Feb. 11, 1930. W. C. KOCH 1,746,704

MACHINE FOR AUTOMATICALLY SELECTING GROUPS OF CLASSIFIED ACCOUNTS

Filed May 27, 1925

Fig. 1.

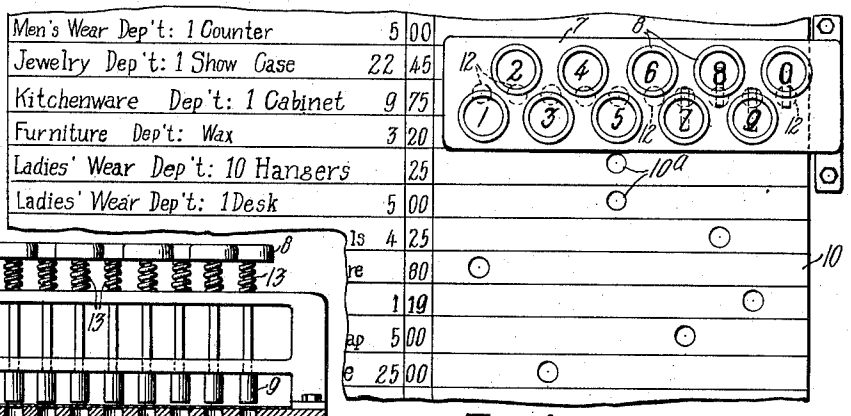


Fig. 2.

Fig. 4.

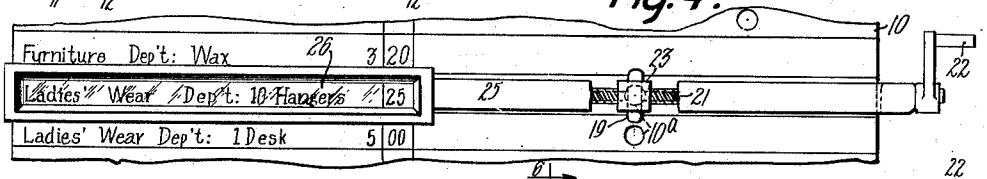
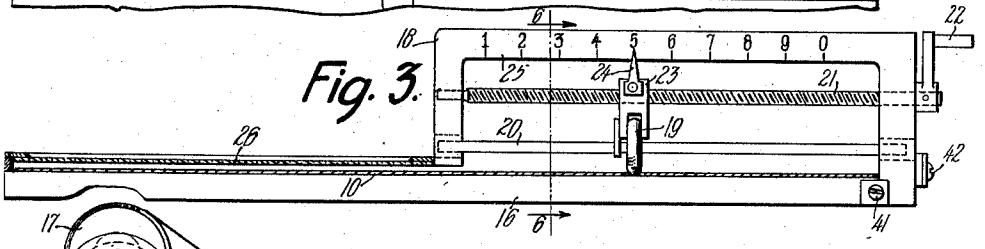


Fig. 3.



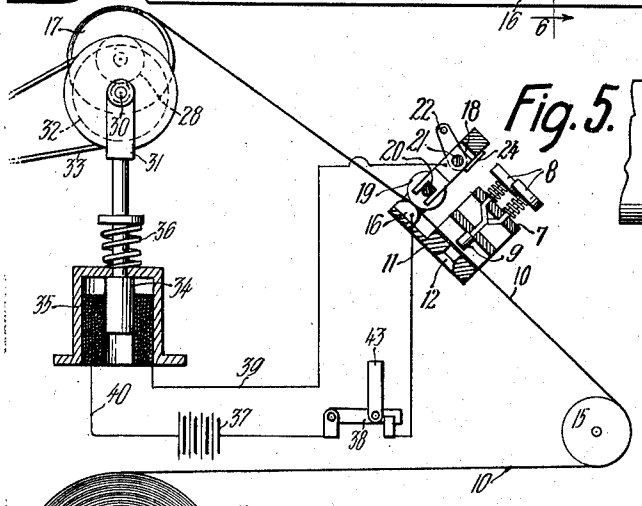


Fig. 5.

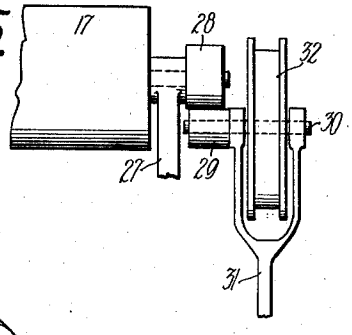
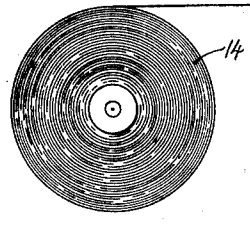


Fig. 6.



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UNITED STATES PATENT OFFICE

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MACHINE FOR AUTOMATICALLY SELECTING GROUPS OF CLASSIFIED ACCOUNTS

Application filed May 27, 1925. Serial No. 33,315.

As is well known, the sales of many business houses must be classified, and the various expense items distributed to the several classes of goods sold. Heretofore, book-keeping machines have been provided for recording such items on a sales journal or on ledger sheets and simultaneously upon a check sheet or roll, but the entries thus made are indiscriminately mixed so that much time and labor has been expended in later separating the items into the required classes, with a view to obtaining the sums of the items in each class.

The present invention relates to means for automatically separating into classes a series of indiscriminately mixed items on a roll or sheet.

It is my object to simplify and quicken the operation of classifying mixed entries on a sheet or roll, and at the same time to facilitate accuracy in the transfer of the classified items to an adding machine roll or in recording said items on a typewriter.

A further object is to provide an improved method for accomplishing this result, in which, perforations are so placed in the check sheets that their positions indicate the several classes, and to collect separately the items of each class by utilizing such perforations, in a suitable machine, to stop periodically the machine and allow recording of each item.

In the accompanying drawings, I have illustrated in simple, diagrammatic form, suitable mechanism for carrying out my invention. Referring to the drawings, Figure 1 is a plan view of a typical check sheet, showing the perforations therein, and also showing a suitable punch in plan view; Fig. 2 is a side elevation of the punch, together with the machine bed in section; Fig. 3 is an elevation of a suitable machine adapted to utilize the perforations to select and classify the items on a check sheet; Fig. 4 is a plan view of the selecting and indicating parts of the machine, showing how the selected item appears through the window; Fig. 5 is a detail elevation of the connection between the drive pulley and roll upon which the check sheet is mounted and Fig. 6 is a diagrammatic view showing the arrangement of the check sheet, rolls and operating mechanism of the classifying machine, including the punching and the selecting devices.

Figures 1 and 4 also show, along with other parts, the sheet 10 after it has been typed with a number of miscellaneous purchases for different departments and perforated as described above to carry out the objects of the invention. The direction of travel of the sheet is downward in both of these figures.

In the drawings, I have used the numeral 7 to indicate a perforating device suitable for use where entries of ten classes are to be allocated. This device 7 has a series of keys 8 adapted to be manipulated to actuate dies 9, which perforate, as at 10^a, a check sheet 10. The device 7 is arranged to be secured to the bed 11 of a book-keeping machine, see Fig. 6, said bed being formed with a series of die holes 12, adapted to receive the ends of the dies 9. The keys 8 are normally maintained in elevated positions by a series of coiled springs 13. The device 7 is preferably arranged over a longitudinal margin of the check sheet 10, as shown in Figures 1 and 2.

By the use of the perforating device, the holes cut in the sheet 10 are placed in fixed, vertical relation, or in horizontal alignment with the items which are entered on the sheet 10. It is to be noted that the keys are severally arranged to place perforations in distinct, vertical columns on the margin, so that the class to which a particular item belongs is indicated by the position of the punched hole in the sheet 10. As perforations are made in the check sheet of the continuous or roll type, it is wound upon a roll, like that indicated by the numeral 14 in Figure 6.

In this manner, a continuous sheet is prepared to include all items pertaining to sales of a particular day, week or other period of time. The perforated roll is now utilized in what may be termed a classifying or selecting device, to facilitate adding the items in the several classes. I prefer to mount the classifying device, one form of which, is shown in Figures 3 to 6 inclusive, upon or adjacent to an adding machine or typewriter. As illus-

trated, the check sheet 10 is extended from its supporting roll 14 over a guide roller 15, through the perforating device 7, and then upon the smooth upper surface of a bar 16 to a receiving roll 17. Obviously, a roller may be substituted for the bar 16, if desired, or a non-revoluble contact element be substituted for the disc 19. The sheet 10 is adapted to be withdrawn from the roll 14 and wound upon the roll 17 by suitable power driven mechanism, during the operation of classifying, hereinafter described.

Extending above the perforated margin of the sheet 10 is a frame 18 carrying a small disc or wheel 19, adapted to run upon the upper surface of the sheet. This wheel 19 is formed to extend through the perforations in the sheet 10, so as to make contact with the bar 16 only when a perforation passes beneath said wheel. To support the wheel 19, a rod 20 is provided, upon which the said wheel is slidable and revoluble. Manually operable means for shifting the wheel 19 laterally across the margin of the sheet 10 is provided. This mechanism includes a screw 21 adapted to be operated by a small handle or crank 22 and threaded in the upper portion of a yoke 23. Projections on the yoke 23 are adapted to engage the lateral surfaces of the wheel 19, and also prevent turning of the yoke about the screw 21 by engagement with the rod 20. Extending upward from the yoke 23 is a small indicator 24, adapted to move over a scale 25 above the screw 21. This scale 25 is graduated so as to indicate the columns of perforations in the sheet 10.

Mounted in parallel relation with the rod 20, above the sheet 10 and bar 16, is a window 26 arranged to display the entry corresponding to each perforation in the sheet 10, at the instant said perforation passes beneath the wheel 19. In the preferred form of my device illustrated, I operate the sheet 10 in the classifying machine electrically through circuits under control of switches, one of which, comprises the wheel 19 and bar 16, and the other, indicated by the numeral 38, being under control of a key or lever on the adding machine. The roll 17, upon which the sheet 10 is wound, is journalled in a suitable bearing 27 and adapted to be driven by a small pulley 28 on the end of an axial shaft in said roller. This pulley 28 is in turn driven by frictional engagement with a roller 29 on a drive shaft 30.

Fixed on the shaft 30 between the prongs of a fork 31 is a flanged pulley 32, arranged to be driven by a motor actuated belt 33 (Figs. 5 and 6). The lower end of the fork 31 is attached to the core 34 of a solenoid 35, and a spring 36 is normally arranged to maintain the small pulley 29 in engagement with the periphery of the pulley 28. An electrical circuit for operating the solenoid 35 includes a battery 37, the switch 38, a wire 39, connecting the solenoid in circuit with the wheel 19, and wire 40 connecting the other side of solenoid circuit in series with the battery 37, switch 38 and bar 16. The wire 40 may be secured at one end to a binding post 41 in connection with the bar 16, and the wire 39 is adapted to connect with a terminal 42, connecting with the wheel 19 through the rod 20. This rod 20 is insulated from the frame 18 so that the circuit between the wheel 19 and bar 16 is closed only when the periphery of said wheel is in contact with the bar 16 through one of the perforations in the sheet 10. A link 43, operatively connected with a switch 38, is adapted to be secured to the adding lever of an adding machine, in such a manner that the switch 38 is opened when the adding lever is actuated.

Operation

In operation, the items of one class, or those corresponding to the perforations in a single vertical column, are added during each passage of the sheet 10 through the machine. To select any desired class of entries, the crank 22 may be operated to move the indicator 24 to the corresponding column of perforations in the margin of the sheet 10. Now the motor operating the roll 17, may be started, thereby winding the sheet 10 upon said roll. As will be readily understood, operation of the motor drives the belt 33, causes the pulley 32 to rotate, together with the frictional wheel 29 and pulley 28, and turns the roll 17. This roll continues to rotate until the circuit through the solenoid 35 is closed, as is the case when a perforation in the sheet 10 passes between the wheel 19 and bar 16. When the circuit which includes the wires 39 and 40 is thus closed, current is caused to flow through the solenoid 35 thereby to draw the plunger or core 34 therein downward against the action of the spring 36. This withdraws the wheel 29 from engagement with the pulley 28 to stop the sheet in such a position that the item corresponding to said perforation is displayed in the window 26.

The item thus displayed may now be entered upon the adding machine, and when the adding lever of said machine is depressed, the switch 38 will be operated to open the circuit to the solenoid 35. The spring 36 now raises the plunger 34 and brings the drive wheel 29 in engagement with the periphery of the pulley 28 on the roll 17. Thus, the sheet 10 is wound upon said roll until the next perforation in the same vertical column passes between the wheel 19 and bar 16, when the above described operation is repeated. When all the items in one class have been entered on the adding machine, the rolls 14 and 17 may be rotated in the reverse direction, and the crank 22 operated to select another class or column o

perforations upon the sheet 10. In the foregoing manner, column after column of the classified items may be quickly and accurately added. Obviously, my invention can be used in conjunction with a typewriter instead of an adding machine, as described above, where it is merely required to list the items separately in the several classes.

The device illustrated and described above is capable of allocating items of ten different classes, but it will be understood that the number of classes may be increased by suitable modifications of the device shown. Thus, two perforations might be made in a check sheet for each class of items to be entered, the horizontal spacing, as well as the position of the perforations of each pair being utilized to differentiate between the several classes. Where two holes are made for each entry on the check sheet, two wheels like the wheel 19 might be provided in the classifying machine, each adjustable transverse the sheet, independently of the other and arranged in series in the circuit through the solenoid 35. Thus, the circuit through the several wheels 19 and bar 16 could be arranged so that the current would pass through one of the wheels 19, then through the bar 16, then the other wheel 19 in series. By this arrangement, ten punch dies in the perforating device 7 could be arranged in two groups, so that twenty-five distinct classifications could be noted by pairs of perforations.

A still further application of the principles of my classifying machine involves photographing the items through a window like the window 26. With such recording means, it would be unnecessary to stop movement of the sheet 10 and the shutter of the photographing apparatus could be controlled by an electro-magnet circuit, like that shown, the circuit being closed through the perforations in the sheet 10.

Another embodiment of my invention is to employ a printing device instead of the punching machine, described above. The ink used in the printing device would be of a metallic composition, capable of penetrating into the paper and rendering the portion to which it is applied conductive to electric currents, the locations of the ink pots corresponding to those of the perforations described above. In this embodiment of the invention, the circuit would be closed through the several ink spots as the same pass between the support 16 and disc 19 of the classifying machine.

It is also to be understood that the broad principles of my classifying machine might be utilized in a device which did not depend upon electrical circuits for controlling the operation of the continuous check sheet 10. With such a machine, the wheel 19 might be utilized to drive frictionally the sheet 10 by suitable connection with an electric motor like the motor for driving the roll 17. In the operation of this form of machine, as long as there was paper between the bar 16 and wheel 19, the check sheet would be moved forward. However, when a hole in the sheet passed beneath the wheel 19, said wheel would turn directly in engagement with the bar 16 through the hole and would not actuate the paper. Thus, the check sheet would be allowed to stop. A window attachment in a position similar, relative to the hole, to that above described in the preferred form, could be provided to reveal the item which was entered when each hole was punched. The "adding" key of the adding machine may be connected with the classifying device in such a manner that when said key is depressed, it causes a small forward movement of the check sheet. This may be accomplished electrically or mechanically by means of a small, continuously rotating disc, which is normally not in contact with the check sheet but has contact only when the adding machine key is depressed, or when other controlling means are operated. When said key is depressed, the check sheet will be started past the hole through which the driving disc is rotating, and the travel of the sheet will be resumed as described above.

As a further modification of the invention, an air control device, similar to that employed in piano players, could be applied, using air pressure or suction to actuate the stopping and starting mechanism for the check sheet having perforations therein, the restarting being controlled by the connection with the adding machine key or other control lever.

While I have described my invention, as applied to classifying records relating to sales, it is to be understood that I do not wish to limit myself to such use, and the invention is obviously adapted for use wherever entries must be classified and grouped in separate lists or additions of the entries relating to the several classes. Thus, the invention is adapted for universal use in the classification of items which are grouped in one arrangement and either addition or different grouping is required.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

1. The combination with a check sheet having noted thereon indiscriminately mixed items to be classified, said sheet being formed with perforations adapted to indicate by their relative positions the class of each item, and the perforations indicating the several classes being disposed in vertical columns, of a roll adapted to be operated to wind said sheet thereon, an element arranged to engage a surface of said sheet during its passage to said roll and to extend into said perforations, means for moving said element transversely

of the columns of perforations to thereby permit selection of the columns thereof and means under control of said element, adapted to stop the movement of said sheet when said element enters a perforation.

2. The combination with a sheet having noted thereon indiscriminately mixed items to be classified, said sheet being formed with perforations adapted to indicate by their relative positions the class of each item, and the perforations indicating the several classes being disposed in columns, of means adapted to move said sheet in a direction parallel to the columns of perforations, an element arranged to engage a surface of said sheet during the movement of said sheet, said element being adapted to extend into said perforations, means for moving said element transversely of the columns of perforations to thereby permit selection of the columns thereof, means under control of said element for stopping the movement of said sheet when said element enters a perforation and means for displaying the item corresponding to a perforation into which said element has entered to thereby permit successive recording of the items on said sheet corresponding to the several perforations into which said element projects.

3. In mechanism for separating into classes indiscriminately mixed items disposed in a column on a sheet, a series of punch dies arranged to perforate said sheet in columns parallel to said column of items, keys adapted to severally actuate said dies and arranged to be manipulated to indicate the class of each item on said sheet by the relatively horizontal spacing of the corresponding perforations, means for moving said sheet longitudinally of the column of perforations, selecting means movable transversely of said columns of perforations, an element of said selecting means arranged to successively register with the perforations of a column, means under control of said element for stopping movement of said sheet upon the registration of said element with a perforation and means for indicating the item on said sheet corresponding to a perforation in registration with said element when movement of the sheet is stopped.

4. In mechanism for separating into classes indiscriminately mixed items disposed in a column on a sheet, a series of punch dies arranged to perforate said sheet in columns parallel to said column of items, keys adapted to severally actuate said dies and arranged to be manipulated to indicate the class of each item on said sheet by the relatively horizontal spacing of the corresponding perforations, electrically controlled means for moving said sheet longitudinally of the columns of perforations, selecting means movably transversely of said columns of perforations, a contact element carried by said selecting means and arranged to successively register with the perforations of a column, an electric circuit under control of said contact element for stopping movement of said sheet upon registration of said element with a perforation and means for indicating the item on said sheet corresponding to a perforation in registration with said element when movement of the sheet is stopped.

5. An indicating machine, to select data of a single classification from tabulated data of miscellaneous classifications, having a controlling sheet therefor with longitudinal zones, each zone in said sheet representing a predetermined classification, said sheet having a plurality of machine-controlling elements in each zone, one element for each item of tabulated data, and an additional longitudinal zone in which said data is tabulated, exclusive of said zones having the elements, feeding means for said sheet, an automatic sheet-arresting means responsive severally to said elements in any selected zone, reading means effective to indicate on the arrested sheet the item of data appearing thereon corresponding to the element to which said sheet-arresting means responds, and means for restarting the sheet.

6. An indicating machine, to select data of a single classification from tabulated data of a plurality of classifications, including a controlling sheet therefor having two longitudinal sections, one section having a plurality of longitudinal zones, one zone for each classification, a plurality of machine-controlling elements in each of said zones, one element for each item of tabulated data, the second section having said tabulated data typed therein, means for feeding the sheet through the machine, an automatic means responsive severally to said elements in any one zone to stop the movement of said sheet, an indicating device positioned with reference to the location of the tabulated data on said sheet to display to the operator the selected data corresponding to the element causing the sheet to stop feeding, and means under the control of the operator to restart the machine.

7. An indicating machine including a traveling sheet for controlling the same, having a plurality of longitudinal and lateral zones, the latter having tabulated indiscriminately-mixed classifications of typed data therein, one item in each zone, a paper-feed-controlling element also in each lateral zone located therein to one side of said typed items and positioned laterally according to the classification of its respective item, each longitudinal zone including all of said elements of the same class, means for feeding the sheet through the machine, a presettable device to select the zone of elements, controlling the feed of the paper, to give the desired data of a single class, means responsive severally to said selected elements to stop the move-

ment of the sheet, an indicating device located in juxtaposition with said presettable device effective, when the sheet is stopped, to display the typed item of data corresponding to the element causing the sheet to stop, and means for restarting the machine.

8. An indicating machine having a sheet typed along one side of the front of the sheet with indiscriminately-mixed items to be classified, said sheet having perforations in the other side of the front of the sheet, in several vertical columns, to indicate by their positions the class of each respective item, all perforations indicating the same class being in the same vertical column, feeding mechanism to move said sheet through the machine, a device controlled severally by said perforations in the sheet, effective to stop the feed of said sheet when the perforations arrive at a predetermined position in the machine, selecting means to determine the vertical column in which said device is to operate, means associated with the typed side of the sheet to indicate the item on said sheet, when stopped, corresponding to the perforation causing the sheet to stop, and means to restart the machine.

9. A mechanism for separating into classes indiscriminately-mixed items, including a controlling sheet having tabulated on one portion thereof in a vertical zone said mixed items to be classified, said sheet having another portion of the same perforated to indicate the classification of each item, one perforation for each item and all perforations of the same class in the same vertical column, a punching device to make said perforations, a device to feed said sheet through the machine, an arresting means to stop the movement of said sheet in response severally to the perforations, means to restart the sheet moving, and an indicating device to display the item on the arrested sheet corresponding to the perforation to which said arresting means responded.

10. An indicating machine including a controlling sheet having noted in a longitudinal zone therein indiscriminately-mixed items to be classified, said sheet having perforations therein outside of said zone indicating by their lateral position the class of each item, all perforations of the same class being in the same vertical column, mechanism effective to feed the sheet through the machine, a device controlled severally by the perforations to make said mechanism ineffective and thereby stop the sheet moving, means to select the column of perforations to which the device is to respond, and means to restart the mechanism.

11. An indicating machine including a controlling sheet having noted in a longitudinal zone therein indiscriminately-mixed items to be classified, said sheet having perforations therein outside of said zone indicating by their position the class of each item, all perforations of the same class being in the same vertical column, mechanism effective to feed the sheet through the machine, a device controlled severally by the perforations to make said mechanism ineffective and thereby stop the sheet moving, means to select the column of perforations to which the device is to respond, an indicating device to display the item on said sheet corresponding to the perforation therein which caused the mechanism to stop, and means to restart the mechanism.

12. A mechanism for separating into classes indiscriminately-mixed items, including a controlling sheet having tabulated on one portion thereof in a vertical zone said mixed items to be classified, said sheet having another portion of the same perforated to indicate the classification of each item and select the items of any given class, one perforation for each item and all perforations of the same class in the same vertical column, a punching device, including a multiple die and a plurality of punches therefor, means for severally operating the punches to make said perforations, a device to feed said sheet through the machine, including a spool upon which the sheet may be wound, a continuously-moving driver engaged therewith, normally tending to drive the same, an arresting means to stop the movement of said sheet in response severally to the perforations, including an electric solenoid to disengage the spool from the driver, means to restart the sheet moving, and an indicating device to display the items on the arrested sheet selected by said perforations.

13. A mechanism for separating into classes indiscriminately-mixed items, including a controlling sheet having tabulated on one portion thereof in a vertical zone said mixed items to be classified, said sheet having another portion of the same perforated to indicate the classification of each item and select the items of a given class, one perforation for each item and all perforations of the same class in the same vertical column, a punching device, including a multiple die positioned to overhang the side of said sheet to be perforated and a plurality of manually-operable punches therefor to make said perforations, an electrically controlled device to feed said sheet through the machine, a solenoid-actuated arresting means to stop the movement of said sheet in response severally to a certain group of said perforations by closing the solenoid-circuit, an electric switch to restart the sheet moving by opening the solenoid-circuit, and an indicating device to display the items on the arrested sheet selected by said perforations.

14. In mechanism for separating into single classes miscellaneous items of a plurality of classes, a strip having said items tabulated thereon near one edge, each item hav-

ing a perforation in lateral alignment therewith near the opposite edge of said sheet, positioned in one of a plurality of vertical columns according to the class of said item, punching instrumentalities to form said perforations in their respective columns, an electrically controlled device to advance the perforated strip through the mechanism, means to arrest the advance of the strip, including electric contacts operably responsive severally to said perforations, effective to disconnect the strip from engagement with the driving device, and a key, actuable by the operator, to restart the movement of the strip.

15. In mechanism for separating into single classes miscellaneous items of a plurality of classes, a strip having said items tabulated thereon near one edge, each item having a perforation in lateral alignment therewith near the opposite edge of said strip, positioned in one of a plurality of vertical columns according to the class of said item, punching instrumentalities overhanging the edge of the strip to form said perforations in their respective columns, an electrically controlled device to feed the perforated strip through the mechanism, means to arrest the feed of the strip, including electric contacts responsive severally to said perforations, effective to disengage the strip from said feeding device, means to connect the contacts to respond to the perforations in any selected column to which said arresting means is to respond, and a key, actuable by the operator, to restart the movement of the strip.

16. In mechanism for separating into single classes miscellaneous items of a plurality of classes, a strip having said items tabulated indiscriminately near one edge thereof, said items having perforations in lateral alignment therewith near the opposite edge of said strip, positioned in vertical columns according to the classes of said items, punching instrumentalities effective to form said perforations in their respective columns, an electrically controlled driving device to advance the perforated strip through the mechanism, means to arrest the advance of the strip, including an electric switch responsive severally to said perforations and effective to disengage the strip from said driving device and stop the movement of the strip, means to connect the switch to respond to the perforations of any selected column, indicating means to display the item, corresponding to the perforation causing the strip to stop moving, and means under the control of the operator to restart the movement of the strip.

17. A machine for classifying miscellaneous items having a strip with said items tabulated indiscriminately on one side of a longitudinal lineal position thereon, including an indicating device to display the items on the strip, perforating instrumentalities overhanging the strip having a plurality of punches, one punch for each class, arranged in alignment and perpendicular with the edge of the strip, manually-operable means to select the punches corresponding to the respective classes and perforate the strip for each item on the opposite side of said lineal position from the tabulated items, a feeding device to advance the strip, means to arrest the feed of the strip in response severally to said perforations, to display at said indicating device the item on the strip corresponding to the feed-arresting perforation, and means to restart the strip.

18. A machine for classifying miscellaneous items having a strip with said items tabulated indiscriminately on one side of a longitudinal lineal position thereon, including an indicating device to display the items on the strip, perforating instrumentalities overhanging the strip having a plurality of punches, one punch for each class, arranged in alignment and perpendicular with the edge of the strip, manually-operable means to select the punches corresponding to the respective classes and perforate the strip for each item on the opposite side of said lineal position from the tabulated items, a feeding device to advance the strip, means to arrest the feed of the strip in response severally to said perforations, a device to select the perforations, of a given class, to control the arresting means, to display at said indicating device the item on the strip corresponding to the feed-arresting perforation, and means to restart the strip.

In testimony whereof, I have hereunto signed my name to this specification.

WILLIAM C. KOCH.