A. Hammer.

Making Extracts.

No. 12,204. Patented Jan. 9, 1855.

Fig. 1.

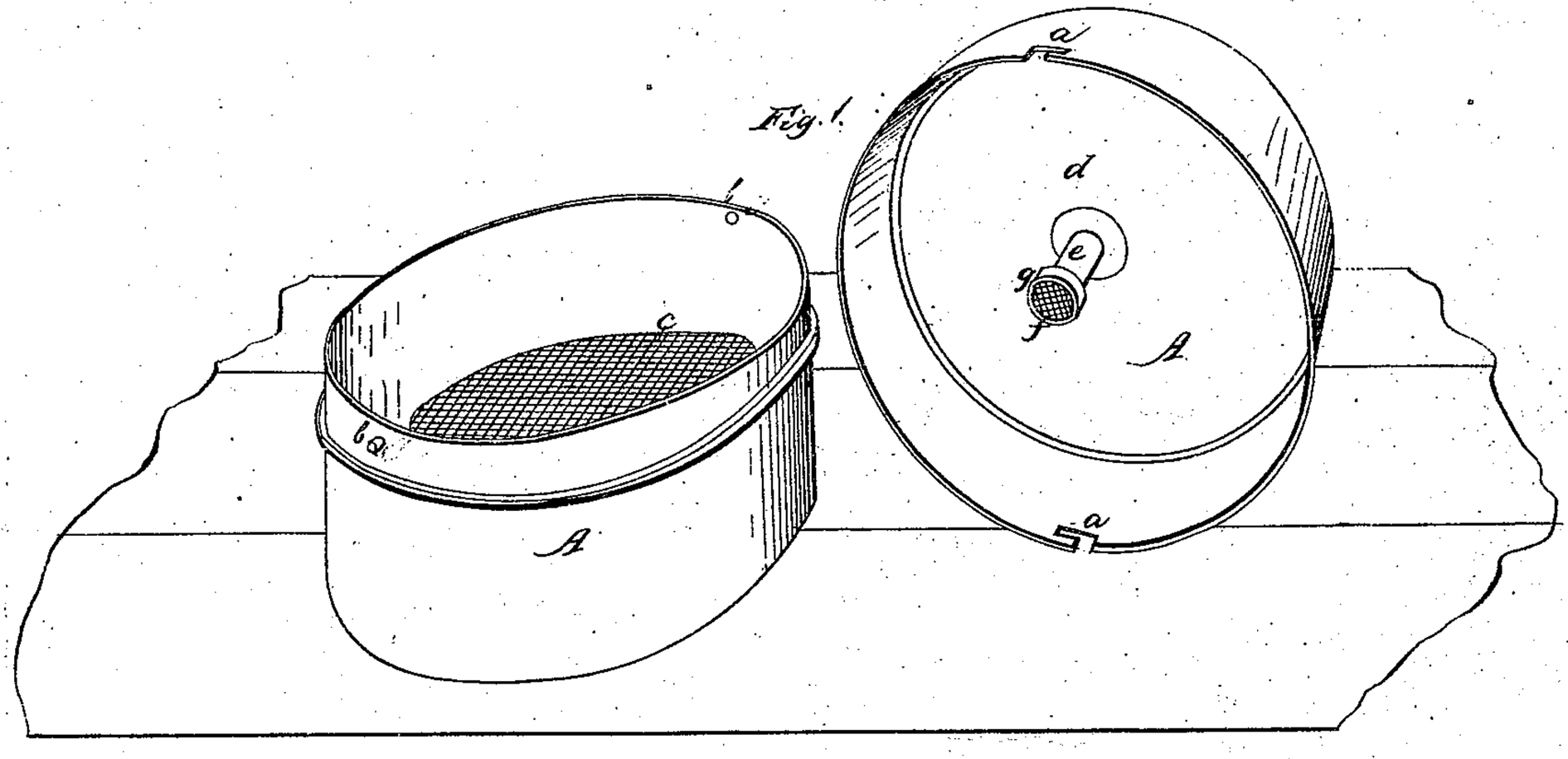
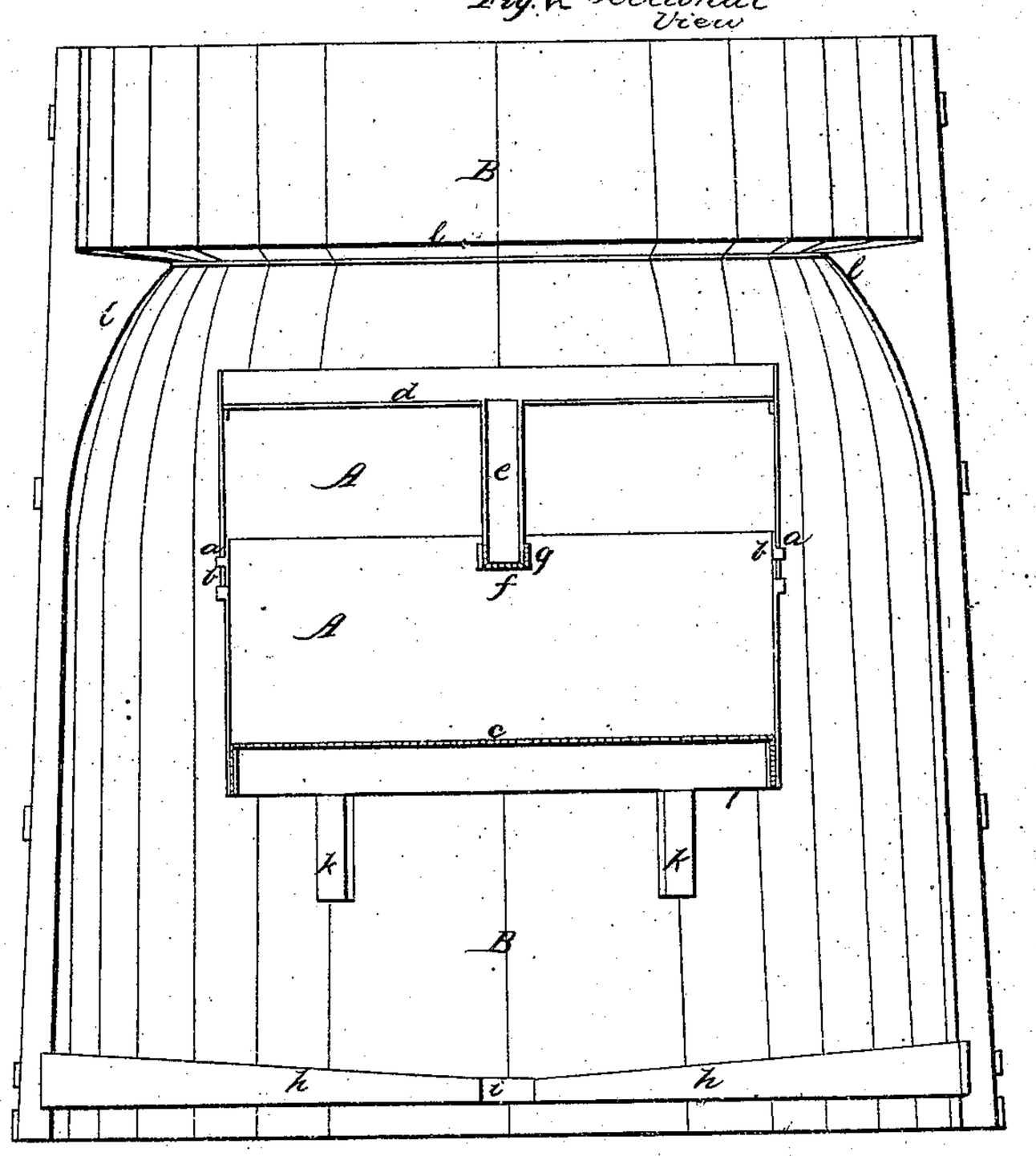


Fig. 2. Sectional View



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UNITED STATES PATENT OFFICE.

ADOLPH HAMMER, OF PHILADELPHIA, PENNSYLVANIA.

HOP-EXTRACTING APPARATUS.

Specification of Letters Patent No. 12,204, dated January 9, 1855.

To all whom it may concern:

Be it known that I, ADOLPH HAMMER, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Apparatus for Producing the Extract from Hops by the Application of Heat by Steam; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a perspective view of the retaining vessel; and Fig. 2, a central longitudinal vertical section of the same, and of the boiling vessel within which it is placed—like letters indicating like parts in both figures.

The nature of my invention consists in providing a suitable metallic vessel, of peculiar construction, adapted for holding the quantity of hops required for a brewing of malt liquor, and retaining therein while partially immersed in the boiling fluid used for the purpose, during the process of extraction, the essential oil or volatile principle of the hops, without the possibility of any considerable loss thereof from evaporation or waste.

The retaining vessel (A, A,) is made cylindrical and in two parts, (a receiver and cover,) capable of being readily adjusted together—the cover fitting accurately over the outside of the upper end of the receiver, and being held thereto by the slots (*a*, *a*,) in the cover, interlocking (by giving a slight horizontal motion to the cover) with the projecting pins (*b*, *b*,) on the outside of the receiver—or in any other suitable manner. Across, near the bottom of the receiver, a wire gauze (*c*) is secured, fitting closely around to the inner side—like a sieve. The cover has its upper end closed by a diaphragm of sheet metal (*d*) soldered or otherwise secured, (air tight), around on the inside, a short distance below the upper edge. This diaphragm (*d*) is perforated with one or more holes, each having a tube (*e*) fitted within it flush with the upper surface of the diaphragm, and soldered fast, (air tight) so as to extend perpendicularly downward far enough to bring its lower edges nearly on a line with the lower edges of the cover; and over the lower end of this tube a wire gauze (*f*), is secured by a flat ring (*g*), or otherwise. The whole of this vessel, which for distinction, I call the retaining vessel, is made of sheet copper or iron, and copper wire or galvanized iron wire gauze, or woven wire.

The boiling vessel (B) is made externally in the form of a conical frustum, of cedar wood, and firmly bound around with iron hoops. Near the larger and lower end a bottom (*h*) is fixed, which is made concave on the upper side, and with a suitable hole (*i*) in its center for the introduction of a tap and faucet, or stop-cock. A short distance above this bottom (*h*) two strong cross pieces (*k*, *k*,) are firmly secured across the vessel, to the inner and opposite sides, in horizontal positions, at the same height and parallel with each other. And upon these two cross pieces the retaining vessel (A) is placed when charged with the hops. Around on the inner side of the boiling vessel, a short distance below its upper end, a continuous projection (*l*, *l*, *l*,) is formed—it being about five or six inches wide, slightly inclined on the upper side, and concave or deflected on the under side. The medium diameter of this boiling vessel should be such as to allow the retaining vessel (A) to be readily lowered through this inner projecting ring (*l*, *l*, *l*,) and placed centrally upon the supporting cross pieces *k*, *k*. A serpentine coil (made of copper pipe of about one and a quarter inches in diameter,) is intended to be placed in the inside of this vessel (B) so as to rest a little above, and nearly cover its bottom;—the two ends of the coil passing out through the side of the vessel, and connecting, one with any suitable steam generator, and the other with an escape pipe; and both fitted with suitable stop cocks or steam valves. As the construction and adaptation of this coil of pipe, with its cocks and connections, are regarded as sufficiently understood, I do not deem it necessary to describe them.

Having thus described the construction of my invention, I will proceed to describe its operation.

The proper quantity of hops for a brew-

ing, being inclosed within the retaining vessel (A), it is lowered down into the boiling vessel (B) and placed so as to rest centrally upon the supporting cross pieces (*k*, *k*,) as before described. The hole (*i*) in the bottom being closed by a tap and faucets, or stop cock, the extracting fluid is now run into the boiling vessel (B), until it reaches within about (say) four inches of the diaphragm (*d*) of the cover of the retaining vessel (A)—there being a small vent cock previously fixed in the said cover, for the purpose of allowing the escape of atmospheric air as the fluid rises above the lower end of the tube (*e*) therein, which cock is closed when the fluid reaches the designated height in the retaining vessel (A)—thus leaving therein an empty space, of about four inches height, between the surface of the fluid and the diaphragm (*d*)—and the surface of this fluid being considerably above the lower edge of the cover, and consequently also above the lower end of the tube (*e*)—this space is sealed from the open air outside. I now commence the extracting process, by boiling the fluid in the vessel (B) by the application of heat by steam passed continuously through the serpentine coil lying over the bottom. The boiling is continued very moderately, except only, occasionally it is increased, so that, by the increased agitation from the ebulition, portions of the fluid are caused to be forced upward, and by the concave projection (*l*, *l*, *l*,) above deflected over the upper edge of the cover of the retaining vessel, upon the diaphragm (*d*), from whence it runs down the tube (*e*) and through the wire gauze (*f*) into the retaining vessel. And thus I am enabled, at pleasure, by simply increasing the current of steam passing through the serpentine coil, to pass fresh fluid through the retaining vessel as that contained therein may need displacement. This boiling process is continued until all the desired qualities are extracted from the hops, and thoroughly incorporated with the fluid—when all the fluid extract is let off through the faucet or cock in the bottom, into any suitable vessel, for use as required.

In order more clearly to point out peculiar facts, showing the superior advantages of my invention, I will first describe the utensils and process in general use by other brewers, for making the necessary extract from hops. For this purpose, they boil the hops with the wort, generally in an open copper vessel, over a fire. The hops, being lighter, incline to float upon the surface of the wort, and much of the volatile oil necessarily escapes as extracted, with the steam or vapor from the boiling wort, and is consequently lost. A dome, or cover, having a large vertical pipe or tube for conducting off the escape steam or vapor is sometimes used, but its effect is, rather to increase than diminish the loss of the best portion of the volatile oil—and it will not answer to contract this escape tube so as to check materially the escape of steam and the volatile oil, as the heat then is apt to become too great in the fluid, and char the saccharine matter of the wort. After the hops have been thus boiled sufficiently, the contents of the "copper," (including the hops) are run off into a vessel called the "hop-bag"—a large flat vessel, in which the fluid extract is separated by straining from the hops, and runs to the "cooler". Now, as the quantity of oil in one hundred pounds of hops is only about two and half ounces, it is manifest that the loss of even one drop of it, will materially effect and impoverish the flavor and keeping qualities of the malt liquor; and that with the utensils and process just described for extracting from the hops, not only many drops, but nearly all the most volatile and best portion of the essential oil is entirely lost; besides the risk incurred of charring the saccharine matter of the wort; and also the trouble and imperfection of the necessary subsequent straining process. To obviate these objections, and consequently to improve the quality of the malt-liquor, is the object effected by the use of my invention.

It will be perceived, that in the use of my invention or apparatus, the essential volatile oil, as extracted from the hops, is retained in the vessel (A) until absorbed or intimately combined with the extracting fluid, (as, being lighter, its tendency is to occupy the sealed space (in the form of vapor) in the upper part of the retaining vessel), and not until so combined, by the heat and ebullition, does it pass with the fluid through the lower gauze (*e*), into and pervade the whole mass on the outside, and consequently but a very minute and almost imperceptible portion can escape afterward with the vapor into the open atmosphere. And if wort is used for making the extract, there is no risk incurred of charring the saccharine matter thereof, as the liquor is boiled by steam; and the boiling vessel being largely open at the top, there is no compression of the accumulating vapor which would aid in increasing the heat of the fluid. And further, there is advantage in the fact, that in the simple running off, after the boiling is finished, all the fluid extract is at the same time perfectly separated from the remaining fibrous matter or hop leaves—they being, from the commencement, perfectly retained in the vessel (A)—and hence also, the usual expense for the "hop-bag," required heretofore, is entirely avoided.

Having thus given a full, clear, and exact

description of the construction and operation of my invention, I proceed to state that what I claim as my invention, and desire to secure by letters patent, is

The retaining vessel (A), constructed and arranged substantially as described—for the purpose of producing the extract from hops, required in brewing malt liquors—using the boiling vessel (B) or any equivalent device, for the purpose of boiling the hops within the said retaining vessel, substantially as described.

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