Oct. 6, 1953 D. E. STEM 2,654,478

METHOD AND APPARATUS FOR AUTOMATICALLY SEPARATING UNDERWEIGHT CANS FROM NORMAL WEIGHT CANS

Filed May 31, 1949

Fig. 1

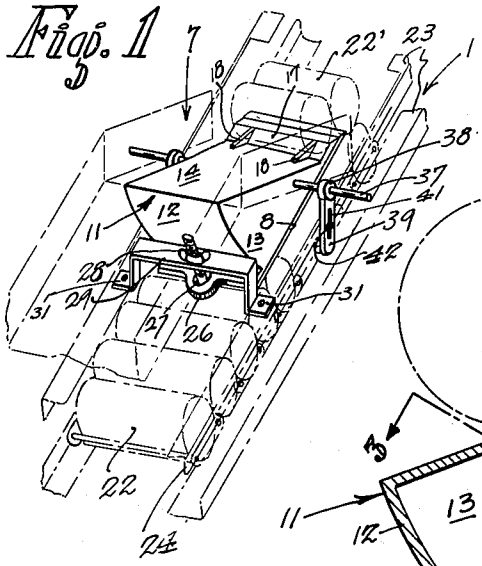


Fig. 2

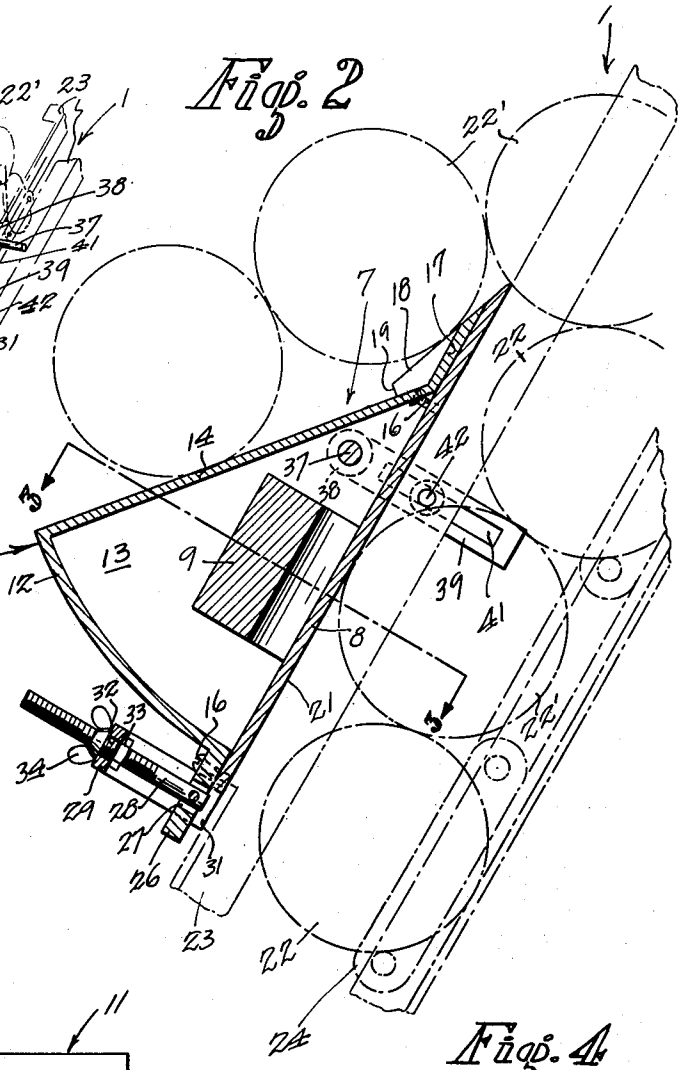


Fig. 3

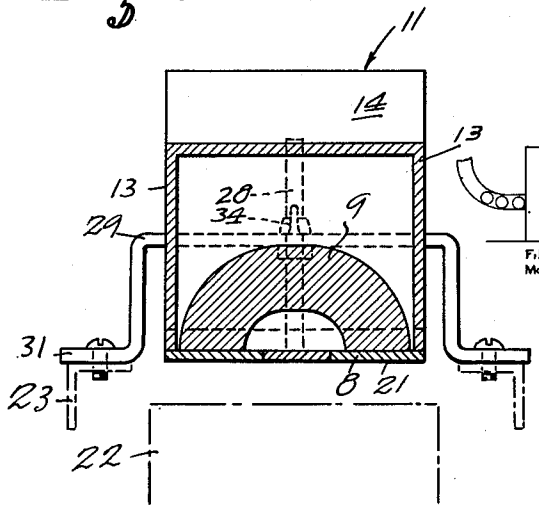
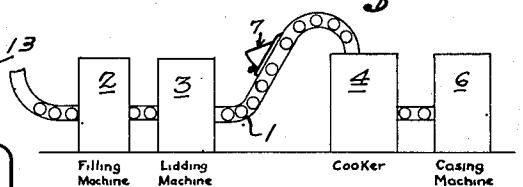


Fig. 4



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Patented Oct. 6, 1953 2,654,478

UNITED STATES PATENT OFFICE

2,654,478

METHOD AND APPARATUS FOR AUTOMATICALLY SEPARATING UNDERWEIGHT CANS FROM NORMAL WEIGHT CANS

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Application May 31, 1949, Serial No. 96,381

14 Claims. (Cl. 209—121)

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This invention relates to a light can eliminator method and device, particularly adapted for use in canned food processing methods and devices.

Cans are usually filled in a can filling device then passed through a lidding device or sealer, and then passed through processing devices and to a casing device. Frequently cans, by accident or failure of a part of the machine, are unfilled or only partially filled by the filling device and then the lid is secured on empty or partially filled cans. Such light cans cause jamming of the can handling devices. For instance such a light can has a tendency to float on the liquid in a processing machine and thus would get off or turn crosswise on the tracks of the machine and thus be dented, mashed, or otherwise become entangled with moving parts of the machine, with attendant waste and damage to canners.

Heretofore light cans were detected and with some effect eliminated by compressed air or steam jets blown across a point of the conveyor path on which the cans were transported between adjacent processing devices. The air or steam blows lighter cans off the conveyor and unto a discharge or reject device. The operation of such prior devices was very expensive, involving high expense for upkeep.

The herein invention provides an eliminator without any expense for operation or upkeep, and at a comparatively low initial cost, and which device and method eliminates positively all so called floaters, namely cans which may float on the liquid in the processing machine.

My method and device provides a positive magnetic pick up at a suitable point on the path of the cans after the filling operation. The cans are passed through a magnetic field capable of attracting light cans, and then the attracted cans are removed from the series of filled cans.

The features of my invention include the provision of a magnet or magnetic device to shift or lift light cans, and to guide them away from the properly filled cans; also the arrangement whereby the properly filled cans push the magnetically attracted can out of the way; also a highly efficient magnetic device and adjustable mounting of the same on a cam conveyor path.

I am aware that some changes may be made in the general arrangements and combinations of the several devices and parts, as well as in the details of the construction thereof without departing from the scope of the present invention as set forth in the following specification, and as defined in the following claims; hence I do not

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limit my invention to the exact arrangements and combinations of the said device and parts as described in the said specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, reference is had to the accompanying drawings for the illustrative embodiment of the invention, wherein:

Fig. 1 is a perspective view of my magnetic light can eliminator, the adjacent portions of the can elevator being shown in broken lines.

Fig. 2 is a sectional view of my magnetic device, the cans and can conveyor and path being shown in broken lines.

Fig. 3 is a sectional view of my magnetic device, the section being taken on the lines 3—3 of Fig. 2, and

Fig. 4 is a diagrammatic view of the process steps with which the step of my magnetic can elimination is combined.

As shown in Fig. 4, the cans, moving on a substantially continuous conveyor path 1, are first filled in a filling machine 2, and the filled cans are then carried through a so-called lidding machine or sealer 3, wherein a lid is fixed on the cans. Then the cans are introduced into a so-called cooker 4, or other processing machines, and finally the cans are packed by a casing machine 6, or by hand. After the cans are filled the cans are passed through a magnetic field at any suitable point of operation. The magnetic field is applied anywhere on the conveyor path, for instance by a magnetic device 7 at a point preceding the cooker 4.

The magnetic device 7 is strong enough to attract empty cans or partially filled cans under a given weight, and such cans are lifted or shifted out of the series of properly filled cans and guided away from the processing line. In the herein illustrative embodiment of the method the light cans are shifted or lifted partly out of line, but sufficiently close to the conveyor elements or to the remaining cans thereon to be pushed by the conveyor or by the full cans along the magnet and onto a rejecting guide, on which the rejected cans can roll by gravity to a suitable collector.

The specific illustrative embodiment of my magnetic device includes a magnetic plate 8 with a magnet 9 of suitable strength thereon, and a non-magnetic cover or shield 11 covering the top of the plate 8 and the magnet 9.

The cover or shield 11 includes an end wall 12,

generally triangular side walls 13, and an inclined top guide wall 14, which inclines from the top of the end wall 12 to the other end of the plate 8. The shield 11 supports the plate 8 by suitable fasteners, such as screws 16.

The converging end portion 17 of the top guide wall 14 has a pair of spaced guide ribs 18 which lead from the adjacent end of the plate 8 and slope away from said plate toward and above the narrower portion of said guide wall 14. The outer ends 19 of said guide ribs 18 are cut away so as to form stop abutments to prevent return rolling of cans thereover.

This magnetic device is mounted above the conveyor path 1, so that the exposed face or bottom 21 of the plate 8 is spaced above the cans 22 traveling on said conveyor path 1. In the present illustration the conveyor path consists of spaced rails 23, between which moves a chain conveyor 24 upwardly on an incline.

The cans 22 are carried by the conveyor 24 upwardly. The plate 8 is parallel with the conveyor 24 and is so arranged that the converging end 17 of the top guide wall 14 is at the higher level, and said wall 14 slopes downwardly and away from the conveyor, as shown in Fig. 2.

On the end wall 12 is a flange 26 with a hole 27 therein in which latter is pivotally secured the lower end of a suspension bolt 28. A U-shaped bracket 29 has its end flanges 31 secured to the opposite top rails 23 of the conveyor frame. The suspension bolt 28 extends through a hole 32 in the middle of the bracket 29. A lock nut 33 and a wing nut 34 on the opposite sides of the hole 32 adjustably fix the location of the bolt 28 in said bracket 29. By raising or lowering the bolt 28 in the bracket 29, the adjacent end of the magnetic plate 8 can be adjusted with respect to the conveyor path 1.

A mounting bar 37 extends through the narrower corners of the shield sides 13 and has its ends journalled in the tops 38 of bracket arms 39. Each bracket arm 39 has a longitudinal slot 41 therein, through which extends a suitable mounting bolt 42 to secure the arm 39 to the side of the adjacent top rail 23. By loosening the bolts 42 the arms 39 can be shifted to desired positions to adjust the spacing of the plate 8 above the conveyor path 1.

In operation the light can 22' is picked up and is rolled on the magnetized plate 8 as it is pushed by the conveyor or by the follower cans 22 as the case may be. The light can 22' is thus pushed up and around the upper edge or top of the plate 8, and it pushes the preceding light can 22' unto the ribs 18. This preceding light can 22' is thus insulated from the magnetic plate 8 and is allowed to roll down the top plate 14 and away from the conveyor to any suitable place of collection not shown.

I claim:

1. A magnetic device for eliminating articles under a predetermined weight from a series of articles moved on a conveyor path, comprising a magnetic plate, a magnet on said plate, a non-magnetic top cover for the magnet and plate to guide articles passed around said end of said plate forming a non-magnetic guide inclined away from an end of said plate, and non-magnetic mounting elements to mount said plate and said magnet and guide with the plate exposed in spaced relation to said conveyor path.

2. A light can eliminator comprising a magnetic plate adapted to extend over a can path, a magnet to magnetize said plate, and a non-magnetic guide on the can magnet and of said plate to guide cans pushed around said end of said plate converging toward an end of the plate, and non-magnetic mounting elements for said guide and plate adapted to be secured to a can conveyor path to lift light cans from said path.

3. A light can eliminator comprising a magnetic plate adapted to extend over a can path, a magnet to magnetize said plate, and a non-magnetic can and guide on the backside of the magnet and of said plate converging toward an end of the plate to guide cans pushed around said end of said plate, and non-magnetic mounting elements for said guide and plate adapted to be secured to a can conveyor path, said mounting elements including brackets adapted to be attached to a conveyor frame, and adjustable securing means between the brackets and said non-magnetic guide, said plate and magnet being held on the guide so that the exposed face of said plate faces toward said conveyor to lift cans under a predetermined weight off of said conveyor.

4. The combination with a conveyor conveying a series of filled cans of magnetizable material placed on their sides on said conveyor, of a magnet above said conveyor and the path of said filled cans for attracting cans under a predetermined weight and lifting them out of alignment with said series, said magnet being spaced from said cans on said conveyor at a distance less than the diameter of the cans thereunder so as to hold attracted said underweight cans within said path to be pushed by the proper weight cans along said magnet, and a device for guiding said pushed underweight cans away from said series of proper weight cans.

5. The combination with a conveyor conveying a series of filled cans of magnetizable material placed on their sides on said conveyor, of a magnet above said conveyor and the path of said filled cans for attracting cans under a predetermined weight and lifting them out of alignment with said series, said magnet having a discharge end for said underweight cans and being spaced from said cans on said conveyor at a distance less than the diameter of the cans thereunder so as to hold attracted said underweight cans within said path to be pushed by the proper weight cans along said magnet and around and above said discharge end of said magnet, and non-magnetic guide means at said discharge end of said magnet to insulate said pushed cans from said magnet and guide them away therefrom.

6. The combination with a conveyor conveying a series of filled cans of magnetizable material placed on their sides on said conveyor, of a magnet at said conveyor opposite and along and spaced from said cans on said conveyor, for lifting cans under a predetermined weight away from said series, said magnet including a plate magnetized by said magnet and extended along said conveyor, the end of said plate toward the discharge of said conveyor being free, and non-magnetic guides on the side of the plate farthest from said conveyor extended from said free plate end to guide the rolling away of lifted underweight cans from said free plate end.

7. A separator for underweight cans of magnetizable material, said separator comprising a magnetized plate mounted adjacent a path of said cans to face the latter with one of its sides, a non-magnetic guide on the other side of said magnetized plate converging toward an end of

said plate to guide underweight cans moving therealong around said end of said plate.

8. A separator for underweight cans of magnetizable material conveyed in side by side series together with cans of proper weight along a path, said separator comprising a magnetizable plate adapted to extend a short length along said path, a magnet on the side of said plate opposite said path to magnetize said plate, and a non-magnetic can guide backside of said magnet and of said plate converging toward an end of said plate to guide cans moved around said end of said plate, and non-magnetic mounting elements for said guide and said plate adapted to secure said separator to said can path to divert underweight cans from said path.

9. In a process of separating underweight cans of magnetizable material in food canning from proper weight cans, the steps of conveying filled cans in side by side series along a path, magnetically displacing said underweight cans within said path and shifting said magnetically displaced underweight cans out of said path under the action of said proper weight cans moving along said path and remaining in said series.

10. In a process of separating underweight cans of magnetizable material in food canning from proper weight cans, the steps of conveying filled cans in side by side series along a path, magnetically displacing said underweight cans within said path and shifting said magnetically displaced underweight cans out of said path under the action of the conveying force.

11. In a process of separating underweight cans of magnetizable material in food canning from cans having the proper weight, the steps of conveying filled cans in side by side series along a path, magnetically displacing said underweight cans within said path, shifting said magnetically displaced underweight cans out of said path under the action of said proper weight cans moving along said path and remaining in said series, freeing said underweight cans from the magnetic action and guiding said underweight cans thus freed away from said series.

12. In a process of separating underweight cans of magnetizable material in food canning from cans having the proper weight, the steps of conveying filled cans in side by side series along a path, magnetically displacing said underweight cans within said path, shifting said magnetically displaced underweight cans out of said path under the action of the conveying force, freeing said underweight cans from the magnetic action and guiding said underweight cans thus freed away from said series.

13. In combination with a conveyor path on which are carried filled cans of magnetizable material in a side to side series, an underweight can separator comprising a magnet mounted along said conveyor path, the spacing between said magnet and said cans on said conveyor path being less than the diameter of said cans so that underweight cans shifted within said path out of alignment with said series under the action of said magnet partially overlap into said series and being pushed by the proper weight cans remaining in said series along said magnet, and means at the end of said magnet to free said shifted underweight cans from the attraction of said magnet and to guide them away from said series of cans.

14. In combination with an inclined conveyor path on which are carried and upwardly conveyed filled cans of magnetizable material in a side to side series, an underweight can separator comprising a magnet mounted along and substantially parallel with respect to said conveyor path and having an upper end, the spacing between said magnet and said cans on said conveyor path being less than the diameter of said cans so that underweight cans displaced within said path out of alignment with said series under the action of said magnet partially overlap into said series and being shifted by the proper weight cans remaining in said series along and around said magnet, and means at said magnet end to free said shifted underweight cans from the attraction of said magnet and to guide them away from said series of cans.

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