May 23, 1933. H. T. THOMAS 1,910,372

DOOR DOVETAIL

Filed Aug. 31, 1931

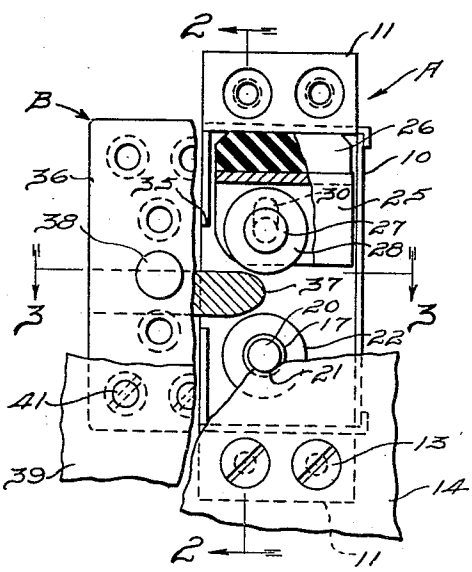


Fig. 1.

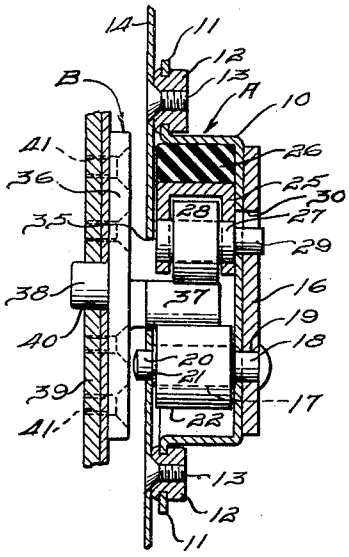


Fig. 2.

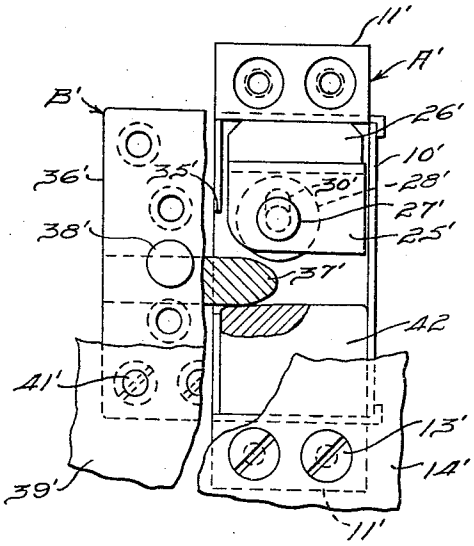


Fig. 4.

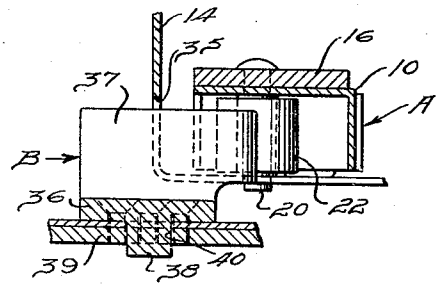


Fig. 3.

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DOOR DOVETAIL

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This invention relates to door dovetails of the type conventionally employed in connection with the body of motor vehicles, the principal object being the provision of a door dovetail of simple construction and efficient operation.

Other objects of the invention are to provide a door dovetail in which the male member will be received between a pair of rollers when the door is in closed position whereby the only resistance offered to withdrawal of the male member is through rolling friction, permitting easy opening of the door; to provide a door dovetail including a pair of opposed rollers, the lower of which is fixed whereby to carry the weight of the door, and the upper one of which is movably carried by a resiliently pressed carrier member; to provide a door dovetail including a pair of opposed metal rollers at least one of which is resiliently urged in one direction whereby to enable the male member to be gripped between them, and to provide a door dovetail in which a fixed abutment is provided for supporting the weight of the door and a resiliently pressed roller is provided for maintaining the male member of the dovetail in contact with the abutment when the door is closed.

A further object is the provision of a door dovetail male member having an integral dowel member projecting therefrom and which is adapted to be received in a cooperating opening in a door whereby to positively fix it against shifting relative to the door.

The above being among the objects of the present invention, the same consists of certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawing and then claimed, having the above and other objects in view.

In the accompanying drawing which illustrates a suitable embodiment of the present invention, and in which like numerals refer to like parts throughout the several different views,

Figure 1 is a partially broken, partially sectioned face view of a door dovetail assembly showing fragments of an automobile body and an automobile body door associated therewith, the male member of the dovetail being shown in a position in which it is about to be projected between the rollers of the female member.

Fig. 2 is a vertical sectional view, taken on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 showing a slightly modified form of construction.

Door dovetails as conventionally employed today in connection with the bodies of automobiles usually include a female member including a pair of opposed members resiliently urged toward each other and between which the male member is adapted to be forced when the door is closed in order to maintain it and the door, with which it is associated, from vertical movement relative to the body. The construction of the female members of such door dovetails as conventionally employed is usually such that in forcing the male member home, rubbing friction is set up between the male member and the opposed members of the female member and, due to the fact that such opposed members must grip the male member with considerable force in order to be effective in operation, it usually takes considerable force to overcome the friction referred to. In fact, the friction is usually so great that it takes such a large amount of effort to overcome it in opening a door that often times it is only with great difficulty that a small person, and particularly a woman, is able to open the door. The present invention includes a construction which largely eliminates such objectionable friction between the parts, without lessening the effectiveness of result in operation of the dovetail.

Referring to the drawing, and particularly to Figs. 1, 2 and 3, a door dovetail female member is indicated generally as at A and a male member indicated generally at B. Female member A includes an open faced box-like member 10 forming a casing and supporting structure and preferably formed from sheet metal in any conven-

tional manner. Attaching flanges 11, preferably integral with the member 10, project upwardly and downwardly from the upper and lower ends respectively of the part 10 in the general plane of the open side thereof. Nut members 12, suitably secured to the flanges 11, are provided for the reception of screws 13 which are shown as being threaded through the wall 14 constituting part of a door pillar to which the female member A is secured and which serves as a closure for the open side of the female member A except for that area necessarily left open for the reception of the male member.

The back face of the box member 10 is reinforced by a relatively heavy plate 16 welded or otherwise suitably secured to the exterior face thereof.

A trunnion member 17, positioned within the lower part of the box-like member 10, is provided with a reduced end 18 which projects through an opening 19 in the back wall of the member 10 and the reinforcement plate 16 and is rigidly fixed therein by riveting over its projecting end. The opposite end of the trunnion member 17 is provided with a reduced end 20 which serves as a dowel and which projects through an opening 21 in the wall 14 into which it is relatively closely received. Rotatably received on the trunnion member 17 between the back wall of the box member 10 and the wall 14 is a roller 22 preferably formed of hardened metal, which serves as an abutment to limit downward movement of the male member when associated therewith.

Vertically slidably received between the back wall of the box member 10 and the wall 14 at the upper end of the box member 10 is an inverted channel-shaped carrier member 25. The carrier member 25 is substantially the same length as the interior width of the member 10 and is thereby maintained against substantial movement in the direction of its length, and being of substantially the same width as the distance between the wall 14 and the back wall of member 10 is maintained against substantial movement in the direction of its width. Between the upper face of the carrier member 25 and the interior face of the upper end of the member 10 a resilient member 26, shown in the form of a rubber block, is located.

The carrier 25 is provided with a trunnion 27 which bridges its opposite sides and which rotatably carries between the sides of the carrier a roller 28 preferably formed of hardened metal, the roller 28 being of such size as to project slightly below the lower edge of the carrier. The trunnion member 27 is provided at its rear end with a reduced extension 29 which projects through a vertically elongated slot 30 in the rear wall of the box member 10 and reinforcing plate 16 and limits downward movement of the carrier. The relative position of the slot 30 is preferably such that when the extension 29 of the trunnion member 27 is positioned at the lower end of the slot 30 there is sufficient room only between the top face of the carrier 25 and the upper end wall of the box member 10 to receive the rubber block 26 without compression thereof. With this construction it will be apparent that movement of the carrier 25 upwardly will cause the rubber block 26 to be compressed and to resist such upward movement.

As in conventional constructions, the wall 14 of the door pillar is cut away as at 35 centrally of the female member A in order to provide for the insertion of the male member into the female member. The male member B shown is, for the most part, of conventional construction including an attaching flange portion 36 and projection portion 37 which is adapted to be received by the female member. In the particular case shown the portion 37 is of substantially equal thickness throughout except at its entering end where it is rounded off to facilitate its entrance between the rollers 22 and 28.

Heretofore it has been the practice, in securing male members of door dovetails to their respective doors, to simply secure them in place by screws, bolts or the like. In service it has been found that such screws or bolts gradually work loose, due to the vibration encountered in service, eventually allowing the male member to shift on the door and to a great extent rendering the function of the door dovetail inoperative. In accordance with the present invention I form on the back face of the flange portion 36 of the male member an integral dowel 38, and form in the corresponding wall 39 of the door an opening 40 which relatively closely receives the dowel 38 and thereby rigidly maintains the male member B against shifting relative to the door. I then employ screws such as 41 as conventionally employed and in the conventional manner for securing the male member B to the door and to prevent disengagement of the dowel 38 with the walls of the opening 40.

In the construction above described the rollers 22 and 28 are so positioned, when the male member is not received between them, that the distance between their adjacent surfaces is substantially less than the thickness of the projection 37 of the male member. When the projection 37 is forced between the rollers 22 and 28, the projection 37, because the roller 22 is fixed against movement except in a rotational direction, is carried up and over the roller 22 and at the same time is forced below the roller 28.

The roller 28 in being forced upwardly carries with it the carrier 25 and upward movement of the carrier 25 will obviously cause a compression of the rubber block 26 which will tend to force the roller 28 downwardly and thus cause the projection 37 to be firmly but resiliently gripped between the rollers 22 and 28. Because of the fact that the rollers 22 and 28 are preferably formed of hard metal, although this is not understood to be essential in all cases, and because the rollers are freely rotatable upon their trunnions, there will be extremely small amount of friction set up between the projection of the male member and the rollers when the projection is forced between them, and a corresponding small amount of friction will be apparent when the projection 37 is withdrawn from between them, and this without substantial regard to the amount of force exerted by the rubber block 26. Accordingly, it will be apparent that with my improved construction the male member and consequently the door will be firmly supported against relative vertical movement upon the lower roller 22, will be firmly maintained in such position by the upper roller 28 through the force exerted upon it by the rubber block 26, and that the resulting structure will necessitate a relatively small force to withdraw the projection 27 from between the rollers 22 and 28.

The construction illustrated in Fig. 4 is similar to that illustrated in the previous figures with one exception and, accordingly, similar parts are indicated by the same numerals in Fig. 4 as in Fig. 1 with the exception that such numerals bear a prime mark. The only difference between the construction illustrated in Fig. 4 and in the preceding figure is that in Fig. 4 the lower roller 22 and its supporting trunnion has been eliminated and in its place has been substituted a rigid block 42 which may be of hardened or other metal or may be formed of some anti-friction material, such as graphite impregnated fabric, or of some other non-metallic material such as bakelite. Where such block 42 is formed of anti-friction material an efficient structure is provided which has substantially all of the advantages of the construction heretofore described with the exception that it is not as easy to operate as the above described construction.

While I have described the male member as being carried by the door, and the female member as being carried by the door pillar, which is conventional practice, it will be apparent that these parts may be reversed relative to the door and the door pillar without affecting the normal operation thereof, and while for the purpose of ease in expression in the following claims the male member may be described as being secured to the door it will be understood that such claims are to be interpreted in such a manner as to permit either method of assembly.

Furthermore, although I have shown the metal of the door pillar 14 as serving to close the open face of the member 10, which is conventional practice where such pillars are of all metal construction, it will be apparent that where the dovetail is to be employed on wooden pillars a separate face plate will be provided to take the place of the wall of the pillar 14 in the construction shown, all of which is in accordance with conventional practice.

Formal changes may be made in the specific embodiment of the invention described without departing from the substance and spirit of the broad invention, the scope of which is commensurate with the appended claims.

I claim:

1. In a door dovetail, in combination, a casing, non-yielding abutment thereon, a carrier vertically slidable in said casing above said abutment, a substantially non-resilient roller carried by said carrier and exposed below the same, and resilient means for urging said carrier downwardly.

2. In a door dovetail, in combination, a casing, a non-yielding abutment thereon, an inverted U-shaped carrier vertically slidable in said casing above said abutment, a roller carried by said carrier between the opposite sides thereof and exposed below the lower face thereof, and resilient means for urging said carrier downwardly.

3. In a door dovetail, in combination, a casing, a non-yielding abutment thereon, an inverted U-shaped carrier vertically slidable in said casing above said abutment, a trunnion extending between opposite sides of said carrier, a roller on said trunnion, and resilient means for urging said carrier towards said abutment.

4. In a door dovetail, in combination, a casing, an abutment thereon, an inverted U-shaped carrier vertically slidable in said casing above said abutment, a trunnion extending between opposite sides of said carrier, a roller on said trunnion, resilient means for urging said carrier towards said abutment, and means for limiting downward movement of said carrier relative to said casing comprising an extention on said trunnion received in a slot in said casing.

5. In combination, a door having a metal side edge, a door dovetail male member, an integral dowel on said male member, said metal side edge being provided with an opening therein fitting said dowel, means securing said male member to said door, a female dovetail member including a casing and an abutment supported thereby against vertical movement and adapted to receive

said male member thereon for supporting the side edge of said door.

6. In combination, a door having a metal side edge, a door dovetail male member, an integral dowel on said male member, said metal side edge being provided with an opening therein fitting said dowel, means securing said male member to said door, a female dovetail member including a casing, an abutment supported thereby against vertical movement and adapted to receive said male member thereon for supporting the side edge of said door, a carrier vertically slidable in said casing above said abutment, a substantially non-resilient abutment carried by said carrier and exposed below the same, and resilient means for urging said carrier downwardly resiliently to maintain said male member in engagement with said first-named abutment.

HORACE T. THOMAS.