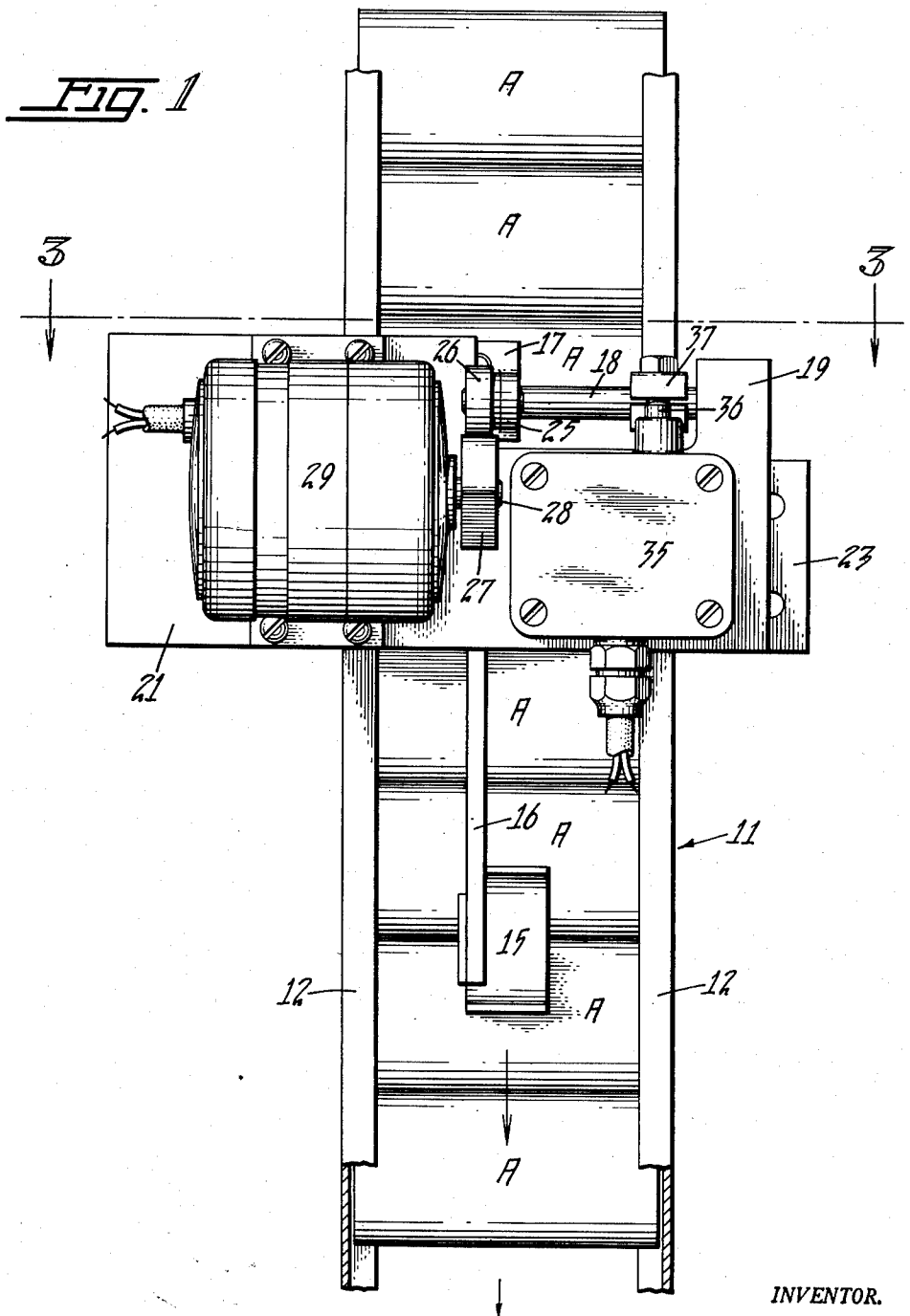
Dec. 30, 1952 C. L. CALKINS 2,623,620

CONTROL MECHANISM FOR MACHINES RECEIVING ARTICLES FROM STACKS

Filed May 5, 1949 2 SHEETS—SHEET 1

FIG. 1



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FIG. 4

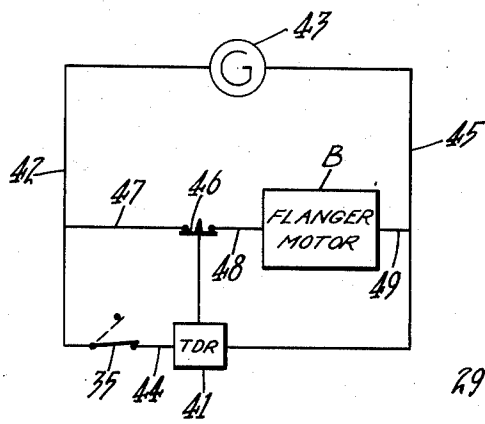


FIG. 2

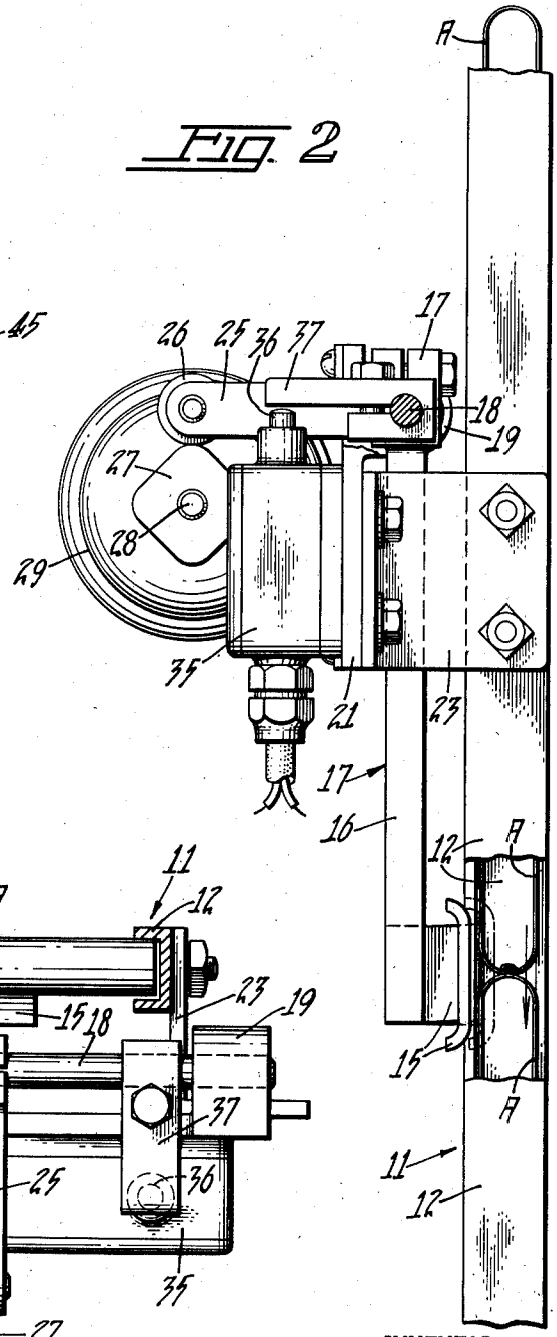
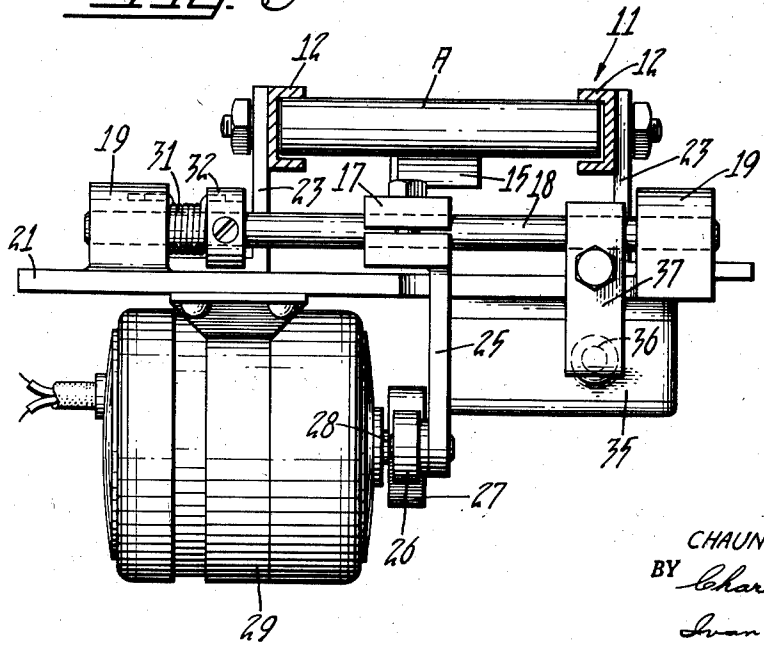


FIG. 3



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CONTROL MECHANISM FOR MACHINES RECEIVING ARTICLES FROM STACKS

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3 Claims. (Cl. 192—125)

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The present invention relates to a control mechanism for governing the operation of a machine or other mechanism in accordance with the flow of articles into the machine and has particular reference to improved devices which are operable upon flexible or light weight articles.

An object of the invention is the provision of a control mechanism for governing the operation of the machine or other mechanism whereby the machine or other mechanism is stopped when the flow of articles into the machine is interrupted and is maintained inoperative for a predetermined time after resumption of the flow of articles takes place so as to accumulate sufficient articles to insure proper flow of the articles into the machine.

Another object is the provision of such a control mechanism which is simple in construction and operation, positive and efficient in action and dependable and sensitive and because of these improved characteristics is particularly adaptable for detecting very light weight flexible or flimsey articles without arresting or interfering with the flow or movement of the articles.

Numerous other objects and advantages of the invention will be apparent as it is better understood 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 front elevation of a control mechanism associated with a feed-in device and embodying the instant invention, with parts broken away and parts shown in section;

Fig. 2 is a side elevation of the mechanism shown in Fig. 1, with parts broken away;

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 in Fig. 1, and

Fig. 4 is a simple wiring diagram of the electric apparatus used with the machine.

As a preferred or exemplary embodiment of the instant invention the drawings disclose a control mechanism for governing the flow or movement of articles such as can or container bodies A (Figs. 1, 2 and 3) into a flanger or other article treating machine B (indicated in Fig. 4) for a flanging or other operation. This would indicate that the invention is equally well adapted to controlling the feeding of articles to a variety of other machines. The bodies A, as shown in the instant example, are flat oblong sheet metal bodies commonly used for oil cans or tobacco cans and because of their lack of end members at this stage in their manufacture, are of light weight and rather flexible or flimsy.

The can bodies A enter the flanging or other machine B from any suitable source of supply, by gravity, along a vertical or inclined runway or chute 11 connecting or associated with the

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flanging machine. This runway comprises a pair of spaced and parallel channel shaped guide rails 12 in which the outer ends of the bodies slide, for supporting the bodies and for guiding them into the machine.

As the can bodies A enter the machine B, they stack up in the runway until a predetermined quantity of bodies are accumulated to insure continued operation of the machine for as long a time as the bodies continue to enter the runway. The machine is prevented from starting until such a stack of can bodies has been accumulated.

Detection of the proper quantity of can bodies accumulated in the runway is effected by a detector shoe 15 which is movable into and out of the path of travel of the can bodies passing through the runway or chute 11. This detector shoe 15 is secured to or formed on the outer end of a long leg 16 of a bell crank detector lever 17 mounted on and clamped to a rocker shaft 18, the ends of which are carried in a pair of spaced bearings 19 which project out from a base plate 21 disposed adjacent to and extending across the runway 11 in spaced relation thereto. The base plate 21 is supported on a pair of angle brackets 23 which are bolted to the guide rails 12.

The bell crank lever 17 is also formed with a short leg 25 which at its outer end carries a cam roller 26. The cam roller 26 normally operates against an edge cam 27 which is mounted on and rotated by a rotor shaft 28 of a continuously operating electric motor 29 bolted to the base plate 21. The motor preferably is of the stallable type to insure against burning out if accidentally jammed for any reason and is back-geared to give the rotor a comparatively slow speed of operation.

The cam roller 26 is pressed against the cam 27 by a tension spring 31 (Fig. 3) which is coiled around the rocker shaft 18 between one of the bearings 19 and a collar 32 secured to the shaft. One end of the spring is secured in the face of the bearing while the opposite end is fastened in the collar. This spring also presses the detector shoe 15 into the path of the bodies in the runway, when permitted by the cam 27 and when no bodies are present in the runway. The cam 27 shown in the drawings preferably is square with rounded corners for rapidly swinging the detector shoe 15 into and out of the runway although other types of cams may be used as desired. When the bodies have accumulated in the chute 11 they prevent the detector shoe from moving through its full stroke into the chute. At such a time, the shoe merely taps against the can bodies and the cam roller 26 is momentarily held away from the flat part of the cam 27 or until the high corner of the cam withdraws the shoe entirely from the path of the bodies in the chute.

Starting of the flanging or other machine B is

controlled through a normally closed electric switch **35** which is carried on the base plate **21**. This switch is provided with a movable element **36** which projects toward but which does not normally engage a switch actuating arm **37** mounted on and clamped to the rocker shaft **18**.

Until sufficient can bodies A back up into the runway **11** to prevent the detector shoe **15** from making its full stroke, the switch **35** remains open and hence no circuit is formed through it.

When sufficient can bodies A back up in the runway **11** to a point above the detector shoe **15**, the shoe is prevented by the bodies from moving the switch actuating arm **37** against the movable element **36** of the switch **35** and the switch remains closed.

Referring now to the wiring diagram in Fig. 4 it will be observed that the switch **35** is part of an electric circuit which includes a time delay relay **41** which times the starting of the flanging machine B after a proper stack of can bodies has been formed in the runway **11**. In this circuit one side of the switch **35** is connected by a wire **42** to a source of electric current, such as a generator **43**. The opposite side of the switch is connected by a wire **44** to the time delay relay **41**, and this in turn is connected by a wire **45** to the generator **43**.

When the switch **35** is closed, electric current flows along this circuit and energizes the time delay relay **41**. After a predetermined period of time, usually a few seconds, the time delay relay **41** closes a normally open relay switch **46** which is included in a machine circuit which includes the starting motor of the flanger B. In this machine circuit one side of the relay switch **46** is connected by a wire **47** to the wire **42**. The opposite side of the relay switch is connected by a wire **48** to the motor of the flanger B, and this in turn is connected by a wire **49** to the wire **45**. This time delay **41** may be of any suitable type, there being many available commercial devices on the market, wherein actuation of a switch after closing of a circuit is delayed. For example, a dash pot principle may be employed such as the time delay dash pot **181** shown in Fig. 4 of the Kruse Patent 2,412,990. This is fully described at the bottom of the sixth column of that patent.

Hence when the relay switch **46** closes, electric energy flows from the generator **43**, along wires **42**, **47**, through the closed relay switch **46**, along wire **48**, through the flanger motor, and returns along wires **49**, **45** to the generator. This flow of electric current excites the flanger motor and thus starts the flanging machine B. Starting of the machine B takes the can bodies A out of the runway **11** and as long as can bodies continue to enter the runway to replace those taken out and thus prevents the detector shoe **15** from swinging into the runway as shown in Fig. 2, the flanging machine B will continue to operate and thus use the bodies entering the runway.

However, as soon as the stack of can bodies A in the runway **11** falls to a position below the detector shoe **15** or the bodies fail to pass the shoe in a continuous procession and thereby permit a space to occur between the bodies, the coil spring **31** immediately presses the detector shoe **15** in time with the rotation of the cam **27**, into the dotted line position as shown in Fig. 2 where the shoe is in the path of travel of the bodies. This inward movement of the shoe, through the bell crank lever **17**, rocks the rocker shaft **18** in a counterclockwise direction as viewed in Fig. 2 and thereby shifts the switch actuating arm **37** against the movable element **36** of the switch **35** and thus opens the switch.

Opening of the switch **35** breaks the circuit through the time delay relay **41** and thereby deenergizes it. This opens the relay switch **46** and breaks the machine circuit and thus stops the motor which actuates the flanging machine B. Hence further feeding of the can bodies A from the runway **11** is discontinued. The flanging or other machine B thus remains idle until the stack of can bodies A in the runway **11** is again built up to a point above the detector shoe **15** as hereinbefore mentioned.

Until such a stack is built up the continuously rotating cam **27** moves or swings the detector shoe **15** into and out of the path of travel of the bodies in the runway so as to permit the bodies to pass freely through the runway but to immediately detect when sufficient bodies have accumulated in the runway to warrant restarting of the flanging machine B.

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:

1. A control mechanism for starting and stopping the operation of a machine in accordance with the flow into the machine of articles to be operated upon comprising in combination, a runway for delivering articles in continuous procession along a predetermined path of travel into the machine, a rocker shaft disposed outside of said runway, a detector lever secured to said shaft for movement therewith, said lever having a long leg extending alongside of the runway and also having a short leg rotatably carrying a cam roller, a detector shoe carried on the long leg of said lever, spring means connected with said rocker shaft for swinging the long leg of said lever toward said runway to urge said shoe into the path of travel of articles therein, a cam mounted adjacent the short leg of said lever and engageable with said cam roller for moving said lever away from said runway to repeatedly withdraw said shoe from the path of travel of the articles against the action of said rocker shaft spring, said cam and spring swinging said detector shoe continuously into and out of said runway, an electric switch included in the operating circuit of said machine, and a switch actuating arm secured on said rocker shaft and engageable with said switch for breaking the machine circuit when said detector shoe freely passes into said runway thus indicating an absence of articles in the runway.

2. A control mechanism for starting and stopping a machine receiving lightweight articles by gravity so that there is an accumulation of articles for feeding into the machine prior to its being operated, the combination of a vertically disposed runway for delivering articles by gravity into the machine, a bell crank lever having a vertically disposed detector leg and an angularly disposed cam leg, said lever being pivotally mounted at one side of said runway, a detector shoe carried on the detector leg of said lever, spring means effective on said lever for swinging its detector leg toward said runway on a forward stroke and in the absence of interference by an

article moving said shoe into the runway, cam means mounted adjacent said lever and operable on the cam leg of said lever to impart a backward stroke to said detector leg thus withdrawing said detector shoe from the path of travel of the articles, said spring means and said cam means cooperating to swing said shoe continuously to lightly tap the articles when in position for engagement by the shoe and to permit free dropping of the articles in said runway when said shoe is withdrawn, an electric switch connected in an electric circuit for starting and stopping the machine, a switch actuating arm connected with and operable by said bell crank lever, said switch breaking the machine circuit and stopping the machine when said detector shoe passes into said runway, and time delay means included in said electric circuit and operable when said switch is closed following a breaking of the circuit for delaying starting of the machine to permit accumulation of articles in said runway to a position where they prevent swinging of said detector shoe into said runway.

3. A control mechanism for starting and stopping a machine receiving lightweight articles by gravity so that there is an accumulation of articles for feeding into the machine prior to its being operated, the combination of a vertically disposed runway for delivering articles by gravity into the machine, a bell crank lever pivotally mounted closely adjacent one side of said runway and having a depending detector leg and an angularly disposed cam leg, said detector leg being disposed substantially parallel to said runway, a detector shoe carried on the lower and free end

of said detector leg, spring means effective on said lever for biasing its detector leg toward said runway and said shoe to the path of travel of articles in said runway, cam means mounted adjacent said lever and operable on the cam leg of said lever to impart movement thereto in opposition to said biasing spring means for intermittently withdrawing said detector shoe from the path of travel of the articles, said spring means and said cam means cooperating to swing said shoe continuously to lightly and yieldably tap the articles when they are in position for engagement by the shoe and to permit free dropping of the articles in said runway when said shoe is withdrawn therefrom, a starting and stopping circuit for said machine and means connected with said starting and stopping circuit operable by said bell crank lever for stopping the machine when said detector shoe engages no articles but passes into said runway.

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