June 29, 1965 E. J. BUZICKY ETAL Re. 25,814

APPARATUS FOR DISPENSING PARTICULAR MATERIAL

Original Filed Nov. 16, 1959 3 Sheets-Sheet 1

FIG. 1

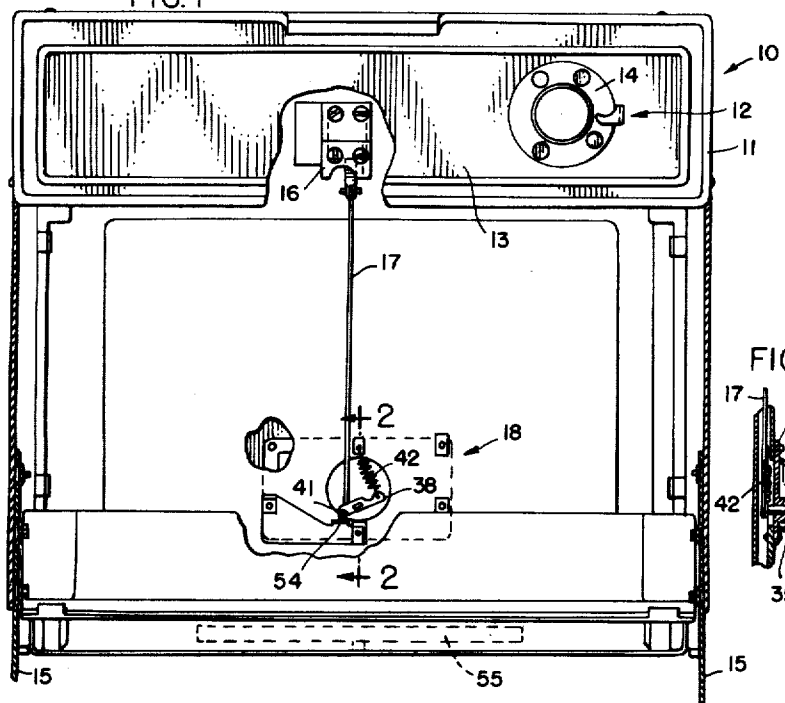


FIG. 2

FIG. 6

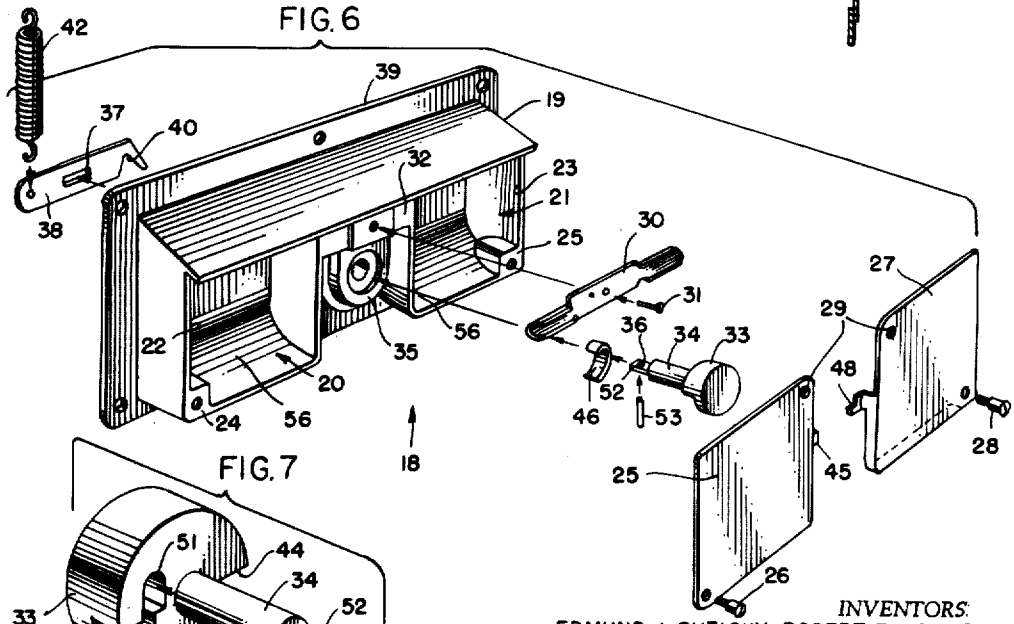


FIG. 7

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FIG. 3

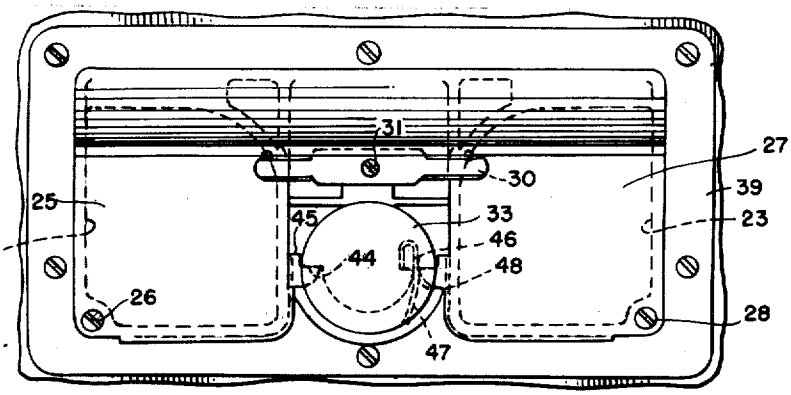


FIG. 4

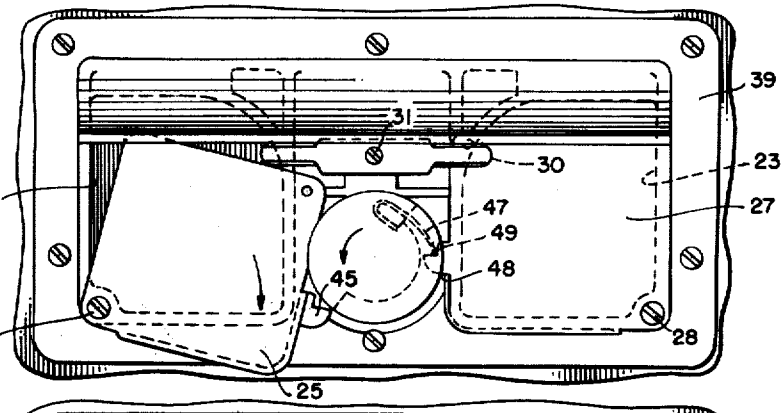
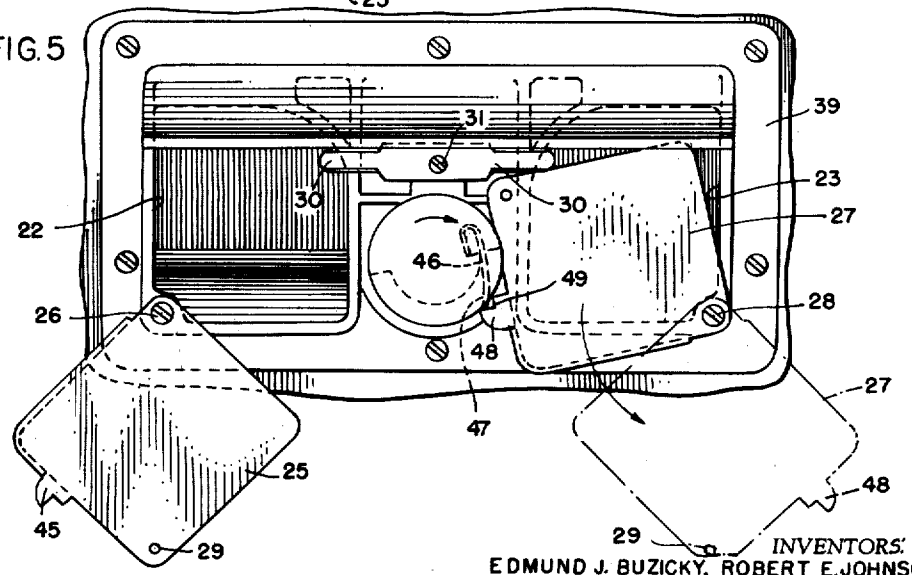


FIG. 5



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FIG. 8

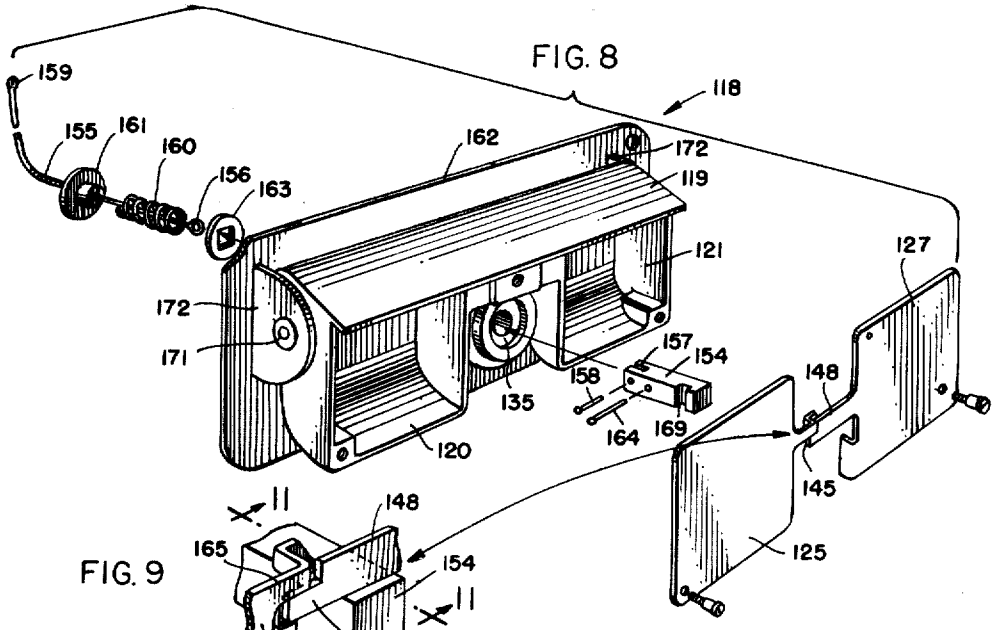


FIG. 9

FIG. 10

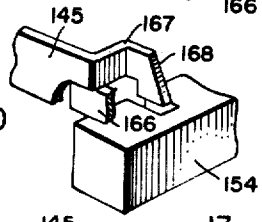


FIG. 11

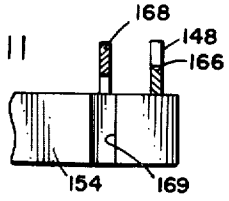


FIG. 12

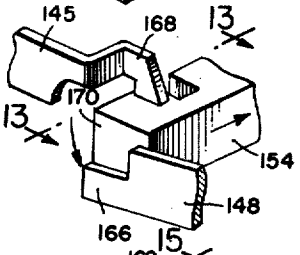


FIG. 13

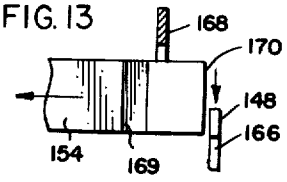


FIG. 14

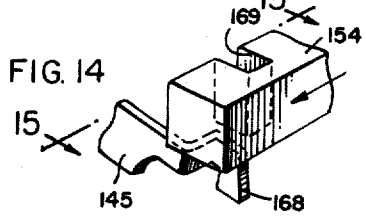
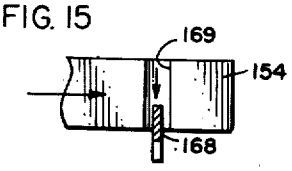


FIG. 15



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APPARATUS FOR DISPENSING PARTICULATE MATERIAL

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Original No. 3,038,641, dated June 12, 1962, Ser. No. 853,368, Nov. 16, 1959. Application for reissue June 3, 1964, Ser. No. 382,981

16 Claims. (Cl. 222—129)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to dispensing apparatus and in particular to apparatus for dispensing particulate material such as powdered detergent in appliances such as dishwashers.

In dishwashers it is desirable to provide a pre-rinse operation in which the dishes are rinsed with clear water prior to a first washing operation wherein detergent is added to the water. It is further desirable to provide a rinse operation subsequent to the washing operation, and then provide a second washing operation wherein detergent is provided in the washing water. The instant invention comprehends a dispenser for providing the detergent material in such a cycle of operation.

One feature of the invention is the provision of new and improved apparatus for dispensing particulate material, such as detergent, for use in a device such as a dishwasher appliance.

Another feature of the invention is the provision of such apparatus including a pair of receptacles each having an opening, a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing that opening, a second closure pivotally mounted to swing from a first position closing the other opening to a second position exposing that opening, and means releasably holding each of the closures in the first position including a member movable between a first and second disposition operable upon movement thereof from the first to the second disposition to release the first closure to swing to its second position and operable upon movement thereof from the second to the first disposition to release the second closure to swing to its second position.

A further feature is the provision of such apparatus including a cam movable between a first and second disposition having a first portion engaging the first closure during movement of the cam from the first to the second disposition to release the first closure from the holding means to swing to its second position, and having a second portion engaging the second closure during movement of the cam from the second to the first disposition to release the second closure from the holding means to swing to its second position.

Still another feature of the invention is the provision of such apparatus wherein the receptacles are laterally spaced and the openings therein face horizontally, the cam being positioned between the receptacles and being rotatable to effect the indicated functioning.

A yet further feature is the provision of such apparatus wherein the cam is provided with a spring yieldably engaging the second closure during movement of the cam from the first to the second disposition to permit continued holding by the holding means of the second closure in the first position, and positively engaging the second closure during movement of the cam from the second to the first disposition to release the second closure from the holding means.

A still further feature of the invention is the provision

of such apparatus including a support and means pivotally mounting the receptacles on the support for movement between a first arrangement wherein the opening faces upwardly to a second arrangement wherein the opening faces horizontally, and wherein the first position of the closures is obtained when the receptacles are in the second arrangement.

Still another feature is the provision of such apparatus wherein the holding means releasably holds one of the closures in the first position, the other closure having means thereon engaging the first closure when the first closure is held in the first position to hold the second closure in the first position, the holding means being operable upon movement thereof from a first disposition to a second disposition to release the first closure therefrom to swing to its second position but retain the second closure in the first position, and being operable upon subsequent movement thereof from the second to the first disposition to release the second closure therefrom to swing to its second position.

Still another feature of the invention is the provision of such apparatus wherein the holding means comprises a reciprocable member and the closures are provided with co-operating shoulders, the shoulder of the first closure resting on the reciprocable member and the shoulder of the second closure resting on the first closure when the reciprocable member is in the first disposition, the finger of the first closure being disengaged from the second member and the finger of the second closure resting on the reciprocable member when the reciprocable member is in the second disposition, and the finger of the second closure being disengaged from the reciprocable member when it is returned to its first disposition.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

FIGURE 1 is a front elevation, partially in section and with parts thereof broken away, of a dishwasher provided with a dispensing apparatus embodying the invention.

FIGURE 2 is a fragmentary vertical section taken substantially along the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged elevation of the dispensing means as taken in the direction of the arrows of FIGURE 2.

FIGURE 4 is an elevation generally similar to that of FIGURE 3, but with the cam means of the dispensing apparatus rotated from a first to a second disposition.

FIGURE 5 is an elevation generally similar to that of FIGURE 4, but with the cam means being rotated from the second to the first disposition subsequent to the rotation thereof to the second disposition.

FIGURE 6 is an exploded perspective view of the dispensing means.

FIGURE 7 is an exploded perspective view of the cam and spring members thereof.

FIGURE 8 is an exploded perspective view of another form of dispenser embodying the invention.

FIGURE 9 is a fragmentary enlarged perspective view of the closure plate fingers and block end in association for retaining the closure plates in a receptacle closing position.

FIGURE 10 is a perspective view thereof looking from the opposite side thereof.

FIGURE 11 is a vertical section taken substantially along the line 11—11 of FIGURE 9.

FIGURE 12 is a perspective view generally similar to that of FIGURE 10 but with the block repositioned to release one of the fingers.

FIGURE 13 is a vertical section taken substantially along the line 13—13 of FIGURE 12.

FIGURE 14 is a perspective view generally similar to

that of FIGURE 12 but with the block repositioned to release the other of the fingers.

FIGURE 15 is a vertical section taken substantially along the line 15—15 of FIGURE 14.

In the illustrative embodiment of the invention as shown in FIGURES 1 through 7 of the drawings a dishwasher generally designated **10** is provided with a door **11** having a sequential control mechanism **12** mounted in the upper portion **13** thereof and manually preset by a dial mechanism **14**. The door is provided at its lower end with pivot supports **15** to permit the door to be swung forwardly and downwardly from the vertical position of FIGURE 1. The control mechanism **12** includes a solenoid **16** which, by means of a connecting rod **17**, operates a detergent dispenser generally designated **18** carried in the door adjacent the lower end thereof.

The control mechanism **12**, which may be of suitable conventional construction, functions to provide seriatim in dishwasher **10** a first, pre-rinse operation, a first wash operation, a rinse operation, a main wash operation, a second rinse operation, and a final drying operation. Solenoid **16** is energized by control mechanism **12** to move rod **17** suitably for operating dispenser **18** to dispense detergent into the wash water during the first wash and main wash operations.

More specifically, a dispenser **18** comprises a body member **19** defining a pair of receptacles **20** and **21** having horizontally facing openings **22** and **23** respectively and arcuate bottom walls **56**. Receptacle **20** is provided with a lower left-hand corner boss **24**.

A first closure plate **25** is pivotally secured to boss **24** by suitable means such as screw **26** for movement in the plane of opening **22** from a first position, as seen in FIGURE 3, closing opening **22** to a second position, as seen in FIGURE 5, exposing the opening. Receptacle **21** is provided with a complementary lower right-hand corner boss **25** and a second closure plate **27** is pivotally secured thereto by suitable means such as screw **28** to swing in the plane of opening **23** from a first position, as seen in FIGURE 3, closing opening **23** to a second position, as seen in FIGURE 5, exposing opening **23**. Each of the closure plates is provided with a dimple **29** releasably engaging the opposite ends of a spring clip **30** secured by suitable means such as a screw **31** to a transverse portion **32** of body member **19** extending between receptacles **20** and **21**, for releasably holding the closure plate in the first position of FIGURE 3. Thus, when door **11** is swung to the horizontal position, detergent may be placed in each of receptacles **20** and **21** and the closure plates **25** and **27** swung to the position of FIGURE 3 closing the openings **22** and **23** respectively of the receptacles to retain the detergent therein when the door is returned to its upright position, as seen in FIGURE 1.

As indicated briefly above, it is desirable to provide a first, pre-rinse operation of the dishwater wherein no detergent is added to the water therein. Thus, during the initial cycle of operation, each of closure plates **25** and **27** is maintained in the position of FIGURE 3 Upon completion of the pre-rinse operation, closure plate **25** is swung downwardly on screw **26** to expose opening **22** and permit the detergent in receptacle **20** to be dispensed into the wash water. The swinging of closure plate **25** is effected by a cam **33** having a shank **34** rotatable in a bearing **35** provided in body member **19**. Shank **34** extends fully through bearing **35** and is provided at its outer end with a flattened portion **36** received in a complementary slot **37** of a lever **38** facially juxtaposed to the rear wall **39** of the body member **19**. At one end, the lever **38** is provided with a downwardly opening groove **40** in which is received a lower turned end **41** of rod **17**. The other end of the rod is connected to a coil spring **42** secured at its outer end to door **11**, which spring biases the lever **38** to urge the cam **33** in a clockwise direction as seen in FIGURES 3 through 5. Cam **33** is provided with

a peripheral arcuate recess **43** defined at one end by a radial shoulder **44** disposed to engage a finger **45** on closure plate **25** and swing the closure plate downwardly, in a clockwise direction as seen in FIGURES 3 through 5, upon counterclockwise rotation of cam **33**. A curved leaf spring **46** is secured to cam **33** to have its free end **47** biased radially outwardly into engagement with a finger **48** on closure plate **27**. In moving from the first position of FIGURE 3, to the second position of FIGURE 4, the spring merely acts radially against finger **48** and effects no movement of closure plate **27**. However, when the spring reaches the second position of FIGURE 4, the free end **47** thereof moves outwardly over a radially extending shoulder **49** of finger **48**. Thus, upon subsequent clockwise rotation of cam **33**, end **47** of the spring positively engages the finger shoulder **49** and effects a counterclockwise swinging of closure plate **27**, as seen in FIG. 5. As best seen in FIGURE 7, the spring **46** is provided with a turned end **50** which is received in a suitable recess **51** in cam **33** to secure the spring to the cam. As seen in FIGURE 6, flat end **36** of the cam shank is provided with a hole **52** through which a suitable pin **53** is passed to secure the cam **33** and lever **38** in operative association on body member **19**.

The operation of dispenser **18** is as follows. A suitable charge of detergent is placed in each of receptacles **20** and **21** by first pivoting door **11** to a horizontal position. The detergent is then placed in the receptacles and closure plates **25** and **27** are swung to the closed position wherein they extend across openings **22** and **23** respectively. The door **11** may now be swung to its vertical position. The closure plates are retained in this position by the spring clip **30**. Solenoid **16** is deenergized at this time and, thus spring **42** urges lever **38** to the arrangement shown in FIGURE 1 wherein its counterclockwise movement is limited by engagement with a stop **54** carried on door **11**. Thus, as seen in FIGURE 3, cam **33** is arranged to have radial shoulder **44** thereof disposed adjacent finger **45** of closure plate **25** and to have spring end **47** bear radially outwardly against finger **48** of closure plate **27**. Actuation of control mechanism **12** may now be effected by operation of dial mechanism **14** to initiate the dishwashing cycle. As the detergent in each of receptacles **20** and **21** is completely enclosed, the first step of operation of the dishwater **10** may be a pre-rinse operation wherein only clear water is circulated therein.

At the completion of such as pre-rinse operation, a first washing operation may be effected. Thus, control mechanism **12** acts to energize solenoid **16** and thereby move rod **17** longitudinally upwardly to pivot lever **38** against the action of spring **42** and rotate cam **33** from the position of FIGURE 3 to the position of FIGURE 4. During such rotation, shoulder **44** of cam **33** moves finger **45** of closure plate **25** downwardly to swing forcibly the closure plate **25** from engagement with spring clip **30** and permit the closure plate to fall by the action of gravity from its position across opening **22** to expose opening **22** and permit the detergent in receptacle **20** to be dispensed into the water in the dishwasher. As shown in FIGURE 1, dispenser **18** is carried on door **11** adjacent the lower end thereof whereby the water thrown by the spray arm **55** in the bottom of the dishwasher forcibly flushes the exposed receptacle, running freely outwardly therefrom over the curved bottom wall portion **56** thereof to assure a complete dispensing of the detergent. During this operation, closure plate **27** remains in its closed position across opening **23** as spring **46** merely acts radially against finger **48** of closure plate **27**.

Upon completion of the first washing operation, the wash water is drained and a subsequent rinse operation caused by control mechanism **12**. Upon completion of the rinse operation, and a subsequent refilling of the dishwater with fresh water, control mechanism **12** deenergizes solenoid **16** to dispense the detergent from

receptacle **21** to cause a second washing operation in the dishwasher **10**. More specifically, when solenoid **16** is de-energized, spring **42** pulls lever **38** to rotate cam **33** back to the position of FIGURE 3. Thus, as seen in FIGURE 5, free end **47** of spring **46** acts positively against shoulder **49** of finger **48** on closure plate **27** to swing that closure plate forcibly downwardly away from spring clip **30**, and cause the closure plate to swing away from its closed position across opening **23**, dispensing the detergent from receptacle **21** into the water in the dishwater. Thus, cam **33** is automatically returned to the first position of FIGURE 3, permitting the user to recharge the receptacles with detergent and close the receptacles by swinging the closure plates to the position of FIGURE 3, as discussed above.

Another form of detergent dispenser, generally designated **118**, is illustrated in FIGURES 8 through 15. Dispenser **118** is generally similar to dispenser **18** and corresponding elements thereof are identified by reference numerals 100 higher. Dispenser **118** functions generally similar to dispenser **18** in that controlled closure of receptacles **120** and **121** of dispenser **118** is effected by a pair of closure plates **125** and **127**, respectively. However, dispenser **118** is provided with another form of means for controlling the release of closure plates **125** and **127**.

More specifically, the closure plate control means of dispenser **118** comprises an elongated cam, or block, **154** having a square transverse cross section and longitudinally slidable through a corresponding squared bearing **135** in the body member **119** of the dispenser. Longitudinal reciprocation of the block **154** is effected by a cable **155** having a first looped end **156** received in a slot **157** in block **154** and secured to the block by suitable means such as pin **158**. The opposite looped end **159** of the cable is adapted to be secured to end **41** of the rod **17** connected to solenoid **16**. Block **154** is biased outwardly through bearing **135** by a coil spring **160** having one end seated on a retainer **161** secured to the mounting plate **162** of the dispenser and the other end seated on a retainer **163** bearing on a pin **164** extending through the block **154**.

The operation of dispenser **118** is generally similar to the operation of dispenser **18** in that successive releases of closure plates **125** and **127** provide pre-rinse, first wash, rinse, and main wash operations of the dishwasher. More specifically, in dispenser **118**, block **154** controls the swinging movement of the closure plates **125** and **127**. To retain the closure plates in the closed position across receptacles **120** and **121**, closure plate **127** is provided with a finger **148** which rests on the upper surface of block **154**. Closure plate **125** is provided with a finger **145** having an outer end **165** which is cut away to rest on a corresponding cut-away outer end **166** of finger **148**. Outer end **165** of finger **145** is provided with an L-shaped extension **167** having an end portion **168** extending transversely to the block **154** and movable through a vertical groove **169** in one side face of the block. When block **154** is urged to its outermost position by spring **160**, extension portion **168** overlies slot **169** but is prevented from downward movement therethrough by the engagement of end **166** of finger **148** with end **165** of finger **145**. Thus, the closure plates are retained in the closed position across the receptacles.

When end **159** of cable **155** is pulled upwardly, as by energization of solenoid **16**, block **154** is pulled inwardly through bearing **135** from the position of FIGURE 10 to the position of FIGURE 12. This permits finger **148** of closure plate **127** to fall past the outer end **170** of the block **154** thereby opening receptacle **121**. Finger **145** moves downwardly at the same time but transverse portion **168** thereof strikes the upper surface of block **154** and prevents swinging of the closure plate **125** away from the closed position across receptacle **120**.

When, at the initiation of a subsequent wash cycle, solenoid **16** is de-energized spring **160** restores block **154** to its outer position wherein slot **169** becomes disposed below transverse portion **168** of finger outer end extension **167**. As finger **148** is no longer disposed to prevent the falling of finger **145**, portion **168** falls through slot **169** and closure plate **125** swings away from receptacle **120** to dispense detergent therefrom.

To permit the mounting of the detergent dispenser on a fixed vertical wall of the dishwasher, such as a side wall or rear wall thereof (which is desirable where the dishwasher is of the top loading type) the body member defining the detergent holding receptacles may be pivotally mounted on the supporting plate of the dispenser. Thus, the dispensers may be pivoted to an upwardly opening disposition when being filled with detergent. The closure plates are then swung to the closed position permitting the receptacles to be re-pivoted to the position wherein they open horizontally, as the closure plates now serve to prevent dispensing of the detergent from the receptacles until they are swung to the open position by the above described control means. Such a pivotal mounting of the receptacles is illustrated in FIGURE 8 wherein the body member **119** is pivotally mounted by suitable means such as rivets **171** on a pair of supports **172** extending forwardly from the mounting plate **162** of the dispenser. As shown in FIGURE 8, the body member is mounted so that its center of gravity is below the rivets **171**, whereby the receptacles automatically pivot to the horizontally opening position when released by the operator.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the other opening to a second position exposing said other opening; means releasably holding each of said closures in said first position; and means including a member movable between a first and second disposition operable upon movement thereof from said first to said second disposition to release said first closure and cause it to swing to its second position, and operable upon subsequent movement thereof from said second to said first disposition to release said second closure and cause it to swing to its second position.

2. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the other opening to a second position exposing said other opening; means releasably holding each of said closures in said first position; and a cam movable between a first and second disposition having a first portion engaging said first closure during movement of said cam from said first to said second disposition to release said first closure from said holding means and cause it to swing to its second position, and having a second portion engaging said second closure during subsequent movement of said cam from said second to said first disposition to release said second closure from said holding means and cause it to swing to its second position.

3. Apparatus for dispensing particulate material, comprising: a pair of laterally spaced receptacles each having a horizontally facing opening; a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the other opening to a second position ex-

posing said other opening; means releasably holding each of said closures in said first position; and a cam between said receptacles rotatable between a first and second disposition, said cam having a first portion engaging said first closure during rotation of the cam from said first to said second disposition to release said first closure from said holding means and cause said first closure to swing to its second position, and having a second portion engaging said second closure during subsequent rotation of said cam from said second to said first disposition to release said second closure from said holding means and cause said second closure to swing to its second position.

4. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the other opening to a second position exposing said other opening; means releasably holding each of said closures in said first position; and a cam movable between a first and second disposition having a first portion engaging said first closure during movement of said cam from said first to said second disposition to release said first closure from said holding means and cause said first closure to swing to its second position, and having a spring yieldably engaging said second closure during movement of the cam from said first to said second disposition to permit continued holding by said holding means of said second closure in said first position, and positively engaging said second closure during subsequent movement of said cam from said second to said first disposition to release said second closure from said holding means and cause said second closure to swing to its second position.

5. Apparatus for dispensing particulate material, comprising: a support; a pair of receptacles each having an opening; means pivotally mounting the receptacles on the support for movement between a first arrangement wherein the opening faces upwardly to a second arrangement wherein the opening faces horizontally, a first closure pivotally mounted to swing from a first position closing the opening of one receptacle when the receptacle is in the second arrangement to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the opening of the other receptacle when said other receptacle is in the second arrangement to a second position exposing said other opening; means releasably holding each of said closures in said first position including a member movable between a first and second disposition operable upon movement thereof from said first to said second disposition to release said first closure and cause it to swing to its second position, and operable upon subsequent movement thereof from said second to said first disposition to release said second closure from said holding means and cause it to swing to its second position.

6. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure pivotally mounted to swing from a first position closing one opening to a second position exposing said one opening; a second closure pivotally mounted to swing from a first position closing the other opening to a second position exposing said other opening; and holding means releasably holding one of said closures in said first position, the other closure having means thereon engaging said first closure when said first closure is held in said first position to hold said second closure in said first position, said holding means being operable upon movement thereof from a first disposition to a second disposition to release said first closure therefrom and cause it to swing to its second position but retain said second closure in said first position, and being operable upon subsequent movement thereof from said second to said first disposition to release said second closure therefrom and cause it to swing to its second position.

7. The dispensing apparatus of claim 6 wherein said holding means comprises a reciprocable member and said closures are provided with co-operating shoulders, the shoulder of said first closure resting on said member and the shoulder of said second closure resting on said first closure when said member is in said first disposition, said shoulder of said first closure being disengaged from said member and said shoulder of said second closure resting on said member when said member is in said second disposition, and said shoulder of said second closure being disengaged from said member when said member is returned to said first disposition.

8. Apparatus for dispensing particulate material, comprising: a support; a cup having an open end; means mounting said cup on said support for movement between an upwardly opening, filling position and a horizontally opening, dispensing position; a closure; means for releasably holding said closure across said open end with the cup in the dispensing position to retain particulate material in said cup despite the cup being in said dispensing position; and means operable to overcome said holding means with said cup still in the dispensing position whereby said closure is removed from across said open end to dispense said particulate material.

9. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure plate pivotally mounted on one receptacle to swing from a first position closing the opening thereof to a second position exposing said opening thereof; a second closure plate pivotally mounted on the second receptacle to swing from a first position closing the opening thereof to a second position exposing said opening thereof; a yieldable clip holding each of said closure plates in said first position; and a disc cam rotatable selectively to first and second dispositions and having a spring arm engaging said second closure plate during rotation of said cam from said first to said second position to release said first closure plate from said clip and cause said first closure plate to swing to its second position, said spring arm yieldably engaging said second closure during rotation of said cam from said first to said second position permitting continued holding by said clip of said second closure plate in said first position and positively engaging said second closure plate during rotation of said cam from said second to said first position to release said second closure plate from said clip and cause said second closure plate to swing to its second position.

10. Apparatus for dispensing particulate material, comprising: a pair of receptacles each having an opening; a first closure plate pivotally mounted on one receptacle to swing from a first position closing the opening thereof to a second position exposing said opening thereof, and having a projecting finger; a second closure plate pivotally mounted on the second receptacle to swing from a first position closing the opening thereof to a second position exposing said opening thereof, and having a projecting finger engaging said first closure plate finger when said closure plates are in said first position, said second closure plate finger having an offset portion; and an elongated member reciprocable longitudinally to first and second dispositions and having an end portion engaging said first closure plate finger when said member is in its first disposition and thereby holding both closure plates in said first position thereof, said first closure plate finger being disengaged from said end portion of the elongated member and said offset portion of said second closure plate finger engaging said end portion of said elongated member upon movement of said elongated member to its second disposition whereby said first closure plate may move to its second position while said second closure plate is retained in its first position, said end portion of said elongated member having clearance with said offset portion of said second closure plate upon movement of said elongated member back to its first disposi-

tion whereby said second closure plate finger is disengaged from said end portion and said second closure plate may move to its second position.

11. Apparatus for dispensing particulate material, comprising: a support; a cup having an open end; means mounting said cup on said support for movement between an upwardly opening, filling position and a horizontally opening, dispensing position; a closure; means for releasably holding said closure across said open end with the cup in the dispensing position to retain particulate material in said cup despite the cup being in said dispensing position; and means for operation solely mechanically, independently of liquid presence conditions adjacent the cup, to overcome said holding means with said cup still in the dispensing position whereby said closure is removed from across said open end to dispense said particulate material.

12. Apparatus for dispensing particulate material, comprising: a support; a cup having an open end; means mounting said cup on said support for movement between an upwardly opening, filling position and a horizontally opening, dispensing position; a closure; means for releasably holding said closure across said open end with the cup in the dispensing position to retain particulate material in said cup despite the cup being in said dispensing position; a member engaging said closure; and means for operation solely mechanically, independently of liquid presence conditions adjacent the cup, to cause said member to overcome said holding means with said cup still in the dispensing position whereby said closure is removed from across said open end to dispense said particulate material.

13. Apparatus for dispensing particulate material, comprising: a support; a pair of cups each having an open end; means mounting said cups on said support for movement between an upwardly opening, filling position and a horizontally opening dispensing position; closure means for selectively closing said cups; means for releasably holding said closure means across said open end of each cup, with said cups in the dispensing position to retain particulate material in said cups despite the cups being in said dispensing position; and means selectively operable to overcome said holding means with said cups still in the dispensing position whereby firstly said closure means is removed from across said open end of said one cup to dispense said particulate material therefrom and

said closure means is subsequently removed from across said open end of said other cup to dispense said particulate material therefrom.

14. The apparatus of claim 13 wherein said last named means comprises a member.

15. Apparatus for dispensing particulate material, comprising: a support; a pair of cups each having an open end; means mounting said cups on said support for movement between an upwardly opening, filling position and a horizontally opening, dispensing position; a first closure; a second closure; means for releasably holding said first closure across said open end of one cup, and releasably holding said second closure across said open end of the other cup, said cups in the dispensing position to retain particulate material in said cups despite the cups being in said dispensing position; and means selectively operable to overcome said holding means with said cups still in the dispensing position whereby firstly said first closure is removed from across said open end of said one cup to dispense said particulate material therefrom and said second closure is subsequently removed from across said open end of said other cup to dispense said particulate material therefrom.

16. The apparatus of claim 15 wherein said last named means comprises a member.

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