A portable litter tray holder and stand including a central discoid member, a mounting arm having a horizontal portion rigidly attached to the central member and a vertical-stand portion attached in upright relation to one side of the litter; and a pair of extension arms each having a horizontal portion pivotally attached to the central member and extending over the litter to terminate in a vertical-stand portion attached in upright relation to the opposite side of the litter.
BACKGROUND OF THE INVENTION

This invention relates generally to the field of service tray supports and, in particular, to an improved combined portable tray support and stand especially adaptable for use with a litter-borne patient.

In the medical evacuation of litter or stretcher-borne patients by air, heretofore, foods, medicines, dressings, instruments and the like have been generally dispensed from and/or supported on service trays either placed on the patient's chest or abdomen, on the cabin floor next to the litter, or, in some instances, held by an air crew member. It is readily apparent that such methods are manifestly unsatisfactory for use with litter-borne patients both from the standpoints of inconvenience and comfort, and from the potentially unsafe conditions resulting therefrom. Thus, it is obvious that a clear and present need exists for some means of providing improved support for such service trays in the close proximity to the litter patient that would be required for convenience, comfort and safety.

Previously used or proposed tray supporting means have generally included either the upright stand frequently found in hospital rooms and which is manually movable to a position adjacent to the patient, or, alternatively, table-like members pivoted to the hospital or patient bed itself have been employed. The relative size, weight and obvious bulkiness of the former, and the need for the substantial support of the hospital bed structure of the latter clearly makes either method impractical for utilization with a litter-borne patient, particularly when being transported by air. Therefore, it is self-evident that an improved portable-type of tray support is required, such as the tray support and stand structure of the present invention, to be hereinafter described in the following summary and detailed description, which combines positive means for retaining the tray being supported thereby, with an integral stand portion that is releasably supported on opposite sides of the litter.

SUMMARY OF THE INVENTION

The present invention consists briefly in a portable tray holder and stand that includes a central, discoid member; a main mounting arm having a horizontal portion fixedly interconnected with the central member and a vertical portion having contoured clip means for engagement with the pole on one side of a litter; and a pair of extension arms each having a horizontal portion interconnected with the central member and adapted to extend over the litter, and a vertical portion having contoured clip means for engagement with the other pole of the litter. The central member is uniquely jointed in configuration to thereby specifically provide for the pivotal attachment thereto and thus the adjustment of the extension arms between an extended position disposed over the litter and a stow-away or folded position adjacent to the mounting arm. The top surface of the central member, and the horizontal portions of the mounting and extension arms provide support for a service tray. Resilient restraint means, to be described hereinafter in more detail, are incorporated on the upper surface of each of the mounting and extension arms to provide a positive hold on the tray.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top/side perspective view, illustrating the novel litter tray holder and stand of the present invention in its stow away, or folded position;

FIGS. 2 and 3 respectively represent additional perspective views, showing step Nos. 1 and 2 involved in the mounting of the inventive tray holder and stand of FIG. 1 in supporting position on, and over a litter;

FIG. 4 is another perspective view, somewhat similar to that of FIG. 3, but showing a patient resting in the litter and with a food tray being supported by the inventive tray holder and stand;

FIG. 5 is an exploded view, in perspective, depicting further details of the inventive litter tray holder and stand.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring generally to the drawings and, in particular, to FIGS. 1 and 2 thereof, the new and improved combined litter tray holder and stand of the present invention is indicated generally at 10 as including principally a main, single mounting arm member 12, that is supportable on one side of a litter, seen at 15 in FIG. 2; a pair of identical extension arm members 13 and 14 that may be mounted to the opposite side of the litter 15; and a centrally and/or intermediate-disposed, discoid member 11 that interconnects the mounting arm member 12 with the extension arm members 13 and 14 in a unique and yet simplified manner to be described in detail hereinafter with specific reference to FIG. 5.

The aforementioned interconnection between said mounting arm member 12, and extension arm members 13 and 14 is provided by the said central, discoid member 11 being made jointed in configuration through its inclusion of a lower, discoidal-shaped housing joint portion, indicated generally at 22 and which has connected flat upper and lower surfaces, at 23 and 24 respectively, between which is combined in unique relation to each other, first, a horizontally-oriented peripheral or circumferential and circular opening 26 into which is rigidly attached the end of a horizontally-disposed arm portion 12a of the mounting arm member 12, and, secondly, a pair of horizontally-oriented, identical and oppositely-positioned peripheral or circumferential and arcuate-shaped slots, one of which is indicated at 25, into which may be attached for pivotal movement the respective ends of a horizontally-disposed arm portion 13a and 14a of each of the extension arm members 13 and 14.

The previously-described rigid attachment between the horizontally-disposed arm portion 12a of the mounting arm member 12 and the housing portion-opening 26 is actually effected by the engagement of a combined housing pin and pivot at 27 that is interconnected within, and between the said opening 26, and aligned openings formed in, or adjacent to, the end of arm portion 12a and within the housing portion-upper surface 23. The pivotal attachment of each extension arm member-horizontally-disposed arm portion 13a and 14a within the circumferential housing portion-
slots, as at 25, may be respectively accomplished by means of similar, combined housing pins and pivots, at 28 and 29, which likewise engage within aligned openings disposed in, or adjacent to the end of each arm portion 13a, 14a and within the appropriate location in the said housing portion-upper surface 23. With this unique and yet simplified use of the jointed housing portion 22 and, in particular, with the horizontally-disposed arm portions 13a and 14a being pivotally attached to, and disposed within the oppositely-disposed arcuate and circumferential slots, as at 25, the quick and easy adjustment of the extension arm members 13 and 14 within the said arcuate-shaped slots, as at 25, and between the extended position of FIG. 2 and the stow away or folded position of FIG. 1 is thereby facilitated and promoted.

The above-noted mounting arm member 12 further incorporates an integral, vertically-disposed arm portion 12b to the lower end of which may be incorporated a resilient litter or mounting and clamping clip 16 that, in accordance with the unique teachings of the present invention, has been especially contoured and therefore made particularly adapted for the mounting of the said vertically-disposed arm portion 12b in releasable, upright relation on the pole formed on one side of the litter, at 15, as is illustrated in FIG. 2, for example, which figure constitutes a depiction of the first step or step No. 1 in the assembling of the inventive tray holder and stand to a selected litter. In this regard, FIG. 1 represents a showing of the stow away or folded position of the invention, as noted hereinbefore, in which the extension arm members 13 and 14 have been pivoted to their collapsed positions adjacent to, and on opposite sides of the mounting arm member 12. Thus, it is obvious that one key feature of the tray holder and stand 10 of the present invention resides in its inherent capability of being quickly removed from the litter 15, when not in use, and thereafter the extension arm members 13 and 14 being easily adjusted to their folded position of FIG. 2, through means of the specially jointed dis- coild member 11, as described hereinbefore. Until its further use is required, the folded and obviously compact condition of the inventive tray support and stand 10 may be located in a relatively out-of-the-way position in the aircraft.

When it is desired to utilize the inventive tray holder and stand 10, the latter may be very easily brought to the litter location, the extension arm members 13 and 14 manually pivoted in the arcuate slots, as at 25, to the extended position of FIG. 2, and thereafter the vertically-disposed arm portion 12b of the mounting arm member 12 may be initially supported in upright relation to one pole of the litter 15, by the releasable engagement therewith of its resilient and contoured litter or mounting and clamping clip 16. Then, the extension arm members 13 and 14 which, at this time (FIG. 2), have already been adjusted outwardly to their extended position, may now be mounted to the opposite pole of the litter 15, through the releasable engagement therewith of the litter or mounting and clamping clips, indicated at 17 and 18 as being respectively formed on and adjacent to the lower end of each of a vertically-disposed arm portion 13b and 14b formed on said extension arm members 13 and 14. This constitutes the final step or step No. 2 involved in mounting the invention to, and in supporting upright relation on, a litter, as at 15. As in the case of the clip 16, clips 17 and 18 have been specifically contoured to exactly conform with, and thus precisely accommodate the particular size of the appropriate pole of the litter 15 in a relatively and sufficiently tight-fitting relation thereto to thus provide an appropriate support for a selected service tray, such as the food tray, indicated at 19 in FIG. 4 as being thereby disposed in close proximity to a patient 20 shown resting on a pillow 21.

To retain the above-described housing pins and pivots 27, 28 and 29 in their respective interconnecting openings provided in the horizontally-disposed ends of the arms 12, 13 and 14 and within the housing portion 22, the central member 11 also incorporates a unique, upper tension plate portion, indicated generally at 30. Tension plate portion 30 is resiliently attached to, and generally maintained on top of, said lower housing portion 22, with its inner surface therefore in resilient, contacting and supporting relation on the top or upper ends of the aforementioned housing pins and pivots 27, 28 and 29, through the use of a tension spring 31 that is retained in contacting relation with the underside of the tension plate portion 30 and is further positioned within an appropriately-sized, recessed opening 32, formed in the lower housing portion-upper surface 23, by means of a housing screw at 33. Additional pivot pins, at 34, are utilized to complete and provide for the adequate resilient mount of the tension plate portion 30 to the housing portion 22.

With the foregoing use of the novel tension plate portion 30 and, in particular, by the selective adjustment of the housing screw 33, the degree of tension being applied by the said tension plate portion 30 to the housing pins and pivots 27, 28, 29 and 34, as well as that being impressed thereby upon the horizontally-disposed arm portions 13a and 14a, may be uniquely and easily controlled and adjusted to that required for providing a desired degree of restraint to the said extension arm members 13 and 14, both while located in either stow away or supporting positions and particularly during their pivotal movement therebetween. In this connection, further restraint is provided by the use of peripheral slots or notches, as depicted at 36, 37 and 38 as being incorporated in a depending skirt portion 35 formed on the circumference of the tension plate portion 30, as is clearly illustrated in FIG. 5. Depending skirt portion 35 is designed to overlap the periphery of the upper housing portion 23, when the tension plate portion 30 is assembled thereto, and thereby resiliently contact the upper surfaces of each of the extension arm members-horizontally-disposed arm portions 13a and 14a, under the action of the tension spring 31. With the use of the notched and depending skirt portion 35, when the extension arm members 13 and 14 are pivot- ed to their stow-away or folded position of FIG. 1, for example, their horizontally-disposed arm portions 13a and 14a respectively snapped upwardly into, and positively engage within the pair of closely spaced notches at 37 and 38 which are located nearly adjacent to the horizontal end of the mounting arm member 12. In this manner, the notches 37 and 38 act both as a positive restraint to the extension arm members 13 and 14, when in their folded position, and as a positive guide means for quickly and easily directing and automatically providing a definite indication as to exactly when the appropriate stow away position has been reached.

When it is desired to pivot the folded extension arm members 13 and 14 outwardly to their properly ex-
tended position of FIG. 2, for example, a similar set of slots or notches, as at 36, which are incorporated along the circumference of the skirt portion 35 at the same relative and oppositely-disposed position, become operative to engage with and provide a positive restraint to the horizontally-disposed-extension arm portions 13a and 14a. Again, the notches, as at 36, are so located as to provide for both the previously referred to positive restraint on, and to further act as a quick means of precisely indicating the correct extended positions of the extension arm members 13 and 14, at which time, the vertically-disposed arm portions 13b and 14b thereof have been accurately positioned for the resilient attachment of the mounting clips 17 and 18 thereof with the appropriate pole of the litter 15.

The combined tray holder and stand 10 also uniquely incorporates means for positively and releasably retaining a selected service tray, as at 19 in FIG. 4, on top of the previously-described central discoid member 11 in simultaneous supporting contact on the upper surfaces of the horizontally-disposed arm portions 12a, 13a and 14a. For this express purpose, the said tray-retaining means includes a resilient retainer clip, indicated generally at 39 as being positioned on top of the horizontally-disposed arm portion 12a of the mounting arm 12, and a pair of identical resilient tray clips, indicated generally at 40 and 41 as being respectively affixed on top of the said horizontally-disposed arm portions 13a and 14a of the extension arm members 13 and 14. Each of said tray clips 40, 41 incorporates a base supporting clip-portion, at 42 and 43 respectively, that are directly supported to the arm portions 13a and 14a, and a resilient, direct tray-engaging clip-portion, at 44 and 45, respectively. With this simplified and yet novel tray retaining structure, after mounting the combined tray holder and stand 10 to the litter 15, as explained hereinafore, the positive emplacement and retention of a food tray, for example, as at 19 in FIG. 4, in supporting relation on top of the discoid central member 11 and the horizontal portions of the mounting and extension arm members 12, 13 and 14 may be quickly accomplished simply by resting the tray 19 on the surfaces mentioned above with one side edge thereof being centered on, and resting or resiliently engaged against and within the retainer clip 39, and, thereafter, snapping the oppositely-disposed corners disposed on the opposite side edge of the tray 19 downwardly until they have been resiliently engaged within the resilient, direct, tray-engaging clip-portions 44 and 45 respectively forming part of the tray clips 40 and 41. Of course, at this point, the bottom surface of each of the above-referred to corners of the tray 19 will be resting in supporting relation on the base supporting clip-portions, indicated respectively at 42 and 43 in FIG. 5.

The above-noted retainer clip 39 may be further uniquely and adjustably mounted for movement to various positions relative to the horizontally-disposed arm portion 12a of the mounting arm member 12 to thereby provide for the easier removal of the tray 19 and to accommodate trays of different sizes. To this end, the retainer clip 39 incorporates an integral pair of spaced-apart, elongated and parallel retainer clip-supporting arm members, indicated at 46 and 47. The latter are slidably engaged within relatively elongated cylindrical-supporting portions 48 and 49 that are affixed, as clearly depicted in FIG. 5, on opposite sides of the horizontally-disposed arm portion 12a. To positively

retain said elongated retainer clip-supporting arm members 46 and 47 in a selectively adjustable position relative to, and within, said cylindrical portions 48 and 49 and thereby provide for the aforementioned variable adjustment of the retainer clip 39, a retainer spring, such as that indicated at 50, is positioned within each of the cylindrical portions 48 and 49 in surrounding and resiliently-contacting and substantially gripping relation to each of the retainer clip-supporting arm members 46 and 47 that are extending therewithin. A screw and washer element, as at 51 and 52, and at 53 and 54, respectively, may be utilized to retain said retainer springs, as at 50, within the particular cylindrical portion, as at 48 and 49. Thus, when it is desired to re-adjust the spacing between the tray clips 40 and 41, and the retainer clip 39, the latter may be rather easily slidably adjusted to the desired position to thereby accommodate the particular tray to be supported thereto.

Thus, a new and improved portable and combined tray holder and stand device has been developed by the present invention and which is both readily installed on a litter, and further both incorporates a center discoid joint facilitating folding of the device for storage, in unique combination with a positive, bracketed restraint means for the supported tray. Moreover, although the inventive device includes specially contoured spring clamps for attachment to the opposite poles of a litter, it can be easily modified for use in other applications, such as buses, cafes, drive-ins, ships and trailers, without deviating from the true spirit or scope of the invention. Furthermore, the present tray holder and stand, which is usable for suspending service trays, such as that used for food, instruments and medications, in a functional position, may be easily used in a similar manner to elevate a patient's arm in a stable position and/or to serve as a convenient and safe work area for supporting certain equipment required to perform aseptic medical procedures, as for example, catheterization or tracheostomy suctioning.

We claim:

1. A portable, collapsible and compact service tray holder and stand device for mounting a food or/and medicine tray or the like on and over a litter and/or other supporting structure in close proximity to a patient, or other occupant or user, and comprising: a central, discoid and tray-supporting member; a main, mounting arm member having a horizontal arm portion providing further support for the tray and being fixedly attached to said central member, and a vertical arm portion integrally formed to said horizontal arm portion and equipped with first, releasable means on the lower end thereof for supporting and attaching one side of said central member in vertically-upright relation to a side or portion of, and over the litter, or other supporting structure; and a pair of extension arm members each having a horizontal arm portion providing further support for the tray when in a second, extended position of adjustment relative to each other and being pivotally attached to said central member for adjustment between both a first, inward, folded, closed and collapsed position in stored relation against, adjacent and parallel to opposite sides of said mounting arm member, and the said second, extended tray-supporting position in substantially oppositely-disposed relation to said mounting arm member, each of said extension arm members incorporating a vertical arm portion integrally formed with the horizontal arm portions thereof.
and oriented in and extending over the litter, or other supporting structure to a vertically-upright relation on the side of said central member remote from said mounting arm member, and with second, releasable means incorporated on the lower end of each thereof and attached to the opposite side of said litter, or other supporting structure; said central, discoid member consisting of jointed means for interconnecting said main mounting and extension arm members in respective rigid and adjustable relation thereto, and comprising: a first, lower housing joint portion having a horizontal opening and at least one arcuate-shaped slot for respectively receiving therein in rigid, and adjustable and pivotal relation the horizontal arm portions of said main mounting arm and extension arm members; and a second, upper tension-applying means positioned over and in indirect, and resilient contact with the upper surface of said first, lower housing joint portion; said tension-applying means having a peripheral portion extending downwardly in overlapping relation relative to the circumference of said lower housing joint portion, and incorporating first and second, resilient stop means in periodic engagement with, and releasably and respectively retaining the horizontal arm portions of each of said extension arm members in a relatively taut relation in their substantially oppositely-disposed first, closed and second, extended positions of adjustment.

2. A portable, collapsible and compact service tray holder and stand device as in claim 1, wherein said tension-applying means comprises a discoid-shaped upper tension plate member adjustably positioned to, and on top of said housing joint portion; and said first and second, resilient stop means each comprises an extension arm-receiving and downward-facing notch formed in appropriately-spaced relation along a depending periphery of said tension plate member.

3. A portable, collapsible and compact service tray holder and stand device as in claim 1, wherein said tension applying means comprises a discoid-shaped upper tension plate member having resilient means adjustably attached to said housing joint portion.

4. A portable, collapsible and compact service tray holder and stand device as in claim 3, wherein the resilient attachment means between said upper plate member and lower housing portion comprises a tension spring element intermediately disposed between the underside of said tension plate member and a centrally-disposed recess formed in said housing portion; and a screw element attached through said tension plate member from the upper side thereof for engagement within and thereby simultaneously providing a guide means for said tension spring, and adjustment of the tension being impressed by said tension plate on said extension arm members.

5. A portable, collapsible and compact service tray holder and stand device as in claim 4, wherein said central, discoid member-jointed means further comprises a relatively short pivot pin interconnected between and engaged in tight-fitting relation within a first opening formed in the ends of, and thereby rotating in simultaneous relation with, the pivotal adjustment of the horizontal arm portions of each of said extension arm members and a second opening incorporated in the upper surface of said lower housing joint portion in alignment with each of said first-named openings; said jointed means still further comprising an attachment pin rigidly interconnecting the horizontal arm portion of said mounting arm member in the said horizontal opening of said central, discoid member-housing joint portion; said attachment pin and said pivot pins extending further upwardly through the top surface of said lower housing joint portion in resiliently-disposed contact with the underside of, and thereby providing a floating-type support for, and with said upper tension plate member through the inherent action thereagainst of the said tension spring element.

6. A portable, collapsible and compact service tray holder and stand device as in claim 5, wherein the variable adjustment of said screw element, relative to the tension spring element, is automatically responsive to vary the tension being applied to said extension arm members, through the said peripheral-resilient stop means of said tension plate member, and said pivot pins in direct proportion to said adjustment.

7. A portable, collapsible and compact service tray holder and stand device as in claim 6, wherein the releasable means of said vertical arm portions of each of the mounting and extension arm members each comprise a flexible clamping device.

8. A portable, collapsible and compact service tray holder and stand device as in claim 7, wherein said flexible clamping device comprises a resilient tray clip contoured to precisely accommodate each pole of a litter.

9. A portable, collapsible and compact tray holder and stand device as in claim 8, wherein said horizontally-disposed arm portions of said mounting, and extension arm members collectively incorporate tray-bracketed restraint means in supporting relation thereto for positively holding a selected tray thereon, said bracketed restraint means being adjustable to thereby accommodate trays of various sizes.

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