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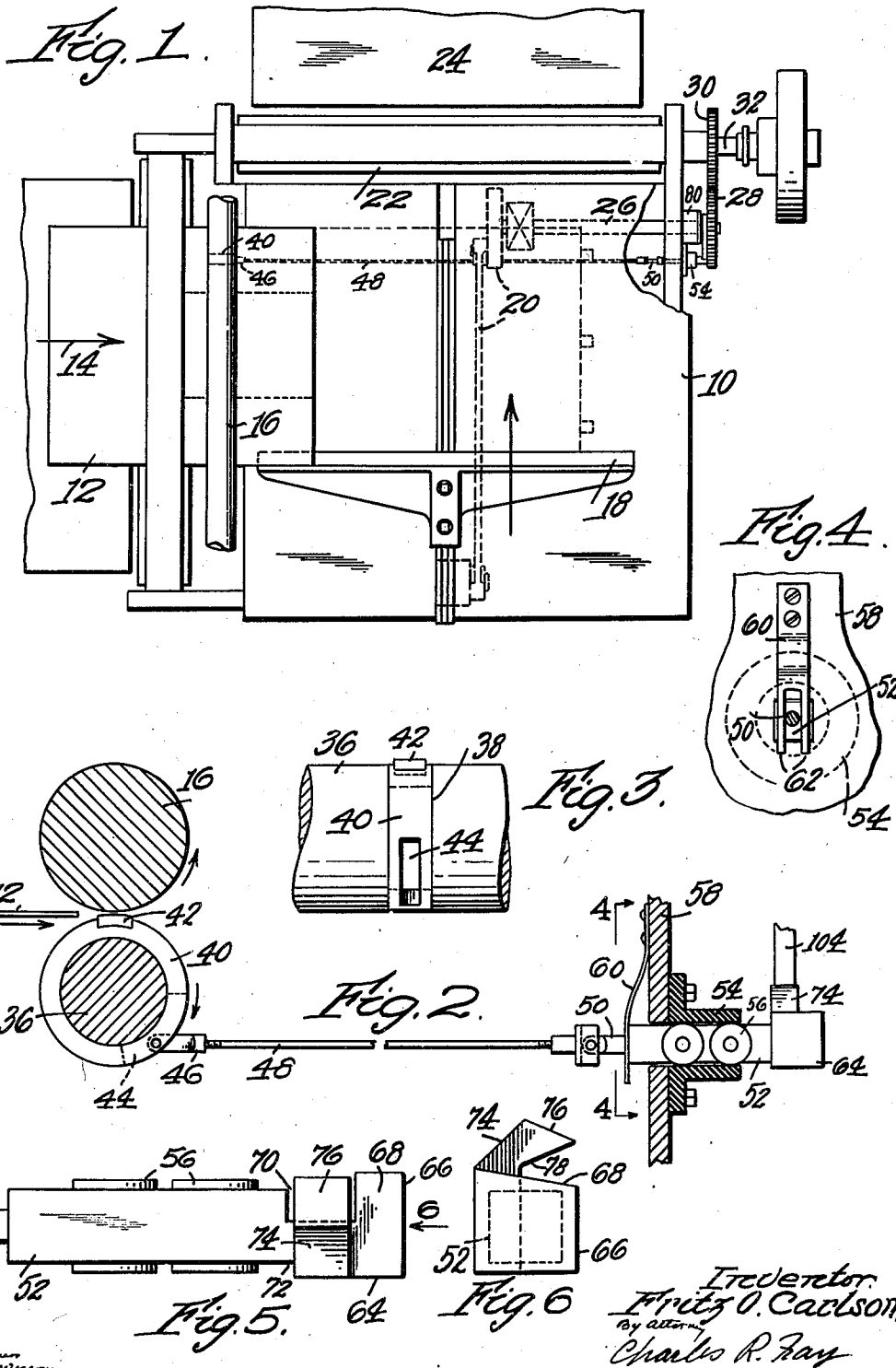
F. O. CARLSON

2,266,587

TRIP MECHANISM

Filed Oct. 12, 1939

2 Sheets-Sheet 1



Dec. 16, 1941.

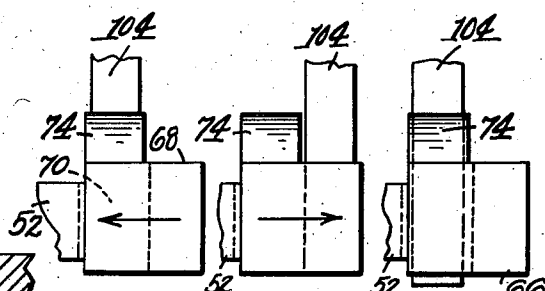
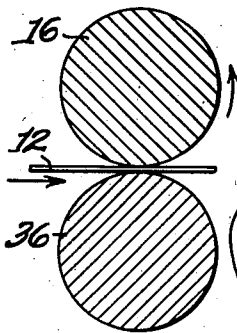
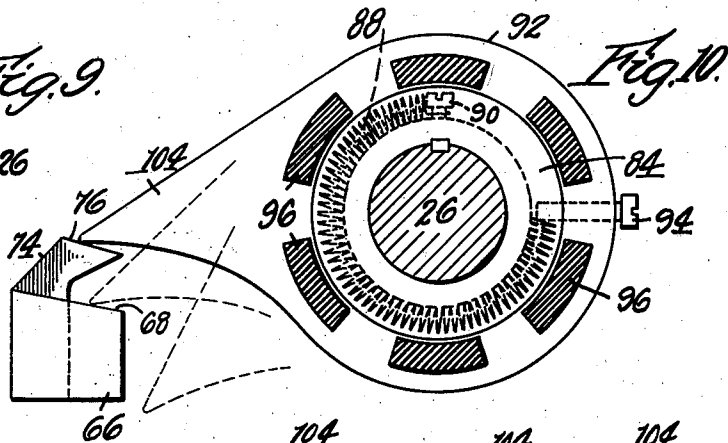
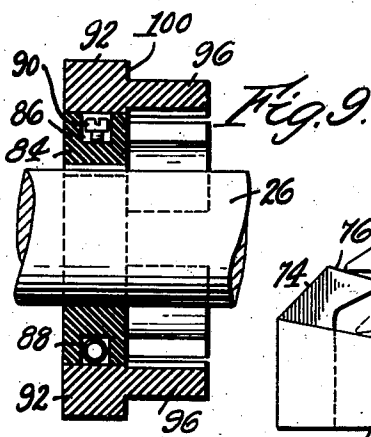
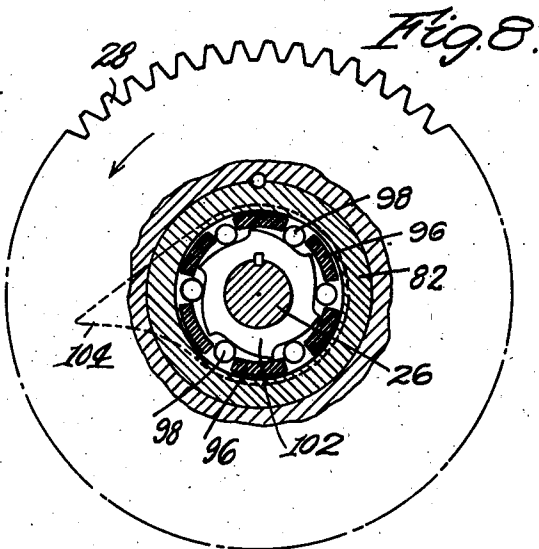
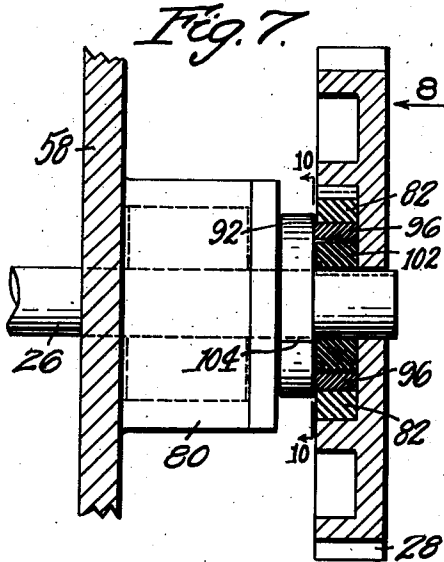
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Filed Oct. 12, 1939

2 Sheets-Sheet 2



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2,266,587

TRIP MECHANISM

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Application October 12, 1939, Serial No. 299,187

14 Claims. (Cl. 192—27)

The subject matter of this invention relates broadly to material feeding or other machines wherein it is desirable to provide a work actuated trip mechanism to initiate the starting and stopping of a device such as a conveyor. More particularly, this invention embraces a trip device operated by the work in its initial path of advance to throw a subsequent feed device into operation, dependent on the position of the work in the machine, the feed device being desirably at an angle to the initial feed of the work.

The objects of this invention include the provision of a simple, efficient, and positively acting trip mechanism to throw a secondary feed device into operation upon the arrival of the work being fed in a predetermined position in the initial feed; the provision of a clutch located between the secondary feed mechanism and the power source, and a trip device to operate the clutch upon the arrival of the work in a predetermined position; the provision of a device as aforesaid wherein a single work-piece-initiated reciprocation of a control member will provide for the closing and opening of the clutch, to accomplish a predetermined duration of operation of the secondary feed, whereby the work will be advanced in the secondary line of travel automatically; the provision of a work actuated mechanism of the character above described which operates to feed a work-piece in a secondary path at an angle to an initial path regardless of the size of the work-piece, the mechanism depending for its operation upon the travel of the work-piece over a trip-operating device, whereby the mechanism will perform the secondary feed upon passing of the work-piece off of or beyond the trip-operating device.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a plan view of a sheet feeding machine to which the present mechanism may be applied;

Fig. 2 is an elevational view partly in section of the trip operating mechanism;

Fig. 3 is an elevational view of the ring trip;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a plan view of the trip control element;

Fig. 6 is an end view looking in the direction of arrow 6 in Fig. 5;

Fig. 7 is an elevational view partly in section of the driving gear and associated parts;

Fig. 8 is an end view looking in the direction of arrow 8 in Fig. 7, with parts broken away;

Fig. 9 is a sectional view of a part of the clutch;

Fig. 10 is an enlarged section on line 10—10 of Fig. 7;

Figs. 11, 12, and 13 illustrate the reciprocation of the control element; and

Fig. 14 shows a modified trip.

For the purpose of illustration, the numeral 10 in Fig. 1 indicates generally a sheet feeding machine in which sheets 12 are fed in from the left in the direction of arrow 14 under feed roll 16, which travels the sheet to the position shown in dotted lines. At this instant, the back gauge 18 is operated thru the crank and crank arm 20, to travel the sheet to the roller feed mechanism 22, out onto the receiving table 24. The crank 20 is fixed to a shaft 26 which is turned one complete revolution by the constantly running gear 28 (in mesh with a gear 30 fixed to the main shaft 32) by means of the closing of a clutch between said gear 28 and the shaft 26. The clutch is closed and opened automatically thru a mechanism controlled by a trip actuated by the sheet 12 in its initial travel. This sheet feeding machine is, of course, only shown by way of illustration, the trip mechanism embodying the present invention being applicable to any machine or device where it may be useful or convenient.

In the present illustration of the device, there is a roller 36 of a size comparable to roller 16 located directly below the same, these two rollers accomplishing the initial feed of the sheet 12. Roller 36 is provided with a circumferential groove 38 in which is rotatably mounted a ring 40 having an outside diameter the same as that of the rollers 16 and 36. In the position of the ring, as shown in Fig. 2, a lug or insert 42, extending slightly beyond the periphery of the ring 40, is located at the top of the ring adjacent the bottom of the roller 16. Rollers 16 and 36, being spaced just enough to grip and feed the sheets therebetween, it will be seen that the sheet 12 will impinge upon the lug 42 and tend to force it forwardly, this action resulting in a clockwise partial rotation of the ring 40.

Located angularly with respect to the lug 42, the ring 40 is provided with a slot 44, the walls of which mount a pintle pivotally supporting the screw-threaded element 46, into which is screwed one end of a long rod or wire 48. The rod 48 is pivotally connected at its other end to a reduced extension 50 of the control element 52,

which is slidably mounted in a fixed guideway 54 on rollers or bearings 56. The guideway 54 is alined with an aperture which extends thru the frame member or other support 58, and is parallel to shaft 26. A leaf spring 60 having a forked end 62 which receives the extension 50, is fixed at its other end to the frame 58 of the machine or to any other convenient fixed support. This spring bears against the shouldered end of the control element 52 and tends to force it to the right, as seen in Fig. 2.

Referring to Figs. 5 and 6, it will be seen that one end of the control element 52 carries an enlarged head 64 having an angular extension 66. The extension 66 is provided with a top bearing surface 68 which is at a slight angle to the horizontal as viewed in Fig. 6. Between the extension 66 and the main body of the control element 52 a vertical slot or recess 70 is provided, and this slot or recess extends all the way thru the control element from top to bottom, leaving, however, a connecting member 72 between the extension 66 and the element 52. Extending upwardly and forwardly above the slot 70 from the member 72, there is a stop element 74 having an inclined bearing surface 76, and this member is cut away as at 78 to leave an open space above the slot. As is clear from Fig. 5, the element 74 is generally parallel to, but offset or spaced from the extension 66, and from Fig. 6, it is seen that the surface 76 is vertically spaced from the surface 68.

Referring to Fig. 7, it will be seen that the frame or other convenient support 58 mounts a bearing 80 for the shaft 26, the latter extending thru the frame and the bearing, and at its extreme end the shaft rotatably mounts the gear 28 thru a connection to be described. Since gears 28 and 30 are constantly meshed, the former is constantly rotated, and gear 28 has a hardened iron ring 82 sunk into one face thereof.

Between the gear 28 and bearing 80, there is fixed to shaft 26 a ring 84 having an annular groove 86 therein. Within the groove, a compression spring 88 is anchored at one end on the pin or screw 90. The spring is retained in its groove by a ring 92 rotatably mounted on the periphery of ring 84, and the free end of the spring abuts a pin or screw 94 extending radially thru the ring 92 into the groove. The spring thus tends to urge the ring 92 counter-clockwise, as seen in Fig. 10. Extending in an axial direction from the right hand surface of ring 92, as seen in Fig. 9, there is a series of arc-shaped, spaced projections 96, which serve to locate and separate a series of rollers 98. The iron ring 82, and thus gear 28, is positioned to fit over and surround the projections 96 and rollers 98, and said ring 82 thus abuts the shoulder 100, but is freely rotatable with respect to these elements, the gear 28 thus being seen to be normally free of the shaft 26.

Within the area bounded by the projections 96 and rollers 98, there is fixed to shaft 26 an annular cam-toothed element 102, the teeth being so shaped that when the ring 92 (and therefore projections 96) is rotated counter-clockwise, as by spring 88, the rollers 98 are spread radially and engage the ring 82 to couple the shaft 26 to gear 28. Hence the ring 82 and cam element 102 are seen to be cooperating clutch parts forming a coupling.

Ring 92 is provided with an integral, radially extending dog 104, which is positioned to normally engage the upper stop surface 76 of the control element 52, see Figs. 10 and 11, thus pre-

venting the spring 88 from causing the clutch parts 82 and 102 to be engaged by a counter-clockwise movement of the ring 92.

When the machine is not operating, or when nothing is being fed thru the feed rollers 16 and 36, the trip mechanism embodying this invention will be at rest, as seen in Fig. 2, and shaft 26 is still. However, if a sheet 12 is started between the feed rollers, the lug or segment 42 will be urged in the direction of the arrow in this figure, and thus ring 40 will be turned in a clockwise direction, pulling rod 48 to the left, against the action of spring 60, and thus moving the control element 52 in the same direction. Spring 88, constantly urging the ring 92 and its dog 104 downwardly in Fig. 2 and counter-clockwise in Fig. 10, will thereupon cause the dog to move down and rest upon surface 68 of the extension 66, since now the stop 74 has been withdrawn as a support for the dog. This is shown in dotted lines, in Fig. 10 and in Fig. 12, and this condition will obtain for so long as the sheet 12 holds the lug 42 in its rotated position. However, this slight movement of the ring 92 and projections 96 is not sufficient to cause the cam 102 to engage rollers 98 with the iron ring 82, and therefore shaft 26 is still at rest, and stays at rest until the sheet moves out of contact with the lug 42.

When the trailing edge of the sheet moves beyond the lug 42 and becomes free thereof, the spring 60 pulls the rod 48 and pushes the control element 52 to the right, as seen in Fig. 2. When control element 52 has been returned to its original position, the dog 104 will relatively move from surface 68 into the slot 70 below the stop 74, see Fig. 13, and there being no bar thereto, the spring 88 now urges the ring 92, and rollers 98 in a counter-clockwise direction (Fig. 10). The cam 102, being stationary on shaft 26, forces the rollers into engagement with the rotating iron ring 82 thus in effect closing the clutch parts, and gear 28, now being engaged with shaft 26, turns the latter (and dog 104) one revolution. This, of course, turns crank 20 and imparts a single reciprocation to the back gauge 18, moving sheet 12 at a right angle to its initial travel and engaging it with the feeding mechanism 22, which feeds the sheet out onto table 24.

During the secondary feed of the sheet just described, the stop 74 is in its original position, in the path of the dog 104, and the single revolution thereof having been accomplished, the dog once more engages the surface 76 on stop 74, and is positively stopped. The gear 28 and its ring 82 continue, under influence of gear 30, and this has the effect of jamming rollers 98 against the cam teeth 102, thus forcing them slightly ahead, so that the clutch parts 82, 102 become effectively disengaged. The entire trip mechanism is now in original position, at rest, and remains in this condition until another sheet is placed in the rolls 16 and 36, when the entire operation is repeated.

It is believed that the construction and operation of the trip mechanism will be apparent from the above description, and that by a mere single reciprocation of the control element 52, due to the passage of the sheet 12 itself, the angular secondary feed is accomplished automatically.

In Fig. 14 there is shown a modified form of work trip, to be used if desired, in place of the ring trip 40. The modification comprises a lever pivoted below the table of the machine 10, as at 112, on a bracket 114. The lever has a long arm 116, extending up thru an aperture in the

table, and it is provided with a work engaging element 118. The lever also has a short arm 120 which is connected to one end of rod or wire 40. A sheet 12, fed thru rollers 16 and 36, will engage the element 118, depress the long arm 116, and draw rod or wire 40 to the left, as occurs with the ring trip 42.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a control for a clutch having driving and driven elements, a clutch operating member, means constantly urging said member to clutch engaging position, a slidable element having a rigid stop and a free space below said stop, a second stop rigid with said element and to one side of and below said first-named stop, the latter normally lying in the path of said clutch operating member, and means to slide the slidable element in a direction transverse to the movement of the clutch operating member.

2. In a device of the class described, the combination of a clutch having driving and driven elements, a movable clutch operating element, and a projection extending therefrom; with a reciprocable control element provided with a pair of rigid offset stops and a free space below one of said stops, the latter one of said stops normally lying in the path of movement of said projection, and means to reciprocate said control element in a direction at right angles to said path.

3. In a device of the class described, a driving and a driven element, a clutch between said elements, means urging the clutch to engaged condition, a clutch controlling member having stops horizontally and vertically offset, a projection associated with one clutch part normally engaged with the higher stop and effective to overcome said urging means, and thereby preventing engagement of the clutch parts, and means forming a passage for said projection below said higher stop, whereby a reciprocation of said member provides for the passage of said projection from the higher to the lower stop and thence beyond said stops into the passage, for consequent engagement of the clutch parts.

4. In a device of the class described, the combination of a clutch having a rotatable clutch-engaging element, means constantly urging said element towards clutch-engaging position, with a slidable control element having a stop and means providing a recessed space below said stop, said control element also having a second stop laterally offset from said first stop in the direction of said space and longitudinally spaced from said first stop, the clutch engaging element normally resting upon said first stop to interdict said urging means, whereby a single reciprocation of said control element releases the clutch engaging element from said first stop, positions it in stopped relation on said second stop, and provides for passage therefrom thru said space, thus engaging the clutch for one rotation thereof, and also again stops the rotation and disengages the clutch, by reengagement of said clutch engaging element and said first stop, and consequent interdiction of said urging means.

5. In a device of the class described, the combination of a clutch disposed between driving and driven members and having a rotatable clutch engaging element, resilient means to urge said element toward clutch engaging position, and a radial projection extending from the pe-

riphery of said engaging element; with a guideway normal to the plane of said engaging element, a member slidable in said guideway and provided with laterally and longitudinally offset stops and a recess below one stop, the engaging element normally resting on and held by said one stop, means to move said slidable element to free the engaging element from said one stop so that it rests on the other stop, and means to return said slidable element to original position, whereby said engaging element enters the recess and is free of said control element for one rotation.

6. In a device of the class described, the combination of a clutch having driving and driven elements, a clutch engaging member, means constantly urging said member towards clutch engaging position, and a rigid projection on said engaging member; with means effective to stop said urging means and comprising a movable rod, an abutment on said rod, the latter having a free space below said abutment, and means effective relatively to guide said projection into said free space upon a reciprocation of said rod, said abutment and said guiding means being relatively offset in the direction of the path of the rod reciprocation and in the direction of engaging movement of the clutch engaging member.

7. In a device of the class described, a clutch comprising a driving and a driven element, means to engage said elements, spring means normally urging said engaging means to engaged condition, and means in the path of said engaging means to interdict the action of said spring, said means comprising a movable member having a pair of abutments and a recess below one abutment and at the side of the other abutment, said abutments being relatively offset in the direction of movement of said member, and normally to the direction of movement of said engaging means under influence of said spring.

8. In a device of the class described, a driving member, a clutch member fixed thereto, a driven member, a clutch member fixed thereto, means to engage said clutch members, means constantly urging said engaging means towards clutch engaging position, and movable means in the path of said engaging means to stop said constantly urging means, said stopping means comprising an element having an abutment, means forming a passage in said element below said abutment, and a second abutment on said element to one side of and below said first-mentioned abutment, said second abutment forming an intermediate stop for said element to guide said engaging means into said passage.

9. In a device of the class described, driving and driven members, a clutch between said members, means to engage said clutch, means normally urging said engaging means towards clutch engaging position, and means controlling said urging means comprising a projection on said engaging means, a movable element, means on said element adapted to stop said projection in one position of said element, the latter having a free space associated with said means, further means rigid with said element and offset from said stop means in the direction of said free space and also in the direction of movement of said movable element, to stop said projection in another position of said element, the latter being effective to release said projection from said second mentioned means on said element upon return of said element to said one position, by reason of said free space.

10. In a device of the class described, driving and driven clutch members, means suitably associated therewith to engage and disengage said members, means urging said engaging means towards clutch member engaging position, control means therefor comprising a movable element, and means on said element normally lying in the path of and adapted to stop said engaging means, and further means on said element offset from said first mentioned means on said element in the direction of movement of said movable means and also in the direction of engaging movement of said clutch engaging means and adapted to lie in the path of and stop said engaging means upon movement of said element, said element having means adjacent one of said stopping means to provide a passage for said engaging means upon a further movement of said element.

11. In a device of the class described, driving and driven clutch members, means suitably associated therewith to engage and disengage said members, means urging said engaging means toward clutch member engaging position, and control means for said clutch engaging means, said control means comprising a reciprocable element, a stop on said element normally stopping said engaging means, a second stop on said element offset from the first-named stop in the direction of reciprocation of said element and in the direction of engaging movement of said clutch member engaging means, and means associated with said element forming a passage for said engaging means, said passage forming means being aligned with the first-named stop, so that a single reciprocation of said element will cause said engaging means to be positioned with respect thereto in such a manner as to relatively move off the first-named stop onto the second stop, off the latter and into the passage.

12. In a device of the class described, driving

and driven clutch members, movable means suitably associated therewith to engage and disengage said members, means urging said engaging means toward clutch engaging position, and a control for said engaging means, said control comprising an element movable with relation to said engaging means, a pair of stops on said element, said element being adapted to locate either stop in the path of said engaging means, and means in said element forming a passage for said engaging means, said passage forming means being located beneath one stop and the other stop being offset from said one stop in directions transverse to and parallel to said path, whereby said control is effective to release said engaging means from both stops upon movement of said element from a position where one stop is in said path to a position where the other stop is in said path and return.

13. A device as recited in claim 12 wherein said element is movable transversely of said path.

14. In a device of the class described, driving and driven clutch members, movable means associated therewith to engage and disengage said members, means urging said engaging means toward clutch engaging position, means normally located in the path of said engaging means and stopping the latter, means adapted to move said stopping means out of said path, means to stop said engaging means at this point, said engaging means being releasable from said second-named stopping means and free to move under influence of said urging means only upon return of said first-named stopping means to original position in said path, there being a free space under said first named stopping means, and said second named stopping means being offset from said first named stopping means in directions parallel to and transverse of said path.

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