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Loyd, Jr.

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[45] **Sept. 4, 1973**

[54] **BRAKE FOR MANUALLY OPERATED ROTARY FILE**

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[73] Assignee: **Acme Visible Records, Inc.**, Crozet, Va.

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[52] **U.S. Cl.** **188/164,** 40/68.4

[51] **Int. Cl.** **F16d 65/34**

[58] **Field of Search** 40/68, 68.4, 68.6; 188/164; 312/183, 186

[56] **References Cited**

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Attorney—Lee J. Gary, Russell W. Pyle et al.

[57] **ABSTRACT**

A circular file is rotatably mounted on a base that includes an annular electromagnet secured against rotation but movable toward and away from the base of the file. The magnet may be electrically energized via one or more switches positioned at various locations around the file in order to cause the electromagnet to frictionally engage and stop rotation of the file at any desired position.

5 Claims, 6 Drawing Figures

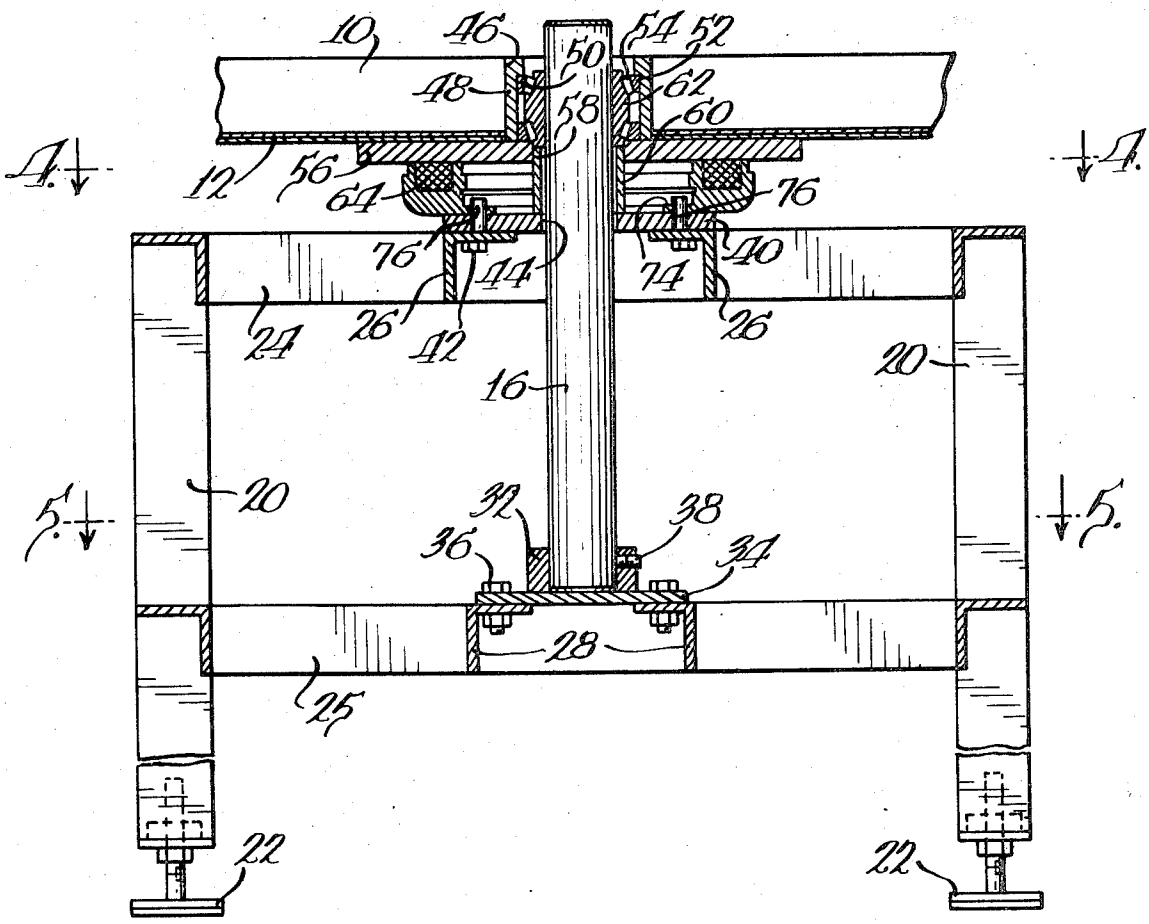


Fig. 1.

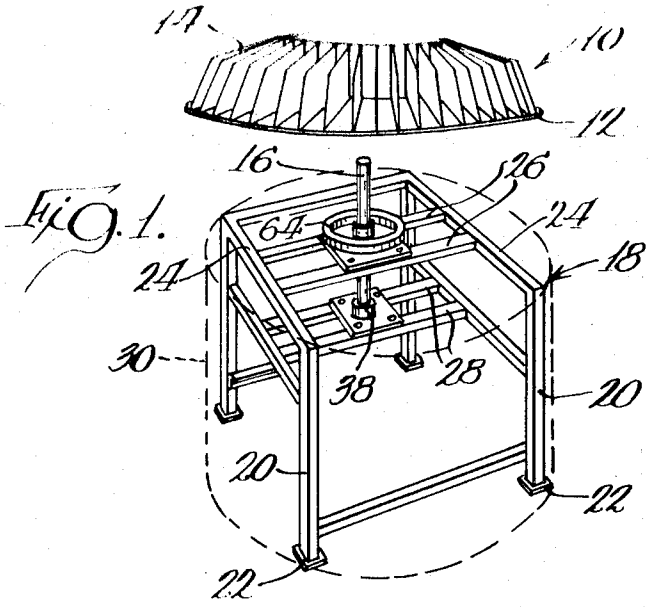

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Fig. 2.

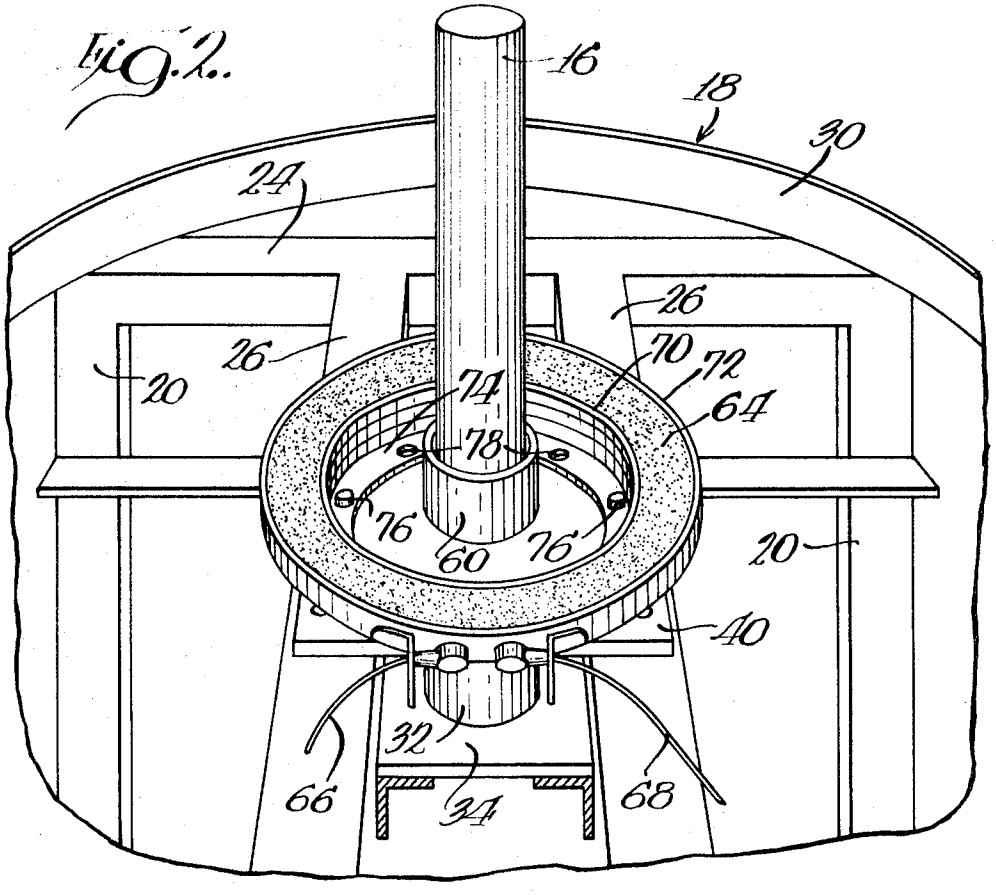

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Fig. 3.

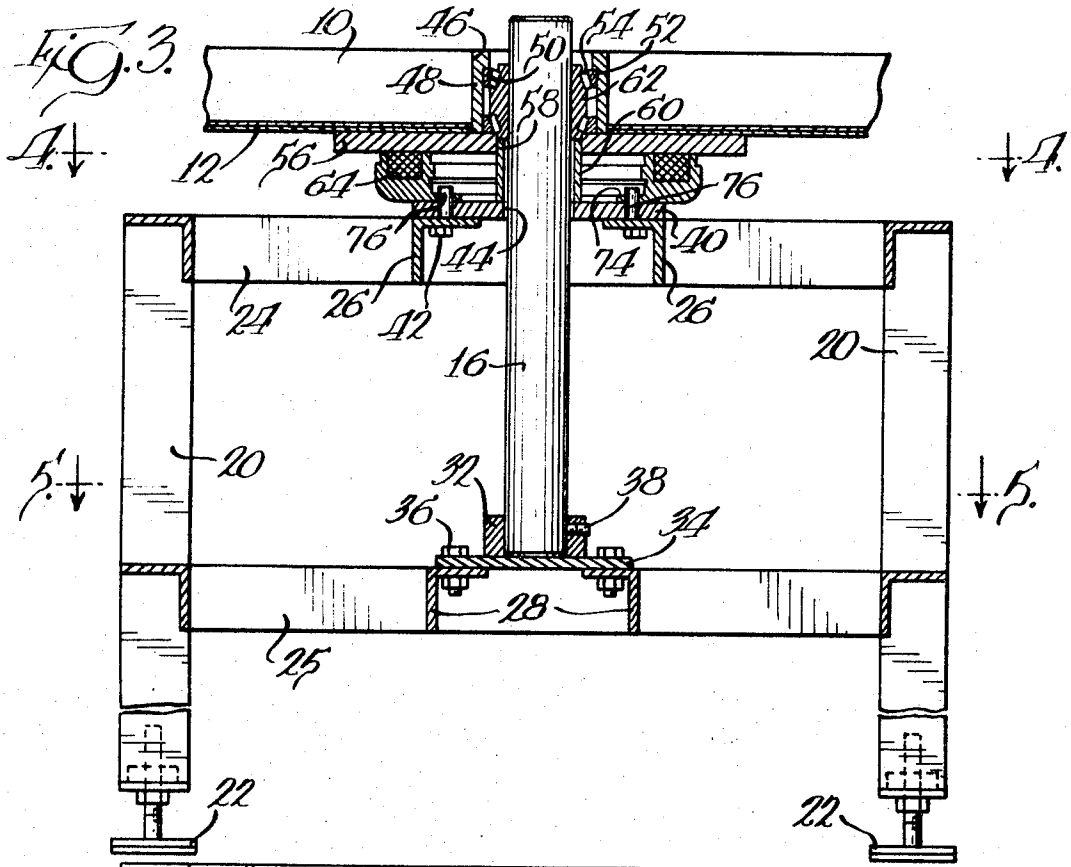

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Fig. 4.

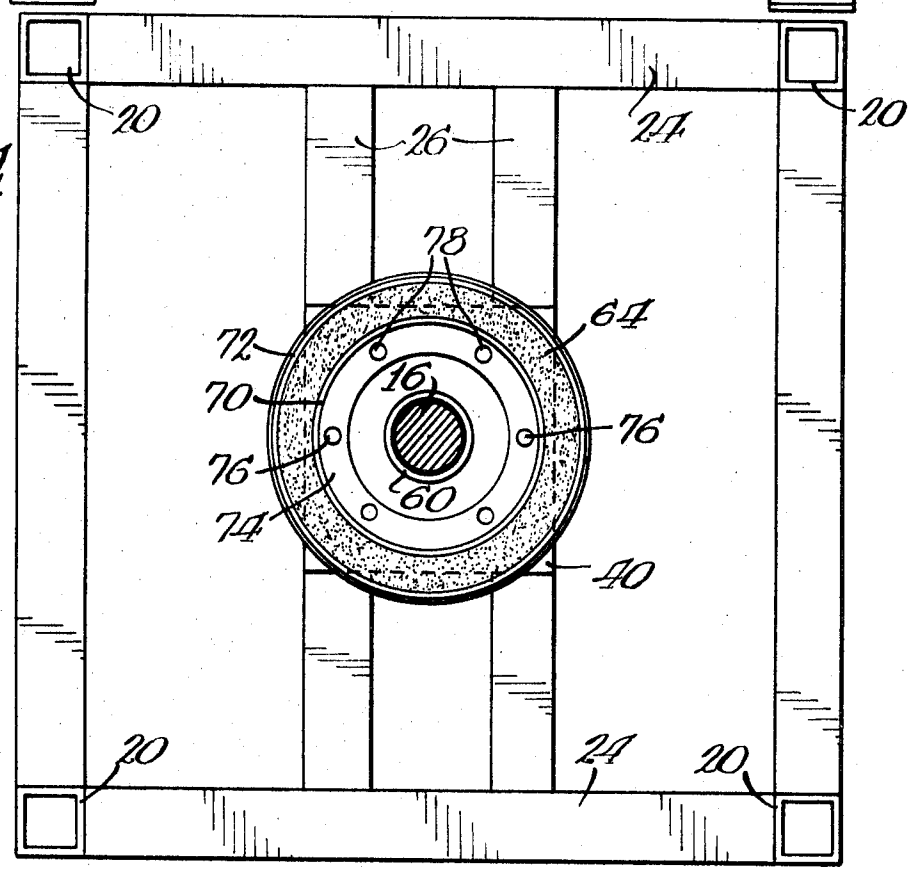

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Fig. 5.

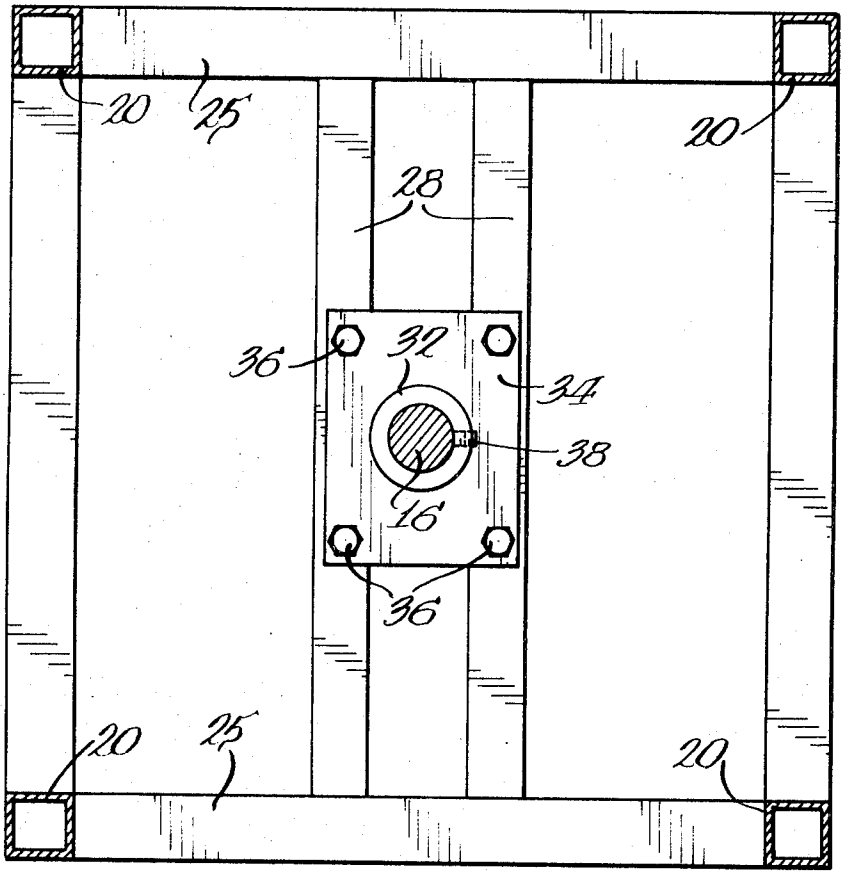
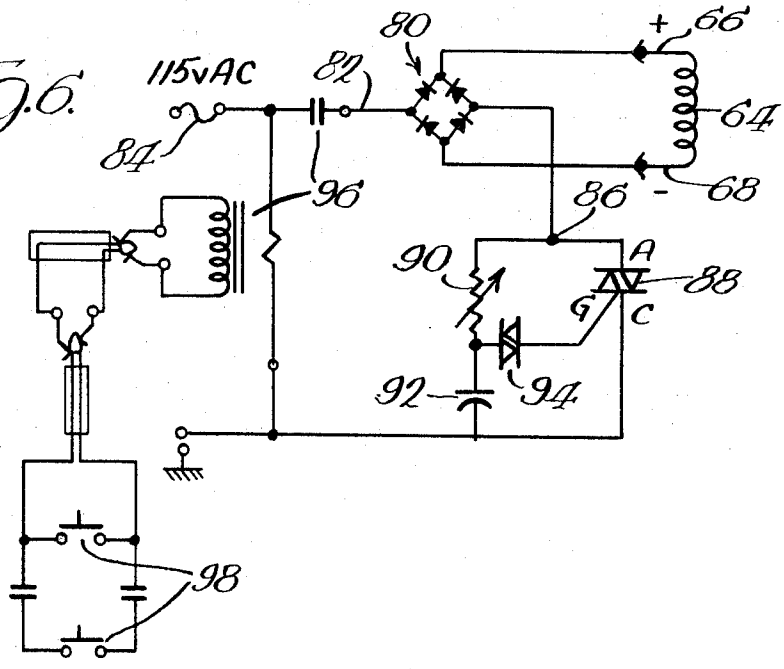

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Fig. 6.


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BRAKE FOR MANUALLY OPERATED ROTARY FILE

BACKGROUND OF THE INVENTION

This invention relates to a rotary filing system and more particularly to an apparatus adapted to carry large volumes of indexed filing data, which are retrievable by a plurality of persons located at control stations spaced around the apparatus.

A typical rotary filing system includes a wheel member which is rotatable about a vertical axis, with the wheel being adapted to carry a multiplicity of spaced indexing or divider elements that contain file data such as cards, books and the like. Rotary filing systems are expecially suitable and convenient for the handling of large volumes of reference data within a relatively confined space by one or several people stationed at fixed locations around the outer periphery of the wheel. The wheel is simply rotated until the desired information is reached, and the wheel is then stopped to allow access to the information.

As described in U.S. Pat. Nos. 3,056,506, 3,084,007, 3,120,824, 3,124,398 and 3,383,147, the wheel of the filing system may be rotatably mounted on a base and driven by a motor. Stopping of the rotating wheel driven by a motor presents no difficulties, since the continuous engagement of the motor drive with the wheel provides a braking effect when the motor is shut down.

In contrast to the aforesaid driven systems, the present invention is particularly suitable for use with a manually rotated file that is rotatably mounted on bearings on a support. Because the circular file may be substantially great in diameter and may carry considerable weight, the inertia developed by the rotating file may be of such a magnitude that stopping of the file at a precise location is difficult or impossible. Thus, although the wheel may be easily rotated by hand, the problem of accurately stopping the wheel has presented a deterrent to the widespread use of such manually operated systems.

SUMMARY OF THE INVENTION

The foregoing problems are solved by the provision of an electromagnetic brake positioned between the wheel and its support. Preferably, the wheel is mounted on a vertical shaft extending upwardly from the support. An annular electromagnet is mounted on the top of the support around the shaft and has a pole facing upward. The electromagnet is mounted so as to be nonrotatable but movable toward and away from a metallic base plate on the wheel. A variable rectified DC circuit is provided to activate the electromagnet from a plurality of stations by means of a switch located at each station. The annular electromagnet, upon activation, frictionally engage the metallic base plate on the wheel and immediately brings the wheel to a complete stop. Upon deactivation, the magnet immediately falls away from the base plate to allow unrestricted rotation of the wheel. The power through the electromagnet may be varied to increase or decrease the degree of braking force applied on the wheel.

THE DRAWINGS

FIG. 1 is a perspective view, shown partly in outline, of a rotary file assembly, the wheel thereof being dissociated from the base;

FIG. 2 is an enlarged fragmentary perspective view of the base of the assembly, looking downward from the top thereof and illustrating features of the presently described invention;

FIG. 3 is a vertical sectional view of the rotary file assembly that incorporates features of the presently described invention, with the wheel of said assembly being omitted for the sake of clarity;

FIG. 4 is a plan view of the base of the assembly, taken substantially along line 4—4 of FIG. 3;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 3; and

FIG. 6 is a schematic of the circuit employed in connection with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, the rotary filing system generally comprises a circular file wheel 10 adapted to carry file data in any suitable manner well known to those skilled in the art. Thus, the wheel 10 may comprise a disc-shaped base 12 having a plurality of upstanding and radially arranged partitions 14 at the outer periphery thereof between which books or other articles of data may be stored. The wheel 10 is adapted to be rotatably mounted around a vertical shaft 16 secured in an underlying base 18 and extending upwardly therefrom.

As shown in FIGS. 1, 2 and 3, the base 18 supports the wheel 10 and includes a rectangular unitary framework comprising four vertical legs 20 having respective threadably adjustable feet 22 to permit leveling of the base. Respective pairs of transverse beams 24 and 25 are secured between the respective tops and an intermediate portion of opposed pairs of legs 20. In addition, respective upper and lower pairs of closely spaced cross beams 26 and 28 are secured medially between the transverse beams 24 to complete the basic framework. The framework may be surrounded by a cylindrical enclosure 30 which extends slightly above the level of the internal framework.

As best shown in FIGS. 2, 3 and 5, the lower portion of the shaft 16 is supported centrally within the base between the pairs of cross beams 26 and 28. The bottom of the shaft 16 is received in a socket 32 mounted upon a base plate 34 secured at its corners (FIG. 5) by bolts 36 or the like to and between the lower pair of cross beams 28, in order to stabilize the lower end of the shaft and to vertically secure the shaft at a fixed level. The socket 32 may include a set screw 38 engaging and preventing rotation of the shaft. The shaft 16 is also held in position at the top of the framework by means of a top plate 40 secured at its corners (FIG. 4) to and between the upper cross beams 26 by means of bolts 42 or the like, said top plate having a circular aperture 44 that snugly receives and supports an intermediate portion of the shaft.

The file wheel or tier 10 is freely rotatably mounted on the shaft 16 in a fixed vertical position above the base 18. A central vertical opening 46 is provided in the bottom of the wheel and is fitted with a collar 48 surrounding the upper portion of the shaft 16 and spaced therefrom. The collar 48 has a downwardly facing shoulder 50 abutting the outer race 52 of a bearing 54 extending from the collar and secured around the shaft. The outer race 52 is supported upon a large disc-shaped base plate 56 secured centrally to the bottom surface of the wheel base 12 and having a central aper-

ture 58 therein for accommodating the shaft 16. A sleeve 60 is provided around the shaft 18 and extends between the top plate 40 and the inner race 62 of the bearing 54, thereby maintaining a vertically fixed distance relationship between the top plate 40 of the base and the base plate 56 of the wheel.

The brake assembly, as best shown in FIGS. 2 and 3 generally includes an electromagnetic member 64 secured in the base against rotation but movable vertically into and out of frictional engagement with the base of the wheel to provide the required braking effect. The electromagnet 64 is preferably annular in shape and contains a coil connected between leads 66 and 68 (FIG. 2) and embedded in magnetizable material between respective inner and outer concentric upstanding bands 70 and 72 mounted on an annular base 74 (FIG. 2). The electromagnet is thus designed to have an upwardly facing pole face that may be attracted to the base plate 40 of the wheel, said base plate being formed of a ferrous or other magnetic material.

As shown in FIGS. 2 and 4, the electromagnet 64 is normally supported on top of the plate 40 and is retained thereon by means of two or more opposed upstanding studs 76 received in respective aligned apertures 78 in the annular base 74 of said electromagnet. In this manner, the electromagnet 64 is movable axially or vertically toward and away from the stationary plate 40 on the studs 76 but is positively restrained against rotation about its vertical axis or against other movement by virtue of said studs. Upon activation, the electromagnet 64 moves upward by its magnetic attraction toward the base plate 56 of the wheel and thereby frictionally engages said base plate to quickly retard rotary movement of the wheel.

FIG. 6 illustrates a schematic of a circuit which may be employed to controllably energize the magnet and which utilizes 115 V AC current. A conventional bridge rectifier 80 is connected in series to the AC line 82 which may include a fuse 84. The rectifier, utilizing four semi-conducting devices, supplies full wave rectified current between the leads 66 and 68 of the electromagnet 64 which are connected at the positive and negative sides of the rectifier.

A control circuit is also provided in the AC line to regulate the current available to the rectifier 80. For this purpose, a bridge 86 is provided in the AC line, one side of which is connected to the anode of a triac or its equivalent, which is a bi-directional silicon thyristor 88 capable of conducting current when switched from a high impedance state to a low impedance state. The other side of the bridge 86 comprises the gating circuit for the triac and contains a variable resistor 90 and a charging capacitor 92 connected in series and a diac 94 connected between said resistor and capacitor to the gate of the triac 88. The diac 94 is also a bi-directional component and serves to controllably switch the triac 88 to a conductive state when power is applied in the circuit. The resistor 90 may thus be conveniently adjusted to vary the power available to the coil of the electromagnet 64 and hence to vary the degree of available braking force to be applied.

In order to close the circuit, a relay 96 is connected across the AC input, an isolation coil is connected to a plurality of normally open push button switches 98, which when closed, shorts out the remote control winding and closes the main circuit. In this manner, one switch may be provided at each of the various operator locations around the wheel.

In operation, the wheel 10 is turned and rotated by one of a plurality of operators desirous of locating a file. When the desired location is reached, the operator pushes a switch 98, which closes the main circuit, thereby energizing the electromagnet to perform the braking function. As long as the operator maintains the stop button in a closed position, the brake remains in engagement and prevents rotation of the wheel by other operators. The variable resistor 90 may be conveniently adjusted to control the braking force, depending on the weight and size of the wheel.

It will be apparent to those skilled in the art that various modifications and changes in design may be made to the invention described herein without departing from the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. A rotary file comprising a circular filing wheel, a base, a fixed vertical shaft secured in said base and extending upwardly therefrom, bearing and support means between said filing wheel and said base for rotatably mounting said wheel around said shaft above said base at a substantially fixed vertical distance therefrom, a magnetic plate secured to the bottom of said wheel, support means secured in said base around said shaft, a plurality of studs projecting upward from said support means, an annular electromagnet disposed around said shaft and normally resting on said support means, said electromagnet having apertures therein in which respective studs are received, whereby said electromagnet is limited in movement to a vertical direction toward and away from said magnetic plate, and means for providing electrical energy to said electromagnet to activate the same, said electromagnet, upon activation, being attracted to and frictionally engageable with said magnetic plate, such that friction between said electromagnet and said plate brakes rotary movement of said wheel.

2. The rotary file of claim 1 wherein said means for providing electrical energy to said electromagnet comprises an electrical circuit connected thereto, and a plurality of switches connected in parallel in said circuit, said switches being provided at spaced locations around said wheel to allow braking of said wheel from each of said locations.

3. The rotary file of claim 2 wherein control means are provided in said circuit for regulating current through said electromagnet, said control means comprising a triac connected in said series in said circuit, a source of voltage connected to the gate of said triac, and means for regulating the voltage to said gate.

4. A rotary file comprising a filing wheel, a base beneath said wheel, means for rotatably mounting said wheel over said base, brake means supported upon said base and movable into engagement with said wheel, said brake means comprising an electromagnet having an upwardly facing pole face and means on said base for confining movement of said electromagnet to a direction toward and away from said wheel, a plate composed of a magnetic material is mounted on the bottom of said wheel and is engageable by said electromagnet, and means for energizing said electromagnet from various positions around said wheel.

5. The rotary file of claim 4 whprein means are provided for adjusting the flow of current through said electromagnet for regulating the degree of braking force applied thereby.

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