The invention is a door check and the dominant object thereof resides in the provision of novel and swiveled means to assure proper alignment of the door check to preclude binding thereof during opening or closing of the door. The invention has as another object to provide an improved compensatory apparatus carrying the door check for automatically lining up the door check due to improper mounting of the door or improper mounting of the door check. The invention has as a further object the provision of a serviceable expansion cup to sustain the piston of an air pump employed in the door check in seal tight engagement with the bore of the cylinder of the pump during reciprocation of the piston on opening and closing of the door. Other objects, advantages and features of the invention will be apparent from the following detailed description taken with the accompanying drawings wherein;

Fig. 1 is a front elevational view of the door check according to my invention shown mounted on the jamb of the door and on the latter, however showing the door closed but adapted to be swung rearwardly.

Fig. 2 is an enlarged horizontal sectional view on the line 2—2 of Fig. 1, shown partly broken away.

Fig. 3 is an enlarged sectional view on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary view of Fig. 2.

Figs. 5 and 6 are longitudinal and transverse sectional views on the lines 5—5, and 6—6 respectively of Fig. 2.

Fig. 7 is a perspective view of the expansion cup.

Fig. 8 is a horizontal sectional view on the line 8—8 of Fig. 3.

Fig. 9 is a sectional view on the line 9—9 of Fig. 3 indicating the neutral relation of the swiveled yoke at a time when the door is closed.

Fig. 10 is a view similar to Fig. 9 but illustrating the swiveled yoke cocked when the door is fully opened, and

Fig. 11 is a horizontal sectional view on the line 11—11 of Fig. 3.

Referring to the drawings, the door check C includes the air pump A, the spring recall device or brake B, the swiveled connection S, and the bracket B.

The pump A comprises a cylinder 10 having the circular bore 11 slidably guiding the piston head P to which is attached the piston rod 12 reciprocably guided in the cap 13 appropriately fastened in seal tight relation to one end of the cylinder.
widest portion at the base 37' of the cup 32, the widest portions merging with the spaced notches 33' along the outer edge of base 37'.

The piston rod 12 extends into and is also threadably connected to the crank or elbow 41 having its lower arm 45 pivotally or partly non-circular shaped opening 43 (Fig. 2) closely receiving and interlocking with a similarly shaped shaft 44 rotatably guided in the bearings or circular openings 45 and 46 in the spaced arms 43 of the U shaped oscillating or swiveled yoke Y having its base or intermediate portion 50 provided with the arcuate portions or cams 50 defining the irregularly shaped opening 51 receiving the squared shaped head or boss 52 of the threaded bolt 53.

The square shaped head 52 is spot welded to the bracket 54 and thus is fixedly carried by the latter. Surrounding the threaded shank 54' of the bolt is the annular washer 55 adapted to be clamped against the flat face 56 of the boss 52 by the nut 57. By the arrangement disclosed, yoke Y may be rotatably rocked or swiveled on the square shaped boss 55 which in fact characterizes fulcrum means for the cams 50 of the intermediate arm 45 which is rotatably guided between the washer 55 and the bracket 54. It follows that if the door be rotated or swung toward or away from the jamb J, yoke Y may be tilted relative to the jamb or to the fixed bracket or support 54.

As previously stated the irregularly shaped shaft 44 is locked or keyed to the crank 41 and if the latter is driven shaft 44 is rotated. This shaft is also rotatably guided in the circular bore 37' of the hollow gear 56 and extends downwardly therethrough and through and the depending skirt 59 of the gear and downwardly through an irregularly shaped opening 55 of a mount 51 appropriately seated on arm 45 of the yoke Y and having its annular flange 52 confined in the annular housing 55 interposed between the arms 47 and 43 of the yoke. Since shaft 44 is thus also keyed to the mount 51, rotation of the crank 41 causes the rotation of mount 51.

Mount 51 of 54 is provided with a cutaway part 64 adapted to receive a reflexed end 65 of the lowest coil 66 of the helical spring 67 or in other words this spring is locked to the mount 51 and if the latter is rotated, the spring is wound up in that the upper coil 68 has its reflexed terminal 66 restrained against a lip 79 of the bayonet slot 71 in the annular skirt 59 depending from the gear 56. Set screws as 72 and washers 73 prevent vertical displacement of the rotatable shaft relative to the yoke Y.

Normally spring 57 is under some tension, that is, wound up although not fully. This is accomplished by applying a suitable wrench to the rotatable gear 56, thus tensioning or compressing the upper part of the spring. The swiveled dog 74 is then interlocked with the gear 56 to prevent accidental rotation of the latter. If shaft 44 is driven by the crank 41, the keyed mount 61 is rotated, hence winding up the lower part of spring 67. This action takes place when the door D is swung open, that is, the spring is placed under additional tension and the latter is utilized to automatically close the door. As a collateral observation, should it be noted that a tubular member 76 loosely surrounds shaft 44 and is interposed between the mount 51 and the skirt 59. This tubular member limits the extent to which the thrust imparting spring 57 may be compressed.

In mounting the door check for controlling the closing of the door, the wings 70 of the bracket or support 54 are appropriately fastened to the jamb or frame J of the swingable door D and the swivelable bracket B is fastened to the door. On opening the door with the engraved or offset rivet 27 in the cylinder 30 away from cap 14, thus air is drawn into the cylinder through the orifices 26 and 22. At this time the piston rod 12 is progressively projected out of the cylinder 19 thus rotating the door and is consequently rotating shaft 44 of the brake or recall device R. It follows that the tension spring 57 is further compressed.

During the tensioning of the spring 57, yoke Y is transversely rocked relative to the support 54, that is slightly rotated from its neutral position shown in Fig. 9 towards an offset position illustrated in Fig. 10, thus precluding binding of the door and provide for uniform operation of the door check, thereby prolonging the latter's life.

Or in other words, the swiveled connection S compensates for the irregularly shaped notches 37 in the mount 61 and is provided with a cut-away part 64 adapted to receive a reflexed end 65 of the lowest coil 66 of the helical spring 67 or in other words this spring is locked to the mount 61 and if the latter is rotated, the spring is wound up in that the upper coil 68 has its reflexed terminal 66 restrained against a lip 79 of the bayonet slot 71 in the annular skirt 59 depending from the gear 56. Set screws as 72 and washers 73 prevent vertical displacement of the rotatable shaft relative to the yoke Y.

By reason of the swiveled or pivoted relation between the yoke Y and the fixed bracket 54, involuntary misalignment of the door check is compensated for, or in other words, the swiveled connection S between the brake carrying yoke Y and the fixed bracket 54 characterizes a loose connection to prevent binding of the door check, thus enhancing its life.

The brake or recall device and the air pump A are of conventional type and have been generally set out herein for purposes of disclosing their association with the novel swingable brake carrying yoke to prevent binding of parts of the door check and with the split resilient cup 32 for insuring a seal tight relation of the piston head with the cylinder 10.

Briefly recapitulating, the door check may be said to comprise the braking device and the pump and the invention herein described in fact is a compensatory apparatus to sustain the braking device of the door check wherein the pump thereof is pivotally associated with the hinged door, the compensatory apparatus having the swiveled or pivoted connection defined in part in the square shaped head or fulcrum means 52 of the threaded bolt 53 fixedly carried by the support 54.

Forming a part of this swiveled connection are the plurality of cam 50 bounding the irregularly shaped opening 51 or in other words, opening 51 has a peripheral wall embodying the cam
means 58, the latter obviously being a part of the base 49 of the swiveled yoke or carrier means Y. The swiveled connection tiltably holds or sustains the carrier means Y relative to the support 84 and such connection is maintained or retained by the clamping means 81 acting on washer 55 by precluding base 49 from slipping off the fulcrum means 52.

Various changes may be made in details of construction and arrangement of parts without departing from the spirit of the invention or sacrificing any of the advantages thereof inherent therein.

I claim:

1. In a compensatory apparatus to sustain a braking device of a door check wherein a pump is pivotally associated with a door hinged relative to the jamb of said door, a support mounted on said jamb and characterizing bearing means, a yoke having spaced arms for sustaining said braking device and having a base juxtapositioned and displaceable relative to said bearing means, said base having an opening bounded by a peripheral wall having convex surface means, fulcrum means fastened to said support and having a portion disposed in said opening and having rectilinear means cooperating with said convex surface means to tiltably sustain said yoke relative to said bearing means, and means mounted on said fulcrum means and cooperating with said yoke to retain said base in close juxtaposition with said bearing means.

2. In a compensatory apparatus to sustain a braking device of a door check wherein a pump is pivotally associated with a door hinged relative to the jamb of said door, a support mounted on said jamb and characterizing bearing means, a yoke having spaced arms for sustaining said braking device and having a base juxtapositioned and displaceable relative to said bearing means, said base having an opening bounded by a peripheral wall having a plurality of convexed portions, fulcrum means fastened to said support and having a polygonal head comprising rectilinear faces disposed in said opening and cooperating with said convexed portions to tiltably sustain said yoke relative to said bearing means, and means mounted on said fulcrum means and cooperating with said yoke to retain said base in close juxtaposition with said bearing means.

4. In a compensatory apparatus to sustain a braking device of a door check wherein a pump is pivotally associated with a door hinged relative to the jamb of said door, a support mounted on said jamb, a yoke having spaced arms for sustaining said braking device and having a base including an opening bounded by a wall having arcuate portions, a bolt secured to said support and having a head provided with a polygonal periphery projecting into said opening and cooperating with said arcuate portions to tiltably hold said yoke relative to said support, and means mounted on said bolt for retaining said yoke adjacent said support.

5. In a compensatory apparatus to sustain a braking device of a door check wherein a pump is pivotally associated with a door hinged relative to the jamb of said door, a support mounted on said jamb, a yoke having spaced arms for straddling and sustaining said braking device and having a base including an opening bounded by a peripheral wall having a plurality of arcuate portions, a bolt secured to said support and having a rectangular shaped head projecting into said opening and cooperating with said arcuate portions to tiltably sustain said yoke relative to said support, and means mounted on said bolt for retaining said yoke adjacent said support.

6. In a compensatory apparatus to sustain a braking device of a door check wherein a pump is pivotally associated with a door hinged relative to the jamb of said door, a support mounted on said jamb, a yoke adjacent said support and having spaced arms for sustaining said braking device and having a base including an opening bounded by a peripheral wall having a plurality of arcuate faces, fulcrum means fixedly carried by said support and having a portion provided with a plurality of rectilinear faces and surrounded by and cooperating with said arcuate faces to tiltably sustain said yoke relative to said support, and means to retain said yoke adjacent to said support.

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