

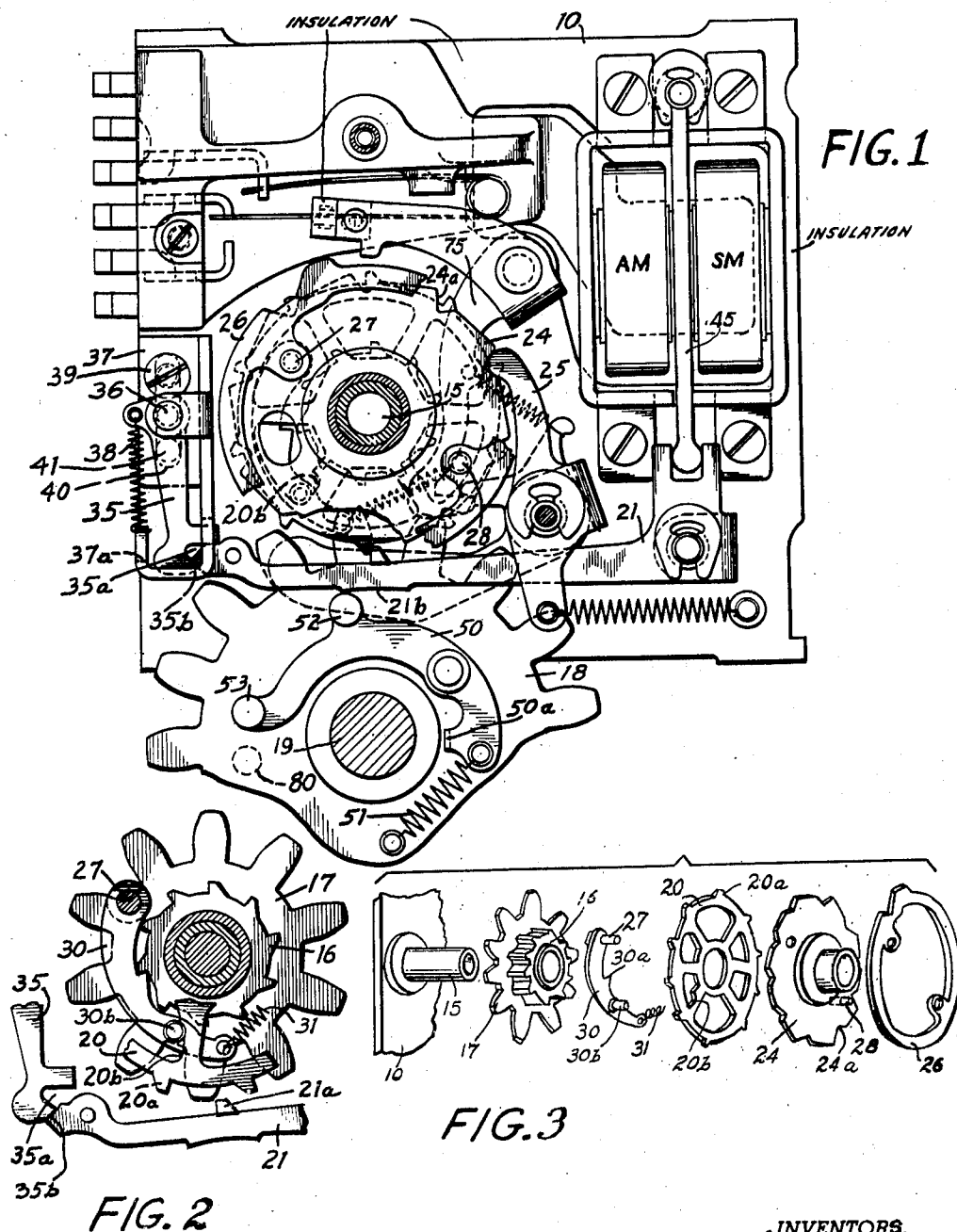
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CLUTCH MEANS FOR ACCUMULATING UNITS

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CLUTCH MEANS FOR ACCUMULATING
UNITS

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This invention is concerned with improving the structure and operation of an accumulating mechanism of the type disclosed in Patent No. 2,150,227. Briefly, the accumulating mechanism of this patent is as follows: The accumulators receive values derived from record cards. Each accumulator order is mounted on an individual plate and comprises a register device and a drive device with clutching means between them. The clutching means is controlled by a clutch lever provided on one arm with an armature disposed between advance and stop magnets. To enter a true number, the advance magnet is energized at a differential time of a cycle selected by a representation of the number on a record card. Energization of the advance magnet moves the armature and lever in a direction to cause clutching of the register device to the drive device. After being driven a differential amount equivalent to the number, a mechanical knock-off in the drive gearing restores the clutching power to declutching position, causing the register device to stop. If the number to be entered is a complement, the advance magnet is energized at a predetermined time of the cycle to initiate rotation of the register device. At a differential time of the cycle selected by the number designation on a record card, the stop magnet is energized, rocking the armature and lever in a direction opposite to the direction in which they are moved by the advance magnet. As a result, the rotation of the register device is stopped after it has entered the complement of the designated number. The advance magnet is energized momentarily to move the clutch lever and armature to clutch engaging position, but the clutch lever and armature are to remain in this position until the register device is to be declutched either by operation of the mechanical knock-off or by energization of the stop magnet. For this purpose a toggle device is provided which straightens out to retain the clutch lever impositively in clutching position. By its nature, the toggle, in order to firmly hold the clutch lever in clutching position, must have an appreciable straightening throw. In turn, this demands a corresponding appreciable play of the armature between the advance and stop magnets. The greater this play, the less sensitive and rapid the response of the armature and connected clutch lever to energization of either magnet. It may be stated, now, that an object of the present invention resides in means to reduce the play between the armature and magnets and

render the armature and clutch lever more sensitively and rapidly responsive to energization of either magnet.

An object is, further, to reduce the play between the armature and magnets by providing novel means for retaining the armature and clutch lever in their actuated, clutch-enabling positions.

An object, further, is to reduce the play between the armature and magnets still further by providing compound, movement multiplying leverage between the armature and clutch lever.

Another object is to provide a novel mechanical knock-off device constructed to absorb shocks and to avoid the necessity for finely exact machining of the knock-off, clutch lever, and related parts.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

Fig. 1 is a sectional view of the accumulator plate unit, showing the declutched condition of the parts,

Fig. 2 is a sectional view, showing the clutched condition, and

Fig. 3 is an exploded view, on a reduced scale, of the clutch.

The accumulator plate unit comprises a mounting plate 13 which has fixed to it a sleeve 15 rotatably carrying a drive device comprising rigidly united ratchet 16 and gear 17. Gear 17 is continuously driven by a gear 18 fixed on a shaft 19 journaled in the frame. Gear 18 makes one revolution a cycle and has sixteen teeth while gear 17 has ten teeth.

Rotatably carried by a hub of ratchet 16 is a disk 20 having ten teeth 20a adapted to be engaged by a tooth 21a on the long arm of a clutch lever 21 to hold the disk against rotation in a counterclockwise direction. At the side of disk 20 is a register wheel 24 rotatable on sleeve 15 and provided with ten peripheral notches 24a. Wheel 24 may take any of ten rotative positions corresponding to values 0 to 9. A spring-pressed lever 25 engages with a notch 24a of the register wheel to hold the wheel impositively and to center it in the value position to which it has been rotated. A transfer cam 26 is fixed to the side of wheel 24 by a pair of studs 27 and 28. These studs extend through openings of disk 20 to positions adjacent ratchet 16 where stud 27 pivotally carries a clutch

dog 30 and stud 28 anchors one end of a spring 31. The other end of the spring is connected to the free end of dog 30 to urge a tooth 30a of the clutch dog to engage ratchet 16. In the positions shown in Fig. 1, the clutch lever 21 is in de-clutching position, its tooth 21a is restraining rotation of disk 20 counterclockwise, and clutch dog 30 is clear of ratchet 16. The clutch dog is being held clear of ratchet 16 by coaction of a pin 30b on the dog with the upper portion of a cam edge 20b of disk 20. When the clutch lever 21 is dropped to cause its tooth 21a to release the disk 20 for counterclockwise movement, the spring 31 is effective to rock the clutch dog 30 into engagement with ratchet 16. During this movement of the clutch dog, its pin 30b rides down the cam edge 20b of disk 20 and cams the disk counterclockwise until its tooth 20a, previously engaged by tooth 21a, is to the right of the latter tooth. The parts are then in clutching positions, shown in Fig. 2, and the register wheel 24 is coupled to the drive device 16—17 for rotation. Through engagement of the pin 30b of the clutch dog with cam edge 20b, the disk 20 is forced to rotate counterclockwise together with the register wheel.

When the clutch lever 21 is returned to upper, declutching position, its tooth 21a intercepts a tooth 20a of disk 20 and stops the disk. The register wheel and clutch dog continue rotating while cam edge 20b of disk 20 cams the pin 30b of the clutch dog upwardly until it is again in its outer position. As the pin 30b is cammed outwardly, clutch dog 30 moves clear of the ratchet 16 and declutches the register wheel from the driving means. The register wheel is then held and centered in its new value position by lever 25.

The clutch lever 21 is held in either clutching or declutching position by a latch 35. The latch is pivoted on a stud 36 carried by an arm of a bracket 37. A spring 38 between the bracket and the latch urges the latch counterclockwise. The bracket is secured to the plate 10 by a clamping screw 39 passing through a vertical slot 40 of the bracket and threaded into the plate. A pin 41 extending from the plate freely projects into slot 40. When the screw 39 is loosened, the bracket may be adjusted vertically and slightly angularly to proper position, thereby also providing an adjustment for the tension of spring 38. With the clutch lever 21 in upper, declutching position, the wedge-shaped tip of the lever is seated firmly in a slot 35a of latch 35. When the clutch lever is moved down to clutching position, its wedge-shaped tip cams against the inclined wall of notch 35a and forces the latch clockwise until the lever tip is below and clear of the notch. The spring 38 then snaps the latch back in a counterclockwise direction, placing an inclined edge 35b thereof above the top of lever 21 to retain the lever in lower, clutching position. The free ends of the lever and latch project into a guide slot 37a formed in bracket 37 and by which sidewise movement of the lever and latch out of their proper planes is prevented. The upper, right hand end of slot 37a also serves as a stop for the counterclockwise movement of latch 35 when clutch lever 21 is rocked downwardly and released from the notch 35a of the latch.

The clutch lever 21 has a short arm swiveled to the lower end of an armature 45. The armature is disposed between an advance magnet AM and a stop magnet SM mounted on plate 10. Energization of magnet AM rocks armature 45 clockwise to lower the lever 21. Energization of magnet SM rocks armature 45 counterclockwise to

raise the lever 21. The nature of the latching means for the lever is such that only a slight downward movement of the lever is necessary to release it from the notch 35a of latch 35, while a correspondingly slight upward movement of the lever reengages its tip with the notch. Accordingly, the angle through which armature 45 moves to bring the clutch lever from upper to lower position or the reverse is proportionately small. Further, the relation of the moment arms of armature 45 and lever 21 is such that a movement of the armature effects a multiplied movement of the lever. All these factors provide for a minimum of play between the armature and magnets AM and SM, rendering the armature sensitively and rapidly responsive to energization of either magnet.

The mechanical knock-off for moving the clutch lever 21 from lower to upper, declutching position comprises a lever 50 pivoted to the side of cyclically and continuously rotating gear 18. The lever is urged clockwise by a spring 51 and limited in such movement by engagement of a surface 50a with the hub of gear 18. Lever 50 is provided with a pair of spaced knock-off pins 52 and 53 adapted during clockwise rotation of gear 18 to ride in succession under an edge 21b of clutch lever 21. Assuming the clutch lever to be in lower position, when either pin 52 or 53 engages edge 21b of the clutch lever, it cams the lever upwardly to re-seat its wedge-shaped tip in notch 35a of latch 35. To insure positive return of the lever 21 into latching coaction with notch 35a without requiring too precise location and machining of parts, the pins 52 and 53 are at such radial distances as to tend to overthrow the lever 21 in an upward direction. The overthrow of the lever 21 is prevented, however, by the engagement of the upper, extended flat wall of notch 35a with the upper flat edge of the lever. This engagement positively arrests the upward throw of lever 21 and, in so doing, causes the edge 21b of the lever to cam the knock-off pin downwardly until the pin rides off the edge. The downward movement of the knock-off pin results in counterclockwise rocking of lever 50, permitted by the yielding of spring 51. The yieldable knock-off structure cushions the shock of engagement between the clutch lever and the upper wall of notch 35a of latch 35 and insures positive restoration and relatching of the clutch lever without requiring too precise location and machining of the parts. The knock-off pin 52 is effective at a fixed point of the cycle to cause the register wheel to be arrested after entry of a true or natural value. The knock-off pin 53 serves at the end of a cyclical carry period to cause the register wheel to be arrested after a carry entry.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. Clutch control mechanism for an accumulator unit or the like having a register wheel and a drive wheel, a clutch therebetween, a clutch control lever movable in opposite directions to clutch enabling and clutch disabling positions, a

latch lever, coacting nose and notch portions on the levers interfitting to latch the clutch lever in one of its positions, a spring acting on the latch lever to maintain the nose portion seated in the notch portion, said nose and notch portions having surfaces sloping relatively to each other and coacting to cam the latch lever aside, against resistance of said spring, upon movement of the clutch lever to its alternative position until the nose portion is unseated from the notch portion, said latch lever and clutch lever having coacting edges sloping relatively to each other and engaging to maintain the clutch control lever in said alternative position and coacting to cam the latch lever aside upon return of the clutch control lever to its other position until the nose portion is re-seated in the notch portion, an advance magnet, a stop magnet, and a common armature between them and connected to the clutch control lever to move the latter to its clutch enabling position, against the influence of said spring, upon energization of the advance magnet and to move the clutch lever to clutch disabling position, also against resistance of said spring, upon energization of said stop magnet, said clutch control lever and latch lever having their coacting nose and notch portions so arranged and constructed that a relatively slight movement of the clutch control lever from one of its positions to its alternative position unseats the nose portion from the notch portion whereby the related movement of the armature and its play between the magnets may be correspondingly slight.

2. The clutch means as defined in claim 1, the

armature and clutch control lever being connected to each other through movement-multiplying leverage to further reduce the play of the armature between the magnets.

3. Clutch means for an apparatus having a register wheel and a driving train including a drive wheel, a clutch to engage the drive wheel with the register wheel, a clutch control lever movable in opposite directions to clutch engaging and disengaging positions, means for releasably holding the control lever in either position, an advance magnet, an armature therefor connected to the control lever to move it to clutch engaging position upon energization of the magnet, a rotating member in the driving train, a knock-off lever mounted thereon for rotation therewith and for rocking relatively thereto and having means for engaging the clutch control lever during rotation of said member to return the control lever to clutch disengaging position, means comprising a spring or the like for biasing the knock-off lever in a direction in which the means thereon for engaging the control lever is at its outward limit with respect to the axis of the member and tends to overthrow the control lever in returning it to clutch disengaging position, and an abutment for stopping overthrow of the control lever and acting therethrough to cause the knock-off lever to rock, against the influence of said biasing means, relatively to the rotating member until the means on the knock-off lever passes the clutch control lever.

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