

Sept. 28, 1965

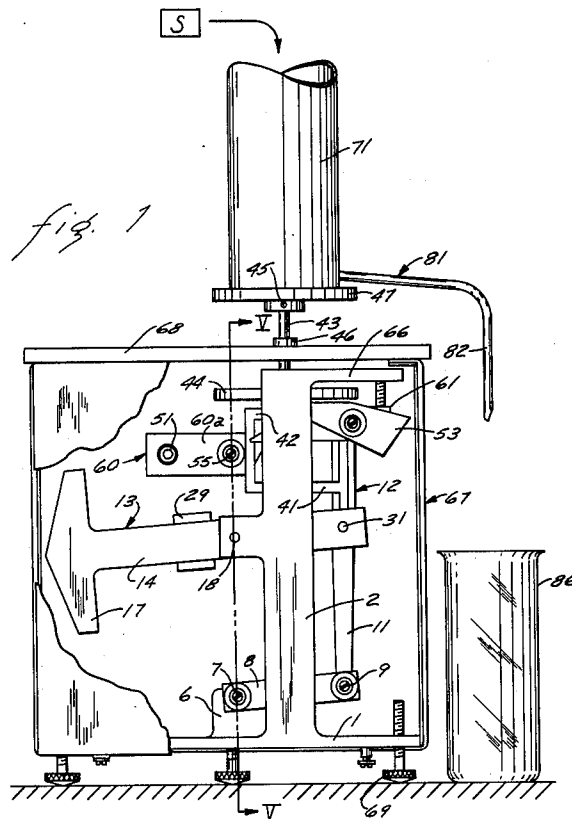
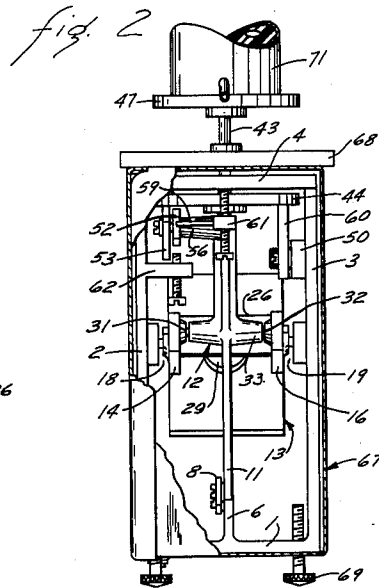
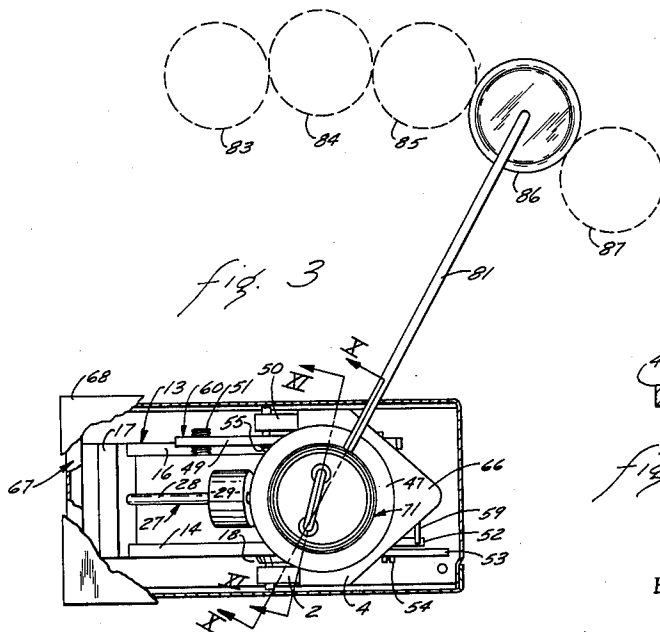
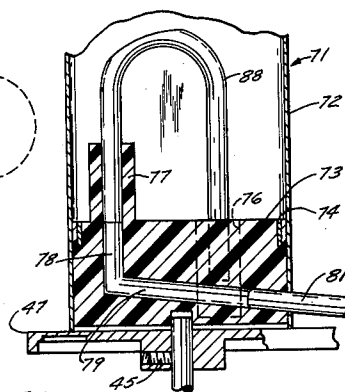
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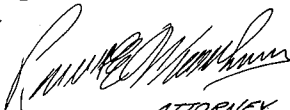
3,208,485

AUTOMATIC FRACTION COLLECTOR

Filed May 13, 1963

2 Sheets-Sheet 1



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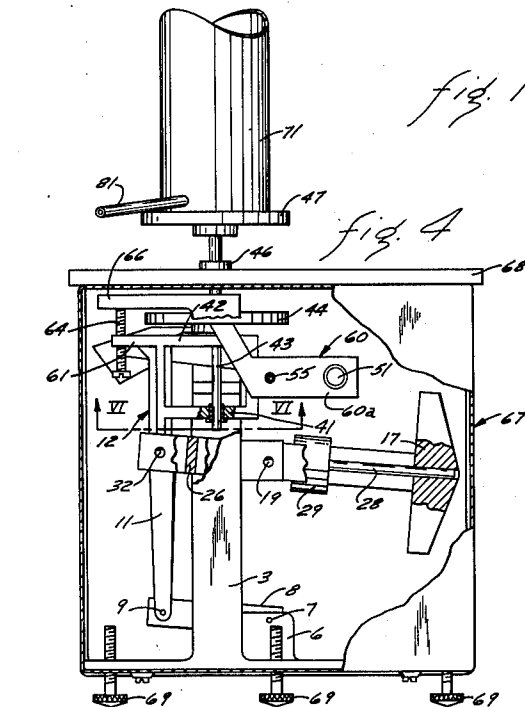
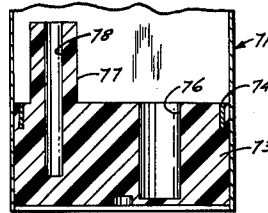
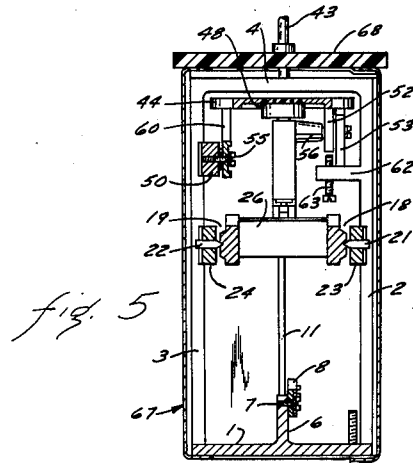
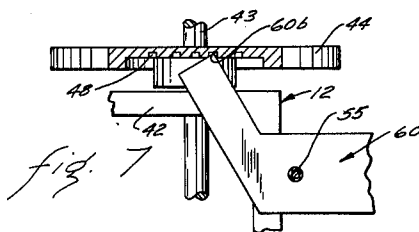
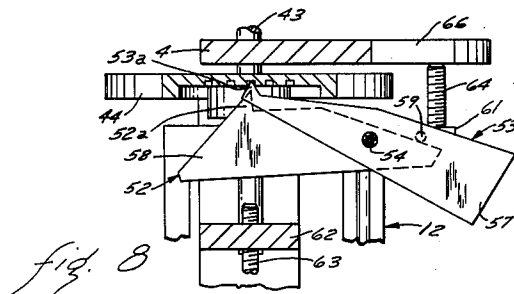
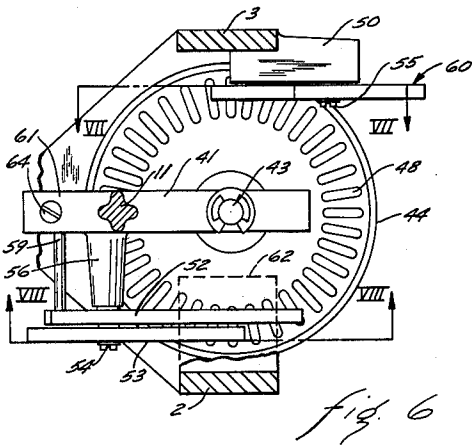
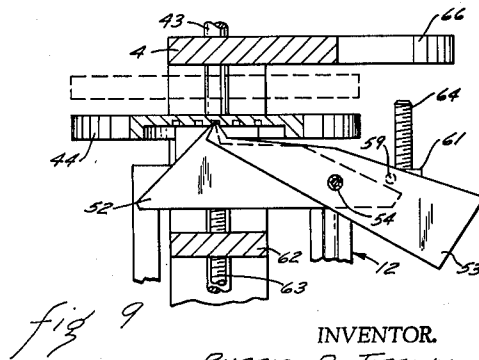
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3,208,485

AUTOMATIC FRACTION COLLECTOR

Filed May 13, 1963

2 Sheets-Sheet 2



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3,208,485

AUTOMATIC FRACTION COLLECTOR

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Filed May 13, 1963, Ser. No. 280,036

13 Claims. (Cl. 141—130)

This invention relates to a distributing device for connecting a source of fluent material successively to a plurality of receptacles for filling same and it relates particularly to a device wherein the weight of the fluent material in a collecting chamber is utilized to effect movement of a discharge nozzle from one receptacle to the next.

The invention herein disclosed and claimed represents an improvement over the apparatus disclosed and claimed in my copending application Serial No. 62,747, assigned to the same assignee as the present application, now Patent No. 3,124,173.

The herein-described invention arose in connection with a need which developed in laboratory work involving fractionations such as chromatographic and fractional distillation processes. Accordingly, the invention will be described in connection with its use in such applications. However, it will be recognized that the apparatus described is capable of other uses also and, accordingly, the hereinafter presented description will be understood as illustrative only and not limiting.

In various kinds of laboratory work, such as in the pharmaceutical industry, many fractionation processes are carried out in which the effluent material is collected in a series of receptacles successively presented to the discharge end of the fractionation apparatus. Since the fractionation operation itself can often be carried out for a long period of time without the presence of attending personnel, it will be and has long been recognized that the only need for attending personnel in many fractionation operation is to remove filled receptacles and place empty ones at the discharge end of fractionation apparatus. This requires the attention, and often the exclusive time, of laboratory personnel who could be used more efficiently elsewhere if an automatic device could be provided for effecting the removal and replacement of the receptacles at the appropriate time. Machines previously known for this purpose are too expensive, complex and inflexible for general laboratory use.

The problem thus far discussed has been, at least partially, met by the apparatus disclosed and claimed in my Patent No. 3,124,173 and the apparatus of said application provides an effective and advantageous handling of the needs above described. However, in a continuing effort to provide a device having the maximum sturdiness and operational reliability, further investigations have disclosed points, particularly in the areas of sturdiness, ease of adjustment and accuracy of operation, at which the apparatus upon which said previous application was based was not completely satisfactory for commercial purposes and it is the purpose of the present invention to provide a machine improving these features.

Accordingly, the objects of the invention include:

(1) To provide a machine for successively connecting a source of fluent material to a plurality of receptacles, which machine is simple to operate, flexible in adjustment and which can be placed in and taken out of operating

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condition quickly and easily, the same, accordingly, being well adapted to laboratory usage.

(2) To provide a machine, as aforesaid, which will measure accurately the amount of the fluent material placed in each container.

(3) To provide a machine, as aforesaid, which will utilize the weight of material accumulated in a collecting or measuring chamber to effect a change of communication of the discharge outlet thereof from one container to the next.

(4) To provide a machine, as aforesaid, wherein the weight of the collecting chamber and material therein provides the force for effecting the change of communication above mentioned.

(5) To provide a machine, as aforesaid, embodying the principles of the apparatus set forth in my Patent No. 3,124,173 but which will be better adapted for commercial production and use than was the particular form upon which said application was based.

(6) To provide apparatus, as aforesaid, in which the moving parts will be firmly supported whereby same may operate over a long period of time and under severe conditions without impairing its accuracy or freedom of movement.

(7) To provide apparatus, as aforesaid, in which the amount of rotation of a dispenser can be easily selected by the operator through a simple movement of a manually controllable device, which device can be readily reached from the side thereof and thereby easily reached through an access opening conveniently placed in the side of a surrounding casing.

(8) To provide apparatus, as aforesaid, wherein the rotational movement of the reservoir supporting means is effected by means solidly backed against a rigid portion of the apparatus, whereby to insure positive and reliable movement of the rotative means under all normal conditions of operation.

(9) To provide a machine, as aforesaid, which, while more sturdy and reliable than the machine illustrated in Patent No. 3,124,173, will still be of simple construction and accordingly inexpensive to build and inexpensive to maintain in good operating condition.

(10) To provide a machine, as aforesaid, wherein the amount of discharge obtained upon each vertical reciprocation of the reservoir can be readily selected by appropriate selection and placement of one of a group of readily replaceable parts.

(11) To provide a device, as aforesaid, wherein the amount of material remaining within the reservoir between discharge operations will be minimized.

(12) To provide a machine, as aforesaid, which will not permit fluent material to flow to said containers during a change in said connection in order that the spillage between said containers will be held to a minimum.

(13) To provide a machine, as aforesaid, having a collecting chamber arranged on a turntable and including means for rotating said turntable when it moves downwardly in response to the weight of a fluent material supplied thereto and wherein such downward movement is utilized for effecting relative movement between the discharge outlet of said chamber and the filling station.

(14) To provide a machine, as aforesaid, wherein the several receptacles being filled have no necessary direct connection with the turntable and may accordingly be placed on and removed from the filling stations freely and

without affecting, or being affected by, the operation of the turntable or apparatus connected thereto.

(15) To provide a machine, as aforesaid, which will be particularly adaptable for use with liquids including, but not limited to, aqueous liquids.

Other objects and purposes of the invention will be apparent to persons acquainted with apparatus of this general type upon reading the following disclosure and inspecting the accompanying drawings.

In the drawings:

FIGURE 1 is a side, partially broken, elevation view of the apparatus taken from the right side thereof when looking in the direction of discharge.

FIGURE 2 is an elevational view of the right side of the apparatus as shown in FIGURE 1 with a portion of the cover broken away to show the interior of the apparatus.

FIGURE 3 is a top plan view of the apparatus showing the placement of containers for filling by the apparatus and with the top cover broken away to show the interior of the device.

FIGURE 4 is a side elevational view partially sectioned and partially broken away taken from the opposite side of the device shown in FIGURE 1.

FIGURE 5 is a section taken on the line V—V of FIGURE 1.

FIGURE 6 is a section taken on the line VI—VI of FIGURE 4.

FIGURE 7 is a section taken on the line VII—VII of FIGURE 6.

FIGURE 8 is a section taken on the line VIII—VIII of FIGURE 6 and showing the vertically movable portion of the apparatus in its upper position.

FIGURE 9 is a figure similar to FIGURE 8 and showing the vertically movable apparatus in its lowered position.

FIGURE 10 is a section taken on the line X—X of FIGURE 3.

FIGURE 11 is a section taken on the line XI—XI of FIGURE 3.

Detailed description

In the following description, the following terminology will be used for convenience only and will be recognized as not being limiting. For example, the terms "upward" and "downward" will denote directions with respect to the normal operating position of the apparatus and will also denote directions in the drawings in connection with which such terminology is used. The terms "rightward" and "leftward" will similarly refer to the drawings. The terms "inward" and "outward" will denote directions toward and away from the geometric center of the apparatus. Further, all terminology hereinabove mentioned also includes derivatives of the terms specifically mentioned as well as words of similar import.

Now turning to the drawings in more detail, there is here provided a base 1 (FIGURES 1 and 2) having a pair of frame supports 2 and 3 extending upwardly therefrom. The upper ends of said supports are connected by a top frame member 4 which may, if desired, be integral with said frame supports or affixed thereto in any convenient manner. An upstanding lug 6 extends upwardly from the base 1 and pivotally supports at 7 one end of a guiding link 8. The other end of said guiding link is pivotally connected at 9 to an upstanding bar 11 of a generally P-shaped frame member 12. A generally U-shaped guide-and-balance member 13 has parallel side members 14 and 16 and an end member 17. Said end member is made sufficiently large and heavy to provide the necessary balance for the P-shaped frame member 12 as hereinafter further described. The guide-and-balance member 13 is pivoted by its side members 14 and 16, respectively, to the upstanding frame members 2 and 3 at and by the pivot structures 18 and 19, respectively. Said pivot structures may be of any convenient nature,

such as the structure shown in FIGURE 5 utilizing pivot pins 21 and 22 carried respectively in blocks 23 and 24, said blocks being mounted in any convenient manner on the side frame members 2 and 3, respectively. A cross bar 26 (FIGURES 4 and 5) may be provided if desired for stiffening purposes between the otherwise free ends of the U-shaped guide-and-balance member 13.

Said guide-and-balance member 13 may also, if desired, and it usually will be desired, have an adjusting member of any convenient type. Here such adjusting member is indicated at 27 and consists of a rod 28 mounted in and supported by the end member 17, extending toward the pivot points 18 and 19 and carrying threadedly thereon an adjustable weight 29. The free ends of said U-shaped guide-and-balance member 13 are pivoted at 31 and 32 to a cross bar 33 (FIGURE 2) which is affixed, integrally in this embodiment, to the vertical stem 11 of the frame member 12. Thus, it will be noted that the two pivot points 7 and 9, together with the common axes of the pivot points 18 and 19 on the one hand and 31 and 32 on the other hand, form a parallelogram or pantograph, insuring that during upward and downward movement of the P-shaped frame member 12, the stem 11 thereof will remain in a position parallel to a line between the pivot point 7 and the axes of the points 18 and 19, which line in this embodiment is vertical.

Extending between, and mounted rotatably on, the horizontal members 41 and 42 of the P-shaped frame member 12 (FIGURE 4) is a vertically positioned shaft 43 supporting a turntable 44 at a point thereon immediately above the horizontal bar 42, said turntable 44 being fixed to said shaft to prevent either axial or rotative movement of said turntable with respect to said shaft. Said shaft extends upward beyond the turntable 44 through a guiding collar 46 and fixedly, as by set screw 45, supports at its upper end a platform 47. Thus, the platform 47 is caused by said shaft to turn simultaneously with any turning of the turntable 44. The underside of the turntable 44 is provided with a plurality of recesses 48 (FIGURE 6) for receiving therein the tips of pawls as hereinafter further described.

Turning now to the pawls and pawl mounting structure, there extends leftwardly (FIGURE 3) from the vertical frame member 3 an ear 50 on which is pivotally mounted at 55 the driving pawl 60. Said driving pawl 60 has a rearwardly (leftwardly in FIGURE 3, rightwardly in FIGURE 4) extending projection 60a which carries a small counterweight 51 by which said pawl 60 is constantly urged in a clockwise direction as seen in FIGURES 4 and 7. Said driving pawl 60 is further provided with a suitable tip 60b for engaging the recesses 48 as hereinafter further described.

A further pair of pawls, indicated at 52 and 53 (FIGURES 6, 8 and 9) are provided, respectively, for preventing overrunning and backlash of the turntable 44 and are mounted on a common pivot 54 to a stub fixture 56 (FIGURE 6) extending sidewardly from a suitable point near the upper end of the P-shaped frame member 12.

The shape of these pawls is best shown in FIGURES 8 and 9. The anti-backlash pawl 53 has a point 53a engageable with the recesses 48 and also has a portion 57 extending oppositely from said pivot point 54 with respect to the point 53a to provide a counterbalance constantly urging said point 53a upwardly.

The stop pawl 52 has a point 52a thereon adapted for engagement with said recesses 48 but it is provided with no counterbalancing means with the result that the point 52a of said pawl 52 tends in response to gravity to remain in a downward position. A pin 59 is mounted in a lug 61 extending forwardly (leftwardly in FIGURES 4 and 6) from the upper end of the P-shaped frame member 12 and limits counterclockwise (as viewed in FIGURE 8) movement of said stop pawl 52.

A small shelf 62 extends inwardly from the side support 2 and carries an adjustable abutment 63, which may

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be a screw threaded through said shelf, in vertical alignment with the overrun-preventing, or stop, pawl 52. Thus, when the turntable 44 and supporting P-shaped frame member 12 come downwardly, the stop pawl 52 also moves downward without rotating until its underside strikes the adjustable abutment 63 which then causes the stop pawl 52 to rotate clockwise as the pivot 54 continues downward, thus causing point 52a to approach the turntable until it engages one of the recesses 48 in the underside of the turntable 44 thereby stopping all downward movement and at the same time preventing any overrunning of the turntable rotation. There is also a vertically adjustable abutment 64, which may be a screw arranged through the lug 61. Said abutment 64 bears against a corresponding extension 66, which projects from the top frame member 4. Thus, suitable adjustment of the abutment 64 limits the upward movement of the P-shaped frame member 12 and an appropriate adjustment of the abutment 63 limits downward movement thereof.

If desired, and as shown in the drawings, the working parts above described may be encased in a suitable casing 67 which is mounted in any appropriate manner on the base 1 and includes a top closure 68. Adjustable feet of any convenient or standard type 69 may if desired be provided to insure that the base of the apparatus will be horizontal even though the surface upon which it rests may be slightly inclined.

Turning now to the reservoir 71 (FIGURES 1, 10 and 11) it will be recognized that this may take any of several forms, including, for example, the form shown in the above-mentioned Patent No. 3,124,173, provided only that introduction thereto of a preselected amount of fluent material will initiate discharging thereof and that such discharge, once initiated, will continue until a preselected amount of material has been discharged therefrom. As in the case of the apparatus shown in Patent No. 3,124,173, this is most conveniently accomplished by siphon means but the siphon means hereinafter described comprise a substantial improvement over the siphon means shown in said Patent No. 3,124,173.

In this embodiment, said reservoir 71 comprises a cylindrical can having side structure 72 (FIGURE 10) and a base 73. Said base is preferably made from moldable material, such as an injection molded synthetic organic plastic material. Said base, being of a material having a substantially different coefficient of expansion than the side structure 72, both in response to temperature changes as well as in response to moisture, caused a serious problem in preventing said bottom member 73 from coming loose from the side structure 72 either at low temperatures or under relatively dry conditions. This has been corrected by the insertion of a metal ring 74 within the body of plastic material and as close as possible to the periphery thereof. This ring is preferably of substantially the same material as is utilized for the side structure 72 and hence it will maintain a diameter bearing at all times approximately the same relationship to the diameter of the side structure 72. Thus, with the side structure 72 fitted to the bottom structure 73 by pressing said side structure over the bottom structure, a firm, tight and leakproof fit will be maintained regardless of changes in moisture conditions or temperature substantially continuously throughout the useful life of the apparatus.

Said bottom structure 73 is also provided with a well 76 and a boss 77. The diameter of said well is only slightly larger than that of the hereinafter-mentioned siphon tube. Said boss has a vertical opening 78 therein which extends downwardly into the base 73 and there connects with a passageway 79 which extends substantially horizontally, angling somewhat downwardly, through said base to the exterior thereof. A distributing tube 81 is connected to said passageway 79 in any convenient manner, such as by being frictionally inserted therein. Said distributing tube 81 has a downturned end 82 (FIGURE 1) in order better to direct material discharged therefrom into

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suitable containers. Such containers may be of any form or kind desired and such containers, or stations at which appropriate containers are placed, are here indicated at 83-87 (FIGURE 3) and arranged in a circle around the axis of the shaft 43 (FIGURE 1) of said distributing device.

The siphon tube 88 (FIGURE 10) is fitted snugly into the opening 78 and pushed down thereinto at least sufficiently to be adequately supported thereby. Further vertical adjustment will be determined by the amount of liquid which it is desired that the device dispense in each operating cycle. Since the siphon will start more quickly when the curved portion thereof is lower with respect to the discharge point of the pipe 81 than when it is in a relatively high position, it will be recognized that the liquid level at which the siphon will start will depend upon the vertical position of the siphon with respect to the container 71. Said vertical position is readily adjusted by selecting the distance the siphon 88 is pushed into the boss 77. On the other hand, since only a relatively small amount of material is contained within the well 76, in any case, the point at which the siphon ceases to conduct will vary only a little in volume regardless of whether the intake end of the siphon is near the upper end of the well 76 or near the bottom end thereof. Thus, by vertically adjusting the position of the siphon 88, the amount of material discharged in each operation thereof can be determined. Further, by providing a plurality of siphons 88 each having respectively different lengths of the parallel portions thereof, and by adjusting each of them from the deepest position with respect to the well 76 to the highest position with respect thereto, it is easy to obtain a continuous selection of discharge volumes merely by selecting an appropriate siphon and positioning it appropriately into the boss 77 as above described.

In addition, since in any position of the intake end of the siphon 88 with respect to the well 76 only a very small amount of material remains within said well 76 below the intake end of the siphon 88, substantially a complete discharge of the collecting receptacle 77 will be obtained during each cycle of operation.

Operation

In order to determine the level at which the collecting receptacle 71 will commence emptying, the siphon tube 88 is selected or adjusted so that the central portion of said tube will be at such a vertical height above the outlet of passageway 79 that flow of said liquid will automatically start when the liquid has reached said level. The weight 29 should be so adjusted that the turntable 44 will commence to move downwardly at some point sufficiently before the liquid in the receptacle 71 reaches the level of the upper end of said siphon tube 88 that the movement of the tube 81 from one receptacle to the next will be completed before any flow of material starts out therefrom. The vertical abutment 63 is adjusted so that the turntable will rotate through the proper amount of arc during each vertical reciprocation thereof.

With the above-mentioned adjustments made, the apparatus is placed below a suitable supply S (FIGURE 1) of fluent material, here a liquid from any convenient source such as a chromatographic or distilling column, and such material is permitted to fall into said collecting receptacle 71. The distributing pipe 81 is at this time disposed so that it will discharge into the receptacle 86. When the liquid reaches the predetermined level in the collecting receptacle, said level being necessarily high enough to provide the weight needed to carry out the action but yet below the upper end of the U-shaped tube 88, the weight of liquid within said receptacle will move the platform 47 and hence the turntable 44 downwardly against the action of the weight 29. In so doing, the driving pawl 60, which is at this moment within one of the recesses 48 of the turntable 44, will cause said turntable to index through an arc of rotation determined by

the adjustment of the vertical abutment 63. This is illustrated in FIGURES 7 and 8 where the turntable 44 is shown in its upward position with the pawl tip 60b engaged in one of the recesses 48. FIGURE 9 shows the turntable 44 after it has moved into its downward position, has been indexed by the action of said driving pawl 60 and stopped by action of the stop pawl 52. Thus, the receptacle 71 and the discharge conduit 81 are rotated to a position over the next filling station, here indicated by the broken circle 87 (FIGURE 3). In this position the receptacle will continue to fill until the level of liquid therein rises high enough to start the siphoning action whereupon the contents of said receptacle will be emptied into a container placed on the station 87. When the weight of liquid within the receptacle 71 diminishes to such a point that it can no longer overpower the force of the counterweight 29, said turntable will again return to its upward position, but this will not effect any rotation of the turntable and the liquid will continue to discharge into the container located on the station 87 until the liquid within the collecting chamber 71 falls below the entrance of the siphon, whereupon the flow of liquid will stop. With the siphon thus becoming inoperative, continued discharge of liquid into the collecting chamber 71 will again start to fill same and the cycle will repeat.

During the operation just described, the stop pawl 52 will engage appropriate ones of the recesses 48 for stopping the rotation of the turntable 44 at a precisely determinable point and prevent overrunning by said turntable of the filling station to which it is intended to turn in a given cycle. The turntable 44 in its upper position is, of course, high enough to clear the tip 52a of the stop pawl 52 and it will remain clear thereof for a sufficient period of time to enable it to rotate through the desired arc of rotation before it descends sufficiently that said stop pawl 52 strikes the abutment 63 and the tip 52a becomes engaged. It will obviously, in view of the foregoing, require a certain amount of careful adjustment of the abutment 63 to make sure that said tip 52a enters the desired one of the recesses 48 at the proper point in the combined rotating and descending movement of said turntable to effect the desired amount of rotation.

It will be recognized particularly that by locating the stop pawl 52 between the turntable 44 and the abutment 63, that the full weight of material within the reservoir 71 will bear upon said stop pawl 52 and thereby be available to insure that said pawl engages the desired one of the recesses 48 firmly and without possibility of skipping. Thus, at the moment that a rotation of the turntable is to be stopped, there is provided a sufficient force against the stop pawl 52 effective to enable it to insure against undesired overrunning of the rotating parts.

The anti-backlash or anti-reverse pawl 53 acts to prevent the turntable 44 from rotating in a reverse direction as a result of the drag applied by the tip 60b of driving pawl 60 when the turntable rises.

While the source S has been indicated herein as a single conduit, it will be recognized that it may comprise multiple conduits all discharging either directly or indirectly into the collecting chamber 71.

It will be recognized that the siphon tube 88 may be readily replaced by siphon tubes of different vertical lengths. Thus, the quantity of liquid within the reservoir 71, necessary to start a siphoning action may be readily selected, and also readily altered, as desired, according to the particular intended operation of the machine.

Although a particular preferred embodiment of the invention has been disclosed above for illustrative purposes, it will be understood that variations or modifications thereof which lie within the scope of the appended claims are fully contemplated.

What is claimed is:

1. Collecting and distributing apparatus for a fluent material comprising in combination:

a base;

a pair of frame support members upstanding from said base and a top member connecting the upper ends of said frame support members;

a counterbalancing unit including a pair of substantially parallel side members each pivotally affixed, by first pivot means at a point of pivoting thereon, intermediate the ends thereof to and supported on a respective one of said frame support members;

a counterbalancing weight positioned on one end of said side members;

a vertical stem pivotally affixed between and to the ends of said side members opposite said counterbalancing weight by second pivot means and linkage means connecting the lower end of said stem to said base and cooperating with both of the aforementioned pivot means for effecting a pantographic relationship between said stem, said counterbalance unit and said linkage means;

a pair of shaft support members projecting sidewardly from said stem, a shaft and means supporting said shaft rotatably with respect to and on said shaft support members, said shaft being positioned substantially parallel with said stem;

a turntable fixed nonrotatably with respect to and on said shaft and positioned between the uppermost of said shaft support members and said top member, said shaft projecting through said top member and carrying a receptacle-supporting platform fixedly at the upper end thereof spaced upwardly from said top member;

pawl means affixed pivotally to one of said frame support members for effecting rotation of said turntable upon downward movement of said turntable;

whereby when a weight is placed on said platform sufficient to overcome said counterbalancing weight, said platform, shaft, turntable, shaft support members and said stem will all move downwardly, said turntable will engage said pawl means and said turntable, shaft and platform will be caused to rotate.

2. The device defined in claim 1 including a lug extending horizontally from said stem and carrying a vertically extending abutment thereon, and means extending laterally from said top member in alignment with said abutment for limiting upward movement thereof.

3. The device defined in claim 2 wherein said abutment is vertically adjustable for controlling the maximum upward movement of said stem and parts associated therewith.

4. The device defined in claim 1 including an ear extending horizontally from one of said frame support members and presenting a vertically aligned surface, said pawl means being pivotally mounted on said ear and parallel with said surface, one end of said pawl means extending to and in contact with the lower surface of said turntable and means applying a constant but yieldable force to said pawl means for urging said end toward said surface;

a plurality of recesses in said turntable for engagement by said end of said pawl means.

5. The device defined in claim 4 including a projection from the other of said frame support members, a stop pawl and means fixed with respect to said stem pivotally supporting said stop pawl at least partially over said projection and for engagement with said recesses of said turntable, and a vertically adjustable abutment extending upwardly from said projection in vertical alignment with said stop pawl, whereby downward movement of said stem will drive said stop pawl against said abutment and into stopping engagement with at least one of said recesses.

6. The device defined in claim 4 including a stop pawl and an antireverse pawl, means fixed with respect to said stem pivotally supporting both of said pawls on a single axis and for engagement against the said recesses in said

turntable, means for constantly and yieldably urging the tip of said antireverse pawl upwardly into contact with said turntable, means constantly and yieldably urging the tip of said stop pawl downwardly and other means fixed with respect to said frame support members for limiting the downward movement of said stop pawl.

7. Apparatus for effecting rotation of a collecting receptacle, comprising:

frame structure having upstanding means;
a turntable having indexing means thereon;
support means rotatably supporting said turntable on and for axial movement with respect to said frame structure and means constantly urging said turntable in a first axial direction;
means for effecting indexing of said turntable upon movement thereof in an opposite axial direction;
a stop pawl and means pivotally mounting same with respect to said frame structure with said pawl positioned for engagement with said indexing means, said pivotal mounting means being such that said pawl tends by gravity to fall away from said turntable, abutment means mounted rigidly with respect to said frame structure for limiting the distance said stop pawl can move away from said turntable so that as said turntable approaches the end of its movement in said opposite axial direction said stop pawl is held for engagement with said indexing means.

8. Apparatus for effecting rotation of a collecting receptacle, comprising:

frame structure having upstanding means;
a generally horizontal turntable having indexing means thereon;
vertically movable support means rotatably supporting said turntable on, and for vertical movement with respect to, said frame structure and means constantly urging said support means upwardly;
means for effecting indexing of said turntable upon downward movement thereof;
a stop pawl mounted on said support means and positioned under said turntable and means pivotally mounting same with respect to said support means with the tip of said pawl positioned for engagement with said indexing means, said pivotal mounting means being such that the tip of said pawl tends by gravity to fall downwardly away from said turntable, abutment means mounted rigidly with respect to said frame structure for limiting the distance said tip of said stop pawl can move downwardly when said turntable and said support means are caused to move downwardly so that as said turntable approaches the end of its downward movement said stop pawl is held for engagement with said indexing means.

9. Apparatus for effecting rotation of a collecting receptacle, comprising:

frame structure having upstanding means;
a turntable having indexing means thereon;
support means rotatably supporting said turntable on and for axial movement with respect to said frame structure and means constantly urging said turntable in a first axial direction;
means for effecting indexing of said turntable upon movement thereof in an opposite axial direction;
said receptacle comprising a hollow cylindrical side structure and a base member fixedly mounted within said side structure and being made of a material having different expansion and contraction characteristics from that of said side structure;
a ring of material having expansion and contraction characteristics similar to that of said side structure embedded within said base member, said ring being located within said base member but close to the periphery thereof;

whereby to resist movement of said base member radially away from said side structure upon change in conditions affecting the radial dimension thereof.

10. Collecting and distributing means for a fluent material, comprising in combination:

a collector having a tubular side structure and a relatively thick base fixedly mounted therewithin at one end thereof, said base having a vertically elongated well therein and a boss extending upwardly from said base, said boss and said base having an opening spaced from said well; an inverted U-shaped siphon tube having one leg extending into said opening and being frictionally held within said boss, the vertical position of said one leg within said boss being adjustable, the other end of said siphon tube being positioned within said well and means defining a passageway from said opening to the exterior of said base;

whereby said siphon tube may be readily replaced as needed to effect the commencement of the siphoning operation at the desired depth of said fluent material within said container.

11. Apparatus for effecting rotation of a receptacle, comprising:

frame structure having upstanding means;
a generally horizontal turntable having indexing means thereon;
vertically movable support means rotatably supporting said turntable on, and for vertical movement with respect to, said frame structure and means constantly urging said support means upwardly;
means for effecting rotation of said turntable upon downward movement thereof;
a lug extending horizontally from said support means and carrying a vertically extending abutment thereon; and
means extending laterally from said frame structure into alignment with and into a position above said abutment for limiting upward movement thereof and thereby limiting upward movement of said support means and said turntable.

12. Apparatus for effecting rotation of a receptacle, comprising:

frame structure having upstanding means;
a turntable having indexing means thereon;
vertically movable support means rotatably supporting said turntable on and for axial movement with respect to said frame structure and means constantly urging said support means in a first axial direction;
pawl means for effecting rotation of said turntable upon movement thereof in an opposite axial direction;
an ear extending horizontally from said frame structure and presenting a substantially vertical surface, said pawl means being pivotally mounted on said ear and parallel with said surface, one end of said pawl means extending to and in contact with the lower surface of said turntable and means supplying a constant but yieldable force to said pawl means for urging said end toward said surface;
means defining a plurality of recesses in said turntable for engagement by said one end of said pawl means.

13. The device defined in claim 12 including a stop pawl and an antireverse pawl;

means fixed with respect to said support means supporting both said stop pawl and said antireverse pawl on a single axis and for engagement against the said recesses in said turntable;
means for constantly and yieldably urging the tip of said antireverse pawl upwardly into contact with said turntable;
means constantly and yieldably urging the tip of said stop pawl downwardly;
and other means fixed with respect to said frame struc-

ture for limiting the downward movement of said
stop pawl.

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