

J. MILLER.

Apparatus for Making Extracts.

No. 52,253.

Patented Jan'y 23, 1866.

Fig. 1,

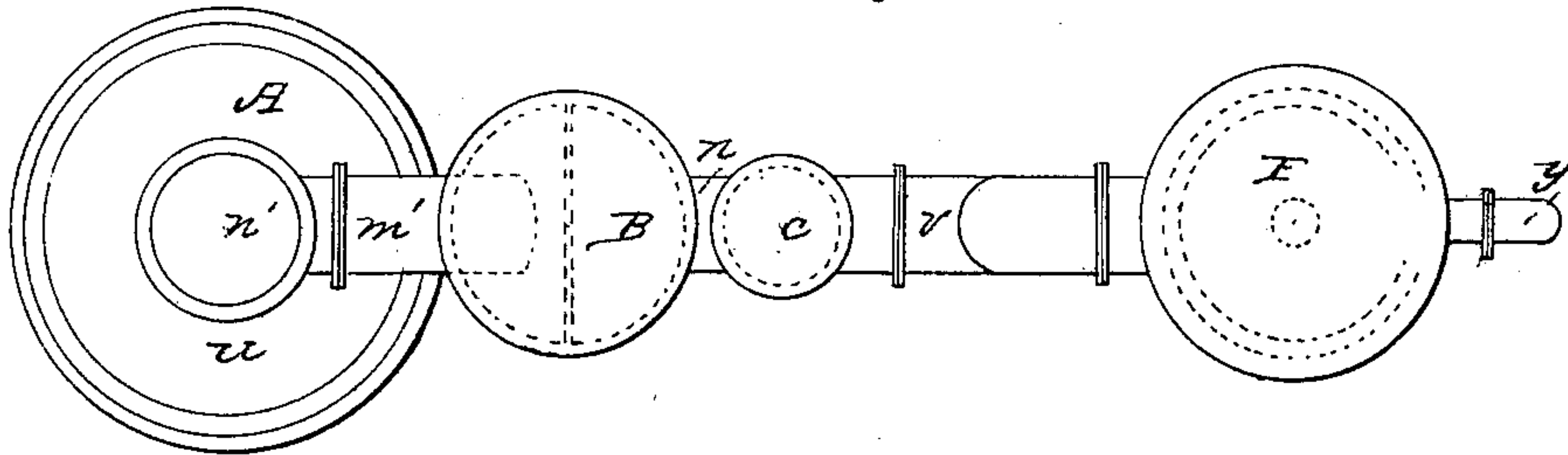
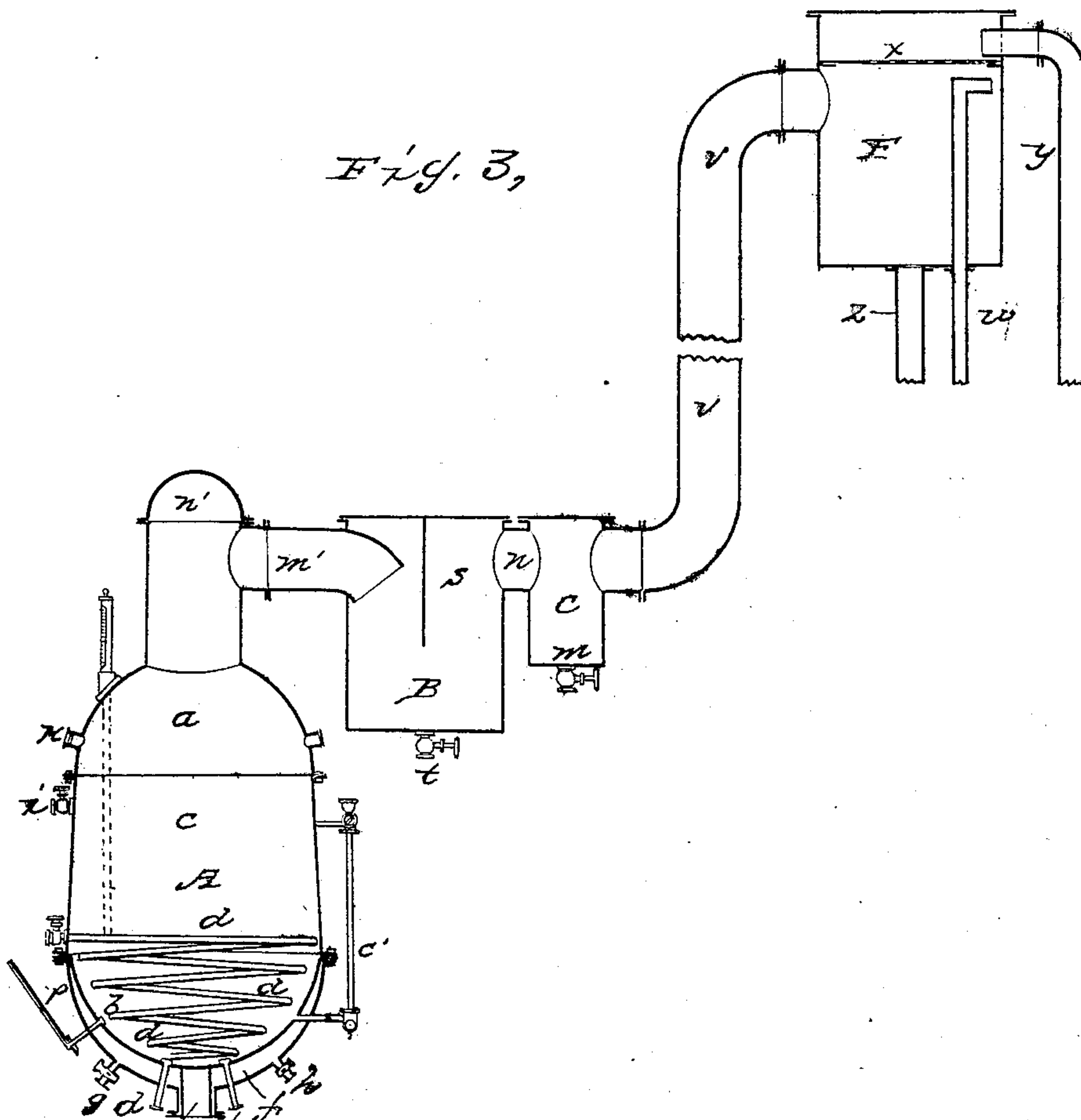


Fig. 3,



WITNESSES:

Samuel C. Allen
Frederick C. Curtis

INVENTOR

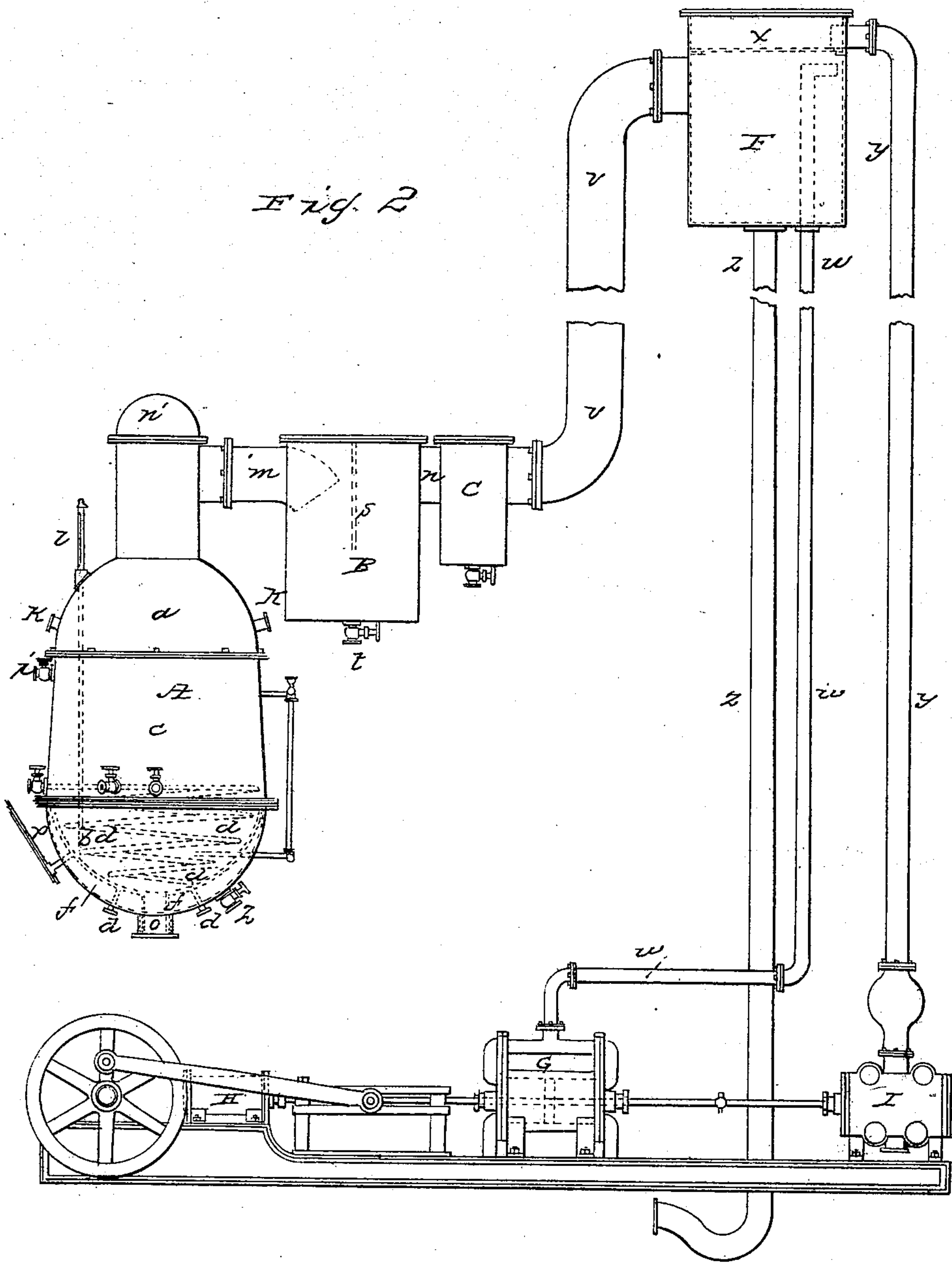
R. M. Cady, atty.

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Apparatus for Making Extracts.

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WITNESSES:
Samuel C. Piper
Fredrick C. Smith

INVENTOR:
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UNITED STATES PATENT OFFICE.

JAMES MILLER, OF UPTON, CANADA EAST.

IMPROVED APPARATUS FOR MAKING EXTRACTS.

Specification forming part of Letters Patent No. 52,253, dated January 23, 1866.

To all whom it may concern:

Be it known that I, JAMES MILLER, of Upton, of Canada East, have invented an Improved Apparatus for Making Extracts from or Evaporating Decoctions of Bark; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, and Fig. 2 a side elevation, of it, certain internal parts being exhibited therein in red lines. Fig. 3 is a vertical section of the evaporator and the condenser and the parts interposed between them.

The particular object of the said apparatus is to effect the evaporation *in vacuo* of a vegetable extract or decoction, and particularly one obtained by steeping in water hemlock-bark or other astringent material containing tannin, the extract manufactured or produced from the hemlock-bark being used by tanners in the process of tanning hides.

In the drawings, A denotes the evaporator, which in many respects is like the vacuum apparatus used in sugar-refineries for boiling or evaporating saccharine sirups; but it is particularly distinguished therefrom by being constructed of an elongated form and very much longer—in fact, sufficiently so for retaining nearly if not all the foam produced during the ebullition of the bark-decoctions.

The ordinary vacuum-pan for boiling sugar-liquor will not answer for the evaporation of the bark-liquor, it being too short. I have found that by increasing the length or height of the evaporator by interposing between its two convex heads, or top and bottom parts, *a b*, a hollow cylinder or slightly conic frustum, *c*, and connecting the whole by flanges and suitable rivets or screw-bolts, I am enabled to construct an evaporator suitable for the reduction of the decoction of oak or hemlock bark to an extract of proper density.

I usually make the evaporator, inclusive of its dome, about twelve feet in height and five feet in its greatest diameter, and make it of copper, or iron lined therewith. Within the lower part of it I arrange a series of three or any other suitable number of spiral worms or copper pipes, *d d d*, each having a diameter of about two inches. They are to be coiled around

within the lower portion, *b*, the upper end of each being made to pass through the shell of the evaporator and connect with a pipe leading to a steam-generator and provided with a stop-cock. The lower end of each of such worms leads through the bottom of the evaporator and the jacket *f* arranged below it, and should be provided with a stop-cock or other means of discharging condensed steam from the pipe. The jacket *f*, made of iron or other suitable metal, curved in the form shown in the drawings, is to be securely bolted to the flanges of the two next adjacent parts of the evaporator. This jacket and the bottom of the evaporator form a space or chamber underneath the bottom, it being for the reception of steam, which to heat the said bottom may be introduced into the space by a suitable conduit leading from it to the steam-generator. The condensed steam may be suffered to escape or be drawn off from the said space by an outlet, *h*, provided with a stop-cock.

A charge-pipe leading from a reservoir containing the bark-liquor to be evaporated is to connect with the evaporator at *i*, where such charge-pipe is to be provided with a stop-cock or faucet for regulating the supply of the liquor to the evaporator.

Two windows, *k k*, are arranged on opposite sides of the part *a* above the level usually reached by the foam. At one of them a lamp may be placed for the purpose of illuminating the interior of the evaporator, in order that the ebullition of the liquor may be distinguished or perceived by a person while looking into the opposite window.

A thermometer, *l*, may be applied to the evaporator, the bulb and tube being caused to enter it and extend down far enough to indicate the temperature of the liquor. A vacuum-gage may be also applied, for the purpose of measuring either the degree of atmospheric pressure on the external surface of the evaporator or the rarefaction of the air within it.

An exhaust-pipe, *M'*, leads out of the upper part of the evaporator and into a box or vessel, *B*, formed with a discharge-cock, *t*, at its bottom, and also with a partition, *s*, extending across its interior and to a distance down from the top thereof equal to rather more than half

the height of the vessel. A smaller cap, *n'*, covers the head or open end of the evaporator, and is held thereon by the pressure of the atmosphere while the apparatus may be in operation.

An extract-gage and try-pipe, *o'*, of glass, with brass ends, may be arranged with respect to the evaporator as represented, it being provided with suitable faucets at its ends to admit of portions of the charge of the evaporator being withdrawn from it. This gage also serves to exhibit the height of the liquor in the evaporator.

A second thermometer, *P*, placed at the lower part of the evaporator and duly connected with its interior, will serve to indicate the temperature of the charge near its lowest part.

A discharge-pipe, *O*, leading out of the bottom of the evaporator, answers to draw off the extract after its completion.

The pipe *m*, after entering the vessel *B*, may be curved downward therein, as shown by the red lines in Fig. 1; but this is not strictly essential. The purpose of the said vessel *B* is to catch any of the foam which at any time may accidentally pass through the pipe *m*. The partition *s* serves to direct the escaping jet or mass of foam downward and prevent any of it from going off by the escape-pipe *w*, which leads out of the upper part of the vessel *B* and into that of another vessel, *C*. This latter vessel is provided with a discharge-cock at its bottom, and has an exhaust-pipe, *v*, leading from it in manner as represented, and into a condenser, *F*, placed at about thirty feet above the evaporator.

The vessel *C* serves to catch any rust or refuse material which may float down and out of the pipe *v*, and prevents such from passing into the vessel *B*, so as to contaminate the extract caught therein.

The condenser, as represented in the drawings, has a foraminous partition, *x*, extending across it just above the entrance of the pipe *v*, and between that of another pipe, *y*, which leads out of its upper end.

A discharge-pipe, *z*, going out of the bottom of the condenser, and being upward of thirty-two feet in height, and having its lower part curved in manner as represented in Fig. 1, serves to discharge from the condenser the liquid which may be produced by condensation of the steam, and also that which may be poured into the condenser for the purpose of effecting such condensation. Owing to the vacuum formed in the condenser while the apparatus may be in operation, the pressure of the atmosphere will maintain a column of water in the pipe and allow the surplus water to escape from the condenser and out of the lower extremity of the pipe.

A pipe, *w*, from an air-pump, *G*, operated by a steam-engine, *H*, enters the condenser and extends nearly up to the partition *x* there-

of. It is by means of the said air-pump and pipe that air is exhausted from the condenser, the pipe *v*, the vessels *B C*, and the evaporator *A*.

A force-pump, *I*, having its piston connected with that of the air-pump, serves to throw water into the condenser, and for the purpose of condensing the steam or vapor therein while the apparatus may be in action.

In operating with the said apparatus the liquid or decoction of bark to be reduced is to be admitted into the evaporator by the charge-pipe *i* until it may reach and cover the worms or steam-heating pipes. Steam should next be admitted into these worms, and also into the space between the jacket and shell of the evaporator, the liquid being thereby raised to the required temperature. In consequence of the partial vacuum produced by withdrawing air from within the evaporator by means of the air-pump, which should be caused to operate, ebullition of the decoction will ensue much sooner than would be the case were the liquor exposed to atmospheric pressure. By means of the boiling process much of the water of the decoction will be reduced to vapor and will pass off through the pipe *M'*, the vessels *B C*, and the pipe *v*, and into the condenser. From time to time samples of the liquor may be extracted from the evaporator by means of the extract-gage, and when the process of evaporation has been carried on sufficiently the steam may be shut off from the worms and jacket and the extract may be withdrawn from the evaporator through the pipe *O*, after which such evaporator may be recharged and the process be carried on as before.

I am aware that globular vacuum-pans, or those made of two concavo-convex disks, have been used for this and other purposes; but they fail to work successfully for the reduction of decoctions of bark owing to their not possessing sufficient height above the liquor to give room for it to foam as it will while in a state of ebullition. When there is not such space the most of the liquid will be lost in consequence of the escape of the foam from the evaporator, whereas by the adoption of the elongated chamber, or by making the evaporator with the intervening part *c* combined with the others, or those marked *a b*, the difficulty above mentioned will be obviated.

My improved evaporator enables the surface of the liquor to stand above the bottom a height about one-fourth of the total length of the evaporator.

I claim—

1. The arrangement and combination, substantially as specified, of the elongated evaporator *A*, the vessel *B*, and the condenser *F*, connected as explained, and the discharge-pipe *z*, the said condenser being provided with means of exhausting it of air and throwing water out of it, as and for the purposes here-

inbefore explained, the whole constituting an apparatus for making bark-extract, as explained.

2. The combination as well as the arrangement of the vessel C, the elongated evaporator A, the vessel B, the pipe *v*, and the condenser F.

3. The combination and arrangement of the partition S with the vessel B and the elongated

evaporator, arranged and applied together as explained, such vessel B being provided with an escape-pipe connected with an air-exhausting pump, or with the same and a condenser, as described.

JAMES MILLER.

Witnesses:

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