

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**

**6 October 2015, Tuesday  
1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100



**INSTRUCTIONS TO CANDIDATES**

1. This Paper consists of 12 pages, including this cover page.
2. Type/Write your answers in English. Answers in any other language will not be marked.  
For candidates who opted out from laptop examination: Answers in illegible handwriting will not be taken into consideration.
3. One hardcopy of the question paper is provided, for your reading and for your use (optional) when answering the question(s) in the Answer Script/Answer Booklet(s). For candidates who opted out from laptop examination: You are given two hardcopies of the question paper.
4. Only your answers and/or drawings to the question(s) typed/written or indicated/glued in the Answer Script/Answer Booklet(s) provided by the Examination Secretariat will be considered. Candidates should not change the format of the Answer Script or type in the margin. For candidates who opted out from laptop examination: You are to write on one side of each sheet in the Answer Booklet(s).
5. Information provided in the question(s) may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the paper. Assume also that the prior art given is exhaustive.
6. The documents provided in this question are:
  - a. Details of Meeting and Client's Write-Up (1 page);
  - b. Document A (6 pages including drawings); and
  - c. Document B – Prior Art (4 pages).

End

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**Details of Meeting and Client's Write-Up (1/1)**

Your client, Grace, has a new invention which she wishes to discuss with you.

5

Grace explains that she was on a recent flight travelling in economy class. During the meal break having had the food tray delivered to her, decided she would like to read while eating. She had a novel in her bag at her feet tucked securely beneath the seat in front of her. However, she was not able to access her bag because of the tray table being extended to support the food tray. This was particularly frustrating for Grace and she spent the rest of the flight thinking of ways to overcome the problem.

10

Grace has now developed two prototype designs which she would like to include in a single patent application. Grace has given you an invention disclosure including a description of the invention including both embodiments as well as figures. These are included and labeled Document A.

15

During Grace's investigation, along with the conventional tray table arrangement shown in Figures 1A to 1D, she has also found Document B, being a hinged tray table, which she has seen on several flights. She wonders whether a simple modification of the tray table in Document B might achieve the same result as her new invention but has never seen such a modification and hadn't considered this type of tray table when she was developing her embodiments.

20

Grace wants you to prepare and file a patent application for her invention. Given her budget constraints, Grace would prefer to have no more than 8 claims. With two embodiments, you explain to Grace about unity of invention and divisional applications, to which she gets very cross and insists she wants one patent to cover her whole invention.

25

Whilst she is only interested in selling actual products, Grace believes protecting the method of assembly could help secure longer commercial protection. She instructs you that a single method claim should be sufficient.

30

Please draft a patent specification for Grace's invention in light of the identified prior art mentioned by Grace.

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**5 Description of Prior Art and New Embodiments**

Figures 1A to 1D show the conventional tray top table 8 that I experienced on my flight.

10 Here we have a conventional seat 2 with a front 4 and a rear 6. A tray table 8 resides in a retracted position within a recess 14 of the rear 6. The tray table 8 is mounted to a frame 10. The tray table 8 is connected to the frame 10, and arranged to move in a first direction 7 from the retracted position within recess 14 to an extended position 12.

15 When in an extended position 12 the tray table is arranged to receive a tray of food or a laptop, etc.

Figures 2A and 2B show an improved version of the tray table. For clarity most of the frame supporting the tray table has been removed with one section 16 showing how the tray table  
20 connects to that frame. I intend to use the same type of frame to move the new tray table from a retracted position to the extended position 20, and so in that respect it will work in the same way as the prior art.

Figure 2A is a plan view of the tray table 18 connected to the frame. For clarity only a side  
25 support 16 and a cross member 24 of the frame are shown. In the position shown in Figure 2A the tray table 18 is in the extended position 20, having already moved along a first direction 7 from the retracted position. In the extended position 20, the tray table 18 is ready to receive a food tray or laptop.

30 Figure 2B however shows the tray table 18 selectively moved 30 from the extended position 20 to a position laterally displaced 22 at right angles. It is absolutely essential for my invention that the tray table 18 is connected to the frame through a mutually engageable slide 26, 28 as shown in Section A-A.

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**Document A (2/6)**

5 Thus, once the tray table has been extended the tray table 18 can move from the extended position 20 to the laterally displaced position 22 through a sliding engagement with the frame.

In the laterally displaced position, the tray table remains sufficiently supported to temporarily hold a food tray and so allow the passenger to reach forward.

10

This embodiment also allows for the tray table to slide in both directions (not shown) and so applicable wherever an accommodating fellow passenger may sit, or allow the tray table to extend into the aisle regardless of which side of the aisle the passenger may be sitting.

15 Assembly is quite easy, with the slide block 27 screwing into the cross member 24 using exactly 4 screws. I am sure there is no other way of mounting this.

Also, for a smoother sliding action, a roller bearing (not shown) may provide a smoother sliding action rather than the slide engagement of Figure 2B. A lock used to lock the table in the  
20 extended position and another to lock in the laterally displaced position may also be useful to accommodate for turbulence.

Figures 3A to 3C show a further embodiment of the present invention. In this view, the tray table 32 has already moved along the first direction 7 from the retracted position to the extended  
25 position.

The tray table 32 is connected to various portions of the frame 34, 36, 40, 44. The tray table is mounted to the frame by connecting the two halves of a hinge 42, then threading a hinge pin to connect the two halves together.

30

Detail C shows how one side of the tray table 32 connects to the frame 44 through a projection 52 fitting into a recess 50 to support the left side of the tray table 32. This projection must snap fit into the recess. It may also have a lock (not shown) for securing it in place.

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**Document A (3/6)**

5 As shown in the plan view of Figure 3A, it is absolutely essential for the right side of the tray table 32 to be supported by an arm 40 of the frame which is connected to the tray table through the hinge 42. Of course, the alternative arrangement having the hinge on the opposite side will also fall within the scope of the invention.

10 Figures 3B and 3C are elevation views of this embodiment whereby the tray table 32, after disengaging the projection 52, pivots 54 about the hinge 42 so as to move from the extended position 46 to the laterally displaced position 48 at right angles as shown in Figure 3C.

As with the first embodiment, a lock to hold the tray table in the laterally displaced position may  
15 be useful.

In this laterally displaced position, the food tray may rest on the inverted side of the tray table.

This embodiment is much better than the first embodiment because I don't think anyone will buy  
20 the sliding version. The pivoting version has an advantage over the first embodiment through providing a more stable lateral position for supporting the food tray, but is limited in only being able to move the table to one lateral position. Nevertheless, I am keen to protect both and let the market decide which is preferable.

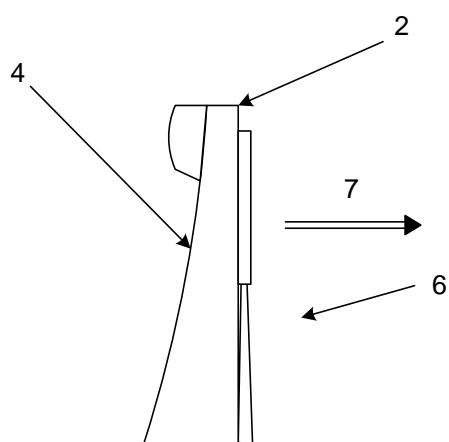
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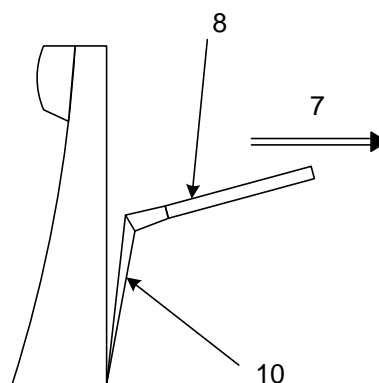
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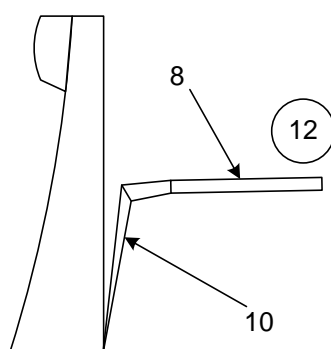
**Document A (4/6)**



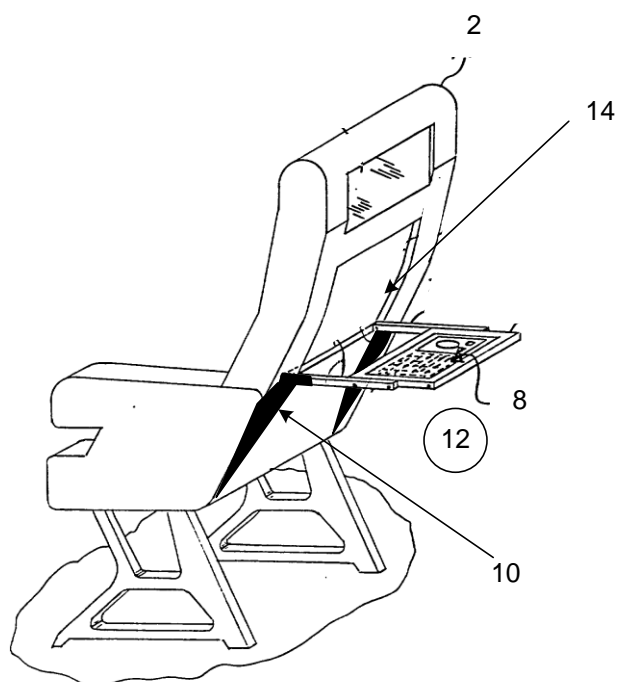
**Figure 1A  
(Prior Art)**



**Figure 1B  
(Prior Art)**



**Figure 1C  
(Prior Art)**



**Figure 1D  
(Prior Art)**

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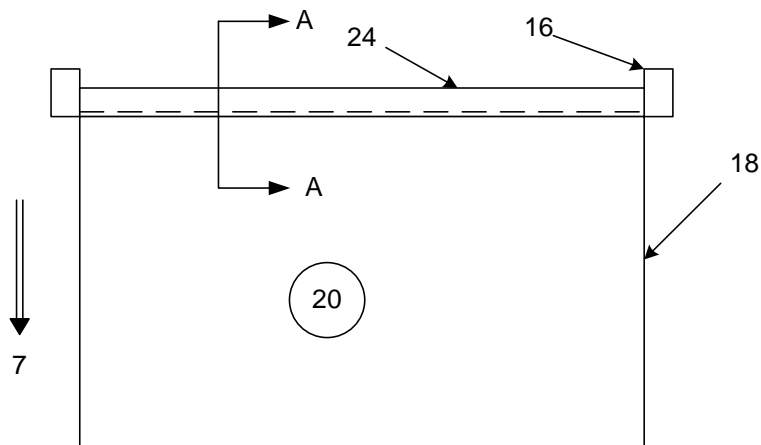
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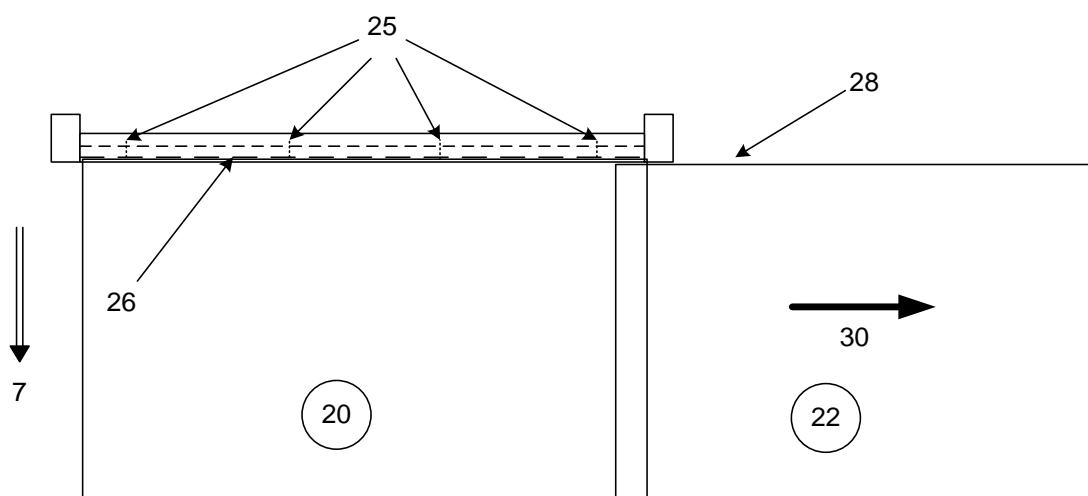
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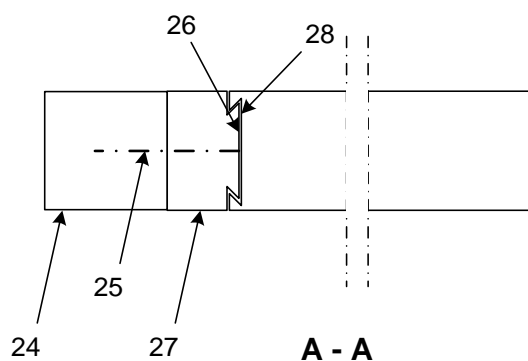
**Document A (5/6)**



**Figure 2A**



**Figure 2B**



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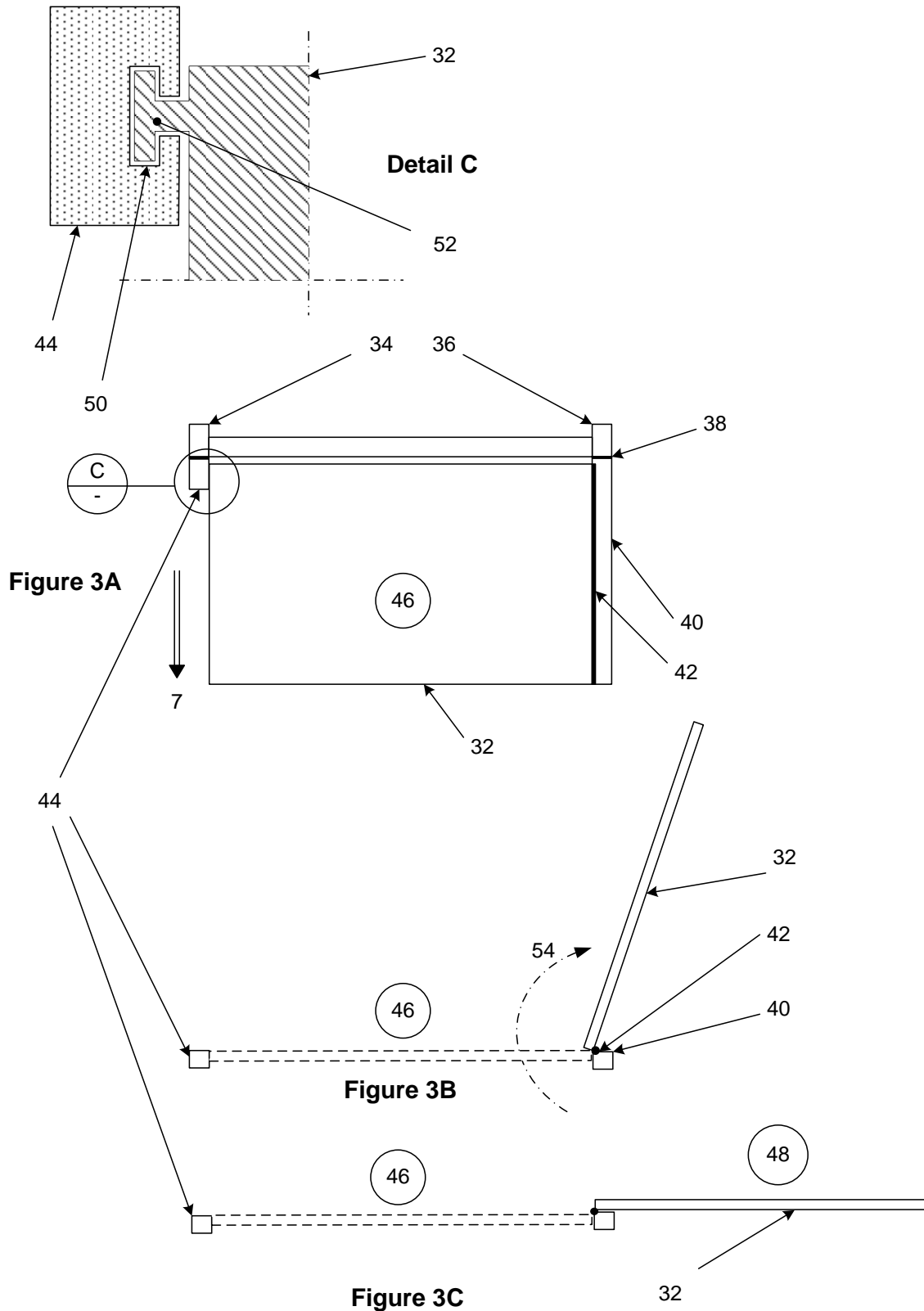
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**Document B – Prior Art (1/4)**

**United States Patent** [19]  
**Brennan**

[11] **3,773,381**  
[45] **Nov. 20, 1973**

[54] **COMPACT TRAY TABLE**

2,597,330 5/1952 Huddleston..... 108/45

[75] Inventor: **Edward J. Brennan**, Litchfield,  
Conn.

*Primary Examiner*—James T. McCall  
*Attorney*—James R. Hoatson, Jr. et al.

[73] Assignee: **Universal Oil Products Company**,  
Des Plaines, Ill.

[22] Filed: **May 8, 1972**

[21] Appl. No.: **251,309**

[52] U.S. Cl..... 297/191, 297/163, 108/45

[51] Int. Cl..... A47c 7/62

[58] Field of Search..... 297/191, 163, 164,  
297/165, 166, 167, 168, 169; 108/45, 42, 48,  
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[56] **References Cited**

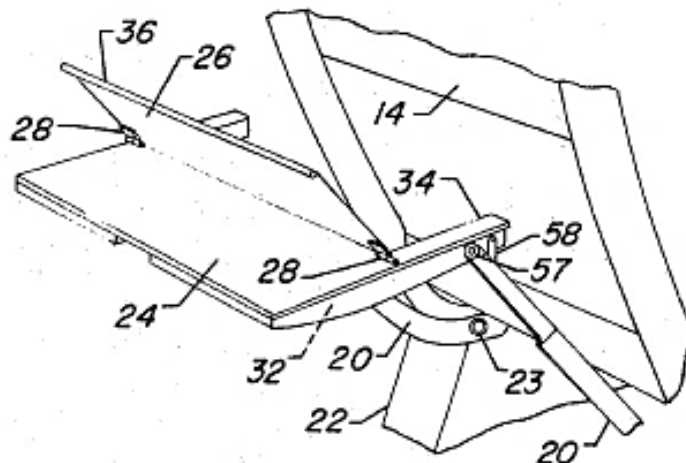
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[57] **ABSTRACT**

Seat back tray table is pivotally mounted to the frame of a seat, and preferably an aircraft passenger seat, so as to be stowable in a recess in the back of the seat but easily movable to a horizontal use position. The table is formed in two hinged sections including an outer thicker section which is fixed to a pair of side support frame members and an inner thinner section which can be pivoted 180° toward the seat back to be supported by the side support frame members in their horizontal use position. The compact table provides more passenger knee room than non-folding prior art tray tables and also permits the table assembly to be of less weight since the pivoted portion of the table would not be expected to receive the loading applied to the fixed table portion which is more accessible to a seat occupant.

**4 Claims, 5 Drawing Figures**



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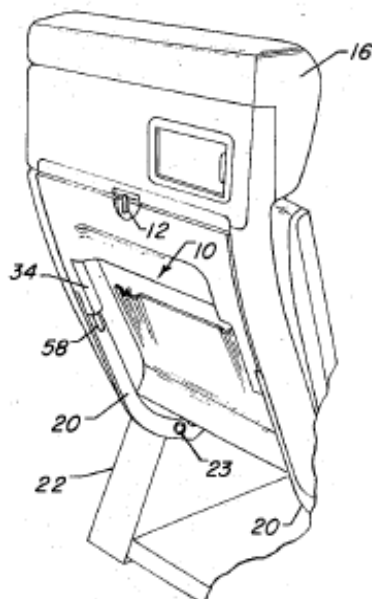
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**Document B – Prior Art (2/4)**

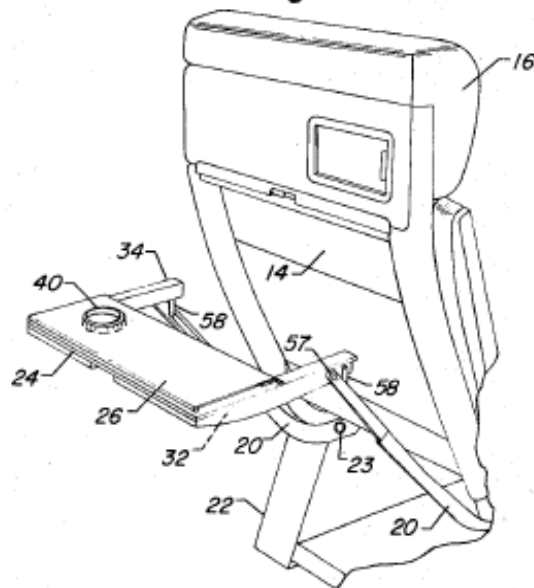
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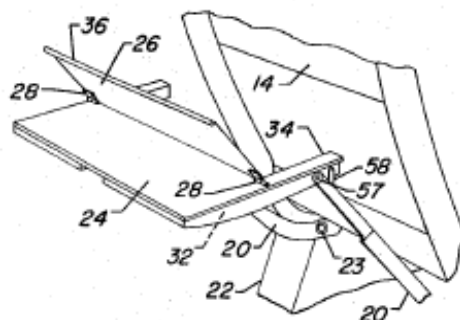
**Figure 1**



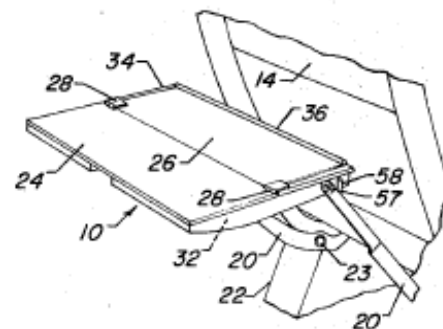
**Figure 2**



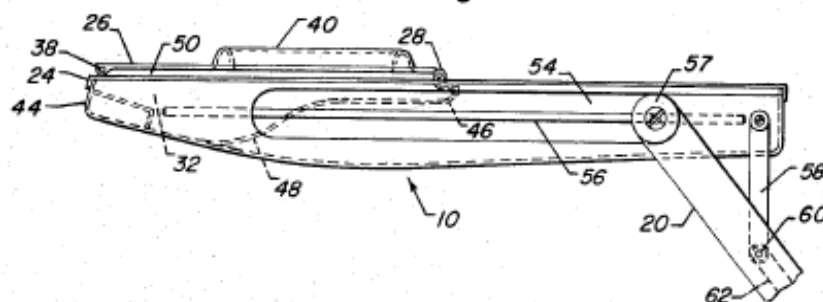
**Figure 3**



**Figure 4**



**Figure 5**



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**COMPACT TRAY TABLE**

**BACKGROUND OF THE INVENTION**

This invention relates to seat mounted tables and particularly to pivoted tables which are stowable in a recess in the back of an aircraft passenger seat and movable outwardly to a horizontal position where they may be used by a passenger in the seat immediately to the rear to support a food tray. Although tray tables are in universal use, they are generally of such a depth that they must necessarily restrict a seat occupant's knee room or interfere with the use of the seat back pocket. A folding tray table in association with an aircraft seat wherein a relatively narrow width table extension portion pivots upwardly and outwardly toward a user is known, but presents certain problems in that the hinges must prevent the extension from assuming a use position in other than the plane of the fixed portion of the table. The extension and hinges must also be sufficiently strong to bear the sometimes very substantial weight applied to it by a passenger.

**SUMMARY**

It is an object of this invention to provide a tray table which may be stored in a very small area of the back of a seat, thereby providing additional knee room between a passenger and the seat in front of him and also making more of the area of the rear of the seat available for other uses.

It is an additional object of this invention to provide a folding compact tray table which is light in weight, strong and rigid.

These and other objects are attained by the tray table of the present invention which comprises a pair of table surface members which are pivoted to each other so that when the table is pulled outwardly from its storage position in a seat back into a horizontal position, the table halves will be stacked over one another with their hinges facing the seat back. The upper movable half can then be lifted and pivoted 180° to a position away from the user where its surface is in a common plane with the lower fixed half. Elongated support arms, which are horizontal when the table is in its use position, are fixed to the sides of the lower table half and attached by a pivot linkage to a pair of pivoted support legs which are attached to the lower frame of the seat so as to be unaffected by movement of the seat back to a reclining position.

Since the improved folded tray table takes up only one half the space in a seat back required by a conventional table, the seat back storage pocket will be quite accessible. Also, should the seat be equipped with seat and back cushions which can be moved from their normal position when not occupied so that an occupant in the seat to the rear can place his feet through the rear of the seat, there will be ample room below the stored tray table for the occupant's feet.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view showing the improved tray table in its storage position in a seat back;

FIG. 2 is a perspective view showing the improved tray table in a horizontal position before it is unfolded;

FIG. 3 is a perspective view showing the improved tray table in an intermediate partially unfolded position;

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FIG. 4 is a perspective view showing the improved tray table in a horizontal use position; and

FIG. 5 is a side edge plan view of the improved tray table.

**DESCRIPTION OF THE PREFERRED EMBODIMENT**

The improved tray table indicated generally at 10 is movable from the storage position shown in FIG. 1, through the intermediate positions shown in FIGS. 2 and 3, to the horizontal use position shown in FIG. 4. In its storage position, the table is retained by a latch member 12 in a recess 14 in the back of a seat 16 such as an aircraft passenger seat. The table 10 is supported for pivotal movement between its storage and use positions by a pair of legs 20. Legs 20 are pivoted to the seat frame 22 on the same pivot axis 23 as the seat back so that reclining movement of the seat back will have no effect on the tray table in its use position (FIG. 4).

The table 10 has a rear portion 24 and a front portion 26 which is pivotally attached to it by hinges 28. The rear portion 24 is fixed at its sides to a pair of support arms 32 which include upper support surfaces 34 which support the forward table portion 26 when it is pivoted to its use position. Since most of the table loading, such as the weight of a passenger's arms, is carried by rear table portion 24, the movable forward portion 26 can be formed of a thin very light material such as plastic. To provide rigidity to the folding portion 26 along its unsupported outer longitudinal edge which bridges the distance between the side support surfaces 34, the edge may have a flange or rib 36 formed thereon. For additional strength, an elongated metal member 38 may be molded within the rib 36. If desired, a circular raised portion 40 may be formed on the bottom of the movable portion 26 so that a passenger could use the table in the folded position shown in FIG. 2 to hold a glass and perhaps a snack when the entire table surface was not needed for supporting a metal tray.

The construction of the table 10 can be seen in FIG. 5. The rear portion 24 of the table is quite thick at its outer edge 44 so as to provide greater strength where a passenger is likely to lean on it. The cross-section becomes thinner toward its inner edge 46 so as to provide a passenger with maximum knee room when the table is in its storage position. The rearward table portion 24 is preferably made of foamed in place or injection molded plastic with the lower portion 48 and the upper portion 50 being joined to each other at their peripheral edges by fusing. The lower portions 48 envelope the support arms 32 and cover some of the moving parts therein. The movable table portion 26 is preferably formed of injection molded plastic. Although the table support linkage forms no part of this invention it might be noted that the support arms 32 include an elongated slot 54 in which a rod 56 is mounted. End members 57 on the legs 20 are guided for sliding movement on the rods 56 when the table 10 is tilted upwardly to the same angle as legs 20 (FIG. 1). A pin 60 on the lower end of pivot link 58 is mounted for sliding movement in a slot 62 in the legs 20 as the support arms 32 are moved to their storage position. In FIG. 5, the link 58 is shown at the upper end of its slot 62 so as to form a rigid triangular linkage to support the table 10 in a horizontal position. As the table is moved to its FIG. 1 storage position, the slots 54 are aligned with the

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Document B – Prior Art (4/4)

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legs 20 and slide down over and cover a portion of the length of the legs equal to the length of slot 54.

I claim as my invention:

1. In a seat back tray table having a pair of support legs pivotally mounted at their lower end on a seat frame for limited movement into and out of a recess in the seat back and a pair of support arm members pivotally mounted at their inner ends to the upper ends of each of said support legs for movement from a storage position in a recess in the seat back to a generally horizontal use position, the improvement comprising a first elongated generally flat table portion attached at its ends to the outer end portions of said support arm members, a second elongated generally flat table portion hinged on its inner longitudinal edge to the inner longitudinal edge of said first table portion and adapted to be pivoted 180° forward between a storage position

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in overlying contact with said first table portion and a use position in overlying contact with the inner end portions of said pair of support arm members, the space between said support frame members which is covered by said second table portion during use being open when said second table portion is in its storage position.

2. The tray table of claim 1 wherein said first table portion is thicker than said second table portion.

3. The tray table of claim 1 wherein said hinge means for hinging said second table portion are mounted on said support frame members.

4. The tray table of claim 1 wherein said second table portion includes retaining means adapted to retain a glass when said table portions are horizontal and in overlying contact with each other.

\* \* \* \* \*

End