Feb. 19, 1935. L. B. GREEN 1,991,742

AGITATOR FOR COMMINUTED MATERIAL DISPENSERS

Original Filed May 25, 1932 3 Sheets-Sheet 1

Fig. 4

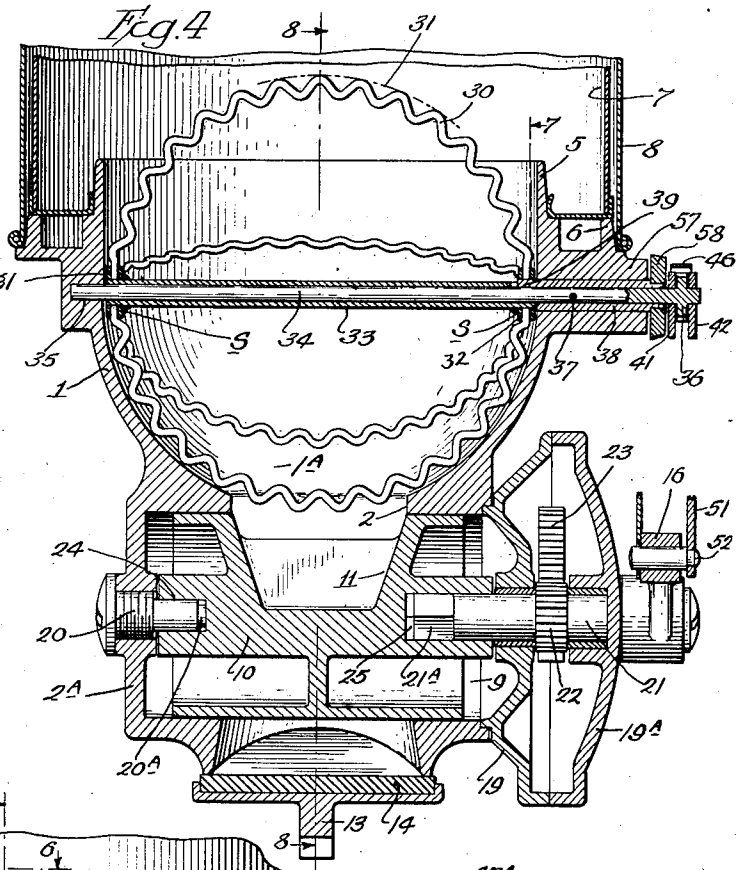


Fig. 3

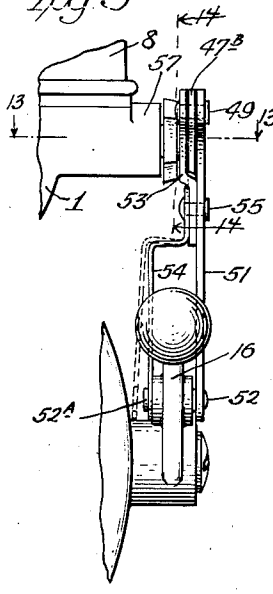


Fig. 1

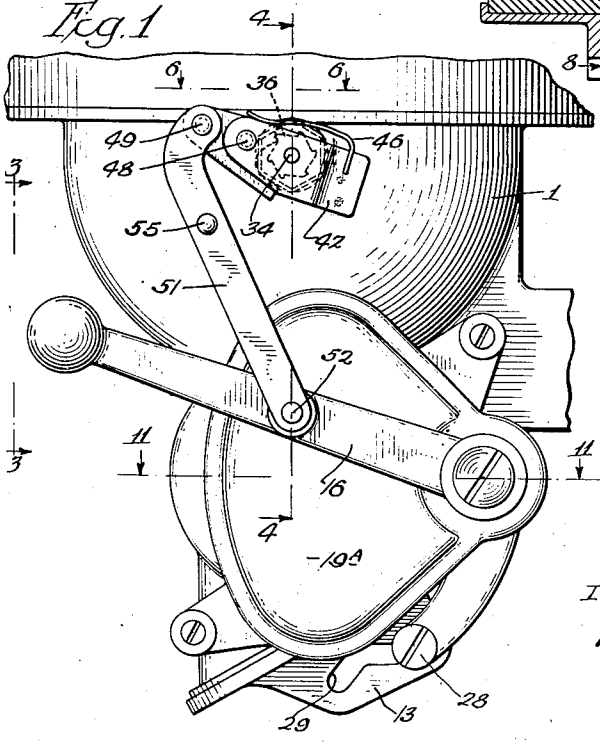


Fig. 5

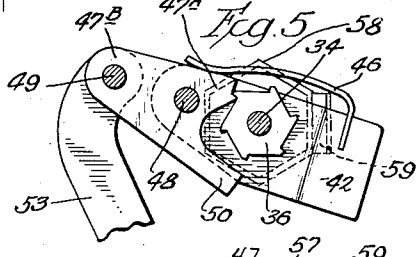


Fig. 6

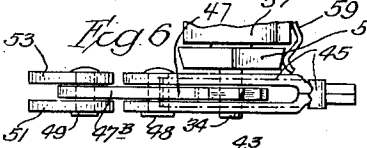
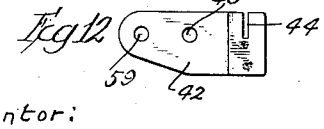


Fig. 12



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AGITATOR FOR COMMINUTED MATERIAL DISPENSERS

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Fig. 8

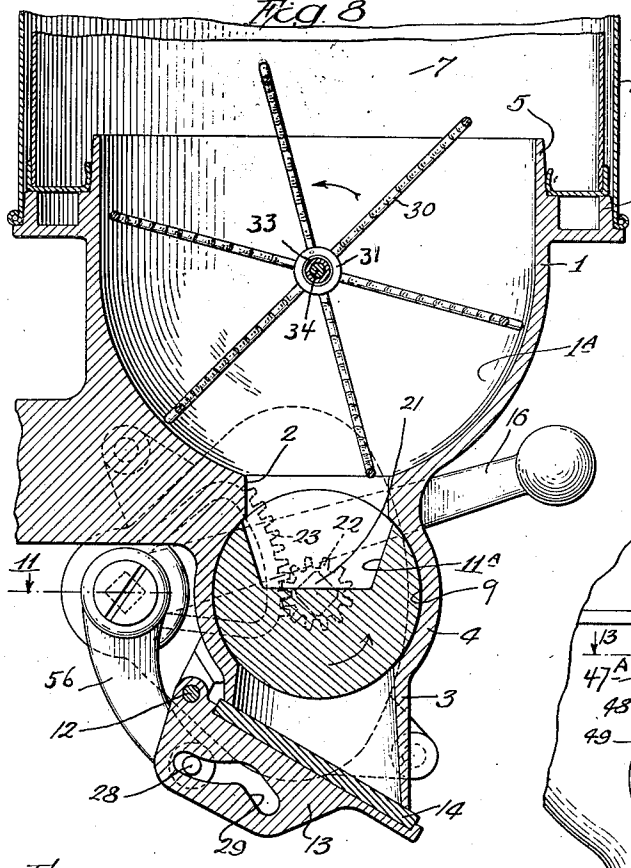


Fig. 10

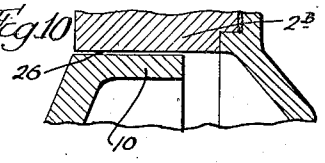


Fig. 7

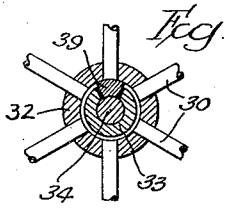


Fig. 2

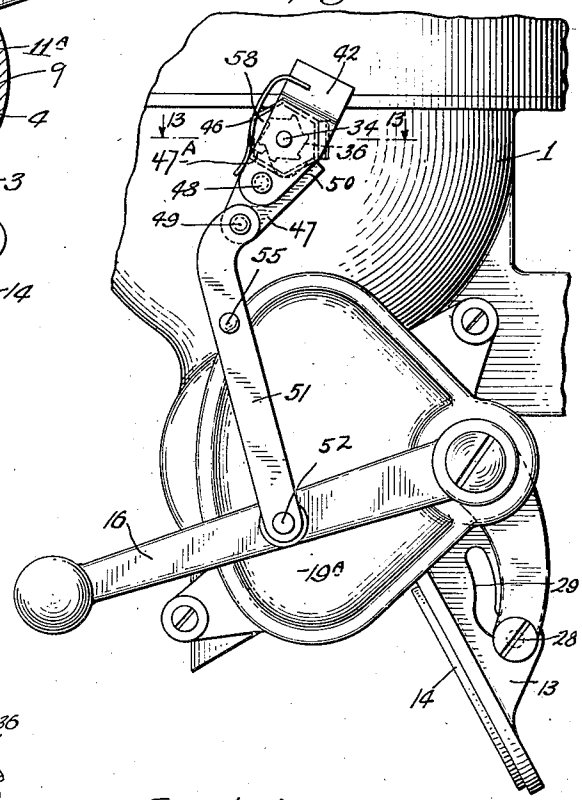


Fig. 11

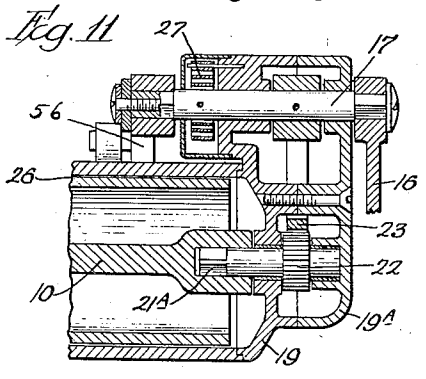
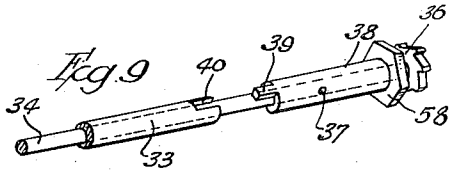


Fig. 9



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AGITATOR FOR COMMINUTED MATERIAL DISPENSERS

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Fig. 16

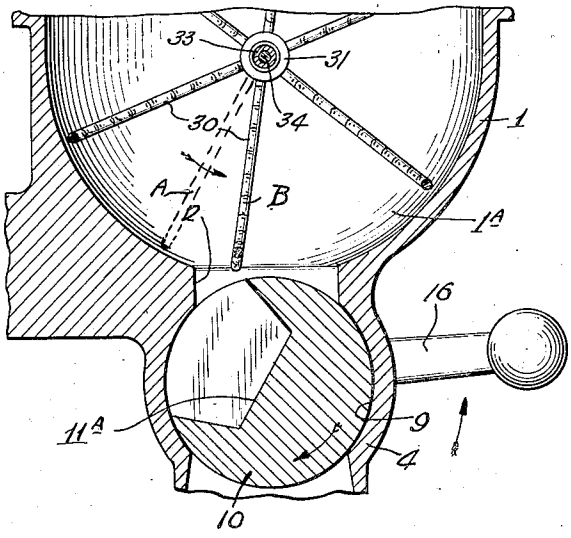


Fig. 14

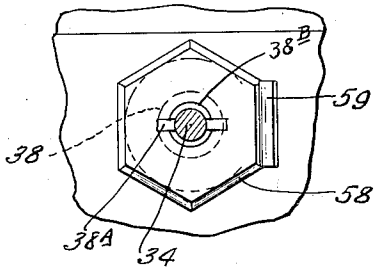


Fig. 15

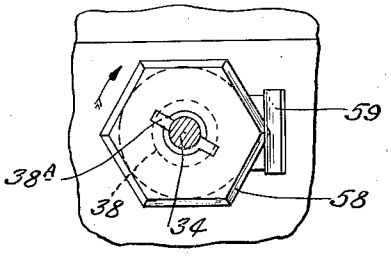


Fig. 17

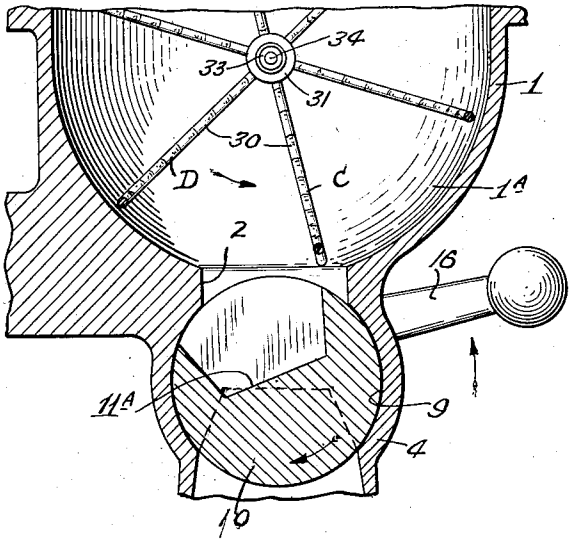
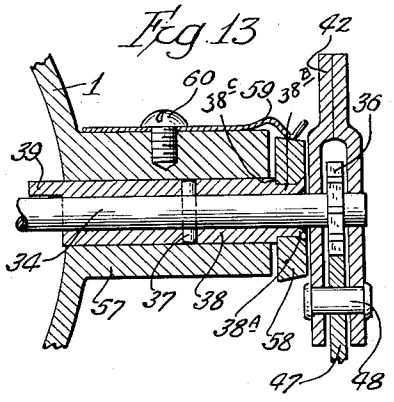


Fig. 13



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Patented Feb. 19, 1935 1,991,742

UNITED STATES PATENT OFFICE

1,991,742

AGITATOR FOR COMMINUTED-MATERIAL DISPENSERS

Lee B. Green, Lakewood, Ohio, assignor to The Globe Machine & Stamping Company, Cleveland, Ohio, a corporation of Ohio

Application May 25, 1932, Serial No. 613,496
Renewed January 11, 1935

9 Claims. (Cl. 259—46)

In one of its general objects, my invention relates to a rotatable agitator for use in connection with pulverized or otherwise finely divided material, and aims to provide an agitator which will be highly effective in stirring up the material and which can readily be detached from the material container in which it is used.

Moreover, my invention relates to an agitator particularly suited for use in a dispenser, and in this aspect aims to provide an agitator construction and mounting which will enable the agitator to insure an unusually high uniformity in the quantity of the material discharged by each actuation of the dispenser, which will effectively agitate the material fed to the measuring member of the dispenser without disturbing the said uniformity by a packing of the material, and which will avoid a jamming of the material between the said measuring member and the dispenser part within which that member moves.

Furthermore, my invention relates to means for intermittently rotating an agitator, and aims to provide a simple and effective agitator-actuating mechanism for this purpose, which mechanism can readily be connected to the oscillable operating member of a dispenser and disconnected from that member to permit a removal of the agitator.

In a further aspect, my invention relates to a construction of cooperating features of a rotatable agitator and of the material-storing chamber in which the agitator operates, and in this aspect aims to provide a novel shape and disposition of the material-stirring bars of the agitator with respect to the interior of the said chamber, together with an agitator construction and mounting which will insure a proper positioning of the agitator without requiring extensive machining, which will permit an easy removing and replacing of the agitator, and which will afford a readily releasable driving connection between the agitator and its shaft.

More particularly, my invention relates to an agitator for use in a dispenser in which the material is fed by gravity from a hopper into the measuring pocket of a rotatable dispensing member, which dispensing member is moved rotationally in one direction during the dispensing operation and thereafter returned to its normal position, a stand-supported dispenser of this general type being shown in my copending application #594,624, filed February 23, 1922.

With dispensers of this class, the following objections and difficulties have been encountered, particularly when the nature of the material is such that this may be rubbed into a film or may have adjacent particles packed by pressure to form larger particles:

(1) If the agitator has any part rubbing against the bore of the hopper, this may also cause a film of compressed or "packed" material to adhere to the said bore, and with a gradual increase in the thickness of this film, the agitator may jam in the hopper.

(2) If any part of the agitator slides upon a part of the dispensing member during the rotational movement of this member, that sliding is apt to rub a film of the material on the corresponding portion or portions of the dispensing member; and when this rubbing occurs within the measuring of pocket of that member, the measuring capacity of the pocket is correspondingly varied as the rubbed film increases in thickness, thereby also producing irregularities in the dispensed quantities of material.

(3) If the rotatable dispensing member has a generally cylindrical exterior fitting a corresponding bore in the body of the dispenser, the rubbing of material between this cylindrical exterior and the said bore may also cause the dispensing member to jam so that the customary retracting spring will no longer return the said member to its normal position after the actuating pressure is relaxed, thereby causing the measuring pocket to receive less than the intended quantity of the material. And when this jamming action increases, the dispenser may even become entirely inoperative.

(4) If the agitator is moved during the initial part of the actuation of the dispensing member, namely while the outlet of the hopper still opens into the measuring pocket, the agitator may move part of the material in this pocket—either by tending to lift material out of the pocket, or by more tightly packing material within the pocket—thereby varying the actually measured quantity of material. In practice, the extent of this variation may also depend on the speed with which the mechanism is actuated, thereby further disturbing the desired uniformity of the dispensing.

(5) During the return movement of the dispensing member, any stationary agitator bars disposed near the pocket in this member will interfere with the speedy and complete filling of this pocket, and an incomplete filling of that pocket will also occur if such agitator bars are not moved in the proper direction during the filling of the pocket.

(6) When agitator bars of the heretofore used

type extend upwardly beyond a horizontal bar-carrying shaft, the rotation of this shaft will cause such upwardly positioned bars to pack material above them in an arched formation in which it then will not continue to feed down properly..

(7) If tools are required for detaching the agitator to permit the needed occasional cleaning of the hopper, this requirement not only makes the cleaning more difficult, but also often causes the user to neglect such cleaning entirely.

My present invention aims to overcome all of these difficulties and objections, and also aims to provide an agitator-operating mechanism which will be highly effective and which will readily enable portions of this mechanism to be disconnected to permit the removing of the measuring member of the dispenser.

Illustrative of my invention and of further objects,

Fig. 1 is a side elevation of a portion of a stand-supported dispenser embodying my invention, with the spring-retracted actuating lever in its normal raised position.

Fig. 2 is an elevation of the same parts, taken at the end of the actuating movement of the said lever.

Fig. 3 is a fragmentary front elevation, taken from the line 3—3 of Fig. 1 and showing the connections between the actuating lever and the shaft of the agitator.

Fig. 4 is a vertical section taken along the line 4—4 of Fig. 1, including higher parts of both the inverted material container and the air-excluding cover which houses this container.

Fig. 5 is an enlargement of a part of Fig. 1, with the outer half of the forked pawl-supporting lever omitted.

Fig. 6 is a similarly enlarged fragmentary plan view, taken from the line 6—6 of Fig. 1.

Fig. 7 is an enlarged and fragmentary vertical section taken along the line 7—7 of Fig. 4, showing the mounting of the agitator bars at one end of these bars, and also showing the splined connection between the two parts of the tube which houses the major portion of the agitator shaft.

Fig. 8 is a vertical section taken along the line 8—8 of Fig. 4.

Fig. 9 is a perspective view showing part of the agitator shaft, the ratchet wheel fast on this shaft, the tube pinned to this shaft, and a part of the tube which connects the two arm-supporting arms of the agitator.

Fig. 10 is an enlargement of a portion of Fig. 4, showing the clearance between the dispensing cylinder and the bore in which this cylinder is disposed.

Fig. 11 is a fragmentary horizontal section taken along the line 11—11 of Fig. 8, showing the connecting of the actuating arm to the retracting spring and to the gate-actuating arm.

Fig. 12 is an elevation of one of the two counterpart portions of the rocking member which supports a spring pressing against the pawl associated with the ratchet on the shaft of the agitator.

Fig. 13 is an enlarged and fragmentary horizontal section taken along the line 13—13 of Fig. 2 or Fig. 3.

Fig. 14 is a fragmentary and enlarged vertical section taken along the line 14—14 of Fig. 3, showing the latching spring as locking the agitator shaft against rotation.

Fig. 15 is a view similar to Fig. 14 but taken after the agitator shaft has rotated one-twelfth of a revolution.

Figs. 16 and 17 are views allied to a portion of Fig. 8, showing two consecutive positions of the dispensing member during the filling of its material-measuring pocket, and also showing the corresponding positions of the rotatable agitator.

In the illustrated embodiment, the body of my dispenser includes a hopper 1 having at its lower end a contracted outlet 2 which leads to the bore of a discharge chute. This chute comprises a downwardly open discharge spout 3 connected to the hopper by a body portion 4 which has a horizontal cylindrical bore 9 partly intercepting the alined bores of both the hopper outlet and the spout 3.

The upper end of the hopper is desirably formed (as described more in detail in my co-pending application) so as to present two concentric and upright tubular webs 5 and 6 of such exterior diameter that the inner web 5 will fit snugly into the usual top opening of a material container 7 (such as a commercial type of coffee can) when this container is inverted, while the outer web 6 fits snugly into a cover 8 which hoods over this container to enhance the exclusion of air from the latter.

Disposed within the horizontal bore 9 and desirably shorter than that bore is a dispensing member 10 having its generally cylindrical exterior surface interrupted by a recess which normally opens upwardly and which forms the measuring pocket of the dispensing member. The end walls 11 of this pocket desirably diverge upwardly so that the spread of their normally upper ends correspond to the length of the hopper outlet 2, as shown in Fig. 4. However, the side walls 11 A of the pocket preferably diverge so that the spread of their outer or normally upper ends is somewhat greater than the width of the hopper outlet, as shown in Fig. 8, thereby permitting the hopper outlet to open fully into the said pocket even when the return movement of the dispensing member is halted in a position differing somewhat in either direction (laterally of Fig. 8) from the medial position there shown.

Pivoted to the dispenser body, as on a horizontal pin 12 (Fig. 8), is a spout-closing gate 13 which has a compressible facing 14 normally sealing the lower end of the spout, and which gate is swung back and forth conjointly with the reciprocating rotational movements of the dispensing member.

As here shown, the connections for this purpose (similar to those disclosed in my said co-pending application) include a gate actuating arm 56 fast on one end of a rock-shaft 17, to the other end of which rock-shaft the actuating arm 18 is fastened. This rock-shaft is journaled in a hollow two-part side member detachably secured to the dispenser body 1, the inward part 19 forming a closure for one end of the horizontal bore 9, the other end of which bore is closed by a solid body side portion 2 A.

A screw 20 extending through this body side portion 2 A has its inner part cylindrical and rotatably socketed in an axial bore 24 in the adjacent end portion of the dispensing member 10; and this screw also has its tip 20 A engaging the inner end of the socketing bore so as to space the said end portion of the dispensing member slightly from the body side 2 A, to eliminate friction between these parts. Extending rotatably through the inward part 19 of the said side member and also journaled in the outer part 19 A of the same member is a pinion shaft 21 carrying

an integral pinion 22 which is freely spaced from both of the parts 19 and 19 A and which pinion intermeshes with a gear segment 23 fastened to the rock-shaft 16.

This pinion shaft has its inner end 21 A of a polygonal section fitting the section of the inward part of an axial bore 25 in the adjacent end of the dispensing member, so that the pinion shaft and the screw 20 conjointly form stub shafts on which the generally cylindrical dispensing member is journaled. By thus journaling that member independently of the wall of the bore 9 within which this member is disposed, I am able to provide a slight clearance 26 between the peripheral surface portion of the dispensing member and the body part, as shown on an enlarged scale in Fig. 10.

This clearance not only greatly reduces the friction in comparison with what it would be if the dispensing member were journaled in this bore in the heretofore customary manner, but also avoids the forcible rubbing of the dispensable material into a film upon the said bore 9. Consequently, by providing this clearance—desirably to an extent slightly larger than the maximum size of the particles of the finely divided material—I overcome the jamming heretofore encountered when dispensers of this class have been used with materials which can be rubbed into films.

The two parts of the hollow side member also house a coiled spring 27 which normally holds the rock-shaft 17 in the position in which the actuating arm 16 is raised and in which the gate arm 56 has its lower end relatively near the discharge end of the spout 3, this lower gate arm end having a pin 28 moving in a slot 29 in the gate so as to cause movements of the gate arm to open and close the gate as more fully described in my said copending application.

Supported within the hopper 1 and rotatable about a horizontal axis is an agitator which includes a plurality of generally arcuate agitator bars 30 disposed in planes radial of the axis of the said axis. The adjacent end portions of these agitator bars are socketed respectively in two hubs 31 and 32, both of which hubs are fastened (as by solder S) to a tube 33 through which the agitator shaft 34 extends. Each agitator bar preferably is crimped as shown in Figs. 4 and 8, with all crimped portions of each bar extending in a common plane radially of the axis of the agitator, and with the outer bends of the crimps disposed in a common spherical surface 31 (Fig. 4) of a slightly smaller radius than that of the hemispherical interior of the part of the hopper below the axis of the agitator.

Moreover, the agitator bars preferably have the crimps in the consecutive bars in relatively staggered relation, as shown in Fig. 4, so that they will cut along relatively different lines through the material in the hopper. By employing this staggered arrangement, I avoid having the agitator bars cooperate in packing the material along streak lines and hence am able to dispose the bars much closer to the said interior of the lower part of the hopper than would be possible with uncrimped arcuate bars. Moreover the crimping causes the consecutive agitator bars to pass through different portions of the material, so that these bars shift the material back and forth longitudinally of the axis of the agitator in addition to lifting and dropping portions of the material, thereby greatly increasing the effectiveness with which the material is agitated both within the hopper and in the upper portion of the hopper outlet 2. Indeed, I have found it feasible to space the outer bends of the crimped bars from the adjacent interior wall of the lower portion of the hopper by distances only slightly greater than the maximum size of the particles of the material which is to be dispensed, while retaining this high effectiveness of the agitator.

The agitator shaft 34 has its inner end extending beyond the hopper bore into a journaling bore 35 in the hopper, while the other end of this shaft has a ratchet wheel 36 fastened to it and spaced slightly inward from its extreme tip. Sleeved upon and fastened to the agitator shaft, as by a pin 37 (Fig. 9), is a second tube 38 which is journaled in the opposite side of the hopper from the said bore 35, which second tube has the major portion of its inner end disposed either flush with, or slightly outward of, the interior 1 A of the hopper. This second tube has a finger 39 extending slidably into an end notch 40 in the hub-connecting tube 33 of the agitator to afford a splined connection between the two tubes in the assembled dispenser, so that a rotation of this second tube will also rotate the agitator.

Interposed between the ratchet wheel and the outer end of a hub 57 (which is cast on the dispenser body and in which the said second tube 38 is journaled) is a latching member 58 of polygonal contour, which member is fastened to the said tube and hence also fast with respect to the shaft 34. As here shown, this latching member has its peripheral surface formed as a portion of a hexagonal pyramid tapering away from the dispenser body, and is initially punched with an axial bore slidably fitting the diametrically contracted outer end portion 38 B of the said second tube, as also with two diametrically opposite recesses into which portions 38 A of the extreme outer end of this tube are pressed after the latching member 58 has been slid against the shoulder 38 C at juncture of the smaller and larger diametered portions of the said tube.

Continually pressing against the frusto-pyramidal periphery of this latching member 58 is a spring 59, which is fastened (as by a screw 60) to the hub 57 on the dispenser body. This spring continually tends to hold the latching member, and hence also the agitator shaft 34, against rotation, and snaps over the corners of this member at each one-sixth rotation of the agitator shaft. Moreover, with the peripheral surface of the latching member thus tapered, the spring also continually presses that member (together with the shaft and the said second tube 38) inwardly of the dispenser so as to hold that tube in splined connection of the bar-carrying tube 33 of the agitator, and likewise holds the inner end of the agitator shaft in its journal 35.

Straddling the ratchet wheel 36 is a spring-supporting fork composed of two interwelded parts 41 and 42, one of which is shown separately in Fig. 12 and each of which has a bore 43 through which a part of the agitator shaft extends, each of these fork parts also having a slot 44. Tightly socketed in the alined slots in these two fork parts is one end of a spring 46 which has its other end portion continually bearing against a pawl 47, the pawl being pivoted on a pin 48 extending through alined bores 49 in the said fork parts 41 and 42. This pawl has a toothed portion 47 A continually pressed by the spring 46 against the ratchet wheel 36 and also has a stop arm 50 disposed for engaging the

ratchet wheel to limit the movement of the pawl about the said pivoting pin 48.

The pawl 47 also has an arm 47 B extending in the opposite direction (with respect to the pivoting pin) from both the toothed pawl portion 47 A and the stop arm 56, and the arm 47 B is connected by a link pin 52 (which extends parallel to the axes of the pawl-pivoting pin and of the shaft 17 of the actuating arm 16) through the actuating arm. This link preferably consists of two generally parallel parts, one of which is resilient to permit a manual disconnection of the link from one of the elements between which it is interposed.

As here shown, the outward part 51 is a single-piece rigid bar pivoted at its ends respectively to the outward ends of the pin 49 associated with the pawl and of the pin 52 which extends through the actuating arm of the dispenser. The inward link part (as shown in Figs. 3 and 6) comprises a rigid upper portion 53 pivoted to the pawl pin 49 and secured to the outer link part 51 by a rivet 55 conjointly with the upper end of a resilient link part portion 54 which has the inner end 52 A of the pin 52 on the actuating arm journaled in its lower end. When this portion 54 is flexed away from the corresponding portion of the outer link part 51 (as shown in dotted lines in Fig. 3) the two-part link can be snapped off the pin on the actuating arm; thereby permitting the actuator shaft, ratchet wheel, pawl, and the said link (together with the said second tube 38 on the actuator shaft) to be detached as a unit from the dispenser without detaching any other parts.

Since the detaching of this unit slides the agitator shaft out of the agitator, the latter can then be lifted out for cleaning both the agitator and the hopper. However, when the said two-part link is in its normal position, it prevents the agitator shaft from sliding toward the side at which the ratchet and pawl are disposed, thereby holding the tubes 33 and 38 interlocked without requiring any auxiliary means for that purpose.

The ratchet wheel 36 has its teeth directed so that the teeth ends will be engaged by the pawl when the pawl is rocked about the axis of that wheel in the direction which is clockwise in Figs. 1 and 5, namely the direction in which an upward movement of the said two-part link will rock the pawl. And, since the spring 46 continually resists relative rotation of the pawl and the forked pawl-carrier, this upward movement of the said link will cause the pawl to engage a ratchet tooth (as in Fig. 5) for rotating the latter.

When the actuating arm 16 is depressed so as to draw the link 51 downward, this link will rock the pawl in a direction which is counterclockwise in Fig. 5, and the friction of the pawl against the ratchet wheel 36 may tend to rotate that wheel in the same direction, but the engagement of the latching spring 59 with the polygonal latching member prevents such rotation of the agitator shaft and of the pawl fastened to the latter. Consequently, the agitator remains stationary during the dispensing movement of the actuating arm; and the spring 46 permits the pawl to rock about its pivot pin 48, so that the toothed pawl part 47 A can snap over consecutive teeth of the ratchet wheel.

However, during the upward or return movement of the actuating arm 16, this arm raises the link 51 so as to force the pawl into engagement with a tooth of the ratchet wheel 36 (as shown in Figs. 1 and 5), thereby positively rotating the ratchet wheel in a direction which is counterclockwise in Fig. 5 but clockwise in Figs. 8, 16 and 17. Consequently, the agitator arms stir up the material in the hopper during the initial portion of the return movement of the dispensing member 10.

Moreover, the dispensing member and the agitator rotate in relatively opposite directions, so as to cause the upward portion of the dispensing member to move in the same general direction as the lowermost agitator bars, which is highly important for this reason:

When the dispensing member rotates from its discharge position (in which the measuring pocket 11 faces downward as shown in dotted lines in Fig. 17), this member presents a cylindrical surface toward the hopper until the said pocket begins to open toward the hopper. But, as shown in Fig. 16, this opening is initially so small that the material would not readily fill the pocket snugly in the short time required for completing the return rotational movement of the measuring member.

However, with the lowermost agitator bar 30 moving from the position A in Fig. 16 to the position B during the early part of the opening of the measuring pocket toward the hopper, this bar pushes material ahead of it; and while the same bar is moving further to the position C in Fig. 17, the next bar D pushes more of the material in the lower portion of the hopper into the hopper outlet 2 and hence into the measuring pocket. As the result, my simple and automatic provisions enable me to obtain a complete and highly uniform filling of the measuring pocket of the dispenser with each actuation, even when the retracting spring 27 is so powerful as to effect the return movement of the dispensing member in a quite short time.

If the agitator bars were merely bent to a semicircular shape without being crimped, they would merely define a hemispherical bottom for material in the container 7 when this material tended to pack, thereby halting the feeding of the material to the hopper. And if the crimps in the bars were not staggered, the result would be a similar arched-bottom packing of the material in the container, but with grooves formed in this bottom. However, with the crimping staggered in each two consecutive bars, the grooves which one bar would thus tend to form will cut across ridges left by the preceding bars; so that any material which tends to pack in the container will be detached and shifted longitudinally of the agitator shaft during the rotation of the agitator. Consequently, my agitator effectively loosens as well as agitates the material, in addition to thereafter insuring a high uniformity in the quantity of material dispensed in successive actuations of the dispenser.

However, while I have heretofore described my invention in connection with a particular embodiment, I do not wish to be limited to the details of the construction and arrangement thus disclosed, since many changes might be made without departing either from the spirit of my invention or from the appended claims. Nor do I wish to be limited to the conjoint use of the various novel features here disclosed.

I claim as my invention:

1. Means for agitating material within a material container which has the lower portion of its interior formed as part of a surface of revolution about a horizontal axis, comprising: a rotatable shaft supported by the material container and extending along the said axis, two hubs

supported by and rotatable with the said shaft, and a plurality of generally arcuate actuator bars each spanning the said hubs and generally parallel to the said surface and each extending in a different plane diametric of the shaft, each of the said bars being crimped to present ridges, all portions of each bar lying substantially in such a plane and the crimps in the consecutive bars being in relatively staggered relation.

2. A rotatable agitator comprising two spaced hubs having a common axis, each hub having bores extending radially into it, and arcuate agitator bars spanning the two hubs, each bar having its end portions respectively socketed in a bore in one and the other of the hubs and having its intervening portion arched away from the spacer member; a tube coaxial with and fastened to both hubs, a shaft normally extending through the two hubs coaxially with the hubs, and means associated with the shaft for interlocking the shaft with the said tube and agitator bar assemblage, the said means being releasable by sliding the shaft in one direction with respect to the said hubs.

3. A rotatable agitator comprising a tube, a plurality of arcuate agitator bars of substantially uniform spread and general shape each secured at its ends to the said tube, the said bars being disposed in different planes radial of the tube; a shaft normally extending slidably through the said tube, and a member fast upon the shaft and normally abutting against one end of the tube; the tube and the said member having normally interlocked formations whereby rotation of the said member will also rotate the tube, the said formations being disengaged when the shaft is slid with respect to the tube in one direction.

4. Means for agitating material within a dispenser which includes a material-storing hopper having an outlet at its bottom and having an upwardly widening hopper bore above the said outlet, comprising a shaft extending across the said hopper bore transverse of the axis of the said outlet, an agitator bar assemblage disposed within the said bore and supported by the shaft coaxial with the shaft, and means normally latching the agitator against rotation upon the shaft, the said latching means being released by sliding the shaft with respect to the agitator in one direction.

5. Material agitating means as per claim 4, including mechanism disposed exteriorly of the dispenser for rotating the shaft, the said mechanism including a portion normally preventing a sliding of the shaft in the said latch-releasing direction.

6. An agitator for use in a dispenser body having an outlet at its bottom and an upwardly widening hopper bore above the said outlet, comprising a shaft rotatably journaled in the hopper and extending across the hopper at higher elevation than the hopper outlet; a tube rotatably sleeved on the shaft, two hubs fast upon the tube and spaced longitudinally of the tube, and a plurality of generally arcuate agitator arms each extending in a plane radial of the tube and each having its ends respectively fastened to the two hubs; the said tube, hubs and arms being disposed entirely within the said hopper bore; and a second tube fast upon the shaft and normally splined to the aforesaid tube, the second tube being journaled in the body of the hopper.

7. An agitator as per claim 3, including spring means normally pressing the said member against the tube to maintain the said interlocking, the said spring means being arranged to permit the disengaging of the said formations when the shaft is forcibly slid in the said one direction.

8. Means for agitating material within a dispenser, comprising an agitator disposed within the dispenser, an agitator-rotating shaft extending into the dispenser, an oscillable actuating member, connections between the said member and the shaft whereby a movement of the said member in one direction rotates the shaft, and means operatively interposed between the dispenser and the shaft for latching the shaft against rotation during the movement of the said member in the opposite direction; the said means comprising a member polygonally exterior in section and fast upon and coaxial with the shaft, and a spring fastened to the dispenser and bearing against the polygonal exterior flaring toward the dispenser so that the spring continually tends to slide the said shaft inwardly of the dispenser.

9. Means for agitating comminuted material within a container which has the lower portion of its interior formed as an upwardly open hemispherical surface, comprising a rigid rotatable tubular member supported by the container and extending across the interior of the container diametric of the said surface; and a plurality of generally arcuate actuator bars each spanning and respectively fastened to the two opposite end portions of the said member and respectively extending in diverging planes diametric of the shaft, each of the said bars being crimped to present outward ridges all tangential to a spherical surface of smaller radius than the said hemispherical surface, the difference in radii of the said surfaces being slightly greater than the diameter of the particles of the comminuted material.

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