No. 709,498. Patented Sept. 23, 1902.

A. MOLET.

APPARATUS FOR MIXING GASES.

(Application filed Oct. 5, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

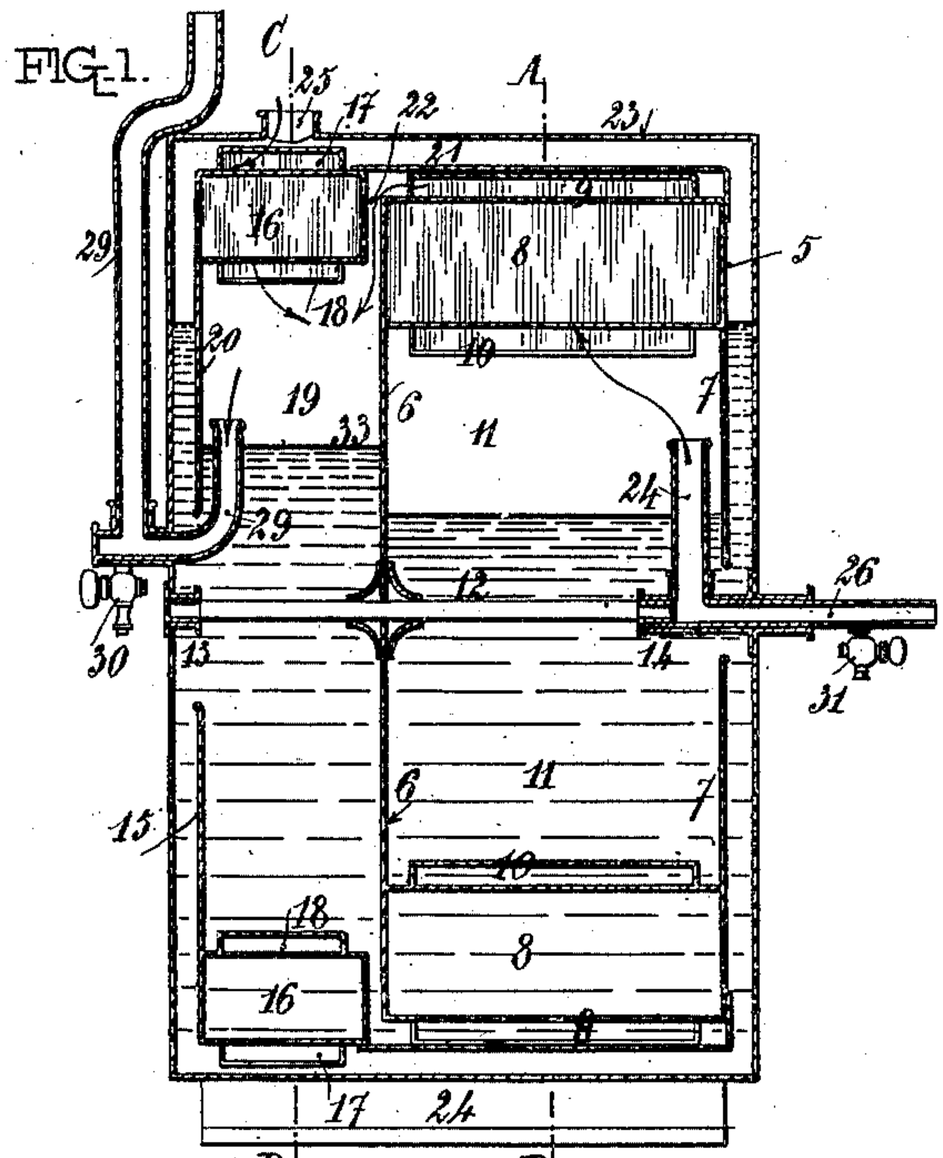
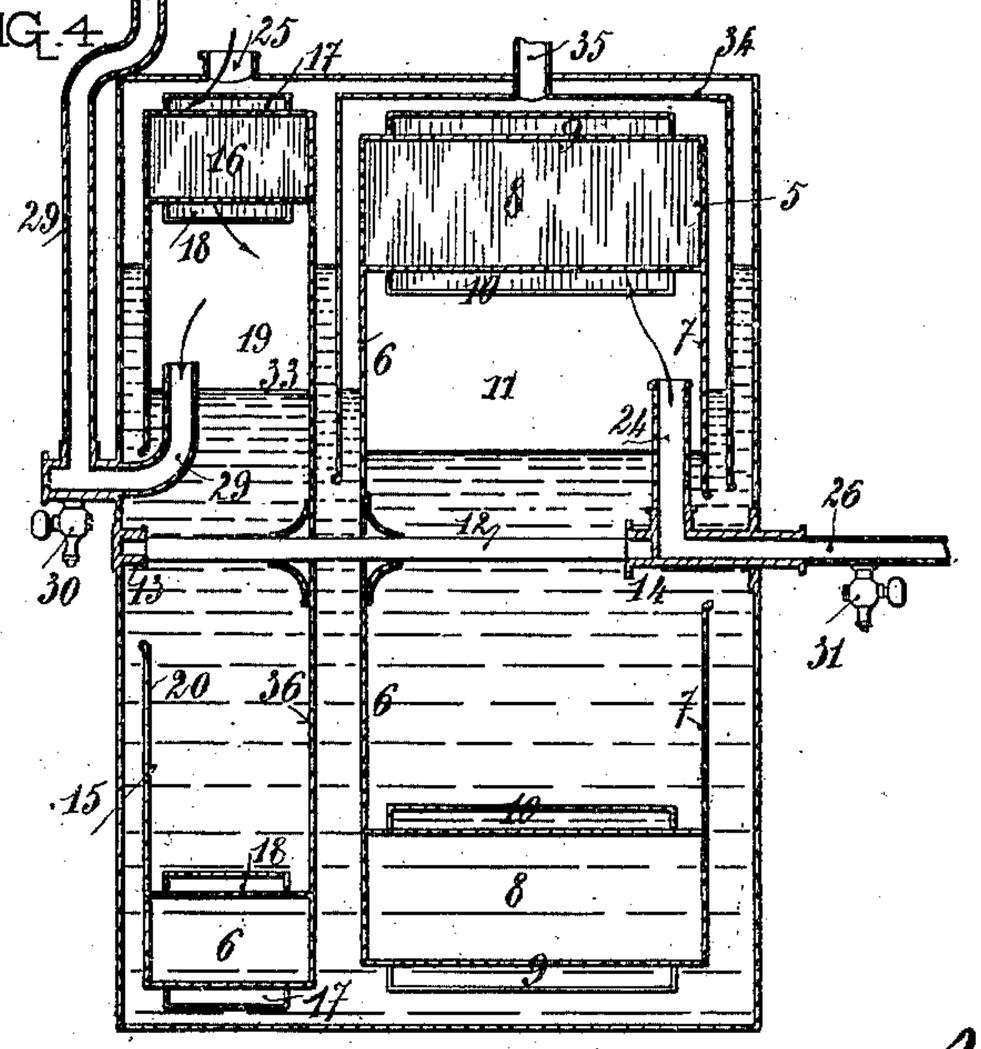


FIG. 4.



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(No Model.) 2 Sheets—Sheet 2.

FIG. 2.

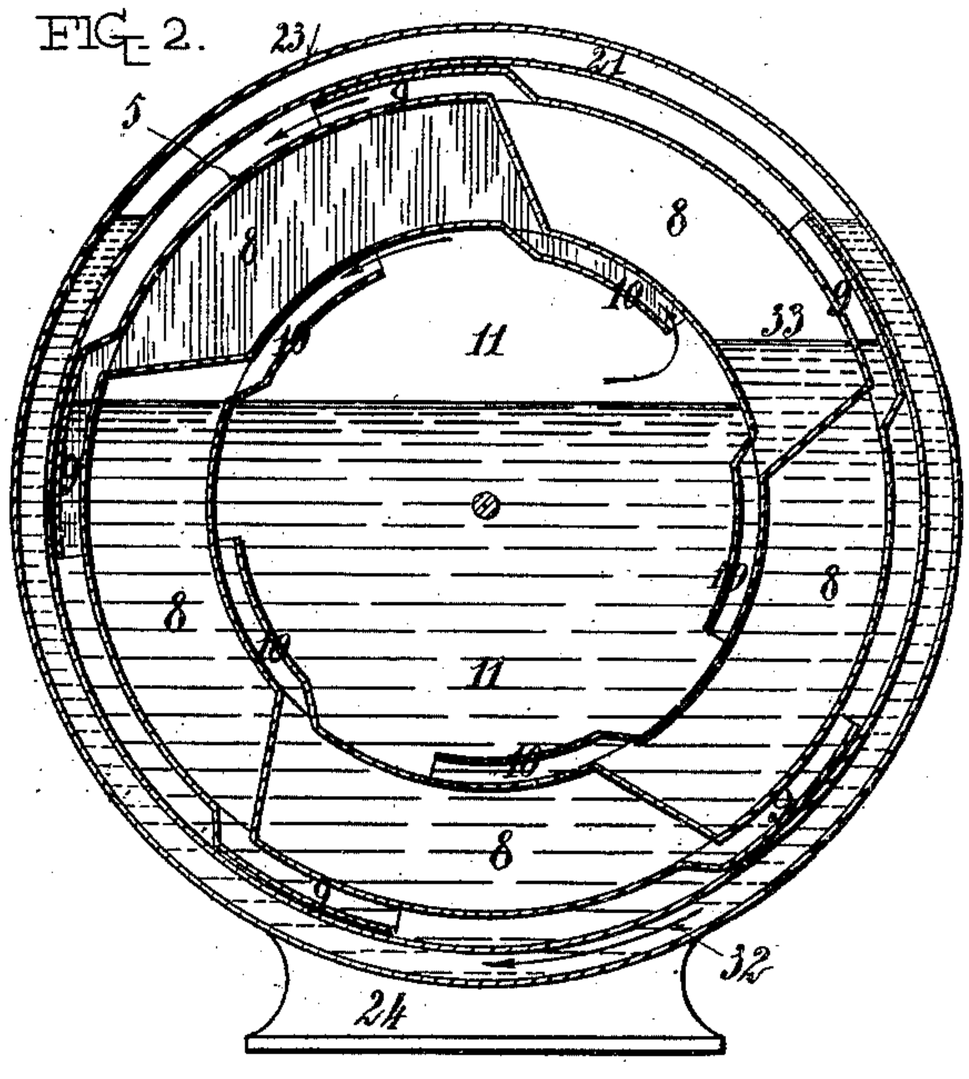
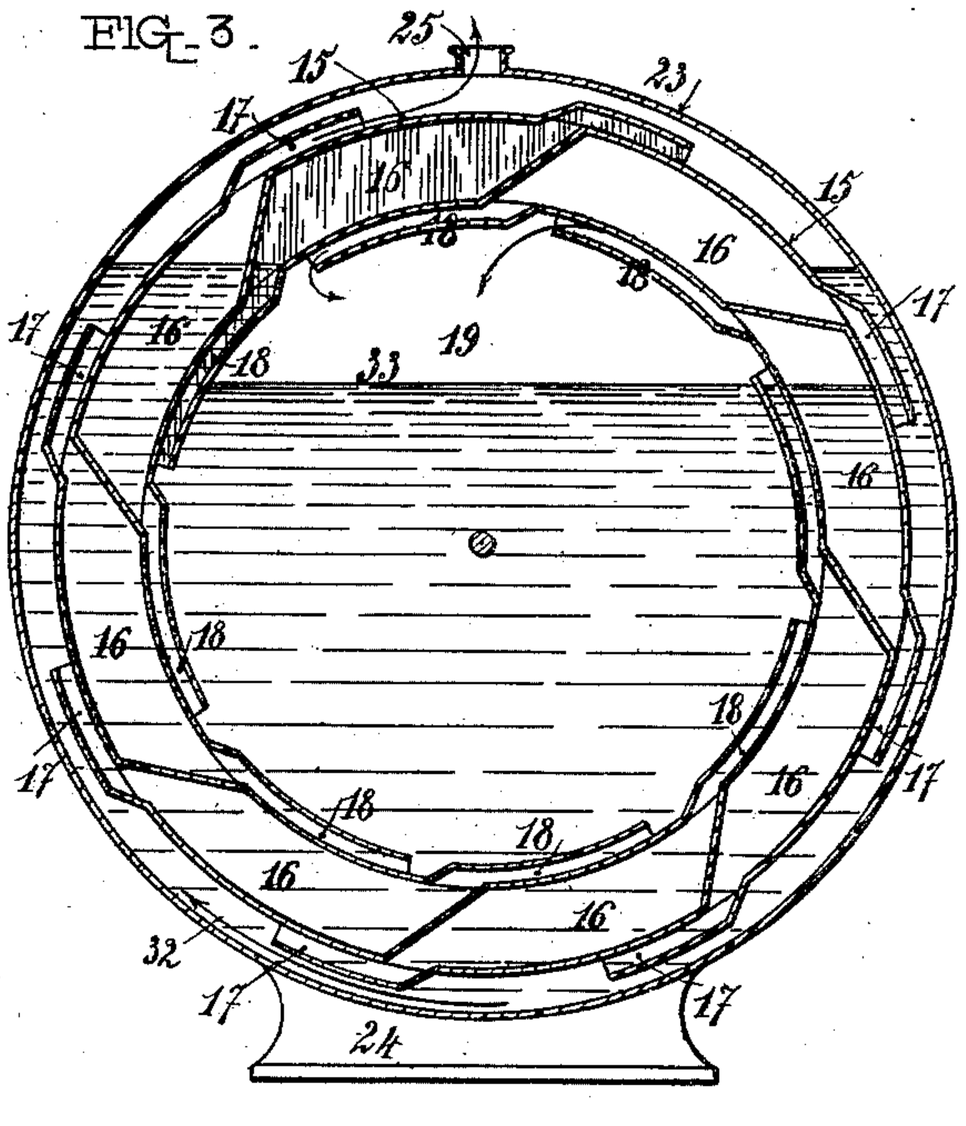


FIG. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MIXING GASES.

SPECIFICATION forming part of Letters Patent No. 709,498, dated September 23, 1902.

Application filed October 5, 1900. Serial No. 32,151. (No model.)

To all whom it may concern:

Be it known that I, ALFRED MOLET, a citizen of the Republic of France, residing at Buenos Ayres, Argentina, have invented certain new and useful Improvements in or Relating to Apparatus for Mixing Gases, (for which I have made application for Letters Patent in Great Britain under No. 13,404, dated the 25th day of July, 1900,) of which the following is a specification.

It is often necessary to mix gases in certain previously-determined proportions.

The apparatus forming the subject of the present application is so constructed that a mixture absolutely proportional is produced automatically and strictly in proportion to the quantity used or consumed by the simple pressure of one or several of the components of the mixture.

The apparatus may be applied in all cases where a mixture of gases is required, whatever may be the proportional quantities of the component gases, the apparatus differing only in details of construction and in the material employed according to the nature, pressure, and the volume of the component gases of the mixture.

I will now describe, as an example, an apparatus constructed according to this invention for mixing acetylene with air, the latter being drawn directly from the atmosphere. I make use of the pressure of the gas for the purpose of obtaining a continuous force and to apply this force so as to obtain the suction necessary for obtaining the required amount of air, the mixing of the latter with the acetylene being effected directly and at the pressure required. The necessary constituents of the apparatus, therefore, are a motor device coupled with an air-suction device.

The apparatus in question is represented in the accompanying drawings, in which—

Figure 1 is a vertical section of a side elevation; Fig. 2, a vertical section of a front elevation on line A B, Fig. 1; Fig. 3, a vertical section of a side elevation on line C D, Fig. 1; and Fig. 4, a vertical section of a side elevation of another form of construction of the apparatus, as represented by Figs. 1, 2, and 3.

The motor device 5 consists of a drum formed by two sides 6 and 7 and a circumferential chamber divided into cells 8 8, each of which cells is prolonged at each end by a tubular passage, one of which, 9, communicates with the outside, while the other, 10, communicates with a central chamber 11 of the drum. The tubular prolongations of the cells overlap the respective adjacent chamber, as shown. One side, 7, of the drum is provided with a central opening, while the other side, 6, is fixed on a revolving shaft 12, turning in bearings 13 and 14. The suction device 15 is also provided with a circumferential chamber divided into cells 16, each of which is provided at each end with a tubular continuation, as in the case of the motor device, but in a reversed direction. One of these, 17, communicates with the outside, while the other, 18, communicates with the central chamber 19, closed in at the sides by two walls, one wall, 20, open at the center, the other opening one of the walls of the motor-drum already described. The tubular prolongations of the cells 16, as in the motor devices, overlap the respective adjacent chambers. This suction device 15 is also connected with the motor-drum 5 by a circular casing 21, so connecting the two devices that a narrow space 22 is left between the two circumferential chambers. The casing 21 does not pass over the tubular prolongations 17 of the suction device 15, but completely surrounds the whole circumference of the motor device 5 with its tubular projections 9, so that these latter discharge into the central chamber of the suction device.

The parts described—namely, the motor-drum 5 and the suction device 15—are inclosed in a cylinder 23, supported on a pedestal 24 and provided at the upper part with an orifice 25. One side of the cylinder is provided at the center with an elbow-tube 26, passing through the side 7 of the motor-drum upward into the upper part of the central chamber 11 of the same, and this supports a bearing 14, on which the motor and suction devices revolve, while the other side carries another bearing 13 and has outside its center an elbow-tube 29, leading from the upper part of the central chamber 19 of the suction device.

The tube 26, intended for the admission of the acetylene gas, is provided with a cock 31,

and the tube 29, through which the mixture of the gas passes from the apparatus, with the cock 30. These act as purging-cocks.

In order to facilitate the understanding of the description, one of the cells 8 has been slightly shaded in Fig. 2, together with its prolongations 9 and 10 in Fig. 3, one of the cells 16 with its prolongations 17 and 18, and in Fig. 1 the sections corresponding to these are shaded. The cells and their tubular projections are so calculated as regards their positions that at no time during the working of the apparatus can more than one of the tubular projections be above the liquid.

The apparatus works as follows: The apparatus having been filled with water through the orifice 25 acetylene gas is admitted through the tube 26. In consequence of the pressure of the gas the level of the water in the part of the apparatus affected by such pressure will be lowered and will rise correspondingly in the part which is under the effect of atmospheric pressure. While the exit-tube 29 remains closed, the pressure on the surface of the water remains in an equilibrium and the whole system remains at rest. When, however, the exit-tube 29 is opened, the prolongations of the motor-cell which happen to be above the water open communication between the casing 21 and the central chamber 19 of the suction-drum. The air contained in the apparatus passes through the same and the pressure on the surface in the cells of which the tubular prolongations 10 are rising above the surface of the water diminishes, with the result that a rotary movement is set up in the direction indicated by the arrow 32. This rotary movement has the effect of alternately filling the cells 8 with gas and emptying them into the cylindrical envelop 21, through which it reaches the inner chamber 19 of the suction apparatus. In this movement of the motor-drum 5 the suction device 15 participates, the cells of which discharge their water and become filled with air as the tubular prolongations 17 emerge from the water, while, on the contrary, they become filled with water and discharge the air which they have just taken in into the inner chamber 19 as the tubular continuations emerge from the water. In consequence of this action a mixture of air and acetylene gas is effected in the said chamber 19, in which the two component parts are contained in exact proportions, depending on the relative capacity of the circumferential cells of the motor and suction devices.

The speed of rotation is self-regulating, according to the more or less rapid flow of the mixture through the tube 29, and it is evident that the production of the mixture, depending as it does on the speed of rotation, will be in strict accordance with the amount consumed. It is also clear from the arrangement of the cells that the production of the mixture will go on steadily without break as regards continuity during the whole time of the working of the apparatus.

The pressure of the mixture will be equal to the difference between the original pressure of the gas and the loss of pressure corresponding to the work done by the suction device less the loss resulting from friction. The level 33 of the water in the chamber 19 will therefore indicate that pressure.

By simply combining this apparatus with a device indicating the number of revolutions of the motor-drum it will act as a gas-meter, indicating the amount of gas used.

Of course it should be understood that the water may be replaced by any other solution or other liquid, according to the nature of the gases to be mixed.

As it is possible that the gases thus brought together may not be fully mixed before leaving the apparatus, it may be necessary instead of inclosing the motor device 5 in a casing 21, rotating with the latter, to inclose its upper part in a bell 34, provided with an orifice 35, Fig. 4, the suction device being in this case provided with a side 36, fixed on the shaft 30, instead of one of its sides being formed by the motor-drum. This construction is shown in Fig. 4.

In the case of mixing acetylene with air the gas would be introduced at the orifice 35 and air by the tube 25.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A gas-mixing apparatus comprising a casing with air and gas inlets and an outlet for the mixed air and gas, and a plurality of drums mounted upon a common shaft, each of said drums having a series of adjacent peripheral chambers with inner and outer walls concentric to the central shaft with outer and inner tubular extensions overlapping the respective adjacent chambers, substantially as set forth.

2. In a gas-mixing apparatus of the kind described the combination with a casing having air and gas inlets and an outlet for the mixed air and gas, of a drum with a series of adjacent peripheral chambers forming a cellular periphery, each chamber having a contracted tubular outer and inner portion overlapping the respective adjacent chambers, substantially as set forth.

3. In a gas-mixing apparatus of the kind described the combination with a casing having air and gas inlets and an outlet for the mixed air and gas, of a plurality of drums mounted upon a common shaft, each provided with a series of adjacent peripheral chambers forming separate cells with contracted tubular outer and inner extensions overlapping the respective adjacent chambers, the outer and inner tubular extensions of one drum extending in the opposite direction to those of the other drum, substantially as set forth.

4. A gas-mixing apparatus of the kind de-

scribed comprising a casing with air and gas inlets, and an outlet for the mixed air and gas, a plurality of rotatory drums mounted upon a common shaft, each drum having a series of peripheral chambers with inner and outer walls concentric to the central shaft, with outer and inner tubular extensions extending in opposite directions and a peripheral casing connecting one drum to the other, substantially as and for the purpose described.

5. In a gas-mixing apparatus of the kind described, a casing provided with gas-inlets and an outlet for the mixed air and gas, a plurality of drums mounted upon a common shaft, each drum having a series of peripheral chambers with outer and inner tubular extensions extending in opposite directions, and a bell arranged over one of the drums and an outlet from said bell, substantially as described.

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

ALFRED MOLET.

Witnesses:
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D. MAYER.