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Morris et al.

[11] **3,873,151**

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[54] **WALL MOUNTED FOLD DOWN SEAT**

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[52] **U.S. Cl.** **297/14,** 297/336

[51] **Int. Cl.** **A47c 1/126**

[58] **Field of Search** 297/14, 336, 335; 108/38, 108/48

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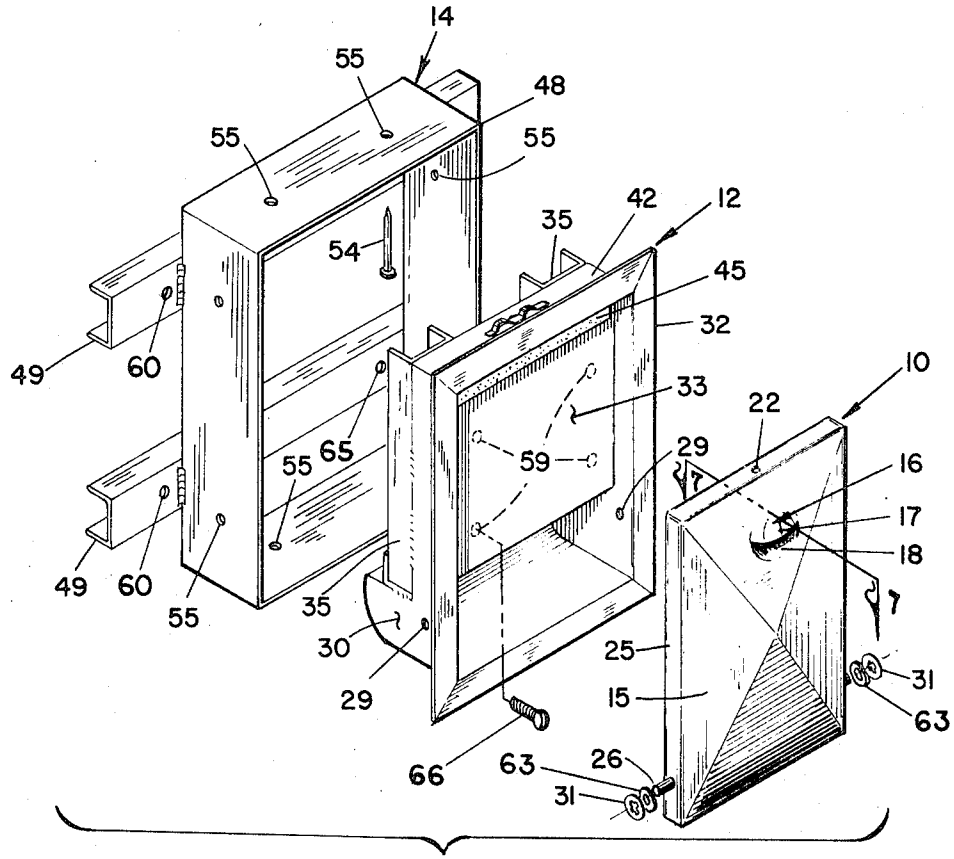
[57] **ABSTRACT**

A wall-hung, fold-down seat and seat stowage and support structure.

15 Claims, 9 Drawing Figures



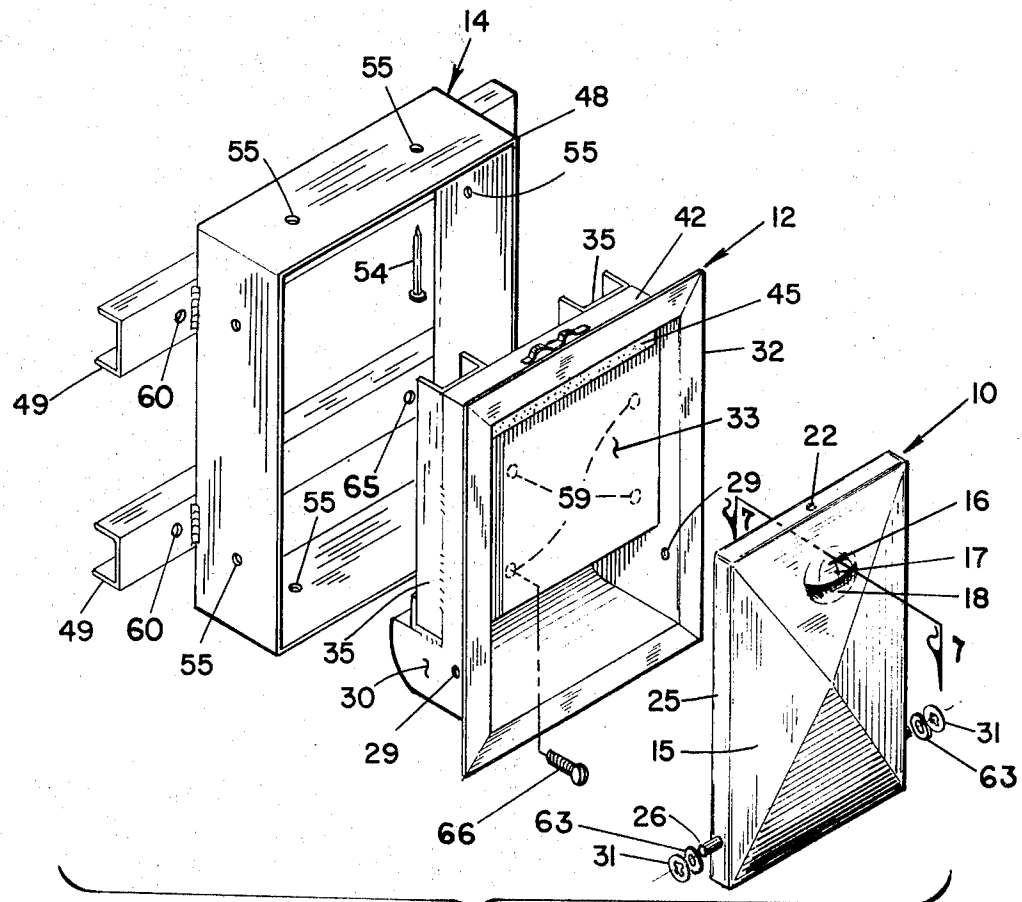


Fig. 1

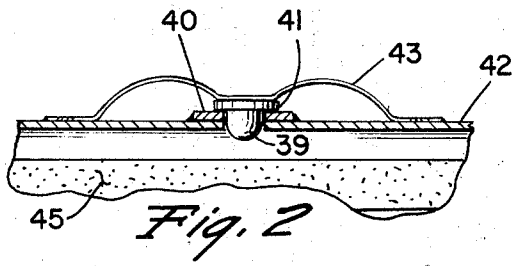


Fig. 2

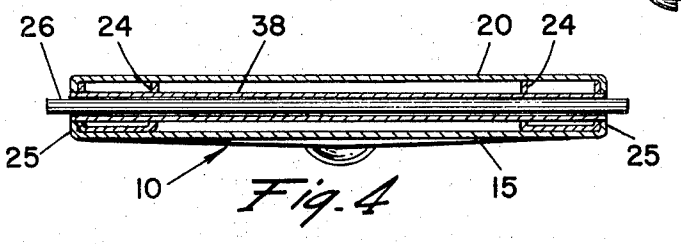


Fig. 4

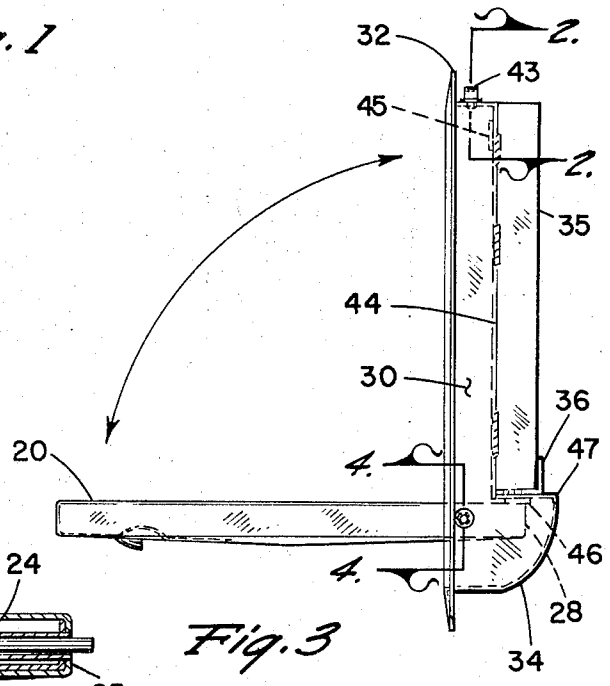


Fig. 3

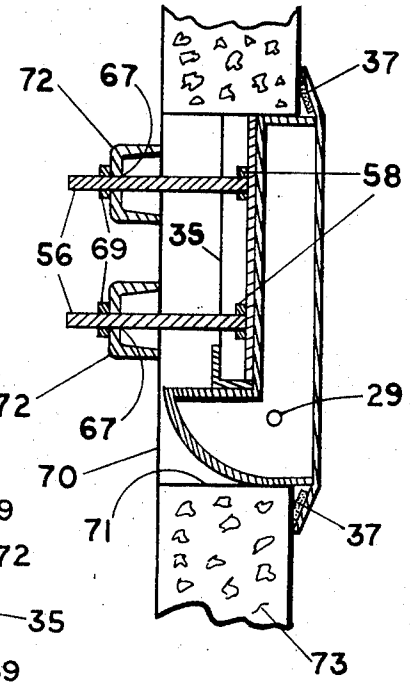


Fig. 5

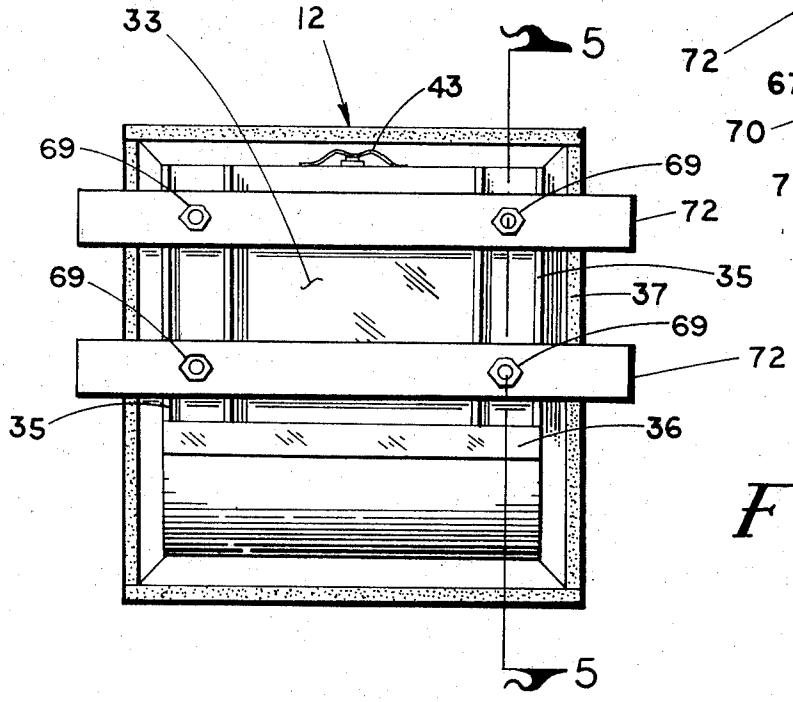


Fig. 6

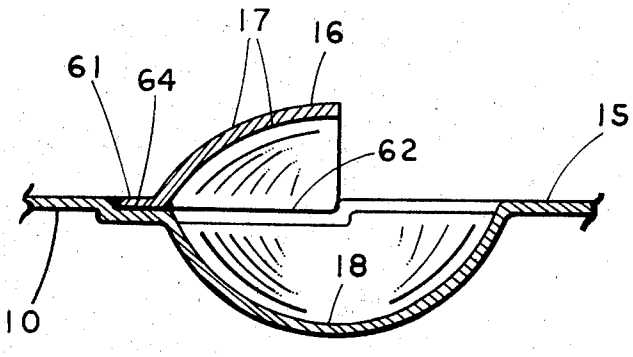


Fig. 7

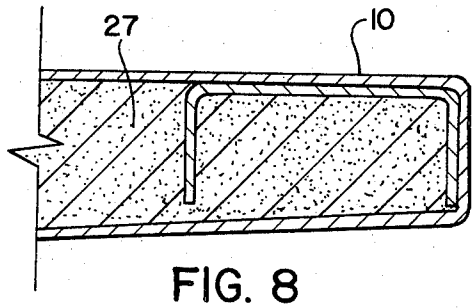


FIG. 8

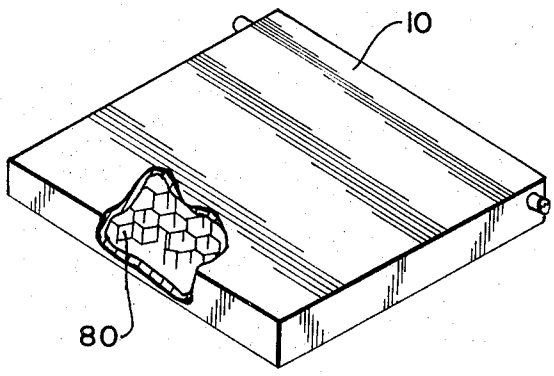


FIG. 9

WALL MOUNTED FOLD DOWN SEAT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the field of recessed, wall-hung, fold-down seats and seat stowage and support structures.

2. Description of the Prior Art

Recessed, wall-mounted fold-down seats are well-known in the prior art. Such seats have found use in both stationary or movable dwelling structures such as trains, hospitals, and other public and institutional facilities, such as prisons and jails.

In hospitals, for example, wall-hung, fold-down seats made of stainless steel and/or similar high-strength, non-deteriorating materials have found use in showering and bathing facilities where a patient may find it difficult or unsafe to stand while showering or bathing.

One greatly desired feature of this type of fold-down seat is that it should be completely free of a leg or legs which must rest upon the floor for seat support. Where leg supports are used, in order to adequately clean and sanitize the floor, the seat must be either completely removed from the area, or it must be moved from one position to another in order to clean the floor space in and around and under the legs of such chairs or benches. This procedure is obviously eliminated when a fold-down seat without legs is utilized.

Another much-wanted feature of such a seat is for it to be quickly and conveniently stowed should it be desirable or necessary to improve freedom of movement in and around the seat mounting area by removing possible obstructions therein.

When utilized in a shower or the like, such a seat must be water-tight to prevent water from entering the unit. Should this occur, the water may stagnate and support the growth of odor-causing and disease-producing bacteria. Further, such captured water could, at least temporarily, increase the weight of the unit and produce additional stresses and strains therein. But, even more importantly, if the water were to be contained within the seat structure, this additional weight would significantly alter the fall-down characteristics of the seat. This added weight would increase the rate at which such seat motion would occur, thereby increasing the potential for harm or injury in the event that it should contact a person during its downward motion.

Another important characteristic of such a seat and seat stowage unit, is that it should be as thin as possible to permit its installation within the thickness of existing walls without the need to create a seat installation accessway completely through the mounting wall. This is virtually a requirement when the opposite side of the mounting wall also faces another room and is not concealed from view.

Due to the anticipated abuse to which such items are typically subjected when placed in public institutions, especially when installed in penal institutions, and the like, the seat must be very rugged and capable of supporting a human even when the seat is jumped upon. Penal institutions are unique in that it is perhaps the only type of institution where the inmates spend a substantial amount of time thinking about ways and means to disable, disassemble or destroy the plumbing fixtures and/or related items such as the seat herein discussed.

Other important features of this type of seat are well known to those knowledgeable in the seating art.

Generally, a fold-down, wall-mounted seat comprises a seat stowage pan and support structure mounted within a recess in a wall, a seating surface pivotally mounted to the seat stowage and support structure so as to be capable of being stowed in a vertical position and movable to a horizontal position for use as a seat. A handle is disposed on the outside surface of the seat to conveniently permit the seat to be lowered into its horizontal or seating position or raised therefrom to its vertical or stowed position. A releasible locking mechanism is generally placed along the upper edge of the seat in order to effect locking engagement with the seat stowage pan and support structure to retain the seat in its vertical or stowed position.

Folding seats found in the prior art employed one or two angle brace and support members to carry the weight of a person on the seat. The angle brace and support member(s) are structurally connected between the sides of the seat and the seat stowage pan and support structure. The angle brace and support member(s) may comprise either a fixed member pivoted at one or both ends so as to be slideably engageable with either or both the seat or the seat stowage and support structure or a collapsible member pivotally attached to both the seat and seat stowage and support structure.

However, it is obvious that when angle braces and support members are used in a seat of this type that such adds both expense and weight to the seat.

Further, such members serve as undesirable obstructions to the seat user. Such obstructions require that the seat area be enlarged to permit a person to sit thereon without contacing the angle-brace members. This, of course, increases the size of the seat and its cost.

When the size of the seat is increased, the recess in the wall which is to accomodate the seat must be correspondingly enlarged as well.

In addition, the slideable or pivotal attachment of such members to both the sides of the seat and the seat stowage pan and support member must be accomplished in such a fashion as to make it difficult, if not impossible, to render it water-tight. Water tightness is highly desirable even when the seat and seat stowage pan and support members are constructed of a non-rusting metal such as stainless steel for many reasons. One reason is that water can be captured within the non-water-tight structure and become stale and foul-smelling and harbor disease-causing bacteria and germs. This, obviously, is undesirable, and in fact, is totally unacceptable when such a seat is utilized in a hospital. Another important reason for desiring water-tightness is that water captured within the unit greatly adds to the weight of the unit. A still further reason for rendering the unit water-tight is to prevent the situation of having water spilling out of the seat when the seat is lowered to its horizontal or seating position.

For use in penal institutions, the seat must also be tamper-proof. It is virtually impossible to render such an item tamper-proof if angle-brace members are employed in the construction of the seat. Such members are easily bent and dislocated. Should either occur, generally the seat cannot be moved from its open to its stowed position. Further, should these members be broken, the seat will, if in a down position, be disposed adjacently to the mounting wall and project outwardly

at an angle thereto thereby constituting an undesirable obstruction to freedom of movement within the area about the mouting wall.

If, on the other hand, the seat is in its stowed position, a safety hazard is created. Such a position, under the circumstances, is unsafe because the seat is relatively heavy and if it is pulled downwardly and released it would fail to stop in its normal seating position which is approximately at 90° with respect to the wall and, instead, continue to travel downwardly until it contacts the seat stowage frame. Since one would anticipate that the seat would come to rest prior to this position, the seat may contact someone or something during its continued, unrestrained downward travel.

One design found in the prior art uses two blade-like angles to support the seat. One end of each of the braces are pivotally connected to a seat stowage frame mounted on a wall by means of a hinge pin anchored to the seat stowage frame. The other ends of the braces which face each other are filled with discs which are pivotally attached to the braces by means of a single pin mounted within the sides of the seat and running from the rear to the front of the seat are hollow, rectangular metal sections which are slotted along the entire length thereof. The discs of the angle braces are adapted to slide freely within the hollow section, and the slotted portion is sufficiently large to allow the disc-attaching pin to move freely therein.

As may be readily observed, the use of an open channel along the sides of the seat is unsightly when viewed from the front of the seat in its stowed position or when placed in its seating position. Further, the use of the open channel is undesirable because it forms a difficult-to-clean and sanitize crevice. Since it is not inherently self-draining when water enters the channel, it offers a breeding environment for odor and disease-causing bacteria, and such unsightly and harmful accumulations such as mildew.

In addition, should the disc's path within the channel be obstructed by relatively solid objects such as clothing, bar soap, fingers and the like, the mechanism will either be jammed or, if moved, will tend to damage the obstruction.

In the event that one of the pins which connect the disc to the brace should become disconnected, a dangerous condition would be created since only one brace would be supporting the seat.

SUMMARY OF THE INVENTION

The present invention overcomes many of the limitations of the prior art devices by eliminating the use of angle brace member(s) for supporting the seat in its horizontal or seating position. In addition, the seat is generally constructed of a rectangular box-like, relative thin-wall structure with rigid support members disposed therein which are disposed along the sides thereof running the length of the seat from the front to the back. A stainless steel rod is passed through the rear portion of the seat and perpendicular to the sides of the thin portion of the seat and through the sides of both rigid support members so that both ends overhang the sides thereof.

The rod ends are adapted to be mounted within the holes in the sidewalls of the seat stowage pan. When mated therewith, the rod ends are captured therein by annular locking members to prevent the rod ends from dismounting. Installed in such a manner, the rod serves as a hinge pin around which the seat may be pivoted. The hollow seat is reinforced with a light-weight, sound-deadening foam.

The seat is retained in its vertical or stowed position within the seat stowage pan by means of a spring-loaded, bullet-nosed locking member disposed through the top portion and to the inside of the seat stowage pan and support structure. The top edge of the seat contains a hemispherical recess or dimple for receiving the nose of the spring-loaded locking member. As the seat is being positioned into its vertical stowage position, the locking member is brought into alignment with the dimpled area. When alignment is achieved, the spring forces the bullet-nosed locking member into the dimpled area, effectively locking the seat into the vertical or stowed position.

When the seat resides in a vertical position, an integral recessed handle is exposed to view near the top of the seat on the front side thereof. The seat may be lowered from its stowed position by gripping the handle and pulling outwardly thereon so as to overcome the holding force of the spring-loaded locking member disposed within the dimpled area on the seat.

Generally, the seat stowage pan is slightly deeper than the thickness of the seat. However, the lower portion of the pan immediately above the hinge pin holes is much deeper to permit the section of the seat which is below the hinge pin when the seat is in its stowed position to freely pass therein to where the seat is lowered to its horizontal position.

The lower portion of this deeper section of the pan has a cross-section which is curved rather than forming a right-angle corner to present a self-draining surface. The upper portion of this deeper section is flat and forms a right-angle with respect to the shallower, flat vertical wall of the pan.

When the seat is in its horizontal position the rear portion of the seat engages this flat surface and stops the seat from traveling further in a downward direction.

Both the vertical and horizontal, rigid support members are welded to the backside of the wall of the pan located above the hinge pin to prevent the pan wall from buckling under the forces produced thereon when a person is seated on the seat.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded assembly view of the apparatus shown in perspective.

FIG. **2** is a section of the locking mechanism taken along plane **2—2** of FIG. **3.**

FIG. **3** is a side elevational view of the seat and seat stowage pan and support structure.

FIG. **4** is a section of the seat taken along plane **4—4** of FIG. **3.**

FIG. **5** is a section of the seat stowage pan and support structure taken along plane **5—5** of FIG. **6** and depicting the method of anchoring same to the wall.

FIG. **6** is a rear elevational view of the present invention.

FIG. **7** is a section of the handle section of the seat taken along plane **7—7** of FIG. **1.**

FIG. **8** is an isometric view of the seat of the present invention with a partial cutaway portion depicting the foam filling within the hollow seat.

FIG. **9** is an isometric view of the seat of the present invention with a partial cutaway portion depicting the honeycomb filling within the hollow seat.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With continued reference to the drawings and, in particular, to FIG. **1**, the present invention comprises a seat, generally designated at **10**, a seat stowage pan and support structure, genenrally indicated at **12**, and a mounting frame, generally indicated at **14**. However, it should be noted at this time that the mouting frame **14**, is generally only required when the seat stowage pan and support structure **12** is mounted to wooden studs in a wall. No mounting frame **14** is required for walls constructed of concrete, steel or concrete blocks where access to the opposite side of the wall is available.

While the present invention can be constructed of any suitable material, it is generally preferable to fabricate it from stainless steel sheet metal due to the many desirable characteristics of this material. Stainless steel does not rust and can be polished or brushed to impart an esthetically pleasing appearance to the finished product. Stainless steel is rugged and sanitary and will endure for a great length of time with little or no care. These features are hightly desirable, and, in many cases, necessary for the present invention to gain acceptance for use in showers, hospitals and penal institutions.

Referring once again to FIG. **1**, seat **10** is clearly shown as a generally rectangularly-shaped box-like structure which is a fully-enclosed, seam-welded sheet metal structure.

The front face **15** of the seat **10** is raised in the form of a shallow pyramid in order to improve its resistance to buckling or dimpling.

With reference now also to FIG. **7**, a handle **16** is generally shown shaped in the form of a quadrant of a sphere and has a flanged lip **61** disposed about the edge **62** which lies in a horizontal plane. The flanged lip **61** is adapted to be nested into a mating depression **64** formed about a portion of the hemispherically-shaped depression **18** formed in the front face **15** of the seat **10**. The flanged lip **61** is then brazed or welded into the depression **64**, thereby forming a handle **16** which is rigidly anchored to the seat **10**.

Fabricating the handle **16** in this fashion places the exposed welded or brazed surfaces on the flat portion of the face **15** where it can be economically ground smooth and polished. Non-flat welded or brazed surfaces cannot generally be polished. In addition, the flange lip **61** is easily maintained in position by nesting it within the depression **64** for welding and brazing. An edge-to-edge, rim-type weld could not be as easily welded or brazed since additional support tooling would be required to hold the handle **16** in the fixed position necessary for proper alignment during welding or brazing.

By shaping and forming the handle **16** in this fashion, the handle **16** has but a single entrance to the hand-gripping surfaces **17**. This is desirable for many reasons. One reason is to prevent a rope from being passed therethrough for use as a suicide device. Another reason is to prevent water from collecting in crevices and voids which are likely to be created in and around such a handle and seat combination when two entrances are provided for a handle. A still further and important reason is that if a handle has two entrances thereinto and in the event that another person is helping another into the seat, should the person being helped prematurely sit on the partially-opened seat, the other person's hand may be caught between the seat and the handle, thereby causing probable injury to his hand.

The seating surface **20**, which is on the side of the seat **10** opposite to the front face **15** of the seat **10** is generally flat as shown in FIGS. **3** and **4**, but may be contoured slightly to improve seating comfort as desired. However, in the present embodiment, the seating surface **20** is flat to prevent water from collecting on the seat **10** in the form of small pools or puddles.

Along the top edge of the seat as illustrated in FIG. **1**, is a dimpled area **22**. This serves as a recess into which a spring-loaded, blunt-nosed, latching member **39**, as illustrated in FIG. **2**, can be received to retain the seat **10** in a stowed position as hereinafterwards described.

Referring now to FIG. **4**, the internal construction of the seat **10** is shown and illustrated. Rigid U-channel members **24** are adjacently disposed to the sides **25** and welded thereto along the corner edges thereof. Together with the walls of the seat **10**, the U-channel members **24** form a strong, light-weight and rigid structure suitable for use as a seat.

A hinge pin **26** is provided for pivotally connecting the seat **10** to the seat stowage pan and support structure **12** via holes **29**. The hinge pin **26** is slideably mated within the body of the seat **10** through the tubular member **38** and is free to rotate therein.

It should be noted that the tubular member **38** is disposed along the common axis of a hole drilled transversely through the lower portion of the seat **10**. The ends of the tubular member **38** are welded to the seat sides **25** to affix the tubular member **38** to the seat and to ensure the water-tightness of the seat **10**. The body of the tubular member **38** is welded to the sides of the U-channel members **24**. By placing the tubular members **38** within both of the U-channel members **24**, positive spacing between the U-channel members **24** is ensured, and a load transmitting capability is provided for the seat **10** and subsequently carried by the hinge pin **26** to the support structure **12**.

The U-channel members **24** provide structural strength and reinforcement for the hollow seat **10**. The need for reinforcement has been found to be especially necessary along the edge portions of the seat **10** from the front to the rear thereof. If the seat **10** is not reinforced, the seat **10** will buckle and subsequently collapse under the weight of an average adult.

To further improve the strength of the seat **10** without substantially increasing the weight thereof, the hollow seat **10** may be filled with structural honeycomb material and bonded into place.

However, it has been found that by filling the hollow seat **10** with rigid foam **27** via one or more holes (not shown) through the rear portion **28**, an acceptable, light-weight seat reinforcement and spacing of the surfaces **15, 20** is effected. In addition, the foam **27** provides a very desirable sound-deadening capability as well. After the foam **27** has filled the hollow portions of the seat **10**, the holes in the rear portion **28** are closed, generally by welding them closed. In this regard, since the open portions of the U-channel members **24** are disposed so as to face the front face **15** of the seat **10** which is raised in the form of a shallow pyramid, a single foam-fill hole may be used. In this arrangement, the foam **27** fills all areas since there typi-

cally exists a small gap between at least one end of the U-channel members **24** and the front face **15.**

The hinge pin **26** is installed through the hinge pin holes **29** in the side walls **30** in the seat stowage pan and support structure **12** and secured therein by means of locking washers **31** placed over the ends of the hinge pin **26** overhanging the side walls **30.** The locking washers **31** prevent the hinge pin **26** and, subsequently, the seat **10** from being removed from the seat stowage and support structure **12** prior to its installation into the recess in the mounting wall, and permanently hold the hinge pin **26** in the desired relationship with seat stowage and support structure **12.**

With reference again to FIG. **1,** it may be noted that in the event that it should be either necessary or desirable, spacing washers **63** may be used to space and prevent metal-to-metal contact between the inside of the side walls **30** and the seat sides **25.**

Referring now also to FIGS. **5** and **6,** the seat stowage and support structure **12** is shown which generally comprises a flange **32,** a recessed pan-like structure **33** having a more deeply recessed portion **34** along the bottom portion thereof and reinforcing members **35, 36** disposed on the backside of the seat stowage pan **33.**

The flange **32** of the seat stowage and support structure **12** extends outwardly in a radial fashion and serves as a cover for the rough edges generally found about the wall recess into which the seat stowage and support structure **12** is seated, especially when such installation is accomplished in an existing building rather than in new construction. It further serves to prevent the seat stowage and support structure **12** from being seated into the recess beyond the plane in which the flange **32** resides.

A gasket **37** composed of a resilient, foam-like material with removable facing material covering the pressure-sensitive adhesive surfaces is adhesively bonded to the backside of the flange **32** by removing the facing material from one of the adhesively-covered faces of the gasket **37** and pressing it against the flange **32.** Immediately prior to installation of the seat stowage and support structure **12** in the wall recess, the facing material is removed from the other adhesively covered face. As the flange **32** is placed in abutment with the surface of the wall about the recess, the gasket **37** adhesively contacts this surface and is bonded thereto and effects a fluid seal therebetween.

With reference now to FIG. **2,** a spring-loaded blunt-nosed latching member **39** is shown disposed through an aperture located along the top wall **42** of the seat stowage and support structure **12** in adjacent disposition to the flange **32.** An annular seat and reinforcing member **40** is disposed between the outwardly directed, radial flange **41** of latching member **39** and the wall **42.** The annular seat and reinforcing member **40** is welded to the wall **42.**

The top portion of the flange **41** is welded to a spring member **43** in substantially the center thereof. The ends of the spring member **43** are welded to the wall **42.** As is clearly shown in FIG. **2,** the spring member **43** is biased in such a manner so as to urge the blunt-nosed end of the latching member **39** downwardly through the aperture in the wall. Latching of the seat **10** in its stowed or vertical position is accomplished as the seat is pivoted into the seat stowage and support structure **12** and is adjacently disposed to the pan-like structure **33.** Immediately prior to reaching this position, the dimpled area **22** on the top of the front edge of the seat **10** is aligned with the spring-loaded latching member **39.** Prior to alignment with the dimpled area **22,** the front edge of the seat **10** forces the blunted nose of the latching member **39** against the spring **43.** When the dimpled area **22** is aligned with the blunt-nosed end of the latching member **39,** the compressed spring **43** urges the latching member **39** downward into the void within the dimpled area **22** thereby latching the seat **10** into its stowed position.

With particular emphasis once again to FIG. **1,** there is shown a strip **45** of resilient, foam-like material which is bonded to the rear wall of the pan-like structure **33** and is adjacently disposed to the wall **42.** This strip **45** serves to cushion the seat in its stowed position and to prevent the seat **10** from contacting the rear wall of the pan-like structure **33.** Should these surfaces contact, the undesirable sound of metal contacting metal would be generated and the strip **45** is employed to prevent this from occuring. Another equally important reason for using the strip **45** is that in the event that it should be desirable or necessary to detachably anchor the pan **33** to the mounting wall via fasteners **66** (only one of as many as four fasteners is shown in FIG. **1**) through holes **59,** the strip **45** will prevent the seating surface **20** from contacting the fastener ends when the seat **10** is stowed.

Of course, it should be noted at this time that the strip **45** can be conveniently separated into a number of small strips or patches and, in fact, do not have to be formed into a continuous strip as shown.

The seat **10** may be withdrawn from its stowed position by merely gripping the hand-gripping surfaces **17** of the handle **16** and pulling outwardly thereon until the latching force effected by the coaction of the spring member **43** and the blunted end of the latching member **39** is exceeded.

As the seat is lowered into its open position as it is pivoted about the hinge pin **26,** the rear portion **28** of the seat **10** starts its upswing within the more deeply recessed portion **34** of the pan-like structure **33.**

A relatively flat, horizontal surface **47** divides the pan-like structure **33** into a shallow zone **44** and a deeply recessed portion **34.**

As shown and illustrated in FIG. **3,** another strip **46,** similar to strip **45,** is bonded to the bottom of surface **47.**

As the seat assumes its horizontal or seating position, the rear portion **28** contacts the strip **46** and is, in turn, prevented from further downward pivotal travel about the hinge pin **26,** by the horizontal surface **47.**

In earlier prototypes of the present invention under 1,000 pound seat loading, the rear wall of the pan-like structure **33** would buckle and yield under the force transmitted thereto by the rear portion **28** through the horizontal surface **47.**

It was discovered that in order to prevent this the rear wall of the pan-like structure **33** had to be reinforced vertically by welding U-channel members **35** thereto.

In addition, in order to space the vertical U-channel members **35** properly during installation and to improve distribution of the forces transmitted from the seat **10** to the U-channel members **35** and the rear wall of the pan-like structure **33,** an L member **36** is disposed transversely to the U-channel members **35** and welded thereto and also to the horizontal surface **47.**

In order to provide for uniformity between the polished texture of the structures **33** and **12**, the pan-like structure **33** is pre-polished prior to assembly. Another reason for pre-polishing is that it is simply virtually impossible to uniformly polish and texturize a deep-drawn, pan-like structure such as **33**.

However, it may be desirable in some installations to texturize the stainless steel by sandblasting the surfaces instead of polishing them. Sandblasting would avoid this need for pre-polishing prior to assembly.

However, when pre-polished materials are used in order to avoid discoloration of the rear wall of the pan-like structure **33** produced by welding temperatures, the vertical U-channel members **35** are welded to the side walls of the seat stowage and support structure **12** only along the corners thereof. If weld temperatures were applied to the rear wall of the pan-like structure **33** discolorations would show through to the front or exposed side thereof, and for esthetic reasons, would require polishing for removal of the discoloration. This extra step would add measurably to the manufacturing expense of the preferred embodiment of the present invention.

Further, it should be noted that the bottom portion of the more deeply recessed portion **34** of the seat stowage pan and support structure **12** contains an upwardly directed slope starting from the front portion thereof. This sloping surface is provided to render the bottom of the recessed portion **34** self-draining when water is placed upon it, and is an important part of the subject invention.

As previously noted, installation of the seat into a concrete, steel or masonry type block wall does not require the use of the mounting frame **14** shown in FIG. **1.** With particular reference now to FIGS. **5** and **6**, it may be seen that in such installations the seat stowage and support structure **12** is bolted thereto by means of threaded studs **56** (only two of four are shown) which are passed through holes **67** (only two of four are shown) in the transversely-mounted U-channel support members **72** which bridge the rear opening **70** of the wall recess **71** and subsequently threadably engage with nuts **58** welded to vertical U-channel member **35.** The threaded studs **56** are rotated until the ends thereof bottom out in the nuts **58.** Additionally, nuts **69** are then threadably engaged with the opposite ends of the studs **56** and tightened so as to force the U-channel members **72** into intimate abutment with the wall **73,** thereby in turn, bringing the flange **32** and the fluid-sealing gasket **37** disposed thereabout into sealing relationship with the mounting wall **73.** This fastening arrangement renders the present invention tamper-proof because it can only be removed from the backside of the mounting wall which, of course, generally is not accessible to the user's side of the present invention.

Of course, the above described procedure presupposes that there exists access to the rear of the mounting wall **73** and there is no need for holes **59** in the pan-like structure **33** as shown in dashed lines in FIG. **1.**

In the event that access does not exist to the backside or rear of the mounting wall **73** of whatever construction the mounting frame **14** may be used as hereinafterwards described for mounting in a wall having wooden studs.

When installation is in a wall having wooden studs, the mounting frame **14** is used. In most modern wall construction, the spacing between the wooden studs is **16** inches. In order to, therefore, accomodate the mounting frame **14,** the spacing between the two vertical side walls of the mounting frame **14** is selected to mate therebetween and is, therefore, 14-⅜ inches.

It should be clearly understood that the mounting frame **14** is utilized in order to facilitate installation and removal of the seat **10** and the seat stowage and support structure **12** combination.

Referring once more to FIG. **1,** the mounting frame **14** comprises a generally rectangular, box-like structure **48** having a pair of opposed openings therein for receiving the seat stowage and support structure **12.** For this purpose, the openings are slightly larger than the peripherial boundary of the rear portion of the seat stowage and support structure **12** and is conformable therewith.

Two U-channel support members **49** disposed in parallel relationship, lie transverse to the rear side of the structure **48** and are welded thereto. Holes **60** are drilled through the bottom portion of the U-channel support members **49** to provide a means for securing the members **49** to the wall by means of fasteners such as those shown at **66.**

The mounting frame **14** is placed in the recess **71** of the wall **73** to which the seat **10** and seat stowage and support structure **12** is to be mounted and secured to the studs in the wall disposed about the structure **48** by means of nails **54** (only one is shown) which pass through holes **55** in the structure **48.**

Holes then are drilled through the wall studs in order to receive fasteners **66** (only one out of the typical four is shown) so as to strongly secure the mounting frame **14** to the wall studs.

The rear portion of the seat stowage and support structure **12** is slideably mated into the structure **48** of the mounting frame **14** and secured thereto with fasteners **66** which pass through holes **65** in the U-channel support members **49** after passing through the holes **59** in the pan-like structure **33.**

The above wall installation and anchoring may be rendered tamper-proof by using bolts **66** having beads thereon which may only be rotatably engaged through the use of special tools whose distribution is limited to authorized personnel.

Other forms and arrangements will suggest themselves to those skilled in the art and the invention should not therefore be regarded as limited.

For example, the box-like shape of the present invention could easily be changed without in any way detracting from its usefulness. In addition, the support members **49** and vertical members **35** should not be considered as being limited to U-channel stainless steel members. Still further, it is obvious that a single transverse U-channel could be easily utilized instead of using the two U-channel members **49** as hereinbefore described. And similarly, a single U-channel member could be utilized in place of the two U-channel members **72.**

We claim:

1. A fold-down seat for mounting in a recess in a wall comprising:

a. seating means;

b. pivot means for said seating means, said pivot means further dividing said seating means into first and second portions;

c. seat stowage and support structure means, comprising:

a duct having front and rear openings, said front opening adapted to receive said seating means therein;

a wall joined to the rim of said rear opening to said duct, and having an upper portion and a lower portion, said upper portion being spaced apart from the plane of the rim of said front opening to said duct by at least a substantial portion of the thickness of said seating means and said lower portion of said wall projecting rearwardly and outwardly away from said upper portion of said wall to form a shoulder and thereafterwards projecting forwardly and downwardly until it joins with said duct;

d. means for connecting said seat dividing and pivot means to said duct so that when a portion of said first portion of said seating means moves from a position within said seat stowage and support structure means to a position outside of said seat stowage and support structure means, said second portion of said seating means moves towards abutting engagement with the shoulder formed by said rear wall joined to the rim of said rear opening of said duct and visa versa;

e. latching means for securing said seating means within said seat stowage and support structure means; and

f. handle means on said seating means, said handle means disposed on the face of said seating means which is exposed when said seating means is stowed within said seat stowage and support means.

2. The fold-down seat of claim **1,** further comprising:

a flange disposed about the rim of the front opening of said duct of said seat stowage and support structure means, said flange being directed outwardly in a radial fashion therefrom.

3. The fold-down seat of claim **2,** further comprising:

a gasket disposed about the rearwardly facing surface of said flange, said gasket forming a fluid seal between said flange and said wall about said recess when said seat is mounted therein.

4. The fold-down seat of claim **2,** further comprising:

means for anchoring said seat stowage and support structure means to said wall about said recess.

5. The fold-down seat of claim **4,** wherein said means for anchoring, comprises:

a. a duct having at least one opening thereinto and being sufficiently large to conformably receive the rear portion of said seat stowage and support structure means thereinto and while preventing said seat stowage and support structure means from passing into said opening beyond said flange of said duct;

b. a U-channel member of sufficient length to bridge the other end of said duct as well as bridging the rear opening to said wall recess, said U-channel member being disposed transversely to said other end of said duct and bonded to said other end and further having at least one threaded hole within the bottom of the U of said U-channel member disposed between the bonding points of said U-channel member; and

c. means for adjustably fastening said U-channel member to said rear wall of said seat stowage and support means.

6. The fold-down seat of claim **1,** wherein said seating means comprises:

a. a box-shaped hollow metal structure having two pairs of oppositely disposed sides forming the edges of said seating means and two relatively larger, oppositely disposed sides forming the inside and outside surfaces of said seating means, said inside surface forming a surface upon which to sit and said outside surface having a depression therein;

b. a handle having a single entrance thereinto and disposed across said depression;

c. a first U-channel member disposed between said inside and outside surfaces, said first member being adjacently disposed to one of said oppositely disposed edges and bonded thereto and having the two legs of the U of said U-channel member being abutted against said inside surface; and

d. a second U-channel member disposed between said inside and outside surfaces, said second member being adjacently disposed to the other of said pair of oppositely disposed edges and bonded thereto and having the two legs of the U of said U-channel member being abutted against said inside surface.

7. The fold-down seat of claim **6,** wherein said hollow metal structure is filled with rigid foam.

8. The fold-down seat of claim **6,** wherein said hollow metal structure is composed of stainless steel.

9. The fold-down seat of claim **6,** wherein said hollow metal structure is filled with structural honeycomb bonded thereto.

10. The fold-down seat of claim **1,** wherein said seat stowage and support means further comprises:

a. a substantially pan-like structure at least as deep as the thickness of said seat, said pan-like structure further having a lower portion below said point where said seat dividing and pivotal connection means is connected to the sidewall of said structure and an upper portion thereabove, said lower portion being projected rearwardly beyond the rear of said upper portion to form a shoulder and thereafterwards sloping forwardly and downwardly to the front rim of the sidewall of said structure;

b. a first rigid U-channel support member bonded to the backside of the upper portion of said pan-like structure along the outer vertical corner of said pan;

c. a second rigid U-channel support member bonded to the backside of the upper portion of said pan-like structure along the other outer vertical corner of said pan; and

d. an L shaped rigid member transverse to said first and second rigid U-channel support members and bonded thereto and being further bonded to said shoulder.

11. A fold-down seat as in claim **10,** further comprising: resilient spacing means secured to said upper portion of said wall joined to said rim of said rear opening to said duct of said seat storage and support structure means and disposed between said seat and said upper portion of said wall to prevent direct contact therebetween when said seat is placed within said structure in its' stowed position.

12. A fold-down seat as in claim **1,** further comprising:

resilient spacing means secured to said seat and disposed between said second portion of said seating means and said shoulder to prevent direct contact

between said seat and shoulder when said seat is disposed in said seating position.

13. The fold-down seat of claim **1**, wherein said pivot means comprises:

a. a hinge pin through one end of said seat and the ends of said hinge pin extending beyond the edges of said seat;

b. a seat stowage and support structure means further having spaced sidewalls with oppositely-disposed holes therein, said holes adapted to receive the ends of said hinge pin thereinto so as to be freely rotatable therein;

c. a first locking ferrule disposed about one end of said hinge pin protruding beyond the sidewall of said seat stowage and support structure means; and

d. a second locking ferrule disposed about the other end of said hinge pin protruding beyond the other side wall of said seat stowage and support structure means.

14. The fold-down seat of claim **1**, wherein said latching means comprises:

a. a spring-loaded, blunt-nosed member disposed within a hole in the top portion of said seat stowage and support structure and adapted to be movable in and out of said hole, said blunted nore portion protruding downwardly therebeyond; and

b. a dimpled surface within the forwardmost edge of said sheet, said dimple lying in substantially the same vertical plane as said blunt-nosed member, so that when said seat is placed in a vertically stowed position the blunt-nosed member is operably disposed in said dimple to retain said seat in the stowed position.

15. The fold-down seat of claim **1**, wherein said handle means further comprises:

a. a handle in the front surface of said seat, said handle being shaped generally in a semi-hemispherical form and having a flange disposed outwardly in a perpendicular fashion therefrom and about one end thereof; and

b. a hemispherically shaped depression within the front surface of said seat, said depression having a recessed portion halfway thereabout adapted to matingly received said flange of said handle thereinto so that said flange can be bonded therein.

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