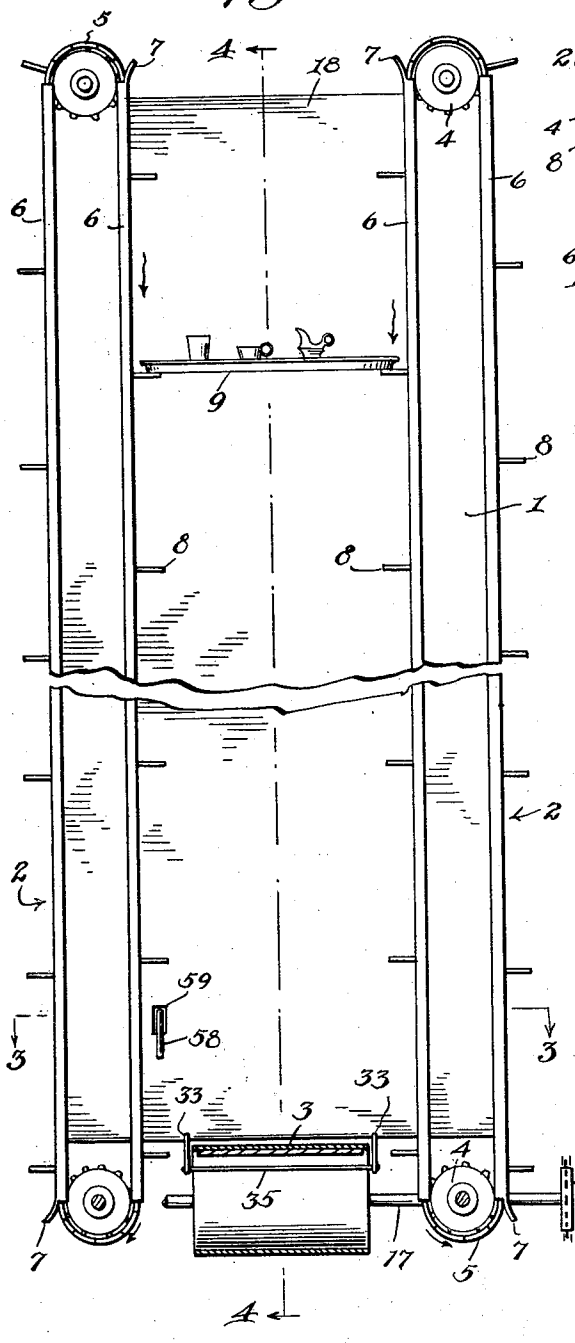
Nov. 8, 1932. M. A. LE GETTE 1,887,456

SAFETY STOP FOR CONVEYERS

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Fig. 1.



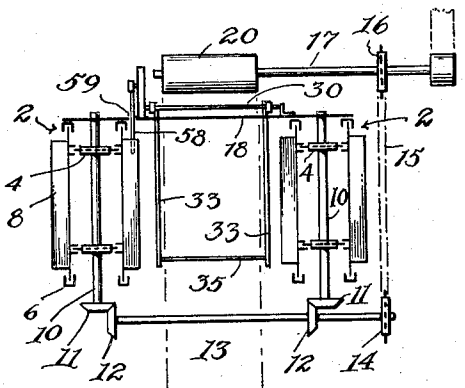


Fig. 3.

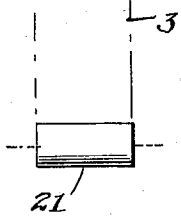
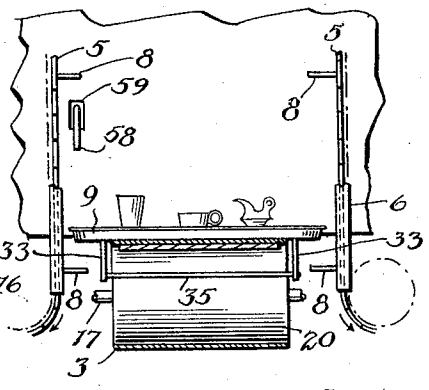


Fig. 2.



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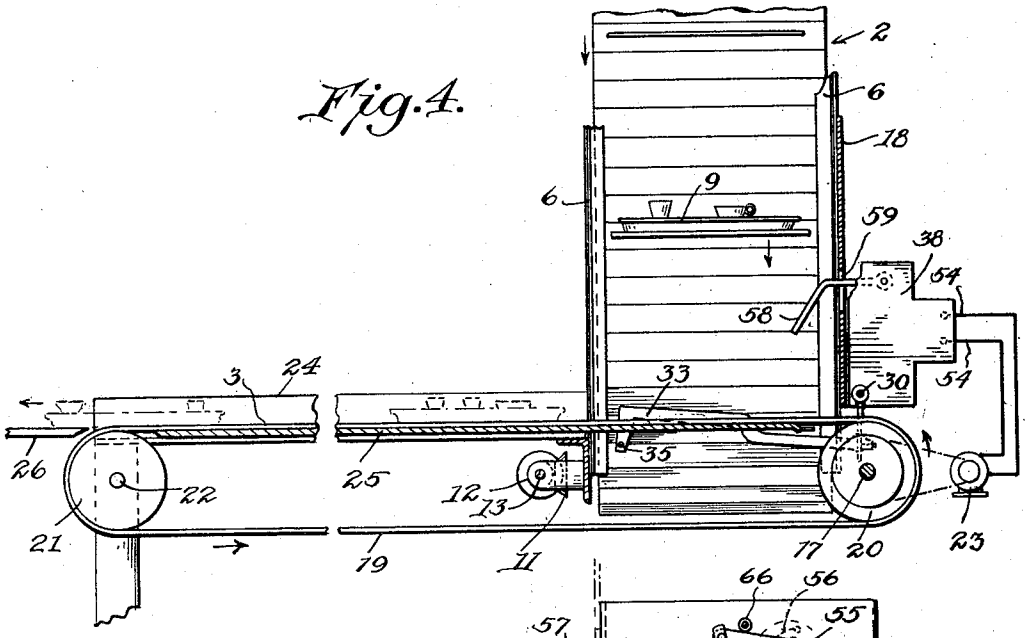
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Nov. 8, 1932. M. A. LE GETTE 1,887,456

SAFETY STOP FOR CONVEYERS

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Fig. 4.



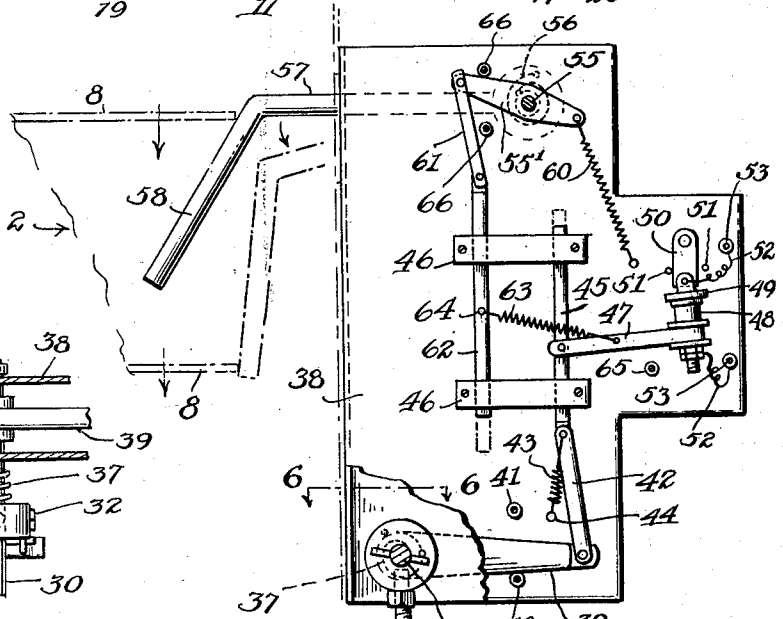
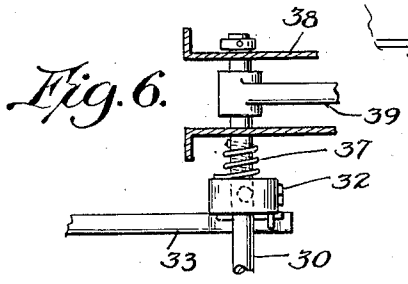


Fig. 6.



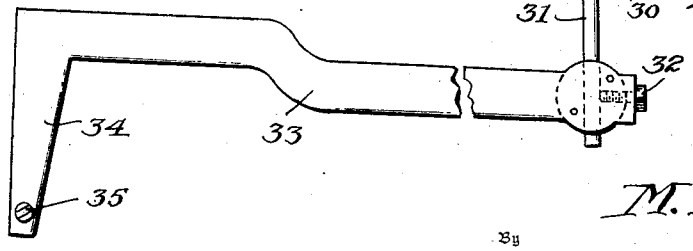


Fig. 5.

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UNITED STATES PATENT OFFICE

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SAFETY STOP FOR CONVEYERS

Application filed January 24, 1930. Serial No. 423,216.

This invention relates to conveyers in general but is more especially concerned with what are known as subveyers for carrying dishes, etc., from the upper floors of a restaurant, lunch room, or the like, to the basement or sub-basement for the purpose of washing.

An object of the invention resides in the provision of means for automatically shutting off the driving power of the conveyer whenever the sequence of operations is interrupted, i. e., whenever the continuous transportation of articles along the conveyer system from the point of loading, is interrupted.

Another object of the invention consists in providing a novel construction of switch for the operating circuit of the conveyer system, which is designed to be automatically opened and held open whenever the cycle of operations of the transportation system is interfered with; and which is extremely sensitive to cyclic changes and therefore reliable in operation.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which

Figure 1 is a front elevational view of the subveyer, partly in section.

Figure 2 is a fragmentary detail view of the device, partly in section.

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 1.

Figure 4 is a vertical sectional view taken on line 4—4 of Figure 1, partly broken away.

Figure 5 is an enlarged elevational view of the switch and operating parts; and

Figure 6 is a detail sectional view taken on line 6—6 of Figure 5.

Referring to the drawings in more detail the numeral 1 indicates generally the conveyer system which comprises vertically disposed conveyers 2 and a horizontally disposed conveyer 3. The vertical conveyers 2 are arranged in parallel relation and extend upwardly a distance depending upon the number of floors comprising the restaurant or the like, in which the apparatus is installed. These conveyers each comprise a pair of endless chains extending around sprocket wheels 4 and on which are mounted a series of slats 5 of a width sufficiently small to allow them to travel over the sprocket wheels. The ends of the slats 5 of the two opposed conveyers travel in guides 6 which are bent outwardly at their upper and lower ends as indicated by the numeral 7 to insure the entrance of the slats into the guides after passing over the sprocket wheels 4.

These conveyers 2 are each provided with a plurality of flights 8 which are operatively arranged on the conveyers so as to support a tray such as indicated by the numeral 9, and in order that these flights may be maintained in horizontal pairs, as indicated, the shafts 10 of the conveyers 2 are provided with bevel gears 11 which mesh with bevel gears 12 on a drive shaft 13. Shaft 13 is driven by means of a sprocket wheel 14 and chain 15 which meshes with a sprocket wheel 16 on a shaft 17 for driving the horizontally arranged conveyer 3.

For the purpose of providing a stop or backing for the vertical conveyer, a metal plate 18 is provided which extends throughout the length of the conveyers 2. This plate 18 serves as an enclosing casing for the rear side of the conveyer and also limits the horizontal movements of the trays as they are pushed onto the conveyer from the various floors of the restaurant.

The horizontal conveyer 3 is disposed in substantially the plane of the lower end of the conveyers 2, and comprises a belt 19 which is mounted on a roller 20 on shaft 17 and a roller 21 on the forward shaft 22. These shafts are mounted in suitable framework and are preferably driven by means of a motor 23. Guide members 24 are provided for the upper portion of the conveyer 3 and a bottom plate 25 is also provided and on which the upper portion of the conveyer 3 travels.

From the mechanism as thus far described it will be apparent that the trays 9 are placed on the oppositely arranged flights 8 on the conveyers 2 and travel downwardly until they are deposited on the horizontal conveyer 3. The conveyer 3 is geared to travel at twice the speed of the conveyers 2 and will, under normal operations, transport the tray away from alignment with the vertical conveyer

prior to the time that a second flight will deposit a second tray upon the conveyer 3. These trays, as they are transported outwardly from the conveyer 2, are pushed onto a table, shelf, or the like, 26, from which they are removed from time to time by attendants. If, however, for any reason, the trays are allowed to accumulate on the table 26 they will eventually block up on the horizontal conveyer 3 and prevent the latter from carrying away the trays deposited thereon by the conveyers 2. Obviously, under such circumstances, if no means are provided for shutting off the driving power for the conveyers, the succeeding flights 8 as they descend will strike the trays on the conveyer 3 and cause considerable damage not only to the trays 9, but will also strip the flights 8 from the vertical conveyers 2 and sometimes strip the gears of the driving mechanism, thus placing the apparatus completely out of commission and involving considerable expense in repairs.

In order to aviod the foregoing difficulties the present invention is provided with means for shutting off the power whenever the continuous travel of the articles along the conveyer system 1 is interrupted. To this end a shaft 30 is mounted slightly to the rear of the plate 18 and adjacent the lower end thereof and supports a pair of downwardly extending arms 31. Mounted on these arms 31 as by means of set screws 32 are a pair of levers 33 which extend outwardly beneath the lower edge of the plate 18 and along the side of the conveyer 3. These levers are provided with downturned ends 34 and are connected beneath the conveyer by means of a tie rod 35 which prevents any possibility of a lateral movement of the levers such as would interfere with the travel of the flights 8. By means of the set screw 32 the levers 33 may be vertically adjusted along the arms 31 so as to adapt them to various installations.

It will be apparent, therefore, that as each tray 9 is deposited on the conveyer 3 it will depress the levers 33 to the level of the conveyer and will thus rock the shaft 30, and in order to avoid any breakage of parts in the event that normal operations are interfered with, a coil spring 37 connects the arms 31 with the shaft 30, as indicated in Figure 6. The shaft 30 extends between parallel plates 38 which form the casing of a novel switch mechanism mounted behind the back plate 18 of the conveyer system, and fixed to the shaft 30 is an arm 39. Referring more especially to Figure 5 it will be apparent that as the arm 31 is rocked by a depression of the levers 33, the arm 39 will be raised from its position of rest on a stop pin 40 and will be brought into engagement with the upper stop pin 41. A link 42 is connected to the free end of the arm 39 and normally maintains the arm 39 in its lowermost position by reason of its connection with a spring 43 which has its other end anchored to the switch casing, as indicated by numeral 44. To the upper end of the link 42 is pivotally connected a rod 45 which is slidably mounted in brackets 46. Pivotally mounted on the rod 45 is an arm 47 which carries at its opposite end a switch contact 48, preferably formed of carbon. This contact is adapted to cooperate with a copper contact 49 which is pivotally mounted on the lower end of the pivotally mounted link 50. This link 50 is limited in its pivotal movement by reason of stops 51 mounted in the switch casing and disposed a suitable distance apart. Conducting wires 52 lead from the contacts 48—49 to terminals 53 in the casing, from which terminals lead wires 54 carry the current to the motor circuit.

At the upper end of the switch casing 38 is mounted an oscillatable shaft 55, and to which is mounted as by means of spring 56 a lever 57 provided with a downturned end 58. This lever 57 extends outwardly through an opening 59 in the plate 18 into the path of travel of the flights 8 of the left hand conveyer 2 (Figure 1). As each of the flights 8 descends it will engage the downturned portion 58 of the lever 57 and thus rock the shaft 55. In this connection it is to be noted that there is a substantial amount of drift in conveyers of this type, the amount of drift depending upon the length of the conveyers, and it is for this purpose that the downturned end 58 of the lever 57 is made of substantial length so as to hold the lever 57 down in spite of any drift which may take place in the conveyer mechanism.

Fixed to the shaft 55 is an arm 55′ and secured to the rear end of this arm is a spring 60 which normally holds the lever 57 in substantially horizontal position. Secured to the opposite end of the arm 55′ is a link 61 which has its opposite end pivotally connected to a slide bar 62 mounted in the brackets 46. To this slide bar is connected a coil spring 63 as indicated at 64, which has its opposite end connected to the arm 47 carrying the contact member 48, and normally holds this contact in engagement with the contact 49 of the switch. It will be apparent, therefore, that each time one of the conveyor flights 8 engages the arm 57 it will depress the same and thereby force the rod 62 downwardly. This movement of the rod 62 will thus lower the point of attachment 64 of the spring 63, but will not lower it sufficiently to carry the spring 63 past the pivot point of the arm 47 unless the levers 33 are also depressed and thus raise the pivot point of the arm 47.

In other words, if both the lever 57 and the lever 33 are depressed the attaching point 64 of the spring will be lowered and the pivot point of the arm 47 will be raised, thereby carrying the spring 63 below the pivot point

of the arm 47 and thus causing the spring to pull the arm 47 downwardly against a stop 65. These two movements of the rods 62 and 45 serve to shift the action of the spring 63 from a point above the pivot of the arm 47 to a point below it, thus opening the switch and shutting off the motor. The parts of the switch are so designed and proportioned that the movement of neither of the bars 45 or 62 is sufficient to change the point of application of the spring 63, and in order to insure this result, stops 66 are mounted in the switch casing at points above and below the arm 59 to limit the movement of this member.

In the operation of the device each of the trays 9 as it is deposited by the conveyers 2 onto the conveyer 3 will depress the levers 33 and thereby raise the rod 45 and consequently the pivot point of the switch arm 47. However, the extent of movement of this rod 45 is limited by the stop 41 and is therefore not sufficient to raise it beyond the plane of the coil spring 63. As each of the flights 8 approaches the horizontal conveyer 3 it engages the downwardly inclined portion 58 of the lever 57 and rocks the shaft 55, thereby depressing the slidably mounted rod 62. The extent of the downward movement of this rod, however, is limited by the stop 66 and is therefore insufficient to carry the spring 63 beyond the pivot point of the arm 47. It will be apparent, therefore, that the operation of either of the levers 33 or 57 alone is insufficent to cause an opening of the switch 48—49. However, if for any reason a tray deposited on the lever 33 is not carried away prior to the contact of the next flight 8 with the lever 57 a compound movement is produced in the switch operating mechanism, namely, a lowering of the anchoring point 64 of the spring 63 and a raising of the pivot point of the arm 47. This compound movement is sufficient to carry the spring 63 below the pivot point of the arm 47 and thereby cause the spring to impart a downward pull to the arm 47. This action of the spring will bring the contact 48 out of engagement with the contact 49, and thus open the motor circuit and hold it open until such time as the tray on the lever 33 is removed. As the tray is removed the rod 45 is drawn downwardly so as to again bring the pivot point of the arm 47 below the spring 63, thereby causing the spring to draw the contact 48 upwardly into its normal closed position thereby closing the circuit and again starting the operation of the conveyers.

From the foregoing description taken in connection with the accompanying drawings, it will be apparent to those skilled in the art that I have provided a safety mechanism for conveyers which is entirely automatic in operation and which insures the shutting off of the motive power whenever the sequence of operations of the conveyers is interfered with; that the switch mechanism is simple in construction and reliable in operation; and that by reason of the safety mechanism as described damage to the apparatus as well as to the articles carried thereby is entirely avoided.

In accordance with the patent statutes I have described what I now believe to be the preferred form of the invention, but inasmuch as various minor changes may be made in the details of the construction without in any way departing from the spirit of the invention, it is intended that all such modifications be included within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In combination with a plurality of conveyers arranged in series and electrical driving means therefor, a single normally closed switch for the electric circuit, and mechanical means for opening said switch, said means comprising a part associated with one conveyer and a part associated with the other conveyer.

2. In combination with a plurality of conveyers arranged in series and electrical driving means therefor, a normally closed switch for the electric circuit, means for opening said switch, means associated with one of said conveyers for imparting a preliminary movement to said switch opening means, and means associated with the other conveyer for imparting a final movement to said switch opening means.

3. In combination with a vertically arranged conveyer and a horizontally arranged conveyer cooperating therewith to provide an uninterrupted travel for articles along said conveyers, an electric motor for driving said conveyers, a single switch in the motor circuit, means for opening said switch, said means including two levers arranged in the planes of travel of the conveyers and adapted to independently affect said switch.

4. In combination with a vertically arranged conveyer and a horizontally arranged conveyer cooperating therewith to provide an uninterrupted travel for articles along said conveyers, an electric motor for driving said conveyers, a single switch in the motor circuits, means for opening said switch, said means including a lever in the plane of travel of one conveyer for setting the switch, and another lever in the plane of travel of the other conveyer for opening the switch.

5. In combination with a plurality of conveyers arranged in series and electrical driving means therefor, a single switch for the electric circuit, means for opening said switch, said means including a separate arm cooperating with each conveyer.

MARVIN A. LE GETTE.