Aug. 3, 1965 N. J. KRUG 3,198,894

ROTARY SWITCH CONSTRUCTION WITH ADJUSTMENT MEANS FOR FILING APPLIANCE

Filed April 30, 1963 3 Sheets-Sheet 1

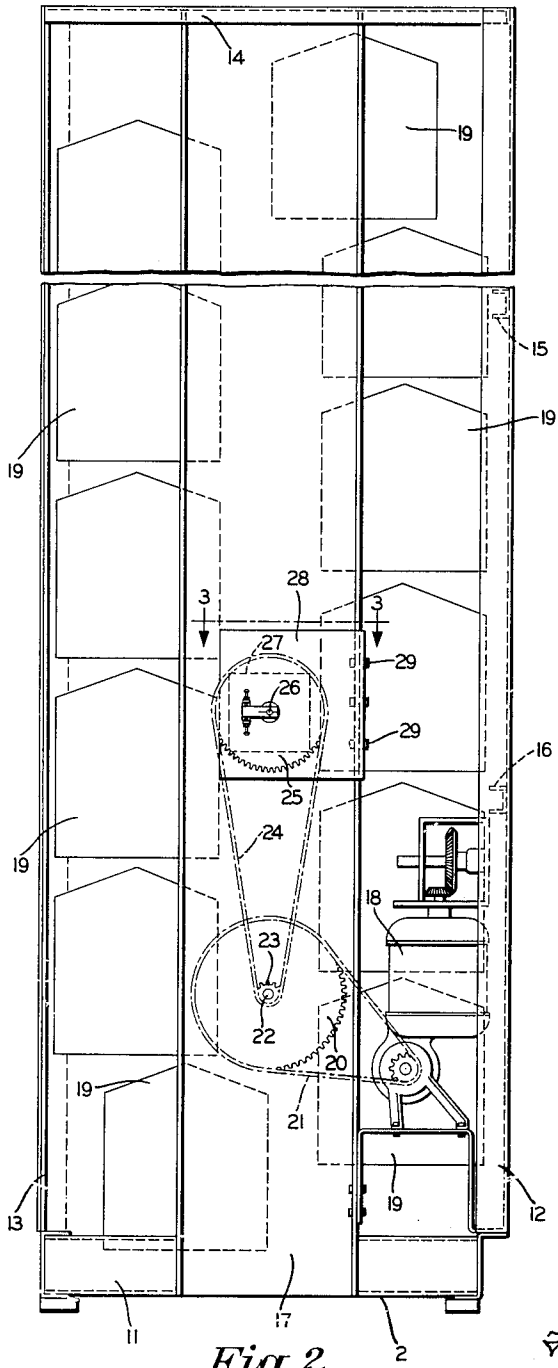


Fig. 2

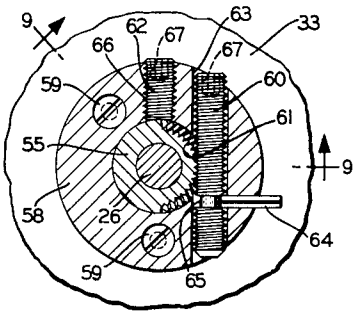


Fig. 8

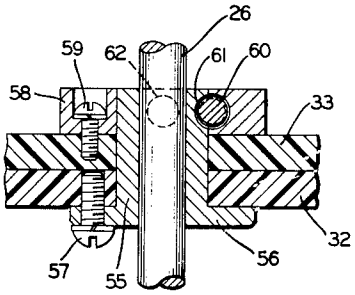


Fig. 9

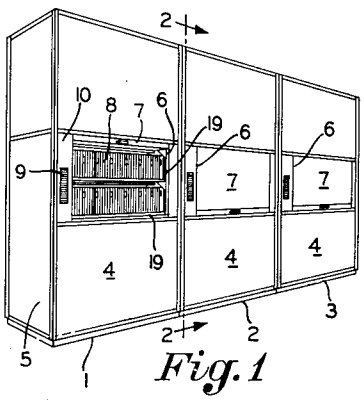


Fig. 1

INVENTOR.
Newton J. Krug
BY
Frease, Bishop, Johns & Schick
ATTORNEYS

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Filed April 30, 1963 3 Sheets-Sheet 2

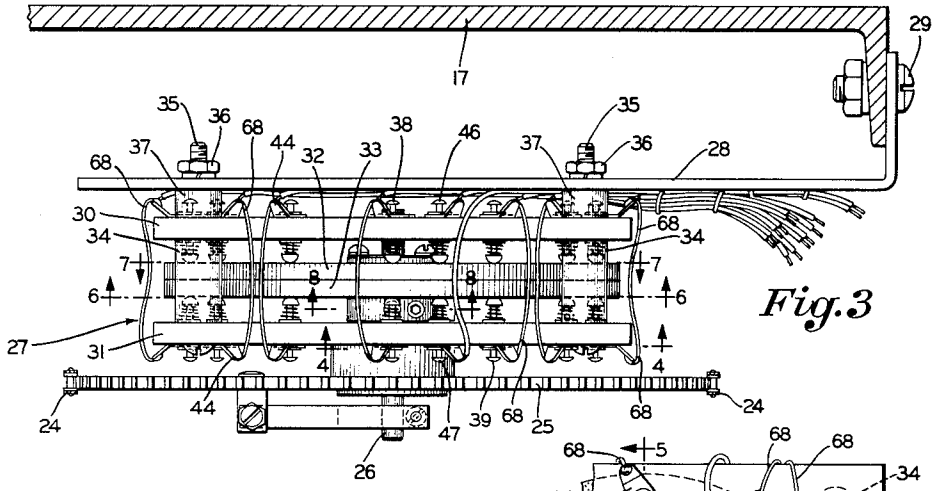


Fig. 3

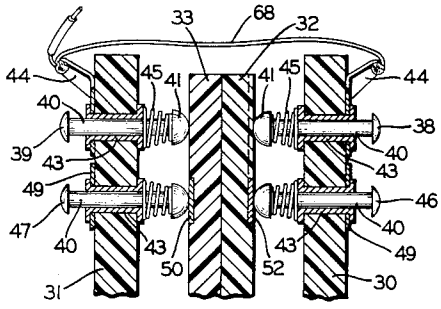


Fig. 5

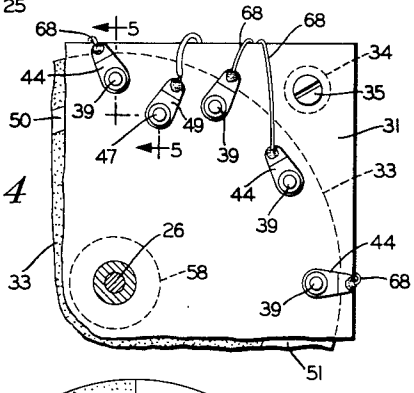


Fig. 4

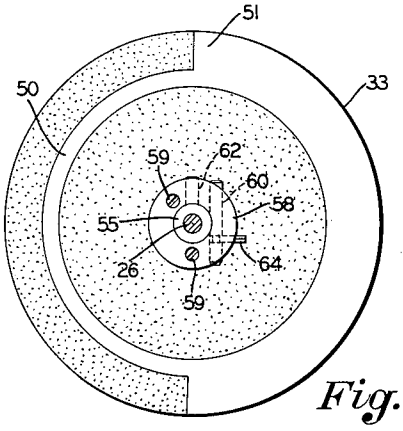


Fig. 6

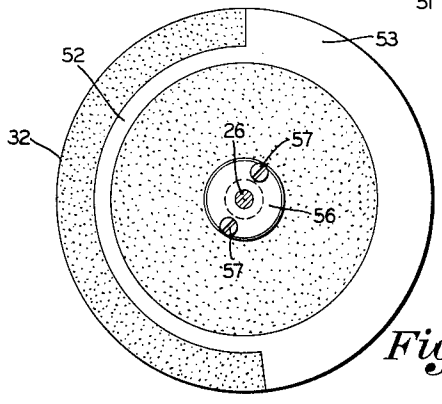


Fig. 7

INVENTOR.
Newton J. Krug
BY
Frease, Bishop, Johns & Schick
ATTORNEYS

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ROTARY SWITCH CONSTRUCTION WITH ADJUSTMENT MEANS FOR FILING APPLIANCE

Filed April 30, 1963 3 Sheets-Sheet 3

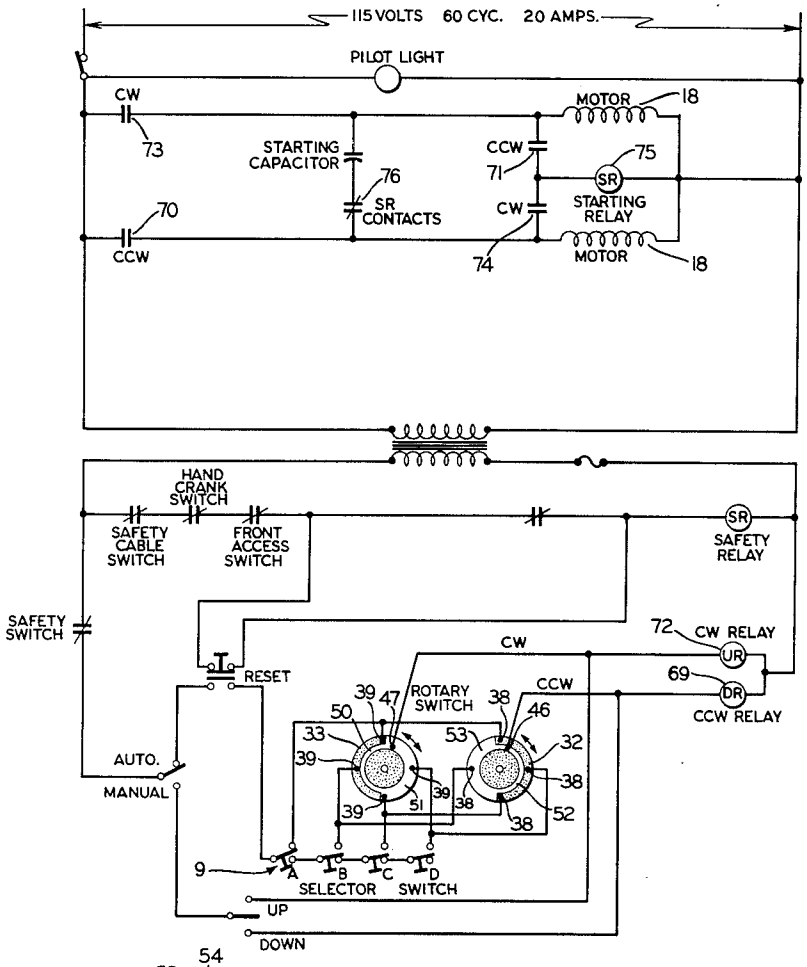


Fig. 11

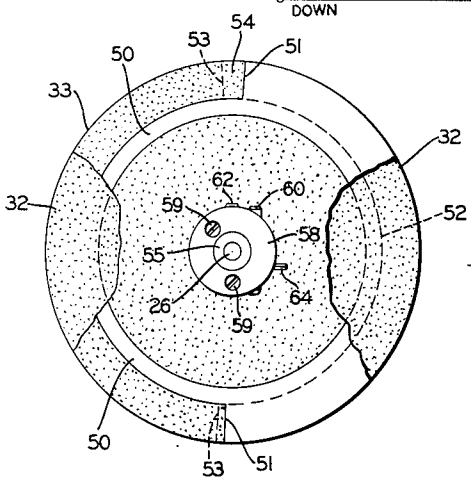


Fig. 10

INVENTOR.
Newton J. Krug
BY
Frease, Bishop, Johns & Schick
ATTORNEYS

United States Patent Office 3,198,894 Patented Aug. 3, 1965

3,198,894

ROTARY SWITCH CONSTRUCTION WITH ADJUSTMENT MEANS FOR FILING APPLIANCE

Newton J. Krug, Canton, Ohio, assignor to Diebold, Incorporated, Canton, Ohio, a corporation of Ohio

Filed Apr. 30, 1963, Ser. No. 276,711
10 Claims. (Cl. 200—11)

This invention relates to a filing appliance for storing records in separate categories or groups that are movable through a continuous orbit of travel. More particularly, the invention pertains to a switch construction for selecting each category of records and bringing the same to an accessible position or opening in the housing of the appliance.

Mechanized filing appliances or files have been used in greater numbers for storage of large volumes of active records and other media such as disclosed in Patent No. 2,940,810. With increased acceptance of such appliances, their size has increased vertically. More recent embodiments of mechanized or power-driven filing appliances extend from the floor to the ceiling with a multitude of record-carrying trays within the housing of the appliance.

A problem associated with the larger files has been the delivery of a tray to the access opening in the housing from a remote position in the orbit of travel of the tray. For that purpose, tray-selector switches have been provided with auxiliary switches which automatically indicate whether the selected tray is to move clockwise or counterclockwise through the shorter distance to the access opening in the file housing. An example of such an auxiliary switch is disclosed in Handel Patent No. 2,985,726.

With larger files there is a problem of maintaining proper alignment of a tray with the access opening in the housing. When a file has been adjusted at the factory for this alignment, this is usually done with the file empty or with weights simulating the records to be housed in the file. After the file is in position and filled with the customer's records, these often are quite different in weight and balance from the simulated weights used for factory adjustment, thus necessitating field alignment to suit the customer's particular records. In addition, most customers want the tray adjustments to suit their particular requirements, as individual operators vary in physical size, reach, etc., and thus need tray adjustments for maximum efficiency.

With larger files there is a problem of maintaining proper alignment of a tray with the access opening in the housing. When a file has been in use for a period of time, the file may loosen up when its original tightness wears off. When the motor operating the file stops, the momentum of the moving parts may cause a tray to coast for a greater distance than when the file was new. For that reason, it may be necessary to make on-site or field adjustments to cause the trays to stop at proper alignment with the access opening.

It has been found that the foregoing problems can be overcome by providing a rotary switch which is adjustable for bringing the card-carrying trays into alignment with the access opening. The switch is provided with one semi-circular conductor for indicating clockwise movement of the trays with another semi-circular conductor for indicating counterclockwise movement of the trays. The conductors supplement each other and cover a circular

zone except for a so-called "stop space" between one pair of ends of the conductors. The stop space is dielectric.

In addition, the rotary switch includes two sets of spaced conductor contacts, one set for clockwise movement and another set for counterclockwise movement. The number of contacts in each set is equal to the number of card-carrying trays. Inasmuch as each conductor is mounted on a separate disc, the length of the stop space may be adjusted to cause a contact corresponding to the selected drawer to stop in the center of the stop space. If the contact stops beyond the center, the next tray traveling in the opposite direction (whether clockwise or counterclockwise), stops in further misalignment with the access opening.

In addition, it has been found that where the larger files are mounted in end-to-end abutment, the on-site adjustments are substantially impossible because of the necessity of removing the end wall of the housing. Thus, access to the rotary switch may be provided by a detachable access panel in the front wall of the file. In that manner, the length of the stop space may be adjusted by a worm and worm gear which are accessible through the housing front wall upon removal of the access panel.

Accordingly, it is an object of this invention to provide a switch construction for a filing appliance having readily adjustable means for maintaining alignment of a card-carrying tray with the tray access opening in the housing of a filing appliance.

It is another object of this invention to provide a switch construction for a filing appliance which facilitates alignment of a tray with the access opening in the housing to suit the customer's particular records, as well as the individual operator's physical size and reach.

It is another object of this invention to provide a switch construction for a filing appliance having a pair of rotatable switch plates one of which is adjustable with respect to the other.

It is another object of this invention to provide a switch construction for a filing appliance having an electric circuit between tray selector switches and the file operating motor which circuit includes a rotatably adjustable conductor plate having readily accessible adjustment means.

It is another object of this invention to provide a switch construction for a filing appliance having a rotatable disc for adjusting the alignment of the file trays with a tray access opening whether the trays move clockwise or counterclockwise.

Finally, it is an object of this invention to provide a switch construction for a filing appliance which substantially eliminates the difficulties enumerated and obtains the foregoing desiderata in an effective manner.

These and other objects and advantages, apparent to those skilled in the art from the following description and claims, may be obtained, the stated results achieved, and the described difficulties overcome, by the apparatus, constructions, arrangements, combinations, subcombinations, elements, parts, and principles, which comprise the present invention, the nature of which is set forth in the foregoing general statements, a preferred embodiment of which—illustrative of the best mode in which applicant has contemplated applying the principles—is set forth in the following description and shown in the drawings, and which is particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the discoveries and improvements of the present invention may be stated in general terms as including a plurality of record-carrying trays mounted between a pair of spaced tray supports for moving the trays in an endless orbit of travel and for stopping a selected tray at an access opening in the housing surrounding the trays, a reversible motor operatively connected to the tray supports, a rotary-switch having a rotatable shaft with a pair of rotary plates mounted on the shaft, one of the plates being fixedly mounted on and the other rotary plate being adjustably mounted on the shaft, each rotary plate having first and second arcuate conductors, the first conductor on the one rotary plate extending through an arc equal to substantially 180°, the first conductor on the other rotary plate being equal to less than 180° and the supplementing the portion of a circular zone covered by the first conductor on the one rotary plate, there being a stop space in said zone between the ends of said conductor, means for rotatably adjusting said other rotary plate on the shaft with respect to the one rotary plate and for varying the length of the stop space, the second conductor on each rotary plate extending through a 360° arc, the first and second conductors on each plate being interconnected, a plurality of spaced first contacts engageable with and disposed in the path of travel of the first conductor on the one rotary plate, a plurality of spaced second contacts engageable with and disposed in the path of travel of the first conductor in the other rotary plate, each contact of the first contacts being connected to one contact of the second contacts and forming a pair of contacts in an electric circuit means for operating the reversible motor, each pair of contacts corresponding to one tray on the tray support, a rotatable shaft operatively connected to the motor, the means for rotatably adjusting said other rotary plate on the shaft including worm and worm gear means, which worm is provided with a wrench-receiving head facing in the direction of the axis of the worm.

A preferred embodiment of the invention is illustrated by way of example in the accompanying drawings wherein:

FIGURE 1 is a perspective view of three room-high power-operated filing appliances;

FIG. 2 is a vertical sectional view taken within one end wall of the housing on the line 2—2 of FIG. 1, showing the relative positions of the electric motor and the switch, and showing several card-carrying trays diagrammatically;

FIG. 3 is an enlarged horizontal sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary elevational view taken on the line 4—4 of FIG. 3;

FIG. 5 is an enlarged vertical sectional view taken on the line 5—5 of FIG. 4;

FIG. 6 is an elevational view of one side of the adjustable rotary plate, taken on the line 6—6 of FIG. 3;

FIG. 7 is an elevational view of one side of the fixed rotary plate, taken on the line 7—7 of FIG. 3;

FIG. 8 is an enlarged vertical sectional view of the adjustment means for the adjustable rotary plate of FIG. 6, taken on the line 8—8 of FIG. 3;

FIG. 9 is a sectional view taken on the line 9—9 of FIG. 8;

FIG. 10 is an elevational view (partly broken away) of the adjustable and fixed rotary plates in side-to-side surface abutment; and

FIG. 11 is a wiring diagram.

Similar numerals refer to similar parts throughout the several views of the drawings.

In FIG. 1 three mechanized or power files **1**, **2**, and **3** are shown in end-to-end alignment with each other.

The files being similar include a front wall **4** and opposite end walls such as end wall **5** for the file **1**. The walls constitute the outer housing of the file. Each front wall **4** includes an access opening **6** that is provided with a movable cover **7** which may be raised out of closing position when access is desired to file records or media **8** within the opening **6**. A selector switch **9** is provided on a removable control panel **10** which switch includes a pushbutton for each record-carrying tray, a reset button, as well as an off-on control switch.

In FIG. 2 the file **2** is shown with the end wall **5** removed. The file frame includes a base **11**, front and rear vertical frame members **12** and **13**, a top frame member **14**, and horizontal channel members **15** and **16** which define the upper and lower limits of the access opening **6**. The frame also includes a vertical channel member **17** at each end of the file and which extends between the base **11** and the top frame **14**.

Operating parts of the file include a reversible electric motor **18** and a plurality of spaced card-carrying trays **19** which move in an endless orbit in clockwise or counterclockwise directions within the file housing. The trays **19** are shown diagrammatically for purposes of illustration and the manner in which they are mounted is not a part of the present invention. The motor **18** drives a sprocket **20** through a drive chain **21** and the sprocket is mounted on a drive shaft **22**. A pinion gear **23** is mounted on the shaft **22** which in turn drives a chain **24** which extends over and around a sprocket **25**. The sprocket **25** is mounted on a shaft **26**, and the sprocket makes one revolution for each revolution of each tray **19** (clockwise or counterclockwise).

In addition to the selector switch **9** (FIG. 1), the file is provided with a rotary switch **27** (FIGS. 2 and 3) for controlling the clockwise and counterclockwise directions of movement of the trays **19**. The switch is attached to a mounting plate **28** by space bolts **29** attached to the channel frame member **17** at a vertical level from the floor substantially equal to that of the removable control panel **10** (FIG. 1). The switch includes a pair of spaced stationary plates **30** and **31**, a pair of rotatable discs or plates **32** and **33**, which discs are mounted on the shaft **26**. The end portions of the shaft **26** are journally mounted in the spaced plates **30** and **31** which are preferably rectangular and are held in spaced relationship by cylindrical spacer members **34** at each corner thereof. Bolts **35** extend through the spacers and aligned openings in the plates and (FIG. 3) are secured to the mounting plate **28** by nuts **36**. The plate **30** likewise is held in spaced relationship from the plate **28** by cylindrical spacers **37** through which the bolts **36** extend similar to the spacers **34**.

The switch **27** also includes a plurality of contacts **38** which are mounted on the stationary plate **30**, and another set of contacts **39** which are mounted on the plate **31**. The number of the contacts in each set of contacts **38** and **39** corresponds to the number of trays **19**; i.e., each contact **38** and **39** corresponds to a given tray **19**. As shown more specifically in FIG. 5, each contact **38** and **39** includes an elongated portion **40** with an enlarged head **41** which is urged against the surface of the corresponding rotatable disc. Each contact **38** and **39** is mounted in the corresponding plate **30** and **31** within a bushing **43** extending through an aperture in the plate and each bushing is provided with a solder lug **44**. To maintain constant engagement of the contact with the discs **32** and **33**, each contact **38** and **39** is provided with a coil spring **45**.

In FIG. 4 a quarter portion of the plate **31** is shown with the contacts **39** disposed at equally spaced arcuate positions. The contacts **39** are disposed entirely around the plate **31** in a circular zone with the axes of the contacts at equal distance from the axis of the shaft **26**. The contacts **38** are similarly disposed on the plate **30**. In

addition, each plate 30 and 31 is provided with an additional single contact 46 and 47, respectively, which contact is situated in the circle of the sets of the contacts 38 and 39. The contacts 46 and 47 are also provided with similar solder lugs 49 as shown for the contacts 47 (FIG. 4).

The rotatable discs 32 and 33 are composed of a dielectric material such as a phenolic resin having a melamine surface. One side of each disc is in abutment with one side of the other disc (FIGS. 3 and 10) and the opposite remote sides of both discs are provided with a circuit pattern which is preferably embedded in the surface of each disc. As shown in FIG. 6, the disc 33 includes a circular metallic conductor 50 which extends through a 360° arc about the disc. An outer metallic conductor 51 is provided as an outer peripheral portion of the conductor 50 and extends through an arc of slightly greater than 180°, preferably 181°-15′ ±15′. Likewise, the disc 32 (FIG. 7) includes a metallic contact 52 which extends through a 360° arc and has an outer peripheral portion 53 which extends through an angle of slightly less than 180° and preferably 173°-15′ ±15′. The total extent of both metallic conductors 51 and 53 is substantially 354° and 30′. Thus, when the discs 32 and 33 are placed in surface-to-surface abutment, the metallic conductor 51 extends through one-half portion of a circular zone and the metallic contact 53 extends through the supplemental portion of the same zone, but leaves a dielectric segment or stop space 54 (FIG. 10) of approximately 6° maximum. The stop space 54 is intentionally provided between one pair of the ends of the metallic conductors 51 and 53.

The metallic conductors 50–53 are preferably copper foil members on one side of each disc 32 and 33 which are embedded in the melamine surface of the disc and are flush with the surface. The outer surface of the copper foil is preferably plated with .0005″ nickel and .00001″ rhodium. The conductors 50–53 serve as commutators or slip rings with which the contacts 38, 39, 46, and 47 engage. More particularly, the set of contacts 38 on the plate 30 engage only the outer peripheral metallic conductor portion 53. Similarly the set of contacts 39 on the plate 31 only engage the outer metallic conductor 51 of the disc 33. The contacts 46 and 47 engage the metallic conductors 52 and 50, respectively. During a complete turn of the discs 32 and 33, the sets of contacts 38 and 39 ride on and off of the metallic conductor portions 51 and 53, while the contacts 46 and 47 remain in constant contact with the conductors 52 and 50.

As shown in FIGS. 6 and 7, the conductors 50 and 52 are in electric engagement with the outer peripheral conductor portions 51 and 53, respectively. Accordingly, a circuit passing through any one of the contacts 38 or 39 also passes through the contact 46 or 47 in order to complete a circuit through the motor 18.

The discs 32 and 33 are separately mounted on the shaft 26, as shown in FIGS. 8 and 9. Both discs are mounted on a central hub or bushing 55, one side of which is provided with a flange 56. The hub 55 is fixedly mounted on the shaft 26 such as by a press-fit. Likewise, the disc 32 is fixedly mounted on the hub 55 by means of bolts 57 extending through the flange 56 and into the inner radial portion of the disc.

On the other hand, the disc 33 is rotatably mounted on the hub 55 and is secured in place by a mounting ring 58 with bolts 59. In addition, means for rotating the disc 33 and for holding it in a particular position with respect to the disc 32 are provided (FIG. 8) which means includes a worm screw 60 and a worm gear 61, the latter of which extends through a portion of the outer surface of the hub 55. A set screw 62 is also provided. The worm screw 60 is seated in an aperture 63 in the ring 58 and is secured in place by a pin 64, the inner end of which rides in an annular groove 65 of the screw 60. The set screw 62 is seated in a threaded aperture 66 and the inner end is engageable with the outer surface of the hub 55 for holding the disc 33 in place once the setting is established by the screw 60.

As shown in FIG. 8, both screws 60 and 62 are provided with similar wrench-receiving aperture means 67 such as sockets for an Allen wrench. The axes of both screws 60 and 62 are perpendicular to the axis of the shaft 26. Thus, the holes or sockets 67 extend toward the access panel 10 (FIG. 2) of the file and are accessible thereby upon removal of the panel 10 for adjustment settings of the disc 33 with respect to the disc 32.

As shown in the wiring diagram (FIG. 11) the metallic conductors 50–53 constitutes a portion of the electric circuit between the selector switch 9 and the motor 18. The conductor portion 51 which extends through an arc of slightly greater than 180° operates to move the file trays 19 in a clockwise direction when such movement is the shorter route to the access opening 6. Similarly, the metallic conductor portion 53 which extends through an arc of slightly less than 180°, operates to move the file drawers 19 in the counterclockwise direction when that direction is the shorter between the position of a selected tray and the access window 6. For purposes of explanation, it is assumed that a file has only four trays 19 for which reason four selector buttons A, B, C, and D are provided in the selector switch 9 (FIG. 11). It is assumed further that the selector switch buttons A, B, C, and D are mechanically locking and mechanically interlocked. As shown in FIG. 11, the push button A has been previously depressed and the contacts 38 and 39 connected to said push button both engage the dielectric portions of the two discs 32 and 33 which position corresponds to the stop spot 54 (FIG. 10).

As shown in FIGS. 3, 5, and 11, each contact 38 is aligned with a corresponding contact 39 and as such said contacts are interconnected by wires 68 to provide pairs of interconnected contacts which corresponds with a specific tray 19. Accordingly, if any other tray 19 is selected by depressing, for instance, the selector button B, the button A is released and returned automatically to its position corresponding to the position shown for buttons C and D (FIG. 11). A circuit is closed through the button B, the contact 38, the conductor 53, the contact 46, and through the circuit to the motor 18. Accordingly, the tray 19 corresponding to the selector button B moves in the counterclockwise direction to the access window 6 of the file. For that purpose, the circuit through wiring diagram actuates a counterclockwise relay 69 which in turn closes the circuit through contacts 70 and 71 for operating the motor 18 in the counterclockwise direction. During operation of the motor the rotary switch discs 32 and 33 rotate until the stop spot 54 passes under the contacts 38 and 39 which immediately breaks the circuit through the relay 69, and therefore opens the circuit through the contacts 70 and 71, causing the motor 18 to stop.

On the other hand, if a tray 19 is selected corresponding to the push button D, the circuit is closed through the contact 39, the conductor 51, the contact 47, and a clockwise relay 72 which relay closes the circuit through a pair of clockwise contacts 73 and 74 for operating the motor 18 in the opposite direction.

The motor 18 is a single phase motor and as shown in FIG. 11, it is provided with two windings, one of which serves as a starting winding when the motor turns in one direction and one of which serves as a main winding when the motor turns in the same direction. On the other hand, when the motor turns in the opposite direction, the main and starting windings have reverse purposes. For that reason, a starting relay 75 is provided which operates at a desired voltage to open starting relay contacts 76 which opens the circuit through the particular winding serving as the starting winding for a particular operation of the file. In the alternative, the relay 75

and contacts 76 may be substituted for by a centrifugal switch.

When an even number of trays 19 are provided, the file farthest away from the access window 6 may travel either in clockwise or counterclockwise direction to the access window because both directions of travel are of equal length. For that reason, when the tray 19 corresponding to the push button C is selected, the circuit is closed through the contact 39 rather than the contact 38 as well as the conductor 51 and the contact 47 to the clockwise relay 73

For that reason, the conductor portion 51 extends through an arc slightly greater than 180°, and the conductor portion 53 extends through an arc substantially less than 180° as well as the length of the conductor 51. Thus, an even number of trays, the tray diametrically opposite the tray corresponding to the contacts at the stop space 54, engages the clockwise conductor 51. When an odd number of trays 19 are used, there is no contact diametrically opposite the contacts disposed at the stop space 54 for which reason the conductor 51 may extend only through an arc of 180°. Moreover, the end portions of the conductors 51 and 53 opposite the stop space 54 do not overlap in order to avoid simultaneous operation of both the realys 69 and 72.

When the circuit is open through the motor 18, momentum causes the trays 19 to coast slightly before stopping. For that reason, the length of the stop space is adjustable by turning the worm screw 60 until the particular contacts 38 or 39 stops at the center of the stop space 54. After a period of time, the file loosens up and coasts further than when it was originally installed. It may, therefore, be necessary to increase the length of the stop space 54 by adjustment of the worm screw 60. Where the wrench sockets 67 of the worm screw 60 and set screw 62 are directed toward the removable access panel 10, adjustment of the stop space 54 is a short-time operation.

The switch construction of the present invention provides a pair of rotatable discs for controlling clockwise and counterclockwise movement of the trays. Once started, the discs continue rotating until a contact corresponding to a selected tray moves onto the dielectric stop space mounted in the electric circular zone of the orbit of travel in the contact. Although the circuit through the motor is broken, the trays continue moving due to momentum, causing the discs to rotate a corresponding distance. Because of the frequent reversing of movement of the trays in clockwise or counterclockwise directions, it is necessary that the contact stop at the center of the dielectric stop space. Under such conditions, the trays continue to stop in alignment with the access opening of the housing.

The construction of the present invention further provides for a means for expeditiously readjusting the length of the stop space when necessary, such as when operating parts loosen up and, therefore, permit the trays to coast further after the motor stops. The adjustment means for the stop space includes a worm and worm gear to which access may be had through an access panel in the front wall of the file. By providing adjustment means through the front panel, two or more similar files may be placed in end-to-end abutment without the necessity of ever moving one file or making such adjustments where the access panel is not provided and the adjustment must, therefore, be made through the end wall of the file.

In the foregoing descrpition certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and the use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

What is claimed is:

1. In motor-driven file equipment of the type wherein a plurality of record-carrying trays are mounted between spaced tray support means for movement of the trays in an endless orbit of travel and for stopping such movement to position a selected tray at an access opening in a housing surrounding the trays, and wherein a reversible motor is operatively connected to the tray support means for moving said trays in said orbit of travel; the combination of a rotary switch having stationary plate means, a shaft rotatable on an axis, a first rotary plate fixedly mounted on the shaft, a second rotary plate rotatably adjustably mounted on the shaft for rotatable movement with said shaft, said first and second rotary plates being disposed in generally parallel and axial alignment with said stationary plate means, each of the first and second rotary plates having first and second arcuate conductors mounted thereon and movable therewith, the first conductor on the first rotary plate extending through an arc equal to substantially 180°, the first conductor on the second rotary plate extending through an arc equal to slightly less than 180° and being located to arcuately supplement the portion of a circle through which the first plate first conductor arc extends, one end of each first arcuate conductor on the first and second rotary plates being located substantially in spaced axial alignment and the other ends of said first arcuate conductors terminating circumferentially short of completing a 360° circle thereby forming an arcuate stop space in said circle on each of said rotary plates having axially spaced arcuately overlapping portions adjacent said other first arcuate conductor ends, means operably connected to the second rotary plate for selectively rotatably adjusting the second rotary plate on the shaft with respect to the first rotary plate thereby varing the extent of arcuate overlap of said arcuate stop spaces, the second conductor on each rotary plate extending through a 360° arc, the first and second conductors on the first rotary plate being inter-connected, the first and second conductors on the second rotary plate being interconnected, a plurality of spaced first contacts, means mounting said first contacts on the stationary plate means, said first contacts being engageable with and disposed in the path of travel of the first rotary plate first conductor, a plurality of spaced second contacts, means mounting said second contacts on the stationary plate means, said second contacts being engageable with and disposed in the path of travel of the second rotary plate first conductor, each contact of the first contacts being connected to a contact of the second contacts and forming a pair of contacts, electric circuit means operably connected through said contacts and conductors to the reversible motor for operating the reversible motor to move the trays in said orbit of travel, each pair of contacts corresponding to one tray on the tray support means, and the rotatable switch shaft having means adapted to be operably connected to the motor for rotation by said motor during tray movement in said orbit of travel.

2. The switch construction of claim 1 in which the rotary plates turn through one complete revolution synchronized with one complete orbit of tray travel.

3. The switch construction of claim 1 in which the first and second rotary plates are mounted on the rotary switch shaft with axially adjacent plate sides abutting and with the plate conductors concentrically disposed on plate sides opposite said abutting sides.

4. In motor-driven file equipment of the type wherein a plurality of record-carrying trays are mounted between spaced tray support means for movement of the trays in

an endless orbit of travel and for stopping such movement to position a selected tray at an access opening in a housing surrounding the trays, and wherein a reversible motor is operatively connected to the tray support means and controlled by a selector switch for each tray for moving said trays in said orbit of travel; the combination of electric circuit means including a rotary switch in the circuit having a shaft rotatable on an axis, first and second arcuate conductors, means mounting the first and second arcuate conductors to extend arcuately around the shaft axis; first and second sets of spaced contacts, means mounting the first set of contacts on the rotary switch for electrical contact with the first conductor and the second set of contacts on the rotary switch for electrical contact with the second conductor upon relative rotation between said first and second sets of contacts and said first and second arcuate conductors; one of said mounting means for said arcuate conductors and said sets of contacts being operatively connected to the shaft for rotatable movement with said shaft to provide relative rotatable movement between said sets of contacts and said arcuate conductors; one each of the contacts of each of the sets being electrically connected to one of the selector switches, the first arcuate conductor extending around the shaft through an arc of 180°; the second arcuate conductor extending around the shaft through an arc of less than 180° and being located to arcuately extend the 180° arc of the first arcuate conductor; the first and second arcuate conductors each having an end located substantially in spaced axial alignment and having their other ends terminating circumferentially short of completing a 360° circle thereby providing non-conductive portions on said arcuate conductor mounting means having axially spaced ends adjacent said other conductor ends located in overlapping relation, means for relatively rotatably adjusting the first and second arcuate conductor mounting means to selectively arcuately adjust the extent of overlap of said overlapping non-conductive end portions of said arcuate conductor mounting means; and means for electrically connecting the reversible motor in the circuit with the selector and rotary switches for operating the reversible motor to move the trays in said orbit of travel when the electric circuit is closed through said selector and rotary switches; whereby operation of one of the selector switches closes a circuit to the motor through one of the contacts and one of the conductors electrically connected to that selector switch thereby operating the motor, and whereby operation of the motor continues until said one contact is positioned opposite said overlapped non-conductive end portions.

5. In motor-driven file equipment of the type wherein a plurality of record-carrying trays are mounted between spaced tray support means for movement of the trays in an endless orbit of travel and for stopping such movement to position a selected tray at an access opening in a housing surrounding the trays, and wherein a reversible motor is operatively connected to the tray support means and controlled by a selector switch for each tray for moving said trays in said orbit of travel; the combination of electric circuit means including rotary switch means in the circuit electrically connected to the reversible motor for controlling clockwise and counterclockwise movement of the trays in said endless orbit of travel; the rotary switch means having a shaft rotatable on an axis, a clockwise arcuate conductor and a counterclockwise arcuate conductor, means mounting the clockwise and counterclockwise arcuate conductors on the switch means to extend arcuately around said axis, first and second sets of spaced contacts, means mounting the first set of contacts on the switch means for electrical contact with the clockwise conductor and the second set of contacts on the switch means for electrical contact with the counterclockwise conductor upon relative rotation between said first and second sets of contacts and said clockwise and counterclockwise condutors; one of said mounting means for said conductors and said sets of contacts being mounted for rotatable movement on said switch means to provide relative rotatable movement between said sets of contacts and said conductors, one each of the contacts of each of the sets of contacts being electrically connected to one of the selector switches, the clockwise conductor extending around said shaft axis through an arc of 180°, the counterclockwise conductor extending around said shaft axis through an arc of less than 180° and being located to arcuately extend the 180° arc of said clockwise conductor; the clockwise and counterclockwise conductors each having an end located substantially in spaced axial alignment and having their other ends terminating circumferentially short of completing a 360° circle thereby providing non-conductive portions on said conductor mounting means having axially spaced ends adjacent said other conductor ends located in overlapping relation, and means for relatively rotatably adjusting the clockwise and counterclockwise conductor mounting means to selectively arcuately adjust the extent of overlap of said overlapping non-conductive end portions of said conductor mounting means; whereby operation of one of the selector switches closes a circuit to the motor through one of the contacts and one of the conductors electrically connected to that selector switch thereby operating the motor, and whereby operation of the motor continues until said one contact is positioned opposite said overlapped non-conductive end portions.

6. The switch construction of claim 5 in which the rotary switch means also includes circular conductor means, means mounting the circular conductor means on the switch means extending about said shaft axis concentric with the clockwise and counterclockwise arcuate conductors, and means electrically connecting the circular conductor means with the clockwise and counterclockwise conductors and with the reversible motor for providing circuit connections between said clockwise and counterclockwise conductors and the reversible motor.

7. In motor-driven file equipment of the type wherein a plurality of record-carrying trays are mounted between spaced tray support means for moving the trays in an endless orbit of travel and for stopping a selected tray at an access opening in a housing surrounding the trays, and wherein a reversible motor is operatively connected to the tray support means and controlled by a selector switch for each tray for moving said trays in said orbit of travel; the combination of an electric circuit including a rotary switch having a shaft rotatable on an axis, a first rotary plate fixedly mounted on the shaft, a second rotary plate adjustably mounted on the shaft, means for rotatably adjusting the second rotary plate on the shaft, the first rotary plate having a clockwise arcuate conductor and a circular common conductor, the second rotary plate having a counterclockwise arcuate conductor and a circular common conductor, all of said conductors being concentrically disposed about the axis of the rotatable shaft, one of the clockwise arcuate conductor and the counterclockwise arcuate conductor extending through an arc equal to substantially 180°, the other of the clockwise arcuate conductor and counterclockwise arcuate conductor extending through an arc of slightly less than 180° and supplementing the portion of a circle covered by said one arcuate conductor, there being a dielectric stop space in the circle between the ends of the one and the other arcuate conductors, the conductors on each rotary plate being electrically interconnected, a plurality of spaced first contacts, means mounting said first contacts engageable with and disposed in the path of travel of the clockwise arcuate conductor on the first rotary plate, a plurality of spaced second contacts, means mounting said second contacts engageable with and disposed in the path of travel of the counterclockwise arcuate conductor on the second rotary plate, and means mounting each of the contacts of each of the first and second sets of contacts electrically connected to one of the selector switches, whereby ac-

tuation of a selector switch closes the circuit through a corresponding contact and arcuate conductor and whereby operation of the motor continues until said corresponding contact engages the stop space in the circular path of travel of the conductors.

8. The switch construction of claim 7 in which the means for rotatably adjusting the second rotary plate on the shaft includes worm and worm gear means.

9. The switch construction of claim 8 in which the axis of said worm is disposed in a plane parallel to the plane of the rotary plates.

10. The switch construction of claim 9 in which the worm is provided with a wrench-receiving head facing in the direction of the axis of the worm.

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BERNARD A. GILHEANY, *Primary Examiner.*