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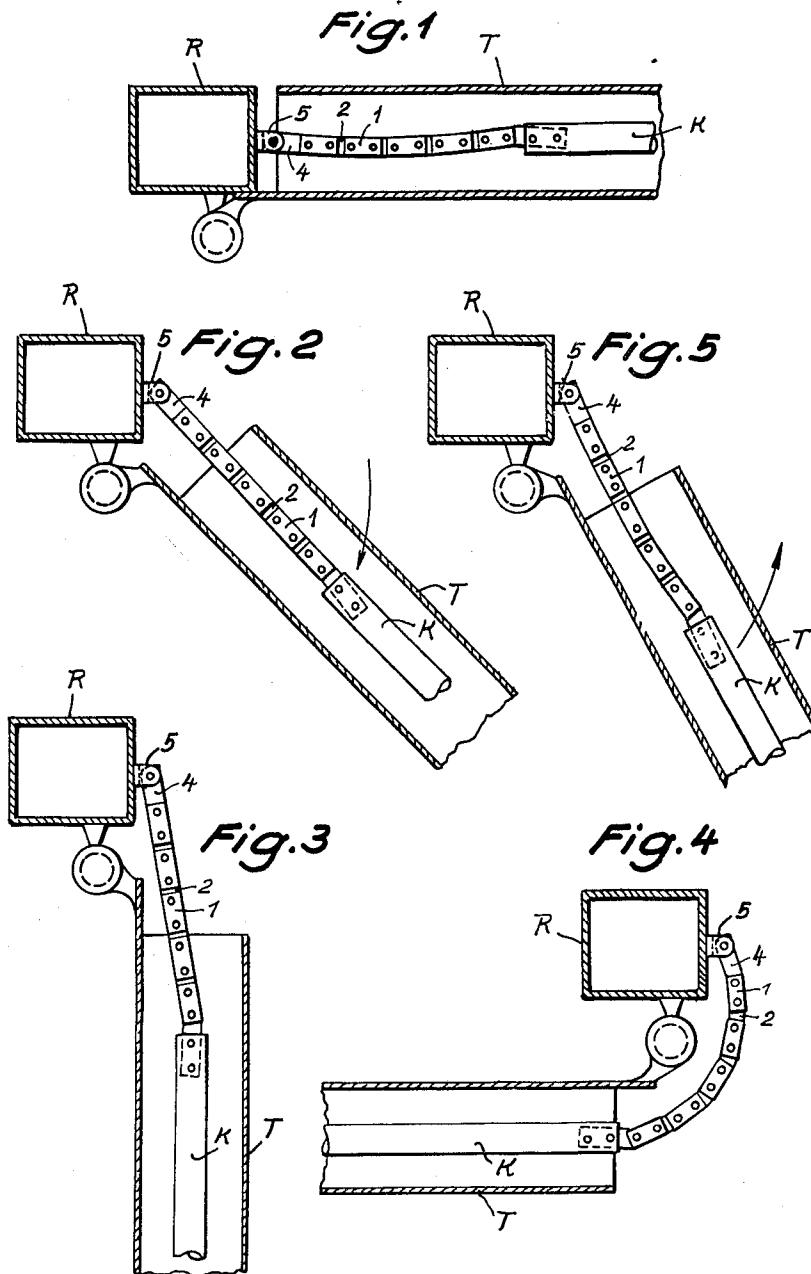
H. EGLAUF

3,177,517

DOOR CLOSING DEVICE

Filed Dec. 22, 1960

2 Sheets-Sheet 1



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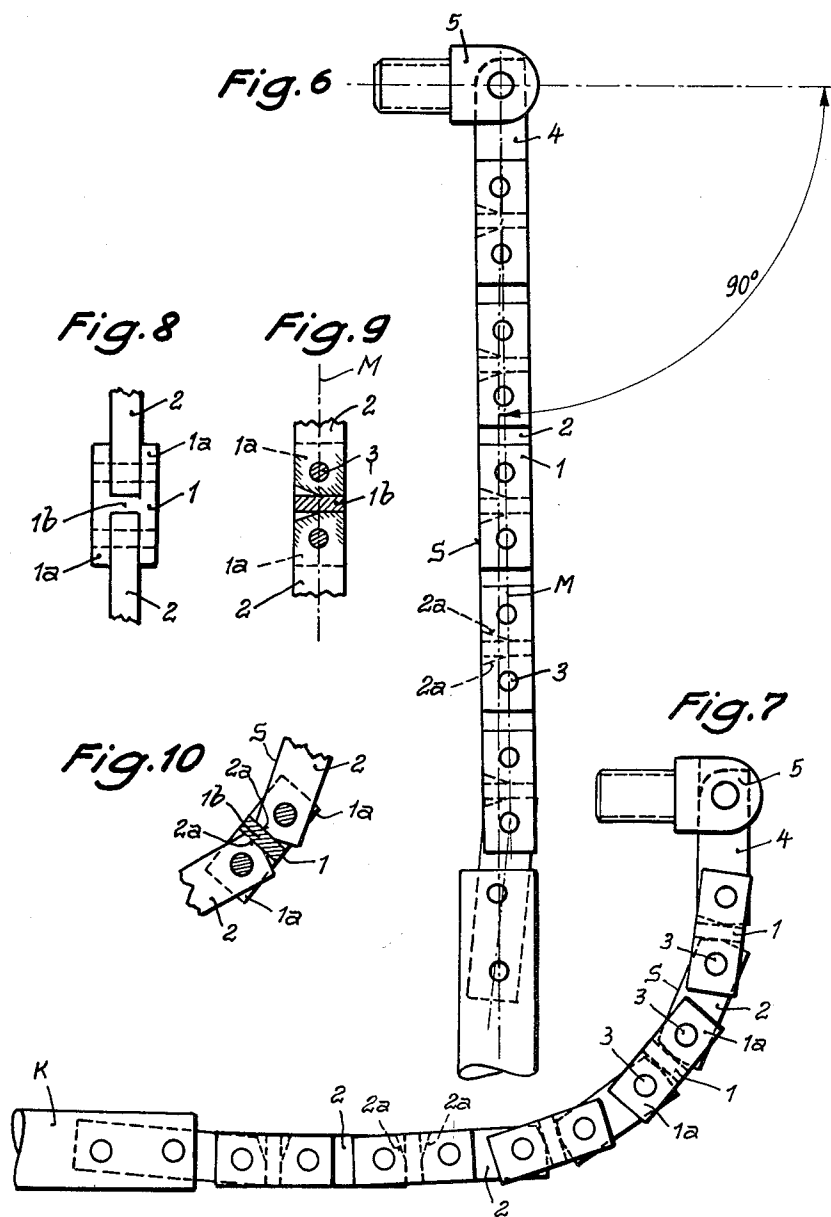
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## DOOR CLOSING DEVICE

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2 Claims. (Cl. 16—61)

The present invention relates to a door-closing device, especially pneumatic or hydraulic door checks, in which a part of the checking device (for instance the damping cylinder or piston) is joined through a connecting chain to a support (such as the door frame) lying eccentrically to the swing axis of the door wing, this chain serving to transmit the swinging movement of the door leaf to the checking device.

The improvement according to the invention resides in the provision of connecting means performed by a chain whose links are only limitedly swingable with respect to one another between two end positions, the chain describing in one end position an arc of definite curvature, whereas the other position substantially coincides with the stretched condition of the chain.

In contradistinction to linkages now in use, the connecting chain according to the invention makes it possible to open or swing any door leaf through an angle of 180° without the need for providing any recesses on the door leaf or the door frame. For this reason, the device according to the invention is particularly suitable also for door closers which are built inside the door leaf.

The accompanying drawing shows by way of example one preferred embodiment of the invention.

In the drawing:

FIG. 1 is a horizontal section of the door post of a door frame with the door leaf hinged thereto, in closed position;

FIG. 2 shows the door leaf according to FIG. 1, but opened through an angle of 45°;

FIG. 3 shows the door leaf as opened through an angle of 90°;

FIG. 4 shows the door leaf as opened through an angle of 180°;

FIG. 5 shows the door leaf and door post in a phase of the closing movement with the connecting chain in its stretched or linear position;

FIG. 6 is an elevational view of the connecting member in stretched position, on a larger scale;

FIG. 7 is an elevational view of this connecting member in curved position;

FIG. 8 is a fragmentary view of the connecting member;

FIG. 9 is a longitudinal section through FIG. 8; and

FIG. 10 shows the assembly of FIG. 9 in curved condition.

From the drawing, it may be seen that the device includes a connecting member 1, 2, 3 having one end 4 articulated to a pivot member 5 in the form of an anchor lug mounted on the door frame R and projecting into the door opening, the other end of this member comprising a terminal link rigidly secured to a piston rod K of a checking device, consisting of, say, a brake cylinder and piston, built into the door leaf. The connecting means

2

consists of a chain whose links 1 and 2 are assembled by hinge pins 3. Every alternate link 1 is constituted by a substantially H-shaped fork piece with two flanges 1a joined by a web 1b. The chain links 1 and 2 are interconnected for horizontal swinging motion within a limited range, the plate-like intermediary members 2 being for this purpose provided with ends engaging in the bifurcated parts formed by the flanges 1a to which they are pivoted by the parallel hinge pins 3. For limiting the swivel range, the connecting plates 2, abutting endwise on the connecting web 1b of the H-shaped links in the stretched position of the chain, have transverse edges each formed with a corner bevel 2a which, starting from the median line or plane M through the axes of the hinge pins 3, all run to one and the same short side S of the plate 2. Because of this bevel 2a of the connecting plates 2, the chain links are permitted to swivel from their aligned position only to one side, i.e. in the door-opening direction until said bevels 2a abut the connecting webs 1b of the H-shaped chain links 1. The end link 4 of the chain, situated on the side of the support 5, is anchored thereto for swivelling through 90°.

On opening the door T, the connecting members 1-4 is under the pulling action of the piston rod K of the checking device and will be swung in its stretched position about its pivot on lug 5, within the frame opening, concurrently with the swing of door leaf T, until it has described an angular movement of 90 degrees about that pivot as shown in FIGS. 1, 2 and 3. With the door T being opened further, i.e. from 90 to 180 degrees, the connecting members 1-4 will be curved in an arc about the pivotal axis of the door, as shown in FIGS. 4 and 7. When the door is being closed, the connecting members 1-4 in swinging through the range of 180 to 90 degrees, will first be brought back to the stretched position, as in FIGS. 3 and 6, and then return to a rigid position according to FIG. 5, curving slightly beyond a straight line in the opposite direction. The continued closing movement on the swinging path from 90 to 0 degrees takes place under the checking resistance of the door closer through the now more rigid connecting members 1-4 without the risk of any collapse thereof.

What I claim is:

1. In a door construction comprising a frame including an opening, a door hinged to a jamb of said frame for swinging to one side of the frame opening about a vertical axis located at said one side of said frame, and a door check on said door provided with a yieldable piston and a chain connecting said piston with said frame, the improvement which comprises a fixed anchor lug for said chain supported on said frame and projecting away from said jamb into the frame opening, said chain being composed of horizontally articulated links including a first link pivoted to said lug for free swinging motion through a horizontal angle of substantially 90° toward said one side, all the links of said chain being provided with abutting formations limiting the relative horizontal swing of adjoining links to a small acute angle in the door-opening direction and substantially preventing any relative horizontal swing in the opposite direction beyond a position of mutual alignment whereby said chain remains substantially straight during an initial door-opening motion within a range of substantially 90° and during a door-closing motion within said range, the relative mobility of said

links being sufficient to permit said chain to flex with a radius enabling a continuation of the door-opening motion beyond said range.

2. The improvement defined in claim 1 wherein alternate ones of said links have a generally H-shaped vertical profile, the remaining links being flat plates pivotally received between flanges of the H-shaped profile of adjoining links and provided with transverse edges adjacent the web of the H, said edges being each formed with a beveled corner portion constituting one of said abutting formations.

5

10

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