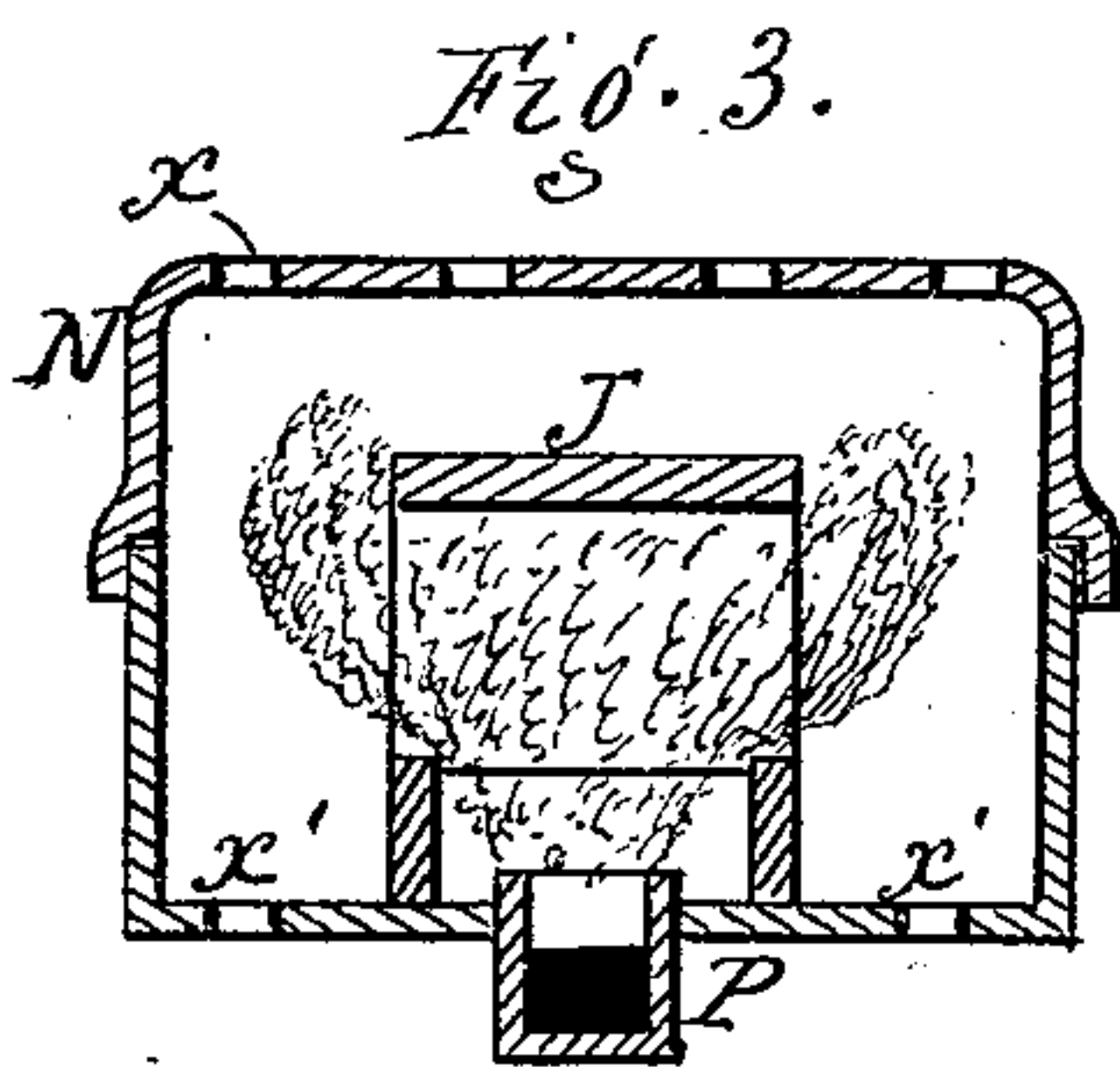
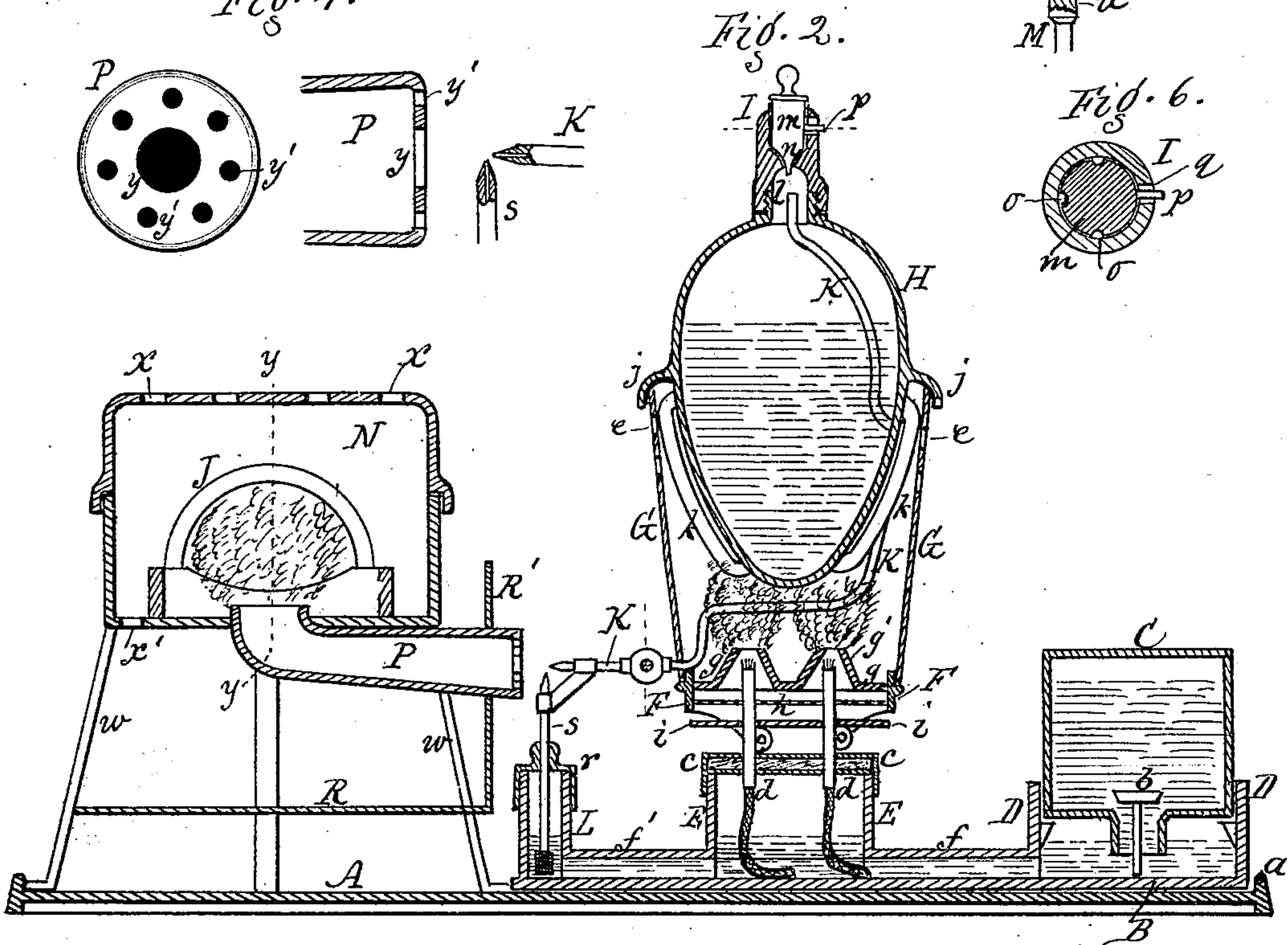
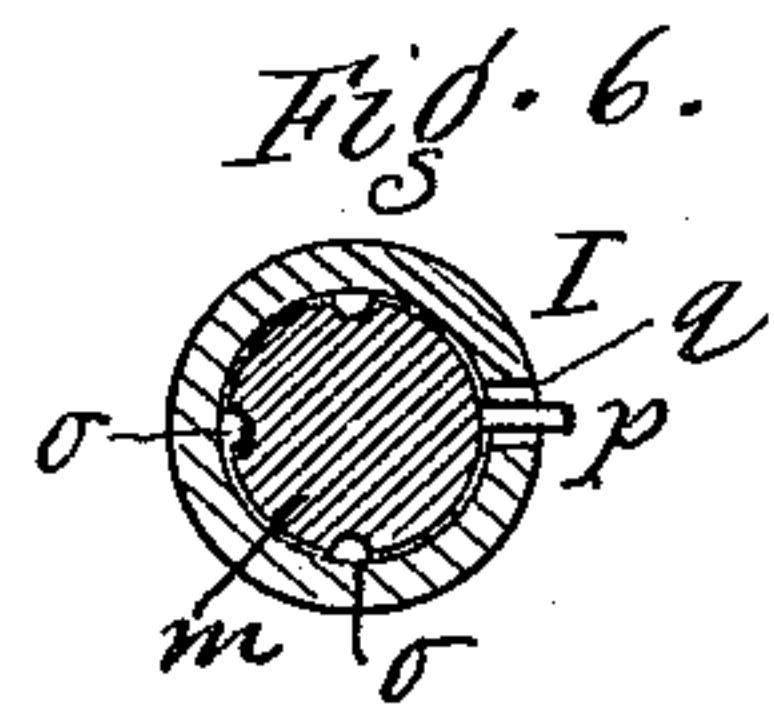
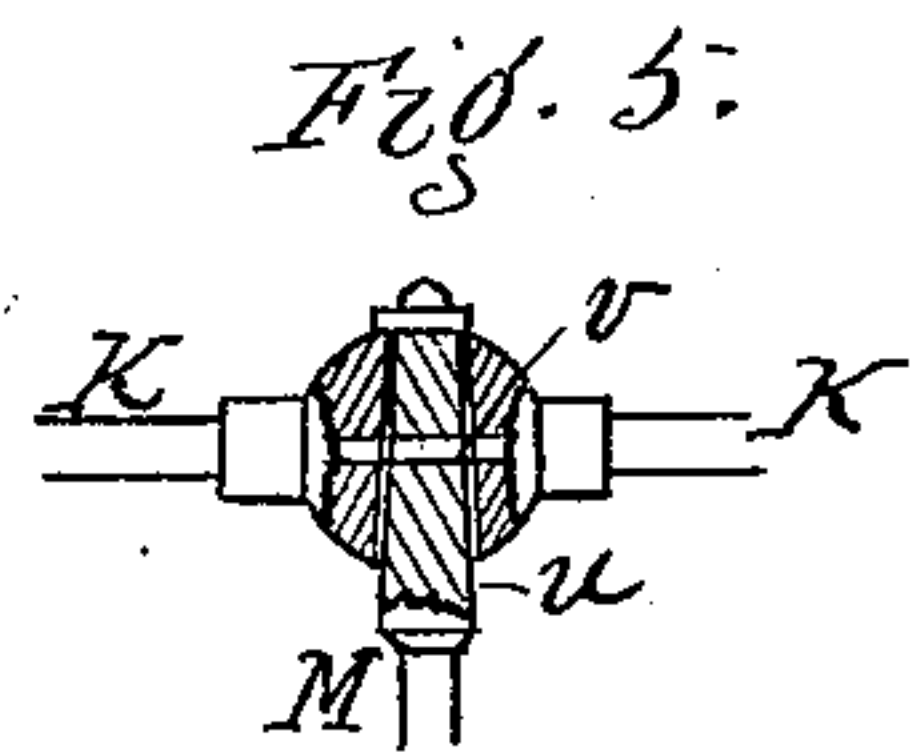
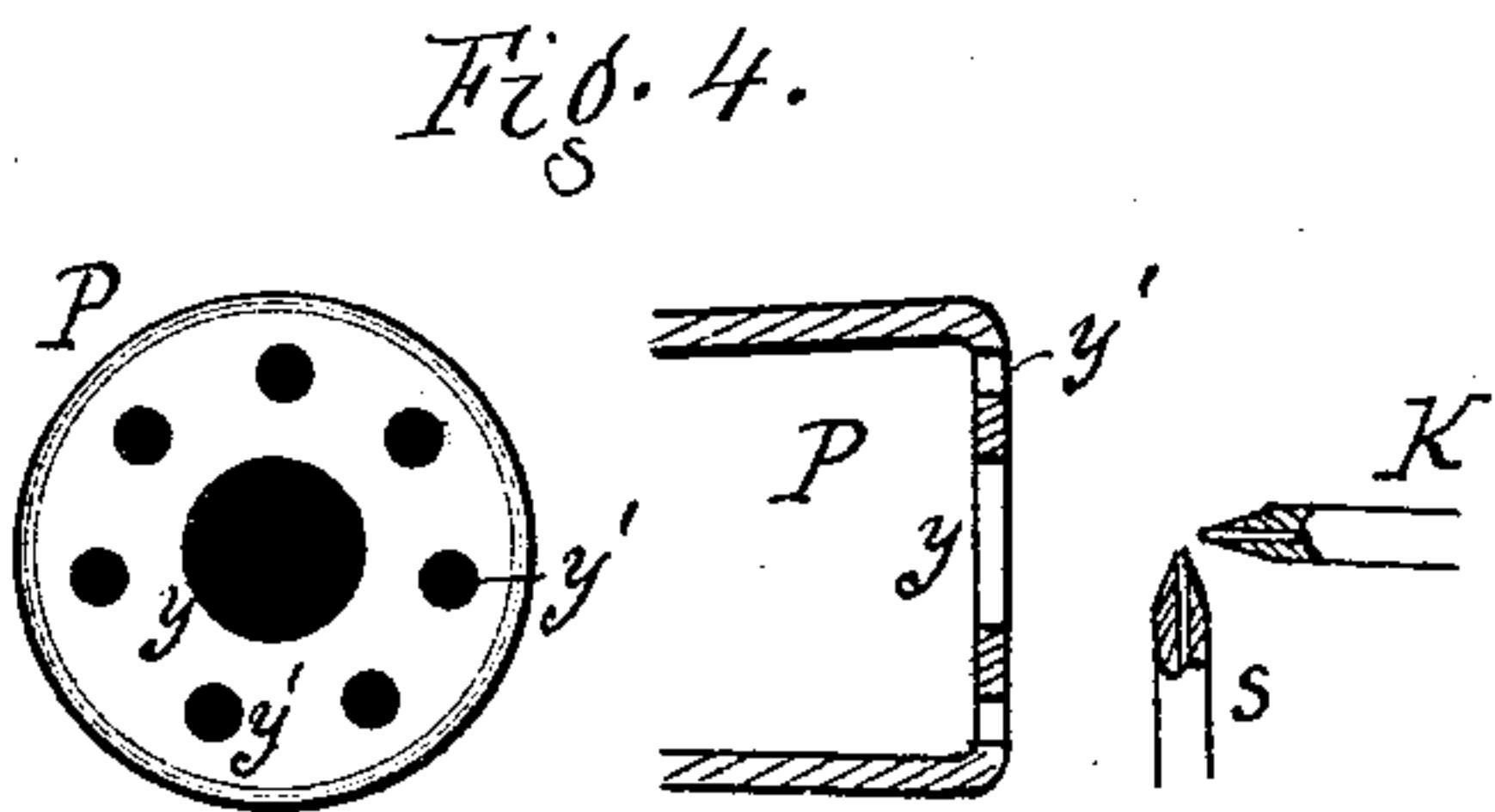
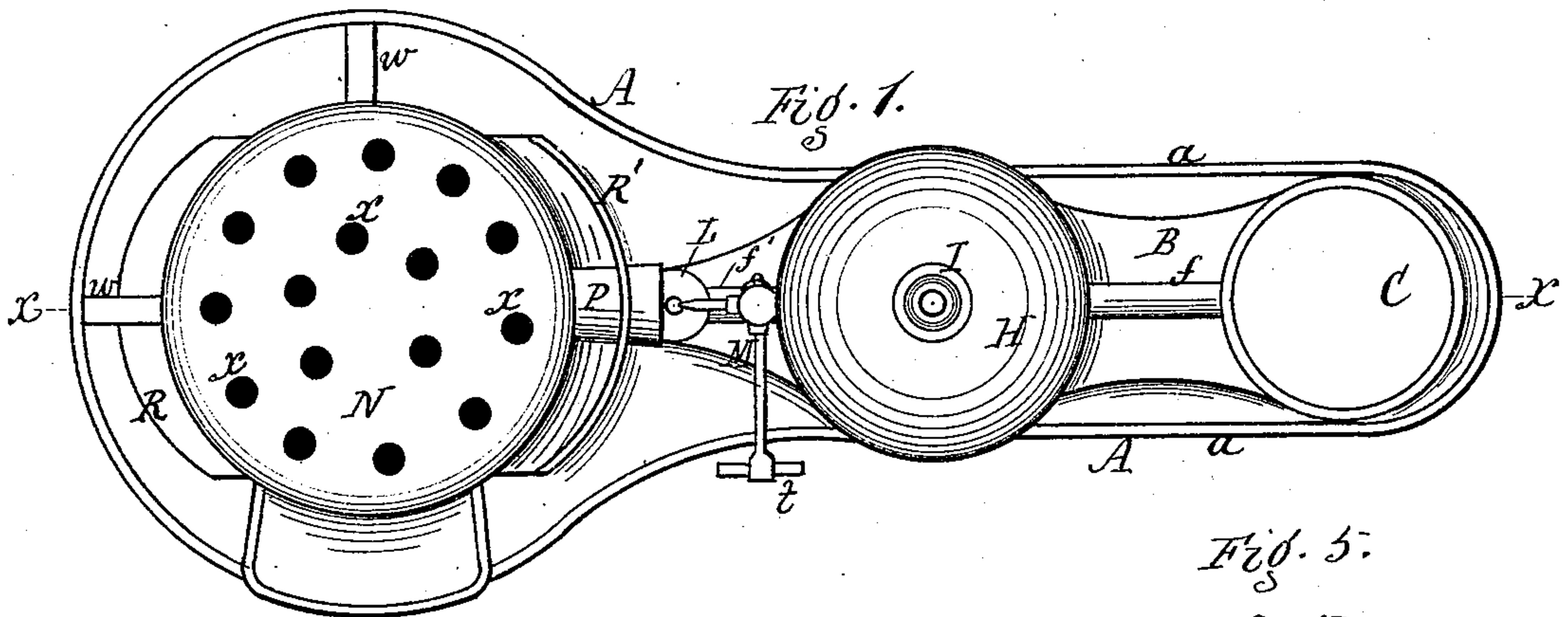


A. V. M. SPRAGUE.  
Heating and Cooking Apparatus.  
No. 217,648.      Patented July 15, 1879.



Attest.  
Jacob Sprague  
John C. Burns.

Inventor.  
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Atty.



# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN HEATING AND COOKING APPARATUS.

Specification forming part of Letters Patent No. 217,648, dated July 15, 1879; application filed  
April 28, 1879.

*To all whom it may concern:*

Be it known that I, AUSTIN V. M. SPRAGUE, of the city of Rochester, county of Monroe and State of New York, have invented a certain new and useful Improvement in Heating and Cooking Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of my improved apparatus. Fig. 2 is a longitudinal vertical section of the same in line *x x*. Fig. 3 is a section in line *y y* of Fig. 2. Figs. 4, 5, and 6 are detail views.

My invention relates to certain improvements in heating and cooking apparatus, in which petroleum in the form of atomized spray is forced by a jet of steam into a closed chamber and burned, resembling in its general features those shown in the patent of Abner Burbank, dated November 5, 1878.

The invention consists in the construction and arrangement of parts hereinafter more fully described, whereby the apparatus is rendered more effective in operation.

In the drawings, A represents the platform or tray which supports the parts, and which is usually made of iron.

B is a carrier or slide, which is also made of iron. The part of the platform on which the carrier-carriage rests is made narrow, and is provided with flanges *a a*, which form ways, and the carrier slides forward and back between these ways in a straight line, so as to present the atomizer in true line with the opening in the tube which communicates with the combustion-chamber. The inverted oil-reservoir, the lamp-body for generating the steam, and the well or fount with which the atomizer connects are all located on this carrier, and move forward and back with it.

C is the inverted oil-reservoir, similar in construction and arrangement with the corresponding part in the German student-lamp, said reservoir resting in an open-topped receptacle, D, and having a valve, *b*, which opens to allow flow of the oil when the reservoir is inserted in the receptacle.

E is the lamp-body, covered by a cap, *e*, which has one or more wick-tubes, *d d*. This

cap may be packed or covered with gypsum or other non-conductor, to prevent the transmission of heat to the oil. The lamp-body E communicates with the receptacle D by a tube or pipe, *f*, by which it receives its supply of oil. *g* is a deflector-plate, having deflectors *g' g'*, covering the wick-tubes; and *h* is a wire or other screen below the deflector-plate, for breaking the currents of air. *i* is a reflecting-plate, situated below the screen and above the lamp-body, for breaking the transmission of heat downward upon the lamp-body.

F is a bearing, consisting of a top ring and projecting legs, which is attached to the lamp by a set-screw on one side, and is made removable.

G is a cylinder of sheet metal, forming a chimney or heat-conductor, which rests on top of the bearing F. It is open at the top and has small draft-holes *e e* near its top.

H is a small steam-boiler, which rests on top of the cylinder G, being sustained by flanges *j j*, as shown. This boiler within the cylinder is provided with a series of pipes, *k k*, standing vertically and surrounding the boiler on all sides. The ends of the pipes open, respectively, into the upper and lower portions of the boiler, and, being subjected to the direct heat of the burners, they facilitate the rapid generation of steam in the boiler by inducing a quick circulation of water. By this means steam can be raised very quickly.

I is a safety-valve on top of the boiler. It consists of a cap which screws on the nozzle of the boiler. In the bottom of the cap is a hollow steam space, *l*, and above this is the cylindrical valve *m*, which rests in a corresponding socket of the cap. The valve has a small point, *n*, which projects through into the socket *l*, and the body of the valve is grooved, as shown at *o*, to allow passage of the steam when the valve is forced up.

On one side of the valve is a pin, *p*, which projects out through an elongated opening, *q*, of the shell, and which serves to gage the throw of the valve. When a given pressure is attained in the boiler the valve rises and the steam escapes through the grooves into the open air.

K is a steam-pipe, which starts from the



space *l*, above the water-line; thence extends downward and through the side of the boiler to the outside within the cylinder *G*; thence around and beneath the boiler and above the burners; and, finally, through the side of the cylinder, where it is extended horizontally to the proper position for acting upon the injector.

A particular advantage of this arrangement of the steam-pipe is that the steam therein becomes superheated by passing directly through the blaze of the burners, being thereby in better condition for mingling with the oil-spray and being burned in the combustion-chamber.

*L* is a well or oil-fount, communicating by a pipe, *f'*, with the lamp-body, and being covered by a cap, *r*, through which passes an oil-pipe, *s*. The ends of the oil and the steam pipes come in coincidence, and are provided with fine orifices, through which the oil and the steam escape.

The whole forms an atomizer, the jet of steam blowing across the oil-pipe drawing the oil up by suction and injecting the same in atomized form, commingled with the steam, into the combustion-chamber.

The steam-pipe *K* is provided with a cut-off, *M*, consisting of a shaft with a cross-head, *t*, by which it is operated. The conical portion *u*, which enters the globe or enlargement in the steam-pipe, is provided with a passage, *v*, extending through the same, and by turning the shaft the whole force of the steam may be turned on, or it may be graduated exactly as desired. By this means the amount of combustion in the combustion-chamber is regulated, which is a matter of great importance.

*N* is the combustion-chamber, which is mounted in a stationary position upon the platform *A*, being supported by legs *ww*. This chamber may be made of different forms, according to the work to be done.

The drawings show a tinman's furnace, in which case the upper part is in the form of a removable cover. For cooking apparatus the chamber may be elongated and provided with ordinary boiler-covers. The top of the chamber is provided with a series of holes, *xx*, and the bottom with one or more holes, *x'*, as shown, which allow a circulation of air through the combustion-chamber while in use, and allow also the necessary draft in burning. This is found essential to produce perfect combustion and to produce the best effects of the apparatus.

*P* is the tube for conducting the atomized spray from the atomizer to the combustion-chamber. The outer end, instead of being open or trumpet mouthed, is closed by a web, in the center of which is a large hole, *y*, surrounded by a series of smaller holes, *y' y'*, as shown in Fig. 4. The object of this arrangement is to modify and temper the currents of air carried in by the injection, and prevent the extinguishing of the fire, which sometimes oc-

curs where the whole mouth is open. These holes, while they allow the entrance of sufficient air to support the combustion, prevent such a current as to blow it out, and accomplish the result by cutting the air into small currents.

In the interior of the combustion-chamber is a heat-deflector, *J*, which is in the form of an arch, resting above the end of the tube *P*, and occupying, in cross-section, a portion only of the width of the combustion-chamber. This deflector serves to break the force of the injection of the oil and steam in the chamber, and to spread the flame outward at the sides, and to concentrate and hold the heat down, preventing a too rapid escape. It is particularly effective in heating soldering-irons, the irons being inserted over the blaze and under the arch.

In cooking apparatus a similar device for spreading or dividing the flame may be used.

*R* is a reflecting-plate, located between the combustion-chamber and platform, and serving to throw off the heat and prevent the transmission of heat to the platform, and its consequent conduction to the oil.

In front is another plate, *R'*, forming a continuation of *R*, but at right angles, covering the front, but allowing tube *P* to pass through.

If desired, a greater number than one of the steam-pipes may lead from the same boiler, and a greater number than one of the atomizers may be used for different purposes; and, if desired, more than one atomizer may be used in connection with the same combustion-chamber.

Having thus described my invention, what I claim herein as new is—

1. In a heating or cooking apparatus, the combination, with the platform *A*, provided with the guiding-flanges *aa*, of the carrier *B*, fitted within said flanges to move forward and back in a straight line, and provided with the oil-reservoir *C*, lamp-body *E*, and oil-well *L*, and their connecting parts, made a fixture with the carrier, as shown and described, and for the purpose specified.

2. In a heating or cooking apparatus, the combination, with the boiler *H* and cylinder *G*, of the steam-pipe *K*, starting from the top of the boiler, extending through, around, and beneath the boiler, and passing directly above the burners, so as to superheat the steam, as herein shown and described.

3. The combination, with the boiler *H*, of the safety-valve on its top, consisting of the cap *I*, provided with the interior space *l*, and the cylindrical plug *m*, provided with grooves *o*, for the escape of the steam, as herein shown and described.

4. In a heating or cooking apparatus, the tube *P*, leading to the combustion-chamber, constructed with a closed outer end, provided with the perforations *y y'*, as shown and described, and for the purpose specified.



5. In combination with the combustion-chamber N and tube P, the heat-deflector J, for confining the heat and spreading the flame, as herein shown and described.

6. The combination, with the platform A and combustion-chamber N, of the reflecting-plates R R', interposed between said parts to prevent transmission of heat to the platform and lamp, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AUSTIN V. M. SPRAGUE.

Witnesses:

GEO. W. ROSS-LEWIN,  
R. F. OSGOOD.