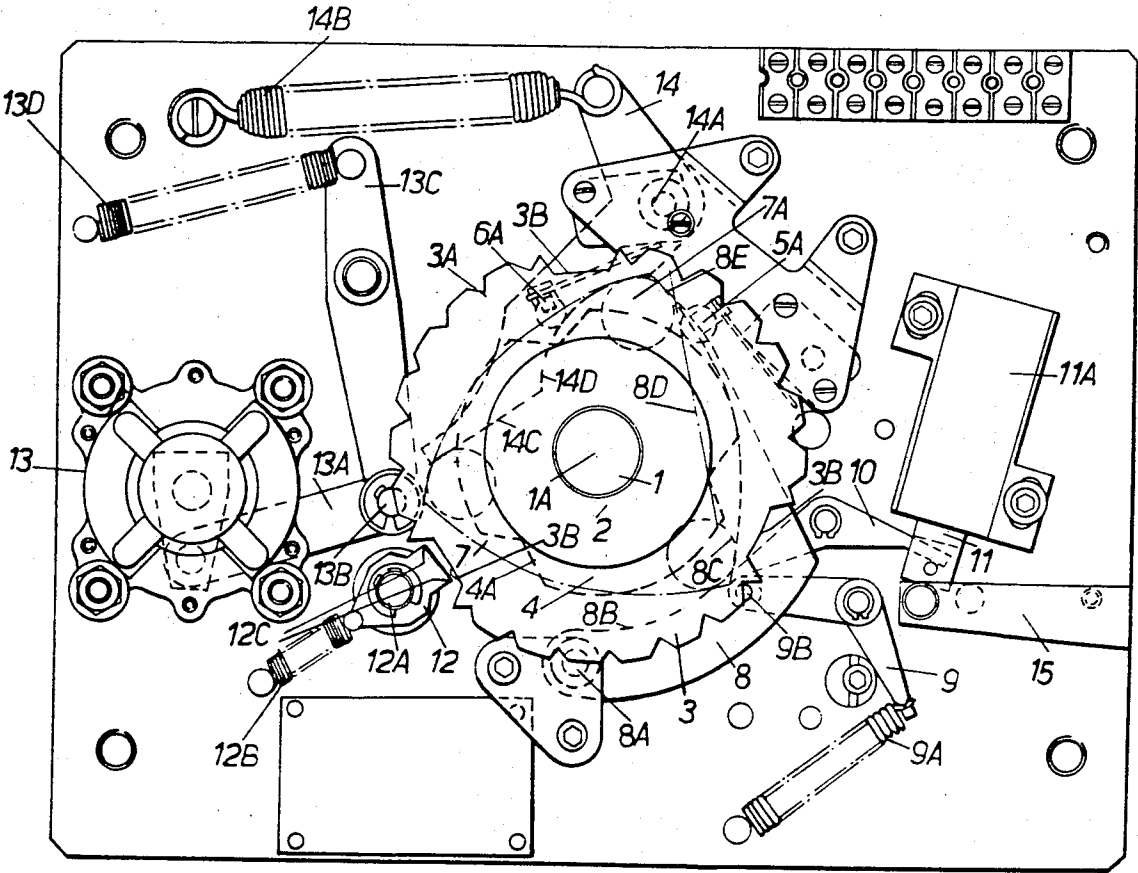


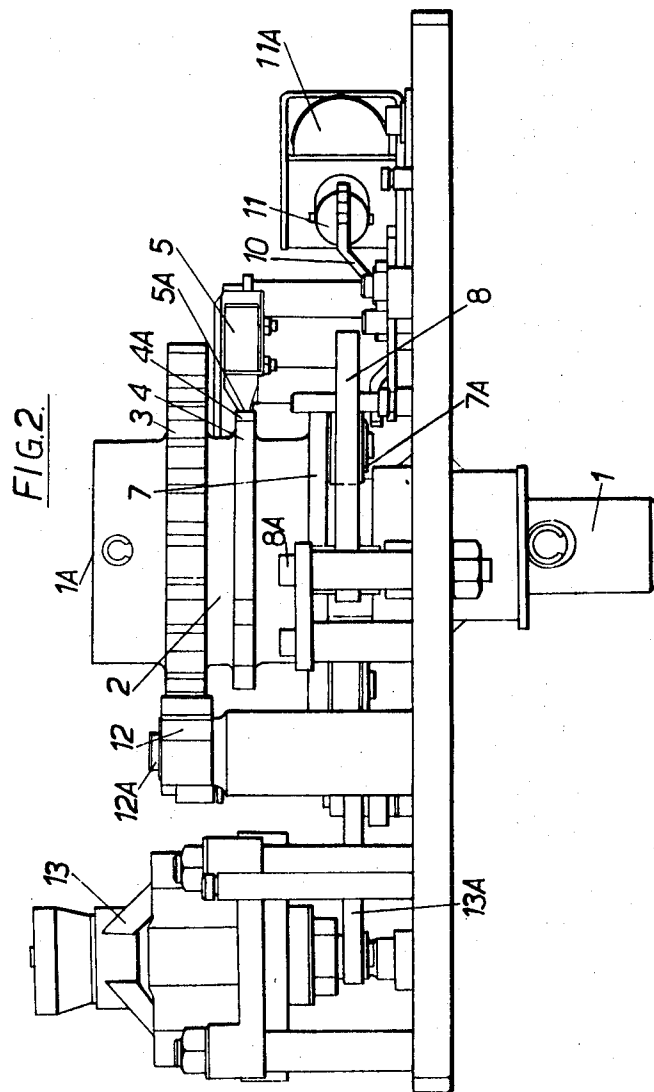
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[31] **50262/68**

1,602,486 10/1926 Hedley et al. 194/DIG. 24
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[54] **SELECTIVE ROTATIONAL CONTROL FOR SUCH MECHANISMS AS TURNSTILES**
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[52] U.S. Cl. **194/9, 49/49**
[51] Int. Cl. **G07f 5/10**
[50] Field of Search **194/9, DIG. 24; 49/46, 47, 49**
[56] **References Cited**
UNITED STATES PATENTS
1,107,975 8/1914 Marks **49/49 X**

ABSTRACT: A mechanism for the selective control of the rotation or part-rotation of a shaft such as is used in turnstiles. The shaft has a cam engaged by a first pawl so as to be locked against rotation in one direction whilst being free to rotate in the other direction. The pawl is moved so as to unlock the shaft by manual or solenoid operation, the latter being energized by a coin-freeed mechanism. A second pawl cooperates with a series of notches and gaps in a circular member mounted on the shaft so as to allow the shaft to rotate in either direction from a locked position but so as to prevent reversal once rotation has started. The mechanism incorporates a damping device and a torque-restoring device. The latter device stores energy during the first half of a part-rotational movement and returns it during the second half so as to assist rotation. A part-rotational movement counting device is also included having two microswitches and a relay with two contacts, the seeming complication ensuring that small random movements of the shaft do not result in miscounting.





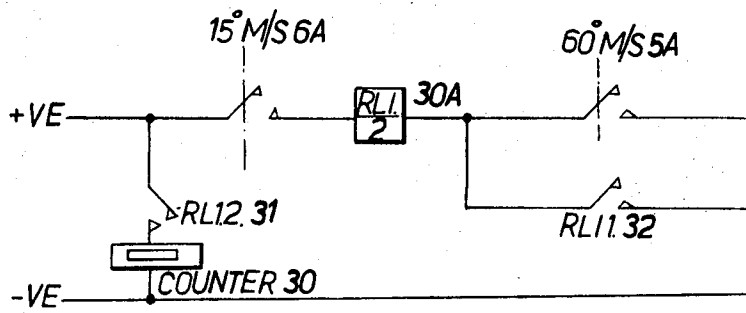
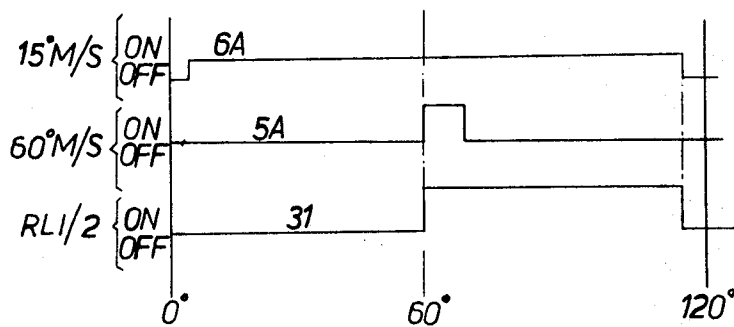


FIG. 3A.

FIG 3B



SELECTIVE ROTATIONAL CONTROL FOR SUCH MECHANISMS AS TURNSTILES

This invention relates to an improved mechanism for the selective control of the rotation or part-rotation of a shaft, hub or similar device of a mechanism forming part of a turnstile, pay-gate, or like intermittently operating means of access, for example for controlling the passage of individual people entering or leaving a public service vehicle, place of entertainment, or other place whereat like problems arise.

Among the requirements of such mechanism are that normally the shaft should be rigidly locked against at least one sense of rotation and that on the performance of an operation such as the insertion of a coin or the movement of an electric switch the shaft should be permitted to turn through a given angle and then become rigidly locked once more in respect of that sense of direction. This cycle can be repeated over and over again, the shaft turning in a chosen direction which may be controllably reversible. In most applications of such a device the shaft should be allowed to freewheel in the sense of direction opposite to that against which it locks. Thus, in a railway entrance, for example, entering is controlled as by coin-insertion, whilst exit is free: and these senses of direction are usually required to be reversible. Still further requirements are that the shaft, in the absence of any external force, should automatically come to rest in a rigidly locked position corresponding to one operation (for example the passage of one person). It is also usual that a count be kept of the total number of operations, and such means is required to be immune to various practical hazards such as the rattling of the device by a passenger through a backlash.

The invention bears some relation to that which is described in application No. 14,396/67, now United Kingdom Pat. No. 1,200,323 and may be considered as additional thereto or a modification thereof. It is, however, further applicable to apparatus which has other purposes and in the same or other purposes, has attributes not achieved in the earlier application.

The present invention seeks to provide control mechanism which is applicable to turnstiles or in installations wherein like problems arise, such as controlled pay-gates (as be used for toll purposes, car parking, or the like). In all such installations it is assumed that rotational control is required of some element which is in the nature of the shaft or spindle of a turnstile. In particular the invention seeks to provide for the following possible functions, not necessarily all together but as a selection of requirements. It will be stated and described for convenience in terms of turnstiles.

The mechanism for control afforded by the invention is capable of operation by coin insertion, electrically or mechanically, or by direct manipulations. It affords selective sense of direction; that is to say, a turnstile may be arranged to pass people one way under control and the other way freely, these senses being selectively reversible. It is such that in any one actuation it cannot be reversed (subject to an inconsiderable number of degrees of angle of reverse, say 15°). Its resistance to operation, which we term the "breakaway torque" is low and operation having been initiated is substantially uniform up to half the operational phase (normally 120° of rotation) whereafter it is self-operating. This attribute can be associated with adjustable damping means which obviates the possibility of the turnstile overrunning by momentum; it will always stop and be relocked after a single operation phase.

It is adapted to be equipped with counting mechanism which is immune to the rough treatment to which turnstiles are exposed. It is a matter of experience, for example, that members of the public will try to rattle a turnstile to and from within a backlash perhaps hoping to find it free, and such abuse must not have the effect of adding up a sequence of abortive movements as if they really meant the passage of persons: the invention obviates such a defect.

The invention is preferably used in conjunction with a turnstile of the three-armed tripodlike kind which rotates on a substantially horizontal axis, but it will be seen that it is readily adaptable to a vertical-axis turnstile (which usually has four "gates") or in other installations presenting like problems.

It is an advantage of construction resulting from the invention, that some of the important parts are such that they can be "handed" in assembly, the same part being used for a clockwise or anticlockwise turnstile.

According to the invention, a mechanism for the selective control of the rotation or part-rotation of a shaft comprises a camlike formation mounted for rotation on the shaft and a first pawl cooperating with the camlike formation so as sequentially to lock the shaft against rotation in one direction whilst allowing rotation in the other direction, means for moving the first pawl from the locked to an unlocked position, a notched circular member mounted for rotation on the shaft and a second pawl so engaging the circular member as to permit the initiation of rotation of the shaft in either direction from a locked position but so as to prevent reverse rotation after such initiation until such time as the shaft reaches the next locked position.

Preferably the camlike formation has a number of identical lobes equal to the number of equal part-rotational movements required for each complete revolution of the shaft and has a roller at each apex where two adjacent lobes join and in which the first pawl is pivotally mounted and spring-located, the inner cam-engaging surface of the first pawl comprising a radially inwardly curved portion joined to a straight portion by a radially inward hook part, the pawl being so shaped and located that when the shaft is in a locked position one of the rollers lies in the hook part whilst the roller next in that direction of rotation against which the shaft is locked engages the end of the straight portion of the first pawl remote from the hook part, the cooperation of the rollers and the pawl further providing that when the shaft is locked against rotation in one direction it is free to rotate in the other direction.

The notched circular member may have equal circumferential notched portions equally spaced apart by a number of gaps, the number of notched portions and the number of gaps both being equal to the number of part-rotational movements required for each complete revolution of the shaft and the second pawl being pivotally mounted, reversible and resiliently urged to a neutral position between two extreme angled positions, the pawl being arranged to engage the notched portions in either sense of direction of the shaft and to lie in its neutral position only when released by a gap the rotational positions at which such release occurs corresponding to the locked positions of the shaft, the shapes of the notches and of the second pawl being such as to allow initiation of rotation in either direction when the pawl is lying in a gap but so as to prevent reverse rotation after such initiation until the pawl is released into the next gap.

According to a further feature of the invention, when the turnstile is to be reversible, there is provided a reversible pawl which is pivotally mounted and resiliently urged to a neutral position between two extreme angled positions, and this pawl is arranged to engage one of a series of teeth or dogs on the rotary part in either one or the other sense of direction, lying in its neutral position only when at each interoperational cycle (for example 120°) it (the pawl) is released by a gap in the series. It follows that in whichever sense the turnstile is used, the pawl prevents backward movement once the forward movement is proceeding.

According to still another feature, there is provided a camlike torque-restoring mechanism rotating with the turnstile in which a specially profiled camformed member is strongly and resiliently urged into engagement with the camlike formation in such a way that when the turnstile is moved through half (or so) of one operative phase or movement (again we quote, for example, 120°) the movement is resiliently opposed by a substantially uniform torque, whilst in the second half (or so) of that phase it is resiliently assisted. This in itself tends to

achieve the advantage that the turnstile operates decisively from one position through its operative cycle (for example 120°) to the next. Such feature is so provided that it operates in either sense of direction. Preferably the cam is formed on a spring-urged lever which bears against three-lobe follower mounted to rotate with the turnstile, the contour of the cam being special in the sense of achieving the torque characteristic required: this needs detailed explanation which is given below by way of example.

In conjunction with the foregoing torque-restoring device the invention preferably further includes a damping mechanism. This is a reciprocating adjustable damper (analogous to a swing-door check damper) of unidirectional effect, which is operated by linkage from the three-lobe element of the turnstile in such a way that when the torque is being restored to the turnstile (i.e. after the halfway condition, when the turnstile is overrunning) the damper restricts the rate of resiliently motored action, and this brings the turnstile shocklessly to rest at the end of that 120° phase. The damper is substantially nonrestricting during the first half of the phase so that it does not add to the required operative torque of the turnstile.

Mechanism provided as above enables an electrical counter device to be provided with the following features. At least two switches, which are precision switches such as microswitches, are provided with operating elements such as wipers or feelers which are arranged to cooperate with a track rotatable with the turnstile, which track has three significant deviations (such as notches or bumps) at the same 120° or so to correspond to the operative phase positions of the turnstile. These switches are spaced angularly by 45° (in the example) and are in series, a relay contact being arranged in a circuit parallel with one of them. The circuit so provided is arranged to operate an electrical numeral counter. Then, when the turnstile is in one of its static positions, i.e. at one of its 120° stations, both switches are open. The first closes after approximately 15° of rotation, after which point and before the second switch operates, the reversible pawl prevents any return movement. Hence, at 60° (approximately) the second switch operates and therefore operates the relay contact (in parallel with the second switch), which then short circuits the second switch so that any further operation of the second switch cannot influence the count. The relay is then cancelled at the end of the operational phase by the opening of the first switch. This double switch arrangement ensures that a digit is only registered by the counter once for every full operational movement of the turnstile, obviating the possible miscounting that may occur if there is only one switch and it is operable by small movements, such as rattling through a small angle, of the turnstile.

The features above stated are preferably all used in combination, but it will become apparent from the following description of an example of the mechanism that they are not necessarily all present. It is obvious, for instance, that if counting is not required the whole of the counting equipment may be omitted.

It will also be obvious that some of the features may be duplicated to increase the diversity of the operation. The release mechanism, described below as operable unidirectionally by a single solenoid as for coin release, may be duplicated so as to be usable in both senses. Moreover, it may be included in a torque-type circuit which may perform functions other than mere release of the turnstile. For example, the release may be coupled with change-giving, transfer ticket printing, token acceptance, or a coded magnetic season ticket facility.

An example of mechanism according to the invention is described below and is illustrated by the accompanying drawings, in which:

FIG. 1 is a view along the rotational axis of a turnstile, a spindle rotating therewith;

FIG. 2 is an elevation view of the same, at right angles to FIG. 1;

FIG. 3A is a diagram of a counter operating circuit; and

FIG. 3B is a graph indicating the phase positions in which the switches of FIG. 3A operate.

The example described is of the invention applied to the so-called head of a turnstile; it is designed for a turnstile of the three-armed type which rotates on a horizontal axis. The exemplary head is intended to be housed in a cabinet which may also include the coin-release mechanism and any other apparatus required to be associated.

The turnstile's axis of rotation—or that of a spindle positively geared 1:1 to the turnstile—is at 1A, this being the axis of a shaft 1. The shaft 1 has secured fast to it a main boss or hub 2, which can conveniently be machined as a single integral part. The hub 2 is conveniently to be thought of as having three effective planes of operation. In one plane there is a notched member 3 which has V-notches 3A at 15°, and at 120° it has three gaps 3B which subtend 30° from the axis 1. In the next plane is a counter operating flange 4 in which there are three V-notches 4A spaced at 120°. To drop into one notch 4A at a time is the operative element 5A of a microswitch 5. This switch is indicated, also by 5A, in FIG. 3A, and its operative phase is shown in FIG. 3B. A second microswitch has a feeler end 6A, so arranged as to drop into any one of the notches 4A. As will be discussed below, the two switches coact to ensure a certain counting function.

In the third effective plane of the hub 2 is a three-lobe cam-like formation (the profile of which is visible in dark-line in FIG. 1) 7, which is of basically equilateral triangle shape but with slightly convex sides. At the three apexes are provided antifriction rollers 7A which act as detents. For rollers, any other antifriction means may be adopted, such as a freely mounted bearing ball, or the outer race of a ball or roller bearing; or even a stationary element such as a cylindrical peg coated with P.T.F.E. antifriction resin. The function of these detents (which for convenience we shall call rollers) 7A is similar to that of the equivalent parts in our recited application. Pivotaly supported at 8A (in FIG. 1) is a pawl 8; this is reversible in mirror-image fashion, if the head is to be assembled for the other sense of operational direction. The pawl 8 has a curved edge at 8B terminating in a radially inward hook part 8C, and this edge thence continues as a straight line 8D to a nose 8E at the end of the pawl remote from pivot 8A. The pawl 8 is urged inwards, that is towards the axis 1A, by spring means.

There are provided two pawl-operating bellcranks. One of these is seen at 9 and it is urged by a spring 9A in clockwise sense; it engages by pin and slot at 9B with the pawl 8, thus providing the inward urge of the pawl. The second bellcrank is seen at 10. At its inner end it can bear outwards on the pawl—conveniently by bearing on the tail of crank 9 or the pin provided thereon at 9B. At its outer end, crank 10 is actuated by the plunger 11 of a solenoid arranged at 11A. When the solenoid 11A is energized (for example by coin-released means) crank 10 rocks anticlockwise and forces pawl 8 outwards.

When the turnstile is in one of its three inoperative positions, one of the rollers 7A is engaged in the hook part 8C of the pawl 8. This prevents rotation of the cam 7 and therefore of the hub 2, and therefore of the turnstile, in the anticlockwise sense as seen in FIG. 1. When the solenoid 11A is energized, the roller 7A is released and the turnstile is free to be rotated.

It will be appreciated that the turnstile as illustrated, is arranged for anticlockwise rotation of the hub 2 when released and (as will be seen) it is free to be rotated clockwise. However, the pawl 8 may be placed in its alternative "handing," to convert the turnstile to clockwise operation.

To prevent the turnstile from being turned backwards once a forward movement has been initiated, a clicking pawl 12 is provided, pivotaly mounted at 12A, and biased to a neutral midposition, as drawn in FIG. 1, in which the nose of the pawl lies in one of the gaps 3B. The nose of the pawl 12 has two angled corners 12C, so adapted that one of them will engage notches 3A as the turnstile rotates, and the pawl 12 is operative in regard to either sense of rotation. This ensures that, starting from one of the 120° positions (as in FIG. 1) in

whichever sense the turnstile is rotated so it is prevented (at every 15°) from being turned backwards until the next gap 3B is entered. Thus, the pawl 12 acts as a reversible nonreturn stop.

The action of the turnstile is damped, chiefly in order to ensure that if it is violently operated it will not overrun by its own momentum. This is provided for by a semirotary hydraulic damper (somewhat like a door damper) generally shown at 13. This is actuated by a link 13A pivotally connected at 13B to a lever 13C urged anticlockwise (in FIG. 1) by a spring 13D. At the pivot at 13B is a roller which is arranged to follow the cam 7. The damper 13 is unidirectional—that is to say, energy is dissipated in its movement one way but not the other. It follows that as each of the three lobes of cam 7 push the link 13A (whichever way the cam 7 is rotating) so there is damping resistance, whilst when the lobe is retracting, the spring 13D restores the damper. The damper thus checks the turnstile so that it moves slowly towards its next 120° position and thus the pawl 12 engages a gap 3B and the hook of the pawl 8 engages the corresponding roller 7A: note that the action of the damper is the same whichever way the turnstile is operating. Related to the provision of damping is the further and important feature described below, which we call the torque-restoring device.

Before we come to that, however, it may here be mentioned that the damper 13 may be so arranged as to fulfill also the nonreturn function of the pawl 12. This may be achieved as follows. If the damper is in the nature of a double acting ram, and is actuated positively in both senses, for example by a groove can and captive cam-follower, it operates as a damper by forcing fluid through an orifice: but in so doing sucks liquid into its other chamber through a nonreturn valve. Then, the damper acts as a unidirectional hydraulic lock because the nonreturn valve prevents escape of the induced liquid. But when, and only when, the damper reaches the end of its stroke, the nonreturn valve is caused to open and this corresponds with each 120° position. The nonreturn valve may be a poppet-valve operated by means within the damper, or it may be operated by the cam 7, or perhaps it may operate simply by falling open when not subject to returning flow.

Coming now to the torque-restoring device, this is provided as follows. On a pivot at 14A is mounted a cam-formed lever 14 which is urged anticlockwise (in FIG. 1) by a spring 14B or, preferably, a set of springs, to afford a required resilient law. The lever 14 has a cam profile comprising a straight edge at 14C and exponentially curved part 14D. These are so arranged that 14C contacts one roller 7A exactly when part 14D contacts a second roller 7A. This condition is shown in FIG. 1. However, when the hub 2 is rotated (in either sense) from one of its 120° positions, one of the rollers 7A rocks the lever 14 against the load of the spring 14B, whereby energy is stored in the spring at a uniform rate throughout the next 60° of hub rotation: during the following 60° the spring 14A restores the lever 14 because the roller 7A now following the cam 14C, 14D is, so to speak, receding. Restoration of the lever 14 thereby imposes a torque on the hub 2 via the contacting roller 7A, which torque urges the turnstile to its next 120° position but subject to the damping action of damper 13. Whether or not the person in the turnstile continues to push it, it tends to retreat from him but comes to rest in its next 120° position, there to be locked by pawl 8 against further rotation in the same sense.

The pawl 8 may be provided with emergency or other authorized release by any suitable manual means, such as a manual lever fast with bellcrank 10, which lever can be under lock and key or otherwise manually inaccessible. Moreover, use may be made of an employee's pass-key to be inserted into the coring of the mechanism to engage the crank 10 or other operating part so as to release the pawl 8.

The mechanism may be made highly adaptable; for example, its sense of operational direction can be made optional (for example to cope with "tidal" passengers) without reassembly, by duplicating the pawl 8 and its immediately as-

sociated parts, and providing means to put either pawl out of action. Everything else is reversible. In FIG. 1 is seen a lever 15; this is shown as typifying a connection between the solenoid 11A and the mechanism such as coin-released, ticket printing or dispensing, or the like.

Turning now to FIGS. 3A and 3B we discuss the electrical arrangements for the counter which is to be operated by the switches 5A and 6A. The location in the circuit of the switches 5A and 6A is indicated by using the same reference numerals in FIG. 3A, and their operative phase positions are indicated in FIG. 3B.

An electrically operated counter is provided as indicated in box form at 30, and this is directly in the electrical input circuit in series with a relay contact 31 closing of which advances the counter by one digit. The operating coil 30A of the relay is connected in series with the switches 5A and 6A (of FIG. 1). In parallel with switch 5A is a second relay contact 32, both contacts 31 and 32 being normally open. The switch 5A is on only when its operative element is in one of the notches 4A and off at any other time. Conversely, the switch 6A is off only when its operative element is in a notch 4A and on at any other time. Referring now to FIG. 3B, which again illustrates the case of a turnstile having three arms, the figure 0° refers to the position of the rotating parts in which the operative element of switch 5A is on the flange portion 4 midway between two of the notches 4A whilst the operative element of switch 6A is in the center of a notch. Thus both switches are off and the relay solenoid 30A is not energized. After a small rotation switch 6A closes but 5A remains open. After 60° 5A closes and completes the relay circuit, thus closing the contacts 31 and 32. The closing of contacts 31 operates the counter 30 and the closing of contacts 32 short circuits switch 5A. This switch opens after a further small rotation but the solenoid 30A remains energized through switch 6A and relay contacts 32. Slightly before 120° rotation switch 6A opens and the relay drops out ready for the next 120° cycle. Thus, even if there be so much fortuitous backlash as to allow the turnstile to be rattled through nearly 30°, the counter will not register.

It will be evident that, although the device has been described in relation to a three-position (120°) turnstile it can easily be adapted to any other number, such as the four-position type which is widely used. It can also be adapted to the release, count, and unidirectional control of a swing door, or indeed to any other installations in which the same problems arise.

I claim:

1. A mechanism for the selective control of the part-rotation of a shaft comprising a camlike formation mounted for rotation on said shaft and a first pawl cooperating with said camlike formation so as sequentially to lock said shaft against rotation in one direction whilst allowing rotation in the other direction, means for moving said first pawl from the locked to an unlocked position, a notched circular member mounted for rotation on said shaft and a second pawl so engaging said circular member as to permit the initiation of rotation of the shaft in either direction from a locked position but so as to prevent reverse rotation after such initiation until such time as said shaft reaches the next locked position.

2. A mechanism according to claim 1 in which said camlike formation has a number of identical lobes equal to the number of equal part-rotational movements required for each complete revolution of said shaft and has a roller at each apex where two adjacent lobes join and in which said first pawl is pivotally mounted and spring-loaded, the inner cam engaging surface of said first pawl comprising a radially inwardly curved portion joined to a straight portion by a radially inward hook part, said pawl being so shaped and located that when said shaft is in a locked position one of said rollers lies in said hook part whilst the roller next in that direction of rotation against which said shaft is locked engages the end of said straight portion of said first pawl remote from said hook part, the cooperation of said rollers and said pawl further providing that when said shaft is locked against rotation in one direction it is free to rotate in the other direction.

3. A mechanism according to claim 1 in which said notched circular member has equal circumferential notched portions equally spaced apart by a number of gaps, the number of said notched portions and the number of said gaps both being equal to the number of part-rotational movements required for each complete revolution of said shaft and said second pawl being pivotally mounted, reversible and resiliently urged to a neutral position between two extreme angled positions, said pawl being arranged to engage said notched portions in either sense of direction of said shaft and to lie in said neutral position only when released by one of said gaps, the rotational positions at which such release occurs corresponding to the locked positions of said shaft, the shapes of said notches and of said second pawl being such as to allow initiation of rotation in either direction when said pawl is lying in one of said gaps but so as to prevent reverse rotation after such initiation until said pawl is released into the next of said gaps.

4. A mechanism for the selective control of the part-rotation of a shaft, comprising a camlike formation mounted for rotation on said shaft and having a number of identical lobes equal to the number of equal part-rotational movements required for each complete revolution of said shaft and a first spring-loaded pawl adapted for cooperation with said cam like formation so as sequentially to lock said shaft against rotation in one direction at the end of each said part-rotational movement whilst allowing rotations in the other direction, and to unlock said shaft by a radially outward movement away from the cooperating surface of said camlike formation so as to permit the next part-rotational movement, said shaft further having a partly notched circular member mounted for rotation on said shaft, the notched circumferential portions of said member being equally spaced apart by a number of gaps equal to the number of lobes of said camlike formation and said notches and said gaps being sequentially engaged by a second spring-loaded pawl, the arrangement being such that when said second pawl is engaged in one of said gaps, then rotational movement of said shaft can be initiated in either sense of rotation but when said second pawl is subsequently engaged in the notched portion next following said one gap, then reverse rotation is prevented until said second pawl drops into the next following gap, the rotational positions of said shaft at which said second pawl is engaged in a gap corresponding to the positions at which said camlike formation is locked by said first pawl, the mechanism further having control means for moving said first pawl from the locked to the unlocked position.

5. A mechanism according to claim 4 in which said first pawl is urged into its locked position by a spring-loaded first bellcrank lever and is pivoted into its unlocked position by the action of a second bellcrank lever.

6. A mechanism according to claim 5 in which said second bell crank lever is actuated by the operation of an electrical solenoid energized by the insertion of a coin into a coin-freed mechanism, the mechanism further having a manual device by which said solenoid can be overridden.

7. A mechanism according to claim 4 in which said first pawl can be located on either side of said camlike formation so that said mechanism can be preset to allow the rotation to be controlled in either direction.

8. A mechanism according to Claim 4 having a torque-restoring mechanism comprising a cam formed member having resilient means strongly urging it into contact with a member adapted for rotation with said shaft in such a way that during substantially the first half of a part-rotational movement energy is stored in said resilient means, the energy being returned to said rotatable member during substantially the second half of such movement so as to assist such rotation.

9. A mechanism according to Claim 8 in which said cam-

formed member is a pivoted lever having a radially inner cam profile comprising a straight edge and an exponentially curved part and in which said resilient means is a spring said lever being so located relatively to said camlike formation that when said shaft is in a locked position a first roller on said camlike formation is in contact with that end of said curved part of said lever remote from said straight edge and a second roller, being the next roller in that direction of rotation against which said shaft is locked, is in contact with that end of said straight edge remote from said curved part, so that on rotation taking place said second roller moves out of contact with said lever and said first roller rides along said curved part of said lever as the first half of the part-rotational movement takes place, thus pivoting said lever and extending said spring, said first roller then moving from said curved part to said straight edge of said lever so that during the second half of the part-rotational movement said spring reasserts itself and transmits a torque to said camlike formation in a direction such as to assist rotation of said shaft such torque being transmitted by way of said straight edge of said lever and said first roller.

10. A mechanism according to claim 4 having damping means to ensure that rapid part-rotation of said shaft cannot cause said shaft to overrun by its own momentum.

11. A mechanism according to claim 10 in which said damping means comprises a semirotary, unidirectional hydraulic damper operated by a link having at the end remote from said damper a roller held in contact with said camlike formation on said shaft by a spring-loaded lever attached to said link, the arrangement being such that damping resistance is encountered as each roller on said camlike formation operates said damper.

12. A mechanism according to claim 4 having damping means comprising a double-acting hydraulic ram cooperating with the camlike formation and acting positively in both directions and including a nonreturn valve in the hydraulic circuit, said ram and said nonreturn valve being so arranged as to fulfill both a damping function and the nonreturn function of said notched member and said second pawl.

13. A mechanism according to Claim 4 having a counting mechanism for counting each part-rotational movement of said shaft comprising an electrically operated counter energized by the closing of microswitches operated by the rotation of said shaft.

14. A mechanism according to claim 13 in which said counting mechanism comprises a circular flanged member mounted for rotation on said shaft and having equally spaced notches corresponding to the locked positions of said shaft, a first microswitch so located as to be opened by the action of its operating element in one of said notches relatively slightly before a locked position of said shaft and closed relatively slightly after the same locked position and remaining closed until relatively slightly before the next locked position of said shaft, a second microswitch in series with said first microswitch and so located as to be closed by the action of its operating element in the next of said notches at a point substantially halfway through the part-rotational movement of said shaft and opened relatively slightly after said halfway point and remaining open during the remainder of the part-rotational movement and during substantially the first half of the next part-rotational movement of the shaft, a relay coil connected in series with both of said microswitches so as to be energized when both of said microswitches are closed thus closing a first pair of relay contacts and actuating said electrically operated counter and closing a second pair of relay contacts connected in parallel with said second microswitch so that said relay is maintained after said second microswitch has opened and until said first microswitch is next opened, all so as to obviate any miscounting which might otherwise be caused by small random movements of said shaft.