April 18, 1950 E. BERTELLO 2,504,629

SELECTIVE DELIVERY FILING CABINET

Filed July 22, 1946 3 Sheets-Sheet 1

Fig. 1.

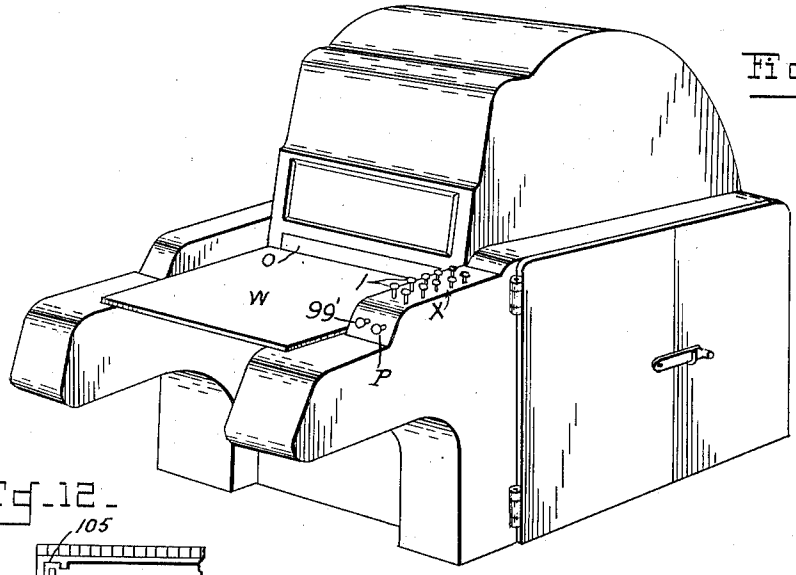


Fig. 12.

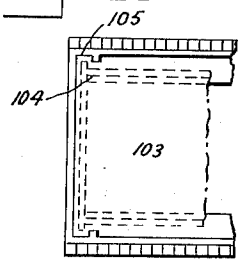


Fig. 2.

Fig. 4.

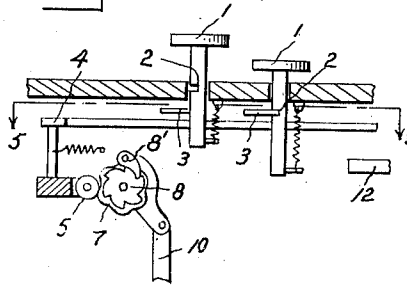
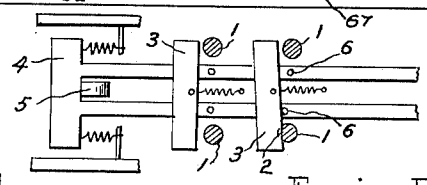


Fig. 5.



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April 18, 1950 E. BERTELLO 2,504,629

SELECTIVE DELIVERY FILING CABINET

Filed July 22, 1946 3 Sheets-Sheet 2

Fig. 3.

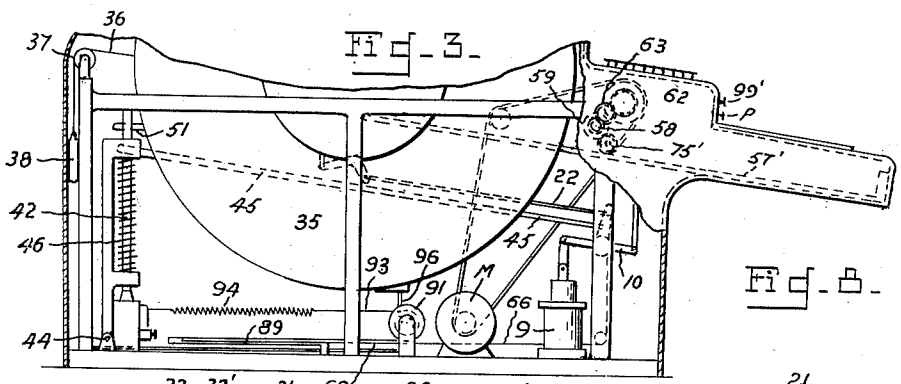


Fig. 8.

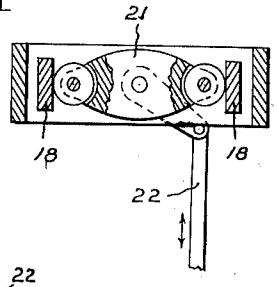


Fig. 7.

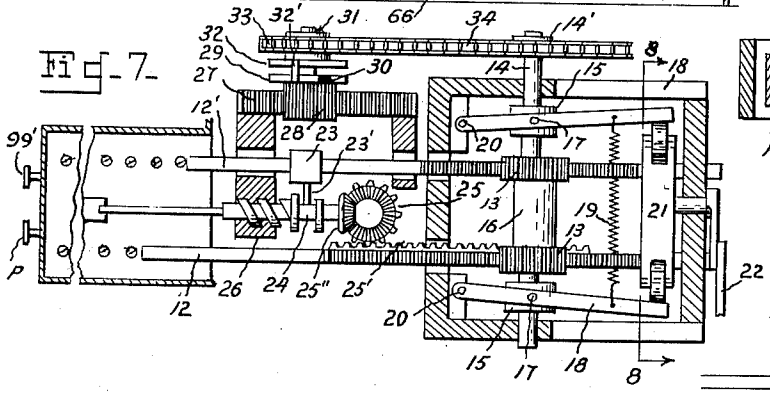
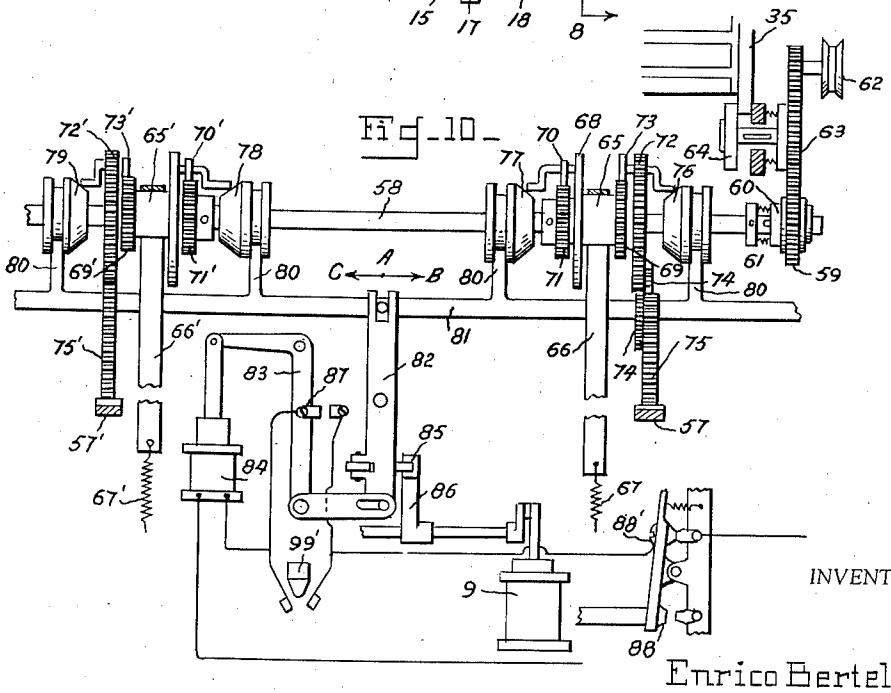


Fig. 10.



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April 18, 1950 E. BERTELLO 2,504,629

SELECTIVE DELIVERY FILING CABINET

Filed July 22, 1946 3 Sheets-Sheet 3

Fig. 6.

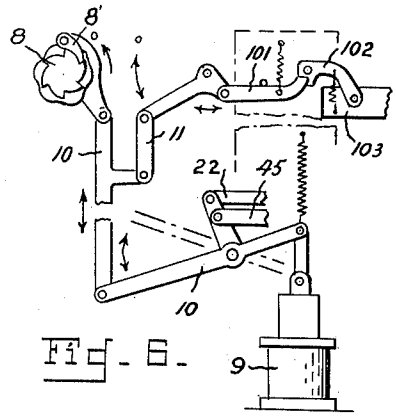


Fig. 9.

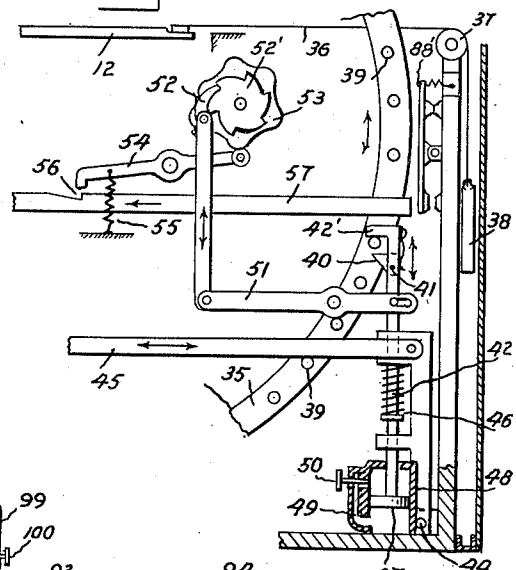


Fig. 11.

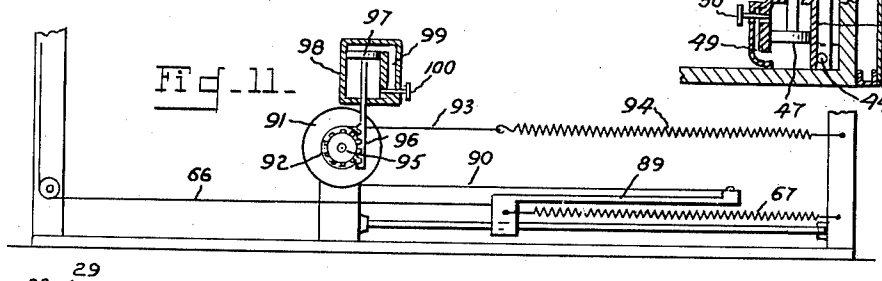
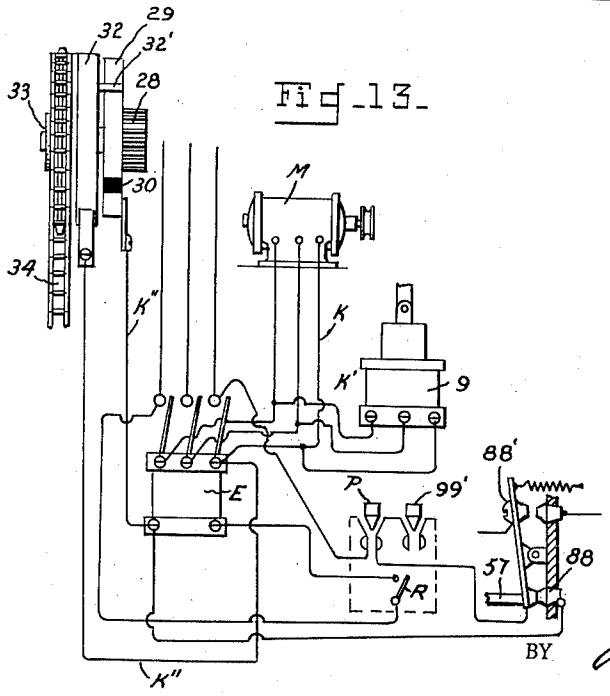


Fig. 13.



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UNITED STATES PATENT OFFICE

2,504,629

SELECTIVE DELIVERY FILING CABINET

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Application July 22, 1946, Serial No. 685,566
In Italy April 17, 1946

14 Claims. (Cl. 45—2)

1

This invention relates to filing cabinets or the like, and more particularly to automatically operated cabinet devices.

The present invention, briefly, comprises a detachable drawer-carrying drum and selectively operated mechanism for rotating the drum through a given angle. This mechanism includes a contact ring synchronized with the drum and electrically connected with a broken conductor ring by means of a brush. This contact ring is selectively positioned relative to the break in the conductor ring by slidable elements, the movement of which is controlled by the keys of a keyboard. The contact ring and drum are then rotated until the brush encounters the break in the conductor ring, which brings the drum to stop in the position required by the operator. In addition, the apparatus includes mechanism for automatically opening and closing the selected file drawer upon the selective movement of the drum.

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, wherein like reference characters indicate like parts throughout the several figures and in which:

Fig. 1 is a view in perspective of a file cabinet in accordance with the present invention;

Fig. 2 is a side view in elevation of the apparatus, with the cabinet wall removed;

Fig. 3 is a view in elevation of the opposite side of the apparatus;

Fig. 4 is an enlarged fragmentary cross-sectional view through the control keyboard and showing the key mechanism;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is an enlarged schematic view of an electromagnetically operated actuating mechanism;

Fig. 7 is an enlarged plan view of the key controlled mechanism for selectively controlling the rotation of the drum;

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is an enlarged fragmentary side view of the mechanism for stopping and holding the drum;

Fig. 10 is a diagrammatic layout of the drawer opening and closing and drum-driving mechanism;

Fig. 11 is an enlarged fragmentary side view of a portion of the drawer operating mechanism;

Fig. 12 is a fragmentary plan view of the connection between the drawer moving mechanism and the selected drawer; and

2

Fig. 13 is a diagrammatic layout of the electric control system and mechanism.

Since the apparatus has many component parts or mechanisms, each part and its operation will be described separately in order to render it more clear, and the complete general operation of the apparatus will be eventually summarized. The essential main parts or mechanisms which constitute the apparatus comprise the key system mechanism; the drum rotating control mechanism; the drum stopping mechanism; the drawer operating mechanism and the control circuits. The foregoing mechanisms will be described in the stated order.

The apparatus, preferably, is housed in a cabinet, as shown in Fig. 1, which substantially encloses the apparatus and is provided with a file drawer opening O behind a work-table W which has a keyboard X conveniently at one side thereof. The keyboard X comprises a series of selector keys 1 and two control switches 99 and P. Within the cabinet is rotatively mounted a drum 35 which carries a plurality of radially positioned and movably supported file drawers S, and the foregoing mechanisms are arranged and adapted, upon the actuation of a selected key 1, to rotate the drum to position a drawer, corresponding to the key, in front of the opening O and then open the drawer by moving it out through the opening O and over the table W and subsequently to close the drawer.

The key selecting mechanism is adapted to select the particularly desired drawer and, as best shown in Figs. 4 and 5, comprises two series of keys 1 which are spring biased upwardly and which are provided with notches 2 in their shanks for the reception of lock bars 3 which lock the keys in depressed position. The lock bars 3 are spring biased against the shanks of the keys 1 and when a key is depressed, the cooperative bar 3 immediately slides into the notch 2 of the key to thereby hold the key down.

A release member 4 is slidably mounted under the lock bars 3 and carries a plurality of release pins 6, one for each end of each bar 3. The member 4 is spring retracted and cam biased to release position by means of a follower roller 5 journalled on the member 4 and peripherally engaging a cam wheel 7. A ratchet wheel 8, operative by a pawl 8', is operatively fixed with the cam wheel 7. The pawl 8' is connected to a lever linkage 10 which is spring retracted and operatively connected to the core of an electromagnet 9, preferably of the solenoid type.

In view of the foregoing description, it is readily evident that when a selected key 1 is depressed, the respective lock bar 3 will immedi-

ately seat in the notch 2 of the key to hold the key down. The key is subsequently released by the action of the solenoid 9 on the lever linkage 10 which operates the pawl 8' to advance the ratchet wheel 8 and cam wheel 7. As the cam wheel 7 is rotated, one of the cam humps thereon will push the roller 5 to bias the member 4 so that the respective release pin 6 will move the particular lock bar 3 out of the notch 2 to permit the key 1 to be raised by its spring.

The selectively depressed keys 1 are cooperative with slidable rack members 12—12' in the drum control mechanism in regulating the degree of rotation of the drum 35. As best shown in Fig. 7, the sliding rack members 12 and 12' mesh with the cog-wheels 13 which are loosely journalled on a shaft 14 which is driven by a sprocket 14'. A pair of collars 15 are freely mounted on the shaft 14 on opposite sides of a drum 16 which is fixed on said shaft 14.

The collars 15 each carry a pin 17 on which is pivoted a lever 18 which is also pivoted at one end on a fixed pivot 20. A spring 19 and spacer cam 21 in opposition thereto are interposed between the two levers 18 adjacent their other ends. The spacer cam is operated by the secondary electro-magnet 9 by means of the system of levers 22, as best shown in Figs. 6 and 8. The slider rack 12 is provided with a finger 23 engaged in a groove in the head of a screw 24, which works in a sliding block 26 that is rigid with a rack 27 which meshes with a cog-wheel 28 that is mounted on a stub shaft 31. The wheel 28 is coaxially fixed to a conducting ring 29 having an insulated sector 30. A contact-ring 32 is also mounted on the shaft 31 and has a brush 32' which electrically engages the conductor ring 29. The contact ring 32 is fixed with a sprocket 33, which is synchronized, by means of a chain 34, with the drawer-holding drum 35. At their rearward ends, the slider members 12 (Figs. 2, 7 and 9) are respectively connected to flexible steel bands 36 which extend over the rollers 37 and are provided with counterweights 38.

This system works as follows: The action of the secondary electro-magnet 9 actuates the leverage 22 which causes the spacer cam 21 to tilt, whereupon the levers 18 are permitted to be biased toward each other by the spring 19, thus causing the collars 15 to engage the cog-wheels 13, to which the motion of the shaft 14 is then communicated. As a consequence, the sliders 12 and 12' travel until their forward ends strike the shanks of the depressed keys 1. In the meantime, while the slider 12' causes the finger 23 and the screw 24 to travel longitudinally for a distance equal to the stroke of the slider itself, the slider 12, by means of the rack 25' and gearing 25—25'', causes the same screw to rotate so as to carry the block 26 for a distance equal to the sum of the strokes of the two sliders. As the block 26 is fastened to the rack 27, the latter will cause the conductor ring 29 to rotate in proportion to the spacing of the depressed keys. Contemporarily, the contact-ring 32 rotates synchronously with the drum 35, until its brush 32', sliding on the periphery of ring 29, reaches the insulated sector 30, whereupon the electric circuit through the rings 29 and 32 is broken and the electro-magnet 9 is de-energized. The movement of the solenoid core to de-energize position actuates the leverage 22 to rotate the spacer cam to bias the levers apart and thereby open or disengage the friction-clutch system 15—16—17—18, which permits the counterweights 38 to

pull the sliders, which are now free, back into their initial position.

The drum-stopping mechanism is best illustrated in Fig. 9, wherein it will be seen that the drum 35 is provided with stop pins 39 in a number equal to that of the drawers which are carried by the drum. A catch 42, having a fixed jaw 42' and a spring-jaw 40, pivoted on a pin 41 on the catch 42, is mounted adjacent the periphery of the drum 35 for cooperation with the pins 39. The catch 42 comprises a shank which is mounted on a frame that is pivotally mounted on a pivot 44 and actuated, through the connecting-rod 45, by the secondary electro-magnet 9 (Figs. 6 and 9). The catch shank 42 has a controlling spring 46 and terminates in a piston 47 working in the cylinder 48. This mechanism is adapted to dampen the oscillations of the drum, due to the force of inertia, at the moment of its stopping. To keep the amplitude of these oscillations within the required limits, the cylinder 48 is provided with a by-pass 49 connecting the two ends of the cylinder and provided with a valve 50. Moreover, the catch 42 is connected by means of a lever system 51, to a pawl 52 which cooperates with a ratchet 52, attached to a cam-wheel 53 that actuates a lever 54. The latter has a lug and is biased by a spring 55 to seat the lug in the notch 56 of a rack-arm 57 of the drawer-holding frame.

This mechanism works as follows: When the drum 35 stops, the electro-magnet causes the lever 45 to pull the catch mechanism, pivoted at 44, towards the drum to engage a pin 39 between the jaws 40 and 42'. The oscillation of the catch 42, due to the force of inertia, causes the cam-wheel 53 to rotate by means of the levers 51 and pawl and ratchet 52, thus disengaging the lug 54 from the recess 56, whereupon the arm 57 of the drawer-holding frame is free. The amplitude of the oscillation of the locking device is controlled by the valve 50. The unlocking of the drum takes place through the reverse action of the mechanism when the secondary electro-magnet 9 is again put into operation.

The drawer operating mechanism is best shown in Fig. 10. A cog-wheel 59 is loosely journalled on a transverse shaft 58 and is provided with a friction-clutch 60 and clutch spring 61. The cog-wheel 59 is driven by the pulley 62 by means of the gearing 63, the pulley 62 being driven by the belt I from the motor M as best shown in Fig. 2. The gearing 63 is provided with another friction-clutch 64, which drivingly engages the rim of the drum 35. On the shaft 58 are also mounted two similar complexes, composed of the drums 65 and 65', upon which are respectively wound the flexible bands 66 and 66' which are fastened at their ends to springs 67 and 67' respectively. These drums 65 and 65' are respectively fastened to the discs 68 and 68' and to the cog-wheels 69 and 69'.

Fingers 70 and 70' are mounted on the discs and are adapted to engage cog-wheels 71 and 71' which are fixed on the cog-wheels 72 and 72' which carry fingers 73 and 73' that engage cog-wheels 69 and 69'. The ends of the said fingers abut the conical surfaces of cones 76, 77, 78, 79, that are mounted on the shaft 58 and the action of which engages or disengages the fingers with the cog-wheels 69, 69', 71, 71'. The cog-wheel 72, through the idler gear 74, meshes with the cog-wheel 75 which actuates the rack-arm 57 of the drawer-holding frame, whereas the cog-wheel 72' meshes directly with the cog-wheel 75' which actuates the rack-arm 57' of said frame.

Each of the four above-mentioned cones 76, 77, 78, 79 are provided with a circular groove, within each of which is inserted a finger 80 carried by a transverse rod 81 which is actuated by a lever 82 that is connected, through a system of levers 83, to an auxiliary electro-magnet 84. A spring biased lever 85 is pivotally mounted on the lever 82 and this lever 85 is actuated by a lever 86 under the action of the secondary electro-magnet 9. On the system of levers 83 is also mounted an electric contact 87, whereas a double-action switch 88—88' is fitted opposite to the extreme end of the rack-arm 57 of the drawer-holding frame.

The ends of the flexible bands 66, as best shown in Fig. 11, are fastened to a slidable guide 89, at the other end of which is attached another flexible band 90, which is wound upon the drum 91 that is coaxial with a smaller drum 92, on which is wound still another flexible band 93 that is tensioned by a spring 94. On the shaft of the drums 91 and 92 is also mounted a cog-wheel 95, meshing with the rack 96 which is fixed to a piston 97 that fits in a cylinder 98 having a by-pass 99 and a control valve 100 and acts as a regulator or dampener.

Assuming the system to be in an initial intermediate position A (Fig. 10), the fingers 70 and 70' are engaged with the cog-wheels 71 and 71' and when the motor is started the shaft 58 rotates, driving the cog-wheels 71 and 71', which in their turn cause the drums 65 and 65' to rotate, thus winding the flexible bands 66 and 66' and stretching the springs 67 and 67'. Simultaneously, the electro-magnet 9 causes the lever 86 to reach the position shown in Fig. 10. Conversely, when the motor is thrown out of gear and the action of the electro-magnet 9 ceases, whereupon the lever 86, acting on the spring-finger 85, forces the lever 82 to travel in the direction shown by the arrow B. As a consequence, the finger 70, lifted by the cone 77, disengages from the cog-wheel 71, while the finger 73 engages the cog-wheel 69 of the drum 65, which rotates under the action of the spring 67, thus driving the cog-wheel 72 which, by means of the gearing 74—75, drives the rack-arm 57 to move the drawer-holding frame from the drum 35.

When the operator wants to retract the drawer, he has only to depress the key 99' to close the circuit of the auxiliary electro-magnet 84 which, through the action of the leverage 83, moves the lever 82 in the direction shown by the arrow C and the contact 87 keeps the circuit closed. As the system travels in the direction of arrow C, the cone 78 disengages the finger 70' from the cog-wheel 71' and the cone 79 causes the finger 73' to engage the cog-wheel 69'. At this moment, and under the action of the spring 67', the drum 65' rotates, driving the cog-wheel 72' which, in turn, drives in a reverse rotation the cog-wheels 75 and 75', and by means of the arm 57' the drawer-holding frame is pulled back into its original position, thus interrupting, by means of the contact 88, the circuit of the auxiliary electro-magnet 84 which, through the system of levers 83, restores the whole device to its original position A. The speed of the above-mentioned movements is controlled by the regulator 97—100, through the complex 89/96.

The general functioning of the apparatus is the resultant of the synchronous and consecutive operation of the foregoing mechanisms. Assuming the apparatus is employed as a filing cabinet, although it may have other uses, every single sector in which the main drum 35 is divided will bear

a number, to which all the documents contained in that sector will be referred. Supposing a document contained in the sector No. 36 is wanted, and as the keyboard is provided with a series of keys 1 corresponding to the tens and another corresponding to the units, the operator will depress the key marked 3 in the first series and that marked 6 in the second series and the two keys will remain depressed.

The general switch R (Fig. 13) being closed, the operator will press the switch button P, thus closing the circuit of the primary contact electro-magnet E, which in its turn closes the circuits K and K' respectively pertaining to the motor M and to the secondary electro-magnet 9, as well as the auxiliary circuit K'', which substitutes for the circuit of the switch P. The electro-magnet 9 is thereupon energized and causes the spacer cam 21 to tilt, so that the friction clutch 13—15—16, shown in Fig. 7, is operatively engaged and the rack sliders 12—12' travel until they strike the shank of the depressed keys. As a consequence of the movement of the sliders 12 and 12', the conductor ring 29 rotates to position the insulation sector 30 corresponding to the number formed on the keyboard and the springs 67 and 67' of the drawer-holding frame are loaded.

The operation of the solenoid also causes the pawl 8' to swing into operative position to release the depressed keys 1 and the levers 11 to pull the latch 101 to release the catch 102 from the previously employed drawer 103, as shown in Fig. 6. Each drawer 103 of the series of drawers S is provided with a catch 102 to normally retain the drawer within the drum. Meanwhile, the lever 45 causes the jaws 40 and 42' to disengage the respective pin 39 of the drum 35, whereupon the drum is rotated under the action of the motor M and the transmission belt T. The drum 35 is rotated until the brush 32' of the contact ring 32 (Figs. 7 and 12) reaches the insulated sector 30 of the contact ring 29; whereupon the circuit K'' is interrupted, the electro-magnet 9 is de-energized and its core resumes its initial position and drives the lever 45 into its original position, thus causing the jaws 40 and 42' to catch the corresponding pin 39.

Contemporarily, the oscillations caused by the force of inertia of the drum actuate the ratchet system 52 and frees the arm 57 of the drawer-holding frame, the lever 86 causes the transverse rod 81 to travel in the direction of the arrow B and the drawer frame is pushed out, carrying with it the required drawer 103 of the series of drawers S, the edge 104 of the drawer 103 being engaged in the groove 105 of the frame, as shown in Fig. 12. Simultaneously, the contact 88 is opened and remains open until the drawer-holding frame is pulled in again, thus avoiding any possible mistake in the operation of the apparatus. The de-energization of the solenoid 9 also causes the operation of the spacer cam 21 to disengage the friction-clutch 13—14—15—16 thereby permitting the counter-weights 38 to retract the rack sliders 12—12' and return the contact and conductor rings 29 and 32 to initial position.

When the operator wants the drawer to be pulled in, he presses the button 99 and the mechanism actuating the drawer-holding frame will operate as previously described to retract the drawer into the drum 35, thus causing the

safety contact 88 to close. The apparatus is then ready for further use.

Although a certain specific embodiment of the invention has been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except in so far as is necessitated by the prior art and by the spirit of tne appended claims.

I claim:

1. A device comprising a rotatable drum, drawers mounted in said drum, means for rotating said drum including a contact ring electrically connected with a conducting ring having an insulated section in its periphery, means including a system of sliding members for determining the rotative position of said rings and the degree of rotation of said drums, a plurality of keys in a keyboard for limiting the movement of said sliding members, and means for automatically moving said drawers in and out of said drum when rotated to a predetermined position and including a drawer holding sliding frame, a system of drums for sliding said frame and having flexible bands wound thereon and attached to springs and controlled by a system of cog-wheels and fingers actuated by cones which are displaceable by a transverse rod under the selective action of two electromagnets.

2. A device as defined in claim 1 wherein said keyboard has a plurality of series of keys respectively corresponding to the numerical units of the drawers in said drum.

3. A device as defined in claim 1 wherein each key has a recess for engagement by a locking bar, and said keyboard is provided with a resiliently biased member for disengaging said locking bar from said key recesses, a rachet system for operating said member, and a secondary electromagnet for actuating said ratchet system.

4. A device as defined in claim 1 wherein each slider corresponds to a series of keys, a friction clutch for operating said sliders, a clutch actuating means including two levers spring biased together and separated by an eccentric spacer, and electromagnetically operated means for operating said spacer.

5. A device as defined in claim 1 wherein one of said sliders is provided with a finger engaging within a grooved head including a screw portion, operated and slidably moved axially thereby, a pinion operated by the movement of said screw, and the other slider is provided with a gear engaging said pinion to cause it to rotate.

6. A device as defined in claim 1 wherein one of said sliders is provided with a finger engaging within a grooved head including a screw portion, operated and slidably moved axially thereby, a pinion operated by the movement of said screw, and the other slider is provided with a gear engaging said pinion to cause it to rotate, said screw being threaded within a sliding block forming part of a rack, and a cog wheel engaging said rack and fastened with said conducting ring, whereby to transmit to said ring the sum of rotation and movement of said screw.

7. A device as defined in claim 1 wherein said sliders are biased to starting position by bands connected with counterweights.

8. A device as defined in claim 1 wherein means are provided for stopping the drum and including

a double jawed spring catch lever which is swingingly mounted for selective engagement with one of a plurality of stops on said drum corresponding to said drawers.

9. A device comprising a rotatable drum, drawers mounted in said drum, means for rotating said drum including a contact ring electrically connected with a conducting ring having an insulated section in its periphery, means including a system of sliding members for determining the rotative position of said rings and the degree of rotation of said drum, a plurality of keys in a keyboard for limiting the movement of said sliding members, and means for automatically moving said drawers in and out of said drum when rotated to a predetermined position and including a drawer holding sliding frame, a system of drums for sliding said frame and having flexible bands wound thereon and attached to springs and controlled by a system of cog-wheels and fingers actuated by cones which are displaceable by a transverse rod under the selective action of two electromagnets, said drawer holding sliding frame, including two spring actuated rack arms, which are operated by said drum wound bands, and said drums are fastened to finger supporting discs and to cog wheels, cog wheel supported fingers abutted by said first cog wheels, said first cog wheels, being connected to an arm through an idler wheel and a cog wheel, said latter cog wheel being connected with said arm by another cog wheel.

10. A device as defined in claim 9 wherein the fingers abut grooved cones and are operated thereby to control engagement of the respective cog wheels.

11. A device as defined in claim 9 wherein said transverse rod is provided with fingers operating in grooves in cones which are operated by a lever system, and secondary and auxiliary electromagnets control the operation of said lever system.

12. A device as defined in claim 9 wherein the drawer holding frame arm is provided with a recess for engagement by a spring catch, and a ratchet system for disengaging said catch and actuated by oscillations of the drum when it is stopped.

13. A device as defined in claim 9 wherein said springs connected with said flexible bands are connected by secondary springs and bands with a regulator which includes a piston and a valve.

14. A device as defined in claim 9 wherein the electrical control of the device includes a double action switch.

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