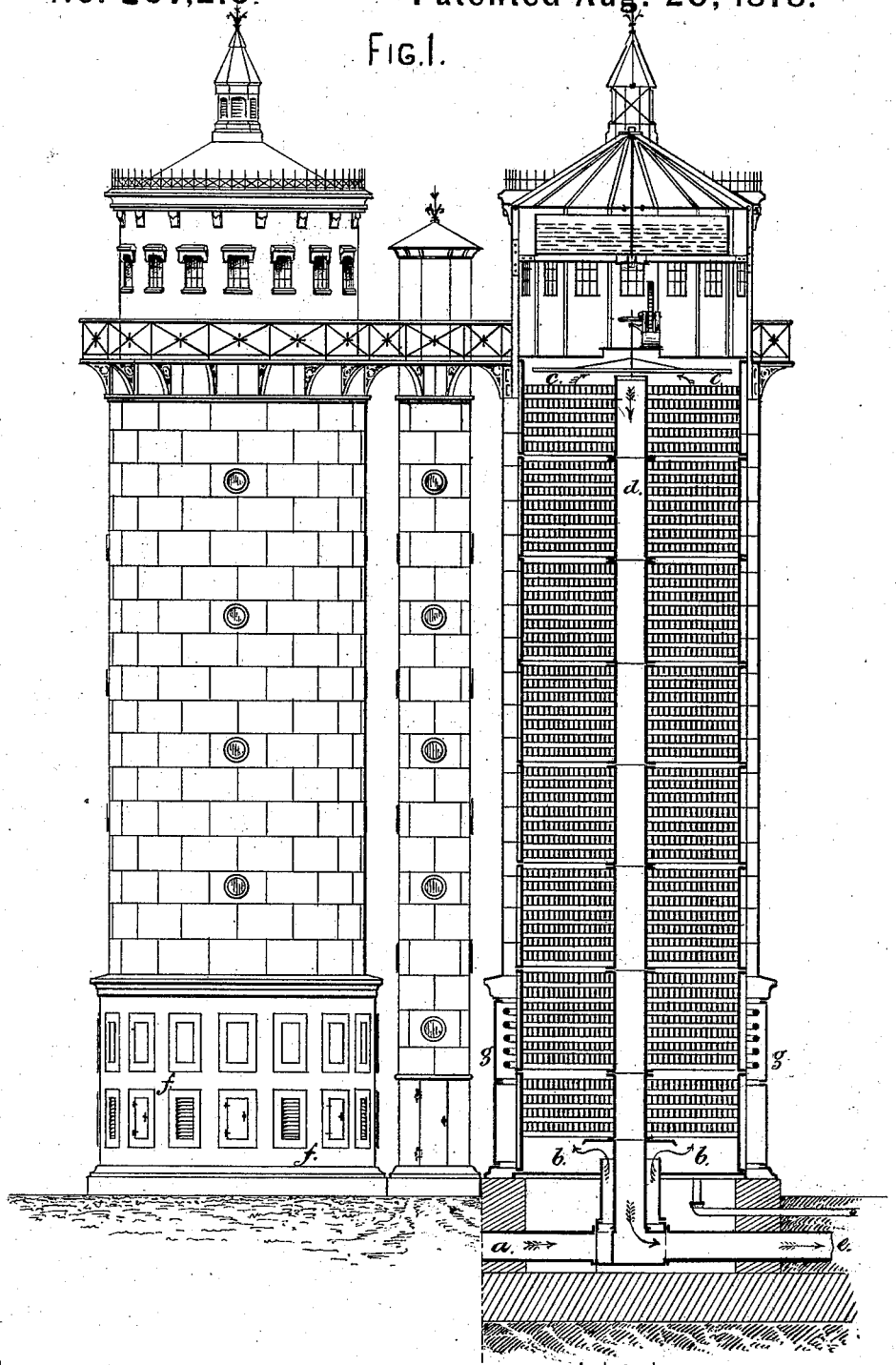
4 Sheets—Sheet 1.

C. V. SMITH & W. FARMER.

Gas-Scrubber.

No. 207,216. Patented Aug. 20, 1878.

FIG. 1.



WITNESSES

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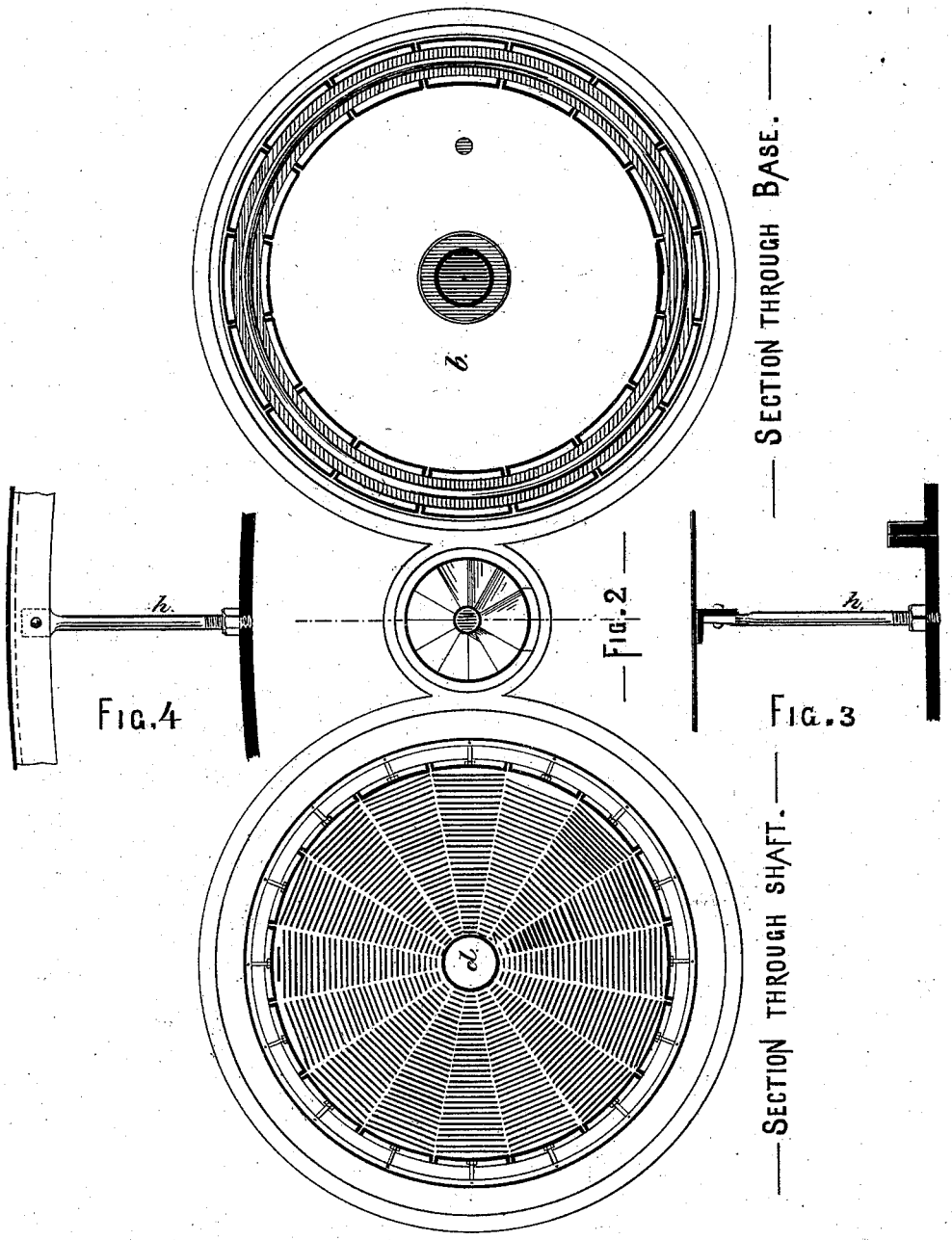

FIG. 4

FIG. 3

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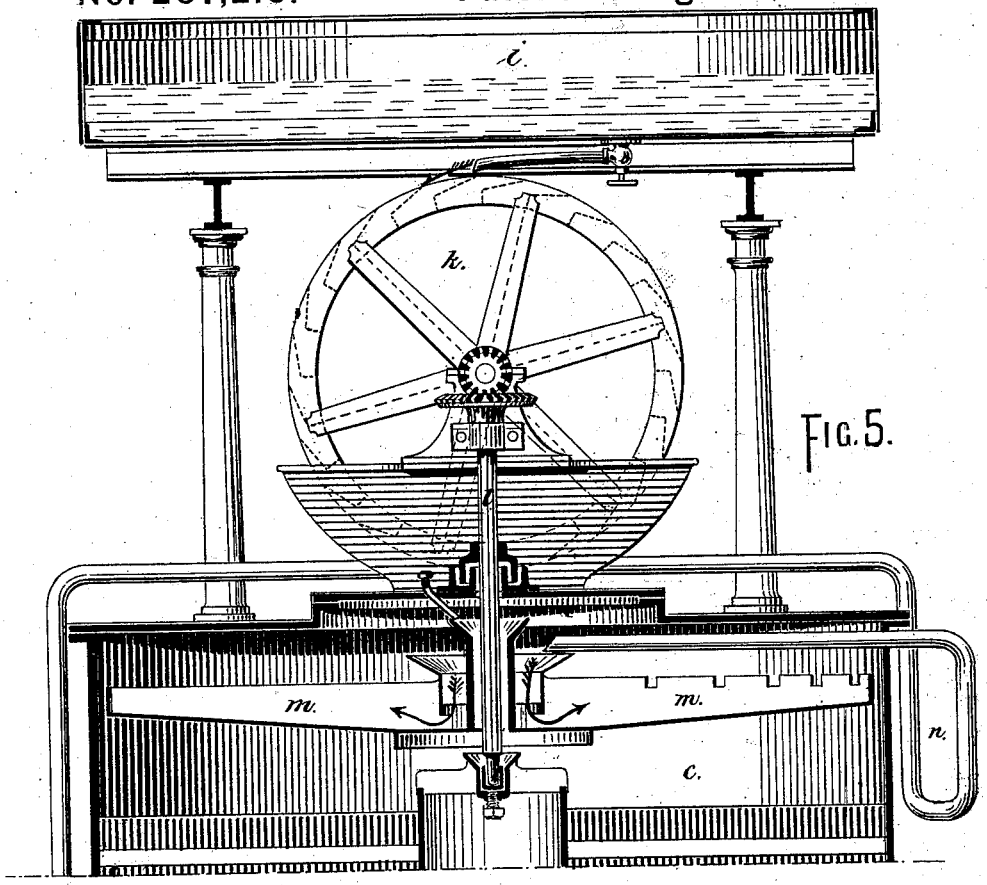

FIG. 5.

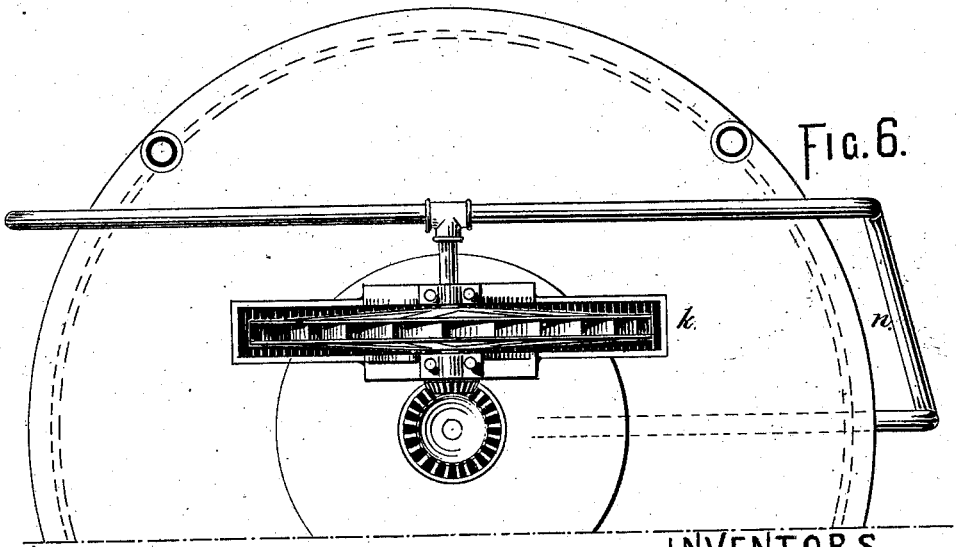

FIG. 6.

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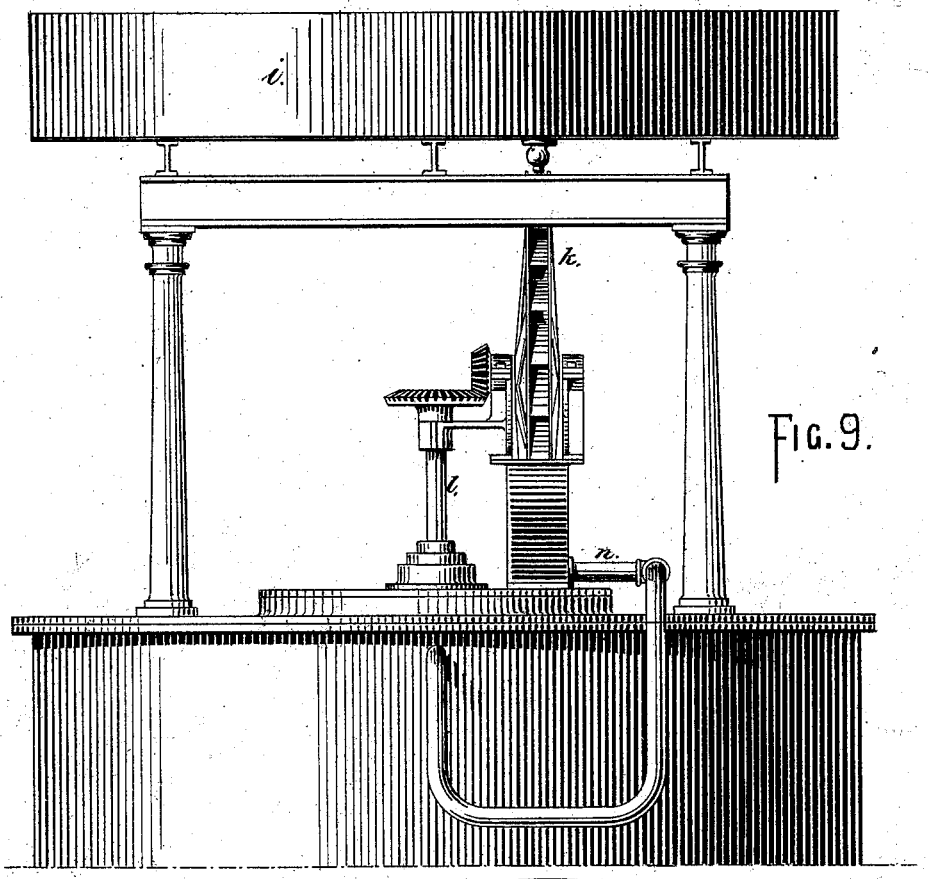

FIG. 9.

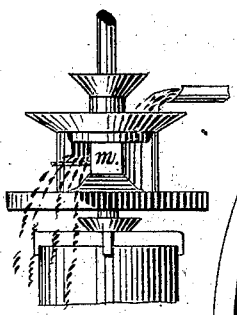

FIG. 8.

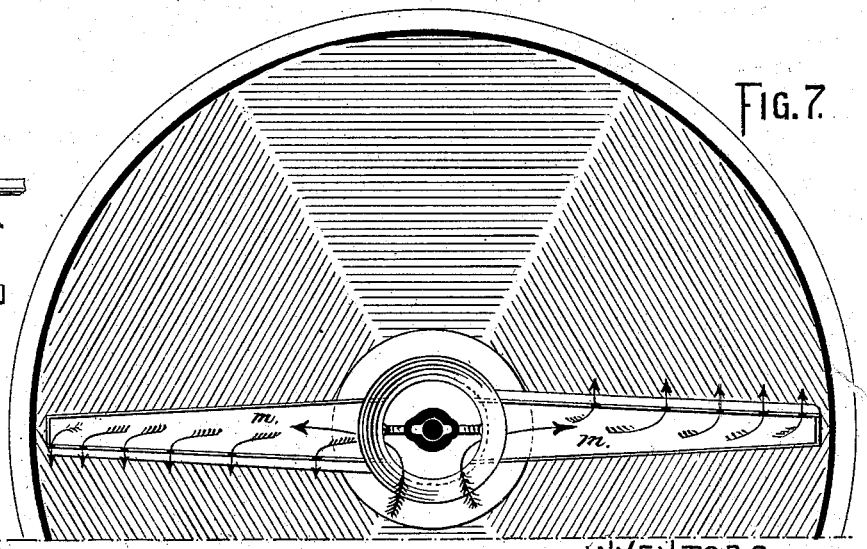

FIG. 7.

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UNITED STATES PATENT OFFICE.

CHARLES V. SMITH AND WILLIAM FARMER, OF NEW YORK, N. Y.

IMPROVEMENT IN GAS-SCRUBBERS.

Specification forming part of Letters Patent No. **207,216**, dated August 20, 1878; application filed December 12, 1877.

To all whom it may concern:

Be it known that we, CHARLES V. SMITH and WILLIAM FARMER, of New York, in the county and State of New York, have invented a certain new and useful Improvement in Gas-Scrubbers, of which the following is a specification:

The said improvement relates to that portion of the apparatus for making illuminating-gas in which the gas traverses a series of wet surfaces for the purpose of purification. The external walls are made hollow, to enable the interior to be kept cool in summer and warm in winter, and the distribution of the water is effected by a rotary machine that is worked by the weight of the small quantity of water that is required for the economical reduction of the ammonia.

Figure 1 is an elevation of a pair of iron towers, used as scrubbers, and built together with a circular stairway between them, by which access is gained to the rooms above the scrubbing-spaces. One of the towers is represented in section.

Fig. 2 is a horizontal section taken on one side through the shaft and on the other through the base of the tower. The gas enters through the pipe *a* to the tower at *b*, passes up among the wet slats and lattice-work to the space *c*, under the floor of the water-chamber at the top of each tower, and then passes down through the central pipe, *d*, to the outlet-pipe *e*. The slotted ventilating openings or louvers *f* in the base admit air in the summer-time, which traverses the space between the outer and the inner walls of the towers, and escapes by similar adjustable openings at the top or in the roofs. The height of the towers insures a rapid circulation of the air, which will prevent the temperature of the interior rising above that at which the ammonia continues to be absorbed from the gas by the water. On the other hand, the coils of steam-pipes *g* are provided for use in the winter, by which the casing may be heated and the interior of the scrubber protected from the prejudicial effects of cold.

Figs. 3 and 4 are respectively vertical and horizontal sections, on an enlarged scale, of the double walls, showing the method of securing the braces *h*, which are tapped into the inner cast-iron wall, with the joint made tight by a jam-nut, and which are rivet to an angle iron on the outer sheet-iron casing.

Fig. 5 is a vertical section of the water-distributer placed at the top of each tower for the purpose of uniformly diffusing or distributing the water over the entire circular area of the tower. The quantity of water required to effect the purpose intended is too small to be diffused by its own force as a spray over so large a surface, or to work a reaction-wheel or revolving arms; and if more water be used the reduction of the ammonia from the liquor will be made proportionately costly.

In this machine the rotary motion to distribute the water is derived from the weight of the small quantity of water required by means of an overshot or breast wheel.

Fig. 6 is a plan of the distributer, all the working parts of which should be made as light as possible. The flow of water from the tank *i* is regulated by a valve and falls upon the wheel *k*, and rotates, by means of bevel-gearing, the shaft *l*, that carries the arms *m* inside the gas-chamber *c*. Where the shaft *l* passes through the floor the joint requires a mercury or other seal.

After the falling water has turned the wheel it passes through the pipe *n* to the interior of the tower, and runs into the cone on the shaft *l*, that carries the arms *m*, by which it is distributed as they revolve, the openings in the arms for the escape of the water being graduated to deliver a larger portion at the ends in proportion to the areas of the enlarged circles to be supplied.

Figs. 7 and 8 are respectively a plan and an end view of the distributing-arms *m*, showing more particularly the arrangement of the openings when two arms are used, and the lips from which the water falls.

Fig. 9 is an external elevation of the apparatus. The water-pipe *n* is bent down to form a seal to prevent the escape of gas.

The details of the improvements herein described may be varied; but we prefer the arrangement illustrated in the drawings; and also, in addition, a regulator may be attached to the tank *i* to determine the amount of water delivered upon the water-wheel *k*, and its consequent speed; and the surplus water, if more

be required for the purification of the gas, may be delivered directly into the tank that supplies the water to the pipe *n*.

We are aware that water has been hitherto distributed in a scrubber by means of rotating arms, and that the arms have been caused to revolve by means of the reaction of the water issuing from holes in the arms or striking against the curved blades of a wheel; but our invention, in this respect, consists in providing the arms with a series of graduated openings or slots, through which the water will be delivered in increasing proportion from the center upon the lip below them, the force required for the rotation being derived from the direct action of the weight of the small quantity of water in the buckets of an overshot wheel.

We claim as our invention—

1. The gas scrubber or purifier made with double walls and provided with the ventilators *f* and the heating-coils *g*, substantially as described.

2. In a gas-scrubber, the water-distributer composed of the arms *m*, provided with graduated openings and the lip to deliver the water in the manner described, in combination with the water-wheel *k*, by which it is operated, substantially as described.

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WM. FARMER.

Witnesses:
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WM. KEMBLE HALL.