S. N. HALL.

HYDRAULIC BED.

APPLICATION FILED OCT. 7, 1914.

1,212,479. Patented Jan. 16, 1917.

Fig. 1.

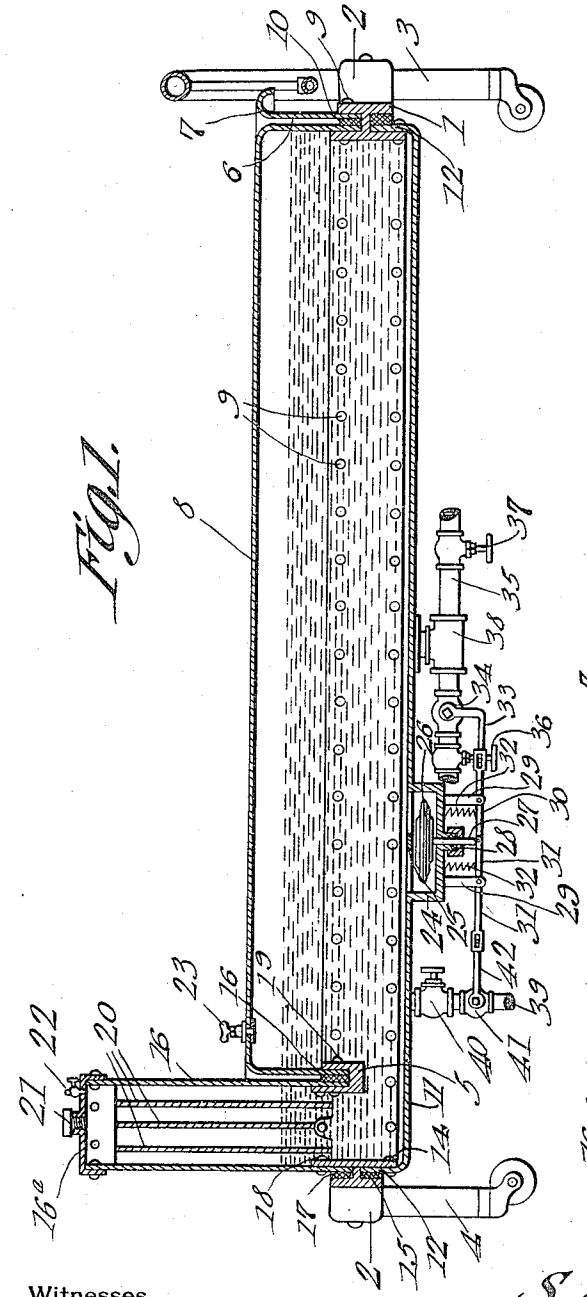
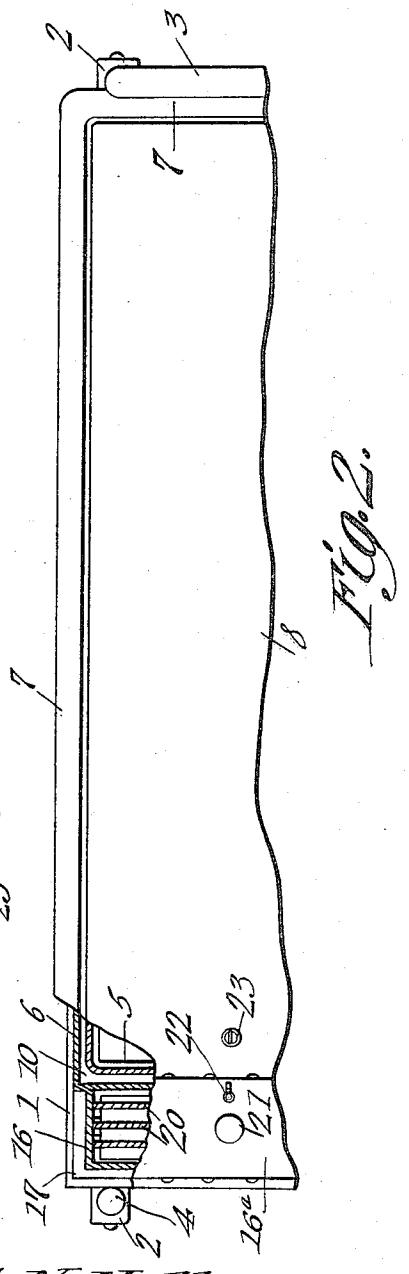


Fig. 2.



Witnesses

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HYDRAULIC BED.

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To all whom it may concern:

Be it known that I, SAMUEL N. HALL, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented a new and useful Hydraulic Bed, of which the following is a specification.

The device forming the subject matter of this application is a bed adapted to contain a fluid, and preferably to contain a liquid, to the end that a yieldable support for a flexible mattress may be provided.

One object of the present invention is to provide a device of the type above mentioned, having an expansion tank into which the liquid within the mattress may rise when a weight is imposed upon the mattress.

Another object of the invention is to provide a device of this type in which the rigidity of the mattress may be regulated by varying the head in an expansion tank which communicates with the mattress.

A further object of the invention is to provide novel thermostatic means whereby the temperature within the mattress may be regulated.

It is within the scope of the invention to improve generally and to enhance the utility of devices of the type herein disclosed, and to improve the same in sundry structural details which will appear in the following description.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawing, Figure 1 shows the invention in vertical longitudinal section; Fig. 2 is a top plan, parts being broken away.

In carrying out the invention there is provided a peripheral frame 1 which, in transverse section, is in the shape of the letter H. The frame 1 may be provided with sockets 2, adapted to receive the foot 3 of the bed and to receive the head legs 4. If desired, however, the foot 3 and the head legs 4 may be dispensed with. Extended transversely of the frame 1 near to one end thereof is a cross bar in the form of a channel 5. Secured to the outer, upper flange of the frame 1 is an upstanding supporting rail 6, in the form of a plate or the like, rolled outwardly at its upper edge, or rounded, as shown at 7 to form a bead. The supporting rail 6 extends along the sides of the frame 1 and across the foot thereof.

The invention includes a flexible mattress 8, the periphery of which is inserted between the upper flanges of the frame 1 and between the flanges of the channel 5, so that the mattress is bound and held entirely around its periphery by the channel and a portion of the frame 1. Rivets 9 may be employed for uniting the supporting rail 6 and the periphery of the mattress 8 with the respective upper flanges of the frame 1, and, if desired, the space between the mattress 8 and the rail 6 may be calked with a suitable packing, as shown at 10.

A bottom 11 is provided, the same preferably being fashioned from metal and including an upstanding peripheral flange 12 disposed between the lower flanges of the frame 1. The flange 12 of the bottom 11 is held to one of the flanges of the frame 1 by means of rivets 14 and a packing 15 may be employed, if necessary or expedient.

The invention includes an upright tank 16, the lower end of which is inserted between the flanges of the channel 5 and between the upper flanges of the frame 1 as clearly indicated in the drawing. A portion of the packing 10, lying within the channel 5, engages one side wall of the tank 16 and the remainder of the periphery of the tank 16 may be packed as shown at 17. Rivets 18 secure a portion of the periphery of the tank 16 to the frame 1 and rivets 19 may be employed for securing the remaining wall of the tank 16 and a portion of the periphery of the mattress 8 to the upstanding flanges of the channel 5. Located within the tank 16 and preferably upheld by the inner flanges of the frame 1 are splash plates 20. The tank 16 may include a lid 16^a, and the lid may be provided with a filling plug 21 and with a valve 22. The mattress 8 may be equipped with an air outlet 23.

A thermostatic means is provided for maintaining the liquid within the receptacle defined by the bottom 11, the frame 1 and

the mattress 8 at a fixed temperature. This thermostatic means may be of any desired form and may be mounted as is demanded by the exigencies of manufacture. In the present instance, but not necessarily, the bottom 11 is provided with a depression 24 across which extends a transverse bar 25 forming an abutment for a thermostat 26 including a stem 27 mounted to reciprocate in a packing gland 28 located on the bottom of the depression 24. Fixed to and depending from the bottom of the depression 24 are hangers 29. Fulcrumed upon the respective hangers 29 are oppositely extended levers 30 and 31, the movement of which is regulated by springs 32 connected with the levers adjacent their inner ends and with the bottom of the depression 24. The outer end of the lever 30 is operatively connected with the stem 33 of a valve 34 interposed in a pipe 35. A coupling 38 establishes a communication between the pipe 35 and the compartment of which the bottom 11 forms a part. Located in the pipe 35 upon opposite sides of the coupling 38 are valves 36 and 37. Opening through the bottom 11 is a drain pipe 39 having a hand valve 40 and provided with a valve 41 the stem 42 of which is operatively connected with the lever 31.

In practical operation, hot water may be admitted into the pipe 35 through one end thereof and cold water may be admitted into the pipe through the other end thereof. Surplus water may be drained away from the compartment through the pipe 39. When the temperature of the liquid within the compartment falls, the thermostat 26 will be operated, the same controlling the valve 34 in the pipe 35 and controlling also the valve 41 in the drain 39. Thus, hot water will be admitted into the compartment through the pipe 35 and the coupling 38. It is in order to compensate for the hot water thus added that the valve 41 in the drain pipe is opened automatically by the action of the thermostat. Thus, the liquid in the expansion tank 16 is maintained at a constant height and at a constant head, and the flexibility of the mattress 8 remains unchanged. It is obvious, however, that at any time, by closing the valve 40 in the drain pipe 39 and by opening one or both of the hand valves 37 and 36 in the pipe 35, the amount of liquid in the compartment and in the tank 16 may be varied, thus regulating the head of liquid in the tank 16 and thereby varying the rigidity of the mattress 8. Further, at any time, the valve 22 in the top of the tank 16 may be opened, thereby letting out any air which may be in the top of the tank. Further, if desired, air under pressure may be pumped into the tank 16 through the valve 22, thus regulating the rigidity of the mattress 8. If it is desired to fill the mattress by hand, this operation may be consummated by removing the filling plug 21. Any air which may accumulate within the mattress 8 as the latter is being filled, may be permitted to escape through the valve 23, the valve in question being closed, when air no longer issues therefrom.

The mattress 8 upstands above the upper edge of the frame 1. Consequently, the mattress never hangs in a trough-like form with the upper edge of the frame 1 as a suspension means. The connection between the mattress 8 and the frame 1, therefore, never is strained. Further, owing to the construction above defined, the mattress never sags into a hammock-like form, to the discomfort of the person lying upon the mattress. The rail 6 serves to prevent an undue lateral movement of the mattress 8 and, owing to the fact that the rail is provided at its upper edge with the curved bead 7, a person may clamber over the rail 6 onto the mattress 8 without danger of injury.

The occupant of the mattress 8 may move freely about thereon, and as the liquid within the mattress is displaced, the same will rise in the tank 16, thus giving the desired flexibility to the mattress, without permitting the same to sag down unduly. Owing to the fact that the splash plates 20 are provided in the tank 16, the entrance of the liquid into the tank, and the passage of the liquid therefrom into the mattress takes place without undesirable noise.

Having thus described the invention, what is claimed is:—

1. A bed comprising a frame; a bottom assembled therewith; a flexible mattress; securing elements connecting the periphery of the mattress with the frame whereby the frame, the bottom and the mattress will define a fluid receiving compartment; the mattress upstanding above the upper edge of the frame thereby to avoid a direct suspension of the mattress from the securing elements and to prevent the mattress from sagging in a trough-like form with the securing elements as opposed points of suspension.

2. A bed comprising a frame; a bottom assembled therewith; a flexible mattress; securing elements connecting the periphery of the mattress with the frame whereby the frame, the bottom and the mattress will define a fluid receiving compartment; the mattress upstanding above the upper edge of the frame thereby to avoid a direct suspension of the mattress from the securing elements and to prevent the mattress from sagging in a trough-like form with the securing elements as opposed points of suspension; and a rail secured to the frame, the rail being upwardly extended to a point adjacent the upper surface of the mattress.

3. A bed embodying a flexible mattress; means for supplying liquid to the mattress; and an upright tank communicating with the interior of the mattress and adapted to contain liquid under a varying head, thereby to vary the flexibility of the mattress.

4. A bed embodying a flexible mattress; means for supplying liquid to the mattress; and an upright expansion tank communicating with the mattress; the tank being provided with a valve whereby the air at the top of the tank may be discharged, wholly or in part, thereby to vary the liquid head in the tank.

5. A bed embodying a hollow flexible mattress; an upright expansion tank communicating with the mattress; a splash plate upstanding in the tank; and means for supplying liquid to the compartment defined by the tank and the mattress.

6. A bed embodying a frame having a groove in its edge; upper and lower closure members coöperating with the frame to define a compartment, the upper closure member being flexible and upstanding above the frame, the edge of one of the closure members being inserted into the groove; and a packing in the groove and coacting with the said closure member to cause the same to conform to the shape of the frame and fit tightly against the frame within the contour of the groove.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

SAMUEL N. HALL.

Witnesses:
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M. E. MCCARTHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."