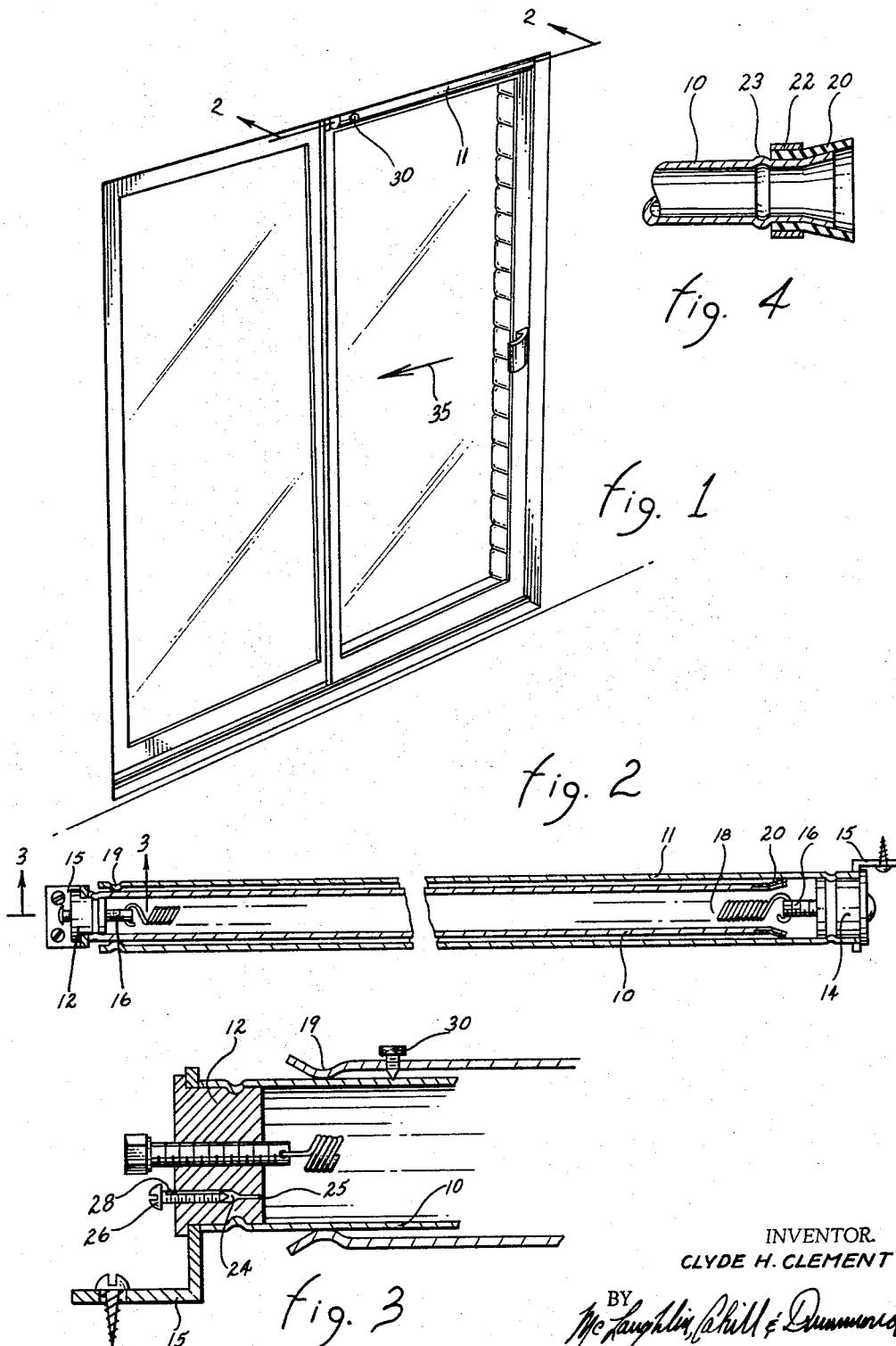


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SLIDING DOOR CLOSER
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SLIDING DOOR CLOSER

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2 Claims. (Cl. 16-66)

My invention relates to a door closer, and more particularly to an automatic door closer for use with sliding doors.

Sliding doors such as arcadia doors have gained wide acceptance and popularity, particularly for use as patio doors or the like. While the art is replete with examples of door closers for use with doors of the ordinary swinging type, no satisfactory door closer is currently available for use with sliding doors. Typical door closers for arcadia doors have the disadvantage of being extremely bulky and complex and do not provide adequate control over the rate of closing. Because of their bulk, presently available door closers must be mounted where they both accumulate dust and present an eyesore to a person approaching the door. The rate at which sliding doors close is highly important. For instance, when carrying objects through a doorway or when small children are using the doorway, it is desirable that the door close relatively slowly so as to prevent a person or child from becoming jammed in the doorway by the closing of the door. In other situations such as in rainy or windy weather, it is desirable that the door close rapidly to minimize the period of time over which the door is open. Previous sliding door closers are not sufficiently adaptable to permit wide variation in the rate at which the door closes.

Another disadvantage of the previously known sliding door closers arises from the fact that they are in substantially constant actuation. In order to maintain a sliding door partly open, it is necessary to block the doorway with a chair, table, box, or the like. Desirably, a sliding door closer permits blocking of the door closed or in any desired opened position.

It is therefore a principal object of my invention to provide an automatic door closer for sliding doors.

It is another object of my invention to provide a door closer which may be locked closed or in any desired opened position.

It is a further object of my invention to provide a door closer for sliding doors in which the rate of closing is fully controllable.

It is still another object of my invention to provide a sliding door closer which is compact and may be mounted in either an exposed or a cloaked condition.

Other objects and advantages of my invention will become apparent to those skilled in the art in the course of the following specification and claims when taken in view of the accompanying drawings.

Briefly, my invention comprises a pair of hollow tube members of different diameters, each tube having one closed end. The tubes are telescoped and a tension member extends between the closed ends thereof. Opening of the telescoped tubes is accomplished only by exerting a force against the tension member which will tend to bring the tubes into a closed telescoped relation. A suction washer or similar means is provided on the inner tube member whereby, except for the tension member, the tubes may be freely opened, but closing of the telescoped tubes must be accomplished against air pressure created inside the tube assembly by expansion of the suction washer. Suitable bleeder valve means permits a slow escape of air whereby the rate of closing or telescoping of the tubular members may be controlled. Suitable bracket means is provided at each end of the assembly whereby the telescoped tube assembly may be mounted on a sliding door and its associated frame member.

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A better understanding of my invention may be obtained in view of the accompanying drawings in which:

FIGURE 1 is an isometric illustrating a typical sliding door having an automatic door closer in accordance with my invention affixed thereto;

FIGURE 2 is a partial sectional elevation taken along 2-2 of FIGURE 1;

FIGURE 3 is a partial, enlarged sectional view taken along 3-3 of FIGURE 2; and

FIGURE 4 is an enlarged sectional elevation illustrating in detail an embodiment of my invention.

Referring to the drawings, an inner tube 10 and an outer tube 11 are mounted in telescoped relationship. Plug member 12 closes the outside end of inner tube member 10 and plug member 14 closes the outside end of outer tube member 11. Bracket means 15 is secured to each of the plug members but may be affixed directly to the tube members as desired. Retainers 16 are positioned inside the closed ends of the tube members and preferably engage the plug members 12 and 14. One or both of the retainers may be threaded to provide a tension-adjusting means. A tension member 18 illustrated in the form of a coil spring, is held by and extends between retainers 16 engaging plugs 12 and 14.

Outer tube member 11 has a circumferential bead 19 positioned near its open end to maintain said outer tube 11 in spaced relationship with the inner tube member 10. The open end of the inner tube member 10 has a circumferential suction washer 20 attached thereto. To aid in securing the suction washer 20, the open end of the inner tube member 10 may be slightly enlarged or bell-shaped, and the suction washer will be shaped accordingly. The suction washer is disposed with the mouth of its bell-shaped portion extending outwardly from the inner tube member. As shown in FIGURE 4, a collar 22 and bead 23 may be additionally employed to secure the suction washer to the inner tube member. Suction washers useful in accordance with my invention are generally of deformable but resilient materials such as rubber, leather, plastic, or the like. The outer surface or side of the suction washer 20 slidably engages the inner side of the outer tube member 11. Since the suction washer is yieldable, air freely passes when the telescoped tubes are opened, but air pressure created as the tubes close causes the suction washer to expand and seal the space between inner and outer tubes.

A bleeder valve 24 is positioned near either end of the assembly in communication with the interior of the inner tube member 10. As illustrated in FIGURE 3, a typical bleeder valve 24 includes an aperture 25 defined in the plug member 12 and closed by a threaded screw member 26. A slot or groove 28 in the threaded portion of the screw member 26 permits air to escape through aperture 25 at the desired rate. By adjusting screw member 26, the rate of closing of the apparatus may be controlled.

Stop means may be provided so that the telescoping may be arrested at any point. For instance, the door with which the door closer is associated may be locked open in substantially any position or may be locked closed if desired. A typical stop means is illustrated particularly in FIGURE 3 wherein a thumbscrew 30 threadedly engages the outer tube member 11 and, when desired, frictionally contacts the inner tube member 10 and restrains movement of the inner tube member relative to the outer tube member.

In the embodiment shown in the drawings, the bracket member attached to the inner tube member is secured to the slidable door and the bracket means attached to the outer tube member is secured to the door frame. When the door is opened as shown by the arrow 35 in FIGURE 1, the tension member 18 restrains the movement slightly

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but is easily overcome. Air passes through the space between the inner and outer tube members and bypasses suction washer 20. A minor quantity of air may enter the apparatus through the bleeder valve 24. When the door is released, the tension member acts to return the tube members to their closed telescoped relationship and thereby closes the door. Counteracting the force of the tension member is air pressure developed inside the tube assembly. When the telescoping tube members are moving to close, the suction washer flairs outwardly or expands and sealingly engages the inside wall of the outer tube member 11. Air is released at the desired rate through the bleeder valve means 24 to prevent the door from closing at a dangerous or otherwise undesirable rate.

My sliding door closer provides an inexpensive, efficient means for automatically closing sliding doors. Further, my sliding door closer permits predetermination of the rate at which the sliding door will close. While discussion herein has been directed to an exposed door closer, my apparatus could easily be mounted in the door frame or otherwise be cloaked from view.

Various modifications of my invention may be made without departing from the spirit or scope thereof, and it is to be understood that I limit myself only as defined by the appended claims.

I claim:

1. A sliding door closer comprising a pair of hollow tubular members disposed in telescoping relationship with their respective outwardly facing ends closed by plug members, the outer tubular member having an inwardly facing bead slidingly engaging the inner tubular member, retainers engaging inside said plug members and engaging a tension spring extending therebetween, at least one of said retainers being threaded to provide a tension adjustment, the open end of said inner tubular member being bell-shaped and having an outwardly facing peripheral bead disposed behind said bell-shaped portion, a peripheral bell-shaped suction washer mounted over said bell-

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shaped portion of said inner tubular member and secured by a collar, said suction washer slidingly engaging the inner surface of said outer tubular member, a bleeder valve positioned on one of said tubular members, and bracket means secured to each of said plug members.

2. A sliding door closer comprising

(a) inner and outer mutually telescoping tubes,

(b) a plug with an annular groove in an outer end of each tube, each such tube being deformed to engage in one of said annular grooves to hold the same in fixed position,

(c) a bracket carried by each plug for attachment respectively to said sliding door and a frame within which it slides,

(d) means forming a recessed annulus at an open end of the outer of said tubes to assist in holding the tube axes in alignment,

(e) means forming an outflared end on an open end of the inner of said tubes,

(f) a sealing washer on said outflared end sealed against the inside surface of said outer tube,

(g) a spring supported under tension between said plugs, and

(h) an adjustable bleeder valve in one of said plugs.

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