

(No Model.)

C. A. BURGHARDT.

APPARATUS FOR CONDENSING NAPHTHA AND OTHER VAPORS.
No. 309,027.

Patented Dec 9, 1884.

FIG 2

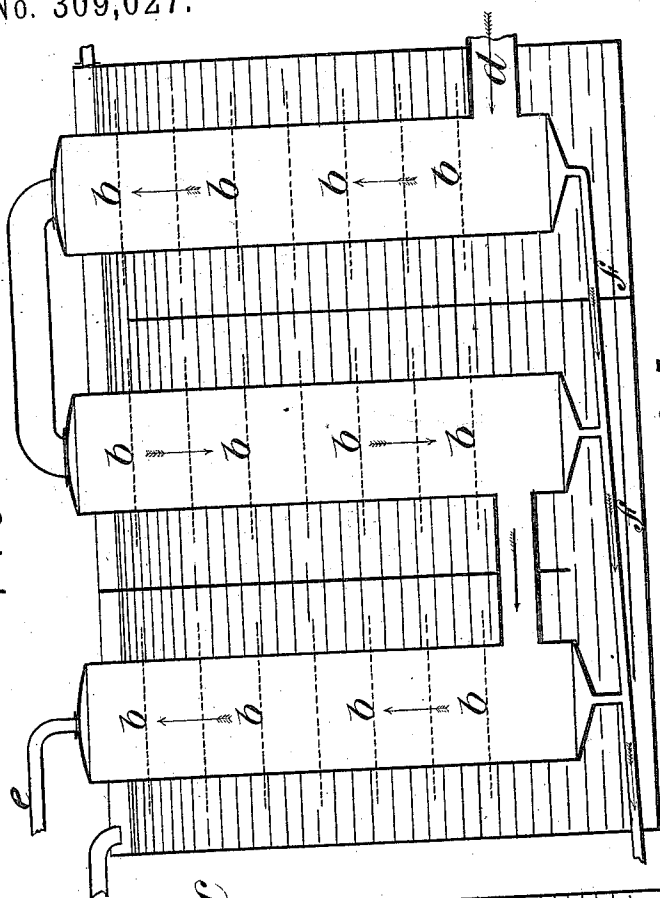


FIG 3

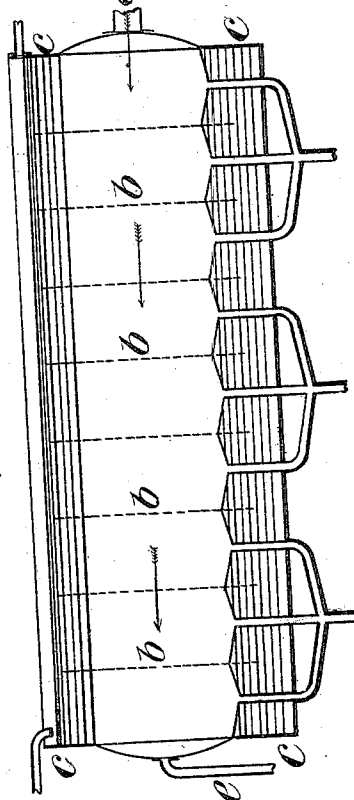
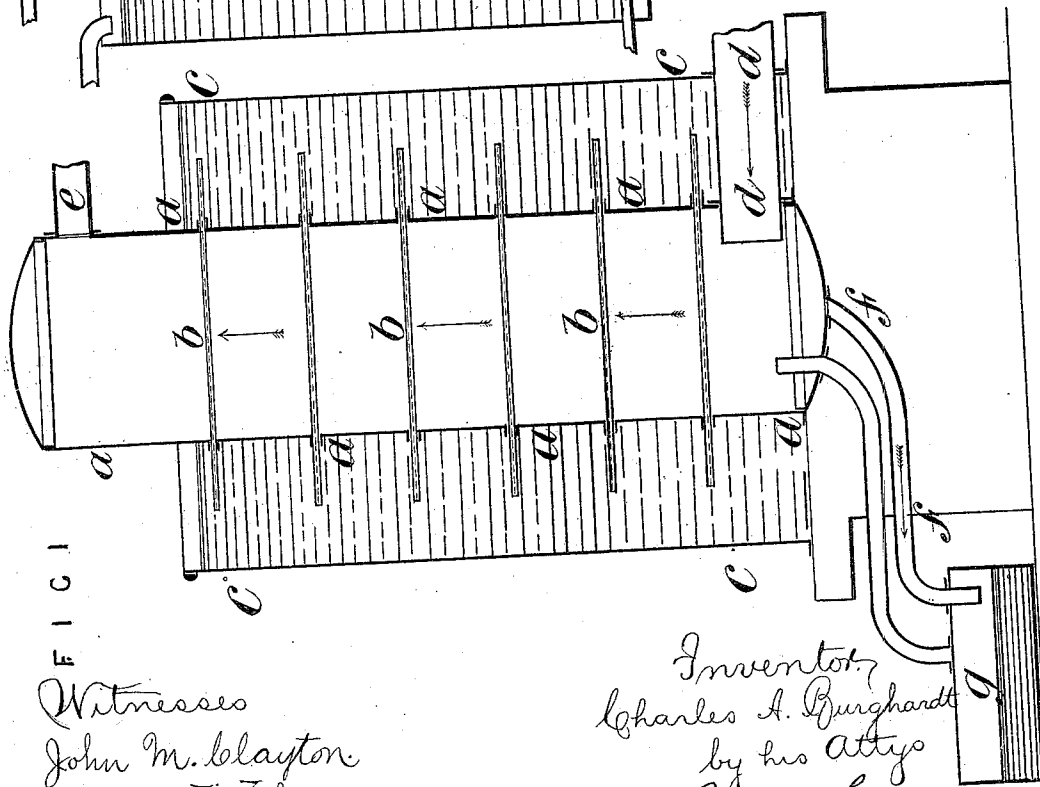


FIG 1



Witnesses
John M. Clayton
James F. Tobin

Inventor
Charles A. Burghardt
by his Atty
Howson & Sons

UNITED STATES PATENT OFFICE.

CHARLES ANTHONY BURGHARDT, OF MANCHESTER, COUNTY OF LANCASTER,
ENGLAND.

APPARATUS FOR CONDENSING NAPHTHA AND OTHER VAPORS.

SPECIFICATION forming part of Letters Patent No. 309,027, dated December 9, 1884.

Application filed March 18, 1884. (No model.) Patented in England July 5, 1883, No. 3,335; in France January 23, 1884, No. 159,899; in Belgium January 24, 1884, No. 63,941; in Germany January 24, 1884, No. 29,153, and in Austria January 23, 1884, No. 6,412.

To all whom it may concern:

Be it known that I, CHARLES ANTHONY BURGHARDT, a subject of the Queen of Great Britain and Ireland, and residing at Manchester, county of Lancaster, doctor of philosophy and analytical chemist, have invented an Improved Apparatus for Condensing Naphtha and other Vapors, (for which I have obtained a patent in Great Britain, No. 3,335, July 5, 1883,) of which the following is a specification.

My invention relates to the condensers for use in the recovery of naphtha or benzole or other volatile solvent which is evolved in the form of vapor during the manufacture of india-rubber goods, and for other uses.

My improved condenser, or each section of the same, consists of a chamber which is divided into a number of compartments by means of partitions, each consisting of a number of sheets of wire-gauze, or of thin finely-perforated plates. The said shell is made in sections, and the sheets of gauze are larger than the area of each section, so that the edges of the said sheets project all round or on all sides into the water or cooling-fluid with which the condenser is surrounded.

In the accompanying drawings, Figure 1 represents a vertical section of a condenser. Fig. 2 represents a condenser having three sections. Fig. 3 illustrates a form of condenser suitable for use in fractional distillation.

In Fig. 1, *a a* are short cylindrical shells, which are united together by means of partitions *b b*, composed of wire-gauze. The said shells may be made of copper, zinc, tinned plate, or other suitable metal or alloy; but I prefer that the partitions *b b* shall be of copper gauze. In cases wherein the vapors to be condensed would have a destructive action upon certain metals I select the metal which will best withstand such action, or I coat the exposed surfaces therewith—as, for example, in some cases I nickel-plate the partitions and the inner surfaces of the shells. Each partition is composed of several sheets of wire-gauze, and I prefer that the lower partitions shall contain more sheets than the upper. In the example the lowest partition might consist of ten sheets, the next of eight, and so on, decreasing in number toward the top of the

condenser. I do not, however, confine myself to any number of sheets in a partition, nor to varying the numbers, as such numbers will depend to a great extent upon the number of partitions, and in some cases a partition or each partition might have only two sheets or might be a single sheet, the number of partitions being increased. The number of partitions may be less than the indications in the drawings. The sheets of gauze are carefully soldered or brazed to the edges of the cylindrical shells *a*, and to each other at the circles of contact in line with the shells, so that water and vapor tight joints are obtained; or cementing or any suitable means are adopted to obtain the same result. The condenser is wholly or partly immersed in water or cooling-fluid contained in a suitable cistern, *c*, and the outer edges of the partitions *b* project all around the condenser some distance into the body of the water. The vapor to be condensed is conveyed through a pipe, *d*, into the lowest compartment of the condenser. The air and uncondensed vapor are discharged from the upper compartment of the condenser through a pipe, *e*. The condensed solvent or other fluid is conveyed by means of a pipe, *f*, into a suitable cistern, *g*, or is otherwise conveyed away from the lowest compartment. In the example a second pipe, *h*, connects the cistern with the bottom compartment, in order that any vapor collecting in the upper part of the cistern may be conveyed into the condenser; but this pipe might be dispensed with.

I do not confine myself to the cylindrical formation of the shell of the condenser, as it may be of any other suitable form—such, for example, as oval or rectangular—and in large condensers it would be advisable to make each section of a long and narrow form in plan in place of increasing the diameter of the sections—as, for example, each section might be three to six inches in width and one foot or two or more feet in length. The power of the condenser may also be increased by employing two, three, or more condensers, the stream of vapor being divided among them. In some cases I should combine together two or more condensers in such a manner as that the uncondensed vapor leaving one condenser would

be conveyed into another condenser. Fig. 2 illustrates such an arrangement. In this example three condensers are connected together by means of pipes or passages, so that any vapor leaving the first condenser is conveyed into a second, and any vapor leaving the second is conveyed into a third condenser. The pipe *f*, which conveys away the condensed naphtha or fluid, is connected with the bottom compartment of each condenser; or each condenser may be provided with a separate pipe, so that a purer fluid may be obtained from the third condenser than the fluid issuing from the first or second. The partitions *b* may be vertical or inclined, instead of being in the horizontal positions shown in Figs. 1 and 2.

Fig. 3 illustrates a condenser having vertical partitions, this form of condenser being suitable for use in fractional distillation. In this example the partitions and compartments of the condensers are vertical, and the said compartments are arranged in three groups, each group being connected with a separate discharge-pipe, so that the product of condensation may be obtained in three strengths or qualities of purity.

Other modifications may be made in the several forms of the condenser so long as the gauze partitions extending into the cooling-liquid outside the condenser are retained.

Finely-perforated plates may be substituted for the wire-gauze.

I claim—

1. A condenser or section of a condenser for use in the recovery of india-rubber solvents and for other uses, divided into compartments by means of partitions of wire-gauze or perforated plates extending through the shell or walls of the condenser into the body of cooling-liquid outside the condenser, substantially as set forth.

2. A condenser composed of sections or shells *a*, united together by means of partitions *b*, each composed of two, three, or more sheets of wire-gauze larger than the said sections or shells, so that the said partitions extend into the surrounding water, substantially as set forth.

3. A condenser suitable for use in fractional distillation, divided into compartments by means of vertical or inclined wire-gauze or finely-perforated partitions extending through the shell of the condenser into the cooling-fluid, each compartment or group of compartments having a separate outlet-pipe for the products of condensation.

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

CHARLES A. BURGHARDT.

Witnesses:

DAVID FULTON,
ROBERT FROST.