

No Model.)

2 Sheets—Sheet 1.

E. N. DICKERSON.

PROCESS OF AND APPARATUS FOR PRODUCING ILLUMINATING GAS.

No. 555,212.

Patented Feb. 25, 1896.

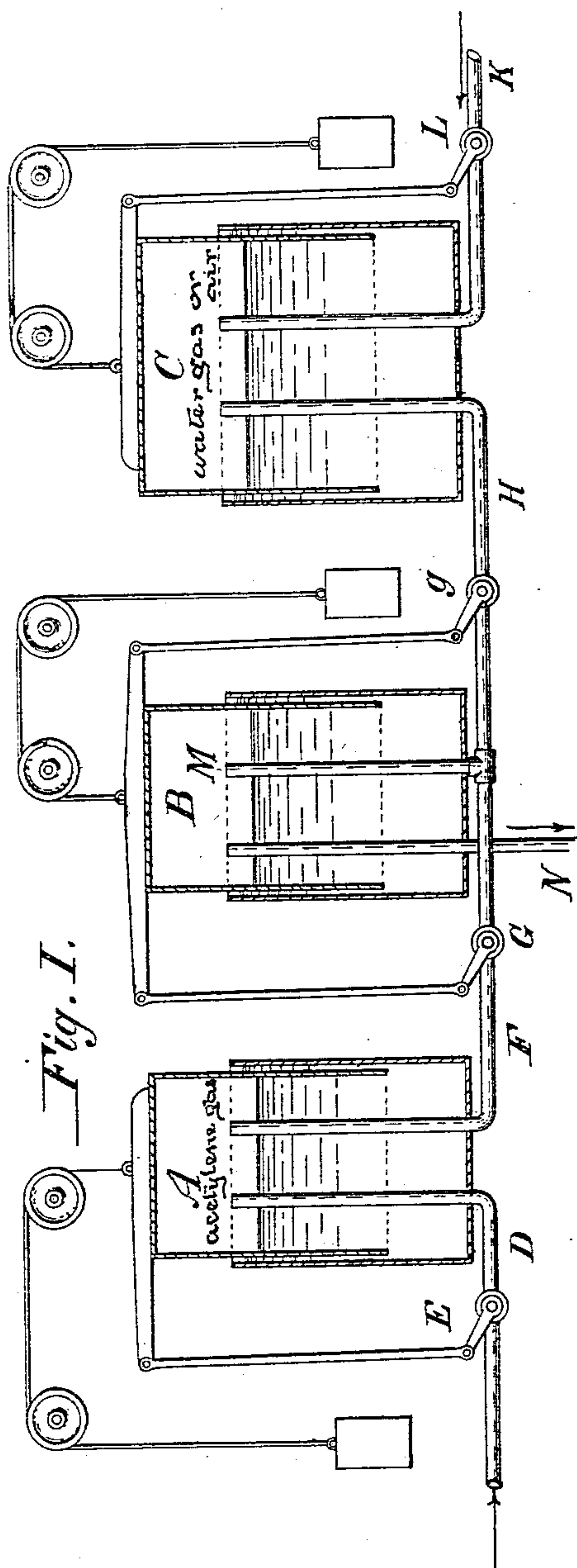


Fig. 1.

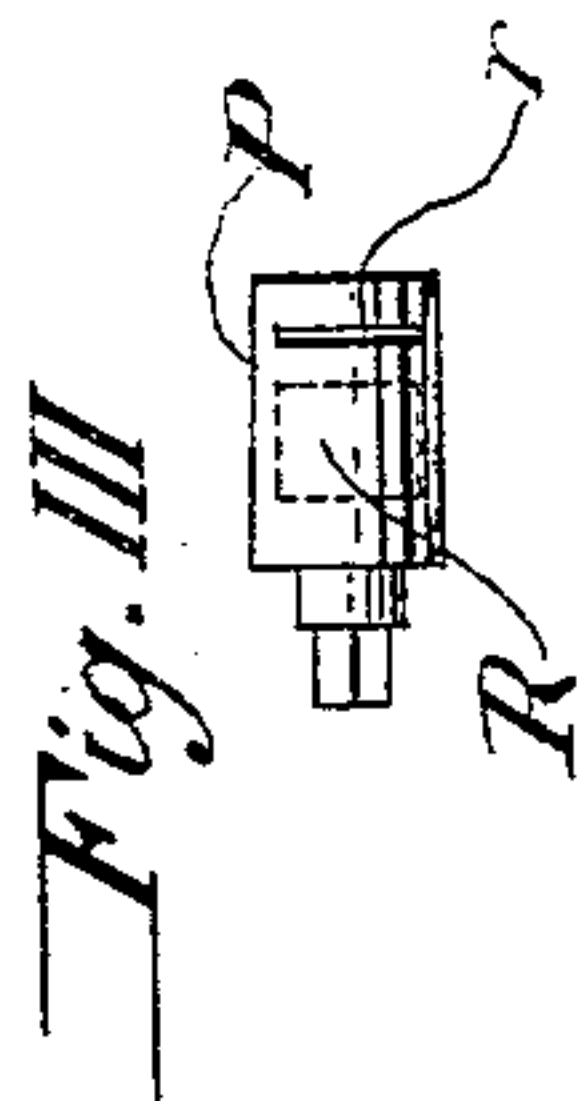


Fig. III



Fig IV

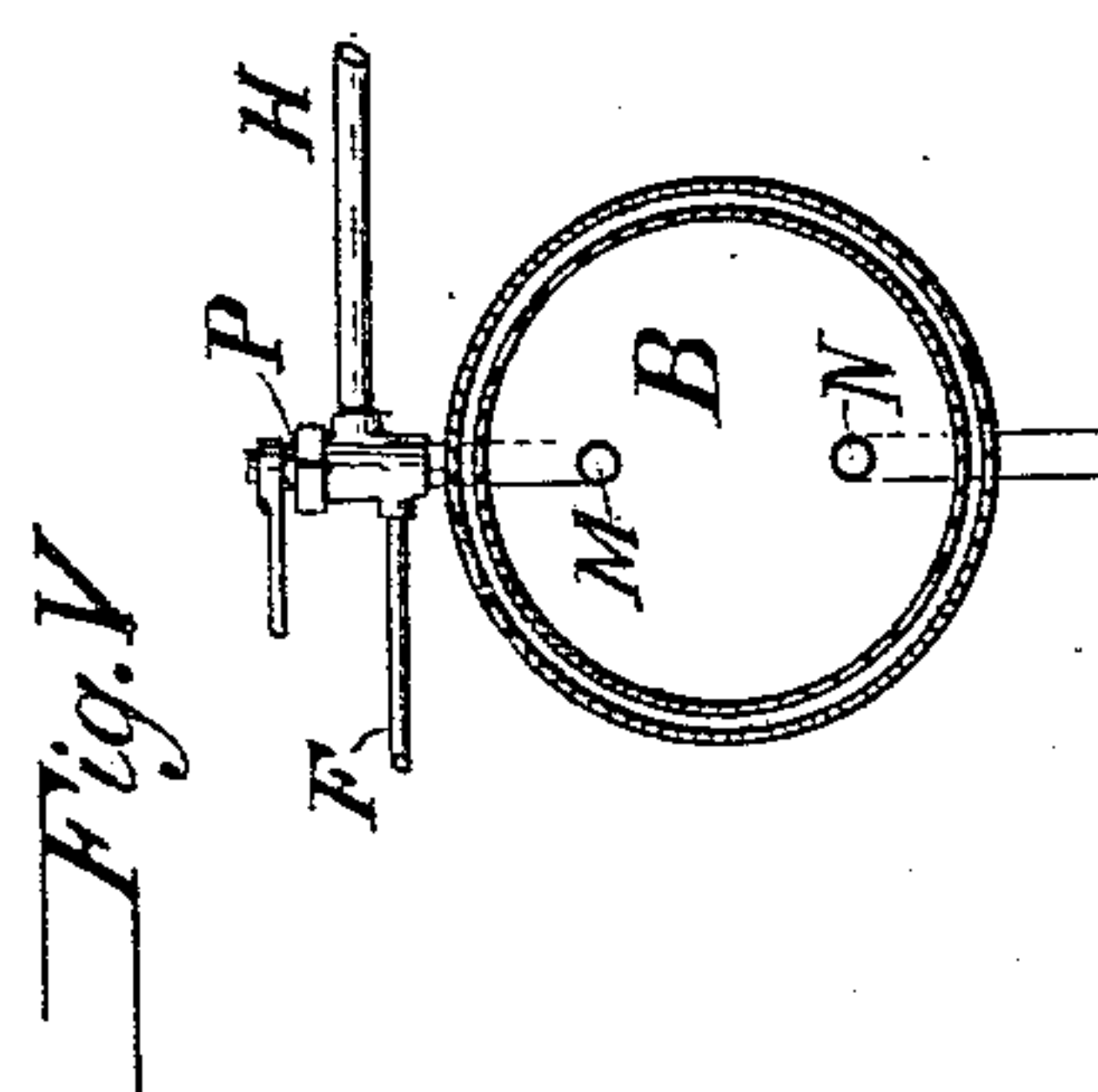


Fig. V

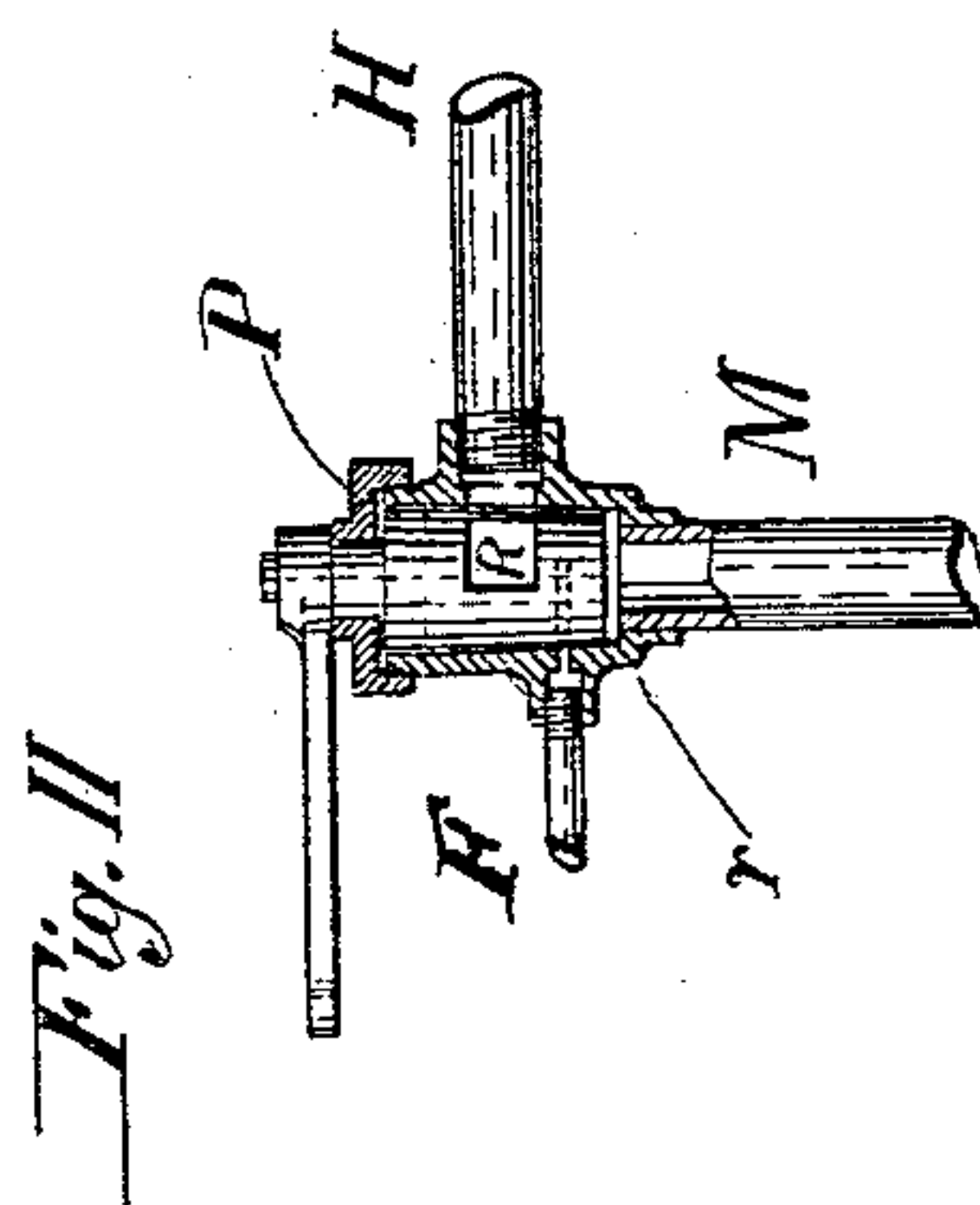


Fig. II

WITNESSES:

H. Constant.
Anthony Mef

INVENTOR

E. N. Dinkens

(No Model.)

2 Sheets—Sheet 2.

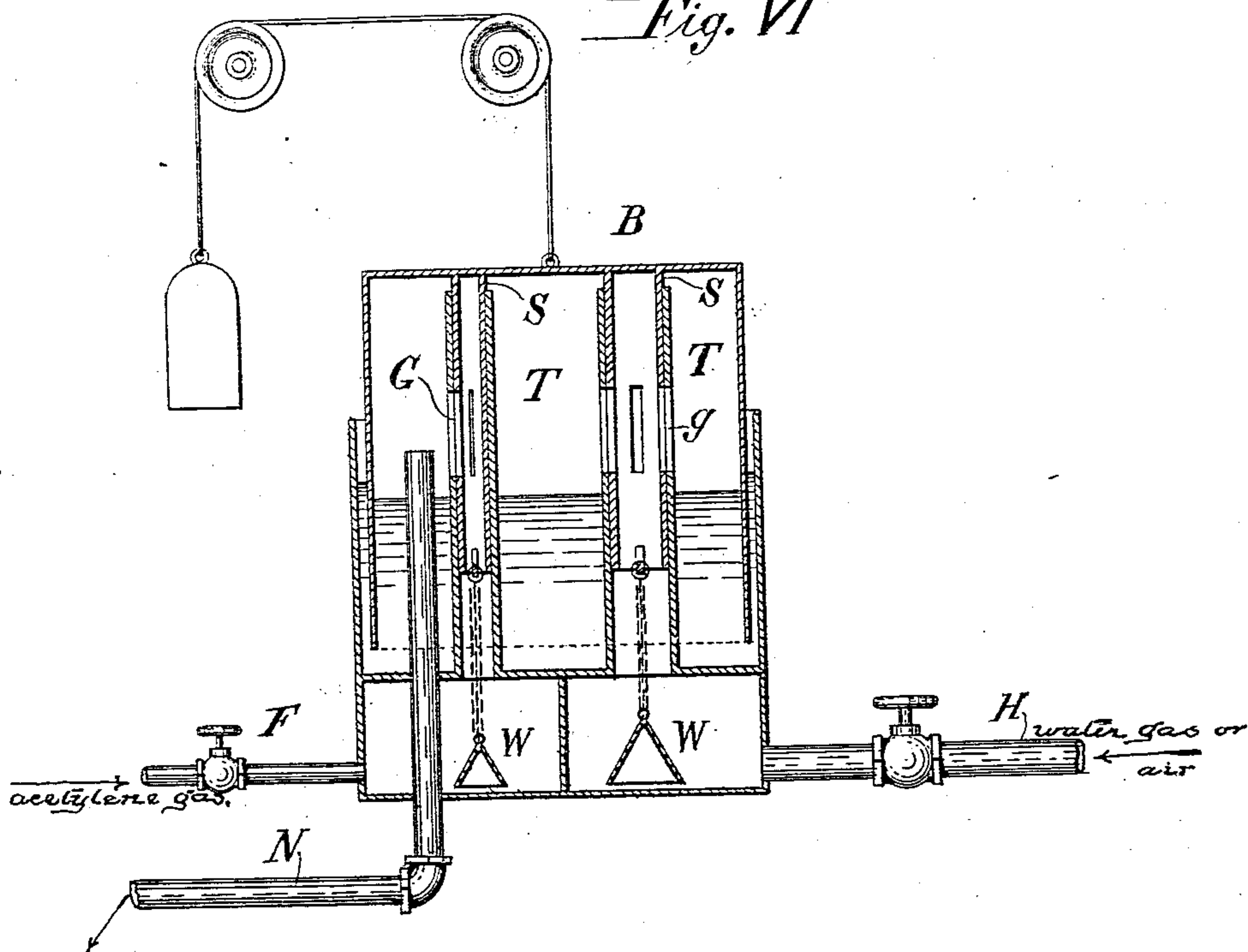
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Fig. VI



WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWARD N. DICKERSON, OF NEW YORK, N. Y.

PROCESS OF AND APPARATUS FOR PRODUCING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 555,212, dated February 25, 1896.

Application filed January 9, 1895. Serial No. 534,285. (No model.)

To all whom it may concern:

Be it known that I, EDWARD N. DICKERSON, of the city, county, and State of New York, have invented a new and useful Improvement
5 in Processes of and Apparatus for the Production of Illuminating-Gas, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

10 This invention relates to an improved process of increasing the illuminating power of gas and mechanism for carrying the same into effect, and it is especially applicable to the addition of acetylene gas, in a determined
15 percentage, to air or a combustible gas. If acetylene as an enricher is added to water-gas, the illumination at first is very high, but after a few hours decreases. It is, therefore, practically impossible to enrich water-gas at
20 the works by acetylene and thereafter supply such enriched gas through the mains.

My invention is primarily designed to supply the enriching material to water-gas practically at the point of consumption of the
25 water-gas. As this illuminant continues in the water-gas without material loss for some time, I thereby am enabled to practically avoid the deterioration of the enriched gas. My process also enables the mixing, in practically
30 predetermined quantities, of two gases—as, for instance, acetylene and air, or acetylene and water-gas or coal-gas—the whole being automatically controlled.

I do not broadly claim to be the inventor of
35 the addition of acetylene to water-gas as an enricher; but the present invention is based upon a means of remedying a difficulty never known to exist, and the remedy of which never was discovered until my invention.
40 That difficulty consists in the fact that, unlike other enrichers, acetylene will disappear, in part at least, as an enricher, if it remains in contact with water-gas for a considerable time—as, for instance, during the period
45 in which gas is stored in gas-works until its delivery to the consumer. It is also based upon the discovery of the law that, unlike many other chemical combinations, the combination of the acetylene or its conversion
50 into some other hydrocarbon does not occur immediately, but only after a period of contact between the water-gas and the acetylene,

and that, therefore, the acetylene can be added at the place of consumption without losing its illuminating power, while it cannot be so
55 added in the ordinary way at the works.

My invention will be readily understood from the accompanying drawings, in which—

Figure I represents an elevation, partly in section, of an apparatus for carrying out my
60 invention; Fig. II, a detail of a double-port stop-cock; Fig. III, a view of the plug of a double-port stop-cock; Fig. IV, a view of the plug of a single-port stop-cock; Fig. V, a plan view of a governor operating a double-port
65 stop-cock like that shown in Fig. III; Fig. VI, an elevation, partly in section, of a modification of the governor B shown in Fig. I.

In my drawings, A, B, and C represent three
70 holders. Instead of the holders A and C ordinary gas-governors may be employed. The holder B serves both as a governor and as a mixing-chamber, and therefore, should preferably be arranged in the form of a holder,
75 though in some cases two gas-governors and a mixing-chamber could be substituted, as will be hereinafter explained.

The holder A is provided with inlet-pipe D provided with governing-valve E. When the holder A is filled to a certain point the governing-valve E is closed, and thereafter the
80 pressure in A remains constant. The gas passes from A to B by a pipe F provided with governing-valve G, preferably of special form. The holder C is similarly constructed
85 and similarly connected with the holder B through pipe H and governing-valve g. The pipes F and H unite in the common entry-pipe M. The holder B is provided with delivery-pipe N, preferably distant as far as
90 possible from the delivery-port pipe M. Of course the pipes F and H might be provided with independent delivery-pipes into the holder B. The governing-cocks G g should be so constructed and adjusted as to open
95 simultaneously and to present at whatever position of opening-ports having the same relative area—that is to say, at all points of the rise of the holder B the cocks G g should present the same relative area of opening—as,
100 for instance, one to ten. Under these conditions, by making the pressures in A and C practically uniform the gas will be delivered into holder B practically in the proportion of

one to ten. Of course, if necessary, allowance will be made for the difference of specific gravity of the two gases and their consequent rate of flow. This, however, is readily
 5 determined by experiment and adjustment of the relative size of the openings of the cocks. These valves or cocks may be constructed in any suitable way, provided they comply with the conditions of constantly presenting open-
 10 ings bearing the same ratio to each other. A simple form consists in making the opening of the plug of an ordinary cock rectangular in section, with a corresponding entry through the cock-casing. By making the openings in
 15 one of the cocks ten times as wide as the opening in the other cock the ratio of delivery will be practically one to ten. A plug of such cock is shown in Fig. IV.

Instead of arranging the two independent
 20 cocks *G g* a single cock *P*, Figs. II and III, can be used, which will then be arranged as shown in Fig. V. In this cock the plug is hollow and has two external openings *R r* corresponding to similar ports in the shell of the
 25 cock. They are arranged to open simultaneously and deliver, as before described, relative proportional amounts of the enriching-gas and water-gas or air through the pipes *F* and *H* into the delivery-pipe *M*. These valves
 30 can also be arranged as shown in Fig. VI. In this case the ports are inside of the governing-holder *B*, and they are preferably arranged in the sides of two tubes *S* and *T*. When the holder is down, as in the position shown
 35 in Fig. VI, the ports correspond. As the pressure rises the ports are simultaneously and relatively closed, being made of the determined proportion. Of course more than one port need not be used unless desired. As
 40 this form of valve is not absolutely tight (though entirely so for all practical purposes) I have arranged that at or about the point of closure of the slot-openings in pipes *S* and *T* the lower parts of the pipes *T* shall be closed
 45 by ordinary valves *W*. Under these circumstances the relative proportion is admitted to the mixing-chamber *B* of the two gases or gas and air, but instead of employing the mixing-chamber in the holder *B* the valves
 50 *G g* can be separately operated by governors simultaneously moving under equal pressure, and the gas led to a separate receiver.

Assuming the holder *A* to contain acetylene and the holder *C* water-gas, the mingled acetylene and water-gas uniting in the pipe *M* will
 55 be delivered into the holder *B*. As the holder rises the cocks *G g* or the cock *P* are closed until they deliver constantly the required amount of gas to the holder *B* which, mingling
 60 in the pipe *M* and the chamber of the holder, escapes thence through pipe *N* to the point of combustion.

If two gas-governors are employed at *G g* delivering into a common delivery-pipe *M* the
 65 same result will be accomplished by making the areas of the delivery-valves of these governors in the desired ratio; but in this case

exceeding sensitiveness on the part of the governors is essential or else one such governor may supply an excess of the gas which it gov- 70
 erns. I therefore much prefer two openings controlled by the same governor rather than two openings controlled by two governors.

It is obvious that the process of adding acetylene as an enricher at the point of con- 75
 sumption may be utilized in other ways besides that shown and by means of other apparatus.

Though I prefer that the pressures in governors *A* and *C* shall be equal the apparatus 80
 can still be operative, even though these pressures be unequal though constant, in which case the areas of the ports in valves *G g* would be correspondingly varied, being proportionately less in area in that port which 85
 governs the gas at higher pressure.

Of course if the areas of the ports remain constant a variable mixture of the gases may be made by varying the relative pressures 90
 upon the governors.

By the process herein described a single main can be used to supply heating-gas and illuminating-gas, the illumination being added to such portion of the gas as it is de- 95
 sired to use for illuminating purposes, and the remainder of the gas being burned for fuel purposes.

I do not in this application claim adding a vapor—as, for instance, naphtha-vapor—to a combustible gas at the point of consumption, 100
 this invention being strictly limited to the addition of the fixed permanent gas acetylene practically at the point of consumption.

What I claim as my invention, and desire to secure by Letters Patent, is— 105

1. The process of enriching combustible gas at the place of consumption, which consists in producing combustible gas at a distant point, in regulating at the place of consumption the pressure of the gas to a constant pressure in- 110
 dependent of the pressure in the mains, in generating or supplying at the point of consumption acetylene gas and delivering it to a mixing device where it is mingled with the previously-transmitted gas, also at a constant 115
 pressure, and in finally mingling the said two gases in their passage to the burner by thus adding the acetylene gas in a constant ratio to the previously-transmitted gas, whatever be the consumption of the enriched gas, sub- 120
 stantially as described.

2. The combination of two gas-governors maintaining constant pressures upon their delivery sides, connections bringing together the two gases passing through said two gov- 125
 ernors, and a third governor simultaneously governing the delivery from the first two governors by means of two delivery-ports of different areas, which two delivery-ports have constantly the same relative area at all points 130
 of their opening, substantially as described.

3. The combination of the governor *A*, and the governor *C*, each connected with the valve *P* having double delivery-ports of different

areas, maintaining, however, the same relative areas at all points of the opening of the cock, and a connection or connections from said cock P to the governor B, and the governor B, substantially as described.

4. The combination of the holder B with the tubes SS and TT having lateral openings G g, and the closing-valves W W, closing the tubes T T when the holder is elevated, substantially as described.

5. The combination of the holders A and C with valves E L and a b, the holder A gov-

erning the valve E and the valve a on the delivery-holder C, and the holder C controlling the valve L and the valve b on the delivery-holder A, substantially as described.

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

E. N. DICKERSON.

Witnesses:

ANTHONY GREF,
H. CONTANT.