June 4, 1940. M. ROSENTHAL 2,203,508

CONVEYER CONTROL DEVICE

Filed Sept. 5, 1939

Fig. 5.

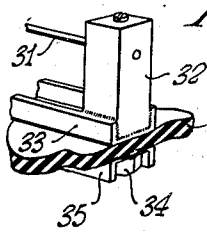


Fig. 1.

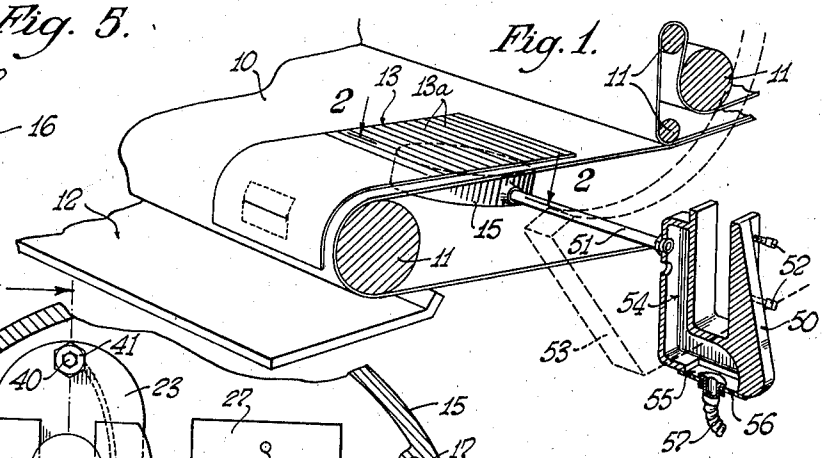


Fig. 2.

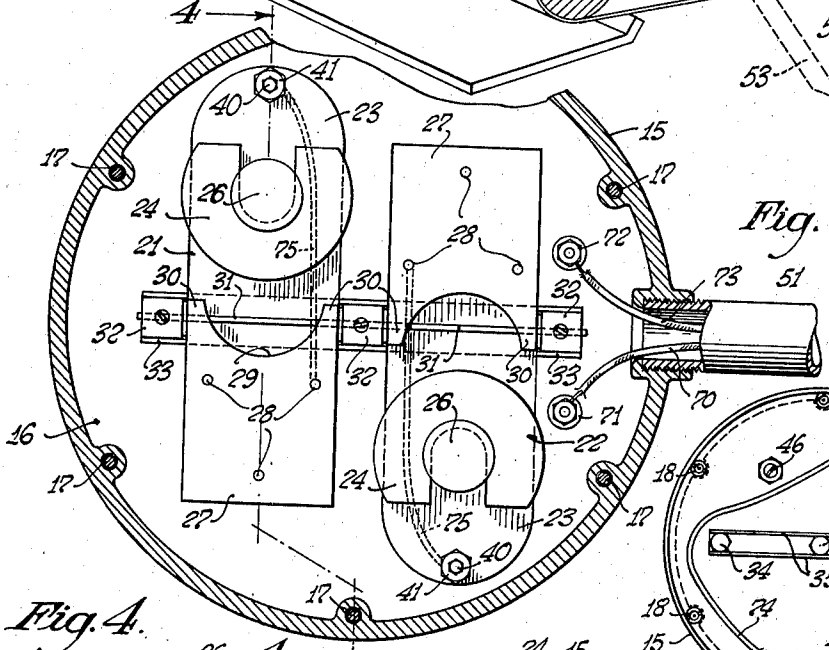


Fig. 3.

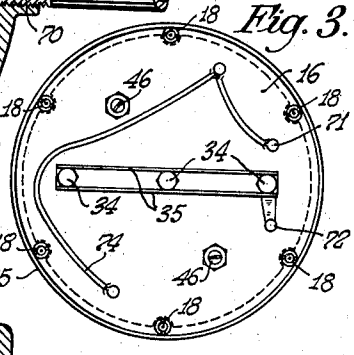


Fig. 4.

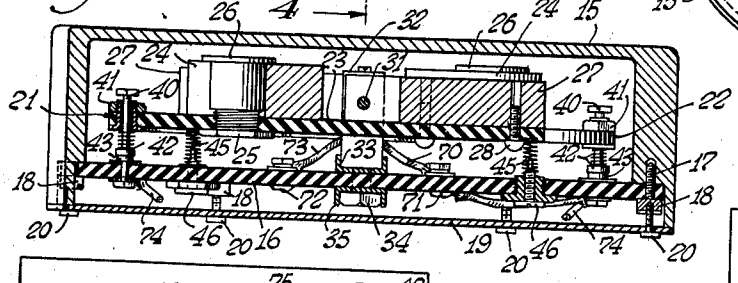
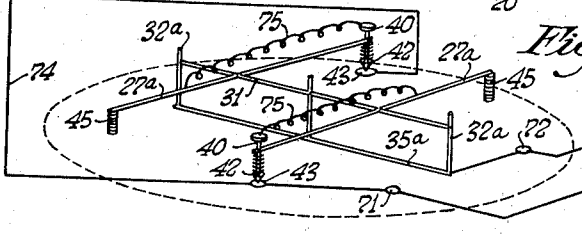
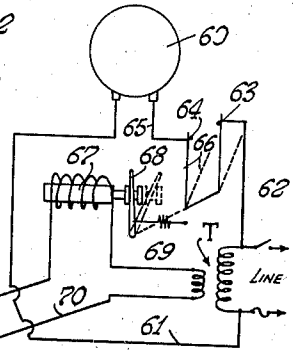


Fig. 5.





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CONVEYER CONTROL DEVICE

Morris Rosenthal, Chicago, Ill.

Application September 5, 1939, Serial No. 293,425

13 Claims. (Cl. 198—232)

This invention has as its principal object the provision of improvements in conveyer control mechanism of the type described and claimed in my copending U. S. application, Serial No. 202,283, wherein there is disclosed a control device especially suited for use with laundry ironers and which includes a magnetic marker deposited on the conveying web and moved relative to a magnetic member which is attracted from a normal position to operate a switch which stops the conveyer when the marker passes the control.

Viewed from another aspect, it is an important object of the invention to provide a control device for use with conveyers and which can be operated to stop the conveyer only when a magnetic substance of predetermined area is carried by the conveyer relative to the control device.

A further object is the provision of a control device of the class described which will not chatter or be falsely operated by magnetically attractable substances other than the intended control marker carried on the conveyer.

A further object is the elimination of false operation and chattering (that is, rapid and ineffectual operations of the control) resulting from the passage of metal belt lacings on the conveyer web, or metal buttons or the like included in the material carried by the conveyer.

Still another and specific object is the provision of a control device in a conveyer arranged to stop the conveyer when a marker is moved thereby past the control, but which can be operated only if the marker is a certain size.

Another object is the provision of bracket means for attaching the control to any conveyer.

Other objects and advantages of the invention reside in various details of construction as well as the arrangement and operation of the parts described hereinafter in view of the annexed drawing, in which:

Fig. 1 is a fragmentary perspective of the discharge end of the conveyer in an ironing machine, with the control device in operative position;

Fig. 2 is an enlarged horizontal section through the control housing showing the control mechanism in top plan view as seen in the direction of line 2—2 of Fig. 1;

Fig. 3 is a bottom plan view to smaller scale of the mechanism seen in Fig. 2;

Fig. 4 is a vertical section along line 4—4 of Fig. 2;

Fig. 5 is a fragmentary perspective to enlarged scale of one of the stanchions and mounting means for the rocking bases; while

Fig. 6 is a circuit diagram.

The improved control device is intended to be used with a conveyer which includes some sort of conveying web such as the canvas web 10 of Fig. 1 which is employed in an ironing machine utilizing rollers 11 to train the web and the goods thereon relative to ironing rollers (not shown). The web moves from a receiving end of the machine (not shown) toward the discharge end (shown in Fig. 1) from which the conveyer laundry articles are collected by attendants and usually stacked on the table 12 preparatory to transfer into a suitable receptacle.

In the operation of these and similar machines, it is customary to separate each batch of articles by a suitable marker 13 which indicates to the attendants at the discharge end of the machine that the last articles of a given order or batch have preceded the marker and that another batch is following.

In order to stop the machine automatically prior to the feeding or delivery of a new batch, there is provided an automatic control means including a magnetic switch operating member disposed close to the web on the underside thereof so as to underlie a marker delivered to the discharge end, and the marker is provided with a magnetically attractable substance which causes the magnetic member in the control to operate and open the power circuit for the conveyer, thus automatically stopping the latter when the marker appears, or approaches, the discharge end of the ironer or conveyer. Such a control mechanism is described in my copending application, and a marker similar to the marker 13 and including small squares of iron or strips of steel shim for coaction with the control, is described and claimed in my copending U. S. application, Serial No. 202,284.

In order to provide a control which will have maximum sensitivity and which will nevertheless not respond to all of the magnetic substances transported by the conveyer but only to certain intended substances or articles, the present invention provides switching or circuit breaking mechanism controlled by a plurality of magnetic members spaced in the control device so that all of the same must be operated at the same time in order to stop the conveyer, the control marker or cooperating magnetically attractable means of necessity being of a size to span the distance between the several magnetic control members for this purpose. In accordance with these improvements, false, impositive and accidental operation of the control by steel belt lacings, but-

tons, and magnetically attractable articles carried in the pockets of garments and the like, is wholly avoided.

Referring to Fig. 4 the control device includes a housing 15 in the nature of a casting of aluminum or some other non-magnetic material and into which is fitted an insulated base 16 of Bakelite or the like, seated on a ledge 17 and secured in position by means of bolts 18. The housing is closed by a cover plate 19 secured in position by screws 20 which thread into the heads of the bolts 18.

Mounted on the base 16 (see also Fig. 2) are a plurality of control elements generally indicated at 21 and 22. Each control element includes an insulated rocker base 23 having a horseshoe magnet 24 secured on the upper side thereof by means of a threaded nipple 25 which passes from the underside of the rocker base up through the bight portion of the magnet and threads into a complementary thimble 26.

The magnets are situated close to one end of their respective rocker bases, and at the opposite end of each base is disposed a counterweight 27 in the form of a rectangle of non-magnetic metal, such as brass or white metal, secured to the base by means of screws 28 and having its end nearest the magnet arcuated as at 29 to provide opposite trunnion arms 30 through which is passed a common shaft or spindle 31 which supports the several rocking bases for rocking motion.

The shaft 31 is supported by a plurality of spaced posts 32 seated in a channel strip 33 on the main base member 16 and secured in position by means of bolts 34 having their head portions (Figs. 3 and 5) clamped between the oposite sides 35 of a channel strip on the underside of the base. The bolts 34 are applied before the sides 35 of the channel strip are turned up, These sides preventing any loosening of the bolts due to the constant vibration to which the unit is subjected.

To complete the control device, circuit closing or switch means is provided for each of the several control elements and includes the provision at one end of each rocking base 23 of a contact 40 seated for vertical sliding movement in a threaded bushing 41 in the base and urged by spring means 42 into contacting engagement with a companion contact 43 fixed on the main base member 16. The effort of the spring 42 is such as to urge the contact into engagement with its companion contact while the rocker is rocking away from its normal position to separate the contacts, this being for the purpose of requiring the movable contact 40 to be moved a certain distance away from the companion contact before the circuit is broken, so as to avoid false operation or chattering which would result from slight rocking movement of the rocking base caused by vibration in the machine or by action of the magnetic members when a magnetically attractable substance other than the actual control marker is passed through the conveyer.

Each of the magnetic control elements or assemblies 21—22 is provided with adjusting means in the form of a spring 45 which is urged by a screw 46 into a recess in the underside of the corresponding rocking base to tilt the latter into normal position and counteract any effort of the springs 42 or any unbalance between the counterweight and the magnet, and thus assure that the rocking base will remain positively in its normal position with the contacts 40 and 43 in normal circuit closing condition.

The control unit is mounted in operative position beneath the conveyer by means of a special clamp 50 (Fig. 1) from which is extended a conduit 51 threaded into a boss on the housing 16, and through which the control conductors are passed. The clamp 50 is of substantially U-shape and has means such as the bolts 52, for clamping the same onto the frame portion 53 of the ironer or conveyer.

A particular feature of the clamp is the provision of a hollow passage portion 54 interiorly thereof and communicating from the point of juncture with the conduit 51 to an opening 55 beneath the bight of the clamp. This latter opening is closed by a plate 56 in which terminates one end of a flexible conduit cable 57 through which the control conductors pass from the control unit to the master switch for the conveyer power circuit. As a result of this construction, the wiring from the control unit is entirely concealed and protected and the connection between the unit and the conduit 57 can easily be effected as a result of the provision of a large hollow space within the clamp and the removable cover plate 56.

The circuit connections for the device are illustrated in Fig. 6 in which there is shown a power circuit for the driving motor 60 of the conveyer, said circuit including a conductor 61 which extends from one terminal of the power line to one terminal of the motor, and a return conductor 62 which extends from the opposite terminal of the power line to one contact 63 of a master switch. Another contact 64 of the master switch is connected by conductor 65 to the remaining terminal of the motor, and in order to energize the latter it is necessary to move a pair of switch blades 66 from normal open circuit position into engagement with the contacts 63 and 64 to bridge the latter.

Operation of the master switch is effected through the agency of a solenoid 67 having a plunger operatively connected with a lever 68 for rocking the switch blades 66 from normal to circuit closing position relative to the contacts 63 and 64 when the solenoid is energized to attract the plunger. The solenoid is under control of the magnetic control means and has one of the terminals of its winding connected by a conductor 69 to one terminal of the secondary of a step-down transformer T, the opposite secondary terminal of which is connected by conductor 70 to one of the binding posts 71 of the magnetic control unit, the circuit for the solenoid being completed by conductor 73 which extends from another binding post 72 in the magnetic control unit to the remaining terminal of the solenoid winding. The primary of the transformer is bridged across the line connections for the motor.

The circuit connections in the magnetic control unit are such that if any one pair of contact or circuit breaking members 40—43 is in closed circuit condition, the power circuit will be completed for the solenoid 67, thus pulling up the armature and rocking the switch blade 66 into closed circuit engagement with contacts 63 and 64.

Stated in other terms, in order to stop the motor 60 it is necessary to deenergize the relay 67 and in order to accomplish this, it is necessary that all of the contacts or circuit breakers 40—43 be moved to open circuit condition. This

is the result of a provision of a plurality of switching devices or circuit breakers 40—43 and the manner in which they are connected in the power circuit for the solenoid. All of the stationary circuit breaker contacts 43 are connected in common by the conductor 74 to the binding posts 71 in the unit, whereas all of the movable circuit breaker contacts 40 are connected in common through the metallic mounting means for the rocking bases, including the shaft 31, the posts 32 and the channel brackets 33 and 35, connection of the contacts 40 to the frame or mounting means being effected by the conductors 75 shown in dotted lines in Fig. 2, and each leading from one of the contacts 40 to one of the mounting screws 28 on the metal counterweight blocks engaging the shaft 31. The showing of the magnetic control unit in Fig. 6 is schematic, but it will be understood that the parts 32*a* correspond to the mounting posts 32, and the part 35*a* corresponds to the channel strip 35, while the parts 27*a* correspond to the metal counterweight plocks 27.

In the operation of the device, referring to Figs. 1 and 6, the rockable magnetic members are urged into normal position by the springs 45 so that the circuit breaker contacts 40 and 43 are all in closed circuit condition, thus energizing the solenoid 67 and closing the master switch contacts 63—64—66 to connect power to the motor 60 which drives the conveyer belt.

Assuming the control unit to be disposed in the housing 16 close to the underside of the conveyer as seen in Fig. 1, a traveling or mobile control member in the form of the marker pad 13 is placed on the conveyer at the loading or feeding end to be transported toward and over the control unit toward the discharge end as illustrated in Fig. 1. The magnetically attractable substance in the marker pad 13 is arranged to extend over an area as great as or greater than that occupied by the several rocking members 21—22 in order that all of the latter may be tilted at the same time instead of in succession, which would be the case if the area of the magnetic substance in the control pad were less than that occupied by the rockable members or in the event that the depth of the area covered by the magnetic substance were less than the distance between the opposite extremities of the area occupied by the rockable members in the direction of movement of the conveyer.

In the illustration of Fig. 1, the area occupied by the magnetic substance in the marker is indicated generally by the crosswise stitching lines 13*a*, and it will be observed that this area is somewhat greater than that of the top surface of the housing 16 therebelow. But in any event it is to be understood that in order to stop the motor, both (or all, if there are more than two) of the rockable members 21 must be tilted at the same time, and in order to accomplish this the area covered by the magnetic substance in the mobile or traveling control element or pad 13, must at least cover the area which incloses or circumscribes the several rockable members 21, as shown, or, in any event, must be at least coextensive with the area of the effective field of the magnetic members 24.

Assuming that the marker 13 has assumed the position shown in Fig. 1, the magnetic members 24 on the rocking bases 23 will be attracted toward the pad 13 and cause the circuit breaker contacts 40 and 43 to separate, thus breaking the circuit through the solenoid 67 and allowing the switch blades 66 to drop back and open the circuit through the motor, whereupon the conveyer will stop. The attendant then removes the marker 13 when he is ready for the next lot, and as soon as the pad is removed the conveyer starts. The pads are returned to the feeding end of the machine by any convenient means.

The field of force of magnetic members such as the horseshoe magnets 24, will obviously permeate a certain area on the conveyer and it is to be understood that the term "effective magnetic area" and similar expressions used in the claims is intended to mean the area that must necessarily be occupied by the magnetic substance in the traveling control pad to cause all of the horseshoe magnets to be attracted at the same time or as a group.

The various advantages and objects of the invention may be accomplished by modifications of the particular embodiment specifically described herein, and it is intended that the appended claims shall include all equivalent arrangements fairly coming within their call.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. Control mechanism for use with a conveyer including a driving motor, said mechanism comprising a plurality of circuit breakers connected in a control circuit for said motor and arranged in normally closed circuit condition to effect operation of said motor, the connections in said control circuit being such that the same can be opened to stop said motor only when all of the circuit breakers are moved into open circuit condition, and a plurality of magnetic control members corresponding in number to the number of circuit breakers and each arranged for movement from a normal position to move one of said circuit breakers into open circuit condition, and means mounting said magnetic control members in a predetermined spaced relation with respect to each other and in close proximity to said conveyer to be moved out of said normal position as a result of magnetic forces between the same and traveling control means carried on the conveyer, and a traveling magnetic control member including a magnetic substance arranged to extend over an area relative to the spacing of said first-mentioned magnetic control members to effect movement of all of the latter out of normal position so that all of said circuit breakers will be operated as a group.

2. Control mechanism for use with a conveyer including a driving motor, said mechanism comprising a pair of magnetic members and means mounting the same for movement independently into and out of normal position, means for mounting said movable magnetic members in close proximity to said conveyer for magnetic cooperation with traveling magnetic control means carried by the latter, means yieldingly urging said movable magnetic members into a normal position, a circuit breaker coacting with each of said movable magnetic members and arranged to be disposed in close circuit condition when the corresponding movable magnetic member is disposed in normal position, and a control circuit for said motor and connected with said circuit breakers to effect operation of said motor when any one of the circuit breakers is in normally closed circuit condition as aforesaid, it being necessary to move all circuit breakers into open circuit condition to stop said motor, and a traveling magnetic control member adapted to be carried by said con-

veyer relative to said control mechanism and including a magnetic substance arranged to effect movement of both of said movable magnetic members when the traveling control member is moved into position opposite the same, whereby all of said circuit breakers will be disposed in open circuit condition at the same time to stop said motor.

3. In a control device for use with power-driven conveyers and adapted to be actuated by magnetic means carried by the conveyer, control mechanism comprising a plurality of circuit breakers connected in a power control circuit with a driving motor for operating said conveyer and so arranged that all of the same must be operated at the same time to stop said motor, and a plurality of movably mounted magnetic members and each arranged for movement from normal position to operate one of said circuit breakers, means for mounting said movable magnetic members in close proximity to said conveyer for movement out of normal position as a result of magnetic attraction between the same and a traveling magnetic control member carried on the conveyer, said movable magnetic members being spaced relative to each other so that the field of force of each of the same lies within a certain area on said conveyer corresponding to the effective magnetic area in said traveling control member, whereby false operation of the control mechanism may be prevented as the result of movement of magnetically attractable substances of lesser effective area than that in the traveling control member.

4. Control mechanism for use with a conveyer adapted to transport a traveling magnetic control member which includes a magnetic substance of certain effective area, said mechanism comprising a plurality of magnetic members mounted for rocking movement into and out of normal position and arranged in spaced relation relative to each other for rocking movement out of normal position as a result of magnetic forces of attraction between the same and said magnetic substance in the traveling control member when the latter is disposed in a predetermined position of alignment opposite said rockable magnetic members, means yieldingly urging each of said rockable magnetic members into normal position, and circuit control means adapted for connection in a power control circuit for said conveyer and operably controlled by said rockable magnetic members when all of the same are disposed out of normal position to effect opening of said power circuit and stop the conveyer.

5. In a control device of the class described, a rockable mounting member and means mounting the same for rocking movement, a magnetic member mounted at one side of the rocking axis of said mounting member, counterbalancing means attached to said mounting member on the opposite side of said rocking axis from the magnetic member, contact means including a contact plunger mounted on said mounting member at one side of said rocking axis for reciprocable movement normal to the plane of the mounting member, spring means urging said contact plunger in a direction away from said mounting member for engagement with complementary contact means, complementary contact means mounted for engagement by the contact plunger as aforesaid, and adjustable means arranged on the side of said rocking axis opposite said contact plunger yieldingly rocking said mounting member in a direction toward said complementary contact means.

6. Control mechanism for use with a conveyer and comprising a plurality of circuit control devices connected in a circuit for operation jointly to stop driving means for the conveyer, a plurality of magnets arranged for movement severally to operate one of said control devices, and means mounting said magnets in a predetermined spatial relationship close to said conveyer for cooperation with travelling control means transported thereon and having paramagnetic means arranged in a spatial disposition to coact magnetically with all of said magnets to effect movement of the latter when the travelling control means is moved by the conveyor into a certain position relative thereto whereby to operate said circuit controlling devices jointly.

7. Motor control mechanism for a conveyer and including: a plurality of rockably mounted control magnets arranged close to the conveyer for cooperation with a travelling control member thereon, motor control means actuated by movement of said magnets, said magnets being spaced apart in a predetermined manner in the direction of movement of the conveyer, and paramagnetic means carried by said travelling member and arranged spatially with respect to the direction of movement of the travelling member by the conveyer to coact magnetically with all of said magnets and effect movement of all of the same at a given time when the travelling member is moved into a certain position relative to the magnets, and circuit control means connected to control the operation of the conveyer motor and operated by coaction of said magnets as aforesaid.

8. In combination, a conveyer and a driving motor therefor, and control mechanism for starting and stopping the conveyer and adapted for actuation by travelling control means carried along by the conveyer, said control mechanism comprising multiple switch contacts connected in a power control circuit for said motor and arranged for individual movement into and out of circuit closing condition in effecting circuit connections to start and stop said motor, and contact operating members mounted for movement individually to effect movement of said switch contacts for operation to start or stop the motor as aforesaid, means yieldingly urging said contact operating members into a normal position with said switch contacts all disposed to effect circuit connections to energize said motor, and a travelling control member including control means arranged therein in a certain spatial relationship for coaction with all of said contact operating members at one time when the travelling member is carried by the conveyer into a certain position opposite said contact operating members.

9. In a magnetic control device of the type used to start and stop a conveyer by means of a travelling control member carried by the conveyer and which includes a magnetically attractable substance adapted to affect a magnet fixed close to the conveyer and cause the same to move and operate circuit control means for the conveyer motor, I claim the arrangement of a plurality of magnets fixed close to the conveyer for movement to operate circuit control means to stop said conveyer motor when all of the magnets are moved out of a normal position at one time, said magnets being spaced relative to each other in a plane parallel to the path of movement of said travelling control member on the conveyer, and said travel-

ling control member having the magnetically attractable substance thereon arranged in a spatial relationship with respect to a plane approximately parallel with the first-mentioned plane, to affect all of said magnets at one time and move the same for the purpose set forth, when the travelling member is conveyed into a certain position opposite said magnets, and means for yieldably urging said magnets into normal position.

10. In a control for a conveyer motor, a plurality of severally movable contact-operating members and contact means actuated by each of the same and connected for operation as a group to control a power circuit for said motor, each of said contact-operating members being arranged to be operated by a magnetic control element operatively associated therewith, and said magnetic control elements being arranged to dispose their magnetic properties in a certain spatial relationship with respect to said conveyer for cooperation with traveling magnetic control means having magnetic properties similarly arranged, the arrangement being such that operation of all of said contact operating members as a group cannot be effected by magnetic substances on the conveyer unless the magnetic properties thereof are disposed in the certain spatial relationship aforesaid.

11. In a conveyer control device, multiple contact means adapted for connection to operate a control circuit for a conveyer motor, circuit connections between said contact means so arranged that all of the latter must be moved as a group from a normal condition to actuate said control circuit, magnetic members each mounted for movement independently to move one of said contact means from normal condition, and means mounting said magnetic members in a certain spaced relation relative to said conveyer for operation by magnet control means on said conveyer having magnetic properties arranged with respect to spatial disposition to coact operatively with all of said magnetic members when moved by the conveyer relative to said control device.

12. An attaching clamp for mounting electrical control mechanism to a support and comprising a U-shaped member having at least one arm thereof hollowed and communicating into an opening opposite the bight portion of the clamp, said hollow arm of the clamp having an opening providing entrance for a conductor into the hollowed portion thereof, a cover plate for said opening opposite the bight in the clamp and having a passage therethrough for said conductor, and means on said clamp for securing the same in engagement with a supporting member.

13. In a control device of the class described, a housing in which control mechanism is disposed, a hollow supporting arm extending from said housing and a U-shaped clamp having a hollowed arm portion in which the end of said supporting arm opposite the housing is secured, said clamp having an opening communicating into said hollowed arm portion thereof, a cover plate for said last-mentioned opening, said cover plate having a passage arranged to receive an end of a conduit for passage of conductors from the conduit through the hollowed arm portion of the clamp and into said supporting arm of the housing for connection with said control mechanism, and means on the arm of said clamp opposite the hollowed arm portion thereof for attaching the clamp to a support.

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