Oct. 29, 1940. M. J. ECONOMIDES 2,219,358

CONCEALED HINGE

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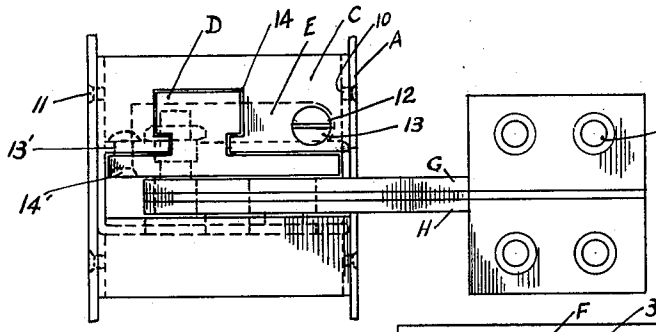

FIG. 1

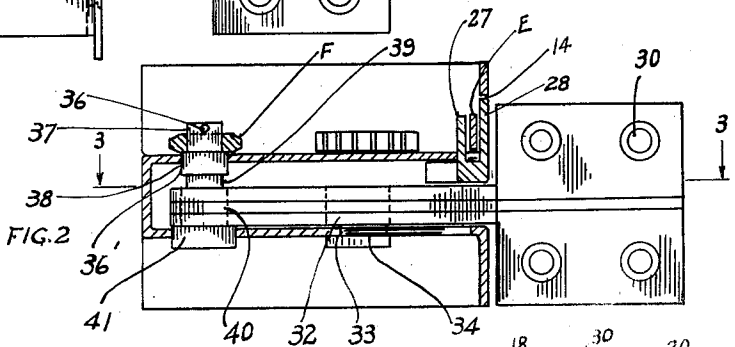

FIG. 2

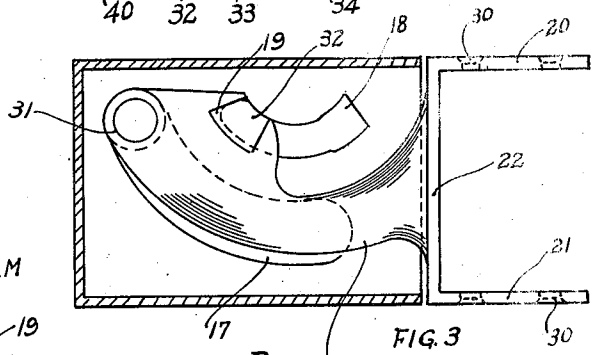

FIG. 3

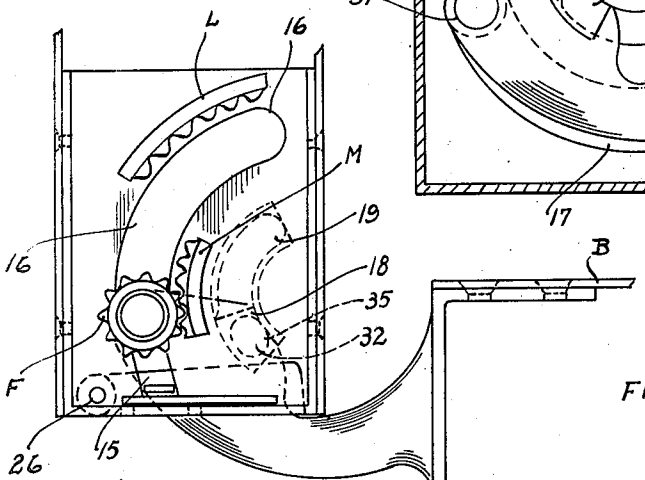

FIG. 4

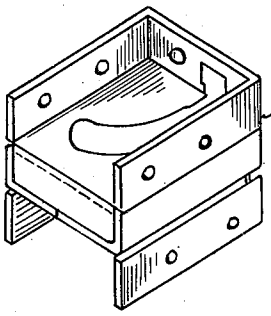

FIG. 5

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CONCEALED HINGE

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7 Claims. (Cl. 16—179)

This invention relates to an improved concealed hinge whose sides are riveted or otherwise attached between the sides of the frame of the modern automobile and other vehicles using hinges for doors and may readily be adopted for general use.

This invention seeks, among other objects, to provide a hinge which may be readily fashioned from suitable sheet of metal which as compared with other hinges as heretofore constructed will be stronger, more durable and possess superior mechanical features suitable for the modern automobile or other vehicles.

This invention seeks, as a further object, to provide a hinge wherein the sides of the fixed hinge member will be sturdily held against spreading, as the side walls of the hinge box is provided with holes for the purpose of riveting said sides to the door or door frame of the vehicle, so that undue looseness is prevented.

It is another object of this invention to eliminate the rattling of the door of automobiles or other vehicles while they are in motion.

One further object of this invention is to provide a hinge wherein the movable hinge member thereof may, when desired, be readily disengaged from the fixed hinge member, permitting the simple displacement of the door with the greatest facility.

Another object of this invention is to provide a hinge whose movable member, when having a guide inserted into a slot located on the lower wall of the box of the fixed hinge member, serves as a strap, for checking the opening of a door and limiting the outward movement of the door on its hinges.

This invention seeks as another very important object, to be suitable for either straight line or curved line doors, while the width of the fixed hinge member remains the same.

Other objects and features will become apparent from reading the following detailed description of the embodiment of the present invention.

The invention generally consists in the features of novelty appearing in the construction, arrangement and cooperation of the several parts hereinafter fully described, and is taken in connection with the accompanying drawing, in which:

Fig. 1 is a vertical plan view of a preferred embodiment as mounted in a frame and door fragmentally shown.

Fig. 2 is a longitudinal, sectional view of the embodiment shown in Fig. 1.

Fig. 3 is a plan view taken on line 3—3 of Fig. 2.

Fig. 4 is a plan view of the embodiment shown in Fig. 1.

Fig. 5 is a perspective view of a portion of the embodiment.

Referring now to the drawing in which reference characters designate like parts throughout, a frame section A of an automobile or other vehicle is recessed to accommodate the non-movable portion C of the device as shown in Figs. 1 and 2. Said portion C is made of any suitable material and is preferably of rectangular shape with a front and two opposed side walls as shown. The walls of said portions are provided with a plurality of openings 10 and 11 for accommodating screw members, not shown, for fixing the portion C to frame section A. Said portion is also provided with a pair of spaced, parallel, horizontal plates fixed to the vertical walls as shown in Fig. 4 being joined thereto and forming a part thereof, by any suitable means well known in the art. It is to be noted that the front wall of said section at its upper portion has a square opening 14 continuing along a reduced slot section 15 and a wider slot section 16 of the intermediate upper horizontal plate member shown in Figs. 3 and 4. It is to be noted that the front wall is also provided with an opening 12 into which fits a screw or rivet member 13 for pivotally holding a safety catch E, while the upper horizontal plate has an opening 13' for a vertically extending rivet member 14' to pivotally retain check D as shown in Fig. 1. Said check D has an opening 26 at one end to be mounted on the rivet as an axis and has spaced upwardly extending lugs or ends 27 and 28 adapted to fit into opening 14 and permit retention thereof by means of said catch E. Said opening 14 is thereby closed by said spaced ends of the catch.

The lower horizontal plate is provided with a curved slot 17, disposed substantially parallel to upper slot 15 and 16, and a guide slot having portions 18 and 19.

Mounted on the upper horizontal plate member of section C there are provided a rack member L disposed adjacent one edge of slot portion 16, and a rack member M disposed adjacent one edge of slot portion 15 for purposes hereinafter described. It is to be noted that said rack members are disposed diagonally opposite each other and are fixed to the horizontal member by any suitable means.

Adapted to coact with the non-movable section C of the hinge as shown in the drawing, there is provided a movable hinge member G—H

with one end having a plurality of side walls 20 and 21 respectively and a face wall 22 integral therewith as shown in Figures 1, 2, 3 and 4. Said vertical side walls are provided with a plurality of openings 30 for accommodating rivet members shown in Fig. 4 and to permit fixing of the movable hinge end to the walls B of an automobile door or other vehicle. Said hinge member furthermore has an outwardly curved arm extending from said walls and is of sufficient length for fitting into the space between the horizontal parallel plates. An opening 31 is provided in the end of the curved arm portion for accommodating a pintle 36'. It is to be noted that said pintle 36' has an opening 36 for accommodating a pin, a main stem portion 37, and spaced flanges 38, 40 and 41. Portion 37 is adapted to accommodate a pinion or cog F, while flange 38 is adapted to slide in groove or slot 16. Intermediate flanges 38 and 40 is a recessed portion 39 which acts as a guide making contact with the sides of slot portions 15 and 16 when the movable hinge member is inserted into operable position in the fixed section of the hinge. Flange 40 of the pintle is adapted to fit in hole 31 of the curved arm and form an integral part of the arm, while flange 41 forms the lower part of the pintle and is adapted to travel in slot 17 in the lower horizontal plate.

In order to limit the outward and inward movement of said hinge member G—H, there is provided a guide member 32 adapted to fit in recess 35 provided therefor on the curved portion of said member. Said member 32 has a recessed portion 33 adapted to travel in slot 19 as shown in Fig. 4, and a flange 34 in the lower part of the guide for retaining the member when traveling in slot 19. It is to be noted that once the movable hinge member G—H is mounted, it can be slid in or out as desired without coming apart from the fixed non-movable portion mounted in section A, as shown in Figs. 1 and 2 of the drawing.

In order to assemble and operate the device as disclosed herein, the pivoted safety catch member E is swung about its pivot so that the free end thereof is raised to form contact with the spaced lugs or ends 27 and 28 of check D. Said check D is swung outwardly on its pivot to permit the insertion of the pintle 37 into slot sections 14, 15, 16 and 17 and the insertion of guide member 32 into slot sections 18 and 19. Pinion F mounted on the upper end of pintle 36' is retained in position thereon by means of a pin member, not shown, adapted to fit in opening 36 thereon. Said pinion is above the upper horizontal plate of the fixed hinge section C and is adapted to be in engagement with either rack L when the vehicle door is to be closed or with rack M when the vehicle door is to be opened. Once the pintle and guide member are in the fixed section of the hinge, check D is closed and engaged with catch member E as shown in Fig. 1. It is to be noted that the space intermediate the two horizontal plates forming fixed section A, is of sufficient depth to permit slight raising of hinge member G—H for proper insertion into the slots above indicated without permitting any unnecessary rattling or looseness. The flat metal plate 43 as heretofore shown in Fig. 5 is inserted into the formed box 23 as shown and is attached to the upper wall of said box to keep guide 32 in relatively operative position when section G—H is actuated.

In operating the hinge above described, the movable section G—H being mounted onto a door may be moved in and out of section C. In such cases, the pintle 36' having parts 38, 39, 40 and 41 mounted on curved arm G—H moves in slot sections 15, 16 and 17 while guide member 32 moves in slot sections 18 and 19 and retains the movable section of the hinge in operable position without becoming separated from fixed section C. Pinion F mounted on pintle 36' revolves thereon and forms an engagement with rack M when the door is to be opened and with rack L when the door is to be closed. By the use of said racks there is an even distribution of the weight of the vehicle door on the hinge and of the stress on the fixed section of the hinge.

The device as described is adapted for either straight line or curved doors of automobiles or other vehicles or of buildings. It can be easily mounted and the width of the fixed portion can be varied to suit the particular type of application. Also, the device permits of a relatively snug fit in the door frame, while the removable portion is fixed to the door by means of rivets or like means. It is to be understood furthermore, that my device as disclosed herein is easily made from plate metal which can be punched, stamped and formed into a unit as shown in Fig. 5 or into a part as shown in Fig. 1.

It is to be noted that the embodiment as disclosed herein in connection with the accompanying drawing is an improvement on my copending application for a concealed hinge, bearing Serial Number 238,436 and filed November 2, 1938.

While one preferred form of my invention has been described in connection with the accompanying drawing, it is understood that various modifications as to form, material, arrangement and use of parts and materials may be made without departing from the spirit and scope of my invention.

I claim:

1. A hinge comprising a box-shaped section having a plurality of spaced horizontal members therein, a plurality of oppositely disposed rack members mounted on one of the members, one of said members having a curved slot therein of two different widths and ending with a narrow section, and a wider curved slot, while the other has a slot corresponding with the wider curved slot of the other member, a movable section having a curved arm intermediate the members adapted to be moved in and out of said first section along the slots thereof, a pinion mounted on the arm for engaging said rack members, and locking means preventing the curved arm from being separated from the first section.

2. A concealable hinge comprising a box-shaped section having a pair of opposed vertical and a front wall, a pair of horizontal plates disposed in the section parallel to each other, said front wall having an opening intermediate the plates extending crosswise of the section and another reduced opening perpendicularly disposed to said first opening, the upper plate having a curved groove therein and a pair of oppositely disposed rack members thereon, while the lower plate has a corresponding groove and an adjacent curved groove, a movable section having a curved arm with a pintle adapted to fit in the corresponding grooves of the plates and a pinion on the pintle for engaging the rack members and a guide at the end of the arm for sliding in the adjacent groove, and actuable locking means for the perpendicular opening for retaining the arm in swingable connection with the first section.

3. A concealable hinge for use on swingable

doors and the like, comprising a box-like section having a pair of spaced horizontal plates therein, said section having an opening therein, pivotal means in connection with the section for closing said opening, one of said plates having a curved groove therein and a plurality of oppositely disposed rack members thereon, while the other plate has a corresponding groove and another curved guide groove, and a removable section provided with a curved arm having a pintle adapted to fit and slide in the corresponding curved grooves of the plates, a guide member adapted to fit and slide in the guide groove, and a pinion on said pintle for engaging said rack members upon the operation of the hinge.

4. A concealable hinge for use on swingable doors and the like, comprising a box-like section having a pair of opposed vertical walls adapted for attachment to a door frame, and a front exposed wall with an opening therein, a pair of spaced horizontal plates, the upper plate having a curved groove containing a restricted portion in connection with the opening in the front wall and an enlarged portion, a pair of oppositely disposed rack members mounted on the upper plate, while said lower plate has an enlarged groove portion corresponding with and parallel to that of the upper plate, and a curved groove in the lower plate disposed laterally of the enlarged portion, means pivoted to the front wall for covering the opening thereof, pivotal means inside the front wall for locking said first means, and a movable section having a curved arm adapted to fit intermediate the plates, said arm having a pintle adapted to move in the grooved openings and a pinion for engagement with the rack members, and a guide member adapted to slide in the curved groove in the lower plate.

5. A hinge according to claim 4, in which the covering means for the opening has upwardly extending spaced lug portions forming a groove for accommodating the pivotal locking means.

6. A hinge according to claim 4 in which a reinforcing plate member is provided for the top horizontal plate having an outline adapted to abut the edge of the curved groove to retain the pintle of the curved arm in relatively vertical position.

7. A hinge comprising a box-shaped section having a pair of horizontal walls, the upper wall having a curved slot therein ending in a narrowed outwardly extending portion, the lower wall having a plurality of slots one of which is disposed below the slot of the upper wall and substantially corresponding therewith and the other is curved and disposed adjacent said first slot, a plurality of rack members on the top wall diagonally disposed toward each other, a movable section having a curved arm adapted to travel intermediate said walls along the slots thereof, a pinion mounted in the arm adapted to engage the rack members when the arm is in operation, a guide member at the end of the arm adapted to slide in the adjacent groove in the lower wall, and locking means intermediate the horizontal walls preventing the curved arm from being separated from the first section.

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