March 17, 1964 C. P. FROMMELT ETAL 3,125,155

PORTABLE SCREEN STRUCTURES

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FIG. 1

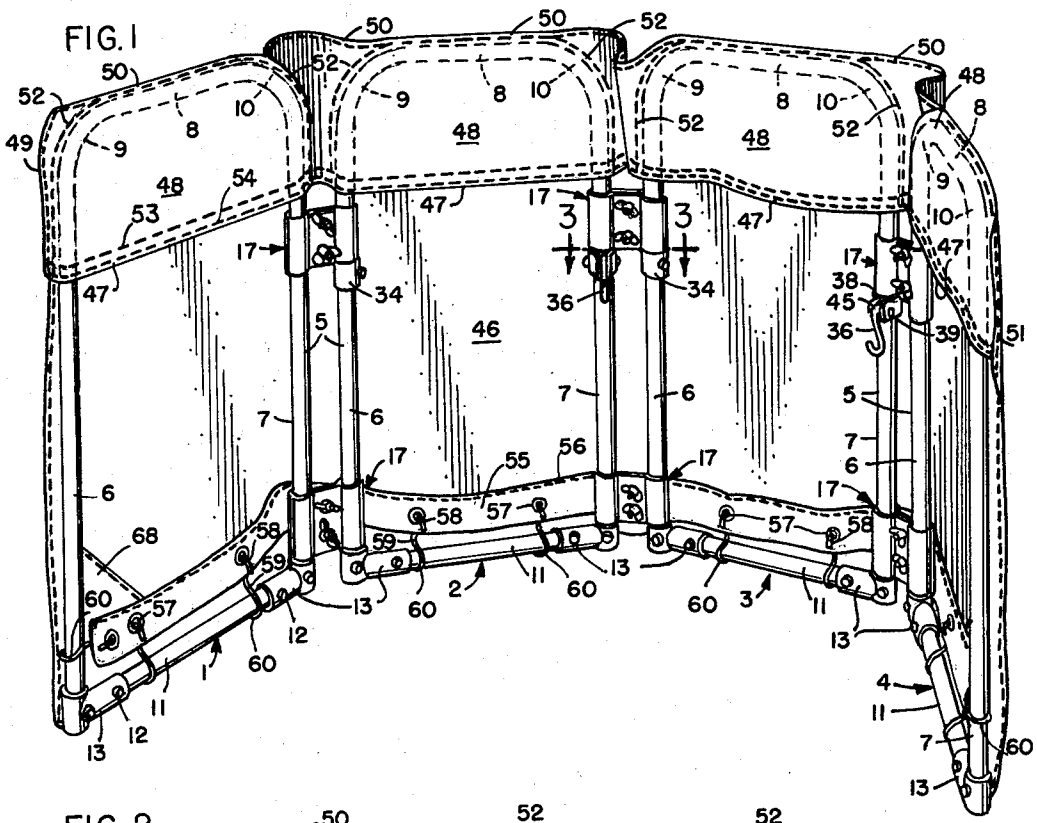


FIG. 2

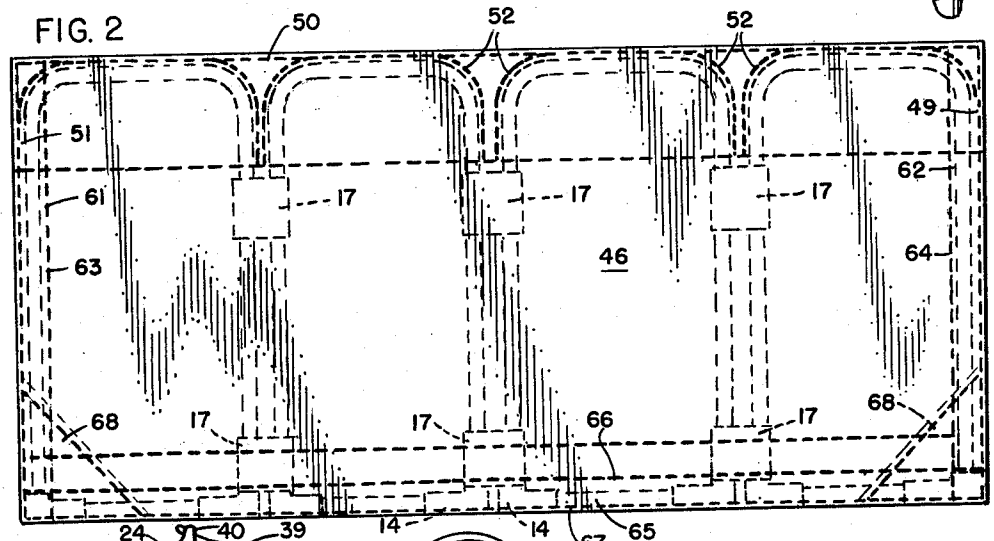
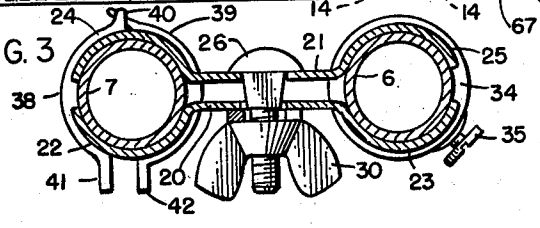


FIG. 3



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PORTABLE SCREEN STRUCTURES

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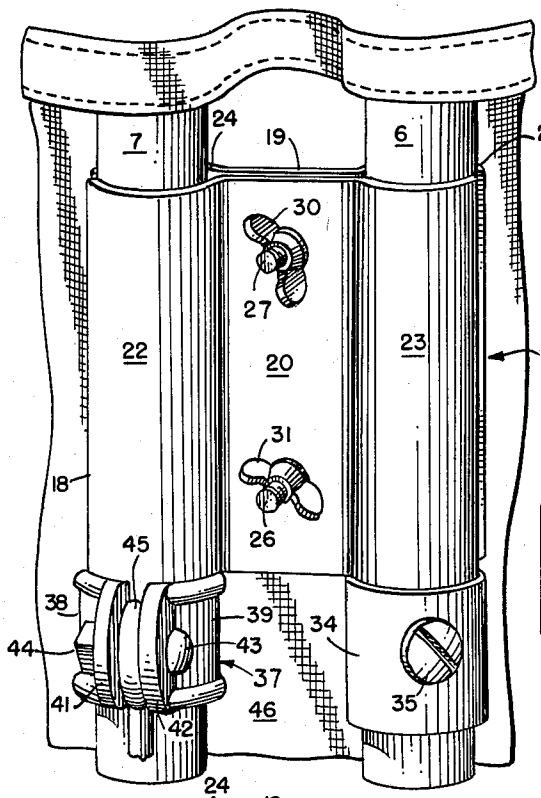


FIG. 4

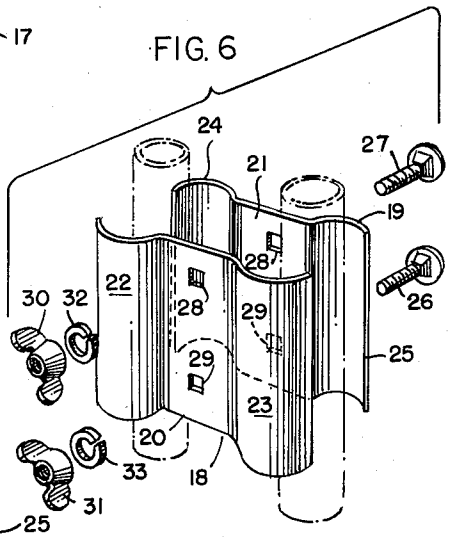


FIG. 6

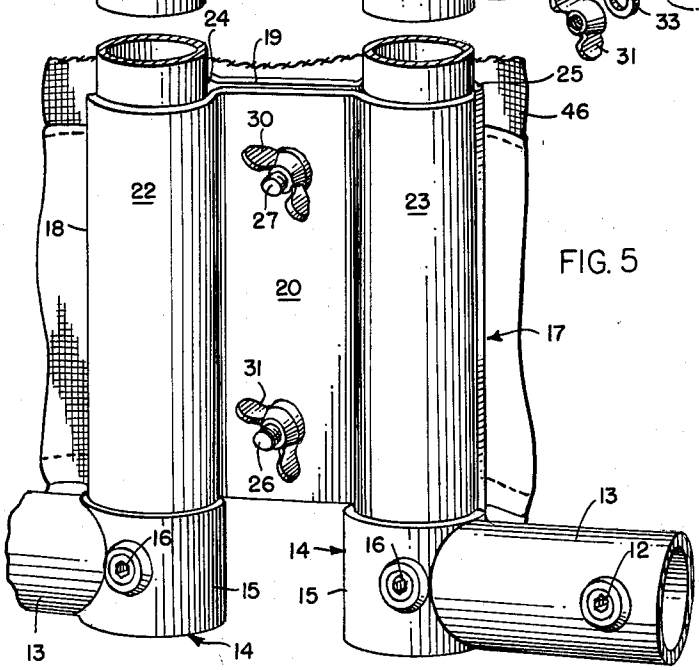


FIG. 5

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FIG. 7

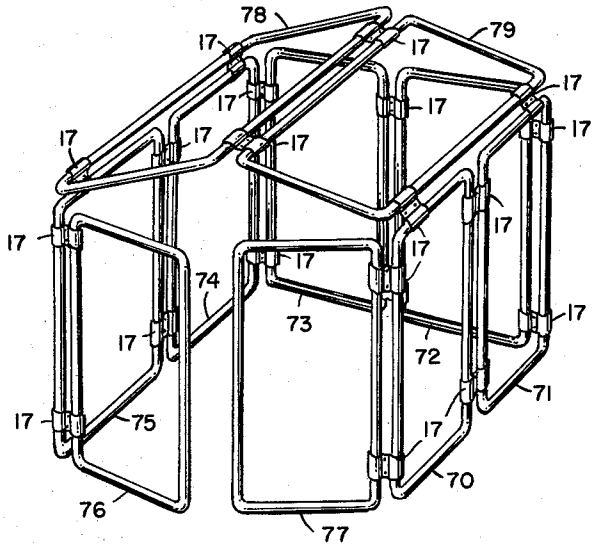
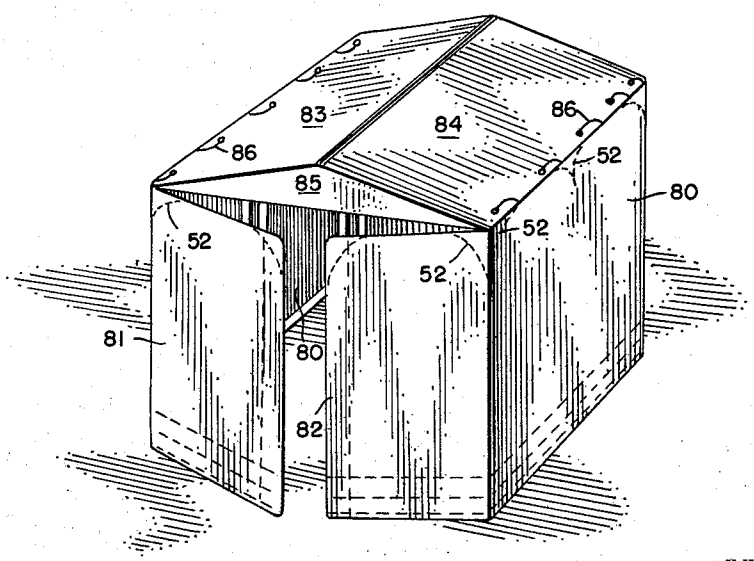


FIG. 8



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PORTABLE SCREEN STRUCTURES

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1 Claim. (Cl. 160—230)

This invention, in general, relates to portable screen structures.

There are many types of portable screens. The types of screens to which the improvements of this invention are directed are screens having sections of open metal framework which are hinged together in side-by-side relationship. The metal framework of each section has a flexible, lightweight cover panel attached and extending over the open framework. The primary features constituting the improvements of the invention in portable screen structures are found in the hinge elements between adjacent sections, the use of slip T's in attaching the bottom cross brace to the vertical legs of the respective sections, and the readily attachable and detachable flexible covering for the side-by-side frame sections.

The invention and the advantages thereof will be understood by reference to the drawing wherein:

FIG. 1 is a perspective view of the inward side of a 4-panel portable screen;

FIG. 2 is a front elevation of the outer side of the screen of FIG. 1;

FIG. 3 is a cross-sectional view of a double acting hinge taken on section 3—3 of FIG. 2;

FIG. 4 is a perspective, enlarged, fragmentary view of an upper hinge and associated hardware;

FIG. 5 is a perspective, enlarged, fragmentary view of a lower hinge and slip T couplings on the framework;

FIG. 6 is an exploded view in perspective of the components of the aforesaid double acting hinges;

FIG. 7 is a perspective view of framework of the invention used to provide the framework for a portable enclosure, e.g., a hut; and

FIG. 8 is a perspective view of the framework of FIG. 7 covered with flexible material to provide a small enclosure.

Referring particularly to FIGS. 1 and 2, the screen of the illustrated embodiment comprises a series of side-by-side, substantially rectangular, open frame sections 1, 2, 3, 4. The frame sections are similar in structure, each section comprising a metal tube 5 having parallel vertical side legs 6, 7, and bight segment 8 and 90° bends 9 and 10. The tubes 5 have the shape of inverted U's having a flat bight segment.

The lower ends of the side legs 6, 7 are connected by a bottom, cross brace tube 11 having its ends detachably held by Allenhead set screws 12 in the leg 13 of a slip T 14.

The cross leg 15 of each slip T 14 is adjustably held on the legs 6 or 7 by an Allenhead set screw 16. The slip T connection of the cross brace 11 to the legs 6 and 7 of the metal tube 5 allow the positioning of the bottom cross brace 11 either at or near the bottom of each frame section, the former used in cases where the screen is designed to extend downwardly in close proximity to or in contact with the floor or other surface. On the other hand, should it be desired that the lower edge of the screen be elevated from the floor or other surface, the cross brace and its slip T's can be moved upwardly on the legs 6 and 7 a desired distance.

The adjacent legs 6 and 7 of frame section pairs 1 and 2, 2 and 3, and 3 and 4 are hingedly joined together by a pair of double acting hinges 17 which are quickly assembled or disassembled. The double acting hinges 17

comprise a pair of opposing, but spaced plates 18 and 19 each having a substantially flat mid-portion 20 and 21, respectively and arcuately bent outer sections 22, 23 and 24, 25, respectively. The arcuately bent outer sections 22, 23, 24 and 25 have a radius of curvature closely approximating the outer radius of the metal tubing 5 in the side legs 6 and 7. The opposing plates 18, 19 are held together to form the double acting hinge 17 by stove bolts 26, 27 extending through square holes 28, 29 in the substantially flat mid-portions 20 and 21 of the opposing plates 18 and 19. The plates 18 and 19 are drawn together by threading wing nuts 30, 31 against lock washers 32, 33 until the arcuate outer sections 22, 24 and 23, 25 press tightly about the legs 6 and 7. The wing nuts 30, 31 are ordinarily drawn up only tight enough so that the legs 6 and 7 are still slidable in the arcuate sections 22, 24 and 23, 25, respectively. In this manner each of the pairs of opposing plates 18, 19 provide a double acting hinge connection whereby the screen sections can be folded or adjusted to any desired positionings.

The legs 6 of screen sections 2, 3 and 4 each have a ferrule 34 fixedly positioned by set screw 35 thereon. The function of the ferrules 34 is that of providing a shoulder or abutment precluding the downward slippage of the upper hinges 17 on the leg pairs 6 and 7. The bottom double acting hinges 17 are precluded against slipping downwardly by the cross leg 15 of the slip T's 14, which similarly provide a shoulder precluding downward movement of the lower double acting hinges.

One or more of the legs 6, 7 may have a hook hardware structure clamped thereon. In the illustrated embodiment, a hook 36 is supported on the leg 7 of both frame sections 2 and 3 by means of a clamp 37. Clamp 37 comprises a pair of arcuate sections 38, 39 connected at their rear sides by the quick release hook and eye arrangement 40 shown in FIG. 3. The front ends of the arcuate sections 38, 39 each have forwardly extending ears 41, 42, respectively. A bolt 43 extends through holes in ears 41, 42. When the nut 44 is tightened, the arcuate sections 38, 39 are clamped tightly about the legs 7. The hook 36 has a hook eye section 45 about the shank of the bolt 43 between the ears 41, 42, by which the hook 36 is supported on the clamp 37.

The hook 36 can be used for hanging working tools, safety goggles, sand buckets, fire extinguishers or any other items on the screen framework.

The open framework of the screen structure has a curtain or screen 46 of flexible material extending across and supported on frame sections. The screen 46 has a plurality of pockets 47 which open downwardly and into which extend the upper portions of the screen sections. The pockets 47 are formed by providing a strip of flexible material 48 along the upper edge of the curtain or screen 46. In the illustrated embodiment, the strip 48 is of flexible material attached along its outer sides and its upper edge to the curtain or screen 46 by stitching 49, 50 and 51. The pockets 47 are formed by joining together the strip 48 of flexible material and the curtain or screen 46 by stitching 52 having the outline of the upper end of the inverted U portion of metal tubing 5 of each screen section.

The lower edge of the strip 48 is turned under and stitched by stitching 53, 54 to provide a reinforced lower edge of the strip 48.

The lower portion of the screen or curtain 46 has a flap 55 extending thereacross. The flap 55 is stitched by stitching 56 along its upper side of the screen or curtain 46. The flap 55 is made of flexible material and has a plurality of grommets 57 mounted therein at spaced intervals. These grommets may be used to lace the lower end

of the screen or curtain to the lower parts of the frame sections or, as in the illustrated embodiment, the grommets 57 may be used to receive a hooked end 58 of double hooks 59, the other hooked ends 60 of which hook about the cross brace tube 11 or the lower ends of the side legs 6 and 7 to detachably hold the lower end of the screen or curtain 46 adjacent the lower ends of the frame sections.

The side edges of the screen or curtain 46 may be hemmed as shown at 61, 62 with stitching 63, 64, similarly, the lower edge of the screen or curtain may be hemmed as shown at the bottom edge 65 by stitching 66, 67. Furthermore, if desired, triangular gussets 68 of flexible material may be stitched into the lower corners of the screen or curtain to reinforce or rigidify the corners.

The curtain or screen 46 may be made of any suitable flexible material such as canvas, cotton duck, thermoplastic resins or any other suitable, flexible sheet material. Where the screen is used to shield areas having a fire danger, such as arc welding areas, the flexible material should be inherently fireproof or should have a fireproof or fire retardant coating thereon.

In addition to screen structures, the structures of the invention may be also used to provide readily collapsible, easily transportable enclosures of the type illustrated in the drawing. In the illustrated embodiment, six hingedly connected frame sections 70—75 of the same character as the frame sections heretofore described are used to form 3 vertical walls of a 4-sided enclosure. The fourth side of the enclosure is formed by the pair of frame sections 76, 77 hingedly connected to frame sections 75 and 70, respectively, but not hingedly connected to each other. The frame sections 76 and 77 form swinging doors on the fourth side of the enclosure.

The roof of the enclosure may be a flat roof or a gabled roof formed by frame sections 78 and 79 connected to each other by the clamp hinges heretofore described, at the apex of the gabled roof, and also attached at their outer sides by the clamp hinges, heretofore described, to the upper legs of screen sections 74, 75 and 70, 71, respectively.

The frame sections 70—77 are covered by a flexible screen or curtain of the type heretofore described, to provide flexible side walls 80 and door panels of flexible material 81, 82. The roof portion of the enclosure is preferably a preformed roof cover comprising roof panels 83, 84 having stitched thereto triangular end panels 85. The roof covering is placed over the roof framing 78, 79 and may be held thereon by any suitable means such as lacing 86 extending along the side edges of the roof panels 83 and 84, and wrapped around the tubular framework of the enclosure.

It will be, accordingly, seen that the invention provides portable screens whose frame sections may be readily assembled or disassembled by double acting clamping hinges which, in turn, are readily attached to or detached from the frame sections. Furthermore, the invention provides improvements in mounting of a screen or curtain of flexible material on the open framework screen structure. Still

further, the structural improvements provided by the invention enable the ready adaptation of the screen structure in the provision of quickly collapsible and quickly assembled enclosures such as small huts or the like.

The invention is hereby claimed as follows:

A portable and foldable screen comprising a plurality of frame sections in side-by-side relationship, each frame section being a four-sided, open frame made from a tube bent in the shape of an inverted U having a straight bight segment and two side members at right angles thereto, said bight segment forming the upper leg of said frame section and said side members forming the side legs of said frame section, the lower leg of each of said frame sections being formed by a straight tube extending between the lower portions of said side legs and being adjustably coupled thereto by means of slip T's on each end of said straight tube and slidably mounted on said side legs of the corresponding frame section, locking means coacting with said slip T's and said side legs to lock releasably said slip T's on said side legs, hinge means hingedly connecting the side legs of adjacent frame sections, a readily removable screen curtain of flexible sheet material mounted on said frame sections and extending across all of said frame sections and the spaces therebetween, said curtain having across its upper side a plurality of pockets defined by the upper portion of said curtain and a strip of flexible sheet material extending across the upper portion of one face of said flexible sheet and stitched to said upper portion by stitching defining pockets opening downwardly and corresponding to the dimensions of the upper portions of said frame sections, in which pockets the upper portions of said frame sections are seated, a second strip of flexible material extending across the lower portion of said face of said flexible sheet, said second strip having its upper longitudinal edge stitched to said flexible sheet and having its lower longitudinal edge unattached thereto, said longitudinal lower edge being spaced a substantial distance from the bottom edge of said flexible curtain, a plurality of grommets at spaced intervals in said second strip, and detachable means connecting said grommets and the lower legs of said frame sections to hold the lower portion of said flexible sheet adjacent the lower portion of said frame sections.

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