

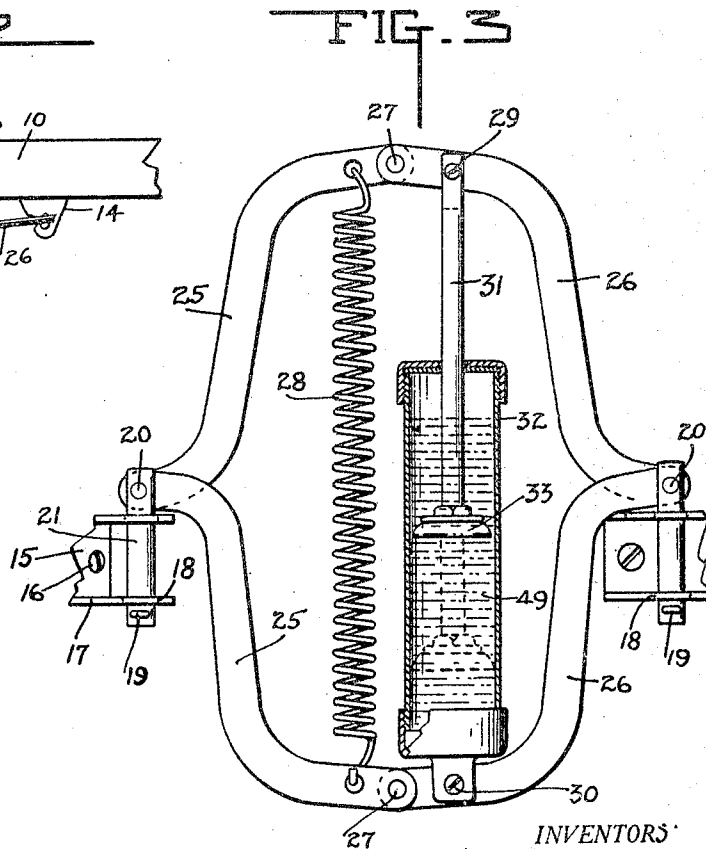
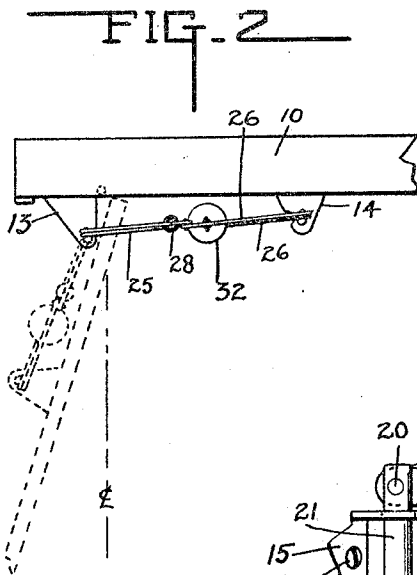
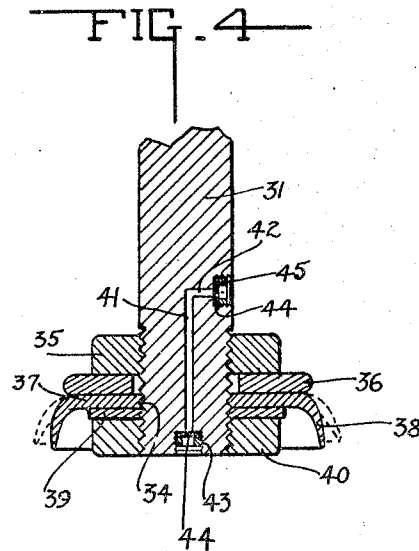
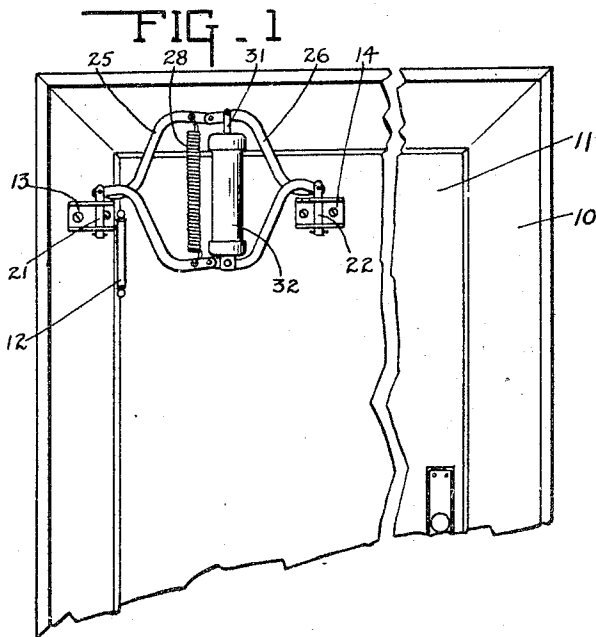
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DOORCHECK

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DOORCHECK

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This invention relates to a door check.

The chief object of this invention is to produce a door check which will permit ready opening of the door and which will increasingly oppose the opening of the door as the door is opened and when the door is closed will increasingly oppose the closing of the door and prevent slamming thereof.

The chief feature of the invention consists in the employment of the toggle lever connection between a door and door frame associated with which are two oppositely acting, force applying constructions, whereby the increasing opposition to the closing and opening of the door is obtained in the extreme portions of the movement thereof.

Another feature of the invention consists in the arrangement of the device such that after the door has been opened to a predetermined position and has been opened slightly farther than that the door will be held by the check in said open position or in over-center position.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings Fig. 1 is a side elevational view of parts of a door and door frame or casing with the invention applied thereto and in the contracted position. Fig. 2 is a top plan view of the same, the dotted lines indicating an overcenter position and the broken line indicating the neutral or center position for the door when opened. Fig. 3 is an enlarged side elevational view of the double acting check with parts broken away to show other parts in detail. Fig. 4 is an enlarged longitudinal sectional view of a detailed construction of the piston mechanism.

In the drawings 10 indicates a door casing or frame, 11 a door pivotally mounted by hinges 12 in any desired or preferred construction. The bracket 13 is mounted on the door casing and the bracket 14 is mounted upon the door. These brackets may be suitably mounted in any desired or preferred position, one herein shown being extending upward. The position, however, may be varied and when varied

the particular construction of the bracket will likewise be varied to accommodate the check mechanism. Each bracket herein shown includes a U-shaped plate having the base 15 by which it is secured to the supporting member thru the screw 16 or otherwise, and the flanges 17 are apertured as at 18 and receive a pin, the bracket 13 supporting a pin 21 and bracket 14 supporting pin 22, said pins being retained by the cotter key 19 or the like and by a vertical pivot pin 20 which has another function. The double flange bearing is provided to prevent cocking of the pin and provides rigid anchorage or support. An S-shaped link 25 and a similar link 26 are pivotally united at 27 and their opposite ends are pivotally supported upon pins 20 and this forms a toggle linkage.

The linkage aforesaid is duplicated by another link 25 and another link 26 pivotally supported at 27. The linkage aforesaid permits elongation and foreshortening necessary in the door movement since the plane of movement of the door check is not the same as the plane of the door. In certain types of construction, however, one half of the linkage may be omitted. Connecting the two links 25 adjacent their pivotal supports 27 is a spring 28 and connecting the links 26 and pivotally connected thereto adjacent the pivotal connections 27 as at 29 and 30, are the piston rods 31 and cylinder 32 respectively of a check or shock absorber construction. Mounted within the cylinder 32 upon the piston rod 31 is a piston construction 33, the details of which are as follows:

Piston rod 31 has its cylinder enclosed end reduced and threaded as at 34 and mounted thereon is a nut 35. A rigid washer 36 of considerable area, but slightly less than the area of the cylinder, bears on nut 35 and supports or reinforces a flexible piston member 37 which is substantially cup-shaped having the flange or rim 38. The washer 39 and another nut 40 adjustably mounts the aforesaid upon the piston rod and in clamped relation. Extending longitudinally thru the rod is the passage or port 41 and extending transversely from the exterior of the rod to the port and passage 41 is the port or passage 42, the same

constituting a by-pass around the piston. Each of the ports 41 and 42 are enlarged adjacent their openings into the cylinder as at 43 and mounted therein is a screen 44 retained in position by a hollow nut 45 which has its centrally apertured portion squared or otherwise fashioned to receive a headless set screw operating tool. The minute size of the by-pass 41—42 necessitates, for certainty of operation in continued use, provision of the aforesaid screening. When the device is built in relatively large sizes such provision is not necessary but may be of assistance and even in small sizes the aforesaid screening arrangement may be omitted.

The action is as follows: As the door closes the piston 33, which is in the upper part of the cylinder, moves downwardly thru the fluid column 49 until the rim of piston member 38 seals against the side wall of the cylinder. The force of the door then forces the liquid, which may be oil or water and preferably the former, through the ports 41 and 42 and permits the piston to settle with the door correspondingly closing until the piston reaches its lowermost position as shown dotted in Fig. 3, whereupon the door is closed. This latter movement through the oil or liquid is very slow and the rate can be adjusted by providing an adjustable arrangement to control the size of the passage or flow of oil through ports 41 and 42, the same being not shown herein. When the door is opened the liquid trapped above the piston bears down upon the relatively free edges 38 or rim and rushes past the same into the vacuum in the lower portion of the cylinder formed as the piston is raised. The door in this movement also expands the toggle linkage from the position shown in Fig. 1 to the position shown in Fig. 3, which elongates spring 28 and as the door opens the resistance to the opening movement increases by the increased stretching of the spring 28. In the closing movement of the door the spring 28 assists the same until the spring becomes less and less effective, that is, in assisting the same and opposing the checking action.

The resultant construction, therefore, consists of a double acting check which in its neutral position permits relatively free movement of the door relative to the casing but which in its extreme positions opposes the quick movement of the door. The leverage increases as the spring effectiveness decreases and the leverage decreases as the spring effectiveness increases.

The invention claimed is:

1. In combination with a casing and a closure member swingingly supported thereby, a door check construction including a multiple toggle linkage having all of the same ends of one end of the toggle construction pivotally mounted upon the casing and all of the same ends of the other end of the

toggle construction pivotally mounted upon the closure, and oppositely acting means including a vertically positioned liquid containing cylinder connected to the intermediate portions of said toggle construction for checking purposes.

2. A check construction including a pair of supporting anchorages each providing a pivotal support, two pairs of substantially S-shaped levers arranged to form a multiple toggle linkage in closed bridge formation, a connection between each anchorage and the adjacent ends of a pair of levers, said connection being pivotally connected to said levers, the axis of said lever pivotal connection being substantially transverse to the pivotal mounting of said connection upon the supporting anchorage, the other ends of adjacent levers being pivotally connected together, and oppositely acting means included within the bridge formation and connected to the levers adjacent the last mentioned pivotal connection.

In witness whereof, we have hereunto affixed our signatures.

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