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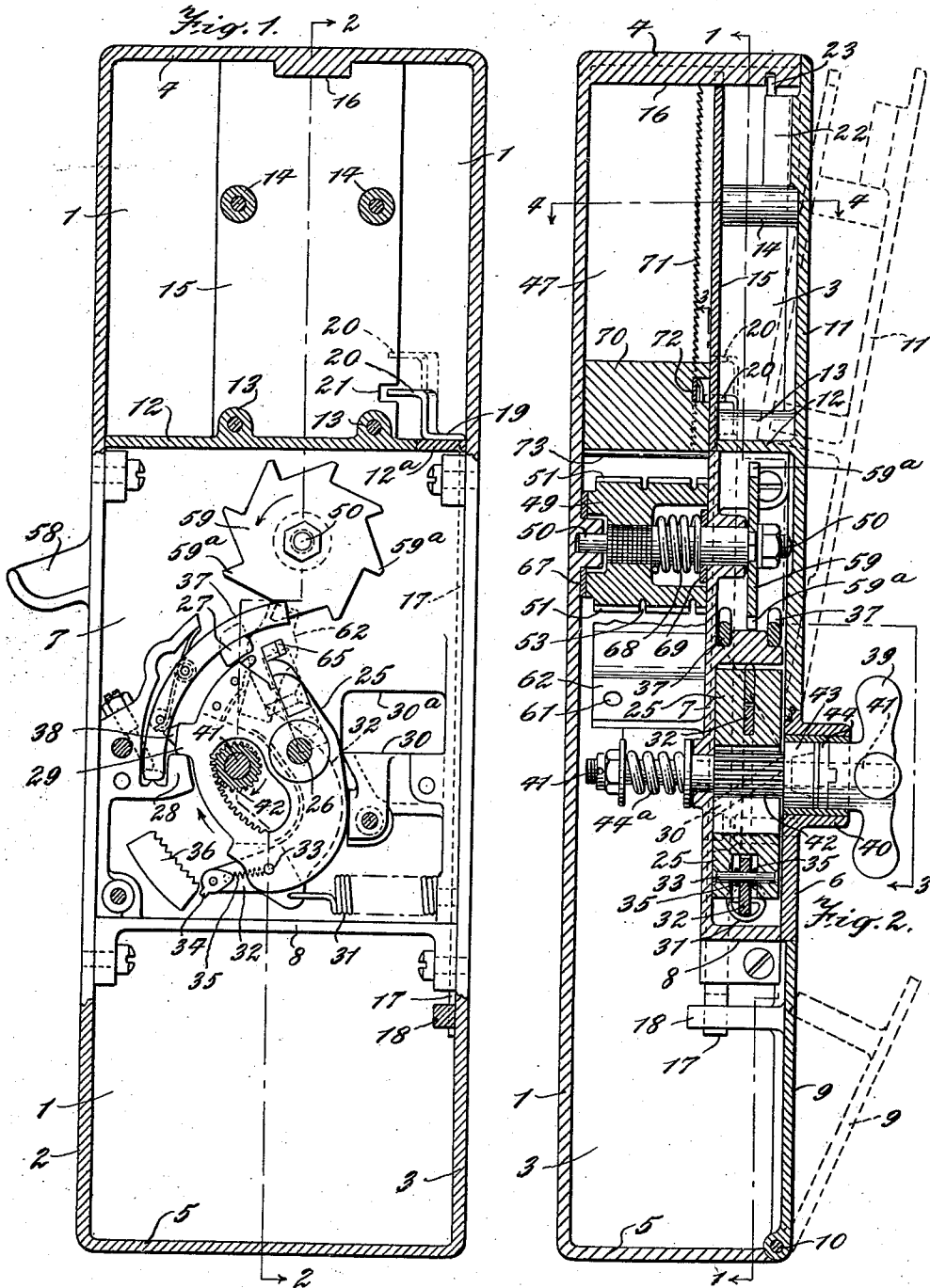
L. H. MORIN

1,739,982

VENDING MACHINE

Filed March 3, 1926

2 Sheets-Sheet 1



INVENTOR
Louis H. Morin

BY *Stoddard & Bond*
ATTORNEYS

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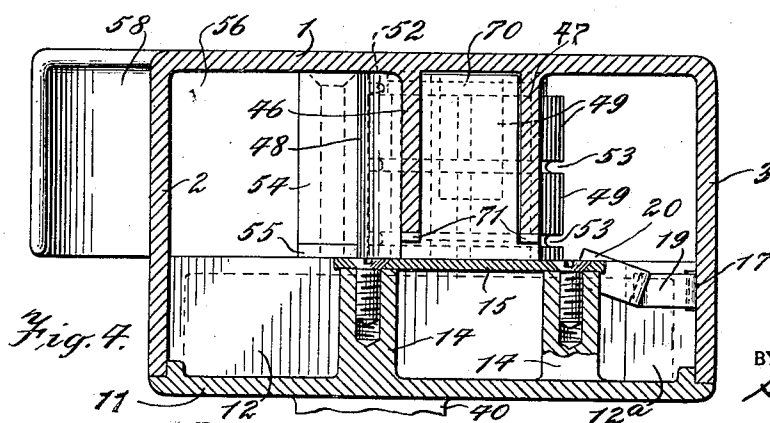
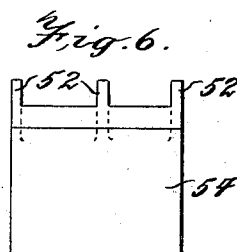
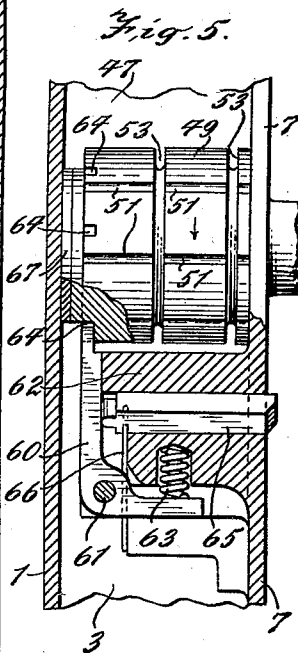
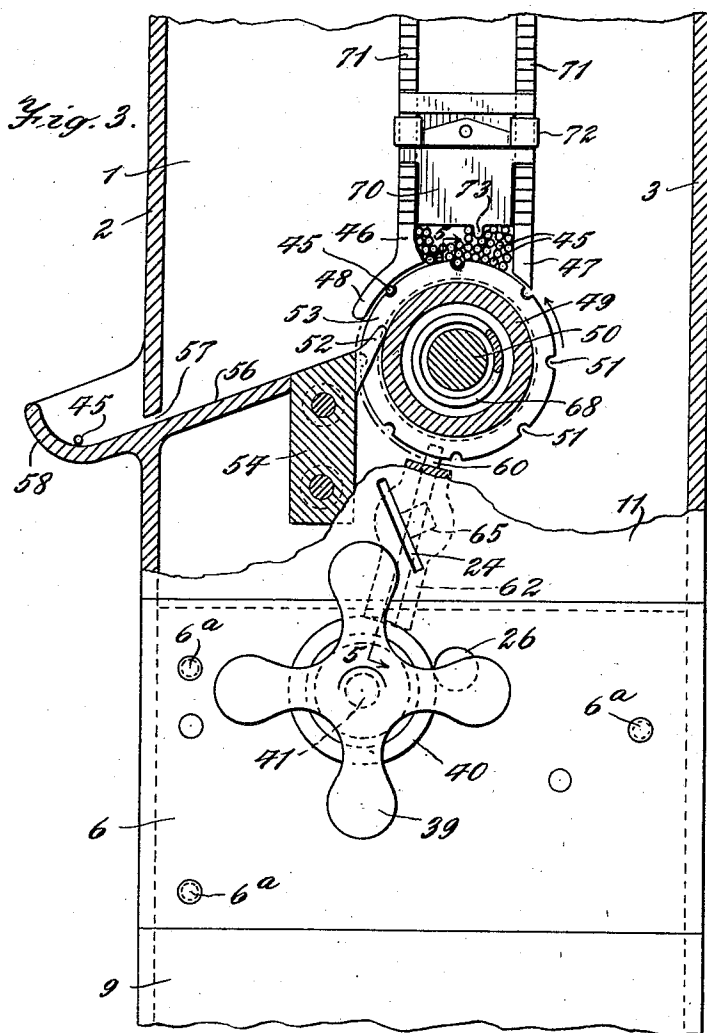
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Louis H. Morin
BY *Stocking & Bond*
ATTORNEYS

UNITED STATES PATENT OFFICE

LOUIS H. MORIN, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO
DOEHLER VENDING MACHINES, INC., A CORPORATION OF NEW YORK

VENDING MACHINE

Application filed March 3, 1926. Serial No. 91,920.

This invention is shown in the drawings as embodied in a machine for vending pencil leads, which, because of their brittleness and small size, must be handled with some care and which because of this and their shape require a special construction of the vending or delivery mechanism. However, while the machine of the present invention is particularly useful in the vending of pencil leads, it is to be understood that a vending machine embodying the present invention could be employed for vending other articles, particularly articles which in their shape and dimensions more or less resemble pencil leads.

This invention relates more particularly to the vending or purchase-delivering mechanism, which in the embodiment of the invention shown in the drawings is so constructed as to be operated and controlled by a moving coin. In carrying out the invention, the mechanism employed for moving the coin to cause the latter to operate the purchase-delivering mechanism is substantially the same as that disclosed and claimed in my copending application Ser. No. 39,442, filed June 25, 1925, which became Patent No. 1,723,948, dated August 6, 1929.

It may be further noted that while this invention has been commercially embodied in a coin controlled vending machine it may as well be embodied in a purely dispensing device or machine without coin control should occasion arise and without departure from the claimed invention.

The particular enclosing casing, per se, shown in the drawings as embodied in the machine of the present invention and hereinafter described forms the subject of my copending divisional application Ser. No. 127,831, filed August 7, 1926, which became Patent No. 1,716,457, dated June 11, 1929.

An object of the invention is to provide a vending machine which is particularly useful for vending pencil leads. Another object is to provide a vending machine in which the purchase-delivering mechanism will cooperate with the coin controlled mechanism disclosed in my said Patent No. 1,723,948. Other objects are to produce a vending machine which is inexpensive to manufacture,

simple in construction, effective in operation, strong, durable and dependable. Other objects and advantages will hereinafter appear.

The invention includes various features of construction and combinations of parts as pointed out in the appended claims and as will appear from the following description of the embodiment of the invention illustrated in the accompanying drawings in which:

Fig. 1 is a vertical section on the zig-zag line 1—1 of Fig. 2 and shows some parts of the operating mechanism in front elevation;

Fig. 2 is a vertical section on the zig-zag line 2—2 of Fig. 1;

Fig. 3 is an enlarged partial vertical section on the zig-zag line 3—3 of Fig. 2;

Fig. 4 is a similarly enlarged horizontal section taken on the line 4—4 of Fig. 2 and also substantially as viewed from above in Fig. 3;

Fig. 5 is a partial substantially vertical section taken on the irregular line 5—5 of Fig. 3; and

Fig. 6 is a detached view in elevation, as viewed from the left in Fig. 3, of the stripping device.

In order to facilitate the description of the operating mechanism of the vending machine shown in the drawings as an embodiment of the invention, the framework of the machine including the outer enclosing casing which forms the subject matter of my hereinbefore mentioned Patent No. 1,716,457, will be first described. The enclosing casing is of elongated rectangular shape, is disposed in upright or vertical position, in its upper portion encloses a magazine, in its middle portion encloses the purchase-delivering mechanism and the coin-controlled operating mechanism, and in its lower portion forms a coin receptacle.

A casing box is shown as formed in one piece to include a back wall 1, side walls 2 and 3, a top wall 4 and a bottom wall 5, and also to include other parts hereinafter described which are formed in one piece therewith. This casing box, together with the parts which are to be formed in the same piece therewith, may be a casting, such as a die-

casting, of suitable metal such as aluminum. The entire front of this casing box is originally open. A portion of the front of the casing box somewhat below the middle thereof is closed by a transverse wall portion 6 which is supported, for example, by means of screws 6^a from the inside as indicated in Fig. 3, upon the front and to form a part of a mechanism-supporting frame which includes a rear vertical wall 7 and a lower horizontal wall 8 both of which extend from side to side of the casing box, and this frame may be secured in place by means of screws at the inside of the casing box entering the side walls 2 and 3 thereof as is shown in Figs. 1 and 2 of the drawings. This entire frame may be a die-casting of suitable metal such as zinc, while the front wall part 6 may be an aluminum die-casting.

A lower door 9 is provided below the transverse wall 6 and at its lower edge is hinged at 10 to the front edge of the bottom casing wall 5 so as to open outwardly and downwardly as indicated in dash lines in Fig. 2. An upper front door 11 extends from the upper edge of the transverse wall 6 to the top wall 4 of the casing box and at its lower end has an undercut interlocking relation with the transverse wall 6 so that by swinging the upper end of this door outward as indicated in dash lines in Fig. 2 this upper door may be opened and removed. These two front doors 9 and 11 may be aluminum die-casting.

Upon the inner side of the upper door 11 somewhat below the upper end thereof, there is cast a horizontal shelf 12 which extends transversely across the casing box and across the upper end of the mechanism-supporting frame from the left side wall 2 of the casing box almost to the right side wall 3 where an intervening space is shown as filled in by a shelf portion 12^a of the mechanism-supporting frame as appears in Figs. 1 and 4. This shelf 12 is provided on its upper side with a pair of ridges 13 and above these ridges towards the top of the door the door 11 is provided with a pair of inwardly projecting bosses 14 shown as cast in the same piece therewith. For a portion of its width the upper door 11 carries an inner wall 15 which may be secured to the inner ends of the ridges 13 and bosses 14 by means of screws as shown in Figs. 1 and 4. This inner wall 15 of the door 11 forms an upward continuation of the frame wall 7 and extends up to the top wall 4 of the casing box where it is notched around a rib 16 shown as formed on and extending from the front to the back of the top casing wall 4. This inner wall 15 forms a front wall and door for the magazine, as will presently more clearly appear, and opens outwardly and is removable with the door 11.

Interlocking means are provided between the upper door 11 and the lower door 9 so

that one of these doors cannot be opened until the other door has been opened, and such interlocking means is shown as a manually operable locking device which is accessible to be operated only when the upper door 11 is open and which prevents the upper door from being closed unless this device has been operated to lock the lower door. A vertically slidable bar 17, forming a bolt, is guided between the mechanism-supporting frame and the right side wall 3 of the casing box by being notched into this frame, as clearly appears in Figs. 1 and 2. The lower end of the bolt 17 is engageable in a notch in a keeper or catch 18 provided on and projecting inwardly from the upper portion of the lower door 9 adjacent the casing side wall 3. The upper end portion of the bar 17 forming the bolt is turned over at right angles away from the casing wall 3 to form a stop 19 to engage the shelf portion 12^a for limiting the downward movement of the bolt 17 and is thence turned upwardly and then towards the left and slightly inwardly or rearwardly to form a handle portion 20 by which the bolt 17 may be lifted to disengage its lower end from the keeper 18 and by which it may be restored to its engaging position with this keeper.

When the lower end of the bolt 17 is in engagement with the keeper 18, as shown in full lines in Figs. 1 and 2, and with the upper door 11 closed, the handle portion 20 of the bolt 17 is received in a notch 21 provided in the adjacent edge of the inner door wall 15 so that the bolt 17 is then securely locked against disengagement, as shown in Figs. 1, 2 and 4. When the bolt 17 has been lifted to its disengaging position, as indicated in broken lines in Figs. 1 and 2, its handle 20 will not then be in position to be received into the notch 21, with the result that the adjacent edge portion of the door wall 15 will strike this handle 20 and prevent the upper door 11 from being closed, thereby compelling the bolt 17 first to be slid downward to lock the lower door 9, as will be clear from an inspection of Figs. 1, 2 and 4 of the drawings. The upper door 11 is provided on its inner side adjacent to its upper edge with a suitable lock 22 the locking bolt 23 of which is engageable in a recess or notch provided in the rib 16, which thereby forms a keeper for the bolt 23 as is shown in Fig. 2. The lock 22 may be of any suitable construction and may be locked and unlocked in the usual way by means of a key.

It will now be evident that access cannot be had to the interior of the enclosing casing except by first unlocking the upper door 11. When the upper door 11 has been unlocked and opened then the bolt 17 may be lifted to unlock the lower door 9 which only then can be opened. The upper door 11 provides access to the upper portion of the enclosing

casing for replenishing the magazine while the lower door 9 provides access to the lower portion of the enclosing casing for removing the accumulated coins therefrom as will hereinafter more clearly appear. Also when the two doors 9 and 11 have been opened, and only then, the entire mechanism-supporting frame, together with the mechanism carried thereby, may be detached and removed, or replaced. In opening the upper door 11 it is first swung outwardly to substantially the broken line position thereof shown in Fig. 2, after which it may be lifted off, the upper end of the inner door wall 15 having sufficient clearance to pass the front edge portion of the top wall 4 of the casing box as the door 11 is swung forwardly.

In order to facilitate the description and obtain a clearer understanding of the purchase-delivering mechanism or vending features of the machine to which the present invention more particularly relates, the coin-controlled operating mechanism employed in carrying out the present invention and which forms the subject of my hereinbefore mentioned copending application, Serial No. 39,442, filed June 25, 1925, will now be described as briefly as is consistent for obtaining a clear understanding of the present invention. A proper coin may be inserted into the machine through a slightly inclined coin slot 24 in the lower portion of the front door 11 as shown in Fig. 3. The inserted coin is received in a coin-holding slot provided in the upper marginal or peripheral portion of a rocking coin carrier 25, the coin being received in this coin-holding slot at the front of a coin-moving finger carried by the coin carrier to engage substantially the center of the coin as shown in Fig. 1. The coin carrier 25 has a pivot stud 26 journaled in the front casing wall 6 and is similarly pivoted to the wall 7 of the supporting frame for the operating mechanism. The rocking movement of the coin carrier is limited by stop lugs 27 and 28 provided on the supporting frame to be engaged by a lug 29 which projects from the back of the coin carrier.

When the coin carrier 25 is rocked in a clockwise direction as viewed in Fig. 1, it will move the coin carried in its slot through the upper arc of a circle towards the right and to an oppositely inclined position for thereby operating the purchase-delivering mechanism, after which it will drop from the slot in the coin carrier upon the rearwardly inclined floor 30 of a coin chute down which it will slide through an opening 30^a provided in the frame wall 7 and will drop into the bottom of the casing, this coin chute being provided on and forming a part of the mechanism-supporting frame as shown in Fig. 1 and as indicated by dotted lines in Fig. 2.

After the coin carrier 25 has been rocked in

a forward direction it is automatically retracted by means of a retractile spring 31 which is connected to the lower part of the coin carrier through the intermediary of a feeler lever 32 which works in a slot in the front face of the coin carrier so that its upper end forms a feeling finger the tip of which may pass across the coin-holding slot in the coin carrier when there is no coin therein but which will abut against a coin in this slot. This feeler lever 32 is pivoted to the lower part of the coin carrier on a pivot pin 33 and on its rearwardly projecting end there are pivoted a pair of reversible pawls 34 which are urged towards a middle position by springs 35 and which when the coin carrier 25 is rocked will wipe over and escape alternately from the opposite ends of an arcuate ratchet 36 provided on the supporting frame.

The coin carrier 25, immediately it starts upon its forward movement, closes or obstructs the coin slot 24 so that a coin cannot be inserted into the machine until the coin carrier has been retracted by its spring 31 to its normal coin-receiving position, shown in Fig. 1. When the coin carrier does not carry a coin the feeler lever 32 is free to yield so as to permit the pawls 34 to reverse on the ratchet 36 so that the coin carrier will be returned to its retracted position by its spring 31 to uncover the coin slot 30 to receive a coin, the feeler tip of the feeler finger of the feeler lever 32 then passing freely across the unoccupied coin-holding slot in the coin carrier. However, when there is a coin in this coin-holding slot it obstructs the passage of the feeler tip of the lever 32 so that the pawls 34 are then unable to reverse upon the ratchet 36, thereby compelling the coin carrier 25 when it carries a coin to be moved forward to its full limit of movement for delivering a purchase, the pawls 34 then escaping from the upper end of the ratchet 36 so that the spring 31 may then retract the coin carrier. This arrangement prevents the possibility of a coin being received by the machine without the delivery of an article which has been paid for.

The coin-moving finger carried by the coin carrier is effective to discard washers, thin metal discs which easily bend, and also paper discs and the like, without operating the purchase-delivering mechanism of the machine to deliver an article which has not been paid for. Magnetizable slugs will be lifted out of the coin-holding slot in the coin carrier and discarded by means of a curved horseshoe magnet 37 which is spring-pressed downward and which is lifted and dropped with a jolt by means of a cam projection 38 on the coin carrier which successively engages a pair of small rollers on the magnet, as shown in Fig. 1, as the coin carrier moves forward, this magnet 37 being mounted to have a slight rocking

movement on the supporting frame for the mechanism.

The coin carrier 25 may be rocked in a forward direction by means of a handle knob 39 having its hub journaled in a bearing sleeve in a boss 40 formed on the front of the casing wall 6. The handle knob 39 is fixed upon the outer end of a handle shaft 41. A pinion 42, loosely mounted upon the handle shaft 41 and having a reduced rear extension journaled in the wall 7, engages with an internal arcuate rack formed on the coin carrier as shown in Fig. 1. The handle knob 39 is operatively coupled to the pinion 42 by means of a friction cone clutch, the cup element 43 of which is carried by the outer end of the pinion 42 and the cone element 44 of which is coupled to the handle knob 39 as shown in Fig. 2. The cup element 43 is journaled in the sleeve in the boss 40. The cone clutch element 44 is pressed into frictional driving engagement with the cup clutch element 43 by means of a coiled compression spring 44^a on the inner projecting end portion of the handle shaft 41. This frictional clutch drive for the coin carrier prevents the mechanism from being broken through undue force applied to the handle knob 39 in an effort to force the coin carrier beyond its limit of movement or to move it when it is locked. As the coin held in the coin-holding slot of the coin carrier is moved by the coin carrier in an arcuate path from the left to the right as viewed in Figs. 1 and 3, between the front wall formed by the upper door 11 and the rear wall 7 forming a part of the mechanism-supporting frame, this coin as it thus moves will operate the purchase-delivering mechanism of the present invention, and such delivery mechanism will now be described.

The supply or stock of pencil leads 45 to be vended, is contained in a magazine shown as a vertically arranged or upright hopper of rectangular horizontal or transverse cross-section and the opposite walls of which are parallel to one another, the back wall of this magazine hopper being formed by the adjacent portion of the rear wall 1 of the casing box, the front wall thereof being formed by the inner wall 15 of the upper door 11, and left and right side walls 46 and 47 therefor are shown as cast in the same piece with the casing box and project forwardly from the rear wall 1 thereof nearly to the front magazine wall 15, but leaving an intervening space for a purpose which will presently appear. The wall 7 of the supporting frame forms a downward continuation of the front wall or door 15 of the magazine from a point near the lower end of the latter, as is clearly shown in Fig. 2. The lower end of the right side wall 47 of the magazine hopper is beveled outwardly or towards the right on an arcuate curve and the lower end of the left side wall 46 is provided at its outer or left side with a

short arcuate skirt 48 the inner end of which at the inside of the magazine hopper forms an abrupt inwardly inclined shoulder as shown in Fig. 3.

The top or upper end of the magazine hopper is closed by the top wall 4 of the casing box. The bottom or lower end of the magazine hopper is closed and an arcuate floor or bottom is formed therefor by the upper peripheral portion of a rotatable delivery cylinder 49, which fits close up to but not quite in contact with the lower beveled end of the right magazine wall 47 and the lower arcuate surface of the skirt 48 on the lower end of the left magazine wall 46. This delivery cylinder may inexpensively be a die-casting of zinc. The delivery cylinder 49 is fixed upon and may be cast upon a knurled portion of a horizontal drive shaft 50, the rear reduced end of which has a bearing in a boss formed upon the inner side of the rear casing wall 1 and which at the forward end of the cylinder 49 is journaled in and projects forwardly beyond a boss formed on the forward side of the frame wall 7. The floor-forming periphery of the delivery cylinder 49 extends rearwardly from the frame wall 7 but terminates before quite reaching the rear wall 1 so as to leave a small intervening space for a purpose which will presently appear. The otherwise smooth peripheral surface of the delivery cylinder 49 has provided therein a circumferential series of equidistantly spaced longitudinal delivery grooves 51, shown as eight in number, having rounded bottoms and abrupt sides and of a depth to receive therein one of the pencil leads 45 substantially flush with the outer peripheral surface of the delivery cylinder 49 as is shown most clearly in Fig. 3.

The stock of pencil leads 45 rests upon the magazine bottom formed by the periphery of the delivery cylinder 49 in horizontal position parallel with its axis and parallel to one another and parallel with the side walls 46 and 47 of the magazine hopper, with the result that the leads 45 will drop one by one successively into the delivery grooves 51, thereby to be delivered from the magazine hopper one by one as the delivery cylinder 49 is rotated to carry them successively beneath and beyond the lower end of the skirt 48, which forms a guard for retaining the leads in the grooves 51 until they reach the delivery point. For each one-eighth rotation of the delivery cylinder 49 one of the pencil leads 45 will be delivered.

Because of their brittleness and the consequent danger of breaking the pencil leads 45, these leads are not permitted to drop by gravity from the bottom or lower side of the delivery cylinder 49, but means are provided for removing them gently laterally from the side of the delivery cylinder. A horizontally aligned series of upwardly inclined stripping fingers 52 at the left side of the delivery cyl-

5 under 49 project inwardly beyond the outer peripheral surface of the delivery cylinder and beyond the bottoms of the lead carrying delivery grooves 51 so as thereby gently to remove the leads from the grooves 51 by gradually easing them out of these grooves as this side of the delivery cylinder moves forward and downward, and at a point substantially on a level with, and shown as beginning a little above, the axis of the delivery cylinder. These stationary stripping fingers 52 are shown as three in number, the forward and middle ones of which are accommodated in circumferential grooves 53 in the periphery of the delivery cylinder 49 and of suitably greater depth than the longitudinal delivery grooves 51 therein, and the third or rearmost stripping finger 52 is disposed adjacent the remote or rear end of the delivery cylinder in a circumferential notch there provided in its periphery. The outer surfaces of the stripping fingers 52 at their upper ends extend substantially in the same direction as the path of movement of a lead 45 at this point, or substantially tangential to the delivery cylinder, and are slightly curved concavely downwardly and outwardly, for thereby more gradually and gently removing the leads 45 from the delivery grooves 51.

30 The stripping fingers 52 are carried by and are shown as formed in one piece with a block 54 which, as shown in Figs. 3 and 4, may be secured by means of screws to a slight lug 55 formed upon the adjacent side of the frame wall 7. This block 54 may be a zinc die-casting. The upper surfaces of the block 54 and the lug 55 are in alignment and inclined gently outward towards the casing side wall 2. A gently downwardly inclined chute floor 56 forms a continuation of the inclined upper surfaces of the block 54 and lug 55 between the rear casing wall 1 and the frame wall 7. This chute floor 56 leads to the outside of the casing through a narrow horizontal slot 57 in the casing wall 2 and terminates at the outside of the casing in a reception trough 58 which, as shown in Figs. 1, 3 and 4, is closed at the rear but is open at the front as well as at the top. A pencil lead 45 will roll safely from the stripping fingers 52 down the gentle inclination provided as above described into the reception trough 58, where it will be safely received by reason of the rounded or concave bottom of this trough and from which it may be readily and conveniently removed by the purchaser.

A one-eighth step of rotation of the delivery cylinder 49 constitutes a complete delivery movement thereof for delivering one of the pencil leads 45 for each coin inserted in payment for such lead. A rotatable coin-operated drive member shown as a peripherally toothed drive wheel 59 is fixed upon the outer squared end of the drive shaft 50 about midway in the space between the front casing

wall provided by the upper door 11 and the interior wall 7 provided by the supporting frame and may be held in place on the drive shaft 50 by means of a nut as shown in Figs. 1 and 2. This drive wheel 59 has eight teeth 59^a which forms a circumferential series of equidistantly spaced abutments some one of which at the lower edge of the wheel is normally in the path of the upper edge portion of a moving coin in position to be engaged thereby and moved a step equal to the distance between the teeth as the coin is moved by the coin carrier 25 from left to right as viewed in Figs. 1 and 3.

At the completion of a one-eighth step of rotative movement of the drive wheel 59 the coin carrier 25 will have nearly reached its forward limit of movement as determined by its lug 29 coming into engagement with the upper stop lug 27, and upon the release of the handle knob 39 and the initiation of the return movement of the coin carrier by its spring 31, the coin will drop from the coin carrier upon the coin chute 30 and thence to the casing bottom 5. The one-eighth step of rotative movement imparted to the drive wheel 59 will of course impart a corresponding one-eighth step of rotative movement to the delivery cylinder 49, thereby to deliver a purchased pencil lead 45 as above described. The teeth 59^a of the drive wheel 50 have abrupt front faces, which are shown as radial, to be engaged by the moving coin, while the rear faces of these teeth are inclined so that the teeth have a tapering form as shown in Fig. 1.

A coin controlled locking device is provided for positively stopping the rotation of the delivery cylinder 49 at the completion of each delivery movement thereof and for positively locking this delivery cylinder against displacement in either direction away from its normal position shown in Fig. 3. This locking device is constructed to be normally automatically effective and to be released by the moving coin preparatory to the delivery movement of the delivery cylinder 49. In the construction shown in the drawings an L-shaped locking pawl 60 is pivoted at its angle or bend, by means of a pivot pin 61, on the lower portion of the inner end of a lug 62 shown as cast upon and projecting rearwardly from the frame wall 7. This lug 62 is slotted along its lower and rear faces to receive the locking pawl 60 as shown in Fig. 5. The locking pawl 60 has an upwardly extending locking arm which is radial to the delivery cylinder 49 and has a horizontal tail arm. The tail arm of the locking pawl 60 is pressed downwardly by a coiled thrust spring 63 which is seated in a recess in the lower side of the lug 62 and urges the upper end of the locking arm of the pawl 60 towards the adjacent rear end of the delivery cylinder 49 as shown in Fig. 5.

The free upper end of the locking arm of the locking pawl 60 overlaps upon the rear end of the delivery cylinder 49 where the latter is cut away at its peripheral portion as hereinbefore mentioned, and this peripheral portion of the delivery cylinder has provided therein a circumferential series of equidistantly spaced abrupt-faced notches 64 for the reception therein of the upper end of the locking arm of the pawl 60 as shown in Figs. 3 and 5, these notches 64 being both of greater radial depth and of greater circumferential width than the longitudinal delivery grooves 51 in the delivery cylinder 49 so that these grooves will not interfere with the operation of the locking pawl 60, the locking end of which cannot enter these grooves. During the delivery movement of the delivery cylinder 49 the locking end of the pawl 60 rides upon the smooth end surface of the delivery cylinder 49 between the notches 64 and at the completion of a step of delivery movement, this locking end of the pawl 60 engages in one of the notches 63 to stop and positively lock the delivery cylinder 49, thereby positively preventing the delivery cylinder 49 continuing its movement by reason of momentum and also preventing the possibility of its subsequent displacement.

For releasing the locking pawl 60 preparatory to a step of delivery movement of the delivery cylinder 49, a horizontally arranged pawl-releasing squared push-rod 65 is guided in the lug 62 and has a reduced rounded inner end, as shown in Fig. 5, in engagement with the front face of the locking arm of the pawl 60 about midway of the length of said arm, and at its forward end the push-rod or bar 65 is provided with an inclined cam surface which projects at the front side of the wall 7 in position to be engaged by the rear edge of a moving coin as the latter is moved by the coin carrier 25 as above described.

The cam end of the pawl-releasing rod 65 projects from the wall 7 immediately forwardly from the coin-holding notch or slot in the coin carrier 25 and the coin slot 24 in the casing, as shown in Figs. 1 and 3, and this inclined cam end of the pawl-releasing push-rod 65 is so located relatively to the drive wheel tooth 59^a which is next to be engaged by the coin that while the moving coin is still in engagement with the outer end of this rod to hold the locking pawl 60 in disengaged or unlocked position, the coin will come into engagement with the tooth 59^a of the drive wheel 59 and start the latter to rotate together with the delivery cylinder 49. A further slight travel of the coin will carry it beyond the end of the pawl-releasing rod 65, whereupon this pawl-releasing rod 65 will be moved outward by a return spring 66 provided therefor, and the locking end of the locking pawl 60, by reason of its spring 63, will ride upon the smooth end surface of the

delivery cylinder 49 between adjacent notches 64 therein in readiness to snap into the next notch 64 for thereby again locking the delivery cylinder 49 together with the drive wheel 59 at the completion of the delivery movement of the delivery cylinder 49. This locking of the delivery cylinder 49 of course will stop any further forward movement of the coin carrier 25, when it carries a coin. The return spring 66 for the pawl-releasing push-rod 65 is shown as a leaf spring which may be secured at its lower end by means of a screw (not shown) to the inner end portion of the lug 62 and which at its upper end engages in a notch provided therefor in the pawl-releasing rod 65.

As hereinbefore noted, because of the small size and brittleness of the pencil leads 45 these leads should be handled with considerable care to avoid breaking them while effecting their delivery from the magazine hopper into the reception trough 58. It is therefore desirable that the delivery cylinder 49 should have a substantially uniform rate of movement which should not be too rapid and which should not be permitted to become substantially accelerated, because of the fact if such rapid movement and acceleration of movement were permitted then the pencil lead 45 which is being delivered could not be so gently eased out of the delivery groove 51 by the stripping fingers 52, and if the engagement of the lead by these fingers were too sudden and abrupt possibly the lead might be broken. In order to assure such a substantially uniform and substantially unaccelerated delivery movement of the delivery cylinder 49, a braking device is provided therefor.

In the construction shown in the drawings, a stationary annular brake disc 67 is interposed between the rear casing wall 1 and the adjacent or remote end of the delivery cylinder 49 to be frictionally engaged by the latter, and this brake disc may fit with sufficient tightness over the bearing boss on the wall 1 to hold the disc stationary. The outer peripheral edge of the brake disc 67 is flush with the cut away portion on the adjacent end of the delivery cylinder 49, thereby together with such cut away portion providing a free space for the movement of the locking pawl 60 to its disengaged position. A recess is provided in the adjacent or remote end of the delivery cylinder 49 for freely receiving the bearing boss provided on the wall 1 for the drive shaft 50, and it is to be noted that clearance spaces are provided between the delivery cylinder 49 and the end of the bearing boss on the wall 1, between the end of the drive shaft 50 and the wall 1, and between the drive wheel 59 and the bearing boss on the wall 7, so that thereby the delivery cylinder 49 may have free frictional braking engagement with the stationary brake disc 67.

The forward end of the delivery cylinder 49 has a rather large and deep recess provided therein surrounding the drive shaft 50 and the delivery cylinder 49 is urged rearwardly into frictional engagement with the disc 67 by means of a strong coiled thrust spring 68 which surrounds the drive shaft 50 and acts between the bottom of the recess in the delivery cylinder 49 and a washer 69 which is interposed between the forward end of the spring 68 and the frame wall 7. This braking device has a sufficient retarding effect upon the delivery cylinder 49 and drive wheel 59 to absorb their momentum and prevent the accumulation of the latter, and also to assure a substantially steady and uniform movement of the delivery cylinder 49 when the handle knob 39 is turned to effect the delivery of a pencil lead 45. Also this braking device has a further advantage in that it guards against the possible breakage of parts of the mechanism by reason of their too sudden movement and quick stoppage.

While the pencil leads 45 may move freely downward by gravity in the magazine hopper by reason of their own weight, this movement is assisted by the weight of a substantially rectangular follower block 70 which rests upon the stock of pencil leads 45 and presses them into closer relation with the magazine floor formed by the periphery of the delivery cylinder 49. Also this follower block 70 assists the parallel side walls of the magazine hopper, particularly the side walls 46 and 47, in maintaining the pencil leads 45 in parallelism so that these leads may be in correct position for readily entering the delivery grooves 51 in the delivery cylinder 49. The follower block 70 is freely guided between the four oppositely parallel vertical walls 1, 15, 46 and 47 of the magazine hopper.

Adjacent the top of its forward end the follower block 70 is provided on each side thereof with a pair of lugs which project between the forward edges of the magazine walls 46 and 47 and the front magazine wall 15 and a transverse groove is provided in the forward end of the follower block between these lugs, as shown in Figs. 2, 3 and 4. The forward edges of the magazine side walls 46 and 47 are provided with downwardly inclined ratchet teeth 71 to be engaged by a manually releasable catch 72 which may be, as is shown in the drawings, a suitable leaf spring located in the transverse groove in the follower block 70 and secured at its middle by means of a rivet or screw to the follower block, as shown in Fig. 3, and having the upper edges of its opposite ends turned inwardly to engage with the ratchet teeth 71 as shown in Fig. 2, thereby to permit free downward movement of the follower block 70 while preventing its upward movement, which otherwise might take place in handling the machine with the result of disar-

ranging the pencil leads 45 contained in the magazine hopper.

In carrying out the invention, the purchase-delivering mechanism includes automatically acting means controlled by the supply of articles, such as the pencil leads 45, in the magazine hopper to prevent the loss of coins in the machine when the magazine hopper requires replenishing. According to this invention the follower block 70 is effective to lock the delivery cylinder 49 at a position in which the latter is in control of means which prevent the loss of a coin in the machine when the delivery cylinder 49 is thus locked by the follower 70. In the machine shown in the drawings as an embodiment of the invention, the delivery cylinder 49 when thus locked by the follower 70 causes the coin carrier 25 to be locked in a position in which it obstructs the coin slot 24 against the insertion of a coin. However, in carrying out the invention, means other than the coin carrier 25 could be employed under the control of the purchase-delivering mechanism for preventing the loss of a coin in the machine when the magazine hopper needs replenishing. In the particular machine illustrated in the drawings as an embodiment of the invention, a lug shown as a longitudinal rib 73 having a rounded face and abrupt sides is provided on the lower side of the follower 70 in a position somewhat to the right side of the delivery groove 51 in the delivery cylinder 49 which is uppermost in any one of the final delivery positions of the delivery cylinder 49, as shown in Figs. 2 and 3.

When the supply of pencil leads 45 in the magazine hopper becomes exhausted or nearly so the descending follower 70 will cause its rib 73 to engage in an empty delivery groove 51 when the latter is brought into alignment with the rib 73 in the delivery movement of the delivery cylinder before it has quite reached its final delivery position, thereby to lock the delivery cylinder 49 against any further forward movement as well as to lock it against the possibility of backward movement. When the delivery cylinder 49 is thus locked by the locking rib 73 on the follower 70 it has not rotated far enough to enable it to be locked by the locking pawl 60, which, as hereinbefore described, only becomes effective at a final delivery position of the delivery cylinder 49. However, when the delivery cylinder 49 is thus locked by the locking rib 73 before it has quite completed its delivery movement it has rotated far enough to effect the delivery of a pencil lead 45, which has been paid for by an inserted coin, and which is the last lead that can be delivered and the last coin that can be inserted until the magazine hopper has been replenished. The delivery cylinder 49 will rotate far enough for this last lead to be eased, by the stripping fingers 52, out of the groove 51

in which it is contained and from which consequently it will roll down into the reception trough 58.

When the delivery cylinder 49 is thus locked by the follower rib 73 the toothed drive wheel 59 is of course also locked before it has completed the full step of rotative movement then being imparted to it by the coin which is carried by the coin carrier 25. This stopping of the drive wheel 59 also stops any further forward movement of the coin carrier 25 by reason of the fact that the coin carried thereby is in engagement with a tooth 59^a of the drive wheel. The coin carrier 25 is thereby prevented from making a complete forward movement and is stopped in a position in which the pawls 34 are still in engagement with the teeth of the ratchet 36 and are prevented from reversing thereon by reason of the fact that the coin in the coin-holding slot of the coin carrier obstructs this slot against the pawl-releasing movement of the feeler lever 32, so that then the coin carrier 25 is locked by the coin against further forward movement and is locked by the pawls 34 against retraction by its spring 31, and in this locked position of the coin carrier 25 it covers and obstructs the coin slot 24 to prevent the insertion of a coin into the machine.

The operation of the machine has already hereinbefore been so fully described along with the description of its construction that it is believed little or nothing need be added as to its operation. In conclusion, however, it may be noted that the opposite parallel vertical side walls of the magazine hopper, assisted by the follower 70, maintain the pencil leads 45 in horizontal parallelism to one another resting upon the arcuate magazine floor provided by the upper peripheral portion of the delivery cylinder 49 so that one of the lowermost of these leads may be readily picked up by one of the delivery grooves 51, and that this pencil lead will be gently and safely delivered to the purchaser, by reason of the relatively slow uniform movement of the delivery cylinder 49, due to the reduction gear through which it is driven and the momentum-absorbing brake thereon, and the gradual easing out and removal of the pencil lead 45 from the delivery groove 51 by the stripping fingers 52.

It is obvious that various modifications may be made in the construction shown in the drawings and above particularly described, within the principle and scope of the invention as defined in the appended claims.

I claim:

1. In a vending machine, the combination of a magazine hopper adapted to contain in horizontal parallel relation a supply of slender brittle cylindrical articles to be vended, a horizontally journaled delivery cylinder provided longitudinally thereof with a cir-

cumferential series of equidistantly spaced delivery grooves in its periphery the upper portion of which forms a bottom for the magazine hopper adapted to remove said articles from the hopper one by one upon successive steps of rotative movement of the cylinder, a stationary arcuate guard extending from the hopper over the upper portion of the forward side of the periphery of the cylinder and sufficiently short to provide for the removal of said articles from the delivery grooves at a level above the axis of the cylinder, a series of circumferential spaces provided along the length of the periphery of the cylinder of greater depth than the delivery grooves, a series of stationary inclined stripping fingers projecting inwardly and upwardly into said spaces with their outer surfaces at their upper ends substantially tangential to the cylinder above the level of its axis and inwardly from the bottoms of its delivery grooves for thereby gently gradually easing said articles out of and removing them from the delivery grooves just below the lower end of said guard, a gentle incline down which said articles may safely roll from the stripping fingers for delivery, and operating mechanism for imparting positively determined steps of rotative delivery movement at a substantially uniform rate to the delivery cylinder.

2. The invention defined in claim 1, in combination with a friction brake having smooth uninterrupted continuously engaged cooperating friction surfaces for uniformly limiting the speed of the delivery cylinder during its steps of delivery movement.

3. The invention defined in claim 1, in combination with a rotatable drive shaft upon which the delivery cylinder is fixed, a recess being provided in each end of the cylinder surrounding the drive shaft, a bearing for the drive shaft at one end of the cylinder projecting loosely into the recess at that end, a smooth-surfaced stationary annular friction brake surrounding the bearing for cooperation with the adjacent end of the cylinder, which end has a smooth annular surface, a bearing for the drive shaft at the opposite end of the cylinder, and a coiled thrust spring surrounding the drive shaft in the recess at this end and acting between the latter bearing and the bottom of the recess to press the cylinder at its other end into frictional braking engagement with said brake for thereby uniformly limiting the speed of the delivery cylinder during its steps of delivery movement.

4. In a vending machine, the combination of a magazine hopper adapted to contain in horizontal parallel relation a supply of slender cylindrical articles to be vended, a horizontally journaled delivery cylinder provided longitudinally thereof with a circumferential series of equidistantly spaced delivery grooves

in its periphery the upper portion of which forms a bottom for the magazine hopper adapted to remove said articles from the hopper one by one upon successive steps of rotative movement of the cylinder, a stationary arcuate guard extending from the hopper downward around a portion of the forward side of the periphery of the cylinder and terminating at a level a substantial distance above the level of the lower side of the periphery of the cylinder for retaining said articles in the delivery grooves until the latter pass below the lower end of such guard, delivery means for removing said articles from the delivery grooves immediately below the lower end of said guard including a downward incline extending away from the periphery of the cylinder from a level substantially above the level of the lower side of the periphery of the cylinder, and operating mechanism adapted to impart uniformly accurately determined steps of rotative delivery movement to the delivery cylinder.

5. In a vending machine, the combination of a magazine hopper adapted to contain in horizontal parallel relation a supply of slender frail substantially cylindrical articles to be vended, a horizontally journaled delivery cylinder provided longitudinally thereof with a circumferential series of equidistantly spaced delivery grooves in its periphery the upper portion of which forms a bottom for the magazine hopper adapted to remove said articles from the hopper one by one upon successive steps of rotative movement of the cylinder, a guard over the upper portion of the forward side of the periphery of the cylinder completely at a level above the axis of the cylinder, a series of circumferential spaces being provided along the length of the periphery of the cylinder of greater depth than the delivery grooves, a series of stationary inclined stripping fingers projecting inwardly and upwardly into said spaces with their outer surfaces at their upper ends substantially tangential to the cylinder above the level of its axis and inwardly from the bottoms of its delivery grooves for thereby gently gradually easing said articles out of and removing them from the delivery grooves just below the said guard, a gentle incline down which said articles may safely roll from the stripping fingers for delivery, and operating mechanism for imparting uniformly accurately determined steps of rotative delivery movement to the delivery cylinder.

In witness whereof, I hereunto subscribe my signature.

LOUIS H. MORIN.