

(No Model.)

R. WEGNER.
MACHINE FOR RAISING LIQUIDS.

No. 538,565.

Patented Apr. 30, 1895.

Fig. 1.

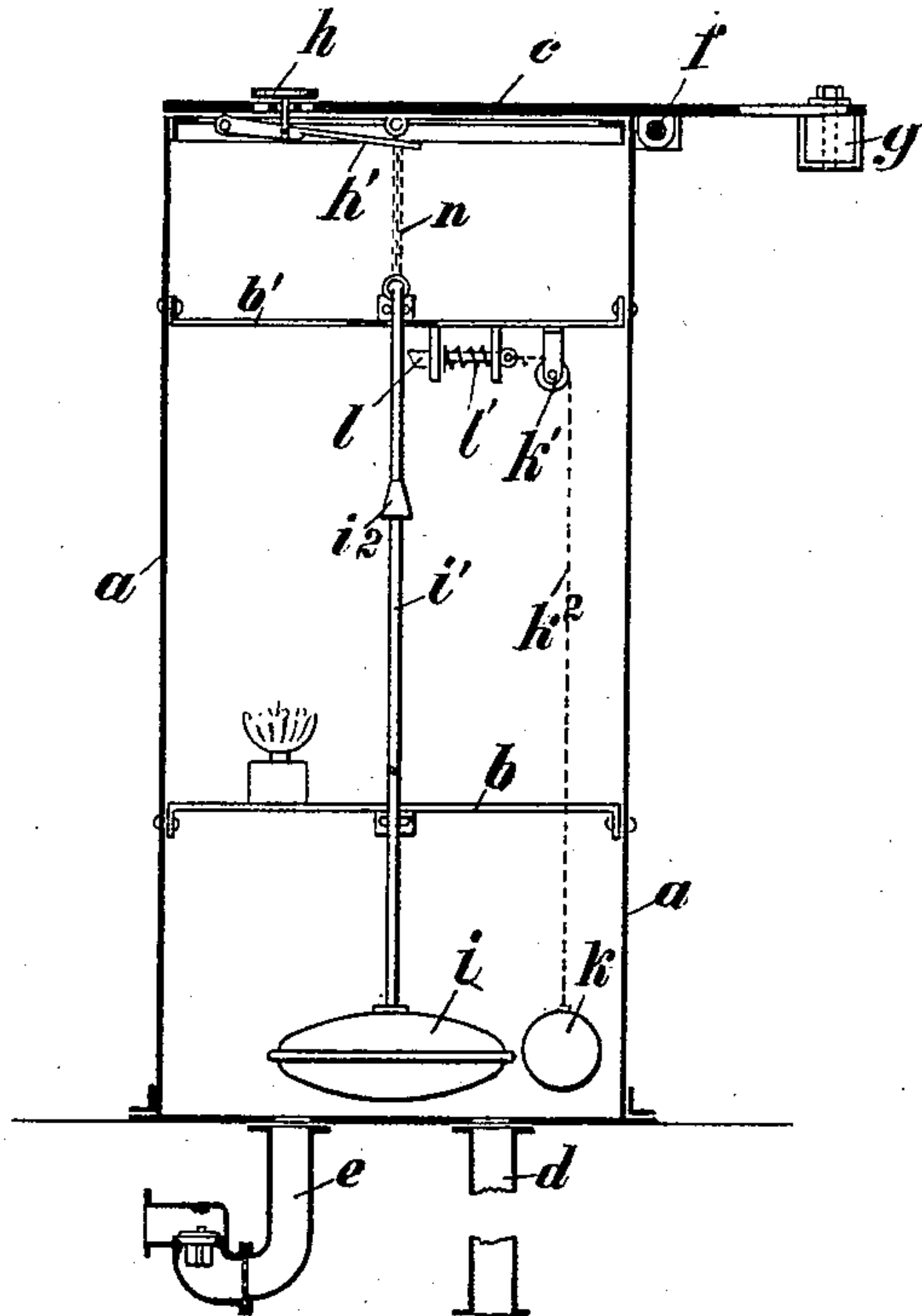


Fig. 2.

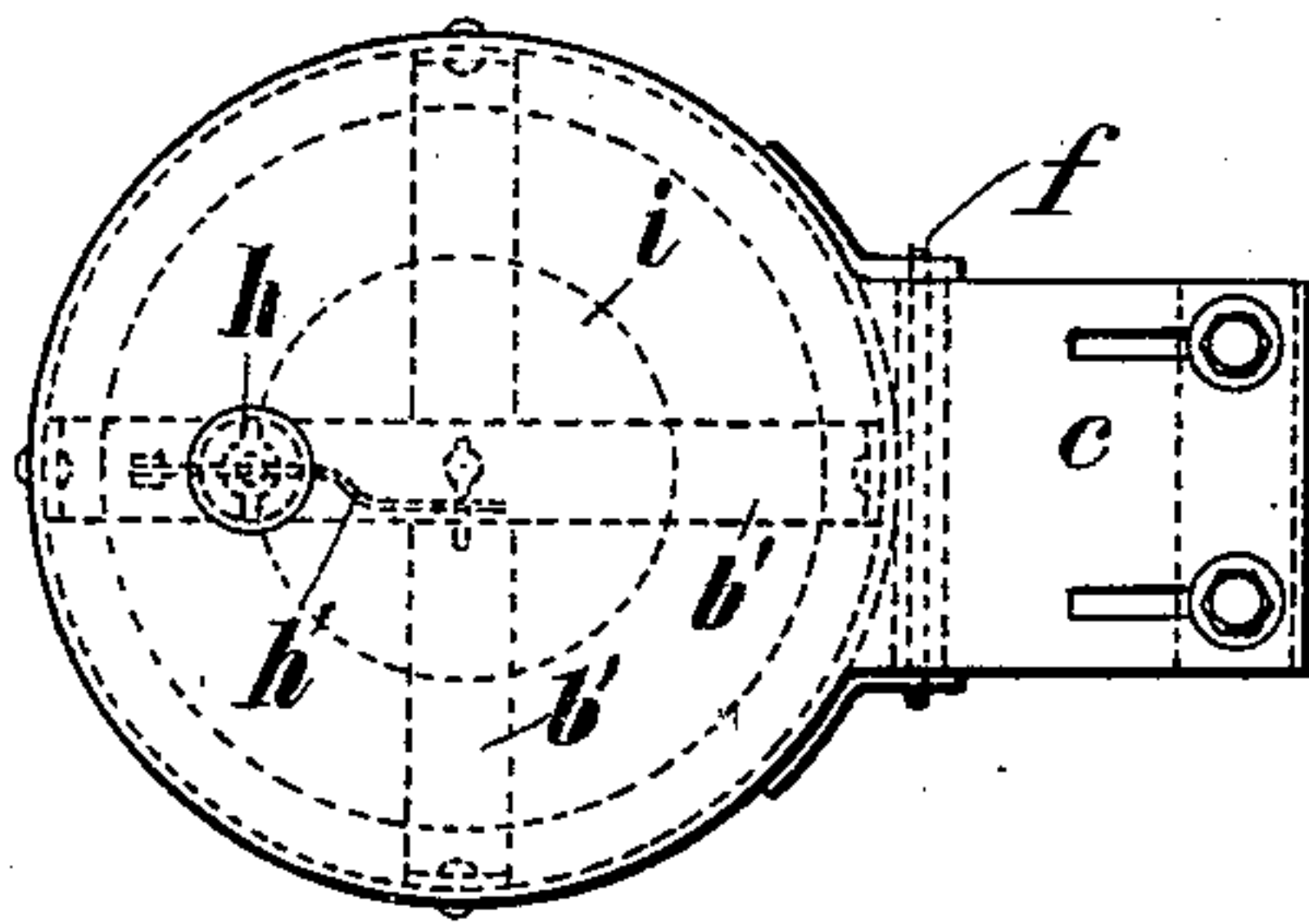
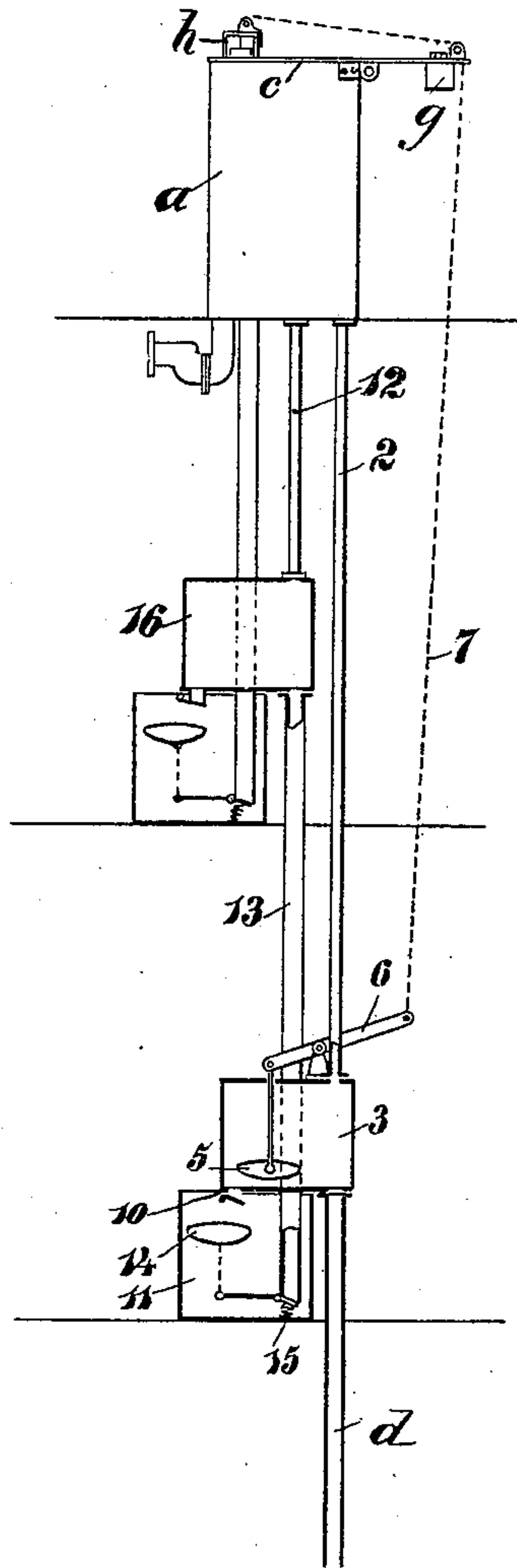


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

RICHARD WEGNER, OF NEU-BRITZ, GERMANY.

MACHINE FOR RAISING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 538,565, dated April 30, 1895.

Application filed July 6, 1893. Serial No. 479,721. (No model.)

To all whom it may concern:

Be it known that I, RICHARD WEGNER, of Neu-Britz, near Rixdorf, in the Kingdom of Prussia and German Empire, have invented
5 a new and useful Machine for Raising Liquids, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to an improved liquid-raising apparatus or siphon which is devised on the principle that the variations of the volume of air confined in a closed vessel or chamber which are brought about by combustion, are capable of being utilized direct
15 for raising liquids, that is to say, without the assistance of a plunger or pump, or the like. One form of apparatus by which this principle may be carried into practice is illustrated in the accompanying drawings, in which—

20 Figure 1 is a central vertical section of an apparatus constructed according to this invention. Fig. 2 is a plan of the same; and Fig. 3 is a side elevation, partly in vertical section, of a modified form of apparatus adapted
25 for raising liquids to comparatively great heights.

In a large vessel *a* is arranged a frame or support *b* which is adapted to support a lamp and at the same time to hold and guide the
30 inner mechanism, that is to say, the two floats *i* and *k*. The top of the vessel is in the form of a lid or cover *c* hinged or pivoted at *f* and provided with an adjustable balance weight *g*, the said cover being adapted to be temporarily opened for the admission of fresh air.
35 Connected with the bottom of the cylinder is a suction pipe *d*, which, like ordinary pumps, is fitted with a foot valve and strainer. The lower end of this pipe descends into the liquid to be raised, while another pipe *e*, also provided with a valve which affords the liquid a passage to the exterior, serves to discharge the elevated liquid. In the hinged lid *c*, is provided a small air-valve *h*, in such a manner that, by opening it, the inner and outer
45 pressures may be equalized.

In the lower part or space of the vessel are arranged two floats *i* and *k* capable of movement in the vertical direction, the float *k*, being
50 adapted to release or withdraw a small spring bolt *l*, by means of a cord *k*² passing round a

roller *k'*, which bolt is normally pressed from right to left by a spring *l'*. The float *i*, is moved up and down by a straight rod *i'* which is provided with a conical collar *i*² to enable
55 the said rod and float to be secured in their highest position by means of the spring bolt *l*, their downward stroke being limited by the length of a cord or chain *n*, by means of which the upper end of the float-rod *i'* is suspended from the lid *c* and which is adapted
60 to close this lid automatically as soon as the float sinks by its own weight. When, however, the float *i* is raised by the rising fluid, the upper end of the float-rod *i'* strikes the
65 small lever *h'* and thereby opens the air-valve *h*, when equalization of pressure or tension takes place.

The operation of the apparatus is as follows: The lamp arranged within the vessel
70 *a* first burns while the lid *c* is closed. As soon as the greater part of the oxygen contained in the air is consumed by the flame, the flame decreases in size, while at the same time the diminution of the oxygen causes a
75 gradual rarefaction of the air, owing to which the liquid rises in the elevating tube or siphon, the sucking action being moreover enhanced by the fact that, as the air becomes heated by the flame, a portion of the air is expelled,
80 thereby assisting the creation of a vacuum. As the water rises the float *i* is lifted, and the rod *i'* secured thereto consequently impinges against the lid *c*, which however, for the time being remains closed owing to external pressure, it only opening when the valve *h* opens
85 and mutual compensation takes place between the external and internal pressures. The lid then springs open to the extent to which it is permitted to do so by the cord or
90 chain *n* attached to the float-rod, and the water issues from the vessel through the pipe *e*. The float *i* is now retained in its highest position by the bolt *l* until the said bolt is released by the auxiliary float *k*, as it sinks together
95 with the liquid. The float then drops, and, carrying with it the lid *c*, through the medium of the cord *n* causes the said lid to close by its own weight. While the lid *c* was open, a fresh supply of air was admitted into the vessel, with the result that the flame resumed
100 its normal size; so that when the lid is closed,

the arrangement operates as before. The liquid is in this manner intermittently raised.

Fig. 2 represents a complete liquid raising plant arranged to elevate liquid to comparatively great heights and to deliver it onto the several floors or stories of a building or the like by means of the siphon above described. *a* designates the vacuum chamber which is constructed as shown in Fig. 1. This chamber or vessel in the present arrangement is situated at the highest point or limit and from it branch off the pipes leading down to the several floors or stories. The suction pipe 2 communicates with a vessel 3, closed on all sides and arranged on the level to which the liquid must be raised for the first or lowermost floor. This vessel is provided with a float 5, which acts upon the lever 6 in the manner illustrated in the drawings, and which through the medium of a chain 7, first slightly lifts the air-valve *h* from its seat, and then opens the lid *c*. The suction-pipe *d*, extending into the well, is provided at its lower part as in the first arrangement with a foot-valve and a strainer (see Fig. 1) and has a sufficiently wide diameter to suit the requirements; while the pipe 2, already mentioned, may be of smaller diameter.

When suction commences in the vessel *a*, in the manner described with reference to Fig. 1, a vacuum is created in the pipes 2 and *d* and the receptacle 3 and the water rises and fills the vessel or receptacle 3, while the valve 10 in the said receptacle 3 is closed by the external upwardly acting pressure of the air. As the water-level rises, the float 5 is lifted and through the float 5, lever 6, chain 7 and valve *h*, the opening of the lid *c* is effected with the result that air is admitted into the chamber 3, so that the valve 10 opens, and the water rushes into another reservoir 11, which is open at the top. When suction recommences, the same operations are repeated, while at the same time the float 14 having opened the valve 15, the pipes 12 and 13 draw in liquid and convey it into the reservoir 16, from which, as before explained, it may be farther raised as far as the next story. When the water reaches the uppermost vessel *a*, the floats *i* and *k* operate in the manner described with reference to Fig. 1. As long as there is no water in the vessel *a*, the weight of the float *k* draws back the bolt *l* so that it will allow the rod *i'* to return to its normal position, and the weight of the float *i* will close the lid *c* when the float 5 is raised by the water entering the vessel 3.

It will readily be understood that the satisfactory continuance or repetition of the operations above described is not limited to any number of floors or stories.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for raising liquids, a closed vessel or chamber, a burner located therein to produce a constantly burning flame adapted to partly absorb the oxygen of the

air confined in the said chamber and thereby create a vacuum in the same, a suction pipe through which the liquid to be raised may enter the said chamber, a float-controlled mechanism for establishing a communication between the interior of the vessel and the outside air when the vessel is filled with liquid to a predetermined level, another float-controlled mechanism for closing the said communication when the vessel is essentially empty, and an outlet for the discharge of the liquid, substantially as and for the purpose set forth.

2. In an apparatus for raising liquids, a closed vessel or chamber, a lamp or burner located therein, a lid for closing the said vessel, a float located in the vessel and adapted to cause the lid to be raised when the vessel is filled with liquid to a predetermined level, means for keeping the lid and the float in an elevated position during the discharge of the liquid, another float for releasing the lid and the first named float to close the vessel when it is essentially empty, and valve-controlled suction and delivery pipes connected with the vessel, substantially as described.

3. In an apparatus for raising liquids, a closed vessel or chamber, a lamp or burner located therein, a lid for closing the said vessel, a float located in the vessel, a rod secured to the float and having a guided movement in the vessel, said rod being provided with an extension, a flexible connection between the upper end of the rod and the lid of the vessel, a bolt adapted to engage with the extension of the float rod to keep the same in its elevated position, a spring for pressing said bolt into engagement with the said extension, another float located in the vessel and having a flexible connection with the said bolt to retract it out of engagement with the said float rod when the vessel is essentially empty, whereby the lid is caused to close the vessel, and valve-controlled suction and delivery pipes connected with the said vessel, substantially as described.

4. In an apparatus for raising liquids, a closed vessel or chamber, a lamp or burner located therein, a balanced lid for closing the said vessel, an air-valve adapted to close an opening in the said lid, a float, a rod connected therewith and having a guided vertical movement, a flexible connection between the float rod and the lid, said rod and connection being constructed in such manner that the air-valve and the lid will be opened successively when the float is raised by the inflowing liquid, means for keeping the lid in an elevated position during the discharge of the liquid, and a float-controlled mechanism for releasing the lid and causing the same to close at the end of the delivery period, substantially as described.

5. In an apparatus for raising liquids, the combination with a closed vessel or chamber, a lid for closing the same, a lamp or burner located in the said vessel, and float-controlled mechanism for opening and closing the said

lid, all constructed substantially as described,
of a series of open and closed reservoirs lo-
cated at different levels in sets of two, a valve-
controlled connection between each closed res-
ervoir and the open reservoir of the same set,
suction pipes extending from the first named
vessel to the said closed reservoirs, a suction
pipe extending downwardly from the lower-
most of the said closed reservoirs, and valve-
controlled delivery pipes connecting each
open reservoir with the closed vessel of the
next set above, substantially as described.

6. In an apparatus for raising liquids, the
combination with a closed vessel or chamber,
a lid for closing the same, a lamp or burner lo-
cated in the said vessel, and float-controlled
mechanism for opening and closing the said
lid, all constructed substantially as described,
of a series of open and closed vessels or res-

ervoirs located at different levels in sets of
two, a valve-controlled connection between
each closed reservoir and the open reservoir
of the same set, suction pipes extending down-
wardly from the first named vessel to the said
closed reservoirs, a suction pipe extending
downwardly from the lowermost of the said
closed reservoirs, delivery pipes connecting
each open reservoir with the closed vessel of
the next set above, and float-controlled valves
arranged at the lower ends of the said delivery
pipes, substantially as described.

In witness whereof I have hereunto set my
hand in presence of two witnesses.

RICHARD WEGNER.

Witnesses:

PAUL FISCHER,
JOHN SALOUSSKI.