United States Patent [19]

Reed et al.

[11] **3,858,643**

[45] **Jan. 7, 1975**

[54] **PERSONNEL SHELTER**

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[73] Assignee: **Protect-O-Dome, Inc.,** Huntington, W. Va.

[22] Filed: **Apr. 17, 1973**

[21] Appl. No.: **352,038**

Related U.S. Application Data

[60] Division of Ser. No. 104,449, Jan. 6, 1971, Pat. No. 3,745,305, which is a continuation-in-part of Ser. No. 80,449, Oct. 13, 1970, abandoned.

[52] **U.S. Cl.** **165/47,** 297/180

[51] **Int. Cl.** **F28f 7/00**

[58] **Field of Search** 165/46, 47, 48, 39, 40; 297/180; 219/217

[56] **References Cited**

UNITED STATES PATENTS

3,131,967	5/1964	Spaulding	297/180
3,295,886	1/1967	Goldmerstein	297/180
3,444,922	5/1969	Dingman	165/46
3,745,305	7/1973	Reed	219/217

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Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

A personnel shelter is defined by a canopy and end walls of transparent lightweight flexible material which are removably attached to a bench. Heating and cooling, and air circulating devices are incorporated with the personnel shelter for conditioning the air within the shelter.

4 Claims, 7 Drawing Figures

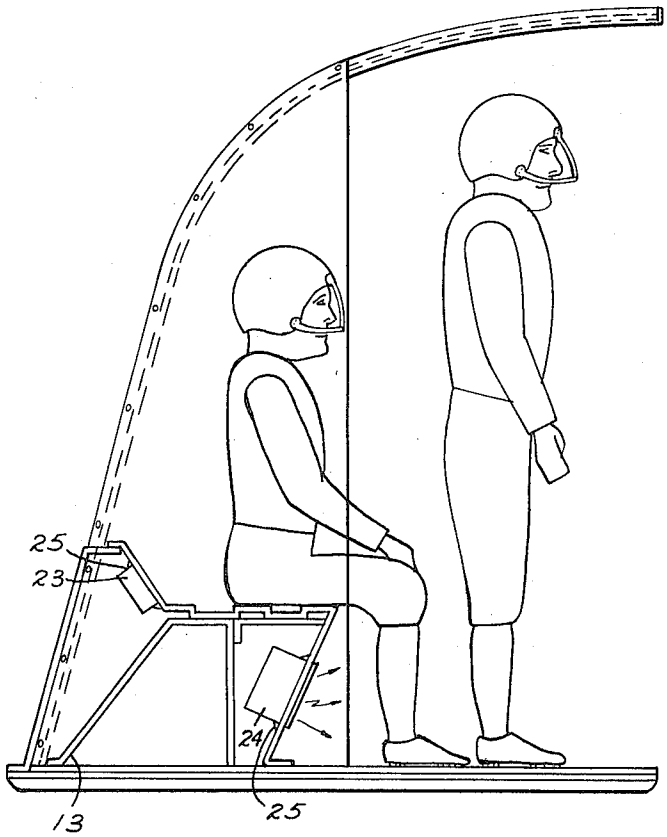


Fig. 1.

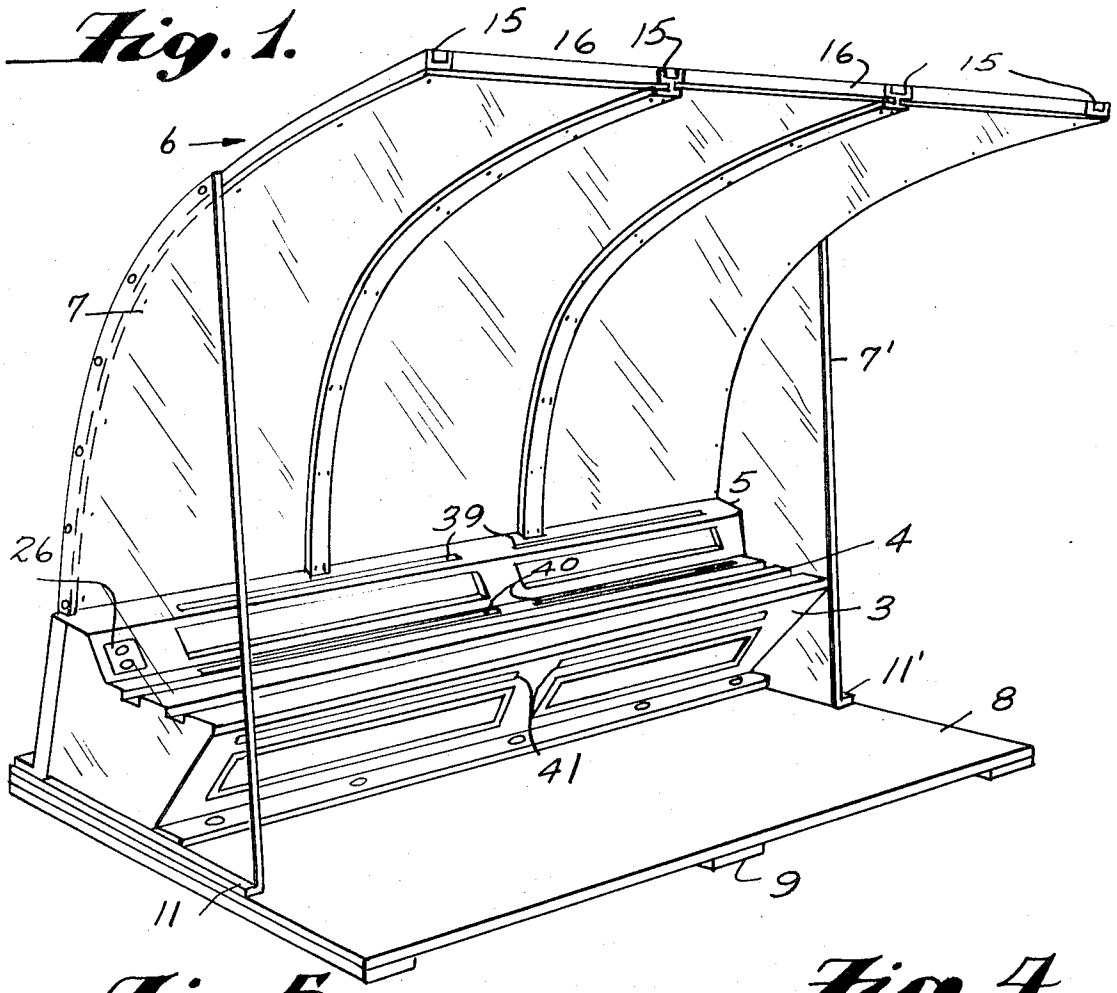


Fig. 5.

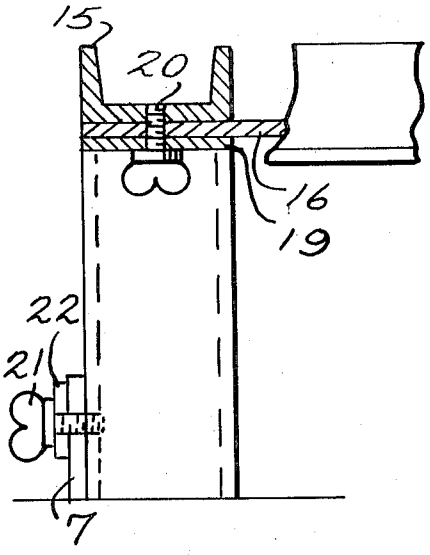


Fig. 4.

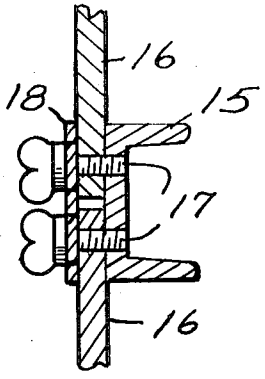


Fig. 2.

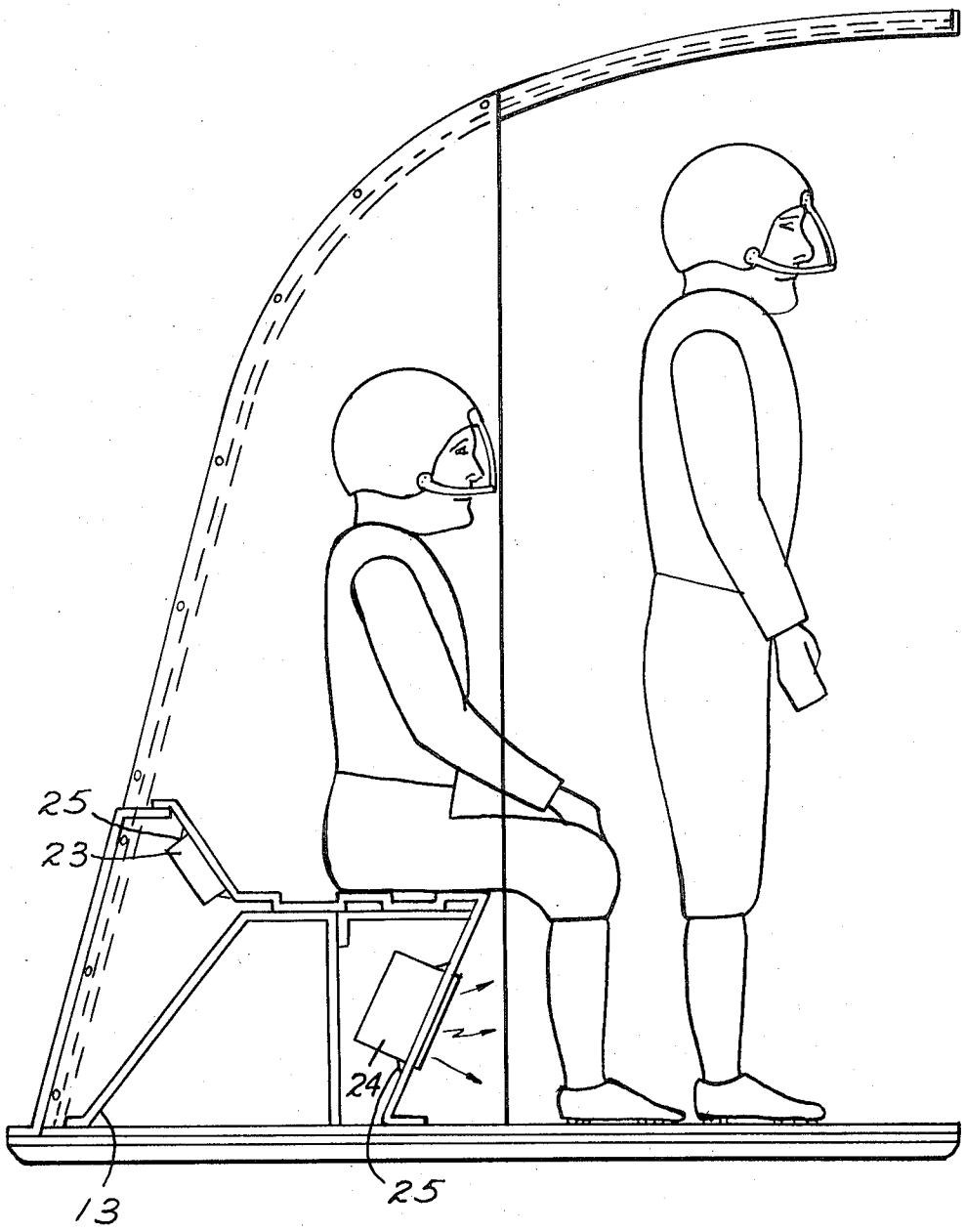


Fig. 3.

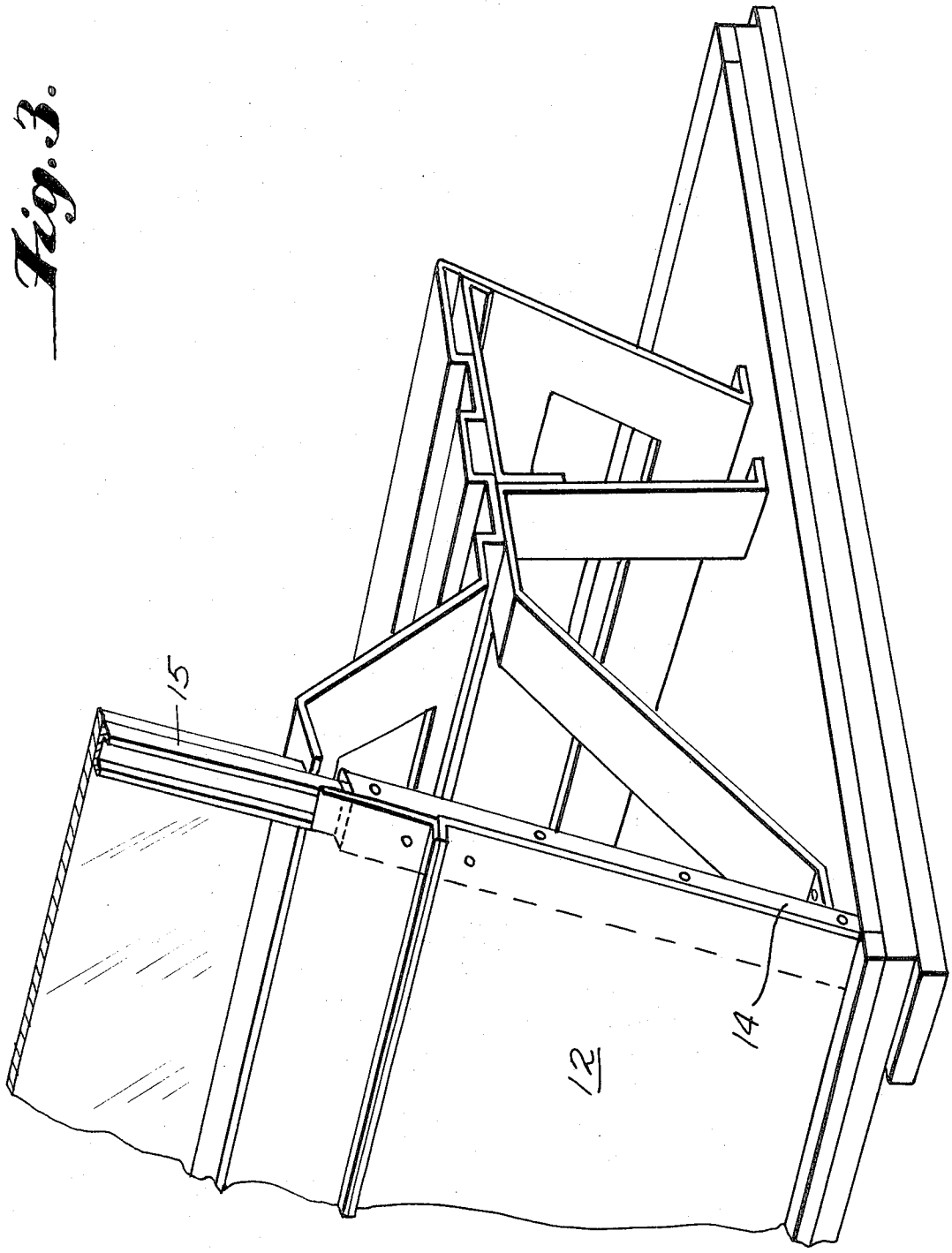


Fig. 6.

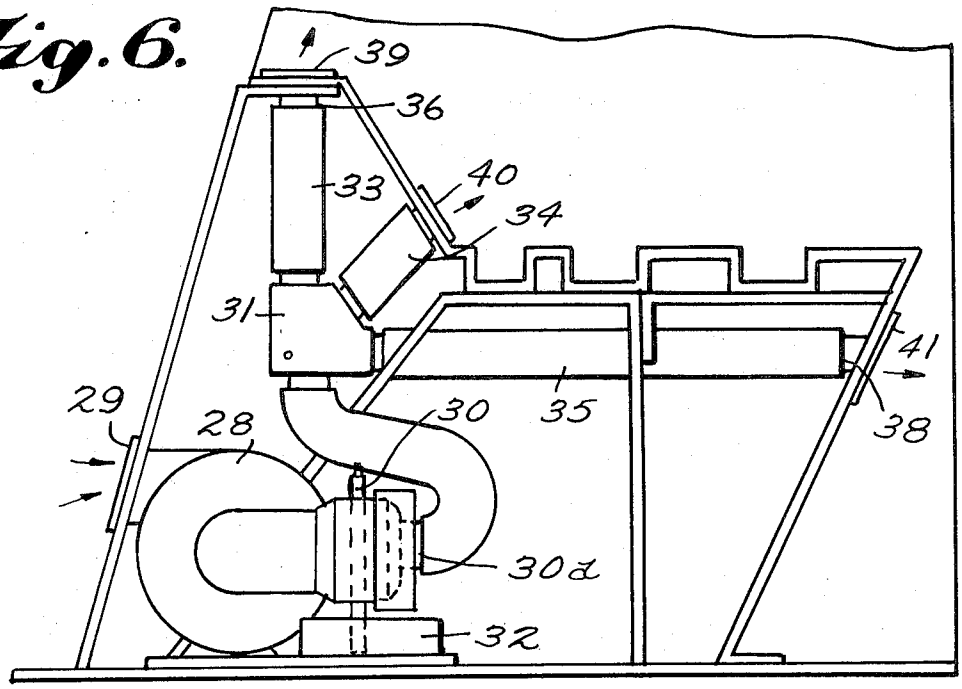
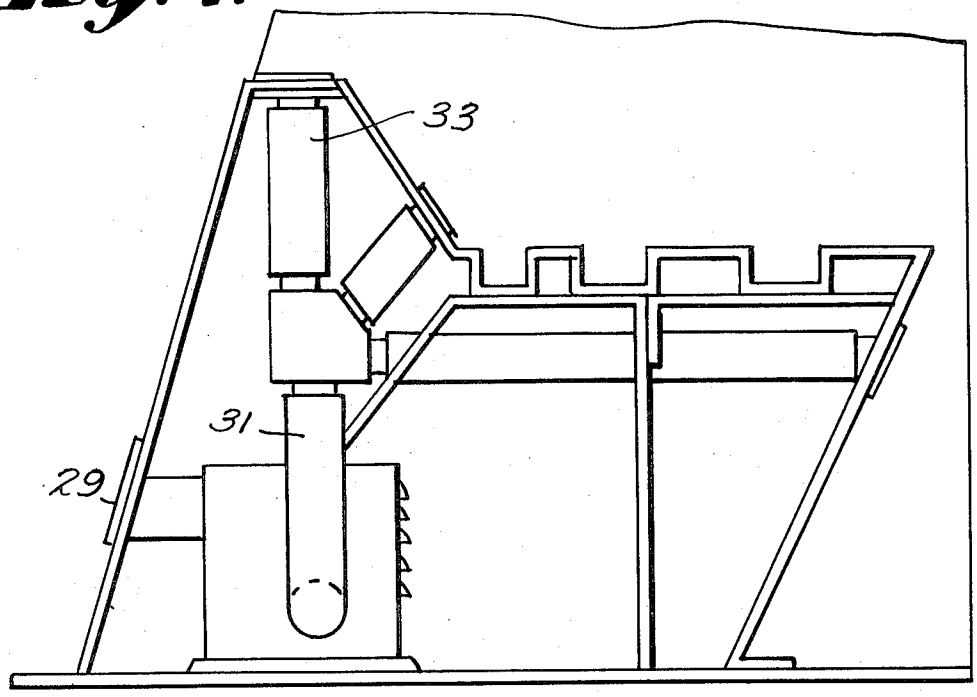


Fig. 7.



PERSONNEL SHELTER

This is a division of application Ser. No. 104,449, filed Jan. 6, 1971, now U.S. Pat. No. 3,745,305, granted July 10, 1973, which is a continuation-in-part of application Ser. No. 80,449, filed Oct. 13, 1970, now abandoned.

BACKGROUND OF THE INVENTION

This invention pertains to personnel shelters and specifically to shelters designed to offer a maximum protection against the elements while maintaining a maximum visual contact with the environment.

Protection against hot, cold and inclement weather has been one of mankind's most constant pursuits throughout history. Nevertheless, in certain areas this battle against the elements has yet to be won. For instance football players ordinarily sit on open benches completely exposed to elements which imposes great hardship upon the players during very hot, cold or inclement weather. Furthermore, besides the primary discomfort involved in being cold and/or wet there is also an increased danger of injury when unthawed muscles are plunged into the heat of competitive sports or when overheated athletes cannot be properly cooled following strenuous exercise.

There have, of course, been previous attempts to shelter football players from the elements. The method of providing dugouts under the stands has not proved convenient because the extra players on the bench need to be located nearer the field for quick substitution. For the same reason the shelter should be so constructed that large groups of people can quickly enter and leave the sheltered area and thus completely enclosed shelters, even if located adjacent to the playing field are impractical.

For the foregoing reasons the most promising shelter for football players developed by the prior art was a canopy which covers the bench area and defines a sheltered area which opens upon the football field. Even this solution, however, was disadvantageous from both the player's and the fan's point of view. While the canopy provided some shelter from the elements it did not contain any heating or cooling means and since it was open it provided no protection against the cold or the extreme heat produced by an artificial turf. In addition, the canopies adopted by the prior art interfered with the fan's view of the playing field and kept him from observing his favorite players and coach while they sat upon the bench. In addition, the prior art shelters were disadvantageous from the point of view of the playing field maintenance crew since they had to be assembled piece-by-piece at the bench site.

SUMMARY OF THE INVENTION

It is therefore one object of this invention to provide a personnel shelter with a transparent canopy. It is another object of this invention to provide personnel shelter which has heating, and cooling means attached thereto. It is yet another object of this invention to provide a personnel shelter which can be moved as a unit or completely disassembled. It is a further object of this invention to provide a personnel shelter including a canopy cooler and heater both of which are removably attached to a bench that the bench can function as an open bench during fine weather.

The above and other objects will be accomplished by the applicant's invention which, simply stated, comprises a personnel shelter having a transparent canopy removably attached to a bench and curving above the bench to provide, in conjunction with end walls, a sheltered area about the bench and heaters and cooling means removably attached to the bench for warming, or cooling, especially the feet and lower back portions of people sitting upon the bench.

While most of the foregoing comments were directed to a shelter specifically designed to protect football players from the elements, it should be obvious that a shelter for this purpose would also have great utility in other areas. For instance, a shelter which would overcome the difficulties mentioned above could provide temporary relief from the elements for construction workers, commuters, skiers or anyone else who has been induced by business or pleasure to spend time outdoors during very hot, cold and/or inclement weather. In particular, a shelter in accord with applicant's invention would be a boon to those who commute during dark hours since they could see through the shelter's canopy and thus spot suspicious persons lurking thereabout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a personnel shelter according to applicant's invention;

FIG. 2 is a side view of the personnel shelter shown in FIG. 1 showing particularly the placement of the heaters;

FIG. 3 is a partial view of the end of the personnel shelter from the perspective of one standing behind the bench;

FIGS. 4 and 5 are details of FIG. 1 showing how the canopy sections are fastened to the channels;

FIG. 6 is a side view of the personnel shelter similar to FIG. 2 showing particularly the placement of the blower means; and

FIG. 7 is a side view of the personnel shelter similar to FIG. 2 showing particularly placement of the mechanical cooling means.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, reference numeral 1 indicates generally the personnel shelter in accordance with applicant's invention, while reference numeral 2 indicates generally the bench portion of the personnel shelter. The bench, in turn, is comprised of a forward support portion 3, a seating portion 4, and a raised back portion 5. The bench is protected by a canopy indicated generally by reference numeral 6 and end walls 7 and 7'. The end walls and bench rest upon platform 8 which is raised above the ground by runners 9. In addition the forward support portion 3 of bench 2 is attached to platform 8 by removable fasteners 10 and the end walls 7 and 7' are similarly attached to the platform by removable fasteners 11 and 11'.

As is best shown in FIG. 3, the forward support portion, the seating portion, and raised back portion of the bench are manufactured together in a single form of molded plastic. The seating area is corrugated for strength and to provide a surface which is easier to keep dry during inclement weather. While any plastic having appropriate mechanical properties may be utilized in molding the bench seat, a textured sheet of Noryl plastic ¼'' thickness has proved satisfactory. A

removable panel **12** which may also be of textured Noryl sheet completes the bench unit.

FIG. **2** shows that the bench seat is braced by the strap steel brackets **13.** In addition, the seat is braced by metallic tubes **14** best shown in FIG. **3** which extend from the platform to the upper surface of the raised back portion. FIG. **3** shows that metallic tubes **14** are properly sized and spaced to receive the ends of channels **15** while FIG. **1** shows that channels **15** and sections **16** of a transparent, lightweight and flexible material together comprise canopy **6.** While any material with suitable mechanical and optical properties may be used for the transparent sections and end walls, it has been found that cold-formed Lexan has excellent optical clarity as well as toughness.

FIG. **4** in which the left side faces the sheltered area, shows how the transparent section **16** is attached to channels **15** by adjusting screws **17** and washer strip **18.** FIG. **5** shows how transparent section **16** is attached to the left channels **15** by washer strip **19** and adjusting screw **20.** In addition, this figure also shows adjusting screw **21** and washer **22** which fasten end wall **7** to channel **15.**

FIG. **2** best demonstrates the positioning of top heater **23** and bottom heater **24.** Both of these heaters are removably attached to bench **2** by one-way fasteners **25** which allow the heaters to be removed from inside the bench once the removable panel **12** has been removed. FIG. **2** shows that the radiation of top heater **23** has its greatest effect on the lower back of a person seated upon seating portion **4** while bottom heater **24** is directed towards the feet of a seated person.

The combined effect of these heaters **23** and **24** produces a most complete warming effect on the seated person because heater **24** directly warms the feet while heater **23** warms the lower back of a seated person, the most critical portion of the body for heating purposes, as well as the persons hands which are normally at the seat level.

The heaters may take any form which is thermally suitable. However, electrically powered infra-red heaters have been found desirable for this use. The temperature of the heaters is adjusted through the upper dial of conventional heater controls **26** and other known circuitry which is not shown.

When it is desired to use the personnel shelter in a warm environment, the fan motor **27** shown in FIG. **6** is energized by depressing the lower button shown in temperature control **26.** The fan motor causes the conventional fan **23** to draw air in through inlet in bottom panel **12** and to discharge air through the evaporator sheet **30** into manifold **31.** The evaporator sheet **30** is supported in the water tank **32** and thus the water lost by evaporation is continually replenished.

The air cooled by pressing through the evaporator sheet into the manifold **31** is led through ducts **33, 34** and **35** to channels **36, 37** and **38,** respectively. The channels are disposed parallel to the top and bottom of the raised back portion **5** of the bench and the forward support portion, respectively, and these channels communicate with the sheltered area through pairs of vents **39, 40** and **41,** respectively.

At certain times it is desirable to cool but not to chill personnel coming to the shelter area from a very hot area adjacent thereto. In this case, the evaporator sheet **30** may be removed and the fan **28** connected directly to the manifold **31.** The personnel seated upon the bench will then be subjected to air at essentially ambient temperatures which aids their normal bodily evaporative process to gradually cool them.

It may also be desirable to cool the sheltered area more than is possible with the evaporator described above. In this case, as shown in FIG. **7,** the fan **28** and evaporator sheet **30** can be replaced by a conventional air refrigeration unit **42** which can be connected by the same ducts as above to the sheltered area and can be operated as the fan was by temperature control **26.**

Both of the above described cooling devices may logically be placed at the longitudinal center of the bench **50,** as to minimize interference with the heaters. In an alternate embodiment, however, the heater units may be removed and replaced by channel units **43** and **44.** In this event, of course, the channels **37** and **38** and the pairs of vents **40** and **41** could be dispersed with.

The overall dimensions of the personnel shelter are, of course, variable within the scope of the applicant's invention. Nevertheless, certain design criteria should be followed, for instance, platform **8** should extend far enough in front of bench **2** to allow a person to stand up, and, of course, the canopy should also cover this portion of the platform. In addition, the curvature of the canopy should be such that the seated individual can rise from a sitting to a standing position without coming into contact with the canopy. As to the length of the personnel shelter there are many possibilities. The shelter can be made long enough to seat an entire football team (one hundred feet of fifty persons) whence it would probably be moved into place by a tractor, or the personnel shelter may be built in modules which are narrow enough (twelve feet or six persons) to be maneuvered by a forklift truck whose prongs would extend under the raised platform **8** substantially parallel to the runners **9.** If module type personnel shelters were used, any number of persons could, of course, be seated by manipulation of the number of modules. The module embodiment would also be advantageous where the shelter is used by small groups of people such as commuters on mass transportation or the other groups discussed above.

The height of the platform above the ground is not critical as long as the platform is raised from the ground enough to provide a surface which is easy to keep clean.

It should be apparent that since the canopy, end walls, and heaters and cooling equipment, are all removably fastened to the bench these items can be removed if it is desired to use the bench as a simple open bench during fine weather.

What is claimed is:

1. A personnel shelter comprising a bench having a forward support portion, a seating portion and a raised back portion, a canopy extending upward from the upper surface of said raised back portion and curving above said bench, means for securing said canopy to said bench, a wall positioned at each end of said bench having one edge shaped to make a flush joint with said canopy and means attached to said bench for conditioning the air within the area defined by said canopy and said end walls, said means for conditioning the air including a fan and duct means communicating the output from said fan with said defined area for circulating the air within said sheltered area.

2. The personnel shelter of claim **1** further including an evaporator sheet disposed between said fan and said

duct means for cooling air before it is circulated within said sheltered area.

3. The personnel shelter of claim 1 wherein said duct means includes three ducts, one disposed along the top of said raised back portion of said bench, a second disposed along the bottom of said raised back portion and a third disposed along said forward support portion of said bench.

4. The personnel shelter of claim 1 wherein said means for conditioning the air comprises an air refrigeration unit and duct means communicating the output of said refrigeration unit with said sheltered area for circulating cool air within said area.

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