May 24, 1927. 1,629,596

E. STOCKER

DOOR CLOSER

Filed Sept. 8, 1925

Fig. 1.

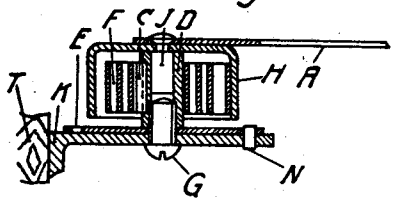


Fig. 2.

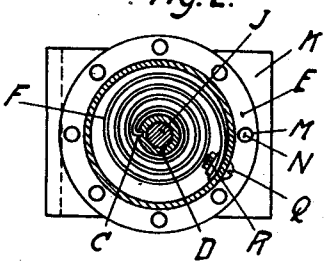


Fig. 3.

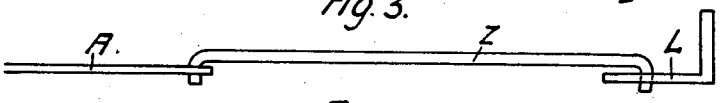


Fig. 4.

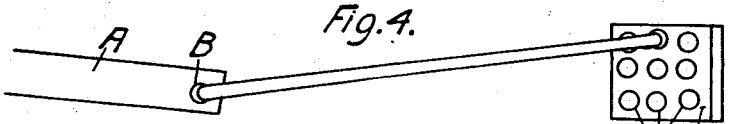


Fig. 5.

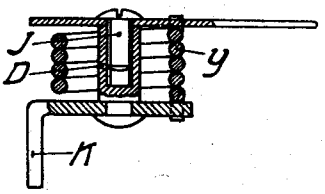
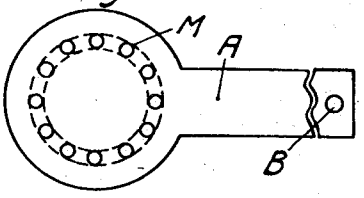


Fig. 6.



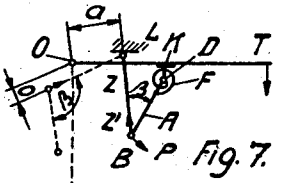


Fig. 7.

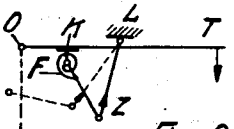


Fig. 8.

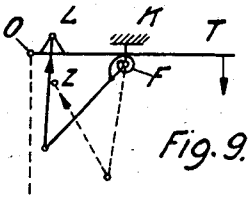


Fig. 9.

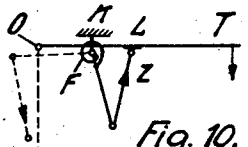


Fig. 10.

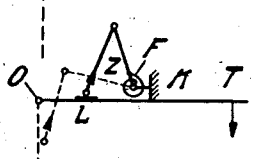


Fig. 11.

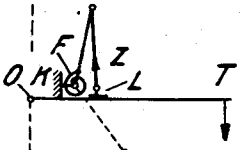


Fig. 12.

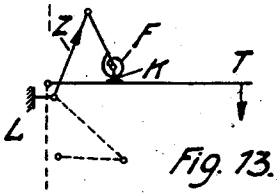


Fig. 13.

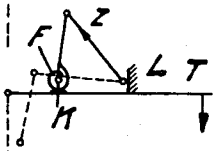
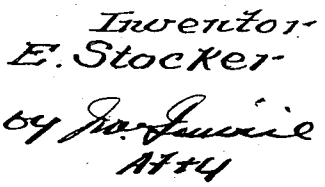


Fig. 14.

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by Jno. Lawrie
Atty



Patented May 24, 1927. 1,629,596

UNITED STATES PATENT OFFICE.

ERNST STOCKER, OF LUZERN, SWITZERLAND.

DOOR CLOSER.

Application filed September 8, 1925, Serial No. 54,972, and in Switzerland September 11, 1924.

The invention relates to a new and improved door-closer adapted to be used for doors, gates and so on.

The main object of the invention is to provide a most simple and effective device of this character which is inexpensive in construction and which can be readily applied to the conventional types of doors.

A further object of my invention consists in the provision of a door-closer which does not offer any appreciable resistance when the door is opened and which needs no readjustment after having been set once.

A further object of the invention is to provide a door-closer which can be readily adapted to any size of doors to close the same gently without jamming.

In the drawings accompanying and forming part of the present specification, I have shown in detail two of the several convenient forms of embodiment of the invention, which will be set forth fully in the following description.

It will be obvious therefore that I do not restrict myself thereto; I may depart therefrom in several respects within the scope of the invention included in the claim following said description.

Referring to the drawings;

Fig. 1 is a sectional side elevation of the first example of my door-closer,

Fig. 2 is a top view thereof,

Figs. 3 and 4 show the means to attach the door-closer in a top and in a side view,

Fig. 5 shows the second form of construction of the door-closer in a sectional side elevation,

Fig. 6 is a top view thereof,

Figs. 7 to 14 show diagrammatically the manner to attach the door-closer to the door and to the door-casing.

Like characters refer to like parts throughout the several figures.

The door-closer shown in Figs. 1 to 4 comprises an angular support K which is rigidly fixed by means of screws to the door T. On the horizontal member of the support K a circular plate E is fixed by means of a screw G engaging a screw-threaded bore of a stud D rigidly connected to the plate E. The plate E is provided with a circular row of holes M and the support K is provided with a pin N projecting in one of said holes M securing the plate E against rotation. The stud D is provided with a radial slot C and into this slot the inner endpiece of a blade spring F projects. The outer end of the spiral spring F is rigidly connected to a casing H by means of a screw Q and a nut R. To the casing H a guide pin J is rigidly fixed at its centre projecting into the bore of the stud D and rotatably mounted therein moreover the casing H is fastened to an arm A. The arm A is connected to an angle piece L by means of a link Z. The piece L is fastened to the door casing by screws and one member L′ is provided with a number of holes L″. The link Z engages with one of its ends one of the holes L″ and with the other end a hole B in the arm A. By opening or closing the door the casing H with the arm A turns around the stud D as its pivot.

The parts K and L of the door-closer may be fixed to the door-wing and to the door-casing in the manner shown in Figs. 7 to 14.

In the arrangement shown in Fig. 7 the support is fixed to the door-wing T and the angle piece L is fixed to the door-casing; the piece L is arranged between the support K and the hinges O of the door if the door is closed. If the distance between support K and hinges O is denoted by a and the angle between the parts A and Z is denoted by B if the door is closed and B′ if the door is opened, if P denotes the force of the spring F measured at the point B and Z′ the force acting in the direction of the link Z then the torque tending to close the door is

$$M + aZ' + a\left(\frac{1}{\sin B}\right)P$$

If by opening the door its angle with the door casing increases, the value of

$$\left(\frac{1}{\sin B}\right)P$$

increases and moreover the force P increases with the increase of the angle B but in a larger measure while the distance a decreases (see position of the door and the door-closer in broken lines Fig. 1). The force tending to close the door can be kept at least very approximately constant by closing a spring F of proper strength and the said force is chosen to be just a little above that to overcome the friction.

The relative position of the points of attachment of the parts K and L on the door and on the door-casing may be as shown in Fig. 8. The support K fixed to the door is

situated between the piece L fixed to the door-casing and the hinges. The position of the parts if the door is opened is shown by broken lines.

As shown in Fig. 9 the support K might be fixed to the door-casing and piece L to the door T the support K being further from the hinges O than the piece L; in Fig. 10 the parts K and L have changed their position with reference to the hinges O but support K is again fixed to the door casing and piece L to the door T.

In all the constructions shown in Figs. 7 to 10 the door-closer is fastened to that side of the door T in which it is opened; the Figs. 11 to 14 show corresponding arrangements of the door-closer fixed to the other side of the door.

It will be seen that the door-closer can be used on any door.

The Figs. 5 and 6 show a modified construction. On the support K the stud D is rigidly fixed and in a bore of said stud D a pin J of an arm A is rotatably mounted. Arm A is provided with a row of holes M running concentrically to stud D. On the support K rests a coiled spring Y one end of which passes through a bore in the support K and the other through one of the holes M.

By fixing the end of link Z in one or the other of the holes L'' the action of the spring F on the door may be varied, said holes constitute a very simple means to adjust a door-closer to a given door.

What I wish to secure by U. S. Letters Patent is:

A door closer including a member to be fixed to one of the relatively movable parts to be operated, a plate rotatably mounted on the member and having an upstanding hollow stud, a casing rotatably supported on the upper end of the stud, a spring arranged between the stud and casing, and means for adjustably holding the plate in desired rotative relation to the member to correspondingly tension said spring, said means comprising a pin cooperating with a hole formed in the member and with any one of a series of annularly arranged holes formed in the plate.

In witness whereof I affix my signature.

ERNST STOCKER.