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Meyer

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[54] **COUNTING DEVICE FOR PUNCH TYPE BALLOT CARD**

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Related U.S. Application Data

[63] Continuation of Ser. No. 849,827, Aug. 13, 1969, abandoned.

[52] **U.S. Cl.** .....**235/61.6 R,** 235/56, 235/92 R, 235/92 SB

[51] **Int. Cl.** **G06k 7/04,** G07c 13/00

[58] **Field of Search**.....235/61.6, 56, 92, 235/61.11, 61.12

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[57] **ABSTRACT**

A counting device especially adapted for counting votes made on a punch type ballot card wherein selections are made by the voter by punching holes at predetermined index point areas. The device provides means for counting all selections on the card simultaneously and permits interruption of the counting cycle to enable viewers to visually inspect the count. Means is provided for ejecting the card from the device.

6 Claims, 4 Drawing Figures

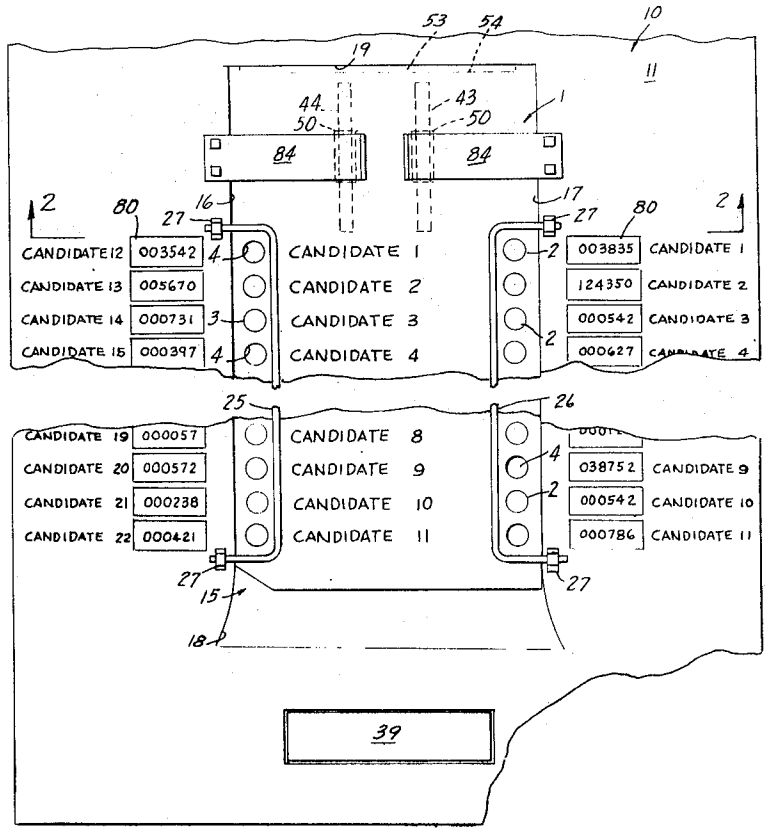


Fig. 2.

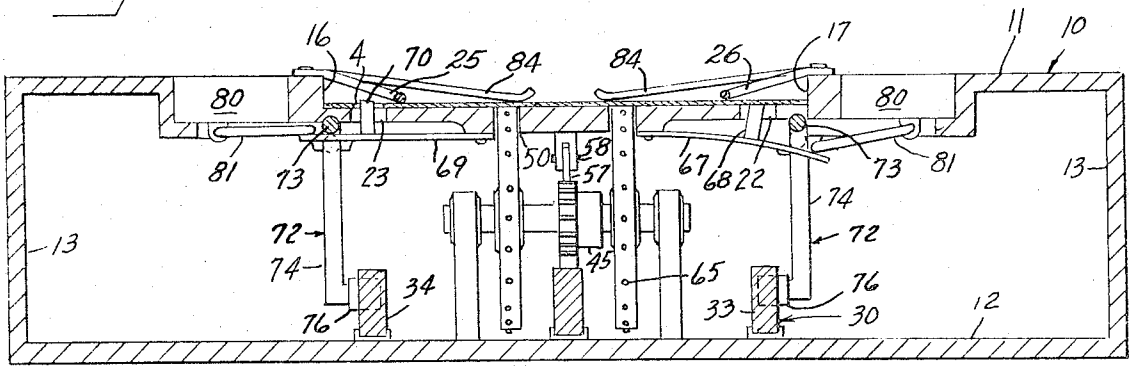
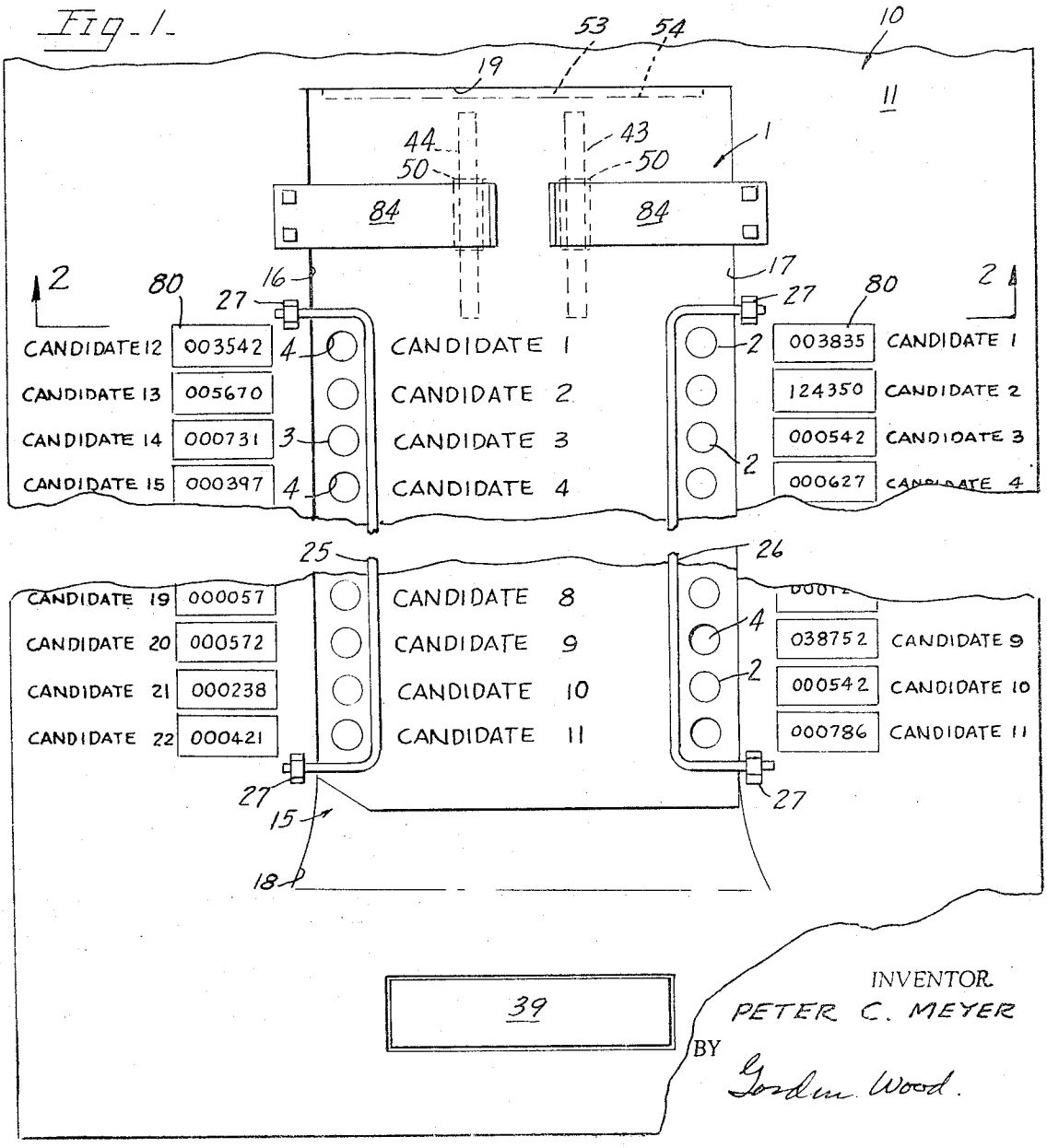


Fig. 1.



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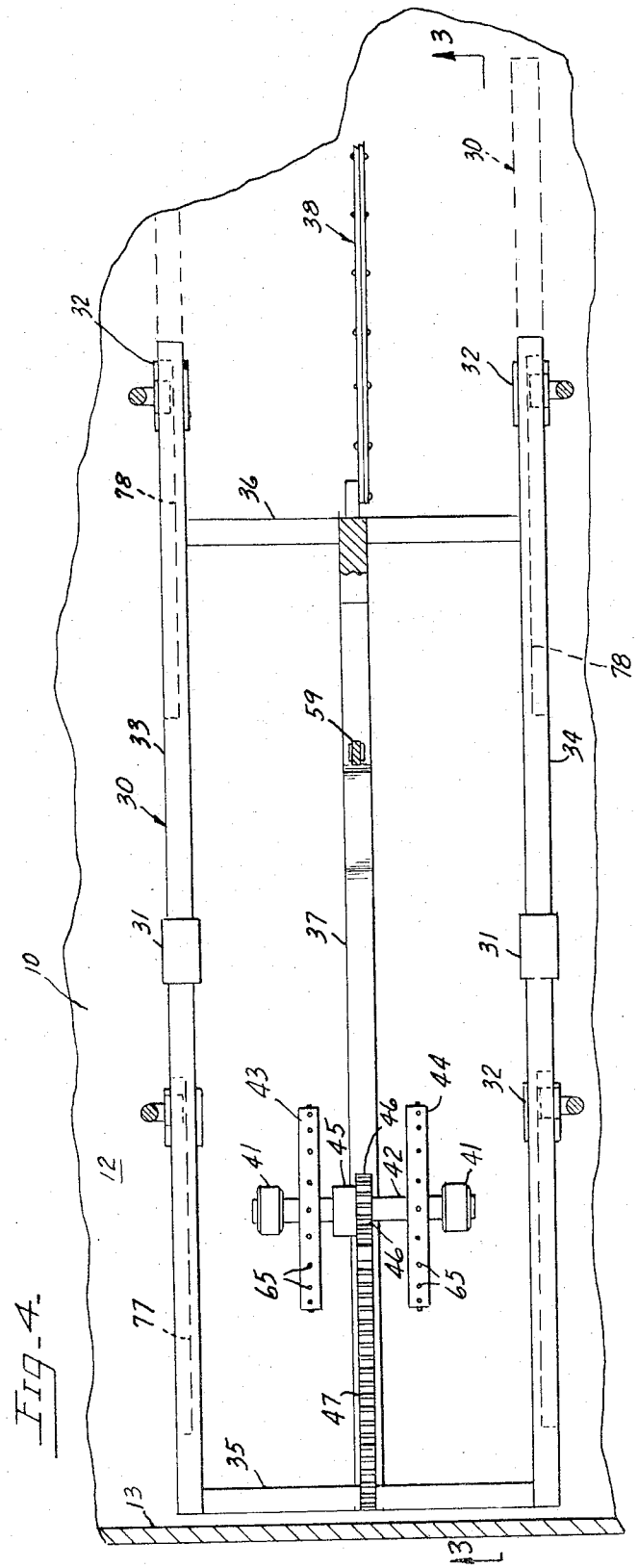

Fig. 4

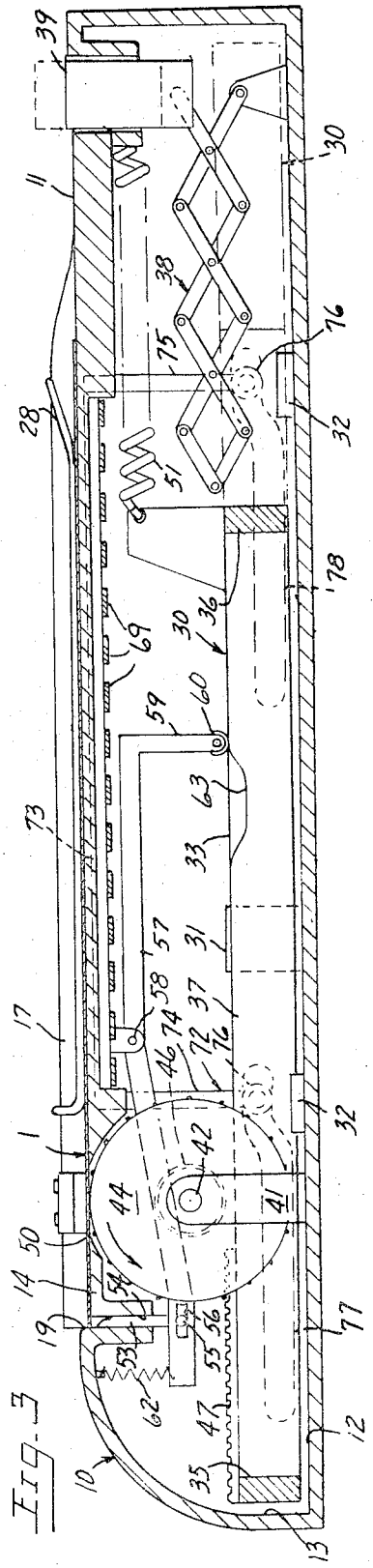

Fig. 3

COUNTING DEVICE FOR PUNCH TYPE BALLOT CARD

This is a continuation of application Serial No. 849,827, filed Aug. 13, 1969 and now abandoned.

This invention relates to a counting device that is particularly adapted for use in counting the votes or selections made by a voter on a punch type ballot card.

In recent years punch type ballot cards have become increasingly popular for use in elections. Although such ballot cards take various forms, the voting operation usually includes the step of permitting the voter to punch out a prescored chip or disk from a voting card on which the candidates and issues are set out. One of the advantages of ballot cards of this type as distinguished from relatively large paper ballots is that such cards lend themselves to a fast counting operation by means of computers or high speed counters. However, various disadvantages attend operations of this type. One disadvantage is that the voters and precinct board workers find it difficult to check the actual count of votes made on a ballot card and the feeling quite often exists that such high speed mechanized counting does not necessarily reflect the vote accurately. Another disadvantage of such highly mechanized ballot card counting techniques is that the punched ballot cards must be transported from the precinct to the computer before the actual votes at a precinct can be determined. This quite often results in delays since in many areas the distance from the precinct to the computer is so great that airplanes are employed to transport them. Another disadvantage of the computer type counting of ballot cards is that it is difficult to obtain early returns from most precincts, especially remote ones.

Still another disadvantage of prior art counting devices is that some register an erroneous count if the prescored chip is not completely removed from the card but remains hanging on the card or returns to its original position to close the hole in the card.

The main object of the present invention is the provision of a ballot card counting device which overcomes many of the disadvantages of prior art counting means. By the present invention a relatively inexpensive counting device is provided which is adapted for use at every precinct where as few as 200 ballots may be counted so that an accurate count may be obtained immediately after the polls close.

Another object of the present invention is the provision of a counter for punch type ballot cards which permits precinct workers and poll watchers to check the accuracy of the count of every ballot and every choice on the ballot as the count proceeds.

Still another object of the invention is the provision of a punch card counting device which is entirely mechanical in operation and does not rely on electrical power so that it may be operated effectively despite power failures.

Still another object of the invention is the provision of a counter of the subject type which is more accurate than sophisticated high speed counters relying on light beams and brush sensing devices and in which cards disappear from view.

Yet another object of the invention is the provision of a counting device which involves extremely low operation costs since the precinct workers at a precinct may prepare and operate the same without the addition of unnecessary personnel.

Other objects and advantages will be apparent from the following specification and from the drawings.

FIG. 1 is a fragmentary top plan view of a counting device constructed in accordance with the invention.

FIG. 2 is a transverse sectional view taken in a plane indicated by lines 2—2 of FIG. 1.

FIG. 3 is a longitudinal sectional view of the device.

FIG. 4 is a fragmentary top plan view of the carriage and its associated mechanism.

In detail, and first with reference to FIG. 1, the invention will be described in connection with a punch type ballot card generally designated 1 which is generally rectangular in shape and is provided along one longitudinally extending margin with a plurality of prescored punch-outs indicated at 2. In use the voter punches out the prescored disks at the index point areas corresponding to the particular candidates or propositions which he favors. The card 1 of FIG. 1 has a reverse side similar to the side shown including a row of prescored disks 3 which, when punched out, result in holes 4 (see also FIG. 2).

The counting device of the present invention includes a housing generally designated 10 which is preferably molded from plastic and includes a top 11, a bottom 12, and side walls 13. The top 11 is formed with a depressed portion 15 for receiving the card 1 therein. Said depressed portion is formed with a pair of opposite side walls 16, 17 spaced apart a predetermined distance so as to snugly receive the card 1 therein. Toward the front end of the machine the depressed portion 15 is flared as indicated at 18 to facilitate insertion of the card 1 into the depressed portion 15 by the operator. The rear end of the depressed portion 15 is defined by an end wall 19 against which the upper end of the card is abutted to position the latter in a predetermined position so that the punch-outs 2, 3 overlie a row of holes 22 along the right hand margin of the card and a row of holes 23 along the left hand margin (FIG. 2). The card 1 is held flat against the bottom of depression 15 by a pair of resilient guides 25, 26 which are secured by clamps 27 to the top 11 so as to press downwardly on card 1 with a slight pressure. Said guides 25, 26 may be flared upwardly at their forward ends as indicated at 28 in FIG. 3 to facilitate insertion of the card.

Referring now to FIG. 4, a reciprocable carriage generally designated 30 is supported on bottom 12 of housing 10. Said carriage 30 is reciprocable from an inoperative dotted line position to the full line position shown in FIGS. 3, 4 and is slidably supported in guides indicated at 31, 32. The carriage 30 is generally rectangular and comprises a pair of similar opposite longitudinally extending side bars 33, 34 connected together by a cross bar 35 at the rear end of the device and a cross bar 36 adjacent the forward end of the device.

The carriage 30 is reciprocated by means of a lazy tong linkage generally designated 38 which is connected at one end to a vertically reciprocable push button 39 and at its opposite end to the carriage 30. It will be apparent from FIG. 3 that when the push button 39 is pressed downwardly by the operator from the dotted line position to the full line position that the carriage 30 will be reciprocated toward the rear end of the device as indicated.

Supported on the bottom 12 of housing 1 are a pair of bearings 41 which rotatably support a transversely extending shaft 42 which carries a pair of parallel card engaging wheels 43, 44. Also carried by shaft 42 is a

unidirectional clutch 45 to which is connected a pinion 46. This pinion 46 is adapted to mesh with a rack 47 carried on the upper face of a central bar 37 integral with carriage 30. Upon movement of the carriage to the projected position shown in FIG. 3 the clutch 45 is disengaged with the result that no rotational effort is imparted to the wheels 43, 44. However, upon the return stroke of the carriage the rack 47, after a short movement to the right as seen in FIG. 3, engages pinion 46 and drives the wheels 43, 44 in a counterclockwise direction (FIG. 3). The bottom 14 of the depressed portion 15 of top 11 is formed with apertures 50 so that the upper peripheries of wheels 43, 44 may frictionally engage the underside of the card 1.

Extending between the carriage 30 and a point on the housing top 11 adjacent push button 39 is a relatively strong extension spring 51 which returns the carriage to the right (FIG. 3) upon release of the push button 39. During the first short portion of the return stroke of the carriage 30 the upper end of the card 1 is urged out of the depressed portion 15 of the housing top by means of a slide 53 which is slidably supported in a vertically extending slot 54 formed in the housing top. The lower end of slide 53 is provided with pins 55 received within slots 56 formed in an actuating bar 57. This actuating bar 57 is pivoted intermediate its ends to the underside of the housing top as indicated at 58 and terminates at its opposite end in a vertically extending end portion 59 provided with a follower wheel 60 rolling on the upper edge of central bar 37 of carriage 30. The end of the actuating bar 57 adjacent the slide 53 is urged upwardly at all times by means of an extension spring 62. The upper face of central bar 37 is formed with a cam portion 63 which, upon initial movement of the carriage 30 to the right as seen in FIG. 3, causes the slide 53 to push the forward end of the card 1 above the end wall 19 of the depressed portion 15 and hold it in its elevated position until the rack 47 rotates the wheels 43, 44 to frictionally engage the card 1 and eject it from the housing. The wheels 43, 44 are preferably provided with small projections 65 to enhance the frictional engagement between the wheels 43, 44 and the underside of the card 1 and, at the same time, create slight indentations on the underside of the card 1 so as to provide proof of the fact that the card has been counted.

Referring now to FIG. 2, a plurality of resilient leaf springs 67 are provided in a row along the right hand side of the device as seen in FIG. 2 and each leaf spring 67 is provided with an upwardly extending probe or sensing element 68. Said leaf springs and probes are positioned so as to register the probes with the holes 22 formed in the housing and thus to register with the scored punch-outs 2 or with the holes 4 formed by removal of such punch-outs. Similarly a plurality of leaf springs 69 are provided along the left hand side of the device and carry similar probes 70. As best seen in FIG. 2, said leaf springs 67, 69 are fixedly secured at their inner ends to the underside of the housing top and are free at their outer ends but, due to their inherent resiliency, tend to assume an upper position shown at the left hand side of FIG. 2.

As leaf springs 67, 69 are adapted to be urged to a depressed position, as shown at the right hand side of FIG. 2, by means of frame members generally designated 72 each of which includes a horizontally extending portion 73 and a pair of downwardly extending legs 74, 75 (FIG. 3). The depressed position of the springs 67, 69 is a condition imposed by frame members 72 when the carriage 30 is in its inoperative position. Said frame members are slidably supported in suitable slots formed on housing top 11. The lower ends of legs 74, 75 are provided with wheels 76 which are received within cam slots 77, 78 formed in the longitudinally extending side bars 33, 34 of carriage 30. From the shape of the cam slots 77, 78 it will be apparent that when the carriage 30 is in its inoperative position, that the horizontal portion 73 holds the leaf springs 67, 69 in their lower position shown on the right hand side of FIG. 2 and, when the carriage moves to the full line position of FIG. 3, the horizontal portion 73 of frame member 72 moves upwardly and permits the leaf springs 67, 69 to swing upwardly to a substantially horizontal position which is that shown on the left hand side of FIG. 2. In the event an aperture is formed in the card 1 the probe or sensing element 68, 70 extends through such aperture; however, if no hole is formed in the card the probe 68 will be held in the depressed position as shown in the right hand side of FIG. 2. It will be understood in this connection that the resiliency of the leaf springs 67, 69 is not sufficient to force the probe through the card or to remove the scored punch-out formed in the card.

Supported on the housing top 11 at points alongside each of the index point areas of card 1 are mechanical counters 80 which are adapted to be actuated to register a count upon the movement of the corresponding leaf springs through an up and down cycle during which the probe penetrates the card. If the probe does not extend through the card the amplitude of the cycle is insufficient to actuate the counter. The actuating arms 81 of the counters 80 engage the outer ends of the leaf springs 67, 69 as indicated in FIG. 2.

It will be apparent from the above described structure that upon movement of the carriage to the rear position of FIG. 3 the probes 68, 70 penetrate all of the apertures that have been formed by the voter so that a visual check may be made by witnesses of the votes for each candidate and proposition. The button 39 may then be released to permit the carriage to move to its inoperative position during which movement the probes are returned to their lower positions so that the counters 80 register a count only for those probes which have been inserted through holes in the card 1. In other words, it will be understood that the actual counts on the counters 80 will not be registered until the button 39 is released giving witnesses an opportunity to question the votes if this is deemed appropriate before the actual count is registered.

As stated before, return of the carriage 30 to its original position causes the card to be sprung upwardly at its upper end to a position above the end wall 19 so that the wheels 43, 44 may discharge the card so that the device is ready for the next card. In order to enhance the friction between the wheels 43, 44 and the card a pair of leaf springs 84 may be secured at one of their ends to the top 11 of the housing and engage the card 1 at points closely adjacent the upper peripheries of wheels 43, 44.

It will be seen that the above described device may be made at a low enough price to warrant the use of one or more counters at each precinct so that there is no delay in reporting the vote after the poll has closed. Furthermore, the use of this device obviates programming costs, transportation costs, computer costs, accu-

racy checks and the personnel that are required for such operations.

One of the important features of this device is the fact that it lends itself to an inspection step during the cycle of the device. Such an inspection step which is required under most voting regulations is not available in those systems in which the cards are transported to a central computer after the polls close. In the event any question arises with respect to the computer count it is necessary for the cards to be checked manually, which is of course a lengthy time consuming operation. This inspection step also eliminates the possibility of a malfunctioning device going undetected over a period of time and any defect in operation may be corrected quickly.

It will also be apparent that ballots and votes cast may be counted as they are removed from the ballot depository thus restricting counting procedures to a one time handling so as to minimize delays and improve accuracy and security.

An additional advantage of the invention is that responsibility and control of vote counting does not reside in one man only — that is, the computer programmer — but is widely distributed among those in charge of the precincts involved.

An obvious modification in the above described device is to omit the probe from one of the leaf springs **67, 69** and employ such leaf spring and its associated counter to count the total number of cards processed.

It will also be apparent that the device will register a count of an index point area even though the corresponding punch-out has not been removed but remains hanging on the card. In such a case the probe has sufficient resiliency to swing the hanging cut out away from its path. This desirable result is not possible in computers relying on light rays and brushes as sensing elements.

The invention also contemplates an interlocking detent actuated by the card to prevent actuation of the device when a card is not in place. Another obvious modification is to form the housing to slant upwardly toward the rear end of the device to facilitate viewing the counting operation.

As best seen in FIG. **1** the invention permits the top **11** of the housing to be used for receiving indicia corresponding to the indicia on the card being counted. Such indicia is placed alongside the rows of counters **80** so that a viewer may see the probes that project through the holes in the card and at the same time note the correspondence between the probes and the candidates with which they are associated. Duplicate punch cards may be conveniently used for this purpose and may be releasably secured to the housing top for this purpose.

I claim:

1. In a device for processing a plurality of alike cards having a plurality of alike index point areas each of which may or may not have an aperture:

a base having inner and outer surfaces and provided with apertures corresponding to said index point areas, adapted to separately and sequentially support said cards on its outer surface in a predetermined position,

a sensing element connected to the inner surface of said base and supported for swinging movement toward and away from an index point area on said cards,

means urging said element toward said area for inserting said element through said base and cards if a card aperture exists at said area,

said means having insufficient force to urge said element through said cards if no card aperture exists at said area,

means to move said element away from said area, and

a counting device, having a visible accumulating register mounted at the outer surface of said base adjacent said point area and having trip-lever means adapted to be actuated by movement of said element through a card aperture at said area followed by movement of said element away from said area, to register the presence of an aperture at said area and to maintain a running total count of the number of times an aperture has been registered at said area for the number of cards checked.

2. In a device for processing a card having a row of index point areas each of which may or may not have an aperture:

first means including a base for supporting said card in a predetermined position at one side thereof for visual inspection during the processing thereof,

a plurality of sensing elements corresponding to said areas respectively and supported at the other side of said base for sensing cycle movement composed of movement toward and away from said areas,

second means urging said elements from retracted positions toward said areas for inserting said elements through said card to projected visually inspectable positions at areas provided with apertures,

the force of said second means being insufficient to urge said elements to projected positions at unapertured areas,

means to move said elements to retracted positions,

a plurality of counters having visible registers mounted on the base at said one side thereof adjacent the cards corresponding respectively to said elements with each adapted to be actuated by movement of its corresponding element through said card to a projected position followed by movement of the same toward a retracted position,

said second means being operable to hold said elements in said projected position for visual inspection of said elements before said elements are returned to their retracted position.

3. A device according to claim **2** wherein means is provided for removing said card from said device, said means including means for first returning said elements to their retracted positions and means for then driving said card out of said device in a generally lengthwise direction.

4. A device according to claim **3** wherein said means for driving said card applies a mark to said card to indicate that said card has been processed.

5. A device according to claim **3** including positioning means provided with a vertically disposed stop member against which one side edge of said card is abutted, means for raising the marginal portion of said card adjacent said one side edge above said stop member before actuation of said means for driving said card.

6. A device according to claim **5** wherein said means for driving said card comprises a wheel in engagement at its periphery with the underside of said card.

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