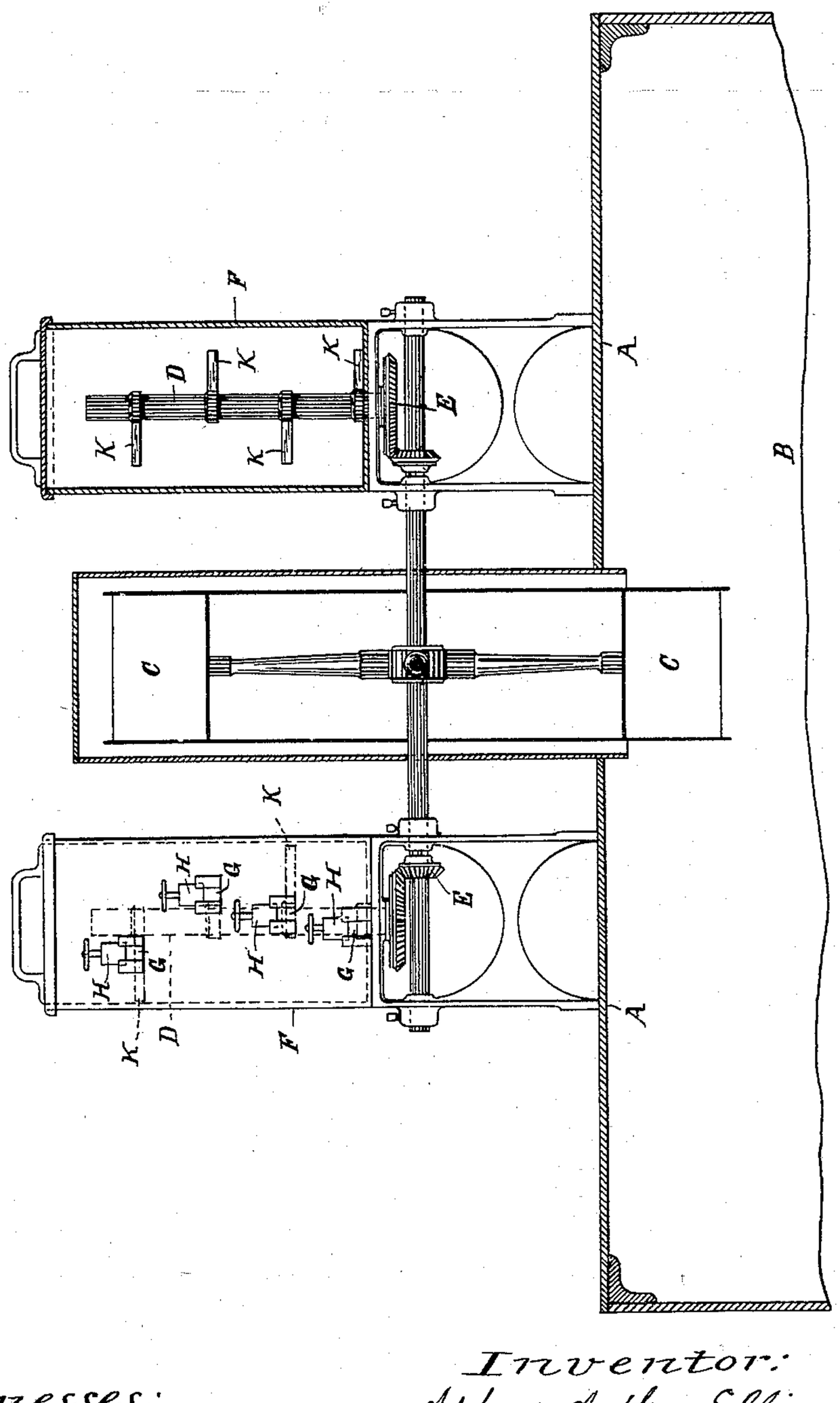
(No Model.)

A. A. ELLIS.

APPARATUS FOR PURIFYING WATER.

No. 604,491. Patented May 24, 1898.



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UNITED STATES PATENT OFFICE.

ALFRED ARTHUR ELLIS, OF LONDON, ENGLAND, ASSIGNOR TO THE MAIGNEN'S FILTRE-RAPIDE AND ANTI-CALCAIRE COMPANY, LIMITED, OF SAME PLACE.

APPARATUS FOR PURIFYING WATER.

SPECIFICATION forming part of Letters Patent No. 604,491, dated May 24, 1898.

Application filed December 21, 1897. Serial No. 662,868. (No model.) Patented in England March 4, 1897, No. 5,823.

To all whom it may concern:

Be it known that I, ALFRED ARTHUR ELLIS, residing at London, England, have invented an Improvement in Apparatus for the Treatment of Water or other Liquids, of which the following is a specification.

The invention has been patented in England, No. 5,823, March 4, 1897.

This invention relates to the treatment of water or other liquids by a uniform or proportional supply of fine powder, such as is the case in the softening of hard water; and it consists of improvements in apparatus applied to such purposes whereby a regular and controllable supply of a powdered substance can be automatically given to the water and liquid to be treated by the action of and in proportion to the amount of the said water or liquid.

Apparatus is already known whereby an overshot water-wheel or other water-motor may be utilized to discharge a fine powder into a receptacle of the water or liquid to be treated; but inasmuch as the charge or store of powder to be used for treatment (if only recharged at considerable intervals) varies much in amount and consequent density of packing during such intervals the resistance of discharge is not constant and the velocity of the water wheel or motor is apt to vary largely. It is to avoid this irregularity of feed that the present improved apparatus has been designed. The rotation of such a water-wheel or other water-motor is utilized to stir and eject a suitable amount of the desired powdered substance charged into one or more canisters or hoppers adjoining the said water wheel or motor and fitted with stirring-blades operated by the said water wheel or motor and ejecting the powder from suitable orifices in the said canisters or hoppers, which orifices are also controlled and regulated as to size by adjustable doors or shutters.

When one orifice of ejection is used alone, it is obvious that as the level of the powder in its hopper or canister falls the resistance to the stirring and ejecting blades decreases and the velocity of the water-wheel will increase with less water passing thereover, and the ratio of the supply of powder to that of the liquid passing will also increase unless constantly controlled and readjusted by an attendant. To avoid this constant attention in this improved apparatus, a series of ejecting-orifices are provided at various levels in the said canisters or hoppers, each with its appropriate stirring and ejecting blades. When then the hopper or canister is full and the speed of the water-motor is at its lowest, owing to maximum resistance, the delivery of the powder takes place simultaneously from many orifices at different heights. As the level of the powder falls through use and the resistance to the water-motor is thereby decreased and the speed of rotation increased the ejection of the powder from one or more of the upper orifices ceases, owing to the fall of the level of the powder below such orifices. By a proper adjustment of the sizes of such ejecting-orifices the amount of powder actually ejected may be made to be exactly and automatically proportioned to the quantity of water passing over the water-wheel without further attention until the powder is exhausted.

Where two or more canisters are employed, various powders of different chemical properties may be used, one in either canister, and their respective feeds of such powders may be adjusted independently of one another as may be desired, and in order that this invention may be the better understood I will now proceed to describe the same with reference to the drawing hereto annexed, and to the letters marked thereon.

The drawing shows a part-sectional elevation through an overshot water-wheel operating two feed-canisters, one in section and the other in outside elevation.

The apparatus is mounted on a bridge A of a tank B or other receptacle for the water or liquid to be treated.

A constant supply of water or liquid is admitted over the overshot water-wheel C, which, being a known mechanism for a similar purpose, is not more particularly described.

The wheel C, being caused to rotate by the passing of the water or liquid thereover, delivers the said water or liquid to the tank or

receptacle B and at the same time operates the vertical ejector-spindles D D within the canisters F F by the bevel cog-wheels E E.

The canisters F F are supplied with the fine powder or various powders, one in each canister, with which it is desired to treat the water or liquid.

Various orifices G G, with finely-adjustable shutter-doors H H, are provided at different heights in the sides of the canisters, and the vertical ejector-spindles D D are provided with an ejector arm or arms K K at the level of each orifice.

When the canisters are full of powder and the resistance to the rotation of the water-wheel C is great, so that a considerable body of water or liquid is passing over it at a slow speed, all or any number of the orifices G may be opened to any required extent, so that a considerable ejection of the powder proportionate to the quantity of water or liquid passing is ejected. As the level of the powder in the canisters F falls and the resistance to the rotation of the wheel or water-motor C diminishes in the same proportion, the number of orifices effective for the delivery of the powder also diminishes by the fall of the level of the powder, and the feed of powder can be thus maintained in proper ratio to the quantity of liquid or water passing over the wheel.

Having now described and ascertained the nature of the invention, I declare that what I claim, and desire to secure by Letters Patent, is—

1. An automatic apparatus for the treatment of water or other liquids with powdered material, comprising the powder-supply canisters having orifices of ejection at various levels with means for the adjustment of the size of the orifices, means for the ejection of powder therefrom and operating means consisting of a water wheel or motor to automatically proportion the feed of powder to the quantity of water or liquid passing over or through the said operative water wheel or motor.

2. In automatic apparatus for the treatment of water or other liquids with powdered material the combination with a water wheel or motor of a canister or canisters adapted to contain a store of powdered material, rotating spindles and ejecting-arms fitted therein operated by the said water wheel or motor, orifices at various levels in the sides of said canisters, and screw-regulated shutter-doors adapted to said orifices substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED ARTHUR ELLIS.

Witnesses:

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