Dec. 1, 1970 G. NILSSON 3,543,327

AUTOMATIC DOOR CLOSING DEVICE WITH DETENT TO HOLD DOOR OPEN

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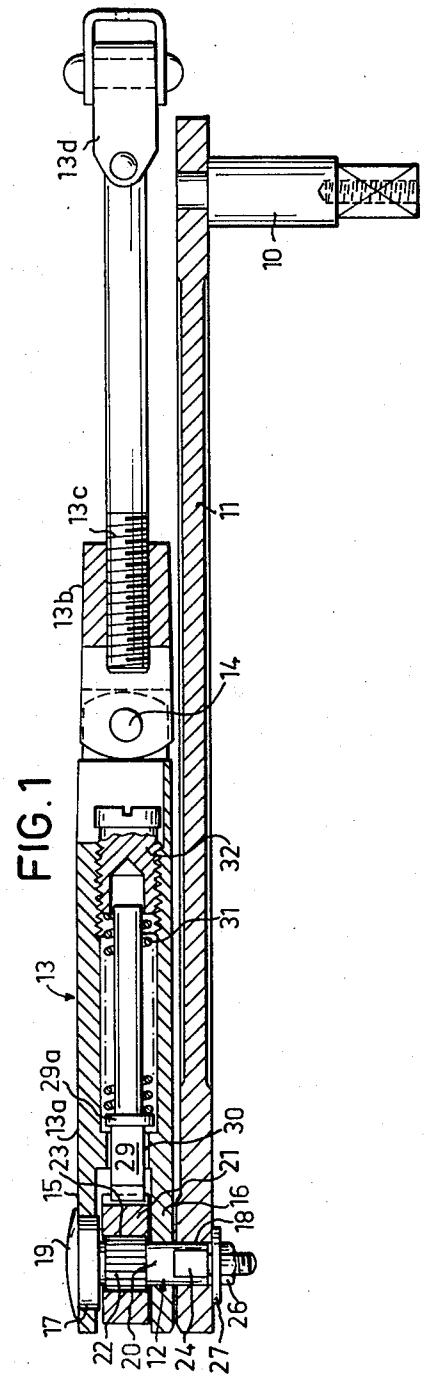

FIG. 1

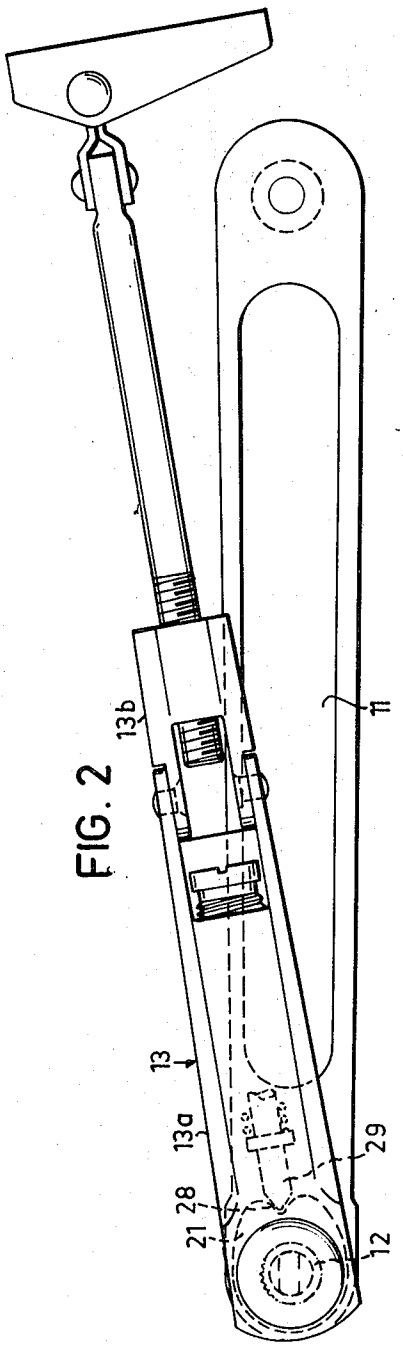

FIG. 2

AUTOMATIC DOOR CLOSING DEVICE WITH DETENT TO HOLD DOOR OPEN

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FIG. 3

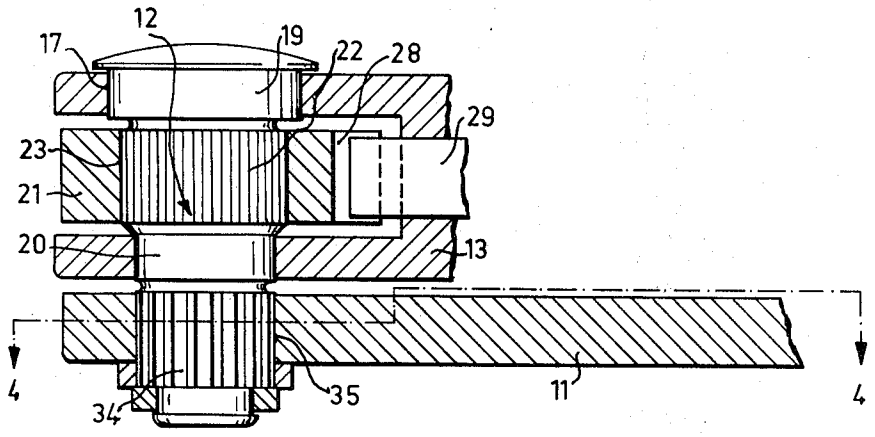
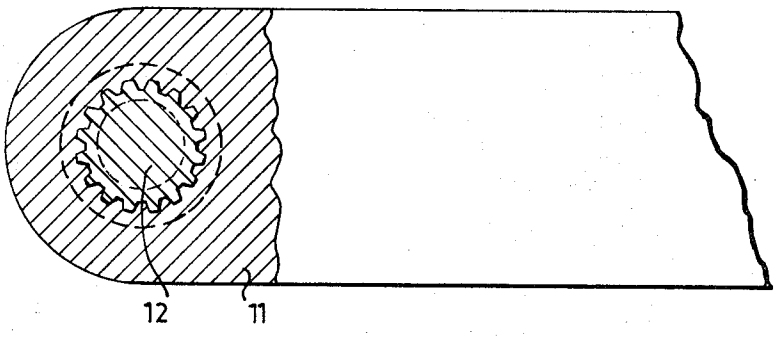


FIG. 4



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AUTOMATIC DOOR CLOSING DEVICE WITH DETENT TO HOLD DOOR OPEN

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Int. Cl. E05f 3/22
U.S. Cl. 16—49 1 Claim

ABSTRACT OF THE DISCLOSURE

An automatic door closing device biased by a spring in a door closing direction includes a swing arm pivotally connected with one end of a link arm. The opposite end of the link arm is pivotally connected, for example to the door when the housing of the device is attached either to the wall above the door opening or to the door frame proper. The pivot connection between the swing arm and link arm includes a pivot pin and a snap action latching device is associated with the pin to hold the door in a predetermined open position.

The present invention is concerned with an automatic door closing device of the type having a shaft rotatably mounted in the housing of the device and which for the purpose of closing the door is actuated by a spring in one direction of swing, the shaft carrying a swing arm which at its one end is pivotally connected with one end of a link arm. The other end of the link arm is intended to be pivotally secured to the door when the housing of the closing device is attached to the wall above the door opening or to the door frame itself. Obviously, if the link arm is pivotally secured to the door frame or to the wall, the housing of the door closing device together with the swing arm will be mounted on the door. Either arrangement is conventional.

The object of the present invention is to provide a releaseable detent mechanism which enables the arms to be latched in selectable angular positions, to hold the door in a corresponding open position.

This is achieved by means of the door closing device according to the invention which is characterized in the annexed claim.

Two embodiments of the door closing device according to the invention are illustrated in the accompanying drawings.

FIG. 1 shows a longitudinal section through the swing arm and the link arm in a door closing device of known design;

FIG. 2 is a plan view of the two arms;

FIG. 3 is an enlarged section of a modified design of the pivot between the arms; and

FIG. 4 is a section through the line 4—4 in FIG. 3.

The door closing device proper, which is not shown in the drawings, is of the type which comprises a housing in which is displaceably mounted a plunger operatively connected with a rotatably mounted sleeve into which the shaft **10** in FIG. 1 is capable of being inserted and locked in a known manner. The plunger is spring operated so that the shaft **10** is spring actuated in one swinging direction, i.e., the direction in which the door is closed. A swing arm **11** is attached to the shaft **10**.

The swing arm **11** is pivotally connected at its outer end with a link arm **13**, by means of a pin **12**. The link arm **13** comprises an outer sleeve **13***a* and a nut member **13***b* which is pivotally connected to said sleeve **13***a* by a pin **14** and which is capable of being adjusted by a screw

13*c*. Pivotally connected at the outer end of the screw is a fitting **13***d*, which is intended to be attached to a door when the housing of the closing device is fastened to the door frame or to the wall above the door frame.

The outer end of the sleeve-like part **13***a* of the link arm **13** is fork-shaped and presents two lug members **15, 16**. The pin **12** passes through holes **17, 18** disposed in said lugs **15, 16** and is pivotally mounted therein. The hole **17** is larger than the hole **18**, and accordingly the pin **12** presents in relation thereto a large diameter at **19** and a small diameter at **20**. The pin **12** supports between the lugs **15, 16** a cam plate **21** which in the shown embodiment is adjustably arranged on the pin by means of a splined wheel **22** positioned on said pin and a corresponding inner splined ring **23** positioned in the hole in the cam plate. The cam disc can therefore be mounted in the desired position of rotation relative to the pin **12**.

The lower end **24** of the pin **12** is of square cross section, which fits into the corresponding, essentially square hole **18** located in the end of the arm **11**. The pin **12** is fixed in its axial position by means of a nut **26** and a washer **27**.

To provide for the latching of the device the cam plate is provided with a latching recess **28**, in which a latching plunger **29** engages and latches in the shown position the arms **11, 13** against relative rotation. This position constitutes a desired open position for a door provided with the door closing device. The latching plunger **29** is displaceably mounted in an axial hole **30** in an end wall within the sleeve **13***a*. The end wall forms the bottom of a cylindrical recess in the sleeve, where a compression spring **31** is positioned between a flange **29***a* on the plunger **29** and a screw plug **32**. The tension of the spring is adjusted by turning the screw plug **32**. The rear end of the plunger **29** is guided by a hole in the rear of the plug.

The pivot connection between the members **13***a* and **13***c* enables the member **13***c* to be swung to one side to facilitate dismantling of plug **32**. The link arm **13** can be easily adjusted to the desired length by means of the screw **13***c*.

As can be seen from FIG. 2 the latching recess **28** and the end of the latching plunger **29** are designed so that the latching plunger can slide out of the latch recess when the arm **13** is subjected to a certain load. This means that the door remains open or ajar in the position determined by the latch recess. The door can be closed, however, by exerting a certain pressure on the door in the closing direction thereof, whereupon the latching plunger **29** springs back and slides out of the latching recess. The cam plate **21** with its recess **28** thus constitute a releaseable detent mechanism.

FIG. 3 shows a variation of the invention, in which the pin **12** is provided with a splined wheel **34** which cooperates with a corresponding, internal splined ring **35** positioned in the hole located in the end of arm **11**. Thus, in this instance the pin **12** can be adjusted in different positions of rotation relative to the arm **11**. In certain instances this adjustment is more easily accomplished in the alternative embodiment than in the embodiment shown in FIG. 1. In other respects this pivot functions the same as that shown in FIG. 1, in that it has been provided with a cam plate presenting a latching recess into and out of which a latching plunger can snap in the manner described above.

I claim:

1. In an automatic door closing device of the type including a shaft rotatably mounted in the housing of the device and which for the purpose of closing the door is actuated by a spring in one direction of rotation, a swing arm secured at one end to said shaft, and a link arm pivotally connected at one end thereof to the opposite end of said swing arm, the opposite end of said link arm

being adapted to be pivotally secured to the door when the door closing device is secured to the door frame or wall, or vice versa, the improvement wherein one end portion of said link arm is fork-shaped and terminates in two parallel lug members having aligned holes therein for mounting a pivot pin connecting adjacent ends of said link arm and swing arm, a cam plate located between said lugs and non-rotatably mounted on said pivot pin, said cam plate being provided with at least one latching recess, a spring-operated latching plunger displaceably mounted in said link arm and which engages said cam plate and the latching recess therein thereby to releaseably hold the door open against the door closing force exerted by said swing arm, the portion of said pivot pin which is engaged with said link arm permitting rotation of said link arm about the axis of said pivot pin, and the other portion of said pivot pin which is engaged with said swing arm being provided with a splined ring which engages a

corresponding splined hole in said swing arm thereby to enable said pivot pin and hence also said cam plate to be rotationally adjusted to different positions relative to said swing arm.

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