

June 14, 1949.

E. A. FORD

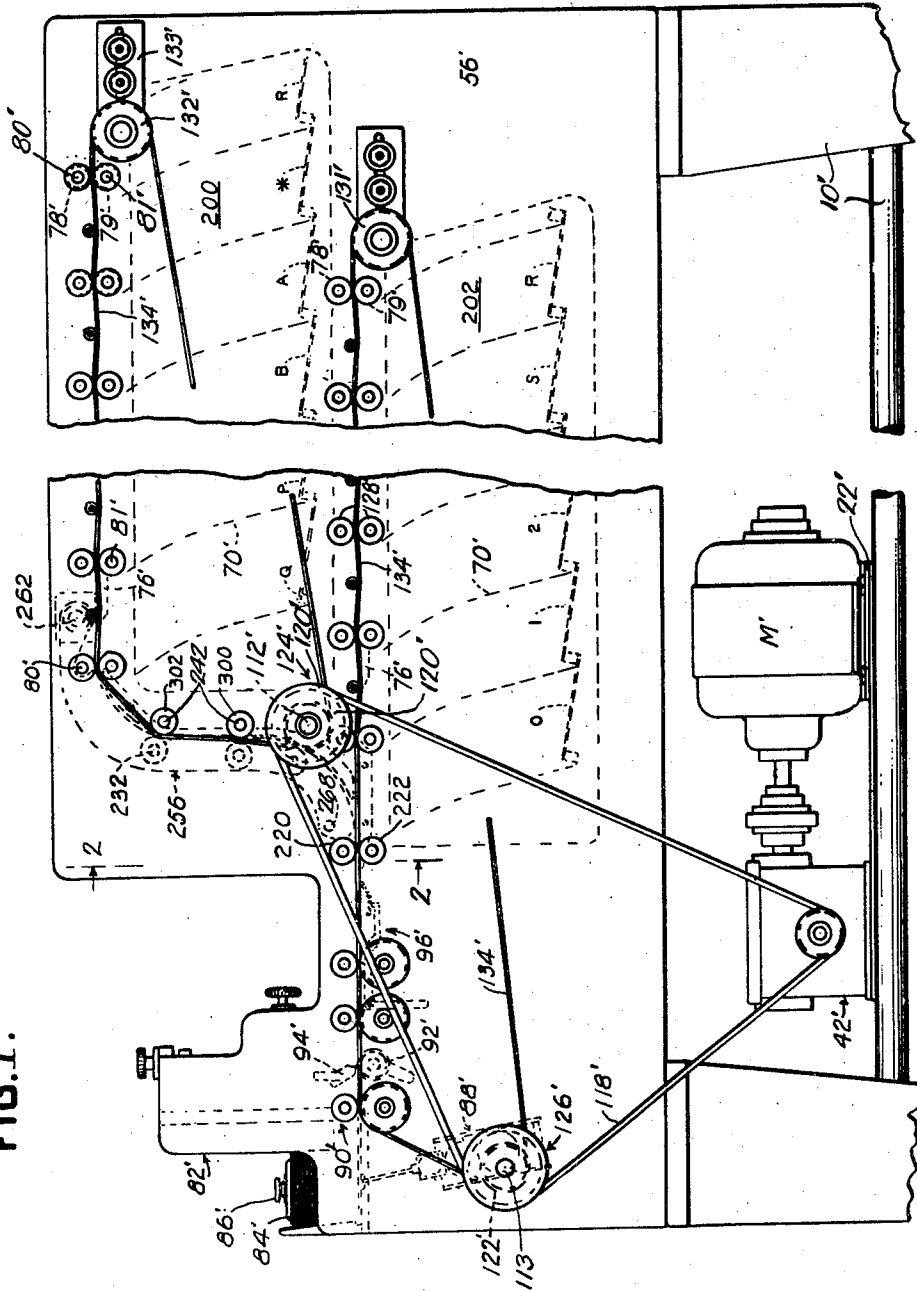
2,472,890

MACHINE FOR SORTING RECORD CARDS

Filed May 16, 1947

3 Sheets-Sheet 1

FIG. 1.



INVENTOR
Eugene A. Ford
BY *Edward R. Saunders*

AGENT

June 14, 1949.

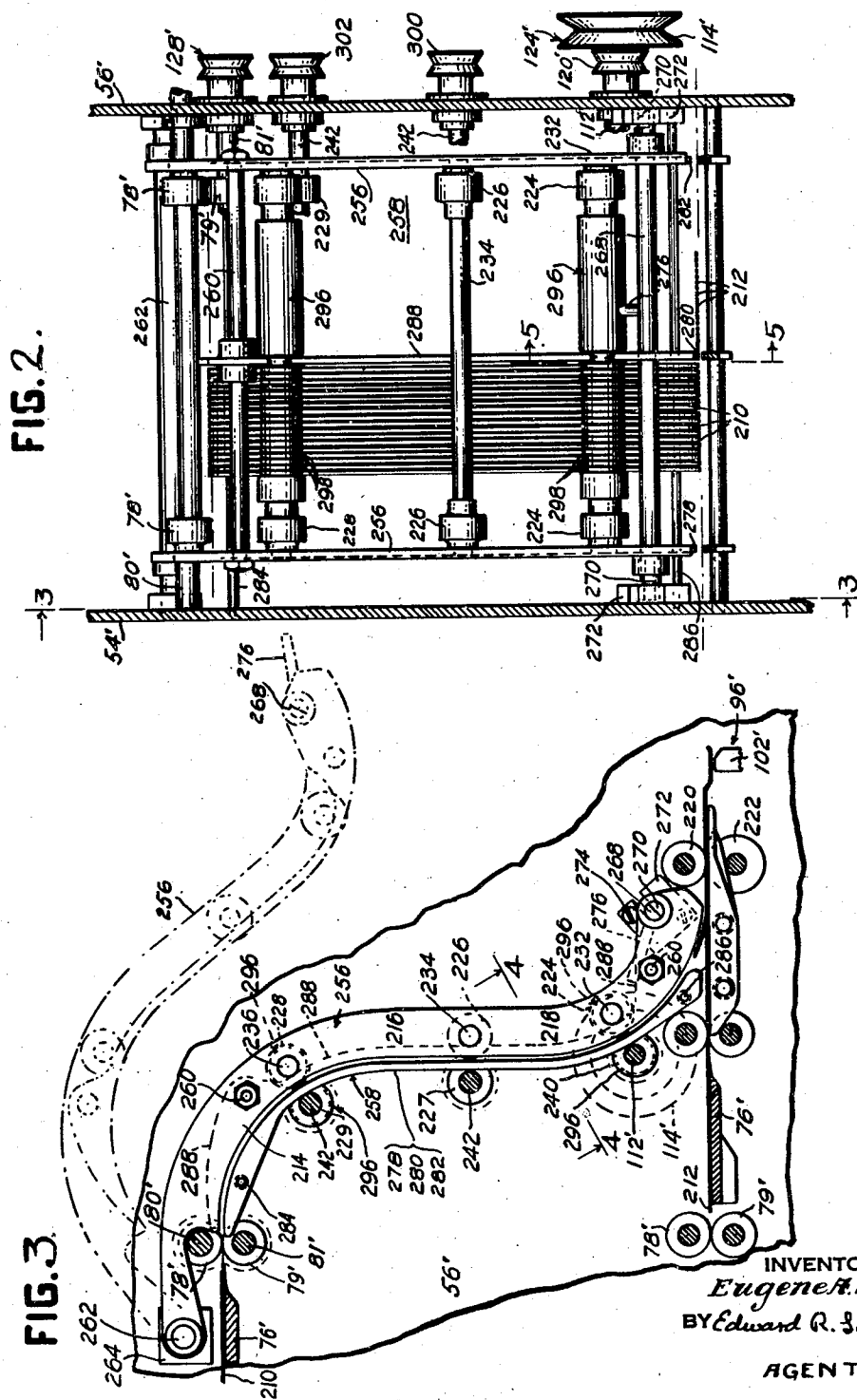
E. A. FORD

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MACHINE FOR SORTING RECORD CARDS

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3 Sheets-Sheet 2



INVENTOR
Eugene A. Ford.
BY *Edward R. Gouindas*
AGENT

June 14, 1949.

E. A. FORD

2,472,890

MACHINE FOR SORTING RECORD CARDS

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3 Sheets-Sheet 3

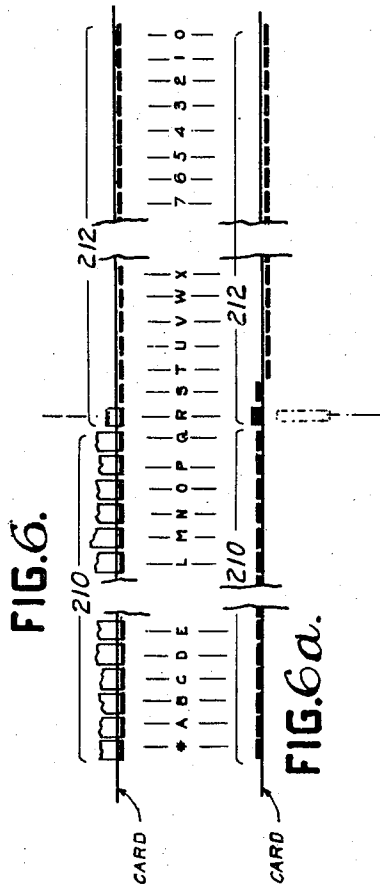
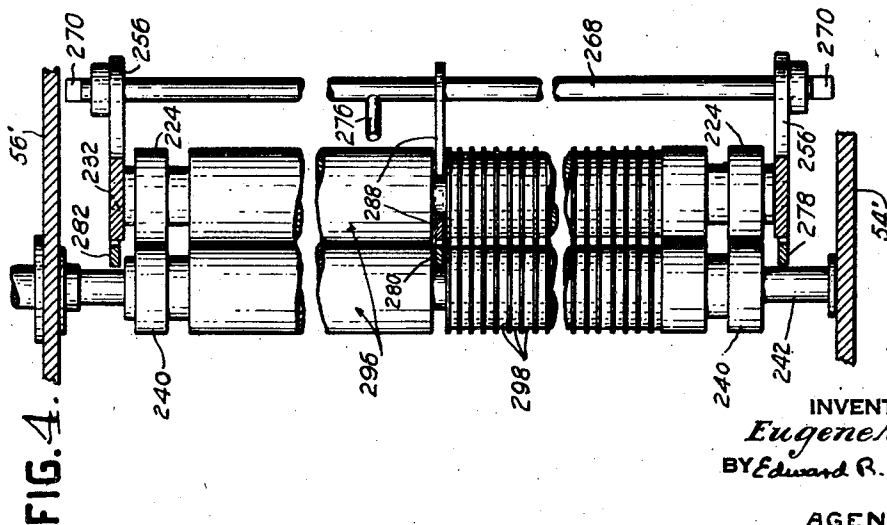
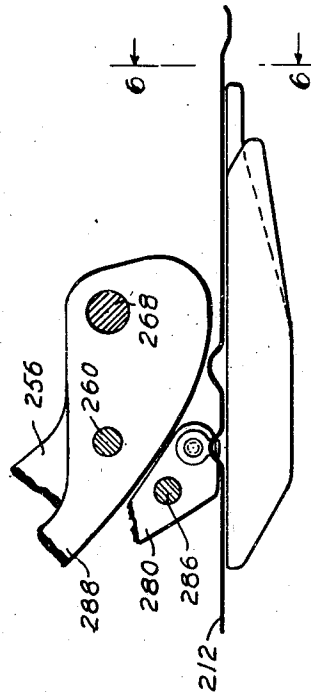


FIG. 5.



INVENTOR
Eugene A. Ford
 BY *Edward R. Souder*
 AGENT

UNITED STATES PATENT OFFICE

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MACHINE FOR SORTING RECORD CARDS

Eugene A. Ford, Endicott, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application May 16, 1947, Serial No. 748,426

4 Claims. (Cl. 271-64)

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The present invention relates to sorting machines of the type employed in connection with the sorting of cards used in tabulating machines such as, for example, the well known Hollerith type of machine.

The invention contemplates the provision of a sorting machine wherein two or more sets of card receiving pockets are arranged in superimposed relationship in the same machine framework and in which the various operative machine parts, such as card impelling rolls, analyzing devices, and picker mechanisms are all driven from a common driving motor.

According to the present invention, it is contemplated that the use of superimposed sorting pockets shall materially conserve the space limitations of a single sorting machine of conventional design capable of accommodating the same amount of work, as well as to eliminate considerable waste motion on the part of the operator. In such an instance, the superimposed sets of card-receiving pockets are served from a single card hopper by a single analyzing mechanism and by a single picker and feed mechanism. A sorting machine of this type is admirably adapted for use where alphabetic or alphabetic and numeric sorting operations are resorted to, especially the former. In such an instance, a very material saving in space and in the distance the operator is obliged to travel to service the machine during operation is obtained.

The provision of a machine of this character which is extremely simple in its construction, one by means of which it has been possible to eliminate a large number of moving parts, one which consequently is unlikely to get out of order, one which is rugged and durable, one which may be manufactured at a low cost, one which is of pleasing appearance and design, and one which otherwise is well adapted to perform the services required of it, are further desiderata that have been borne in mind in the production and development of the present invention.

The provision of a machine such as has been briefly outlined above being the principal object of the invention, other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the accompanying drawings forming a part of this specification two embodiments of the invention have been shown.

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In these drawings:

Fig. 1 is a rear elevational view of another form of sorting machine likewise constructed in accordance with the principles of the invention.

Fig. 2 is an enlarged detail sectional view taken longitudinally through a portion of the sorting machine in the vicinity of the forward ends of the chute blades. This view is taken along the line 2-2 of Fig. 1.

Fig. 3 is an elevational view, partly in section, of the structure shown in Fig. 2 and is taken on the line 3-3 of Fig. 2.

Fig. 4 is a sectional view taken substantially along the line 4-4 of Fig. 3.

Fig. 5 is a sectional view taken substantially along the line 5-5 of Fig. 2.

Figs. 6 and 6a are detailed views, somewhat schematic in their representation, showing the forward ends of the chute blades as viewed from the section lines 6-6 of Fig. 5. In these views legends have been applied to illustrate certain principles associated with the invention.

In all of the above described views, like characters of reference are employed to designate like parts throughout.

Referring now to the drawings in detail and particularly to Fig. 1, the sorting machine involves in its general organization an upper tier 200 and a lower tier 202 of sorting pockets 70'. These two tiers are arranged in the machine framework in superimposed relationship and are served by a single card magazine or feed hopper 82'. The feed hopper 82' is adapted to receive therein a stack 84' of record cards with a card plate 86' resting on top thereof. A conventional picker mechanism designated in its entirety at 88' serves to pick up the cards in the stack 84' one at a time from the bottom thereof and feed them in succession through an adjustable throat mechanism 90' from whence the cards are passed to a sensing mechanism including a contact roll 92' and a sensing brush 94'. Thereafter the cards are admitted to a cam controlled analyzing or distributing mechanism 96' by means of which selection of the various pockets is made.

The analyzing or distributing mechanism 96' per se forms no part of the present invention and reference may be had to my copending application, Serial No. 744,144, filed April 26, 1947, for Card distributing mechanism for sorting machines for a full disclosure of such a mechanism. Likewise, the picker mechanism 88' per se forms no part of this invention and reference may be had to my copending application, Serial No. 745,834, now Patent 2,464,569 filed May 3, 1947, for

Card feeding mechanism for accounting machines for a full disclosure of this device.

The pockets in the upper tier are labeled, reading from right to left, R, * (special character), A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q. The pockets in the lower tier are labeled, reading from right to left, R, S, T, U, V, W, X, Y, Z, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0. In the drawing in Fig. 4, the medial region of the machine has been deleted by broken lines and, as a consequence, certain of the pockets are not shown, but their existence should be apparent.

The hopper 82', picker mechanism 88', sensing mechanism 92', 94', and analyzing mechanism 96' form no part of the present invention and reference may be had to my above mentioned co-pending applications for a full disclosure of these instrumentalities.

Referring now specifically to Figs. 1 and 3, upper and lower card supports 76' respectively provide respective superimposed card paths extending longitudinally of the machine. Each card path has associated therewith a series of chute blades, those blades associated with the upper card path being designated at 210, while those associated with the lower card path are shown at 212. Both sets of chute blades 210 and 212 are loosely disposed on the upper surfaces of their respective card supports and each blade is anchored at one end thereof by spot welding or the like to a respective support. These chute blades are relatively narrow, and are arranged in parallelism along the upper surfaces of their respective supports. The blades 210 and 212 are of successive lengths and terminate at their respective card-receiving stations or pockets to direct the record cards thereinto.

The upper set of blades 210 are designed to accommodate the pockets labeled A to Q inclusive, as well as the R pocket and the special character pocket, while the lower blades are designed to accommodate the pockets R to Z inclusive and 0 to 9 inclusive.

The lower blades 212 rest loosely upon the upper surface of the lower set of card supports 76' and are substantially straight throughout their entire length. Their forward ends terminate in the vicinity of the analyzing instrumentalities 96' (Fig. 3). These blades 212, together with the supports 76', follow a substantially straight lower card path extending longitudinally of the machine.

The upper blades 210 rest loosely upon the upper card support 76' and are substantially straight throughout a major portion of their lengths but are curved downwardly as at 214 (Fig. 3), extend vertically as at 216 for a short distance and are curved as at 218 in such a manner that the forward ends of these blades merge into the plane of the lower blades 212. Both sets of blades 210 and 212 terminate at their forward ends in the same transverse line across the card path in the vicinity of the analyzing instrumentalities 96'.

After the cards have passed the analyzing station and selection thereof has been made by the various chute blades 210 or 212, as the case may be, they are engaged by a pair of feed rolls including an upper roller 220 and a lower roller 222, from whence the cards are conducted either directly rearwardly along the lower card path or upwardly along the curved card path leading to upper sets of feed rolls 78', 79'.

In order to guide the cards upwardly for reception in the upper tier of pockets, a plurality

of feed rollers 224, 226 and 228 are mounted on transverse shafts 232, 234 and 236 respectively. These shafts have their ends rotatably journaled in a pair of swinging frame members 256. These members 256 constitute the side pieces of a ladder-like framework unit or structure designated in its entirety at 258. The frame-like structure 258 involves in its general organization, in addition to the members 256, a plurality of cross members or tiers 260, one of which is located adjacent the top of the framework and the other of which is located adjacent the bottom thereof. The members 256 are substantially of reverse S-shape configuration and the upper ends thereof are secured to a rock shaft 262, the opposite ends of which are journaled in blocks 264 secured to the front and rear plates 54', 56'. The rollers 224, 226 and 228 are designed for respective cooperation with a series of rollers 240, 227, and 229 carried on transverse shafts 242 extending between the front and rear plates 54' and 56'.

At latch rod 268 extends across the lower ends of the members 256 and the extreme ends of the latch rod are formed with latching elements 270 which are designed for reception in respective latch plates 272 secured as at 274 to the front and rear plates 54', 56'. An operating handle 276 is secured in any suitable manner to the latch rod 268 in the medial regions thereof and is designed for manipulation in order that the latching elements 270 may be secured in or withdrawn from the latch plates 272. From the above description it will be seen that the entire frame-like structure 258 is capable of being swung about the axis of the rock shaft 262 from an inoperative position wherein the rollers 224, 226 and 228 are out of cooperation with their counterparts 240, 227 and 229, to an operative position wherein these various pairs of rollers are in close proximity to each other for card impelling purposes.

To provide a positive card path leading from the analyzing unit 96' to the path afforded by the pairs of rolls 78', 79', a plurality of stationary guide elements 278, 280 and 282 are mounted upon cross rods 284 and 286 extending between the front and rear plates 54', 56'. The guide member 278 is located adjacent the front of the framework 258 and the guide member 282 is located at the rear of the framework, while the guide member 280 is disposed centrally of the framework. These three guide members are substantially identical in shape and conform to the curvature of the card path. The guide members 278 and 282 are designed for cooperation with the lower edges of the side members 256, these latter members occupying a position in close proximity but slightly spaced from their counterpart guide members when the framework 258 is in its operative position. A central guide member 288 is fixedly secured to the cross tiers 260 and cooperate with the guide member 280 to provide a curved card path. The space existing between the various cooperating guide members represents the card path leading from the analyzer to the upper set of card feeding rolls.

In order to securely hold the upper card blades 210 in their respective positions of parallelism, the shafts 232 and 236 are formed with central enlarged body portions 296 in which there are formed a series of annular grooves 298 providing a series of ribs therebetween. Each of the grooves 298 is adapted to receive therein one of the chute blades 210, while the ribs serve to maintain the chute blades slightly spaced from each other. In a similar manner the shafts 242 are likewise pro-

vided with enlarged body portions, ribs and grooves, the arrangement being such that when the frame 258 is locked in its lowered position, all of the chute blades are confined and maintained in their respective positions.

Referring to Figs. 3, 6 and 6a, it will be seen that when all of the upper chute blades 210 overlie any particular card leaving the analyzing station 96', the card will proceed along the lower horizontal card path for selective reception in the pockets designated R to Z inclusive and 0 to 9 inclusive. If, however, one or more of the chute blades 210 underlies any particular card leaving the analyzing station 96', this particular card will be guided upwardly along the path provided for it by the guides 278, 280 and 282, the card being impelled by means of the positively driven rollers 240, 227 and 229. As the card reaches the upper regions of the framework 256, it will be engaged by the rolls 78', 79' and conducted to one of the pockets designated A to Q inclusive.

The driving instrumentalities for the sorter are best illustrated in Fig. 1 and include a motor M' mounted on a motor platform 22' suitably supported in the machine framework 10'. The motor M' operates through a gear reduction device 42' to drive a belt 118' which passes around the pulleys 124' and 126' mounted on respective driving shafts 112' and 113' respectively. Additional pulleys 120' and 122' are mounted on the shafts 112' and 113' and constitute the driving elements of the upper and lower card impelling instrumentalities.

Upper and lower feed rollers 78', 79' mounted on transverse shafts 80', 81', extending between the front and rear plates 54', 56', are driven by means of friction belts 124' and 134' respectively, these latter belts passing around the respective pulleys 120', 122', 131' and 132'. The upper belt 124' passes over a pair of pulleys 300, 302 mounted on the shafts 242 outside of the framework at the rear of the machine to provide a positive card-impelling drive for the cards as they move upwardly along the path 218, 216 and 214 leading from the lower card line to the upper card line.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the apparatus illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a sorting machine for record cards having index points, a machine framework including a front plate, a rear plate, a plurality of upper card supporting members extending transversely of the machine in alignment and spaced relationship between said plates adjacent the top thereof, said members defining by their upper surfaces an upper card path, and a plurality of lower card supporting members extending transversely of the machine in alignment and spaced relationship between said plates in the medial regions thereof and likewise by their upper surfaces defining a lower card path, an upper set of card receiving pockets disposed between said upper and lower card supporting members and communicating with the spaces existing between adjacent upper card supporting members, a lower set of card receiving pockets disposed beneath

said lower card supporting members and communicating with the spaces existing between the adjacent lower members, a plurality of upper card chute blades resting on the upper surfaces of said upper card supporting members, each blade forming therewith a card passage to one of said upper set of card receiving pockets, a plurality of lower card chute blades resting upon said lower card supporting members, each of said latter blades forming therewith a card passage to one of said lower set of card receiving pockets, the forward regions of said blades converging and terminating in a common plane, a plurality of additional card supporting members extending transversely of the machine between said plates and defining by their upper surfaces a common card path in the plane of the forward ends of said blades, and means for feeding record cards to said blades along said latter plane.

2. In a sorting machine for record cards having index points, a machine framework including a front plate, a rear plate, a plurality of upper card supporting members extending transversely of the machine in alignment and spaced relationship between said plates adjacent the top thereof, said members defining by their upper surfaces an upper card path, and a plurality of lower card supporting members extending transversely of the machine in alignment and spaced relationship between said plates in the medial regions thereof and likewise by their upper surfaces defining a lower card path, an upper set of card receiving pockets disposed between said upper and lower card supporting members and communicating with the spaces existing between adjacent upper card supporting members, a lower set of card receiving pockets disposed beneath said lower card supporting members and communicating with the spaces existing between the adjacent lower members, a plurality of upper card chute blades resting on the upper surfaces of said upper card supporting members and forming therewith card passages to said upper set of card receiving pockets, a plurality of lower card chute blades resting upon said lower card supporting members and forming therewith card passages to said lower set of card receiving pockets, the forward end regions of said upper card chute blades extending downwardly and terminating in the plane of said lower card path, and means for feeding record cards from a stack along said lower card path to the forward ends of said blades for selective transmission of certain of said cards to said upper card path.

3. In a sorting machine for record cards having index points, a machine framework including a front plate, a rear plate, a plurality of upper card supporting members extending transversely of the machine in alignment and spaced relationship between said plates adjacent the top thereof, said members defining by their upper surfaces an upper card path, and a plurality of lower card supporting members extending transversely of the machine in alignment and spaced relationship between said plates in the medial regions thereof and likewise by their upper surfaces defining a lower card path, an upper set of card receiving pockets disposed between said upper and lower card supporting members and communicating with the spaces existing between adjacent upper card supporting members, a lower set of card receiving pockets disposed beneath said lower card supporting members and communicating with the spaces existing between the adjacent lower members, a plurality of upper

card chute blades resting on the upper surfaces of said upper card supporting members and forming therewith card passages to said upper set of card receiving pockets, a plurality of lower chute blades resting upon said lower card supporting members and forming therewith card passages to said lower set of card receiving pockets, a plurality of pairs of upper feed rolls for impelling records along said upper card path, a plurality of lower feed rolls for impelling record cards along said lower card path, a plurality of transfer rolls for impelling record cards from said lower card path to said upper card path, the forward regions of said upper chute blades following the card path defined by said transfer rolls, and the extreme forward ends of all of said chute blades terminating in a common plane, and means for feeding record cards along said plane to the forward end of said chute blades.

4. In a sorting machine for record cards having index points, a machine framework including a front plate, a rear plate, a plurality of upper card supporting members extending transversely of the machine in alignment and spaced relationship between said plates adjacent the top thereof, said members defining by their upper surfaces an upper card path, and a plurality of lower card supporting members extending transversely of the machine in alignment and spaced relationship between said plates in the medial regions thereof and likewise by their upper surfaces defining a lower card path, an upper set of card receiving pockets disposed between said upper and lower card supporting members and communicating with the spaces existing between adjacent upper card supporting members, a lower

set of card receiving pockets disposed beneath said lower card supporting members and communicating with the spaces existing between the adjacent lower members, a plurality of upper card chute blades resting on the upper surfaces of said upper card supporting members and forming therewith card passages to said upper set of card receiving pockets, a plurality of lower chute blades resting upon said lower card supporting members and forming therewith card passages to said lower set of card receiving pockets, a plurality of pairs of upper feed rolls for impelling records along said upper card path, a plurality of lower feed rolls for impelling record cards along said lower card path, a plurality of transfer rolls for impelling record cards from said lower card path to said upper card path, the forward regions of said upper chute blades following the card path defined by said transfer rolls, and the extreme forward ends of all of said chute blades terminating in the plane of said lower card path, and means for feeding record cards from a stack of cards along said latter path to the forward ends of said chute blades.

EUGENE A. FORD.

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