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HYDRAULIC DOOR CLOSER

Filed June 5, 1964

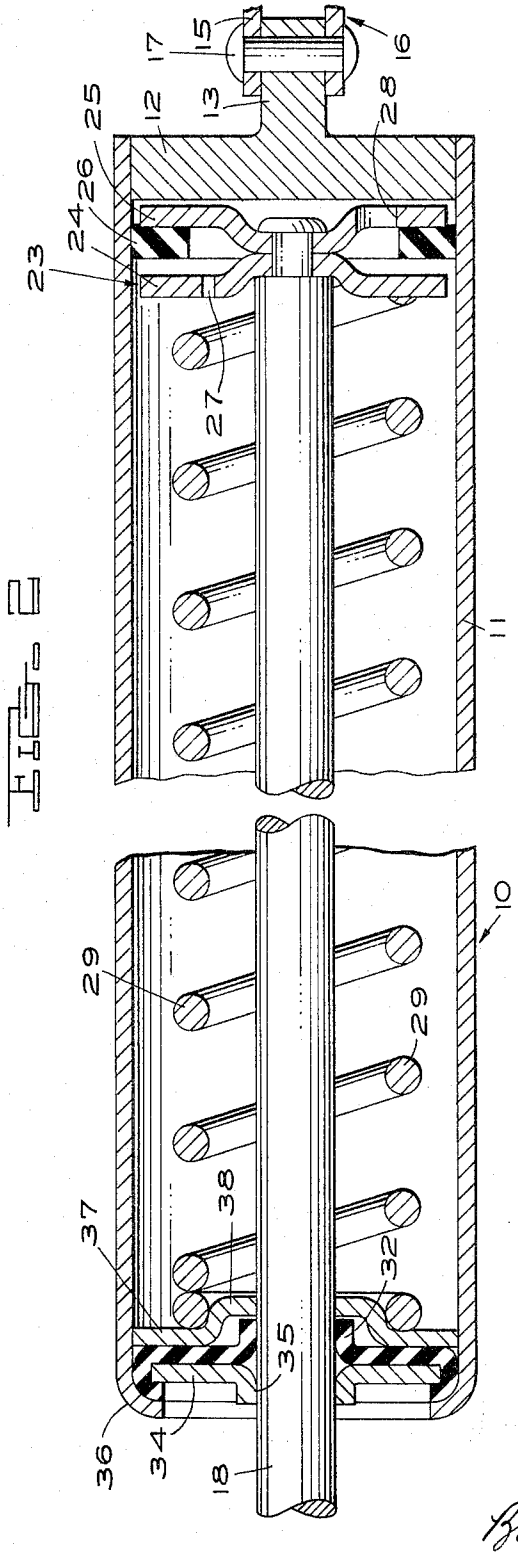



FIG. 2

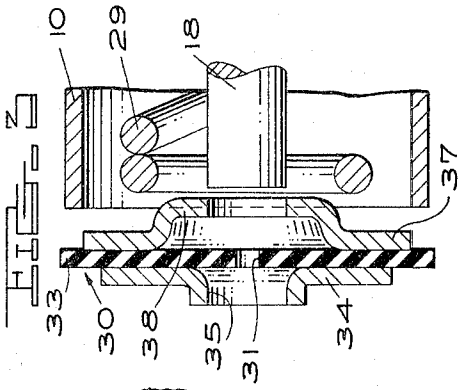



FIG. 4

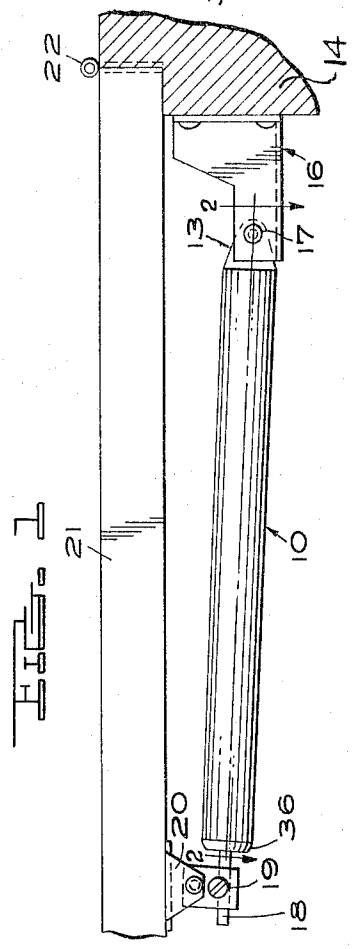



FIG. 1

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# HYDRAULIC DOOR CLOSER

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This invention relates to hydraulic door closers and particularly to door closers for use with light weight doors such as are found around the home and in light commercial installations.

A common problem with hydraulic door closers of the light weight type is there is a tendency for leakage between the piston rod and the casing as the piston rod reciprocates within the casing.

It is an object of this invention to provide a hydraulic door closer which has novel sealing means between the piston rod and the casing.

It is a further object of the invention to provide such a door closer which can be manufactured at low cost.

In the drawings:

FIG. 1 is a fragmentary plan view of a hydraulic door closer embodying the invention showing the closer in position on a door jamb.

FIG. 2 is a fragmentary longitudinal sectional view taken along the line 2—2 in FIG. 1.

FIG. 3 is an exploded sectional view of a portion of the hydraulic door closer shown in FIG. 2.

Referring to FIGS. 1 and 2, the hydraulic door closer **10** embodying the invention comprises a cylindrical tubular casing **11** which has one end thereof closed by a plug **12** and formed with an integral extension **13** providing a means for pivoting the door closer to a door jamb **14**. Extension **13** extends between spaced walls **15** of a bracket **16** that is mounted on the jamb **14**. A rivet or pin **17** extends through alined openings in the wall **15** and through an opening in the extension **13** to thereby pivot the casing **11** on the bracket **16** and in turn the jamb **14**.

A piston rod **18** extends through the other end of the casing **11** and a seal is provided between the piston rod **18** and the casing **11**, as presently described. The end of the rod **18** which is external of the casing **11** is held by a clamp **19** which is pivoted to a bracket **20** fixed on the door **21** at a point spaced from the door hinge **22**.

A valve and piston assembly **23** is mounted on the end of the rod **18** within the casing **11**. The valve and piston assembly **23** comprises spaced members **24, 25** between which a resilient annular ring **26** is positioned in sealing engagement with the inner surface of the casing **11**. Member **24** is provided with a small axial opening **27** and member **25** is provided with a larger axial opening **28**. A spring **29** yieldingly urges the piston rod to door closing position such as shown in FIG. 2. When the door is opened by hand, the ring **26** moves to the right offering a free flow of hydraulic liquid within the casing **11** around the periphery of member **24** and through axial opening **28**. When the door is released, the spring **29** tends to return the door to closed position but is opposed in this movement by the restricted flow of hydraulic fluid which is produced by shifting of the ring **26** against the member **24** thereby obstructing flow through the periphery of the member **24** and permitting flow only through restricted opening **27**. This produces a gradual controlled closing of the door.

Referring to FIGS. 2 and 3, the seal between the piston rod **18** and the casing **11** is formed by a flat resilient washer **30** having an opening **31** centrally thereof through which the rod **18** projects. The size of the opening **31** is substantially smaller than the diameter of the rod **18** so that a central portion **32** of the gasket extends axially in the direction of the valve means **23**. The length of the portion **32** axially of the rod **18** is such that when the rod



**18** is reciprocated the portion **32** remains in position extending toward the valve means **23** regardless of the direction of movement of the piston rod **18** thereby forwarding an efficient seal between the piston rod **18** and resilient washer **30**.

The diameter of the gasket **30** is such that a peripheral portion **33** thereof extends axially along the inner surface of the casing **11** away from the valve means **23**. A flat rigid washer **34** having a central opening **35** slightly larger than the diameter of the rod **18** is provided on the other side of the gasket **30** and has its periphery spaced from the inner surface of the casing **11**. An end portion **36** of the casing is turned over thereby compressing the peripheral portion **33** of the resilient gasket **30** against the periphery of the washer **34** to provide a seal. As shown in FIGS. 2 and 3, a washer **37** is provided adjacent the one surface of the resilient washer **30** and has a central portion **38** which is raised to provide clearance for the axially extending portion **32** of the resilient washer **30**. Spring **29** provides an axial force surrounding the portion **38** yieldingly holding the gasket **30** in position.

In the manufacture of the hydraulic door closer, the washer **37**, resilient washer **30** and washer **34** are assembled on the piston rod after the valve means **23** and spring **29** have been placed on the piston rod with the axial portion **32** of the washer **30** extending toward the valve means **23**. The entire assembly is then inserted within the casing **11** so that the peripheral portion **33** of the resilient gasket **30** is forced axially away from the valve means. The washer **34** is then maintained within the casing against the action of the spring **29** while the end **36** of the casing **11** is deformed into position.

At all times, the elastic memory of the gasket forces axial portion **32** against the surface of the piston rod to insure an efficient hydraulic seal.

It can thus be seen that there has been provided a hydraulic door closer having novel sealing means between the piston rod and the casing.

I claim:

**1.** In a hydraulic door closer, the combination comprising

a casing defining a piston chamber,

a piston rod reciprocally mounted in said casing with one end thereof extending within said chamber and the other end thereof extending externally of said casing,

valve means on the end of said piston rod within said chamber adapted to selectively restrict communication between one side of said valve means and the other,

means for sealing around a portion intermediate the ends of said rod comprising

a washer of resilient material having an axial opening therein through which said rod projects,

the diameter of said opening being less than the diameter of said rod,

said washer being substantially flat in an untensioned state when removed from the casing,

a first rigid washer engaging a surface of said resilient washer and having a central portion spaced from said resilient washer allowing a central portion of said resilient washer to extend axially along said rod in sealing relation to said rod in the direction of said valve means,

the axially extending portion of said resilient washer being of such thickness and length that flexing of said axially extending portion is prevented during reciprocating movement of said rod in both directions so that said axially extending portion extends toward said valve means during movement of said piston rod in both directions,

the free end of said axially extending portion being unrestrained in the direction of said valve means,

a second rigid washer, which closes a portion of an end of said casing, on the other side of said resilient washer,

said resilient washer having a peripheral portion surrounding and extending axially around the radially outermost periphery of said second rigid washer in a direction away from said valve means,

said casing having a peripheral portion deformed radially inwardly to compress said peripheral portion of said resilient washer against the radially outermost periphery of said second rigid washer to provide a seal between said casing and the peripheral portion of said resilient washer,

and means for applying an axial force to said first rigid washer at an area surrounding said central portion of the resilient washer.

**2.** For use in a hydraulic door closer including

a piston rod reciprocally mounted in a casing with one end thereof extending within said casing and the other end thereof extending externally of said casing, the improvement comprising

means for sealing around a portion intermediate the ends of said rod comprising

a washer of resilient material having an axial opening therein through which said rod projects,

the diameter of said opening being less than the diameter of said rod,

said washer being substantially flat in an untensioned state when removed from the casing,

a first rigid washer engaging a surface of said resilient washer and having a central portion spaced from said resilient washer allowing a central portion of said resilient washer to extend axially along said rod in a direction toward the interior of said casing,

the axially extending portion of said resilient washer being of such thickness and length that flexing of said axially extending portion is prevented during reciprocating movement of said rod in both directions so that said axially extending portion extends toward the interior of said casing during movement of said piston rod in both directions,



the free end of said axially extending portion being unrestrained in a direction toward the interior of said casing,

a second rigid washer, which closes a portion of an end of said casing, on the other side of said resilient washer,

said resilient washer having a peripheral portion surrounding and extending axially around the radially outermost periphery of said second rigid washer in a direction away from the interior of said casing,

said casing having a peripheral portion deformed radially inwardly to compress said peripheral portion of said resilient washer against the radially outermost periphery of said second rigid washer to provide a seal between said casing and the peripheral portion of said resilient washer,

and means for applying an axial force to said first rigid washer at an area surrounding said central portion of the resilient washer.


**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,753,008 | 7/1956 | Peirce | 277—212 X |
| 2,920,882 | 1/1960 | Allinquant. | |
| 3,160,910 | 12/1964 | Quinn | 16—51 |
| 3,182,349 | 5/1965 | Sogoian | 16—52 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 678,804 | 9/1952 | Great Britain. |



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