

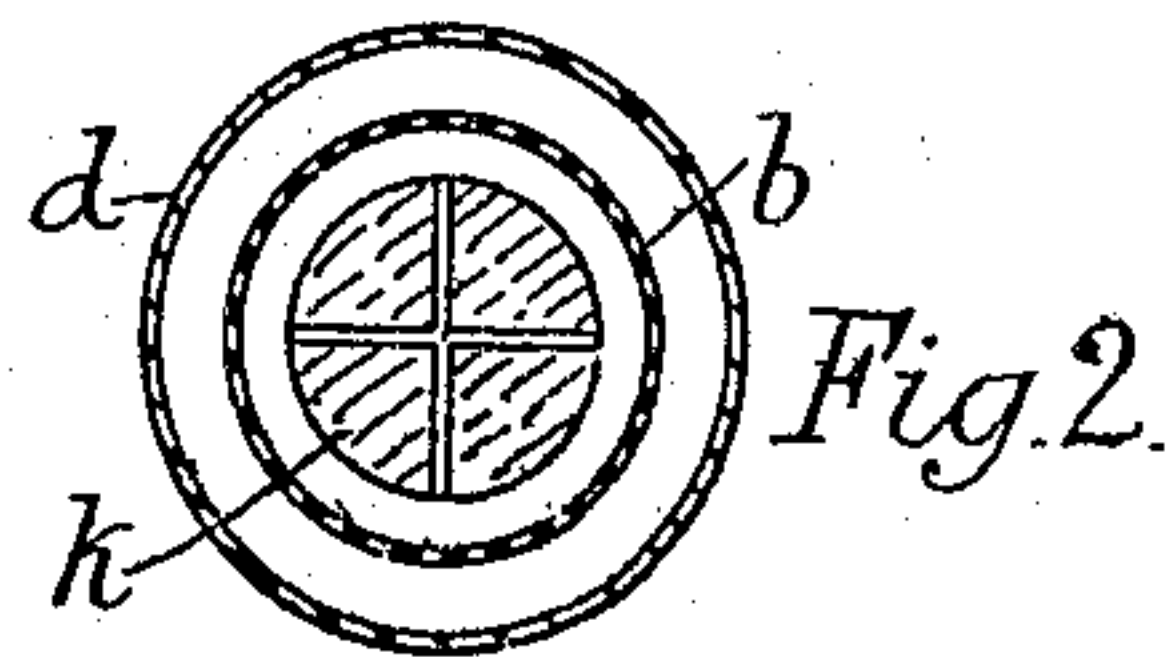
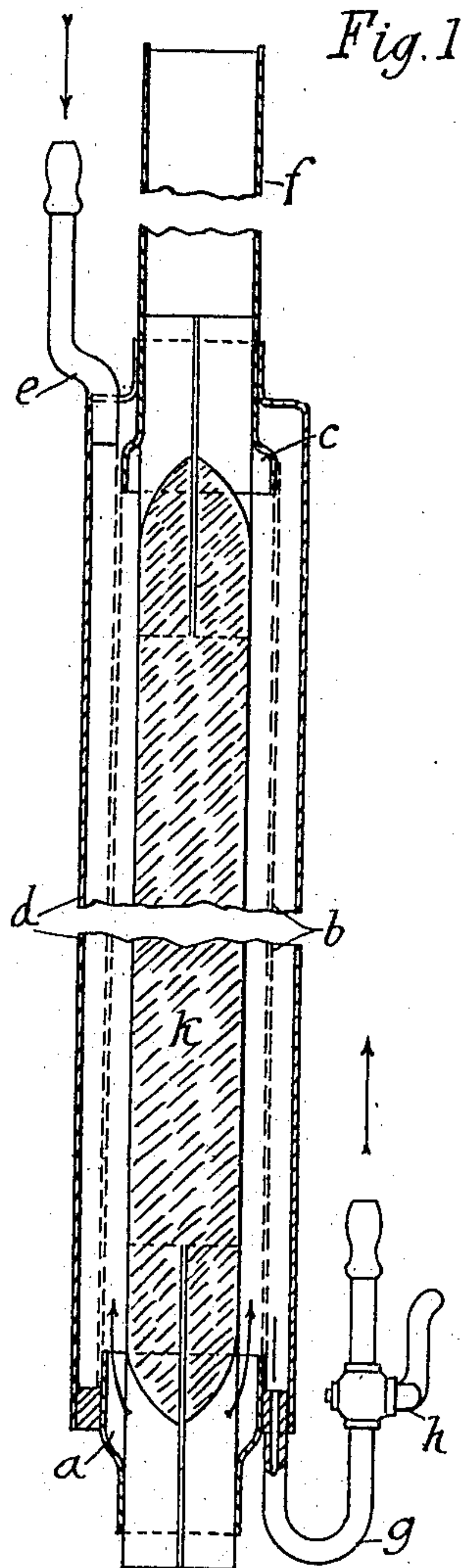
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PATENTED NOV. 19, 1907.

H. STROH.

MEANS FOR IMPREGNATING LIQUIDS WITH GAS.

APPLICATION FILED NOV. 9, 1906.



Witnesses:
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UNITED STATES PATENT OFFICE.

HEINRICH STROH, OF HEILBRONN, GERMANY.

MEANS FOR IMPREGNATING LIQUIDS WITH GAS.

No. 871,245.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed November 9, 1906. Serial No. 342,696.

To all whom it may concern:

Be it known that I, HEINRICH STROH, a subject of the German Emperor, residing at Heilbronn, Germany, have invented new and
5 Improved Means for Impregnating Liquids with Gas, of which the following is a specification.

The object of my invention is to provide an apparatus for impregnating liquids with
10 gas in order to produce physical, chemical or biological effects in liquids or gases or to regenerate and purify water.

In my apparatus gas is forced through an osmotic partition into a liquid which is
15 caused to flow along the other side of such partition while the impregnated liquid runs over a lengthy course in a pipe, or conduit, so as to insure floating gas bubbles to be absorbed and prevent segregation of the in-
20 corporated gas.

The apparatus by which I obtain these results is illustrated in the annexed drawings.

Figure 1 is a longitudinal section partly broken away; Fig. 2 is a cross-section of my
25 invention.

A pipe *abc* has its middle portion *b* enlarged and preferably made of fine wire gauze which in some instances is coated with a gas absorbing substance such for ex-
30 ample as a mixture of caoutchouc and finely ground carbon which thus forms a cylindrical membrane. This membrane is surrounded with a slightly wider and air-tight jacket *d* and the annular space between these parts is in communication with the gas ingress tube *e*
35 and egress tube *g* which latter is fitted with a tap *h*. The internal free space of the metal gauze pipe can be reduced by a more or less large core *k* whose ends are preferably
40 pointed or egg-shaped and slit endwise so as to engage in metallic cross-strips for centering purposes. The apparatus is fitted with an ascension pipe *f* and can be adopted inde-
45 pendently of or in connection with any form of pipe installation for liquids.

For independent use, the apparatus is placed vertically or slightly inclined so far into the liquid that the ascension pipe *f* is entirely filled with such liquid. By intro-
50 ducing gas into the apparatus the following action takes place. Owing to the head pressure of the liquid and its adhesion to the wet metal gauze, a superior gas pressure can be created in the annular gas space to that of
55 the liquid without either the gas or the liquid being able to pass through the wire gauze.

When the gauze is covered with a membrane, the difference in pressure can be carried still further. At the present time and independent of the pressure, the gas be-
60 comes absorbed or condensed through the mass of the membrane into which latter the liquid is unable to penetrate. By reason of natural diffusion, the gas is slowly carried to the next farther portion of the liquid slightly
65 away from the gauze. Practically, the diffusion affects only small depths, and therefore, the gas absorbed in a standing liquid can only escape therefrom in minute globules. The escaping gas passes upwards into
70 the ascension pipe *f* in which latter the real action of incorporating the gas takes place correlative with the pressure and the solving power of the particular gas used. The gas is caused to flow along the comparatively
75 narrow ascension pipe and thereby induces a strong relative current of the liquid in the same direction with the result that a constant renewal takes place from below of the
80 fresh liquid so causing the same to come in contact with the membrane, while the im-
pregnated liquid passes upwards.

When the apparatus is placed in a tank, the height of the column of liquid and consequently the strength of current generated in
85 the apparatus with its resulting effect on the absorption of gas are limited by the depth of such tank. By placing the apparatus in a conduit, the liquid is enabled to flow through both. This arrangement will enable the
90 effective pressure column or head to be increased to a great range.

When a portion of mixed gases, after passing through the annular space, is allowed to escape from the tube *g* through the tap *h* a
95 partial separation of the gases takes place. For example, when atmospheric air is used with water as the absorbing medium, it will be found that a larger proportion of oxygen than nitrogen passes through the osmotic
100 membrane and is absorbed in the water. Consequently the gas mixture passing through the membrane, will have gained in oxygen while the remaining gas at the other side of
105 such membrane is richer in nitrogen.

I claim:

1. The apparatus for impregnating liquids with gas, which comprises an annular gas chamber in an enlarged portion of a pipe be-
110 tween a solid outer jacket and a wire gauze which latter forms a central water chamber as set forth.

2. The apparatus for impregnating liquids with gas which comprises a water pipe combined with a wire gauze enlargement and an external jacket over said wire gauze, an ingress nozzle and an egress nozzle connected to said jacket, as set forth.

3. The apparatus for impregnating liquids with gas which comprises a water pipe combined with a wire gauze enlargement, central
10 plug in the interior of the wire gauze, an external jacket over said wire gauze, an ingress nozzle and an egress nozzle connected to said jacket as set forth.

4. The apparatus for impregnating liquids with gas which comprises a water pipe com- 15
bined with a wire gauze enlargement, a double pointed central plug in said wire-gauze, a cross-shaped centering holder at each end of said plug, an external jacket over said wire gauze, an ingress nozzle and an 20
egress nozzle connected to said jacket as set forth.

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Witnesses:

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