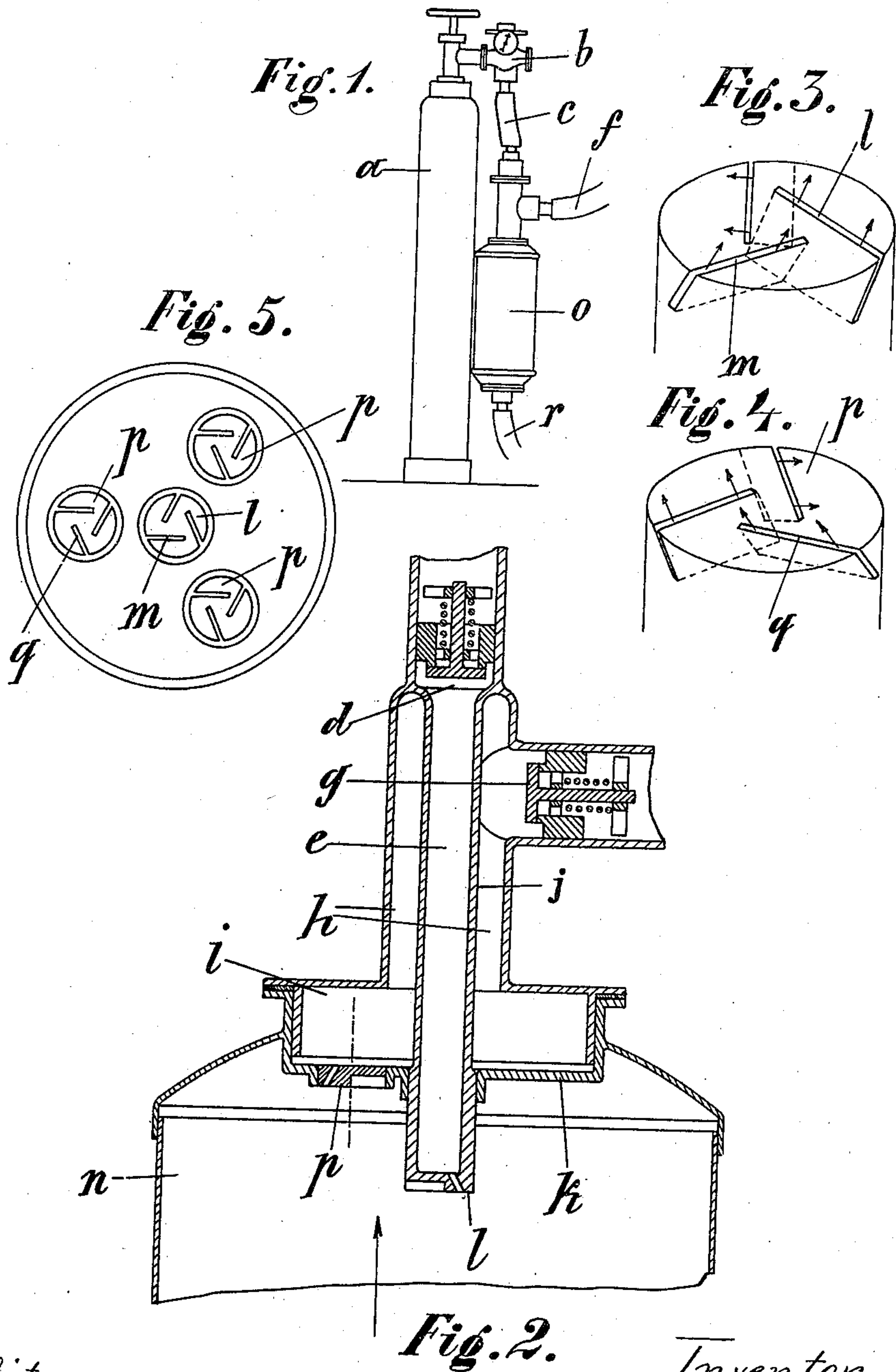


B. LEUSCHNER.
 APPARATUS FOR MIXING LIQUIDS AND GASES.
 APPLICATION FILED MAR. 8, 1907.

903,297.

Patented Nov. 10, 1908.



Witnesses
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UNITED STATES PATENT OFFICE.

BRUNO LEUSCHNER, OF DRESDEN, GERMANY.

APPARATUS FOR MIXING LIQUIDS AND GASES.

No. 903,297.

Specification of Letters Patent.

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Application filed March 8, 1907. Serial No. 361,367.

To all whom it may concern:

Be it known that I, BRUNO LEUSCHNER, a subject of the King of Saxony, residing at Dresden, German Empire, have invented certain new and useful Improvements in Apparatus for Mixing Liquids and Gases, of which the following is a specification.

My invention relates to apparatus for mixing liquids and gases. In such devices, just as in other mixing apparatus, a gyratory motion is imparted to the substances to be mingled, for the purpose of increasing the mixing effect.

The feature of my invention is that the passages for admission of the substances to be mingled into the mixing chamber run in planes which are inclined relatively to the direction of flow of the said substances. In this manner not only is the mixing operation rendered wholly independent of the shape and conformation of the mixing vessel, but the axes of the gyratory surfaces can be given any desired direction by suitable disposition and inclination of the planes of the passages; furthermore, any desired number of gyratory surfaces may be employed and by appropriate selection of the places of inlet for the substances may be distributed in such manner in the mixing chamber, that one and the same gyratory surface of the one substance may meet with several gyratory surfaces of the other substance in succession. In this manner the mingling of the substances is rendered still more intimate.

My invention is illustrated in the accompanying drawing, in which

Figure 1 is an elevation of the mixing apparatus connected with a water pipe and with a bottle of carbonic acid. Fig. 2 is a vertical section showing to a larger scale the principal parts of the apparatus. Figs. 3 and 4 and 5 are detail views to be hereinafter referred to.

At the top of the carbonic acid bottle *a* there is a reducing valve *b*, through which the carbonic acid flows at a certain pressure (for instance, 2 atmospheres) and passes further through the flexible pipe *c* to the upper back pressure valve *d* of the mixing apparatus, which it opens on its way to the chamber *e*. The flexible pipe *f* is connected to a water pipe, from which water (say likewise at a pressure of 2 atmospheres) flows through the laterally located back pressure valve *g*, into the chamber *h*, which concentrically incloses the chamber *e*, and thence

into the chamber *i*. The chambers *e*, *h*, *i* are closed air-tight outwardly. The pipe *j*, inclosing the chamber *e*, passes through the bottom *k* of the chamber *i* and is closed by a base *l* having slots *m* which run in inclined planes and connect the chamber *e* with the mixing chamber *n* of the vessel *o*. Fig. 3 shows on a larger scale the bottom of the pipe *j* as seen in the direction of the arrow Fig. 2. Through the slots *m* the carbonic acid under pressure flows out of the chamber *e* into the mixing chamber *n*, and owing to the inclination of the slots is set in rotation in clockwise direction. In the bottom *k* of the chamber *i* nozzles *p* are provided, each having slots *q* connecting the chamber *i* with the mixing chamber *n*. One of these nozzles is shown on a larger scale in Fig. 4, the nozzle being viewed in the direction of the arrow Fig. 2. Fig. 5 is an underside view of the bottom *k*, with pipe *j* projecting through it; and as will be seen from this figure and from Figs. 3 and 4, the inclination of the slots *q* is counter to that of the slots *m*, so that the pressure water flowing through the slots *q* from the chamber *i* into the mixing chamber *n*, though also set in rotation, gyrates in counterclockwise direction. Owing to the carbonic acid and water thus playing into each other with great energy in counter directions, exceedingly intimate mingling is effected.

In view of the pressure in the interior of the mixing chamber, a third back pressure valve (not shown in the drawing) at the bottom of the vessel *o* will open and the liquid and gas mixture will flow out through this valve and through the flexible pipe *r*, for instance, direct to a bath for the purpose of enabling carbonic acid ablutions to be undertaken.

Naturally the new apparatus can be employed for various other purposes than that here particularly described. It may be used everywhere, where intimate mingling of gases and liquids is desired, for example, in the manufacture of mineral waters, lemonades, etc.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is—

1. In an apparatus for mixing liquids and gases, a mixing chamber provided in its upper end with a depressed recess concentric with the chamber and having a central opening, the side walls of said recess being ex-

tended beyond the top of the chamber, and a concentric series of openings being provided in the bottom of the recess shaped to give a spiral movement to liquid forced through them into the mixing chamber, in combination with a tubular body having its lower portion enlarged and fitted into said recess and a central concentric tube secured within said tubular body and projecting below it through the bottom of the recess in the mixing chamber, the lower end of said central tube being provided with a discharge opening constructed to give a spiral motion to liquids forced therethrough into the mixing chamber, such spiral motion being in the direction opposite to that of the liquid forced through the openings in the bottom of the recess of the mixing chamber, substantially as described.

2. In an apparatus for mixing liquids and gases, a mixing chamber provided in its upper end with a depressed recess concentric with the chamber and having a central opening, the side walls of said recess being extended beyond the top of the chamber, and a concentric series of openings being provided in the bottom of the recess shaped to give a spiral movement to liquid forced through

them into the mixing chamber, in combination with a tubular body having its lower portion enlarged and fitted into said recess and a central concentric tube within said tubular body and projecting below it through the bottom of the recess in the mixing chamber, the lower end of said central tube being provided with a discharge opening constructed to give a spiral motion to liquids forced therethrough into the mixing chamber, such spiral motion being in the direction opposite to that of the liquid forced through the openings in the bottom of the recess of the mixing chamber, the upper end of the central tube being open and communicating with a source of supply under pressure, a back pressure valve located at said opening, a communication from the tubular body with a source of supply under pressure and a back pressure valve in said communication, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BRUNO LEUSCHNER.

Witnesses:

PAUL ARRAS,
CLÄRE SIMON.