No. 806,866. PATENTED DEC. 12, 1905.

E. BOUCHAUD-PRACEIQ.

APPARATUS FOR RECOVERING THE VAPORS OF VOLATILE SOLVENTS.

APPLICATION FILED MAR. 25, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

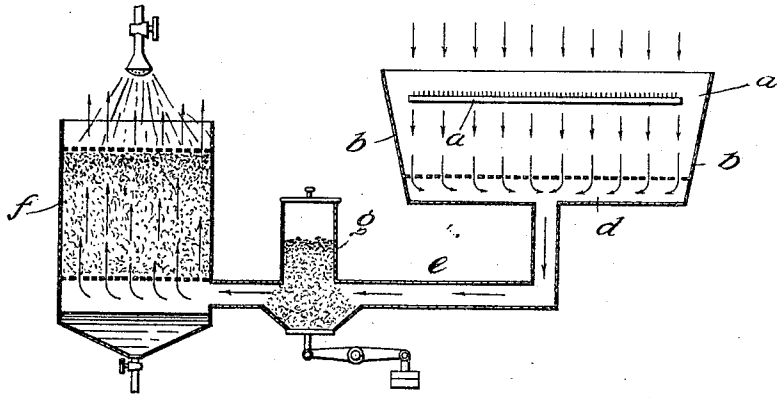


FIG. 2.

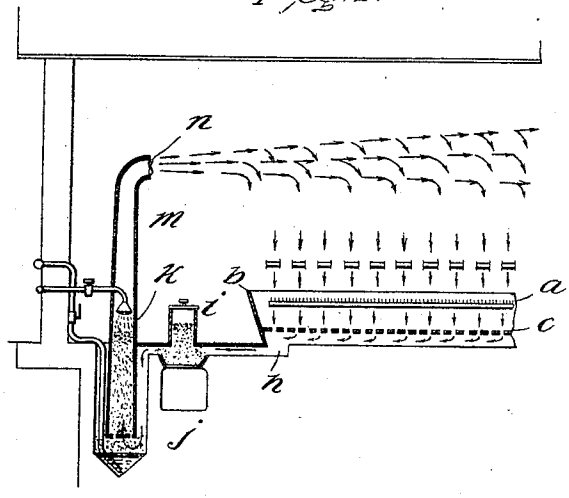
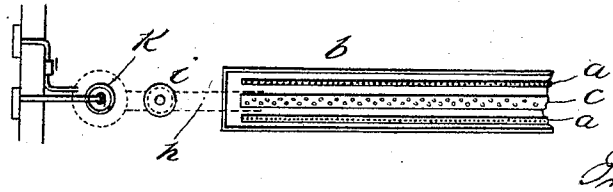


FIG. 3.



Witnesses:

Wm. B. Kerkam

Gustave R. Thompson.

Inventor:

Edouard Bouchaud Praceiq,

by

Mauro, Cameron, Lewis & Massie,

attys.

No. 806,866. PATENTED DEC. 12, 1905.

E. BOUCHAUD-PRACEIQ.

APPARATUS FOR RECOVERING THE VAPORS OF VOLATILE SOLVENTS.

APPLICATION FILED MAR. 25, 1905.

2 SHEETS—SHEET 2.

FIG. 6.

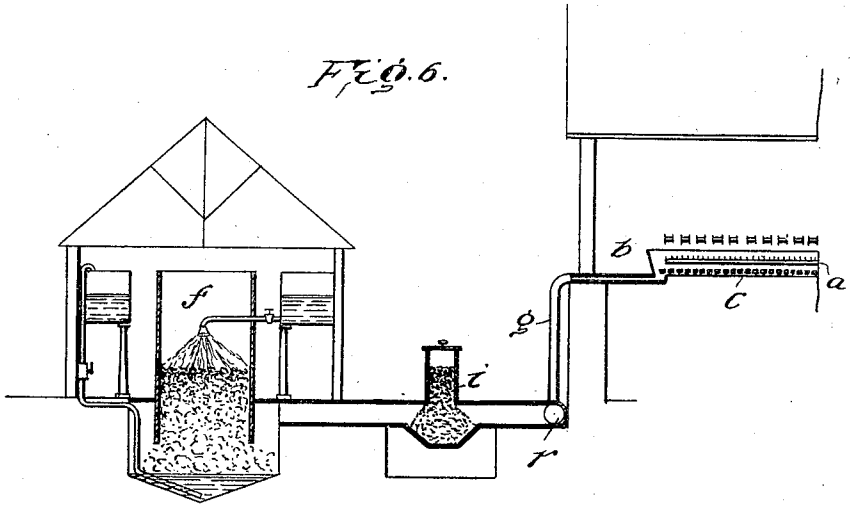


FIG. 4.

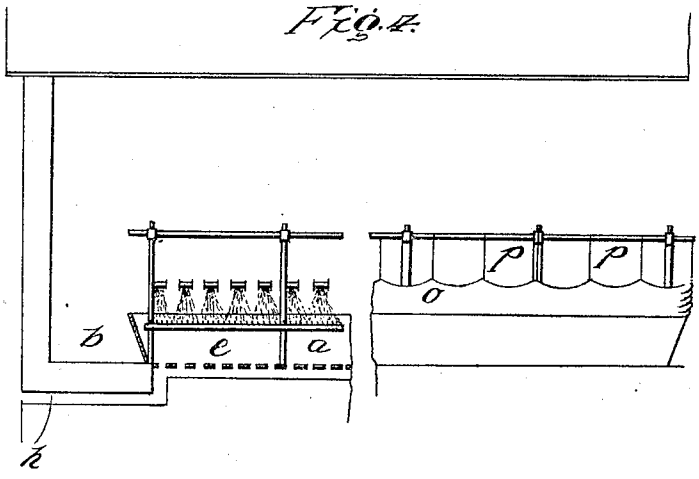
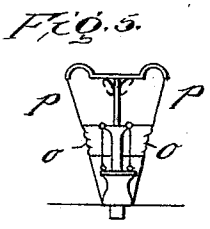


FIG. 5.



Witnesses:

Wm. B. Corkam.

Gustave R. Thompson.

Inventor:

Edouard Bouchaud Praceiq.

by

Munn, Cameron, Lewis & Massie,

attys.

UNITED STATES PATENT OFFICE.

EDOUARD BOUCHAUD-PRACEIQ, OF PARIS, FRANCE.

APPARATUS FOR RECOVERING THE VAPORS OF VOLATILE SOLVENTS.

No. 806,866. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed March 25, 1905. Serial No. 252,103.

To all whom it may concern:

Be it known that I, EDOUARD BOUCHAUD-PRACEIQ, of Paris, France, have invented a new and useful Improvement in Apparatus for Recovering Vapors of Volatile Solvents, which invention is fully set forth in the following specification.

The present invention relates to apparatus such as used in the manufacture of photographic plates and pellicles, impermeable tissues, smokeless powder, artificial silk, &c., where large quantities of volatile solvents—notably ordinary alcohol and its derivative, ethylic ether—are employed, and has for its object the recovery of these solvents, which are usually lost with consequent economical results and, further, the obviation of the risks of fire, explosions, and injury to the health of the workmen, due to the presence of the vapors of the solvents in the establishment.

To this end the invention comprises a vaporizing-chamber open to the atmosphere for holding the material (artificial silk, smokeless powder, &c.) from which the volatile solvent is to be removed, and a suitable solvent-fixing and air-purifying chamber, which is connected to said vaporizing-chamber by a passage. These chambers are so relatively positioned as to form between the same through the connecting-passage a column of fluid, said column exerting by gravity greater fluid-pressure at its vaporizing-chamber end than at its other end, with the result that the fluid will be naturally and automatically propelled through the system by the force of gravity. In passing through the solvent-fixing and air-purifying chamber the laden air will of course be relieved of the solvent vapors with which it became burdened in passing through the material in the vaporizing-chamber.

The invention will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a general view of the apparatus employed. Figs. 2 and 3 are respectively a vertical section and a plan, showing the application of the device to a spinning-frame. Figs. 4 and 5 are respectively a longitudinal elevation, partly in section, and a transverse section of a spinning-frame provided with a device for preventing the loss of the laden air from the vaporizing-chamber; and Fig. 6 is a general view of a modified form of the device.

Referring to the drawings, *a* is a frame provided with openings from which pass the material destined to form the thread, (as in the manufacture of artificial silk,) said frame being mounted in a vaporizing-chamber *b*, provided with a false perforated bottom *c*, through which passes the laden air which descends into a drain *d*, from which it passes through a passage *e* to the solvent-fixing and air-purifying chamber *f*, passing on its way through drying material contained in a suitable receptacle *g*, provided with a cleaning-plug for the saturated material. The arrows indicate the circulation in the apparatus.

The chamber *f* contains pumice-stone saturated with fixing agents which relieve the air passing therethrough of its vapors, the air then leaving the upper part of the chamber, and can be used anew to take up a new quantity of vapor, as will be further explained.

In the construction shown in Figs. 2 and 3 the vaporizing-chamber *b* is connected with a passage *h*, which conducts the air charged with vapors to the drier *i*, from which it passes into a drain or depression *j*, at the bottom of which opens the lower extremity of the solvent-fixing and air-purifying chamber *k*. The liquid resulting from the action of the fixing material on the vapors is collected in the bottom of the drain *j*, from which it is recovered and conducted to suitable recuperating apparatus. The chamber *k* is surmounted by a draft-pipe *m*, curved at its upper end and provided with a revolving fan *n*, the function of which is to indicate by its movement the operation of the apparatus.

The air, dried and despoiled of vapors, leaves the upper orifice of the pipe *m* in order to spread over the vaporizing-chamber and again takes up a quantity of vapor in passing therethrough. The same air can, therefore, so to speak, "serve" indefinitely.

In order to avoid losses caused by the escapement of the air saturated with vapors over the edges of the vaporizing-chamber and to prevent injury and damage thereby, the sides of this chamber are continued upward to a suitable distance by a soft web *o*, hung by elastic fastenings *p*, connected with the frame, Figs. 4 and 5. The workman can easily, therefore, attend to a broken thread, manipulate a tap, or make a small repair by depressing with his arm, at the point where he is to work, the flexible side *o*, the opening thus produced being closed by the workman's arm. The sides *o* are preferably made of a transparent tissue—oiled silk, for instance—to permit inspection of the apparatus contained in the tank.

Fig. 6 shows the application of the system to a group of spinning-frames, of which all the vaporizing-chambers *b* are disposed as described above. The pipes *q* bring the air saturated with vapors to a main passage *r*, from which it passes to the solvent-fixing and air-purifying chamber.

The drying substances capable of liberating elements of ethylic products, due to the absorption of water, may be, for instance, a granulated mixture composed of calcium carbid and sodium carbid in the following proportions:

$$CaC_2+H_2O=C_2H_2+CaO$$
$$Na+H_2O=H_2+NaO$$
$$=C_2H_4\ (\text{ethylene})$$

or a mixture of calcium and manganese carbids.

Generally any material may be employed as the fixing material in which are soluble or with which can enter into combination the solvents which it is desired to fix and may be, for instance, cheap products, such as bisulfate of sodium or potash, resulting from the manufacture of nitric acid or the old acids having been used in the preparation of the nitric celluloses employed in the above-mentioned industries.

Having now particularly described and ascertained the nature of said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In apparatus for the purpose described, the combination of a vaporizing-chamber adapted to receive material to be dried or treated to remove volatile solvent therefrom, the interior of said chamber being exposed to atmospheric pressure, a solvent-fixing and air-purifying chamber, and a passage connecting the bottom of said vaporizing-chamber with said solvent-fixing and air-purifying chamber, said chamber being so relatively positioned as to form between the same through the connecting-passage a column of fluid said column exerting by gravity greater fluid-pressure at its vaporizing-chamber end than at its other end, whereby said fluid will be automatically and naturally propelled through the system by the force of gravity.

2. In apparatus for the purpose described, the combination of a vaporizing-chamber adapted to receive material to be dried or treated to remove volatile solvent therefrom, the interior of said chamber being exposed to atmospheric pressure, a solvent-fixing and air-purifying chamber, a passage connecting the bottom of said vaporizing-chamber with said solvent-fixing and air-purifying chamber, said chambers being so relatively positioned as to form between the same through the connecting-passage a column of fluid said column exerting by gravity greater fluid-pressure at its vaporizing-chamber end than at its other end, whereby said fluid will be automatically and naturally propelled through the system by the force of gravity, and a drier interposed in said connecting-passage.

3. The combination of a vaporizing-chamber adapted to receive material to be dried or treated to remove volatile solvent therefrom, said chamber being open at the top and thus exposed to atmospheric pressure, a solvent-fixing and air-purifying chamber, and a passage connecting the bottoms of the chambers, said chambers being so relatively positioned as to form between the same through the connecting-passage a column of mixed air and gas, said column exerting by gravity greater fluid-pressure at its vaporizing-chamber end than at its other end, whereby said mixed air and gas will be automatically and naturally propelled through the system by the force of gravity.

4. In apparatus of the kind described, the combination with a vaporizing-chamber open at its top, of an apron of flexible transparent material extending upward about the open upper end of said chamber.

5. In apparatus of the kind described, the combination with a vaporizing-chamber open at its top, of an apron of flexible transparent material extending upward about the open upper end of said chamber, and elastic means supporting said apron at its upper edge.

6. In apparatus of the kind described, the combination with a vaporizing-chamber open at its top, of an apron of flexible transparent material extending upward about the open upper end of said chamber, a frame above the chamber and elastic fastenings supporting said apron from said frame.

In witness whereof I have hereunto signed my name, this 14th day of March, 1905, in the presence of two subscribing witnesses.

EDOUARD BOUCHAUD-PRACEIQ.

Witnesses:

JULES ARMENGAUD, Jeune,

HANSON C. COXE.