Aug. 20, 1957 L. C. JOHNSON 2,803,319

TRANSOM ADJUSTER

Filed May 26, 1955 2 Sheets-Sheet 1

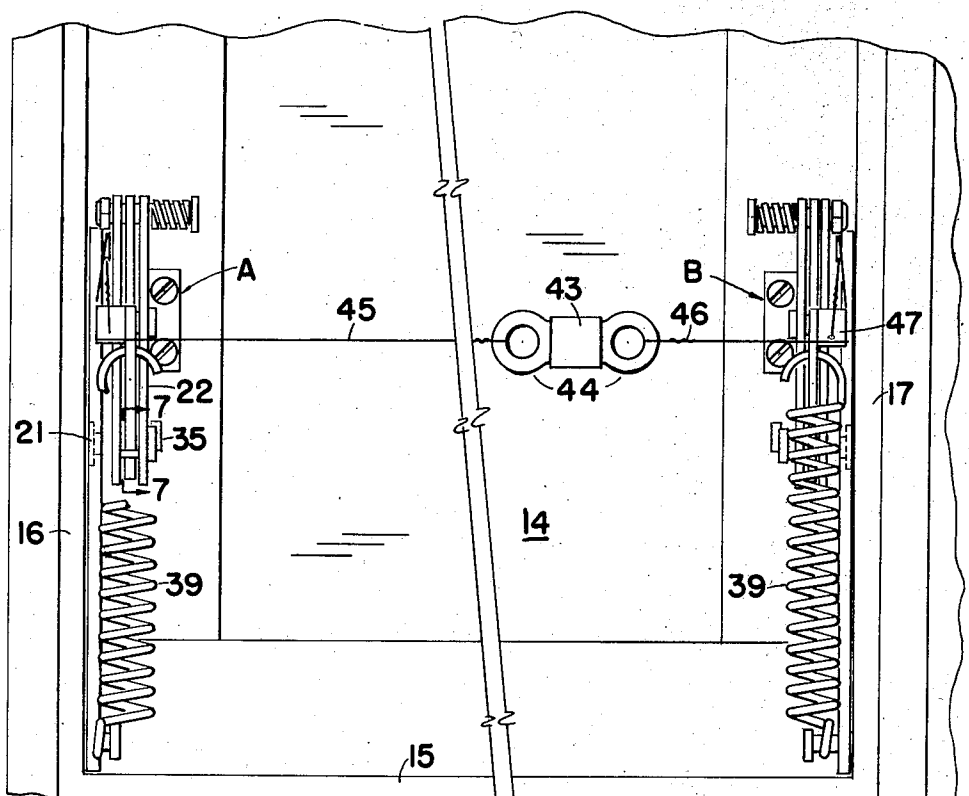


FIG. 1

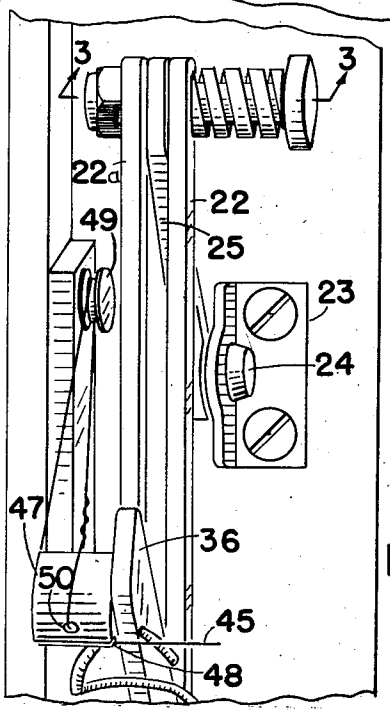


FIG. 2

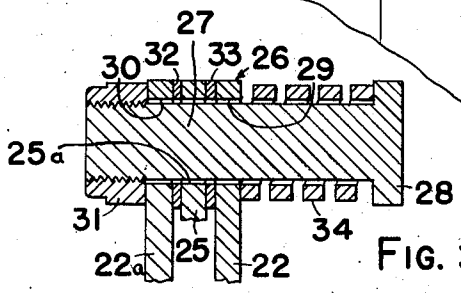


FIG. 3

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TRANSOM ADJUSTER

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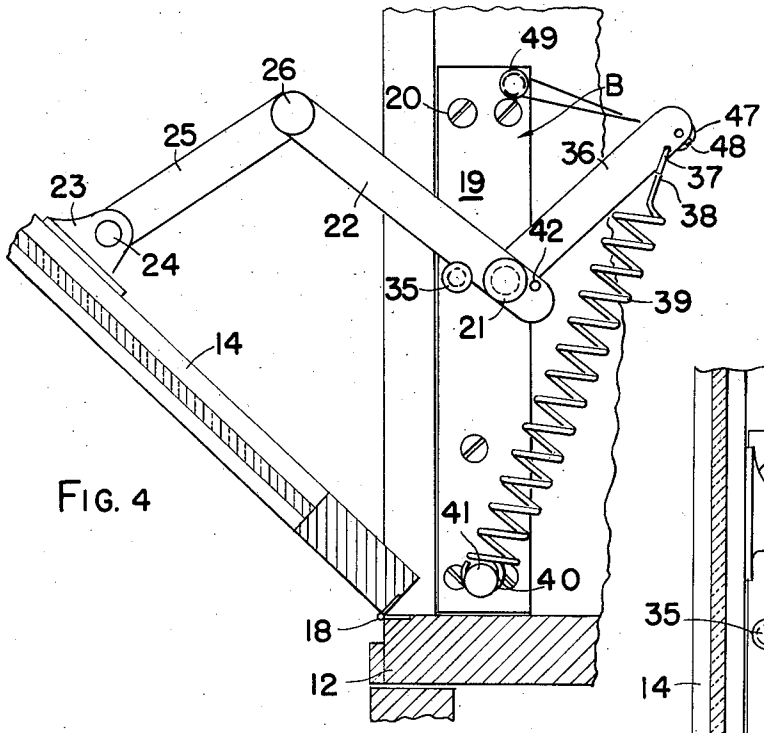


FIG. 4

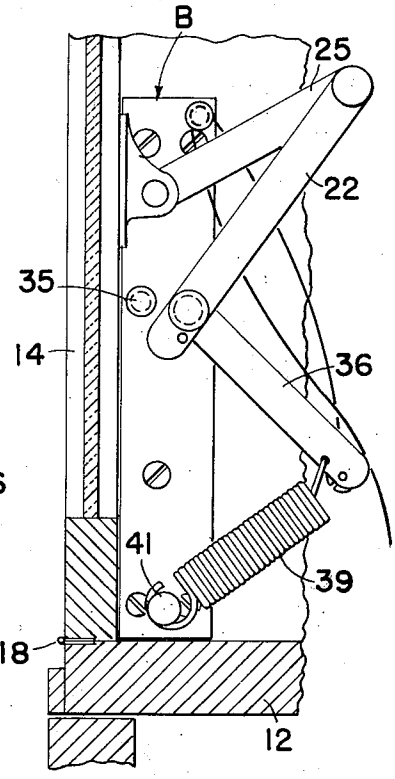


FIG. 6

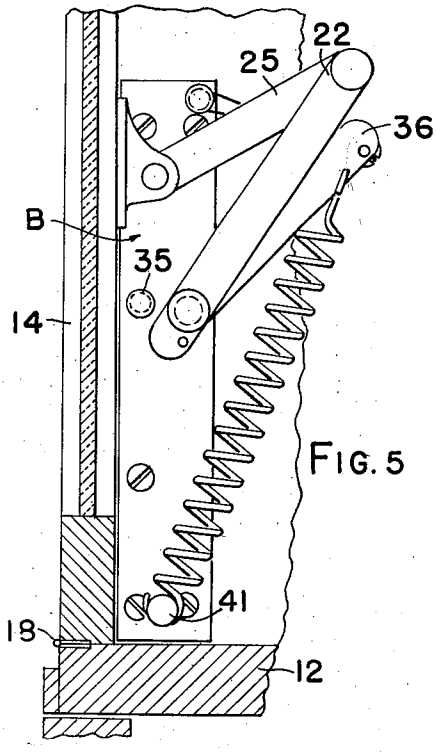


FIG. 5

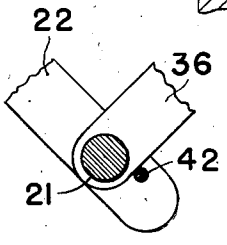


FIG. 7

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TRANSOM ADJUSTER

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Application May 26, 1955, Serial No. 511,378
9 Claims. (Cl. 189—71)

This invention relates to safety devices for closure members and particularly to a heat sensitive device for automatically closing a door transom in case of fire.

It is a well known fact that in large buildings having corridors and rooms opening into the corridors, a fire travelling down a corridor will follow the path of least resistance and will enter those rooms having openings communicating with the corridor. A room having an open door or transom on the corridor will catch fire before one that is sealed from the corridor, and this is particularly true if a window is also open in that room, thereby creating a draft to accelerate the spread of the flames. This has led certain municipalities and states to enact legislation which forbids the use of an opening from the room into the corridor other than the door itself. Many buildings in those jurisdictions which had been equipped with transoms before the legislation was enacted have found it necessary to nail such transoms shut, thereby depriving the occupants of air circulation in hot weather.

It is an object of this invention to provide a device for holding a closure member, such as a transom or the like, in any given position of opening within a predetermined range of openings but which nevertheless will automatically and quickly turn the closure member to closed position upon the happening of a predetermined event such as the attainment of a predetermined degree of temperature in the vicinity of the closure member.

As another object, this invention seeks to provide means for holding a transom open to any degree usually found suitable for transoms, one such holding means being used on either side of the transom with heat sensitive means common to both holding means for automatically initiating the closing of the transom.

A specific object of this invention is the provision of a transom holding device having the principal parts thereof mounted on a unitary plate for ease of installation, said transom holding mechanism including spring operated means for automatically closing the transom, the spring operated means in turn being held in potentially active position by a heat sensitive device.

A feature of this invention is a fastening and guiding means for a wire which is used to hold the heat sensitive device in its most effective position relative to the transom.

These and other objects and features of this invention will become apparent from the following detailed description when taken together with the accompanying drawings in which,

Fig. 1 is a fragmentary front elevational view of a door and transom showing the transom holding and closing device of this invention applied thereto;

Fig. 2 is a greatly enlarged fragmentary elevation in perspective of the mechanism;

Fig. 3 is a still further enlarged fragmentary elevation, in section, a friction pivot used in the mechanism of Figs. 1 and 2;

Fig. 4 is a side elevational view of the transom of Fig. 1 showing the position the mechanism occupies when the transom is open and the automatic closing mechanism is energized, but has not operated;

Fig. 5 is a side elevational view corresponding to Fig. 4 showing the transom in closed position with the automatic closing mechanism still unoperated;

Fig. 6 is a side elevational view corresponding to Figs. 4 and 5 showing the transom closed by the automatic closing mechanism; and

Fig. 7 is a fragmentary rear elevational view of a portion of the mechanism of Fig. 4 which provides in effect a lost motion connection between the automatic closing means and the portion of the mechanism normally used to hold the transom in an open position.

In its preferred form, this invention contemplates the use of two mechanisms for a single transom or closure member with a single heat sensitive device connected to both mechanisms to cause a simultaneous operation of both mechanisms when a predetermined temperature is reached in the device. It is also contemplated that the two mechanisms will be placed one on each side of the transom and secured to the door frame adjacent such sides. It is understood, however, that it is possible to use only one such operating mechanism, or to use individual heat sensitive devices for the two mechanisms instead of a common heat sensitive element, and that other variations apparent to those skilled in the art may likewise be made without departing from the spirit of this invention.

Referring now to the drawings for a detailed description of the invention, and particularly to Fig. 1, there is shown a fragment of a wall **10**, which may be the wall dividing a room from a corridor or hall, into which is set a door frame **11** having a transverse sill **12** dividing the opening defined by door frame **11** into lower and upper openings for a door and a transom, respectively. Said openings thus may be closed by a door **13** and a transom **14**, respectively. The transom opening may be sealed by trim or stop members **15**, **16** and **17** applied to sill **12** and to the sides of door frame **11**, respectively. The upper trim or stop is not shown, but it is understood that such trim or stop may be used across the top of the transom opening.

As shown more clearly in Figs. 4, 5 and 6, transom **14** is secured to sill **12** by a hinge **18** in such manner that the transom will open inwardly into the room about a horizontal axis. It is understood that any of the ordinary transom operators may be used to open and close transom **14**, but for simplicity, and in view of the fact that the device of this invention incorporates a transom holding device, said transom may be operated by any means calculated to pull the transom down or to push it up, such as an ordinary window pole or the like. Since such operators are well known in the art and form no part of this invention, a showing and description thereof have been omitted from this specification.

Two transom holding and closing devices A and B made in accordance with this invention may be used for each transom. These devices are identical, except that one is left-handed and the other is right-handed so that device A is applied only to the left-hand side and B to only the right-hand side of a transom as viewed in Fig. 1. To simplify the description of the invention, only device B will be described in detail herein, it being understood that device A, insofar as the transom-operating linkage used in the device is concerned, is identical with device B.

Referring now to Figs. 4 to 7 inclusive, device B is conveniently assembled on a plate **19**, which also constitutes the mounting plate for securing the device to trim **17**. Appropriate wood screws **20**, passing through openings (not shown) in the plate may be used to secure plate **19** to trim **17**.

Fixed to plate **19** by any suitable means is a pin **21** about which is pivotally mounted a pair of links **22** and **22***a* extending generally upwardly from said pin. Secured to transom **14** is a bracket **23** in which is mounted a pin **24** extending transversely thereof, that is, extending

parallel to the pivot axis of hinge 18, and to which is pivotally mounted a link 25. The free end of link 25 extends between the free ends of links 22 and 22*a*, and the free ends of all three said links are connected by a friction pivot shown generally at 26, the details of which are shown in Fig. 3.

Referring now to Fig. 3, friction pivot 26 is comprised of a pin 27 threaded at its left-hand end, as viewed in Fig. 3, and provided with a head 28 at its other end. Said pin 27 passes through suitable openings 29, 25*a* and 30 in links 22, 25 and 22*a*, respectively, and said links are retained on pin 27 by a nut 31. Link 25 is spaced from links 22 and 22*a* by washers 32 and 33. A coiled spring 34 is compressed between head 28 and link 22 by nut 31, the pressure being transmitted from link 22 through washer 26, link 25, washer 32 and link 22*a* to nut 31. This spring pressure is utilized to provide sufficient friction between the links and spacers to hold links 22, 22*a* and 25 at any desired angular position with respect to one another corresponding to any desired degree of opening of transom 14 despite the weight of said transom. The greatest permissible opening of transom 14, however, is determined by a stop 35 (Figs. 4, 5 and 6) secured to plate 19 and interposed in the path of movement of links 22, 22*a*.

It may be apparent from the description thus far given that with the use of devices A and B, transom 14 may be opened and closed, or held open in any desired position between the wide open position shown in Fig. 4, and the closed position shown in Fig. 5, in the normal fashion, i. e. by pulling or pushing the transom with the aid of a window pole or the like. This may be done independently of the automatic transom closing mechanism which is incorporated in the devices and which will now be described.

Pivotally mounted on pin 21 between links 22 and 22*a* is a link 36 which extends to the right of plate 19 as shown in Figs. 4, 5 and 6. The right-hand end of link 36 as shown in these figures is provided with a small opening 37 through which is passed the hooked end 38 of a coil spring 39, the opposite end 40 of which is hooked around an anchor pin 41 on plate 19. Thus, spring 39 tends continuously to urge link 36 to rotate about its pivot pin 21 in a clockwise direction as viewed in Figs. 4, 5 and 6. A stop 42 secured to links 22 and 22*a* and extending across the space therebetween into the path of movement of link 36 causes any such clockwise movement of link 36 to be transmitted to links 22 and 22*a*, which, in turn, causes link 25 and transom 14 to be moved similarly toward the right with the result that transom 14 will pivot about hinge 18 to closed position. As long as link 36 occupies the position shown in Figs. 4 and 5, however, links 22, 22*a* and 25 may move independently of link 36.

The position of link 36 shown in Figs. 1, 2, 4 and 5 is maintained by a heat sensitive mechanism comprising a fused link 43 provided with eyes 44 at the ends thereof to which are fastened the ends of wires 45 and 46. A post 47 is secured to the free end of link 36 in such manner that a portion thereof extends beyond the edge of the link. A transverse groove 48 is formed in the extending portion of post 47, and wire 45 is laid into groove 48 and then passed around a fixed, peripherally grooved guide 49 on plate 19 and back to post 47. The free end of wire 45 is then threaded through an opening 50 (Fig. 2) in post 47 and wound back over itself to form a firm anchor for that end of the wire. It is understood, of course, that wire 46 is similarly anchored to its corresponding link 36 in device B. Thus links 36 on both sides of the transom are held firmly in the angular position shown in Figs. 1, 2, 4 and 5 by virtue of the fact that the wires 45, 46 pass under the levers 36 through grooves 48, which prevent the wire from sliding along the edge of the links 36, all as long as fusible link 43 is intact.

In the event of a fire in the corridor adjacent transom 14, whereby fusible link 43 would be exposed to heat at or above the critical temperature for the link, said link will melt and will be parted by the tension imposed thereon by springs 39 through wires 45 and 46. With link 43 parted, there is no longer present a restraining force for springs 39 and the latter will accordingly immediately collapse, causing links 36 to be rotated clockwise about pivots 21 during the collapsing movement. Stops 42, however, will be immediately engaged by links 36 so that the clockwise rotation of said links 36 will be imparted to links 22 through said stops 42, and the clockwise rotation of links 22 will result in an immediate closing of the transom 14. The relative positions of the links 25, 22 and 36, after the fusible link 43 has parted and spring 39 has collapsed, is shown in Fig. 6. It is understood that sufficient tension remains in springs 39 after the transom is fully closed to hold the transom firmly in closed position.

Fusible link 43 is normally placed midway between the sides of the transom, that is, midway between devices A and B. Its location, however, is not material to the operation of this invention and it may be inserted anywhere between posts 49 on devices A and B. Where but a single device is used, the link may be inserted between posts 47 and 49. In the latter event the complete device may be assembled with the fusible link in place at the factory so that the device may be shipped with spring 39 properly tensioned and thus eliminating possibility of error in the installation on the transom. It is understood that the devices A and B may be used to close automatically other closure members such as doors, windows, ventilator ducts, etc. and that the scope of the invention therefore is not to be limited to the foregoing description but is to be determined by the appended claims.

I claim:

1. Operating mechanism for a closure member hinged to a frame, said mechanism comprising a link pivoted to the closure member, a link pivoted at one end to the frame and at its other end to the first-mentioned link, means for holding the links in a selected one of a plurality of angular positions with respect to one another, resilient means for moving the member to closed position, severable means holding the resilient means in energized position corresponding to an open position of the member, and a lost motion connection between the resilient means and the closure member and adapted to provide free movement of the closure member independently of the resilient means while the latter is held by the holding means, said resilient means upon severance of the holding means being adapted to overcome the holding means and move the member to closed position.

2. Operating mechanism for a closure member hinged to a frame, said mechanism comprising a link pivoted to the closure member, a link pivoted to the frame, a friction pivot connecting the links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, resilient means for moving the member to closed position, severable means holding the resilient means in energized position corresponding to an open position of the member, and a lost motion connection between the resilient means and the closure member adapted to provide free movement of the closure member independently of the resilient means while the latter is held by the holding means, said resilient means upon severance of the holding means being adapted to overcome the holding force of the friction pivot to move the member to closed position.

3. Operating mechanism for a closure member hinged to a frame, said mechanism comprising a link pivoted to the closure member, a plate, a link pivoted to the plate, a friction pivot connecting the links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, resilient means anchored to the plate for moving the member to closed position, heat sensitive means also anchored at one end to the plate and holding the resilient means in energized position corresponding to an open position of the member, said

heat sensitive means being adapted to soften upon the attainment of a predetermined temperature therein, and a lost motion connection between the resilient means and the closure member adapted to provide free movement of the closure member independently of the resilient means while the latter is held by the holding means, said resilient means upon softening of the holding means being adapted to sever the holding means and to overcome the holding force of the friction pivot to move the member to closed position.

4. Operating mechanism for a closure member hinged to a frame, said mechanism comprising a plate secured to the frame, a link pivoted at one end to the closure member, a link pivoted to the plate, a friction pivot connecting the free ends of the links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, resilient means anchored at one end to the plate, a third link pivotally connected at one end to the plate and having its other end connected to the resilient means, a lost motion connection between the resilient means and the closure member, and severable means holding the free end of the third link in a position corresponding to an energized position of the resilient means and to an open position of the closure member, said resilient means upon severance of the holding means being adapted to overcome the holding force of the friction pivot to move the member to closed position through said lost motion connection.

5. Operating mechanism for a closure member hinged to a frame in a manner to turn about a horizontal axis, said mechanism comprising a plate secured to the frame, a link pivoted at one end to the closure member, a link pivoted to the plate, a friction pivot connecting the free ends of the links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, resilient means anchored at one end to the plate, a third link pivotally connected at one end to the plate about the same pivot as the second-mentioned link and having its other end connected to the resilient means, a lost motion connection between the resilient means and the closure member, and severable means holding the free end of the third link in a position corresponding to an energized position of the resilient means and to an open position of the closure member, said resilient means upon severance of the holding means being adapted to overcome the holding force of the friction pivot to move the member to closed position through said lost motion connection.

6. Operating mechanism for a closure member hinged to a frame in a manner to turn about a horizontal axis, said mechanism comprising a plate secured to the frame with its principal plane disposed vertically and at right angles to the said horizontal axis, a link pivoted at one end to the closure member, a link pivoted to the plate, a friction pivot connecting the free ends of the links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, resilient means anchored at one end to the plate below the pivot for the second-mentioned link, a third link pivotally connected at one end to the plate about the same pivot as the second-mentioned link and having its other end connected to the resilient means, a lost motion connection between the resilient means and the closure member, and severable means holding the free end of the third link in a position corresponding to an energized position of the resilient means and to an open position of the closure member, said resilient means upon severance of the holding means being adapted to overcome the holding force of the friction pivot to move the member to closed position through said lost motion connection.

7. Operating mechanism for a transom hinged to a door frame, said mechanism comprising a pair of plates, one disposed on each side of the transom and secured to the frame, there being operatively associated with each plate a link having one end pivoted to one of said plates, a second link having one end pivotally secured to the transom, a friction pivot connecting the free ends of the first and second links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, a coil spring, means securing one end of the spring to the said one of said plates, a third link pivoted at one end to the said one of said plates, the other end of the spring being connected to the free end of the third link, said third link having a position in which the spring is tensioned, a lost motion connection between the second and third links and adapted to provide free movement of the closure member independently of the resilient means while the latter is tensioned by the third link; and means for holding the third link of each plate in its spring tensioning position, said means comprising a pair of wires each anchored at one end to the free end of the third link of each plate, a pin on each plate, each said wire passing around a pin and then back around the said free ends of the third link, and a fused link, said wires being connected to the opposite ends of the fused link.

8. Operating mechanism for a transom hinged to a door frame, said mechanism comprising a pair of plates, one disposed on each side of the transom and secured to the frame, there being operatively associated with each plate a link having one end pivoted to one of said plates, a second link having one end pivotally secured to the transom, a friction pivot connecting the free ends of the first and second links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, a spring, means securing one end of the spring to the said one of said plates, a third link pivoted at one end to the said one of said plates, the other end of the spring being connected to the free end of the third link, said third link having a position in which the spring is tensioned, a lost motion connection between the second and third links and adapted to provide free movement of the closure member independently of the resilient means while the latter is tensioned by the third link, and common heat sensitive means for both plates and severable upon the attainment of a predetermined temperature in said heat sensitive means for holding both said third links in their spring tensioning position.

9. Operating mechanism for a transom hinged to a door frame, said mechanism comprising a pair of plates, one disposed on each side of the transom and secured to the frame, there being operatively connected to each plate a link having one end pivoted to one of said plates, a second link having one end pivotally secured to the transom, a friction pivot connecting the free ends of the first and second links and adapted to hold the links in a selected one of a plurality of angular positions with respect to one another, a coil spring, means securing one end of the spring to the said one of said plates, a third link pivoted at one end to the said one of said plates, the other end of the spring being connected to the free end of the third link, said third link having a position in which the spring is tensioned, and means for holding the third link in its spring tensioning position, said means comprising a pair of wires each anchored at one end to the free end of the third link of each plate, a pin on each plate, each said wire passing around a pin and then back around the said free ends of the third link; and a fusible link, said wires being connected to the opposite ends of the fusible link, and a pin extending into the path of movement of the third link from each of said first links, such that said third link causes the first link to turn about its pivot in a transom closing direction when the fusible link is parted and the wires thereby released.

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