

July 1, 1930.

H. CARRIER

1,769,489

DOOR LATCH

Filed April 4, 1924

Fig. 1.

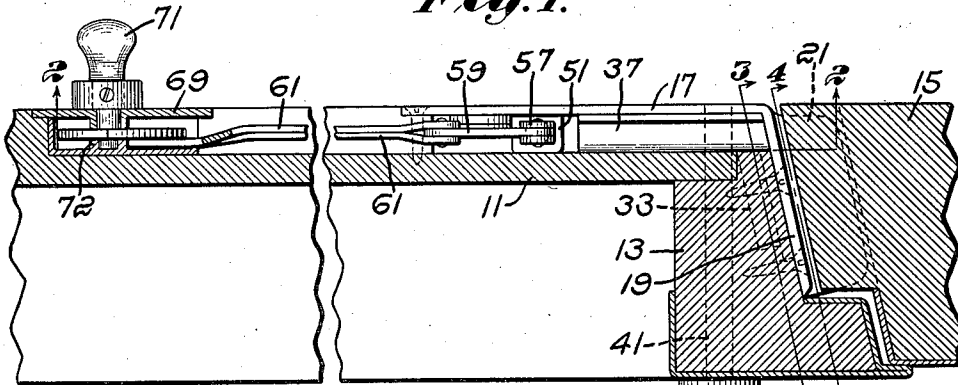


Fig. 3.

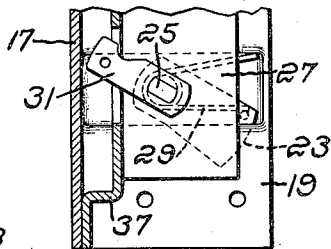


Fig. 2.

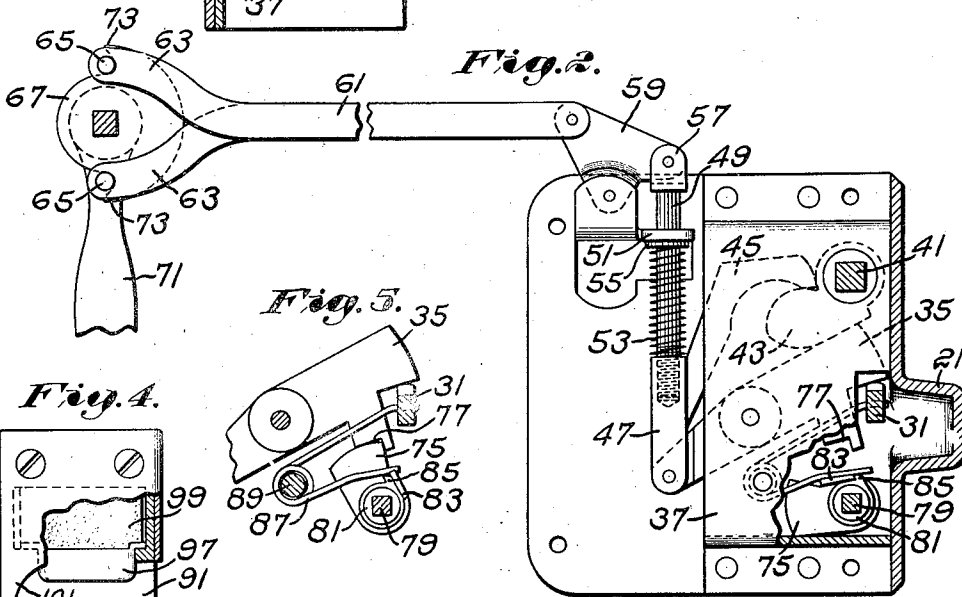


Fig. 5.

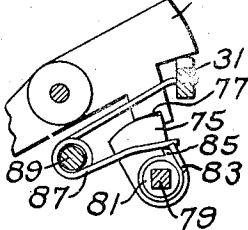
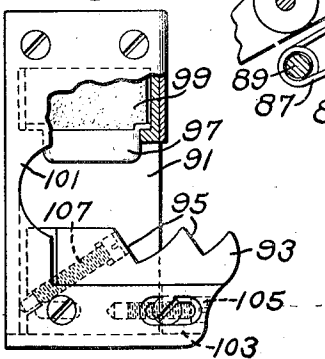


Fig. 4.



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DOOR LATCH

Application filed April 4, 1924. Serial No. 704,143.

This invention relates to a latching mechanism for closures and finds a particular application to the door latches of automotive vehicles and in particular to vehicles of the closed type. The object of the invention is to provide a simple construction of this character which will be effective and convenient in use and have advantages which will more fully appear as the description proceeds.

In the accompanying drawings I have shown by way of example an illustrative embodiment of my invention as applied to the door of an automobile and the mechanism shown embodies various features of construction disclosed in my copending application, Serial No. 681,770, filed Dec. 20, 1923, and claimed therein. In the drawings:—

Fig. 1 is a partial section along a horizontal line through the framing of an automobile door and the jam against which it closes;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1 simplified by the omission of parts and with a portion broken away;

Fig. 3 is a section through the door fitting along line 3—3 of Fig. 1;

Fig. 4 is an elevation of the jamb fitting or keeper as seen from the line 4—4 of Fig. 1 and with parts broken away; and

Fig. 5 is a detail of a portion of Fig. 2 showing parts in another position.

Referring to Fig. 1 of the drawings, I have there shown a portion of the vehicle door including a lock bar 11 and a rabbeted lock pillar or style 13, the latter adapted to close inwardly against the jamb 15. While certain of the improvements of my present invention may be applied to various types of latches or locks, I have herein illustrated a construction utilizing a bolt pivoted on a horizontal axis at the edge of the door, that is, on the face of the lock pillar which adjoins the jamb when the door is closed. In such a construction and with the organization of parts hereinafter referred to provision is made for a strong and easily operated latch-

ing mechanism which for its installation will require very little cutting away of the lock bar and lock pillar, if these parts are of wood, so that they will not be weakened and so that the installation of the latch will be simplified. In the case of a metal lock bar the mechanism may be housed in a shallow depression pressed therein.

Referring particularly to Figs. 1, 2 and 3 of the drawings, the latching mechanism here shown is organized on a casing of generally angular form including a plate 17 adapted to be placed flush with the inner face of the door, being mortised into the lock rail 11, and a flange 19 adapted to be set flush with the edge of the door. From the flange 19 projects outwardly a hollow housing 21, best shown in Fig. 2, which accommodates, as shown in Fig. 3, a latch bolt 23 which may be pivoted on a substantially horizontal axis formed by a pin 25 journaled in the outer wall of the housing and in an inner wall formed by the plate 27 fixed to the inner surface of the flange 19. The end of the bolt is projected by the spring 29 through a suitable opening in the bottom of the housing to engage a keeper on the door jamb, shown in Fig. 4 and hereinafter more fully to be described, the door swinging to closed position from the right hand side in Fig. 4. The upper portion of the housing 21 may serve as a stop for the bolt. To swing the bolt against the force of the spring 29 to retract it within the housing and permit the door to be opened, there may be provided on the pivot 25 an arm 31 located inwardly of the plate 27 lying flat against the same and extending towards the angle defined between the plate 17 and the flange 19. This arm 31 is in effect the tail of the latching bolt and the bolt proper 23 and the arm 31 are preferably related one to another as are the parts of a lever of the first class. When installed on the door it will be noted that the housing and the relatively heavy

bolt project outwardly from the face of the lock pillar 13 and that a relatively shallow portion of the latter is cut away, as shown by dotted lines at 33 in Fig. 1, to accommodate the arm 31.

The arm 31 may be operated to swing the bolt (see Fig. 2) by means of a flat lever 35 lying against the inner face of the plate 17 and having an end engaging the end of the arm 31 adjacent the junction of this plate with the flange 19. The lever may be pivoted on the plate 17 and on the auxiliary plate 37 secured thereto which forms a partial housing for this lever and other mechanism to be described. If the lever 35 is swung clockwise viewing Fig. 2, the end of arm 31, viewing Fig. 3, will be depressed and the latch bolt 23 will be retracted within the housing 21 against the force of spring 29.

The lever 35 lies close to the plate 17 and the operating mechanism therefor herein provided permits the latch bolt to be operated either from the inside or outside of the door without cutting away the lock bar 11 except to a relatively shallow depth, as indicated in Fig. 1, sufficient to receive the casing formed by the plates 17 and 37 which houses the flat lever 35 and certain other mechanisms herein to be described which are also organized in a shallow space along the inner face of the door lying substantially in the plane of the inner face of the door.

I will first describe the means herein shown for operating the lever 35 from the exterior of the door and this is herein effected by means of a rotatable handle 39 having the square spindle 41 extending through the lock pillar 13 and engaging a shallow cam or roll back 43 journaled in the plates 17 and 37 and coplanar with the lever 35. It will be apparent from Fig. 2 that if the cam is rocked counterclockwise from the position shown in that figure, the rise or nose thereof will depress the right hand end of the lever 35 to unlatch the bolt. Preferably the arrangement is such that the bolt will be lifted in whichever direction the handle 39 is turned and for this purpose I may provide an arm 45 presented at the opposite side of the cam 43 and connected to the opposite end of the lever 35, the arm 45 being herein formed as an extension of a fork 47 pivoted to the left hand end of the lever and forming a portion of another operating mechanism hereinafter to be described and constrained to move in a substantially vertical direction by the threaded rod 49 screwed into the fork 47 and guided in the lug 51 struck up from the plate 17. It will be apparent that if the cam 43 is rotated in a clockwise direction from the position shown in Fig. 2, it will lift the arm 45 and depress the right hand end of lever 35 to unlock the bolt. In whichever way the cam 43 is turned, either directly to depress the lever

35 or to act on the arm 45, it will move freely away from the other element and will return freely. Mechanically speaking, the cam and either of the elements on which it acts constitute a force-closed couple and there is lost motion between the parts of either couple when the other is operated. It will be noted further that the lever 35, arm 45 and cam 43 are all shallow elements lying in the same plane and are consequently housed in a space of minimum depth.

Conveniently the end of arm 45 may have a hook-like form, as best seen in Fig. 2, providing an end or bill engaging close to the center of cam 43 and preferably in such angular relation thereto that the normal movement thereof is a short arc crossing or closely adjacent the horizontal. By this construction the handle 39 acts with good mechanical advantage and lifts the arm 45 upwardly substantially without sideways thrust which might cause binding or bending of the parts. The throat of the hook provides clearance for the nose of the cam.

For operating the latch from the inner side of the door suitable means are preferably provided which may be received also in a shallow space of slight depth as indicated clearly in Fig. 1. To operate the latch from the inner surface of the door I may utilize a pull rod moving substantially vertically in the shallow space adjacent the plate 17 and comprising the fork 47 into which taps the screw 49 already referred to, the whole being loosely guided in the lug 51 and normally depressed by the helical spring 53 surrounding screw 49 and interposed between the fork 47 and a washer 55 engaging the lower surface of the lug 51. The spring 53, besides returning the pull rod to position, obviously tends to swing the lever 35 counterclockwise, releasing the bolt to the action of its spring 29.

The rod 49 may be connected by means of the fork 57 to a relatively flat lever 59 pivoted at the upper edge of the plate 17 and rocking movement of this lever substantially in the plane of the inner surface of the door, that is, within the shallow zone assigned to the reception of the latching mechanism, as will be understood from an inspection of Fig. 1, will serve to lift the pull rod and depress the right hand end of lever 35. It will be noted further that in this action both the lever 35 and the arm 45 move freely away from the cam 43 so that operation of the latch from the inner side of the door is entirely independent of any connection with the outer handle 39, its spindle 41 and the cam 43. Preferably the arrangement is such that if the cam 43 is utilized to swing the latch in either manner, which obviously causes a lifting of the pull rod 49, the inner operating handle is not affected, the connections from the rod 49 to the operating handle having the required lost motion to effect this, and the

preferred structure is also such that an inner rotatable handle is provided which will act on the pull rod 49 in whichever direction it is turned.

5 The mechanism herein shown for operating the door from the inside is one providing for the positioning of the inner handle at a point considerably remote from the edge of the door as is desirable in vehicle practice.
 10 In the construction shown the bell crank lever 59 connected to the pull rod may be rocked through the medium of a suitable link or connecting rod which in the form of the invention shown consists of two flat links 61
 15 having ends 63 offset in opposite directions and provided with pins 65, the two constituting in effect a connecting rod with a forked end. To pull on this connecting rod a suitable rocker is provided which may take the
 20 form of a flat disc 67 received in a shallow housing 69 at the inner face of the door and turned by the spindle of the rotatable handle 71. The disc 67 may receive a three point support in the housing from the links
 25 61 and a boss 72 on the bottom of the housing between the positions of links 61. On opposite sides of this disc are hooks 73 engaging the pins 65 from the same side. It will be apparent from Fig. 2 that if the disc
 30 67 is turned in a counter-clockwise direction the upper hook will be effective on the upper arm of the fork to draw the connecting rod to the left and so through the medium of the bell crank lever 59 and pull rod 49 to rock the
 35 latch operating lever 35 and that in this action the disc will move freely away from the stud 65 on the lower arm of the fork. If the disc is turned in the other direction the stud on the lower arm is effective and there is lost
 40 motion between the upper pin 65 and the corresponding hook portion 73. In other words the disc 67 and each of the links 61 forms a force-closed couple and not only may the latch be operated by turning the
 45 handle 71 in either direction but, if the latch is operated by means of the cam 43 and the rod 49 thereby lifted, both of the links 61 may move freely to the left in Fig. 2 with lost motion with respect to the rocker disc
 50 67 so that the inner handle 71 is not affected and constitutes no drag on the operation of the latch by means of the outer handle 39.

55 Preferably suitable means are provided for dogging the lever 35 to hold it against movement and thus prevent the unlatching of the door. The construction herein shown provides a dog which may be operated by a key-controlled lock of the cylinder type not herein shown in detail as it is of ordinary
 60 and well known form. Referring to Figs. 2 and 5, I may provide a dog 75 received between the plates 17 and 37 substantially in the plane of the lever 35 and adapted to be turned from the inoperative position shown
 65 in Fig. 2 where it is out of the path of move-

ment of the lever 35 to the position shown in Fig. 5 where it will engage in a notch 77 formed in the lower surface of the right hand end of this lever and will support the same against such downward swinging movement as serves to release the latch bolt. To effect this purpose as shown by Figs. 2 and 5, the dog may have a turning movement through a relatively limited arc, herein substantially a quadrant. A customary type of lock used on vehicle doors is of the cylinder type and provides for the turning by means of the key of a rearwardly projecting square spindle and to operate this lock and withdraw the key the spindle is given a complete revolution. To permit the operation of the dog by means of such a key-controlled mechanism having a spindle 79 the dog may be driven from this spindle by an intermediate member free to make a complete revolution with that spindle and having the requisite lost motion relative to the dog 75. In the embodiment of the invention shown the spindle 79 passes through the center of the operating member 81 journaled in the plates 17 and 37 and having the dog 75 itself loosely mounted thereon. The dog 75 may be provided with a flange portion 83 and the driving element may have a tooth 85 which when the element is turned in one direction counterclockwise to the position shown in Fig. 2 engages the end portion of this flange. When the device is turned in the opposite direction to the position shown in Fig. 5 the opposite side of the tooth will engage the inner face of the flange moving the dog from the position of Fig. 2 to the position of Fig. 5, the driving element 81 returning as shown to the same position, thus making a complete revolution and permitting the withdrawal of the key from the lock controlling the spindle 79. It will be apparent from the figures that the major portion of the rotation of the driving member from either of the positions shown is idle but in the latter part of its travel the tooth engages the flange 83 and gives the requisite movement to the dog 75. The flange 83 provides for the application of a retaining spring to the dog 75, which spring 87 may be coiled around a post 89 and conveniently has one end engaged with the tail of the latch bolt formed by the arm 31, the other end extending and resting either on the side or the end of the flange as shown respectively in Figs. 2 and 3, the position of the parts preferably being such that the side and end of the flange present flat bearings for this end of the spring. It will also be noted that in the turning movement the point of pressure of the spring 87 on the dog 75 is moved from one side to the other of the spindle 79 so that the pressure of the spring in each instance tends to hold the dog in the position to which it has been turned.

Referring to Fig. 4, I shall next describe

the particular construction of strike or keeper herein illustrated. This comprises a jamb fitting adapted to be set in the mortise of the jamb 15 substantially flush with the face thereof which opposes the edge of the door and having a recess 91 opening towards the exterior of the door into which the housing 21 is adapted to close. In the form of the invention shown this fitting comprises a back plate secured to the jamb and having flanges at the top, bottom and back defining the recess 91 and providing for the support of the keeper proper consisting of a bar 93 supported on the bottom flange of the fitting and provided with notches 95 into which snaps the end of bolt 23 in a manner which will be clearly understood by a comparison of Figs. 3 and 4 if the reader imagines the casing 21 in the former figure to be aligned with the recess 91 in the latter and moved towards the left so that the casing enters the recess. Opposing the keeper proper and co-operating with the hollow casing 21 of the latch bar is a cushioning and aligning bumper herein taking the form of a flanged metal shoe 97 projecting into the recess 91 from the upper side and resiliently supported against upward movement by means of the block of rubber 99, the device being secured in a suitable recess in the upper flange of the keeper member which recess closed on the outside by the cover plate 101, a portion of the shoe 97 projecting through the restricted lower opening of this recess opposite the notched keeper bar 91 and being maintained therein by its flanges which rest on the sides of this opening. The removal of the plate 101 provides ready access to this member for renewal or repair.

To provide for adjustment of the notched keeper bar 93 it may be provided with a depending flange portion 103 and a set screw 105 may extend through this flange portion and tap into the lower flange member of the jamb fitting on which the notched bar 93 rests. Cooperating with the screw 105 is another set screw 107 which may extend through the wall of one of the notches 95, the head being preferably countersunk as shown. This screw is tapped into the notched bar and bears against the jamb fitting. Obviously these two screws operate in opposite directions and by manipulation of the two they serve mutually to lock one another and to hold the element 93 rigidly in adjusted position. It will be noted that the heads of both screws are exposed at the outer side of the fitting and are easily accessible for that reason.

I have described in considerable detail the particular mechanical construction shown in the accompanying drawings as an example of the invention in order that the details thereof might be clearly understood. It is clear, however, that all these details are not

essential and that the mechanical construction may be widely varied without departing from the essential inventive ideas which will be defined in the annexed claims.

In referring to the various parts in these claims I will use such words as "inner" and "outer," "upper" and "lower" and the like, with reference to a lock as applied to an ordinary automobile door which opens outwardly and on which the lock would be installed with the handle 71 at the inner side of the door and the handle 39 at the outer side, the door lying in a vertical plane. It will be obvious, however, that these words are merely relative and used in an exemplary sense.

I claim:—

1. Door latch mechanism comprising a latch bolt, a swinging lever to act on the bolt, a cam or roll-back cooperating with the lever at one side of its pivot and force-transmitting means connected to the lever at the other side of the pivot and having a follower portion presented to the opposite side of the cam.

2. Door latch mechanism comprising a latch casing having a plate to lie at the side of the door and a flange to lie at the edge of the door, a bolt swinging on a horizontal pivot adjacent the flange, a shallow lever adjacent the plate engaging the bolt at the angle of plate and flange, a cam or roll-back turning closely adjacent said plate and engaging an end portion of said lever when turned in one direction and an arm also lying closely adjacent the plate connected to the other end portion of the lever and presented at the other side of the cam.

3. Door latch mechanism comprising a bolt, a pull rod operating substantially in the plane of the side of the door for operating the bolt, a handle connected to the rod for moving the same, an arm fixed to the rod and a cam acting on said arm also to lift the rod and another handle for turning the cam.

4. Door latch mechanism comprising a latch bolt, a swinging lever pivoted between its ends to act on the bolt, a cam directly acting on one end portion of said lever when turned in one direction, a separately operable mechanism connected to the opposite end of lever and an arm carried by said mechanism cooperating with said cam to swing the lever when said cam is turned in the other direction.

5. Door latch mechanism comprising a latch bolt, a swinging lever pivoted between its ends to act on the bolt, a cam having a handle for turning the same and directly acting on one end portion of the lever when turned in one direction, a link connected to the opposite end of the lever, a rotatable handle connected to the link to move the same lengthwise in the same direction on rotation of the handle in either direction and an arm carried by the link cooperating with the cam

likewise to move the link when the cam is turned in the other direction.

6. A mechanism as described in claim 5 wherein the lever operating instrumentalities are force closed pairs effective through force-closed connection whereby movement of the lever by one handle is independent of movement of the other.

7. Door latch mechanism comprising a supporting plate, a lever adjacent the plate for operating the latch, a cam adjacent the plate adapted to be turned by a transverse spindle, said cam effective on opposite ends of said lever when turned in opposite directions respectively and further means for operating said lever comprising link work connected thereto and a remote rotatable handle having when turned in either direction force-closed engagement with said link work to swing the lever always in the same direction.

8. Door latch mechanism comprising a latch casing having a plate to lie at the side of the door and a flange to lie at the edge of the door, a bolt swinging on a horizontal pivot adjacent the flange, a shallow lever adjacent the plate engaging the bolt at the angle of plate and flange, a pull rod guided beside said plate for swinging the lever, a crank substantially in the plane of the plate for moving the rod, a shallow link extending from said crank closely adjacent the plane of the side of the door, a rocker for operating the link and a handle for turning the rocker.

9. Door latch mechanism comprising a bolt pivoted at the edge of the door to swing in a vertical plane transverse thereto, a pivoted lever at a side of the door for operating the same, a pull rod connected to said lever, a handle remote from the edge of the door and a bell crank and link adjacent said side of the door for operating the rod from said handle.

10. Door latch mechanism comprising a latch casing having a plate to lie at the side of the door and a flange to lie at the edge of the door, a bolt swinging on a horizontal pivot adjacent the flange, a shallow lever adjacent the plate engaging the bolt at the angle of plate and flange, a pull rod guided beside said plate for swinging the lever, a crank substantially in the plane of the plate for moving the rod and a handle for turning the crank.

11. Door latch mechanism comprising a latch bolt operating member, a pull rod for operating the same, a rotating handle and connections between said handle and pull rod effective to move the latter on turning of the handle in either direction, a second rotatable handle for operating said member independently of the first and also effective on turning in either direction.

12. Door latch mechanism comprising a latch bolt and means for operating the same

organized and moving in a shallow space at one side of the door and comprising a lever swinging in said space, a pull rod connected thereto and means for moving said rod substantially longitudinally thereof and in said space comprising a link extending to a remote handle and a handle controlled rocker moving substantially in the plane of the side of the door for moving said link.

13. Door latch mechanism comprising a latch bolt having a portion presenting adjacent the angle of the edge of the door, means for moving the bolt comprising an operating lever engaging said portion lying in a shallow space at the side of the door and moving substantially in the plane of said side, a coplanar device on one side of the lever for moving the same and a coplanar dog on the other side for securing it.

14. Door latch mechanism comprising a latch casing having a plate to lie at the side of the door and a flange to lie at the edge of the door, a bolt swinging on a horizontal pivot adjacent the flange, a shallow lever adjacent the plate engaging the bolt at the angle of plate and flange, means to swing the lever and a dog turning adjacent the plate for securing said lever against movement.

15. Door latch mechanism comprising a latch casing having a plate to lie at the side of the door and a flange to lie at the edge of the door, a bolt swinging on a horizontal pivot adjacent the flange, a shallow lever adjacent the plate engaging the bolt at the angle of plate and flange, means to swing the lever, a dog lying adjacent the plate and means to turn the same to engage with or be disengaged from the lever comprising an element capable of complete revolution and having a lost motion driving connection with said dog.

16. Door latch mechanism including a lever for moving the latch bolt, a pivoted dog for securing the lever having a projecting lug, and a concentrically pivoted member having lost motion relative to said dog and having surfaces to engage the lug to move the dog in opposite directions.

17. Door latch mechanism including a lever for moving the latch bolt, a pivoted dog for securing the bolt having a flange and a concentrically pivoted rotatable member for turning the dog having a tooth engaging the edge of the flange when turned in one direction and the side thereof when turned in the other.

18. Door latch mechanism including a lever for moving the latch bolt, a pivoted dog for securing the bolt having a flange presenting a side and end to a retaining spring when turned substantially through a quadrant, a spring cooperating therewith and a completely rotatable driver having a lost motion connection with said dog.

19. Door latch mechanism including a le-

ver for moving the latch bolt, a pivoted dog
for securing the bolt having a flange present-
ing a side and end to a retaining spring when
turned substantially through a quadrant, a
5 spring cooperating therewith and a com-
pletely rotatable driver having a tooth en-
gaging said flange during the latter part of
its movement in opposite directions for turn-
ing the dog.

10 In testimony whereof, I have signed my
name to this specification.

HERMENEGILDE CARRIER.

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