March 2, 1943. F. PAYMENT 2,312,438

BOTTLE CHUTE

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Fig. 1.

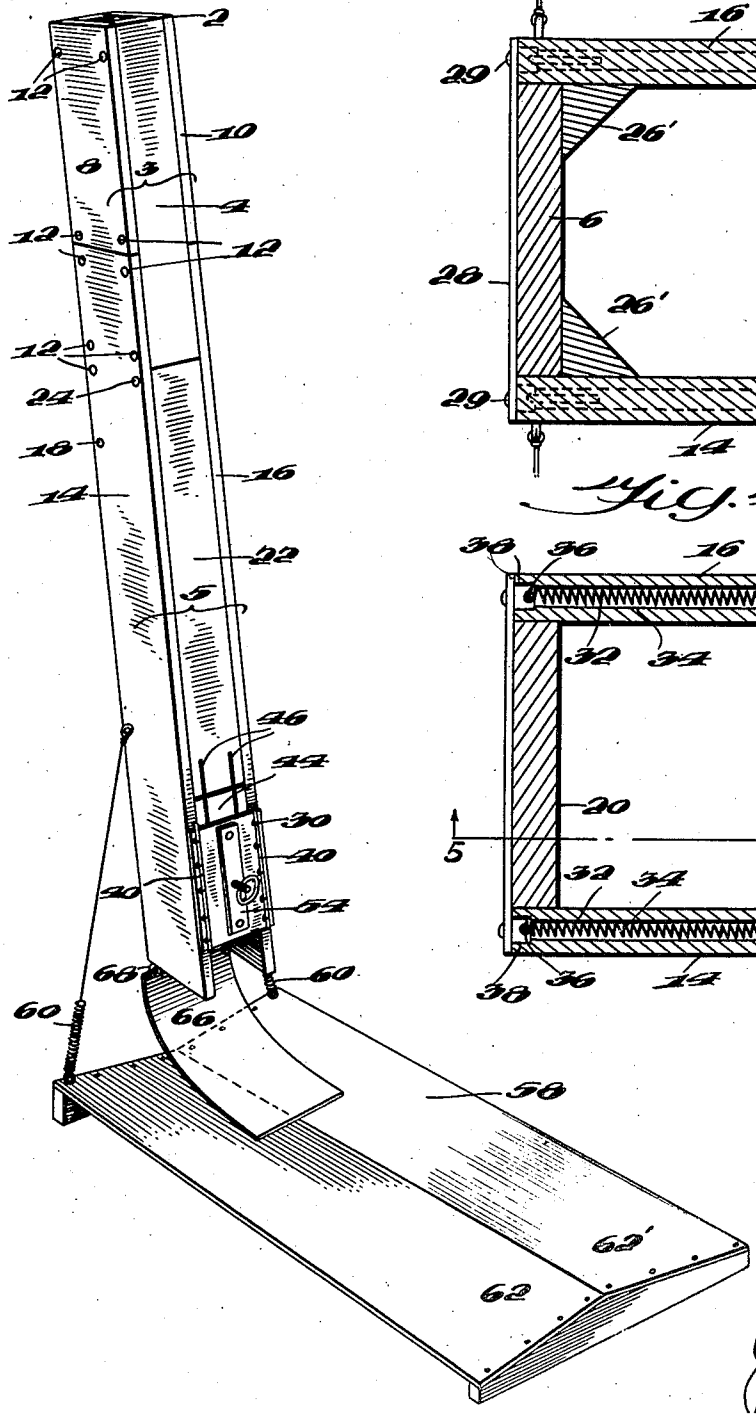


Fig. 3.

Fig. 4.

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Fig. 2.

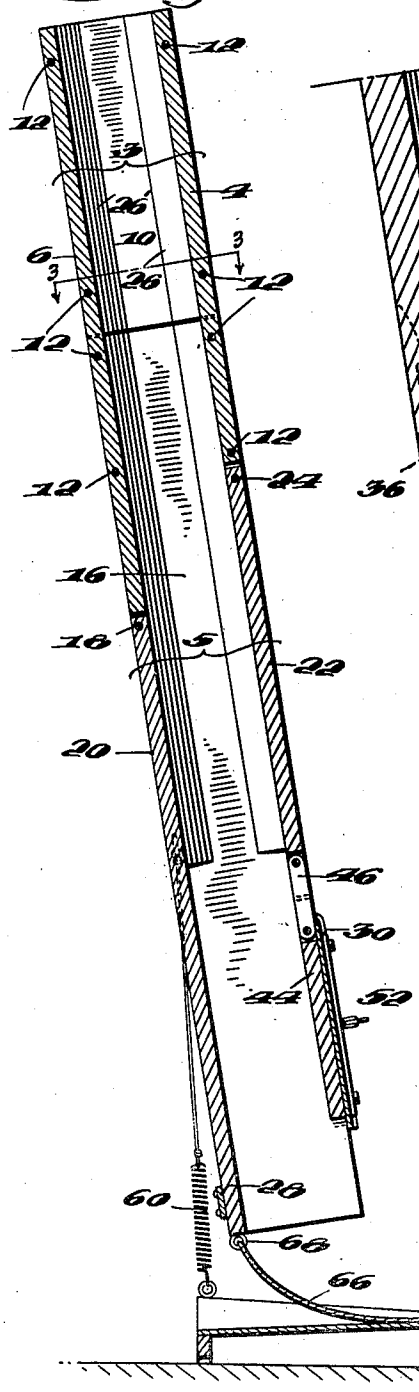
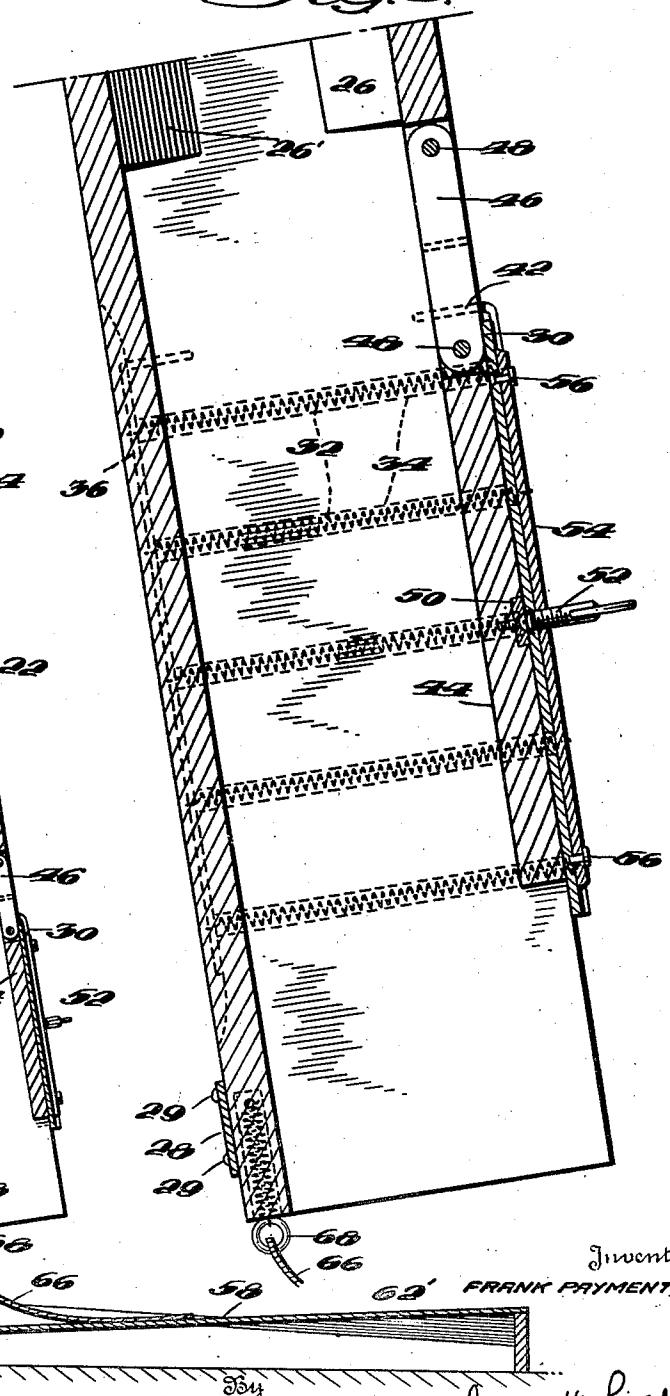


Fig. 5.



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Patented Mar. 2, 1943

2,312,438

UNITED STATES PATENT OFFICE

2,312,438

BOTTLE CHUTE

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Application January 16, 1942, Serial No. 427,058

10 Claims. (Cl. 193—32)

This invention relates to a bottle chute and, more particularly, to a chute for guiding bottles down a vertical or inclined path, and a retarder for overcoming the gravitational forces of the downwardly sliding bottles.

One of the objects of this invention is to provide a bottle chute having a retarder, the principal retarding effect of which occurs near the bottom of the chute. Another object, however, is to provide a retarding mechanism, a portion of which extends along the major part of the length of the chute. Still again, an object of this invention is to provide a retarding mechanism having a gradually increasing retarding effect which, at the upper portion of the chute, serves to decrease the speed of the bottles slightly as they pass through the upper portion of the chute and then gradually to decrease the speed of the bottles as they approach the lower end of the chute.

Still another object is to provide a bottle chute formed of rigid elements resiliently mounted whereby to prevent breakage ordinarily resulting when bottles hit against rigid elements. Additonally, it is proposed to combine the functions of the retarding mechanism and the resiliently yieldable elements to provide a self-cleaning bottle chute.

Yet another object is to provide for the adjustment of the retarding mechanism near the lower end of the chute so that the velocity of the bottles as they emerge from the lower end may be altered. A further object is to provide a structure automatically correlating the retardation of the lower and upper retarding elements so that when the lower elements are adjusted for increased retarding effect, the retarding effects of the upper elements are simultaneously increased. Still again it is proposed to provide retarding elements in the upper portion of a bottle chute having a constant retarding effect near their upper ends, but in which the ratio of retardation between the lower and upper ends may be increased; that is, it is intended to provide a chute wherein no matter how greatly the velocity of the bottles may be decreased by the retarding structure at the lower end, the bottles will always be initially retarded gradually.

Still another object is to provide, in combination with the bottle chute, a receiving table resiliently supported at the lower end thereof for gently receiving the bottles emerging from the lower end of the chute. It is further proposed to provide inclined surfaces on the receiving table for guiding the bottles from the path of succeeding bottles emerging from the lower end of the chute.

These and other objects will appear from the following specification and drawings in which:

Figure 1 shows the combined bottle chute and receiving table in perspective;

Figure 2 is a vertical section taken through the chute and receiving table;

Figure 3 is a horizontal section along the lines 3—3 of Figure 2;

Figure 4 is a horizontal section along the lines 4—4 of Figure 2; and

Figure 5 is a vertical section along the lines 5—5 of Figure 4.

Referring first to Figures 1 and 2, reference numeral 2 denotes a bottle chute which comprises an elongated hollow body rectangular in cross section preferably formed principally of wood. Metal composition board, or other suitable rigid material may be used, however. For convenience in assembly, the chute is formed of upper and lower sections indicated by brackets 3 and 5, respectively, fitted together, the upper section including fixed front, rear and side walls 4, 6, 8 and 10, respectively, rigidly secured to one another by bolts 12. It will be seen that the upper section 3 is separable as a unit from the lower section 5 which includes fixed lower side walls 14 and 16 rigidly secured to fixed front and rear walls 4 and 6 by bolts 12. Immediately below the lower edge of fixed rear wall 6, a pintle 18 pivotally supports a lower rear wall section 20, the lower end of which is swingable forwardly and rearwardly. In the front of the chute an intermediate section 22 of the front wall of the chute is pivoted at its top by pintle 24 so tht the lower end of section 22 may also be swung forwardly and rearwardly. Pivoted front and rear wall sections 20 and 22 are normally held parallel with the upper wall sections 4 and 6 by four resilient guide strips, comprising front and rear pairs 26, 26', respectively, the upper ends of which are rigidly secured in the corners of the chute near the upper end thereof and extend finger-like down into the intermediate portion of the chute. It is thus seen that strips 26 resiliently resist rearward movement of front wall section 22 and likewise resist forward swinging of rear wall section 20 so that if it becomes necessary to clear the chute of bottles lodged therein, either of wall sections 20 or 22 may be pushed inwardly after which strips 26 return them to normal position. When wall section 20, for instance, is pushed inwardly, a bottle lodged thereagainst is pushed against wall section 44

which yields resiliently against the tension of springs 32 so that when wall sections 20 and 44 return to their normal position, a kneading action is accomplished, thus to straighten out a bottle which has become stuck by being tilted, and simultaneously to shake the bottle downwardly. Additionally, when front wall section 22 is compressed rearwardly, the distance from strips 26 to strips 26' is decreased, particularly at their lower ends. At the lower end of Figures 2 and 5, a stop 28 comprising a transverse strip secured to side walls 14 and 16 by screws 29, prevents outward displacement of the lower end of the pivoted rear wall section 20.

Referring particularly to Figures 4 and 5, a clutch plate 30 is resiliently mounted adjacent the lower end of the chute and by springs 32 extends through bores 34 through the side walls 14 and 16, the rear ends of springs 32 being looped around rods 36 fitted in vertical slots 38 in the rear edges of the side walls. The front ends of the springs, which extend through suitable openings in plate 30, are looped around rods 40, the upper ends 42 of rods 40 being slidably engaged in suitable openings in the side walls, so that plate 30 may be moved forwardly against the tension of springs 32.

The front wall assembly is completed by lower section 44 suspended by links 46 from the lower end of pivoted section 22, the links 46 fitting into slots therefor and secured by pintles 48 to sections 22, 44. As shown in Figures 4 and 5, lower front wall section 44 is provided with a shoe 50 abuttingly engaged by screw 52 threaded through a strip 54 which is riveted at 56 to plate 30 so that when screw 52 is threaded inwardly, lower wall section 44 is thereby forced rearwardly.

The operation of the chute structure described above is as follows: When a bottle is placed in the upper end of the chute 2 and released, it drops downwardly between guide strips 26. The lower ends of guide strips 26 are normally held slightly pressed towards one another by lower front wall section 44 which, in turn, is normally resiliently held by springs 32 so that the distance between strips 26 and strips 26', and the distance between the inner sides of the front and rear walls 20 and 44, is slightly less than the diameter of the bottles. Thus, the velocity of the downwardly sliding bottles is gradually decreased as they pass between strips 26. When the bottles engage the inner surface of lower front wall section 44, it resiliently swings forwardly against the tension of springs 32, thus to absorb most of the energy from the downwardly falling bottles. Being suspended by links 46, section 44 moves slightly downwardly as well as forwardly under the force of falling bottles to decrease the impact thereon. The final speed of the bottles as they emerge from the lower end of the chute may of course be predetermined by adjustment of screw 52 which determines the ultimate resistance of springs 32. It should be noted, however, that when screw 52 is rotated to swing section 44 inwardly and thus increase the retarding effect of springs 32, a slight rearward force is simultaneously exerted against section 22, thus, in turn, to compress the lower ends of strips 26 towards the lower ends of strips 26'.

A particular advantage results from the articulation of sections 44 and 22 through links 46 in that the chute is self-cleaning. That is, if a bottle should stick between sections 20 and 44, the next succeeding bottle engaging strips 26 swings section 22 forwardly, thus to lift section 44 slightly upwardly and forwardly to free the lodged bottle before the next one reaches it.

At the lower end of chute 2, a receiving table 58 is resiliently supported by springs 60, table 58 being provided with inclined upper surfaces 62, 62' which form a V at the upper end of the table and an inverted V at the bottom of the table for deflecting the bottles to one side or the other from the path of the succeeding bottles emerging from the lower end of the chute. Finally a curved deflector plate 66 is pivoted at 68 at the lower end of the chute for guiding the bottles to the table. Receiving table 58 may also be used for inspecting and sorting bottles, which, by slight manual manipulation, may be deflected to one side or the other to roll down the inclined surfaces 62 or 62'.

In practice, the chute may be of considerable length so as to extend between two or more floors and the receiving table may likewise be sufficiently long to accommodate a number of operators, the portions and dimensions shown being only by way of example and not of limitation.

I claim:

1. A bottle chute for guiding bottles dropping along a substantially vertical path, comprising an elongated body of rigid material having open upper and lower ends and a passage therebetween, means in said chute for retarding the descent of said bottles, said body having a substantially flat wall section, means pivoting said section to said body, the lower end of said section hanging freely downward and being swingable transversely of said path whereby to clear said chute, a stop on said casing for engaging said section to prevent the lower end thereof from swinging in one direction substantially beyond alignment with the remainder of said body, and resilient means engaged between said body and said section resiliently to resist swinging of said section in the opposite direction substantially beyond said alignment.

2. A bottle chute for guiding bottles dropping along a substantially vertical path, comprising an elongated body of rigid material having open upper and lower ends and a plurality of walls defining a passage therebetween, one of said walls comprising upper and lower portions, said lower portion being pivoted to said body for swinging transversely of said passage, an elongated guide element of flexibly resilient material having the upper end thereof rigidly affixed to the inside of said casing adjacent said upper portion and having the lower end thereof overlapping against said lower portion whereby resiliently to resist inward swinging of said lower portion transversely of said passage, and stop means on said body for limiting outward swinging of said lower portion.

3. The combination claimed in claim 2, and means in said body opposite said lower portion for retarding the descent of said bottles.

4. A bottle chute for guiding bottles dropping along a substantially vertical path comprising, in combination, an elongated hollow body having open upper and lower ends and a pair of opposed wall sections, each of said sections having an upper portion rigidly affixed to the adjacent portions of said body and a lower portion pivotally affixed thereto whereby for swinging transversely of said path, a plurality of elongated, flexibly resilient guide members having their upper ends affixed to the inside of said body adjacent said upper portions and having their lower ends overlapping and respectively lying adja-

cent said lower portions resiliently to resist inward swinging of said lower portions, stop means on said body for limiting the outward swinging of one of said lower portions, and adjustable resilient means for urging the other of said lower portions inwardly.

5. In a bottle chute for guiding bottles dropping along a substantially vertical path, an elongated hollow body having open upper and lower ends and a plurality of walls defining an elongated passage therebetween, one of said walls comprising upper and lower portions, means pivoting said upper portion to the adjacent wall portions whereby to allow the lower end of said upper portion to swing inwardly, means pivoting the upper end of said lower portion to the lower end of said upper portion whereby to allow said lower portion to swing inwardly, adjustable means for selectively holding said lower portion in any one of a plurality of inwardly swung positions, and resilient means for resisting outward movement of said adjustable means.

6. In the combination claimed in claim 5, resilient means engaged between said upper portion and the adjacent portions of said body yieldably to resist inward swinging of the lower end of said upper portion.

7. The combination claimed in claim 5, the means pivoting the upper end of said lower portion to the lower end of said upper portion comprising link means whereby to swing said lower portion about two spaced axes.

8. In a bottle chute for guiding bottles dropping along a substantially vertical path, an elongated hollow body substantially rectangular in cross-section having open upper and lower ends and front, rear and two side walls of flat, rigid material, said rear wall comprising an upper portion rigidly affixed to said side walls and a lower portion pivotally affixed at its upper end between said side walls, said front wall comprising an upper portion rigidly affixed to said side walls, an intermediate portion pivotally affixed at its upper end between said side walls, and a lower portion pivoted at its upper end to the lower end of said intermediate portion, a plate lying in front of said lower portion, spring means yieldably holding said plate against the fronts of said side walls, and threaded means on said plate engaging said lower portion selectively to force said lower portion inwardlly.

9. In a bottle chute as claimed in claim 8, a plurality of elongated resilient guide strips respectively affixed at their upper ends to the inner corners of the upper portion of said body, the lower ends of said strips overlapping and respectively abutting the lower portion of said rear wall and the intermediate portion of said front wall.

10. In a bottle chute comprising an elongated hollow body having open upper and lower ends and an elongated passage therebetween, an elongated receiving table, means resiliently suspending one end of said table from the lower end of said chute, the surface of said table being of inverted V-shape in cross-section with the ridge of the V aligned with the lower end of said chute for deflecting bottles moving therealong from the path of succeeding bottles emerging from said chute.

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