C. NEAMES.

DIFFUSION APPARATUS.

No. 180,623. Patented Aug. 1, 1876.

Fig: 1.

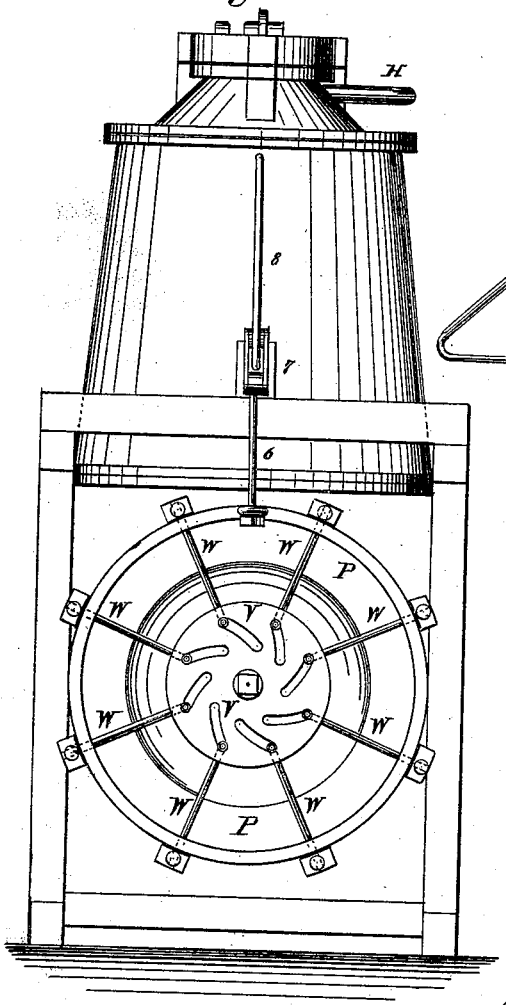


Fig: 2.

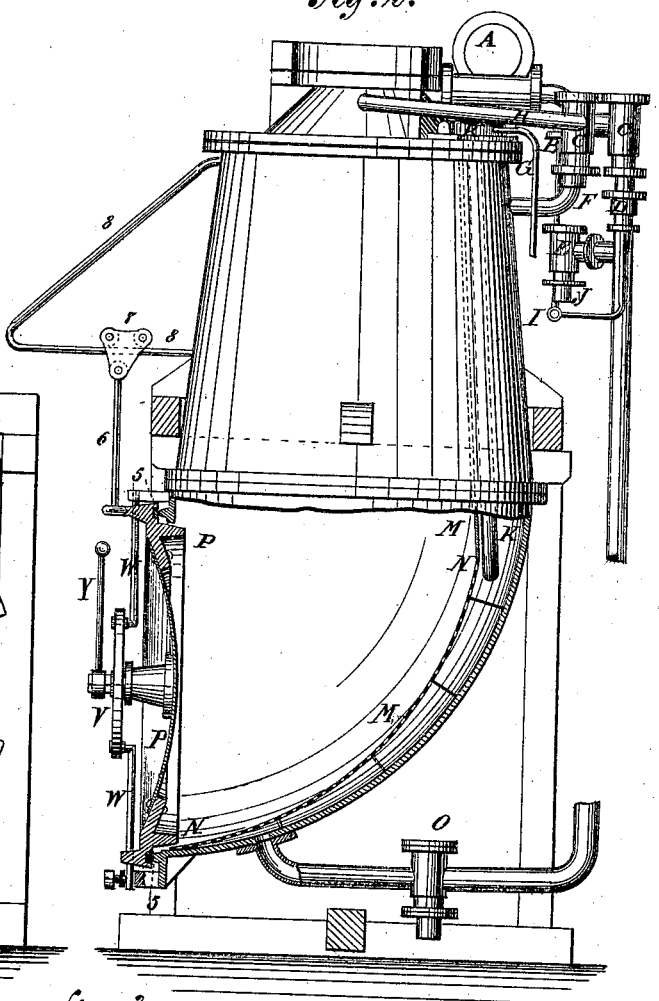


Fig: 3.

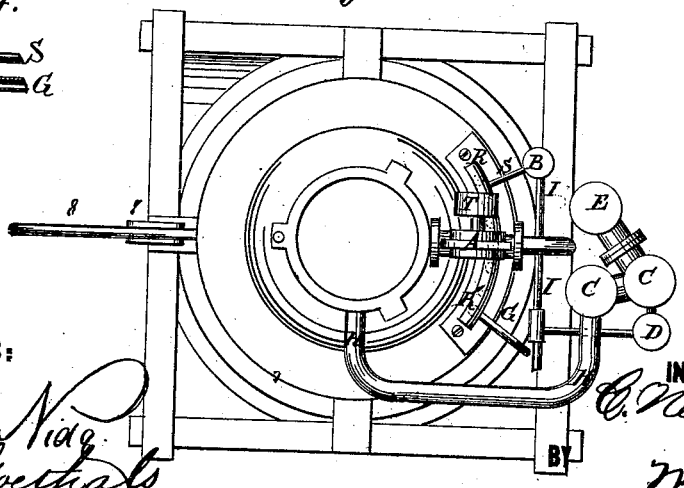
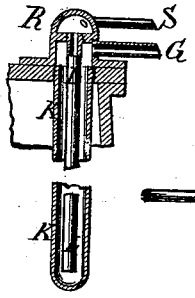


Fig: 4.



WITNESSES:

Chas. Nidy.

John Goetschius

INVENTOR:

C. Neames

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES NEAMES, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN DIFFUSION APPARATUS.

Specification forming part of Letters Patent No. **180,623**, dated August 1, 1876; application filed May 16, 1876.

To all whom it may concern:

Be it known that I, CHARLES NEAMES, of New Orleans, Orleans parish, State of Louisiana, have invented a new and Improved Diffusion Apparatus, of which the following is a specification:

In the accompanying drawing, Figure 1 is a front view of one of the diffusion-vessels. Fig. 2 is a side view of the same, the lower part being shown in section. Fig. 3 is a top view of the same, and Fig. 4 is a detail sectional view of one of the steam heating-pipes.

Similar letters of reference indicate corresponding parts.

The object of this invention is to improve the construction of the diffusion apparatus known as the "Julius Roberts Diffusion Apparatus," in such a way as to secure a more perfect extraction of the saccharine matter from the material used, and at the same time make a more economical and simple apparatus. In doing this I dispense with the outside heater, its two lines of leading pipes, and their necessary valves, by placing the pipes for heating purposes within the diffusion-vessels, and thus avoid loss of heat by radiation from the saccharine liquid while traveling through two long lines of pipe, back and forth between the heater and the diffusion-vessel.

By placing the heating-pipes in each diffusion-vessel, one-sixth of the amount of heating-surface now required for each vessel will be sufficient, and also a uniform temperature may be obtained in one, two, or more vessels at the same time. This latter advantage is of great importance to a thorough extraction of all the saccharine matter from sugar-cane, beets, &c., by diffusion, and is not attainable in the apparatus now in use, as in them the liquid from only one diffusion-vessel can be heated at a time.

The peculiar construction of my diffusion-vessel enables the refuse to be more readily discharged. This is of great importance in operating upon sugar-cane, as the cane-chips pack and are troublesome to discharge from a vessel with parallel sides.

My invention consists in a diffusion-vessel of a diffusion apparatus gradually increasing in size from its top or inlet opening to its bottom or outlet opening; in the wood packing interposed between the rim of the doors and the door-frames of a diffusion-vessel; in the division-plate extending from the top to the bottom of the diffusion-vessel to form the heating-chamber, and having its lower part perforated with numerous small holes to serve as a strainer; in the heating-pipes placed within the diffusion-vessels of a diffusion apparatus; and in the combination of the circulating-wheel and its pipe with the diffusion-vessel of a diffusion apparatus, as hereinafter fully described.

In the annexed drawing, A represents the circulating-wheel, the pipe of which is connected with the top and side of a diffusion-vessel, and to the journal is attached a pulley, T. B is the angle stop-valve for the steam-pipe S, leading to the steam-chamber R of the heating-pipes, of which there are ten in each vessel. C are two stop-valves cast together, one being the water-pressure valve, and the other being the overrun-valve, which is used when bringing the liquid forward from the bottom of one vessel to the top of another vessel of the train. D is the angle stop-valve for the steam-pipe, leading from the steam-pipe I into the stand-pipe 4, and is used for steaming the cane-chips, and for steaming out the diffusion-vessel and the pipes to clean them. E is the stop-valve attached to the stand-pipe 4, and to the leading discharge-pipe J, and is used for discharging the saccharine liquid from the diffusion-vessel after it has acquired sufficient density. F is the leading water-pipe, with which the overrun-valve C is connected. G is the pipe for removing the water of condensation from the heating-pipes. H is the overrun-pipe, which connects the overrun-valve C with the top of the diffusion-vessel. I is the main leading steam-pipe, from which the steam is taken through the valves B or D. K is one of the heating-pipes, the lower end of which is closed, and its upper end is screwed into the top of the diffusion-vessel. Within each of the pipes K is placed a small pipe, L, the lower end of which is open, and its upper end is screwed into the division-plate of the steam-distributing chamber R. M is the sheet-iron division-plate that forms the heating-chamber, and extends from the top to the bottom of the diffusion-chamber, and the

lower part of which, between the points N N, is perforated with numerous small holes to adapt it to serve as a strainer. O is an angle stop-valve, which is used for discharging the waste-water from the diffusion-vessel into the waste-water trough. P is the lower or discharge door, in the inner side of the rim of which is formed a groove to receive a wood packing, 5, which is pressed against a tongue or flange formed upon the door-frame, to form a close joint. The door P is pressed into place by eight screw-bolts, which are screwed up against the outer ends of eight square bars, W, that pass through wrought-iron clevises, provided with screw-holes to receive the said screw-bolts. The clevises are secured in an outwardly-projecting flange of the diffusion-vessel. The inner ends of the square bars W have a wrist at right angles to same, which are inserted in curved slots formed in the disk V. The disk V is turned, to operate the bars W, by a lever, Y, attached to it. The disk V is pivoted to the wrought-iron middle part of the door. The door P is attached to the lower end of a rod, 6. the upper end of which is attached to a pulley-block, 7, which rolls along the horizontal arm of a bracket, 8, attached to the upper part of the diffusion-vessel, to open and close the door P. The upper door is packed with wood and secured by bolts, in the same way as the lower door, except that only two bolts are used, which are moved in and out by hand, and the said door is pivoted to the door-frame by a bolt.

The diffusion-vessels of the train are connected as follows: A pipe coming out of the bottom of each diffusion-vessel is connected with the stand-pipe 4 of the next vessel, and the pipe coming out of the last vessel is connected with the stand-pipe of the first one, completing the circuit.

The liquid can be sent forward through the train of diffusion-vessels by hydrostatic pressure obtained from an elevated water-cistern.

In the ordinary diffusion apparatus there is an average loss of one pound of sugar in every one hundred pounds of cane, arising from insufficient circulation. To obviate this I have applied my circulating-wheel, arranged to be run by a pulley-belt and a shaft extending the whole length of the apparatus, with one wheel for each vessel. This, in connection with heating-pipes placed within each vessel, avoids the outside heater, saves one hundred and eighty feet of pipe, and renders unnecessary twenty-two valves, while I can have a uniform temperature in two or more vessels at the same time. The object of the wheel is to keep up a circular motion of the liquid in each vessel. The door is operated by a partial rotation of the disk having slots, the clevis screw-bolts being set down on bars, and made to force the door up to the flange of vessel.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a diffusion apparatus, a diffusion-vessel gradually increasing in size from its top or inlet opening to its bottom or outlet opening, substantially as herein shown and described.

2. The division-plate M, extending from the top to the bottom of a diffusion-vessel to form the heating-chamber, and having its lower part perforated with numerous small holes to serve as a strainer, substantially as herein shown and described.

3. The combination of circulating-wheel with heating-pipes K L, placed within the diffusion-vessels of a diffusion apparatus, substantially as herein shown and described.

4. The combination of the circulating-wheel and its pipe with the diffusion-vessel of a diffusion apparatus, substantially as herein shown and described.

CHARLES NEAMES.

Witnesses:
J. PARIS CHILANG,
E. F. HOLMES.