Feb. 19, 1924. 1,484,137

E. M. LA BOITEAUX

SORTING MACHINE

Filed Feb. 3, 1923 4 Sheets-Sheet 1

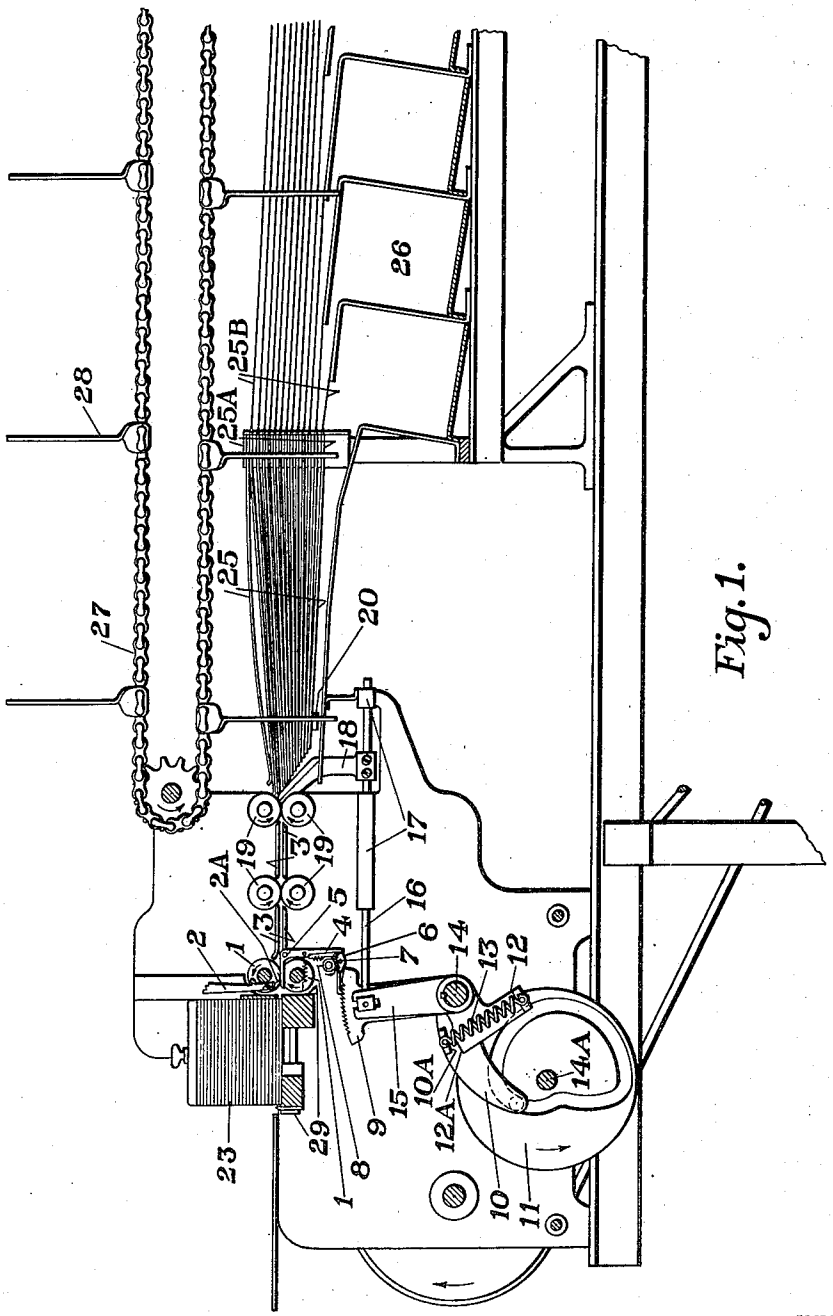


Fig. 1.

Witnesses:
E. A. Nelson, Jr.
J. C. Noel

INVENTOR.
E. M. La Boiteaux

BY

ATTORNEYS.

Feb. 19, 1924. 1,484,137

E. M. LA BOITEAUX

SORTING MACHINE

Filed Feb. 3, 1923 4 Sheets-Sheet 2

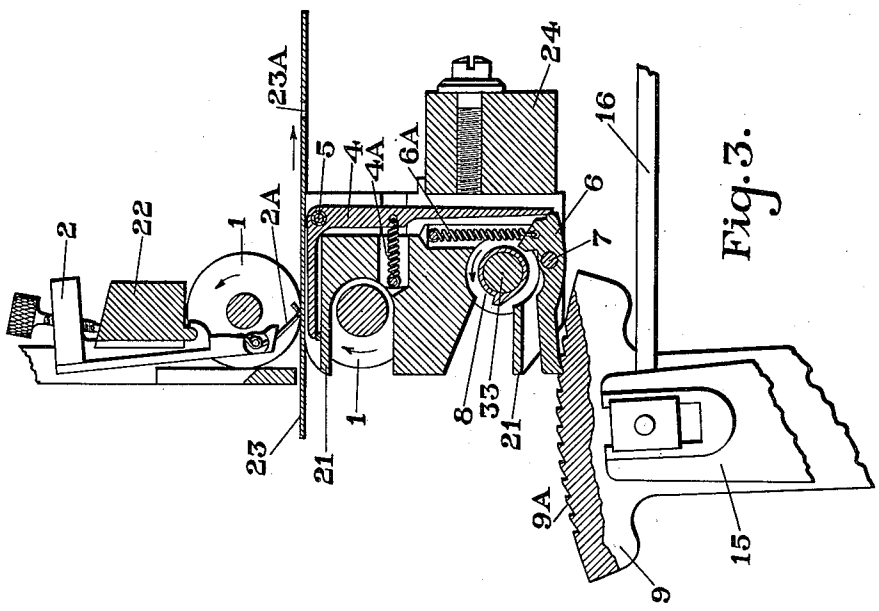


Fig. 3.

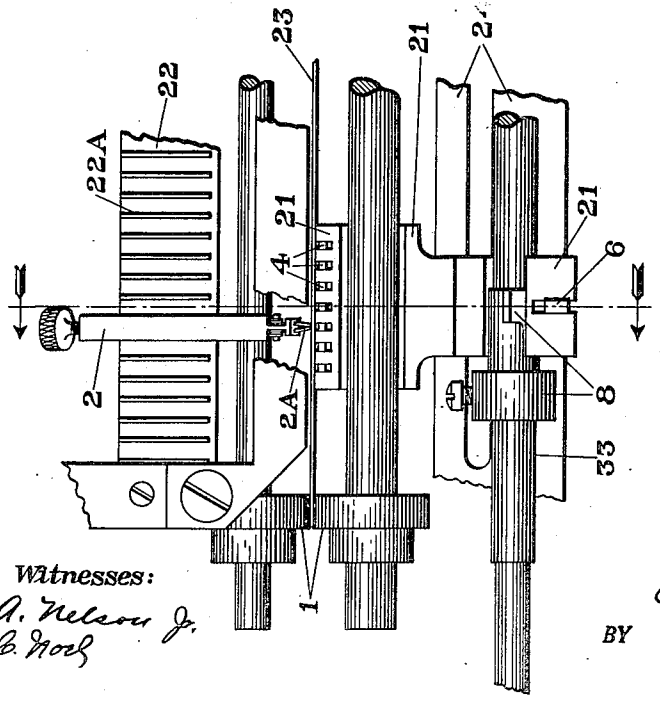


Fig. 2.

Witnesses:
E. A. Nelson Jr.
J. C. Noll

INVENTOR.
E. M. La Boiteaux

BY

ATTORNEYS.

Feb. 19, 1924. 1,484,137

E. M. LA BOITEAUX

SORTING MACHINE

Filed Feb. 3, 1923 4 Sheets-Sheet 3

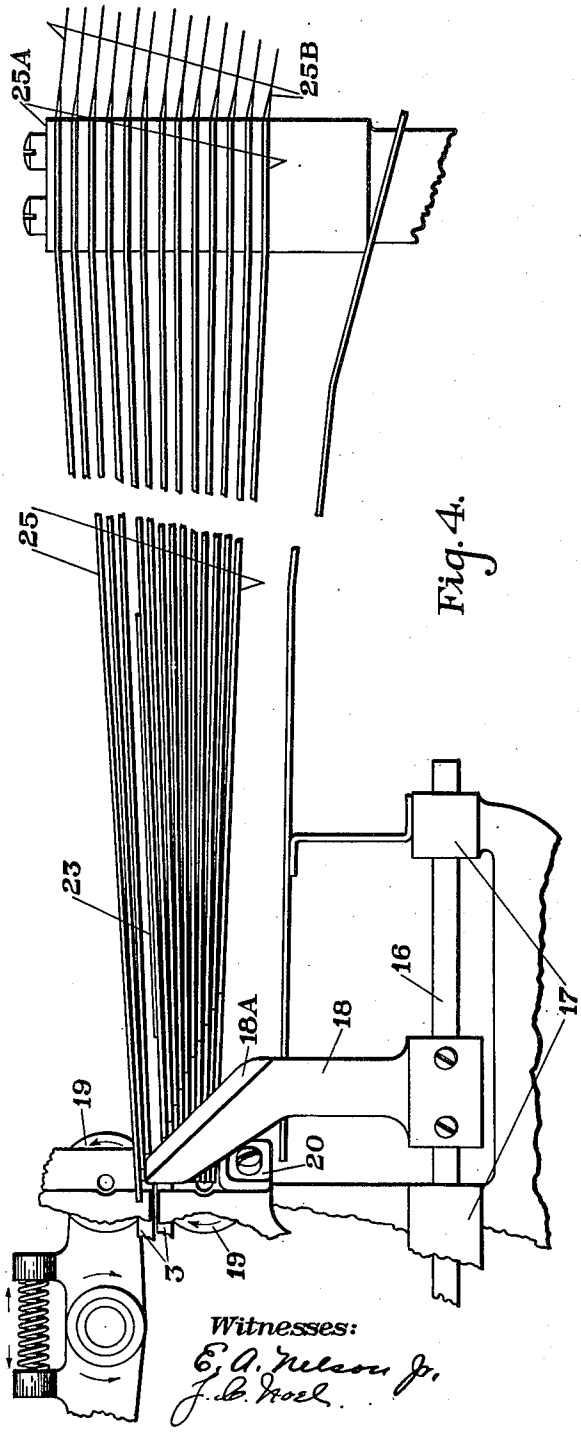


Fig. 4.

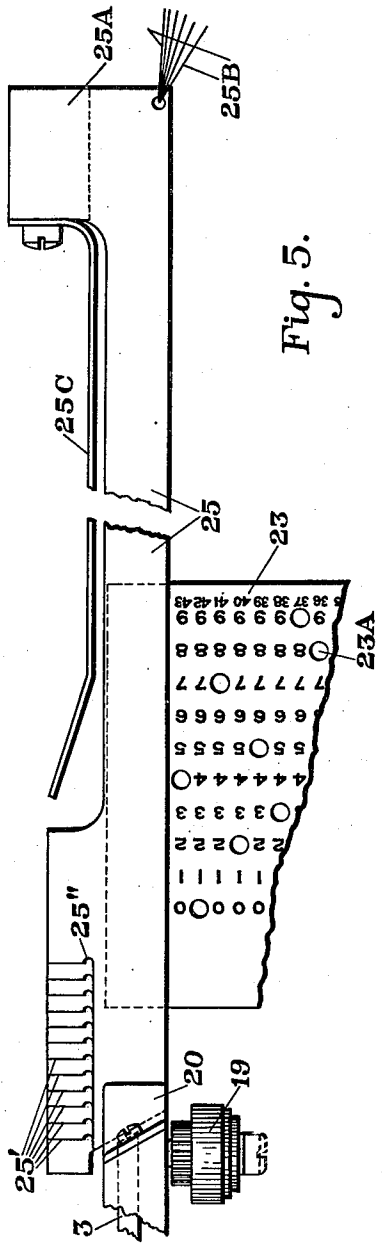


Fig. 5.

Witnesses:
E. A. Nelson Jr.
J. L. Noel

INVENTOR.
E. M. La Boiteaux

BY

ATTORNEYS.

Feb. 19, 1924. 1,484,137

E. M. LA BOITEAUX

SORTING MACHINE

Filed Feb. 3, 1923 4 Sheets-Sheet 4

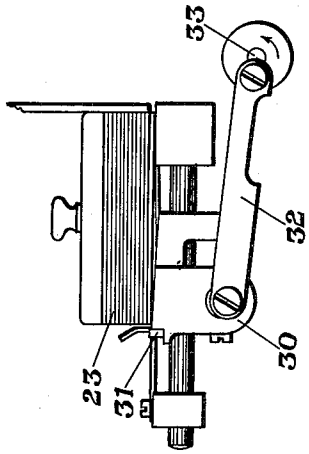


Fig. 7.

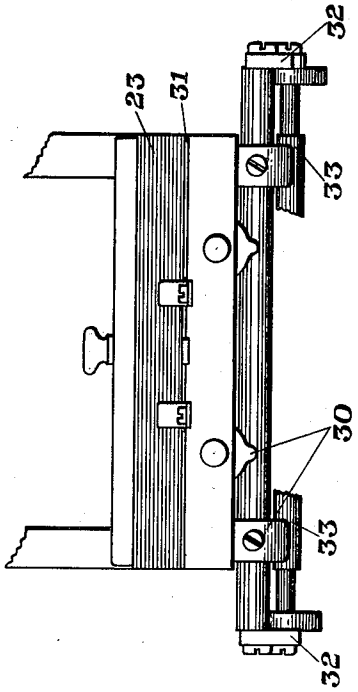


Fig. 6.

Witnesses:
J. C. Nock
M. R. Vollmer.

INVENTOR.
E. M. La Boiteaux
BY

ATTORNEYS.

Patented Feb. 19, 1924. 1,484,137

UNITED STATES PATENT OFFICE.

EUGENE M. LA BOITEAUX, OF WASHINGTON, DISTRICT OF COLUMBIA.

SORTING MACHINE.

Application filed February 3, 1923. Serial No. 616,784.

To all whom it may concern:

Be it known that I, EUGENE M. LA BOITEAUX, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Sorting Machines, of which the following is a specification.

This invention is a record classifying and sorting apparatus designed more particularly to sort or distribute records of that type which consist of separate cards having index points formed thereon or punched therein to denote the character or value of the items represented by the particular cards, although the invention is not limited in its operation to any particular system of record.

One of the purposes of the invention is to rapidly and accurately assort or classify a relatively large number of records and to deposit the records so sorted in appropriate compartments. Further objects of the invention are to provide, first, an improved form of feeding means conducting the record card successively from an initial point or stack to its appropriate guide chute or guide-way; second, to provide efficient means for indexing the record; third, to provide a direct chute or record-path control with minimum mechanism; fourth, to secure a definite and positive action of the free ends of the chute for the reception of the records, and fifth, to reduce the number and inertia of the moving parts to a minimum with an increased output and lessened maintenance. Other objects and advantages of the invention will appear from the detailed description.

Broadly said, the invention comprises record-feeding means associated with selective guide mechanism whereby the records or cards may be transmitted to appropriate receptacles by suitable conveying mechanism.

The operation of the apparatus is controlled by the record cards to be sorted. These cards or records may be fed from a stack of records rapidly and successively between contact elements which control selective mechanism whereby the records may be conveyed along a path, to be determined by the selective mechanism, to a compartment corresponding with the indication or classification of the record card. Should a record pass between the contact elements which is not provided with the appropriate indicating classification, it will be conveyed to an appropriate compartment representing discarded records.

To enable others to more fully understand the invention, I have illustrated an embodiment thereof in the accompanying drawings, in which—

Figure 1 is a vertical view through a part of a machine showing some of the compartments into which the records are distributed. It is understood that all rotating shafts carrying members of the machine, including feed rolls (the driving details of which are not shown) are suitably connected and driven by well known construction.

Figure 2 is a fragmental rear elevation of the main feed rolls and the indexing mechanism.

Figure 3 is a vertical section of the mechanism disclosed in Figure 2.

Figure 4 is a fragmental side elevation of a chute unit and its controlling cam, substantially identical units being provided at each side of the machine for controlling the entrance to any predetermined chute.

Figure 5 is a bottom plan of one of the two chute assemblies, the controlling cam being omitted in order to show clearly the variation in position of chute shoulders.

Figure 6 is an enlarged detailed view illustrating the card feed mechanism to feed the cards singly from the bottom of a stack.

Figure 7 is a view of the card feed mechanism as seen from the left of Figure 6.

Referring to Figure 2 of the drawings, the main feed rolls 1 are shown engaging with a record 23. One of the contact elements 2 is shown provided with detachable spring fingers 2^A, which fingers cooperate with another contact element shown as a trigger member 4 to control the selective guide mechanism to be hereinafter described. This contact element 2 may be adjustably mounted with relation to the class of records to be sorted by means of a series of slots 22^A in the index bar 22. It will be understood that this bar 22 is suitably supported by the side frames (not shown) of the machine. The records 23 are fed from a stack by any suitable means such as a hopper "slicing mechanism" shown at 29, and more particularly illustrated in Figure 6 of the drawings. The records are fed singly and successively from the bottom of the stack into contact with

the main feed rolls 1 by means of a reciprocating head 30 having a catch plate 31. Any suitable means may be employed to actuate the head 30, such as a link 32 extending from the shaft 33.

The compartment selective mechanism is shown more in detail in Figure 3. In this view, as in Figure 2, there is shown a slotted bar 24 which is rigidly supported by the side frame of the machine. Upon the bar 24 is slidably mounted a block or housing 21 (Figs. 2 and 3) in which is pivoted an L-shaped lever or trigger 4. This trigger is shown provided with a plurality of horizontal limbs and with a vertical limb. A dog 6, which is shown pivoted at 7, may be provided with a latching shoulder to be engaged and controlled by the vertical limb of the trigger 4. The dog may be provided with a spring 6^A to hold the dog into engagement with a ratchet 9^A for a predetermined period until the dog is reset by the revolvable cam 8. It is obvious that any desired ratio between the horizontal and vertical limbs of the trigger 4 may be adopted according to circumstances, and that the trigger 4 and the dog 6 may be differently formed or arranged than the form and arrangement disclosed in the accompanying drawings.

The ratchet segment 9 (shown in Figures 1 and 3) may be slidably mounted on the shaft 14, and it is preferably splined thereto with no lost motion. This segment arm may be provided with means for locking it into position as determined by the varying location of the housing 21. If desired, a plurality of ratchet segments (not shown) mounted upon individual or common arms may be provided according to the requirements.

Arms 10 and 12 are shown mounted upon shaft 14, and a cam 11 is shown mounted upon shaft 14^A. If desired, the arms and cam may be mounted on the outside of the main frame of the machine, but in Figure 1 they are shown occupying a position between the side frames merely to more clearly illustrate their relative positions and functions. Arm 12 is preferably rigidly secured to the end of shaft 14, and cam arm 10 may also be mounted on shaft 14 and adjacent to arm 12, as illustrated. The cam arm 10 is free to oscillate on the shaft 14 and to permit the end of the arm to follow the contour of the groove on the cam 11. The rotation of the cam causes shaft 14 and the members mounted thereon to oscillate through an angular extent predetermined by the index position indicated or perforated in the record, it being understood that the arm 12 is limited also in its movement by arm stops 10^A and 12^A, and by the extension spring 13. Shaft 14 also carries arm 15 which may be rigidly attached to the shaft and mounted closely adjacent to the inner face of each side frame. These arms 15 operate a reciprocating member which serves as a guideway-actuating device and is more clearly shown in Figures 1 and 4 as a chute cam 18 connected to the arm 15 by the sliding rod 16. The rod 16 may be guided in its slidable movements by a guide such as shown at 17.

Referring more particularly to Figures 1 and 4, there is shown a plurality of chute units 25 which may be composed of resilient material such for example as spring steel. The stationary ends of the individual members of the chute units are preferably separated the required distance to permit free passage of the records between them, although the stationary ends are firmly anchored as at 25^A. From the anchorage position suitable conducting members, which may be in the form of steel wires 25, lead from each individual chute of the unit to a respective compartment 26 for each individual chute.

The free ends of the individual chutes have an initial "set" downwards (see Figs. 1 and 4) and when not in contact with the face of the cam 18 are limited in their downward movement by stops 20, the stop being preferably positioned adjacent to the feed rolls 19.

By reference to Figure 5 of the drawings it will be seen that the free ends of the chute units 25 are provided with projecting shoulders 25′ on their outer edges, the shoulders being variously arranged with relation to each other, so that they may be successively engaged by the inclined face 18^A of the cam member 18 during the oscillation of the cam member with relation to the chute units. If desired, the shoulders 25′ may be provided with clearance notches 25″ to isolate the shoulders from the balance of the chute end and thereby prevent undue wear or interference with the operation of the cam 18. The location or spacing of the aforesaid shoulders 25′ as a group or unit is such that when taken in conjunction with the angle 18^A or face of the cam 18 and the movement thereof, will produce the least movement of the chutes as a whole and a maximum opening at the extreme ends of the chutes for the reception of records. In Figure 1 the free ends of the chutes are shown cut off squarely at the shoulders in order to emphasize this detail of construction, though in a practical embodiment of the invention the chutes 25′ are extended as shown in Figure 4.

In Figures 4 and 5, as in actual practice, the over-all lengths of all active members comprising the chute units are preferably identical in order that the working clearance between the ends of the guides 3 formed in each side frame of the machine

and the free or vibrating ends of all chutes shall be the minimum. Cooperating with the chutes 25, the conducting elements or wires 25^B and the series of compartments indicated at 26 is an endless conveyor of any desired type, but which is shown in the drawings as an endless chain conveyor 27 having a plurality of extended arms 28 designed to engage the record upon its discharge from the feed rolls 19 and to conduct the record through the guideway chutes 25 and the guideways 25^B to the respective compartments 26.

The progress of a punch record through the machine will now be described. A record, such as a record card indicated at 23 in Figure 5 of the drawings, having been projected from the record feeding mechanism 29, is passed from the hopper or stack into contact with the main feed rolls 1, where it is also brought into contact with the spring finger or contacting element 2. Below this spring finger 2 is the housing 21 carrying the trigger 4, so that the record 23 in reality passes between the spring finger contact member 2 and the trigger contact member 4. A cam 8 forming a part of the selective guideway mechanism and shown more particularly in Figure 3, is so timed as to have performed its function of resetting the pivoted dog 6 immediately following the lifting of a spring finger 2 by the forward edge of the advancing record 23. The cam 11 (Fig. 1) is also timed to cause the ratchet segment 9 to begin its forward movement in synchronism with the lineal advance of the record, the series of teeth forming the ratchet lagging slightly behind their corresponding index positions on the record. Assuming that the record is a card having perforations 23^A occurring at any predetermined position thereon, such card being projected into the path of the aforesaid spring finger 2, will permit the finger to strike or impinge upon the trigger 4 and thereby release dog 6 which engages a tooth of the ratchet segment 9 corresponding with the index position of the perforations 23^A in the record, said dog thereby arresting any further forward movement of the ratchet segment and the integral parts thereof.

The chute cams 18 are advanced and arrested by the same agencies just described in connection with the ratchet segment 9. The shoulders 25′ of the chute units 25 are adapted, as previously explained, to contact with the angular face 18^A of the cams 18 to cause the chute ends to take a position to form an opening between a plurality of the chute unit members which opening will be in alinement with the guides 3 of the feeding mechanism. There will be provided thereby a free entrance for the record 23 between a plurality of the chute units and as the record 23 is fed at accelerated speed by the rolls 19 it will be projected sufficiently far into the passage between these units that it may be engaged by the arms 28 of the conveyor and thence conducted to its respective compartment 26 representing the index point on the record.

Although the detailed description of the invention has recited that the device is used particularly in connection with record cards having index points punched thereon, it is obvious that the principles of the invention may be employed in the sorting and distribution of records which may not be known in the trade as record cards. It will be understood also that the device contemplates the provision of a series of compartments 26 which may represent a series of items indicated by index numbers upon the record 23, and that the record, such as a record card, in passing through the feeding mechanism will be conducted by means of the cooperation of the feed mechanism and selective compartment mechanism to distribute the card through the guideway system to the particular compartment representing the particular index point on a particular card.

I claim as my invention:

1. An apparatus for sorting records having a plurality of compartments provided with guideways leading thereto, record-feeding mechanism including a record engaging finger to actuate a trigger, compartment-selective mechanism controlled by the cooperative action of said finger and trigger of the feeding mechanism for directing a record to a predetermined compartment, and conveying means for the selected and directed records.

2. An apparatus for sorting records provided with a series of compartments having guideways leading thereto, record-feeding mechanism including a record engaging finger to actuate a pivoted trigger, and a guideway actuating device controlled by the cooperation of the finger and trigger of the feeding mechanism with an indexed record passing through the feeding mechanism to direct a record through a predetermined guideway to a compartment represented by an index point on the record.

3. An apparatus for sorting records provided with a record feeding mechanism having means to feed records separately and successively and having means also to cooperate with index points on the records and with trigger mechanism, said index-point-cooperating means actuating the trigger mechanism to open respective passageways in the selective guide mechanism to direct the records from the feeding mechanism to respective compartments represented by the index point on the records.

4. An apparatus for sorting records comprising a record feeding mechanism which

controls selective guideway mechanism by means of a controlling trigger of the feeding mechanism, the trigger being actuated by means of the index point on the record, whereby records may be transferred from the feeding mechanism to respective compartments represented by the index points on the records.

5. In an apparatus for sorting record cards including conveying mechanism and record card feeding mechanism, means to transfer record cards from a feeding position to respective compartments represented by the index points on the record cards, such means comprising a compartment selective mechanism to control guideways leading to various compartments, and a contact device comprising a finger to cooperate with the index point on a card and trigger mechanism for actuating the compartment selective mechanism to direct the record card into its designated guideway and compartment.

6. In an apparatus for sorting records, including conveying mechanism and record feeding mechanism, means to transfer records from a feeding position to respective compartments represented by the index point on the record, such means comprising a contact device adapted to be variously positioned to cooperate with various groups of index points on the record and trigger mechanism controlled by the contact device, and a compartment selective mechanism to control guideways leading to various compartments representing various index points on the record cards, the contact device and its trigger mechanism controlling instrumentalities of the compartment selective mechanism to direct the records singly to their respective compartments.

7. In an apparatus for sorting records, including conveying mechanism and a plurality of compartments to receive index records, means to feed records to the various compartments represented by the particular index matter on the respective records, said means comprising feeding mechanism and compartment selective mechanism, the feeding mechanism having a contact element adapted when in contact with an index point on a record to actuate trigger mechanism and thereby control the compartment selective mechanism to temporarily arrest the movement of guideway control members of the selective mechanism while the record card is fed into a guideway determinable by the index point of the record card.

8. In an apparatus for sorting records including conveying mechanism and a plurality of compartments to receive index records, means to conduct records to the various compartments represented by particular index matter on the respective records, said means comprising feeding mechanism and compartment selective mechanism, the feeding mechanism having a readily replaceable contact finger adapted to operate, when engaging the index point of a record a trigger mechanism of the compartment selective mechanism for controlling instrumentalities to direct the record to the particular compartment indicated by the index on the record.

9. In an apparatus for sorting records including conveying mechanism and a plurality of compartments to receive index records, means to convey records to the various compartments represented by the particular index matter on the respective records, said means comprising feeding mechanism and compartment selective mechanism, the feeding mechanism having a resilient finger to cooperate with the index point of a record and engage a trigger element of the compartment selective mechanism to thereby arrest the movement of the guideway selective elements of the mechanism for a period sufficient to enable the particular record causing the suspension of movement to be directed into a guideway to correspond with its index point and to be thereafter conveyed to a compartment determinable by the record index point.

10. An apparatus for sorting records such as record cards comprising conveying mechanism, a plurality of compartments, compartment selective mechanism and record feeding mechanism, the selective mechanism having a reciprocating member to successively engage a plurality of guideways, and means operable by the passage of a record between cooperating elements of the compartment selective mechanism and a record feeding mechanism to cause the reciprocating member to open a predetermined guideway for the passage therein of the record.

11. An apparatus for sorting records such as record cards having an index point thereon, comprising conveying mechanism, guideways for the records, guideway selective mechanism and record feeding mechanism, the selective mechanism having a reciprocating cam member to successively engage guideway members to permit the passage of a record through a particular guideway corresponding to the index point carried by the record, the controlling means being effected through the engagement of a contact element of the feeding mechanism with an index point of a record and with a trigger element of the selective mechanism to arrest the action of the cam member whereby the particular guideway for the particular record will be maintained in a receiving position until the record shall have passed beyond the control of the feeding mechanism.

12. An apparatus for sorting records such as record cards having an index point thereon comprising conveying mechanism, guide-

ways for the records, guideway selective mechanism, and record feeding mechanism, the selective mechanism having a cam member which successively engages chute units of the guideway to control the passage of a record through a particular guideway corresponding to the index point carried by the record, the controlling means being effected through the cooperation of a contact finger of the feeding mechanism with a trigger element of the selective mechanism to temporarily arrest the movement of the guideway selective means, and means to reset the trigger element prior to the entry of the next record into the feeding mechanism.

13. An apparatus for sorting records such as record cards having an index point thereon comprising conveying mechanism, guideways for the records, guideway selective mechanism, and record feeding mechanism, the selective mechanism having a plurality of chute units provided with variously positioned actuating sections, a reciprocating member to engage the actuating sections of the chute units to successively open passageways forming a part of the various guideways, and means controllable by the passage of a record between a contact element of the feeding mechanism and a cooperating mechanism to arrest the movement of the reciprocating member to thereby maintain in its opened position a passageway leading to a guideway.

14. An apparatus for sorting cards such as record cards having an index point thereon comprising conveying mechanism, guideways for the records, guideway selective mechanism, and record feeding mechanism, the selective mechanism having a plurality of movable chute units provided with shoulders to be successively engaged by a reciprocating member in the form of a chute cam, the position of the reciprocating member being controlled by cooperation with card feeding mechanism and the selective mechanism when a record passes between contact elements of said mechanisms to suspend the selective action of the reciprocating member, and means to reset the elements of the selective mechanism to engage the succeeding record.

15. An apparatus for sorting records such as record cards having an index point thereon comprising guideways for the records having ample chute units, a reciprocating chute cam to successively provide a passageway between a plurality of said chute units, the chute cam being pivotally connected with the sector, means controllable by the passage of a record through the feeding mechanism to restrain the sector and its chute cam from movement in one direction and to thereby open a passageway between a plurality of chute units, and means to release the sector and permit of reciprocation of the chute cam prior to the passage of a successive record through the feeding mechanism.

16. An apparatus for sorting records such as record cards having an index point thereon comprising conveying mechanism cooperating with guideways leading to compartments, record feeding mechanism having a resilient finger to engage controlling trigger mechanism upon the passage through the feeding mechanism of an indexed record and to thereby actuate selective guideway mechanism said trigger mechanism controlling, means to temporarily arrest the movement of cams of the selective guideway mechanism to thereby open a passage way through a predetermined guideway to a predetermined compartment, and continuous record feed instrumentalities cooperating with the feeding mechanism and the selective guideway mechanism to feed the records singly and successively and to restore movement to the selective mechanism.

17. In an apparatus for sorting records, a plurality of chutes forming a guideway for records, a reciprocating chute cam to successively provide a passage way between a plurality of said chute units, a segment connected with said chute cam and mounted on a shaft, a revoluble cam having an arm connecting said cam with the segment shaft to impart reciprocating movement to the segment, and means operable by record feeding mechanism upon the passage of an index record through the feeding mechanism for arresting the movement of the segment and its chute cam to provide a passageway in said guideway corresponding to the particular index of a record.

EUGENE M. LA BOITEAUX.