Dec. 14, 1954 C. J. MALHIOT 2,696,941

AGITATING MECHANISM FOR CARTON FILLING MACHINES

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FIG. 1

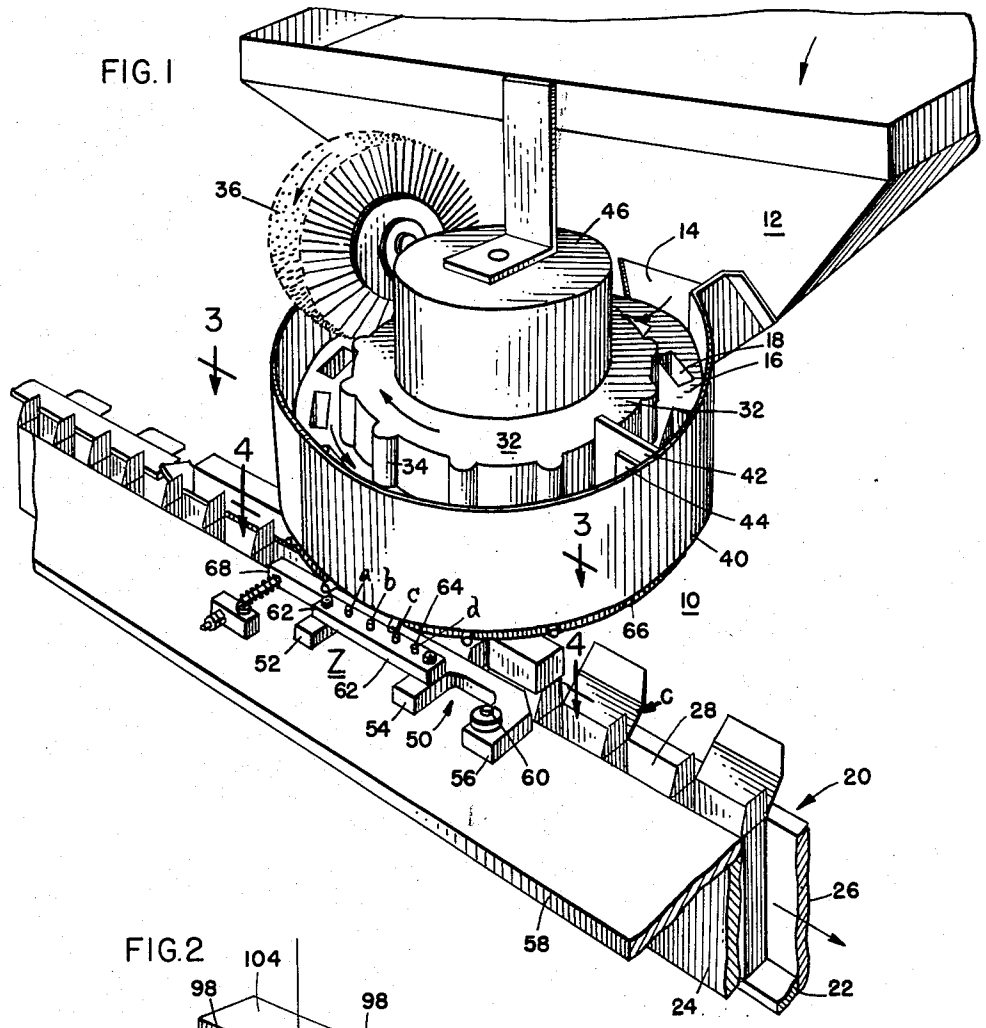
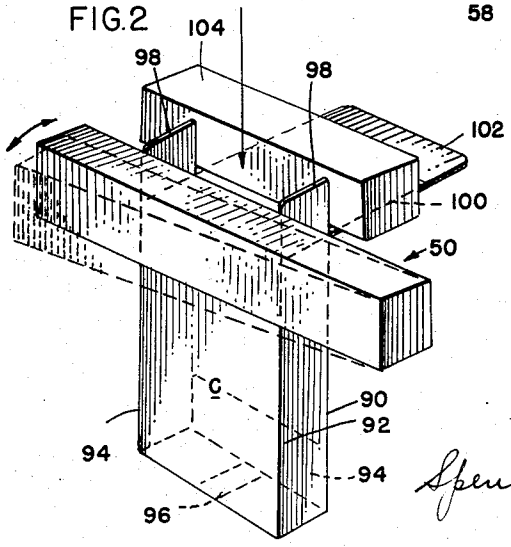


FIG. 2



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FIG. 3

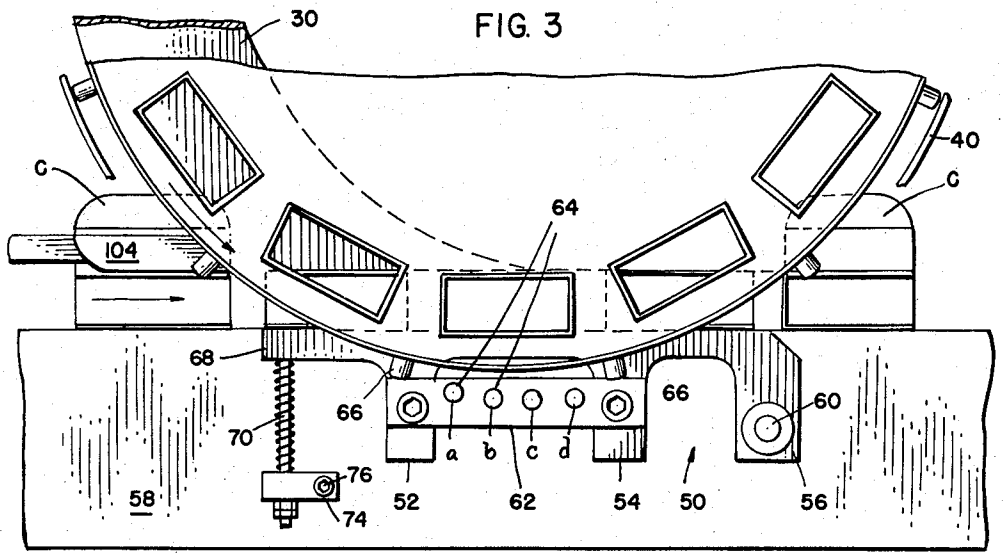
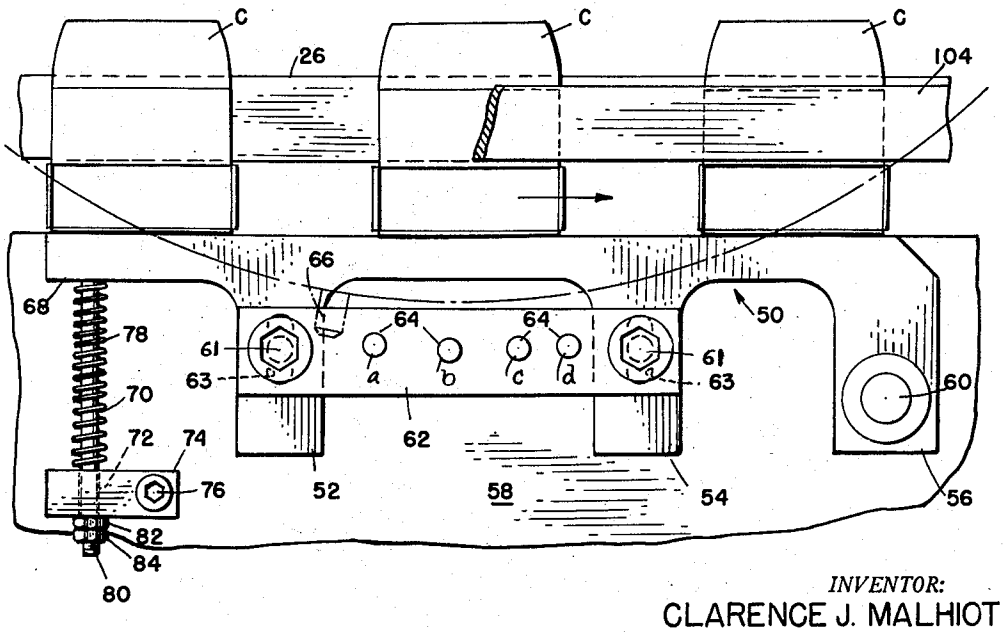


FIG. 4



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United States Patent Office

2,696,941

Patented Dec. 14, 1954

2,696,941

AGITATING MECHANISM FOR CARTON FILLING MACHINES

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Application October 7, 1950, Serial No. 189,009

13 Claims. (Cl. 226—95)

The present invention relates to carton filling machines of the general type wherein a series of open ended containers or cartons carried on a straight line conveyor are passed through a filling zone and are fed with the material or with the articles undergoing packaging from a series of measuring pockets or so-called measuring cups provided in a rotary transfer wheel by means of which the material or articles are transferred from a hopper and delivered to the containers or cartons.

More specifically, the invention relates to an agitating mechanism whereby the articles delivered at the filling zone to the containers or cartons may be agitated so as to cause the same to quickly enter the cartons through the filling opening thereof and assume a compact relationship within the carton and thus prevent the presence of voids in the carton or the piling up of the articles in the vicinity of the filling opening.

One of the principal objects of the present invention is to provide an agitating means of the character briefly outlined above which is extremely simple in its construction and which may readily be incorporated with machines of the general type set forth above, or which may be economically installed on existing machines.

A further object of the present invention is to provide an agitating mechanism of this sort which derives its power by impact from a rotating part of the machine, thus eliminating the necessity of providing extraneous vibrating mechanism, or the like.

A still further object of the present invention is to provide an agitating means in the form of an agitator bar which normally is positioned along the path of movement of the open ended cartons through the filling zone and which is caused to vibrate or oscillate throughout a slight arc during passage of the cartons through the filling zone so as to engage the material delivered by gravity from the measuring cups of the transfer wheel into the open ended cartons and agitate the same so as to facilitate delivery of the articles into the cartons and so as to insure substantial levelling of the composite mass of articles after they have been released into the cartons.

Another object of the invention is to provide an agitating bar of the character set forth above which derives its oscillating or vibrating motion by a repeated cam action effected by a series of projections on the transfer wheel and a series of protuberances on the agitating arm which are placed in the path of movement of the projections and which are adapted to be successively engaged by each projection to cause a rapid vibration or oscillating movement of the agitating arm.

A still further object of the invention is to provide agitating means of this character in which the oscillating movements of the agitating arm may be varied or adjusted at will to effect the most efficient and desirable type of action on the material undergoing agitation.

The provision of an agitating means which is extremely simple in its construction, one which is comprised of a minimum number of moving parts and which is unlikely to get out of order, one which is rugged and durable and is therefore possessed of a long life, one which may be readily installed as an integral part of an original feeding mechanism or which may readily be applied to existing feeding mechanisms are further desirable features which have been borne in mind in the production of the present invention.

With these and other objects in view, which will become more readily apparent as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts shown in the accompanying two sheets of drawings, in which

Fig. 1 is a perspective view of a filling machine showing an improved mechanism associated therewith;

Fig. 2 is an enlarged fragmentary detail perspective view somewhat diagrammatic in its representation showing the manner in which the agitating mechanism operates upon the material undergoing packaging;

Fig. 3 is a horizontal sectional view taken substantially on the plane indicated by the lines 3—3 of Fig. 1 in the direction indicated by the arrow, and

Fig. 4 is a sectional view taken substantially along the plane indicated by the lines 4—4 of Fig. 1 in the direction indicated by the arrow.

In all of the above described views, similar characters of reference are employed to designate similar parts throughout.

Referring now to the drawings in detail and particularly to Fig. 1, the carton filling machine is designated in its entirety at **10** and is shown as having applied thereto the agitating mechanism comprising the present invention. Only such operative machine instrumentalities as are necessary to an understanding of the agitating mechanism have been illustrated herein inasmuch as no novelty is attached to the filling machine per se in the absence of the agitating mechanism.

The carton filling machine **10** involves in its general organization a feed hopper **12** having a discharge opening **14** formed therein adjacent the bottom thereof through which the material undergoing packaging is adapted to be discharged by gravity so as to flow onto the upper surface of a generally cylindrical feed or transfer wheel **16**. The transfer wheel **16** is provided with a series of pockets or measuring cups **18** therein and these pockets extend completely through the transfer wheel from the upper plane surface thereof to the lower plane surface thereof and are preferably rectilinear in design to accommodate the shape of a series of article receiving containers or cartons *c*, which are adapted to receive therein the material or articles undergoing packaging. The cartons *c* are adapted to be fed in straight line formation along the upper straightaway portion of a carton conveyor designated in its entirety at **20**. The conveyor **20** includes a feed belt **22** on which the folded bottoms of the cartons *c* are adapted to rest and front and rear backing plates **24** and **26**, respectively, which in combination with the feed belt **22** define an elongated channel **28** along which the cartons *c* are adapted to pass.

The linear movement of the conveyor belt **22** and the rotary movement of the transfer wheel **16** are synchronized and so correlated that successive measuring cups or pockets **18** move over the filling opening of successive cartons *c* during their passage through a filling zone Z. A supporting shelf or dead plate **30** is disposed beneath the transfer wheel **16** and extends from the vicinity of the discharge opening **14** to the vicinity of the filling zone and is situated in close proximity or is contiguous to the lower plane surface of the transfer wheel for the purpose of retaining the material or articles carried by the measuring cups **18** in the latter until such time as the measuring cups pass over the open ends of the cartons *c*, after which the material or articles may fall by gravity, or may be pushed by a plunger or the like, downwardly into the open ended cartons. The dead plate **30** is discontinued along a line which is disposed in the vertical plane of the rear carton sides, so that as the articles drop off the edge of the dead plate they will be aligned with and fall into the filling opening of the carton.

A spreader wheel **32** is mounted for rotation about the vertical axis of rotation of the transfer wheel **16** and carries a series of circumferentially spaced radially extending protuberances or ribs **34** thereon. The spreader wheel **32** is of less diameter than the diameter of the transfer wheel and the protuberances occupy positions concentrically within the circular extent of the measuring cups or pockets **18**, as clearly shown in Fig. 1. The

spreader wheel 32 is adapted to be rotated in a direction counter to the direction of rotation of the transfer wheel to partially counteract the tendency of the material to flow from the discharge opening 14 toward the filling zone and thus the ribs 34 formed on the spreader wheel serve to assist in distributing the material on and about the upper surface of the transfer wheel and to impel some of the material into the upper open ends of the measuring cups or pockets 18. A circular brush 36 is mounted for rotation about a horizontal axis and is continuously rotated in the direction of the arrow in Fig. 1. The brush is arranged substantially tangential to the upper plane surface of the transfer wheel and thus as the transfer wheel rotates in a direction tending to carry the articles or material from the discharge hopper to the transfer zone the brush serves to sweep the material back toward the discharge chute and distribute the same over the surface of the transfer wheel, so that the articles will readily find positions within the measuring cups 18. The brush 36 also serves to level off the material or articles arriving at the transfer zone in the measuring cups.

A generally circular retaining wall 40 extends around the transfer wheel 16 from one edge of the discharge opening 14 in the feed hopper 12 to the other edge thereof and may be suitably attached to and supported from the hopper 12 or from any other stationary portion of the machine framework. The retaining wall 40 thus partially encompasses the transfer wheel 16 and extends upwardly above the plane upper surface of the transfer wheel a sufficient distance to maintain the material or articles undergoing transfer within the circular confines of the upper surface of the transfer wheel 16. A resilient baffle 42, which may be in the form of a flat sheet of rubber, or the like, is secured to a plate 44 which, in turn, is secured to the inner surface of the retaining wall 40. The baffle 42 projects inwardly of the retaining wall 40 to a point adjacent the periphery of the spreader wheel 32 and assists in confining the articles on the upper surface of the transfer wheel to the vicinity of the discharge opening 14. The gearing or other mechanism by means of which the transfer wheel 16, spreader wheel 32 and carton conveyor 20 are driven in timed relationship to each other has not been shown in the accompanying drawings since it forms no part of the present invention. This gearing may be of any desired nature and that portion of the gearing which serves to drive the transfer wheel and spreader wheel in opposite directions may be conveniently enclosed within a suitable guard or cover 46.

The agitating means comprising the present invention for agitating the material or articles being fed into the cartons *c* consists of an agitator bar 50. This bar 50 is in the form of an elongated piece of metal, as for example steel, and is provided with three laterally extending leg portions 52, 54 and 56, extending from left to right as viewed in Figs. 1, 3 and 4. The bar 50 is adapted to be pivoted to a shelf-like extension 58 of the backing plate 24 by means of a stud 60 which passes through the leg 56 and which is anchored in the shelf 58. A supporting bar 62 bridges the two lateral extensions 52 and 54 and is adjustably anchored thereto by means of anchoring studs 61 which pass through slots 63 provided in the leg portions 52 and 54. A series of projections or protuberances 64 extend upwardly from the upper surface of the bar 62 and are adapted to be positioned in the path of movement of a series of radially extending fingers 66 mounted at circumferentially spaced points around the periphery of the transfer wheel 16 adjacent the bottom thereof. While any number of protuberances 64 may be provided on the bar 62 only four such protuberances have been shown and these four protuberances have been labelled *a, b, c* and *d*, extending from left to right as viewed in Figs. 1 and 3.

The free end of the bar 50 projects outwardly as at 68 beyond the leg portion 52 and has projecting outwardly therefrom adjacent its outer end a guide rod 70 which passes through a slot 72 provided in a bracket 74 anchored by means of a stud 76 to the shelf-like extension 58. A coil spring 78 surrounds the guide rod 70 and bears at one end against the extension 68 and at the other end against the bracket 74, thus serving to normally maintain the bar 50 in an advanced position wherein the inner edge thereof is positioned in close proximity to the open end of a carton *c* passing through the filling zone Z. The free end of the rod 70 is threaded as at 80 and has mounted thereon an adjusting screw 82 and a locking screw 84 by means of which screws the normal angular position of the bar 50 relative to the cartons *c* passing through the filling zone may be adjusted.

As previously stated, the supporting bar 62 is adapted to be positioned so that the protuberances 64, labelled *a, b, c* and *d*, are positioned in the path of movement of the fingers 66 provided on the transfer wheel 16 and thus, as each finger 66 sweeps through the filling zone Z in an arcuate path, it engages the protuberances *a, b, c*, and *d* in succession and causes the agitating bar 50 to be oscillated about the pivotal axis 60 to agitate the contents of the various measuring cups 18 as the same falls by gravity into the cartons *c*. The centers of the protuberances, labelled *a, b* and *c* on the adjustable bar 62 may be arranged in arcuate fashion on an arc whose radius of curvature is substantially equal to the distance from one of the protuberances as it exists when the bar 50 is installed on the machine to the axis of rotation of the transfer wheel, while the protuberance labelled *d* may be offset slightly from the arc extending through the three other protuberances so that this latter protuberance is positioned slightly further from the axis of rotation of the transfer wheel. The bar 62 may be adjusted and set at a slight angle to the longitudinal axis of the conveyor 20 so that as each protuberance *a, b* or *c* is engaged by one of the fingers 66 substantially the same amplitude of oscillatory motion is applied to the agitator assembly as a whole. The protuberance labelled *d* may be so positioned that when engaged by a finger 66 a very slight amplitude of oscillatory motion is applied to the assembly.

As shown in Fig. 2, the carton *c* is comprised of front and rear walls 90 and 92 and side walls 94, together with a bottom flap assembly 96, and a top flap assembly including side flaps 98 extending from the side walls 94, and an end flap 100 extending from the front wall 90. As the cartons enter the filling zone Z the end flap 100 is spread laterally, as shown in Fig. 2, and travels beneath a spreading bar 104 which extends completely through the filling zone and terminates at a region along the conveyor 20 wherein the cartons emerge from the filling zone in filled condition. The side flaps 98 pass through the filling zone undisturbed and emerge from the filling zone at the forward side of the flap spreading bar 104. The agitating bar 50 is adapted to occupy the position shown in Fig. 2 and, in its normal position, has its forward surface arranged in close proximity to the front edges of the side flaps 98. The extent of oscillation of the bar 50 is relatively small and is illustrated by the dotted lines in Fig. 2, together with the oppositely facing arrows.

In the initial installation of the agitating device, the adjusting screw 82 may be turned upon the threaded portion 80 of the rod 70 until the forward face of the agitating bar 50 is brought into parallelism with the forward edge of the shelf 58. Thereafter the adjusting screw 82 may be loosened and the protuberances 64, labelled *a, b, c*, and *d*, given the desired relationship with respect to the fingers 66 so that as each finger 66 passes through the filling zone Z three complete oscillations of the bar 50 of substantially equal extent will be imparted to the bar 50 followed by an oscillation of lesser extent or amplitude. The exact extent of oscillation afforded the bar 50 by each of the protuberances 66 is not critical and may be varied to accommodate different materials undergoing transfer from the feed hopper 12 to the cartons *c*. For example, if desired, all four protuberances may be arranged on an arcuate line.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of movements of articles flowing from the cups to the cartons,

and means operatively associated with said agitator member for moving the latter to agitate the articles flowing from the cups to the cartons.

2. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of movement of articles flowing from the cups to the cartons, and cooperating cam means on said article conveyor and agitator member for moving the latter to agitate the articles flowing from the cups to the cartons.

3. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable in the path of movement of articles flowing from the cups to the cartons, and an abutment on said article conveyor movable therewith into engagement with said agitator member for moving the latter to agitate the articles flowing from the cups to the cartons.

4. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation about an axis and positioned between and laterally of the lower end of a measuring cup and the upper end of a carton at said filling zone adjacent the path of movement of articles flowing from the cups to the cartons, and an abutment on said article conveyor movable therewith into engagement with said agitator member to oscillate the latter and agitate the articles flowing from the cups to the cartons.

5. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of articles flowing from the cups to the cartons, a series of fingers on said article conveyor, and a series of protuberances on said agitator member, said fingers being movable with the article conveyor successively into engagement with the protuberances on said agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons.

6. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively through a carton filling zone, an article conveyor adapted to move a series of measuring cups through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of spaced protuberances on said agitator member, a series of fingers on said article conveyor and movable therewith, the protuberances on said agitator member being positioned in the path of movement of said fingers whereby, upon movement of the article conveyor, the fingers thereon will successively strike said protuberances and, by a camming action, impart a vibratory movement to the agitator bar to agitate the articles flowing from the cups to the cartons.

7. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member positioned between and laterally of the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, and a series of abutments on the rotary transfer wheel successively movable upon rotation of the latter into engagement with the agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons.

8. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation between the lower end of a measuring cup and the upper end of a carton adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of protuberances on said agitator member, and a series of cooperating protuberances on said rotary transfer wheel movable with the latter successively into engagement with the protuberances on said agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons.

9. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of protuberances on said agitator member, and a series of cooperating protuberances on said transfer wheel movable with the latter successively into engagement with the protuberances on said agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons, said protuberances on the agitator member being arranged on an arcuate line, the radius of curvature of which is substantially equal to the radius of said transfer wheel.

10. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of protuberances on said agitator member, and a series of cooperating protuberances on said transfer wheel movable with the latter successively into engagement with the protuberances on said agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons, said protuberances on the agitator member being arranged on an arcuate line, the radius of curvature of which is substantially equal to the radius of said transfer wheel, and the center of curvature of which is slightly offset from the axis of rotation of the transfer wheel.

11. In combination, a carton filling machine having a

carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation adjacent said filling zone and movable toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of protuberances on said agitator member, and a series of cooperating protuberances on said transfer wheel movable with the latter successively into engagement with the protuberances on said agitator member for moving the latter in a vibratory manner to agitate the articles flowing from the cups to the cartons, said protuberances on the agitator member being arranged in an arcuate line, the radius of curvature of which is substantially equal to the radius of the transfer wheel, and means for bodily adjusting the positions of the protuberances on said agitator member collectively.

12. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator member mounted for oscillation about an axis and positioned adjacent said filling zone and movable upon oscillation thereof toward and away from the path of movement of the articles flowing from the cups to the cartons, a series of protuberances disposed on said agitator member, a series of protuberances disposed on said transfer wheel, said latter protuberances being successively movable into engagement with said former protuberances upon rotation of the transfer wheel to move the latter in a vibratory manner and agitate the articles flowing from the cups to the cartons, certain of said protuberances on said agitator member being arranged on an arcuate line, the radius of curvature of which is substantially equal to the radius of curvature of said transfer wheel and another of said protuberances on said agitator member being offset outwardly from said arcuate line.

13. In combination, a carton filling machine having a carton conveyor adapted to move a series of open ended cartons successively in straight line formation through a carton filling zone, a rotary transfer wheel provided with a series of measuring cups movable through an arcuate path through the zone in timed relation to the movement of the cartons to bring the measuring cups into filling register with the cartons for flow by gravity of the articles from the cups to the cartons, an agitator bar positioned adjacent said filling zone and mounted for oscillation about an axis wherein one side thereof may be moved from an advanced position in the path of movement of articles flowing from the cups to the cartons to a retracted position out of said path of movement, a plate adjustably secured to said bar, a series of protuberances arranged in spaced relationship on said plate, and a series of spaced cooperating protuberances on the periphery of said transfer wheel, said latter protuberances being successively movable upon rotation of the transfer wheel into engagement with successive protuberances on said plate to move the latter, and consequently the agitator bar, in a vibratory manner to agitate the articles flowing from the cups to the cartons.

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