Oct. 26, 1937. R. H. BIRD 2,096,729

COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 1

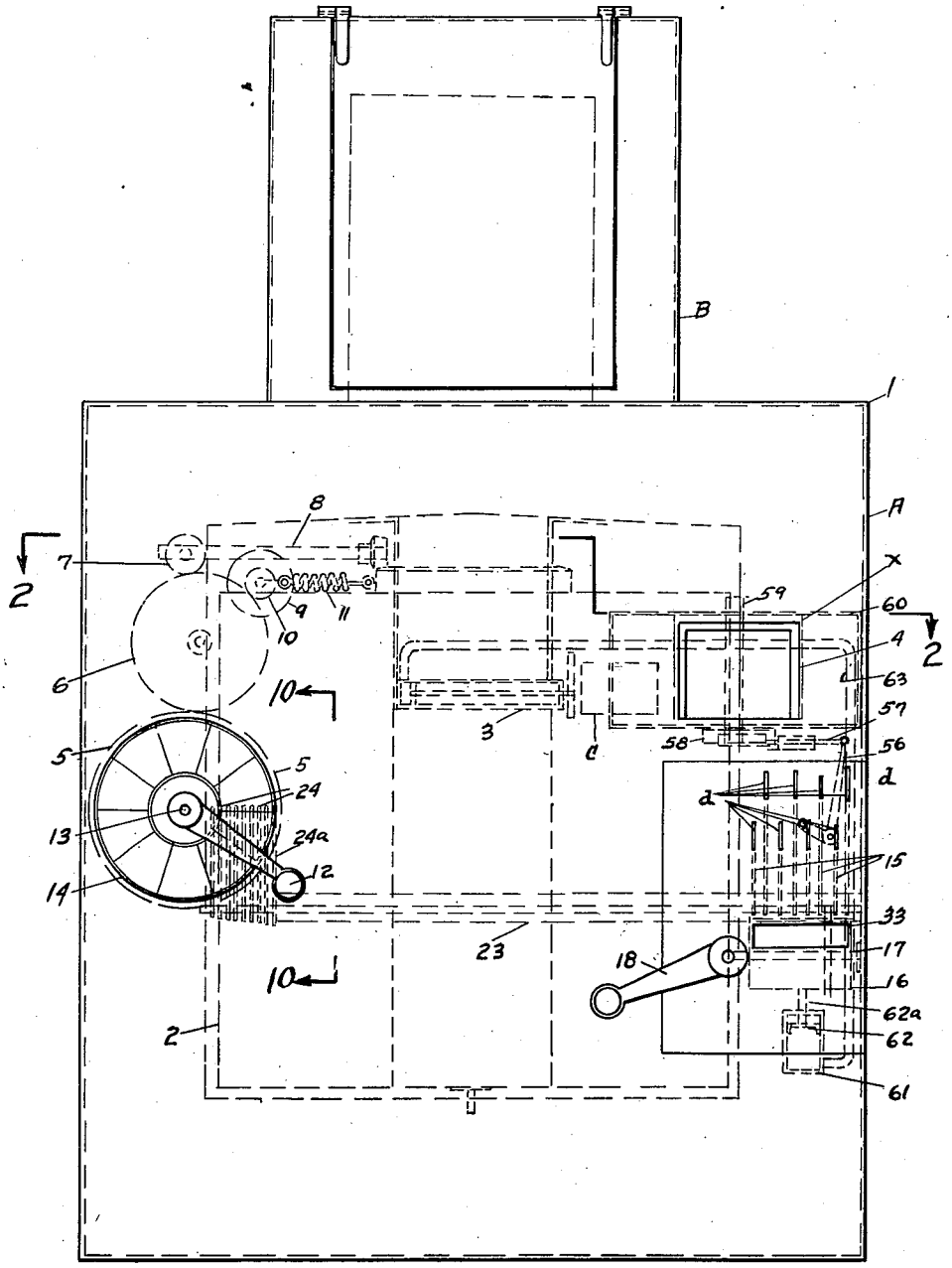


Fig. 1

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COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 2

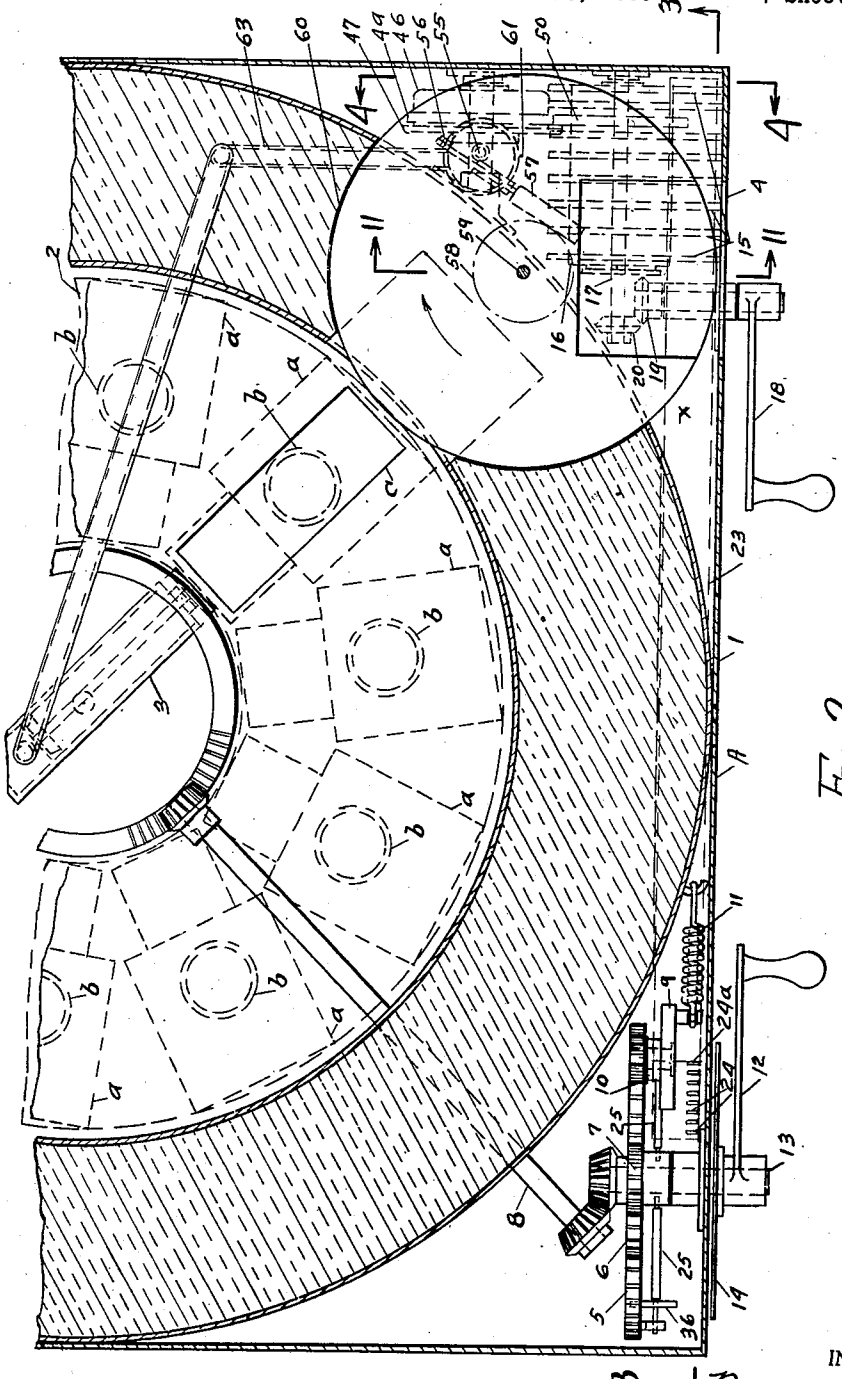


Fig. 2

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COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 3

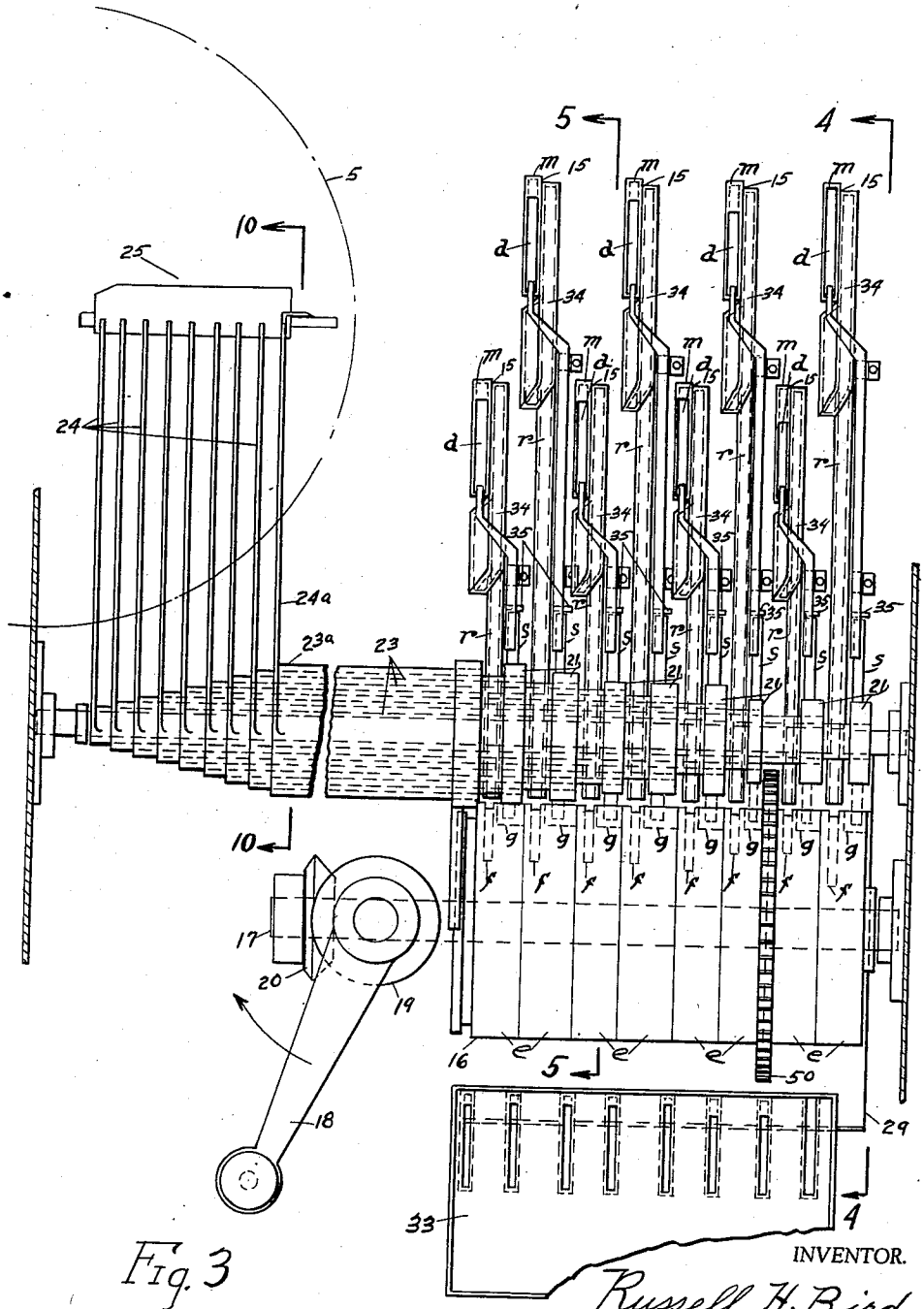


Fig. 3

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COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 4

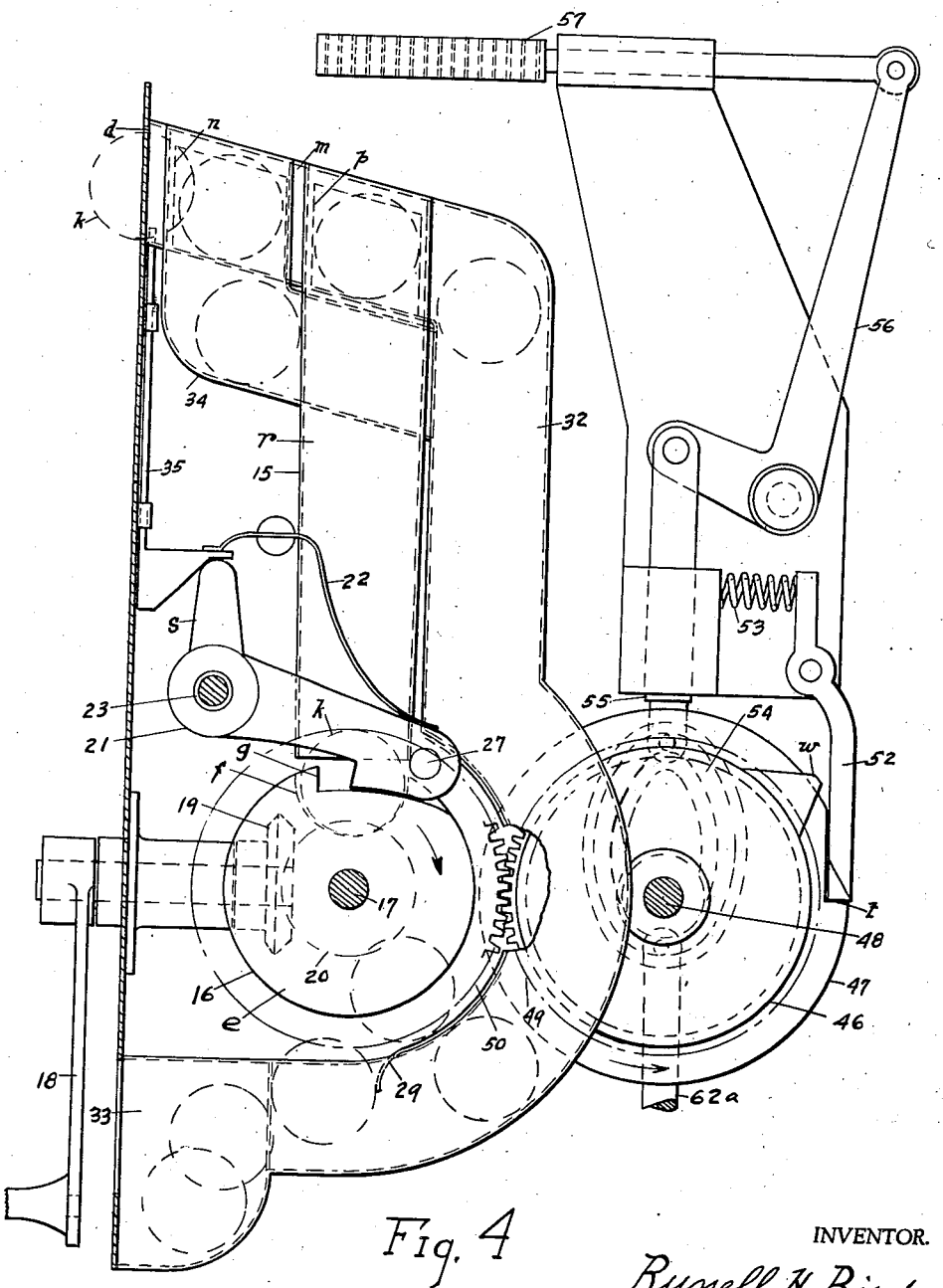


Fig. 4

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Oct. 26, 1937. R. H. BIRD 2,096,729

COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 5

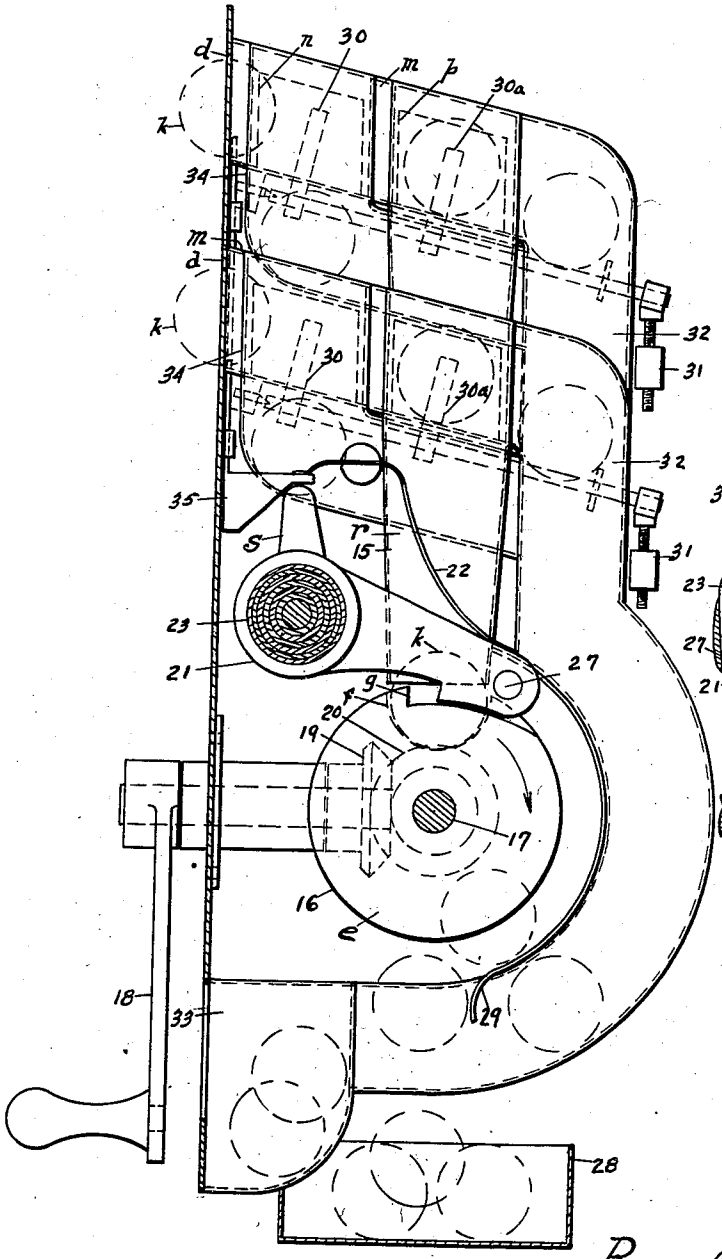


Fig. 5

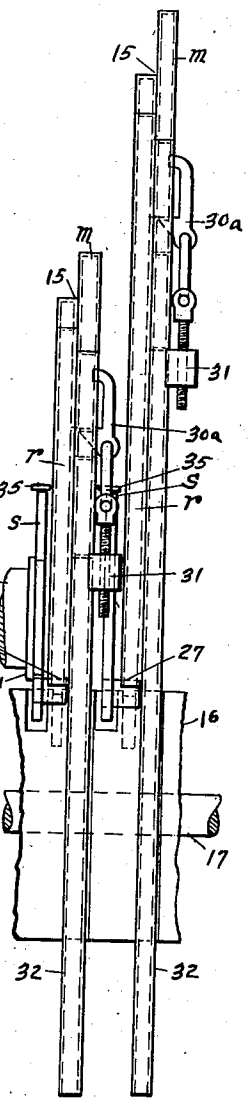


Fig. 6

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COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 6

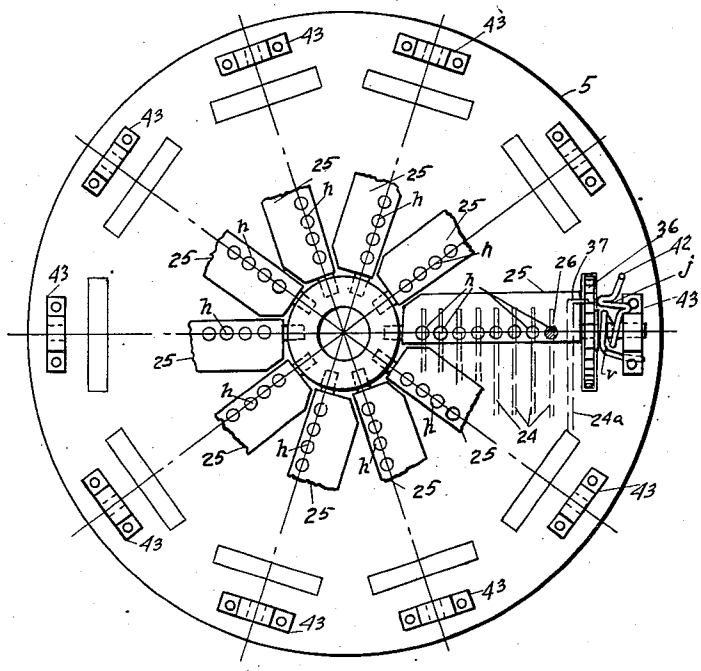


Fig. 9

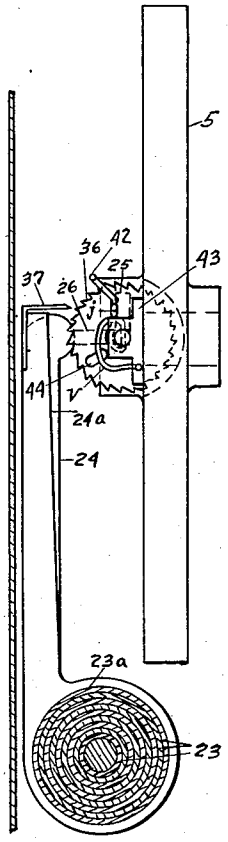


Fig. 10

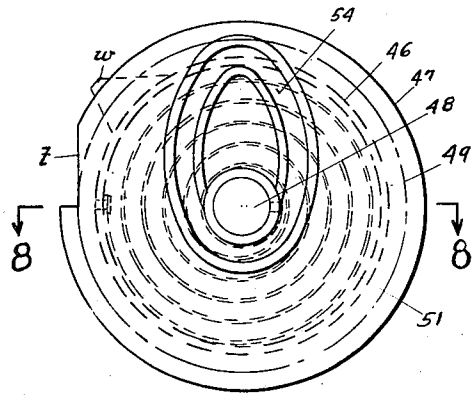


Fig. 7

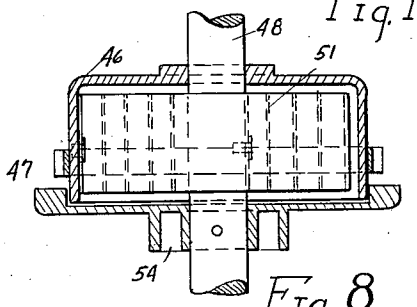


Fig. 8

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COIN OPERATING DEVICE FOR VENDING MACHINES

Filed Feb. 13, 1935 7 Sheets-Sheet 7

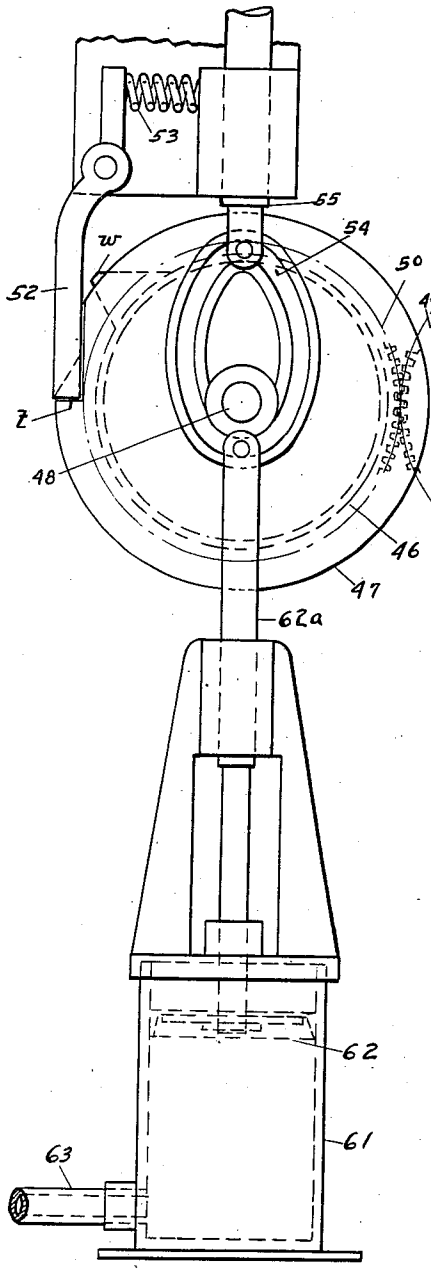


Fig. 11

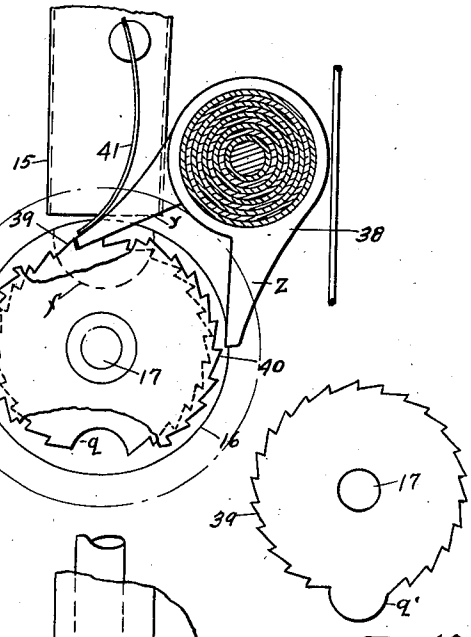


Fig. 13

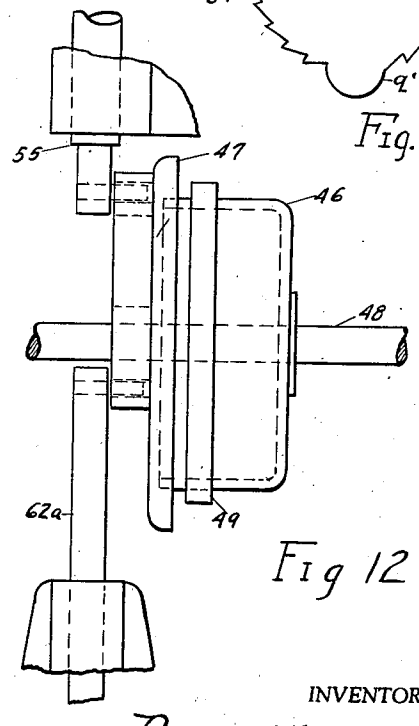


Fig 12

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Patented Oct. 26, 1937 2,096,729

UNITED STATES PATENT OFFICE

2,096,729

COIN OPERATING DEVICE FOR VENDING MACHINES

Russell H. Bird, Detroit, Mich.

Application February 13, 1935, Serial No. 6,328

3 Claims. (Cl. 194—63)

This invention relates to a coin operating device.

The object of my invention is to produce a coin operating unit adapted for a special vending machine dispensing several different kinds of merchandise therefrom.

Another object is to produce a coin operating unit that is automatically selective and operative for different denomination coins as may be required deposited therein for securing different priced merchandise as may be selected.

A further object is to produce a coin operating device adapted for multiple compartment dispensing machines, that will automatically lock certain coin chutes not operative for special merchandise selected, and that will automatically lock the operating mechanism if the chosen merchandise compartment is empty.

A still further object is to produce an automatic coin operating unit that is simple in construction, easily and efficiently operated and can be manufactured at a low cost.

These several objects are attained in the preferred form by the construction and arrangement of parts more fully hereinafter set forth.

Similar parts on all drawings are marked by similar numerals or letters.

Fig. 1 is a front view of an assembled vending machine showing the general arrangement of the vending machine operating mechanism and the connected coin operating unit mounted therein.

Fig. 2 is a cross-sectional view through the vending machine taken on the line 2—2 of the Fig. 1 showing the front half of the cabinet and the coin operating unit as mounted thereon, with its connecting means for the vending machine operating mechanism.

Fig. 3 is a enlarged front view of the coin operating unit taken on the line 3—3 of the Fig. 2 with the cabinet front plate removed, showing the general arrangement of the coin operating unit working parts.

Fig. 4 is an enlarged end view of the coin operating unit taken on the line 4—4 of the Figs. 2 and 3, showing the relative position of the coin operating unit and the connected vending machine operating mechanism.

Fig. 5 is a vertical sectional view through the coin operating unit taken on the line 5—5 of the Fig. 3, showing the recessed coin disc and locking means operating therewith.

Fig. 6 is a back view of the coin chutes shown in Fig. 5 showing the slug ejecting members and connected coin return chutes.

Fig. 7 is a front view of the spring driving drum showing the operating cam grooves formed therein.

Fig. 8 is a cross sectional view of the driving drum taken on the line 8—8 of the Fig. 7, showing the spring driving means and connection to the drum unit.

Fig. 9 is a front view of the selective lock release disc showing the series of selective lift plugs mounted thereon.

Fig. 10 is a vertical sectional view taken on the line 10—10 of the Figs. 1 and 3, showing the edge view of the selective release lock disc shown in Fig. 9, and the release operating arms engaged with the lift plugs mounted therein.

Fig. 11 is a vertical sectional view taken on the line 11—11 of the Fig. 2 showing the vending machine dispensing mechanism controlled by the coin operating unit, and locking means for the coin drum.

Fig. 12 is a side view of the same mechanism shown in the Fig. 11 showing the connecting means to the driving drum.

Fig. 13 is a modified form of locking cam for the coin drum.

My invention can best be understood when illustrated and described in combination with a multiple compartment vending machine with which it is to be used.

In general, my invention comprises a series of vertically positioned coin chutes positioned directly over a coin disc operating drum rotatably mounted therebeneath, which, if rotated with the required operating coins deposited therein, will unlock the connected vending machine and allow the chosen merchandise article to be dispensed therefrom. A selective lock releasing disc is rotatably mounted adjacent the coin chutes, and functions to release the coin disc locking arms not engageable by required deposited operating coins.

I will now describe more fully the detailed construction of my device, referring to the drawings and the marks thereon.

The preferred vending machine cabinet 1 as illustrated in the Figs. 1 and 2 of the drawings, comprises a lower merchandise compartment A and connected refrigerating compartment B mounted directly thereabove. All of the cabinet walls of both compartments are made of suitable heat insulating material and construction. The cooling means as may be applied in the upper compartment is not material to this invention and not herein shown. Within the lower compartment A is rotatably mounted a cylindrical merchandise cage 2 formed with a series of sepa-

rated merchandise compartments *a* positioned radially therein and uniformly spaced around the cage walls. Each vertical merchandise compartment is provided with a suitable spring elevator *b* for automatically raising the respective merchandise packages *c* as may be placed therein, to the cage top where the respective packages are dispensed by an automatic hydraulic plunger **3** mounted in the compartment top, opposite the cabinet delivery door opening **4**. Suitable operating mechanism is preferably mounted at one corner of the cabinet, comprising rotatably mounted spur gears **5**, **6** and **7** and the gear connected drive shaft **8** for rotating the merchandise cage **2** to position any chosen compartment *a* opposite the delivery door **4**. A small timing disc **9** is mounted on the cabinet wall and rotatably connected by a gear **10** to one of the spur drive gears, designed to make one complete rotation for each merchandise compartment displacement, and is provided with a restraining spring **11** attached thereto to insure accurate placing of the cage compartments *a*. A small setting crank **12** is attached to the mounting shaft **13** of the large drive gear **5** providing turning means therefor. Also a selective merchandise dial **14** is fixedly mounted on the gear shaft **13**, positioned outside the cabinet wall, and is divided radially into sections, one section for each merchandise compartment *a*, and carries printed thereon the name and price coins required for the merchandise article in the respective cage compartments, said dial **14** being synchronized to rotate directly with the connected cage **2**, and set with the chosen dial section opposite an indicator point as its corresponding merchandise compartment is opposite the cabinet delivery door **4**. Directly opposite the drive gears **5**, **6** and **7**, inside the cabinet wall, is a series of fixedly mounted vertical coin chutes **15**, each designed to receive a chosen denomination operating coin therein, deposited through the chute wall openings *d* formed through the cabinet casing. The lower coin chute ends are uniformly positioned in alignment over a special coin disc drum **16** which is rotatably mounted directly therebeneath. The coin disc drum **16** is formed of a series of coin discs *e* assembled on a drive shaft **17**, and is provided with a drive crank **18** connected thereto by intervening drive gears **19** and **20**. Each coin disc *e* is formed with a semi-circular coin recess *f* in one edge, and positioned directly beneath its respective coin chute open end. Each coin disc *e* is formed with a special lock notch *g* adjacent but at one side the coin recess. Directly above the coin drum **16** is mounted a series of locking arms **21**, one arm being positioned above each coin disc notch *g*, adjacent its respective coin chute **15** and engageable with said disc notch when unrestrained, by reaction of the attached spring member **22**. Each of the series of lock arms **21** is mounted on a tubular operating shaft **23**, positioned along the cabinet front wall, said tubular shafts preferably being nested together, one inside the other as shown in Figs. 3 and 5 of the drawings, and are extended to a position directly opposite the drive gear **5** which is also made into a selective lock releasing disc. All of said tubular shafts **23** are rotatably mounted on the cabinet wall and each shaft operates independently of the other. This selective lock release unit herein shown is of a flat disc construction, instead of the cylindrical type as shown in my former patent application Ser. No. 723,765, filed May 3, 1934, previously mentioned. Either type may be used with this invention. Fixedly mounted on the outer end of each tubular shaft **23** is an operating arm **24**, all being positioned in alignment and with their upper ends opposite the horizontal diameter of the gear **5**. The outer face of the gear **5** is divided into radial sections corresponding to the sections of the selective merchandise dial **14**, one section for each merchandise compartment *a*. Each gear radial section (or selective lock releasing disc section as hereinafter referred to), is provided with a radially positioned plate shaft **25** rotatably mounted on the gear or disc face. Each plate shaft **25** is formed with a series of plug holes *h*, positioned one directly beneath the end of each operating arm **24**, and lift plugs **26** are inserted within chosen holes *h* to engage the respective operating arms **24**, designed to displace all of the remaining lock arms **21** from the coin disc notches *g* not engageable by required deposited operating coins, when the gear section plate shaft **25** corresponding to a chosen merchandise compartment *a*, is rotated to a position opposite the operating arms **24**, thus leaving engaged with the coin disc only the lock arms **21** requiring coins to pay for the goods selected, and for these arms the lift plugs **26** are omitted. When the proper coin *k* is inserted within its respective coin chute **15** and into the coin disc recess *f*, the coin drum **16** may be slightly rotated by the crank **18**, because of the slack in the lock notch *g*, and the inserted coin, or coins *k*, will engage the respective pins **27** of the lock arms **21**, raising and releasing the lock arm from the disc notch *g*, allowing one complete rotation of the drum **16**, and also deposit the coins *k* within a cash box **28** located beneath the drum, the semi-circular drum shield **29** retaining the coins within the disc recesses *f* until partial rotation is made. Each coin chute is made with the top coin channel *m* slightly inclined, and is formed with two side openings *n* and *p*. The inner lower ends of each inclined coin channel *m* opens directly into an attached return coin chute **32** leading back to the cabinet wall opening **33**, also the side opening *n* is provided with another return coin chute **34** leading into the chute **32**. The coin channel side opening *p* connects with the vertical section *r* of the chute **15** leading directly to the coin disc drum **16**. Within the channel sections *m*, opposite the respective side openings *n* and *p*, are pivotally mounted trap yokes **30** and **30***a*, preferably balanced by an attached adjustable arm weight **31**. Should a slug be deposited within any chute **15**, if heavier than the perfect required coin, when contacting the foot of the first trap yoke **30**, will rock the same and the side yoke arm will eject said slug coin through the side opening *n* into the return coin chute **34** and into the chute **32** returning same to operator through the cabinet wall opening **33**. If the coin is of perfect weight and size it will pass over the first yoke **30** and engage the foot of the second yoke **30***a*, unbalancing same and ejecting the coin *k* through the channel side opening *p* into the chute section *r* leading to the coin disc drum **16**. However, if the slug coin is lighter than the required perfect coin, it will pass both trap yokes **30** and **30***a* without tripping either of them, and roll directly into the return chute **32**, returning to the operator. The several side coin return chutes and trap yokes are intended to prevent cheating by the use of fake slugs or coins. Each coin chute wall opening *d* is provided with a vertical lock bar **35** slidably mounted therebeneath, and

positioned to engage the cam arms *s* formed on the side of the lock arms **21**, designed to lift the said slide lock bar **35** and partially close the coin chute opening whenever said lock arms are disengaged from the coin disc notches *g*, and preventing any further insertion of coins in the respective coin chutes. The lock bars are retained in position by engaging the extended end of the spring member **22**.

To insure a more complete locking of the coin operating device and coin chutes for any special setting where the corresponding merchandise compartment *a* is empty, a special ratchet gear **36** is loosely mounted on the end of each plate shaft **25**, each engageable with a spring pawl **37** mounted on the end of an operating arm **24***a* of the outside tubular operating shaft **23***a*, the tubular shaft being extended to a position adjacent the coin drum **16**, and which also carries a double lock arm **38** mounted thereon, said double arm **38** designed to engage alternately two ratchet gears **39** and **40** fixedly mounted on the coin drum shaft **17**, and arranged thereon with their respective ratchet teeth positioned opposite to each other as shown in the Fig. 11. The ratchet **39** may be formed with either a concave or convex edge formation, *q* or *q'*. The function of the recess *q* in the ratchet **39** is to allow the arm *y* of the double lock arm **38** to drop therein at a greater depth than provided by the shallow lock teeth on the rim, to cause sufficient rocking of the outer casing **23***a* and arm **24***a* with attached arm pawl **37** to engage the ratchet **36** and rotate same one tooth, registering thereon one merchandise package dispensed from its corresponding merchandise compartment. The boss *q'* as shown on the ratchet **39** in Fig. 13, operates in the same way but in the opposite direction should the ratchet wheel **36** be reversed in position, operating to pull instead of push said ratchet tooth. One arm *y* of the double lock arm **38** is positioned to engage with the tooth of the ratchet **39**, and retained in that position by the spring **41**, this position relieving the arm *z* from the tooth of the adjacent ratchet **40**.

A special curved wire spring **42** is mounted on the outer end of each plate shaft **25**, each positioned adjacent its respective ratchet wheel **36**, said spring having one end mounted through a hole formed through the shaft end, coiled around the shaft in the coil *v* with the end fixedly attached to the wall of the shaft bearing **43**, said spring being stressed and capable of rotating the shaft **25** to an edgewise position with the supporting gear disc **5** on which it is mounted, when unrestrained, and with the longer plate shaft edge positioned to engage and displace all of the operating arms **24** and **24***a*. The opposite end of the spring **42** is curved and formed with a T-shaped head end *j*, designed and positioned with one head arm engaging the end wall of the shaft bearing **43** to lock said plate shaft **25** in a normal position flatwise to the face of the supporting gear disc **5**, against the tension of the spring coil *v* and positioning the series of lift plugs **26** opposite the operating arms **24**, said spring head *j* being retained in that position by the opposite head arm engaging the face of its respective ratchet wheel **36**. The spring end arm slides along the ratchet face as the respective ratchet is rotated, until it reaches the respective wall slots **44** formed in each ratchet wheel face, whereupon the spring end drops therein, disengaging from the bearing end **43** and allows the spring coil *v* to re-tilt said plate shaft **25** edgewise on the supporting disc **5**, engaging and displacing all operating arms, and thereby locking all coin chute openings *d*, and the coin drum **16** by engaging the lock arm *z* with the tooth of the ratchet **40**, preventing any further rotation of the coin drum **16** and connected mechanism. If the ratchet wheels **36**, as mounted on each shaft **25**, is set with its wall slot **44** positioned a definite number of ratchet teeth back of the engaging operating arm pawl **37**, each equal to the number of packages in its respective corresponding merchandise compartment *a*, then each respective ratchet **36** will be advanced one tooth for each corresponding package dispensed from its corresponding compartment by alternate reaction of the irregular edge formation of the ratchet **39** and the spring **41** on the engaging lock arm *y*, thus rocking the tubular shaft **23***a* and connected operating arm **24***a* as said coin drum is rotated, each rotation registering one package dispensed from some compartment by advancing its respective ratchet one tooth. When any compartment is empty, the wall notch **44** is then turned beneath the spring end *j*, releasing it from the bearing end, and the spring coil *v* re-tilts the respective corresponding plate shaft **25** edgewise with the supporting gear disc **5**, and locks the operating coin mechanism for that particular setting of the merchandise cage compartment, but releases same when other filled compartments *a* are rotated in position.

Adjacent the coin disc drum **16** is a hollow driving drum **46** provided with a loose end bearing cap **47**, both assembled on shaft **48** and rotatably mounted on the casing. The cap member **47** is fixedly attached to the shaft **48**, while the drum **46** is free to rotate thereon, said drum carries mounted thereon a ring spur gear **49** positioned to mesh operatively with a spur gear **50** mounted on the coin drum **16**, and rotatable therewith. Within the driving drum **46** is mounted a spiral spring **51** having its opposite ends attached to the drum walls and the shaft respectively, the spring being positioned to wind up as the coin disc drum **16** is rotated in forward direction. Pivotally mounted on the frame adjacent the edge of the drum cap **47**, is a pawl **52**, engageable with the cap rim notch *t* through reaction of the attached coil spring **53**. A trip tooth *w* is formed on the outer wall of the drum **46**, positioned to engage pawl **52** on rotation to that position, displacing same and allowing the cap **47** to rotate with the drum by reaction of the inclosed spiral spring **51**. On the outer surface of the cap **47** is formed an eliptical cam groove **54**, positioned thereon excentric with the axis of the shaft rotation and extended vertically above the shaft, at its rest position. Slidably mounted above the cap **47** is a follower rod **55** having its lower end engaged with the cam groove **54** and movable therewith. The follower rod **55** is connected to a pivoted rocker arm **56** mounted thereabove, said rocker arm being pivotally connected to a slidably mounted gear rack **57**. The gear rack **57** engages operatively a pinion gear **58** mounted on shaft **59** of the rotatable cylindrical package delivery door **60**, and which is pivotally mounted in the cabinet wall opposite the opening **4**. The cylindrical delivery door **60** is formed with a package recess *x* in one edge thereof, positioned, at rest, opposite the cabinet wall opening **4**, and rotatable to a position opposite one of the merchandise cage compartments *a* directly in front

of the hydraulic delivery plunger 3 as the driving drum cap 47 is rotated. By means of the pawl 52 engaging the cap rim notch *t*, the delivery mechanism is delayed until a partial rotation of the drum 46 is made, then released by the drum tooth *w* and operates by reaction of the spiral spring 51, rotating the cylinder door 60 to the package compartment position, receiving the merchandise package *c* in the recess *x* and returning to the rest position opposite the cabinet wall opening 4. Also slidably mounted directly below the drum cap 47 is a hydraulic cylinder 61 and having an operating plunger 62 mounted therein, said plunger being extended by plunger rod 62*a* at the upper end and also engages operatively with the cap cam groove 54 and moves therewith, depressing the plunger 62 within the inclosing cylinder 61, and when properly filled with liquid will force the same through the connecting pipe 63 directly into the hydraulic delivery plunger 3, and automatically displace a merchandise package *c* from the cage compartment *a* into the recess *x* of the door 60, when said door is rotated to that position. The plunger 62 being connected to the cam groove at the short radius thereof, delays the delivery plunger 6 until the door 60 is fully rotated to that position, completing the operation.

Having fully described my coin operating device, what I claim as my invention and desire to secure by Letters Patent is:

1. A coin operating device adapted for multiple compartment vending machines and used in combination with the vending machine operating mechanism and required operating coins, comprising a series of adjacent open end coin chutes vertically mounted within a suitable casing, a coin drum formed of a series of recessed and notched coin discs assembled on a shaft and rotatably mounted beneath the series of coin chutes, in alignment therewith, designed and positioned with one coin recess beneath each coin chute open end, crank turning means mounted on the casing and connected with the coin drum for rotating same, a series of locking arms rotatably mounted above the coin drum, one arm positioned above each coin disc notch, engageable therewith but formed with means for being displaced by an operating coin when deposited through the coin chute into the respective coin disc recess, as the drum is rotated each locking arm being provided with a suitable operating arm, a selective lock releasing disc rotatably mounted on the casing and provided with a series of lift plugs radially positioned thereon, one series of plugs for each compartment of the merchandise vending machine, said selective lock releasing disc being positioned to engage the operating arms and displace from the coin drum disc notches all of the locking arms not engageable by the required deposited operating coins, rotating means connected to said selective lock releasing disc for setting the proper series of lift plugs engageable with the operating arms, and geared means connected with the coin disc drum for rotatably connecting same to the operating mechanism of a vending machine.

2. A coin operating device adapted for a multiple compartment merchandise vending machine, and used in combination with the vending machine operating mechanism and required operating coins, comprising a series of adjacent, L-shaped open end coin chutes vertically mounted within a suitable casing, a coin drum formed of a series of recessed and notched coin discs assembled on a shaft and rotatably mounted beneath the series of coin chutes, designed and positioned with one coin recess beneath each coin chute opening, crank means mounted thereon and connected to the coin drum for rotating same, a series of locking arms mounted above the coin drum, one above each coin disc notch, engageable therewith but designed to be disengaged by an operating coin when deposited through the coin chute into the respective coin disc recess, as the coin drum is rotated, said series of locking arms being mounted on the ends of a nested series of tubular shafts rotatably mounted one within another, said tubular shafts each being provided with an operating arm mounted on its opposite end, all positioned adjacent and in alignment with each other, a selective lock releasing disc rotatably mounted on the casing positioned opposite the ends of the series of operating arms, said disc being provided with series of lift plugs radially positioned thereon, one series of plugs for each compartment of the merchandise multiple vending machine, designed to engage and displace various operating arms and connected locking arms unlocking them from the coin disc notches as are not engageable by required deposited operating coins, ratchet means mounted on said selective lock releasing disc, one for each plug series, for engaging and locking the mechanism when the respective merchandise compartments are empty, rotating means mounted on said selective disc for setting the proper lift plugs engageable opposite the operating arms, and geared means mounted on the coin drum for connecting same rotatably with the operating mechanism of the vending machine.

3. A coin operating unit adapted for a multiple compartment merchanidse vending machine and used in combination with the vending machine operating mechanism and required operating coins, comprising a series of adjacent, open end coin chutes vertically mounted within a suitable frame, each of said coin chutes being provided, with a chute opening lock slide, a coin drum formed of a series of recessed and notched coin discs assembled and rotatably mounted beneath the series of coin chutes, designed and positioned with one coin disc recess beneath each coin chute end opening, crank turning means mounted thereon and connected to the coin drum for rotating same, a series of lock arms mounted above the coin drum, one above each coin disc notch, engageable therewith but designed to be disengaged by an operating coin when deposited through the coin chute into the respective coin disc recess, as the coin drum is rotated, each of the said lock arms being formed with a cam projection positioned to engage the respective chute lock slides, raising same as the locking arms are raised and blocking the chute openings, said series of locking arms being mounted on a nested series of tubular shafts rotatably mounted one within another, said tubular shafts each being provided with an operating arm mounted on its opposite end, all positioned adjacent and in alignment, a selective lock releasing disc rotatably mounted on the casing positioned opposite the series of tubular shaft operating arms, said disc being provided with a series plate shaft, radially positioned and rotatably mounted on said selective disc face, one plate shaft for each vending machine merchandise compartment, each plate shaft being provided with a series of selective lift plugs also positioned radially thereon, designed to engage and displace various operating arms

and connected locking arms from their respective coin disc notches as are not engageable by the required deposited operating coins, ratchet locking means mounted on the ends of each plate shaft also engageable with one of the operating arms mounted on the tubular shafts, designed to rotate said plate shaft and lock all operating mechanism when a specified number of merchandise packages have been dispensed from the respective merchandise compartments of the vending machine, rotating means mounted on the said selective lock releasing disc for setting the proper series of lift plugs opposite the operating arm ends, and geared means mounted on the coin drum mechanism for connecting same rotatably with the operating mechanism of the vending machine.

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