United States Patent

Zoltok

[15] **3,665,645**

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[54] DOOR ASSEMBLY FOR BAGGAGE COMPARTMENTS AND THE LIKE

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[52] **U.S. Cl.** **49/248,** 49/394

[51] **Int. Cl.** **E05d 15/00**

[58] **Field of Search** 49/246, 248, 276, 394

[56] **References Cited**

UNITED STATES PATENTS

2,601,983	7/1952	Schoelkopf	49/276
2,794,511	6/1957	Mackie	49/248
3,085,297	4/1963	Linderfelt	49/276 X
3,440,762	4/1969	Olsson	49/276 X

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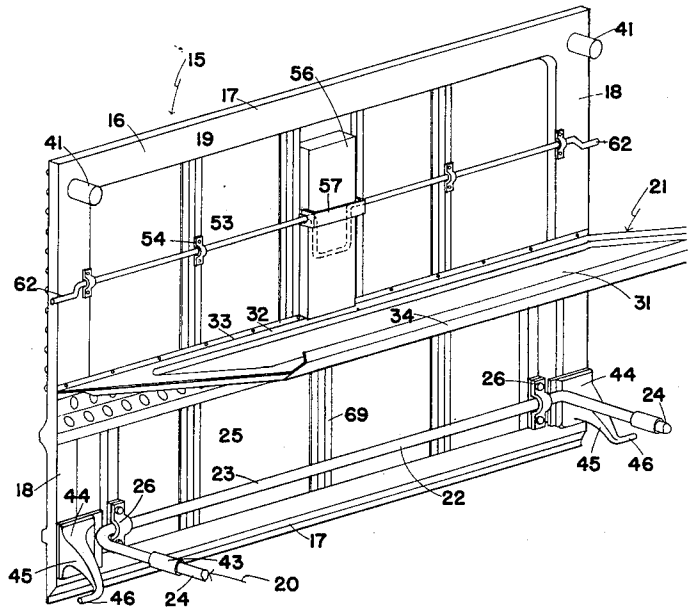
[57] **ABSTRACT**

A planar door is held by a pantograph linkage and when it is closed, the lower catch engages and then the upper catch which pulls the door into a sealed relationship with the frame by an over center action.

19 Claims, 7 Drawing Figures



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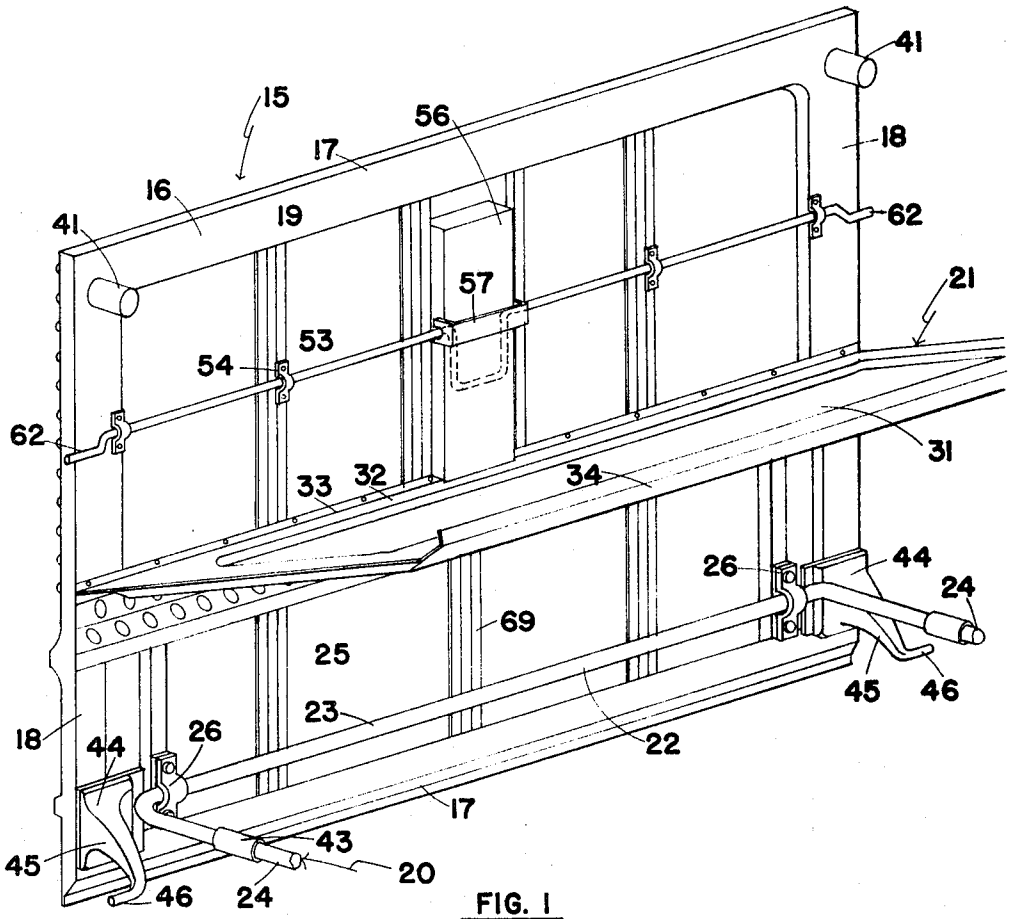

FIG. 1

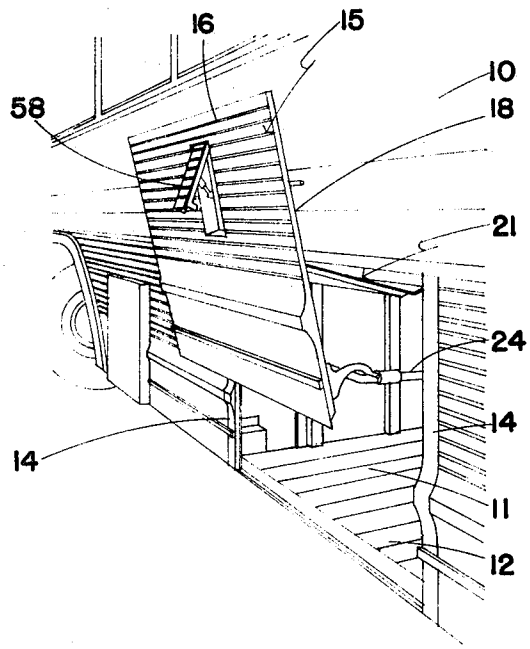

FIG. 5

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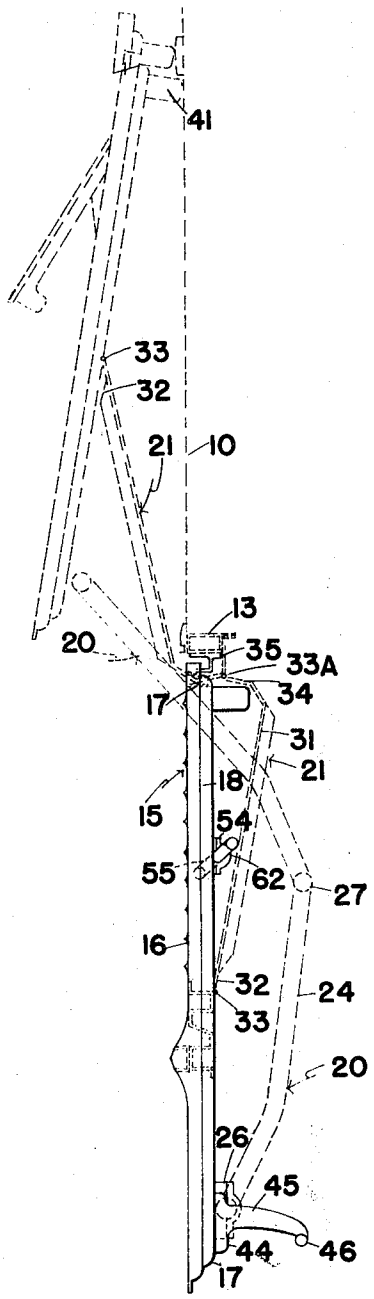

FIG. 2

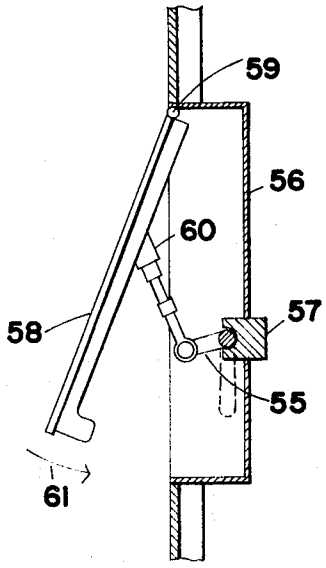

FIG. 6

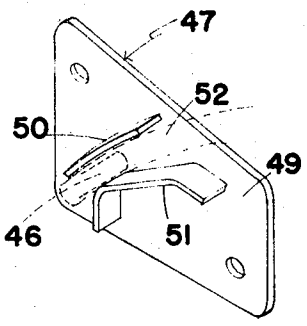

FIG. 7

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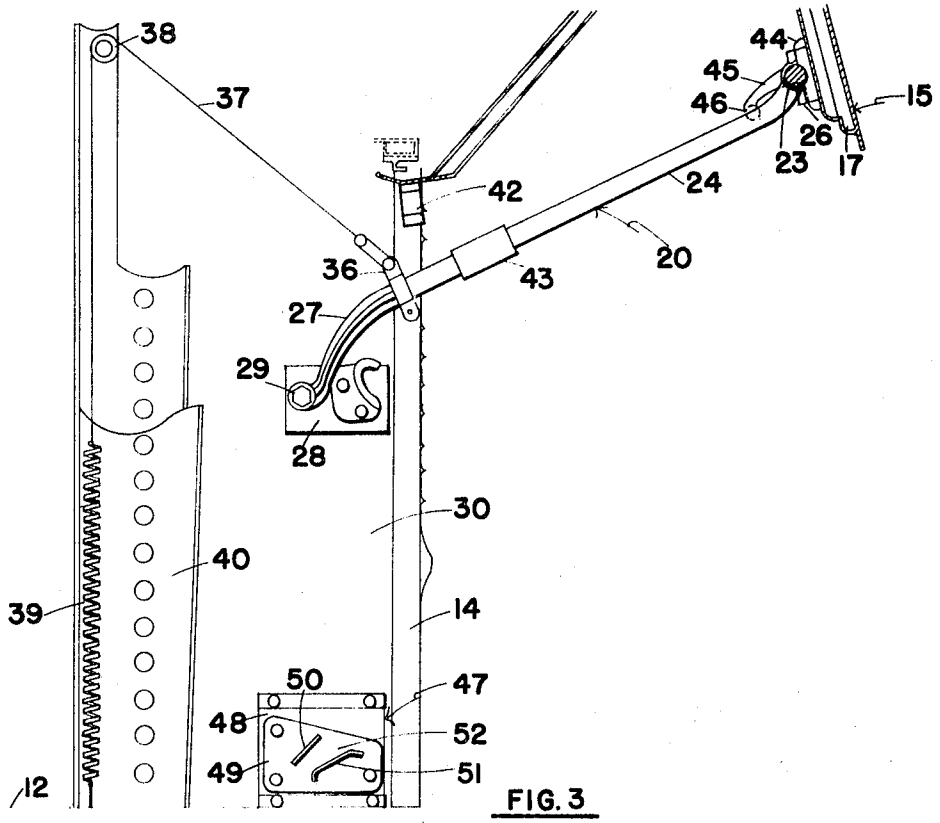

FIG. 3

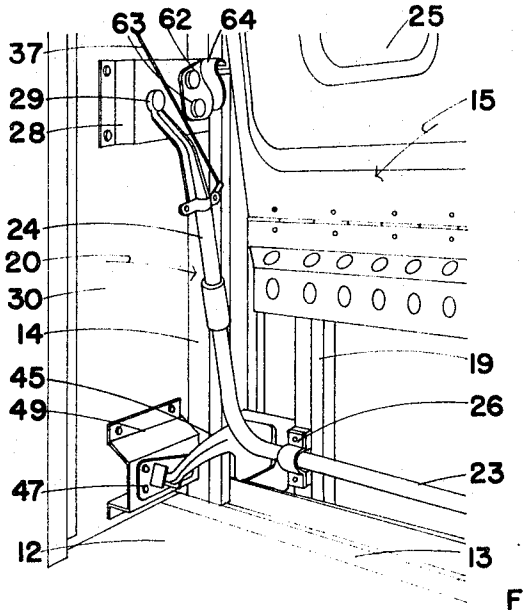

FIG. 4

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DOOR ASSEMBLY FOR BAGGAGE COMPARTMENTS AND THE LIKE

This invention relates to new and useful improvements in door assemblies specifically designed for baggage compartments of motor coaches and the like. However, it will be appreciated that this door assembly can be used on any form of compartment which requires a relatively large door to be opened, and closed in the minimum of space and yet at the same time close in a sealed relationship with the frame surrounding same.

Although the specification and drawings of this application illustrate a baggage compartment of a motor coach, nevertheless it can be adapted for use for aircraft baggage compartments, or any form of baggage compartment utilizing a substantially rectangular door.

In such environments as motor coaches and the like, a fairly large baggage compartment is required in order to store baggage, mail, express and the like normally transported by the motor coach in conjunction with passenger service.

Ready access is desired so that it is normal to make the access door or baggage door relatively large. However, this poses a problem of requiring sufficient space to open the door if it is hinged at the upper edge in the normal manner. Furthermore, such doors are difficult to seal against the ingress of dust and moisture.

The present invention utilizes a pantograph linkage mounting the door panel which enables it to be opened to the full extent without extending beyond the confines of the outer panel of the vehicle to any great extent.

Furthermore, the arrangement of upper and lower latches, permits the door to be pulled into sealing engagement with the frame when closed, by simple over center action incorporated in the operating handle of the door panel.

Another advantage of the present invention resides in the fact that very little usable baggage compartment space is taken up by the mechanism involved in the opening and closing and mounting of the door panel.

A yet further object of the invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture, and otherwise well suited to the purpose for which it is designed.

With the considerations and inventive objects herein set forth in view, and such other or further purposes, advantages or novel features as may become apparent from consideration of this disclosure and specification, the present invention consists of the inventive concept which is comprised, embodied, embraced, or included in the method, process, construction, composition, arrangement or combination of parts, or new use of any of the foregoing, herein exemplified in one or more specific embodiments of such concept, reference being had to the accompanying figures in which:

FIG. 1 is an isometric view of the inside of the door panel showing the upper and lower latching mechanisms.

FIG. 2 is a side elevation of the door panel shown in full line in the closed position, and in phantom, in the open position.

FIG. 3 is a fragmentary partially isometric view of one side of the baggage compartment showing the door in the open position.

FIG. 4 is a view similar to FIG. 3, but showing the door in the closed position.

FIG. 5 is a partial isometric view of the exterior of a vehicle with the door in the opened position.

FIG. 6 is a fragmentary enlarged view sectioned in part of the operating mechanism.

FIG. 7 is an enlarged isometric view of the lower latch receiving plate and ramps.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding therefore to describe the invention in detail, reference character **10** shows the outer surface of a vehicle such as a motor coach having a baggage compartment **11** formed therein. This baggage compartment includes the lower frame **12**, upper frame **13** and side frame members **14** all of which define a rectangular opening within the side **10** of the vehicle as clearly shown in FIG. **5**.

The door assembly collectively designated **15** consists of a substantially rectangular planar panel **16** manufactured from aluminum or the like and including upper and lower horizontal members **17** and side members **18** together with reinforcing members **19** which are conventional in the construction of such assemblies.

Means are provided to mount this door within the compartment frame, said means taking the form of a lower hinge arm mechanism collectively designated **20** and an upper hinge mechanism collectively designated **21**.

The lower hinge arm mechanism includes a U-shaped rod or tube **22** including the main portion **23** and a pair of arms **24** extending outwardly at right angles from the ends of the main portion **23**. Of course, it will be appreciated that this particular assembly could be formed in two parts, if desired.

The U-shaped portion **22** is mounted to the inside **25** of the door panel **16** by means of bearing blocks **26** engaging around the portion **23** and being secured to two convenient vertical supports **19** so that this portion can rotate within limits as clearly shown in FIG. **1**.

The inner ends **27** of the portions **24** are pivotally secured to support plates **28** by means of pivot pins **29**, said plates **28** being secured to the sides **30** of the compartment one upon each side thereof.

The upper hinge mechanism takes the form of a substantially rectangular panel **31** secured by longitudinal edge **32** to the inside of the door panel **16** by means of a piano-type hinge **33**, and by the other longitudinal edge **34**, to a bracket **35** on the upper frame member **13** of the compartment, also by means of a piano-type hinge **33A**.

The mounting of the door panel **16** by means of the upper hinge mechanism **21** and the lower hinge mechanism **20** forms a type of mounting for the door so that it can be moved from an upper position shown in phantom in FIG. **2** to a closed position shown in full line also in FIG. **2** with the door panel moving substantially parallel with the side **10** of the vehicle. In other words, the door does not hinge outwardly by one edge as is usual so that the door can be opened and closed within the minimum of space.

Reference to FIG. **3** will show a bracket **36** attached to the portion **24** of the lower hinge mechanism **20**, adjacent the end **27** thereof. A flexible steel cable **37** is secured by one end thereof to this bracket and extends upwardly and inwardly within the compartment, over a sheave **38** and then downwardly to be secured to one end of a relatively heavy-duty tension spring **39** anchored by the other end thereof to the base of the compartment. A shield **40** covers the tension spring, a portion of the cable and the sheave **38**, and these spring assemblies are mounted upon each side of the baggage compartment. The positioning of the cable and spring and the mounting thereof to the lower hinge mechanism **20** facilitates the opening and closing of the door panel inasmuch as the tension springs are in tension when the door is closed and assist in lifting the door to the uppermost position shown in phantom in FIG. **2**.

When in the upper position shown in phantom in FIG. **2**, bumpers **41**, situated adjacent the upper inside corner of the door panel, engage the side **10** of the vehicle and prevent damage occurring. Means are also provided to hold the door in the open position shown in phantom and take the form of a resilient clip **42** situated externally of the vehicle one upon each side of the baggage compartment and adjacent the upper frame member **13** thereof. The portions **24** of the lower hinge mechanism **20** engage within the resilient clips as shown in FIG. **3**, when the door is in the uppermost position and a nylon sleeve **43** is provided around the arms **24** where they engage the clips **42**.

Lower latch means are provided and take the form of latch members **44** secured to the inside of the door panel **16** adjacent the lower corners thereof. These latch members are in the form of a casting with an offstanding arm **45** formed thereon. The ends **46** of these arms are in turn extended or offset at right angles so that they lie parallel with the plane of the door panel.

Lower latch engaging means collectively designated 47 take the form of brackets 48 secured to the sides of the baggage compartment adjacent the lower front corners thereof. A plate 49 is secured to bracket 48 and this plate is provided with an upper curved ramp 50 and a lower curved ramp 51 spaced from the upper ramp 50. These ramps define a channel or pathway 52 therebetween which inclines inwardly and downwardly from the outside of the baggage compartment.

When the door is moved to the closed position, the horns 46 of the lower latch means 44 engage between ramps 50 and 51 and terminate substantially in the position shown in phantom in FIG. 7. When in this position, the door is inclining upwardly and outwardly of the baggage compartment from the lower edge thereof with the upper edge just spaced away from the upper frame member of the baggage compartment.

Upper latch means take the form of an elongated rod 53 bearably supported in a horizontal position by bearing blocks 54, upon the inside of the panel 16 above the lower latch means 20 and above the upper hinge mechanism 21.

This rod is provided with an offset crank portion intermediate the ends thereof shown in FIG. 6 and identified by reference character 55. A casing 56 secured to the inside of the door panel 16 includes a bearing 57 which assists in mounting the rod 53 which passes through the casing at the point containing the offset crank portion 55.

A hinged plate 58 is situated externally of the door panel 16 and is hinged by the upper edge thereof to the door panel as indicated by reference character 59 and linkage 60 extends between plate 58 and the offset crank portion 55 of the rod 53. When in the open position shown in FIG. 6, the hinged plate is away from the door panel, but when in the closed position, after having moved in the direction of arrow 61, it lies flush with the door panel. Moving the hinged plate between the open and closed position, partially rotates rod 53 due to the offset crank portion 55. Cranked ends 62 are formed on each end of rod 53 and are at a different angle to the offset crank 55 so that movement of rod 53 from the open position to the closed position rotates these cranked ends from the position shown in FIG. 1 to a position substantially at right angles thereto. Upper latch engaging means are provided upon each side of the baggage compartment adjacent the pivotal connection 29 of the arm portions 24. The latch engaging means take the form of a plate 63 having a pocket extending therefrom which inclines upwardly and inwardly within the baggage compartment and receives the cranked ends 62 of the upper latch means rod 53.

When the lower horns 46 are engaged between ramps 50 and 51 as aforesaid, pressure upon the upper side of the door causes the cranked ends 62 to enter the pockets 64 whereupon pressure on hinged plate 58 moves it to the flush position and rotates rod 53 thus forcing the cranked ends 62 upwardly and inwardly within the ramp pockets or cammed pockets 64 which draws the door panel into sealing engagement with the frame defining the baggage compartment opening. Normal resilient seals (not illustrated) are of course provided.

In summarizing, the lower latch means engages between the ramps 50 and 51 which acts as a pivot to enable the upper part of the door to be closed firmly and then pulled into sealing engagement by the ramping action of the sleeves 64 when the hinged plate is pushed flat with the surface of the door panel.

Various modifications can be made within the scope of the inventive concept which is herein disclosed and/or claimed.

What I claim as my invention is:

1. A door assembly for baggage compartments and the like in which the door opening is defined by upper, lower and side edges of frame of said compartment; comprising in combination a door panel, a lower hinge arm mechanism pivotally secured to the inside of said door panel adjacent the lower side thereof and to the compartment frame, an upper hinge mechanism pivotally secured to the inside of said door panel above said lower hinge mechanism and to the compartment frame, lower latch means on said door panel, lower latch engaging means on said compartment frame, upper latch means on said door panel, upper latch engaging means on said compartment frame, and means on said door panel to rotate said upper latch means in said upper latch engaging means to pull said door into sealing relationship with said compartment frame.

2. The assembly according the claim 1 which includes a tension spring assembly extending between said lower hinge arm mechanism and said compartment frame and positioned to assist in the opening of said door assembly, said spring assembly being in tension when said door assembly is closed.

3. The assembly according to claim 1 in which said lower hinge arm mechanism includes an angulated member and each side of said door panel, means on the inside of said door panel to bearably support one end of said angulated member for pivotal movement, the other end of said angulated member extending at right angles to the plane of said door panel and being pivotally secured to the frame of said compartment.

4. The assembly according to claim 2 in which said lower hinge arm mechanism includes an angulated member and each side of said door panel, means on the inside of said door panel to bearably support one end of said angulated member for pivotal movement, the other end of said angulated member extending at right angles to the plane of said door panel and being pivotally secured to the frame of said compartment.

5. The assembly according to claim 1 in which said upper hinge mechanism comprises a substantially rectangular panel pivotally secured by one longitudinal edge thereof to the inside of said door panel above said lower hinge arm mechanism, and by the other longitudinal edge thereof to said compartment frame.

6. The assembly according to claim 2 in which said upper hinge mechanism comprises a substantially rectangular panel pivotally secured by one longitudinal edge thereof to the inside of said door panel above said lower hinge arm mechanism, and by the other longitudinal edge thereof to said compartment frame.

7. The assembly according to claim 3 in which said upper hinge mechanism comprises a substantially rectangular panel pivotally secured by one longitudinal edge thereof to the inside of said door panel above said lower hinge arm mechanism, and by the other longitudinal edge thereof to said compartment frame.

8. The assembly according to claim 4 in which said upper hinge mechanism comprises a substantially rectangular panel pivotally secured by one longitudinal edge thereof to the inside of said door panel above said lower hinge arm mechanism, and by the other longitudinal edge thereof to said compartment frame.

9. The assembly according to claim 1 in which said upper latch means comprises an elongated rod, means to bearably support said rod upon the inside of said door panel, an offset crank portion intermediate the ends thereof, a cranked end on each end of said rod, said means in said door to rotate said upper latch means including a hinged plate externally of said door panel and being hingedly secured thereto by one edge thereof, and linkage means extending between said hinge plate and said offset crank portion whereby said elongated rod is partially rotated when said hinged plate moves from an open unlatched position to a closed latching position.

10. The assembly according to claim 1 in which said lower latch means includes a latch member, an offstanding horn on said latch member, said lower latch engaging means including a support plate secured to the side of said compartment frame, a curved lower ramp on said plate, and a curved upper ramp on said plate spaced from said lower ramp, said horn engaging between said ramps.

11. The assembly according to claim 3 in which said upper latch means comprises an elongated rod, means to bearably support said rod upon the inside of said door panel, an offset crank portion intermediate the ends thereof, a cranked end on each end of said rod, said means in said door to rotate said upper latch means including a hinged plate externally of said door panel and being hingedly secured thereto by one edge

thereof, and linkage means extending between said hinge plate and said offset crank portion whereby said elongated rod is partially rotated when said hinged plate moves from an open unlatched position to a closed latching position.

12. The assembly according to claim 5 in which said upper latch means comprises an elongated rod, means to bearably support said rod upon the inside of said door panel, an offset crank portion intermediate the ends thereof, a cranked end on each end of said rod, said means in said door to rotate said upper latch means including a hinged plate externally of said door panel and being hingedly secured thereto by one edge thereof, and linkage means extending between said hinge plate and said offset crank portion whereby said elongated rod is partially rotated when said hinged plate moves from an open unlatched position to a closed latching position.

13. The assembly according to claim 11 in which said lower latch means includes a latch member, an offstanding horn on said latch member, said lower latch engaging means including a support plate secured to the side of said compartment frame, a curved lower ramp on said plate, and a curved upper ramp on said plate spaced from said lower ramp, said horn engaging between said ramps.

14. The assembly according to claim 12 in which said lower latch means includes a latch member, an offstanding horn on said latch member, said lower latch engaging means including a support plate secured to the side of said compartment frame, a curved lower ramp on said plate, and a curved upper ramp on said plate spaced from said lower ramp, said horn engaging between said ramps.

15. The assembly according to claim 9 in which said upper latch receiving means includes a bracket secured to the side of said compartment frame, and a cranked end receiving pocket on said bracket inclining upwardly and inwardly from the front of said compartment.

16. The assembly according to claim 3 in which is included clip means externally of said compartment detachably engageable by said other end of said angulated member when said door is open to hold said door in said opened position.

17. The assembly according to claim 4 in which is included clip means externally of said compartment detachably engageable by said other end of said angulated member when said door is open to hold said door in said opened position.

18. The assembly according to claim 7 in which is included clip means externally of said compartment detachably engageable by said other end of said angulated member when said door is open to hold said door in said opened position.

19. The assembly according to claim 11 in which is included clip means externally of said compartment detachably engageable by said other end of said angulated member when said door is open to hold said door in said opened position.

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