

No. 890,788.

PATENTED JUNE 16, 1908.

C. F. McKENNA.

RETORT.

APPLICATION FILED APR. 22, 1903. RENEWED SEPT. 30, 1907.

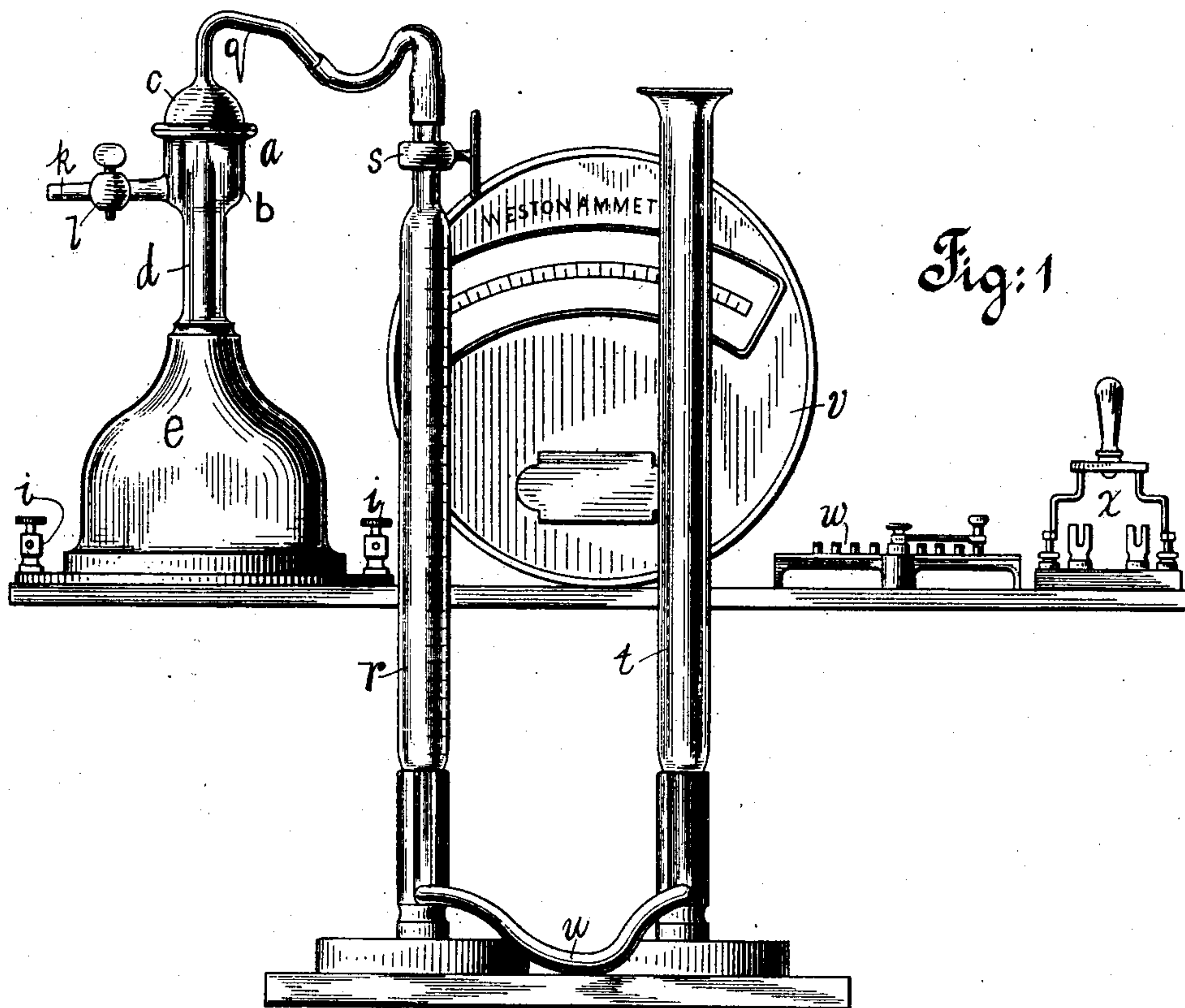


Fig:1

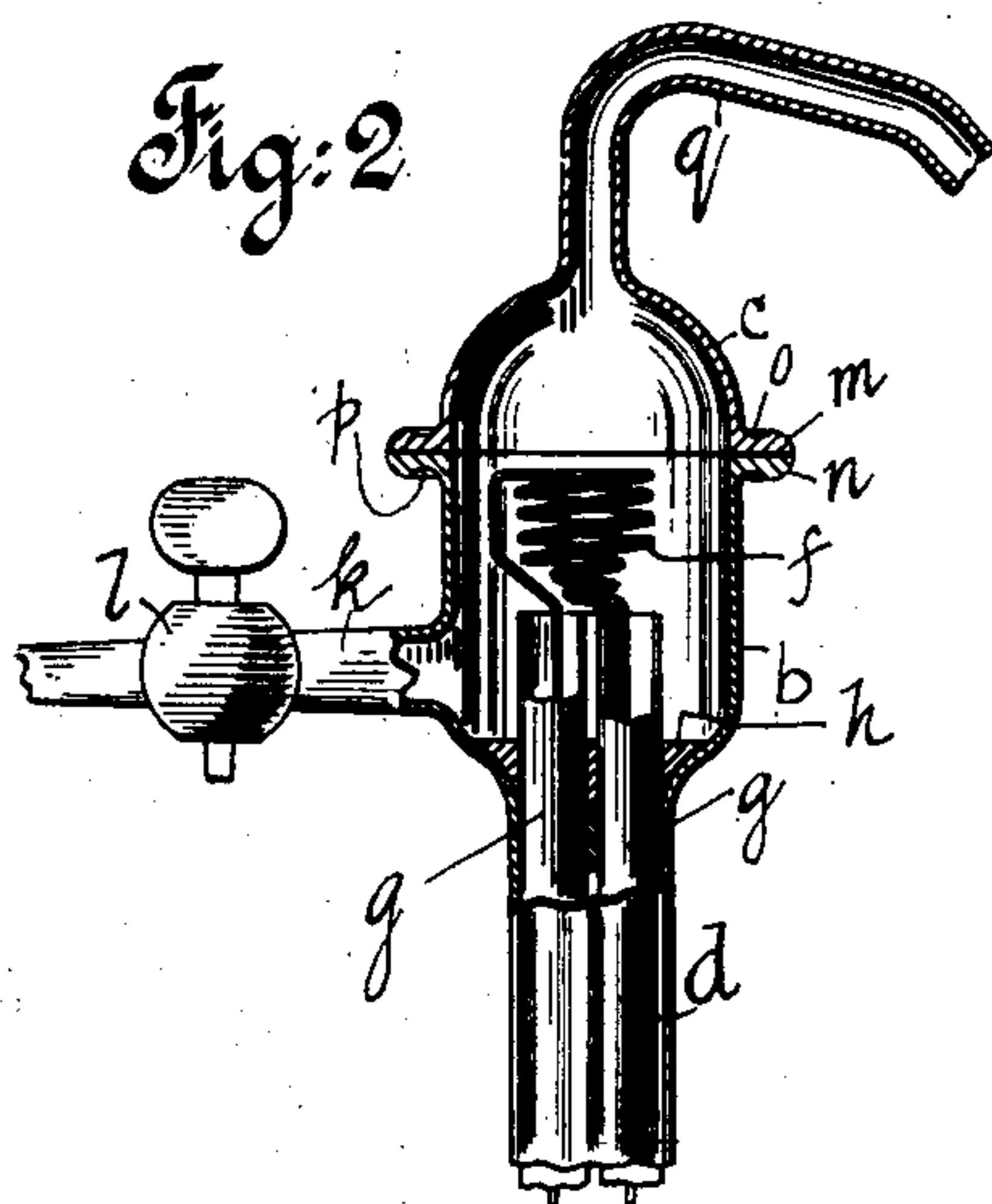


Fig:2

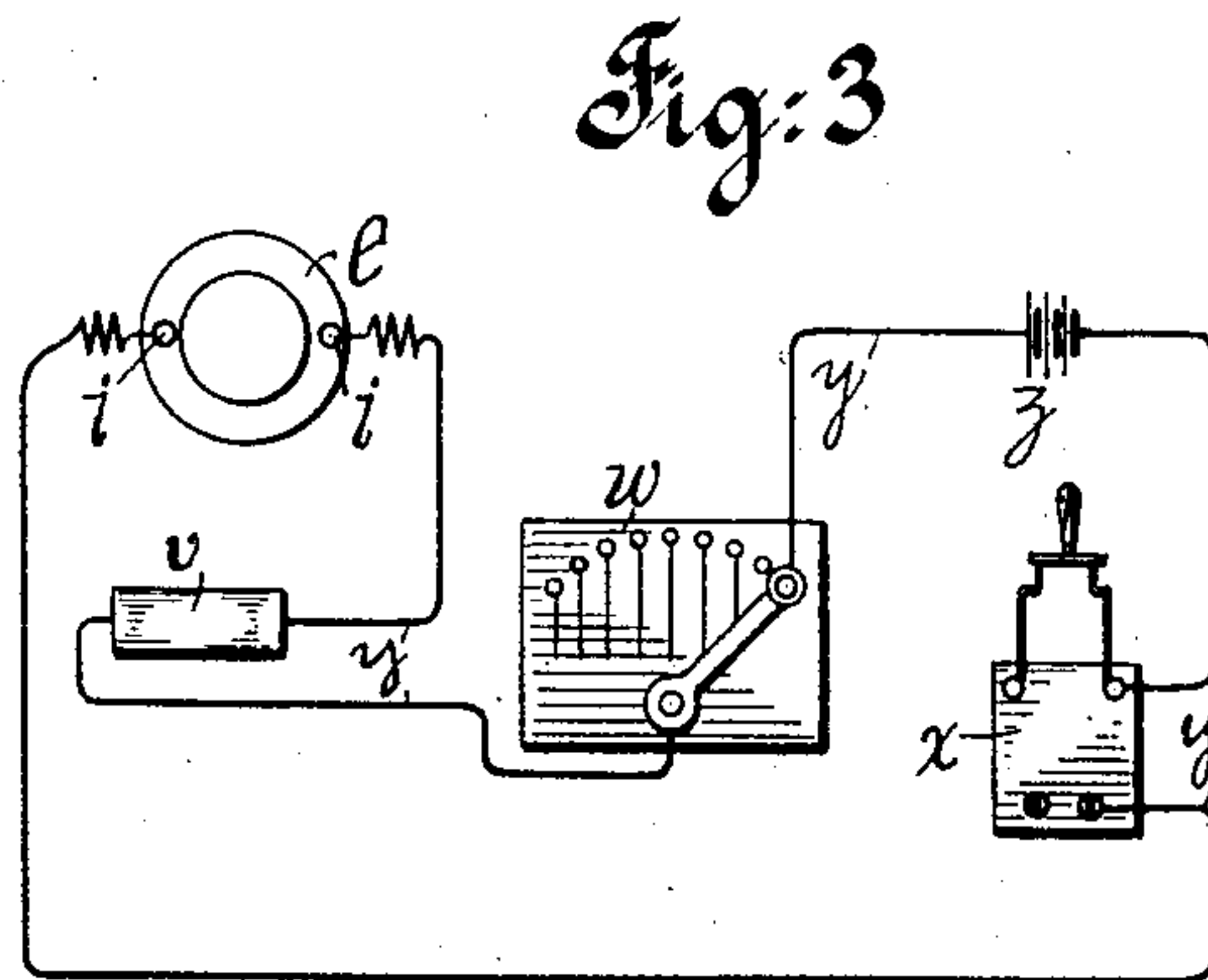


Fig:3

Witnesses  
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Charles F. McKenna,  
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# UNITED STATES PATENT OFFICE.

CHARLES F. McKENNA, OF NEW YORK, N. Y.

## RETORT.

No. 890,788.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed April 22, 1903, Serial No. 153,761. Renewed September 30, 1907. Serial No. 395,181.

*To all whom it may concern:*

Be it known that I, CHARLES F. McKENNA, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented a certain new and useful Improvement in Retorts, of which the following is a specification.

This invention relates to apparatus for separating those constituents of substances which may be driven off by heat from those constituents which are not volatilized, vaporized, or otherwise driven off or separated by the heat actually employed, and is applicable alike in the arts and the laboratory.

Among the objects of the invention are the control of the degree of heat used, the collection of the gases or liquids evolved, the measurement of the volume or amount of the evolved gases, the use of a neutral gas or vapor, the creation of a vacuum prior to or during the evolution of the gases, the avoidance or promotion of combustion, and other objects, as will appear hereinafter.

To these ends, the invention consists of features of construction, arrangements, and combinations of devices hereinafter described and more particularly pointed out in the appended claims.

One form of the invention is embodied in the apparatus illustrated in the accompanying drawing, forming part of this specification, in which—

Figure 1 is a general view of the apparatus, showing the various parts thereof in elevation; Fig. 2 is a vertical sectional view of the heating chamber shown in Fig. 1; and Fig. 3 is a diagram of the electric connections.

In the drawing, the reference *a* designates a heating chamber which, in the instance shown, comprises a vessel *b* and a covering and detachable dome *c*, the vessel *b* being shown as integral with the column *d*, which, in turn, is suitably supported by a base *e*. Within the chamber *a* and preferably wholly within the vessel *b* is a coil *f* of platinum or other wire arranged to receive and retain the substance which is to be heated, as by having the bottom, or even the whole, of the coil tapering downward. Or the substance to be heated may be placed in an asbestos cone, and the cone be placed in and be supported by the coil *f*; in the latter case, the coil need not be tapering. The terminals of the coil *f* pass out through the column *d*, being cov-

ered in whole or in part with insulation *g*, and being sealed where they pass from the column *d*. From the column *d*, the terminals pass to binding posts *i*. Or a suitable cement *h* may be used to render the bottom of the vessel air-tight, the said terminals passing through such cement seal in such case.

By preference, the vessel *b* has one or more inlet pipes or tubes *k*, each of which is provided with a stop-cock *l* whereby the chamber *a* may be filled with a neutral gas or vapor, or may be exhausted as hereinafter set forth.

The dome *c* and the vessel *b* have meeting flanges *m n*, which are fitted together in an air-tight manner, and these flanges may be clamped or otherwise fastened together in any suitable manner. In the particular instance shown, these flanges are grooved at *o p* to afford a better hold to a clamping device. In some cases, such clamping device may consist of pairs of pivoted jaws held together by springs (not shown).

At the top of the dome is an outlet pipe or tube *q* which may be connected with some suitable form of gas receiver, and which may have a suitable stop-cock therein (cock not shown). In the particular instance shown, the tube *q* is connected by a flexible tube with a burette *r*, there being a stop-cock *s* at the upper end of the burette.

Reference *t* designates a tube which, like the burette, is shown as being mounted in or on a suitable stand. The lower ends of the tube and burette are connected by a flexible tube *u*, whereby a fluid in the said parts may flow from one to the other, and whereby the same level of such fluid may be maintained in both tube and burette as the gases enter at the top of the burette and force down the fluid therein.

The reference *v* marks an ammeter; *w*, a rheostat having its resistance adjustable as usual; *x*, a switch for throwing current off and on; and *y*, wires for connecting the parts electrically. Current may be taken from commercial mains, or from a battery or generator *z*.

The substance which is to be subjected to the action of heat is placed in the coil *f*, either with or without an asbestos cup or cone lining to said coil, after which the dome *c* is put in place in an air-tight manner, and clamped down if desirable. If the substance to be heated is inflammable, or if it is so desired for any reason, the chamber *a* may be filled



with a gas which will remain neutral; this may be done conveniently by introducing such gas or vapor through the tube *k* while the air is allowed to escape from the tube *q*, after which the cock *l* is closed and the tube *q* is connected with the burette. The level of the fluid in the burette may be brought to the top of the burette by opening the cock *s* and raising the tube *t* properly; or the fluid level in the burette may be brought to any predetermined or initial mark in the same way, and the levels of the fluid in the tube and the burette may be kept even during the collection of gas in the top of the burette by gradually lowering the tube during the collection thereof. When current is turned on, the coil quickly rises to the desired degree of heat, the rheostat being employed to regulate the amount of current. The substance in the coil is heated by contact or by radiant heat, and may be brought to incandescence in a very short time, giving off gases the while. The current is turned off when gases cease to be evolved or when it is desired to stop their evolution. The evolved gases are collected in the burette, and their volume is easily ascertained by reading the scale on the gas-receiver.

If it is desired to create a vacuum in the chamber *a* and to maintain the same as far as possible so that the substance to be heated shall be in a vacuum or under reduced pressure, a vacuum pump may be attached to the tube *k*, the cock *l* being open, and the tube *q* being closed. By creating a vacuum in the chamber before current is turned on, and then collecting the gases as above described in the receiver or burette, combustion may be avoided. It is obvious that a neutral gas or vapor may replace the air in the chamber *a* before heating takes place, and combustion thus be avoided. It is also obvious that a combustion-supporter may be introduced

through the tube *k* and that combustion may take place under pressure within the chamber. It is obvious, also, that the coil *f* may be bare of, or be covered by, insulation, and that such covering insulation may itself form a cup or holder for the substances to be heated, the conductor being embedded in such insulation or otherwise in such case.

While I have described a particular form of the invention and have shown an apparatus embodying such form, it is to be understood that the principle of the invention may be embodied in other forms without departing from the scope of my claims.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. The combination of a closed chamber comprising a vessel and a removable cover therefor, an electric heater within said chamber, a gas receiver, and tubular connection between the cover of said chamber and said receiver, substantially as described.

2. The combination of an upright column having a vessel at the top thereof, and a cupped electric heating device at the top of said column, the terminals of said heater passing out through the said column, with a removable cover for said vessel.

3. The combination of a vessel, an electric heater and holder within the vessel, the terminals of said heater passing out through the bottom of the vessel, an inlet tube provided with a stop-cock, and a dome or cover for said vessel, said dome or cover having an outlet for the vessel or chamber, substantially as described.

Signed at New York in the county of New York and State of New York this 18th day of March, A. D. 1903.

CHARLES F. McKENNA.

Witnesses:

R. W. BARKLEY,  
FRANK RYALL.