(No Model.)

R. KELTING.

RECEIVER FOR GASES OR LIQUIDS.

No. 595,124. Patented Dec. 7, 1897

Fig. 1.

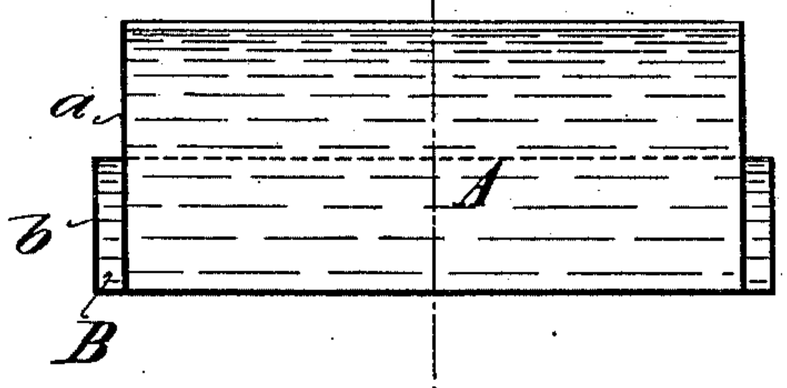


Fig. 2.

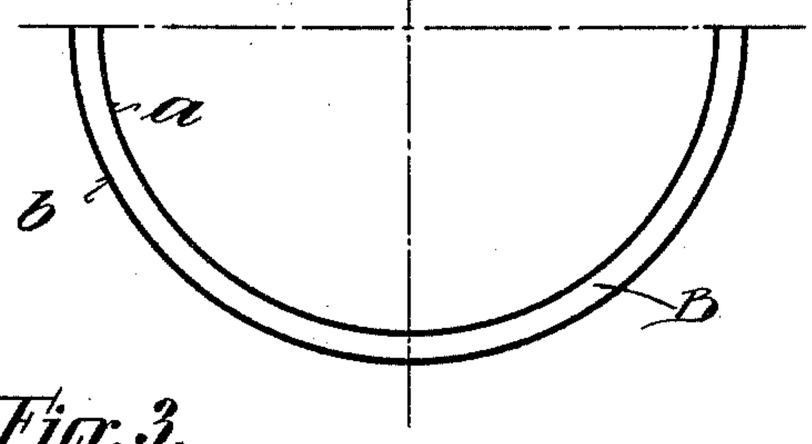


Fig. 3.

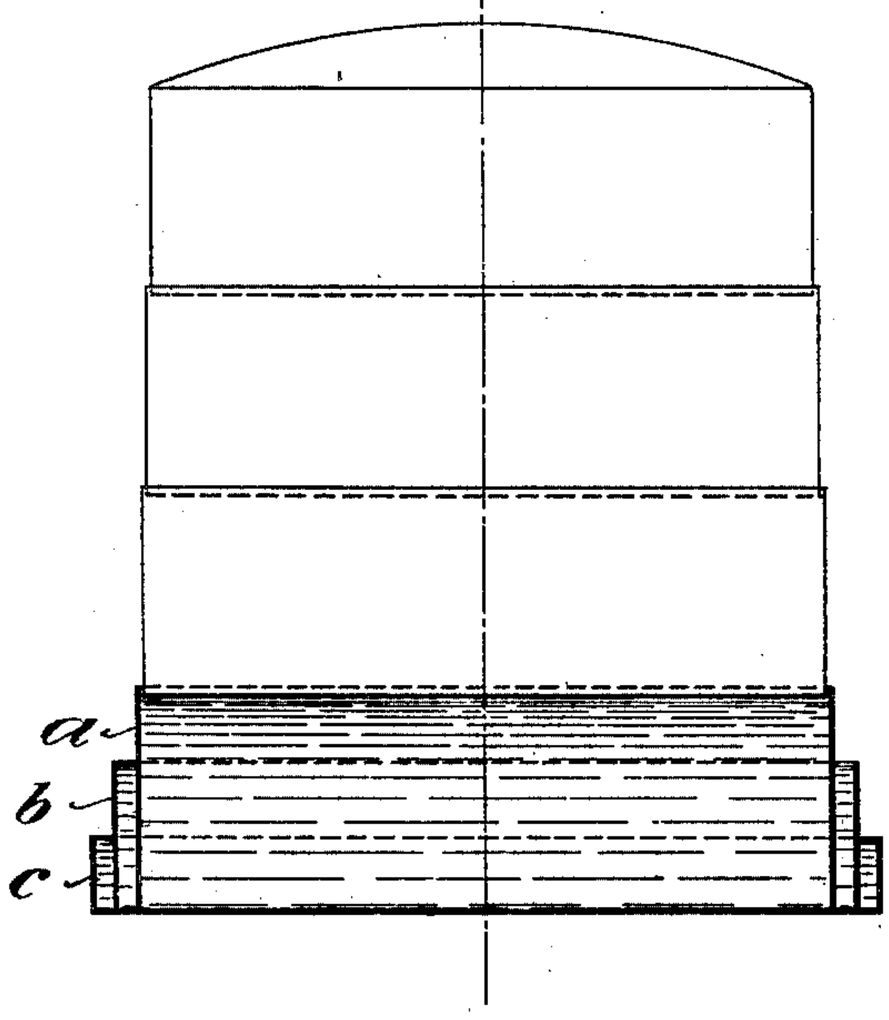
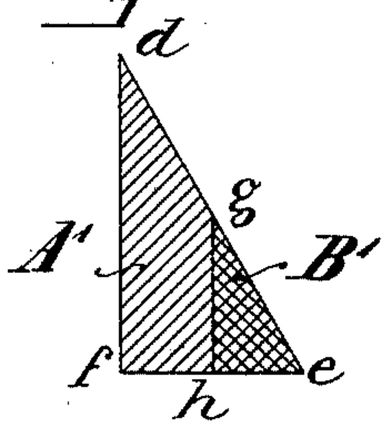


Fig. 4.



Witnesses.
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per
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UNITED STATES PATENT OFFICE.

RUDOLF KELTING, OF ESCHWEILER 2, GERMANY.

RECEIVER FOR GASES OR LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 595,124, dated December 7, 1897.

Application filed March 5, 1897. Serial No. 626,175. (No model.) Patented in Germany March 5, 1896, No. 93,146; in France February 20, 1897, No. 264,248; in Belgium February 20, 1897, No. 126,466; in Austria February 20, 1897, No. 23,525, and in England February 20, 1897, No. 4,676.

To all whom it may concern:

Be it known that I, RUDOLF KELTING, a subject of the King of Prussia, Emperor of Germany, and a resident of Eschweiler 2, Prussia, Germany, have invented new and useful Improvements in Receivers for Gases or Liquids, (for which patents have been obtained in Germany, No. 93,146, dated March 5, 1896; in France, No. 264,248, dated February 20, 1897; in Belgium, No. 126,466, dated February 20, 1897; in Austria, No. 23,525, dated February 20, 1897, and in England, No. 4,676, dated February 20, 1897,) of which the following is a full, clear, and exact description.

Sheet-metal receivers—such as are used as water-tanks, and particularly as gasometers—can be made only up to a predetermined size, as the required thickness of the metal makes it impossible or impracticable to exceed a certain size. On an average fifty meters diameter and ten meters height are the maximum dimensions obtainable with the usual sheet-metal constructions. When this limit is exceeded, receivers of the above-indicated class have to be made of concrete or brickwork.

The object of my invention is to provide a construction whereby large receivers may be made of sheet metal.

To this end I provide the receivers around their base with an exterior shell, forming a space adapted to receive a filling, such as water, which will counterbalance or partly counterbalance the outward pressure of the liquid within the receiver.

My invention consists in the particular construction defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of a water-tank constructed according to my invention. Fig. 2 is a plan of one-half of said tank. Fig. 3 is an elevation, with parts in section, of another form of construction; and Fig. 4 is a diagram illustrating the inward and outward pressures to which the shell of the receiver is subjected.

The receiver proper, A, may be of any suitable construction. Its vertical wall *a* consists of sheet metal and is made of a thickness less than that required according to the usual method.

b is an outer shell extending from the base of the receiver to the level at which the thickness of the wall *a* is just in accordance with the formula for the strength of material to resist pressure with safety. A space B is left between the walls or shells *a* and *b*, and this space is filled with a suitable substance capable of exerting an inward pressure on the inner shell *a*. The simplest way consists in filling said space with a liquid, such as water, the space being open at the top so that the water can be readily poured in. In this case the inward pressure on the shell *a* is due to the weight of the water in the space B. It will be understood, however, that the space B does not communicate with the interior of the receptacle or tank A, the said space or chamber having a closed bottom. Thus the water may stand at different levels in said space and in the tank proper.

The function of the filling in the space B will be understood best by reference to Fig. 4. At the level of the water within the tank A—that is, at the point *d*—there is no pressure on the vertical wall *a*. The pressure gradually increases toward the bottom in direct ratio to the distance from the water-level *d*, as indicated by the line *d g e*. Therefore if there was no filling in the space B the outward water-pressure at the bottom of the tank would be represented by the line *f e*. This pressure would considerably exceed that which the wall or shell *a* can stand with safety. When, however, water is filled into the space B up to the level *g*, there will be an inward water-pressure on the part of the inner shell *a* below said level, said inward pressure likewise increasing downwardly in direct ratio to the distance from the level *g*, as indicated by the line *g e*. This inward pressure (represented by the area *e g h* or B′) will therefore partly counterbalance the pressure within the tank A, so that from the level *g* downward there will be no increase of the resultant or effective outward pressure, as represented by the area *d g h f* or A′—that is, the same thickness of material that is sufficient for the shell

a at the point or level *g* (level of the upper end of the shell *b*) will do for all points below said level.

Whenever it is impossible to sufficiently reduce the effective outward pressure on the shell *a* by the use of a single shell *b*, I may employ one or more additional shells, such as *c* in Fig. 3, it being understood that each shell is subjected to inward and outward pressure downward from the point at which the thickness of the wall is just sufficient to stand the interior or outward pressure. The shells will therefore form a stepwise arrangement, as shown. In this case also each of the outer shells forms a chamber which has no communication with the interior of the tank. It will be understood that although water is the most convenient material to fill the space surrounding the shell or shells other substances capable of producing an inward pressure may be substituted.

I claim as my invention—

1. The combination of the inner shell forming the outer wall of a receiver, and the outer shell of less height than the inner shell and arranged at a distance therefrom forming a space for the reception of a suitable filling substance, the two shells being connected by a solid bottom preventing a communication between the interior of the receiver and said space substantially as described.

2. The combination of the inner shell forming the outer wall of a receiver, and the outer shell of less height than the inner shell and surrounding the base thereof at a distance therefrom, forming a space for the reception of a suitable filling, the two shells being connected by a solid bottom preventing a communication between the interior of the receiver and said space substantially as described.

3. In receivers for gases or liquids, the combination with an inner mantle, of an outer mantle of smaller height than the inner mantle, the space between said mantles being adapted to be filled with a suitable liquid or filling mass, the mantles being connected by a solid bottom so that the several spaces and the interior of the receptacle do not communicate with one another substantially as described and for the purpose set forth.

4. In receivers for gases or liquids, the combination with an inner mantle, of outer mantles surrounding concentrically the inner mantle and decreasing in height toward the outside, the space between said mantles being adapted to be filled with a suitable liquid or filling mass, the mantles being connected by a solid bottom so that the several spaces and the interior of the receptacle do not communicate with one another substantially as described and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

RUDOLF KELTING.

Witnesses:
JOHN HECKMANNS,
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