

March 19, 1935.

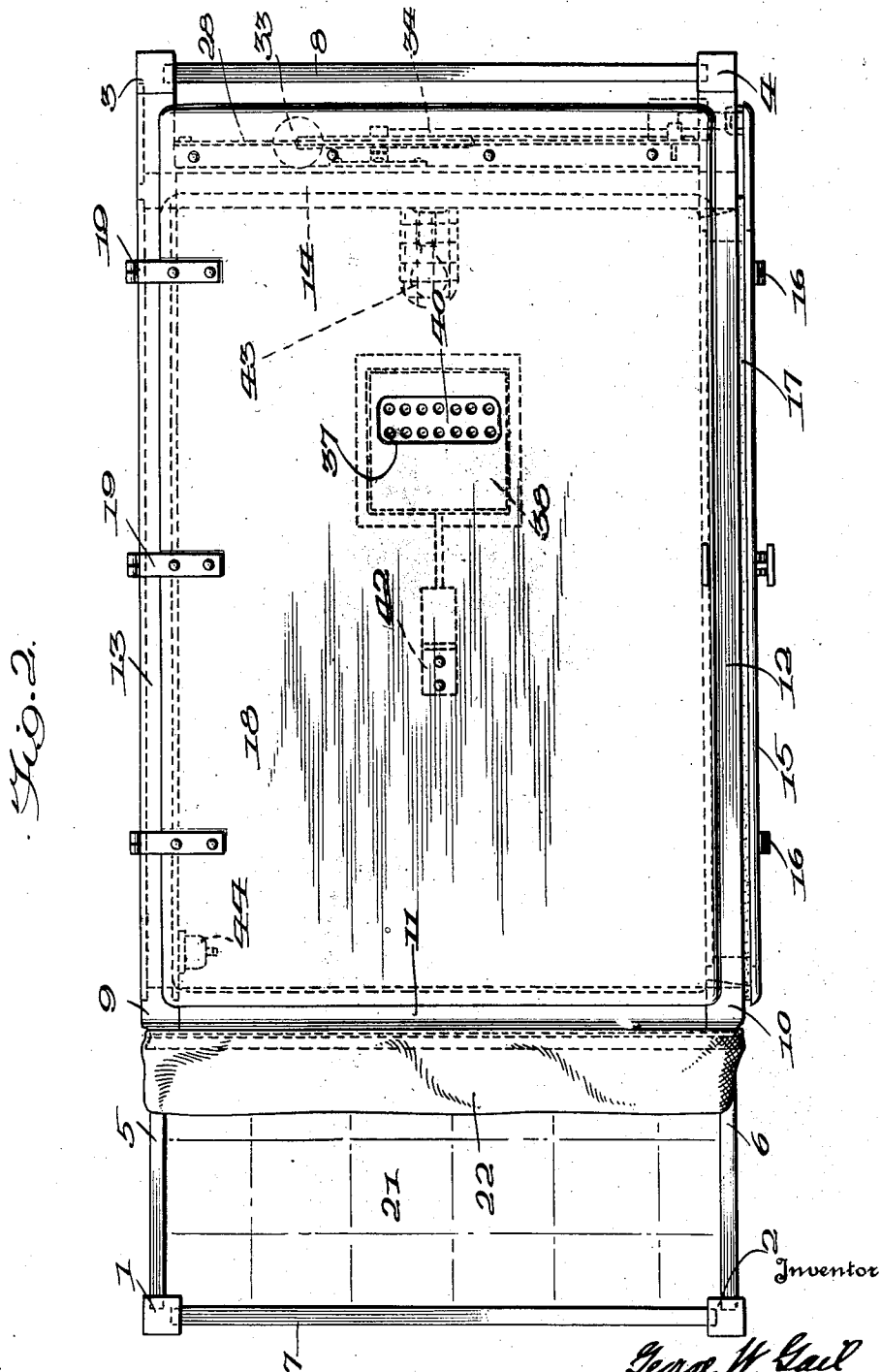
G. W. GAIL

1,995,205

BED

Filed Jan. 28, 1932

5 Sheets-Sheet 2



Inventor

George W. Gail,
by K. C. Crockett.
Attorney

March 19, 1935.

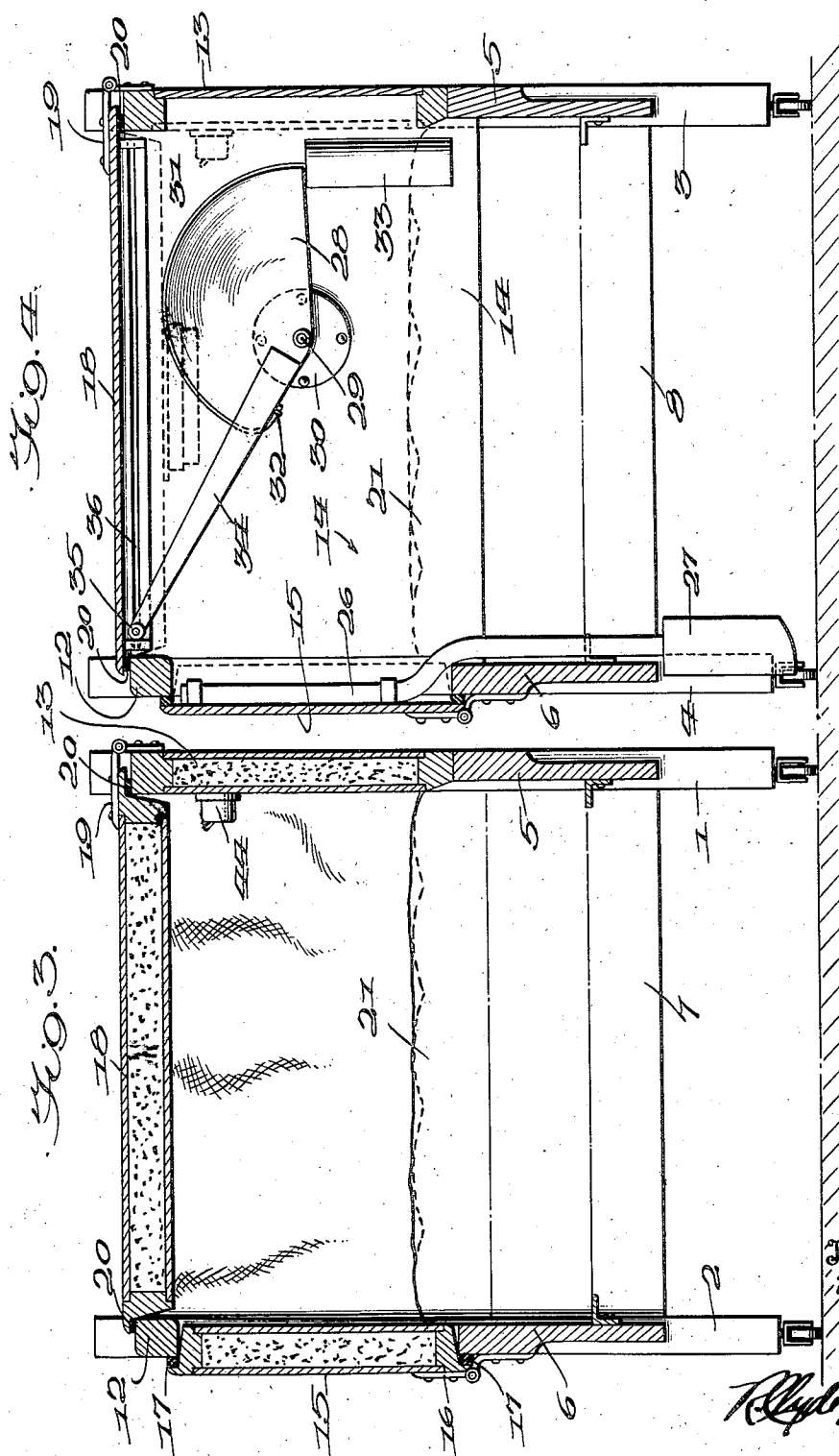
G. W. GAIL

1,995,205

BED

Filed Jan. 28, 1932

5 Sheets-Sheet 3



March 19, 1935.

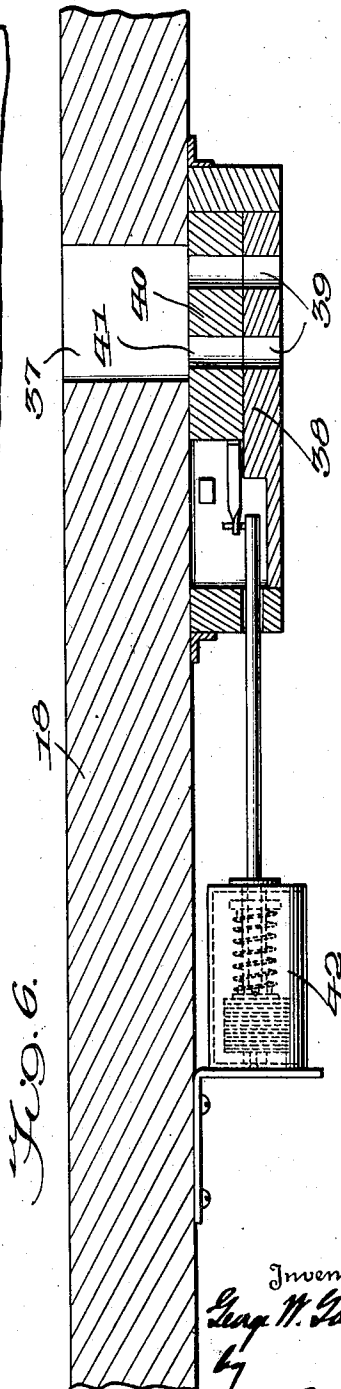
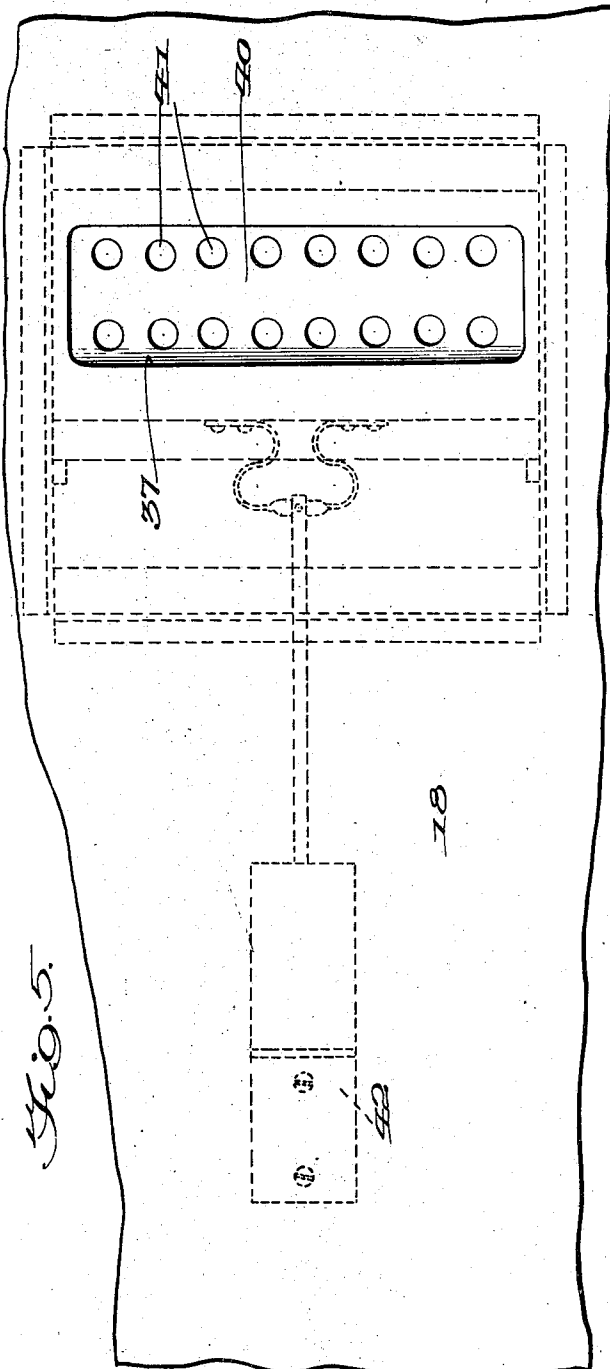
G. W. GAIL

1,995,205

BED

Filed Jan. 28, 1932

5 Sheets-Sheet 4



By

Inventor
G. W. Gail
by
R. C. Gail
Attorney

March 19, 1935.

G. W. GAIL

1,995,205

BED

Filed Jan. 28, 1932

5 Sheets-Sheet 5

Fig. 7.

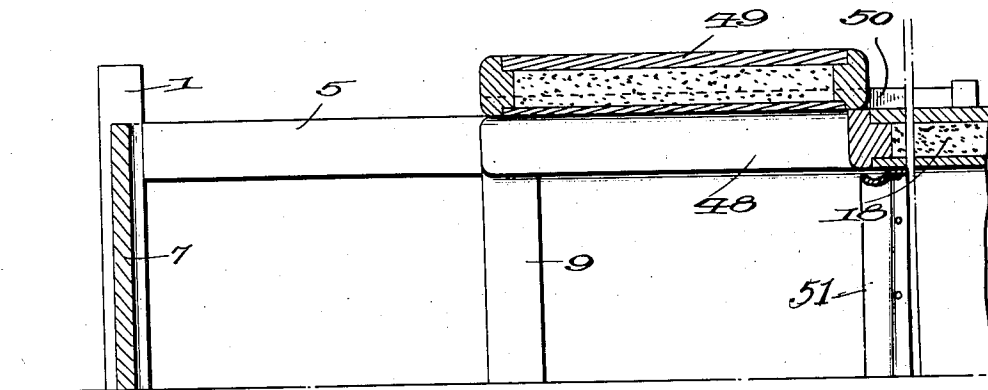


Fig. 8.

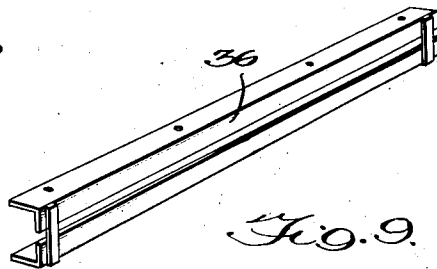
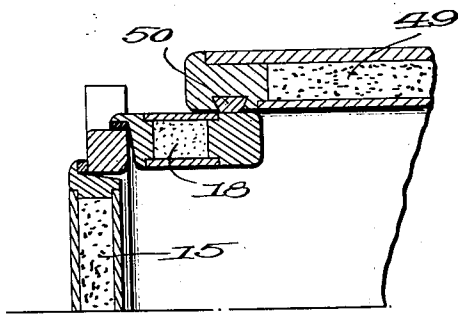


Fig. 9.

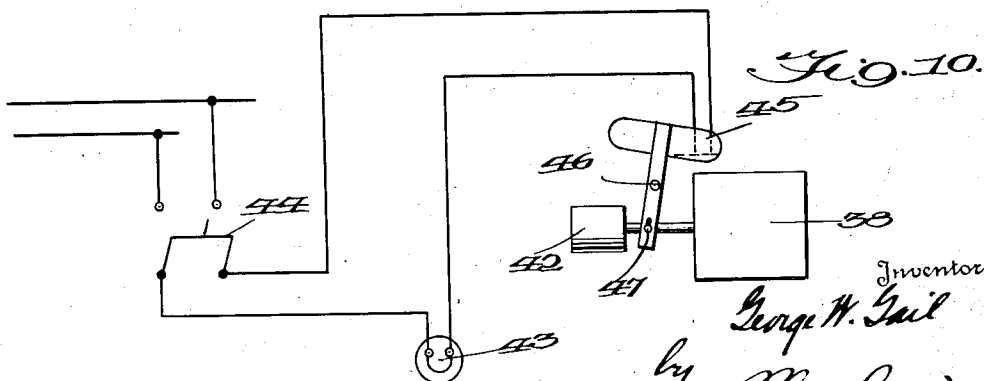


Fig. 10.

By

Inventor
George W. Gail
by *A. Clyde Curtis*
Attorney

UNITED STATES PATENT OFFICE

1,995,205

BED

George W. Gail, Ruxton, Md.

Application January 28, 1932, Serial No. 589,502

5 Claims. (Cl. 5—334)

This invention relates to certain improvements in beds and also to a new method, whereby the actual heat of one's body may be conserved and utilized during the sleeping or resting period.

5 The object of the invention is to provide a bed for universal use so designed and constructed, whereby, without the use of artificial heat, blankets or similar bed clothing, the body of the occupant will be maintained at the desired uniform temperature, yet at the same time allowing said occupant to avail himself of the maximum amount of fresh air.

10 This is accomplished, broadly, by providing the bed with an enclosure completely insulated to exclude the surrounding atmospheric air and capable of retaining heat generated within said enclosure, whereby the heat given off by the body of the person occupying the bed, will be available for providing the necessary heat to the enclosure, it being understood that this enclosure is for the body only, leaving the head exposed to the outside or fresh air.

15 This enclosure above referred to, in one embodiment of the invention is of rectangular form constructed of hinged sections and each section is insulated or made of insulating material and the joints between said sections properly sealed so that when the enclosure is in operative position the interior thereof is completely insulated from the surrounding atmosphere and any heat generated or given off within the enclosure will be retained.

20 An average adult dissipates about 400 B. t. u. per hour for comfort, of which about 30% is lost by contact with the air, 43% by radiation and 27% by exhalation and other means.

25 Since the occupant's head will not be within the housing, the heat of exhalation will be lost so that there will be available for the present purpose 43% plus 30% or a total of 73% of the original 400 B. t. u. ($.73 \times 400 = 292$ B. t. u. per hour).

30 To make use of this body heat it is only necessary to provide sufficient and proper insulation for the bed enclosure and no auxiliary heat is necessary except when desired for initial warming to make the bed comfortable on retiring.

35 Means are therefore also contemplated for warming the enclosure before retiring, when necessary, and this is accomplished in a simple manner by providing an electric lamp of the usual type, within the enclosure. It has been found that a lamp of 100 watts consumption will be ample for this purpose.

40 Thermostatically controlled means, such as a slide valve or the like are also provided for automatically maintaining the temperature within the enclosure within predetermined limits as desired.

45 One form of the invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of the complete bed;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical transverse section;

Fig. 4 is a view partly in section and partly in elevation at the foot of the bed, illustrating the counterweight mechanism for the hinged side and top;

Fig. 5 is an enlarged detail view of the slide valve;

Fig. 6 is a view partly in section and partly in elevation, illustrating the relation between the thermostat and slide valve and the preferred manner of mounting these parts;

Fig. 7 is a modification wherein a portion of the top section is made in the form of a slide for the purpose to be hereinafter described;

Fig. 8 is a sectional view showing the relation between the slide and the upper hinged section of the bed;

Fig. 9 is a view showing the preferred construction of guide for the upper end of the counterbalanced arm associated with the top hinged section as illustrated in Fig. 4; and

Fig. 10 diagrammatically illustrates the wiring circuit for the automatic heat control wherein a mercury tube switch is associated with the thermostat and slide valve.

Referring to the drawings in detail the bed comprises generally a main frame having mounted thereon a supplemental frame, and associated with said supplemental and main frames are stationary and hinged sections forming the bed enclosure.

The main bed frame comprises head posts 1 and 2 and foot posts 3 and 4. Connecting these posts are side rails or side frame members 5 and 6, a head board 7 and a foot board 8, all of which being quite similar to the general construction of the conventional bed.

40 The supplemental frame consists of vertical posts 9 and 10 and an upper connecting transverse rail or the like 11 mounted upon the side rails 5 and 6 respectively and spaced a proper distance from the head board 7 for the purpose to be hereinafter described. The vertical post 10 has secured to its upper end a longitudinal rail or frame member 12, the opposite end of which is secured to the foot post 4. The other vertical post 9 has secured thereto a wall or side panel 13 extending rearwardly and secured at its opposite end to the foot post 3.

45 Extending transversely of this supplemental frame at the foot portion of the bed, and slightly spaced from the foot board 8 is a transverse wall or partition 14, leaving a space between said wall or partition 14 and the foot board 8 of the bed for mounting the counter-balance mechanisms for the hinged section to be hereinafter described. (See Figs. 1, 2 and 4.)

The side panel 13 and the end partition 14 are preferably of a double wall construction, the space between the double walls being filled with an insulating material as best shown in Fig. 3.

5 As hereinbefore stated this side panel 13 and end partition 14 preferably form a permanent part of the bed enclosure, the top and one side of the enclosure being formed of hinged sections.

Referring to Fig. 1 the movable side section 15 is provided with hinges or the like 16 pivotally securing this side wall to the main side rail 6 of the bed frame. This hinged section 15 is also of hollow wall construction with a filling of insulating material between the walls as shown in Fig. 3, and the joint between the edges of this hinged section 15 and the supplemental frame opening adapted to be closed by the hinged section 15 is provided with a sealing strip or the like 17 so that when this section is closed, a tight seal will be provided to the exclusion of atmospheric air to the interior of the enclosure and prevent any escape at these points of any heated air from within the enclosure.

The top 18 of the enclosure is also preferably of double wall construction and provided with insulating filling between the two walls whereby this top section or panel will be completely insulated. Similar to the side hinged section 15 the top section 18 is likewise provided with hinges 19 pivotally securing the same to the upper rail of the permanent side section or panel 13, and this top section 18 is also provided with a sealing strip 20 in a similar manner and for the same purpose as that described in connection with the hinged side wall 15.

With this construction just described relative to the supplemental frame and enclosure, keeping in mind that a mattress 21 covers the bottom of the said enclosure, this enclosure will be substantially and completely insulated from the outside or surrounding air with the exception of the forward end opening defined by the vertical posts 9 and 10 and transverse member 11. This opening through which the occupant's head projects, is covered by a flexible shield or curtain 22, said curtain being provided with a hem around one edge through which is inserted an elastic cord or the like 23 whereby the flexible shield is secured to the open end of the enclosure, the ends of the elastic cord 23 being secured to the main side rails 5 and 6 of the bed frame by fastenings 24 of any preferred form. To facilitate the maintaining of this shield in proper place and to also provide a tight seal, the vertical posts 9 and 10 and transverse member 11 are formed with a groove 25, all of which is clearly shown in Figs. 1 and 2. This shield is made sufficiently long to overlap the mattress and be properly draped around the neck of the occupant so that a relatively tight seal is provided at this point. Furthermore the fact that the only joint is that point adjacent the mattress or the bottom of the shield, the warm air within the enclosure having a natural tendency to rise will obviously not escape at this point.

In order to facilitate ease of operation of the hinged sections these hinged sections 15 and 18 are provided with counter-balance weight mechanisms mounted within the space between the insulated end wall 14 of the enclosure and the foot board 8 of the main frame. (See particularly Fig. 4.) The side hinged section 15, adjacent the foot portion of the bed is provided with a properly shaped rod or bar 26 having secured

at its lower end a weight or the like 27, this weight being sufficient to properly counter-balance the weight of the hinged side wall 15 so that upon the opening and closing of this section, no great effort will be required and furthermore the weight will have a tendency to maintain the hinged side wall 15 in closed or operative position.

The counter-balance weight mechanism for the top hinged section 18 of the enclosure also mounted in the aforesaid space, comprises an arcuate sector 28 pivotally secured as at 29 to a fitting 30, said fitting being secured to the end wall 14 and provided with a pin or the like upon which the arcuate sector 28 is pivotally mounted. This sector 28 is not a true sector of a circle but it is somewhat eccentric. This is for the purpose of varying the leverage about the center of rotation. The curved edge of the sector 28 is provided with a groove to support a wire cable or the like 31, one end of which cable is secured to the sector as at 32 and the free end thereof supports a weight 33. This sector 28 also carries a lever arm 34, and the upper end of this lever arm is provided with a pin or roller 35 adapted to ride in a groove 36 preferably formed by two spaced parallel angle irons as shown in Fig. 9, secured to the under face of the top hinged section 18. (See Figs. 1 and 4.) When the top hinged section 18 is closed or nearly so, the greatest leverage is needed, whereas in other positions of the top hinged section, a reduced leverage is sufficient. Therefore when the weight of the door has been definitely determined, its center of gravity may be found and the sector 28 shaped to give it the proper length of lever arm 34 for all of the various positions the top hinged section may assume, the leverage increasing and decreasing as desired upon opening and closing of this hinged section, according to the eccentricity of the sector 28.

In order to maintain, under working conditions, the proper uniform temperature within the enclosure, the top hinged section 18 is formed with an opening 37, and this opening is provided with a slide valve mechanism 38. (See Figs. 2, 5 and 6.) This slide valve mechanism comprises a stationary part or housing secured to the inner face of the upper hinged section 18 immediately below the opening 37, and said stationary part is provided with openings 39 in line with the main opening 37 through the hinged top 18. Mounted within the housing 38 and cooperating with the opening 37 and openings 39 is a slide valve member 40 likewise provided with openings 41, so that in the open position of the slide valve member 40 direct communication will be established between the interior of the enclosure and the exterior air, to a limited degree as defined by the aforesaid openings. When this slide valve member 40 is moved to its reverse position all communication will be cut off as will be obvious upon referring to the drawings. The operation of this valve is controlled by a thermostat 42 of the syphon-bellows type so that according to the setting of the thermostat the proper functioning of the valve can be had. In other words as the temperature within the enclosure during operation increases or decreases, the valve 41 will be opened or closed accordingly in order that a constant uniform temperature may be had within said enclosure.

As hereinbefore stated, it may be necessary to provide a means for warming up the enclosure in a preliminary way so that the temperature

therein may be of the proper degree when the bed is first occupied. This can be accomplished by mounting within the enclosure a lamp or the like 43, the lamp being in circuit with a manually controlled switch 44 conveniently arranged within the enclosure. (See diagram Fig. 10.) Preferably this manually controlled switch is in circuit with an automatically controlled mercury tube switch 45 and this mercury tube switch 45 is pivotally mounted as at 46, upon a lever arm having its lower end as at 47 associated with the thermostat 42 and slide valve 38 so that should the lamp be left on it will be automatically cut off by the automatically operated mercury tube switch 45, all of which is clearly shown in Fig. 10.

Referring to Figs. 7 and 8 a modified construction of the top hinged section is provided wherein the forward end part of this top is formed with an opening 48 adapted to be closed by a slide 49, the slide being mounted on rails or the like 50 secured to the top section adjacent the side edges of the opening 48. This slide is for the purpose of providing more room at the forward end of the bed enclosure in the event that one should desire to sit up in the bed for the purpose of reading and the like, the original disclosure not permitting enough room between the enclosure and the head board 7 of the bed proper.

In using this modified construction, it will of course be understood that the cross rail 11 will be omitted, and the posts 9 and 10 rigidly supported in the side frame members 5 and 6. Further, in this modification (Fig. 7) there is provided an auxiliary curtain-supporting member 51 for the purpose of attaching an additional curtain when reading or the like, in order to keep the lower part of the body warm at such times.

The heating means above described is merely incidental to the invention, as said invention resides in the method and apparatus wherein the body heat given off by the occupant of the bed, is utilized to maintain the bed enclosure at the desired temperature without the use of artificial heat, blankets or other bed clothing except in extreme cold weather, at which time it might be desirable to employ the automatically controlled heating means.

The elimination of bed clothing not only does away with the necessity of daily work in making up the bed and the airing of bed clothing, but the occupant is not hampered during his sleeping period with excessive weight and bulky and cumbersome bed clothing. This is important especially with tall persons where the feet of such persons extend fully to the foot of the bed and are pressed down, by the covers being folded or tucked under the mattress at that point. The covers either press upon the feet or are dislodged during the night by the feet so that one often becomes uncovered in a cold room at night.

Many other advantages will be apparent in the use of the structure and the method involved as disclosed in the present application.

What is claimed is:

1. A bed, for maintaining the body of a person at rest, at a predetermined temperature without the use of bed clothing or artificial heat, comprising head and foot boards and side rails and

having mounted thereon an enclosure for said body, said enclosure consisting of a permanent foot portion independent of the foot board of the bed and spaced therefrom, a permanent side portion, a hinged side portion and a hinged top portion, all of substantially rigid insulating material with air tight joints between the parts, and a flexible head portion, said side and top portions extending approximately to the foot board of the bed enclosing said space between the foot portion and foot board.

2. A bed comprising head and foot boards and side rails and means for closely supporting a mattress between said side rails, a stationary panel mounted upon one of said side rails, a hinged panel carried by the opposite side rail, a stationary foot panel spaced from said foot board, a hinged top panel, and a flexible head portion all cooperating to form an enclosure for said mattress and all joints between panels being provided with an air-tight seal, said side and top panels extending approximately to the foot board of the bed enclosing said space between the foot panel and foot board.

3. A bed comprising head and foot boards and side rails and means for closely supporting a mattress between said side rails, a stationary, substantially rigid insulated side panel mounted upon one of said side rails, a substantially rigid panel of insulated construction hinged to the opposite side rail, a substantially rigid stationary foot panel of insulated construction spaced from said foot board, a top panel also of substantially rigid insulated construction hinged to the upper edge of said stationary side panel, and a flexible head portion all cooperating to form an enclosure for said mattress and all joints between panels being provided with an air-tight seal, said side and top panels extending beyond the foot panel and approximately to the foot board of the bed enclosing said space between the foot panel and foot board.

4. A bed comprising head and foot boards and side rails, and means for closely supporting a mattress between said side rails, a stationary substantially rigid insulated side panel mounted upon one of said side rails, a substantially rigid panel of insulated construction hinged to the opposite side rail, a substantially rigid stationary foot panel of insulated construction spaced from said foot board, a top panel also of substantially rigid insulated construction hinged to the upper edge of said stationary side panel, and a removable flexible curtain for the head end of said enclosure, all joints between panels being provided with an air-tight seal, and counterbalances for said hinged sections mounted in the space between the foot panel and foot board.

5. A bed comprising head and foot boards and side rails, and means for closely supporting a mattress between said side rails, stationary and hinged panels of insulated construction supported by said bed and providing an enclosure therefor, one of said stationary panels being a foot panel spaced from said foot board and counterbalances for said hinged panels mounted in the space between the foot panel and foot board.