

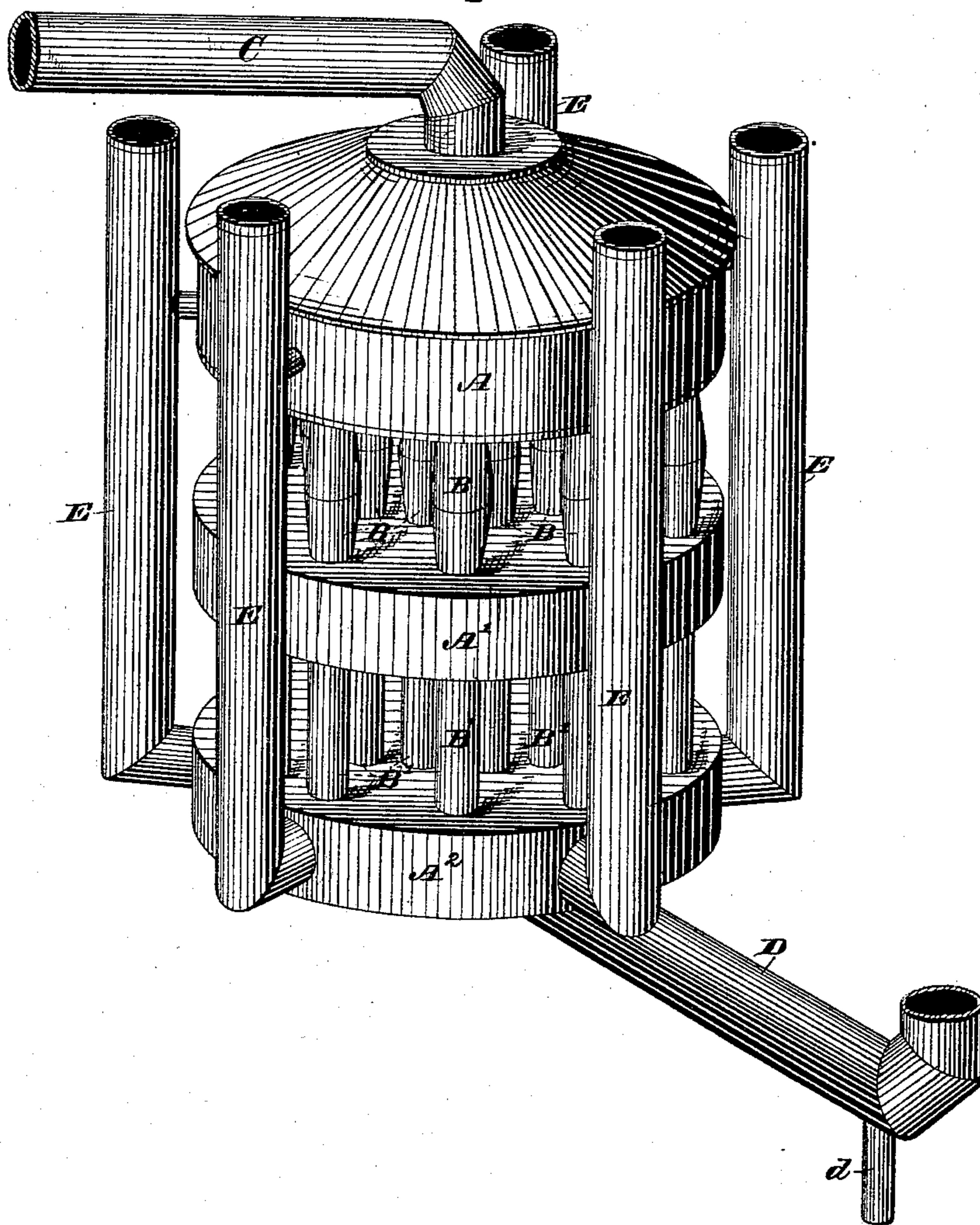
W. McINTYRE.
Condenser.

2 Sheets—Sheet 1.

No. 221,840.

Patented Nov. 18, 1879.

Fig. 1.



WITNESSES:
Jas. E. Hutchinson.
Henry C. Hazard.

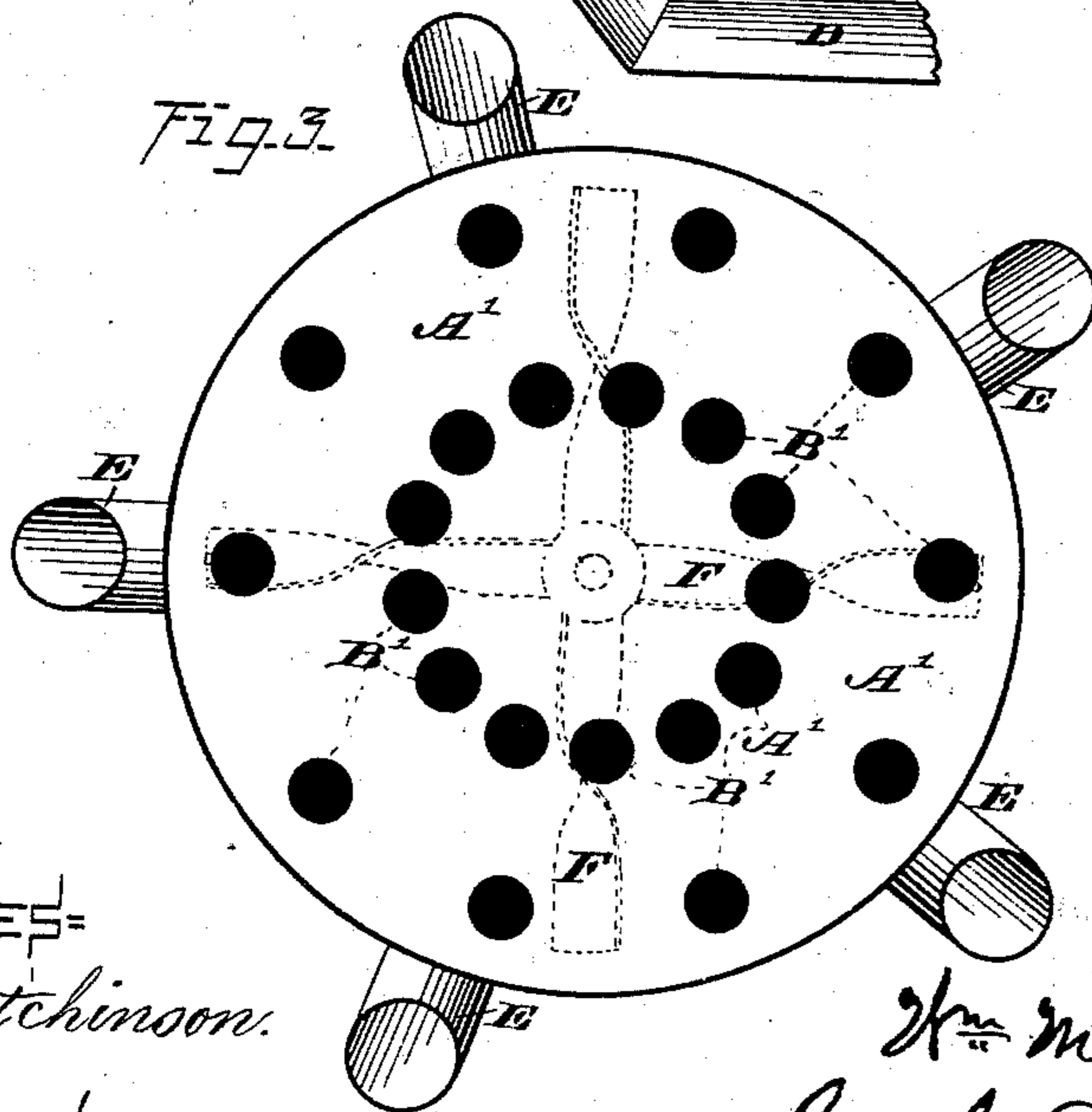
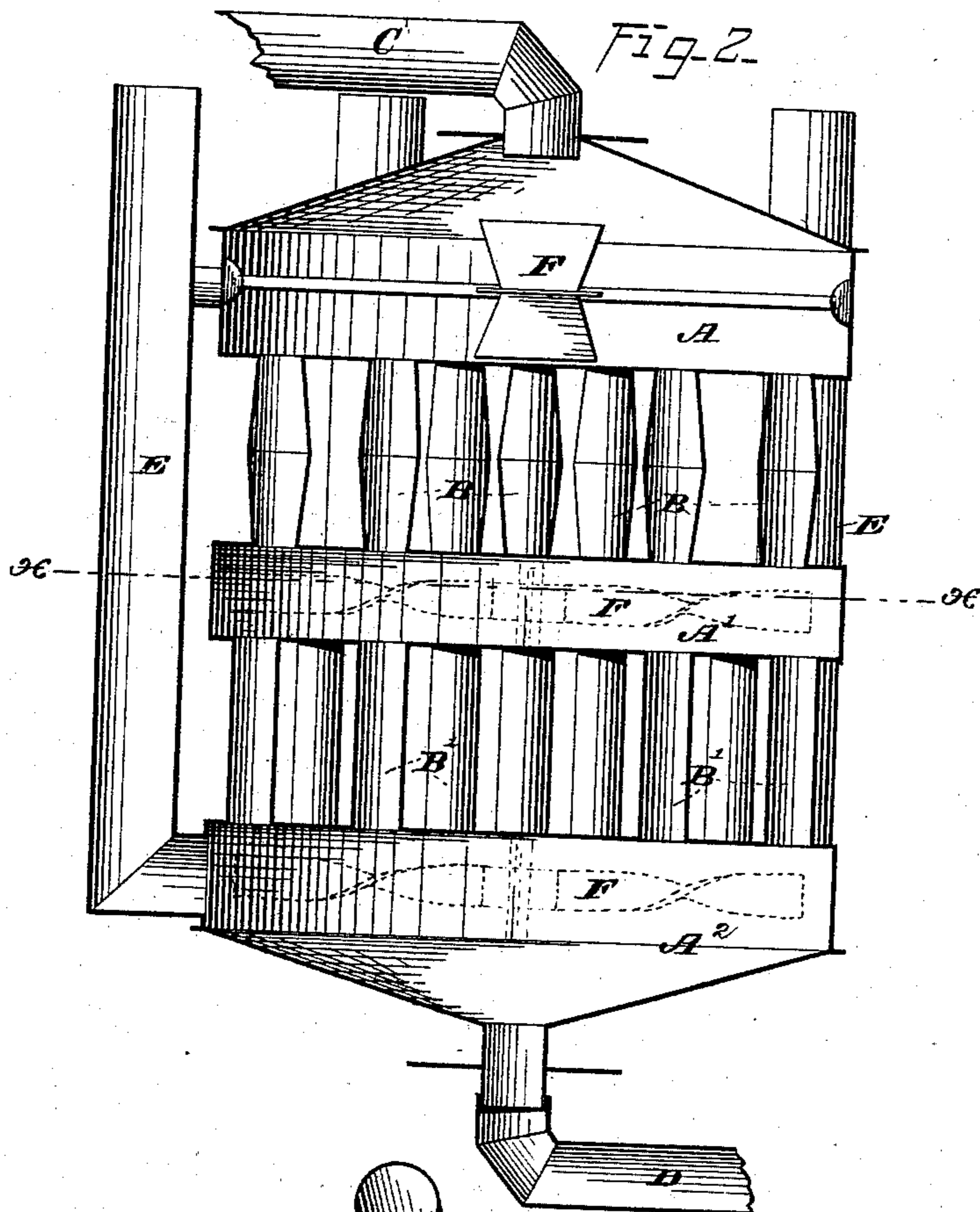
INVENTOR.
Wm. McIntyre, by
Geo. S. Prindle, his Att'y

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UNITED STATES PATENT OFFICE.

WILLIAM MCINTYRE, OF CARROLLTON, MISSOURI.

IMPROVEMENT IN CONDENSERS.

Specification forming part of Letters Patent No. **221,840**, dated November 18, 1879; application filed October 3, 1879.

To all whom it may concern:

Be it known that I, WILLIAM MCINTYRE, of Carrollton, in the county of Carroll, and in the State of Missouri, have invented certain new and useful Improvements in Condensers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my improved device as arranged for use. Fig. 2 is a vertical central section of the same, and Fig. 3 is a horizontal section upon line *x x* of Fig. 2.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable water used for the production of steam to be condensed and used again, so as to effect a saving in fuel, to secure pure water that will not incrust a steam-generator, and to render practicable the employment of any desired steam mechanism in places where the supply of water is limited, to which end it consists, principally, in a condenser composed of a series of chambers connected with each other by means of a series of pipes, and each chamber provided with a fan, which is rotated by the passage of steam to be condensed, substantially as and for the purpose hereinafter specified.

It consists, further, in a condenser composed of a series of connected chambers, the lower one of which is provided with pipes for the escape of air and means whereby the water of condensation can pass to a tank or receiver, substantially as and for the purpose hereinafter shown.

It consists, further, in a condenser provided with vertical pipes or tubes for the passage of steam to be condensed, which tubes have an increased diameter between their ends, substantially as and for the purpose hereinafter set forth.

It consists, finally, in the device as a whole, its several parts being combined to operate in the manner and for the purpose substantially as hereinafter shown and described.

In the annexed drawings, A, A', and A² rep-

resent three cylindrical casings, constructed, preferably, from sheet metal, and connected together, so as to have the same axis, by means of two series of pipes, B and B', that extend between their contiguous heads and furnish communication between their interiors.

The upper head of the upper casing, A, is preferably made conical, and from its center a pipe, C, extends to and communicates with a steam-supply, the exhaust-pipe of a steam-engine, a boiler, &c., while from the similarly-formed bottom head of the lower casing, A², a pipe, D, extends downward, horizontally outward, and thence upward, and operates as an escape for waste-steam. From the horizontal portion of said pipe D a pipe, *d*, extends downward to and is connected with a suitable receptacle, and furnishes means whereby the water of condensation may pass from the condenser.

From suitable points around the periphery of the lower casing, A², pipes E extend outward and upward, and furnish means whereby air may escape from the interior of the device.

Within each casing A, A', and A² is provided one or more fans, F, which may have either vertical or horizontal axes, as preferred, and are caused to revolve by the downward flow of steam.

The device is now complete, and operates as follows, viz: Steam from the pipe C enters the upper chamber, A, and by means of the fan F is distributed through the interior of the same, and from thence passes through the pipes B, casing A', and pipes B' into the lower casing, A², having during such passage been cooled by contact with the inner faces of said chambers and pipes, the exteriors of which are in contact with the external air until, upon reaching said lower casing, said steam is nearly or quite converted into water, which passes through the pipes D and *d* into the receptacle provided therefor. Such air as is carried into the condenser with the steam escapes into and through the pipes E, while any surplus or waste steam escapes through the pipe D.

It is found that under ordinary circumstances so large a percentage of the steam is condensed by this apparatus as to render the waste or loss of water very small, so that when the condenser

is used it is practicable to employ steam mechanism of any capacity in places where the supply of water is very limited.

In addition to the advantage named, the use of my condenser enables water perfectly free from sediment or impurities to be returned to the generator, which water has a temperature but slightly below the boiling-point, the result being an entire absence of calcareous deposit within said steam-generator and a material saving in the quantity of fuel required for operating the same.

The enlarged central portions of the connecting-pipes B enable them to withstand a greater pressure than would otherwise be practicable, while from such increase in diameter a larger surface is exposed to the air, and the condensation of steam within said pipes is more rapid.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A condenser composed of a series of chambers connected with each other by means of a series of pipes, and each chamber provided with a fan, which is rotated by the passage of steam to be condensed, substantially as and for the purpose specified.

2. A condenser composed of a series of connected chambers, the lower one of which is provided with pipes for the escape of air, and means whereby the water of condensation can pass to a tank or receiver, substantially as and for the purpose shown.

3. A condenser provided with vertical pipes or tubes for the passage of steam to be condensed, which tubes have an increased diameter between their ends, substantially as and for the purpose set forth.

4. The hereinbefore-described condenser, consisting of the casings A, A', and A², each provided with one or more fans, F, the connecting-pipes B and B', the inlet-pipe C, the outlet-pipe D *d*, and the air-pipes E, all combined to operate substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of September, 1879.

WILLIAM MCINTYRE.

Witnesses:

W. Z. DAW,

WILLIAM H. WINFREY.