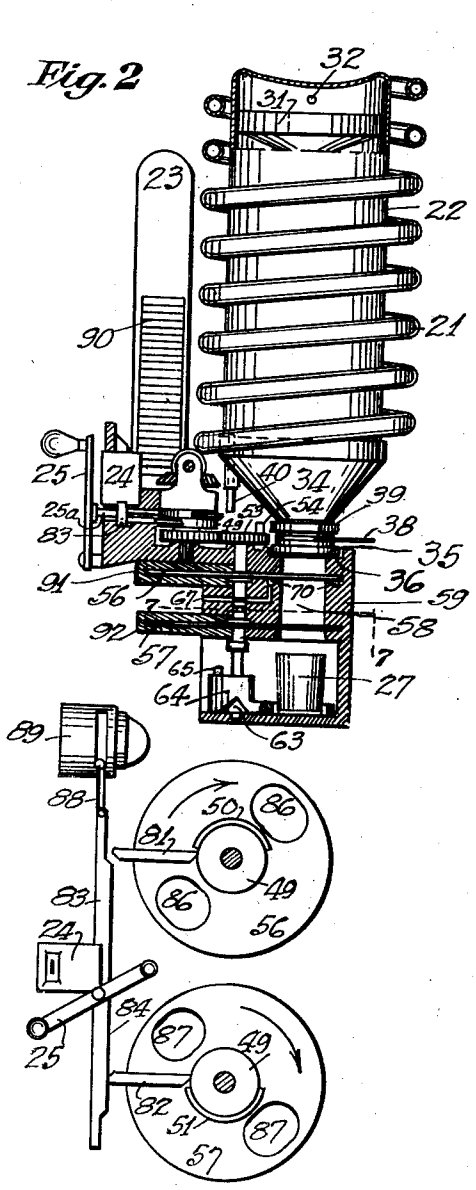
April 7, 1931. M. H. LOUGHRIDGE 1,799,755

VENDING MACHINE

Filed Jan. 31, 1927 2 Sheets-Sheet 1



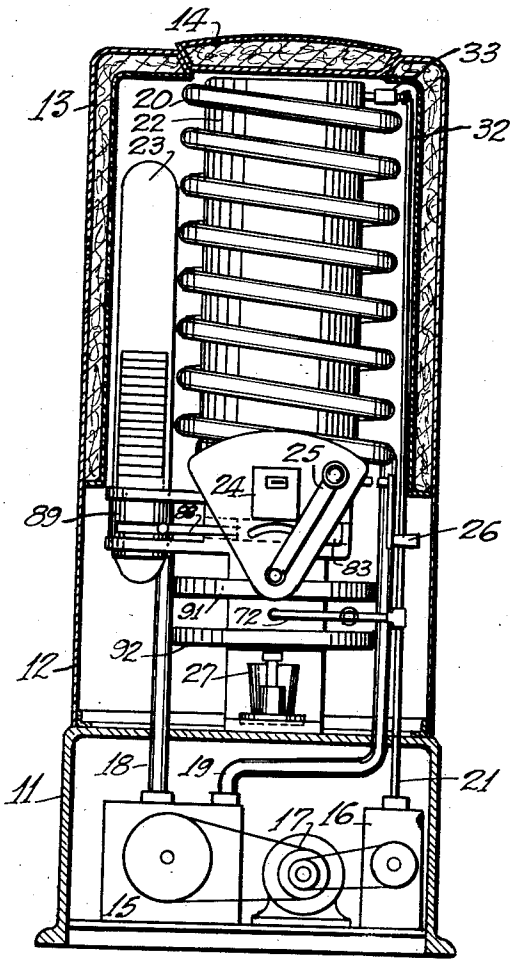


Fig. 1

Fig. 3

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VENDING MACHINE

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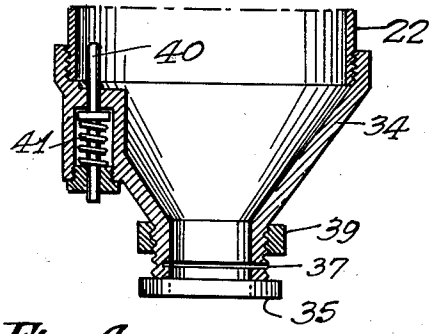


Fig. 4

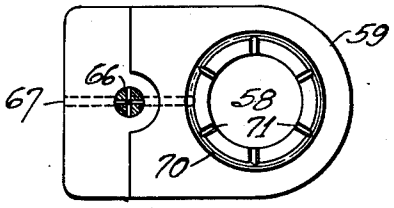


Fig. 6

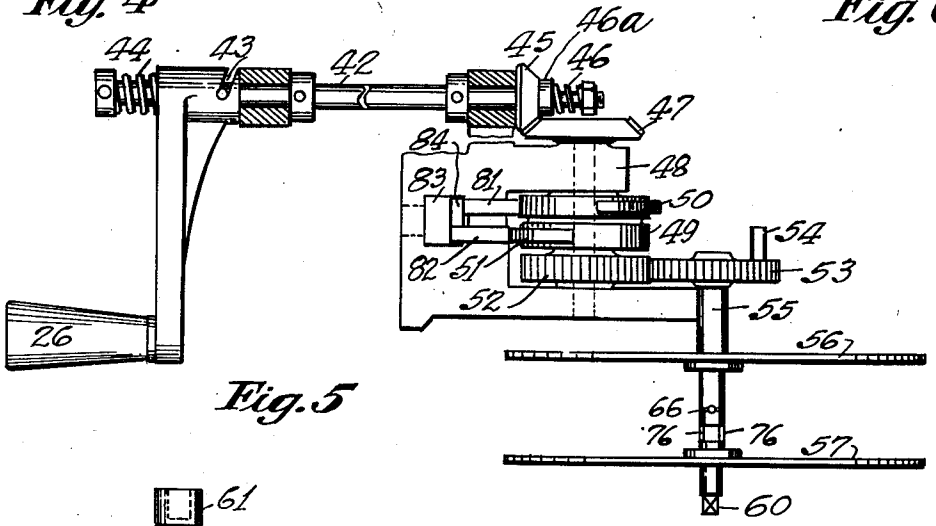


Fig. 5

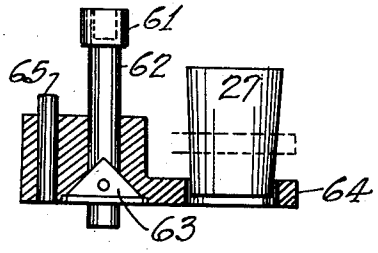


Fig. 8

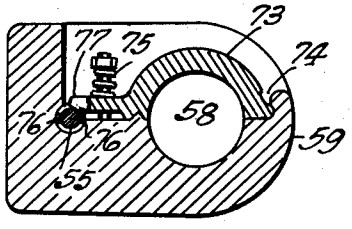


Fig. 7

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UNITED STATES PATENT OFFICE

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VENDING MACHINE

Application filed January 31, 1927. Serial No. 164,957.

This invention relates to vending machines which may be coin controlled and some of its objects are to provide a vending machine for articles of food which has to be preserved at a low temperature, to provide a vending machine for a plastic material and to provide a machine for delivering a measured quantity of the material. Further objects of the invention include a detachable container for the material, a forced feed and a forced delivery of the material. The invention further includes a co-operative action between a plurality of delivery devices, the one being ancillary to the other, sometimes called a two stage machine, an interlocking arrangement whereby the machine cannot be improperly operated and in which each operation must be completed before another operation can be started. The invention also resides in the construction and arrangement of the parts whereby the mechanism can be readily cleaned and kept in a sanitary condition.

The invention is described in detail in the following specification and is illustrated in the accompanying drawings, in which, Fig. 1, is a front elevation of the vending machine with the cover shown in section, Fig. 2 is a side elevation of the operating part of the machine, partly in section, with the cover removed, Fig. 3 illustrates the principles of the interlocking mechanism, Fig. 4 shows in section, the delivery orifice of the container, Fig. 5 is an enlarged view of the operating mechanism, Fig. 6 is a detail showing the method of securing the forced delivery, Fig. 7 is another detail showing the method of releasing the material before delivery and Fig. 8 shows an arrangement, partly in section for preventing the removal of the material until the machine completes its action.

Some of the features of this invention apply to vending machines in general, other features are associated with a plastic material, such as ice cream and other features are specific to a plurality of operating mechanisms, as fully described in the specification.

The drawings show this invention applied to the vending of ice cream and its operation will be described in connection with a plastic material of this character. Ice cream is usually supplied in cylinders and in the present case these cylinders are provided with a piston whereby a forced feed is obtained and a conical head is applied to these cylinders, which, when inverted, adapts them to the delivery mechanism of the machine. The material is thus delivered to the machine as it is received.

It is necessary to maintain a predetermined temperature in the contents of the container and for this purpose a mechanical refrigerating outfit is provided which is self regulating and automatically maintains the temperature desired.

It is necessary to provide cups or receptacles for the material delivered by the machine and for this purpose a separate cup dispensing outfit is provided. A preliminary operation of the mechanism, controlled by a coin slot mechanism, releases a single cup and also releases the delivery mechanism. The delivery mechanism may then be operated to deliver the material to the cup and to restore the mechanism for another operation.

The cup dispenser is operated by a handle having two positions moving through an arc on front of the machine. Each position of the handle releases a cup and operates a locking mechanism controlling the delivery mechanism.

The delivery mechanism is rotary in its action and comprises a pair of spaced discs which intercept a column of the material and by prearranged apertures cuts off and delivers a measured quantity of the material. One half turn of these discs represents one cycle of operation, thus, two measured quantities are delivered for each complete revolution of the discs. The material is released by expanding the walls of the delivery chamber and by an air blast acting on the top of the material at the proper time.

The discs of the delivery mechanism have a position synchronizing with the handle operating the cup dispensing outfit. Each half turn of the discs requires the position of the handle to be changed. The locking arrangement is such that when the handle is moved to release a cup, it releases the discs for one

half turn, but as soon as the discs have made an initial movement the handle is locked and cannot be moved to the opposite position until this movement is completed. When the handle is moved to the opposite position the discs are released for another half turn and thus each half turn of the discs require a movement of the handle to synchronize the position of the handle with the discs. The handle and the discs cannot be moved at the same time.

The cup is placed under the delivery orifice in a ring holder which, normally, projects only slightly above the base of the stand. As soon however as the handle operating the discs is turned a cam raises this holder to about the middle of the cup bringing the cup into alignment with the delivery orifice and preventing its removal until the discs have completed their operation, thereby forcing the operator to restore the machine to its normal condition after each operation.

Machines of the character described dispensing food stuffs must be easily cleaned and kept sanitary. With this end in view the operating mechanism is placed above the delivery mechanism and to one side thereof. The discs are provided with removable covers and by withdrawing the shaft vertically on which these discs are mounted they may be removed for cleaning purposes and the cup holder can be removed at the same time. The removable head of the cylinder is, of course, cleaned each time a cylinder is replaced.

In the drawings 11 is the base of one form of my invention, 12 is a cover provided with a heat insulating lining as indicated at 13 and 14 is a removable cover closing the orifice through which the cylinders are replaced. A refrigerating unit indicated by 15 is driven by the motor 17 and an air compressor driven by the same motor is indicated at 16. Details of this apparatus are not embodied in the present invention. One form of apparatus suitable for this purpose is shown in U. S. Patent 1,415,231, issued May 9, 1922. The cooling coil 20 is connected with the refrigerating unit by the pipes 18 and 19 so that the temperature of the cylinder 22 is automatically maintained by mechanical refrigeration.

The principal parts of the machine embody the cup container 23, the coin slot lock 24, the releasing handle 25, the operating handle of the delivery mechanism 26, and the cup 27.

The container 22 is an ordinary ice cream cylinder provided with a conical shaped piston 31 above which the air pipe 32 is connected by the coupling 33, thus securing a forced feed by the air pressure above the piston. On this container the conical head 34, Fig. 4, is screwed which tapers into the discharge orifice shown. This orifice is closed by the slide 38 in the slot 37 and which is removed after the cylinder is inverted in the machine and the slot 37 is closed by the ring 39 threaded on the stem with a coarse thread. The head terminates in a flange 35 which is faced to match a recess in the delivery mechanism at 36 and by the weight of the tank forms a seal therewith. The tanks or cylinders are thus removable by raising them vertically after the coupling 33 is uncoupled. The plunger 40 is provided in the head which is depressed against the action of spring 41 by the piston 31 when the cylinder is empty and thereby stops the action of the machine.

The delivery mechanism is operated by the shaft 42, best shown in Fig. 5, which is rotated in one direction by the operating handle 26 through the slot and pin at 43 which is normally engaged by the action of spring 44. The bevel gear 45 mounted on shaft 42 is driven through the friction clutch 46*a* held in engagement by the spring 46. This friction clutch on shaft 42 prevents undue strain being applied to the working parts and introduces a slippage when the discs are cutting through comparatively solid material.

The bevel gear 47 engages the gear 45 and through the shaft in frame 48 rotates the locking drum 49 and the spur gear 52 which meshes with spur gear 53 on shaft 55. This shaft, it will be noted is made in steps of reduced diameter and engages discs 56 and 57 with a nonturning engagement. The end terminates in the square section 60 which fits the socket 61 of shaft 62 carrying the cam 63 which engages the cup holder 64, this cup holder being arranged to slide vertically on pin 65.

It will be noted that rotating handle 26 turns the discs 56—57 and the shaft 62. The gear ratio between shafts 42 and 55 is such that handle 26 must be turned at least twice for one revolution of shaft 55. A comparatively slow turning movement of the discs is desired and the gear ratio can be adjusted to secure this result.

From Fig. 2 it will be observed that the discs intercept the delivery chamber 58 and cut off the quantity of material in this chamber between the discs. Disc 56, Fig. 3, is provided with a pair of diametrically opposed apertures 86 aligning with the delivery chamber 58 as the disc is rotated, and disc 57 is also provided with a similar pair of apertures at 87. The discs are so assembled that these apertures are in staggered relation to each other as in the diagram in Fig. 3. Each half turn of the discs brings an aperture in the upper and lower discs into register with the delivery chamber and while the aperture in the upper disc is in register the aperture in the lower disc is out of register. Thus the delivery chamber is closed on the lower disc while it is open to the tank in the upper disc. This is the normal position of the machine and enables the forced feed to fill the delivery

chamber. As the discs are rotated the aperture in the upper disc is moved out of register closing the connection from the tank while the aperture in the lower disc is moved into register opening the delivery chamber over the cup 27. Further movement of the discs closes the lower end of the delivery chamber and opens the upper end to the supply, thus restoring normal conditions for the next operation. In this way a measured quantity of material is delivered for each half revolution of the discs.

A plastic material like ice cream will not always discharge by gravity and a forced discharge, under certain conditions, may be necessary. For this purpose I provide an air blast which acts upon the top of the material in the delivery chamber at the time the lower end of this chamber is open. Air is taken from the compressor 16 through pipes 21 and 72 to the passage 67. This passage is intercepted by the shaft 55 but which has a pair of apertures 66 at right angles in register with the passage and through which the air passage is continued to the annular channel 70 below the top disc. Radial passages 71 connect this channel with the delivery chamber 58 as best shown in Fig. 6. The rotating shaft 55 thus acts as a valve to control a blast of air which is applied beneath the top disc when the lower disc is in register with the delivery chamber. It is apparent that water may be applied to the delivery chamber, if desired, by a similar construction.

A certain amount of suction may develop between a plastic material and the walls of the delivery chamber which would tend to retard the delivery. To overcome this condition I provide for expanding the walls of this chamber at the time of delivery. A cross-section of the delivery chamber below the channel 70 is shown in Fig. 7. The chamber is diametrically divided by the frame 59 and the movable side 73 which pivots on 74 and is held in position to seal the delivery chamber 58 by the spring 75. The shaft 55 has a reduced portion with opposed cams 76 which engage the projecting end 77 of the side 73. This causes a separation of the side 73 from 59 and destroys any suction that may develop. The cams 76 are so located as to expand the walls of the delivery chamber when it is open at the lower end.

The cup holder as shown in Fig. 8 provides an annular ledge as a guide for inserting the cup below the delivery orifice. As the operating handle is turned shaft 62 is rotated, raising this holder on cam 63 sliding vertically on pin 65 until it assumes the position shown dotted, where it remains until the cycle of operation of the mechanism is completed and shaft 62 has moved one half turn. This holds the cup in perfect alignment with the delivery orifice and prevents the removal of the cup during the operation of the machine. The operator is thus forced to complete the cycle of operation in order to remove the cup and this brings the machine to its normal posion for the next operation.

Attention is here directed to the fact that sanitation in a machine of this type is of the utmost importance and the parts associated with the delivery of food must be readily removable for cleaning and inspection. The removable heads on the cylinders enable these heads to be cleaned and inspected each time a cylinder is replaced. The discs are provided with removable covers 91—92 which expose one half of the discs. The shaft 55 is removable vertically with the gear 53 when the tank is removed, this releases the discs which can then be taken from the machine. Removing the shaft 55 enables the shaft 62 and the cup holder to be removed. In this condition the delivery chamber can be easily cleaned. The operating mechanism, it will be noted, is located to one side and above the delivery chamber so that in the cleaning operation this mechanism is not interfered with.

The operation of the mechanism is stopped when the supply is exhausted by the plunger 40 engaging the pin 54 on the spur gear 53 preventing shaft 55 from rotating.

The cup container 23 is provided with individual cups 90 which are delivered through the magazine 89 by a lever moved back and forth by the connection 88. Each position of this lever delivers one cup, the details of this mechanism, however, do not form part of the present invention.

The connection 88 is moved back and forth by the locking bar 83 which, by pin 25*a*, Fig. 2, connects with the releasing handle 25 and moves back and forth as this handle is moved in either direction. Thus, each movement of handle 25 in either direction, delivers one cup. This cup, when delivered is placed in the cup receptacle.

Machines of this kind which do not have an attendant are usually provided with a coin slot mechanism whereby the insertion of a coin releases the mechanism for one operation and a second coin is required before another operation can be performed. A coin controlled mechanism is provided in the present machine as indicated at 24 behind the plane of movement of the handle 25. This mechanism straddles the locking bar 83 and for each coin inserted permits one movement only of this bar in either direction. The details of this coin controlled mechanism are not shown as they do not form part of the present invention. Thus, for each coin inserted, the handle 25 is released to change its position and when so changed a cup is delivered from 89 and the locking mechanism now to be described is released.

Since payment is made through the coin slot mechanism 24, it is necessary that this

mechanism control the delivery of the material as well as the delivery of the cups, but the latter should precede and be completed before the former starts. The movement of the release handle therefore delivers a cup and unlocks the delivery mechanism for operation by the operating handle. The system of locking between the release handle and the delivery mechanism will be understood from the diagram in Fig. 3. The locking drum 49 is provided with a semi-circular ledge 50 moving in the plane of the tappet bar 81 and with a similar ledge 51 moving in the plane of tappet 82. The opposite ends of these tappets engage the ledge 84 of the locking bar 83 which is moved by the release handle 25. The locking drum 49 is moved in the direction indicated by the arrows only. In the position shown the movement of tappet 82 is restricted by 84 and the ledge 51 engaging this tappet prevents movement of the drum and the connected discs. Now if a coin is inserted in 24 and the release handle is moved to the opposite position, the tappet 82 will be released but the tappet 81 will be restricted. The drum 49 is now free to move until the ledge 50 engages tappet 81, that is, for one half revolution of the drum and the discs. If another coin is now inserted in 24 the release handle 25 may be moved back to the position shown which restricts tappet 82 but releases tappet 81. As the locking drum has moved through one half revolution the ledge 51 is on the opposite side of tappet 82 and is not engaged thereby and as tappet 81 is free, ledge 50 it not restricted thereby. Thus the delivery mechanism is released for another half revolution which is terminated when ledge 51 engages tappet 82.

From the operation of this locking mechanism it will be observed that a condition of synchronism obtains between the releasing lever and the delivery mechanism. Each position of the lever calls for a change in position of the locking drum to synchronize therewith and the initial movement of the locking drum locks the lever against further movement until the locking drum has completed its operation.

In practice the locking mechanism is constructed as shown in Fig. 5 with the tappet bars 81 and 82 placed over each other in a groove in the frame where they are free to slide and engage the locking bar 83.

The invention as described and illustrated relates to a single unit but it should be understood that multiples of this unit are contemplated connected with the same refrigerating outfit.

The operation of this machine has been described in connection with the operation of its various elements. It is designed to be fool proof, sanitary and adaptable for dispensing various materials including plastic substances.

Having thus described my invention, I claim:

1. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, a pair of spaced discs intersecting said chamber, a mechanism for locking said discs and capable of being released, an operating handle for rotating said discs and a friction clutch connecting said handle with said discs.

2. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, a pair of spaced discs intersecting said chamber and apertured to register with said chamber, a shaft upon which said discs are mounted for rotation, means on said shaft for rotating said discs and means associated with said container for preventing rotation of said discs.

3. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, means intercepting said connection and means expanding the width of said chamber.

4. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, means intercepting said connection and opening one end of said chamber and means simultaneously expanding the width of said chamber.

5. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, a plurality of spaced discs intercepting said chamber and apertured to register with said chamber and means expanding the width of said chamber corresponding with predetermined positions of said discs.

6. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, a shaft carrying rotating elements controlling the entrance and exit of said chamber and means carried by said shaft for increasing the size of said chamber.

7. In a vending machine as described, the combination, a container, a delivery chamber vertically divided into sections connected with said container, means for controlling the entrance and exit of said chamber and means co-ordinated with said controlling means for moving one of said sections and for applying an air blast to the material in said chamber.

8. In a vending machine as described, the combination, a container, a delivery chamber comprising a spring controlled section connected with said container, means controlling the exit of said chamber and means moving said spring controlled section and applying an air blast at the top of said chamber when the exit is opened.

9. In a vending machine as described, the combination, a container, a delivery cham-

ber connected with said container, a shaft carrying a pair of disc members controlling the exit of said chamber and an air supply forcing the material from said chamber, said air supply controlled by said shaft.

10. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, a shaft carrying a member controlling the exit of said chamber and an air supply for forcing material from said chamber, said shaft controlling said air supply and expanding said chamber.

11. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, means controlling the exit of said chamber and means co-acting therewith for expanding said chamber and for forcing the material therefrom.

12. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, said container comprising a cylinder with a detachable conical head and having means for closing said head projecting through a slot in the side, means for covering the slot and manually operated means for obtaining a measured quantity of material from said delivery chamber.

13. In a vending machine as described, the combination, a container, a delivery chamber connected with said container, means controlling the connection to said container, means for forcing material from said container into said delivery chamber and means for expanding said delivery chamber to facilitate the discharge of the material therefrom.

14. In a vending machine as described, the combination, a container, a piston in said container, a delivery chamber connected with said container, a mechanism for effecting delivery from said chamber, means for stopping the action of said mechanism when said piston is in a predetermined position and means for obtaining a measured quantity of material from said delivery chamber.

15. In a vending machine, the combination, a pair of independent containers each having a delivery mechanism, one containing material and one containing cups, means for operating the cup mechanism to deliver cups and independent means for operating the material mechanism to deliver material, means operatively connecting said delivery mechanisms, a locking device for locking said delivery mechanisms through said connecting means, a coin controlled device controlling said connecting means and means for locking a cup in position to receive material from said mechanism by the operation of said material mechanism.

In testimony whereof I affix my signature.

MATTHEW H. LOUGHRIDGE.