July 21, 1942. S. E. H. ULFVING 2,290,219

DOOR CLOSING DEVICE

Filed Dec. 7, 1939

Fig. 1

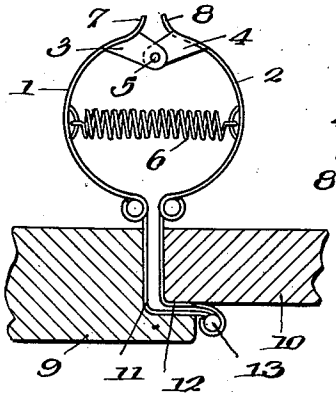


Fig. 2

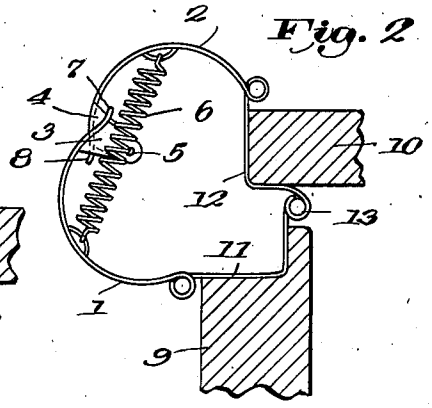


Fig. 3

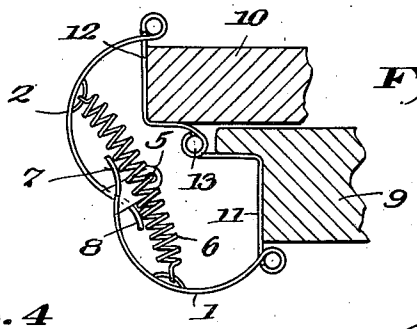


Fig. 4

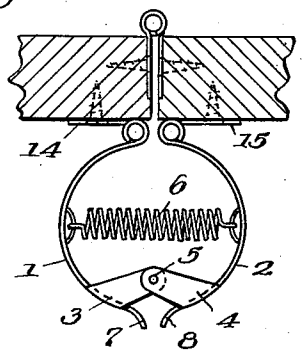
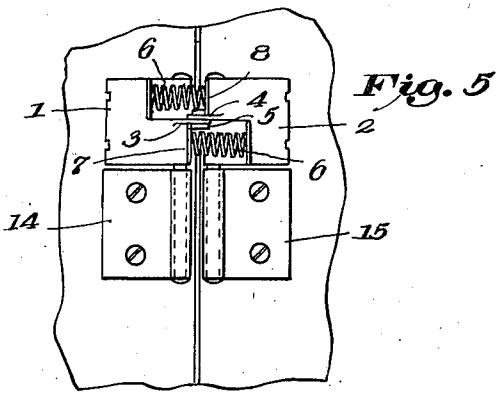


Fig. 5



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DOOR CLOSING DEVICE

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In Sweden December 19, 1938

7 Claims. (Cl. 16—89)

The present invention relates to devices for closing and keeping in closed position doors, shutters or other similar objects which are arranged to be turned especially round a vertical axis, particularly doors of small cupboards. Previous suggestions for such devices made with the object of accomplishing the automatic closing and keeping in closed position of doors of the kind referred to have been complicated and impractical, particularly as the earlier devices have been intended to be countersunk in the door and the cupboard wall or the door-case.

An object of this invention is to provide a door closing device which is simple and inexpensive to manufacture and easy to mount in place and which will eliminate the necessity of providing special means for keeping the door closed.

Another object of the invention is to provide a door closing device comprising a pair of arcuate shanks hingedly interconnected at one end and actuated in a direction towards each other by one or more tension springs located between the shanks, such shanks being pivotally connected to the door and the wall respectively in the vicinity of the turning axis of the door on the side opposite the turning axis.

A further object of the invention is to provide a door closing device of the kind referred to in which at least one of the shanks has an abutment adapted to engage and to bend the spring when the door is being opened beyond a certain limit.

A still further object of the invention is to provide a door closing device of the kind referred to in which the spring is fastened to the shanks at points so located that a line of connection between said points passes in close proximity to the common pivoting axis of the shanks when the door is in a certain open position.

A still further object of the invention is to provide a door closing device of the kind referred to in which the free end of each shank is pivotally connected to a fastening plate secured to the door and the wall respectively.

A still further object of the invention is to provide a door closing device of the kind referred to in which both such plates are directly pivotally interconnected and adapted to form a hinge for the door.

The following is a description of two slightly different embodiments of the invention as illustrated in the accompanying drawing, in which Fig. 1 is a top view in closed position of a door closing device according to the invention with parts of the door and the cupboard wall shown in section. Fig. 2 is a view similar to Fig. 1 of the same device in the 90 degrees open position of the door. Fig. 3 is a view similar to Fig. 1 with the door in the 180 degrees open position. Fig. 4 is a view similar to Fig. 1 of substantially the same device but fastened to the door and the wall in a somewhat different manner, and Fig. 5 the same device as in Fig. 4 viewed from inside the cupboard.

In the drawing 1 and 2 are a pair of arcuate shanks preferably drawn from sheet steel. Said shanks 1 and 2 are at one end formed with bent-out flaps 3, 4 respectively, and are joined together by means of a pin 5 passing through holes in the flaps 3 and 4 in such manner that the shanks 1 and 2 are able to pivot with respect to one another and to assume the different relative positions illustrated in Figs. 2 and 3. To the shanks 1 and 2 are fastened two parallel tension springs 6 in such a manner that they tend to keep the shanks 1 and 2 closed in the position shown in Fig. 1. As a result of the arcuate shape of the shanks a sufficient space for the springs 6 is formed between the shanks 1 and 2. Further, each of the shanks is provided with an abutment 7 and 8 respectively, each of such abutments being intended to engage one of the springs 6 in a certain open position of the shanks 1 and 2.

The free ends of the shanks 1 and 2 are bent to form a narrow loop and hingedly connected to plates 11 and 12 fastened to the door 9 and the wall 10 respectively. In the embodiment shown in Figs. 1–3 the plates 11 and 12 are hingedly interconnected at 13 so as to form also a hinge for the door 9. In Figs. 4 and 5 the corresponding plates denoted 14 and 15 respectively are intended to be fastened separately to door and wall respectively. The joints between the shanks 1 and 2 and their fastening plates are preferably detachable in order to facilitate the mounting operation.

Briefly the door closing device functions in the following manner. When the door is in closed position, as in Fig. 1, the springs 6 tend to press the shanks 1 and 2 together and, as a result, the door is kept closed. If the door is opened only a small angle and let free it will close immediately and remain closed. But if the door is opened so far as to make the mechanism assume the position shown in Fig. 2 where a line of connection between the fastening points of the springs 6 passes in close proximity to the common pivoting axis of the shanks

1 and 2 the springs evidently will have no appreciable turning action upon the shanks, and thus the door will remain in its position. The abutments 7 and 8 are so dimensioned that they will just engage the springs 6 in this very position of the door, and on continued opening of the door the springs 6 will consequently be bent around the said abutments as illustrated in Fig. 3. According to the invention the abutments are further so dimensioned that the tension of the springs will then remain substantially constant, consequently making it possible for the door to remain at rest in any position between those shown in Figs. 2 and 3.

Although the combination of a door closing device and a hinge as illustrated in Figs. 1–3 is to be considered as of particular advantage the invention is not limited to such combination only, as the new device can be employed with advantage also with doors or the like having separate hinges, as shown in Figs. 4 and 5. It is also possible to change or modify the construction in other respects without departing from the spirit of the invention. For instance the shanks may be joined together by means of two coaxial studs and in such cases it may be preferable to use one single spring instead of two as shown. The fastening plates may, of course, be given a different shape depending on the circumstances in each case. Further, it should be clear that the invention is not restricted to cupboard doors, moreover the invention may be used also with other objects pivoted round an axis in cases where an automatic return to a certain position is desired.

I claim:

1. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, said shanks being pivotally connected at their free ends with the door and the wall respectively in the vicinity of the turning axis of the door on the sides of said door and wall opposite said turning axis.

2. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, said shanks being pivotally connected at their free ends with the door and the wall respectively in the vicinity of the turning axis of the door on the sides of said door and wall opposite said turning axis, one of said shanks having an abutment extending inwardly between said shanks to engage and to bend said spring when the door is being opened beyond a certain limit.

3. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, said shanks being pivotally connected at their free ends with the door and the wall respectively in the vicinity of the turning axis of the door on the sides of said door and wall opposite said turning axis, said spring being fastened to the shanks at intermediate points so located that a line of connection between said points passes in close proximity to the common pivoting axis of the shanks when the door is in a certain open position.

4. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, said shanks being pivotally connected at their free ends with the door and the wall respectively in the vicinity of the turning axis of the door on the sides thereof opposite said turning axis, said spring being fastened to the shanks at intermediate points so located that a line of connection between said points passes in close proximity to the common pivoting axis of the shanks when the door is in a certain open position, one of said shanks having an abutment for engaging and bending said spring on further opening movement of the door so as to make the length of said spring remain substantially constant.

5. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, fastening plates attached to the door and wall respectively, each of said shanks being pivotally connected at the free end thereof with one of said fastening plates, the positions of said fastening plates being in the vicinity of the turning axis of the door on the side opposite the turning axis.

6. A door closing device comprising a pair of arcuate shanks hingedly interconnected at one end, a tension spring located between the shanks and having its ends connected respectively to intermediate points of said shanks so as to draw said shanks toward each other, fastening plates secured to the door and wall respectively, each of said shanks being pivotally connected at the free end thereof with one of said fastening plates, the positions of said fastening plates being in the vicinity of the turning axis of the door on the side opposite the turning axis, the ends of said spring being fastened to the shanks at intermediate points so located that a line of connection between said points passes in close proximity to the common pivoting axis of the shanks when the door is in a certain open position, at least one of said shanks having an abutment extending inwardly between the shanks to engage and to bend said spring on further opening movement of the door so as to cause the length of said spring remain substantially constant.

7. A door closing device, comprising a pair of arcuate shanks, said shanks being at one end hingedly interconnected with each other and at the other end hingedly interconnected with the door and wall respectively, and a tension spring located between said shanks and having its ends connected respectively to intermediate points of said shanks so as to draw the shanks toward each other.

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