SELECTIVE ARTICLE DIRECTOR
MULTIPOSITION GATE

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ABSTRACT

An article directing gate selectively routes advancing articles such as photoprints into any of three offbear paths in accordance with simultaneous energization of different combinations of two of four electromagnet relays with the other two remaining deenergized. The relay armatures act on the pivoted gate through a walking beam and gate crank arm.

5 Claims, 5 Drawing Figures
SELECTIVE ARTICLE DIRECTOR MULTIPosition GATE

BACKGROUND

This invention relates to a new and improved gating mechanism for the selective routing of conveyed articles, such as photoprints or negatives in an automatic packaging or processing machine, such as wherein the prints are to be directed to any one of three points of disposal. In the case of a commercial photoprint packaging machine, for example, the prints are individually premarked according to whether they are to be accepted, remade or rejected and are to be directed accordingly by sensing the markings and directing their route of conveyance to any of the three appropriate receiving points. The invention is herein illustratively described by reference to the preferred embodiment thereof; however it will be recognized that certain modifications thereof with respect to details may be made without departing from its essential features.

A broad object of this invention is to provide a positive and quick-acting director gate mechanism having at least three settings of the gate. A related object is to devise such a gate mechanism of low cost which can be manufactured using readily available electromagnet relay actuators.

A further object hereof is to devise a selective director gate mechanism the actuators of which are energized electrically and thereby easily controlled by electrical signals so as to facilitate automated or semi-automated control of the gate.

A specific object is to provide an improved director gate for use in a photoprint sorting and packaging machine or the like. In general terms the invention provides a high-speed multiposition sorting gate by which photoprints or similar articles moving rapidly in succession along a conveyor path may be directed individually into any one of three offbear paths without interruption or slowing of the movement. In this regard it will be appreciated that in such machines and similar applications the prints or other articles are moving so fast that selective operation of the gate constitutes essentially a flicking motion, so rapidly must it change positions at times between articles in order to intercept and deflect the path of each. Yet operation of the gate must be positive and consistently reliable in order to perform its sorting function adequately.

Accordingly the invention features a plate-like gate member pivoted intermediate its ends on a transverse shaft by which the gate is tilted variably into any of the three positions by a crank arm operated through controlled shifting of a walking beam. For such purpose, that is in order to achieve three-way positioning of the gate, the ends of the walking beam are independently movable to either of two opposite positions, this being carried out by means of electromagnet relays which are energized in selected combinations.

These and other features, objects and advantages of the invention will become more fully evident from the following description by reference to the accompanying drawings.

DESCRIPTION

FIGS. 1, 2 and 3 are side views of the gate mechanism and associated conveyor parts in each of the gate's three respective operating positions.
feeding gate 120. If a relatively longer gate is used it may in certain instances be appropriate for the gate to incorporate its own article engaging and feeding means that exert an advancing force on the articles assuring their traverse of the gate.

Pivot shaft 120b, non-rotationally fixed to the plate-like gate member 120, passes rotatably through journal apertures in frame plate 162 at each end of the gate. At one end, that is adjacent one of the side plates 162, shaft 120b rigidly mounts a crank arm 120c projecting generally upward from shaft 120b. A transversely projecting actuator shaft 120d on the outer end of crank arm 120c projects therefrom parallel to journal shaft 120b. Actuator shaft 120d is rotatively socketed in a walking beam 120e at a location intermediate the ends of the latter. The upper and lower ends of the walking beam are carried by upper and lower shuttles 121 and 123. To this end the shuttles comprise cylindrical sockets 121a and 123a in which the ball-shaped upper and lower ends of the walking beam are slidably and pivotally received. Shuttle 121 interjoints the aligned and opposed armatures 125a and 127a of electromagnetic relays 125 and 127. Similarly shuttle 123 interjoints the aligned and opposed armatures 129a and 131a of relays 129 and 131 extending parallel to relays 127 and 125; also generally parallel to the feed direction of articles A. Thus energization of the coil of relay 125 with relay 127 deenergized draws the shuttle 121 toward relay 125, and with it in the upper end of walking beam 120e. Conversely energization of relay 127 with relay 125 deenergized draws the shuttle oppositely. Relays 129 and 131 work similarly on the shuttle 123 and thereby the lower end of the walking beam.

Now it may be seen that simultaneous energization of relays 125 and 131 with their counterparts 127 and 129 deenergized shifts both ends of the walking beam in the same direction as in FIG. 2 and thereby rocks the gate 120 into its counterclockwise position or “remake” position. Likewise, and conversely, simultaneous energization of relays 127 and 129 with their counterparts 125 and 131 deenergized as in FIG. 3 shifts both ends of the walking beam in the same direction and thereby positions the gate 120 in its opposite extreme or “reject” position. The intermediate or “accept” setting of the gate is accomplished by energization of relays 125 and 129 with relays 127 and 131 deenergized. This latter setting could be achieved also by the alternative of energizing relays 127 and 131 with relays 125 and 129 deenergized.

In any event a reliable and positive, quick-acting three-position gate operator is provided economically with readily available commercial relays and simple mechanical connector elements. There is no need to rely upon return springs, drive motors nor other complex and expensive mechanism. Furthermore the system of controls for the relays being essentially a simple selective electrical switching circuit which is shown symbolically in FIG. 5 requires only four switches. These may be electro-mechanical switches, solid-state switching devices or other electronic current gating means, so may easily be programmed or controlled by electrical sensing or selector devices of any suitable type, as in the aforementioned copending application disclosure of a means for controlling the acceptance, rejection or remake selection of photoprints or negatives to be packaged for making up a customer delivery order.

These and other aspects of the invention will be appreciated as ancillary to its central concept and not limiting thereon.

What is claimed is:

1. A gate mechanism for directing articles advancing to and beyond said mechanism comprising a gate member, means movably supporting said member to permit the same to be shifted into any of three different article directing positions, means to actuate said member between such positions comprising a walking beam having electromagnet relays operatively connected to the respective ends of the walking beam, connector means operatively connecting the walking beam intermediate its ends to the gate, and means for selectively energizing the relays.

2. The gate mechanism defined in claim 1, wherein the relays comprise two pairs of relays, the members of each of said pairs being positioned in mutual alignment and having oppositely acting armatures, the armatures of one of said relay pairs being commonly connected to one end of the walking beam and the armatures of the other of said relay pairs being commonly connected to the opposite end of said walking beam.

3. The gate mechanism defined in claim 2, wherein the connector means comprises a crank arm connected to the gate member for tilting the same and connected to the walking beam for rocking the crank arm by shifting of the walking beam in accordance with selective energization of the relays.

4. In a photoprint and similar article conveyor system comprising infed conveyor means for the articles, three offbear receiving means for the articles generally aligned with said infed conveyor means and branching in relatively different directions therefrom, and article directing gate means including a member pivotally mounted in general alignment with said infed conveyor means ahead of said offbear receiving means and movable angularly into any of three positions to direct the articles selectively to any of said offbear receiving means, said gate means including a plurality of electromagnet relays operatively connected to the gate member and arranged by selective energization of selected combinations of said relays to move the gate member selectively from any of such three positions to either of the other positions.

5. The apparatus defined in claim 4 wherein there are four such relays arranged in mutually aligned pairs spaced apart in parallel relationship and with the members of one pair having armatures interconnected by a walking beam with the armatures of the members of the other pair, said walking beam being operatively connected intermediate its ends to the gate member for actuating the same between positions. * * * *