May 7, 1968 A. G. BODOH 3,381,561

TICKET PUNCHING DEVICE

Filed Feb. 23, 1966

Fig. 5

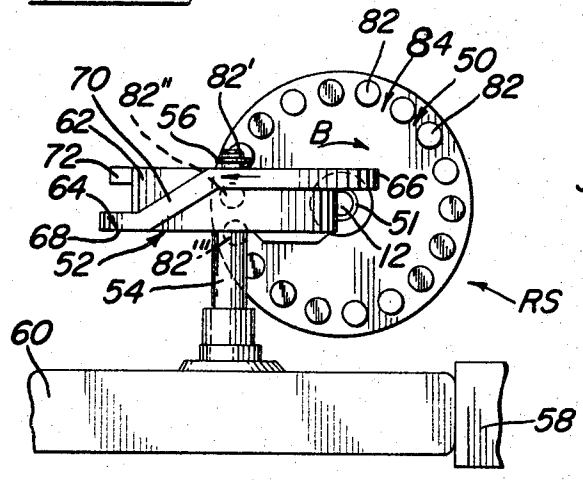


Fig. 4

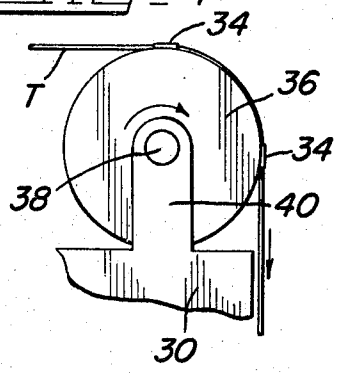


Fig. 1

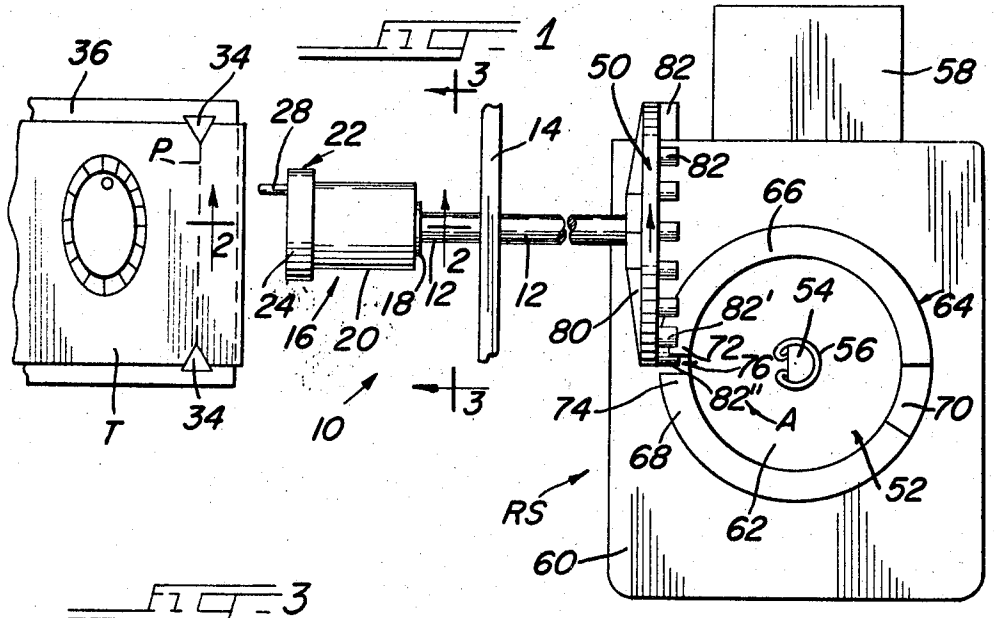


Fig. 3

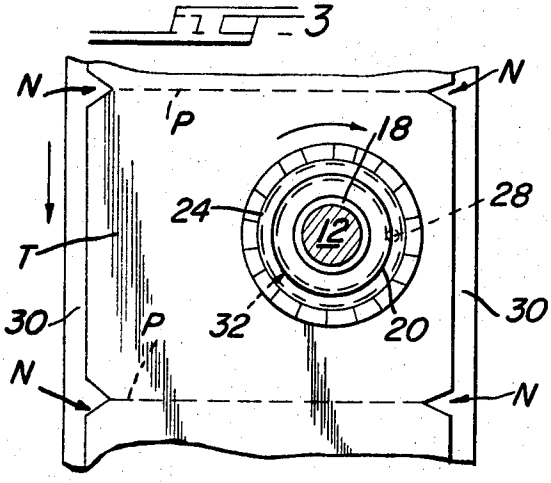
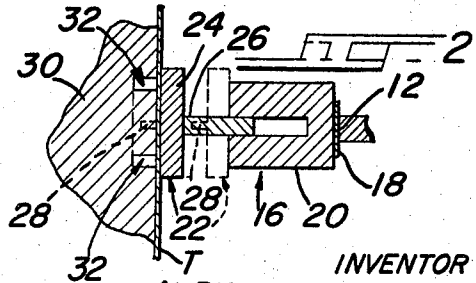


Fig. 2



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TICKET PUNCHING DEVICE

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ABSTRACT OF THE DISCLOSURE

A device adapted for use in association with a scan award system such as that shown in United States Patent No. 3,263,788, issued Aug. 2, 1966, enables substantially any product or service to be offered at a bargain price. The device indicates, in response to an ordinary purchase, one of a series of award selections that is available to the customer for bargain purchase via a punching operation performed on a dispensable ticket. Punching means are provided and means are provided in order to rotate the punching means through a series of angular positions. Means for actuating the punching means are employed, with the actuating means being adapted to actuate the punching means only when said means is disposed in a predetermined one of the angular positions. Means are provided for supporting a punchable ticket member adjacent the punching means, and indicia corresponding to the respective angular positions are provided on the ticket itself. Means for serially advancing the punchable ticket are likewise disclosed.

This invention relates to an automatic ticket punching device and more particularly to a device adapted to punch dispensible tickets at a predetermined one of a plurality of angular positions.

It is well known that automated vending installations have become a significant factor in the retail merchandising of products (e.g., candy bars) and of services (e.g., the playing of recorded music). However, one important disadvantage to such installations has been their relative inflexibility for utilizing improved merchandising techniques based upon award and bargain concepts. To an extent, bargain merchandising has been used in the vending business (as, for example, by offering a single selection record play for ten cents and three single selection record plays for twenty-five cents in coin-operated automatic phonographs), and such use has been highly successful. However, vending merchandisers are constantly striving for additional ways to utilize bargain concepts, and the present invention provides a device adapted for use to that end.

A co-pending United States patent application, Scan Award System, Ser. No. 381,715, filed July 10, 1964, now United States Patent No. 3,263,788, in the names of Herman G. Jensen and Robert Kapoun, discloses a system suitable for utilization in an automated vending installation and adapted to vend award selections under certain predetermined conditions. The disclosed preferred embodiment of the said co-pending patent application is a coin-operated automatic phonograph in which a customer, after purchasing an ordinary record selection at a regular price, is given the opportunity of purchasing one of a series of album award selections at a bargain price, the said album award selection being predetermined by scan means which normally scan a series of album award selections and which, in response to the ordinary purchase, dwells upon a predetermined (although apparently random) one of the series of album award selections. Such a system has obvious utility in other vending environments (e.g., food and beverage vending units) in addition to the phonograph environment described in detail in the co-pending application.

However, the described scan award system is limited to bargain sale of services or other products normally vendible from the vending installation in which it is incorporated. Thus, an automatic phonograph unit equipped with the scan award arrangement could not vend bargain selections not already vendible from the phonograph. Likewise, a product vendor adapted to vend, for example, beverages by the cup, could not offer bargain priced bottled beverage units (e.g., bargain priced six-packs).

The present invention provides a device, adapted to be used in combination with a scan award arrangement such as that of the co-pending United States patent application, which offers bargain award selections, which may comprise substantially any product or service, in response to the purchase of an ordinary product or service from the vending installation. In practice, the device of the present invention is adapted, in response to an ordinary purchase, to indicate (by carrying out a punching operation on a dispensible ticket) one of a series of award selections that is available to the customer for bargain purchase. Specifically, the dispensible ticket has indicated thereon, at a series of equally spaced angular positions, indicia corresponding to a series of available award selections. The rotary punching device of the present invention is adapted, as determined by the particular one of the series of award selections on which the scan means has dwelled, to punch the dispensible ticket adjacent the indicia of the corresponding award in response to the customer's deposit of the bargain purchase price. The marked ticket is dispensed to the customer, who may later redeem it for the indicated award merchandise or service. The available award selections need not be the specific product or service available from the vending installation. By way of specific example, a beverage vending installation located in a gasoline service station could offer as award selections merchandise (e.g., automobile accessories, petroleum products, etc.) and service (e.g., automobile washing, waxing, lubrication, etc.) at bargain prices.

Thus, utilization of the rotary ticket punching device of the present invention in combination with a scan award system of the type described provides even greater merchandising flexibility than is obtainable with the scan award system alone.

In the embodiment illustrated and described herein, the invention takes the form of punching means adapted, when actuated, to carry out a punching operation on a punchable ticket member. Means are provided in order to rotate the punching means through a series of angular positions. Means for actuating the punching means are provided, said actuating means being adapted, according to the preferred embodiment, to actuate the punching means only when said means is disposed in a predetermined one of the angular positions. The invention further comprises means for supporting a punchable ticket member adjacent the punching means, and indicia, corresponding to the angular positions in which the punching means is positionable, are preferably provided on the ticket. In addition, means for advancing the punchable ticket over the anvil means are also preferably provided.

A primary object of the present invention is to provide a new and unique rotary punching device of the character described.

A related object of the present invention is to provide a rotary punching device in which a punching die is incrementally rotated in a stepwise manner to successive angular punching positions.

Another object of the present invention is to provide a punching device of the character described capable of punching a ticket member, provided with indicia corresponding to the angular punch positions, in a predetermined one of such positions.

These and other objects, advantages, and features of the present invention will hereinafter appear, and, for purposes of illustration, but not of limitation, an exemplary embodiment of the present invention is shown in the appended drawing, in which:

FIGURE 1 is a fragmentary top plan view of a preferred embodiment of the present invention;

FIGURE 2 is a sectional view taken substantially along line 2—2 of FIGURE 1, but showing the punch in its actuated position;

FIGURE 3 is an enlarged, sectional view taken substantially along line 3—3 in FIGURE 1;

FIGURE 4 is a fragmentary side elevational view of a ticket advancing mechanism utilized with the present invention; and

FIGURE 5 is a right-side elevational view of the embodiment shown in FIGURE 1.

With reference to the drawing, a rotary punching device **10** is generally illustrated in FIGURE 1. The device **10** includes a shaft **12** which is journaled for rotation in a frame **14** (the other portions of which are broken away so as not to obscure the parts of the device **10**). A solenoid punch **16** is mounted at the end of shaft **12** by any suitable means, such as mounting collar **18**.

The solenoid punch **16** comprises a coil **20**, connected to a source of electrical power (not shown), and an actuator generally indicated by the reference character **22**. As best shown in FIGURE 2, actuator **22** comprises an annular disc **24** and a shaft **26**. Actuator **22** is movable between a normal position (shown in broken lines in FIGURE 2), wherein disc **24** is positioned adjacent coil **20**, and an actuated position (shown in full lines in FIGURE 2), wherein disc **24** has moved away from coil **20**. The solenoid punch **16** is arranged so that the movement of the actuator **22** from its FIGURE 2 broken line position to its FIGURE 2 full line position occurs when coil **20** is energized. Suitable means, such as a spring (not shown), are provided in order to restore actuator **22** to the FIGURE 2 broken line position when coil **20** is de-energized.

A projecting die **28** is provided on disc **24** (see FIGURES 1 and 2). Die **28** is adapted to pierce a punchable ticket disposed in its path when actuator **22** moves to its FIGURE 2 full line position in response to the energization of coil **20**. Die **28** is positioned between the center and the periphery of disc **24** such that when shaft **12** and solenoid punch **16** are rotated, die **28** traces a circular path about the center of shaft **12**.

Means are provided for positioning and supporting a punchable ticket member such that it may be pierced by punching die **28** when coil **20** is energized. A punching anvil **30** is provided in a position such that disc **24** is disposed adjacent thereto upon energization of coil **20** (see FIGURE 2). An annular groove **32** (see FIGURES 2 and 3) is provided in the punching anvil **30**, and groove **32** corresponds to the path of rotation traced by die **28**. Thus, when a punchable ticket member T is positioned on anvil **30**, the movement of actuator **22** to its FIGURE 2 full line position causes a punching operation to be carried out, die **28** piercing the ticket member and moving into groove **32** in anvil **30**.

Means are provided for serially advancing punchable ticket member T over anvil **30**. A series of individual tickets T are interconnected by perforations P (see FIGURES 1 and 3). Thus, after a given ticket T has been punched by the die **28**, it may be removed from the remaining series of tickets by manual tearing along perforations P or by a conventional ticket cutting mechanism (not shown). The edges of tickets T are cut away at each end of the perforations P in order to form a plurality of notches N. The notches N are adapted for engagement with pairs of triangular driving teeth **34** provided on a drum **36** (see FIGURES 1 and 4). Drum **36** is mounted on a drive shaft **38**, which is journaled in a pair of projecting ears **40**. Ears **40** project upwardly from anvil **30**. Rotation of shaft **38** and, hence, drum **36**, causes triangular teeth **34** to engage notches N in the tickets T, thereby causing the tickets T to be moved passed anvil **30**. As will be obvious to one skilled in the art, the ticket driving mechanism may be provided either above or below anvil **30**, depending upon the direction in which it is desired to advance ticket T.

Suitable printed indicia are preferably provided on each of the individual tickets T as shown in FIGURES 1 and 3. The printed indicia include a series of marks provided in annular disposition corresponding to the various punching positions which the solenoid punch **16** assumes, as hereinafter described. Thus, a marking is provided on the ticket T adjacent each point at which ticket T may be punched.

As will hereinafter be described, a source of operative power (such as an electric motor, not shown) is provided in order to cause the shaft **38** to rotate. Control means for activating the source of operative power is also provided in order to cause the series of tickets T to be advanced at predetermined times in relation to the operation of punch **16**.

Means generally indicated by the reference character RS and adapted to successively position punch **16** in a series of predetermined annular orientations in a stepwise manner are shown in FIGURES 1 and 5. Means of this character are described and claimed in a co-pending United States patent application, Rotary Stepping Device, Ser. No. 381,844, filed July 10, 1964, now abandoned, in the name of Joseph E. Wright, Jr. It will, of course, be apparent to one skilled in the art that substantially any other device capable of effecting stepwise incremental rotation of the shaft **12** may be also utilized.

Means RS comprises step follower **50**, which is mounted on shaft **12** for rotation therewith by means of a ring **51**, and a cam stepper **52**. Stepper **52** is retained on a rotatable shaft **54** by means of a ring **56**. A conventional electric motor **58** is adapted to cause shaft **54** and cam stepper **52** to rotate by means of a gear drive assembly **60**. Motor **58** and assembly **60** are conventional elements and are illustrated schematically for purposes of brevity.

Cam stepper **52** comprises a cylindrical frame **62** which is provided with an integral extending cam flange **64**. Cam flange **64** extends generally circumferentially about the frame **62**, but is discontinuous and non-planar in part. Cam flange **64** comprises an upper arcuate portion **66** disposed in a first plane and a lower arcuate portion **68** disposed in a plane parallel to the said first plane. An interconnecting inclined web portion **70** interconnects the portions **66** and **68** so that a continuous structure is provided from one end **72** of the upper portion **66** through web portion **70** and to an end **74** of lower flange portion **68**, with a space **76** being defined between ends **72**, **74** and generally corresponding to the height of web portion **70**.

Step follower **50** comprises a disc frame **80** which has a series of perpendicularly extending circumferentially and equally spaced lugs **82** thereupon. A series of spaces **84** are provided between adjacent lugs **82** (so that each space **84** defines a dwell surface situated between a pair of lobe surfaces defined by adjacent lugs **82**), and, although any given number of lugs **82** and corresponding spaces **84** can be provided, as required, the illustrated embodiment discloses eighteen such lugs **82** and spaces **84** in order to provide eighteen steps of incremental rotation (of 20° each) for each cycle of revolution of cam stepper **52**, as hereinafter described. As previously noted, step follower **50** is mounted for rotation on shaft **12**.

Preferably, flange **64** completes substantially a 360° arc (as best seen in FIGURE 1) as end **72** of flange portion **66** and end **74** of flange portion **68** approach each other to define the space **76**. Cam stepper **52** and step follower **50** are disposed in prependicular relationship to each other, that is, cam stepper **52** is adapted to rotate

in a first given plane of rotation, and step follower **50** is adapted to rotate in a plane of rotation that is perpendicular to the said given first plane, and cam flange **64** is adapted to mesh in a given space **84** between a pair of adjacent lugs **82** on step follower **50**. With this spacial difference, rotation of cam stepper **52** (in the direction of the arrow A shown in the drawing) will cause a stepwise incremental rotational movement of step follower **50** (in the direction of arrow B shown in the drawing) in the following manner.

Initial rotation of cam stepper **52** in the direction of arrow A does not immediately cause any rotation of step follower **50** and indeed positively locks step follower **50** in its initial position. However, as rotation in the said direction continues, end **72** of upper flange **66** approaches and passes through the space **84** between lugs **82'** and **82''** (see FIGURE 1), and substantially simultaneously end **74** of flange portion **68** (which follows end **72** in the indicated direction of rotation) approaches and passes through the space **84** between lug **82''** and the next-below lug **82'''** (see FIGURE 5). However, step follower **50** will still be locked in position against rotation during this transition, since lower flange portion **68** achieves a positive locking function corresponding to that described for the upper flange portion **66**.

As rotation continues, eventually inclined web portion **70** approaches the space **84** between lugs **82''** and **82'''** and urges step follower **50** to rotate by 20° in the direction of arrow B, with lug **82''** facing the upper surface and lug **82'''** facing the lower surface respectively of inclined web portion **70**. As web portion **70** passes through and beyond the space **84** between lugs **82''** and **82'''** (so as to complete 360° of rotation for cam stepper **52**), it will be apparent that upper flange portion **66** then passes through and beyond the said space so as again to positively lock step follower **50** in position until such time as lower flange portion **68** is meshed in the next-below space **84**.

It should be apparent that the described operation can be continued indefinitely with continuous rotation of cam stepper **52** being translated into stepwise incremental rotational movement of step follower **50** (i.e., each 360° of rotation for cam stepper **52** being translated into 20° of rotation for step follower **50**) and with step follower **50** being positively locked in position (either by upper flange portion **66** or by lower flange portion **68**, as the case may be), except for the relatively short duration of the cycle when the inclined web portion **70** passes through a space **84** between any two adjacent lugs **82** provided on the step follower **50**. In view of the relatively short effective arcuate length of web portion **70** (as compared to 360°), it is apparent that step follower **50** will dwell (i.e., will be retained) in a given position for a relatively long time (as compared to the time required for the actual rotational step movement of 20° between dwells).

Thus, operation of the rotary stepping device in the foregoing manner causes solenoid punch **16** which is mounted on shaft **12** to undergo stepwise incremental 20° movements. Thus, punch die **28** also successively moves through 20° increments in moving between eighteen equally spaced positions along its angular path of movement. Since the dwell time is relatively long and the actual movement time is relatively short, solenoid punch **16** remains in a given one of its angular positions for a relatively long time and then moves relatively quickly to its next successive angular position.

Means, such as the scanning arrangement disclosed and claimed in the previously discussed co-pending United States patent application Scan Award System, may be utilized in cooperation with the apparatus of the present invention in order to de-energize motor **58**, and, hence, to stop the rotation of cam stepper **52**. When stepper **52** stops, step follower **50** (and hence solenoid punch **16**) are disposed in a predetermined (although apparently a random) one of eighteen different angular positions.

At the same time motor **58** is de-energized, conventional elecrtical control means (not shown) causes electrical power to be supplied to the coil **20** in order to effect the energization thereof. As a result, actuator **22** moves to its FIGURE 2 full line position, thereby causing die **28** to pierce the ticket T at a point corresponding to the predetermined position in which punch **16** has stopped. Preferably, the electrical control means do not supply electrical energy to the coil **20** until a customer deposits coins in the amount of the bargain purchase price. Thus, for example, the rotary stepping device may be utilized to position the die **28** in a given one of its angular orientations in response to an ordinary purchase. Electrical energy is supplied to coil **20** after the customer has elected to purchase the award selection by depositing coins in the amount of the bargain price.

Means are also provided for energizing the source of operative power for shaft **38** after actuator **22** has returned to its FIGURE 2 broken line position (i.e., after the punching operation has been carried out). Thus, the ticket T is advanced to a position wherein the punched ticket is separated, either by a conventional cutting mechanism (not shown) or by manual separation by the customer.

The rotary punching device of the present invention thus provides a novel mechanism by which a predetermined (though apparently random) one of a sequence of bargain priced award selections may be permanently recorded on a ticket which is dispensed to a customer. When so utilized, the present invention provides a flexible and useful means for employing award and bargain concepts of merchandising in vending installations.

It should be understood that, in addition to the rotary stepping device described herein, substantially any other arrangement for rotating the solenoid punch **16** of the present invention in stepwise increments may be utilized. Furthermore, substantially any means of controlling the rotation of the rotary stepping device may be utilized in order to position the solenoid punch **16** in a predetermined one of its angular positions.

It should also be understood that various other changes, modifications, and alterations can be effected in the details of operation and assembly for the various components illustrated and described herein without departing from the spirit and the scope of the instant invention, as defined in the appended claims.

What is claimed is:

1. A rotary punching device adapted to punch a punchable ticket in one of a series of angular positions comprising:

means for supporting the punchable ticket member;

punching means selectively positionable in a series of angular positions, actuation of the punching means being adapted to carry out a punching operation on the ticket member;

positioning means adapted to cause the punching means to move in a stepwise manner through its series of angular positions,

the said positioning means comprising:

a first rotatable member operatively connected to the punching means whereby rotation of the first member causes the punching means to rotate;

a second rotatable member;

cam follower means on the first member;

cam means on the second member adapted to cooperate with the cam follower means for rotating the first member stepwise in increments of rotational movement; and

means for rotating the second member, rotation thereof being translated into stepwise incremental rotation of the first member and the punching means; and means for actuating the punching means.

2. A rotary punching device adapted to punch a punchable ticket in one of a series of angular positions comprising:

means for supporting and advancing a series of punchable ticket members;

a punching member positionable in a series of equally spaced angular positions, actuation of the punching means being adapted to carry out a punching operation on the ticket member in an angular position corresponding to the position of the punching means at the time of actuation;

positioning means adapted to cause the punching means to move in a stepwise manner through its series of angular positions,

the said positioning means comprising:

a first rotatable member operatively connected to the punching means whereby rotation of the first member causes the punching means to rotate;

a second rotatable member;

cam follower means on the first member;

cam means on the second member adapted to cooperate with the cam follower means for rotating the first member stepwise in increments of rotational movement; and

means for rotating the second member, rotation thereof being translated into stepwise incremental rotation of the first member and the punching means; and

actuating means for actuating the punching means, said actuating means being operable only when the punching means is disposed in one of its angular positions.

3. A rotary punching device adapted to punch a punchable ticket in one of a series of angular positions comprising:

a frame;

means for supporting and serially advancing a series of punchable tickets;

the said tickets having indicia imprinted thereon corresponding to a series of angular positions;

a shaft journaled for rotation in the frame;

a solenoid mounted on the shaft for rotation therewith, and including an actuator, energization of the solenoid being adapted to move the actuator to a punching position and deenergization of the solenoid being adapted to move the actuator to a rest position;

a punching die on the actuator, the said die being adapted to pierce one of the series of tickets in a position corresponding to one of the indicia thereon, rotation of the solenoid and actuator being adapted to move the die through a series of angular positions; and

positioning means for rotating the shaft stepwise through a series of angular positions.

4. A rotary punching device, as claimed in claim 3, wherein the positioning means comprises:

a first member mounted on the shaft for rotation therewith;

a second rotatable member having a plane of rotation perpendicular to the plane of rotation of the first member;

cam follower means on the first member comprising a series of circumferentially and equally spaced dwell surfaces each situated between a pair of lobe surfaces;

cam means on the second member comprising a cam flange adapted to mesh in a given dwell surface member and having a first planar portion in a first plane parallel to the plane of rotation of the second member, a second planar portion in a second plane parallel to the first plane, and a web portion interconnecting the first and second portions; and

means for rotating the second member, rotation thereof being translated into stepwise incremental rotation of the first member and the shaft.

5. A rotary punching device, as claimed in claim 4, wherein the means for supporting and advancing a ticket is operated to serially advance the tickets one ticket-length after the punching of a given ticket whereby said given ticket is dispensable.

6. A rotary punching device, as claimed in claim 4, wherein the means for rotating the second member includes a normally energized electric motor, and further comprising means for de-energizing said motor when the punching die is disposed in a predetermined one of its angular positions.

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