June 7, 1949. W. P. BENNETT 2,472,397

DOOR HOLDER AND BUFFER

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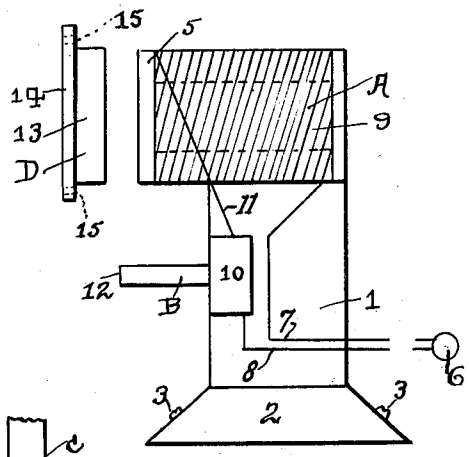


Fig. 1.

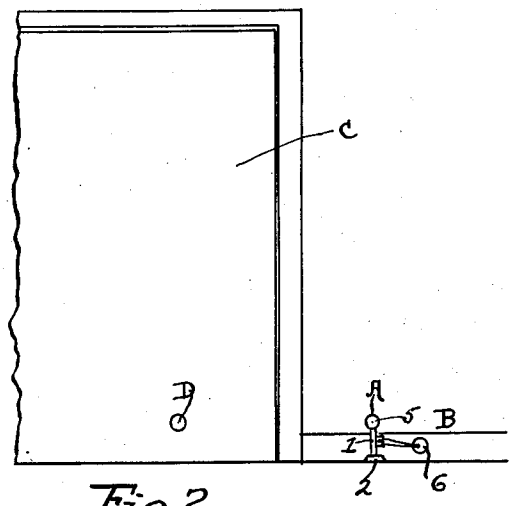


Fig. 2.

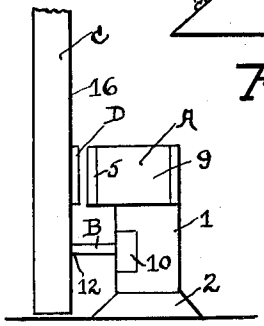


Fig. 3.

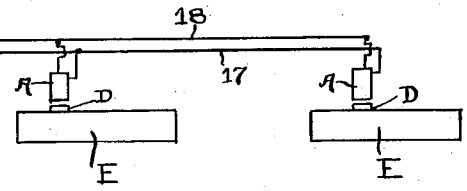


Fig. 4.

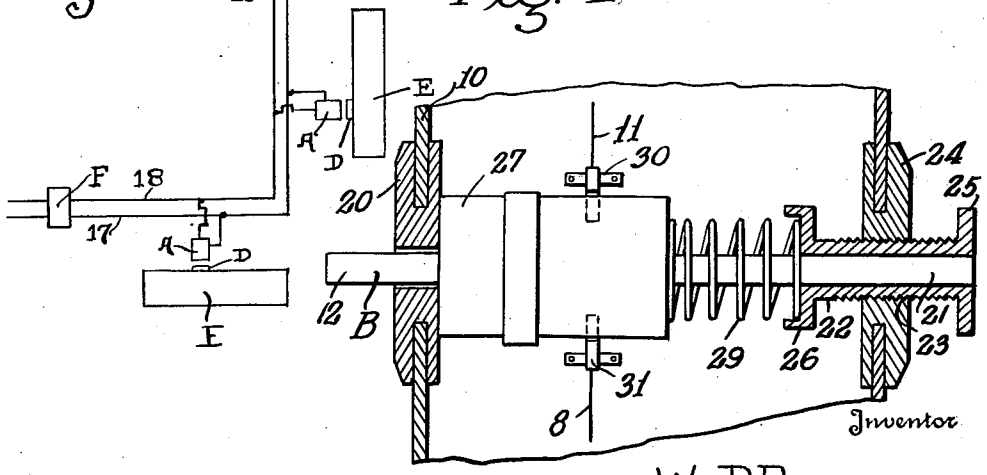


Fig. 5

Inventor

WM. P. BENNETT

By

Pattison, Wright & Pattison

Attorneys

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DOOR HOLDER AND BUFFER

William P. Bennett, San Bernardino, Calif.

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5 Claims. (Cl. 292—70)

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This invention pertains to a door holder and buffer but more particularly and specifically to an electro-magnetic door holder and a buffer in the form of a push button type of electric switch.

In the drawings, an embodiment of the invention is illustrated but the invention is not limited to the exact constructions therein appearing as departures therefrom can be made without departing from the inventive concept.

The primary object of the invention is the provision of a novel and improved combined door holder and buffer.

Another object of the invention is the provision of an electro-magnetic door holder wherein the electric current to the magnet is automatically turned on upon opening the door and wherein the means controlling the delivery of current acts as a buffer to the opening movement of the door.

Another and further object of the invention is the provision of an arrangement for holding doors open which arrangement includes means for automatically releasing said doors and permitting them to close.

A still further object of the invention is the provision of a combined door holder and buffer which is simple and cheap of manufacture, simple of operation and maintenance, highly efficient and durable in use and which can be quickly and cheaply installed.

Other objects, advantages, benefits and novel features of construction of the invention appear in and can be understood from the following description when read in the light of the accompanying drawings.

In the drawings:

Fig. 1 is a side view of the invention.

Fig. 2 illustrates the invention as used in combination with a door, the door being shown closed.

Fig. 3 is a detail view showing the door held in an open position.

Fig. 4 is a schematic illustration of the invention as applied to a plurality of doors which are normally urged toward a closed position.

Fig. 5 is an illustration of the switch 10, the switch housing being shown in vertical section.

Describing the invention in detail and referring first to Fig. 1, 1 is a standard provided with a base 2 intended to be suitably secured to the floor of a room by screws 3 or the like. An electro-magnetic coil A is suitably secured to and extends across the upper end of the standard and outwardly beyond the front of the standard and terminates in a usual and conventional head 5.

Electric current can be supplied to the magnet from any desired source but for convenience the

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current is obtained by plugging into the house or building current supply thru the medium of a conventional wall or floor plug. Such a plug 6 appears in Fig. 2 from which extends a pair of current conductors 7 and 8.

The conductor 7 is directly connected to the coil 9 of the electro magnet while the conductor 8 extends to a switch box 10 mounted on the standard 1. From the switch or switchbox a conductor 11 extends to the coil 9 for completing the electric circuit when the switch 10 is closed.

The particular construction of switch utilized is not important. Rather than the construction illustrated in the drawings a dashpot or other type of switch could be substituted.

Describing in detail the switch illustrated in Fig. 5 of the drawings it will be seen that the push arm B is in the form of an elongated shaft the front end of which is loosely supported in and guided by a bushing 20 in the front wall of the switch housing while the rear end 21 thereof passes loosely through a sleeve 22 which is threadedly mounted as at 23 in a bushing 24 in the rear wall of the switch housing. The sleeve exterior of the housing is provided with a knurled operating screw or knob 25 while its inner end within the housing is provided with a spring engaging and retaining cap 26.

Intermediate its length and within the housing the rod or shaft B is provided with an elongated tubular enlargement 27 which is secured to and movable with the shaft and is composed of a non-current conducting material as for instance plastic. Intermediate its length the enlargement carries a fixed metallic band 28, a coil spring 29 surrounds the shaft and is positioned between the inner end of the enlargement 27 and the spring retaining cap 26. A pair of metallic current conducting fingers 30 and 31 are closely associated with the shaft enlargement 27. The conductor 8 is connected to the finger 31 and the conductor 11 to the finger 30. The positions of the fingers 30 and 31 are such that the spring 29 normally holds the band 28 out of current conducting contact with the fingers but inward movement of the shaft will carry this band into electrical contact with the fingers and close the circuit across them.

Outward movement of the shaft is limited by abutment of the shaft enlargement with the bushing 20 and the degree of resilient tension exerted upon the shaft is adjustable by rotation of the sleeve 22 in the bushing 24. The spring 29 acts as a yieldable retarder to the opening movement of the door. The switch is a normally

open switch and is moved to a closed position against spring 29 by the application of pressure upon the switch operating push arm B. This arm extends outwardly from the switch beyond the front of the standard and has its outer end 12 terminating in a vertical plane beyond that occupied by the outer face of the coil head 5.

Referring now to Figs. 2 and 3, C is a swinging door to one side of which is affixed a metallic plate D which is composed preferably of manganese steel. This plate has a head portion 13 and a base 14 and is secured to the door by screws or the like which pass thru suitable openings 15 in the base.

In use the electro-magnet is positioned on the floor, closely adjacent to that wall, against which the door is swung when the door is opened. The head of the magnet is positioned in the path of travel of the door and the plate D is positioned so that it will abut the magnet head 5 when the door is moved to an open position. Obviously the magnet can be positioned so that it is abutted by the door at any desired point in the path of travel of the door as it is opened.

In operation, the door is swung open, and its side 16 will first engage the end 12 of the switch push arm B and move the switch to a closed position. This movement is against resilient tension on the arm B and the speed of movement of the door is retarded. The switch arm acts as a buffer. A slightly further opening movement of the door brings the door plate 13 into contact with the magnet head 5 and the door is held in an open position because the switch 10 has been closed, closing the electric circuit and the electro-magnet is energized at the time the plate 13 and the magnet head 5 contact. When it is desired to close the door this is accomplished by applying a slight physical force upon the door in a closing direction. This force overcomes the holding power of the magnet and as the door moves away the switch automatically moves to an open position thus breaking the electric circuit but leaving the device in readiness to repeat the described cycle of operation.

Should it be desired the plate 13 can be inset in the door to be flush therewith. The size and shape of the standard, base, electro-magnet is optional and can be varied at will, as can other features of the invention without departing from the inventive concept.

By the slight modification of the insertion of a master switch in the electric circuit the invention can be made to serve a very useful purpose in a building where the doors are normally open but are all closed at some specific time. Such a use of the invention is illustrated in Fig. 4 wherein there are a plurality of doors E which are normally urged, in any well known and commonly used manner, toward a closed position. Each of said doors are equipped with a plate D and in conjunction with each door there is an electro-magnet A. Plate D and the electro-magnet A are identical to the construction illustrated in Fig. 1 and therefore require no detailed description. Each of the electro-magnets is electrically connected thru its switch 10 with a pair of current conductors 17 and 18, the flow of current thru which is under the control of a master switch F.

The mode of operation of this form of the invention is identical to that previously described in respect to opening the door. The difference is in the closing of the doors. When it is desired that the doors close it is necessary only to open the master switch F. This de-energizes the electro-magnets and permits all of the held open doors to close under the influence of the particular means which urge the doors toward a closed position. This arrangement should be of great benefit in the evening for closing all of the doors in a large building as the doors can obviously be of the type which automatically lock. If at any time it is desired to close any particular door while leaving the others open this can be done by exerting the necessary physical force upon the door as has been previously described.

Although the invention is illustrated and described for use with doors, it is to be understood that it can be used and is applicable to other closures where there is a desire or need for holding the closure in an open position. Accordingly, the invention is not to be limited by the drawings but only by the scope of the following claims.

I claim:

1. For use with a door or the like provided at one of its sides with a metallic element, a fixed electro-magnet positioned in the path of travel of said metallic element as the door is moved to an open position, an electric supply circuit for energizing said magnet and including a normally open switch movable to a closed position against resilient tension, and said switch being in the path of travel of said door as the door is moved to an open position and being actuated by said door to close the electric circuit prior to contacting engagement between the door carried metallic element and the electro-magnet.

2. For use with a door or the like provided at one of its sides with a metallic element, a fixed electro-magnet positioned in the path of travel of said metallic element as the door is moved to an open position, a normally open current supply means adapted to energize said magnet, means operable upon the opening of said door to close said circuit, and said last named means acting to retard the opening of the door and being actuated prior to engagement between the door carried metallic element and the magnet.

3. For use in a building or the like having a plurality of doors which are automatically movable to a closed position and each of which at one of its sides is provided with a metallic element, a fixed electro-magnet in the path of travel of each door carried metallic element when the door is moved to an open position, an electric current supply circuit including each electro-magnet, a normally open movable circuit maker and breaker associated in said circuit with each electro-magnet and being in the path of travel of a door and being moved to a circuit closing position by the door as the same is opened and prior to contact between the door carried metallic element and an electro-magnet, and a master circuit maker and breaker in said circuit for simultaneously controlling the delivery of electric current to all of said electro-magnets.

4. For use with a door or the like having at one side thereof a metallic element, a standard provided with a base adapted to be rigidly secured to a suitable support, an electro-magnet secured to and extending across the end of said standard and having an end adapted to be engaged by the door carried metallic element, an electric current supply circuit for the magnet, said circuit including a normally open push contact switch movable to a closed position against resilient tension, said switch being carried by said standard and being provided with an outwardly extending switch operating push element,

and said push element having its outer end disposed to be contacted by said door prior to contact between said door carried metallic element and the end of said electro-magnet.

5. For use with a door or the like provided at one of its sides with a metallic element, a standard rigidly secured to a suitable support and carrying an electro-magnet, said electro-magnet being positioned in the line of movement of said door to an open position and in line with the door carried metallic element, an electric current supply circuit for the electro-magnet including a normally open movable switch movable to a closed position against resistance, means supporting said switch, a movable operating element for said switch, and said element being disposed in the path of travel of said door and positioned to be contacted by said door and actuated to close the current supply circuit prior to contact between the door carried metallic element and the electro-magnet.

WILLIAM P. BENNETT.

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