in the selling of an article 26 from any one of the plurality of columns. This singleness of structure and purpose makes it possible to build the columns 18 closer together. More merchandise can be assembled in a given space with a consequent reduction in the charge for the necessary servicing of the machine. A cheaper construction of the machine is also possible as is evident by a comparison of this machine with coin controls individual to each of a plurality of columns of merchandise.

While the construction and arrangement of the improved vending machine is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A vending machine comprising a plurality of discharge slides, guide means for slidably supporting the slides, a single plunger which is movable in two directions, a series of selector fingers movable with the plunger, and a selecting shaft having lifters for successively engaging and disengaging the fingers with the respective slides finally maintaining locking engagement with a selected slide to impart the two-directional movement of the plunger to the selected slide upon its guides.

2. A vending machine comprising a discharger slide, a plunger which is movable to operate the slide, a finger which is movable with the plunger and connectible with the slide so that the movements of the plunger will be imparted to the slide, and a revoluble selecting shaft otherwise stationary in respect to the plunger having a lifter upon which the finger will ride when moved against the finger to maintain a connection thereof with said slide.

3. A vending machine comprising a plurality of discharger slides, a series of selector fingers, a selector plate by which said series is pivotally carried, a movable plunger with which said plate is connected, and a revoluble selecting shaft in respect to which the plunger is movable, having a series of lifters engageable with and disengageable from successive fingers upon revolving the shaft finally retaining one of the fingers in locking engagement with a selected slide during a subsequent movement of the plunger.

4. A vending machine comprising a discharger slide, a plunger which is movable to operate the slide, a selector finger movable with the plunger, and a lifter assuming a position stationary relatively to the plunger to support the finger in locking engagement with the slide and acting as a bearing for said finger upon subsequent movement of the plunger when operating the slide.

5. In a vending machine, a guided discharger slide having a lug, a reciprocable selector plate, a selector finger pivotally carried by the plate, means for moving the finger upon its pivot to connect the plate with said slide, and a head on the finger with which said means is engageable, having a notch to receive the lug and having both a projection and a confronting step co-acting with an edge of the plate to limit the pivotal movements of the finger.

6. In a vending machine, a discharger slide having a lug, a selector plate which is slidable to correspondingly move the discharger slide, a finger pivotally carried by the plate having a head

with a notch at one end and a lug at the other, means to swing the finger in one direction upon its pivot to engage the notch with the slide-lug, and resilient means acting on the finger-lug tending to keep the finger in engagement with said means and to move it away from the slide-lug.

7. In a vending machine, a base having a top, a guided discharger slide having a lug, a selector finger having a notched head to receive and engage the lug, a selector plate pivotally carrying the finger and having runners bearing on the top, means with which said plate is connected for movements of the runners on said top, and means stationary relatively to the selector plate upon which said finger will ride and thus shift the notched head in engagement with said lug.

8. In a vending machine, a finger, a base having a top, a plate having runners bearing on the top, carrying means for the pivotal support of the finger, said means being mounted on the runners, and a plunger having means for its connection to said plate, having bearing on the base.

9. In a vending machine, a selector plate having runners upon which it has slidable bearing, a selector finger, a hub, sleeves adjoining the sides of the hub one of the sleeves having an annular reduction defining a groove in which the hub has bearing, a shaft upon which the sleeves are assembled and spanning the distance between the runners, and resilient means tending to swing the finger in one direction upon its bearing.

10. In a vending machine having a plunger, a rack plate for preventing premature retrograde movement of the plunger, and a pawl to co-act with the rack plate; a collar on the plunger from which the pawl is swung, and shouldered screws passing through the collar and biting into the plunger and having the shoulders abutting the collar respectively for securing the collar and pivotally supporting the pawl.

11. In a vending machine having a multi-sided selecting shaft with a lifter mounted on each of its sides, means to hold the shaft in various settings comprising a spring clip consisting of a pair of spring arms receiving the shaft between them and securing means to mount the arms on a support; spacers spanning the ends of the arms, one of said spacers and the respective ends of the arms having means making a loose connection.

12. In a vending machine, means defining containers for columns of articles, discharger means for displacing an article from any one of the columns, a selecting shaft having means by which any one of the discharger means is placed in readiness for operation, a knob having a hub provided with legends denoting the various article columns, and a fixed cup in which the hub fits having a sight opening at which the legends are seen to denote a selected adjustment of the shaft.

13. In a vending machine, a framework composed of angle bars arranged to define an article column, the webs of certain ones of the bars being cut away to define a passageway, guides spaced apart but supporting said bars, and a discharger slide having notches receiving the edges of the guides and being movable along said guides out of and into said column to discharge an article at said passageway.

14. In a vending machine, a base comprising a front plate, a flanged rear plate and side plates having flanges and recesses by which the flanges of the rear plate are received, a framework composed of sets of angle bars grouped to define article columns, rails applied to the bars at places and having tongue and slot connections therewith to complete the framework, guide plates secured to the front plate and to one of the flanges of the rear plate in spaced relationship and supporting groups of the bars, and end column brackets attached to the end bars and being secured through adjacent guide plates to the flanges of said side plates to make an integral structure.

15. In a vending machine, discharger means, guide means therefor, selector means, lifter means to engage the selector means with the discharger means, a movable plunger, and means by which the selector means is mounted on the plunger.

16. A vending machine comprising a discharger slide, guide means for slidably supporting the slide, a movable plunger, selector means to shift the slide with the plunger and means by which the selector means is mounted on the plunger, locking means for the slide and selector means comprising an element on the slide and an element on the selector means, and lifter means on which the selector means is restable to bring the elements of the locking means together and subsequently rideable to keep the elements together.

17. A vending machine comprising a discharger slide, a plunger which is movable to operate the slide, a finger which is movable with the plunger, and means to cause connection of the finger with the slide and providing a rest on which the finger is rideable to maintain the connection.

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