J. B. HARRIS.

DOOR CONTROLLING MECHANISM.

APPLICATION FILED NOV. 26, 1920.

1,430,228.

Patented Sept. 26, 1922.

Fig. 1.

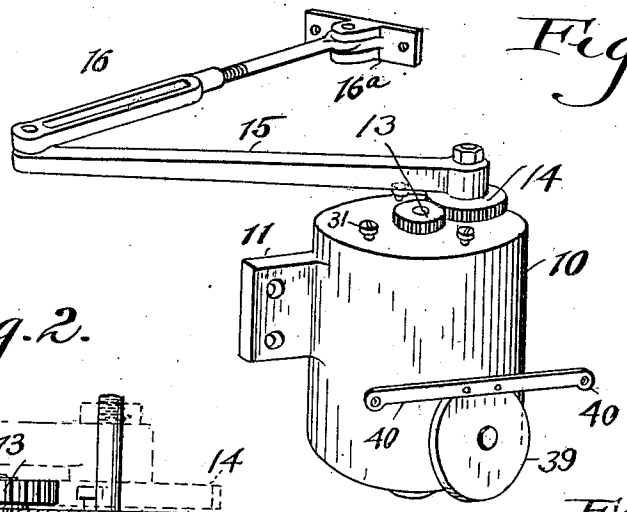


Fig. 2.

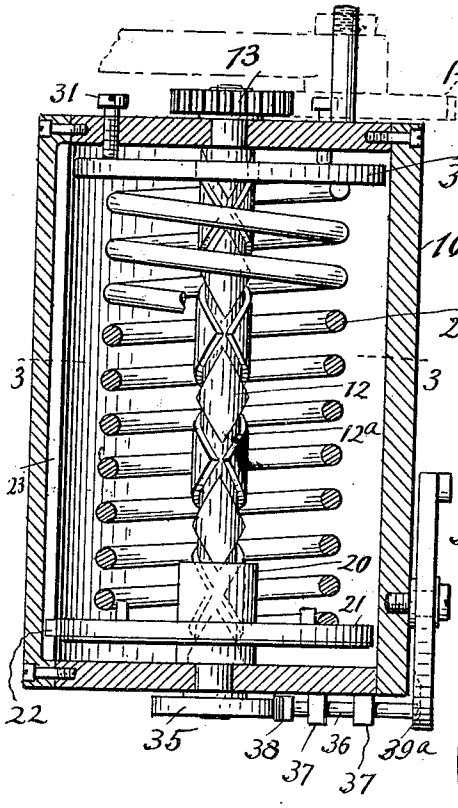


Fig. 3.

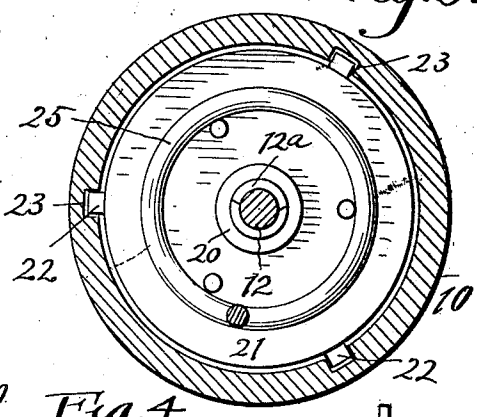
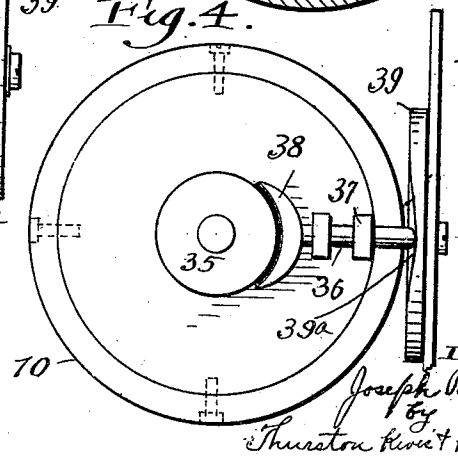


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH B. HARRIS, OF CLEVELAND, OHIO.

DOOR-CONTROLLING MECHANISM.

Application filed November 26, 1920. Serial No. 426,476.

To all whom it may concern:

Be it known that I, JOSEPH B. HARRIS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Door-Controlling Mechanism, of which the following is a full, clear, and exact description.

The object of this invention is to provide a relatively inexpensive but efficient device by which a door may be closed without slamming, or held open at any desired position.

The invention consists in the construction and combination of parts shown in the drawing and hereinafter described and pointed out definitely in the appended claims.

In the drawing, Fig. 1 is a perspective view of the device which embodies the invention; Fig. 2 is a central longitudinal section through the cylinder of the device; Fig. 3 is a horizontal section of said cylinder in the plane of line 3—3 on Fig. 2; Fig. 4 is a bottom plan view of the cylinder.

Referring to the parts by reference characters, 10 represents the cylinder having a wing or wings 11 by which it may be secured to a door, with its axis in a vertical position. A rotatable shaft 12 passes axially through the cylinder, and is rotatably mounted in the ends thereof through which ends the shaft projects. On the upper projecting end of said shaft a pinion 13 is fixed, which pinion meshes with a gear 14 which is rotatably mounted on the upper end of the cylinder. One of the toggle arms 15, such as are commonly used on door closing devices of this general character, is fixed to this gear 14, and the other toggle arm 16 which is pivoted to the arm 15, is pivoted at its other end to a bracket 16^a by means of which it may be secured to a door casing.

The shaft 12 is formed with a steep spiral groove 12^a. A nut 20 embraces the spirally grooved shaft and has an operative engagement with the groove thereof. This nut is fixed to a plunger plate 21, that is somewhat loosely fitted within the cylinder, and is movable lengthwise therein, but can not rotate. To produce this action the plunger plate is provided with one or more tongues 22 which engage in longitudinal grooves 23 in the inner surface of the cylinder.

A coil spring 25 is placed within the cylinder and is normally slightly compressed between the upper end of the cylinder and said plunger plate.

When one opens a door to which this device is secured the toggle arms 15, 16, will through the described mechanism, cause the turning of the shaft 12; and the turning of this shaft in the direction in which it will be turned when the door is opened will cause the nut and, of course, the plunger plate to which it is secured, to move up within the cylinder, and thereby compress spring 25. When the door is released this spring, forcing the plunger plate down, will reverse the motion of the described parts and cause the door to close. The plunger plate fits rather loosely within the cylinder, but nevertheless when the door is being closed, by the action of the spring against this plunger plate, the downward movement of the plate is to some extent checked by an air cushion between the lower end of the cylinder and said plunger plate. It will be understood by those familiar with this art, that the plunger plate can be fitted with any degree of nicety required to prevent such a rapid escape of air from below the plunger plate as will prevent the door from slamming.

Within the cylinder adjacent the upper end thereof is a false end plate 30 with which the spring 10 engages; and this end plate may be adjusted up and down by means of set screws 31 so as to vary the tension of the spring 25 to any desired degree.

It will be noted that the shaft 12 is formed with two spiral grooves running in opposite directions. Only one of said grooves is necessary, but the presence of both enables the device to be very readily adjusted to either a right or left hand opening door. All that is necessary to do is to substitute for the plunger plate and nut which engages one of said spiral grooves, another plunger plate and nut which is adapted to engage the other spiral groove.

It is desirable to provide a door with means by which it can be held open to any desired extent. To effect this result the downward extension of the shaft 12 is provided with a brake disk 35. A rod 36 is

mounted to slide radially in lugs 37 formed on the lower end of the cylinder, and it carries a brake shoe 38 on its inner end adapted to engage the periphery of the brake disk 35. A rocker 39 is mounted on the side of the cylinder, and this rocker is formed with a beveled surface 39a on its inner face located so as to engage the outer end of the brake rod 36. This rocker is provided with two arms 40 by means of which it may be rocked in one direction or the other. When rocked in one direction the beveled surface on the rocker will by engaging the brake rod 36, force the brake into contact with the brake disk whereby the rotation of the shaft is prevented, and whereby therefore the door is held against movement.

Having described my invention, I claim:—

1. In a door closing device, the combination of a cylinder, a shaft rotatably mounted therein having a steep spiral groove in its outer surface, a plunger plate which is movable lengthwise only within said cylinder and is provided with a nut which embraces the shaft and has an operative engagement with the spiral groove thereon, a coil spring within the cylinder compressed between the upper head thereof and said plunger disk, a pinion fixed to the projecting upper end of said shaft, a gear rotatably mounted on the upper head of the cylinder in engagement with said pinion, and two toggle arms one of which is connected with said gear and the other of which is pivotally connected with a bracket adapted to be connected with the door frame, the cylinder being provided with means for connecting it with the door.

2. In a door closing device, the combination of a cylinder adapted to be connected with the door, a shaft rotatably mounted therein, means through which the opening or closing of the door is necessarily accompanied by a rotation of said shaft, a brake disk secured to said shaft, a brake positioned to co-operate with said disk and brake operating mechanism mounted upon the cylinder.

3. In a door closing device, the combination of a cylinder adapted to be connected with the door, a shaft rotatably mounted therein, means through which the opening or closing of the door is necessarily accompanied by a rotation of said shaft, a brake disk secured to said shaft, and brake operating mechanism mounted upon the cylinder, the cylinder having radial guides on its lower end, a bar slidable in said guides, a brake shoe fixed to said bar for engagement with the periphery of the brake disk, a rocker pivotally mounted on the cylinder and having an inclined surface with which the end of said bar engages.

4. In a door closing device, the combination of a cylinder adapted to be secured to a door, a false head movable lengthwise in the upper end of said cylinder, adjustment screws which screw through the cylinder head into engagement with said false head, a plunger plate which is movable lengthwise only in said cylinder, and a coil spring compressed between said plunger plate and false head, an axially disposed shaft which is rotatably mounted in the ends of the cylinder, and a steep spiral groove on its outer surface said plunger plate being provided with a nut which embraces said shaft and operatively engages the spiral groove therein, a pinion fixed to the upper end of said shaft, a gear rotatably mounted on the head of the cylinder in engagement with said pinion, and two toggle arms one of which is connected with said gear and the other of which is pivotally connected to the bracket adapted to be connected with the door frame.

In testimony whereof, I hereunto affix my signature.

JOSEPH B. HARRIS.