

[72] Inventors **Raymond A. Day, Jr.**
Nassau;
Sherwin Epstein, Albany; Robert F. Pulfer,
New Scotland, all of, N.Y.

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[45] Patented **Sept. 14, 1971**

[73] Assignee **Sterling Drug Inc.**
New York, N.Y.

[56]

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Primary Examiner—Roy D. Frazier
Assistant Examiner—Frank Domotor
Attorney—Charles R. Fay

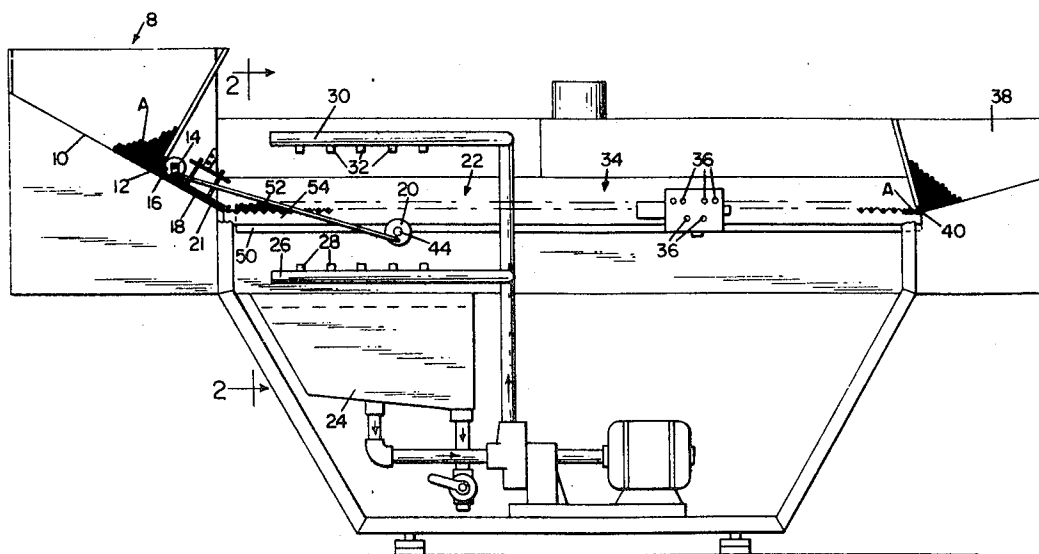
[54] **AUTOMATIC WASHING AND DRYING MACHINE FOR AMPOULES**
3 Claims, 3 Drawing Figs.

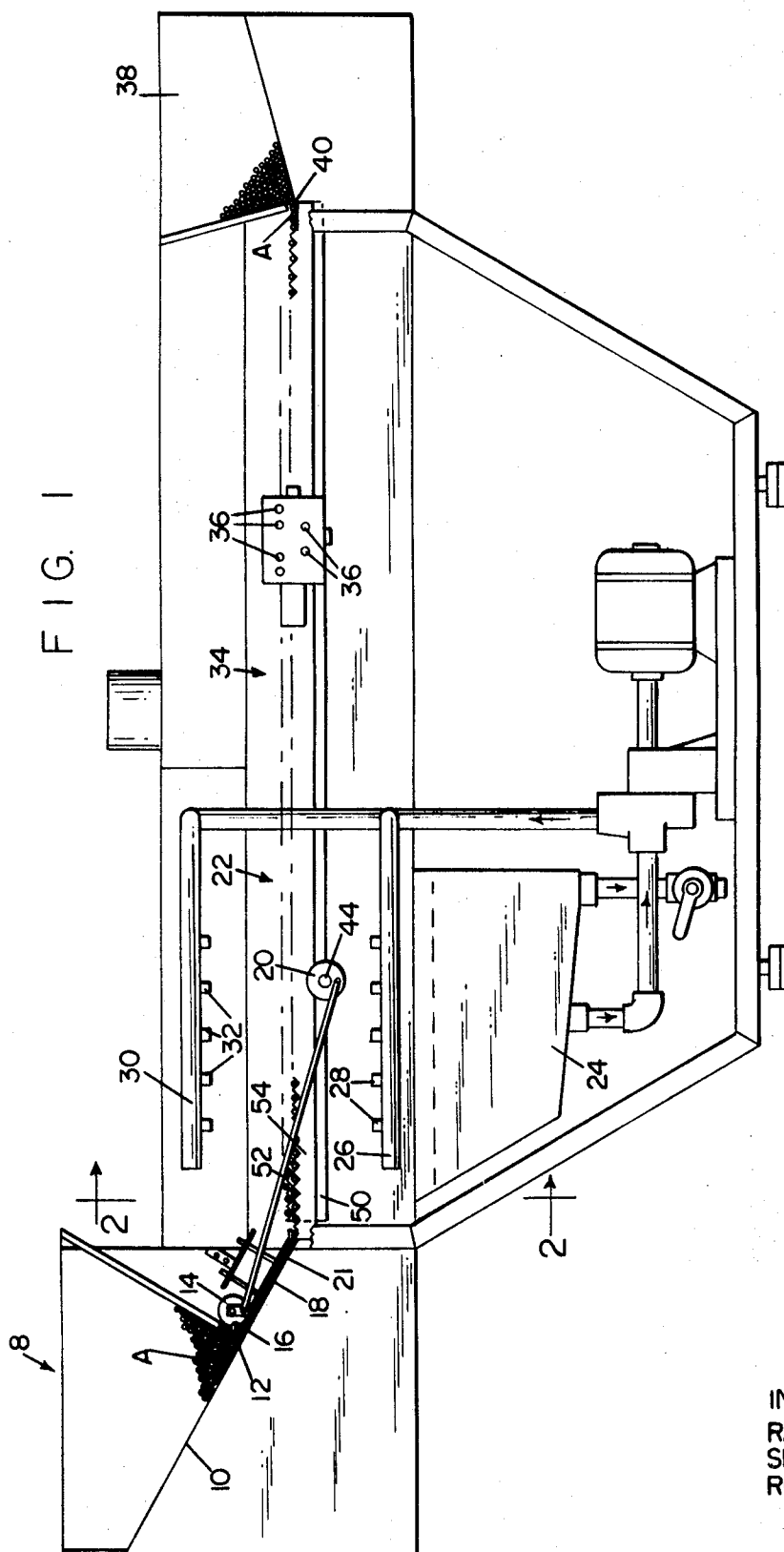
[52] U.S. Cl. **134/61,**
134/86, 134/102, 134/134, 134/151, 134/157,
198/33, 198/219

[51] Int. Cl. **B08b 3/02**

[50] Field of Search **134/61, 62,**
133, 82, 83, 94, 102, 134, 137, 151, 153, 157, 161;
118/320, 321, 58; 198/219, 33 R

ABSTRACT: Automatic machinery feeding ampoules one by one from a magazine, rotating the ampoules while advancing them through a spray mist water wash, through a compressed air drying area, and into an ampoule accumulator having a bottom feed.





INVENTORS
 RAYMOND A. DAY, JR.
 SHERWIN EPSTEIN
 ROBERT F. PULFER
 BY *Chas. R. Day*,
 ATTORNEY

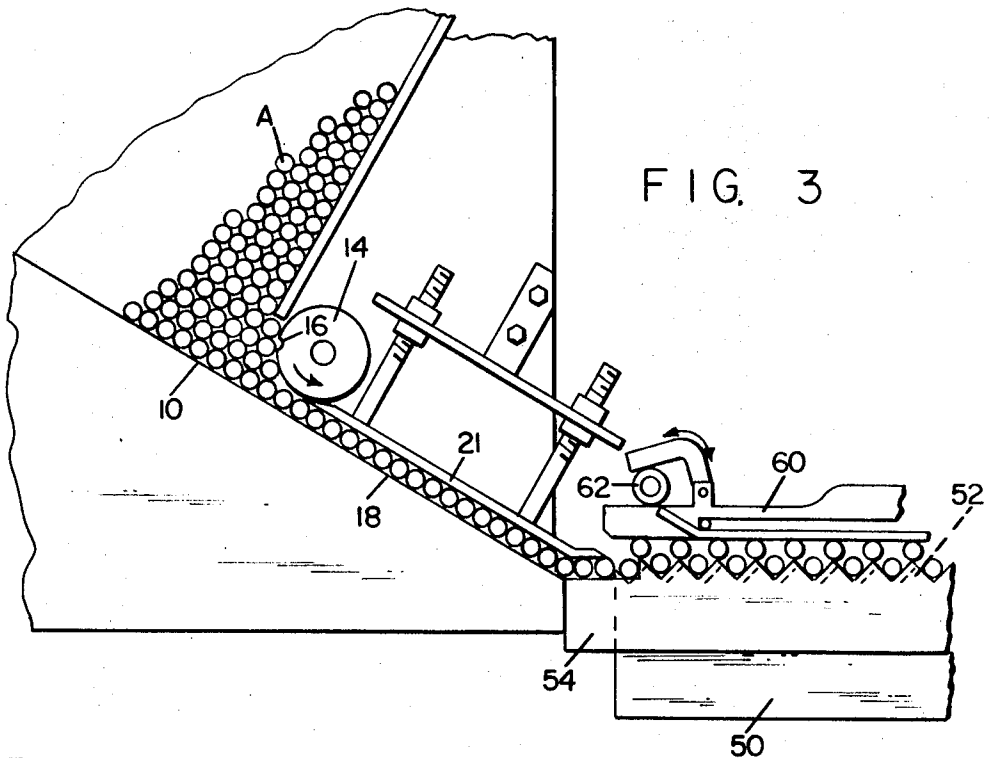


FIG. 3

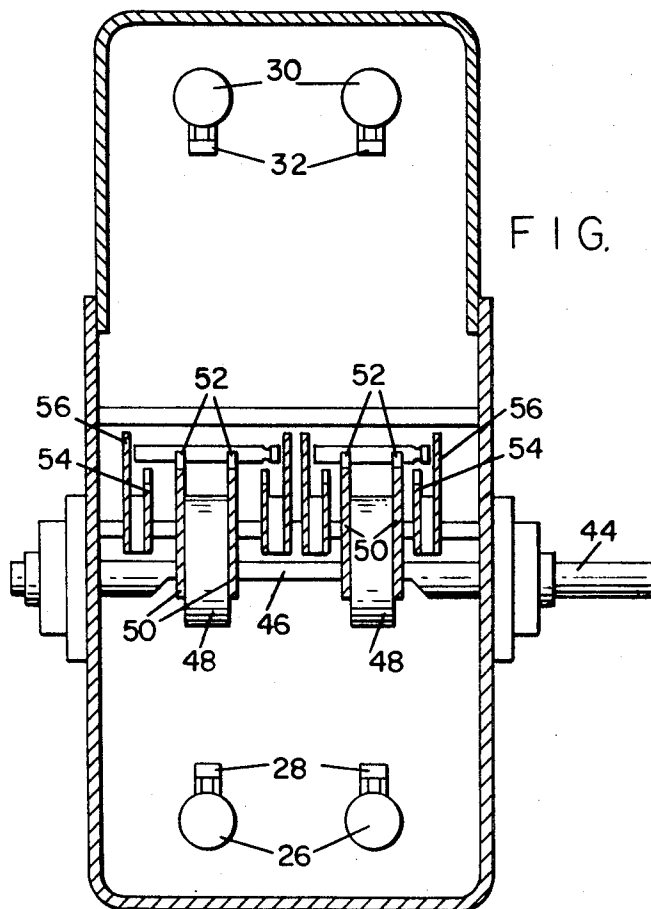


FIG. 2

INVENTORS
 RAYMOND A. DAY, JR.
 SHERWIN EPSTEIN
 ROBERT F. PULFER
 BY *Chas. R. Day*,
 ATTORNEY

AUTOMATIC WASHING AND DRYING MACHINE FOR AMPOULES

BACKGROUND OF THE INVENTION

When ampuls are filled with medicaments and capped or closed in any way, there is often overfill, etc. on the outside of the ampuls. The ampuls must be washed and this is ordinarily done by relatively simple machinery often in batches which is not fully satisfactory inasmuch as complete cleaning is not always provided. The present invention provides for a completely automatic complete washing and drying apparatus, the ampuls to be washed emerging one by one from a magazine or hopper, being washed, dried and stored in an accumulator without being touched by hand at any point; and they can be removed from the accumulator by any sterile means which may be convenient or desirable.

SUMMARY OF THE INVENTION

The washing and drying machine of the present automatic is completely enclosed. At one end thereof there is an automatic ampul magazine feed having an inclined bottom and a release exit with an oscillating member ensuring that the ampuls proceed down the incline parallel and in a single layer, single line. The ampuls descend to a conveyor of a walking beam type that picks up and advances the ampuls. The walking beam comprises two toothed members that are given a rotary motion and thus rise and fall and advance. This motion picks up the ampuls so that they proceed singly and separately through a washing chamber and a subsequent compressed air drying chamber. In the washing chamber there is a vertically reciprocating holddown that causes the ampuls to rotate as they pass by rows of nozzles above and below, so that all surfaces of the ampuls are flushed with the water.

The compressed area blows off the wash water remaining on the ampuls at a relatively high temperature and the combination of the high temperature and high velocity of the air, together with the rotating action, completely dries the ampuls.

The ampuls then pass of the exit end of the walking beam under a holddown bar which has an upward inclined bottom serving to keep the ampuls aligned and providing for an easy abstraction of the cleaned ampuls by any desired or convenient means.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in side elevation showing the entire machine with parts removed for clarity of illustration;

FIG. 2 is a section on an enlarged scale taken on line 2—2 of FIG. 1 and illustrating the walking beam construction;

FIG. 3 is an enlarged detail view showing the oscillating gate member of the magazine feed, the holddown bar for the ampuls, and the ampul-feeding action of the walking beam.

PREFERRED EMBODIMENT OF THE INVENTION

Referring now to FIG. 1 there is shown a magazine feed generally indicated at 8 which has an inclined bottom member 10, the ampuls being shown at A piled up in the magazine exiting at a port 12 where they are aligned and agitated by an oscillating gate member 14. The gate member 14 has a peripheral notch 16, the latter being on a curve smaller than the diameter of the respective ampuls. This oscillating member ensures that the ampuls will not stick together which would be possible otherwise, e.g. due to the overfill on the exteriors of the ampuls, and it also ensures that only one ampul will roll down the track 18 at a time. This oscillating member is oscillated by a crank or the like 20 which also serves to power the walking beam to be described. An adjustable guide bar 21 aids in holding the ampuls to a single layer.

The ampuls proceed down the incline onto the walking beam arrangement which separates the ampuls completely and travels them one by one through the water washing area which is generally indicated at 22, FIG. 1. In this area,

deionized water is maintained in a tank 24 and is pumped by more or less conventional means to a pipe 26 having nozzles 28 spraying water in a mist upwardly underneath the passing ampuls and also to a pipe 30 having nozzles 32 spraying water downwardly upon the ampuls as they pass along in the direction of the arrow to the right.

The walking beam then transfers the ampuls in a similar arrangement to the compressed air drying area 34 where a series of air nozzles as for instance at 36, 36 blast the water from the ampuls. There may be as many of these nozzles as may be necessary for the purpose, e.g., and the drying air may be heated if desired. It proceeds at a high velocity, completely drying the ampuls which then pass one by one upwardly into the ampul accumulator indicated at 38 from which they may be removed by any desired or convenient means. At the exit area which is indicated at 40 there is a guide maintaining the ampuls A in a contacting line so that they are delivered by the walking beam in substantially contacting relationship into the accumulator 38.

An adequate drive for the crank 20 is provided by any means not shown. Referring to FIG. 2, this drive also drives a shaft 44 rotating the same. Shaft 44 has a reduced cutout portion 46 which in turn rotates a member 40 upon which the walking beam 50 is mounted. The walking beam is shown as formed of a pair of spaced rails and has a saw-toothed upper edge at 52, 52. The walking beam has a rotary action which is imparted by the drive shaft 44, the part 46 acting in the nature of a crank so as to provide the ampuls individually and simultaneously with a steady advance. As shown in FIG. 2, the walking beam may be double, two lines of ampuls being conveyed at the same time.

At each side of the walking beam there is provided notched or saw-toothed fixed supporting members 54, 54. The walking beam raises the ampuls and carries the same slightly forwardly at each revolution, dropping any individual ampul into the next notch of the fixed sawtooth edge member 54. Side guides 56 which may be adjustable are provided to ensure that the ampuls do not shift endwise under the influence of the action of the machine and it is believed that it will be clear that the ampuls are moved from left to right through the machine by the rotational action of the walking beam both in its up and down motion and forward motion with respect to the ampuls which are intermittently supported by the top sawtooth edge of the fixed bars 54, 54.

Referring now to FIG. 3, there is shown on an enlarged scale a holddown bar assembly generally indicated at 60. This has been omitted from FIGS. 1 and 2 for clarity of illustration. The bar extends the length of the machine and it moves up and down as the ampuls are moved up and down, it being noted that all of the ampuls move together. Appropriate connections not shown oscillate a member 62 as from the main drive shaft at 20 so that the ampuls are in light contact with the under side of the holddown bar. Thus the ampuls rotate through friction with respect to the holddown bar as they progress, and this in turn ensures that both the wash and the drying actions will encompass every portion of the surface of each ampul for a complete wash and dry operation.

It will be seen that the operation of this machine is continuous as long as filled ampuls are provided for the hopper or magazine and the cleaned ampuls are removed periodically from the accumulator.

We claim:

1. An ampul washing and drying machine comprising a magazine for filled ampuls or the like, means providing for advance of the ampuls one by one to a washing area, an ampul feed member extending through the washing area and also through a subsequent drying area, means providing said member with an up and down and advance and retract motion,

means at both sides of the feed member providing a support for the ampuls as the feed member is lowered, the moving feed member raising the ampuls from the support and advancing the ampuls simultaneously in separated condition,

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means spraying the ampuls in the water wash area, compressed air drying the ampuls in the drying area, and an accumulator receiving the washed and dried ampuls, means rotating the ampuls as they are advanced, said last named means being substantially in constant contact with the ampuls.

2. The machine of claim 1 wherein the ampul-rotating means includes a holddown bar against which the ampuls are moved by the moving feed member for rotating the ampuls by contact with the holddown bar, and means to vertically reciprocate the holddown bar as the ampuls are lifted and lowered.

3. An ampul washing and drying machine comprising a magazine for filled ampuls or the like, means providing for advance of the ampuls one by one to a washing area, an elongated toothed member extending through the washing area and also through a subsequent drying area, means providing

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said toothed member with an up and down and advance and retreat motion,

means at both sides of the toothed member providing a similarly toothed edge at each side thereof in fixed relationship with respect to the machine, the moving toothed member raising and advancing all of the ampuls in the machine simultaneously from notch to notch between the teeth of the fixed members and in separated condition,

means spraying the ampuls in the water wash area, compressed air drying the ampuls in the drying area, and an accumulator receiving the washed and dried ampuls,

a holddown bar against which the ampuls are moved by the moving toothed member for rotating the ampuls by contact with the holddown bar, and means to reciprocate the holddown bar in accordance with the motion of the ampuls under influence of the toothed member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,604,435 Dated Sept. 14, 1971
Inventor(s) Raymond A. Day, Jr., Sherwin Epstein and
Robert F. Pulfer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 21 (specification, page 1, line 18),
"automatic" should read -- invention -- .

Column 1, line 62 (specification, page 3, line 5),
"oscillating" should read -- oscillatory -- .

Column 2, line 24 (specification, page 4, line 11),
"member 40" should read -- member 48 -- .

Claim 1, column 3, lines 5 and 6 (original Claim 6, as amended), after "named means" insert -- extending through the washing and drying area and -- .

Signed and sealed this 4th day of April 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents