July 7, 1942. W. A. HARRIS 2,289,325

VENDING MACHINE

Filed May 24, 1941 5 Sheets-Sheet 1

Fig. 1.

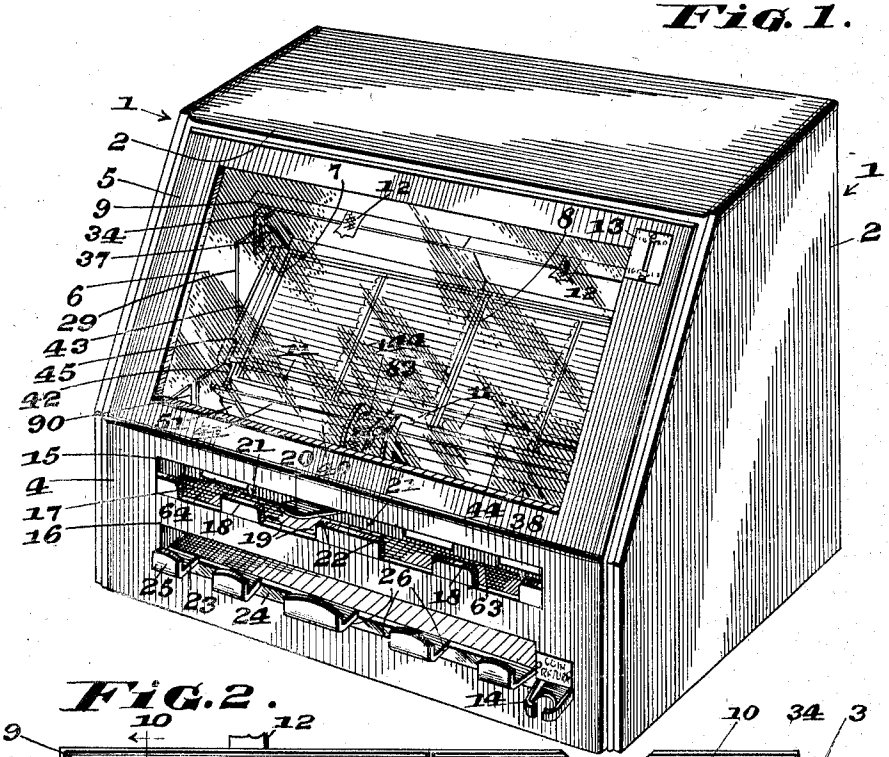
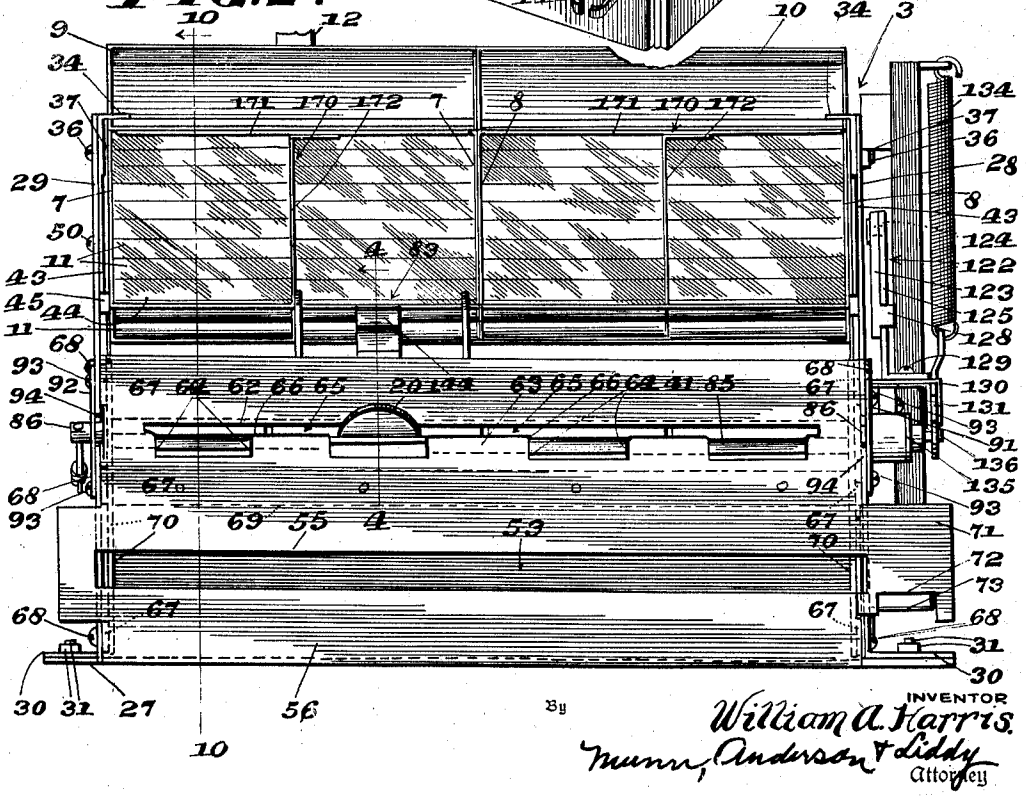


Fig. 2.



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July 7, 1942. W. A. HARRIS 2,289,325

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Filed May 24, 1941 5 Sheets-Sheet 2

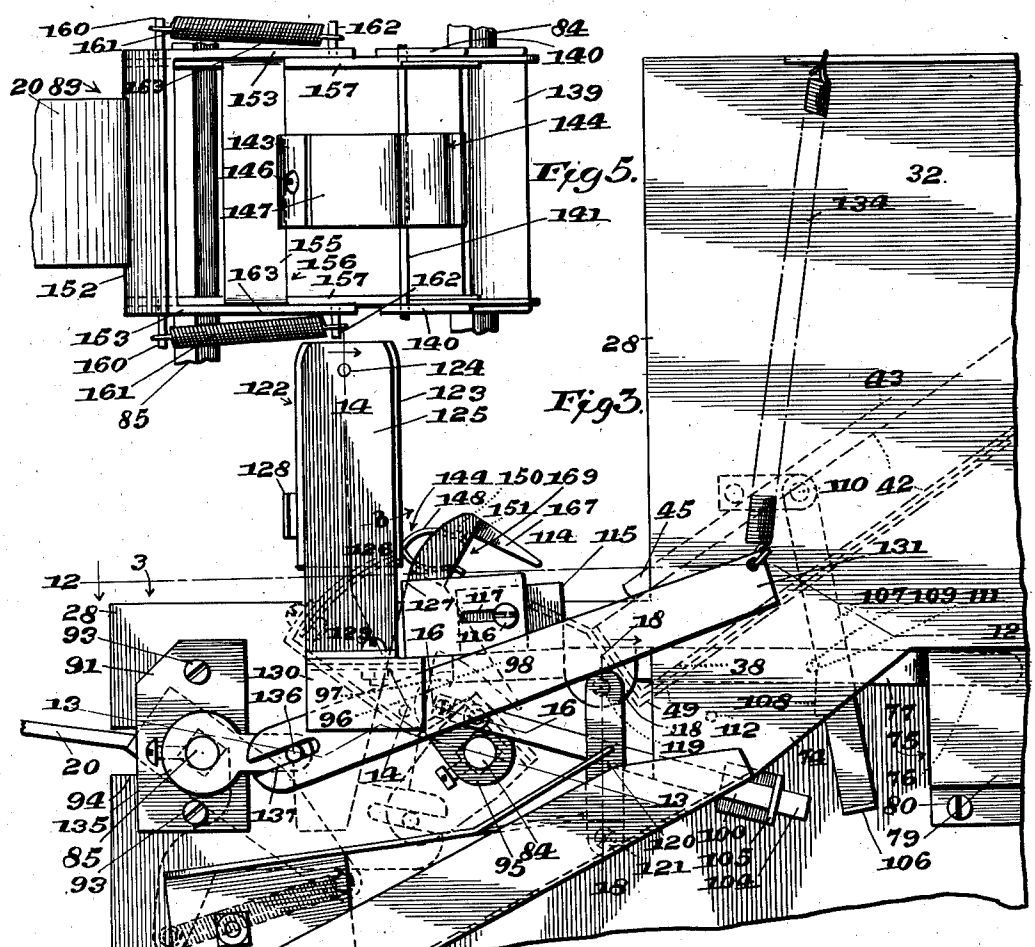


Fig 5.

Fig 3.

Fig 4.

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July 7, 1942. W. A. HARRIS 2,289,325

VENDING MACHINE

Filed May 24, 1941 5 Sheets-Sheet 3

Fig. 6.

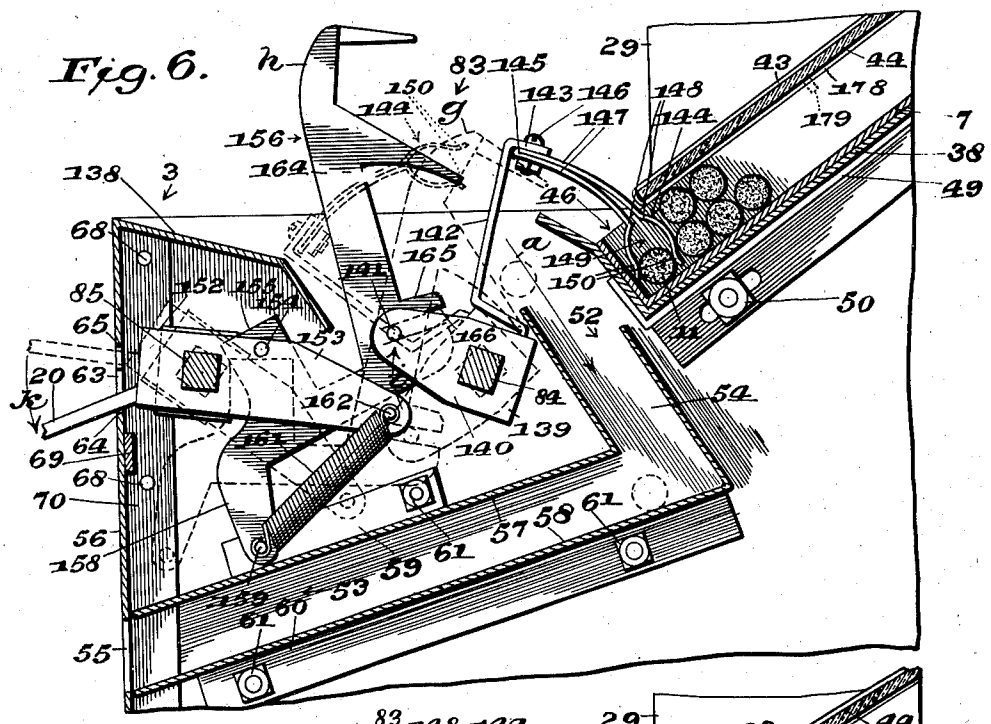
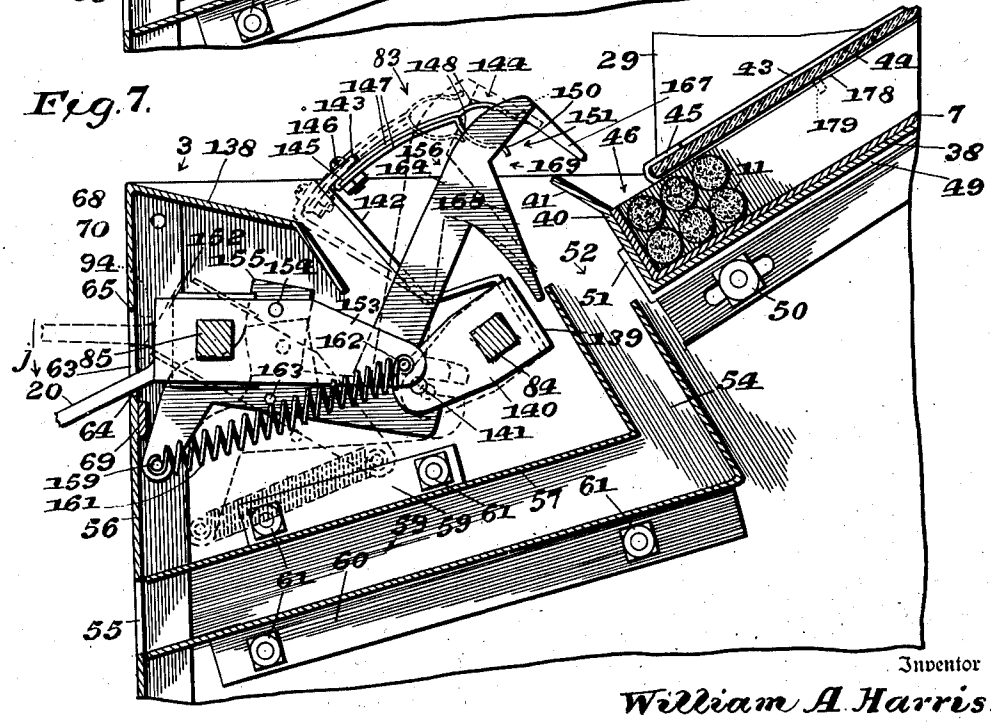


Fig. 7.



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July 7, 1942. W. A. HARRIS 2,289,325

VENDING MACHINE

Filed May 24, 1941 5 Sheets-Sheet 4

Fig. 8.

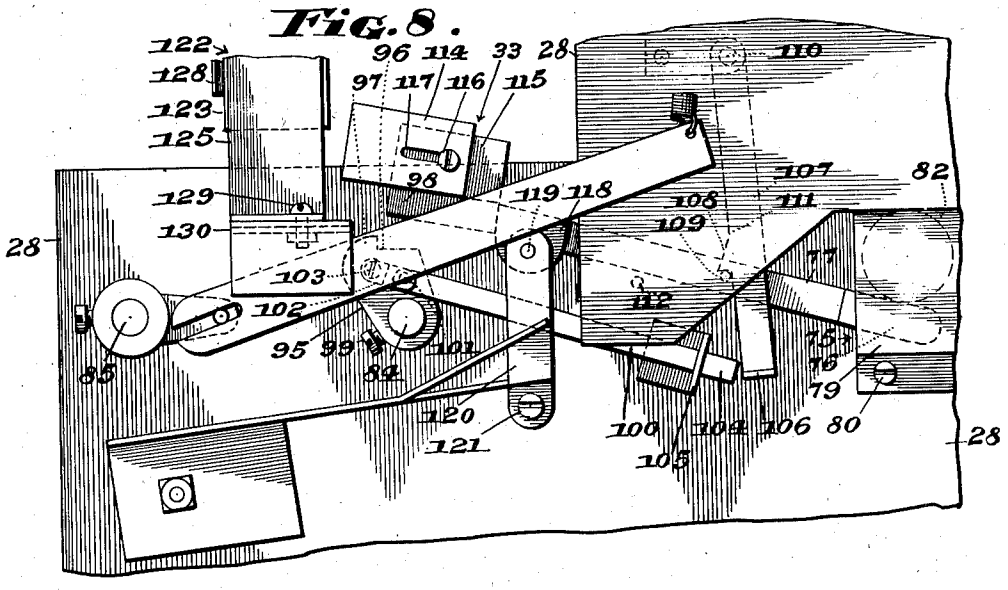
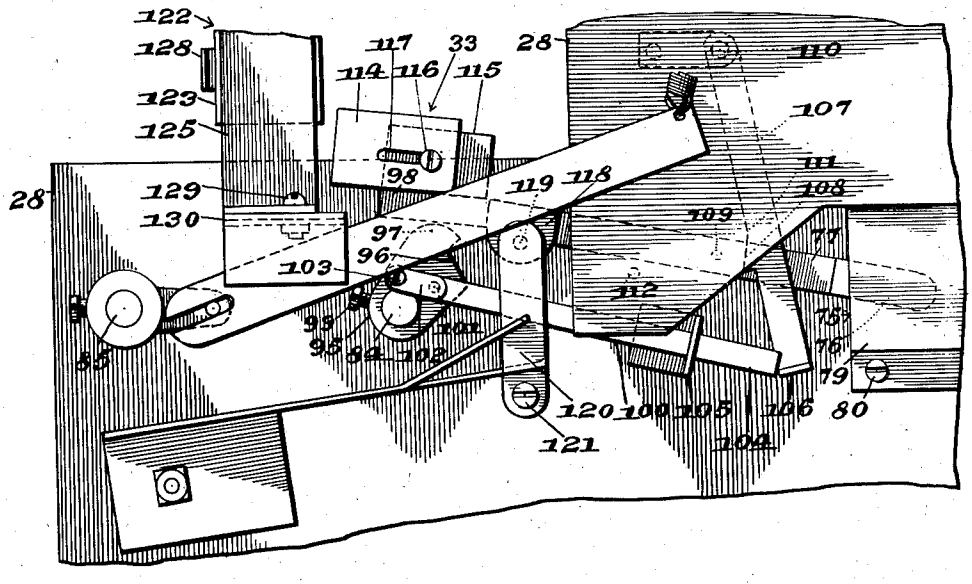


Fig. 9.



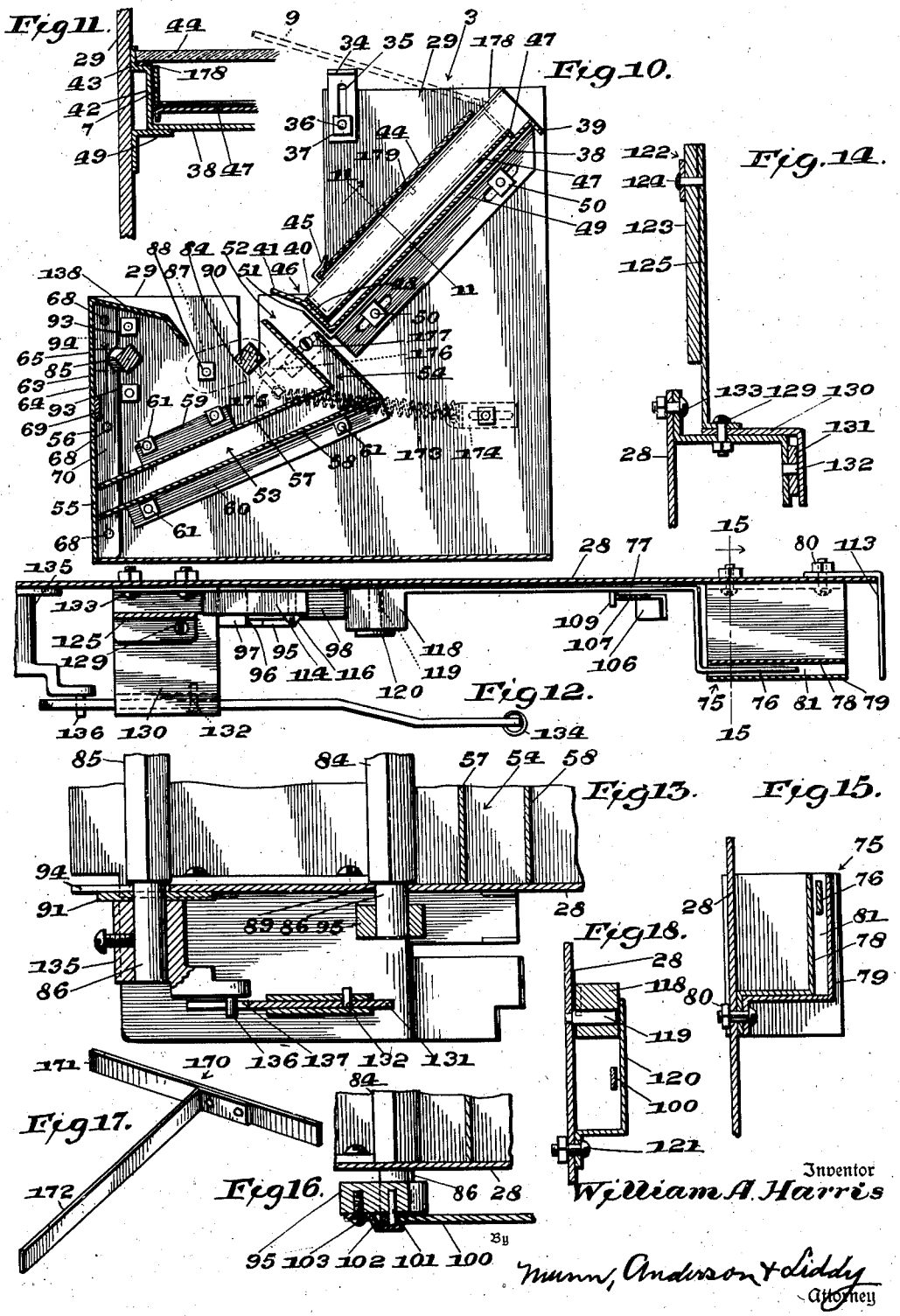
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VENDING MACHINE

Filed May 24, 1941 5 Sheets-Sheet 5



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Patented July 7, 1942

2,289,325

UNITED STATES PATENT OFFICE

2,289,325

VENDING MACHINE

William A. Harris, Greenville, S. C.

Application May 24, 1941, Serial No. 395,104

24 Claims. (Cl. 312—76)

This invention relates to improvements in vending machines, particularly being adapted to vending single cigarettes, one at a time in successive individual vending operations, so as to accommodate a large portion of the purchasing public which is interested only in buying single cigarettes rather than entire packages of cigarettes. Although reference is herein made to the vending of cigarettes it is to be understood that the principles of the invention are applicable to vending equivalents of cigarettes, for example, cigars.

In contriving the instant machine, primary consideration was given to enabling the vending of the tobacco product directly from a statutory package so that the only necessity encumbent upon the possessor of the machine is to break the customary internal revenue stamp and insert the carton into the machine after first having removed from beneath the cigarettes the usual lining papers and having inserted a separator between the rows of cigarettes to avoid friction between contiguous ends. The particular carton here in mind is the type containing 50 cigarettes, but it is readily conceivable that cartons containing more or less cigarettes could be used in conjunction with the machine because no alteration of principle would thereby be involved.

In furtherance of the foregoing primary consideration the machine embodies what is herein known as a finger grip, so called because of its close simulation of the act of the human fingers in abstracting a cigarette from a carton, said finger grip providing for a direct feed of the cigarette from the original package, delivering the cigarette to a point of access after certain releases have been accomplished in the mechanism by the insertion of a coin.

The foregoing considerations are in compliance with Federal statutes which relate to the vending of tobacco products from the original statutory packages, which statutes further require making the package plainly visible both from the front and back so that the purchaser on the one hand can see the product which he intends buying and that other interested persons on the other hand may have an unobstructed view of the usual factory notice on the back of the package. With this preamble in mind the objects of the invention are as follows:

First, to provide a vending machine which is contrived to vend single cigarettes or their tobacco equivalents, one at a time as the result of individual vending operations.

Second, to provide such a machine which is made to accommodate one or more packages of cigarettes, preferably of the hinged-lid carton type, into which the finger grip is adapted to reach and abstract a single cigarette for subsequent release so that delivery can be made to the purchaser who, necessarily, is required to insert a coin.

Third, to provide a vending machine with supports so arranged as to dispose the carton and lid at the best possible angles to supply a clear and unobstructed view of the cigarettes through a glass panel in front of the machine and a clear and unobstructed view of the customary factory notice on the bottom of the carton through a glass panel in back of the machine.

Fourth, to provide a finger grip device which has provisions for yielding to an idle depression of the hand lever, thereby dissipating the force of such idle depression which might otherwise harm the mechanism.

Fifth, to provide a finger grip device which cannot be made to act twice in the same dispensing operation with the view to attempting to abstract more than one cigarette for a single coin.

Sixth, to provide a self-embodied finger grip device which is selectively movable into its operating position in front of any chosen row of cigarettes.

Seventh, to provide a device requiring the leveling of the machine before it can be operated, said device, herein conveniently termed the level-insuring device, acting only when the machine is tilted too far back.

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 front elevation of the vending mechanism, the latter having been removed from the housing shown in Fig. 1.

Figure 3 is a fractional side elevation showing the vending mechanism of Fig. 2 in its normally static position and as seen from the right in said Fig. 2.

Figure 4 is a detail cross section taken on the line 4—4 of Fig. 1 and particularly illustrating the finger grip device also in its normally static position.

Figure 5 is a plan view of the finger grip device.

Figure 6 is a sectional view on the order of Fig. 4, illustrating the movements occurring in the finger grip device during a true dispensing operation.

Figure 7 is a view similar to Fig. 6 illustrating

the movements occurring in the finger grip device during a false or idle operation.

Figure 8 is a detail view of what is herein known as the detent mechanism, illustrating the change in position of the parts in comparison with Fig. 3 when a coin strikes the end of the coin lever.

Figure 9 is a similar view illustrating the action during the subsequent dispensing operation and agreeing with Fig. 6.

Figure 10 is a cross section taken on the line 10—10 of Fig. 2.

Figure 11 is a cross section taken on the line 11—11 of Fig. 10.

Figure 12 is a horizontal section taken on the line 12—12 of Fig. 3.

Figure 13 is a horizontal section taken on the line 13—13 of Fig. 3.

Figure 14 is a detail section of the level insuring device, taken on the line 14—14 of Fig. 3.

Figure 15 is a detail section taken on the line 15—15 of Fig. 12.

Figure 16 is a detail horizontal section taken on the line 16—16 of Fig. 3.

Figure 17 is a detail perspective view of one of the separators hereinafter referred to.

Figure 18 is a vertical section taken on the line 18—18 of Fig. 3.

In carrying out the invention the vending machine, generally designated 1, appears substantially as shown in Fig. 1. There is no necessity for adhering precisely to the configuration of the housing 2 because this can be varied to suit individual desires, but from the standpoint of effectively containing the vending mechanism 3 (Fig. 2) said housing does serve the purpose and is intended to be adhered to. Said housing includes an erect front wall 4 which is relatively short when compared with the height of the housing, said front wall merging into a pitched wall 5 which, because of its inclination, affords the best possible view of the interior of the housing through the front glass panel 6.

The vending mechanism 3 is contrived to accommodate two packages 7, 8 of cigarettes. These particular packages may consist either of metal boxes or paper cartons. They are respectively supplied with lids 9, 10 which are intended to be swung open and held there in the machine so as to fully reveal the cigarettes 11 which are intended to be vended. These particular packages are of the type which are marketed with fifty cigarettes each. As far as the principles of the machine are concerned, the accommodation may be for less or more than the two packages shown, and the packages themselves may contain less or more than fifty cigarettes each.

As appears farther on in the description, the packages 7 are set at an angle to substantially match the pitch of the wall 5. There is no need of a precise match as long as the packages 7, 8 are so set as to be in full and clear view. This emplacement of the packages 7 and 8 involves another important consideration. The prevailing practice is to market each package of cigarettes with a factory notice. This notice is generally printed on the bottom of the package, and it is a requirement of the law that this notice shall be in full view as well as the cigarettes and also substantial portions of the revenue stamp 12. In order that the factory notice may be seen provision is made in back of the housing 2 of a removable closure with a glass panel. Said closure is omitted herein but the reader will understand that in practice it is fitted in a back opening through which the mechanism 3 can be abstracted when adjustments are required, and when it becomes necessary to substitute the packages 7, 8, with fresh ones.

In addition to the necessary openings for the coin receiver plate 13 and the coin return trough 14 the housing 2 has a pair of longitudinal openings 15, 16. These openings occur in the front wall 4. The top opening 15 is shielded in part by a plate 17 which covers the bottom of the opening. This plate is bent down on the inside where it is secured. On the outside it carries a series of upstanding flanges 18. These flanges are bent up from the outer edge of the plate 17, their purpose being to demarcate spaces 19 to which the operation of a hand lever 20 is confined.

These flanges stop short of the top of the opening 15 to leave spaces 21 in which the hand lever can be slid from one dispensing position to another. However, the depth of the spaces 21 is very slight so that very little motion can result if the hand lever 20 is ever depressed while in position over one of the flanges 18. The corners of the latter are rounded at 22 so that the lever 20 may readily glance off should the vendee have failed to exercise care in bringing the hand lever to its proper working position in the selected space 19.

In matching positions below the flanges 18 are forwardly extending members 23 which are bent from a plate 24 which is attached on front of the wall 4. These members have lips 25 which guard against the dropping of the cigarettes when the latter roll out of the bottom opening 16 in bridging positions across the spaces 26 between the members 23. The reason for having the cigarettes to roll out so that they bridge the space between any two of the members 23 is to afford the vendee a ready finger hold upon the cigarette. He will simply reach into the requisite space 26 with his thumb and forefinger and thus lift the cigarette from its resting place against the back of the lips 25.

The vending mechanism 3 embodies all of the mechanical structure necessary to the dispensation of single cigarettes in response to the manual manipulation of the hand lever 20 after a coin of the required denomination has been inserted at the slot in the plate 13 (Fig. 1). The invention is not concerned with any specific coin control and for that reason the details have been omitted. The invention is concerned mainly with the specific vending or dispensing mechanism and in that respect attention is first directed to Fig. 2. Here a base plate 27 is shown to comprise the foundation for a pair of end plates 28, 29. Each of these plates includes a bottom right angled flange 30 which when affixed to the base plate as by means of bolts and nuts 31 supports the respective end plate in a perfectly erect position.

Both plates 28, 29 are generally alike in outline. The plate 28, however, is herein chosen to carry the control mechanism and for that reason may have holes here and there which are not required in the plate 29. Said plate 28 is the carrier of a coin control which in practice is emplaced at 32 (Fig. 3) and also of the detent mechanism 33 appearing especially in Figs. 8 and 9. Reverting to Fig. 2, provision is made of a pair of angles 34 on which the lids 9, 10 are rested. It is these angles which hold the lids open far enough to fully reveal the contents of the packages 7, 8.

One of these angles is shown in detail in Fig.

10. It is slotted at 35 to receive the bolt 36 which goes through the respective end plate which in this case is the plate 29. A nut 37 on the bolt serves to clamp the angle 34 in that position wherein the lid 9 is supported as desired. The packages 7, 8 are emplaced upon a tray 38. This tray is removable from the mechanism 3 merely by sliding it up and out at the back, although under ordinary circumstances there is no necessity for ever removing it.

Said tray comprises a metal plate which is flanged down at 39 along the upper and back edge, and is flanged up at 40 along the lower and front edge. Said flange 40 has a forwardly bent portion 41. This portion is desirable from the standpoint of frustrating the remote possibility of an attempt to reach into the machine through the bottom opening 16 with a wire and thus working out one or more of the cigarettes. The flange portion 41 makes this virtually impossible.

At each of its ends the tray 38 is bent up at 42 (Fig. 11). The top edge of each end 42 is bent twice to form a rabbet 43 (Fig. 11). These rabbets provide rests for the ends of a glass pane 44 which is laid on chiefly to prevent the cigarettes from tumbling forwardly, it being remembered that the packages are set at an angle. This angle is approximately 45° and were it not for the covering pane 44 there is the possibility that some of the cigarettes might buckle out of their row position.

The bottom edge of the pane 44 is seated in hooks 45 which are formed by curling back portions of the rabbets 43. These hooks occur a slight distance above the flange 40, thereby being responsible for defining an opening 46 (Figs. 6 and 10) between said flange and the bottom edge of the covering pane 44. In some instances a filler 47 is emplaced on the tray 38. This filler elevates the cigarette package a very slight distance. Said filler is used in cases where the package 7, 8, has only a single depth of cigarettes instead of two layers as in Fig. 6. The filler 47 includes a front flange 48, but since the metal of which the filler 47 is made is not very thick there will not be any obstruction to the reaching in of the gripper for which purpose the opening 46 is fundamentally intended.

Angled cleats 49 (Figs. 10 and 11) are adjustably attached to the end plates 28, 29 as at 50 to provide the support for the tray 38. Each of these cleats terminates in a lug 51 at the front and bottom. The tray 38 is slid in between the end plates 28, 29 with a fairly tight fit and when fitted in place it rests against the lugs 51. The flange 39 also rests against the tops of the cleats 49 thereby insuring a firm emplacement of the tray. When the packages 7, 8, are required to be replaced it is only necessary to reach in through the open back of the housing 2 without having either to remove the dispensing mechanism 3 or the tray 38.

The entrance 52 (Figs. 6 and 10) of a discharge chute 53 is stationed immediately below and slightly to the back of the free edge of the bent portion 41. The chute passage is directed backwardly at 54 rather sharply from the entrance 52, partly to aid in the foregoing frustration of attempting the unauthorized abstraction of cigarettes. However, the backward pitch at 54 is of more importance from the standpoint that it is lined up more or less directly with the angle of discharge (arrow *a*, Fig. 6) of the bought cigarette. The chute 53 communicates with an opening 55 in a front plate 56. Said opening 55 is in registration with the bottom opening 16 in the front wall 4 (Fig. 1), and when a cigarette is discharged into the chute 53 it presently rolls out of the opening 16 to a resting position across the space 26 between a pair of the members 23.

Plates 57, 58 define the chute 53, 54 and its entrance 52. They are provided with sharply angled bends to define the desired chute passage. Each plate has flanges 59, 60 which are secured at 61 to the respective end plates 28, 29. The front plate 56 (Fig. 2) has some of the characteristics of the front wall 4 of the housing 2. The opening 55 is elongated to match the bottom opening 16. It has a second elongated opening 62 to match the longitudinal top opening 15. Said opening 62 also has upstanding flanges 63, matching the flanges 18, and the former demarcate spaces 64 in which a full depression of the hand lever 20 may be had. The narrow spaces 65 allow only for the sliding of the handle 20 from one position to the next. The corners 66 of the flanges 63 are rounded so that the handle may readily glance off in the event of having been positioned out of center in the chosen space 64.

Flanges 67 are bent back from the front plate 56 and are made to fit fairly tightly on the inside between the end plates 28, 29. There said plate 56 is secured by screws 68 which are driven through the end plates and usually all of the flanges 67. In practice the front plate 56 is desirably made quite rigid. For this purpose it is reinforced longitudinally by a bar 69 (Fig. 2) and is equipped with end reinforcements shown at 70 (Figs. 2 and 10). At least one end of the plate 56 is extended at 71 (Fig. 2) and is cut under at 72 to define a part of the outlet of a coin return chute 73 (Fig. 3). This chute has no concern with the instant invention, and it can be dismissed by stating that its lower end registers with the opening of the trough 14 (Fig. 1) and that its upper end communicates with a portion 74 (Fig. 3) of the mechanism to be regarded as emplaced at 32.

Immediately below said mechanism and to the rear of the portion 74 (Fig. 3) there is a guide 75 (Figs. 3 and 15) for the free end 76 (Fig. 12) of a coin lever 77. The guide 75 consists mainly of a pair of substantially matching bent plates 78, 79 which, when fastened at 80 to the end plate 28 define a very narrow passage 81. This passage is only a little wider than the free end 76 is thick, and only wide enough to provide free clearance for the coin 82 (Fig. 8). Said coin drops into the passage 81 after having been inserted in the opening of the plate 13 (Fig. 1), whereupon it displaces the coin lever 77 from its normally substantially horizontal position (Fig. 3) to release the finger grip device 83 (Figs. 4 and 5) for the immediately succeeding operation.

Said finger grip device 83 is a unit. It is selectively slidable as such upon a pair of shafts 84, 85 (Fig. 4). These shafts extend longitudinally of the vending mechanism 3 (Fig. 2). They are non-circular in cross section excepting at their extremities where they are rounded at 86 (Figs. 2 and 13) to provide trunnions. Said shafts could be made round all the way and the finger grip device 83 splined in position. However, it is mechanically simpler to use cross-sectionally square rods and to turn down the ends to form the trunnions 86.

Said shafts 84, 85, occupy a common horizontal plane (Fig. 4). The end trunnions 86 thereof are turnably supported by the end plates 28, 29. Actual bearing for the rear shaft 84 occurs directly in the plate 28 at the right end and in a bearing plate 87 (Fig. 10) at the left end. This bearing plate is rigidly secured at 88 and the reason for its use is to accommodate the insertion of the right end of the shaft 84 in a hole 89 (Fig. 13) in the end plate 28 and then the dropping of the trunnion at the other end in a slot 90 (Fig. 10) in the plate 29 where the bearing is completed by means of the plate 87.

The front shaft 85 is provided with special bearings 91, 92 (Fig. 2) for its trunnions 86. These are secured at 93 to the end plates 28, 29 over slots 94 through which said trunnions are inserted to their bearing positions. The right trunnion end of the shaft 84 (Fig. 13) has a dog 95. Said dog has a recess 96 (Fig. 8) defining a tooth 97 with which the end 98 of the coin lever 77 is abuttable (Fig. 3) to prevent the clockwise turning of the shaft 84 which, as appears below, is necessary for the inward movement of the gripper to abstract a cigarette. Thus it is by the occupancy of the recess 96 by the end 98 (Fig. 3) that the dispensing mechanism is locked in its static position. Conversely, the mechanism is unlocked for a vending operation by the dropping of the coin 82 (Fig. 8) against the free end 76 of the coin lever 77, by which act the end 98 is raised from the recess 96 thereby freeing the shaft 84 for the turning required to bring the gripper to the position in Fig. 6.

Said dog 95 is rigidly secured to the trunnion 86 (Fig. 13) by a screw 99 (Fig. 8) or any preferred equivalent. A link 100 is pivoted at one end on the dog 95 by means of a pin 101 (Fig. 16). Said pin is fixed in the dog in a projecting position. The link 100 is then slipped over the pin and a retaining clip 102, secured to the dog 95 at 103 so as to overlap the free end of the pin, holds the link 100 from slipping off. The other end 104 of the link 100 (Fig. 8) is slidable in a guide 105. This guide is firmly affixed to the plate 28 in such a position that said end 104 may act as a pusher against the angled extension 106 of a detent 107. This is the coin lever detent and it has a shoulder 108 which coacts with a stud 109 on the coin lever 77.

The detent 107 is loosely hung from a pivot 110 on the side of the plate 28. It is intended to gravitate against the stud 109. For this purpose the pivot 110 is centered slightly forwardly of the stud 109 so that the detent 107 always hangs at a slight angle in a resting position against the stud 109. The latter occupies the base 111 of the shoulder 108 in the static position of the dispensing mechanism (Fig. 3). The downward displacement of the lever 77 under the weight of the coin 82 (Fig. 8) swings the detent 107 aside. The stud 109 will then register with the shoulder 108 and by that means to lock the coin lever 77 in its position of retraction with respect to the dog 95. The vendee may then at his leisure actuate the hand lever 20 for the dispensing operation. The coin lever 77 is held free from the dog 95 until the vendee does depress the hand lever.

It is not until the vending operation is thus begun that there is any chance of the coin lever returning to its locked position against the dog 95 and thus frustrating the sale. The depression of the hand lever 20 rocks the shaft 84 clockwise as has been stated. The accompanying clockwise turn of the dog 95 moves the link 100 backwardly in its guide 105 (Fig. 9). It is by this act that the pusher end 104 of the link 100 displaces the detent 107 to the right by making engagement with its extension 106. The shoulder 108 is thus moved away from the pin 109. This again releases the coin lever 77 but said lever is capable of only gravitating to a resting position on top of the tooth 97, it being remembered that as yet the dog 95 stands in its displaced position in Fig. 9.

A pin 112, projecting from the side of the plate 28 (Fig. 8) limits the tilting of the coin lever 77 under the weight of the coin 82. Said coin then rolls off of the end 76 into a coin box below, there being a guard 113 at the back (Fig. 12) to insure the dropping of the coin as intended. A weight 114 (Figs. 3 and 8) is responsible for the gravitation of the end 98 of the coin lever toward the dog 95. The lever end 98 is made considerably broader than the lever 77 (Fig. 12), partly to match the thickness of the dog 95 and partly to provide an adequate rest for the weight 114. The latter is seated in the corner between the end 98 and an upstanding part 115 of the lever 77. It is into said part that a screw 116 is driven through a slot 117 in the weight. The weight 114 is adjusted to overbalance the lever 77 toward the left, thereby insuring its gravitation toward the dog 95 both normally (Fig. 3) and upon the release of the stud 109 by the detent 107 during a vending operation (Fig. 9).

A hub 118 (Fig. 12) on the coin lever 77 is seated on a pin 119 (Fig. 18) which provides the pivot. Said pin projects from the end plate 28. The hub 118 is simply slipped in place on the pin where it is retained by a clip 120. Said clip is affixed at 121 to the plate 28 and its free end simply overlaps the hub 118.

At this point reference is made to the previously mentioned level insuring device 122 (Fig. 3). This device consists of a weight 123 which is pivoted at 124 to a standard 125. The inner bottom corner 126 of this weight clears the forward top corner 127 of the weight 114 as long as the machine stands level. If the machine is tilted backwardly to any appreciable extent the resultant swinging of the weight 123 in the direction of arrow *b* (Fig. 3) will dispose the corner 126 over the corner 127. The weight 123 will thus be in the path of the weight 114 and will thus obstruct the turning movement of the coin lever 77 in a vending operation prior to the clearance of the tooth 97 by the lever end 98. A stop 128 on the forward side of the weight 123 is adapted to engage the standard 125 and limit the swinging of the weight 123 in the direction of arrow *b*.

Said standard 125 is attached at 129 to a support 130 which is part of a structure that is shown herein although it has no immediate concern with the invention. Said structure includes a lever 131 which is pivoted at 132 to said support, the latter being affixed at 133 to the end plate 28 (Fig. 14). At its upper end said lever 131 has a spring 134 connected to it, said spring serving to actuate a part of the coin control (not shown). The lever 131 is rocked by a crank 135 on the right end of the forward shaft 85. Said crank has a pin 136 which works in the slotted end 137 of the lever 131.

Reference is next made to the finger grip device 83 (Fig. 4). This device is covered in part by a guard 138 which is bent inwardly and downwardly from the top of the previously described front plate 56. The finger grip device 83 is man-

ually slidable on both shafts 84, 85 as a unit. Its slider 139 on the shaft 84 is in the form of a U. The arms 140 of the U are directed forwardly and downwardly. The space between the free ends of said arms is bridged by a pin 141 which is fixed at its ends in said arms (Fig. 5). The slider 139 has a stout bracket 142 (Fig. 4) centered on it.

Said bracket functionally is an integral part of the slider 139. It is variously bent in order to station its free end 143 in correct relationship to the rest of the finger grip device. Said free end comprises the mount for the gripper 144 (Fig. 4). The gripper is made of spring metal. It is doubled upon itself and secured at 145 to the mount 143 by means of a bolt and nut 146. Thence it is arched at 147, and the arch consisting of two normally closely contacting leaves which separate but slightly when the cigarette is initially gripped. The free ends of the leaves are reversely bent to comprise a fork 148, the tines of which suggest the thumb and fore-finger of a human hand. The act of the latter in picking up a cigarette is simulated by the fork. Said fork defines a cavity 149 in which the cigarette is received.

In forming the fork slight restrictions 150 are included at the free ends. These restrictions slightly narrow the entrance 151 of the cavity 149. Thus the entrance to the cavity is restricted. The size of the entrance is slightly less than the diameter of the cigarette. Therefore the leaves 147 are spread slightly when the fork is forced upon the cigarette and is thereupon spread open to admit the latter to the cavity.

The size of the cavity is approximately the same as the diameter of the cigarette. Thus the fork exercises only enough of a grip upon the cigarette to hold it. A tight grip is not required because the usual balancing in position of the cigarette centrally (or substantially so) of the fork is adequate to support it in position prior to being discharged from the machine.

A slider 152, similar to 139, is carried by the front shaft 85. The hand lever 20 is made integral with this slider, and because of the connections between the two sliders 152, 139, the finger-grip device 83 is capable of being slid along the shafts 84, 85 as a unit. The slider 152 has arms 153 which make the actual sliding engagement with the shaft 85. The slider 152 is also in the form of a U, and the arms of the two sliders are directed downwardly toward each other as shown in Fig. 4. A pivot pin 154 connects the yoke 155 of a pusher 156 with the arms 153 of the slider 152.

The yoke 155 bridges the distance between side members 157 which at the front have downward extensions 158 in the ends of which a pin 159 is set. The ends of this pin project at 160 (Fig. 5), and provide the mounts for the forward ends of springs 161, the rear ends of which are hooked onto studs 162 which project from the free extremities of the arms 153. The springs 161 exercise a contracting force on the arms 153 and extensions 158, tending to swing the two toward each other (arrows *c* and *d*, Fig. 4) upon the pivot pin 154. This tendency to swing is limited by the engagement of the arms 153 with stops 163 on the sides of the members 157.

Under normal conditions, that is to say when the dispensing mechanism is in its static condition, the arms 153 are held in position against the stops 163. The springs 161 allow an idle depression of the hand lever 20 to its full extent in any one of the spaces 64 (Fig. 2), such as may be expected when the machine is made available to a more or less curious public. It is only under such a circumstance that the springs 161 yield. Therefore the purpose of these springs is to dissipate the force of a false or idle operation of the lever 20, preventing its transmission to the vital parts of the finger-grip device.

The foregoing side members 157 have upwardly extending arms 164 which have elbows 165 provided with slots 166. These slots register crosswise of the machine and they are occupied in part by the pin 141 of the slider 139. Said pin has only a slight amount of idle movement in the slots 166 because in practice the coin lever end 98 does not fit quite tightly against the tooth 97. In practice there is a little space between the two, and it is the extent of this space which determines the amount of idle movement of the pin 141 in the slots 166. According to the drawing wherein the coin lever end 98 is shown fitted snugly against the tooth 97 there can be no idle movement of the pin 141 in said slots. Therefore the immediate response to an idle depression of the lever 20 is a yielding of the springs 161 to the full extent of depression of the lever 20 if need be, the only effect upon the pusher 156 being a slight rocking thereof upon the pin 141 in response to the raising of the pivot pin 154 (arrow *e*, Fig. 4).

It is at the virtual extremities of the arms 164 that the actual pushing act occurs. Here the arms 164 have a pair of tines 167, 168 standing in flaring relationship to the arms 164 and defining a crotch 169 with which the cigarette is abuttable to cause its release from the gripper 144. The tines 167 are directed toward the opening 46 and are high enough to avoid any possible interference with the abstraction of the cigarette at the opening 46. The tines 168 permanently delineate a substantial continuation of the pitched portion 54 of the discharge chute 53. They thus constitute a guard down which the cigarette is adapted to roll (arrow *a*, Fig. 6).

When the finger-grip device 83 functions for the dispensation of a cigarette, at which time the dog 95 is released from the detent mechanism 33 in Fig. 8, the slider 152 and pusher 156 swing as a unit (arrow *f*, Fig. 4). The shaft 85 constitutes the center of swinging. The extent of swinging is from the normal position at *g* (Fig. 6) to the displaced position *h*. At this time there is no yielding whatsoever of the springs 161. The arms 153 and the stop 163 remain together. In this swinging the slots 166 (Fig. 4) exercise a cam action on the pin 141. The slider 139 is thus turned in the direction of arrow *i* (Fig. 6), and since it is this slider which carries the gripper 144 it follows that the latter is swung through the opening 46 (Fig. 6) into the package 7 in order to grip the nearest cigarette 11.

It is usual in packages of the particular kind herein contemplated to supply two rows of cigarettes as seen in Figs. 1 and 2. In order to avoid any possible interference with the working of the gripper 144 which might be occasioned by the friction between the adjoining ends of the cigarettes in the two rows use is made of a separator 170 (Fig. 17). This separator is in the form of a T. It comprises a cross member 171 which is emplaced longitudinally of the package 7, 8, the pendent blade 172 then functioning as a divider between the two rows. The ends of the cigarettes thus have a smooth metal contact which makes it easy to abstract them at the opening 46.

Reverting to the working of the finger-grip device 83 reference is made to Fig. 10 which shows the means for returning said device to its starting position after hand pressure is released from the lever 20. Said means comprises a stout spring 173 which is anchored at one end to an adjustable cleat 174 on the side of the end plate 29. The other end of the spring is attached to a pin 175 which projects from the trunnion 86 of the rear shaft 84. The spring 173 draws the pin 175 against a stop 176. This stop is adjustable at 177, and the position of adjustment of said stop determines the relationship of the tooth 97 to the coin lever end 98 (Fig. 8).

It is readily seen that the tooth 97 can be set closer to said end 98 by adjusting the stop 176 in the downward direction (Fig. 10), assuming for the purpose of this illustration that there is an undesirable amount of spacing between said tooth 97 and the end 98. If the stop 176 is set low enough, which in fact it is according to these drawings, the tooth 97 will be directly against the end 98 although necessarily with enough clearance to enable the easy displacement of the coin lever 77 under the weight of the coin 82.

In conclusion reference is again made to the glass panel 44. This it will be remembered is intended to hold the cigarettes from tumbling out. In order to sustain said pane with a degree of resilience as well as to exert some pressure on it from underneath so as to maintain a good contact with the hooks 45, the rabbets 43 are equipped with spring cleats 178 (Figs. 10 and 11). These are long leaves which are centrally fixed at 179. The ends thereof are free to exercise their spring action against the glass pane.

The operation is readily understood. The static position of the dispensing mechanism 3 appears in each of Figs. 3 and 4. Fig. 4 particularly shows the initial position of the finger-grip device 83, while Fig. 3 illustrates the initial position of the detent mechanism 33. As has been explained in detail, an idle depression of the hand lever 20 cannot cause any injury to the mechanism because the force then expended is dissipated in the springs 161.

This is readily seen by comparing Figs. 4 and 7. In Fig. 4 the parts are shown in the initial position in full lines. In Fig. 7 the same position is indicated in dotted lines. The change in position upon an idle depression of the lever 20 (arrow *j*, Fig. 7) is shown in full lines. The slider arms 153 and the extensions 158 of the members 157 are swung away from each other. This stretches the springs 161. The pivot 154 has been raised, the result being a slight forward swinging of the pusher 156.

Upon dropping a coin into the mechanism there will be a displacement of the coin lever 77 from the position in Fig. 3 to the position in Fig. 8. Previously to this both shafts 84 and 85 were locked from turning by the engagement of the tooth 97 of the dog 95 by the end 98 of the lever 77. The striking of the free end 76 by the coin 82 lowers the lever 77 so that the stud 109 becomes engaged with the nether side of the shoulder 108 (Fig. 8). The detent 107 is displaced by the riding of the stud 109 across the shoulder. The detent 107 thus locks the end 98 in its elevated position (Fig. 8) until the vendee is ready to press down on the lever 20.

In doing so (arrow *k*, Fig. 6) the finger grip device is swung from the dotted line position *g* to the full line position *h*. The position *g* matches the showing in Fig. 4. The gripper 144 is swung toward the supply of cigarettes, entering the opening 46 (Fig. 6). By virtue of the restrictions 150 being closer together than the cigarette 11 is large in diameter, the initial gripping act is accompanied by a slight separation of the arched leaves 147 (Fig. 6).

In practice the cigarette may be withdrawn under the exercise of a slight amount of tension of the fork 148 against its sides. This would occur in the event of the gripper 144 not being pushed all the way down into the package 7. More often the cigarette 11 will become fully seated in the cavity 149. In an event the cigarette 11 will be held by the gripper 144 substantially centrally of its length and upon letting up on the hand lever 20 the spring 173 (Fig. 10) tends to restore the parts to their former position.

It is then that the dispensing act is completed. The slider 152 will turn clockwise and the slider 139 counterclockwise. The slider 152 and pusher 156 turn as a unit. Consequently the crotch 169 approaches its former position adjacent to the opening 46. At the same time the gripper 144 departs from the opening 146 inasmuch as it is now moving counterclockwise with the slider 139 which carries it. The cigarette 11 is thus advanced into the crotch 169. The crotch acts as an abutment for it. The gripper 144 wipes past the crotch, so to speak, forcibly ejecting the cigarette from its entrance 151 so that the cigarette falls onto the tines 168 and rolls into the entrance 52 of the discharge chute.

It is important to observe that there is no chance of relocking the mechanism prior to the dispensation of the cigarette. During the foregoing act of dispensation the coin lever end 98 rides the top of the tooth 97 (Fig. 9). As the gripper 144 approaches the crotch 169 there is an accompanying retrogression of the tooth 97 toward the left (Fig. 9). The end 98 will drop into the recess 96 before the cavity 149 registers with the bottom of the crotch 169. In other words, the machine is relocked at 97, 98, before the cigarette in the gripper 144 is advanced far enough into the crotch 169 to be pushed out. It is thus impossible for the vendee to abstract two cigarettes for the price of one.

I claim:

1. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a gripper operable to move toward and into the container to grip one of the articles and then recede from the container, abutment means past which the gripper is movable in said recession for the release of the article from the gripper to a point of disposal, and cooperating means for causing the abutment means and the gripper to move toward or away from each other.

2. A vending machine comprising a support for sustaining the container of a vendible article in a display position, and a finger grip device for abstracting single articles at a time, said device consisting of a gripper to reach into the container and take hold of one of the articles, abuttable means against which the gripper is operable to strike off the gripped article for its release from the finger grip device, and cooperating means for causing the abuttable means and the finger grip device to be moved relatively to each other when the gripped article is being released.

3. A vending machine comprising a support for

sustaining the container of a vendible article in a display position, and a finger grip device having a remotely located two-directional movable manual lever and including gripper and abutment components movable away from each other on the first movement of the lever and toward each other on the return movement of the lever, respectively to grip one of the articles and then to contact said article with the abutment means to displace the article from the gripper.

4. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a finger grip device comprising a pair of interconnected rockable members, one of said members having a gripper and the other member having abutment means, and a two-directionally rockable lever having a connection with one of said members to rock said members diversely to each other on each of the movements of said lever, first to move the gripper toward and into the container to grip one of the articles, second, to move the gripper out of the container and at the same time move the abutment means toward the gripper, causing the gripper and abutment means to pass each other and to displace the article from the gripper by contacting with the abutment means.

5. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a pair of interconnected and oppositely rockable members one of which has a gripper and the other a crotch, and a manually and two-directionally movable lever having connection with one of said members for moving the gripper and crotch parts upon movement of the lever in one direction and at the same time to move the gripper into the container to grip one of the articles, and to move said gripper and crotch toward and past each other upon the return movement of the lever, thereby advancing the article into the crotch and shoving it out of the gripper.

6. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a finger grip device consisting of a pair of interconnected and positively movable members, one of said members carrying a gripper and the other member carrying a crotch, a two-directionally movable manual lever for cousing diverse movements of said members on each of the two movements of said lever, respectively to cause the gripper to reach into the container for gripping a single article and then for advancing said article into the crotch for its displacement from the gripper, lock means in conjunction with said movable members, preventing the movement thereof as long as said means remains locked, and a yieldable connection between said lever and one of said members, yielding as long as said means remains locked, thereby to translate one of the movements of said lever into an idle movement and causing the return of said lever upon relaxation of pressure thereon.

7. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a finger grip device consisting of a pair of oppositely turnable and interconnected members, a gripper forming part of one of the members and abutment means forming a part of the other member, a two-directionally movable lever for turning said members upon movement in one of its directions thereby to swing the gripper toward and into the container to grip an article and at the same time swing the abutment means away, and upon return movement in its other direction to swing the gripper out of the container and the abutment means toward the gripper to meet the article and thereby displace it from the gripper, and a yieldable element connecting the lever with one of said members, being subject to yielding only in the event of locking said members against movement in response to the initial movement of said lever.

8. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a pair of oppositely turnable shafts, a slider splined on each of the shafts and including arms, a gripper carried by one of the sliders and a two-directionally movable lever carried by the other slider, a member pivotally mounted on the arms of the slider of the lever and having abutment means to coact with the gripper, a loose connection between said member and the arms of the other slider, and a yieldable connection between the arms of the slider of the lever and said member, normally remaining rigid to transmit at least one of the movements to the gripper and abutment means, and yielding only in the event of a locking of said gripper and abutment means against movement.

9. A vending machine comprising a support for sustaining at least two containers of vendible articles in spaced apart display positions, a pair of oppositely turnable but fixedly related shafts, a slider splined on each of the shafts, being oppositely turnable in common with the shafts, a two-directionally movable hand lever on one of the sliders, responding to a manual movement of the lever in at least one direction to cause the turning of the sliders and shafts, a member pivotally connected to the slider of the lever and in turn having a loose connection with the other slider thereby consolidating said member and sliders into a unit, abutment means forming part of said member, a gripper carried by said other slider, said unit being slidable as such along the shafts to position the gripper adjacent to the chosen one of the containers, and a connection between the slider of the lever and said member converting the movement of the lever in one direction to movements of the sliders whereby the abutment means and gripper depart from each other, said gripper then reaching into the chosen container to grip an article, and converting the return movement of the lever in the other direction to movements of the abutment means and gripper toward each other, thereby contacting the article with the abutment means and displacing said article from the gripper.

10. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a discharge chute adjacent to the container, a gripper operable to move toward and into the container to grip one of the articles and then recede from the container, abutment means past which the gripper is movable in said recession for the release of the article from the gripper, guard means forming part of the abutment means, being alined with the chute to direct the released article thereinto, and cooperating means for causing the gripper and abutment means to be moved relatively to each other so that the abutment means will force the article away from the gripper.

11. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a discharge chute having an entrance adjacent to one edge of the

container, a gripper operable in one direction to cross said edge and reach into the container to grip one of the articles and then being operable in the other direction to lift said article over the edge, abutment means obstructing part of the path of movement of said article thereby to push said article out of the gripper, guard means forming part of the abutment means, being alined with a portion of the chute thereby to direct the article into the entrance thereof, and cooperating means for causing the gripper and abutment means to be moved relatively to each other and in operative relation so that the abutment means will force the article from the gripper.

12. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a discharge chute, abutment means including a pair of diversely directed tines defining a flaring crotch, a gripper consisting of a resilient fork, being two-directionally movable with respect to the abutment means, first to reach into the container and grip an article in its fork, second to introduce the article into the crotch for engagement with the abutment means and displacement from the fork, said article then moving over one of the tines and into the chute, and cooperating means for causing the gripper and abutment means to be moved relatively to each other and in operative relation so that the abutment means will force the article from the gripper.

13. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a pair of turnable shafts, detent means related to one of the shafts and adapted to constitute a lock therefor, resilient means coupled to said one shaft, tending to avoid looseness in the lock, a slider splined on each of the shafts, each of the sliders having arms, a two-directionally movable lever on one of the sliders, a member pivotally carried by said one slider, a loose connection between said member and the arms of the other slider, serving to convert said member and sliders into a unit, abutment means forming part of the member and extensions branching off from said member, a gripper carried by the other slider, being movable into the container to grip an article upon movement of the lever in one direction against the tension of said resilient means when the detent means is unlocked, and resilient means connecting said extensions with the arms of the slider of the lever, resisting expansion when said detent means is unlocked and thereby transmitting said movement of the lever to the shafts, but yielding to expansion when said detent means is locked, thereby converting said movement of the lever to an idle movement with respect to turning the shafts.

14. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a finger grip device for abstracting single articles at a time, said device including a gripper, a two-directionally manually movable lever, a series of articulated members coupling the lever to the gripper for transmitting the movement of the lever in one direction to the gripper for the abstraction of the article, a detent mechanism for locking the gripper against movement until the detent mechanism is displaced, and a yielding connection embodied in said articulated members allowing for an idle movement of the lever in said one direction as long as the detent mechanism remains locked.

15. A vending machine comprising a support for sustaining the container of a vendible article in a display position, a finger grip device for abstracting single articles at a time, said device including a gripper, a two-directionally manually movable lever for actuating the gripper when moved in one direction, a series of articulated members coupling the lever to the gripper, a stop on one of the members, and a spring connecting said one member with its companion member, said spring holding said one member against the stop so that said one member and its companion work as a unit, and detent means adapted to assume locked and unlocked positions with respect to the gripper, respectively to prevent and permit its movement toward the container, said spring yielding only to the movement of the lever in said one direction when the gripper is locked by said detent means.

16. A vending machine comprising a gripper, means for moving said gripper in each of two directions, a support for sustaining the container of a vendible article at a pitch so as to be readily accessible to the gripper in one of its movements, a covering on the container for preventing the articles from tumbling because of said pitch, said covering being spaced back from one edge of the container to define an opening admitting the gripper, abutment means obstructing the path of the gripped article on the return movement of the gripper, displacing it from the hold of the gripper, and a filler between said container and support insuring the establishment of said opening at the proper altitude with respect to the gripper.

17. A vending machine comprising angled means for supporting the container of two rows of cigarettes at a pitch, a finger grip device including a gripper, a lever extending off from said device, being movable in one plane to selectively station the gripper in front of a chosen row, said lever also being movable in another plane to actuate the finger grip device for the introduction of the gripper into the container for gripping a cigarette, and a separator inserted in the container between the rows so as to prevent abutting ends of the cigarettes from interfering with the abstraction of a cigarette.

18. A vending machine comprising a housing having a pair of longitudinal openings, a unitary dispensing mechanism removably emplaced in the housing and having matching elongated openings, supporting means embodied in said dispensing mechanism for sustaining plural rows of cigarettes in vendible positions, a finger grip device for mechanically abstracting individual cigarettes from chosen rows, a lever extending from said device and projecting through a matching pair of openings to a point of manual access for longitudinal and depressing movements, and a chute underlying all of the rows and communicating with the remaining matching openings for delivering single cigarettes as dropped by the finger grip device.

19. A vending machine comprising a housing having a pair of longitudinal openings, a unitary dispensing mechanism removably emplaced in the housing and having matching elongated openings, supporting means embodied in said dispensing mechanism for sustaining plural rows of cigarettes in vendible positions, a finger grip device for mechanically abstracting individual cigarettes from chosen rows, a lever extending

from said device and projecting through a matching pair of openings to a point of manual access for longitudinal and depressing movements, a chute underlying all of the rows and communicating with the remaining matching openings for delivering single cigarettes as dropped by the finger grip device, and lips extending from the housing opening in communication with the chute, being spaced apart to catch the cigarettes in bridging positions across the spaces.

20. A vending machine comprising a dispensing mechanism, said mechanism including a base plate and upstanding end plates, a pair of oppositely turnable shafts journaled on said end plates, means for supporting rows of cigarettes in vendible positions above and behind said shafts, a finger grip device splined to the shafts, being slidable therealong and including a gripper operable upon any row of cigarettes, a lever extending from said device, being movable in one plane to slide said device along the shafts to make a selection and then movable in another plane to actuate said gripper for the abstraction of a cigarette, a chute common in all of the rows of cigarettes for receiving the selected cigarette from the gripper, and a front plate fixed in position between the end plates, said front plate having a pair of longitudinal openings respectively for the lever and for registration with the chute, said lever opening including upstanding flanges outlining spaces in which the lever is movable in said second plane, said spaces insuring the registration of the finger grip device with a chosen row of cigarettes.

21. A vending machine comprising a pair of turnable shafts, a toothed dog on one end of one of the shafts, a detent device releasably engaging the tooth to lock the shafts from turning while engaged but permitting turning when disengaged, a finger grip device slidable upon and splined to said shaft, said device consisting of articulated members terminating in a hand lever at one end and a gripper at the other end, and means for supporting cigarettes in positions of access by the gripper upon movement of the gripper toward the cigarettes by operation of the lever when said detent device is unlocked.

22. In a vending machine, a turnable shaft, a finger grip device splined to and supported in part by said shaft, the operation of said device involving the turning of the shaft, a dog attached to said shaft and having a tooth, a swingable lever having an end engageable and disengageable with respect to the tooth for locking or for releasing the shaft from and for turning, and detent means swinging into position to lock the swingable lever when said end is swung away from the tooth thereby placing the shaft in readiness for turning upon operation of the finger grip device.

23. In a vending machine, a turnable shaft, a finger grip device splined to and supported in part by said shaft, the operation of said device involving the turning of the shaft, a dog attached to said shaft and having a tooth, a swingable lever having an end engageable and disengageable with respect to the tooth for locking or for releasing the shaft from and for turning, detent means swinging into position to lock said lever when said end is swung away from the tooth thereby placing the shaft in readiness for turning upon operation of the finger grip device, and a link attached to the dog and extended toward the detent means, swinging said detent means from its locked position upon said turning of the shaft thereby allowing the return of the lever end to its reengagement with the tooth.

24. In a vending machine, dispensing apparatus comprising an angled support for sustaining the container of a quantity of cigarettes at a predetermined pitch, a finger grip device for abstracting single cigarettes in succeeding operations, a toothed dog embodied in the finger grip device, a releasable lever in engagement with the dog to prevent the operation of said finger grip device as long as said lever is in engagement with the dog, and means requiring the leveling of the dispensing apparatus before said finger grip device can be actuated, said means consisting of a weight pivotally supported adjacent to an end of said lever, being adapted to swing across said end to prevent the displacement of the lever until said apparatus has been leveled.

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