

(No Model.)

2 Sheets—Sheet 1.

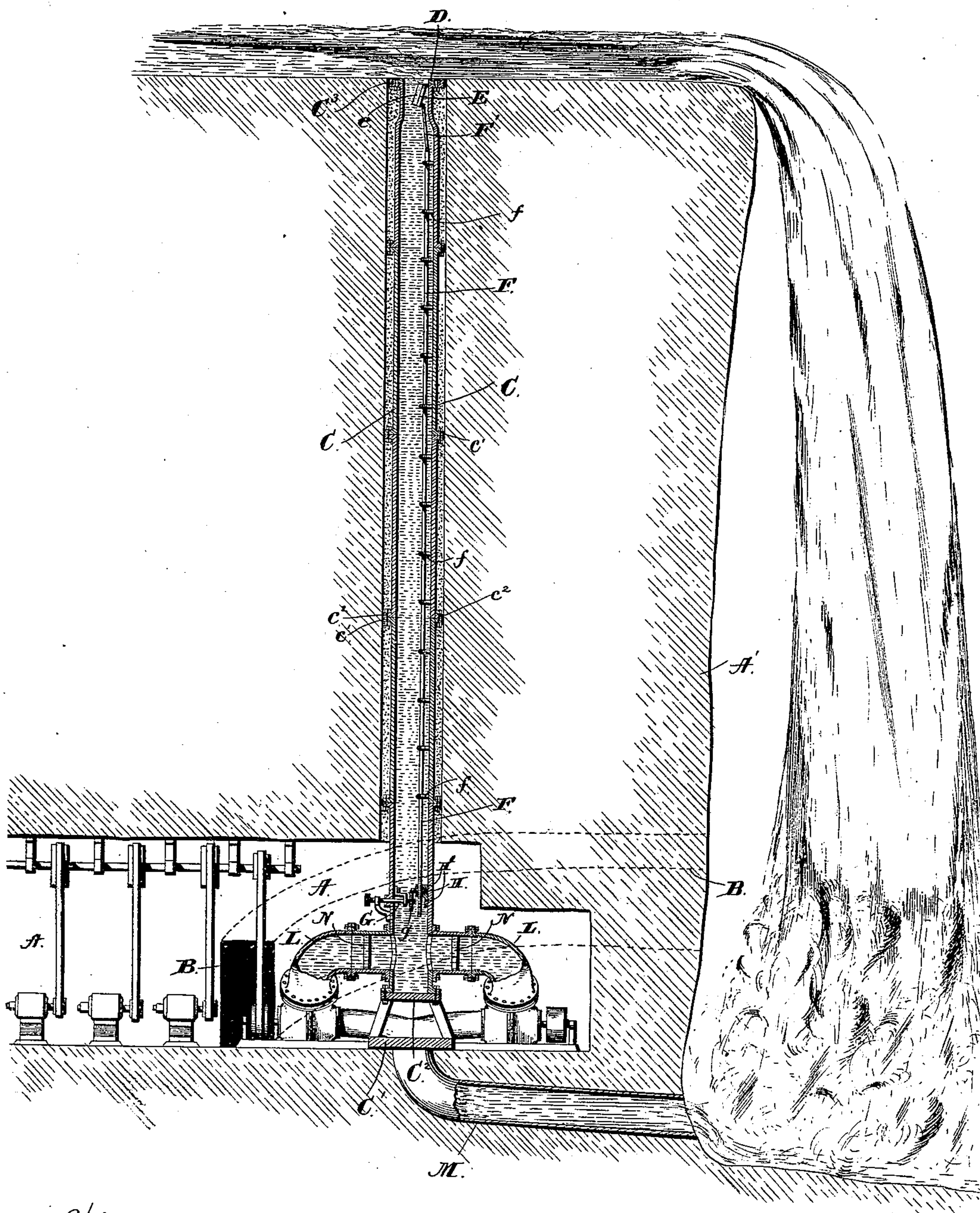
S. H. HAMILTON.

METHOD OF AND APPARATUS FOR UTILIZING WATER POWER.

No. 431,540.

Patented July 1, 1890.

Fig. 1.



Witnesses:

Jas. E. Hutchinson
Henry C. Hazard

Inventor.
Silas H. Hamilton
by Prindle & Russell
his attorneys

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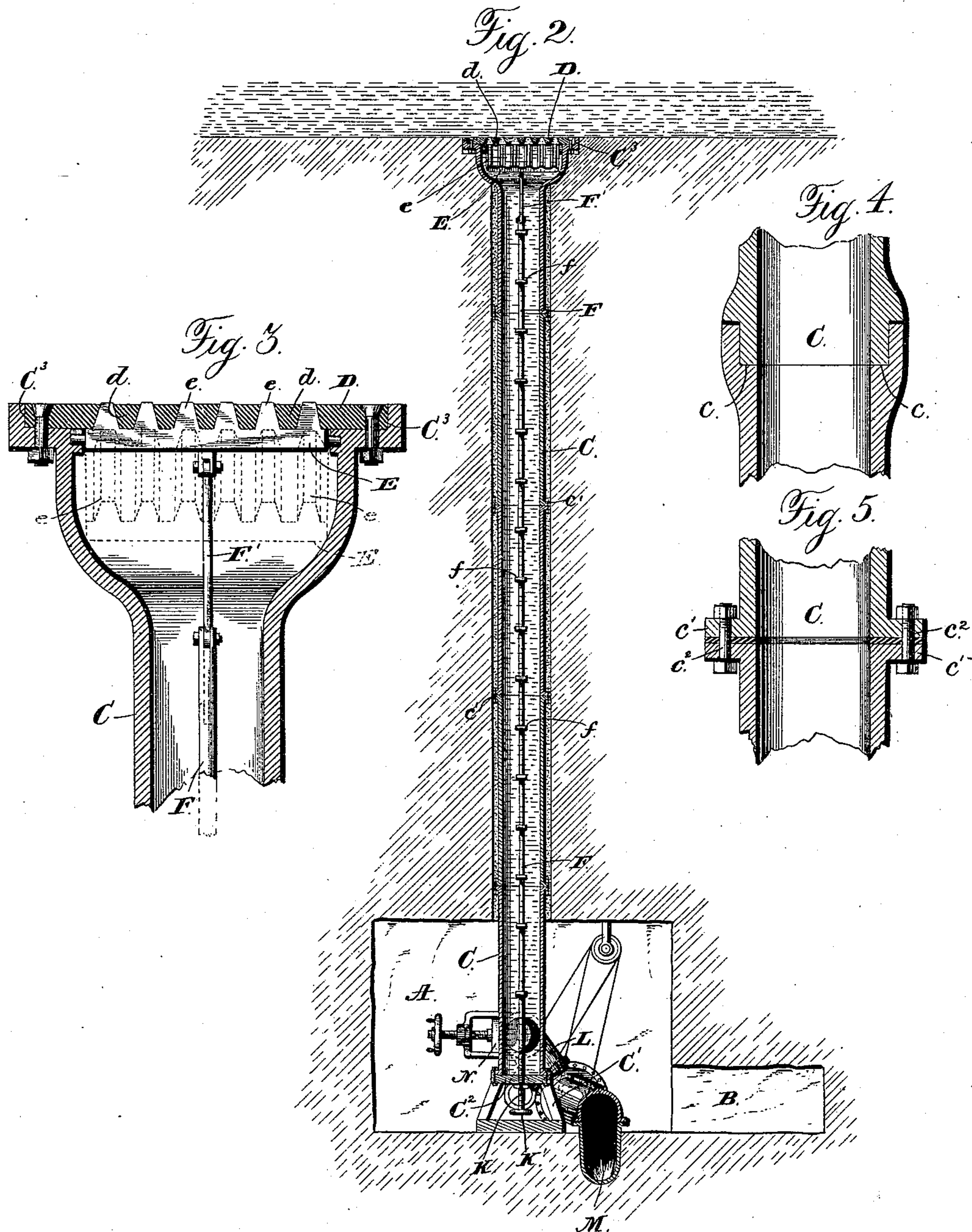
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UNITED STATES PATENT OFFICE.

SILAS H. HAMILTON, OF NEW YORK, N. Y.; MAMIAN HAMILTON EXECUTRIX
OF SAID SILAS H. HAMILTON, DECEASED.

METHOD OF AND APPARATUS FOR UTILIZING WATER-POWER.

SPECIFICATION forming part of Letters Patent No. 431,540, dated July 1, 1890.

Application filed September 16, 1889. Serial No. 323,994. (No model.)

To all whom it may concern:

Be it known that I, SILAS H. HAMILTON, of New York, in the county of New York, and in the State of New York, have invented certain
5 new and useful Improvements in the Method of and Apparatus for Utilizing Water-Power; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying draw-
10 ings, in which—

Figure 1 shows a view of my apparatus in vertical section; Fig. 2, a similar view, with the plane of vertical section at right angles to the section plane of Fig. 1; Fig. 3, a detail en-
15 larged view, partly in elevation and partly in section, of the grating at the top of the water-conduit and the valve for closing and clearing the same; Fig. 4, a detail sectional view showing one way of connecting the pipe-sections together, and Fig. 5 a similar view show-
20 ing another form of pipe-section connection.

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

The object of my invention is to provide a
25 method of and apparatus for utilizing a portion of a river or other body of water to drive machinery and furnish power for various purposes without disfiguring the river or body of water or detracting from the beauty of the
30 scenery.

My method and apparatus, as hereinafter described and illustrated in the drawings, are especially intended for use where there is a fall of water, as is the case with Niagara Falls,
35 for instance, which it is not desirable or permissible to disfigure by buildings or water-driven machinery in the view of, or capable of being seen by, those looking at the falls.

In putting my invention into practice I ex-
40 cavate a chamber A below the bed of the river and at some distance back of the breast A' of the falls. This chamber, which is to receive and contain the wheels or other motors to be driven by the water, and also one or more
45 dynamos or other machines for utilizing the power derived from the water through the wheels or motors, is accessible from above or from one side of the falls through a suitable tunnel or passage B, through which can also
50 be carried out the conductors for the electricity derived from the dynamos in the cham-

ber A or suitable conduits or conveyers for compressed air or other means of transmitting power connected with other forms of machine than a dynamo.

From the top or surface of the bed of the river or other body of water, at a point back of the edge of the breast of the falls, I drill or otherwise cut or excavate a passage leading
55 down to the chamber A. Where this passage 60 is through the solid rock, in some cases no lining or pipe need be used; but I prefer to employ a pipe or tubular conduit C within said passage.

This pipe, which is preferably round in
65 cross-section, but can be of any other desired shape without departure from my invention, is preferably put in place in short sections, bolted or otherwise fastened together, as de-
70 sired. As shown in Fig. 4, one of the pipe-sections can have its lower end adapted to fit into a rabbet c on the upper end of the next lower section. The joint can then be calked or otherwise made water-tight; or, as shown
75 in Fig. 5, the abutting ends of the pipe-sections can be provided with suitable flanges c', adapted to be fastened together, as by bolts c². As the pipe-sections are put in place, any space around them within the pipe-receiving
80 passage can be filled in with cement or rubble, so as to prevent any chance of water leaking down around the outside of pipe C to chamber A. The lower end of said pipe pro-
85 jects down within such chamber, and is supported upon a suitable foundation or bed on the chamber-floor. As shown, this founda-
90 tion consists of a frame C', whose upper plate or top C² is bolted to and serves to close the pipe end. I do not, however, intend to limit myself to such construction or arrangement
95 of the supporting-bed for the pipe. Any other can be used without departure from my invention.

At the upper end of the pipe, and preferably flush with the bed of the river or body of
95 water, is a grating D, adapted to allow the passage of water down into the pipe while keeping out stones, sticks, and other débris. This grating is, by preference, not round like the main portion of pipe C, as shown in the
100 drawings, but is rectangular and made longer in one way than the other. Its bars d d run

at right angles to its longest diameter, and the grating is set so that such bars are substantially parallel with the line of the current or flow of the water to and over the grating. The portion of the pipe C immediately below and at the grating is, in cross-section, of the same general shape as the latter, its upper end being provided with a rabbet C³ to receive and support the grating-bars or a frame in which they may be held. In order to prevent clogging of the spaces between the bars, the latter are made tapering downward from their upper surfaces, so that the spaces flare downward. With this construction any matter working in between the upper portions of the grating-bars will not be held, but can pass freely downward, so as not to clog the grating.

Hinged to the pipe C, at a point just below and to one side of the grating, is a swinging plate E, adapted to act as a valve and close, when desired, the passage down through the grating into the pipe-body. On the upper side of this plate are ribs *e e*—one for each space between the grating-bars—and so situated as to project up into the respective spaces when the plate is swung up. With this construction, and with the ribs high enough to reach well up to the upper face or surface of the grating-bars, the grating can be cleared at any time of clogging matter by simply swinging the plate upward. The ribs *e e* will then as they pass up between the bars *d d* force up and outward, so that it will be carried away by the flow of water over the grating, any dirt or debris which may have lodged between or upon the bars.

For operating the valve-plate E, as desired, I provide the rod F, guided vertically within the pipe C by guides *f f*, or other suitable holding and directing means, and a link or connecting rod F', pivotally connected at its upper and lower ends, respectively, with the outer or free edge of plate E and the upper end of rod F. For raising and lowering this rod from the outside of pipe C, I can use either of the two devices shown in the drawings. One of them, as shown in Fig. 1, consists of a transverse shaft G, journaled in suitable bearings on the pipe C and having on it a gear *g*, meshing with and turning the pinion H, through which a screw-threaded portion of the rod F is tapped. This pinion, rotating on a vertical axis, is held against up-and-down movement by the bearings H' on a suitable bracket within and attached to the pipe. On the outer end of shaft G is a suitable hand-wheel, whereby the shaft can be turned in one direction or the other, so as to rotate the pinion H to cause the rod F to be raised or lowered. In Fig. 2 I show other means of adjusting or moving said rod, consisting of a screw K, tapped up through a suitable fixed nut or plate at the lower end of the pipe, and having its upper end swiveled to the lower end of rod F. This screw can be rotated by means of a wheel K' on its

lower end, or otherwise, so as to cause it, and consequently the rod F and plate E, to be raised and lowered.

From the pipe C, at or near its lower end, one or more pipes or conduits L can be used to conduct the water to a turbine wheel or other water-driven motor. As shown in the drawings, there are two of these branch pipes conducting the water from pipe C to the inlet-openings of two turbines with a common or joined discharge-passage. This arrangement or form of motor is, however, not necessary, and can be varied, as desired, without departure from my invention.

Leading from chamber A to a point behind the falls I have a passage M, which either with or without a pipe or other form of lining can be used as a tail-race to conduct away the water discharged from the motor or motors.

Connected with the turbines or other water-driven motors by suitable shafting and belting I have one or more dynamos for generating electricity to be conducted away to any desired point through the passage; or where other means for transmitting power—as, for instance, compressed air—is used, I couple or connect with the motor or motors the desired air-compressing apparatus. In each of the pipes leading from main pipe C, I place a valve N, which can be of any desired shape or construction adapted to be used to close the respective pipe at will.

Instead of one vertical shaft or pipe taking water from above and conducting it to the chamber A and the motors therein, I contemplate using, as desired, two or more of them.

As all my apparatus and machinery is below and behind the water, it cannot be seen from without by those viewing the river or falls, and consequently does not in any manner appear upon the landscape and cannot interfere with or mar the beauty of the scenery. As also in using my apparatus I do not have to dam up or deflect the water by any means visible from without or above the latter, and simply take a portion from the bottom of the water-body. I in no wise change or alter the appearance of the surface of the water or interfere with its natural flow.

The power obtained from the water by the motors and transmitted by electricity or compressed air can be supplied where wanted at any place or places at a distance from as well as near to the plant.

Having thus described my invention, what I claim is—

1. The method of obtaining power from a body of water without detracting from its external appearance, which consists in taking a portion of the water from the bed of the body of water, conducting it downward through the foundation of the bed of the body of water, and utilizing for water-power, underground and out of sight, the portion of water taken, substantially as and for the purpose specified.

2. The method of obtaining power from wa-

ter above and adjacent to a water-fall, which consists in taking water from the bed of the stream back of the edge of the fall, conducting it downward through the foundation of the bed of the stream, and utilizing the water so taken for driving-power, substantially as and for the purpose set forth.

3. The method of obtaining power from the stream of a water-fall adjacent to and above the water-fall without detracting from the beauty of the scenery, which consists in conducting a portion of the stream from the bed of the stream downward through the foundation of the bed, utilizing the stream within the foundation and out of sight, and transmitting its driving-power to a distant point, substantially as and for the purpose specified.

4. As a means for obtaining power from a body of water without detracting from its external appearance, the combination, with motor mechanism located in a chamber below the level of the body of water and out of sight, of a water-conduit leading from the bed of the body of water downward through its foundation to the motor mechanism, and driving mechanism connected with the motor mechanism, substantially as and for the purpose shown.

5. As a means for obtaining power from a body of water without detracting from its external appearance, in combination with one or more motors situated in a chamber below the level of the body of water and out of sight, a conduit leading directly downward from the bed of the water-body to the motor or motors, one or more dynamos connected with the latter, and suitable conductors for conducting away the electricity from the dynamos to any desired point or points, substantially as and for the purpose set forth.

6. The means for obtaining power from water where there is a water-fall without affecting the appearance of the scenery, which consists in one or more motors situated in a chamber

within the breast of the fall, one or more conduits taking water from the bed of the stream back of the edge of the fall and conducting it down to the motor or motors, and suitable machinery connected with and driven by the latter, all in combination, substantially as and for the purpose described.

7. As a means for obtaining power from water where there is a fall, in combination with one or more water-driven motors situated in a chamber within the breast of the fall, a conduit for taking water from a point in the bed of the stream back of the edge of the falls and conducting it directly downward to the motor or motors in the chamber, suitable machinery connected with and driven by the motors, and a pipe or conduit for conducting the water discharged from the latter away to a point back of the fall, substantially as and for the purpose specified.

8. In combination with the pipe or conduit and the grating therefor, the swinging plate within the pipe or conduit adapted to open and close the same, and provided with clearing projections to enter the openings in the grating, substantially as and for the purpose specified.

9. In combination with a pipe or conduit for taking water from below the surface of a stream, a grating having its bars running in the direction of the current, a movable piece within the conduit below the grating having ribs adapted to be passed up between the bars, and means for moving such piece toward and away from the grating at will, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of September, 1889.

SILAS H. HAMILTON. [L.S.]

Witnesses:

F. B. SCHMITGEN,
D. E. HAMILTON.