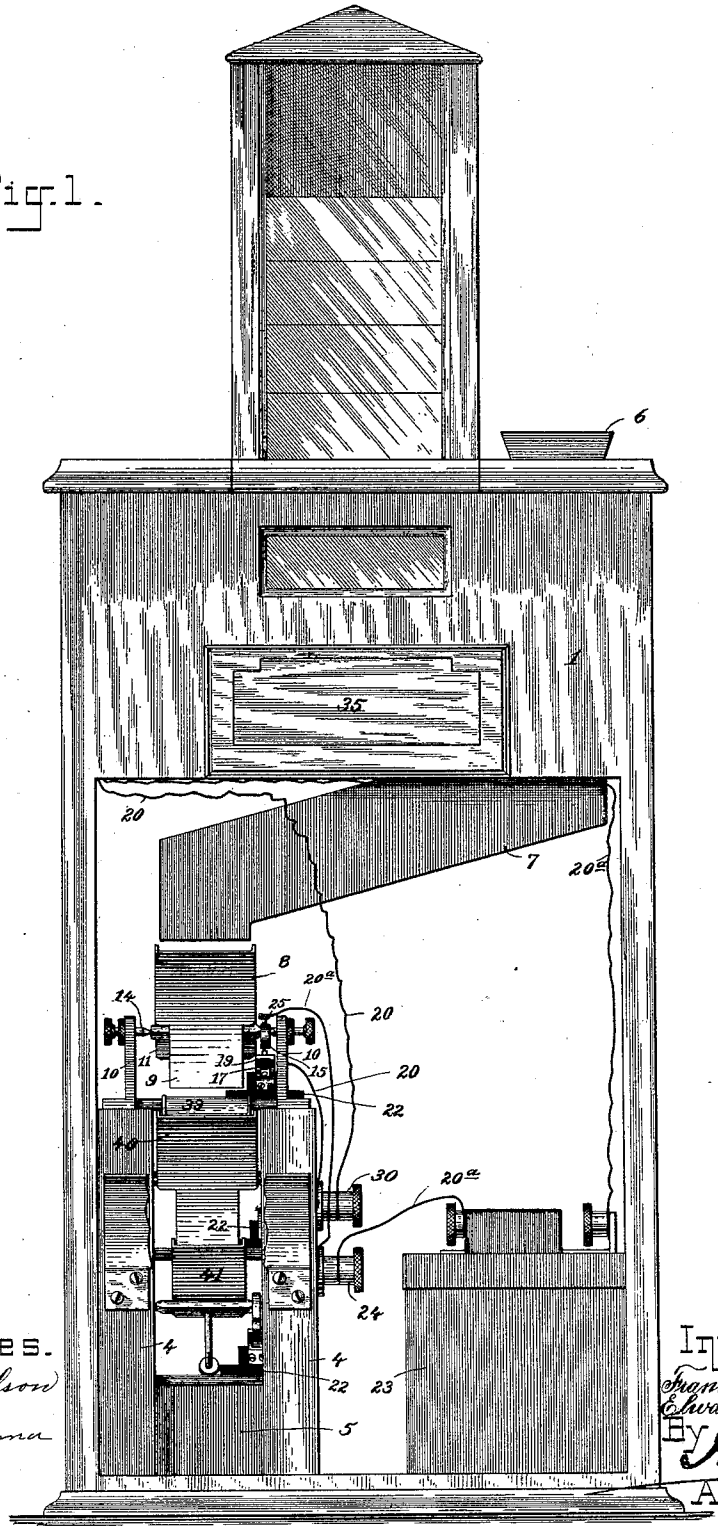
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F. VILLIERS-STEAD & E. R. HEDGMAN.

AUTOMATIC VENDING APPARATUS.

No. 422,326. Patented Feb. 25, 1890.

Fig. 1.



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Fig. 2.

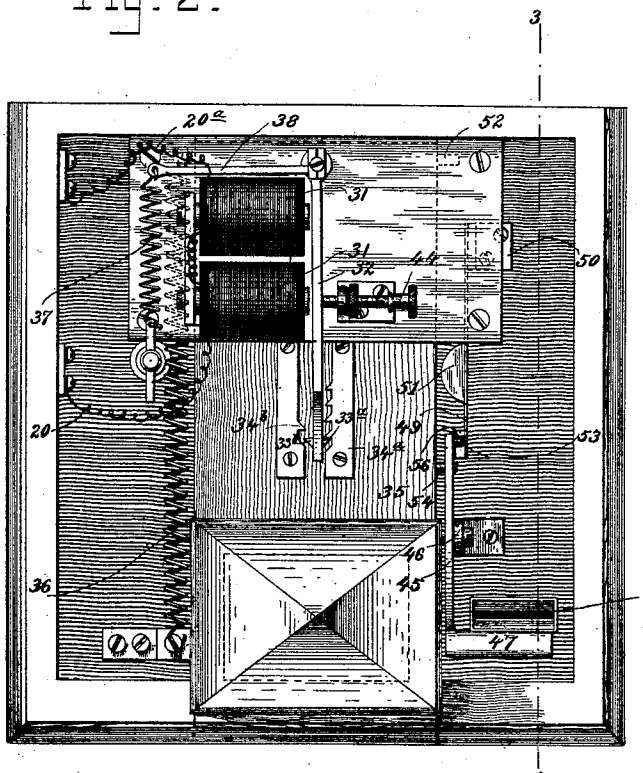
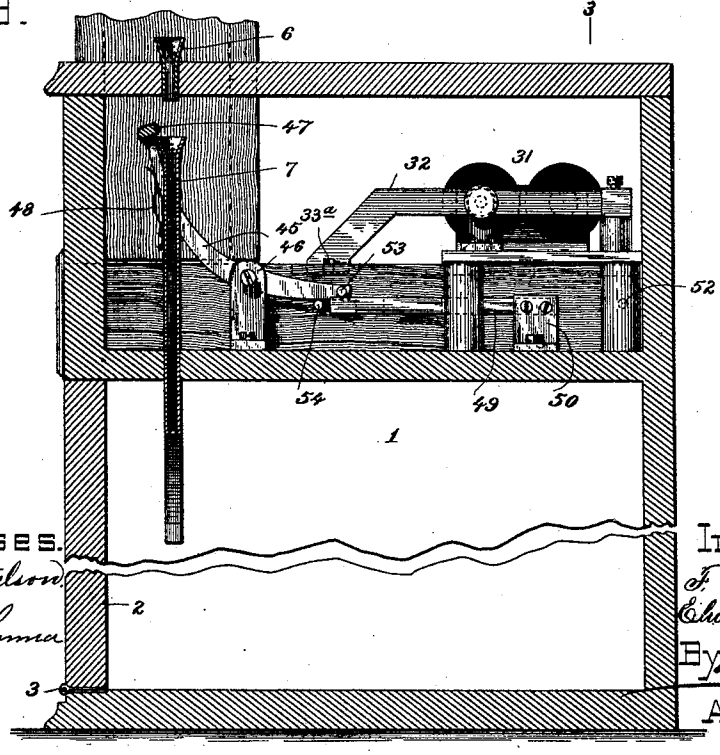


Fig. 3.



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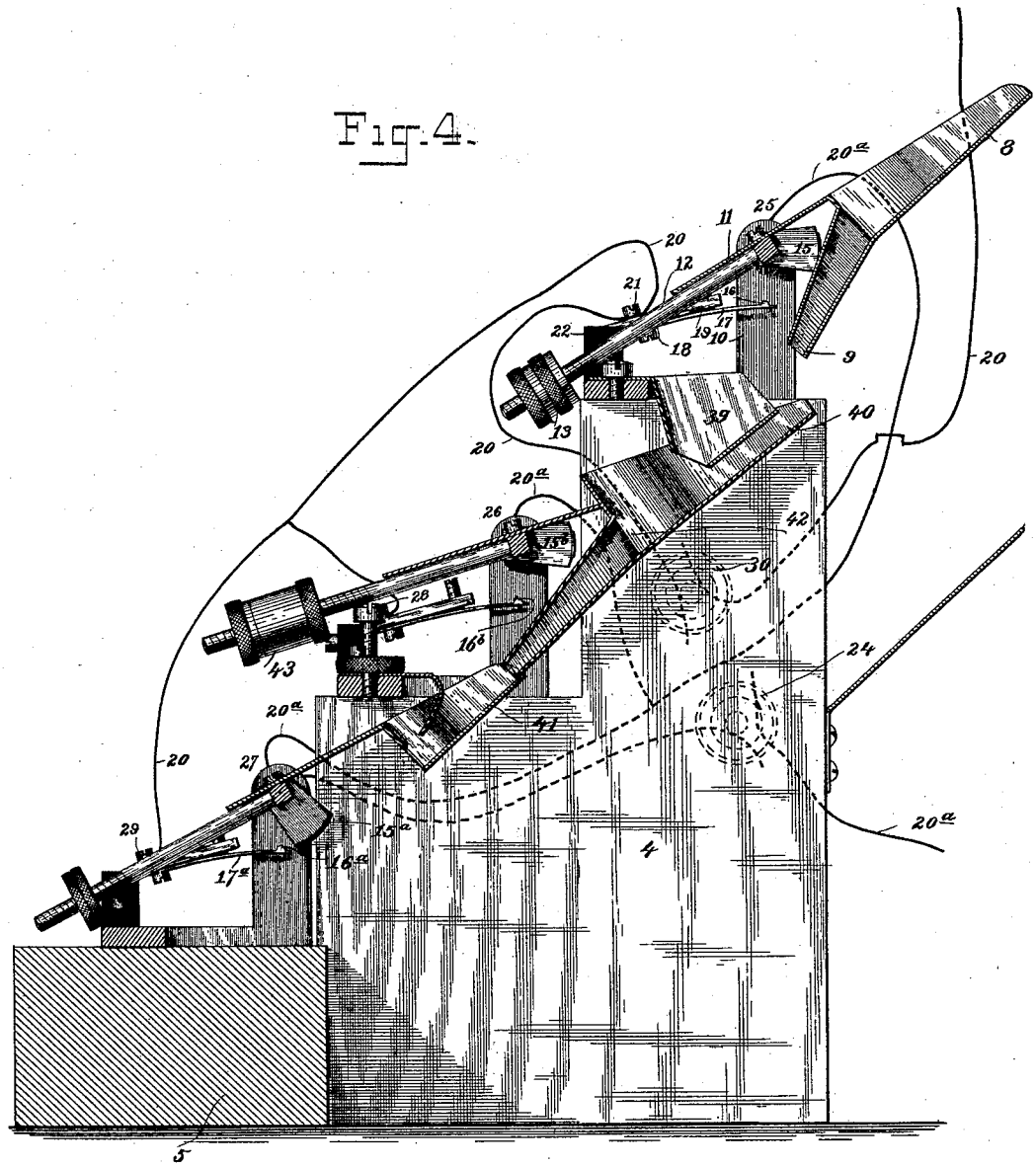
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Fig. 4.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC VENDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 422,326, dated February 25, 1890.

Application filed September 4, 1888. Serial No. 284,556. (No model.)

To all whom it may concern:

Be it known that we, FRANK VILLIERS-STEAD and ELWARD RADFORD HEDGMAN, subjects of the Queen of Great Britain, residing at London, county of Middlesex, England, have invented certain new and useful Improvements in Automatic Vending Apparatus, of which the following is a specification.

Our invention relates generically to that class of apparatus which are constructed to form receptacles or repositories for merchandise, and which are provided with mechanism capable of being operated by means of coins of certain weights, and which when so operated will automatically deliver to the depositor one or more packages or samples of the merchandise deposited within the apparatus.

The object of our present invention is to construct an apparatus which will have a wider application than any apparatus of a similar nature now upon the market, and so construct and arrange it as that a single coin of the proper denomination will cause the discharge of the article purchased, or an accumulation of coins of smaller denomination whose total value is the same as that of the proper coin will also cause the machine to operate and cause the merchandise to be delivered in the same manner after the proper amount has been deposited.

Our invention consists in a suitable series of balancing devices connected by means of an electrical conductor to an electro-magnet, which, when excited by the oscillation of the balancing devices, operates an armature which forms a part of an escapement attached to the drawer containing the merchandise, so that the disengagement of the opposing racks, hereinafter particularly described, will permit the merchandise-drawer to be thrust outwardly by means of a suitable spring. The opposing racks constitute the escapement, which is regulated by and depends upon the extent and duration of the electric current, which in turn depends upon the duration of the different contacts made by the tipping movements of the various coin-receiving trays.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation of our improved apparatus or machine, the front part of the box or casing being removed to show the interior working parts. Fig. 2 is a plan view with the cover removed. Fig. 3 is a partial section on the line 3 3, Fig. 2. Fig. 4 is a detail section, on a larger scale, through the various balancing devices.

In the drawings, 1 is a box or casing provided with a door 2, hinged at the bottom by means of hinges 3 to the floor of casing 1, as shown in Fig. 3. Fig. 1 shows this portion removed for the purpose of exposing the working parts. It is, however, normally closed and affords means for obtaining access when open to the money-compartment for the purpose of removing the coin deposited within the apparatus from time to time. It may be locked and secured in any suitable manner.

Upon the floor of the box or casing 1 are secured two upright plates 4, made preferably of metal, which, in connection with block 5 at the rear of the apparatus, serve to support a series of oscillating or pivoted trays so constructed, distributed, and adjusted as that they will operate automatically according to the number, quality, and weight of the coin or coins dropped upon them and in such a manner as that they will, through the medium of the electric conductor above referred to, effect the liberation of the merchandise-drawer only after the total amount of money inserted equals the amount which the notice on the apparatus calls for.

The apparatus we are about to describe, and which is illustrated in the accompanying drawings, is constructed so as to deliver the package of merchandise or samples upon the introduction in the slot 6 of a silver ten-cent piece. This denomination of money is of such a weight and size as that it will slip over all of the intervening and intermediate pivoted trays and will operate to depress the last and lowest one of the series, and thereby establish an electrical connection with the escapement, which will, through the medium of suitable mechanism, hereinafter described, permit the merchandise-containing drawer to be thrust outwardly, thus exposing and rendering accessible to the purchaser the article paid for; but our improved apparatus is also adapted to operate if, instead of a ten-cent piece, other and smaller denomination of coin

are dropped in the slot 6, so long as the correct total of ten cents is eventually deposited. The apparatus will not operate unless exactly the correct amount is deposited. The apparatus will work if two five-cent nickels are dropped in the slot, and it will also operate if one five-cent piece and five one-cent pieces are deposited; or in lieu of any of these it will also operate if ten one-cent pieces are deposited. We will describe its operation when two five-cent nickels are successively deposited.

Each coin in dropping through the slot 6 falls into the chute or conduit 7, constructed preferably in a sinuous or irregular form, as shown in Fig. 1, and after reaching the lower end of said chute or conduit it drops onto the topmost tray 8. The tray 8 is open in its upper portion and terminates at its lower end in a hopper or funnel-shaped construction 9. It is hung upon lugs or shoulders 10 of the plates by means of an arm 11, which extends inwardly and downwardly from the tray 8. The arm 11 is attached to a bar 12, which bar is provided at its lower end with an adjustable counterbalancing-weight 13. These parts are all hung from the pivots 14 in the upwardly-extending lugs or shoulders 10. Attached to the bar 12 is also a contact-plate 15, and if the coin is of suitable size to depress the balance-tray 8 (to wit, a five-cent nickel) the parts will all turn upon the aforesaid pivot and the contact-plate 15 will be thrown in connection with the contact-button 16 upon the platinized-steel spring-plate 17. The spring-plate, being attached by means of a binding-screw 18 to the post 19, will establish an electrical connection through the conductor 20, which is also attached to said binding-post by means of binding-screw 21. The binding-post is suitably insulated from the frame by means of insulating-block 22. The electrical conductor 20^a extends from the battery 23, located preferably in the bottom of the casing 1, to the general binding-post 24, located on the upright plate 4 of the apparatus. The conductor from there extends to the binding-post 25, and from this point by means of branch conductors to the binding-posts 26 and 27. This is shown diagrammatically in Fig. 4. The other branches of the conductor 20 are attached to the binding-posts 21, 28, and 29, and are connected to the other general binding-post 30, from which point the conductor extends upwardly through the electro-magnet 31, and from the electro-magnet 31 the conductor returns to the battery 23, thus completing the circuit. When, therefore, the plate 8 is depressed, as above described, the swinging contact-plate 15 presses against the button on the platinized spring-plate 17, thus closing the circuit and causing an electric current to flow from the battery through the electric conductor. The electro-magnet becomes excited and draws the armature 32 toward it. This armature is of considerable length and extends farther forward than the electro-magnets, and is provided with teeth 33^a and 33^b upon either or both sides. These teeth are so constructed and arranged as that they will interlock with similar teeth upon plates 34^a, located upon the upper face of the merchandise-containing drawer 35.

It will be noticed by referring to Fig. 4 that the contact upon the swinging contact-plate 15 is a short one, so that when the contact is made and the electro-magnets excited the armature, being drawn toward them, will cause the tooth 33^a to be withdrawn from the plate 34^a upon the merchandise-containing drawer 35. As soon as this takes place the drawer 35 will be thrust outwardly by means of the spring 36, located at the side of said drawer. This spring is adapted to thrust the drawer forward when the armature is withdrawn from the rack. The action being momentary and the contact being a short one, the electric currents will cease to flow (on the breaking of the contact) and the armature will be released and will fly back to its normal position by virtue of the spring 37 pulling upon the arm 38 of the armature 32. It will be seen by referring to Fig. 2 that the armature is formed in the shape of a bell-crank. At the first movement, however, of the armature, as above described, the tooth 33^a being withdrawn from the rack, the merchandise-containing drawer 35 will be thrust forward, as aforesaid, but will be prevented from a further outward movement owing to the interlocking of the tooth 33^b with the tooth upon the rack or plate 34^b when the armature is drawn against the electro-magnets. When the armature is released and is traveling back, there is a further sliding movement of the merchandise-containing drawer 35, and the tooth 33^a of the armature, instead of entering its original position, will be forced to occupy the second depression of the rack 34^a. This is the position the parts of the apparatus will occupy after a five-cent nickel has been deposited by the purchaser, and upon the depositing of a second five-cent nickel the electrical connection will be again established and the former operation will be repeated, with the exception that the armature so withdrawn from the rack will permit the merchandise-containing drawer to be thrust forward to its full outer position, owing to the fact that there are no further teeth upon the rack 34^b to stop the further movement of the box. The merchandise is now accessible to the purchaser, and can be removed and the drawer returned to its original position, which being done, the armature will assume its proper place in respect to the racks. If, however, instead of two five-cent nickels, the purchaser deposits a ten-cent piece into the slot 6, the said piece of money will fall through and upon the tray 8; but, not being of sufficient weight to depress the same, will drop through the funnel 9 into the pan 39, and from this into the tray 40. The ten-cent piece will not depress this tray, but will

fall into the third or bottom tray 41. This tray, being provided with a very small counterpoise, will be depressed by the ten-cent piece, and will cause a contact between the swinging contact-plate 15^a and the button 16^a on the platinized-steel plate 17^a. This will establish electrical connection through the apparatus and will cause the armature to be excited and operate, throwing the tooth of the armature out of contact with the plate and into the tooth of the opposite plate of the rack. The tray 41, however, will be sufficiently depressed so as to enable the contact-plate to swing beyond the button 16^a, and when the coin is dropped from the tray the said tray will be swung back to its normal position by means of its counterpoise and the contact will again be established, and the armature will again be withdrawn from the rack, and as no further teeth are provided on the opposing rack the merchandise-containing drawer will be thrust forward to its full outer position, as above described.

When one-cent pieces are deposited, they will slide over the first tray 8 and will drop through the pan 39 and into the tray 40. This tray is provided with a throat or contracted passage 42, which will permit the passage of a ten-cent piece, but will interrupt the progress of one-cent pieces, owing to their being of larger size. The tray 40 is provided with a large counterbalancing-weight 43, which can only be overcome by an accumulation of five one-cent pieces. When the five pieces have been deposited, the tray 40 will tip over, and through the medium of the contact-plate 15^b, button 16^b, &c., the electrical circuit will be established and the escapement will be operated the same as in the case of a five-cent piece. The trays 8 and 40 are arranged not to tip far enough to break the circuit, as in the case with tray 41. The operation can be repeated by depositing five more one-cent pieces, or a single five-cent nickel may be deposited in lieu thereof. An adjusting-screw 44 is provided for regulating the throw of the armature.

In Fig. 3 we show a device for preventing the insertion of money in the slot 6 if the merchandise-drawer is not in the proper position. A lever 45 is suitably hung on a shoulder 46, attached to the frame-work of the apparatus. At its upper end it is provided with a finger 47, which is adapted to swing over on top of the chute or conduit 7. A spring 48 serves to force the lever upward when it is liberated at its lower end. A spring-plate 49 is secured by means of stud 50 to the frame of the apparatus and extends forwardly, as shown in Figs. 2 and 3. It is provided about midway of its length with a cam or eccentric plate 51. A pin 52, located upon the merchandise-containing drawer, comes in contact with the cam when the drawer is being pulled out, by this means bending the said spring outwardly, thus permitting the pin 53 on the lower end of the lever 45 to drop and the spring 48 to force the lever up, thus closing up the slot 6. When the merchandise-containing drawer is thrust back, a pin 54 upon the drawers travels along under the lever 45 and throws it up into position, which movement will of course throw the finger away from the slot 6 and permit the introduction of another coin. When, however, the drawer is thrust out, the lower end of the lever 45 is locked in its lower position by means of the pin 53 being held beneath a shoulder 56 on the spring-piece. When the drawer is returned, the pin 54 forces the lever 45 up, thus discharging the parts. In case of a five-cent piece being introduced, the movements of the parts will not be sufficiently extensive to cause the finger to intervene in the slot. If, however, the merchandise-drawer has not been returned to its inner and normal position, the lever 45 will still remain locked in the position which closes the slot, so that the purchaser when depositing a coin can easily withdraw it if all the parts are not in their normal and operative position.

The escapement device may be modified according to the price of the article vended. If a five-cent article is introduced, the tooth in the plate 34^b may be omitted, so that the machine will operate by depositing five cents; or another tooth may be added to this rack when vending a fifteen-cent article. The other rack 34^a is provided with several teeth and will meet any contingency, so that only one rack—namely, 34^b—has to be changed.

Having thus described our invention, the following is what we claim as new therein and desire to secure by Letters Patent:

1. The combination, in an automatic vending apparatus, of two or more coin-receiving trays pivotally attached to the frame and arranged in series, substantially as shown and described, a merchandise-containing drawer, an escapement arranged in connection with the drawer, means for operating the escapement by electricity, and a suitable conductor between the various coin-receiving trays and the electrical devices.

2. In an automatic vending apparatus, the combination of a series of pivoted trays arranged substantially as shown and described, adapted to be operated differentially, according to the coin or coins deposited therein, electrical conductors leading from the said trays, a merchandise-receiving drawer, an escapement, and an electrical device connected to the aforesaid conductors, all the parts being so constructed and arranged as that the merchandise will be issued irrespective of the denominations of the coin provided the proper sum is deposited, substantially as set forth.

3. In an automatic vending apparatus, the combination of a coin-receiving tray suitably pivoted, as shown, and having a weighted end, whereby when a coin is deposited on the tray it is depressed and as the coin falls therefrom said tray is returned to normal position by its weighted end, a merchandise-

drawer, an escapement device consisting of one or more racks upon the said drawer, an armature provided with one or more shoulders or racks and working in connection with the rack or racks, an electro-magnet for operating the armature, suitable conductors extending from the electro-magnet, and an automatic make-and-break contact operated solely through the medium of a coin or coins when deposited on said tray, all constructed and adapted to operate substantially as and for the purpose set forth.

4. In an automatic vending apparatus, the combination of a self-returning coin-receiving tray having a weighted end and pivoted substantially as shown and described, and adapted to be depressed by a coin or coins, a contact-plate which swings with the tray, a platinized spring-plate, conductors extending from the plate and trays to an electro-magnet, an armature, suitable racks with which the armature interlocks, and a merchandise-containing drawer, all adapted to operate substantially as shown and described.

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