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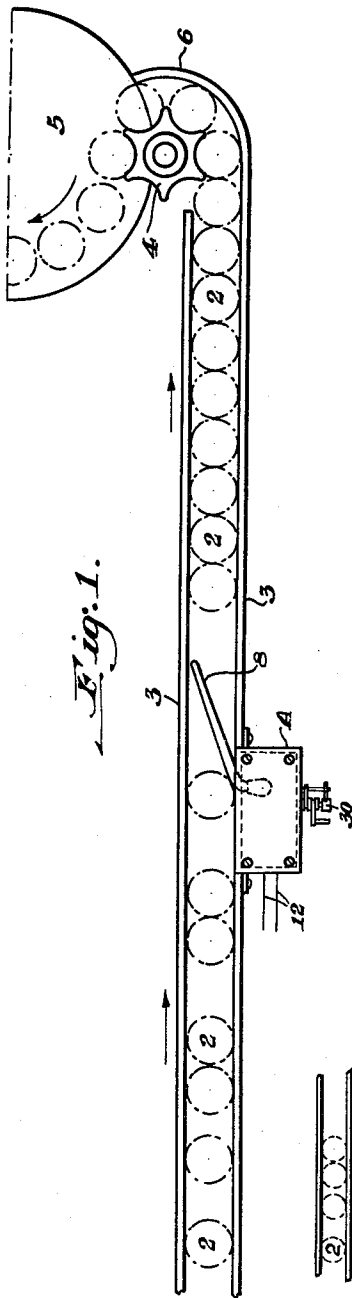
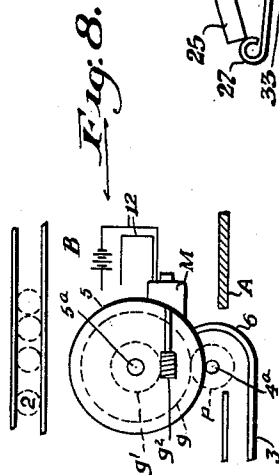
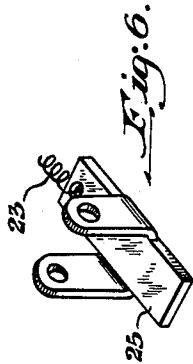
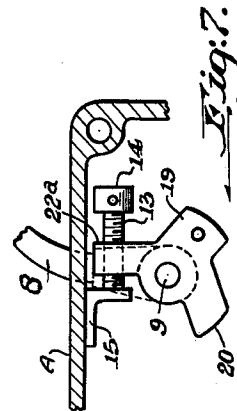
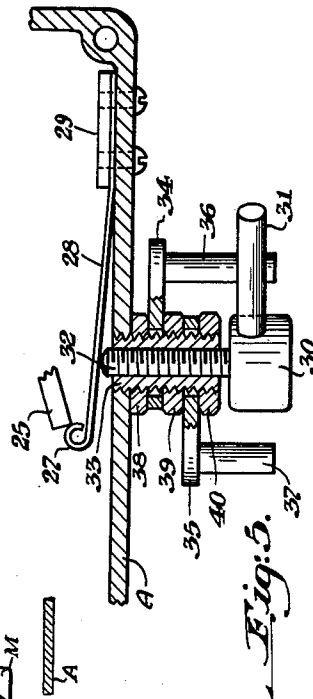
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2,599,220

AUTOMATIC START AND STOP MECHANISM

Filed May 18, 1946

2 SHEETS—SHEET 1



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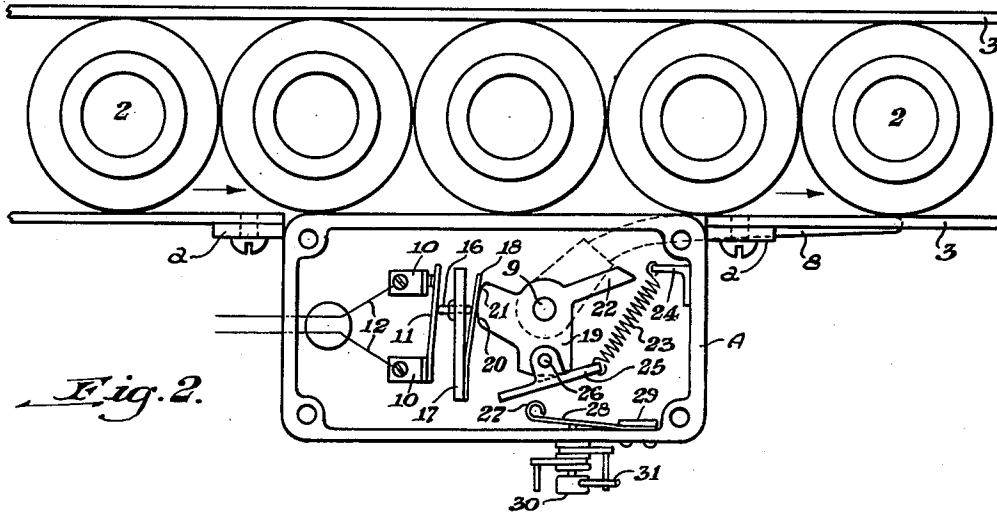
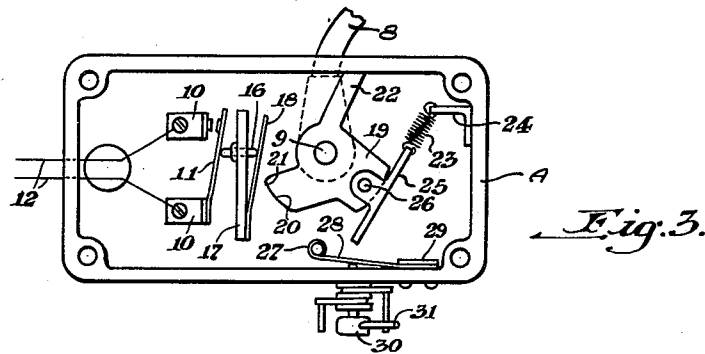
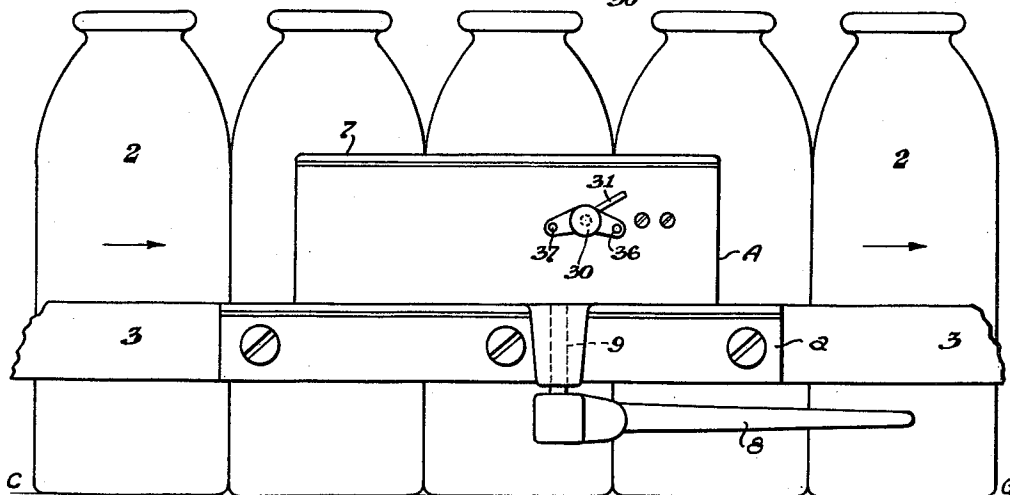
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AUTOMATIC START AND STOP MECHANISM

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2 SHEETS—SHEET 2



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AUTOMATIC START AND STOP MECHANISM

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8 Claims. (Cl. 198-232)

1

This invention is an improvement in means for controlling the motor or prime mover of a machine dependent upon normal feed thereto of a continuous succession of units to be acted upon, and for promptly discontinuing the operation of the machine, due to any temporary interruption of the normal feed.

More particularly, it is designed for use, in connection with the art of filling receptacles, as milk bottles, where, due to interruption of continuous grouping of a column, irregular spacing, improper or abnormal placement on the conveyor runway, etc., proper and correct delivery to the machine, as a bottle filler, is prevented.

Such interruptions, in the operation of modern dairy plants, frequently result in jamming and breakage of bottles, causing loss and delay. Ordinarily, the bottles are conveyed to the filler, for instance, in regular successive contact engagement with a synchronized delivery device, as in the common practice of using a star wheel.

Wherever however, due to relay or any cause, effecting irregular and open spacing of the bottles in approaching or arriving at such device out of proper timing, the normal operation is interrupted with resulting jamming and breakage. It is desirable therefore, that the motor control means of the present invention be located at a sufficient distance in the rear of or backwardly from the said star wheel, with ample intervening supply of bottles in continuous progress, to ensure proper successive engagement with the filler-distributing star wheel, when the motor of the filler is again energized.

The present invention is an improvement in that type of construction disclosed in my prior Patent No. 2,368,738.

Assuming the invention to be utilized in the transfer and regulation of milk bottles, it is illustrated in the accompanying drawings, in which:

Fig. 1 is a general plan view of the installation as used in distributing bottles to a filling machine.

Fig. 2 is an enlarged plan view of the casing of my control device with the cover removed, and showing the operating arm depressed backwardly, with the circuit closed.

Fig. 3 is a plan view similar to Fig. 2 showing the deflecting arm erected, and with the circuit open.

Fig. 4 is a side elevation of Fig. 2.

Fig. 5 is a further enlarged sectional detail view of the adjusting mechanism for the spring abutment.

Fig. 6 is an isometric view of the arresting and releasing latch.

2

Fig. 7 is a detail view showing a modified construction of movement limiting means.

Fig. 8 is a diagrammatic view illustrating one means for driving the filling machine and the star wheel, as controlled by the switch mechanism of casing A.

As shown in Fig. 1, a column of bottles 2 is being transferred in the usual manner by a supporting continuously running conveying chain, on the line C, G, Fig. 4. The bottles travel between the usual lateral guides 3, 3, towards the filler.

The guides lead to any suitable point where a controlling star wheel or other synchronized device 4, distributes them generally in circular travel, around the localized positions on the rotating platform of a filling machine. Such machine, diagrammatically indicated by the numeral 5, is usually geared with a star wheel 4, within guide extension 6, and is rotated by a driving motor.

The filling machine 5 is usually rotated at a definite speed continuously, during normal feed of bottles or other containers.

Fig. 8 illustrates, somewhat diagrammatically, one means for driving the filling machine 5 and the star wheel 4, as controlled by the switch mechanism of casing A.

Drive shaft 5a of filler 5 is geared with shaft 4a of the star wheel 4, as by gear g and pinion p, and shaft 5a is initially driven by gears g¹ and g² of shaft s of motor M, energized through conductors 12 and source of current B.

The operating mechanism whereby current control is regulated to suit the varying conditions incident to the transfer of bottles or the like, is contained in a suitable casing A, as hereinafter described.

The casing itself, in the form of a closed rectangular box, is provided with a hermetically sealed cover plate 7, for protection against moisture, usually incidental to liquid splashing operations as in a bottling plant.

The casing is mounted with its inner edge substantially flush with one of the guide bars 3, and is supported in any suitable manner, as by an angle bar a, connected with the ends of the guide bar as shown.

Ordinarily, the bottles 2 in their normal progress, are regularly distributed from the longitudinal conveyor to the filler delivering terminal, in a continuous supply column. However, due to any interruption or delay, it sometimes happens that open spaces or gaps between the bottles, or between sections thereof, may cause a termina-

tion of close continuity of the column, and interruption of regular delivery to the filler assembly 5.

For prevention of column interruption and confusion, with resulting bottle breakage or jamming against wheel 4, and especially for avoiding the otherwise numerous stopping and starting of the motor of the receiving machine, or filler, the invention provides means for immediately effecting the termination of filler operation after the terminal bottle of a column has passed beyond a point of conveyor progress, ahead of an open space or gap in the column.

Such spacing in the column may, for instance, occur after the end bottle has passed beyond the control mechanism, and where there are frequent intervening spaces between individual or separated small groups of bottles. In such cases, resulting frequent stopping and starting of the filling machine motor, is not only expensive and wearing on the equipment, but tends to disorganization and undesired interruptions otherwise.

Such interruptions are usually due to lack of a sufficient number of bottles coming from the bottle washer to the filler, and will occur every time the washer is stopped or the bottle supply from the washer falls below the adjusted operating speed of the filler. Every time this happens, the bottles will separate and jam at the star wheel entrance to the filler, which upsets them and causes bottle breakage, and also does damage to the filler before it is manually stopped by the operator.

By my improvement, the filler 5 cannot start automatically until separated bottles are first grouped together, and then released by the pressure of a group of any desired predetermined number of bottles for which the adjustment is made.

Alternately, the automatic control groups any number of separated bottles first, and then when the pressure is built up to the adjusted degree, the group of bottles is released, and only then is the control switch automatically closed to start the filler.

In the present case I utilize but a single swinging arm 8, secured to the lower end of vertical stem or shaft 9 extending through the bottom of the casing, and operatively connected with the switch control mechanism therein. Switch terminals 10, of any suitable construction, are adapted to be closed by a resilient switch blade 11, to open and close the circuit to the motor M of the filler 5 through conductors 12.

Contact blade 11 and its terminal is closed across the terminals 10, by means of a slidably mounted spring-retracted pin 16 mounted in a suitable supporting fixed frame 17, the pin 16 being actuated by any suitable means as a leaf spring 18.

The upper end of shaft 9 is provided with a fixedly attached dog 19 having an arcuate radial face 20, and a closing initial abutment 21.

A projecting arm 22 of the dog extends outwardly, and is adapted to assume arresting position against the inner wall of the casing, so as to arrest movement of the arm 8 in its outer position across the path of bottle travel, as in Fig. 3.

I show in Fig. 7 a modification of the movement limiting stop 22, for varying the extent of outward swinging movement of arm 8. In such case the dog 19 is provided with the extension 22a, provided with an adjustable set screw 13 having a turning head 14, for adjustment in the arm 22a toward or from a bracket 15, extending inwardly from the wall of the casing A. Thus by

adjusting of the screw the outward movement of the arm may be varied, as in the case of adjusting its movement for different operating conditions.

Adjustment of the throw of the dog also controls the timing of the switch, and action of the radial face 20 and abutment 21 in closing arm 18 against pin 16, for correct closure of the circuit terminals 10, 10.

Ordinarily, under the pressure of a moving column of bottles, the arm 8 is depressed backwardly as in Fig. 2, and is there held until the entire column of bottles has passed beyond the arm terminal, whereupon it is then thrust outwardly, opening the contact by action of spring 23, as in Figs. 1 and 3.

Such spring is connected with a suitable terminal fixture 24 of the casing and with a pivotally mounted arresting and releasing latch or plate 25. Such latch is pivoted to dog 19 by a cross pin 26 engaging the middle portion of the dog 19, as shown.

When the arm 8 is thrust outwardly as in Figs. 1 and 3 by such spring action, the latch 25 passes freely backwardly over a resilient abutment 27. In such movement the latch assumes substantially a central line relation with the spring, and with its terminal closely adjacent to the rounded terminal abutment 27 of spring 23, secured as at 29 to the side wall of the casing.

In retracted position the latch bears against the corner of the dog and is in line centrally with spring 23.

As thus constructed, when the first one of a column of bottles depresses the arm 8 backwardly, the dog 19 and latch 25 are thrust annularly, bringing the terminal of latch 25 into contact with the terminal rounded abutment 27 of the leaf spring 23, and beyond it, as in Fig. 2. Dependent on the tension and adjustment of spring 23, the arm 8, because of such frictional opposition, may oppose bottle progress, until overcome by bottle accumulation. Upon release, of bottle pressure, the latch 25 will be thrust backwardly against and over the abutment 27 of spring 23, as in Fig. 3.

To provide for varying circumstances and varying pressure, dependent on the number of the bottles, or their size, or other conditions, it is very desirable that the opposing friction of latch 25 against the abutment of spring 23 shall be in proportion to such bottle pressure. I have therefore provided means for varying the stiffness or resiliency of the spring 23 so as to provide for a slight, intermediate, or maximum resistance before permitting the latch 25 to pass over the abutment terminal 27, to provide for recession of arm 8.

Such device consists of an adjustable head 30 having a finger piece 31, and a feeding screw 32. The latter is threaded interiorly of a threaded bushing 33 fixedly connected with the wall of the casing, as by lock nut 38. Likewise, arms 34 and 35, swivelled around the bushing 33, may be fixedly held by locknuts 39 and 40.

Said arms 34 and 35 are provided with limiting stops 36 and 37, capable of being set annularly as desired for interference with the finger bar 31 of head 30, so as to limit the entire movement to the desired range between a minimum pressure against spring 23, or a maximum pressure and much increased resistance, or any intervening pressure. The reason for such adjustment is to provide for an overly extended variation in spacing, dependent upon the grouping as to number

of bottles sufficient to overcome resistance of spring 28.

Each of arms 34 and 35 is thus capable of being set, with relation to each other, around the adjusting screw 32, to arrest arm 31 in one direction, as by unscrewing to release tension of spring 28, for minimum resistance; or in the opposite direction, to extend the spring for maximum resistance, or as to any intermediate compromise position.

Such adjustment is of great advantage in providing variable resistance by arm 8, in holding back and grouping separated units, as of any predetermined number of bottles, before the filler 5 is automatically started. It thus prevents unnecessary starting and stopping of the filling machine at any time the supply, as from the washer, is not continuous or falls below the absorbing speed of the filler.

The importance of my improvement will be appreciated by all those familiar with manual control filler operation and the amount of damage done when a filler operates with bottles missing under one or more of the filler tubes, also the difficulties encountered in manual operation when the containers are not delivered to the star wheel entrance to the filler in a continuous unbroken column, in synchronism with the operating speed of the filler.

The construction and operation will be readily understood from the foregoing description. Assuming a continuous procession or column of containers is supplied to the machine, as a filler, the first unit in its progress, as carried by the conveyor and closely adjacent following units, will actuate arm 8, and close the circuit to the motor M of the filler.

In case of a temporary delay in the supply, causing one or more open spaces, arm 8 will be relieved from bottle pressure, and will then move outwardly across the conveyor, arresting further movement of units until sufficient bottles have accumulated, to overcome adjusted resistance of spring 28.

Thereafter, the supply will be renewed and continued, with or without interruption, and with a minimum requirement of stoppage and starting of the motor of the receiving machine, due to the bottle grouping and filler control provided for herein.

If desired, an additional arresting device, such as the arm 8, may be interposed in the progress of the bottles in approaching the current control installation A for the filler.

What I claim is:

1. In combination with an independently driven unit conveyor having lateral guides leading to a terminal receiving device, and a motor therefor, a casing at one side of the conveyor, means for energizing said motor comprising a switch in said casing, a switch operating arm pivoted to said casing, movable across the conveyor and reversely therefrom to arrest and release unit progress, means connected with the arm for opening and closing the switch, and means limiting outward movement of the arm.

2. In combination with an independently driven unit conveyor having lateral guides leading to a terminal receiving device, a motor for the receiving device, a casing at one side of the conveyor, means for energizing said motor comprising a circuit and a switch, a switch operating arm movable across the conveyor and reversely therefrom, means connected with the arm for opening and closing the switch, means for impart-

ing outward movement to the arm, and means for arresting the arm in position across the conveyor.

3. In combination with an independently driven unit conveyor having lateral guides leading to a terminal receiving device, and a motor therefor, means for energizing said motor comprising a circuit and a switch, an enclosing casing for the switch, a switch operating arm movable across the conveyor and reversely therefrom and pivoted to the casing, means connected with the arm for opening and closing the switch, and means controlling the movement of said arm comprising a part mounted for a pivotal movement with said arm, a latch pivoted on said part, a spring connected with said latch for applying a bias through said part for moving said arm across the conveyor, and a resilient abutment engageable with said latch upon movement of said arm across said conveyor for resiliently latching it against reverse movement.

4. In combination with a unit conveyor, a casing alongside the conveyor, a switch therein, a rotatable vertically disposed shaft in the casing, a laterally movable arm connected with the shaft for location across the conveyor and reversely alongside it, a resiliently mounted abutment in the casing, a dog secured to the shaft having a portion for closing the switch when the arm is reversed, a pivotally mounted latch on the dog engageable with said abutment when the arm is reversed, and a spring connected with the latch and with a terminal fixture on the casing for imparting outward movement to the arm.

5. Means for opening and closing a circuit to the motor of a machine receiving conveyor-supplied series of units as conventionally delivered by a conveyor, comprising with such conveyor, a unit-actuated arm, and its pivoting shaft, a circuit and a switch, a rotatable dog secured on the shaft having a switch operating portion and a pivoted latch, a spring exerting tension on the latch and dog, a leaf spring having an abutment in range of the latch and engageable thereby, and adjusting means for varying the tension of the leaf spring.

6. In combination with a conventional conveyor and a receiving machine for units delivered by the conveyor, said receiving machine having an operating motor, a casing along side the conveyor, a current supply circuit for the motor, an opening and closing switch therefor, a pivoting shaft operatively connected with a laterally and longitudinally movable unit-actuated arm, a switch operating dog connected with the arm, a latch pivotally mounted on the dog, a tension spring connected with the casing and the dog for thrusting the movable arm outwardly across the conveyor, a resilient member secured to the casing having a resistance abutment engageable by the latch when the arm is thrust backwardly and means for adjusting said resilient member and its abutment with relation to the latch for varying resistance therebetween.

7. Construction as in claim 6 characterized by inclusion of a surface contacting arm connected with the unit-actuated arm for limiting outward movement of the laterally movable arm.

8. In the art of conveying bottles along and by a conveyor as from a washer to a filling machine provided with an actuating motor, means for starting and stopping the motor dependent upon bottle arrangement in the conveyor to automatically arrest the filling machine and movement of bottles thereto upon separation of one or more bottles of a column, and to restart the motor of

the filling machine after contact grouping of bottles and their release; comprising a conveyor, a receiving machine and its motor, a laterally and longitudinally movable arresting and releasing arm pivotally mounted at one side of the conveyor and adapted to be extended across or at one side of the conveyor for interruption or release of bottles in progress, a circuit and switch for supply and discontinuance of current for the motor of the receiving machine, a partly rotatable dog operatively connected with the arresting and releasing arm and its pivotal mounting having a switch-engaging and disengaging portion, an enclosing casing therefor, a resilient leaf spring secured to the casing having a terminal abutment, and a pivoted latch on the dog adapted to engage and disengage the abutment, and a spring connecting the latch with the casing.

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