Dec. 6, 1960 W. E. WINE 2,962,982

RAILWAY HOPPER CAR DOOR LOCKS

Filed Sept. 25, 1956 3 Sheets-Sheet 1

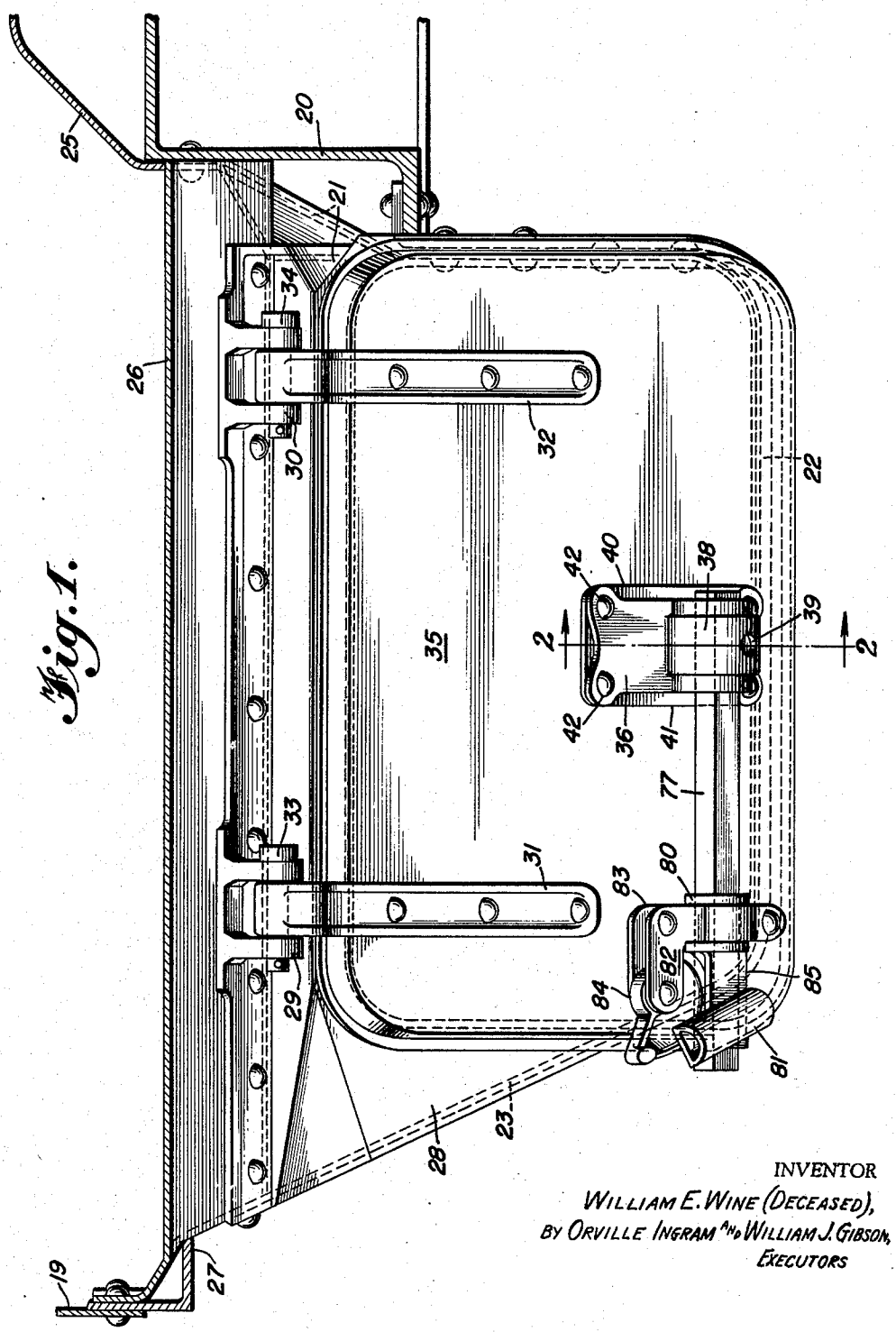


Fig. 1.

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RAILWAY HOPPER CAR DOOR LOCKS

Filed Sept. 25, 1956 3 Sheets-Sheet 2

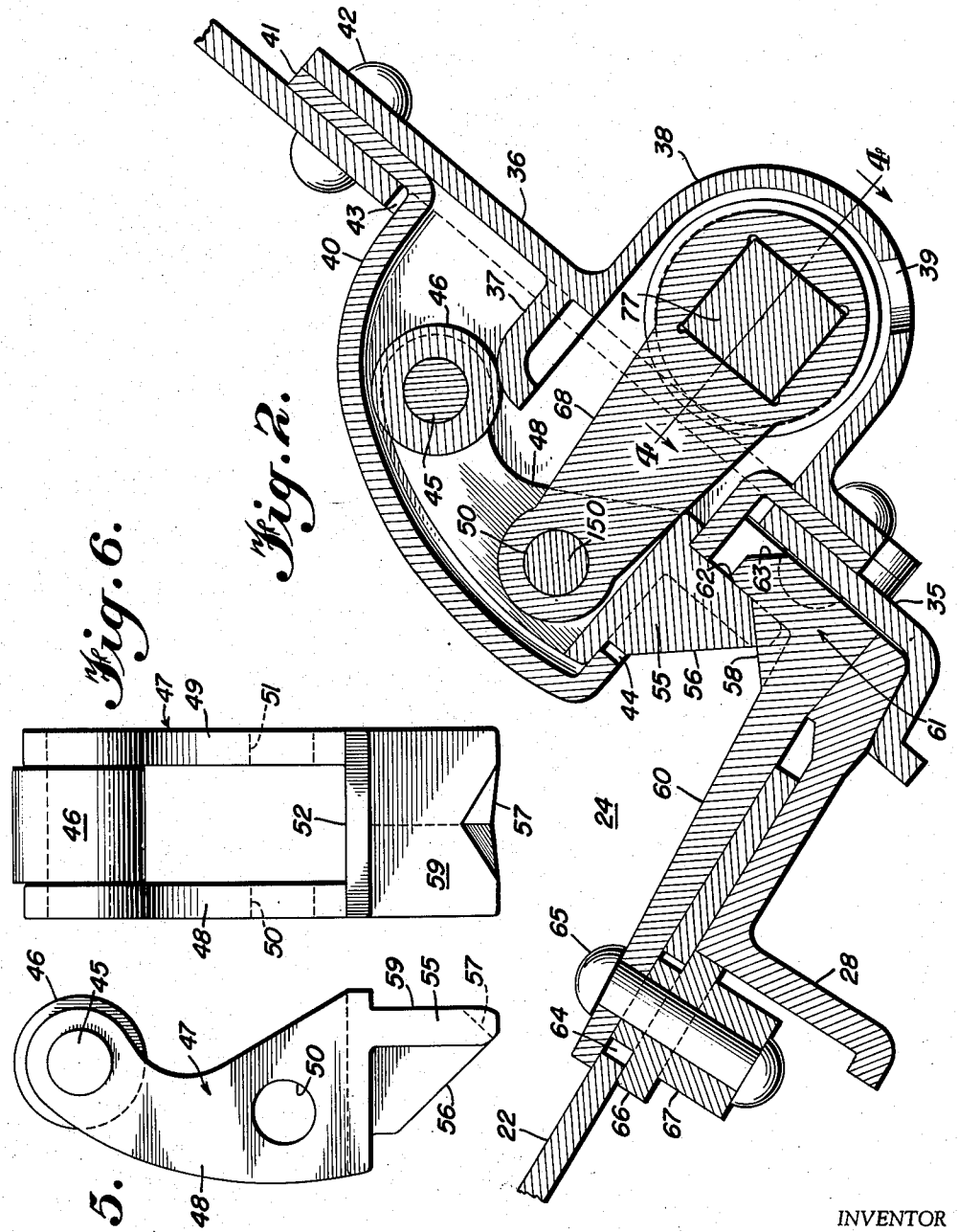


Fig. 2.

Fig. 6.

Fig. 5.

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Fig. 3.

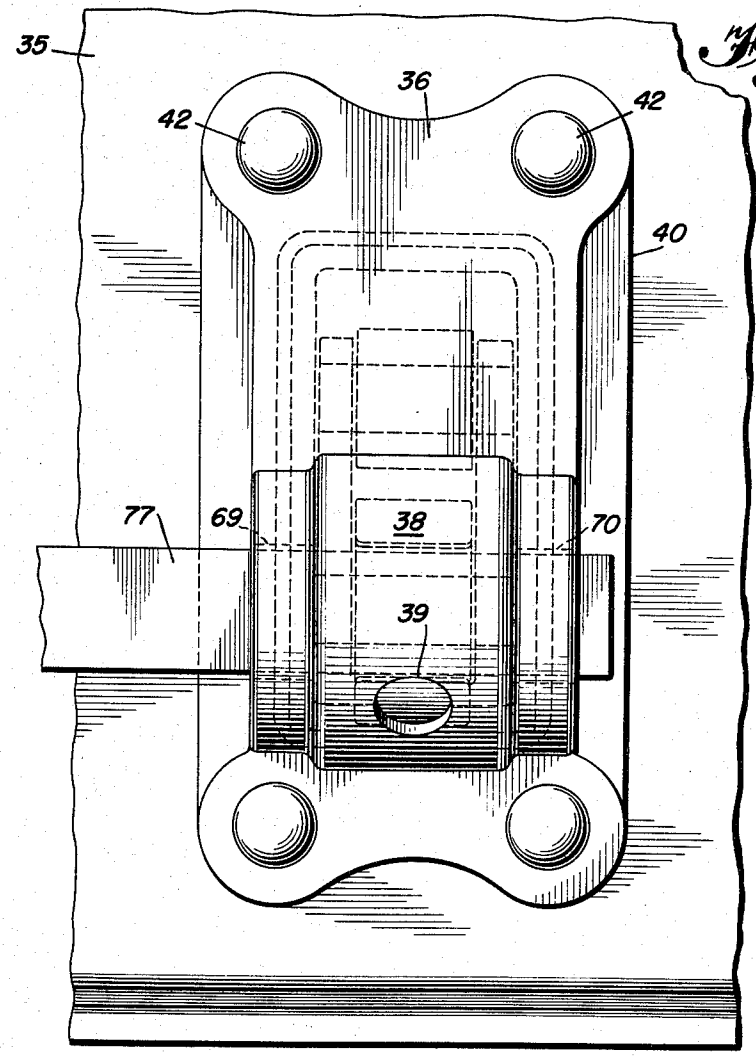
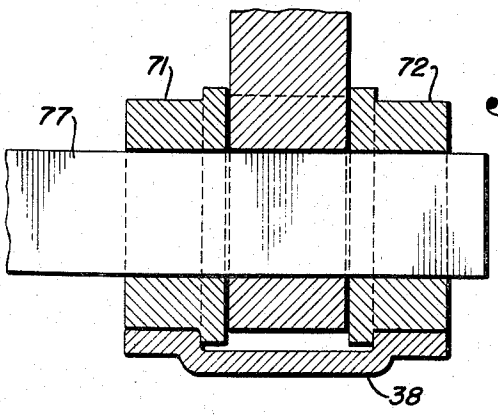


Fig. 4.



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United States Patent Office

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RAILWAY HOPPER CAR DOOR LOCKS

William E. Wine, deceased, late of Berryville, Va., by Orville Ingram, Pinecrest, and William J. Gibson, Fredericksburg, Va., coexecutors, assignors to Unitcast Corporation, Toledo, Ohio, a corporation of Ohio

Filed Sept. 25, 1956, Ser. No. 612,029

4 Claims. (Cl. 105—308)

This invention relates to railway hopper car door locking device of the type wherein each hopper may be secured in locked position independent of the adjoining hopper of the typical standard hopper car and is an improvement over my co-pending application filed jointly with Orville Ingram, as joint inventor and Orville Ingram and William J. Gibson, executors of the estate of William E. Wine, deceased, Serial No. 629,030, and this case is filed concurrently with that application.

The principal object of this invention is to provide strong, simple and efficient means for retaining a hopper car door, which may be manually unlocked, of the individually operable type, in closed position.

A primary feature of the invention consists in providing, in combination with a hinged door movable to open position under the influence of gravity, means for supporting the door in closed position involving a plurality of members rigidly mounted on and swingable with the door and having a portion engageable with an adjustable member rigidly mounted within the lading retaining zone of the hopper to hold the door in closed position.

A further feature of the invention consists in providing, in combination with a hinged door movable to open position under the influence of gravity, a housing means mounted on and swingable with the door, said housing extending through an opening in the door and having a flange portion engaging the outer face of the door. This flange portion is mounted on the outer face of the door so that the mounting means will not be subject to corrosive elements of coal lading and at the same time reinforce the opening in the door, as well as provide a seat for a bearing cover.

A still further feature of the invention consists in providing an outer cover to protect the operating elements of the locking mechanism from wheel spray during rainy weather and dust particles from being blown into the operating parts causing accelerated wear, or to become clogged, as with extraneous matter.

A special feature of this invention consists of providing a means for controlling the movement or action of the bolt portion of the locking mechanism wherein the door may be initially brought to a partly closed position and further operation of the locking mechanism will cause the bolt to act on the keeper, drawing the door to fully closed position.

With such objects in view, this invention consists of the formation, combination and arrangement of parts, as will be herein described and particularly claimed.

In the accompanying drawings which show a preferred form of the invention, Figure 1 is an end elevational view of a hopper showing a door mounted on a cast hopper reinforcing hopper frame with the associate door parts, and a door supporting mechanism applied to the face of the door, the door supporting mechanism being constructed in accordance with the plan of the present invention. The operating means for actuating and controlling the locking mechanism is shown but is more particularly

described in my co-pending application as joint inventor with Orvill Ingram, Serial No. 629,030.

Figure 2 is a side elevational sectional view taken on line 2—2 of Fig. 1, this section shows the operating relationship of the associate parts of the assemblage of the invention.

Figure 3 is an elevational view of the housing of my locking mechanism showing the cover for the housing in relation to the main body portion of the housing which extends into the lading retaining zone. This view also shows a bearing portion of the cover plate and the relationship of the rotatable shaft with respect to the bearings and cover plate.

Figure 4 is a section taken on line 4—4 of Fig. 2 and shows the bearings in relationship to the operating arm.

Figure 5 is a side elevational view of a bolt assemblage.

Figure 6 is an elevational view of the bolt assemblage particularly showing the bifurcated tongue and the cooperating roller in operable position.

Referring now in more detail to the drawings, the center sill of the car is indicated as at 20, and forms the backbone of the hopper car. Riveted to the center sill 20 is the inside hopper sheet 21. Lower floor sheet 22, the outside hopper sheet 23 and inside hopper sheet 21 form substantially the lading retaining hopper 24. The longitudinal hood 25, cross ridge sheet 26 attached to side sill 27 and center sill 20 together with the reinforcing hopper frame 28 preferentially shown as a one-piece cast steel member, and door 35 complete the lading retaining hopper. Cast integral with hopper frame 28 are hinge lugs 29 and 30. Mounted in operable relation with hinge lugs 29 and 30 are hinges 31 and 32 by the use of hinge pins 33 and 34. Attached to hinges 31 and 32 is the door 35 and when held in engaging relation with frame 28 by suitable holding or locking mechanism serves to retain lading within the hopper 24. Hopper car side 19 attached to side sill angle 27 functions as a lading retaining wall until unloading operations cause lading to pass by gravity into hopper 24.

The locking mechanism referred to above consists of the following relationship and details of parts. A cast housing consists of two parts, a cover 36, having a guide 37 for restricting the direction and movement of the bolt action. A bearing housing portion 38 has an opening 39 which serves, first to permit an insertable tool for aligning opening in operating arm 68, so that shaft 77 may easily be inserted in operating arm 68, and then as a drain hole. The second portion of said cast housing consists of inner housing 40 which passes through opening 43 in the door and into the lading retaining space of the hopper structure and having a flange which overlies the outer face of the door 35. The entire housing structure may be mounted on the door, when the movable portion of the door locking mechanism (later to be described) is assembled in position, by riveting or welding housing flange 41 and cover 36 to the nonlading retaining face of the door as at 42. Cast housing 40 is provided with opening 44 which acts to receive bolt 47. Bolt 47 consists of a first body portion having an opening for receiving retaining pin 45 for securing in operable relationship roller 46. A second body portion of bolt 47 consists of spaced side 48 and 49 having opening 50 and 51 for receiving a retaining pin 150 for securing operating arm 68 in operative relation with bolt 47. Spacer wall 52 rigidly connects spaced sides 48 and 49, as well as rigidifies the third portion of tongue 55. A third portion or tongue 55 completes the details of bolt 47. Tongue 55 has an inclined surface 56 and a bifurcated tip 57. Tongue 55 has an engaging surface 59 relieved at its tip, which when in contact with keeper 60 holds the door 35 in locked position.

Keeper 60 comprises a first or catch portion 61 having an engaging face 62 substantially parallel to the face of the door 35. Relieved portion 63 will when door 35 is moved from open to closed position assist in raising bolt 47 to clear portion 61 of keeper 60 so that bolt 47 will drop by gravity into engageable, or locking relation with keeper 60. Portion 61 of keeper 60 is provided with a relieved portion 62, to ease the starting movement of bolt 47 during initial engagement with keeper 60. The second portion of keeper 60 consists of a pyramidal-like integral reinforcing rib 58 positioned so that the bifurcated portion 57 of tongue 55 will overlie said reinforcing rib 58. When the bifurcated tongue 55 is brought into locking relation with keeper 60 the tapered surface of the bifurcated tongue 57 will move foreign objects in its path of movement, permitting full engagement of the bolt 47 and keeper 60. A third portion of the keeper 60 consists of a tail-like extension or plate portion connecting first, second, and fourth portions and extending over an opening 64 in floor sheet 22.

A fourth portion of keeper 65 consists of a rivet 60 which extends through eccentric 66 having a square head 67 so that a wrench may be used to rotate eccentric 66 thereby moving keeper 60 to its preferred adjustment.

Housing 40 may conveniently be pre-assembled to door 35, bolt 47 inserted in the housing and held in position by an operating link 68. Keeper 60 may then be loosely mounted on the hopper floor sheet 22 and held in preliminary position by eccentric 66 contacting an edge of the reinforcing hopper frame 28. When the door is swung to closed position the preliminary relationship of bolt 47 and keeper 60 will be established. Eccentric 66 may then be rotated by the use of a wrench on nut head 67. The eccentric 66 acting on the hopper frame 28 during this action will move keeper 60 until the bolt surface 59 and keeper surface 62 are in proper relation to hold door 35 in practicable fitted relation to frame 28. The keeper 60 is then tack welded in a fixed position to the lower floor sheet 22 and the hopper frame 28.

Housing cover 36 is provided with bearing retaining wall openings 69 and 70. Inserted in bearing retaining opening are bearings 71 and 72. These bearings are provided with substantially a square opening for receiving operating shaft 77, which shaft is to be rotated during locking or unlocking operations. Rotatable operating shaft 77 passes through bearings 71 then through a substantially square opening of link 68 then through bearing 72. It can easily be seen that when operating shaft 77 is rotated link 68 will move up or down accordingly as the shaft is rotated. Link 68 being operatively connected to bolt 47 will raise or lower, thus either engaging or disengaging bolt 47 from keeper 60 thereby either locking or unlocking the mechanism. When the locking mechanism is disengaged the door 35 will swing open by gravity.

Operating shaft 77 extends substantially parallel to the face of the door to the control elements of the locking mechanism.

The control mechanism is mounted near the outer marginal edge of the door 35 and consists in part of an integral bearing 80 and a socket 81 for receiving an insertable bar. Split bearing housings 82 and 83 are provided to receive and hold bearing 80 in rotatable position. A dog or pawl 84 is provided so that when holding face is in engagement with the shaft housing 85, the shaft 77 will not rotate.

The operating elements of the control mechanism are more clearly shown, described and claimed in a co-pending application of Orville Ingram and William E. Wine, deceased, by Orville Ingram and William J. Gibson, executors, and forms no part of the present invention except to complete a fully operable mechanism.

We claim:

1. A door locking mechanism for a hinged door swingable to close a discharge opening of a hopper of a railway hopper car, comprising a keeper mounted in and initially adjustable from without relative to said hopper, housing means mounted on said door, a bolt member movably mounted in said housing means and engageable with said keeper in a closed position of said door for locking said door in said position, said housing means including a first housing element fixed to an outside face of said door and extending through an opening therein and into said hopper in said closed position of said door, and a second housing element fixed on said outside face of said door to and having a portion extending into said first element, said extending portion and a portion of said first element together forming a guide for guiding an end of said bolt member on movement thereof in said housing means, and means including a shaft mounted on said outside face of said door and connected to said bolt member for controlling operation of said mechanism.

2. A door locking mechanism for a hinged door swingable to close a discharge opening of a hopper of a railway hopper car, comprising a keeper mounted in and initially adjustable from without relative to said hopper, housing means mounted on said door, a bolt member movably mounted in said housing means and having an end engageable with said keeper in a closed position of said door for locking said door in said position, roller means pivotally mounted on an opposite end of said bolt member, said housing means including a first housing element fixed to an outside face of said door and extending through an opening therein and into said hopper in said closed position of said door, and a second housing element fixed on said outside face of said door to and having a portion extending into said first element, said extending portion and a portion of said first element together forming a guide for receiving said roller and guiding said opposite end of said bolt member on movement thereof relative to said housing means, and means including a shaft mounted on said outside face of said door and connected to said bolt member for controlling operation of said mechanism.

3. A door locking mechanism for a hinged door swingable to close a discharge opening of a hopper of a railway hopper car, comprising a keeper mounted in and initially adjustable from without relative to said hopper, housing means mounted on said door, a bolt member movably mounted in said housing means and engageable with said keeper in a closed position of said door for locking said door in said position, said housing means including a first housing element fixed to an outside face of said door and extending through an opening therein and into said hopper in said closed position of said door, and a second housing element fixed on said outside face of said door to and having a portion extending into said first element, said extending portion and a portion of said first element together forming a guide for guiding an end of said bolt member on movement thereof in said housing means, means including a shaft mounted on said outside face of said door and connected to said bolt member for controlling operation of said mechanism, and bearing retaining portions integral with said second housing element and journalling bearings receiving a portion of said shaft.

4. A door locking mechanism for a hinged door swingable against a door frame fixed to a hopper of a railway hopper car for closing a discharge opening of the hopper bounded by the frame, comprising a keeper mounted in said hopper on a floor thereof and having a catch portion, said keeper having a plate portion extending rearwardly from said catch portion and overlying an opening in said floor, adjusting means rotatably connected to and projecting below said plate portion through said floor opening, said adjusting means below said floor having an eccentric portion acting against said frame on rotation of said adjusting means for adjusting an initial position of said keeper relative to said frame, housing means mounted on said door, a bolt member movably mounted

in said housing means and engageable with said catch portion of said keeper in a closed position of said door for locking said door in said position, said housing means including a first housing element fixed to an outside face of said door and extending through an opening therein and into said hopper in said closed position of said door, and a second housing element fixed on said outside face of said door to and having a portion extending into said first element, said extending portion and a portion of said first element together forming a guide for guiding an end of said bolt member on movement thereof in said housing means, and means including a shaft mounted on said outside face of said door and connected to said bolt member for controlling operation of said mechanism.

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