July 6, 1943. W. PECHY 2,323,351

CONTROL MECHANISM

Filed Nov. 13, 1941

Fig 1

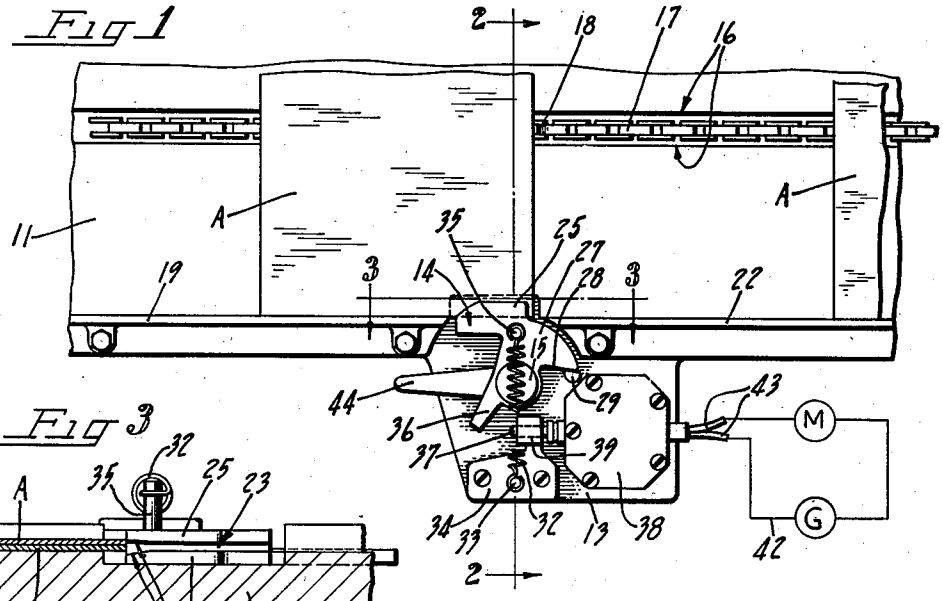


Fig 3

Fig 2

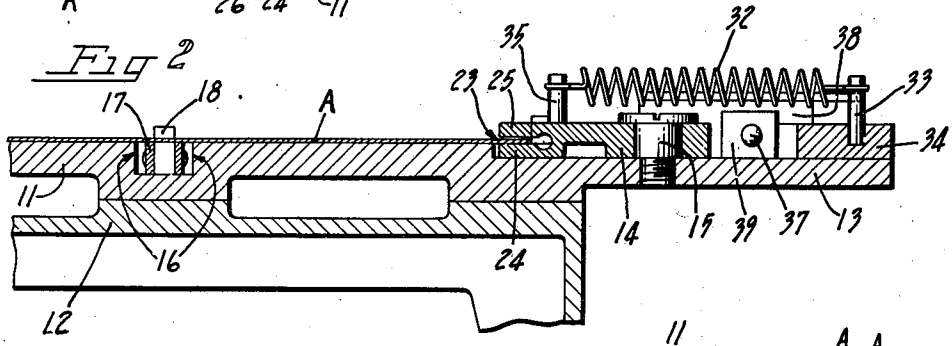


Fig 5

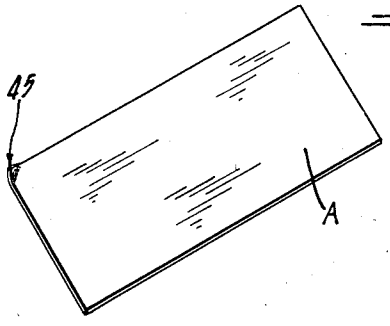
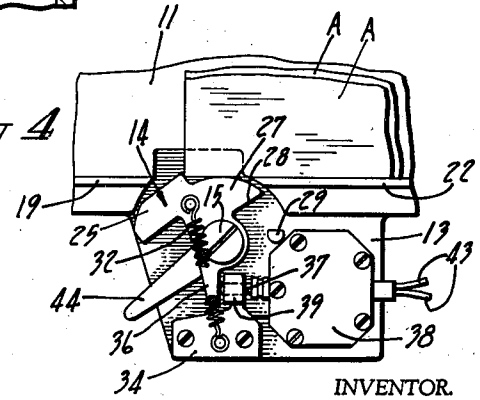


Fig 4



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Patented July 6, 1943

2,323,351

UNITED STATES PATENT OFFICE

2,323,351

CONTROL MECHANISM

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Application November 13, 1941, Serial No. 419,004

5 Claims. (Cl. 192—126)

This invention relates to a thickness gauging device for detecting abnormal or improperly fed sheets passing through can or container making machinery and has particular reference to an automatically operated mechanism for immediately stopping the further feeding of such sheets.

The instant invention contemplates a sheet detecting gauge and stopping mechanism connected with a sheet feed device which is located in front of the initial work station of a machine with the result that subsequent operations are performed only on good and properly fed sheets, i. e., sheets which are of uniform thickness and which are free of bent corners.

An object of the invention is the provision of a plural sheet detector adapted to gauge the thickness of sheets while in transit and to automatically stop the feeding of double thickness or otherwise imperfect sheets.

Another object of the invention is the provision of a gauge detector of the character described which will allow passage of sheets of a predetermined and uniform thickness for successive can manufacturing operations and which will automatically operate suitable mechanism for stopping the machine to prevent further feeding of sheets which are of abnormal thickness or which have bent corners, thus requiring removal of such irregular sheets before the machine can be operated.

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 drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a fragmentary plan view of a conveyor and feed table showing a device embodying the invention positioned on the table in the path of a sheet moving with the conveyor for gauging the sheet;

Fig. 2 is an enlarged transverse section with parts broken away as viewed substantially along the line 2—2 in Fig. 1 and showing a single sheet of standard thickness passing through the detecting gauge;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along the line 3—3 in Fig. 1 and showing a double sheet about to engage the detecting gauge;

Fig. 4 is a view similar to Fig. 1, showing fragmentary portions of two superimposed sheets after being moved against and having operated the detecting gauge to stop such sheets from being fed; and

Fig. 5 is a perspective view of a sheet having a bent corner, characteristic of the type which is identified easily by the instant detecting gauge.

The invention is directed to an automatic mechanism including an electric switch control for can making machinery which is designed to stop the feeding of sheets which are in improper condition or unsatisfactory for further operations. The switch control may be arranged to stop subsequent operations of a machine into which the sheet is being fed and the machine will remain inoperative until such a sheet is removed. The removal may be automatic if desired, in which event a suitable ejecting device will be necessary for the sheet without stopping the operations in the machine. The present disclosure does not contemplate such automatic features. This detecting and stopping mechanism is applicable to practically all can making machines and for that matter, on most types of article making machines. Therefore, the term "sheet" as used in the description and in the claims is intended to cover broadly any type of flat article such as a can body blank or other flat material.

In order to illustrate an embodiment of the invention there is disclosed in Fig. 1 of the drawing a conveyor or feed table 11 which may be a separate part or an extended portion of the feed-in end of a can making machine. The table 11 is supported on a base or frame 12 (Fig. 2) and has an integral and stepped bracket or extension 13 upon which a sheet detecting gauge 14 is mounted. This gauge is mounted pivotally on a stud 15.

The table has a groove 16 cut in the upper surface, within which an endless conveyor drive chain 17 is confined. This chain operates to move lengthwise of the table. The chain has a plurality of spaced lugs or conveyor fingers 18 which extend above the chain proper and are adapted to engage against an edge of a separated sheet A and to push the sheet along the table 11 in a predetermined path. For this purpose side guides 19, 22 are disposed on the table.

The detecting gauge 14 is located on the stepped bracket 13 so that a slotted or grooved section 23 thereof extends into the path of the moving sheets as they are transferred along the table by the chain conveyor. The slotted section of the gauge is longitudinally disposed and is substantially parallel with the edge of a sheet when the gauge is in gauging position (Figs. 1 and 2). The

walls of the slot or groove preferably are of a definite spacing so that only the sheets of a desired thickness having no bent corners or other imperfections or projections can pass through the gauging slot.

The lower wall of the slot 23 is designated by the numeral 24 and the upper wall by the numeral 25. The lower wall preferably is flush with the upper surface of the table 11 and a single thickness of sheet freely passes between the slot walls 24, 25 (Fig. 2). In Fig. 3 a double sheet produces an abnormal condition which it is desirable to detect and such double sheets will not pass through the slot but will trip the detecting gauge and will stop further feeding of the sheets.

The forward edge of the slot 23 is beveled as at 26 (Fig. 3) to allow free entrance of normal single thickness sheets and these have no gauging affect as they pass through the detecting gauge slot at the inspecting station. The detecting gauge 14 is formed with an arcuate or segmental section 27 the peripheral wall of which is concentric with the pivotal mounting on the stud 15. This provides free movement of the gauge part.

This peripheral edge of the segmental section also momentarily serves as a movable side guide for the sheet which is not of normal thickness, the gauge 14 being located in the space between the fixed guides 19, 22. The section 27 at one side terminates in a shoulder 28 and this shoulder normally rests against a vertical pin 29. It is held in such position by a tension spring 32 (Fig. 1). One end of the spring is hooked to a pin 33 which is fastened in a guide bracket 34, the latter being mounted on the extension 13. The opposite end of the spring is hooked over a pin 35 which is fastened in the detecting gauge 14.

The pins 29 and 35 are positioned relative to each other so that when the shoulder 28 is disposed against the pin 29, the pin 35 is just to the right of a straight line passed through the stud 15 and the pin 33 (as viewed in Fig. 1). In this position the spring 32 holds the detecting gauge in its non-gauging position. Should an irregular or double sheet engage against the detecting gauge in the course of feeding, the gauge will be swung into the position of Fig. 4 by the moving sheet. This stops further feeding of such a sheet. This interruption of sheet and conveyor movement is accomplished by a stop control finger 36. The finger is an integral part of the detecting gauge 14 and strikes against a plunger 37 of a normally closed switch 38.

The plunger 37 is slidable in a guide or boss 39 formed on the guide bracket 34 and when pushed into the switch 38 by the finger 36, the plunger opens an electrical circuit. Such a circuit is designated broadly by the numeral 42 which is connected to lead wires 43 of the switch 38. This breaks the flow of electrical current from a power source G, immediately stopping a motor M in the circuit which operates the can making or other machinery as well as the conveyor 17 for the sheets A.

The sheet or sheets that operate the detecting gauge 14 and cause such disruption may be removed manually. As previously suggested a suitable automatic ejecting device may be used but such a device forms no part of the present invention and is not shown or described.

The operations of the can making machinery and the subsequent feeding of sheets may be resumed only after the detecting gauge is placed into an operative position. This is done in the present machine by manual actuation of a start and stop handle 44 which extends from the detecting gauge. Moving the handle from inoperative position (Fig. 4) to operative position as illustrated in Fig. 1 places the gauging slot 23 directly in the path of the moving sheets being advanced by the chain conveyor 17.

The bent corner type of sheet hereinbefore referred to and which is illustrated in Fig. 5 of the drawing also will cause the detecting gauge to operate. A bent corner 45 may be located at one corner, at two adjacent corners adjoining one side, or on opposite corners. For best results therefore the detecting gauge will be duplicated on the other side of the conveyor 11 so that the two opposite sides of the sheet will be served by the two slots 23 on both sides of the apparatus. A bent corner on either side, therefore, will operate the gauging device on that side. It will be understood that when two sets of gauging devices are used the lead wires 43 of both will be in one circuit passing into the motor M which drives the conveyor.

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 sheet feed control and stop mechanism, comprising a detecting gauge disposed in the path of moving sheets for gauging abnormal sheet thickness or other sheet irregularities, said gauge having spaced walls defining a slot of predetermined dimension and providing free passage for a normal sheet but preventing passage of an abnormal sheet, such abnormal sheet actuating the gauge to remove its slot from the sheet path, and a sheet movement stop mechanism operable by said gauge when it is moved for stopping the further feeding of the abnormal sheet.

2. A sheet feed control and stop mechanism, comprising a conveyor for advancing sheets to be gauged, a movable detecting gauge disposed in the path of said moving sheets for gauging abnormal sheet thickness or other sheet irregularities, said gauge having spaced walls defining a slot of predetermined dimension and providing free passage for a normal sheet but preventing passage of an abnormal sheet, engagement of an abnormal sheet with said slot moving the latter and said gauge out of the path of said abnormal sheet, and stop mechanism operable by movement of said gauge for stopping said conveyor to arrest further feeding of the abnormal sheet.

3. A sheet feed control and stop mechanism, comprising a pivotally mounted detecting gauge disposed in the path of moving sheets for gauging abnormal sheet thickness and other sheet irregularities such as bent corners, said gauge having spaced upper and lower walls to provide a free passage therebetween for an edge of a normal sheet of predetermined thickness, said moving sheet when of greater thickness or when formed with bent corners and constituting an abnormal sheet being prevented from passing between said spaced walls whereupon the gauge pivots on its support to move said spaced wall from the sheet path, and a sheet movement stop

mechanism operable by said moving gauge to interrupt further movement of said sheets.

4. A sheet feed control and stop mechanism, comprising a pivotally mounted detecting gauge disposed in the path of moving sheets for gauging abnormal sheet thickness and other sheet irregularities affecting such sheet thickness, said gauge having spaced upper and lower walls to provide a free passage therebetween for one edge of a normal sheet of predetermined thickness, an abnormal moving sheet having greater thickness or having bent or irregular corners being prevented from passing between said spaced walls, said gauge pivoting on its support when engaged by such abnormal sheet, and a sheet movement stop mechanism operable by the pivoting action of said gauge interrupting further movement of said sheets, said mechanism including an electric switch unit having a sheet moving electrical circuit.

5. A sheet feed control and stop mechanism, comprising a table for supporting the sheets for gauging, a conveyor passing across said table for advancing the sheets to be gauged, a detecting gauge pivoted on said table at one side of said moving sheets, said gauge having a part extending in the path of the moving sheets for gauging abnormal sheet thickness and other sheet irregularities, said part being formed with spaced upper and lower walls to provide a free passage therebetween for an edge of a normal sheet of predetermined thickness, a sheet when of greater thickness or one having bent corners being prevented from passing between said spaced walls, such sheet striking the gauge and pivoting it on its table support, electric means for operating said conveyor, a stop mechanism including an electric switch unit electrically connected with said electric means, and a stop finger carried by said gauge for actuating said switch unit when the gauge is moved for interrupting movement of said conveyor to necessitate removal of the abnormal sheet from said table before further gauging operations are resumed.

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