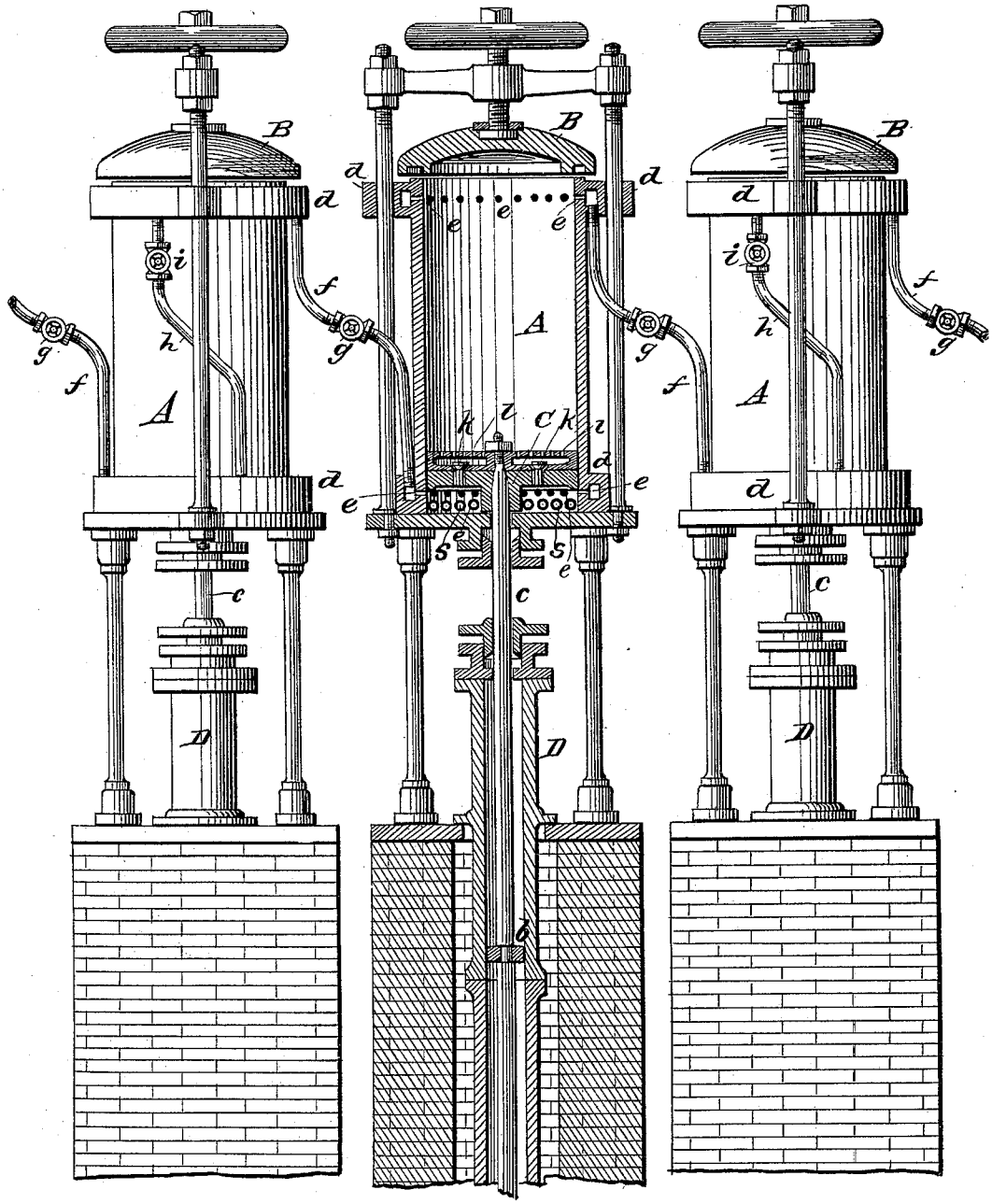
(No Model.)

W. GOLDING.

DIFFUSION BATTERY.

No. 405,472. Patented June 18, 1889.



WITNESSES:

Phil. C. Dieterich.

C. Sedgwick

INVENTOR:

W. Golding

BY Munn & Co

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM GOLDING, OF NEW ORLEANS, LOUISIANA.

DIFFUSION-BATTERY.

SPECIFICATION forming part of Letters Patent No. 405,472, dated June 18, 1889.

Application filed September 5, 1888. Serial No. 284,614. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GOLDING, of New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and useful Improvement in Diffusion-Batteries for Extracting Sugar, of which the following is a full, clear, and exact description.

This invention relates to diffusion-batteries for extracting sugar, in which, as heretofore constructed, the cane after being sliced or cut into chips is thrown into a series of cells or tanks forming the battery, and which are closed by a tight-fitting cap or cover. Hot water under pressure is then admitted to the first tank or cell and caused to flow successively through the other tanks or cells, and when the last cell is full the first cell or tank is discharged and refilled, and the operation repeated. Heaters have been placed between the tanks to heat the juice as it passes from one tank to another, and the discharge has usually been made through a drop-bottom or through side doors applied to the tanks. In such construction of the battery and mode of operation there is necessarily much water charged with the sugar run off with the refuse cane or bagasse, and efforts have been made to remedy this in part by saving the water remaining in the last tank and forcing it out by compressed air. The spent cane material has also been discharged in such a wet and sloppy condition as to be unfit either for use as fuel or as a fertilizer, and it has been necessary to cart it away at much expense. There has also been much sugar left in the refuse by reason of the imperfect circulation of the water through the tanks, inasmuch as the fluid naturally travels or circulates through the course of least resistance, and so escapes contact with chips lying out of the free course of circulation.

My invention has for its object the remedying of these and other defects; and it consists in certain novel constructions and combinations of parts in a diffusion-battery for the purpose named, and in which the cells or tanks are in the form of cast-iron or other suitable cylinders bored out and fitted with pistons and heads, substantially as hereinafter described, and pointed out in the claims, and whereby an apparatus is produced that will provide for perfect circulation, for heating the fluid in each cell or tank, for pressing the last or remaining water out of the cane refuse or bagasse, thus saving the sugar by retaining the water in the tank when discharging the bagasse, and delivering the bagasse in a dry condition.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure represents a partially-sectional elevation of an apparatus embodying my invention, the same showing a diffusion-battery of three cells, tanks, or cylinders; but the invention is not restricted to any number of cells or diffusion-chambers.

A A indicate the diffusion cells or chambers, each of which is in the form of an upright cast-iron or other suitable cylinder, and each of which is of similar construction and provided with similar attachments or adjuncts. These cylinders A are closed at their bottoms, but fitted with a removable cover B on top, for feeding in the split cane or chips and for discharging the cane refuse or bagasse, said covers being closed by a central screw or any other suitable means. Said cylinders are bored out or otherwise suitably finished on their inside to provide for the working of pistons C within them, each of said pistons being raised to effect the discharge by a hydraulic device beneath, consisting of a cylinder D, piston *b*, and rod *c*, connecting said piston *b* with the piston C in each cylinder A.

Cast around the upper and lower ends of each cylinder are hollow belts *d*, made to communicate with each cylinder A, above and below, by circumferential series of apertures *e*, which have the effect of causing the fluid to enter from all directions centripetally and to discharge centrifugally in all directions, thus effecting a perfect circulation. The water for producing the diffusion enters and is discharged from tank to tank or cell to cell, as heretofore, pipes *f* fitted with valves *g* connecting the belt on the upper end of one cylinder with the belt on the lower end of the next cylinder; but instead of the juice being heated between the cells it is heated in each cylinder itself by a coil *s*, arranged in the bottom thereof, and through which any suitable heating fluid, gas, or vapor may be passed. The discharge of the juice or fluid from the one cylinder to the other is through the up-

per perforations *e* in the cylinders, the piston *b*, as it rises in each hydraulic cylinder D, forcing all the running water into the next tank, or at least as much as is desired thereof, any remaining fluid being returned from the upper to the lower end of the cylinder by a passover-pipe *h* upon opening a valve *i* controlling the latter.

The pressure applied to each hydraulic cylinder D should be sufficient to press all the juice out of the sliced or cut cane, and when the cover B of the cylinder is removed to discharge the bagasse or spent cane through the top of the cylinder in a comparatively dry condition ready for use as fuel or as a fertilizer, as desired. Little or no water will be discharged while doing this, and as a consequence little or no sugar will be lost.

The piston C of each diffusion cell or cylinder A is fitted with valves *k*, controlling apertures through the piston and opening upward, to allow of the passage of the fluid through the piston in the downstroke of the latter, and over said valves is arranged a perforated shield or distributer *l*, that allows of the juice passing through the piston to be divided into a number of small streams, whereby the circulation of the fluid is improved or increased.

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

1. In diffusion-batteries for extracting sugar, the combination of a series of cells or diffusion-chambers composed of upright cylinders connected the lower end of one cylinder with the upper end of an adjacent cylinder, opening and closing covers applied to the upper ends of the cylinders, perforated pistons fitting said cylinders, provided with one or more valves operating to allow of the passage of fluid through the pistons in their downstroke, and means for operating said pistons, substantially as specified.

2. In a diffusion-battery for extracting sugar, the cylinders A, constructed with hollow belts *d* at their upper and lower ends in circumferential communication with the cylinder by a series of apertures *e*, in combination with the connecting-pipes *f* between the cylinders and a perforated reciprocating piston C in each cylinder having valves *k*, and a perforated shield or distributer *l* over said valves, essentially as described.

3. The passover-pipes *h* and valves *i*, in combination with the cylinders A, having opening and closing covers B at their upper ends, the pipes *f*, connecting said cylinders, and a perforated reciprocating piston C in each cylinder fitted with valves *k*, substantially as specified.

4. In a diffusion-battery for extracting sugar, the combination of the cylinders A A, having opening and closing covers applied to their upper ends, and hollow belts *d* at their opposite ends in communication with each cylinder circumferentially by apertures *e*, the pipes *f*, connecting said cylinders, the perforated piston C in each cylinder having valves *k* and a perforated shield or distributer *l*, and a hydraulic device connected with said piston and operating to raise it, essentially as herein set forth.

WM. GOLDING.

Witnesses:
NATHAN STERN,
WM. WRIGHT.