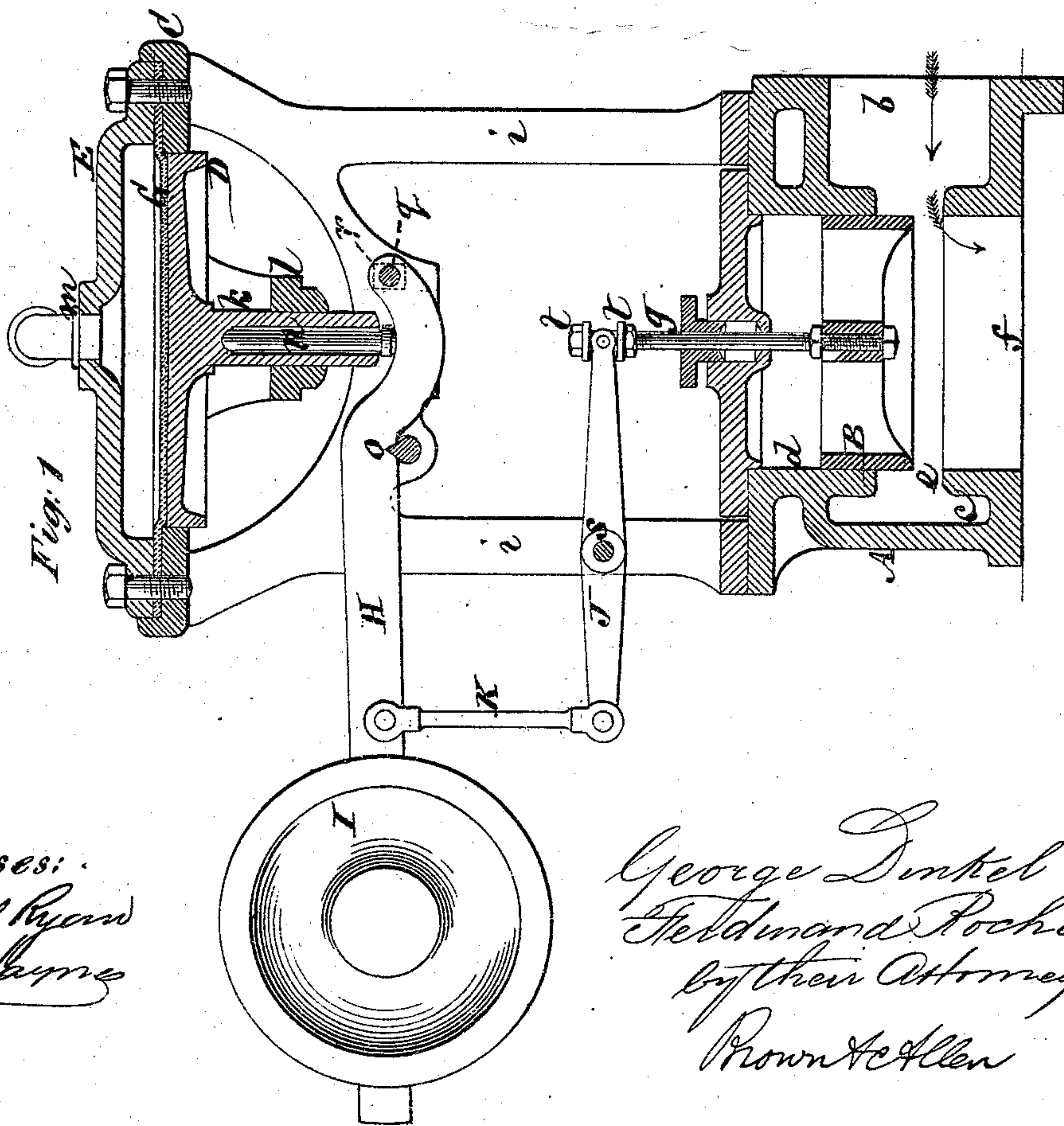
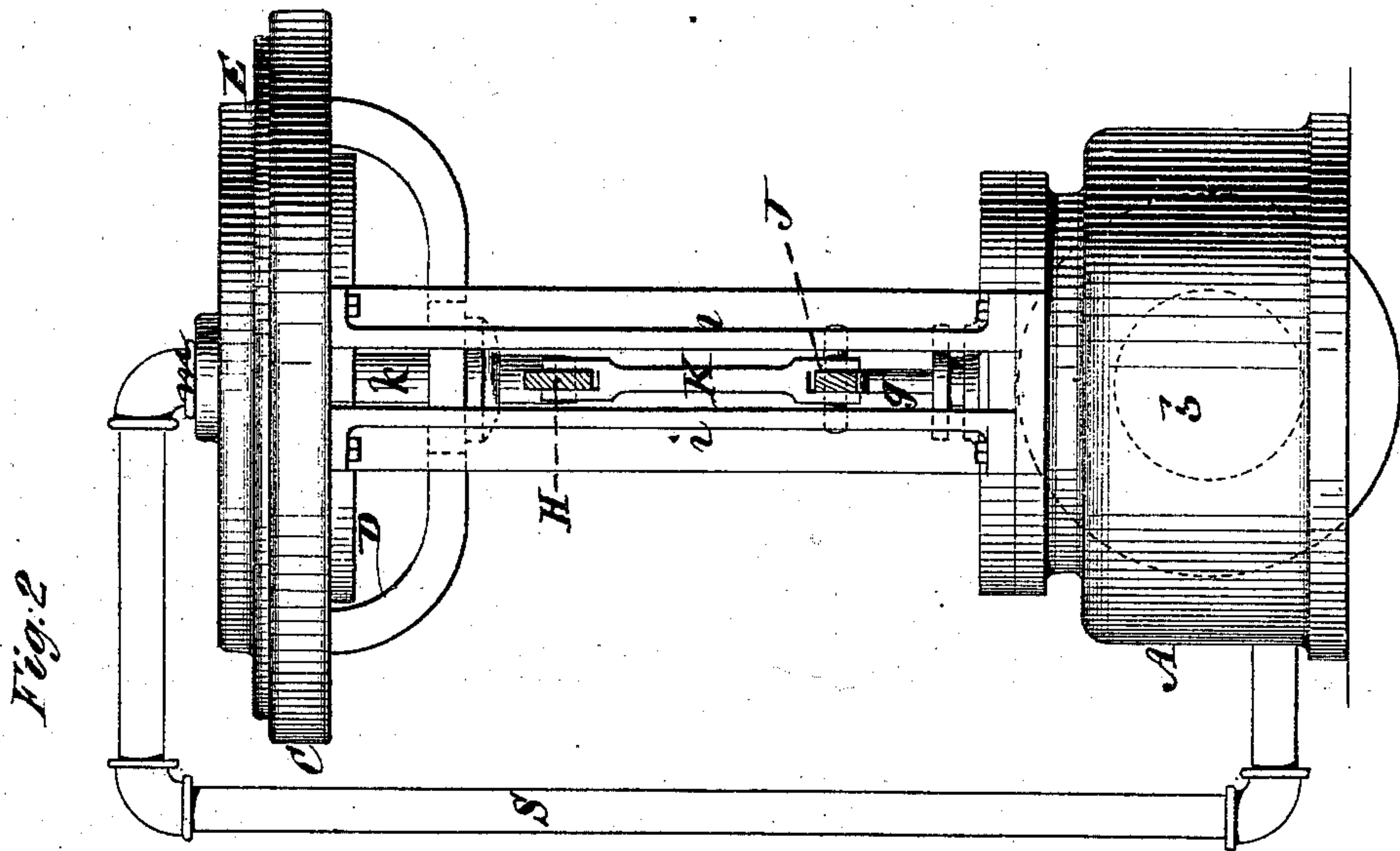


G. DINKEL & F. ROCHOW.
Pressure Regulators.

No. 150,541.

Patented May 5, 1874.



Witnesses:
Michael Ryan
Per: Hayne

George Dinkel
Ferdinand Rochow
by their Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

GEORGE DINKEL, OF JERSEY CITY, NEW JERSEY, AND FERDINAND ROCHOW,
OF BROOKLYN, NEW YORK, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO
WALTER R. ELMENHORST, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN PRESSURE-REGULATORS.

Specification forming part of Letters Patent No. **150,541**, dated May 5, 1874; application filed
February 18, 1874.

To all whom it may concern:

Be it known that we, GEORGE DINKEL, of Jersey City, in the county of Hudson and State of New Jersey, and FERDINAND ROCHOW, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Pressure-Regulators, of which the following is a specification:

This invention relates to apparatus for regulating the pressure or temperature of steam or other aeriform gases or fluids in their flow from one vessel to another, as from a generator to a receiver. While not restricted to any particular use, it may be employed to advantage in the manufacture of sugar, and for various boiling, distilling, or refining purposes where a given heat is required; also, to other purposes where a given pressure is required, the pressure always controlling the temperature where a given heat is required, as, for instance, in the case of steam in which a given pressure involves a given temperature.

The invention consists in a novel combination of a flexible diaphragm or close piston and its cylinder; a balance-valve of annular or sleeve-like construction detached from the flexible diaphragm, and arranged to operate in the base of the structure, which carries at its top the chamber covered by the flexible diaphragm; inlet and outlet passages controlled by said valve; and intervening levers having a regulating-weight for operation of the valve by the diaphragm, and arranged to lie or project within the main frame or structure, so that the same frame or standards thereof carry and bind together both the cylinders of the flexible diaphragm, or close piston and independent valve; and the compound system of levers by which the diaphragm has a less motion than the valve, thus insuring great compactness and strength, together with a cheap construction and the most perfect general efficiency.

In the accompanying drawing, Figure 1 represents a vertical section of an apparatus, constructed in accordance with our invention, suitable to sugar-boiling purposes; and Fig. 2 an outside view of the same at right angles to Fig. 1.

A is a cylinder or hollow base, having an inlet, *b*, which communicates with an annular chamber, *c*, that connects with, or is open to, the interior circular portion *d* of the cylinder by an annular opening, *e*. The bottom of said cylinder is open, and forms a general outlet, *f*. B is an annular valve, of a sleeve-like construction, having a clear opening through it, and arranged to work in close contact with, and to move up and down within, the interior *d* of the cylinder A, so as to more or less contract or fully open and close the annular opening *e*, and forming, in effect, a balance-valve. The stem *g* of said valve passes through an upper cover of the cylinder A. C is an upper ring or short cylinder, supported by suitable standards *i*, which are mounted on the base A. D is a piston, arranged to freely fit within said ring, and having a lower central hollow stem, *k*, which passes through a fixed guide, *l*. The ring C is closed above by a cap, E, which also serves to clamp or hold a flexible diaphragm, G, lying on top of the piston D, and serving to hermetically seal it without preventing its free movement. This cap E has a pipe or opening, *m*, which connects, in any suitable manner, with the outlet *f* of the base, as by a pipe, S. The piston D is supported by a stem, *n*, which rests on a lever, H, having its fulcrum at *o*, said lever being arrested at the limits of its up and down movement by a stop, *q*, working in a slot, *r*. I is a weight, adjustable on or along the lever H, by which the action of the regulator is controlled. J is a lever, having its fulcrum at *s*, and connected at its one end by a rod, K, with the lever H between the fulcrum and the weight of the latter, and in forked connection at its opposite end, between adjustable nuts *t t*, with the stem *g* of the valve B.

The system of leverage herein described, which connects the flexible diaphragm G, or its supporting-piston D, with the valve B, is such that but a slight movement up or down of the piston D and the lever H gives a large or accelerated movement to the valve B.

In the operation of the apparatus, it is evident that, upon free communication being established between the outlet *f* and opening *m*,

steam or other gas or fluid entering by the inlet *b*, and the valve B being more or less open as regards its control of the annular passage *e*, said steam, acting on the diaphragm G and piston D, will, through the levers H J and their connections, move down, more or less, the valve B to throttle the opening *e*, according to, or in conformity with, the adjustment of the weight I on the lever H, and accordingly as the pressure on the diaphragm G is increased or diminished above the required limit, as controlled by the weight I, will the valve B be operated to more or less throttle the outlet *f*, and thus keep the flow through said outlet at a given pressure. The valve B, being balanced, requires but little force to move it; and the diaphragm G, being exposed to the reduced pressure of the throttled steam or fluid, and, by the leverage which connects it or its piston D with the valve, having but a very limited movement for a large movement of the valve B, said diaphragm is ex-

posed to very little wear and tear, and the regulator is made extremely sensitive or quick in its action.

We claim—

The combination of the upper cylinder C with its piston D and flexible diaphragm G exposed to pressure from above, the base A constructed to form a cylinder for the regulating-valve, and connected with the upper cylinder by the same general frame or standards *i*, the annular balance-valve B, the apertures *b f*, and a regulating weight with compound levers having their fulcrums on said frame, and projecting within it for operation of the independent valve by the diaphragm, substantially as shown and described.

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Witnesses:

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