

April 16, 1929.

C. HENTZSCHEL

1,709,430

CARD FILING AND SELECTING APPARATUS

Filed Nov. 26, 1926

6 Sheets-Sheet 1

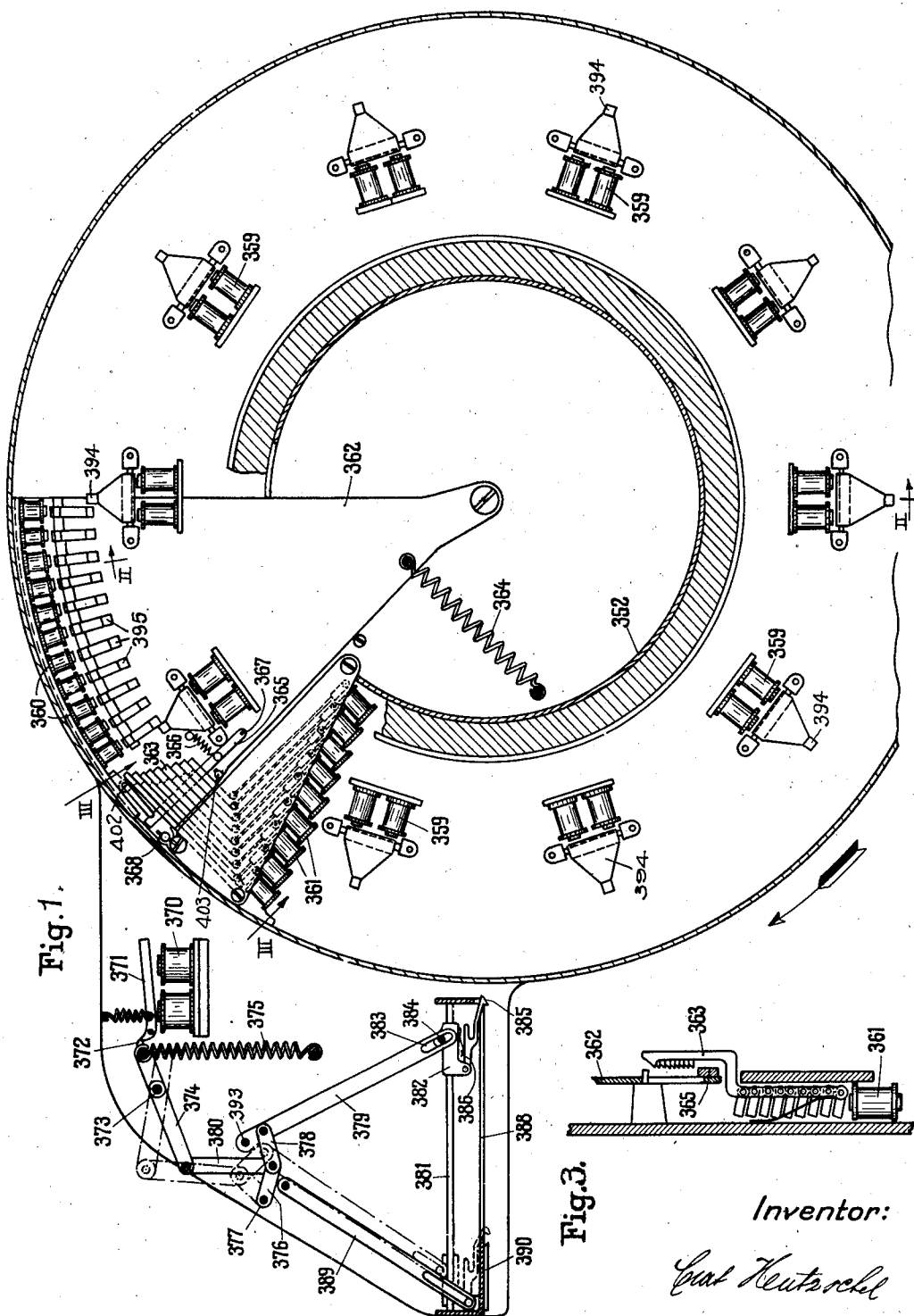


Fig. 1.

Fig. 3.

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April 16, 1929.

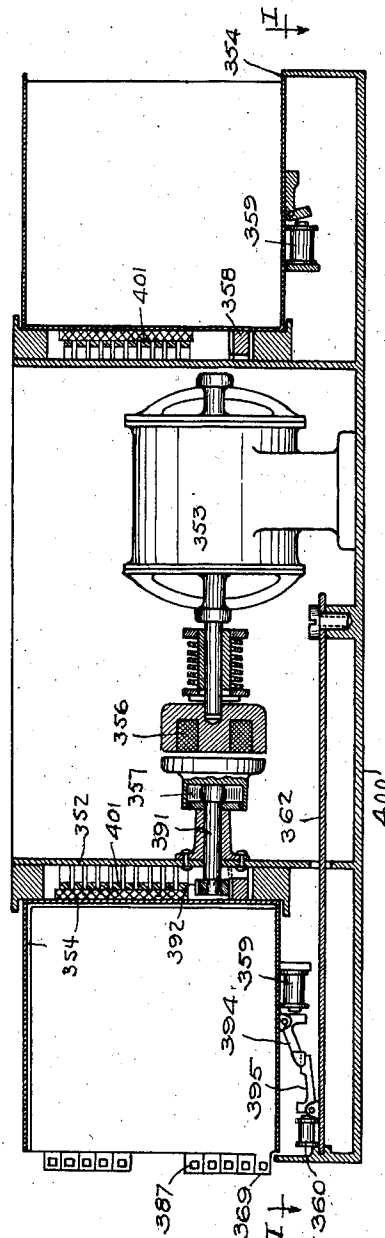
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6 Sheets-Sheet 2



Inventor:

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CARD FILING AND SELECTING APPARATUS

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Fig. 4

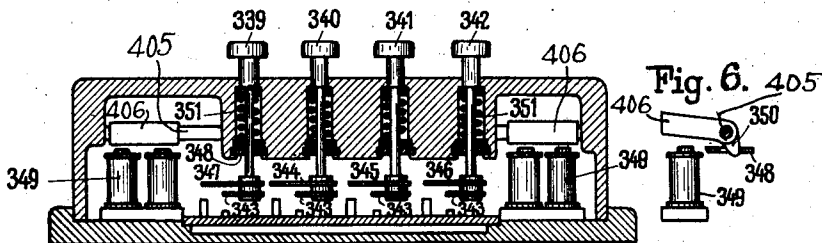
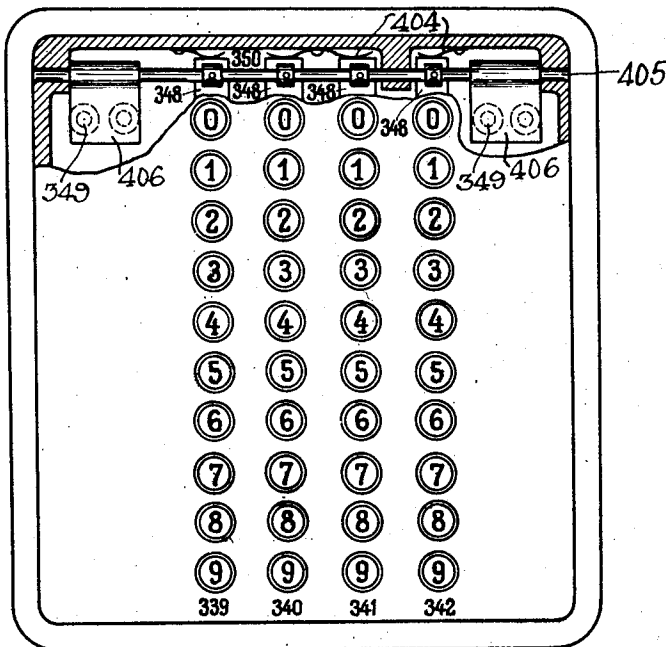


Fig. 5



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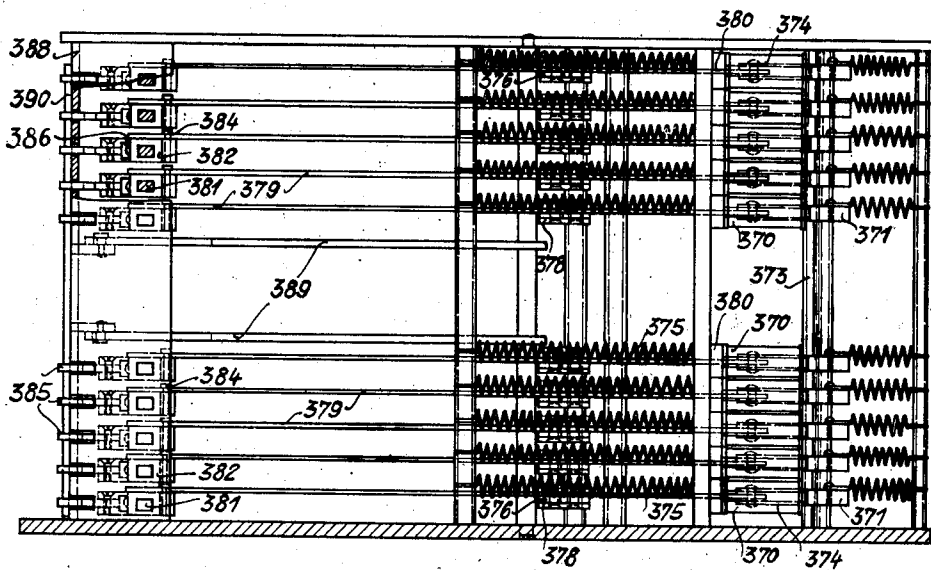


Fig. 7.

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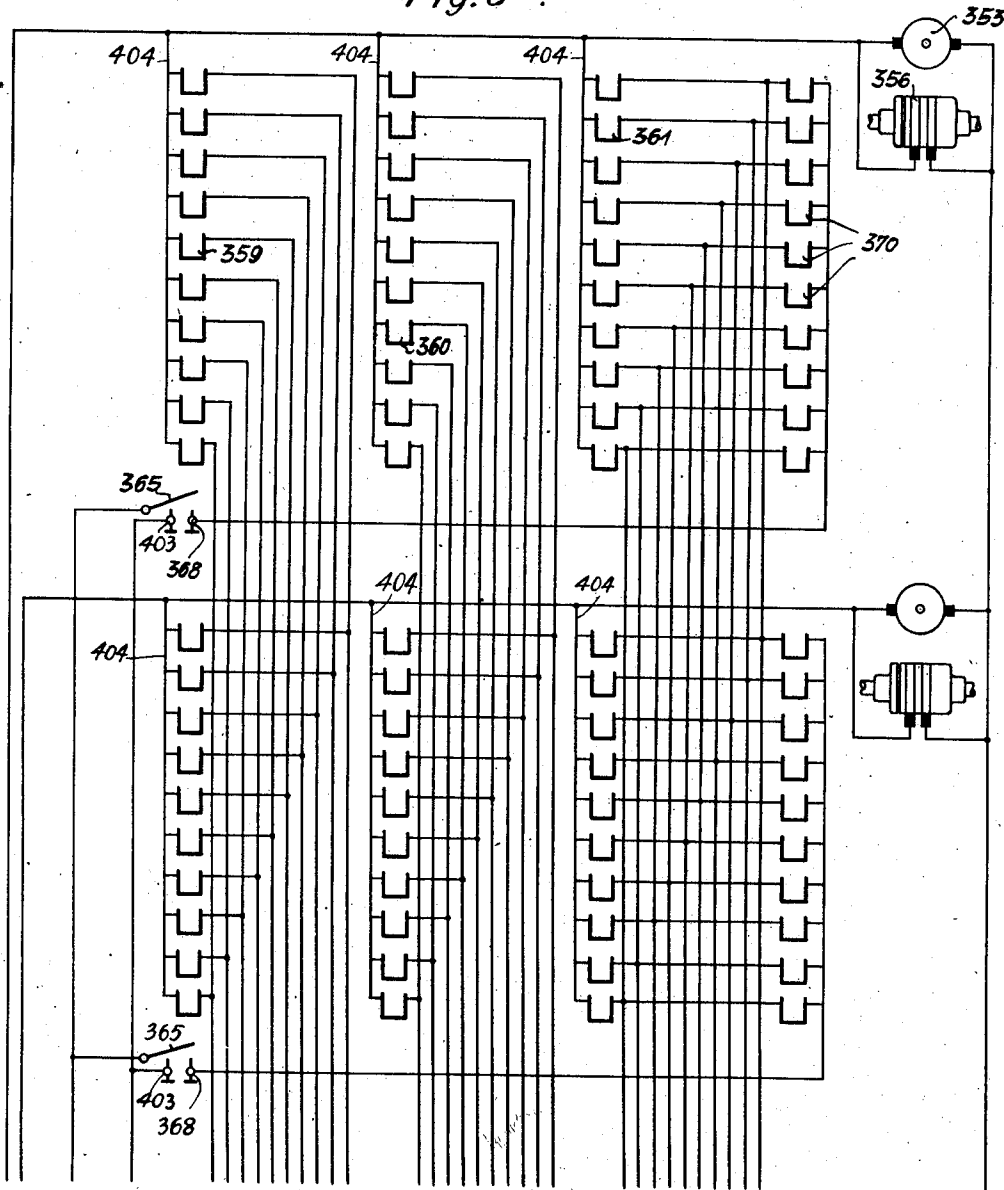
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CARD FILING AND SELECTING APPARATUS

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Fig. 8a.



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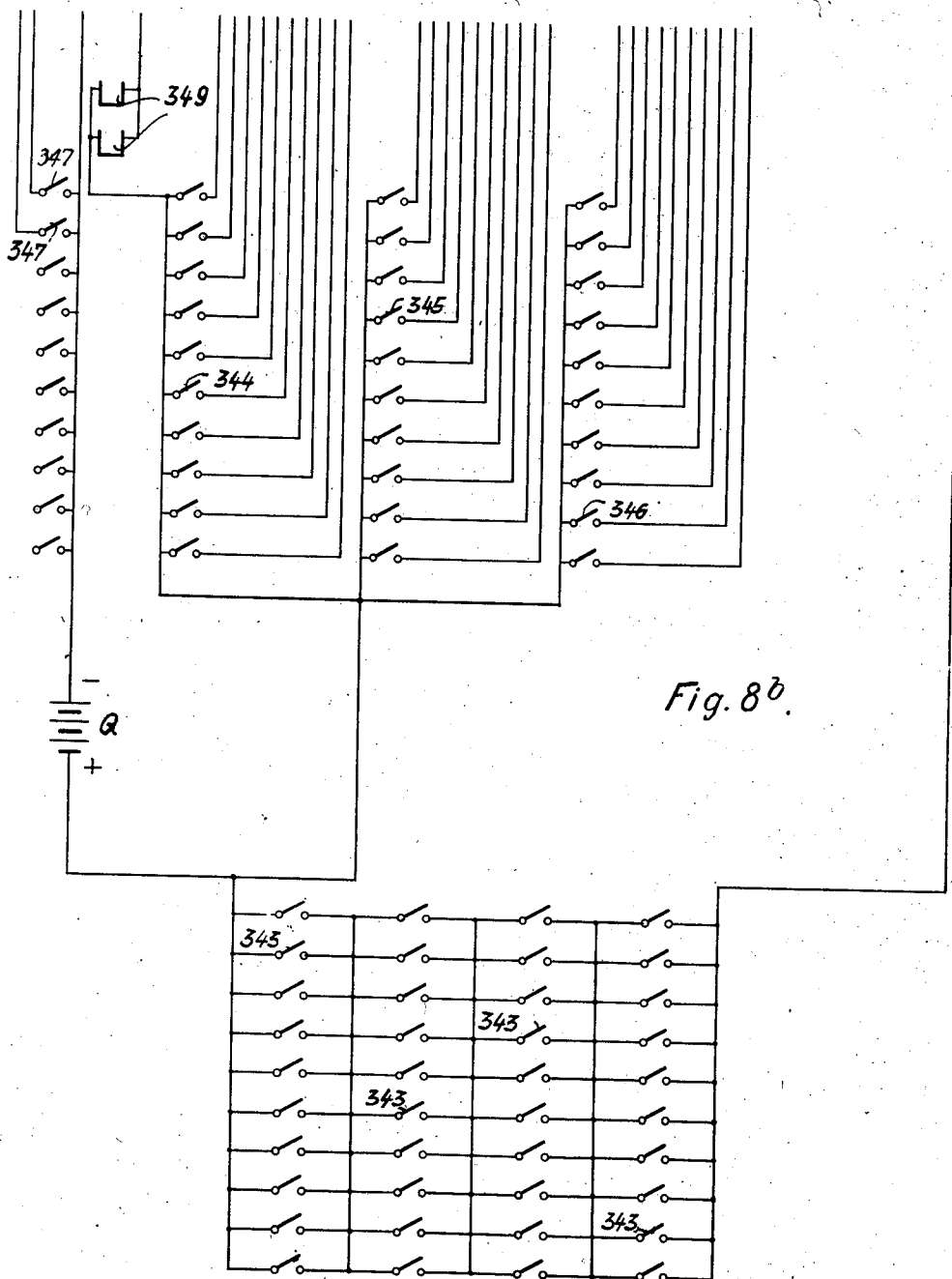
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CARD FILING AND SELECTING APPARATUS

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UNITED STATES PATENT OFFICE.

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CARD FILING AND SELECTING APPARATUS.

Application filed November 26, 1926, Serial No. 151,377, and in Germany August 29, 1925.

This invention relates to a card filing and selecting apparatus for use in account keeping systems and the like, and consists in the provision of an annular, circumferentially open card magazine which revolves through the medium of a motor about a vertical axis and which is controlled by means of a selector keyboard whereby it can be positioned relative to an automatic card extractor for the delivery of any given card.

The cards are arranged vertically in radial positions in the magazine and formed with staggered tabs whereby they cooperate with the catches of the card extractor.

The apparatus is operated by means of electromagnets which are switched on by means of the selector and switched off by the arrival of the magazine in the selected position.

Fig. 1 of the accompanying drawings represents a horizontal section of the magazine and card extractor taken on the line I—I of Fig. 2,

Fig. 2, a section on the line II—II of Fig. 1,

Fig. 3, a section on an enlarged scale of the part included between the lines III—III of Fig. 1,

Fig. 4, a vertical section of the selector key board,

Fig. 5, a plan view of the same, partly in section,

Fig. 6, a view of the key-releasing device,

Fig. 7 a section of the card extractor taken on the line VII—VII of Fig. 1, and

Figs. 8^a and 8^b represent together a diagram of the electric circuits.

The cards 355 are arranged radially in a vertical position in an annular card magazine 354 which revolves about a central cylindrical chamber 352. An electromotor 353 in the latter drives, by means of a magnetic clutch 356, a shaft 391 which is geared through the medium of a pinion 392 to a circular rack 358 connected to the card magazine. The rotary movement thus imparted to the magazine serves the purpose of positioning any particular card relative to the card extractor. The latter is composed of

ten superposed catches 385 each of which is controlled by an arm 379 and two toggle members 376 and 378. Each catch is pivoted to a slide 382 which is guided on a rod 381. An arm 379 has an elongated aperture 383 whereby it engages a pin 384 on the slide. A spring 386 holds the catch against the plate 388 which is provided with slits through which the operative ends of the catches protrude. The toggle member 376 and the arm 379 are pivoted at 377 and 393 respectively to a rigid support. The member 378 is pivoted to the arm 379, and both toggle members are connected by means of a link 380 to one end of a double-armed lever 374 pivoted at 373. The opposite end of the lever 374 is engaged by a spring 375 and has a nose piece 372 whereby it is normally supported on the pointed end of a pivoted armature 371 appertaining to a magnet 370 of which there is one for each catch. The elements are shown by full lines in their normal positions. The spring 375 tends to move them into the position shown in dotted lines and does so when the lever 374 is released owing to the energization of the magnet 370. It will be seen that the toggle members are normally in an angular position relative to each other and that, to reach the other end position, they must first pass a position of alignment. During the first part of the movement, therefore, the catch 385 will be pushed by the arm 379 towards the card magazine and then retracted and moved to the outer end of the guide plate 388.

The cards are arranged between partitions 85 in the magazine in groups of ten and are provided with tabs 369 having apertures 387 for engagement with the catches 385. The tabs are staggered so that only one tab occurs on the same level in the same group. The catch 385, on moving forward, snaps into the aperture 387 of the tab with which it registers and, on returning, pulls the card out of the magazine. The return of the card after use may be effected either directly by hand or by means of a lever 389 and the slide 390 which also restores the slide 382 to its initial position.

In the arrangement shown, means are provided for filing and selecting one thousand cards in one magazine. The positioning of the magazine is effected by means of electromagnetic stops. The card magazine is rotated by the motor 353 in the direction of the arrows. A sector 362, which is arranged under the magazine and which moves about the same axis as the latter, carries a concentric row of magnets 360 which operate stops 395 arranged at the same angular distance from one another as the card groups. For cooperation with these stops, the magazine carries ten equidistant stops 394 which are controlled by magnets 359 and which determine each the particular series of 100 cards from within which the selection of one card is to be made. The magnets 359 receive their current over sliding contacts composed of rings 401 connected to the magazine and corresponding, insulated brushes connected to the stationary chamber 352. The selection of the particular card within a group of ten is determined by magnets 361 which control a row of stops 363. The latter, which are supported by the stationary base 400 under the magazine, cooperate with a bar 365 arranged in a radial position on the sector 362 and are staggered so as to arrest the sector in different positions. The bar 365 is pivoted to the sector and controlled by a spring 366. The sector is itself controlled by a spring 364 connected at one end to the base 400, which also carries a stop 402 whereby the normal position of the sector is determined. When an operated stop 394 on the magazine strikes against an operated stop 395 on the sector, the latter is turned in opposition to the spring 364 until the bar 365 is arrested by an operated stop 363. On engagement with the stop 363, the bar 365 is deflected in opposition to the spring 366 until it makes contact with two studs 368 and 403 connected to the sector. Through the medium of the stud 403, the bar 365 closes a circuit whereby the motor and stop circuits are interrupted so as to leave the magazine with the selected card in position opposite the respective catch 785. At the same time the circuit of the respective magnet 370 is momentarily closed over the bar 365 and the stud 368 so that the catch will be released and the selected card extracted.

A plurality of such magazines and card extractors may be employed in a single card system.

The selection of the cards from a set of ten magazines each containing 1000 cards is effected by means of a switch keyboard having keys arranged as shown in Figs. 4 and 5. Four vertical rows of keys 339, 340, 341 and 342 are employed, the keys in each row being numbered from 0 to 9. The cards

are provided with four-figured numbers and the keys are selected in accordance with the number of the particular card to be extracted. The keys are supported by springs 351 and latched in depressed position by means of slidable arresting bars 348 of which there is one for each row of keys. Each key stem passes through a slot in a slidable bar 348 controlled by the spring 404 and has a ratchet tooth with which the bar snaps into engagement in the depressed position of the key, the slots being large enough to allow the bar to be operated by one key without affecting the other keys. The release of the keys is effected by means of triggers 350 which are mounted on a shaft 405 together with the armatures 406 of electromagnets 349 whereby the shaft and triggers can be rocked. The triggers engage in apertures in the bars 348 and move the latter in opposition to the springs. Each key 340 has a contact plate 344 which completes the supply lead from a source Q of current (Fig. 8^b) of a particular magnet 359 in any magazine. Each key 341 energizes a particular magnet 360 in any magazine by means of a contact plate 345. A contact plate 346 on each key 342 completes the supply lead to one of the magnets 361 in any magazine. The common return leads 404 of all the stop magnets to the battery Q in one of the magazines is completed by a plate 347 on the depression of a key 339. Each key has moreover a contact plate 343 which cooperates, as shown in the diagram in Fig. 8^b, with the corresponding plates in the other rows, for closing the circuit of the motor 353 and the clutch 356 in the magazine selected by the depression of the key 339, the return being over the closed contact 347.

The action is as follows: As soon as four selected keys have been depressed, the circuits of the motor and of the different stops in the magazine containing the required card will be closed, and the card magazine will be set in motion. When the group containing the required card arrives at the card extractor, the operated stop 395 on the sector will be engaged by the operated stop 394 of the magazine, and the sector will then participate in the movement until the selected card is in position in front of the respective catch 385, the magazine being then stopped owing to the breaking of the motor and clutch circuit and of the circuits of the different stop magnets through the medium of the contact 403. At the same time the respective magnet 370 is energized by means of the contact 368 so as to operate the catch and withdraw the selected card from the magazine. The contact 403 closes the circuit of the magnets 349 which then restore the keys to the normal position. After a card has been dealt with it is replaced in the mag-

azine either direct by hand or by means of the lever 389 which also restores the operated catch to its initial position.

To prevent shocks at the starting of the magazine, the motion from the motor is transmitted through the medium of a spring 357 arranged in one of the clutch elements. Since the clutch is switched off at the same time as the motor, the latter is allowed to spend its impetus without affecting the magazine.

The tabs and the catches 385 are arranged so that a free space is formed in the middle of the card group for the attachment of the usual riders employed in card systems.

Instead of being formed on or attached to the cards, the tabs may be applied to envelopes or other holders in which the cards are inserted.

I claim:

1. A card filing and selecting apparatus comprising an annular, circumferentially open card magazine adapted to hold the cards in a vertical and radial position, a support for said magazine, the magazine being rotatable thereon about a vertical axis, a card extractor adapted to engage and remove individual cards from the magazine, an electromotor for rotating the magazine, a series of electromagnetic stops mounted on the magazine and on the support so as to be able to cooperate for stopping the magazine, and a key-board selector whereby said motor and stops can be controlled for stopping the magazine with any particular card in position to be removed by means of the card extractor.

2. The structure claimed in claim 1, in combination with electromagnetic means for operating the card extractor and means controlled by the magazine stop for closing a contact whereby said operating means can be energized.

3. A structure as claimed in claim 1 wherein the card magazine is annular, a cylindrical chamber about which the magazine is guided, a circular rack connected to the inside of the magazine, a pinion engaging with said rack, and an electromagnetic clutch for connecting said pinion with the driving motor.

4. A card filing and selecting apparatus comprising a support, a cylindrical, circumferentially open card magazine adapted to hold the cards in a vertical and radial position, the magazine being rotatable about a vertical axis, a magnetically operated card extractor adapted to engage and withdraw individual cards from the magazine, an electromotor for rotating the magazine, a spring-controlled sector pivoted to the support under the magazine so as to be movable about the same axis as the latter, a circular row of electromagnetic stops carried by the magazine concentrically with its axis of rotation, a row of electromagnetic stops arranged

on the sector concentrically with the pivot, the stops of the magazine and those of the sector being adapted to engage when operated by their magnets so as to couple the sector to the magazine, an arresting bar arranged on the sector in a radial position, a third row of electromagnetic stops arranged on the support so as to cooperate, when their magnets are energized, with said arresting bar for stopping the sector and the magazine in different angular positions, a switch keyboard, electric circuits connecting said keyboard with the different stops, means in said keyboard for selectively closing the circuits so as to cause the arresting bar to stop the magazine with any particular card in position to be removed by means of the card extractor, a circuit connecting the keyboard with the motor, and means for closing said latter circuit automatically together with the stop circuits.

5. The structure claimed in claim 4 wherein the arresting bar is pivoted to the sector and spring-controlled so as to be deflected by engagement with the stops, and electric contacts adapted to be closed by the bar when thus deflected for switching off the motor and the stop magnets and switching on the extractor magnet.

6. The structure claimed in claim 4 wherein the card extractor comprises a catch member, a slide holding said member, a guide rod for said slide, a pivoted arm engaging said slide by means of a pin and slot device so that it can be used for moving the slide along the guide rod, toggle members controlling said arms, and a magnetically controlled lever for operating said toggle members, the latter being arranged so that, when actuated by the lever, the catch member is first moved towards the card magazine and then away from it, said catch member being adapted, when in its advanced position, to engage with a perforated tab on one of the cards to extract the card when the catch member moves away from the magazine.

7. The structure claimed in claim 4 wherein the card extractor comprises a plurality of superposed catch members for cooperation with perforated tabs on the cards, adjacent cards having their tabs on different levels for cooperation with different catch members.

8. The structure claimed in claim 4 wherein the switch keyboard is provided with a key-operated switch plate for each stop, the keys for each group of stops being arranged in the same vertical row, the motor circuit being led over a separate and additional switch plate for each key in each row.

9. The structure claimed in claim 4 wherein the switch keyboard is adapted for the control of a plurality of card magazines and includes four rows of keys and switch plates, three rows of plates being reserved

for leading current to different magnets in the same groups of stops in different magazines, the fourth row being adapted to complete all the circuits in different magazines.

5 10. The structure claimed in claim 4 wherein the switch keyboard has a spring-supported key for each separate electromagnetic stop of a card magazine, a switch plate on each key adapted to close the magnet circuit on the depression of the key, latches 10 for retaining the keys in depressed position, magnets for releasing the latches, and means whereby the release takes place automatically through the medium of the arresting bar when the magazine is stopped.

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