

[54] **FLEXIBLE MIXER DISCHARGE**

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[52] U.S. Cl. **259/29, 51/163**

[51] Int. Cl. **B01f 7/14**

[58] Field of Search 259/29, 72, 54, 12; 51/163

[56] **References Cited**

UNITED STATES PATENTS

3,132,848	5/1964	Garlinghouse	259/72
3,376,905	4/1968	Lau	259/72

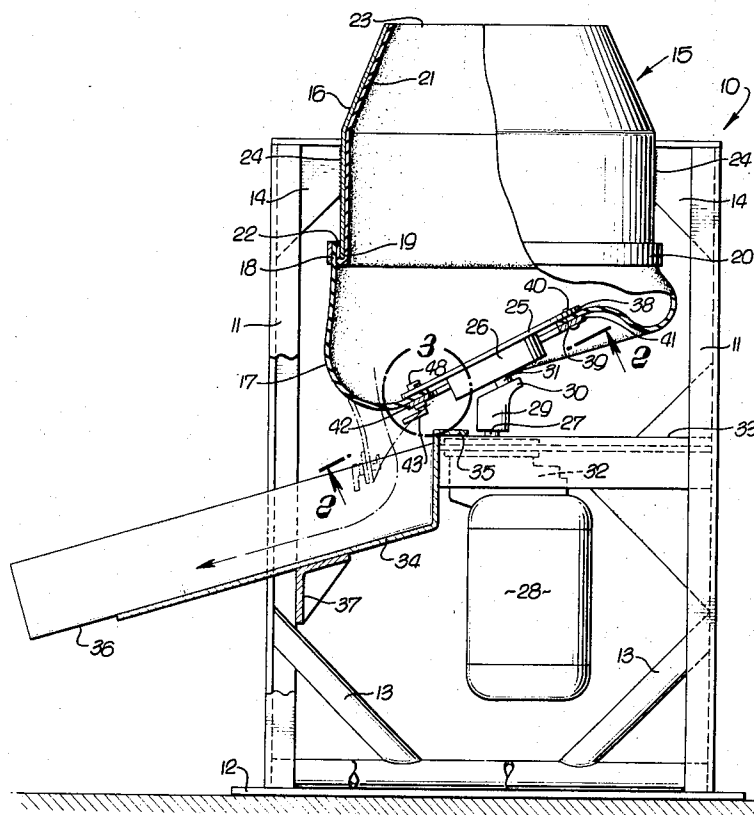
3,390,490 7/1968 Hesslenberg..... 51/163

Primary Examiner—Robert W. Jenkins

[57] **ABSTRACT**

A mixer type device has a container for materials built in two parts, the upper part being rigid and mounted on a frame and the lower part being flexible. A stiff disc at the center of the flexible part has a wobbler attached to it driven by a motor mounted on the frame below the container. For discharging material from the container a section of the flexible lower part is releasably connected to the disc so that when disconnected the material will be discharged downwardly into a delivery chute. After discharge the section can be reconnected to the disc and the container then made ready to receive a new load of material which is put in at the top.

11 Claims, 12 Drawing Figures



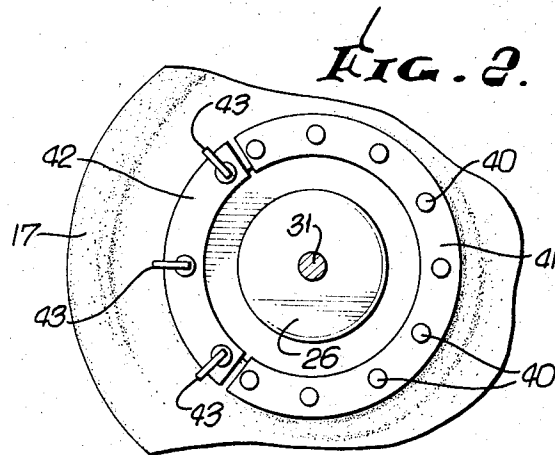
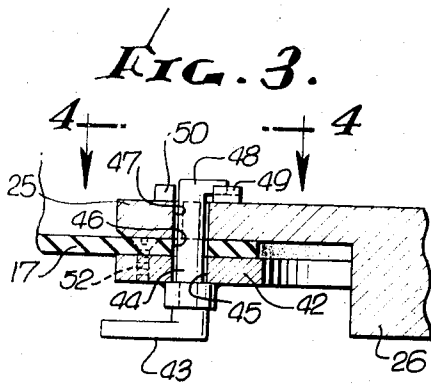
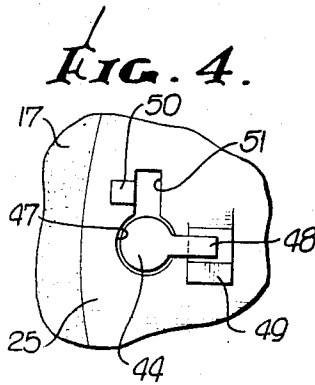
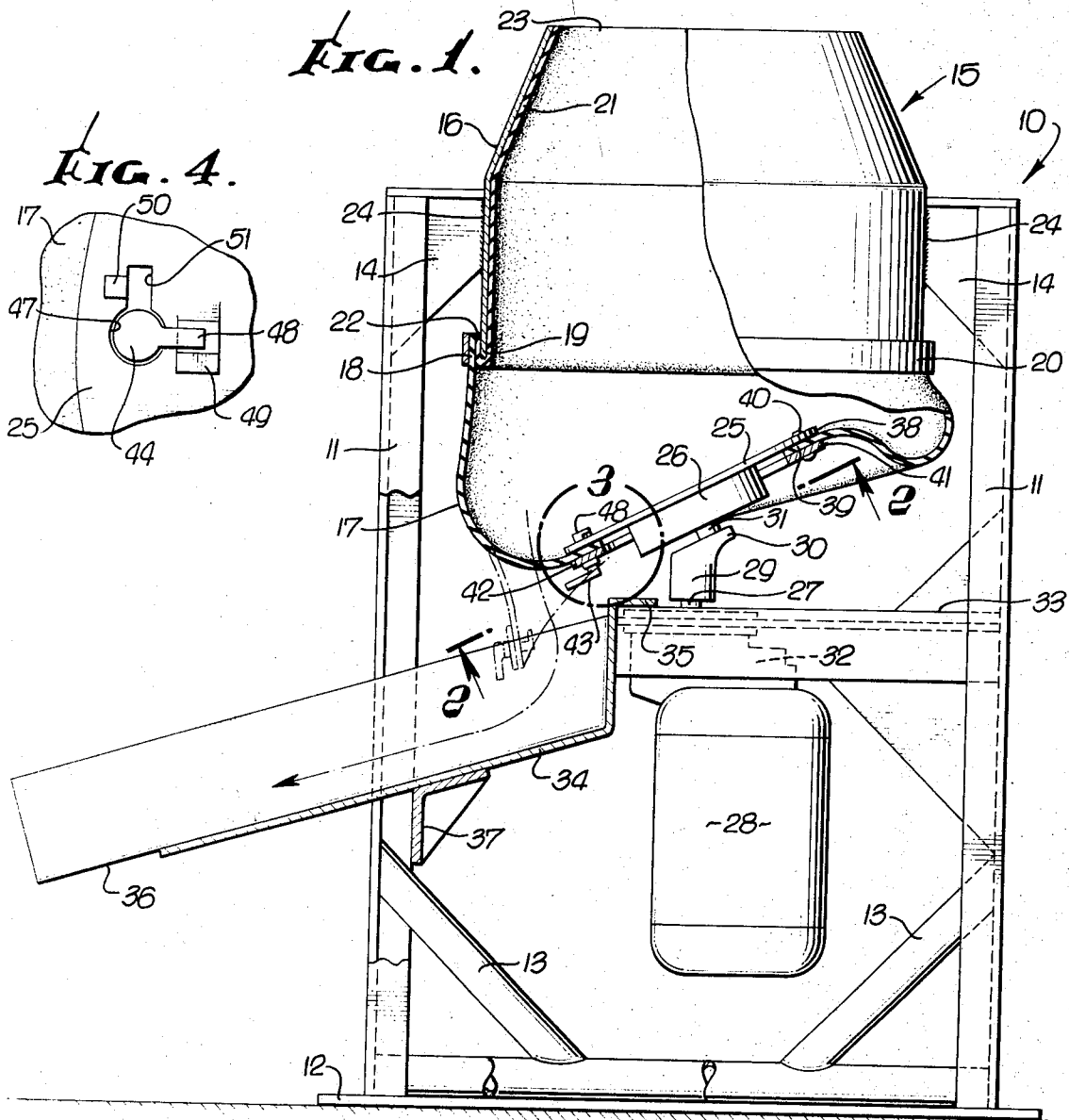


FIG. 5.

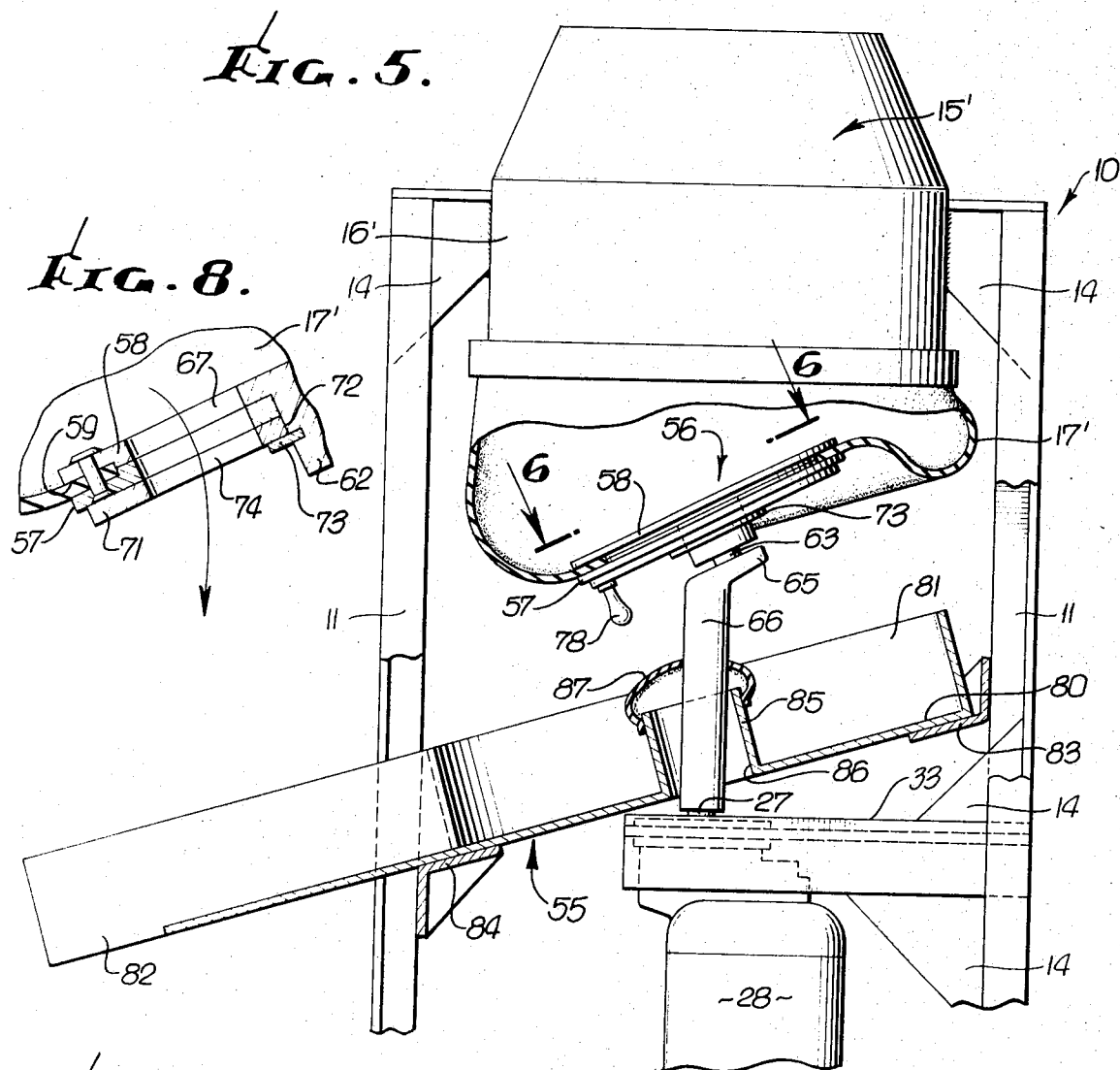


FIG. 7.

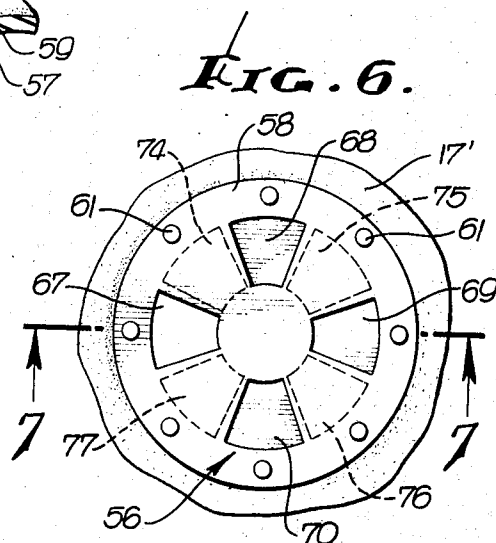
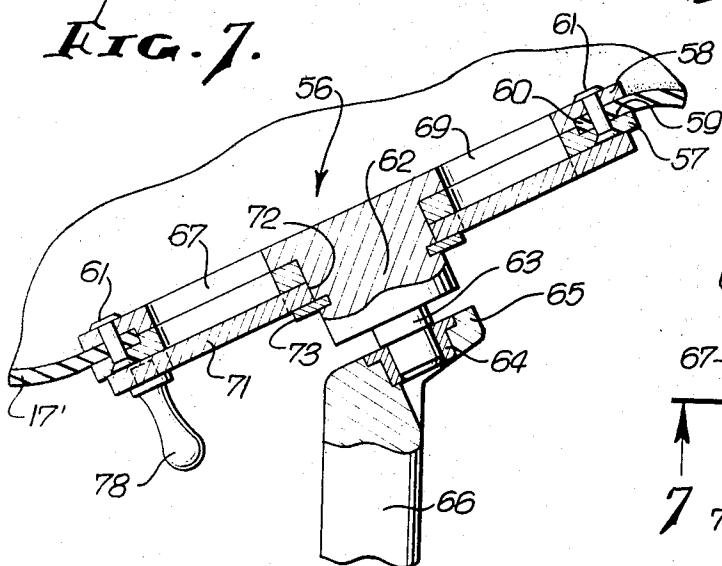


FIG. 9.

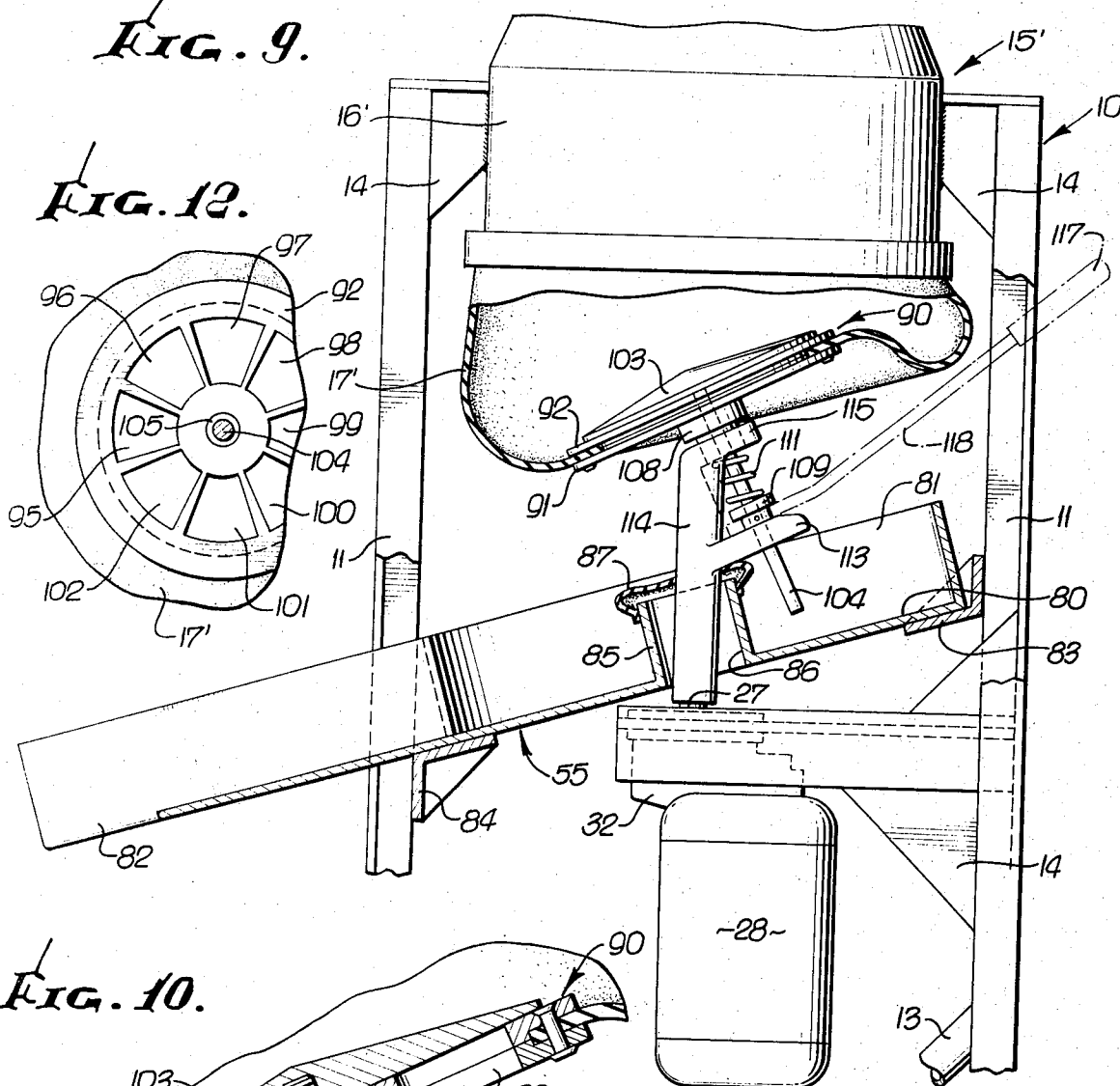
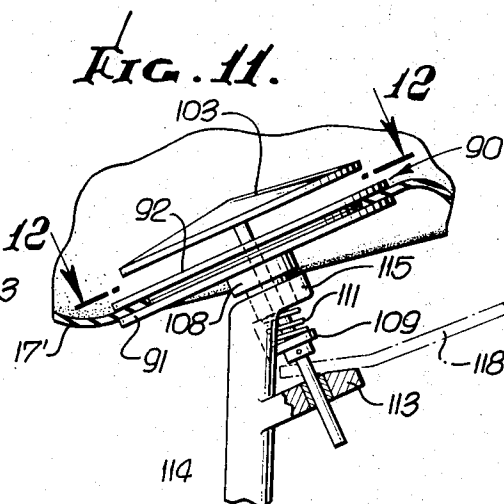
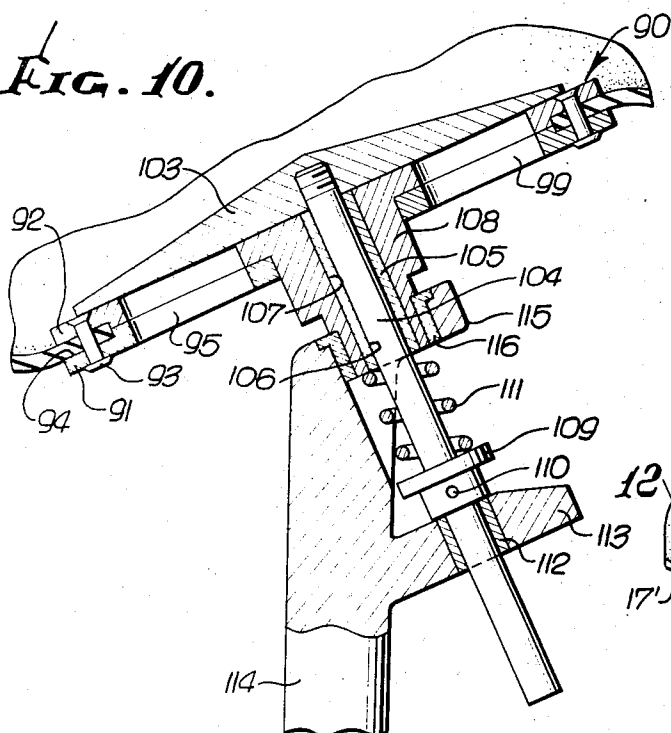


FIG. 10.



FLEXIBLE MIXER DISCHARGE

The invention relates to a container useful in such operations as mixing, polishing, burnishing etc. wherein a mass of aggregate which may be either dry or wet is turned about in that portion of the device which has flexible walls wherein a wobble motion applied by means of a wobble joint and a flat disc causes the flexible portion of the container in which the material resides to be agitated until the operation is complete. A comparable type of container is disclosed in U.S. Pat. No. 3,132,848.

Apparatus for agitating mixtures heretofore, except for devices such as are illustrated in the patent have been to a very large degree rigid containers mounted in a fashion permitting them to be moved in some fashion or other as by rotation, tumbled, gyrated etc. in order to churn the contents to achieve the desired condition. One of the more common instances is that of a concrete mixer which is loaded from the top, operated, and then tilted in such fashion that it is discharged from the top.

Other types of containers of a rigid character at times are provided with a door or gate used to empty the contents when the operation has been completed. In those few instances where flexible walled containers have been devised, and wherein most of the load is contained within the flexible portion of the container after the operation has been completed have resorted to tilting in order to discharge the contents. While tilting is obviously effective from the point of view of getting the device completely emptied such an expedient requires an appreciable amount of structure and an attendant mechanism for performing the tilting operation, there further being need to provide some form of fastening the apparatus in operating condition.

It is therefore among the objects of the invention to provide a new and improved flexible type container capable of agitating a batch of ingredients which can be discharged from the flexible lower portion, without need for otherwise disturbing the mounting of the device on a suitable frame.

Another object of the invention is to provide a new and improved flexible type container the lower portion of which is agitated by a wobble or other type motion wherein there is provided a gate which can be opened wide enough to thoroughly discharge all of the contents after the operation is complete and which thereafter can be effectively sealed in closed position ready for the next operation.

Still another object of the invention is to provide a new and improved container of the type having a flexible bottom subject to agitation wherein the container itself is rigidly mounted upon a frame together with the motive power and wherein for discharging the contents a portion of the flexible part of the device can be released whereby to provide an ample opening for discharging the contents after which the flexible portion can then be readily and effectively closed for continued operation, the mechanism for opening being relatively simple and capable of being easily handled by a single operator.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter set forth, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a longitudinal sectional view of the device shown mounted and ready for operation.

FIG. 2 is a fragmentary cross-sectional view on the line 2 — 2 of FIG. 1.

FIG. 3 is a fragmentary longitudinal sectional view taken on the circled line 3 of FIG. 1.

FIG. 4 is a fragmentary plan view of the closure means taken on the line 4 — 4 of FIG. 3.

FIG. 5 is a longitudinal sectional view of a second form of the invention.

FIG. 6 is a fragmentary cross sectional view on the line 6 — 6 of FIG. 5.

FIG. 7 is a transverse sectional view on the line 7 — 7 of FIG. 6 showing the parts in closed position.

FIG. 8 is a fragmentary view of a portion of FIG. 7 showing the parts in open position.

FIG. 9 is a longitudinal sectional view of still another form of the invention.

FIG. 10 is a fragmentary longitudinal sectional view showing the closure for the discharge opening in closed position.

FIG. 11 is a fragmentary longitudinal view similar to FIG. 10 but showing the closure in open position.

FIG. 12 is a fragmentary cross sectional view on the line 12 — 12 of FIG. 11.

In an embodiment of the invention chosen for the purpose of illustration there is shown a frame indicated generally by the reference character 10 consisting of upright legs 11 and a base 12. Struts 13 provide diagonal bracing and gusset plates 14 provide stiffening and a means for attachment of other parts of the device.

A container indicated generally by the reference character 15 is constructed in the main of two parts their being an upper rigid section 16 and a lower flexible section 17. An upper edge 18 of the lower flexible section is anchored to the lower edge 19 of the upper rigid section by means of a band 20. In the chosen embodiment the upper rigid section 16 is provided with a liner 21 which can be of material similar to that of the lower flexible section 17, fastened by suitable adhesive means to the interior wall of the upper rigid section. A fold 22 of the liner is clamped beneath the band 20 where it secures the upper edge of the lower flexible section in place. There is an opening 23 at the top for loading materials into the container for whatever operation may be expected. The upper rigid section is anchored firmly in position by welds 24 to the adjacent gusset plates 14.

Centerably disposed in the lower flexible section 17 is a rigid disc 25, preferably circular in shape, provided with a plate support 26. A drive shaft 27 of a motor 28 has mounted on it a fitting 29 provided with an off-set head 30 on which is mounted a tilted shaft 31. The tilted shaft by means not shown is rotatably secured in the plate support 26. In this arrangement of operating parts when the drive shaft 27 is rotated by the motor 28 through a suitable speed reducer 32 a wobble motion is imparted to the disc 25, in place, by reason of the tilted disposition of the shaft 31 and its off-set relationship with respect to the center of rotation of the fitting 29.

A platform 33 which is a stationary part of the frame 10 provides a mounting for the motor 28. A discharge chute 34 has an upper end 35 anchored to the platform 33 and is tilted outwardly and downwardly toward an

open discharge end 36. A bracket 37 supports the mid-portion of the discharge chute 34 on the frame.

The perimeter 38 of the disc 25 is attached to an annular rim 39 of the lower flexible section by means of appropriate rivets 40 throughout a large portion of the circumference as viewed in FIG. 2, the rivets being attached through a partial ring 41.

To provide an appropriate discharge port means a segment 42 is provided, separate from the partial ring 41, which is equipped with securing handles 43, of which there are three in the chosen embodiment. Each handle has a shaft 44 which extends through a hole 45 in the segment, a similar hole 46 in the lower flexible section 17 and a hole 47 in the disc 25, as shown in FIG. 3. A locking arm 48 at the upper end of the shaft 44 overlies the disc 25 and is rotatable between stops 49 and 50. In the disc 25 is a slot 51 through which the locking arm 48 can be withdrawn when the discharge port is to be opened. Bolts 52 are used to secure the adjacent portion of the lower flexible section 17 to the segment 42.

In operation of the device the discharge port is closed by virtue of the locking arms 48 overlying a portion of the disc 25 adjacent the stops 49. The motor is then operated and the lower flexible section flexed by the wobble action heretofore described. Upon completion of the operation, the handles 43 are rotated to positions wherein the locking arms 48 abut against the stops 50, in alignment with the slots 51. The handles can then be pulled downwardly so that the locking arms pass through the slots 51 upon being released and this in turn permits the segment 42 to drop to the broken line position of FIG. 1 by reason of the flexible character of the lower flexible section. An opening is thereby provided in alignment with the upper end of the chute 34 and the contents of the container will fall into the chute. If the contents should be sticky and not flow readily wobble motion can be continued inasmuch as the discharge opening will remain precisely in position above the end of the chute despite there being a wobble motion imparted to the flexible section.

Upon completion of the discharge the handles are re-applied by thrusting the shafts upwardly through the appropriate holes until the locking arms 48 can be again rotated to a position overlying the upper face of the disc 25 abutting against the stops 49.

It will be observed that despite the very appreciable flexibility of the lower portion of the container 15 the container as a whole can be held ruggedly in position on the frame during loading through the opening 23 and agitation as a result of the wobble motion. There are as can be further observed relatively few moving parts, the discharge port actually being a part of the structure of the lower flexible section itself.

In the embodiment of the invention of FIGS. 5, 6, 7, and 8 a different type of discharge port is made use of to discharge the contents of a container 15' onto a delivery chute 55. In this form of the device wherein a lower flexible section 17' is attached to an upper rigid section 16', a disc indicated generally by the reference character 56 has an outer part 57 and an inner part 58 forming between them an annular recess 59 in which an edge 60 of the lower flexible section is clamped by means of rivets 61. The disc comprising the two parts has a central boss 62 from which a stub shaft 63 extends downwardly, tilted with respect to vertical, as in the first described embodiment. The stub shaft is jour-

naled in a bearing 64 carried by an off-set head 65 on a fitting 66 which is driven by the drive shaft 27 of the motor 28.

The disc formed as described, has extending through it a series of circumferentially disposed outlet port openings 67, 68, 69 and 70. A valve element 71 is rotatably mounted upon the boss 62 by means of an opening 72, the valve element being held in place by a retaining washer 73. The valve element has in it a series of circumferentially disposed valve ports 74, 75, 76 and 77 which correspond in size and spacing to the outlet port openings 67, 68, 69 and 70. By use of a handle 78 the valve element 71 can be rotated so as to have the valve ports coincide with the outlet port openings whereby to move the valve element from the closed position of FIG. 7 to the open position of FIG. 8 when the contents of the container 15' are to be discharged.

To receive the contents thus discharged there is provided a delivery tray 80 which has an annular receiving portion 81 which is located below and which extends circumferentially a distance far enough outwardly to catch material from all of the valve ports without prospect of spilling. The delivery chute 55 is sloped downwardly and outwardly as shown to a discharge end 82, the delivery chute being stationarily mounted upon brackets 83 and 84. A collar 85 provides an enlarged opening 86 through which the fitting 66 extends so as to be able to rotate freely. A flexible seal 87 may be provided to prevent the contents of the container from falling through the opening 86.

In still another form of the invention illustrated in FIGS. 9, 10, 11, and 12 opening and closing of the discharge ports means is handled in a slightly different fashion. In this form of the device a disc indicated generally by the reference character 90 has an outer part 91 and an inner part 92 which when secured together in the relationship shown in FIG. 10 by means of rivets 93 provide a recess 94. The lower flexible section 17' is clamped in the recess 94 by application of the rivets as shown in FIGS. 9, 10, and 11. Outlet port openings 95, 96, 97, 98, 99, 100, 101 and 102 extend through both the outer and inner parts 91 and 92 of the disc 90.

In operating condition, the outlet port openings are covered by a valve element 103. To the valve element is attached a valve stem 104 which reciprocates slidably through a cylindrical bearing sleeve 105 which provides a central opening 106. The sleeve 105 is contained within a bore 107 centrally in a boss 108 which is part of the inner part 92 of the disc 90.

A collar 109 fastened by a set screw 110 on the valve stem 104 provides a spring keeper for a compression spring 111, the other end of the spring 111 being in engagement with the adjacent end of the boss 108. A second bearing sleeve 112 in an extension 113 of a fitting 114 provides an additional sliding support for the valve stem 104. The fitting 114, as in the previous embodiments, is provided with an off-set head 115 in which is located a bearing 116 within which a lower end of the boss 108 is rotatably mounted.

After the contents of the container 15' have been processed and are to be discharged a handle 117 on which is a rod 118 can be placed adjacent the underside of the collar 109 and the collar moved upwardly thereby to elevate the valve 103 from the closed position of FIG. 10 to the open position of FIG. 11. When this has occurred the contents of the container 15' are

free to flow under the valve element 103 and then outwardly through the outlet port openings 95, 96, 97, 98, 99, 100, 101, and 102 and then into the delivery chute 55. Upon release of the handle 117 the valve element 103 is pulled to the closed position of FIG. 10 by action of the spring 111.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. An agitating device for aggregate type materials comprising a frame,
a container constructed in two sections,
a first of said sections being rigid and mounted on the frame,
said rigid section having a feed opening at the upper side and a perimetrical rim at the lower side,
a second of said sections being of flexible material having a rim anchored to the perimetrical rim of the first section and forming a flexible bottom for the container,
said second section having a central rigid disc at the lowermost location,
a wobble drive connected to said rigid disc,
and discharge port means at the lower portion of said second section having a closed position during operation of said wobble drive and an open position when operation of the wobble drive is discontinued whereby to discharge the contents of said container.
2. An agitating device as in claim 1 wherein there is a motor on the frame and a drive shaft on the motor connected to said wobble drive.
3. An agitating device as in claim 1 wherein there is a discharge chute on the frame having a loading end beneath said discharge port means and an unloading end remote from said loading end.
4. An agitating device as in claim 1 wherein said discharge port means comprises a relatively stiff segment at the perimeter of said disc, releasable securing handles in operable engagement with said disc and said

segment each having respective locked and unlocked position, and edge portion of said second section having a shape conforming to said segment and adapted to be releasable held in position closing said discharge port means and adapted to be released to open said discharge port means when said segment is released.

5. An agitating device as in claim 4 wherein the relatively stiff segment is attached to the flexible material of said second section.

6. An agitating device as in claim 1 wherein said discharge port means comprises at least one aperture through said disc and a closure rotatably mounted on said disc having open and closed positions relative to said aperture.

7. An agitating device as in claim 1 wherein said discharge port means comprises a plurality of apertures through said disc at circumferentially spaced locations and a closure rotatably mounted on an axis concentric with respect to the center of said disc.

8. An agitating device as in claim 7 wherein there is a discharge chute having an annular receiving portion at the upper end located beneath said apertures.

9. An agitating device as in claim 1 wherein said discharge port means comprises a plurality of apertures extending through said disc and circumferentially spaced around the center of said disc, and a closure extending over said apertures at the inner side of said disc, an outwardly extending stem on said closure and a central bore through said disc having said stem reciprocatably located therein.

10. An agitating device as in claim 9 wherein there is a spring acting between said stem and said disc biased normally to draw said closure to closed position over said apertures.

11. An agitating device as in claim 9 including a handle acting upon said stem whereby to lift said stem and said closure to open position.

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