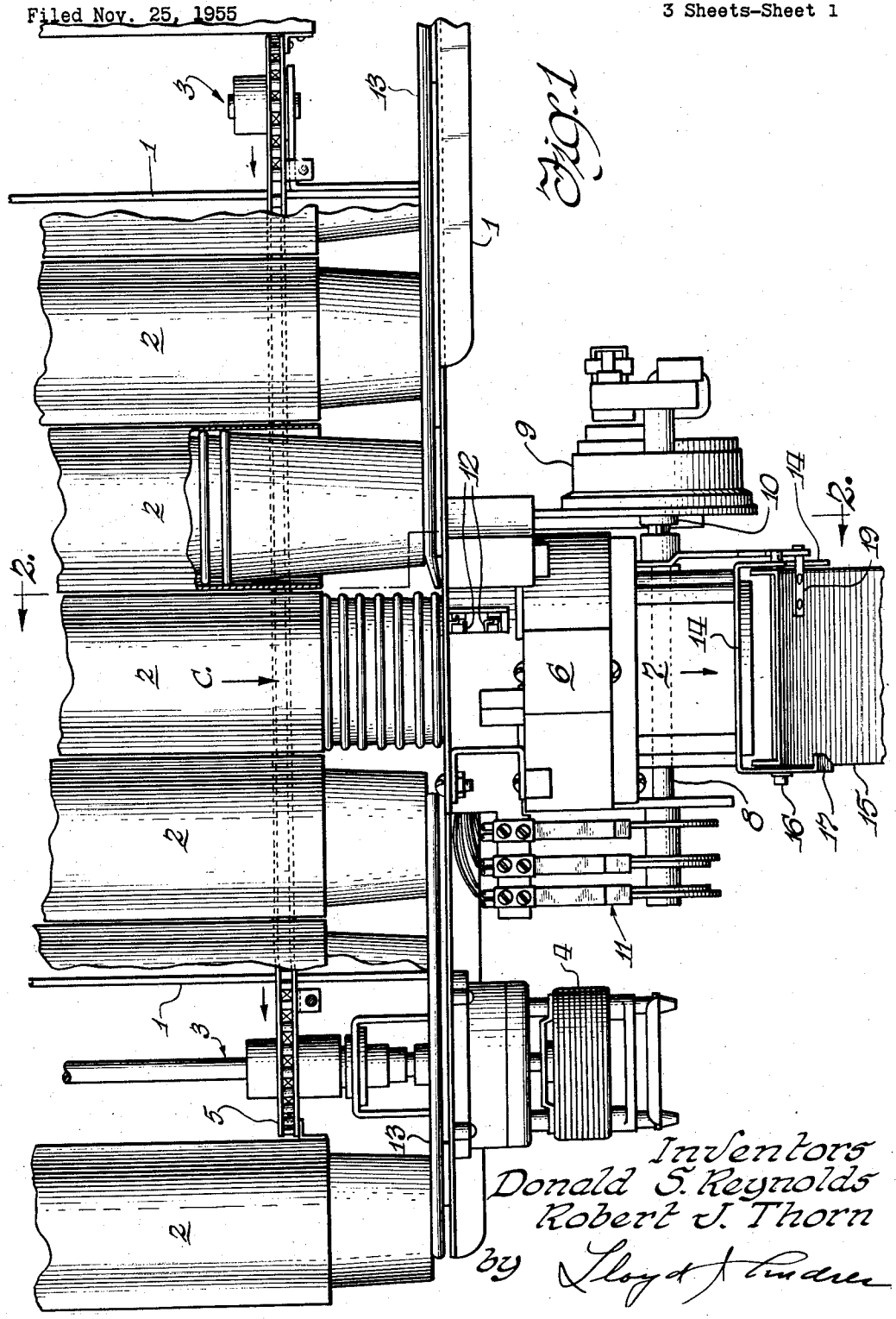
July 7, 1959 D. S. REYNOLDS ET AL 2,893,598

AUTOMATIC ARTICLE DISPENSER

Filed Nov. 25, 1955 3 Sheets-Sheet 1

Fig. 1



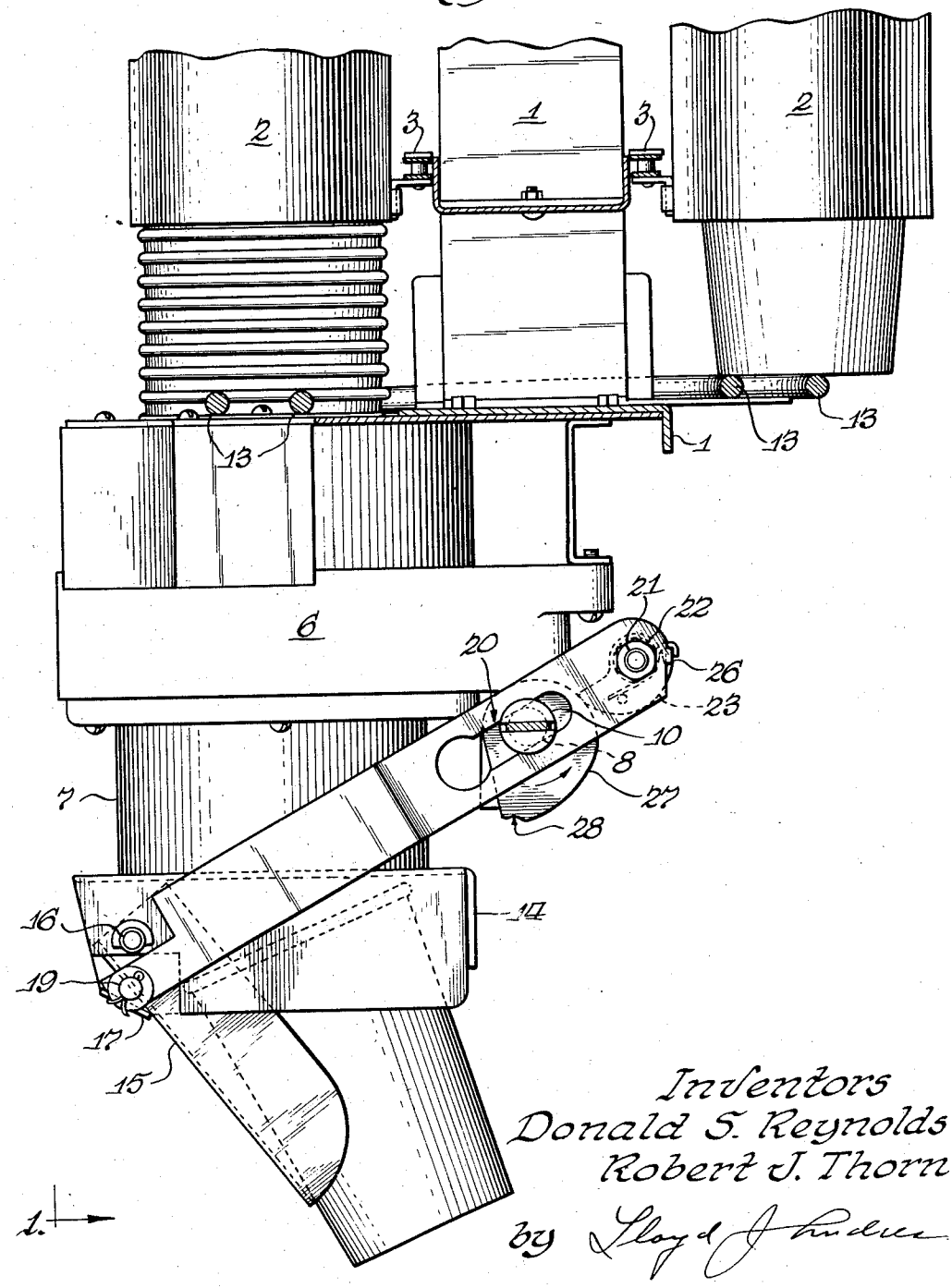
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July 7, 1959 D. S. REYNOLDS ET AL 2,893,598

AUTOMATIC ARTICLE DISPENSER

Filed Nov. 25, 1955 3 Sheets-Sheet 2

Fig. 2



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AUTOMATIC ARTICLE DISPENSER

Filed Nov. 25, 1955 3 Sheets-Sheet 3

Fig. 3

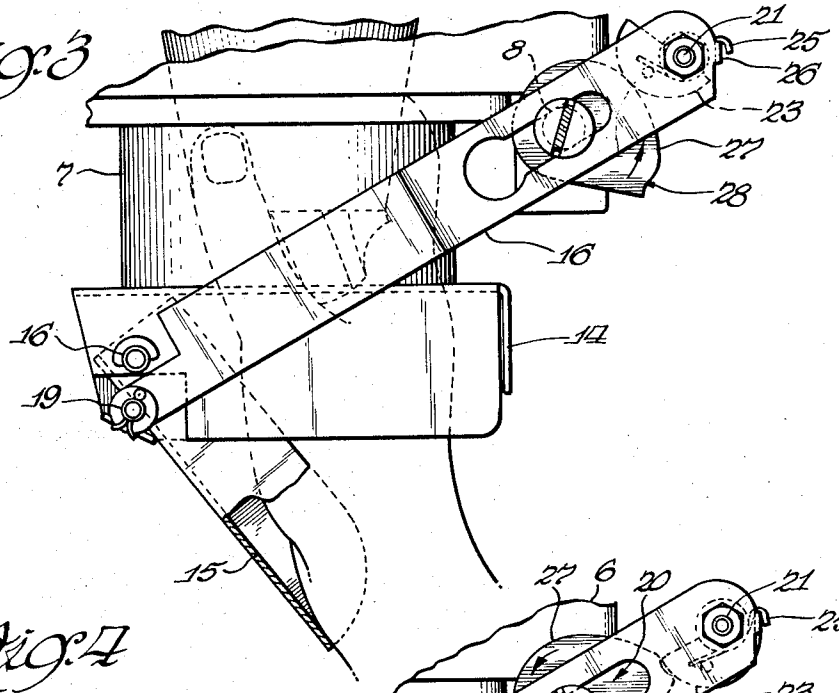
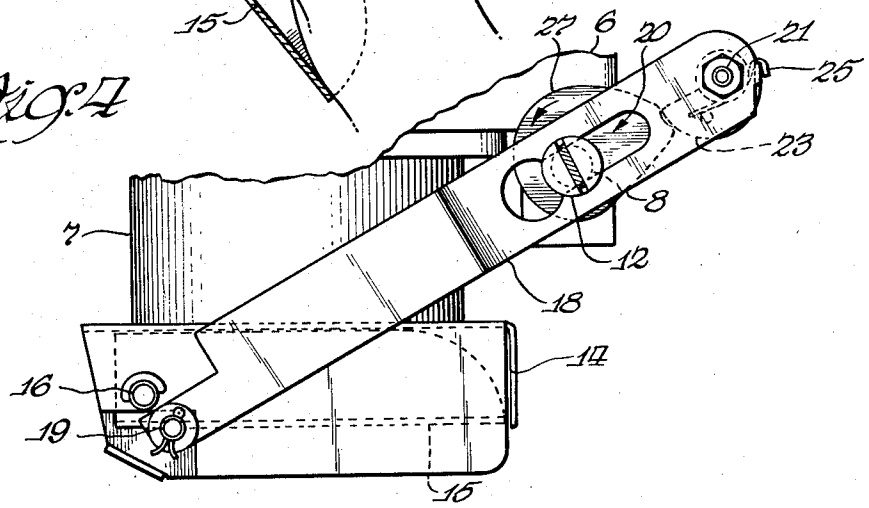


Fig. 4



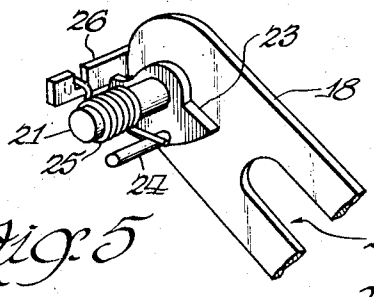


Fig. 5

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AUTOMATIC ARTICLE DISPENSER

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Application November 25, 1955, Serial No. 549,099

8 Claims. (Cl. 221—248)

This invention in general relates to coin actuated vending machines and more particularly to improvements in a closure mechanism for automatically and sequentially opening and closing the discharge passageway for the articles dispensed.

Dispensing mechanisms prior to this invention discharge each article through an exit passageway or orifice which remains open when not in use, thus permitting the stored articles to be subject to contamination by dust, debris and insects etc. Furthermore, a member of the public may insert a wire or his hand through the exit orifice in an attempt to retrieve articles without charge, and in so doing, the lowermost articles are sometimes damaged and deformed to the extent where the machine is made inoperative.

The above faults and related problems are completely overcome by the present invention which provides a complete closure for the article exit orifice when the machine is not in use and includes additional means for momentarily opening said closure to discharge and guide said article to a predetermined position.

The invention provides a safety device to prevent injury to a person tampering with the dispenser as well as the prevention of damage to the mechanism itself, which feature is on of the important objects of the invention.

A further object of the invention is the provision of an automatic closure for a dispenser which will operate simultaneously with the operation of the dispenser from a common source of power.

Another object of the invention is the provision of a closure for the exit passageway of a dispenser which is yieldably driven from open to closed position and vice versa.

Another object of the invention is the provision of a cam and yieldable follower for reciprocating a member wherein the operative association between the rotating cam and the follower may be interrupted by yieldable movement of the follower when the reciprocating member is restrained against movement.

These and other objects in one embodiment of the invention are shown and described in detail in the appended drawings and specification applied to a dispenser for drinking cups in which

Fig. 1 is a fragmentary front elevation of a cup dispensing mechanism showing the automatic closure;

Fig. 2 is a fragmentary side elevation of the machine shown in Fig. 1 showing the closure in open position;

Fig. 3 is a fragmentary view of the closure shown Fig. 2 in changed position;

Fig. 4 is a fragmentary cross section view of the closure in closed position taken through section line 2—2 Fig. 1;

Fig. 5 is a fragmentary perspective view of the safety components of the closure shown in Figs. 1, 2, 3 and 4.

The closure hereinafter described is applied to a cup dispensing machine and it will be apparent that the same general organization of elements may be applied to a

wide variety of machines for dispensing different articles of merchandise.

Referring to Fig. 1, a frame assembly **1** is adapted to support the entire cup dispensing mechanism. A plurality of cylindrical tubular containers **2** are arranged adjacent to each other in vertical position on a conveyor means **3** which conveyor is driven by a gear-motor **4**. A pair of endless chains **5**, one of which is shown, provides the transport means for sequentially moving each container **2** laterally to a central position "C" by arrow in coaxial register with the cup dispensing mechanism **6**.

The cup dispenser **6**, well known in this art, is adapted to deliver through discharge tube **7** individual cups in the direction shown by arrows, when driven by one revolution of shaft **8** coupled to gear motor **9**, by coupling **10**. This discharge action is accomplished by a well known shuttle means, not shown, sequentially engaging the rim of each cup.

A source of electric power and a circuit not shown is connected to rotary switch means **11** and discharge switch means **12** responsive to initiating switches, not shown, provide a cyclic operation of gear motor **9** to sequentially discharge single cups from the dispenser through the orifice of discharge tube **7**.

When a supply of cups in a given container **2** is exhausted, and by the same switch and circuit means described, the conveyor **3** will sequentially move a fully loaded container **2** in proper registration with the dispenser **6** for continued operation. The lowermost cup in each tube will ride on rails **13**. When a given container **2** is in proper registration with the dispenser the cups stacked therein will descend into the dispenser for sequential discharge thereby.

Referring to Figs. 1 and 2, the shaft **8** and coupling **10** are adapted to operate dispenser **6** through mechanism, not shown, to discharge one cup, by gravity, for each revolution thereof through tube **7**. A housing member **14** is secured to the lowermost end of tube **7** and is provided with a coaxial hole therein to permit the passage of the cups. A combination door-chute **15** is pivotally secured to the housing member by a shaft **16** as shown in Figs. 1 and 2.

A stop **17** integral with housing member **14** is positioned in the path of movement of chute **15** to limit its downward gravitational movement to the position shown Fig. 2, thus providing a predetermined path for the descent of each cup. An arm **18** is pivotally secured at one end to a crank pin **19** which in turn is secured by rivets to chute **15** as shown and positioned to provide a crank relation with respect to shaft **16**.

The arm **18** is also retained to the frame of the dispenser by means of the engagement of shaft **8** in slot **20** which provides the bearings for the combined reciprocating and oscillatory movement of the arm. It is apparent that the arm **18** could likewise be supported on a fixed pivot in the frame.

Referring to Figs. 2 and 5, the outer end of arm **18** is provided with a shoulder stud **21** secured therein by nut **22**. A follower lever cam **23** having a stop pin **24** secured therein is normally urged into position shown in Fig. 5 by a spring **25** having one end thereof resting on pin **24** and its opposite end engaging lug **26** integral with arm **18**. The follower **23** has a cam-engaging surface comprising a curved portion—the curve being defined by points, beginning at the normal operative position of the follower, of gradually diminishing distance from the pivot axis comprising the shoulder stud **21**. Lug **26** also serves as a stop for arresting the cam in its normal position as shown Fig. 5. An actuating cam **27** is secured to shaft **8** and is adapted for rotation adjacent arm **18**, as shown, in the same plane as cam **22**. A locking de-

pression or small recess 28 is provided at the extreme high lift portion of the cam, for engaging the outer end of cam 23. As will be noted in Figs. 2–4, the follower 23 is pivotally mounted on the arm 18 on the side of the cam 27 remote from the door 15.

In operation and referring to Fig. 4, the closure is shown in its normal closed rest position in which the chute 15 is in its extreme upward position in housing 14 completely closing the orifice in tube 7. The arm 18 and the chute 15 are locked in this position by virtue of the engagement of the outer extremity of follower cam 23 with the outer extremity of cam 27. The depression 28 in cam 27 is provided to lock the arm 18 without requiring extreme precision in the rest position of shaft 8 and to resist movement of arm 18 when forces are applied thereto. When the cams 27 and 23 are in the position shown Fig. 4, with the follower 23 in the recess 28, the arm 18 will resist any longitudinal motion to open the chute 15 since the resisting forces set up by the cams 23 and 27 are linear with the arm and the axes of rotation of the cams. Further protection against physical entry or entry of debris is afforded by the side walls of the housing 14 which encloses the chute 15 when it is in its closed position.

When the cup dispenser 6 is initiated by means previously described, the shaft 8 will be rotated one revolution by motor 9 and indexed to stop at home position (Fig. 4) by switch means 11, during the first part of this one revolution, the chute 15 under the influence of gravity will lower to its open position under the restraining crank motion of the arm 18 controlled by the counterclockwise movement of cam 27 acting against follower cam 23 which is normally stationary with respect to the arm 18. The chute 15 will descend to its extreme open position in contact with stop 17 shown in Fig. 2 and in this position the follower cam 23 will encounter the dwell portion of cam 27 for a sufficient period of time to permit the discharge of one cup by gravity from the dispenser.

Following the discharge of a cup in a predetermined path, the slow rise portion of cam 27 in contact with follower cam 23 will return the arm 18 and the chute 15 to their normal closed positions as shown in Fig. 4.

During the short time the door 15 is moving or in its open position for the discharge of a cup, it is apparent that free access through the discharge tube 7 is possible either with the human hand as shown in Fig. 3 or by the use of a wire or the like. In the case of the human hand, no violence will be done to the hand when the door 15 begins to automatically close since any restraining force against the door will overcome the force exerted by the spring 25 as the cam 27 continues to rotate and will result in the temporary interruption of the operative association between the door-chute 15 and the door operating means, whereby the drive cam 27 continues its cyclic rotation and rotates the follower cam 23 about stud 21 against the restraining action of spring 25, the spring 25 pivotally urging the follower 23 to an operative position in a pivotal direction the same as the direction of rotation of the cam 27. However, as soon as the obstruction in the doorway is removed, the cam 23 under the influence of spring 25 automatically will rotate against the cam 27 to complete the oscillation of arm 21 to close the door with all parts in the normal door-operating position as shown in Fig. 4, and no damage is done to the obstruction or the cup dispenser itself. Thus the three important objects of the invention are accomplished, namely to provide a locking closure for an article dispenser during its idle period and to protect both the closure mechanism and any object in the path of travel of the vended article when subject to improper operation.

Having thus described our invention, we claim:

1. A closure mechanism for an article dispenser comprising a means forming a frame including a housing forming a passageway through which said articles are dispensed in sequence, a combination door-chute pivotally secured to said housing for closing said passageway when in closed position and forming a chute for guiding said articles in a predetermined path when in open position, a control cam journalled for a predetermined cycle of rotation about an axis in said frame, an operating arm pivotally connected at one end to said door-chute and journalled for reciprocating and oscillatory movement about a pivot in said frame, a lever follower pivotally secured to said arm and adapted to engage said cam, spring means biasing said follower in a predetermined normal position with respect to said arm, means on said cam cooperating through said follower to lock said door-chute in its said normal closed position by said cam and said follower and said arm when said cam is in its rest position and whereby the rotation of said cam will permit said door-chute to move to its open position to discharge one of said articles in a predetermined path, said spring means bias being of a force that external restraint of the movement of said door-chute during its movement will permit said cam to rotate said lever-follower against the restraining action of said spring means and permit said cam means to complete its said cycle of rotation.

2. A closure mechanism for an automatic article dispenser comprising means forming a frame, an article dispenser in said frame adapted to discharge by gravity a single article from a plurality of articles therein when actuated, said dispenser having a discharge housing on the lower end thereof forming an exit pathway, drive shaft means journalled in said frame articulated with said dispenser for actuating same to discharge one article for each revolution thereof, a combination door-chute pivotally secured to said discharge housing for closing said exit pathway when in its rest position and for forming a chute for said articles when in its open position, a crank arm supported for reciprocation and oscillatory movement by said shaft, said crank arm pivotally secured at one end for crank motion to said door, a cam follower journalled for rotation on the opposite end of said arm, spring means for normally biasing said follower in a normal position against a stop on said arm, cam means secured to said shaft means in the same plane of rotation as said cam follower for cyclic engagement therewith, said cam follower, when positioned against said stop, having its journal axis and point of contact with said cam means on a line parallel with the longitudinal axis of said crank arm, said cam means being thereby adapted to lock said cam follower, said arm and said door when said door is in closed position and to normally open and close said door for each cycle thereof to discharge said article whereby the rotation of said cam means will move said cam follower against the restraining action of said spring means when an obstruction prevents the normal movement of said door.

3. A closure mechanism for an article dispenser comprising a housing and frame means forming a discharge passageway for said articles, a door hinged to said housing for closing and opening said passageway when operated, an actuating cam journalled for cyclic rotation on said frame, an operated arm retained for reciprocating and oscillatory movement on said frame and having one end pivotally connected for crank movement to said door, a second cam secured for pivotal movement to said arm and positioned in the path of movement of said actuating cam on the side of the cam remote from said door, spring means for normally pivotally urging said second cam in a pivotal direction the same as the direction of rotation of said cam into fixed relation with said arm, whereby each cyclic movement of said actuating cam will permit said second cam to move said arm and door to sequentially open and close said passageway.

4. In an article dispensing mechanism, means forming a passageway through which articles are dispensed, a door pivotally mounted in a position for closing and opening said passageway, an operating arm pivotally con-

nected at one end to said door and journalled for reciprocating and oscillatory movement about a pivot, a control cam having a camming surface and journalled for a predetermined cycle of rotation about an axis, a follower pivotally mounted on said arm on the side of said cam remote from said door and engaging said camming surface, said follower having a curved portion for engaging said camming surface, and spring means pivotally urging said follower to a normal, operative position in a pivotal direction the same as the direction of rotation of said cam, said curved portion of said follower being defined by points, beginning at the normal operative position of said follower, of gradually diminishing distance from the pivot axis of said follower whereby said follower is pivotable out of its normally operative position to another position providing contact of said curved surface of said cam and another point along said curved portion of said follower when a force restraining closing of said door overcomes the force exerted by said spring means as said cam continues to rotate.

5. In an article dispensing mechanism, means forming a passageway through which articles are dispensed, a door pivotally mounted in a position for closing and opening said passageway, an operating arm pivotally connected at one end to said door and journalled for reciprocating and oscillatory movement about a pivot, a control cam having a camming surface with a small recess therein and journalled for a predetermined cycle of rotation about an axis, a follower having a curved cam-engaging surface and also having a relatively sharply pointed portion, said follower being pivotally mounted on said arm on the side of said cam remote from said door and engaging said camming surface, and spring means pivotally urging said follower in a pivotal direction the same as the direction of rotation of said cam, stop means for positioning said follower in a normal, operative position, and means for indexing said cam in a home position at the end of a predetermined rotation cycle with the relatively sharply pointed portion of said follower in seated said recess to prevent rotation of said follower when said cam is in the home position, thereby preventing opening of said door by the exertion of manual pressure on said door, whereby said follower is pivotable out of its normal, operative position when a force restraining closing of said door overcomes the force exerted by said spring means as said cam continues to rotate during the rotation cycle and the door is locked against opening when the cam is in home position.

6. In an article dispensing mechanism, means forming a passageway through which articles are dispensed, a door pivotally mounted in a position for closing and opening said passageway, an operating arm pivotally connected at one end to said door and journalled for reciprocating and oscillatory movement about a pivot, a control cam having a camming surface with a small recess therein and journalled for a predetermined cycle of rotation about an axis, a follower pivotally mounted on said arm on the side of said cam remote from said door and engaging said camming surface, said follower having a curved portion for engaging said camming surface, and spring means pivotally urging said follower to a normal, operative position in a pivotal direction the same as the direction of rotation of said cam, said curved portion of said follower being defined by points, beginning at the normal operative position of said follower, of gradually diminishing distance from the pivot axis of said follower, stop means for positioning said follower in said normal, operative position, and means for indexing said cam in a home position at the end of a predetermined rotation cycle with said follower in said recess, whereby said follower is pivotable out of its normally operative position to another position providing contact of said curved surface of said cam and another point along said curved portion of said follower when a force restraining closing of said door overcomes the force exerted by said spring means as said cam continues to rotate.

7. In a machine, a reciprocable member, a rotatable cam having a camming surface, means for rotating said cam in one direction, a follower pivotally mounted on said member and having a curved portion for engaging said camming surface, and spring means pivotally urging said follower to a normal, operative position in a pivotal direction the same as the direction of rotation of said cam, said curved portion of said follower being defined by points, beginning at the normal operative position of said follower, of gradually diminishing distance from the pivot axis of said follower, whereby said follower is pivotable out of its normally operative position to another position providing contact of said curved surface of said cam and another point along said curved portion of said follower when a force restraining reciprocating movement of said member overcomes the force exerted by said spring means as said cam continues to rotate.

8. In a machine, a reciprocable member, a rotatable cam having a camming surface with a small recess therein, means for rotating said cam in one direction, a follower pivotally mounted on said member and having a curved portion for engaging said camming surface, spring means pivotally urging said follower to a normal, operative position in a pivotal direction the same as the direction of rotation of said cam, said curved portion of said follower being defined by points, beginning at the normal operative position of said follower, of gradually diminishing distance from the pivot axis of said follower, and means for indexing said cam in a home position at the end of a predetermined rotation cycle with said follower in said recess, whereby said follower is pivotable out of its normally operative position to another position providing contact of said curved surface of said cam and another point along said curved portion of said follower when a force restraining reciprocating movement of said member overcomes the force exerted by said spring means as said cam continues to rotate.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent 2,893,598 July 7, 1959

Donald S. Reynolds et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 39, for "on of" read -- one of --; column 2, line 10, for "by arrow" read -- shown by arrow --.

Signed and sealed this 26th day of January 1960.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents