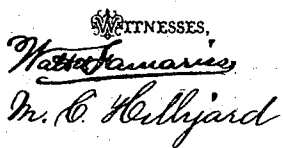


S. M. MALHIOT.
FILTERING APPARATUS.

Patented Oct. 3, 1893.



By W. C. Stevens.  T. Y.

UNITED STATES PATENT OFFICE.

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FILTERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 506,127, dated October 3, 1893.

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To all whom it may concern:

Be it known that I, SAMUEL MILLS MALHIOT, a citizen of the United States, residing at Albemarle, in the parish of Assumption and State of Louisiana, have invented certain new and useful Improvements in Filtering-Apparatus; and I 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.

This invention relates to that class of devices which are used for filtering liquids of various kinds, and its object is to provide means whereby cane juice and other similar liquids may be rapidly filtered under pressure.

To this end my invention consists in the construction and combination of parts forming filtering apparatus, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1, shows a complete system of my filtering apparatus partly in side elevation and partly in longitudinal vertical section.

Fig. 2, represents a top view of a single filter taken at the horizontal line *x* Fig. 1. Fig. 3, is a top view of a clamping ring.

1 indicates a tank for containing the fluid which is to be filtered.

2 is a pump, and 3 a pipe for carrying the fluid to the filters 4, any number of which may be connected with the pipe 3 by branch pipes 5, and 6 represents stop cocks in these branches, whereby the liquid may be permitted to flow through any branch into its filter, or be stopped therefrom.

7 represents the nozzles of the branches 5, each closed at its lower end and perforated along its sides to distribute the flow evenly up and down within the filtering sack 8. This sack is made tapering from its mouth toward its bottom, and is secured around the head 9 by means of a rope 10 which draws it firmly into a neck 11 in the head 9. The head 9 is secured to a support 12 by any usual means such as the bolts 13, and the pipe 5 passes centrally through the head, terminating, as before described, in the nozzle 7. In place of the rope 10, I may use a ring-shaped clamp 14, shown in Fig. 3, made in two pieces hinged together at 15, and provided with a binding screw 16, whereby the clamp may be drawn

with great force around the mouth of the bag to bind it into the neck 11.

17 is a basket placed around the sack and supported upon the head 9 by means of screw-bolts 18, hinged to swing outward and inward on the basket to engage ears 19 projecting from the sides of the head 9. This basket is preferably made of steel wire, but perforated sheet metal, or any similarly strong perforated material would answer the purpose as well, its main object being to prevent bursting the sack by the pressure of liquid within it by the force pump 2. This basket further serves as a backing upon which the sack is supported at all points alike so that the filtration through the sack will be finer and more even than it could be if the sack were not thus supported.

20 is a trough adapted to receive the filtered liquid as it runs from any one or all of the filters located above it.

21 is a pipe through which the refuse may be returned from the trough 20 to the tank 1, when the pipes, the filters and the trough are washed out after service.

22 is a pipe and 23 a stop cock therein to communicate with a steam boiler whereby steam or heated water may be introduced to thin the liquid which is being filtered, whenever it becomes too thick to flow well, and to supply hot water for washing out the apparatus after service.

24 is a pressure gage for indicating to the eye of the operator the amount of resistance which the filters are at any time offering to the free passage of the liquid, so that he may know when the filtering sacks require cleaning.

I have arranged the filters in a series upon a single supply pipe 3 in order that the filtering operation need not be discontinued for the purpose of repairing or cleaning any one filter, it being a great advantage to proceed continuously in filtering the liquid when it is in proper condition. The filtering sacks 8 and the baskets 17 surrounding them taper downward in order that the filtered liquid may the more readily escape from the upper regions of the sack without interfering with the escape below. In filtering fluids like cane juice a residue gathers upon the filter and when the latter is in the form of a bag the

residue becomes caked more or less according to the pressure upon the fluid and the length of time a bag is used continuously, and as long as juice can be pressed through it this residue aids to make the filtration more perfect. I have therefore formed the bag and basket tapering for the further purpose of lessening the amount of residue at the lower end where it first accumulates, so that fluid may still be pressed through it while the upper portion of the bag is being filled, and finally I form the bag and basket tapering in order that the cake of residue when firmly pressed may be removed from the basket and bag, without the trouble of digging it to pieces, thus enabling the filter to work longer and do better work and yet be readily cleaned. Each sack is also made a very little larger than the basket which is to contain it, in order that the actual pressure within the sack may be supported wholly upon the basket instead of straining as it would otherwise do, to part the meshes of the sack and cause bad filtration at that point. Though steel wire is suggested for the baskets, any other wire of suitable strength to maintain its form under pressure, or any perforated sheet metal that would accomplish the same purpose may be substituted, and for the purposes of the claim this will be called a strong basket.

Some of the advantages of this filter are as follows: Simplicity of construction and consequent economy in first cost and subsequent repairs; the ease and rapidity with which any one filter may be removed for repairs or clean-

ing while the others remain undisturbed in operation; absolute security against bursting the sacks and thus spoiling a batch of liquid by discharging unfiltered liquid into it; and the ease with which more filters may be added at any time to the main supply pipe to increase the capacity of the works, or with which the number of filters in service may at any time be reduced when less work is required to be done.

The advantage of filtering some liquids under pressure is too well known to require comment here.

Having thus fully described my invention, what I believe to be new, and desire to secure by Letters Patent, is the following:

The combination in filtering apparatus of a head hung upon a support and provided with projecting ears, and a neck; a supply pipe passing through the head and perforated along its sides as a nozzle; a sack around the nozzle and secured to the head by being bound into the neck thereof, and a basket smaller than the sack but surrounding it and provided with screw bolts hinged to its sides at the upper end and adapted to removably engage the ears on the head, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL MILLS MALHIOT.

Witnesses:

A. F. TETE,
LAWRENCE H. PUGH.