

May 16, 1939.

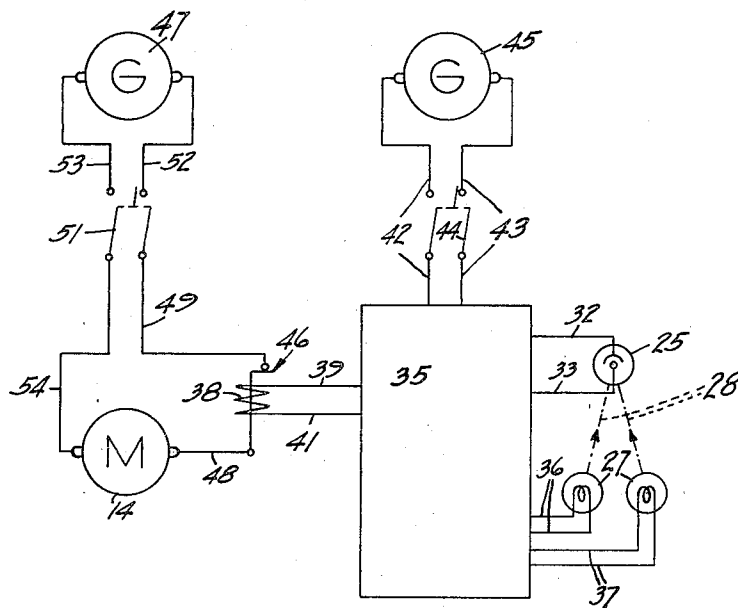
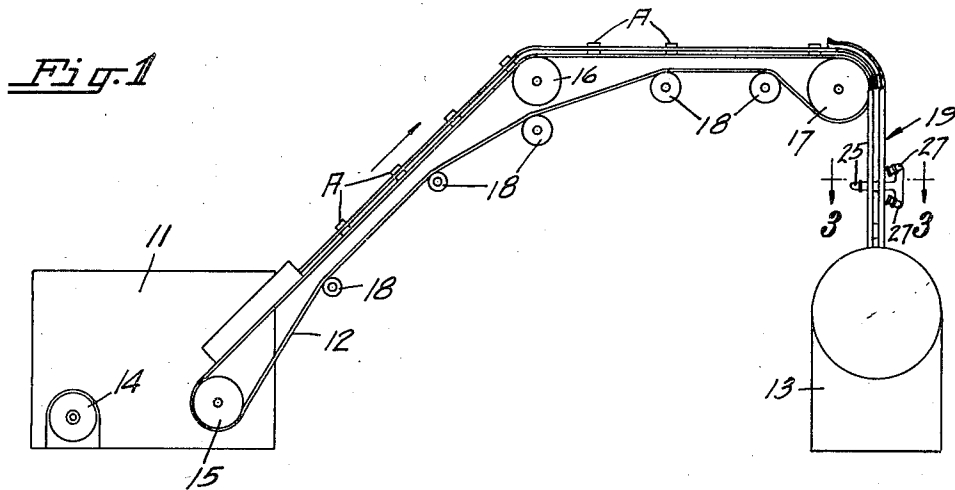
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2,158,069

CONTROL DEVICE FOR CAN MAKING MACHINERY

Filed Dec. 24, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

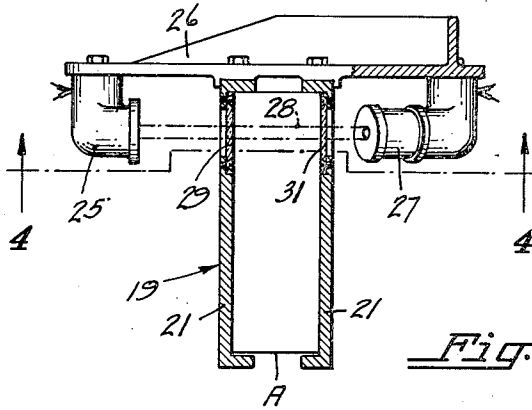


Fig. 4

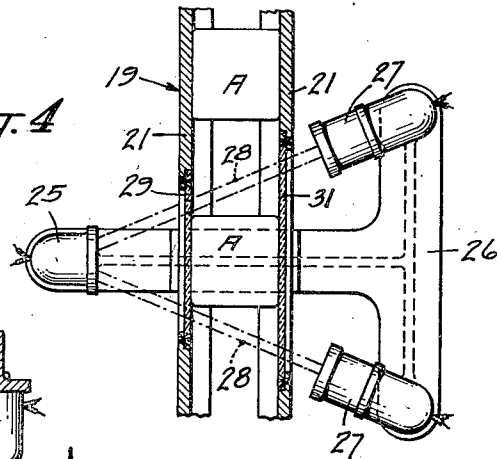


Fig. 5

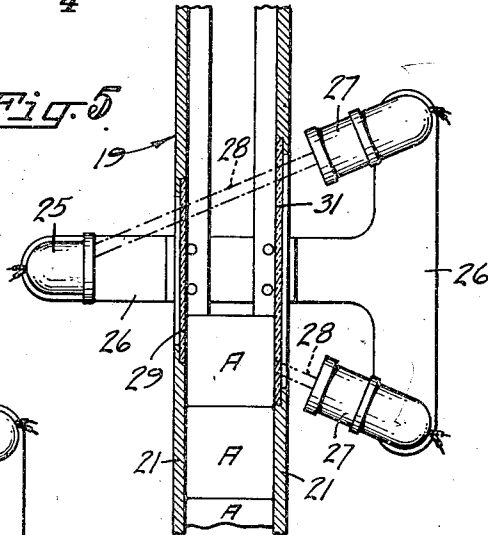
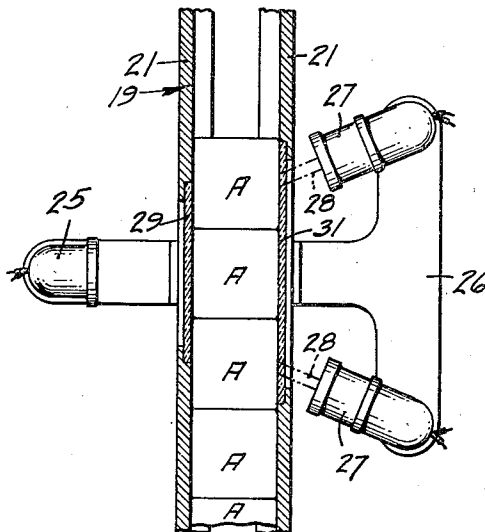


Fig. 6



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CONTROL DEVICE FOR CAN MAKING
MACHINERY

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1 Claim. (Cl. 198—37)

The present invention relates to feed control devices for can making machinery and the like and has particular reference to photo-electric control devices actuated by a plurality of converging beams of light emanating from a plu-

5 rality of separate and spaced sources for governing the feeding of articles such as containers or cans passing into and through a runway or other conveyor.

10 The instant invention contemplates the use of a photo-electric control device for stopping the feeding of additional articles into the runway when the latter becomes clogged by an accumula-

15 tion of such articles and for resuming the feeding operation when the congestion has been cleared away.

The usual set-up of photo-electric cell illuminated by a beam of light projected across the path of travel of the articles passing in the run-

20 way has been found to be insufficient for this purpose. Because of the keen sensitivity of the photo-electric cell the momentary interception of the light beam occasioned by the normal passing of an article through the runway is sufficient

25 to cause actuation of the control devices every time an article passes. This results in an undue jerky stopping and starting of the feeding mechanism which is undesirable for efficient operation of the control device.

30 The instant invention contemplates such a control device having a plurality of light beams concentrated on a single photo-electric cell, the light beams being spaced apart so that an article passing through the runway will intercept them

35 successively and as long as one or the other of the beams strike upon the photo-electric cell the latter will be continuously illuminated sufficiently to permit normal passage of articles through the runway. An accumulation of such

40 articles, however, will intercept all of the light beams at once and cause a darkening of the photo-electric cell with its resultant action on the control devices. This effects a smoother and more efficient operation of the control devices.

45 The invention further contemplates the projection of these light beams at an angle across the path of travel of the articles in the runway so that an accumulation of loosely packed articles or an accumulation of articles having an irreg-

50 ular shape will completely intercept the light beams and prevent illumination of the photo-electric cell. For example, where articles are to be conveyed by belt or otherwise in a horizontal plane any vibration might tend to cause

55 momentary separation of adjacent articles suffi-

ciently to allow passage of light therebetween where a single light beam is used and it is to prevent such a false condition that the present invention is also directed.

An object, therefore, of the invention is the 5 provision of an electric control device for governing the feeding of articles through a runway of a can making machine or the like wherein the feeding is influenced by the interception of a plurality of beams of light projected across the 10 path of travel of the articles in the runway and which normally illuminate a single photo-electric cell unit associated with the feed control devices for actuating the latter.

Another object is the provision of such a con- 15 trol device wherein the beams of light are projected across the runway at an angle, converging and concentrating on a single photo-electric cell unit disposed outside the runway, the beams in the runway being spaced apart so that a nor- 20 mally passing article will only momentarily intercept one beam at a time and thereby maintain the control devices in full article feeding operation, while an accumulation of articles in the runway will totally intercept all the beams at 25 once and thereby cause cessation of feeding of additional articles until the congestion in the runway has been cleared away.

A further object is the provision in a control device of this character wherein a plurality of 30 spaced apart independent light sources disposed at an angle to the runway are utilized to project the converging light beams across the runway and to concentrate them onto a single photo-electric cell unit so that the beams in the run- 35 way will be properly spaced apart for the desired interception by the articles passing therethrough.

Numerous other objects and advantages of the invention will be apparent as it is better under- 40 stood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a schematic side elevation of a pair 45 of can making machines connected by conveyors one of which is equipped with electric feed control devices embodying the instant invention;

Fig. 2 is a wiring diagram of the electric cir- 50 cuits and apparatus used;

Fig. 3 is an enlarged transverse sectional view of the control devices showing one arrangement of photo-electric cell unit and light source, the view being taken substantially along the line 55 3—3 of Fig. 1; and

Figs. 4, 5 and 6 are horizontal sections taken substantially along the broken line 4—4 in Fig. 3, Fig. 4 showing the normal passage of articles through the conveyor and through the light beams of the control devices; Fig. 5 illustrating articles in the conveyor accumulated to the extent of blocking off one of the light beams with the other beam still illuminating the photo-electric cell to maintain feeding of the articles, and Fig. 6 shows the limit of such an article accumulation in the conveyor, the accumulated articles blocking off both light beams from the photo-electric cell and causing a temporary cessation of further feeding of articles.

As a preferred embodiment of the instant invention the drawings illustrate a container making machine 11 (diagrammatically shown in Fig. 1) and a contiguous belt conveyor 12 which will be hereinafter collectively referred to as the article feeding mechanism. This mechanism is preferably used for performing an operation on containers A or the like articles and for delivering or feeding them forward to a subsequent operation machine 13 (also diagrammatically shown in Fig. 1). The feeding mechanism is preferably actuated by an electric motor 14.

Containers delivered by the feeding mechanism are preferably raised to a position over the top of the subsequent operation machine 13. For this purpose the belt conveyor 12 is partly inclined. The conveyor is driven by a driving pulley 15 which forms a part of the feeding mechanism and is indirectly driven by the motor 14. The upper run of the belt takes over a pair of idler pulleys 16, 17. The lower run takes over a plurality of idler pulleys 18.

The belt conveyor 12 preferably drops the containers into a vertical runway 19 the upper end of which is located in alignment with the conveyor adjacent the idler pulley 17. The lower end of the runway connects with the receiving machine 13. Containers deposited in the runway fall by gravity and are guided by the runway into the receiving machine. For this purpose the runway is formed with oppositely disposed channel shaped side members 21 (Figs. 3, 4, 5 and 6).

Provision is made for controlling the feeding of the containers from the feeding mechanism to prevent clogging of the runway 19 under adverse operating conditions which may prevail at times in the receiving machine. This feeding is controlled by electric devices which include a photo-electric cell unit located adjacent the runway. A photo-electric cell 25 (Figs. 3, 4, 5 and 6) is disposed on one side of the runway adjacent one of the members 21 and is secured to a bracket 26 which is bolted to the flanges of the members.

On the opposite side of the runway 19 the bracket 26 carries a pair of lamps 27 which constitute sources of light for projecting restricted beams of light 28 into the photo-electric cell 25. The lamps are spaced apart and are set at an angle so that the light beams pass obliquely through the runway across the path of travel of the containers and are focused to concentrate on the photo-electric cell as shown in Fig. 4. Windows 29, 31 secured in the sides of the runway members 21 permit the light beams to pass across the runway.

The spacing of the lamps and the angle at which they are set is arranged so that a container A falling in the runway will pass successively the light beams without blocking off both of them

simultaneously. This insures that when the passing container normally blocks off one beam the other will still illuminate the photo-electric cell to keep it in operation. Should more than two light beams be used, each will be arranged so that all light passing into the photo-electric cell will be blocked off only when there is an accumulation of articles.

Referring now to the wiring diagram in Fig. 2 it will be observed that the photo-electric cell unit 25 is connected by wires 32, 33 to a photo-electric amplifying relay indicated by the numeral 35. The lamps 27 are connected to the relay by wires 36, 37 and a solenoid 38 is also connected to the relay by wires 39, 41. Electric energy is supplied to the relay and the parts associated therewith in any suitable manner as by lead wires 42, 43 and a service switch 44 which connect with a source of power such as a generator 45.

The amplifying relay 35 is in itself a well known commercial article and provides for energizing and de-energizing the solenoid 38 through the action of the photo-electric cell 25 when the latter is illuminated or darkened. In the present use of the relay the solenoid is de-energized when the photo-electric cell is darkened and the resulting action is utilized to stop the feeding of articles into the runway 19.

In the form herein illustrated the solenoid 38 is utilized to control the operation of the electric motor 14 of the feeding mechanism. The solenoid opens and closes a switch 46 which is included in a motor circuit receiving electric energy from a suitable source of power such as a generator 47. The switch is connected by a wire 48 to one terminal of the motor and by a wire 49 to a service switch 51 used for manually starting and stopping the motor. The service switch is connected by wires 52, 53 to the generator 47 and also by a wire 54 to the motor 14 thus making a complete circuit when the switches are closed.

During normal operation of the feeding mechanism falling containers moving through the runway 19 and successively passing the light beams 28 of the control device have no effect on the relay 35 since one of the light beams continues to strike the photo-electric cell 25 when a falling container passes the other beam. Therefore the photo-electric cell is normally kept illuminated and the energized solenoid 38 continues to hold the switch 46 closed. The motor circuit is thus maintained, the service switch 51 being closed and the flow of electric energy from the generator 47 therefore continues to rotate the motor 14 which in its turn causes the feeding mechanism to deliver containers into the runway 19.

When for any reason the feeding mechanism delivers the containers faster than they can be operated upon in the receiving machine they accumulate in the runway 19 as shown in Figs. 5 and 6. When accumulated containers reach a height where they block off both beams of light 28 coming from the lamps 27 as shown in Fig. 6 the resulting darkened photo-electric cell 25 acts on the relay 35 to de-energize the solenoid 38. This opens the switch 46, breaks the motor circuit and stops the operation of the feeding mechanism.

Clearing of the runway causes the light beams 28 to again illuminate the photo-electric cell 25. As soon as this condition prevails the motor 14 is set in motion again to operate the feeding

mechanism to feed more containers into the runway. Thus the feeding of containers or the stopping of the feed is continually and automatically effected or resumed to prevent clogging of the runway.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

A feed control device for container parts comprising in combination: a runway, a photo-electric cell unit disposed adjacent the path of moving parts in said runway, said unit including a photo-electric cell disposed on one side of said runway and a plurality of light beams from spaced light sources disposed on the opposite side of said

runway, said light beams projecting obliquely across said runway and converging onto said cell, the space between said light beams across said runway being greater than the width of a said container part, whereby normal feed of said parts in spaced relation along said runway through said light beams cannot temporarily intercept more than one light beam simultaneously thereby failing to darken said cell, abnormal accumulation of said container parts in the runway adjacent said units serving to simultaneously intercept all of said light beams to thereby temporarily darken said cell until the abnormal accumulation of parts is relieved, and electrical means responsive to the condition of said cell for terminating the feed of said parts when said cell is darkened under abnormal conditions, said electrical means being further operable to re-establish and permit the feed of said parts under normal conditions when one or more of said light beams are projected upon said cell.

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