

(No Model.)

2 Sheets—Sheet 1.

R. C. HOWES.

BONE BLACK DISCHARGER FOR CONTINUOUS FILTERS.

No. 335,586.

Patented Feb. 9, 1886.

Fig. 1.

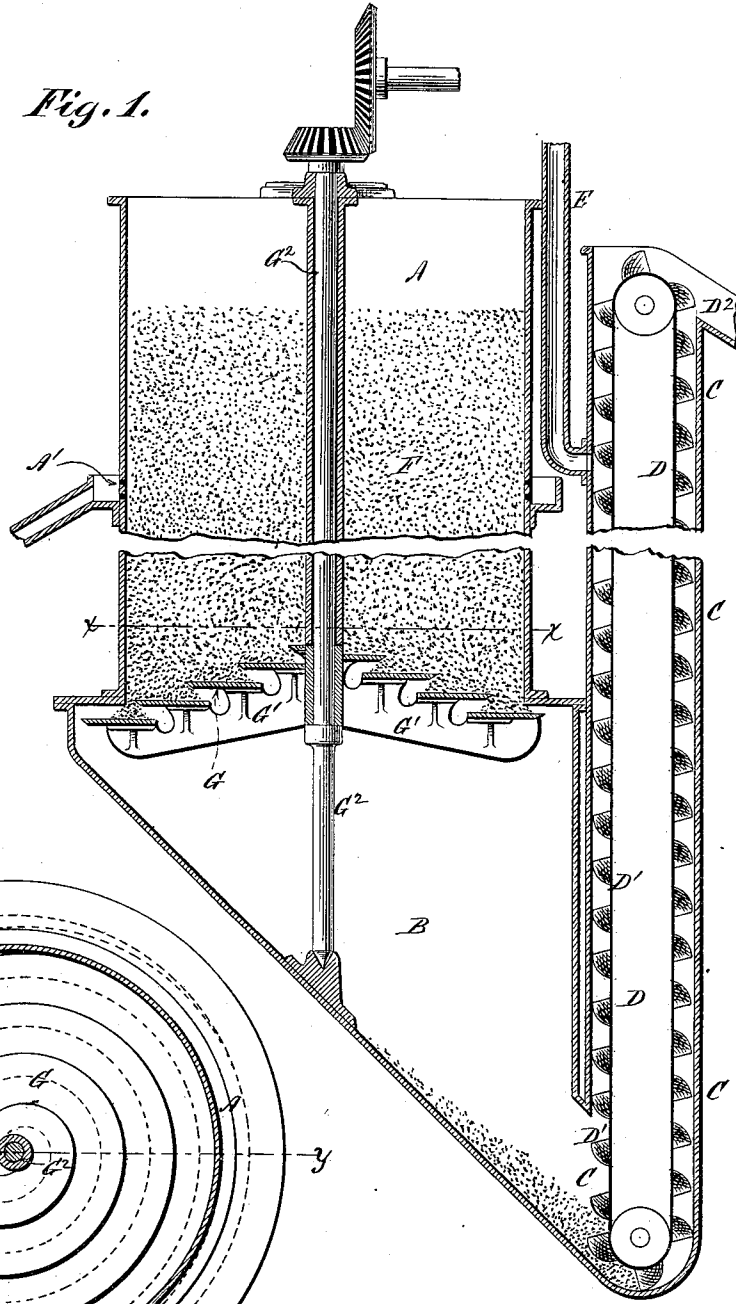
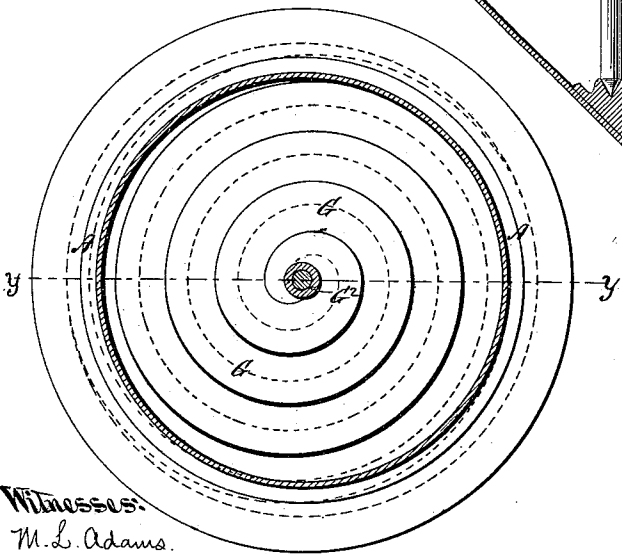


Fig. 2.



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Fig. 3.

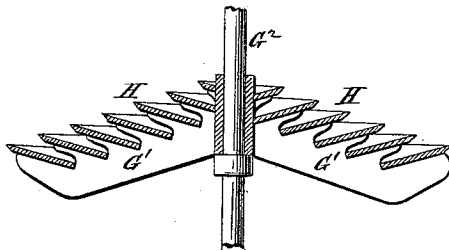


Fig. 4.

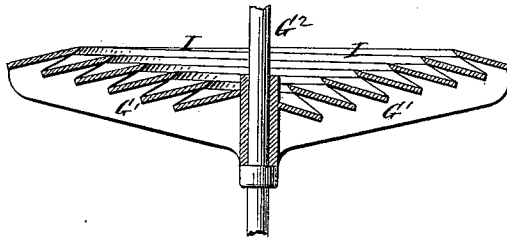
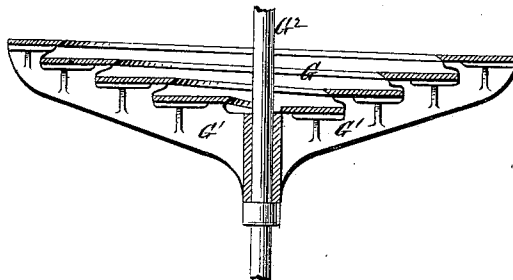


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BONE-BLACK DISCHARGER FOR CONTINUOUS FILTERS.

SPECIFICATION forming part of Letters Patent No. 335,586, dated February 9, 1886.

Application filed October 26, 1885. Serial No. 180,895. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. HOWES, of East Orange, New Jersey, have invented certain Improvements in Bone-Black Dischargers for Continuous Filters, of which the following is a specification.

This improvement is designed for employment for the purpose of effecting the removal of the exhausted bone-black from the bottom of a filtering-chamber containing a column of bone-black through which the sugar-liquor to be purified is forced in an upward direction; and the invention consists in providing a rotating bottom for the filtering-chamber composed of a slightly-conical frame supporting a cutting-blade arranged in the form of a conical helix, having the convex edge of each convolution of the blade successively overlapping the concave edge of the next adjoining convolution, the spaces between the successive convolutions and the extent of overlapping being arranged with reference to preventing the superincumbent bone-black from falling through the spaces between the convolutions merely under the influence of its own gravity, so that there will be no fall of bone-black through the discharger into the receiving-chamber, excepting when the discharger is rotated for the purpose of effecting the discharge of a prescribed quantity of bone-black from the bottom of the column.

The accompanying drawings of a continuous filter containing the improvement are as follows: Figure 1 is a central longitudinal section. Fig. 2 is a horizontal section through the line xx on Fig. 1. Fig. 3 is a central vertical section taken through the line yy on Fig. 2, illustrating a modification of the arrangement of the cutting-blade, which consists in having each convolution of the blade canted inwardly and downwardly from its outer edge. Fig. 4 is a section similar to Fig. 3, showing the convolutions of the cutting-blade so arranged as to cant outwardly and downwardly from their inner edges. Fig. 5 is a central vertical section of the discharger modified by having the convolutions of its shearing-blade gradually descend from the circumference to the center.

In continuous filters for effecting the puri-

fication of sugar-liquor by the process of upward filtration through bone-black the bone-black at the bottom of the filtering-chamber requires to be gradually removed as it becomes charged with impurities and loses its decolorizing power, and a quantity of fresh bone-black equal to that removed is at the same time introduced into the top of the filtering-chamber.

The characteristic features of the continuous filtering apparatus illustrated in the drawings are, the filtering-chamber A, surmounting the receiving-chamber B; the well C, containing the chain-and-bucket elevator D, for effecting the removal of the exhausted bone-black from the receiving-chamber, and the service-pipe E, for supplying the sugar-liquor to be purified under sufficient head to enable it to make its way upward from the receiving-chamber through the column of bone-black in the filtering-chamber to the outlets A', through which it is discharged from the filtering-chamber. The column of bone-black F in the filtering-chamber is supported at the bottom upon the top of a helically-coiled cutting or shearing blade, G, which is mounted on the frame G', affixed to the vertical shaft G², to which power is applied for the purpose of rotating the discharger. Whenever the necessity arises for the removal of the exhausted bone-black from the bottom of the filtering-chamber, the discharger is rotated and a stratum of bone-black of uniform thickness is thereby sheared from the lower end of the column and forced through the spaces between the convolutions of the shearing-blade. When thus discharged, the exhausted bone-black falls down the inclined bottom of the receiving-chamber B to the lower end of the well C, and is caught and carried up by the buckets D' of the elevator and discharged upon the inclined chute D² at the top of the well. The buckets D' are perforated, or made of wire-gauze, in order that the sugar-liquor may to some extent drain out of them before they discharge their contents upon the chute.

The chain-and-bucket elevator and other contrivances which have been heretofore devised for removing the exhausted bone-black from the bottom of the receiving-chamber

without interrupting the continuity of the filtering operation do not constitute any part of the present invention, and are equivalent elements, either of which is a recognized appurtenance of a continuous filter. The shearing-blade may be arranged in the form of a spiral plane, gradually ascending from the circumference to the center of the filtering-chamber, as shown in Fig. 1, or descending from the circumference to the center, as shown in Fig. 5. The various convolutions H H, &c., of the shearing-blade may also be canted inwardly and downwardly, as shown in Fig. 3; or the shearing-blade may have its convolutions I I, &c., canted outwardly and downwardly, as shown in Fig. 4. If, however, the convolutions of the shearing-blade are canted in either direction, they must be so propor-

tioned and arranged as to more widely overlap each other than when arranged in the form of a spiral plane, as illustrated in Fig. 1.

What is claimed as the invention is—

In a continuous filter, a bone-black discharger consisting of a shearing-blade arranged in the form of a conical helix, the convolutions of which overlap and are separated from each other to a prescribed extent, a suitable frame for supporting the shearing-blade, and means for imparting rotary motion to the discharger upon its vertical axis, as and for the purpose set forth.

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