March 18, 1952 L. W. BELEW 2,589,598

ROTARY CARD FILING APPARATUS

Filed June 9, 1948 4 Sheets-Sheet 1

Fig. 1.

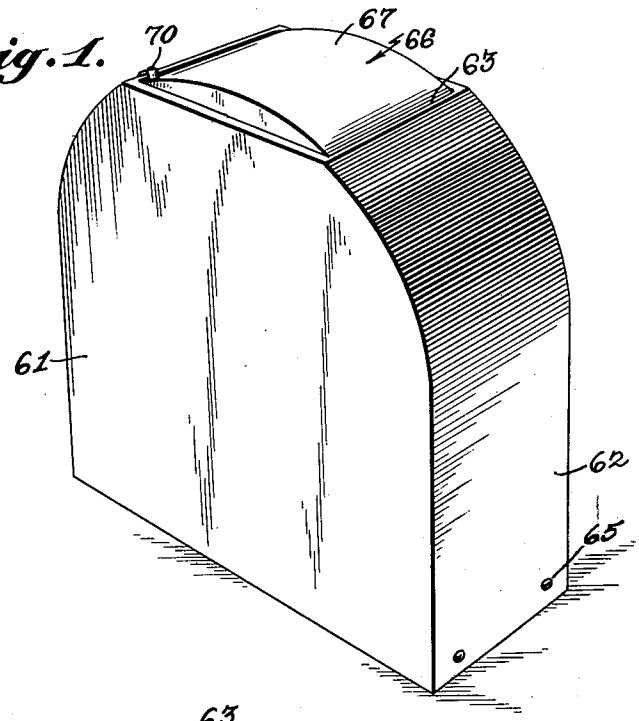
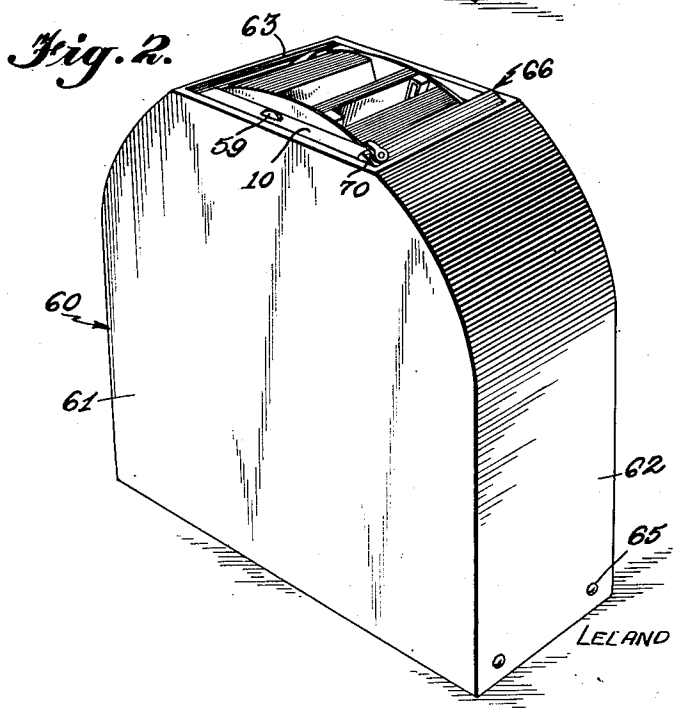


Fig. 2.



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ROTARY CARD FILING APPARATUS

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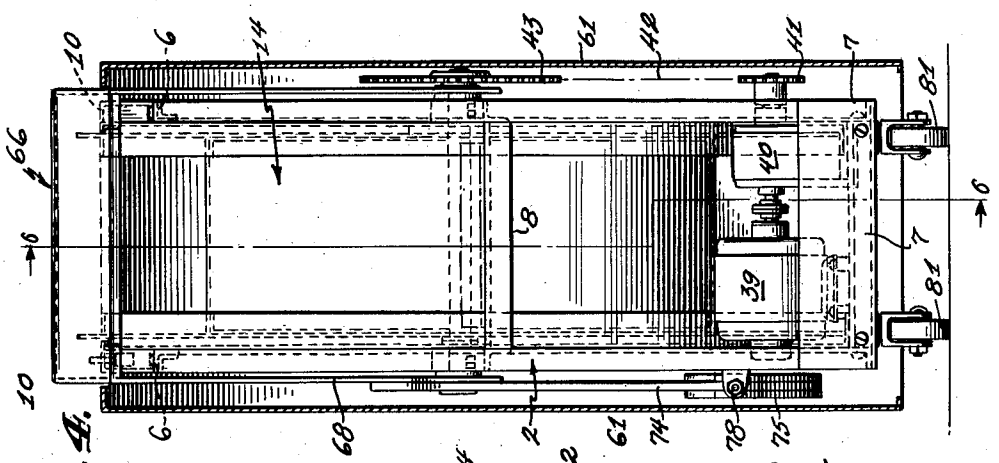

Fig. 4.

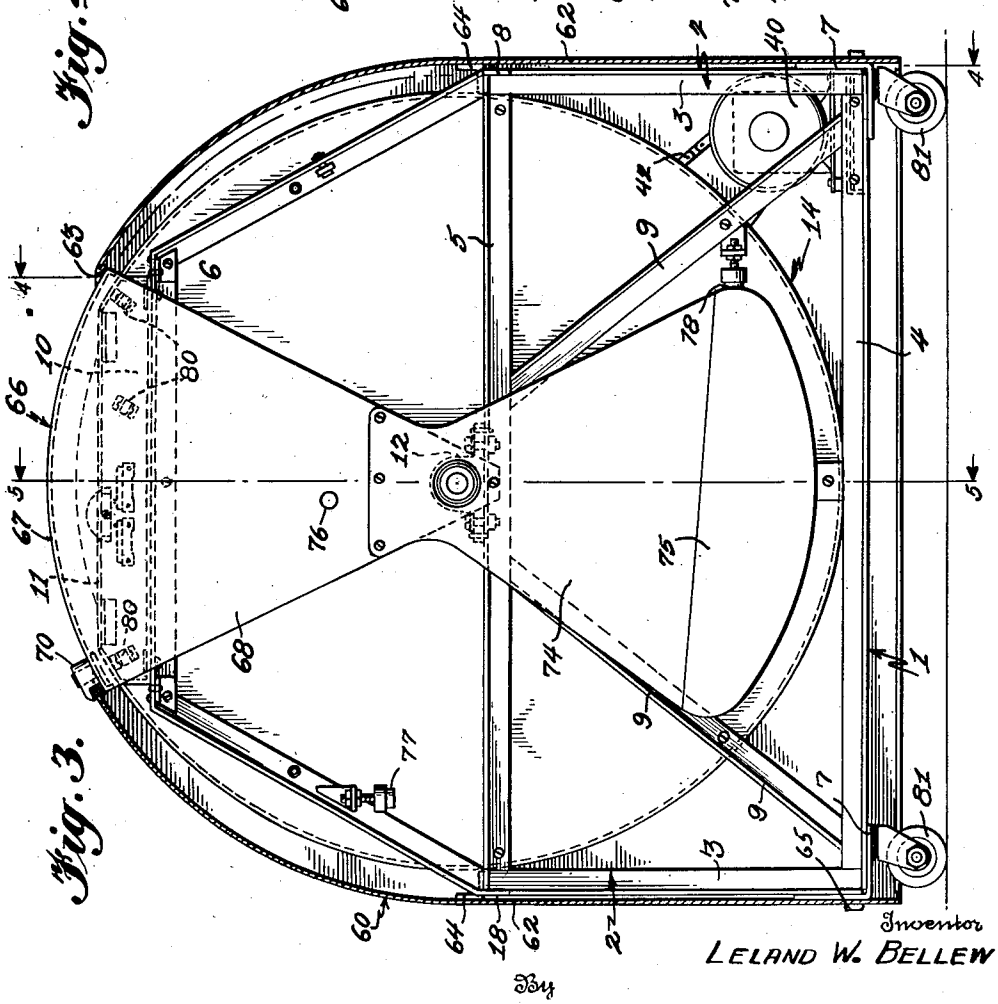

Fig. 3.

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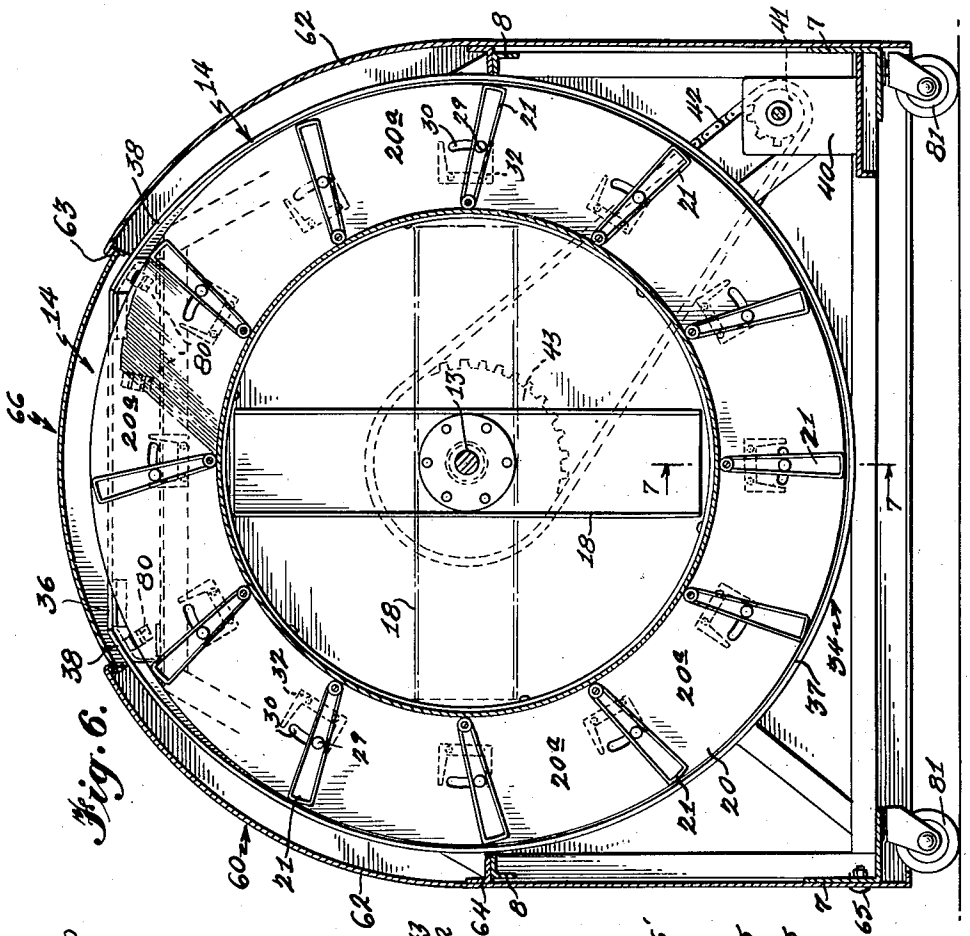

Fig. 6.

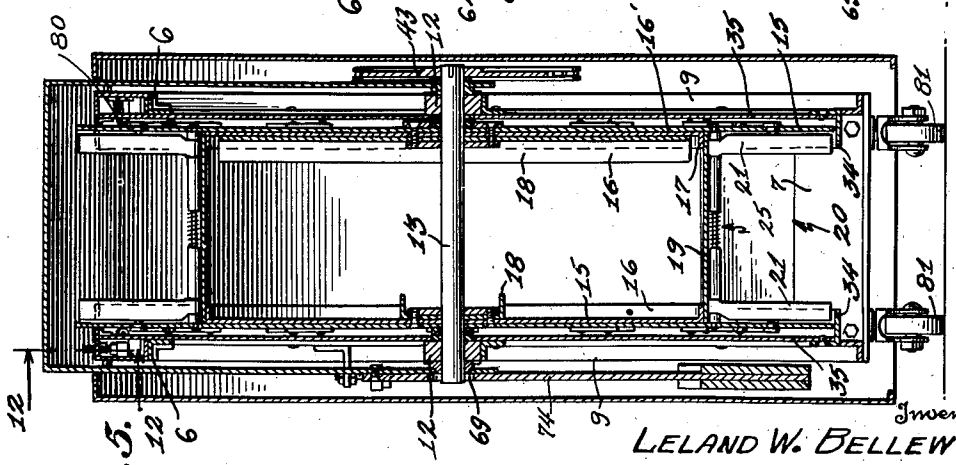

Fig. 5.

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Fig. 7.

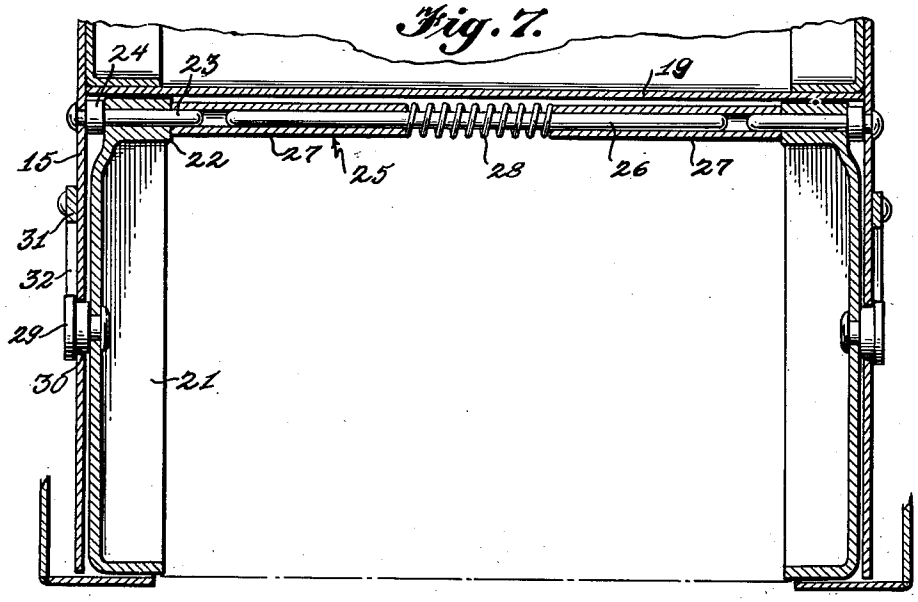


Fig. 9.

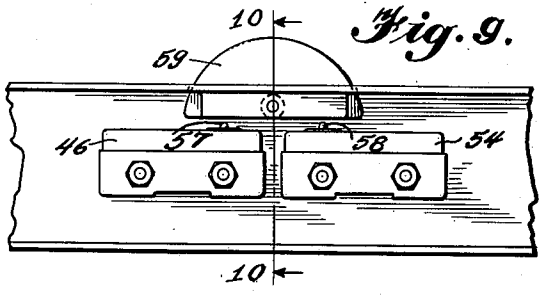


Fig. 10.

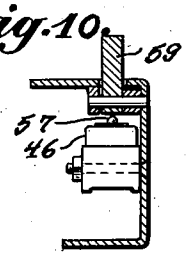


Fig. 11.

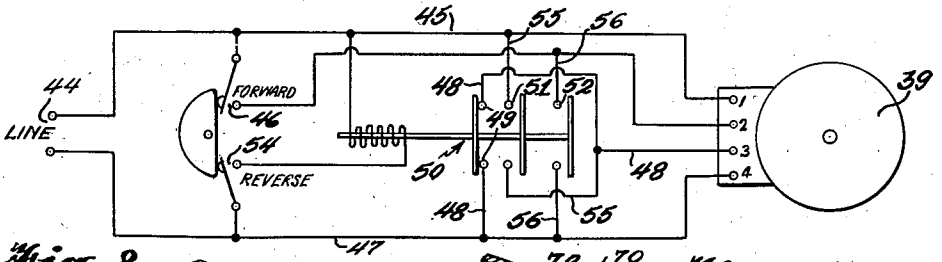
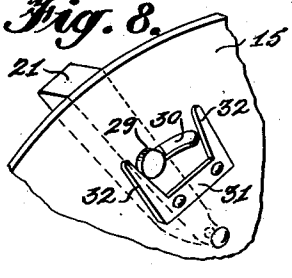


Fig. 8.



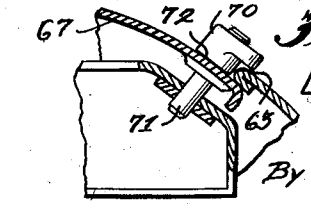


Fig. 12.

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Patented Mar. 18, 1952

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UNITED STATES PATENT OFFICE

2,589,598

ROTARY CARD FILING APPARATUS

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Application June 9, 1948, Serial No. 31,873

8 Claims. (Cl. 45—3)

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The present invention relates generally to card filing apparatus and more particularly to improvements in card filing apparatus of the type in which conventional file cards are carried generally radially in a series of segmental pockets in a peripheral channel of a rotary drum.

Filing apparatus of the type to which the present improvements relate, generally comprise an enclosed supporting structure in which a rotary drum is mounted. The drum defines a peripheral channel which is divided circumferentially into a number of card receiving segmental pockets by partition means which are pivoted to opposite side walls of the channel adjacent the bottom thereof for limited pivotal movement to permit easy fanning of any particular pocket of cards. The cards are freely held in the pockets and are prevented from falling out on the lower sector of the drum by engagement of opposite outer corners of the cards with arcuate relatively stationary retaining strips which also serve, with the partition means, as a friction brake for the drum.

The pivot limiting means for the partition members comprise a pin carried by each partition member and movable in and engageable with the ends of an arcuate slot in the side wall of the channel concentric with the axis of pivot of the partition. It has been found, however, that when the drum is rotated and the partition members move by gravity to their pivotal limits, considerable noise is developed by the pins striking the ends of the slot. In addition, continued use of the file occasions wear in the pivots of the partition members which also causes operating noise as such wear increases. These operating noises have been found very objectionable.

One of the objects of this invention, therefore, is the provision of resilient buffer means incorporated with the partition limit pins to yieldingly retard the pivotal movement at the limits thereof and reduce the above mentioned noise.

Another object of this invention is the provision of resilient compression means oppositely exerting a yielding force against the opposed pairs of partition members forming the segmental pockets along their pivotal axis to retain the partition members on their respective pivot pins and also to reduce noise occasioned by wear of the pivots of the partition members.

Another object of the invention is to provide a card filing apparatus of the described type in which the drum is motor driven and which provides a novel means for controlling the operation and direction of rotation of the motor, such control means including a finger engaging element which is moved in the desired direction of rotation of the drum to effect a corresponding rotation of the drum.

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A further object of the invention is to provide a card file of the described type in which the card retaining strips or bands are concentric with the drum from positions adjacent the descending sectors of the drum before the upper faces of the partitions assume horizontal positions and from such positions upwardly the bands diverge slightly outwardly from the drum circumferences.

With the above and other important objects and advantages in view, which will become more apparent during the course of the following description, the invention consists in the parts and combinations hereinafter set forth with the understanding that various changes may be made therein, such as in the shape, size and arrangements of the parts, or in the substitution of equivalents, by those skilled in the art, without departing from the spirit of the invention.

In the accompanying drawings, wherein preferred means for carrying the invention into practical effect are shown:

Figure 1 is a view in perspective of the card filing apparatus according to this invention with the closure for the case in closed position;

Figure 2 is a view similar to Figure 1 with the closure shown in open position;

Figure 3 is a view in side elevation of the filing apparatus with the case being shown in transverse section;

Figure 4 is a cross sectional view taken along the line 4—4 of Figure 3;

Figure 5 is a cross sectional view taken along the line 5—5 of Figure 3;

Figure 6 is a vertical transverse sectional view taken along the line 6—6 of Figure 4;

Figure 7 is a fragmental cross sectional view taken along the line 7—7 of Figure 6;

Figure 8 is a view in perspective of a portion of the card carrying drum showing one of the buffer springs and its associated partition member;

Figure 9 is a view in elevation of the motor control switch arrangement;

Figure 10 is a cross sectional view taken along the line 10—10 of Figure 9;

Figure 11 is a schematic wiring diagram of a motor control circuit; and

Figure 12 is a detailed view partially in section of the locking arrangement for the case.

As seen in the drawings, the card file com-

prises a framework 1 built preferably from angle iron to form opposed side frames 2 of general A shape. These side frames consist each of end pieces 3 joined together by a bottom stringer 4 and an intermediate stringer 5. Upwardly from the stringers 5 the end pieces 3 converge angularly toward each other and are connected together at their upper ends by a stringer 6. The side frames 2 are joined together at their opposite lower ends by angles 7 and at the intermediate stringers 5 by angles 8. The lower portion of the side frames are braced by angularly disposed truss members 9 and the top stringers 6 each carry a channel member 10, which may be called a molding trim, the upper face 11 of which is exposed as seen in Figure 2.

Centrally mounted respectively on the intermediate stringers 5 are a pair of axially aligned bearings 12 which rotatably journal a horizontal shaft 13 to which is rigidly secured a card carrying drum indicated generally as 14.

The drum 14 comprises a pair of axially spaced circular disks 15 to the inner face of each of which is secured a small eccentric disk 16 having a peripheral, inturned flange 17. Each of these disk assemblies may be reinforced by a channel piece 18 secured to the inner face of the disks 16 and extending diametrically thereacross as seen in Figures 5 and 6. A cylinder 19 spaces and connects the disks 15 by attachment at its opposite ends with the flanges 17. The cylinder 19 forms with the radially extended or flange portions of the disks 15, a peripheral channel 20 for the reception of file cards. It may be pointed out that the width of the cylinder and its diameter with respect to that of the disks 15, are calculated with respect to the size of the card to be used in the file so that the cards will easily fit between the side walls of the channel 20 and, in radial position, their lower and upper edges will coincide respectively with the bottom wall and upper periphery.

The card file of the type shown is adapted to hold approximately 5,000 file cards and to permit ease in handling and for other reasons, the cards are preferably divided into a number of groups or stacks between 400 and 500 each. To this end, the channel 20 is divided into a circumferential of twelve segmental pockets 20*a* by means of opposed pairs of wedge shaped partition members 21 of a width sufficient to engage opposite ends of the cards. The partition members 21, as best seen in Figure 7 are each provided with a hub portion 22 at its apex and by means of which the opposed pairs of partitions are mounted for pivotal movement respectively on axially aligned pins 23 respectively secured to the disks 15 adjacent the cylinder 19 and projected into the channel 20. It will be noted that the pins 23 are provided each with a blocking flange 24 adjacent the disk 15 to provide a thrust shoulder against which the hub 22 gears spacing the outer face of the partition member slightly from the inner wall of the channel 20. The pins 23 extend through and slightly beyond the inner end of the hubs 22.

Resiliently urging opposed partition members of each pair apart and into engagement with the pin flanges 24, maintaining them on their respective pins and also compensating for wear in the pivotal connections, is an expansion thrust member 25. These thrust members comprise a rod 26 on which is slidably mounted a pair of tubes 27. The rod 26 is somewhat shorter than the axial distance between the pins 23 and the outer ends

of the tubes 27 fit on the projecting ends of the pins. Between the inner ends of the tubes 27 and surrounding the rod 26 is a relatively light compression spring 28 which urges the tubes apart and into engagement with the inner faces of the opposed hubs 22 urging them into engagement with the pin flanges 24.

Restricting pivotal movement of the partitions 21 to desirable limits, i. e., a maximum which will permit sufficient fanning of a stack of cards in a pocket for ready inspection of individual cards, and a minimum which will position the cards of the stack substantially radially of the drum, is a headed pin 29 secured to the partition member and extending from its outer face through an arcuate slot 30 in the disk 15 radially outward from and concentric with the pin 23.

Secured to the outer faces of the disks 15 adjacent each of the slots 30 is a U-shaped buffer member 31, made of spring metal, and with its free ends or leaves 32 lying respectively adjacent opposite ends of the slots 30 so that the head 33 of the pin 29 riding therein will engage the free end of the buffer member and yieldingly retard movement of the partition member before the pin 29 strikes the ends of the slot 30. While other resilient buffer means may be used to accomplish the same purpose, the U-shaped spring members 31 are not subjected to any wear and have been found very effective in substantially eliminating the noise occasioned by movement of the pins 29.

Preventing the cards on the lower sector of the drum from falling out are a pair of relatively stationary, arcuate strips 34 which are welded or otherwise secured respectively to a pair of plates 35 secured respectively to the inner faces of the side frames 2, as best seen in Figure 3. The strips 34 extend around and overlie the peripheries of the disks 15 except for a gap 36 at the top of the drum of a length slightly in access of the maximum peripheral length of one of the card receiving pockets. As best seen in Figure 6 the strips 34, from a point adjacent the periphery of the drum just prior to that at which the partitions 21 assume a horizontal position on the descending arc of the drum and around to a similar point on the opposite side of the drum, the intermediate length 37 of the strips 34 are concentric with the drum and lie closely adjacent the peripheries of the disks 15. From these points upwardly to their ends, which lie adjacent the upper ends of the molding strips 10, the strips diverge outwardly slightly from the peripheries of the disks 15 as indicated at 38. These diverging ends 38 serve to force any displaced cards to the bottom of the pockets and evenly stack them as the drum is rotated. Moreover, this evening is accomplished prior to the point where the stacks assume a horizontal position and the weight of the stack would inhibit movement of the displaced cards and increase the tendency of turning the corners of the cards. After the cards have passed the horizontal on the descending arc of the drum they fall outwardly and their opposite corners engage the strips 34 and serve thereby to frictionally break the drum and restrain overriding thereof.

The pockets in the channel 20 are properly packed with cards to substantially but loosely fill the bottom of the pockets. At the top of the drum therefore, where the partitions defining a pocket may be spread apart, as shown in Figure 6, the stack of cards may be fanned sufficiently to inspect the entire face of any card. At the bottom of the drum, however, the weight of the cards

in the lower quadrants hold the cards in the bottom pocket or pockets substantially tightly stacked inhibiting relative angular movement in the pockets and serve, by engagement with the adacent partition members and the strips 34, to effectively break the drum.

For rotating the drum to bring a desired pocket to access position at the top of the file, there is provided an electric motor 39 which is coupled through a speed reducing transmission unit 40 with a sprocket 41 and thence through a chain 42 with a sprocket 43 secured to the drum shaft 13. As shown diametrically in Figure 10, the motor 39 may be of a four wire, reversing type wired for rotation in a forward direction with its number 1 terminal connected with the one side of a power line 44 through a lead 45, and its number 2 terminal connected with the lead 45 through a normally open switch 46. The number 4 terminal of the motor is connected with the opposite side of the power line through a lead 47, while the number 3 terminal is connected with the lead 47 through a lead 48 in which are normally closed contacts 49 of a relay 50. The relay 50 is also provided with two sets of normally open contacts 51 and 52 and is energized to open the normally closed contacts 49 and close the normally open contacts 51 and 52 by its winding 53 which is connected across the leads 45 and 47 through a normally open switch 54. The motor is wired for reversing by connecting the number 3 terminal with the lead 45 through a lead 55 and the normally open contacts 51 of the relay 50, and the number 2 terminal with the lead 47 through a lead 56 and the normally open contacts 52 of the relay.

As seen in Figures 3, 5, 9 and 10, the switches 46 and 54 are mounted end to end on the web of one of the channeled molding trims 10. The switches 46 and 54 are provided respectively with spring loaded closing plungers 57 and 58 which extend vertically upwardly and are adapted to be selectively depressed to close the switches by opposite ends of a manual actuator 59 which is pivotally mounted for rocking movement on the molding trim 10. The actuator 59 is semicircular in shape with its arcuate face extending through a slot in the upper flange of the molding trim 10 to be rocked or rotated about its pivot by the operator's finger. The switches 46 and 54 are arranged below the actuator so that the motor will be operated in the direction of movement of the actuator.

It will be seen therefore that when the actuator 59 is rotated in a direction to close the switch 46 the number 1 and number 2 terminals of the motor will be connected with the one side of the power line 44, and the number 3 and number 4 terminals will be connected with the return side, and the motor will be operated in a forwardly direction. When the actuator is rotated in the opposite direction to close the switch 54 the relay 50 will be energized and the connections to the number 2 and number 3 motor terminals will be reversed, the number 1 and number 3 terminals being connected with the lead 45 and the number 2 and number 4 terminals connected with the lead 47.

It is obvious that a foot switch or other reversing means could be provided for controlling the motor 39 but the above arrangement, which requires the use of the operator's hand, precludes the possibility of his hand in the path of movement of cards when the drum is rotated and reduces the possibility of injury.

Enclosing the drum and its support frame is a case 60 composed of parallel side walls 61 and end walls 62. The bottom of the case is open to slip over the frame and its lower half is rectangular and has cross sectional dimensions to snugly fit over the lower portion of the frame 1 while the upper half is semi-circular and concentric with the drum when the case is in position on the frame. The case is provided with a top access opening 63, rectangular in shape with a length somewhat in excess of the maximum length of a card receiving pocket and a width substantially that of the frame. As seen in Figure 2 the upper edges of the side walls 61 are flat and inturned and lie substantially flush with the upper flanges of the molding trims 10 so that the upper sector of the drum projects through the opening 63. The case 60 is supported on the frame by means of a pair of opposed angles 64 which rest on the angles 8 of the frame, as best seen in Figure 6, and the case is secured to the frame by only four screws 65 which pass through the end walls 62 into the bottom angles 7 of the frame.

The access opening 63 is adapted to be closed when the file is not in use by a closure indicated generally as 66 and which disappears inside of the case when open, as shown in Figure 2. The closure 66 comprises an arcuate door 67 having segmental, depending side portions 68 which lie outside of the frame 1 and are pivotally journalled by bearings 69 on opposite ends of the drum shaft 13. The door 67 is concentric with the drum and lies inside of the case with its opposite ends overlapping the corresponding ends of the openings 63 when the door is in closed position.

One end of the door 67 is provided with a key operated lock 70 having a plunger 71 which, when actuated by a key in closed position of the door enters an aperture 72 in the molding trim 10, as best shown in Figure 12, to lock the door in closed position. It will be seen in Figures 3 and 12 that the lock 70 is provided with a lateral extension or hook 73 which, in closed position of the door, overlies the edge of the access opening 63 and engages the case to prevent the case being lifted off the frame whn the file is locked.

The closure 66 is counter balanced in a manner which produces a closing moment about its pivotal axis between a closed position and a partially open position of the door and thereafter produces an opening moment so that the operator merely starts the opening or closing movement and the door then moves of its own accord to fully open or to fully closed position. As seen in Figure 3, the closure 66, that is, the door 67 and its supporting sides 68, are symetrical, in closed position, on opposite sides of a vertical plane passing through the axis of the shaft 13. In other words, the mass of the closure, in closed position, is equally distributed on opposite sides of this vertical plane. Secured to one of the sides 67 and extending on the opposite side of the shaft 13 is an arm 74 which carries on its free end a weight 75. The mass of the closure-counterweight assembly is distributed on opposite sides of the shaft 13 so that the closure 66 slightly overbalances the weight 75. The mass of the weight 75 is somewhat to the left (as shown in Figure 3) of the vertical plane passing through the shaft axis, however, positioning the center of gravity of the assembly, in closed position, slightly above and slightly to the left of the shaft axis as indicated at 76. This produces a moment in the assembly to the left about the axis of the shaft

13, or a closing moment. Moving the closure to the right, as in opening, to a position between about one-fourth and one-half open, moves the center of gravity 76 to the opposite side of the vertical plane and the moment about the shaft axis will then be to the right and move the door to its open position. Stop means such as resilient blocks 77 and 78, attached to the frame 1 to engage the counterweight 75, are provided to limit movement of the closure to its full open and full closed positions. The closure is guided in its movement by the antifriction rollers 80 carried by the opposed molding trims 10 and engaging the sides 67 of the closure.

The file is easily moved from one location to another on four wheels or rollers 81 attached to the bottom corners of the frame, two or all which may have caster connections with the frame. Current is supplied to the motor 39 by means of a flexible cable connection (not shown) with a service outlet and, preferably, the cable has a plug and socket connection with the file, in addition to the service outlet, to facilitate moving the file.

I claim:

1. In a rotary card filing apparatus including a drum defining a peripheral channel for the reception of file cards and means supporting the drum for rotation about a horizontal axis, partition members mounted on the drum for circumferential pivotal movement within the channel and dividing the channel into a circumferential series of segmental pockets, said partition members including means engageable with the drum for limiting said pivotal movement, and resilient means engageable with the limiting means adjacent the limits of pivotal movement of said members for yieldingly retarding said pivotal movement.

2. In a rotary card filing apparatus including a drum defining a peripheral channel for the reception of file cards and means supporting the drum for rotation about a horizontal axis, partition members mounted on the drum for circumferential pivotal movement within the channel and dividing the channel into a circumferential series of segmental pockets, said partition members including means engageable with the drum for limiting said pivotal movement, and spring means secured to the drum and engageable with the limiting means adjacent the limits of pivotal movement of said members for yieldingly retarding said pivotal movement.

3. In a rotary card filing apparatus including a drum having radial side flanges forming therewith a peripheral channel for the reception of file cards and means supporting the drum for rotation about a horizontal axis, partition members mounted on the flanges for circumferential pivotal movement and dividing the channel into a circumferential series of segmental pockets, said flanges having an arcuate slot therein respectively adjacent each partition member and concentric with the axis of the pivot thereof, pin means carried by each partition member and extending through the slot for engagement respectively with the ends thereof to limit said pivotal movement, and resilient means carried by the flanges adjacent the ends of said slots for engagement with the pin means to absorb the shock of engagement of the pin means with the slot ends.

4. In a rotary card filing apparatus including a drum having radial side flanges forming therewith a peripheral channel for the reception of file cards and means supporting the drum for rotation about a horizontal axis, partition members mounted on the flanges for circumferential pivotal movement and dividing the channel into a circumferential series of segmental pockets, said flanges having an arcuate slot therein respectively adjacent each partition member and concentric with the axis of the pivot thereof, pin means carried by each partition member and extending through the slot for engagement respectively with the ends thereof to limit said pivotal movement, and leaf spring members carried by the flanges adjacent the ends of said slots for engagement with the pin means to absorb the shock of engagement of the pin means with the slot ends.

5. In a rotary card filing apparatus including a drum having radial side flanges forming therewith a peripheral channel for the reception of file cards and means supporting the drum for rotation about a horizontal axis, partition members mounted on the flanges for circumferential pivotal movement and dividing the channel into a circumferential series of segmental pockets, said flanges having an arcuate slot therein respectively adjacent each partition member concentric with the axis of the pivot thereof, pin means carried by each partition member and extending through the slot for engagement respectively with the ends thereof to limit said pivotal movement, and U-shaped spring members secured to the flanges and having free ends adjacent the ends of said slots for engagement with the pin means to absorb the shock of engagement of said pin means with slot ends.

6. In a rotary card filing apparatus including a drum having a pair of radial flanges defining therewith a peripheral channel for the reception of file cards and means supporting said drum for rotation about a horizontal axis, a circumferential series of opposed pairs of partition members pivotally mounted respectively on said flanges and dividing the channel into a circumferential series of segmental pockets, means for limiting the pivotal movement of said members, and resilient compression means interposed respectively between each pair of the partition members and engaging the same adjacent the pivotal axis thereof.

7. In a rotary card filing apparatus including a drum having a pair of radial flanges defining therewith a peripheral channel for the reception of file cards and means supporting said drum for rotation about a horizontal axis, a circumferential series of opposed pairs of axially aligned pivot members carried respectively by said flanges adjacent the bottom of said channel, a partition member mounted for pivoting movement on each pivot member, said partition members dividing the channel into a circumferential series of segmental pockets, blocking means on each pivot member, and resilient compression means extending between each opposed pair of pivot members and engaging the partition members thereon for resiliently loading the partition members against said blocking means.

8. In a rotary card filing apparatus including a drum having a pair of radial flanges and defining therewith a peripheral channel for the reception of file cards and means supporting said drum for rotation about a horizontal axis, a circumferential series of opposed pairs of axially aligned pivot pins carried respectively by the flanges, each pin having a radial shoulder, a partition member mounted on each pin for pivot-

ing movement, said partition members dividing the channel into a circumferential series of segmental pockets, compression means comprising a rod and a pair of tubes thereon and respectively engaging each pair of pivot pins, compression spring means interposed between said tubes and urging the same into engagement with the partition members and loading the latter against said shoulders, and means for limiting the pivotal movement of said partition members.

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