(No Model.) 5 Sheets—Sheet 1.

F. B. COCHRAN.

COIN OPERATED VENDING MACHINE.

No. 412,469. Patented Oct. 8, 1889.

Fig. 1.

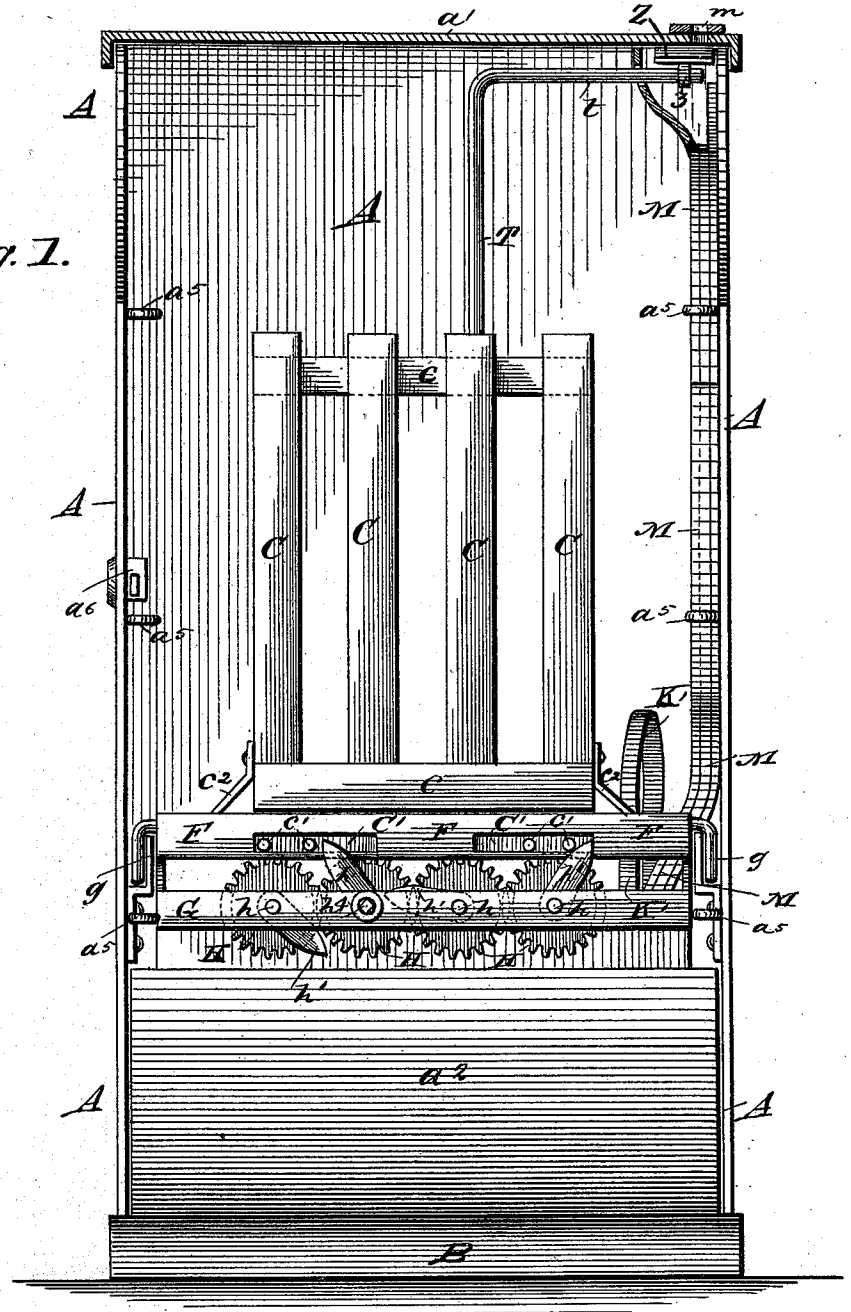


Fig 12.

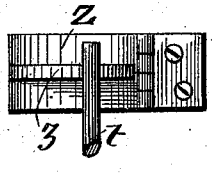
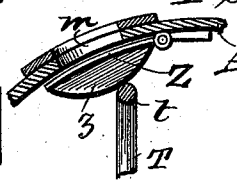


Fig. 13.



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Fig. 2.

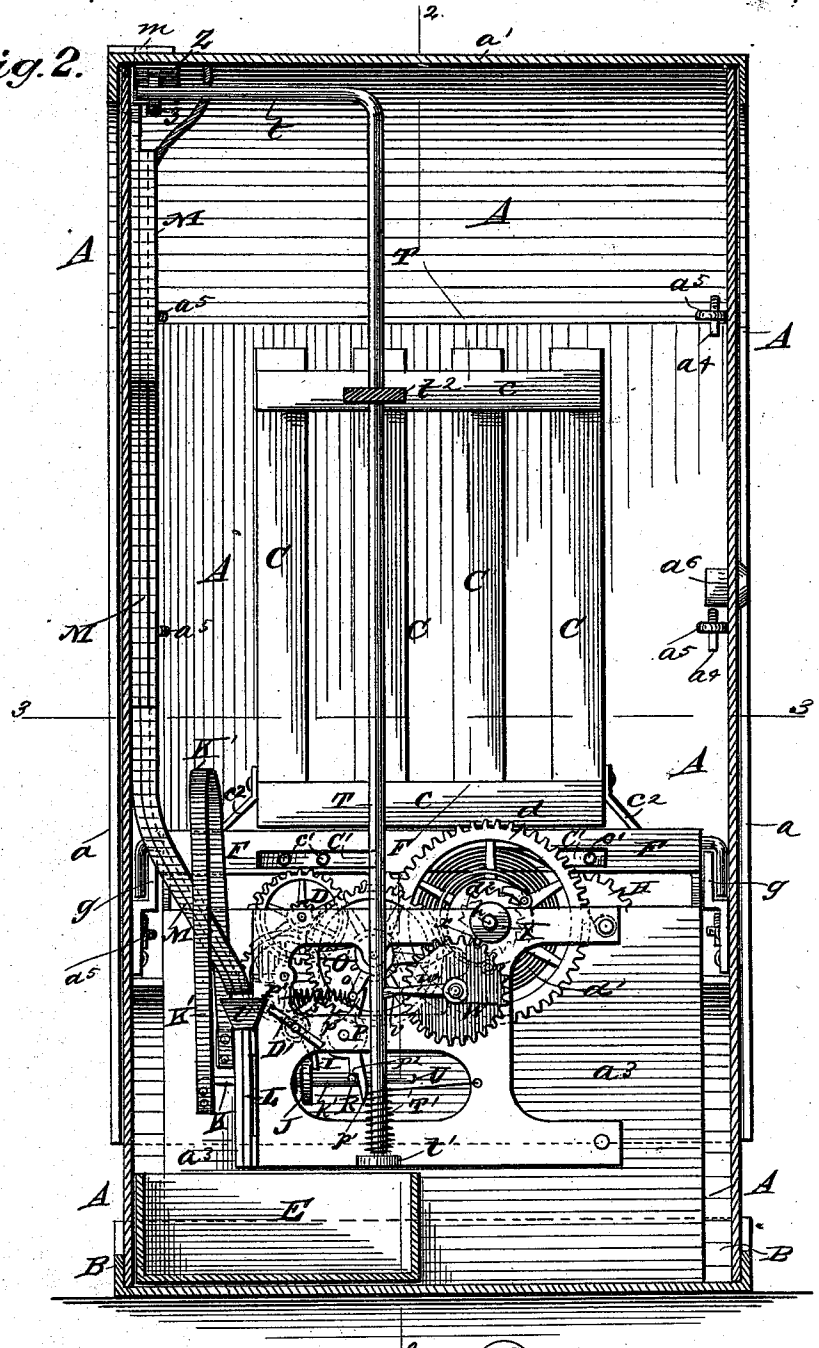
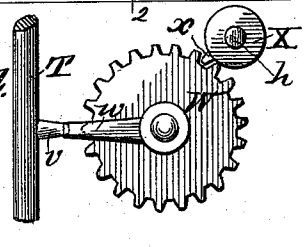


Fig. 14.



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COIN OPERATED VENDING MACHINE.

No. 412,469. Patented Oct. 8, 1889.

Fig. 3.

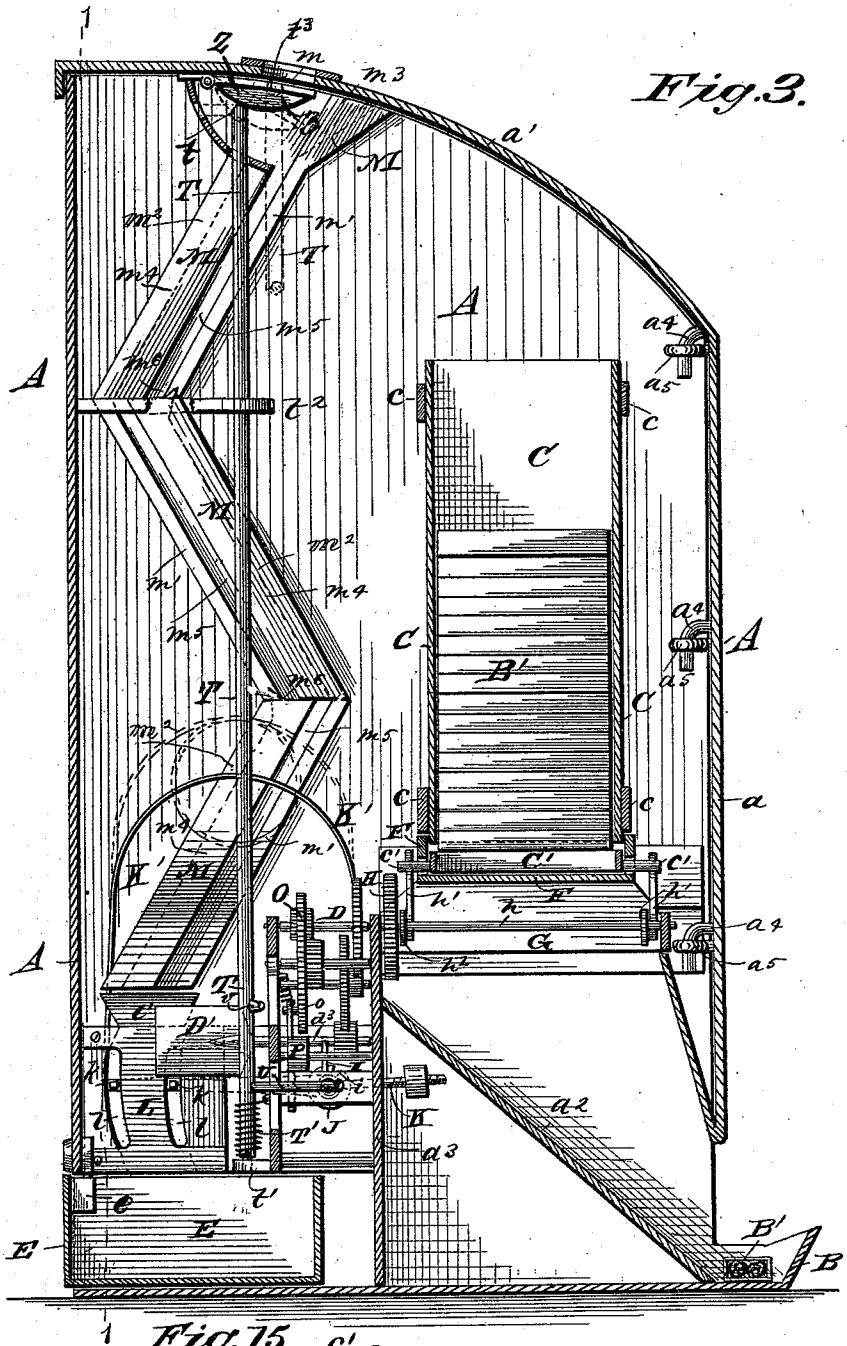
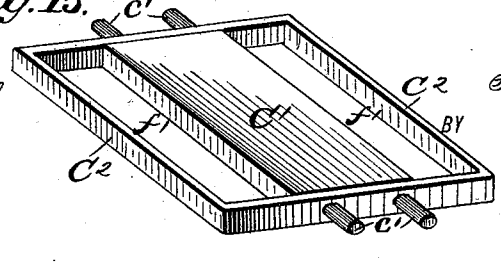


Fig. 15.



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COIN OPERATED VENDING MACHINE.

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Fig. 4.

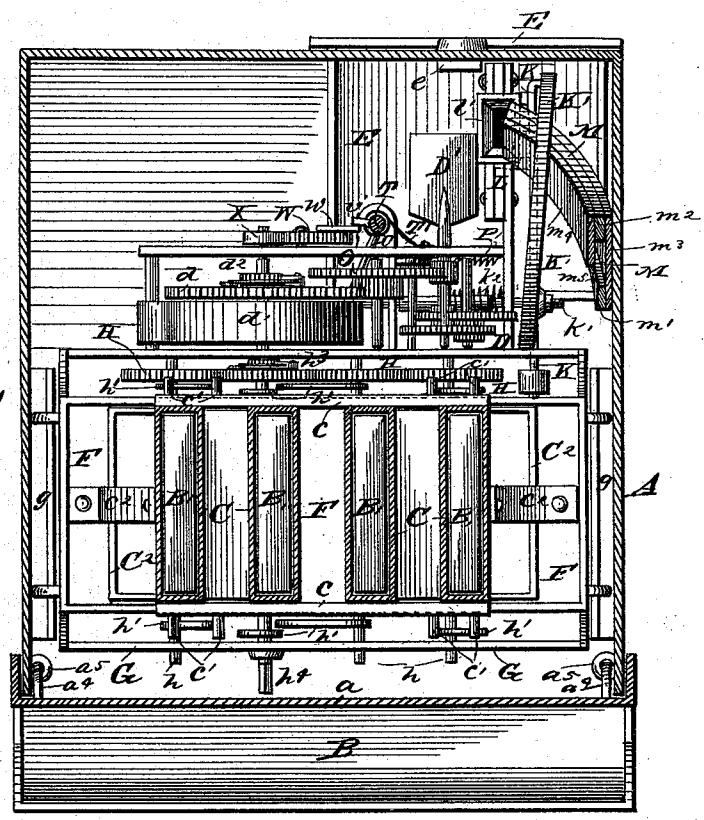


Fig. 5.

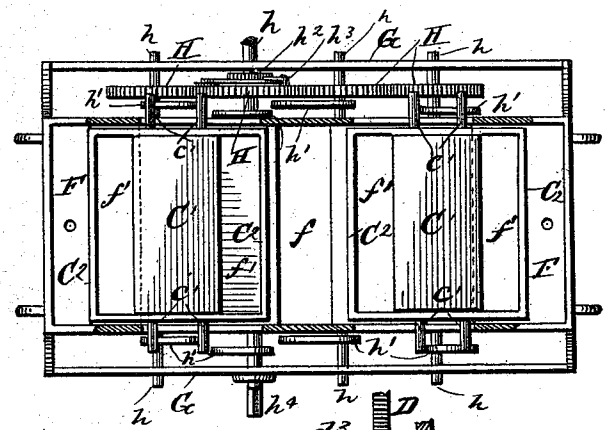
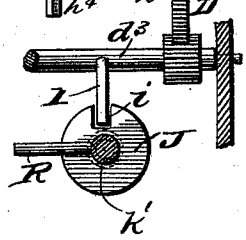


Fig. 6.



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COIN OPERATED VENDING MACHINE.

No. 412,469 Patented Oct. 8, 1889.

Fig. 7.

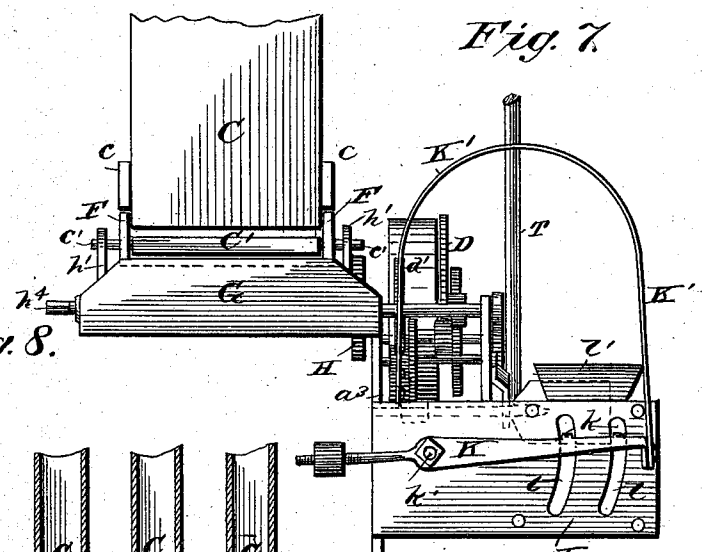


Fig. 8.

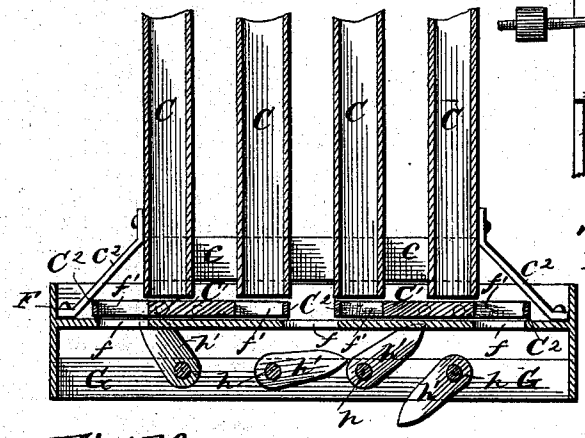


Fig. 9.

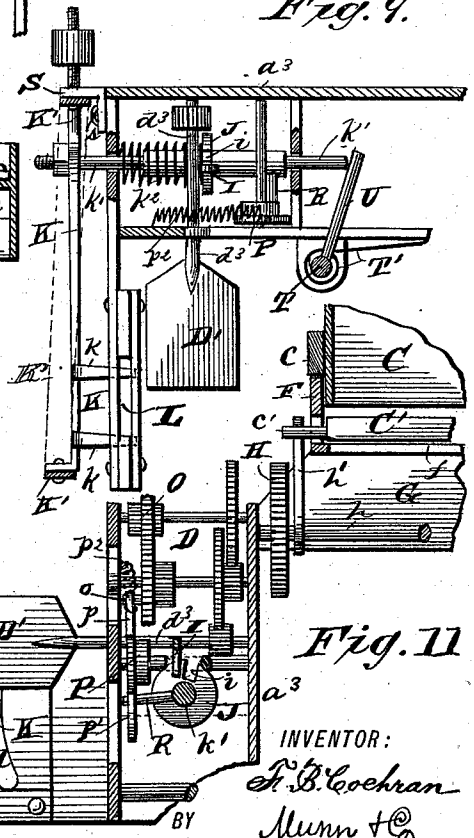


Fig. 10.

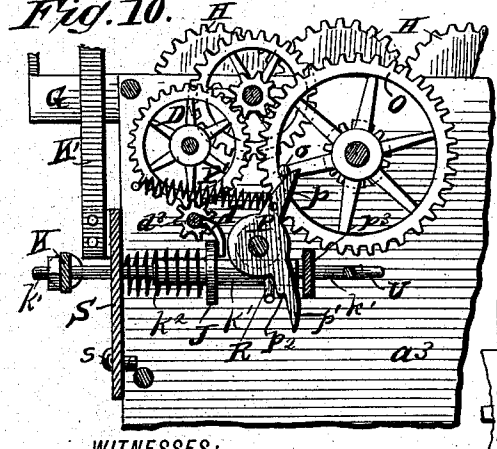


Fig. 11.

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UNITED STATES PATENT OFFICE.

FREDERIC B. COCHRAN, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN AUTOMATIC VENDING MACHINE MANUFACTURING COMPANY, OF NEW YORK.

COIN-OPERATED VENDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 412,469, dated October 8, 1889.

Application filed December 19, 1888. Serial No. 294,085. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC B. COCHRAN, of the city, county, and State of New York, have invented a new and Improved Coin-Operated Vending-Machine, of which the following is a full, clear, and exact description.

My invention relates to a vending machine or apparatus which automatically delivers goods or small wares—such as cigarettes, chewing-gum, confections, and the like—on payment of a proper coin passed into the machine by a purchaser; and the invention has for its object to provide a compact, efficient, reliable, and comparatively inexpensive machine of this character.

The invention consists in certain novel features of construction and combinations of parts of the vending apparatus, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front view of the vending-machine with most of the front and cover removed. Fig. 2 is a rear view of the machine with the case and other parts in vertical section on the line 1 1 in Fig. 3. Fig. 3 is a vertical transverse section taken on the irregular line 2 2 in Fig. 2. Fig. 4 is a sectional plan view taken on the line 3 3 in Fig. 2. Fig. 5 is a detail plan view of the delivery devices with their frames or support partly in horizontal section. Fig. 6 is an enlarged detail view of the coin-lever shaft and its trip-connection with the clock-works mechanism of the machine. Fig. 7 is a right-hand end view of the coin-lever, clock-works, and delivery devices. Fig. 8 is a transverse vertical detail sectional view of the delivery devices. Fig. 9 is a detail plan view of the coin-lever and adjacent parts of the clock-works. Fig. 10 is an enlarged detail rear sectional view of the coin-lever, its rock-shaft, and adjacent parts of the clock-works mechanism. Fig. 11 is an enlarged detail transverse vertical section through parts of the coin-lever, clock-works, and delivery mechanisms as viewed from the left-hand side or end of the apparatus. Figs. 12 and 13 are detail views of the coin-slot-closing devices. Fig. 14 is an enlarged detail view of the mechanism controlling or locking the coin-slot valve to prevent insertion of coins after the goods are sold out of the machine, and Fig. 15 is an enlarged top perspective view of one of the goods-delivery slides of the machine.

The case or box A of the vending-machine is preferably made of metal and in the general form shown in the drawings, and with a removable section comprising its front a and top wall a', which are provided with in-bent and down-bent flanges, which overlap the stationary back and opposite side walls of the casing. The front wall of the case falls short of its bottom, which is extended forward and upward to form a tray or trough B, into which the goods sold—cigarettes, chocolates, chewing-gum, or other small wares—fall from their storage boxes or trunks C, arranged in the case above an inner inclined wall a^2, down which the goods slide from the boxes to the tray, from which the purchaser takes them after he shall have dropped a suitable coin into the case in payment for them, as hereinafter fully explained. A vertical transverse plate a^3 behind the inclined wall or plate a^2 forms the chief support to the clock-works mechanism D of the machine, and behind this plate, at the bottom of the case A, is fitted a drawer E, which receives the coins deposited by the buyer in payment for the goods delivered. This drawer opens, preferably, at the back wall of the case and will have a suitable lock e, to be opened only by an authorized person.

I provide the removable front and top of the case A with a series of hooks a^4, which are adapted to enter eyes or staples a^5 on the body of the case, and a lock a^6 on the case-body is arranged to have its bolt projected over one of the hooks to secure the removable section or give access to the interior of the case only to proper persons for refilling the goods boxes or trunks after the stock is exhausted, or for other legitimate purpose.

I will now describe the goods boxes or trunks and their delivery devices, the arrange-

ment of the clock-works mechanism for operating them, the coin-lever and its connections with the clock mechanism for controlling the delivery of the goods after payment of the proper coin, the means employed for rejecting light or base coins, and, finally, the peculiar construction of the coin-chute and the means for closing it when the stock of goods is sold out, all in the order above named, as follows:

One of the important features of this machine is the arrangement of the goods-boxes C and their delivery devices in such manner as shall allow the storage in and sale from a machine of comparatively small size of a large quantity of goods without refilling it. I may employ but one or two of the boxes C in the machine and cause delivery of goods therefrom by mechanism operating in accordance with my invention, or I may use three, four, six, ten, twelve, or more goods-boxes, as the nature of the goods or the circumstances attending their sale may suggest or require. As a fair example of this feature of my machine I show one having four separate goods-boxes C C C C, which are preferably attached by soldering or otherwise to upper and lower pairs of straps *c c*, which hold them together in one readily-handled structure. The lower straps support all the boxes from the front and rear upturned flanges of a table F, which is supported from or connected to a frame G, and both the table and frame have support from the opposite end walls of the main case A, preferably by means of hooks on the table entering flanged supports fixed to the frame, as shown at *g* in Figs. 1 and 4 of the drawings. Brackets c^2 c^2, fixed to the outside or end boxes C C, and preferably screwed to the table F, support the cluster of boxes against movement endwise or transversely of the apparatus. The bottoms of the boxes C stand above the table F sufficiently to allow a couple of slides C′ C′ to reciprocate on the table below them, and the table is provided, preferably, with three slots or openings *f*, each as large or a trifle larger than the interiors of the boxes, to allow free passage through them of goods falling from the table onto the plate a^2 into the tray B to the purchaser, one package or piece only of goods—cigarettes, for instance—being delivered after deposit of a proper coin into the machine.

The principle of operation involved in reciprocating the delivery-slides C′ under the goods-boxes is the employment of a tappet or tappets on a shaft or shafts of gearing actuated from the clock-works mechanism D and controlled by or from the pivoted or tilting coin-lever of the machine, said tappets acting on pins or studs or shoulders on the delivery-slides. The mechanism employed in this connection will necessarily vary with the number and size of the goods-boxes and the nature or size of the gearing operating the tappets which shift the slides to deliver the goods. In the machine shown in the drawings each of the delivery-slides is provided with two studs *c′ c′* at each end, and these studs of each slide are guided in slots of the frame F, and are acted on by two pairs of tappets *h′ h′*, fixed to shafts *h*, which are journaled in the frame G and carry intermeshing gears H, driven from the power-transmitting shaft of the clock-works, which, as shown, is one of the shafts *h*, to which the mainspring *d* is attached. These pairs of tappets act alternately on the delivery-slide studs to carry the slide C′, having said studs, from beneath one of the goods-boxes C, and simultaneously push through one of the table-openings *f* the package B′ of goods which had just previously fallen onto the table F from the other of the two goods-boxes. This operation will be hereinafter more fully explained.

When I use more than one or two goods-boxes in the machine, I will extend the train of gears H as may be necessary to shift the box-slides in proper order to deliver but one package of goods for each proper coin dropped into the machine. In using four boxes C and two slides delivering therefrom through three openings *f* in the table F, as shown in the drawings, I employ four shafts *h*, each having a pair of tappets *h′ h′*, one at each end of it, and each shaft has a gear wheel or pinion H, and all four pinions mesh with each other. I am not limited to any particular timing of motion of the slides; hence the tappets may project from the shafts in any required radial planes to cause one slide to deliver at or by one edge, and then the other slide to deliver by one edge, and then the first slide to deliver by its other edge, and then the second slide to deliver by its other edge; but when the slides are made with guard-frames C^2 C^2 projecting from each edge of them, as presently explained, the tappets will be set to move one slide both ways and then move the other slide both ways to avoid contact of the slide-guards. These guards C^2 on the slides C′ are important and are most clearly shown in Figs. 5, 8, and 15 of the drawings. They consist of frames projecting from each package-discharge or acting edge of the slide, and of the same height or thickness as the slide, and providing spaces *f′* next its edges about as wide as the table-discharge openings *f*. In the movements of the slide the goods fall alternately into the slide-openings *f′* from the boxes C, and then are discharged through the table-openings *f* onto the inclined plate a^2 into the tray B. The special function of the guards C^2 is to prevent the introduction of a wire or other robbing implement between the goods-boxes C and table F to purloin the goods from the boxes or table. The guards thus prevent stealing the goods by a wire introduced from below at the front opening of the case next the tray, and would also prevent pilfering by a wire or other instrument were the mechanism otherwise incased than as shown in the drawings. The clock-works spring *d′* is connected at one end to the third shaft *h* of the

slide-gearing H and at its other end is held to the clock-works frame. This shaft h carries fixedly the ordinary ratchet d^2, which is engaged by a pawl on the gear-wheel d, which is loose on the shaft and is of such diameter that one turn of it shall rotate the gears H at such relative speed as shall cause the tappets h' of the gear-wheel shafts h to act once each on one of the slides C during each revolution of the driving gear-wheel d.

In delivering the goods from the four boxes shown in the drawings the tappets will move the first slide from the position shown in Figs. 1 and 8 to the left hand, and the package of goods B′, which has just fallen onto the table F from the second box C into the left-hand opening f' of the slide, will be pushed over to the center table-opening f, through which it will fall. Meanwhile a package B′ will fall from the first box C onto the table within the right-hand opening f' of the slide, and the tappets will now impart a return movement to this slide, which will push the second package along the table and discharge it through its right-hand opening f. The tappets will then actuate the second slide in like manner, but in reverse order of movement, to drop a third package from the third box C through the center opening f and a fourth package from the fourth box through the left-hand opening f. As before stated, the tappets may be set to reciprocate the slides differently to drop the packages in any desired order from the boxes; but when the delivery-slides have the guards C^2 economy of space is promoted by giving a complete reciprocation to one slide before actuating another one; hence this is the preferred manner of operating the slides. Should the gearing be proportioned otherwise than above described, each slide C′ may have but one stud c' or shoulder at each end instead of the two studs shown. The usual weighted followers are placed on top of the goods in the boxes C to carry the packages positively to the table. The arrangement of the mainspring d' and ratchet d^2 with the pawl on the wheel d allows rewinding of the mainspring at any time without otherwise affecting the clock-gearing, and the third shaft h, to which the spring is connected, is coupled to the pinion H, which it carries loosely, by means of a ratchet h^2, fixed to the shaft and engaged by a pawl h^3 on the pinion, so that when this shaft is turned by a key applied to its squared end h^4 to wind up the spring d' the shaft will slip around in the pinion and will not change the position of the tappets relatively to the delivery-slides and goods-boxes. The clock mechanism imparts rotary motion, when permitted so to do by the coin-lever, to a shaft d^3, which carries the fan D′, which regulates the speed of the mechanism, and said shaft d^3 also carries an arm or tappet I, which stops the clock-works by contact with one face or side of a disk J, which is fast on the shaft k' of the coin-lever K, said disk having a radial notch or open slot i, through which the tappet I may freely pass when the coin-lever takes an intermediate position; but when the lever stands above or below this position the tappet will stop at the disk J and at one side or the other of the notch i, as hereinafter more fully explained.

In the preferred construction the coin-lever K is fixed to its shaft k', which is suitably journaled in the frame of the clock-works and ranges transversely of the machine or at right angles to the shafts h of the clock-works and goods-delivery mechanism. The coin-lever preferably rests normally in perfect balance, which may be maintained by an ordinary adjustable counter-weight, as shown. At its front end the lever is provided with a pair of laterally-projecting fingers $k\,k$, which are preferably made tapering and pass through slots $l\,l$ in the side walls of a lower coin-chute L, which is preferably formed by or at a lateral or rearward extension of the clock-works frame, and has at its upper end a funnel-mouth l', which receives the coin from the upper main coin-chute M, presently to be described, and after the coin has tilted or acted upon the lever it is thrown therefrom automatically by a lateral bodily movement of the lever, causing withdrawal or partial withdrawal of the lever-fingers, and the coin falls into the money-deposit drawer E, which is below the auxiliary chute L. A spring k^2, placed on the lever-shaft k', acts normally between the frame and a shoulder on the shaft (which may be the disk J) to restore the lever to a stop and into position to receive on and retain by its fingers $k\,k$ the next coin passed down the chutes. In the normal position of the coin-lever its fingers $k\,k$, where they pass through the chute-slots $l\,l$, are separated the precise distance required to detain the proper coin—one cent, for instance; but when the lever is moved outward bodily the taper of the fingers will allow the coin to drop from between them. Should the fingers be straight instead of tapering, a further bodily lateral movement of the lever would be necessary to drop the coin from off the ends of the fingers. It is obvious that any coin smaller in diameter than the proper one, or any overworn coin of proper denomination, will pass between the lever-fingers without operating the lever, and consequently without actuating the goods-delivery mechanism from the clock-works, as will hereinafter more fully appear. Coins larger than those intended for use in the machine cannot be inserted at the coin-slot m of the main chute M.

I will describe farther on the special functions of a spring K′, which is held at one end to the clock-works frame and is fastened at the other end to the extremity of the coin-lever K near its fingers $k\,k$. I, however, state that this spring sustains the weight of the coin independently of the even balance of the lever, and the coin at the intermediate position of the lever trips the goods-delivery

mechanism into action, and should the coin be too light or too heavy the goods-delivery mechanism will remain inoperative; hence the exact weight of the coin, aside from its exact diameter, is an important factor in the operation of the machine. One gear-wheel O of the clock-works mechanism is driven by the meshing of its attached pinion directly with the prime-motor wheel *d*, driven from the mainspring, and this wheel O actuates the gear wheels and pinions which rotate the shaft d^3, which carries the speed-regulator D′, and the tappet-detent I, which detent stops at the disk J on the coin-lever shaft, but may rotate through the notch *i* of said disk. The gear-wheel O carries a pin or tappet *o*, which as the wheel is rotated acts on one arm *p* of a trip lever or device P, which is suitably journaled to the frame and has a lower arm or tail *p′*, which is provided with a shoulder p^2 at its edge, which faces a pin R, which projects radially and forward from the shaft *k′* of the coin-lever K. A spring P′ restores the trip-lever to its normal position, where it stops at a cross-bar or plate p^3 on the clock-works frame. It follows that a contact of the pin *o* with the trip-lever P will swing the lever over and cause its tail *p′* to push the coin-lever shaft outward endwise and shift the coin-lever bodily to withdraw its fingers *k k* sufficiently from or in the slots *l l* of the chute L to cause the coin which had operated the lever K to drop into the drawer E.

As hereinbefore stated, the arrangement of the coin-lever spring relatively to the lever and the devices for tripping the goods-delivery slides into action is quite important. I am not limited to the precise form of spring shown for this purpose. I find, however, in practice that the simple bowed steel-plate spring K′ (shown in full lines in the drawings) serves well, or such a spring having a coil at its arch or bow, as indicated in dotted lines in Fig. 3; but springs of other form may be used to advantage. This spring is fixed at one end to the upper free end of a plate or link S, which is pivoted at its other end to the clock-works frame, preferably by a screw *s*, which may be loosened to allow the plate to be swung over forward or backward at its upper end to assure a precise setting of the spring to hold the coin-lever fingers *k k* at proper height in the chute-slots *l l* prior to the deposit of the coin onto the fingers, whereupon the screw may be tightened to secure the spring at this adjustment. Provision is thus made for most delicate control of the evenly-balanced coin-lever by the spring, which has considerable length and allows the fullest downward-tilting movements of the lever by coins or other bodies without impairment of its elasticity.

I specially mention that the most important office of the spring K′ is to sustain the actuated coin-lever at proper angle or position either to allow or to prevent the operation of the clock-works. Hence my coin-lever-sustaining spring is readily distinguishable in operation from a spring which merely restores a coin-lever to its normal position after a coin had lowered or tilted it and had been discharged from it prior to reception of another coin by the lever. The clock-works gearing is so proportioned that one complete turn of the gear-wheel *d* by the mainspring, while imparting but one revolution to each of the goods-delivery-slide-operating gears or pinions H, will rotate the wheel O as many times as there are delivery-slides—in the present instance four times, as four slides are used.

The operation of the coin-lever and goods-delivering mechanism is as follows: A coin—one cent, for example—being dropped into the chute M, will fall into the lower chute L, and, if it be of proper size, will be retained by the lever-fingers *k k*. If the coin be too light, or if any other light body—a button or counterfeit coin, for instance—be dropped onto the fingers, its weight, sustained by the lever-spring K′, will be insufficient to tilt that end of the lever low enough to cause the disk J on the lever-shaft to move around sufficiently to allow the clock-works tappet or detent I to pass through the notch *i* of the disk. Consequently the goods-delivery mechanism remains inoperative. If the coin or body be of greater weight than that of the proper good coin, the lever which retains it will be swung down past the intermediate position, which would cause the disk J to move too far around and thereby carry its notch *i* beyond the path of the detent-tappet I. During this movement of the lever, and as the notch *i* of its shaft-disk J was passing by the clock-works detent I, the latter would make a turn or two through the notch, and then would stop against the disk at the other side of the notch. As the detent was turning one or more times through the passing disk-notch the clock-works would move a little; but when the detent had stopped against the disk at the other side of the notch the clock-works would be instantly checked or stopped, the same as when the too-light coin was held by the lever. Should the coin be of exact size and weight required, its lodgment on the lever-fingers *k k* will tilt the lever downward to the intermediate position, which will carry the disk J around just far enough to hold its notch *i* in the path of the tappet I, which rotates freely through the notch, until the pin *o* on the clock-works gear O strikes the trip-lever P and causes this lever to strike the pin R of the coin-lever shaft *k′* and force this shaft outward endwise against the tension of the spring k^2, and thereby cause the coin to drop from the lever into the money-drawer. The instant the coin drops from the lever the spring K′ would tend to again lift the lever to normal position; but this should not be allowed until after the pin *o* on the gear-wheel O had fully passed by the trip-lever P to allow its spring P′ to reset it for the next action

of the pin *o* on it. It is obvious that when the lever K tilts downward its pin R also swings downward, and as the trip-lever P acts on this pin the shoulder p^2 of said lever overlies the pin, as shown in Fig. 2 of the drawings, and thus prevents the upward tilting movement of the coin-lever until after the pin *o* of wheel O fully passes by the trip-lever P, whereupon the lever P first resumes its normal position through action of the spring P′, thus leaving the coin-lever free to rise an instant later to its normal position. During the suspension of the coin last dropped and the simultaneous operation of the clock-works one of the slides C′ had been operated to drop one of the goods-packets B′ from one of the boxes C, and immediately the coin-lever had been raised to normal position by the spring K′ the notch *i* of the disk J was turned out of the path of the clock-works tappet I; hence the disk had stopped the clock-works, and all is now ready for the dropping of the next coin into the machine.

I am not aware that any other machine of this class is provided with a coin-chute, goods-receptacle, and mechanism delivering the goods, and a coin-lever having a laterally-projecting coin-support and adapted to lower or tilt by lodgment of a coin on it at the chute to trip the goods-delivery mechanism into action, and adapted also for bodily lateral movement to strip or dislodge the coin from it; hence I claim such a coin-lever, broadly, as of my invention. Furthermore, I am not limited to the precise form or arrangement of coin-lever herein shown and particularly described—that is to say, the lever is not necessarily held to an endwise-movable shaft, forming a pivot or fulcrum to it, as these principles of operation may be preserved by mounting the coin-lever in other ways discernible by experienced mechanics.

I have provided a very simple and effective mechanism for a twofold purpose, or for assuring the positive discharge of any counterfeit coin or other substance from the coin-lever prior to the passage of the following proper coin to the lever, to prevent clogging of the machine, and to close the coin-slot to prevent insertion of coins after the stock of goods has been sold out of the machine. This mechanism I describe as follows: A rod T, provided with an upper laterally-projecting arm *t*, is journaled in suitable bearings t' t^2 within the case A, and is provided with a lower arm U, which projects from the rod in such radial plane as to normally rest behind or lightly against the inner end of the coin-lever shaft *k*′. The rod also has a radial stud *v*, which operates in connection with a stud or pin *w* on a gear-wheel W, journaled to the clock-works frame, and with a tappet-wheel X on the shaft *h* of the wheel *d* of the clock-works, for a purpose presently described. On the rod T is placed a spring T′, which is held at one end to the rod and at the other end to the clock-works frame, and normally turns the rod to carry its upper arm *t* against a cam-plate *z*, which is on the under side of a valve Z, which is hinged to the top *a*′ of the machine-case A at the coin-slot *m*, and thereby holds the valve normally closed to protect the mechanism from moisture or dirt, which otherwise would enter at the coin-slot and injure the machine. The valve Z works on its hinge within the upper broadened end of the coin-chute M, into which the arm *t* of the rod T passes to be operated by the valve. It is obvious that as a coin is pushed into the slot *m* it will open the valve Z downward, and thereby turn the rod T axially. This movement of the rod will carry its arm U around to the coin-lever shaft *k*′ endwise, and thereby move this lever bodily outward to strip the coin or other substance held by the lever-fingers *k k* from said fingers and drop it into the drawer E, and in substantially the same manner as the coin is dropped by the operation of the trip-lever P, as hereinbefore explained. It is manifest that every time the valve Z is opened by inserting a coin any light or overheavy coin or other substance which may have previously lodged on the coin-lever without operating the goods-delivery and coin-discharge mechanism will be automatically thrown from the lever to allow it to resume its normal highest position under the delicate action of its supporting-spring K′, and each time the rod T is turned backward to normal position by its spring T′ after it has been operated by the insertion of a coin onto and past the valve Z the coin-lever spring k^2 will instantly return the lever to normal position in time to catch on its fingers *k k* or lateral coin-rest the coin which had just shifted the lever endwise through the medium of the valve Z and rod T, and simultaneously the rod-stud *v* will be turned around into the path of the tappet *w* of the wheel W, where it remains while the coin-slot is closed by the valve. I wish it to be distinctly understood that I am not restricted to the use of the valve Z in connection with the upper arm of the rod T for actuating the latter for purposes above described, this being only a preferred construction to guard the coin-slot *m*. It is manifest that the rod T could be so located that its upper arm would cross the coin-slot *m*, as indicated by dotted lines at t^3 in Fig. 3 of the drawings. In this case the upper arm of the rod would be acted on directly by the coin inserted at the slot *m* instead of by the valve Z, and with the same results, the rod being turned axially in either case to cause discharge of a coin or other substance previously lodged on the coin-lever. I make special mention of this bodily movement of the coin-lever from the coin-chute slot for discharging from the lever a counterfeit coin or other substance each time the rod T is actuated by inserting a coin or anything else at the slot, as this important feature in the operation of the machine entirely overcomes serious objection to other apparatus of

this class which do not admit of free and positive discharge of counterfeit coins or other substances which had been passed into the coin-chute without operating the goods-delivery mechanism of the machine, and in which case a good coin next passed into the machine would only clog it more completely and no delivery of goods would ensue, and this alone would destroy the confidence of the public in machines of this character. I also especially mention the advantages the coin-slot-closing valve Z has over the bent upper arm t^3 of the rod T in preventing the successful use of a wire or other robbing implement at the coin-chute, it being obvious that a wire could easily be passed into the chute at the coin-slot at one side of the rod-arm t^3 without turning the rod axially, and hence without moving the coin-lever fingers $k\,k$ or coin-support bodily out of the coin-chute passage, thus leaving the fingers or coin-support of the lever within the chute in the path of any tampering implement passed down the chute and allowing operation of the lever by the implement to cause delivery of goods; but when the valve Z is used it is plain that a wire could not be passed around the valve and down the chute without first turning the rod T axially to throw the lever-fingers $k\,k$ or coin-support laterally out of the coin-passage of the chute, thus removing the lever from the path of the implement, should the latter be successfully thrust past the valve, and while the lever-fingers are so withdrawn from the coin-passage of the chute the lever cannot be operated by this implement or otherwise to cause delivery of goods; hence, an attempt to tamper with the coin-chute and lever in this manner only frustrates nefarious purposes by positively preventing operation of the goods-delivery mechanism from the lever. The above-mentioned wheel X on one of the shafts of the delivery-slide gearing, and preferably on the shaft carrying the mainspring d' and wheel d, makes one revolution for every four packages of goods delivered into the tray B, and said wheel X has one stud or tappet x, which meshes into the teeth of the gear-wheel W, which is journaled on the clock-works frame; hence the wheel W will be turned the distance of one tooth every time or after four packages of goods are delivered. The wheel W has as many teeth as the proportion the total number of packets or articles charged into the boxes C bears to the number of articles dropped by the delivery mechanism during each complete revolution of the shaft carrying the tappet-wheel X. For instance, during each revolution of the shaft of the driving-gear wheel d four packages are delivered, as hereinbefore explained; hence, if one hundred packages or articles to be sold are charged into the machine, the wheel W will have twenty-five teeth and its tappet w will be set behind the stud v of the rod T when the machine is started. It follows that when all the goods have been delivered or sold out of the boxes C the tappet w will then have moved around so as to lie in front of the rod-stud v in a manner to prevent the axial movement of the rod, and consequently prevent opening of the coin-slot valve Z, to effectually prevent insertion of coins at the slot m, and no further notice, by placard or otherwise, is necessary to inform an intending purchaser that the goods are sold out of the machine; hence a fair sale is assured. The main coin-chute M is preferably given a zigzag or sinuous form vertically, as most clearly shown in Fig. 3 of the drawings, from the coin-admitting slot m to the auxiliary chute L, in which the coin-lever works. This zigzag form breaks or interrupts the gravity force of a coin passing down the chute to allow its comparatively easy impact onto the retaining-fingers of the coin-lever. The cross-sectional form of the chute M is best shown in Figs. 3 and 4 of the drawings. The chute is made with two narrow strips or portions m' m^2, which for most of their length may be fixed directly to the inner face of the casing A; but, as shown, these two strips, which are a little thicker than the coins to be used, are fixed by soldering or otherwise to an inner or back plate m^3 and a suitable distance apart to allow passage of a coin between their edges. To the outer face of one of the strips—say the the one m^2—is fixed a face-plate m^4, which overlies the coin-passage of the chute for considerable of its width, extending only far enough to form a slot m^5 at the outer side or wall of the chute next the strip m'. When the chute has the preferred sinuous or zigzag form, the strip m' and side slot m^5 will be at or toward the lower edge of the slanting or angularly-disposed sections of the chute and the strip will thus form a rail or track, down which the coin rolls to the coin-lever. When the chute is straight or slightly curved, the strip m' and slot m^5 would extend unbroken from end to end of the chute. The side slot m^5 of the chute gives free exit therefrom of buttons or other small substances which may be maliciously passed through the coin-slot. Said side slot m^5 also assures the passage through it of a wire, which may be pushed into the coin-chute at the coin-slot, thus trapping the wire out of the coin-passage of the chute and preventing operating of the coin-lever by the wire, which, if permitted, might cause surreptitious delivery of the goods. These guarding functions are especially well performed by the sinuous or zigzag form of chute having the side slot. This form of chute also has special advantages in preventing the use of a coin or other substance tied to a string for working the coin-lever to cause delivery of the goods, as the thread would very likely be caught at the angles or bends of the chute and cut off or broken when withdrawal of the coin by the string was attempted. To further promote safety against this latter method of robbing the machine, I provide cutters m^6 at the

angles or bends of the chute, and preferably at the lower ends of the strips m' of the two upper sections of the chute. I show these cutters made by notching the strips m' to produce teeth, forming them in this way of the metal of the chute; but said cutters may be separate blades or knives fixed in the coin-passage at the angles of the chute. It is manifest that in attempting to withdraw a coin tied to a string and let down the chute the string would inevitably be severed by one or other of these cutters. One cutter m^6 only may be used at the lower angle of the chute; but by placing a cutter at each angle of it the cutting of a string suspending a coin is assured. The lower end of the chute M is curved inward from the case-wall to register with the mouth l' of the auxiliary coin-chute L, as most clearly shown in Figs. 1 and 2 of the drawings.

I am not limited to the precise construction shown, as various modifications may be made within the scope of my invention. For instance, the arms p p' of the trip device P need not extend in the same plane, as it may be preferable to extend the auxiliary chute L forward from the clock-works frame instead of rearward, as shown in Fig. 3 of the drawings, as in this case still greater compactness of the machine would be secured. Should this be done the trip-arm p' would probably be in a plane considerably in front of the trip-arm p of the lever P; but both arms would be fixed to the same shaft or fulcrum of the trip device. The main coin-chute M would also be arranged farther toward the front of the machine. The laterally-projecting fingers k k of the coin-lever may be substituted by a lateral flange or shelf on the lever, which would project through or into the coin-chute to form a rest or table on which the coin would lodge. In this case the weight of the coin would alone determine the operation of the goods-delivery mechanism by or through the medium of the coin-lever, as will readily be understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a coin-operated vending-machine, the combination, with a clock-works mechanism tripped into action by a coin, of a table, a goods-box held thereat, a slide reciprocating on the table at the discharge end of the box, gearing at the table actuated from the clock-works, and one or more tappets on said gearing operating the slide to deliver the goods.

2. In a coin-operated vending-machine, the combination, with a clock-works mechanism tripped into action by a coin, of a table having a series of slots, a series of goods-boxes held at the table, a series of slides reciprocating on the table at the discharge ends of the boxes, gearing near the table actuated from the clock-works, and tappets on said gearing operating the slides to deliver the goods, said clock-works mechanism geared with the coin-lever-tripping devices to operate one slide to deliver one piece of goods at each tilting of the coin-lever by the proper coin.

3. In a coin-operated vending-machine, the goods-delivery apparatus comprising a table, one or more goods-boxes arranged thereat, and one or more slides reciprocating between the table and boxes, and provided with edge-guards, preventing abstraction of goods, substantially as herein set forth.

4. In a coin-operated vending-machine, the combination, with a clock-works mechanism tripped into action by a coin, of a table F, having slots f, one or more goods-boxes C at the table, slides C′, fitted between the table and boxes and provided with pins or shoulders c', one or more shafts h, journaled near the table, tappets h' on said shafts, and gear-wheels on said shafts actuated from the clock-works and operating the slides, substantially as herein set forth.

5. In a coin-operated vending-machine, the combination, with a clock-works mechanism tripped into action by a coin, of a table F, having slots f, one or more goods-boxes C at the table, slides C′, fitted between the table and boxes and provided with pins or shoulders c' and guards C^2, one or more shafts h, journaled near the table, tappets h' on said shafts, and gear wheels or pinions H on said shafts actuated from the clock-works and operating the slides, substantially as herein set forth.

6. In a coin-operated vending-machine, the combination, with a clock-works mechanism, of a table, one or more goods-boxes thereat, one or more delivery-slides reciprocating on the table at the box or boxes, gearing near the table carrying tappets actuating the delivery slide or slides and operated from the clock-works mechanism, a pivoted or tilting coin-lever, a notched disk or plate on the rock-shaft of said lever, and a detent or arm on the clock-works, stopping them when it is out of alignment with the notch of the coin-lever-shaft disk and allowing operation of the clock-works and delivery-slides when the lever tilts and holds the notch in the path of the detent, substantially as herein set forth.

7. In a coin-operated vending-machine, the combination, with a clock-works mechanism, of a table, one or more goods-boxes thereat, one or more delivery-slides reciprocating on the table at the boxes, gearing near the table carrying tappets actuating the delivery slide or slides and operated from the clock-works mechanism, a slotted coin chute or guide, a coin-lever held to an endwise-movable rock-shaft having a radial pin or arm, said lever provided with coin-holding fingers or coin-support entering the coin-passage of the chute or guide, retracting devices for the endwise-movable shaft and for the lever, a notched disk or plate on said shaft, a detent or tappet on the clock-works adapted to stop them when out of alignment with the notch of the disk or plate, a pin on one of the clock-works gear-

wheels, and a retracting trip-lever engaged by the latter pin and engaging the coin-lever shaft to move it endwise, substantially as described, whereby, as the coin-lever is tilted, the disk-notch may be brought into register with the clock-works detent to trip said works and the goods-delivery slides into action, and when one package of goods is delivered the coin-lever will be moved bodily to drop the coin and will rise and stop the clock-works, as and for the purposes set forth.

8. In a coin-operating vending-machine, the combination, with a coin-lever held to an endwise-movable rock-shaft provided with a radial pin and with a device for retracting it endwise, a notched disk or plate on said shaft, and a rotating tappet in a clock-works mechanism adapted to stop at said disk and work through its notch when the coin-lever is tilted, of a pin on one of the clock-works wheels, a trip-lever having tappet-arms, one engaged by the clock-works pin and the other engaging the coin-lever-shaft pin, substantially as described, whereby, when the coin-lever is tilted by a proper coin, the clock-works will be started to actuate a goods-delivery mechanism, and after a package is delivered the coin-lever is moved bodily to discharge the coin, as set forth.

9. In a coin-operated vending-machine, the combination, with a coin-lever held to an endwise-movable rock-shaft provided with a radial pin and with a device retracting it endwise, a notched disk or plate on said shaft, a retracting device restoring the lever to normal position, and a rotating tappet in a clock-works mechanism adapted to stop at said disk and work through its notch when the coin-lever is tilted, of a pin on one of the clock-works wheels, and a trip-lever having tappet-arms, one engaged by the clock-works pin and the other engaging the coin-lever-shaft pin, said latter tappet having a shoulder opposing the shaft-pin as the shaft and tilted coin-lever receive bodily movement from the trip-lever, substantially as described, whereby, when the coin-lever is tilted by a proper coin, the clock-works will be started to actuate a goods-delivery mechanism, and the coin-lever will be shifted bodily to discharge the coin, and the shoulder on the tappet will assure passage of the clock-works pin clear of the trip-lever before the coin-lever resumes its normal position, as herein set forth.

10. In a coin-operated vending-machine, the combination, with a clock-works mechanism, of a table, one or more goods-boxes C thereat, one or more delivery-slides at the boxes, gearing *h* H at the table, operated by the clock-works, tappets *h'*, driven by said gearing and actuating the slides, a coin-lever, a notched disk or plate J *i* on the lever rock-shaft, and a detent I on the clock-works adapted to stop them when out of line with the disk-notch *i*, substantially as described, for the purposes set forth.

11. In a coin-operated vending-machine, the combination, with a clock-works mechanism, of a table, one or more goods-boxes C thereat, one or more delivery-slides at the boxes, gearing *h* H at the table, operated by the clock-works, tappets *h'*, driven by said gearing and actuating the slide or slides, a coin-lever held to an endwise-movable rock-shaft retracted by a spring, a radial pin R and notched disk-plate J *i* on the lever-shaft, a coin chute or guide having slots *l l*, said coin-lever having tapering fingers entering said slots, and a tappet I on the clock-works, stopping them by contact with the disk J, but allowing their operation when the coin-lever is tilted to bring the notch *i* of the disk into the path of the tappet, all arranged for operation substantially as herein set forth.

12. In a coin-operated vending-machine, the combination, with a clock-works mechanism, of a table, one or more goods-boxes C thereat, one or more delivery-slides at the boxes, gearing *h* H at the table, operated by the clock-works, tappets *h'*, driven by the gearing and actuating the slides, a coin-lever held to an endwise-movable shaft adapted to be retracted by a spring, a radial pin R and notched disk J *i* on the lever-shaft, a coin chute or guide, said coin-lever having laterally-projecting fingers or coin-support entering the coin-passage of the chute, a tappet I on the clock-works, stopping them by contact with the disk, but allowing their operation when the coin-lever is tilted to bring the notch *i* of the disk into the path of the tappet, a trip-lever P, having arms *p p'*, the arm *p'* acting on the coin-lever-shaft pin R, and a pin *o* on the clock-works, acting on the arm *p* of said trip-lever, all arranged for operation substantially as herein set forth.

13. In a coin-operated vending-machine, the combination, with a coin-chute, goods-receptacles, and mechanism delivering the goods, of a coin-lever having a laterally-projecting coin-support and adapted to lower or tilt by lodgment of a coin on it at the chute to trip the goods-delivery mechanism into action, and adapted also for bodily-lateral movement to strip or dislodge the coin from it, substantially as herein set forth.

14. In a coin-operated vending-machine, the combination, with an endwise-movable shaft provided with a retracting device, of a coin-lever held to said shaft and having lateral fingers or support on which the coin lodges, and a coin chute or guide into which the coin-support of the lever passes to sustain the coin, substantially as described, whereby the lever coin-support has motion in the chute as the lever tilts and the bodily lateral movement of the lever will discharge the coin from it, as set forth.

15. In a coin-operated vending-machine, the combination, with the coin-lever and clock-works mechanism, of a spring which sustains the coin-actuated lever in position to allow operation of the clock-works, substantially as herein set forth.

16. In a coin-operated vending-machine, the combination, with clock-works mechanism and a coin-lever fulcrumed at a normal balance, of a spring which sustains the coin-actuated lever in position to allow operation of the clock-works, substantially as herein set forth.

17. In a coin-operated vending-machine, the combination, with the coin-lever and clock-works mechanism, of a spring connected at one end to the coin-receiving end of the lever and at the other end to an adjacent support and sustaining the coin-actuated lever in position to allow operation of the clock-works, substantially as herein set forth.

18. In a coin-operated vending-machine, the combination, with a clock-works mechanism and a coin-lever, of a spring sustaining the coin-actuated lever in position to allow operation of the clock-works, and connected at one end to the lever and connected at its other end to a plate adjustable for setting the lever by the spring relatively to the weight of the coin and to a tripping mechanism of the clock-works which the lever controls, substantially as herein set forth.

19. In a coin-operated vending-machine, the combination, with a clock-works mechanism and an endwise-movable rock-shaft having a retracting device, of a coin-lever held to said shaft and provided with lateral fingers or support on which the coin lodges, a coin chute or guide into which the coin-support of the lever passes, and a spring connected to the coin-lever and sustaining it when actuated by a coin in position either to allow or to prevent operation of the clock-works, substantially as herein set forth.

20. In a coin-operated vending-machine, the combination, with a clock-works mechanism and an endwise-movable rock-shaft having a retracting device, of a coin-lever held to said shaft and provided with lateral fingers or support on which the coin lodges, a coin chute or guide into which the lever coin-support passes, and a spring sustaining the lever, when actuated by a coin, in position either to allow or to prevent operation of the clock-works, and connected at one end to the lever and connected at its other end to a plate adjustable for setting the lever by the spring relatively to a coin, and a tripping mechanism of the clock-works which the lever controls, substantially as herein set forth.

21. In a coin-operated vending-machine, the combination of a coin-lever held to an endwise-movable shaft provided with a retracting device and a radial pin, a notched disk or plate on said shaft, and a tappet in a clock-works mechanism adapted to stop at said disk and work through its notch when the coin-lever is tilted, a pin on one of the clock-works wheels, a trip-lever having tappet-arms, one engaged by the clock-works pin and the other engaging the coin-lever shaft, said coin-lever having a lateral support on which the coin lodges, a coin chute or guide in the coin-passage of which the coin-lever support moves while sustaining the coin, and a spring connected to the coin-lever and sustaining it prior to delivery of goods through the medium of the clock-works, which the tilting of the coin-lever trips into action, substantially as described, for the purposes set forth.

22. In a coin-operated vending-machine, the combination, with a coin chute or guide having side slots *l l*, of a coin-lever K, fulcrumed at an even balance by a rock-shaft *k'* and provided with fingers *k k*, said shaft having a notched disk J *i* and a pin R, a trip-lever operated by clock-works and shifting the coin-lever shaft endwise, and a bowed spring K', connected at one end to a suitable support, as the clock-works frame, and connected at its other end to the coin-lever to sustain it and trip the clock-works and a connected goods-delivery mechanism into action, substantially as herein set forth.

23. In a coin-operated vending-machine, the combination, with a coin chute or guide having side slots *l l*, of a coin-lever K, having fingers *k k* entering said slots and geared to start a clock-works and goods-delivery mechanism by its tilting movement, and a spring K', connected at one end to the coin-lever and connected at its other end to an adjustable plate S, substantially as described, for the purposes set forth.

24. In a coin-operated vending-machine, the combination, with a coin-chute and a coin-receiving lever movable bodily to discharge coins from it, of a rod movable by or through the insertion of a coin at the chute and provided with an arm opposing the coin-lever, substantially as described, whereby when the rod is turned by inserting a coin the coin-lever will be moved bodily to discharge a counterfeit coin or other substance previously lodged thereon, as and for the purposes set forth.

25. In a coin-operated vending-machine, the combination, with a case having a coin-admitting slot and a coin-chute, a valve closing said slot, and a coin-receiving lever movable bodily to discharge a coin from it, of a rod movable axially and provided with an arm normally closing the coin-slot valve and provided with another arm opposing the coin-lever, substantially as described, whereby when the coin-slot valve is opened by a coin inserted in the chute the rod will be operated to shift the coin-lever and discharge a counterfeit coin or other substance from it, substantially as herein set forth.

26. In a coin-operated vending-machine, the combination, with a case having a coin-admitting slot and a coin-chute, of a rod T, having an arm *t*, extending to be acted on by or through the medium of a coin passed into the slot for turning the rod axially, a spring T' on said

rod normally retracting it, and a laterally-movable lever adapted to tilt after receiving a coin from the chute, said rod T having an arm opposing and giving bodily movement to the lever to discharge a coin or other substance from it each time the rod is actuated by inserting a coin, substantially as herein set forth.

27. In a coin-operated vending-machine, the combination, with a case having a coin-admitting slot and a coin-chute, of a valve closing the slot and having an inclined or cam face, a rod T, having an arm *t*, extending for operation by the valve to turn the rod axially through the medium of a coin passed into the slot, and a laterally-movable lever lowered by receiving a coin from the chute, said rod T having an arm opposing and giving bodily movement to the lever to discharge a coin or other substance from it each time the rod is actuated by inserting a coin, substantially as herein set forth.

28. In a coin-operated vending-machine, the combination, with a coin-chute, and a laterally movable coin-lever lowered by receiving a coin, and having lateral fingers or coin-support entering the coin-passage of the chute, and adapted by its downward movement to trip a goods-delivery mechanism into action, substantially as specified, of a rod T, having an arm extending to be acted on by or through the medium of a coin passed into the coin-chute for turning the rod axially, said rod also having an arm opposing the coin-lever and shifting it laterally to discharge a coin or other substance from it each time the rod T is operated, substantially as herein set forth.

29. In a coin-operated vending-machine, the combination, with a clock-works mechanism operating a goods-delivery mechanism and a rod T, having an arm extending to be acted on by or through the medium of a coin passed into a coin-chute for turning the rod axially, said rod having an arm or tappet *v*, substantially as specified, of a tappet *x*, carried by a shaft of the gearing which actuates the goods-delivery mechanism, and a toothed wheel W, actuated from the clock-works, and which is turned as the goods are delivered, said wheel W having an arm *w*, which intercepts the rod-tappet *v* when the last piece of goods is sold from the machine, and thereby locks the coin-slot against insertion of coins, substantially as herein set forth.

30. In a coin-operated vending-machine, the combination, with a clock-works mechanism operating a goods-delivery mechanism consisting of one or more slides reciprocating at the goods-boxes and actuated by tappets driven from the clock-works mechanism, substantially as specified, of a tappet *x*, rotated by or from the goods-delivery mechanism, a rod T, having an arm extending to be acted on by or through the medium of a coin passed into a chute for turning the rod axially, said rod having a tappet *v*, a toothed wheel W, which the tappet *x* turns one tooth each time one package of goods is delivered, and a tappet *w* on the wheel W, which intercepts the rod-tappet *v* when the last piece of goods is sold from the machine, and thereby locks the coin-slot against insertion of coins, substantially as herein set forth.

31. In a coin-operated vending-machine, the coin-chute made with a passage having opposite edge walls presented to the edges of a coin, a side wall holding the coin between these opposite edge walls, and a ledge fixed to one edge wall and forming another partial opposite side wall, leaving a space m^5 next the other edge wall for exit of coins, wires, or other bodies from the chute, substantially as herein set forth.

32. In a coin-operated vending-machine, the coin-chute made in zigzag form, with a correspondingly-shaped coin-passage having opposite edge walls presented to the edges of a coin, a side wall holding the coin between these opposite edge walls, and a ledge fixed to one edge wall and forming another partial opposite side wall, leaving a space m^5 next the other edge wall for exit of coins, wires, or other bodies from the chute, substantially as herein set forth.

33. In a coin-operated vending-machine, the coin-chute made in zigzag form, with a correspondingly-shaped coin-passage having opposite edge walls presented to the edges of a coin, a side wall holding the coin between these opposite edge walls, and a ledge fixed to one edge wall and forming another partial opposite side wall, leaving a space m^5 next the other edge wall for exit of coins, wires, or other bodies from the chute, and a cutter, as m^6, located at one or more angles or bends of the chute, substantially as herein set forth.

34. In a coin-operated vending-machine, the coin-chute made with strips m' m^2, held to a suitable backing, and a ledge or wall m^4, held to the strip m^2 and overhanging the coin-passage, but providing a side slot m^5 next the strip m', substantially as herein set forth.

35. In a coin-operated vending-machine, the coin-chute made in zigzag or sinuous form, with strips m' m^2, held to a suitable backing, said strips m' m^2 arranged at opposite edges of the chute at necessarily lower angular sections of it, and ledge or wall sections m^4, held to the strips m^2 and overhanging the coin-passage, but providing side slots m^5 next the strips m', substantially as described, for the purposes set forth.

36. In a coin-operated vending-machine, the coin-chute made in zigzag or sinuous form, with strips m' m^2, held to a suitable backing, said strips m' m^2 arranged at opposite edges of the chute at necessarily lower angular sections of it, ledge or wall sections m^4, held to the strip m^2 and overhanging the coin-passage, but providing side slots m^5 next the

strip m', and a cutter m^6, held at one or more angles of the chute, substantially as herein set forth.

37. In a coin-operated vending-machine, the casing of its mechanism provided with a coin-deposit box or drawer and with a goods-delivery tray, and a removable section having hook-and-eye connection with the fixed section thereof, and a lock whose projected bolt locks the removable section by opposing a hook, substantially as herein set forth.

FREDERIC B. COCHRAN.

Witnesses:
HENRY L. GOODWIN,
C. SEDGWICK.