No. 819,579. PATENTED MAY 1, 1906.

P. McGRANIGHAN.

SUBMARINE FILTER.

APPLICATION FILED NOV. 4, 1905.

2 SHEETS—SHEET 1

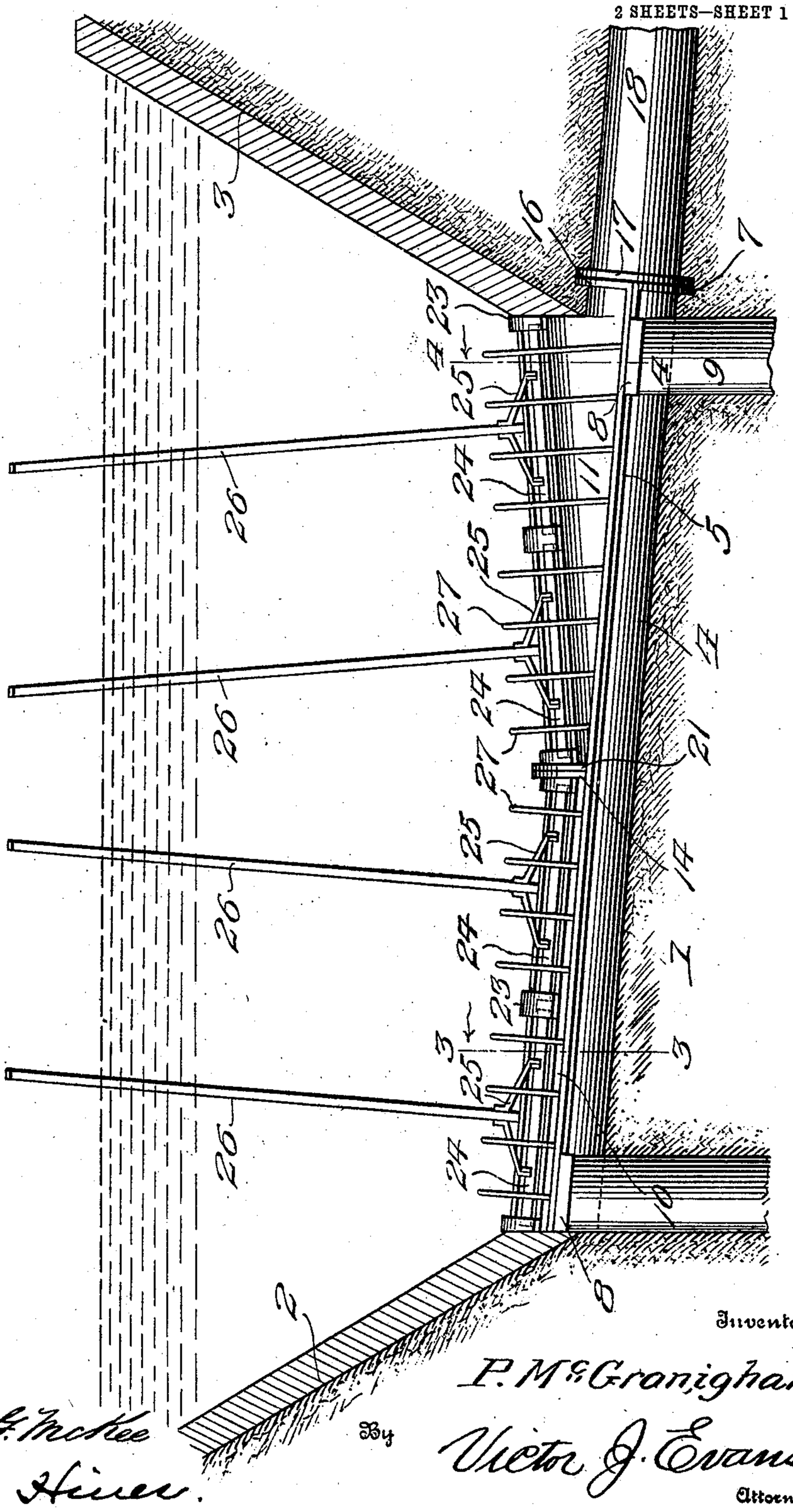

Fig. 1.

Witnesses

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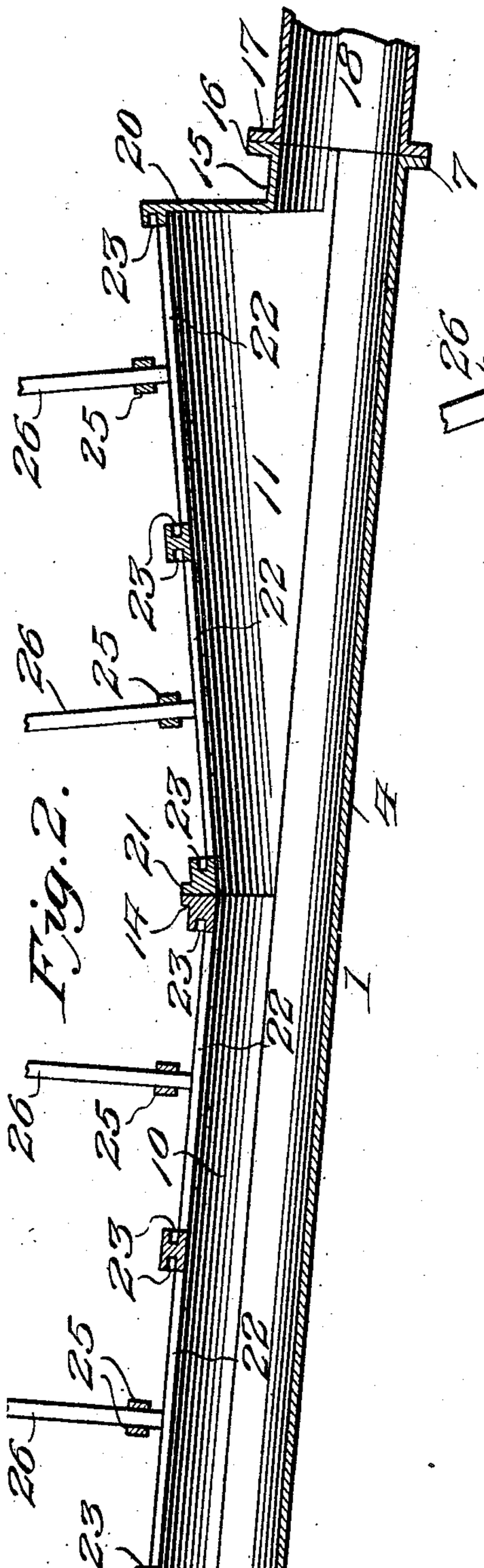

Fig. 2.

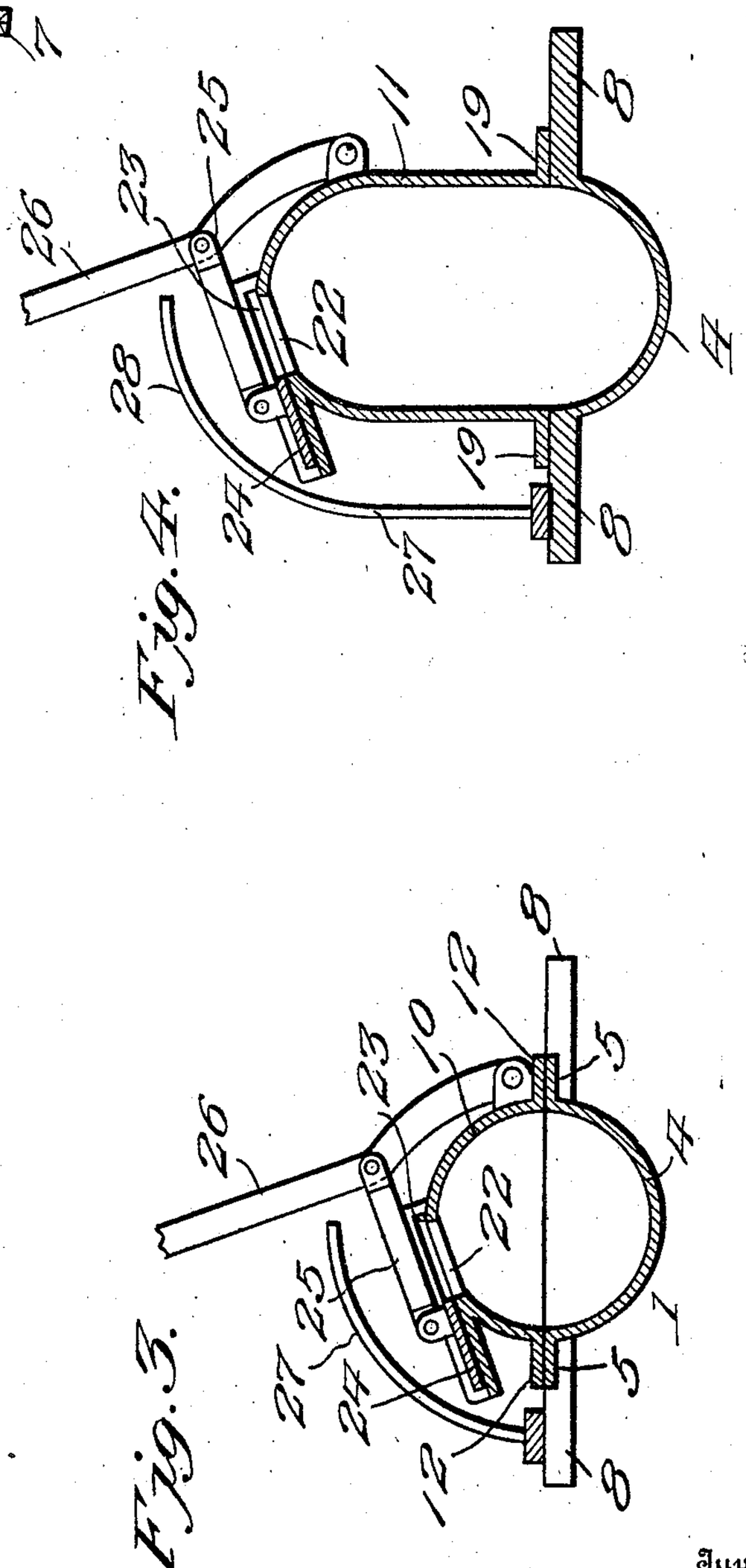

Fig. 4.

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

PATRICK McGRANIGHAN, OF GRANITE, VIRGINIA.

SUBMARINE FILTER.

No. 819,579. Specification of Letters Patent. Patented May 1, 1906.

Application filed November 4, 1905. Serial No. 285,904.

To all whom it may concern:

Be it known that I, PATRICK McGRANIGHAN, a citizen of the United States of America, residing at Granite, in the county of Chesterfield and State of Virginia, have invented new and useful Improvements in Submarine Filters, of which the following is a specification.

This invention relates to a submarine filter designed for use at the bottom of a canal, race, conduit, or other watercourse in which there is sand, gravel, or any fine material of a specific gravity heavier than the water. Its primary object is to provide a device to remove sand from canals from which power is derived, thus clearing the water and preventing to a large extent abrasion of the pumps, power-wheels, &c., of the mechanism.

The invention consists of the features of construction, combination, and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a cross-section through a canal or similar watercourse, showing the application of the invention. Fig. 2 is a vertical longitudinal section through the filter. Figs. 3 and 4 are cross-sections taken, respectively, on line 3 3 and line 4 4 of Fig. 1.

Referring now more particularly to the drawings, the numeral 1 represents the bed of a canal, race, or other similar stream, and 2 and 3 the banks or side walls thereof. The filter or sand and gravel eliminating apparatus is disposed at the bottom of the canal and extends transversely thereof. It comprises in its construction a conduit comprising a bottom section 4 of semicircular or semi-elliptical form and provided along its side edges with bolting-flanges 5, at one end with a head-section 6, and at its opposite end with a semicircular flange 7. This bottom section of the conduit is of somewhat greater length than the width of the canal and extends on a downward inclination from the base of the bank or wall 2 to and through the bank or wall 3 to cause the discharge of the sand, gravel, and the like taken from the water by gravity, as hereinafter described. If desired, the end portions of the said bottom section 4 may be provided with supporting-flanges or plates 8 to rest upon piles or concrete or other suitable supports 9 to hold the apparatus firmly in position and prevent it from sinking into the bed of the stream.

The top section of the conduit is composed of two portions 10 and 11. The portion 10 covers approximately one-half of the bottom section 4 from the center to the higher end thereof or the end of said bottom section adjacent the wall 2 and is semicircular or semi-elliptical in form to complete the upper half of the conduit and is provided with side flanges 12, a rear head-section 13, and a flanged abutting head 14, the latter located at its lower end or the end abutting against the inner end of the section 11. The head-sections 6 and 13 coöperate to form a head closing the conduit at its inner or higher end, and the section 10 is united to the section 4 by bolts, rivets, or other suitable fastenings passing through the flanges 5 and 12.

The section 11 is substantially semifrusto-conical in form and has an outer terminal semicylindrical or semi-elliptical portion 15, resting upon the outer end of the bottom section 4 and provided with a flange 16, coöperating with the flange 7 of the section 4 to form about the outer end of the conduit an encircling flange, which is bolted or otherwise fastened to the flange 17 of a discharge-pipe 18, extending beyond the wall 3 to a suitable point of discharge for the sand, gravel, and other heavy particles extracted by the device. The lower edges of the section 11 rest upon the side edges of the lower half of the section 4 and are formed with flanges 19, bolted or otherwise suitably secured to the flanges 8 of the section 4 to secure the part 11 in position thereon. The terminal 15 of the section 11 forms with the outer or lower end of the section 4 a coupling portion corresponding in form to the discharge-pipe 18, and above said portion 15 the section 11 is provided with a closing wall or head 20, while at its inner end said section 11 is formed with a flanged head 21, abutting against the flanged head 14 of the section 10 at the center of the conduit and secured thereto by bolts or other suitable fastenings.

The sections 10 and 11 are made of the forms described in order to cause the upper wall of the conduit to slope from the banks 2 and 3 toward the center of the conduit, while permitting the latter to extend on a downward inclination between the banks 2 and 3, so that the sand and other heavier particles gravitating toward the bottom of the canal and at the sides of the canal will flow downwardly over the conduit, so as to facilitate the entrance of the same thereto.

The sections 10 and 11 are provided with

inlets 22, which are arranged at one side of the center line of the conduit so as to incline and partially face upstream in order to more effectually catch the downflowing sand and gravel. In proper relation to each opening is a guideway 23, in which operates a sliding gate or valve 24, controlling the opening 22. This gate or valve is pivotally connected by a link 25 with an operating-lever 26, pivoted at its lower end to the adjacent section of the conduit and extending upwardly and having its upper or handle end projecting a sufficient distance above the surface of the water to permit of its convenient operation when it is desired to close the valve or open it to a prescribed extent. By this means the size of the inlets 22 may be regulated according to conditions of the water.

Arranged on the upstream side of the device and suitably supported by one of the sets of flanges are guard fingers or rods 27, having bent or curved upper ends 28, which extend over the valves and inlets and serve as barriers or fenders to catch all vegetable or other matter and prevent the same from entering or clogging the gates and interfering with their free action.

In operation it will be understood that the inlets 22 are opened to a desired extent, and as the sand, gravel, or other gritty material rolls along the bottom of the canal it flows into the conduit through the inlets 22, and, acted upon by the water entering therewith, is carried through the conduit into the pipe 18 and discharged through the same to a nearby dump or point of deposit, thus disposing of a large proportion of the gritty matter which would otherwise cause wear and tear upon the machinery of the power plant. It will be observed that the sloping arrangement of the upper sections of the conduit causes the upper surfaces of the device to conform substantially to the cross-sectional shape of the bed or bottom of the canal, and as in practice the bottom section 4 is preferably arranged a little below the level of the bed it will be readily apparent that a more effective flow of the gritty particles to and their taking up by the apparatus will be insured.

If desired, the seat in the bed formed for the reception of the bottom section 4 may be of stone, concrete, or other suitable material to prevent any possible liability of displacement of the apparatus.

Having thus described the invention, what is claimed as new is—

1. A canal or other watercourse provided with a submerged sand or other grit eliminator extending transversely across the bed thereof and inclined from one bank to the other, said device having its upper side inclining downward toward its center from the banks and provided with inlet-openings, valve mechanism controlling said openings, and a discharge extending through one of the banks of the canal and communicating with the lower end of the eliminator.

2. A submarine filter for extracting sand and other gritty matter from canals and other watercourses comprising a bottom section inclined from one side to the other of the canal, top sections coöperating with said bottom section and having their upper surfaces sloping toward the center of the conduit and provided with inlets, said sections being properly united and forming a conduit enlarged from its center to its outer end, and a discharge-pipe connected with the outer end.

3. A canal or other watercourse provided with a filter submerged therein and extending transversely across the bed thereof, said filter being inclined from one bank to the other and having an outlet through one bank at its lower end, the tube being provided in its body portion with inlets, controlling closures for said inlets, and fenders on the upstream side of the tube and projecting over said inlets.

4. A canal or other watercourse provided with a submerged filter extending across the bed thereof and inclined from one bank to the other, said filter comprising a tubular body having inlet-openings and a discharge through one of the banks at its lower end, the lower half of the body having an upward enlargement, the upper surfaces of the body being inclined from the banks toward the center of the body, and controlling closures for said inlets.

5. A canal or other watercourse provided with a filter submerged therein and extending transversely across the bed thereof, said filter comprising a tube inclined from one bank to the other and having an outlet at its lower end through the adjacent bank, said tube being provided in its top with inlets facing on the upstream side, and closures mounted on the tube for controlling said inlets.

6. A canal or other watercourse provided with a filter submerged therein and extending transversely across the bed thereof, said filter comprising a tube inclined from one bank to the other and having an outlet through one bank at its lower end, the upper side of the tube being inclined toward its center from the banks and provided with inlet-openings facing on the upstream side, and valves upon the tubes controlling said openings.

7. A canal or other watercourse provided with a filter submerged therein and extending transversely across the bed thereof, said filter comprising a tube inclined from one bank to the other and having an outlet at its lower end through one bank, the upper side of the tube being inclined downwardly toward its center from the bank and provided

with inlets facing on the upstream side, controlling-closures on the tube for said inlets, and fenders on the upstream side of the tube projecting over said inlets.

8. A canal or other watercourse provided with a filter submerged therein and extending transversely across the bed thereof, said filter comprising a tube inclined from one bank to the other and having an outlet at its lower end through one of the banks, said tube having its upper side inclining downward toward its center from the banks and provided with inlets facing toward the upstream side, guideways upon the tube adjacent the inlets, closures slidably mounted in said guideways, and means for actuating said closures.

9. A submarine filter comprising a tubular body provided with inlets on the upstream side thereof, closures for said inlets, and fenders on the upstream side of the tube and projecting over said inlets.

In testimony whereof I affix my signature in presence of two witnesses.

PATRICK McGRANIGHAN.

Witnesses:
A. L. ADAMSON,
M. C. MANN.