

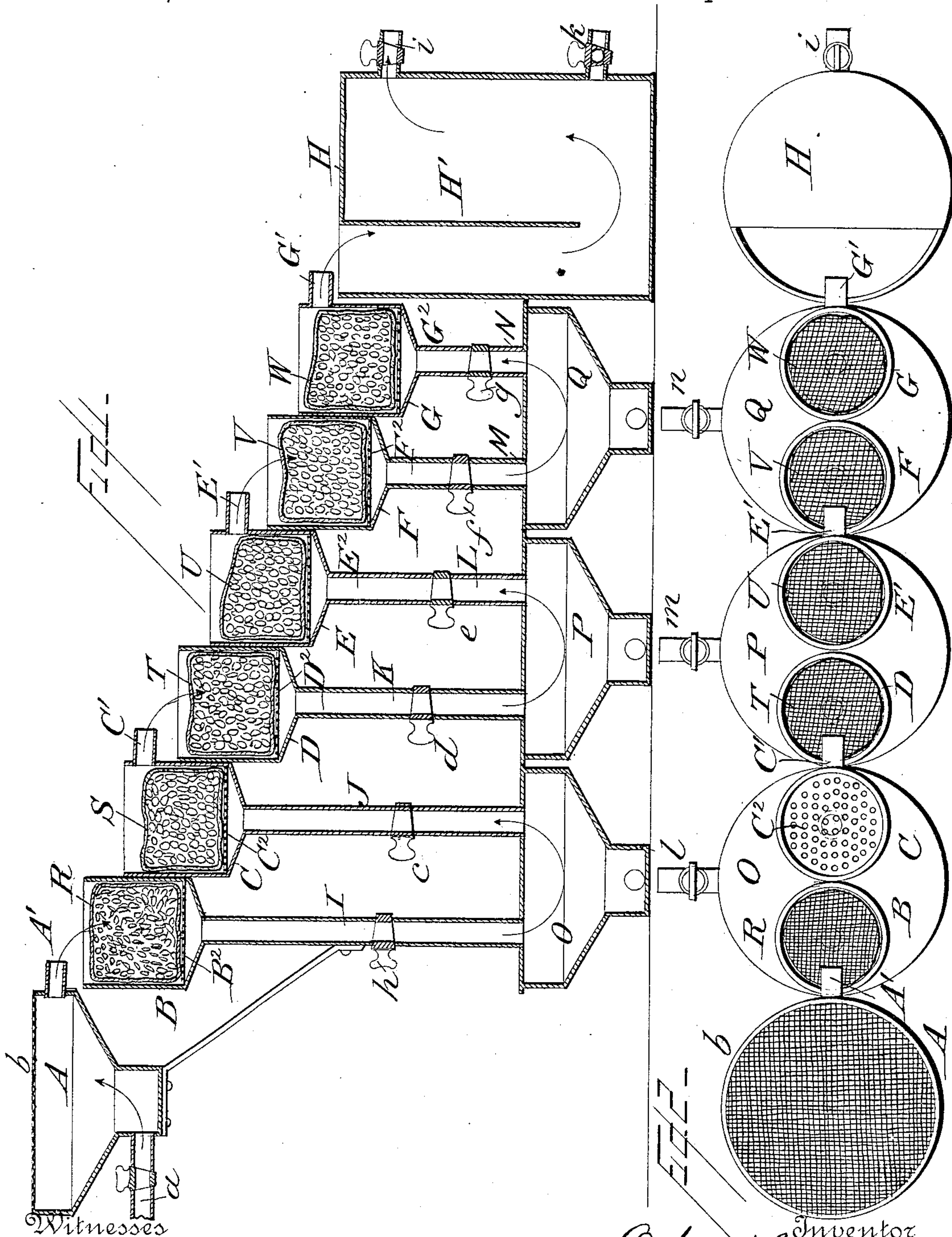
(No Model.)

O. WELLS & S. JOHNSTONE.

SUGAR CANE JUICE FILTER.

No. 389,427.

Patented Sept. 11, 1888.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## SUGAR-CANE-JUICE FILTER.

SPECIFICATION forming part of Letters Patent No. 389,427, dated September 11, 1888.

Application filed May 8, 1888. Serial No. 273,184. (No model.)

*To all whom it may concern:*

Be it known that we, OSBERN WELLS and SILAS JOHNSTONE, citizens of the United States, residing at Newberry Court-House, in the county of Newberry and State of South Carolina, have invented certain new and useful Improvements in Sugar-Cane-Juice Filters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to a filtering apparatus for purifying the juice of the sugar-cane after it has been expressed therefrom; and it consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the accompanying drawings, illustrating our invention, Figure 1 is a vertical longitudinal sectional view of our improved sugar-cane-juice-filtering apparatus, and Fig. 2 is a top plan view of the same.

Like letters of reference designate corresponding parts in both the figures.

It is well known to all persons experienced in the manufacture of sugar from the juice of the sugar-cane that when this juice has been extracted from the cane by the operation of suitable machinery for that purpose the juice is filled with various kinds of impurities—such as fine sand, particles of the stalk, juice-cells, and other foreign substances—which must be removed therefrom in order to render it pure and clean. Besides these substances there is a kind of oily solution, not perceptible to the naked eye, which clogs a filter and requires a constant change of the filtering material through which the juice passes. Our invention aims to facilitate this change of the filtering material by so constructing the filtering apparatus that extra filtering-sacks may be easily and quickly substituted for those which have been clogged or rendered unserviceable by reason of this oily solution in the cane-juice; also, it may be stated that among the various impurities found in the cane-juice after it leaves the mill is a whitish milky-looking sediment, which it seems impossible to thoroughly filter from the juice; but, as

it is heavier than the juice, it will in the apparatus constructed by us be caused to fall into properly-located sediment-tanks, whence it will be easily removable, and in this manner the whitish sediment can be separated from the cane-juice.

With this general indication of the purpose of our apparatus, we will proceed to describe in greater detail the construction and operation of the several parts of the apparatus, whereby our invention is carried practically into effect and made useful for the purpose of cleansing and purifying the expressed juice of the sugar-cane stalks.

A denotes a tank which receives the juice of the sugar-cane, which is conveyed to it from the mill by some suitable conduit or passage—as, for instance, the pipe *a*. (Shown in Fig. 1.) The tank A is kept covered, usually by means of a coarse cloth, *b*. This tank A occupies a position in the top of the apparatus, so that the juice of the cane may pass outward therefrom and fall by gravity into suitable filtering devices placed to receive it.

Our invention proceeds upon the principle of subjecting the cane-juice to successive filtrations; and for this purpose a series of funnels or receptacles are provided, each one containing a mass of filtering material and each one located adjoining its predecessor, but in a lower position, the series being thus a descending series, and said funnels or receptacles being so arranged in connection with each other, by means of pipes and sediment-tanks, that the cane-juice is enabled to pass of its own accord through the entire series of filters, and at length to emerge in a purified state in a tank placed to receive it at the end of the series of filters. It is of course obvious that we are confined to no special number of filtering funnels or devices, but that the series thereof may be composed of any number. In the present example of our invention we have chosen to represent six of these funnels, B C D E F G. Said funnels are made in any suitable form, size, and shape. Each one contains a mass of filtering material, which material is contained within a sack which rests within the funnel or box upon a perforated bottom. These perforated bottoms are lettered, respectively, in



the various funnels B<sup>2</sup>, C<sup>2</sup>, D<sup>2</sup>, E<sup>2</sup>, F<sup>2</sup>, and G<sup>2</sup>. The filtering-sacks located within the funnels are respectively lettered R, S, T, U, V, and W, the sack R being located within the funnel B, the sack S within the funnel C, and so on. The filtering material preferably employed is coarse sand or sugar-cane seed; but other filtering material of any preferred kind may be used. It is obvious at a glance that these filtering-sacks are easily removable from the funnels or boxes that contain them, and that therefore when the filtering material becomes clogged the sack can easily be withdrawn and a fresh one substituted in its place. The funnel or receptacle B is the highest of the series. It is located beneath the spout A', which projects from the tank A, so that the juice, finding exit from the tank through spout A', falls at once into receptacle B and passes through the filtering material in the sack R. The receptacle B is supported by a vertical tube or pipe, I, which extends upward from the tank O. After the juice, therefore, has passed through the filtering-sack R and the perforated plate B<sup>2</sup>, it will enter the pipe I and be conveyed to the tank O. The pipe I is supplied with a faucet, *h*, whereby the flow of the juice may be stopped when desired. The receptacle C is located close to the receptacle B, but in a slightly lower position. It is supported by the pipe J, which likewise extends upward from the tank O, and is supplied with a faucet, *c*. Said receptacle C has a spout, C', which extends outward above the receptacle D, that adjoins the receptacle C, and is supported on a vertical pipe, K, extending upward from the sediment-tank P, which is situated adjacent to the tank O. The pipe K has a cock, *d*. The receptacle E is adjacent to the receptacle D, and is supported on the pipe L, that extends from the tank P, said pipe L having the cock *e*, and said receptacle E having the spout E'. The receptacle F is located beneath the spout E', and is supported by the pipe M, fastened on the tank Q, which tank likewise supports the pipe N, that carries the receptacle G, having a spout, G'. Said pipe N is provided with a cock, *g*.

The tank O is provided with a draw-off cock, *l*, the tank P with a faucet, *m*, and the tank Q with a faucet, *n*. By means of these faucets the sediment that collects in the bottom of these tanks can be easily withdrawn. It will thus be apparent that when the sugar-cane juice has passed from the pipe I into the tank O, as above stated, it will pass upward from the tank O in the direction of the arrow through the pipe J into the receptacle C, through the perforated bottom C<sup>2</sup>, and then through the filtering-sack S. Afterward it will find an exit from the receptacle C through spout C', will fall into the receptacle D, and pass through the filtering material of sack T, located in said receptacle. In a similar manner the juice will pursue its course through the sediment-tank P, the receptacles E and F, the tank Q, and

the receptacle G. As the receptacles or funnels vary in their horizontal position, it is thus made possible for the sugar-cane juice which is in the tank A, that occupies a position higher than any of the funnels, to pass and be successively and repeatedly filtered in the manner described. After the juice has passed through all the different filtering-sacks in the series of funnels, it will emerge through the spout G' from the funnel G and enter the tank or reservoir H. This reservoir is provided with a partition, H', which reaches very close to the bottom—to within, say, about four inches of the bottom—so that when the juice enters the reservoir it is forced to pass downward and under this partition. This gives the sediment further time for settling. The reservoir is preferably independent from the filtering apparatus and not attached thereto. It has two faucets—an upper one, as *i*, and a lower one, as *k*. Through the upper one, as *i*, the juice is permitted to flow out and be removed therefrom. The lower faucet, *k*, is used for the purpose of drawing out free from sediment whatever juice remains that cannot be withdrawn by the cock *i*.

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

1. The herein-described filtering apparatus for sugar-cane juice, which consists in a series of receptacles containing filtering material and having perforated bottoms, said receptacles being arranged at different heights, a series of vertical pipes carrying on their upper ends said receptacles and communicating therewith, and sediment-tanks that uphold the pipes and are entered by them, all arranged for use, substantially as described.

2. In a filtering apparatus for sugar-cane juice, the combination of a series of one or more receptacles containing removable sacks of filtering material, vertical pipes supporting on their upper ends said receptacles, and sediment-tanks from which said pipes extend upward, substantially as described.

3. In a filtering apparatus for sugar-cane juice, the combination of a series of one or more receptacles having perforated bottoms, said receptacles being located at different heights and some of them having projecting spouts, the vertical pipes of unequal length supporting on their upper ends said receptacles, and sediment-tanks, each of which supports the lower ends of two of said pipes, all said parts being arranged to permit the juice to flow from one receptacle to the other, substantially as described.

4. In a filtering apparatus for sugar-cane juice, the combination of the supply-tank for the juice, the series of filtering-receptacles containing removable sacks of filtering material and having perforated bottoms, the vertical pipes that support these receptacles, the sediment-tanks from which these vertical pipes extend upward, and the reservoir for receiving



ing the purified juice, substantially as described.

5 5. The combination, in a filtering apparatus, of a series of filtering-receptacles, vertical pipes supporting them, and sediment-tanks upholding the pipes, all arranged for permitting a continued flow of the juice from one receptacle to the other, and a reservoir, H, for receiving the purified juice, having a partition,  
10 H', extending to near the bottom thereof and having faucets, substantially as described.

6. In a filtering apparatus, the combination of a sediment-tank, two vertical pipes extending upward therefrom of unequal heights, filtering-receptacles carried on the upper ends  
15 of these pipes, having perforated bottoms and containing removable sacks of filtering material, the tank for supplying juice to the first receptacle, and a reservoir for receiving the  
20 purified juice, substantially as described.

7. In a filtering apparatus for sugar cane juice, the combination of the series of funnels or receptacles B C D E F G, said receptacles being located at different heights, the pipes I  
25 J K L M N, for supporting said receptacles, the tanks O P Q, upon which said pipes are mounted, all the parts being arranged to permit a continuous flow of the juice through all the receptacles of the series.

30 8. The combination of the series of recepta-

cles B C D E F G, said receptacles being located at different heights and having respectively the perforated bottoms B<sup>2</sup> C<sup>2</sup> D<sup>2</sup> E<sup>2</sup> F<sup>2</sup> G<sup>2</sup>, the removable filtering-sacks R S T U V W, located, respectively, within said receptacles, the  
35 upright pipes I J K L M N, carrying the receptacles on their upper ends, and the sediment-tanks that uphold the upright pipes, all arranged substantially as described.

9. In a filtering apparatus for sugar-cane juice, the combination of the funnels or receptacles B C D E F G, said funnel C having spout C', said funnel E having spout E', and said  
40 funnel G having spout G', all of said funnels having perforated bottoms and being arranged at unequal heights, the removable sacks of filtering material located within the different funnels, the upright pipes carrying the receptacles and having faucets, and the sediment-tanks upholding said pipes and likewise hav-  
50 ing faucets, all the parts arranged to accomplish the purposes hereinbefore specified.

In testimony whereof we affix our signatures in presence of two witnesses.

OSBERN WELLS.  
SILAS JOHNSTONE.

Witnesses:

WM. WALTER HOUSEAL,  
WILLIAM ZOBEL.