

No. 800,967.

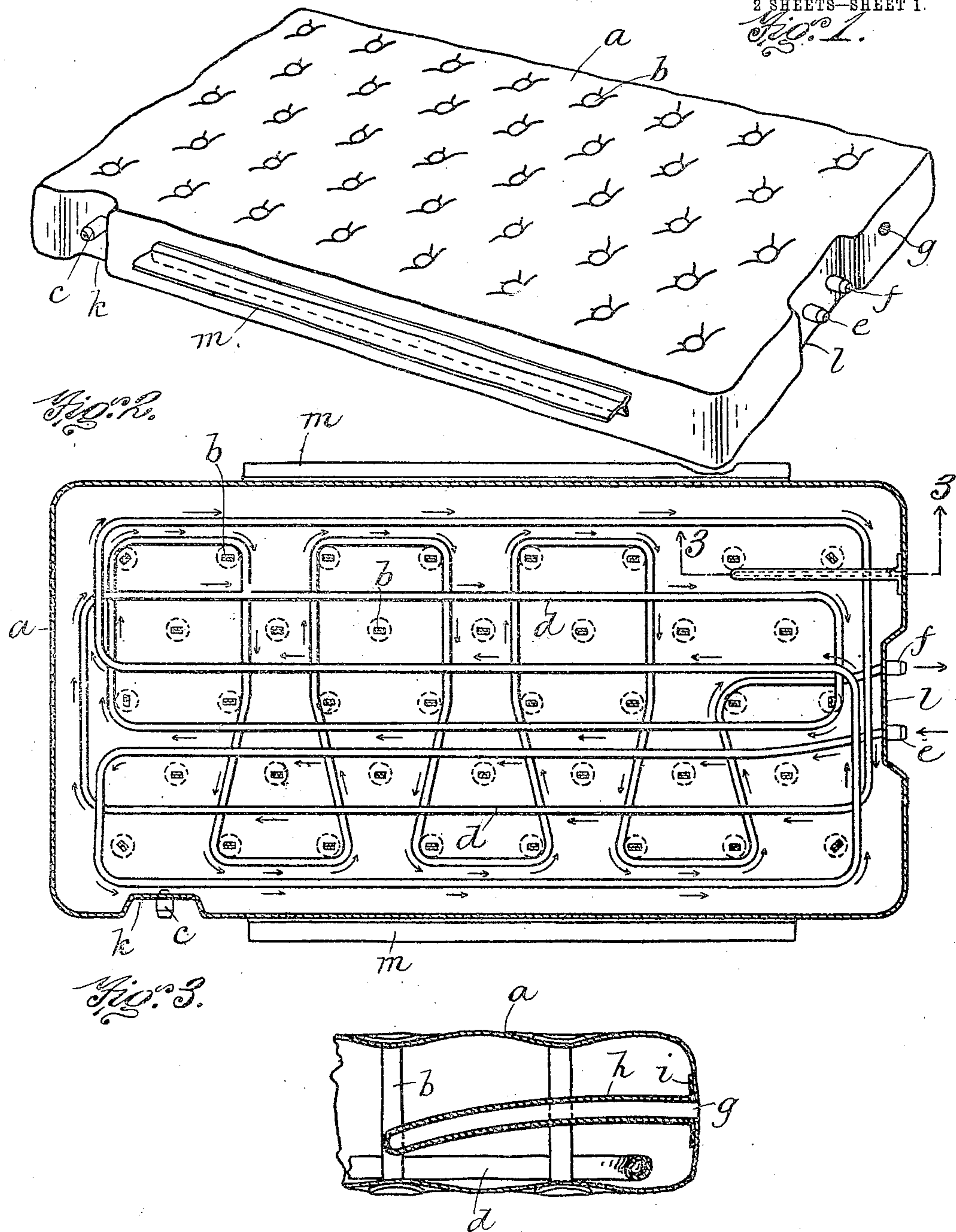
PATENTED OCT. 3, 1905.

A. A. YOUNG & T. A. ABBOTT.

PNEUMATIC MATTRESS, &c.

APPLICATION FILED OCT. 20, 1904.

2 SHEETS—SHEET 1.



Witnesses:

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Inventors.

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2 SHEETS—SHEET 2.

Fig. 4.

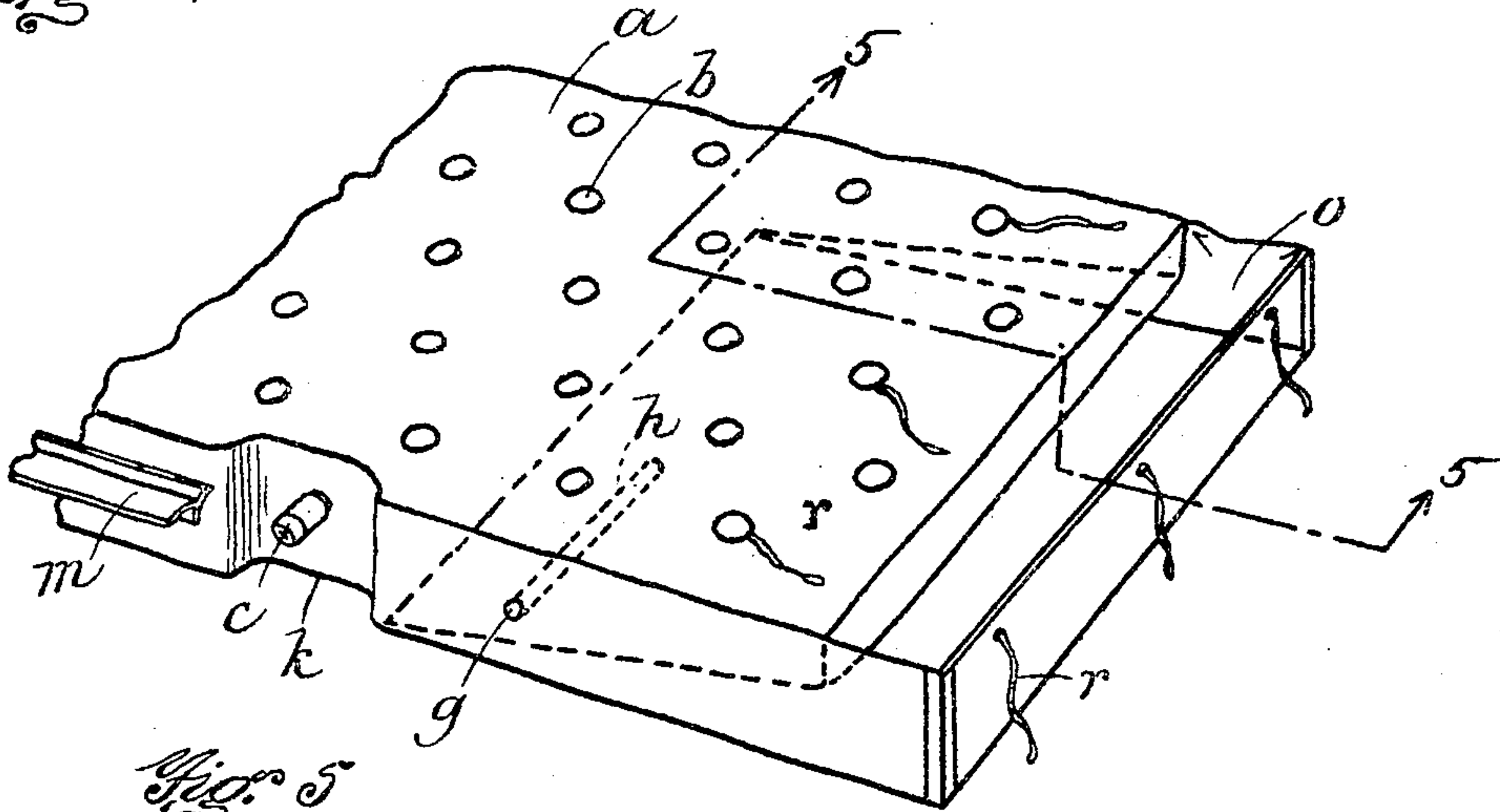


Fig. 5.

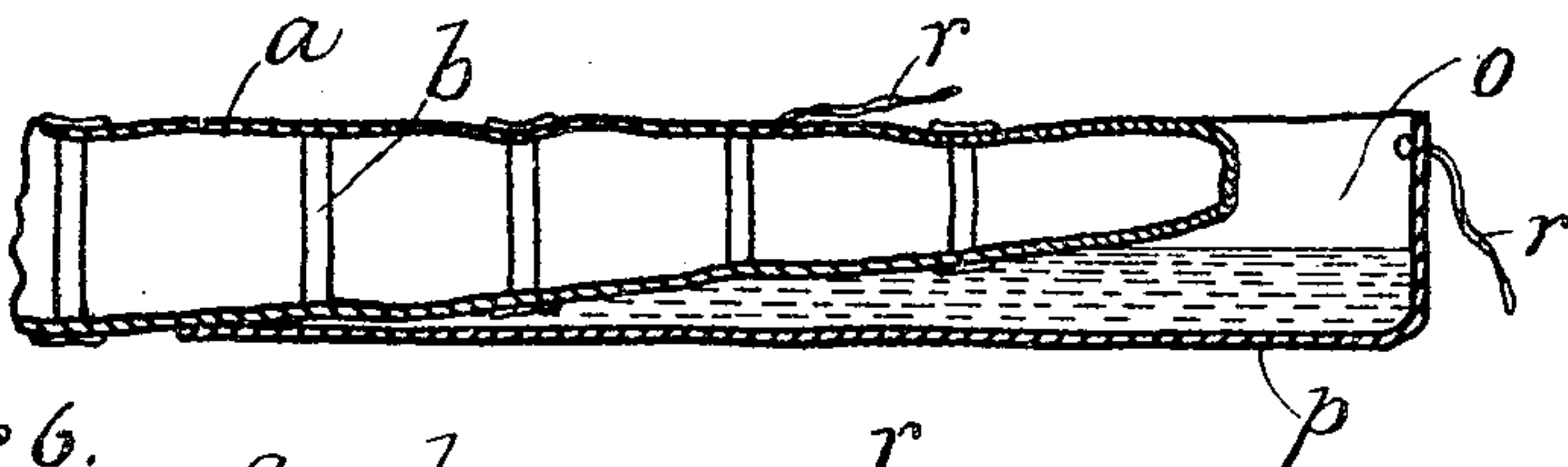


Fig. 6.

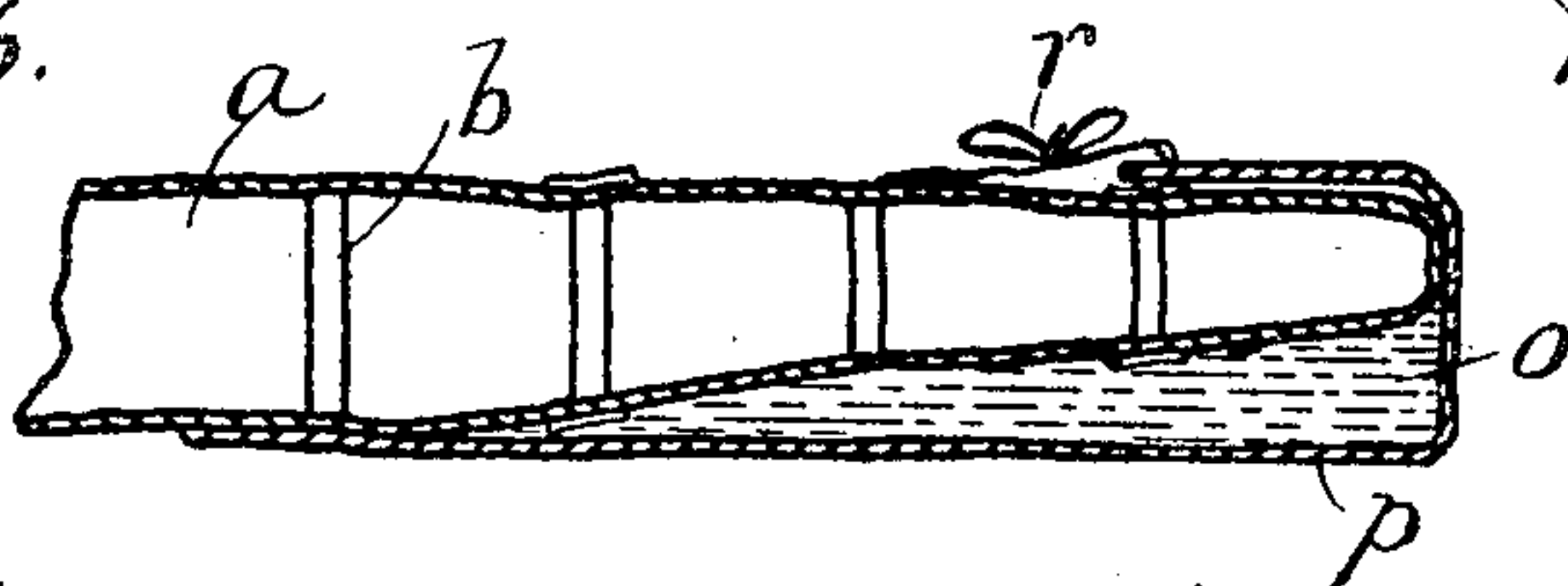
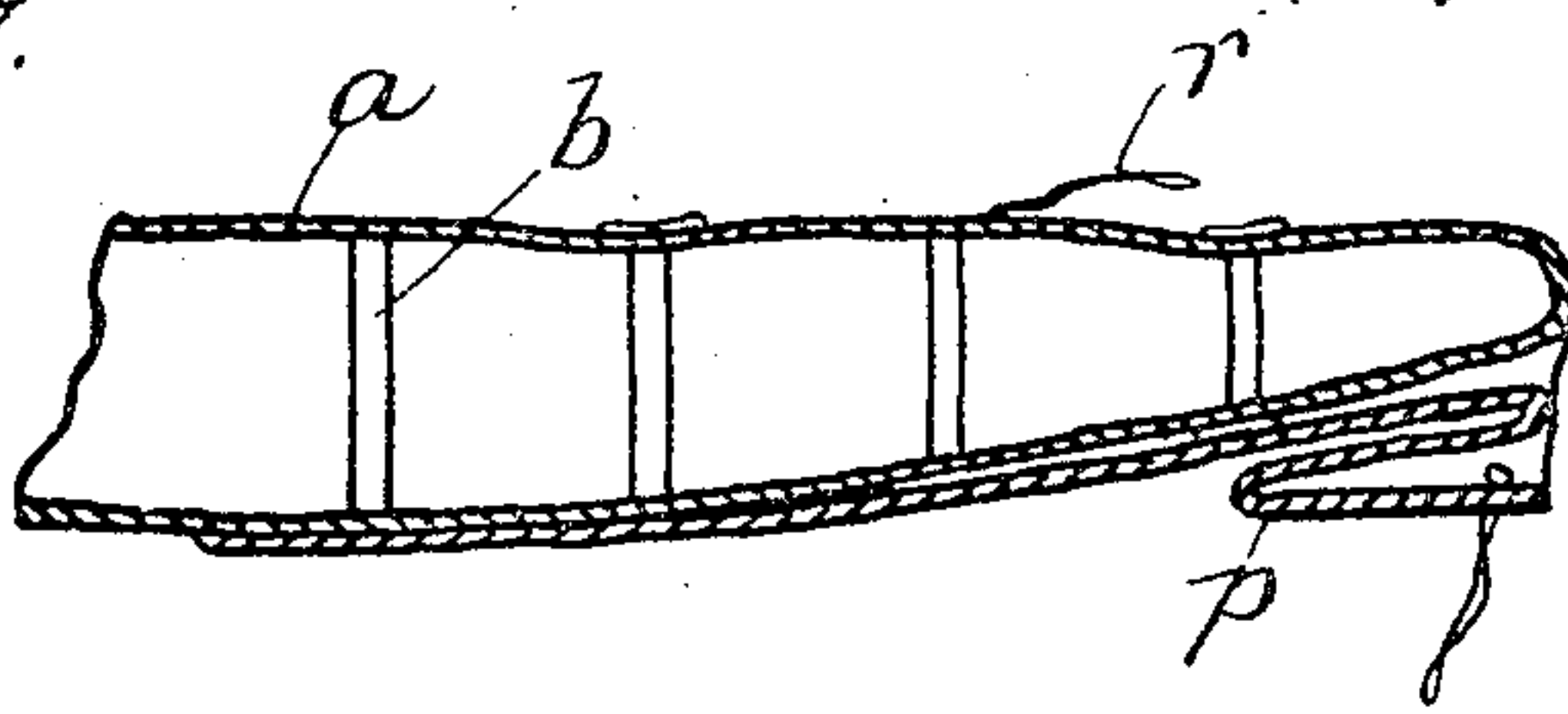


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALBERT A. YOUNG, OF WAKEFIELD, AND THOMAS A. ABBOTT, OF READING, MASSACHUSETTS, ASSIGNORS OF ONE-HALF TO GEORGE S. TOLMAN, OF WINTHROP, MASSACHUSETTS, AND C. L. SOPHER, OF WAKEFIELD, MASSACHUSETTS.

PNEUMATIC MATTRESS, &c.

No. 800,967.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed October 20, 1904. Serial No. 229,213.

To all whom it may concern:

Be it known that we, ALBERT A. YOUNG, of Wakefield, and THOMAS A. ABBOTT, of Reading, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic Mattresses, &c., of which the following is a specification.

The device of the present invention relates to pneumatic mattresses, cushions, &c., particularly to those for the use of invalids, and comprises an inflatable air-sack containing a temperature-regulator, which is preferably a line of tubing through which a heating or cooling medium—such as steam, hot or cold water, or a suitable chemical solution—may be caused to circulate for the purpose of heating or cooling the air inside the sack, all as hereinafter more fully described and claimed.

In the drawings, Figure 1 is a perspective view of a mattress embodying the principles of our invention. Fig. 2 is a horizontal section of the same, showing the tubing in place. Fig. 3 is a cross-section on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of one end of a mattress embodying a modified form of our invention. Figs. 5, 6, and 7 are vertical sectional views of the same, taken on line 5 5 of Fig. 4, showing the parts in various positions.

Like reference characters designate like parts wherever they occur.

a represents an inflatable air-sack, formed in this case as a pneumatic mattress, consisting of wide top and bottom and narrow side pieces or members vulcanized or secured together in any other suitable way at their edges to make an air-tight flat wide bag, the top and bottom pieces being kept from bulging when the mattress is inflated by stays or tie members *b* in the usual manner. An air-admission valve *c*, set in any suitable part of the mattress, permits inflation of the latter. A tube *d*, adapted to contain steam, water, or a chemical solution, is placed in the mattress, preferably in the manner shown in Fig. 2, said tube extending sinuously forward and back and across the mattress a number of times to provide heating or cooling coils or

sinuosities having a sufficiently large area of surface for the purposes intended. These sinuosities are engaged with and held in place by the stays *b*, as shown in Fig. 2. The two ends of the tube are led out of the mattress at any desired points, preferably side by side, and secured to the wall in such manner as to make an air-tight joint therewith and are provided with valves *e f*. A heating or cooling medium—such as steam, hot or cold water, or a chemical solution—may be pumped or otherwise forced into the end of the tube to which the valve *e* is connected, which constitutes the inlet, said medium flowing through the coils in the course indicated by the arrows in Fig. 2 and finally passing out of the other end of the tube through the valve *f*, which constitutes the outlet of the system. The air confined in the mattress is either heated or cooled by the circulating medium and is evenly heated or cooled to any desired degree, depending on the temperature of the medium used.

A hole *g* is made in one of the walls of the mattress, through which a thermometer may be inserted to determine the temperature of the air within. In order to permit insertion of the thermometer without permitting escape of the air, a long narrow pocket *h*, having a flange *i*, is secured to the wall of the mattress in line with the hole *g*, the flange being placed so as to surround the hole and vulcanized or otherwise so secured to the wall as to make an air-tight connection therewith. The pocket *h*, opening in line with the hole *g*, projects into the air-chamber and constitutes a part of the air-tight wall thereof, said pocket being formed to receive a thermometer.

Those portions of the vertical mattress-walls in which the air-valve and ends *e f* of the tube are secured are set back or inwardly offset a sufficient extent to form recesses which allow the valve and tube ends to project far enough to be connected to the air or water supply without protruding beyond the line of the edges of the mattress. The recesses are clearly shown in Figs. 1 and 2, the one wherein the air-valve is located being indicated by the let-

ter *k* and that which contains the ends of the tube by the letter *l*. By this construction the valve and tube ends are prevented from coming into engagement with the frame of the bed and are protected from injury.

Flaps *m* are secured to opposite side edges of the mattress to provide connections to which the bedclothes may be fastened, said flaps enabling pins to be employed in securing the clothing without liability of puncturing an air-confining part of the mattress.

Figs. 4 to 7, inclusive, show a different form of the invention, in which the temperature-regulator is composed of one or more receptacles or pockets *o*, connected to one or both ends of the mattress. In this form the ends of the mattress are thinned or tapered down, and to the under side thereof at the beginning of the tapered portions are secured sheets or plies *p* of waterproof material, which are extended beyond the ends of the mattress and shaped to form a trough or reservoir the sides of which are secured to the side edges of the mattress, spaces being formed between the end walls thereof and the ends of the mattress when the reservoirs are extended in the manner shown in Fig. 1. When in this position, hot or cold water may be poured into the reservoirs, and the ends are turned up over the ends of the mattress, as shown in Fig. 6, and tied in place by the ties *r*, the heating or cooling medium occupying the space between the plies *p* and the under side of the reduced ends and affecting the temperature of the air confined in the mattress. When the reservoirs are not in use, the flaps or plies from which they are formed are folded down under the reduced ends of the mattress, as shown in Fig. 7, where they occupy the space in which the water is held when they are in use.

Our invention may be applied to cushions and other flexible sacks adapted to confine a body of air.

It will be seen that in each embodiment of our invention there is provided an air-confining chamber and a receptacle for a temperature-regulating medium the wall of which is in contact with the confined air, the contents of the receptacle being separated by said wall from the confined air. A relatively small quantity of the regulating medium is therefore enabled to impart a uniform temperature to the confined air and to the top surface of the mattress. When a heating medium is employed, it may be used at a relatively high temperature without danger of injury to the occupant of the mattress, because the heat is diffused and conducted to the supporting-surface through the body of confined air. Moreover, the receptacle is separated from the supporting-surface of the mattress by a body of air, as shown in Figs. 3 and 5, so that the

heated surface of the receptacle does not touch the said supporting-surface. Owing to the fact that a heating medium at a relatively high temperature may be safely used, a small quantity of the heating medium is sufficient. Hence the weight of the mattress is not unduly increased by the heating medium. The mattress may be therefore easily transported, which is an important advantage in hospital use.

We are aware that it has been proposed to entirely fill a flexible-walled mattress with hot or cold water for the purpose of regulating the surface temperature. A mattress thus filled would be too heavy to be transported conveniently and would require the heating and circulation of a large quantity of water. We are also aware that it has been proposed to circulate a heating medium in pipes or conduits inserted in an upholstered mattress; but this construction will not impart a uniform temperature to all parts of the supporting-surface of the mattress and, moreover, involves an undesirable weight.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A mattress or sack comprising an air-confining chamber, and a regulating-medium receptacle the interior of which is separated from the confined air.
2. A pneumatic mattress or air-sack comprising an air-confining chamber, and a regulating-medium receptacle separated from the supporting-surface of the sack by a body of confined air.
3. A mattress or sack comprising an air-confining chamber, and a regulating-medium receptacle having means for receiving and discharging said medium.
4. A mattress or sack comprising an air-confining chamber, and a regulating-medium receptacle formed as a conduit having an inlet and an outlet, and having also air-tight connections with the wall of the sack.
5. A mattress or sack comprising an air-confining chamber, and a conducting-receptacle having an inlet and an outlet, and separated from the top of the sack by a body of confined air, the receptacle having air-tight connections with the wall of the sack.
6. A mattress or sack comprising an air-confining chamber, and a regulating-medium receptacle formed as an elongated tube, the end portions of which extend through and have air-tight connections with the wall of the sack, the main portion of the tube being disposed sinuously within the air-chamber.
7. A mattress or sack comprising an air-confining chamber, the top and bottom members of which are connected by suitable stays, and a regulating-medium receptacle formed as an elongated tube, the end portions of

which extend through and have air-tight connections with the wall of the sack, while the main portion is disposed in bends or sinuosities which are engaged with and held in place
5 by said stays.

8. A mattress or sack comprising an air-confining chamber, a regulating-medium receptacle, the interior of which is separated
10 from the confined air, and a thermometer-pocket forming a part of the air-tight wall

of the sack and projecting into the air-chamber.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ALBERT A. YOUNG.
THOMAS A. ABBOTT.

Witnesses:

C. F. BROWN,
GEO. S. TOLMAN.