No. 790,346. PATENTED MAY 23, 1905.

F. W. COWERN.

FEED WATER PURIFIER.

APPLICATION FILED MAY 26, 1904.

FIG. 1

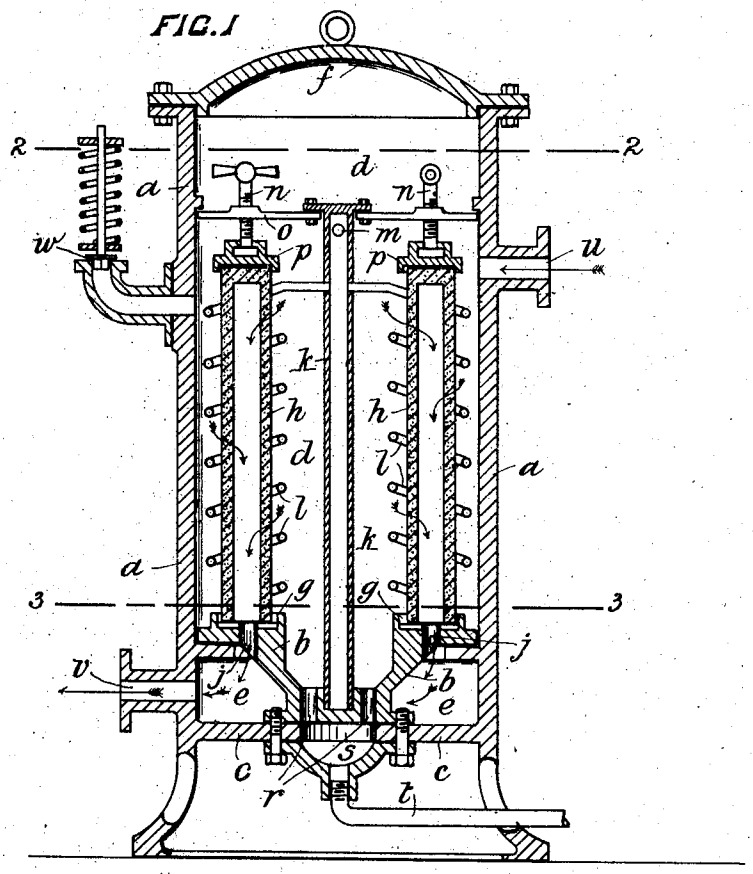


FIG. 2

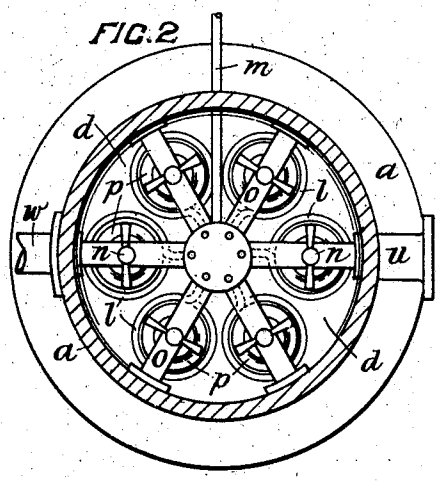
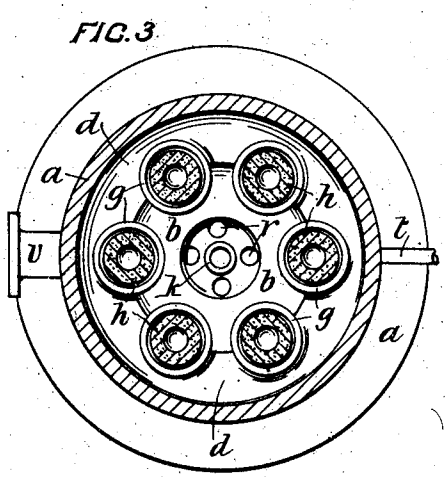


FIG. 3



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM COWERN, OF WELLINGTON, NEW ZEALAND, ASSIGNOR TO WILLIAM COWERN, OF HAWERA, TARANAKI, NEW ZEALAND.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 790,346, dated May 23, 1905.

Application filed May 26, 1904. Serial No. 209,948.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM COWERN, a subject of the King of Great Britain, residing at Wellington, in the Colony of New Zealand, have invented a new and useful Improved Feed-Water Purifier; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates specially to means for purifying or filtering the feed-water of steam-boilers. The appliances used may, however, be employed for filtering other water or liquids.

The means devised for carrying out the purpose of the invention consist of a metal cylinder or casing that is divided into two chambers by means of a false bottom extending across the casing a suitable distance from the lower end thereof. In the upper chamber are mounted a number of vertical hollow cylinders made of porous stone. The top ends of these stone cylinders are closed, while their bottom ends are in communication with the lower chamber of the casing.

The appliance in use is placed between the pump and the boiler, and the water is led into the top chamber and filters through the sides of the stone cylinders down into the lower chamber, from whence it travels to the boiler.

Means are provided whereby the outsides of the porous cylinders may be kept clean and whereby the dirt and other matters collecting in the top chamber may be cleared out at desired intervals.

In order, however, that the invention may be properly understood, reference will be made to the accompanying sheet of drawings, in which—

Figure 1 is a vertical section of the purifier. Fig. 2 is a sectional plan taken on the line 2 2 of Fig. 1, and Fig. 3 is a sectional plan taken on the line 3 3 of Fig. 1.

a is the metal casing, which may be of any desired cross-sectional shape, but is preferably made cylindrical. Near the bottom of the casing is secured a false bottom *b*, the center of which dips downward and rests upon the true bottom *c* of the casing. The casing is thus divided into an upper chamber *d* and a lower chamber *e* by means of the false bottom. The top end of the casing *a* is covered by a dome or other cover *f*.

The false bottom *b* is formed with a number of platforms or rests *g*, on each of which stands a vertical cylinder of porous stone *h*. These cylinders (of which six are shown in the drawings) are made hollow and have their top ends closed, while their bottom ends are open and rest above openings *j*, formed in the false bottom *b* and extending into the lower chamber *e*. The insides of the porous cylinders are thus in communication with the lower chamber *e*.

Mounted centrally within the upper chamber *d* is a hollow column *k*, and from this column lead a number of steam-pipes *l*, which are coiled around the outside of each of the porous cylinders *h*, as shown in the drawings. A steam-pipe *m* leads from any convenient source to the top end of the column *k*. The pipe-coils *l* are provided with perforations in the faces adjacent to the cylinders *h*.

The cylinders *h* are kept in position by means of set-screws *n*, which pass through arms *o*, radiating from the top of the column *k*. The bottom ends of the set-screws are provided with caps *p*, which fit over the tops of the cylinders *h* when the screws are turned down, and thus force the cylinders tightly onto their respective platforms and keep them securely in position.

The central portion of the false bottom *b* is formed with a number of openings *r*, which pass through into a sludge-chamber *s*, secured beneath the bottom *c* of the casing. From this chamber a blow-off pipe *t* leads to any desired point.

In operation the water to be treated is led under pressure into the top chamber *d* through the opening *u*. The pressure then forces the water through the sides of the porous cylinders *h* into the centers thereof. During its passage through the stone the impurities contained in the water will be caught and prevented from passing into the center. From the cylinders the water will be led into the

lower chamber *e*, from which it will emerge through the outlet *v* to the boiler.

w is a safety-valve by means of which any excess of water may be allowed to flow from the upper chamber *d*.

To clean the filter-cylinders, steam or hot water will be introduced through the pipe *m* into the column *k*, from whence it will flow through the coils *l* and be sprayed upon the outside faces of the cylinders. The dirt and sludge thus formed will gravitate into the sludge-chamber *s* through the openings *r* and will be blown off out through the pipe *t*.

When it is desired to remove any of the cylinders *h* for the purpose of being replaced by a new one or for other causes, the set-screw *n* is unscrewed, so as to raise the cap *p*, and the arm *o* is swung to one side, when the cylinder may be lifted out through the top of the casing *a*, which has previously been uncovered. A new cylinder may then be introduced and secured in position and the cover replaced, the whole of the operations taking a minimum of time and not interfering for any appreciable period with the supply of water to the boiler.

The stone employed in the manufacture of the cylinders may be of any suitable constituency that will allow of the water when submitted to pressure passing freely through. A stone especially adapted for this purpose and demonstrated by actual experiments is a stone found in large quantities in the Colony of New Zealand and known as "Oamaru" stone, "Mount Somers" stone, and other local appellations. The principal constituent of this stone is carbonate of lime, the percentage of which varies from seventy to ninety-six per cent. Other stones of like properties may be employed with equal effectiveness.

The number of cylinders *h* employed may be varied at will, and instead of being formed of cylindrical shape the filters may be of any other approved shape in cross-section.

If desired, two or more of the appliances herein described may be coupled together for treating large quantities of water, in which case the operation of filtering may be proceeded with continuously, each separate casing being cut out for the purpose of cleaning.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In feed-water purifiers, a metal casing divided by means of a false bottom into two compartments, hollow cylinders of porous stone mounted vertically upon the false bottom and communicating with the compartment beneath, a central column secured within the upper chamber, movable arms radiating from the top of the column, set-screws passing through the arms, and caps upon the bottom ends of the set-screws adapted to fit upon the ends of the porous cylinders, substantially as specified.

2. In feed-water purifiers, a metal casing divided by means of a false bottom into two compartments, hollow cylinders of porous stone mounted vertically upon the false bottom and communicating with the compartment beneath, a stationary hollow central column secured within the upper compartment, a steam-pipe leading to the center of the column and perforated pipe-coils surrounding each porous cylinder, and connected to the hollow column, substantially as set forth.

3. In feed-water purifiers, a filtering-chamber, cylinders of porous material mounted therein and means whereby such cylinders may be kept in position consisting of a central column, movable arms radiating therefrom, set-screws passing through the arms and caps on the bottom ends of the set-screws adapted to fit upon the cylinders, substantially as specified.

4. In feed-water purifiers, a filtering-chamber, cylinders of porous material mounted therein and means whereby such cylinders may be cleaned consisting of a perforated pipe-coil surrounding each cylinder and in communication with a central non-rotatable pipe to which steam or hot water may be led, substantially as specified.

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

FREDERICK WILLIAM COWERN.

Witnesses:
G. T. WIX,
W. ALEXANDER.