No. 775,677. PATENTED NOV. 22, 1904.

P. J. HEALEY.

MACHINE FOR CLEANING SEWERS.

APPLICATION FILED OCT. 12, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

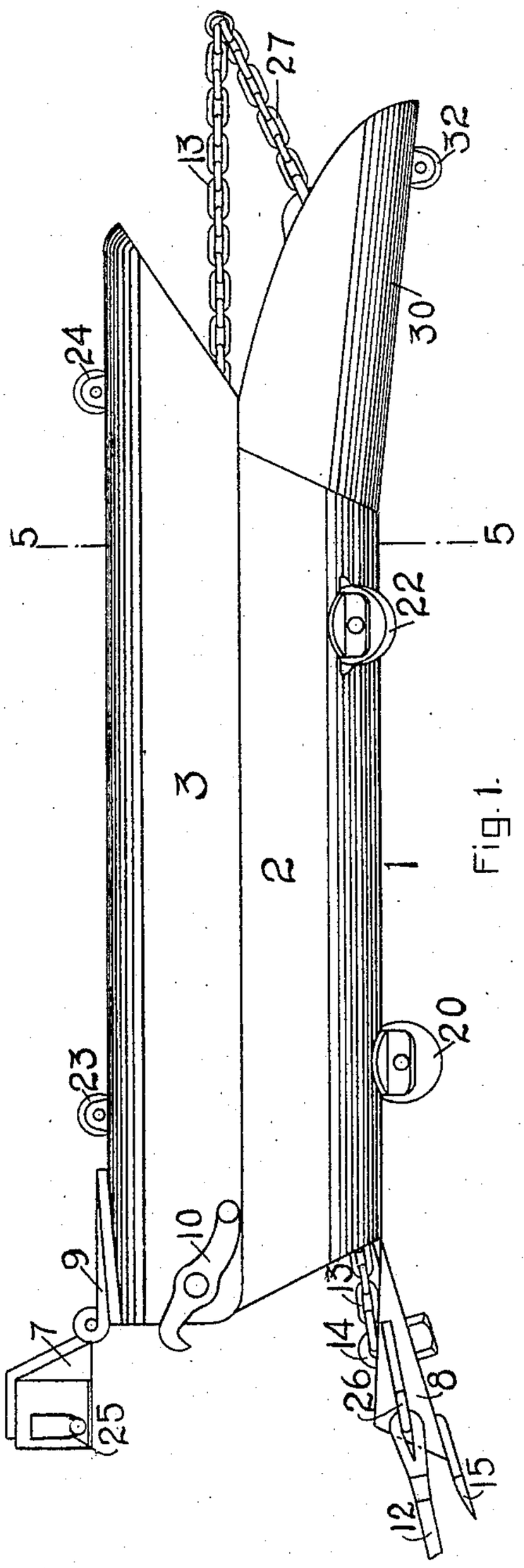

Fig. 1.

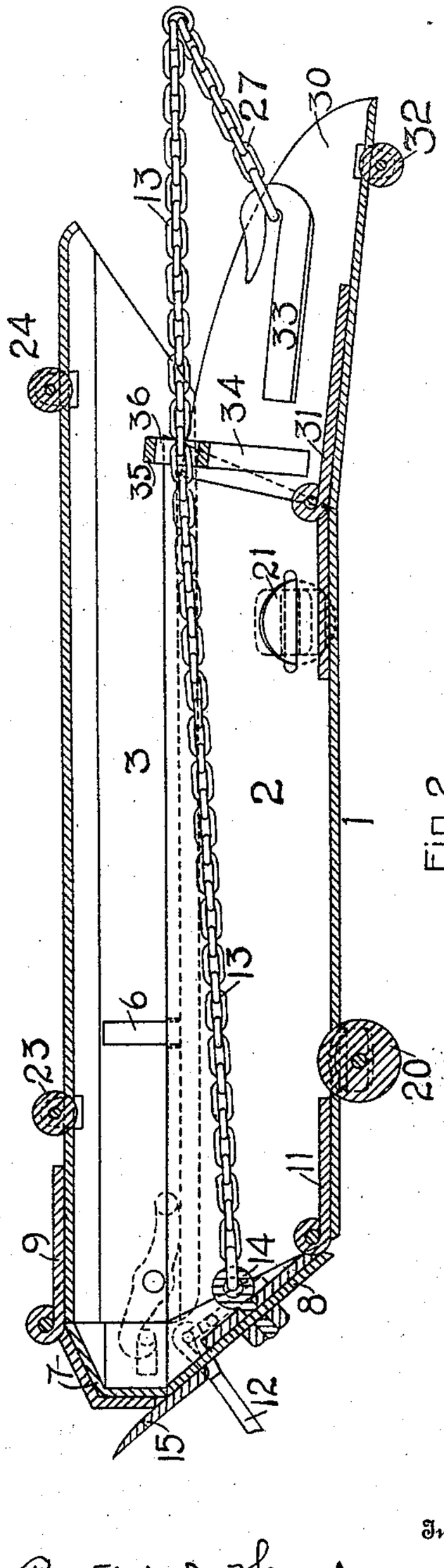

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 2.

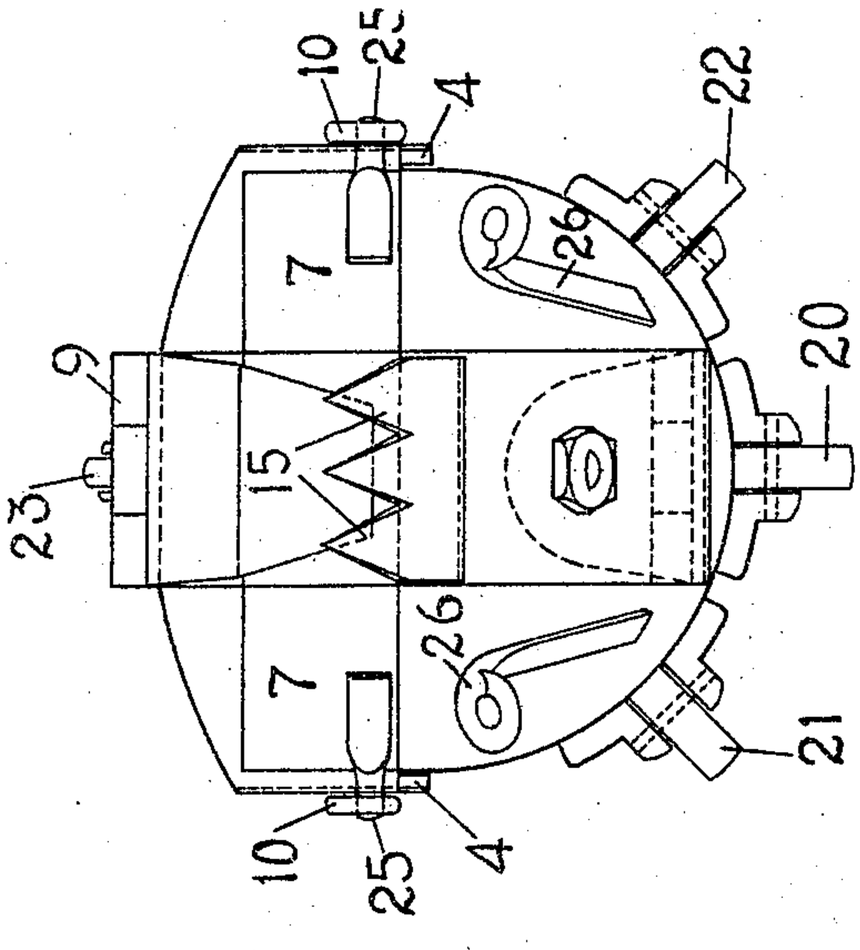

Fig 4.

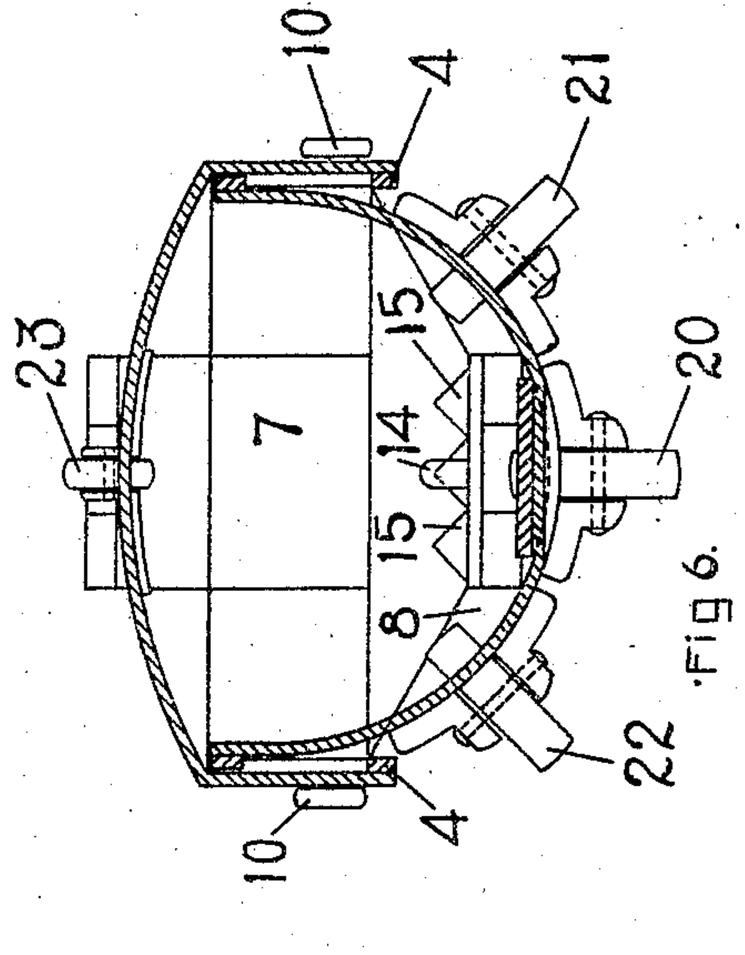

Fig 6.

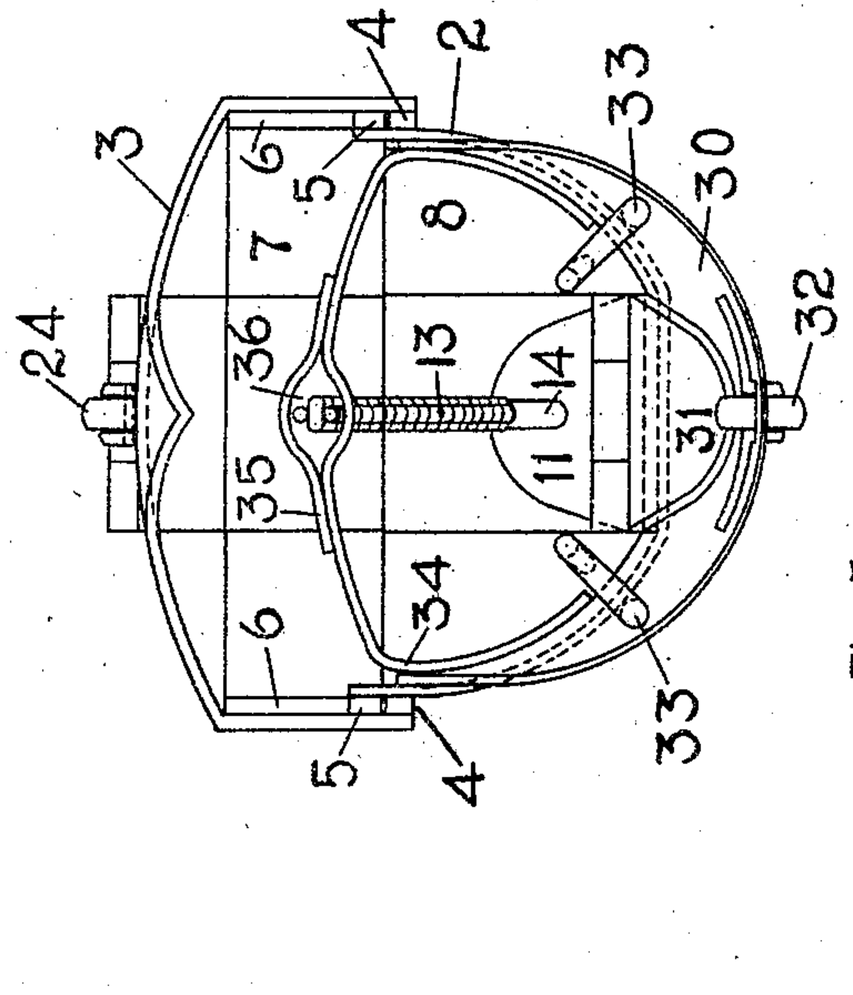

Fig 3.

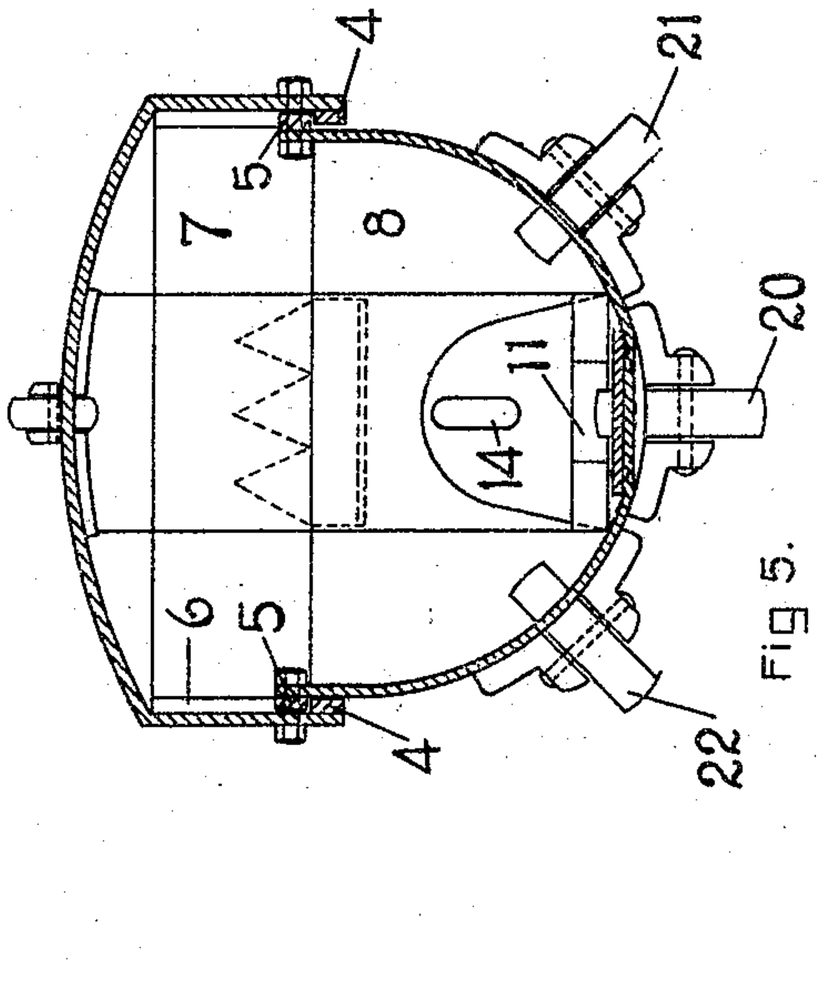

Fig 5.

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MACHINE FOR CLEANING SEWERS.

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NO MODEL. 3 SHEETS—SHEET 3.

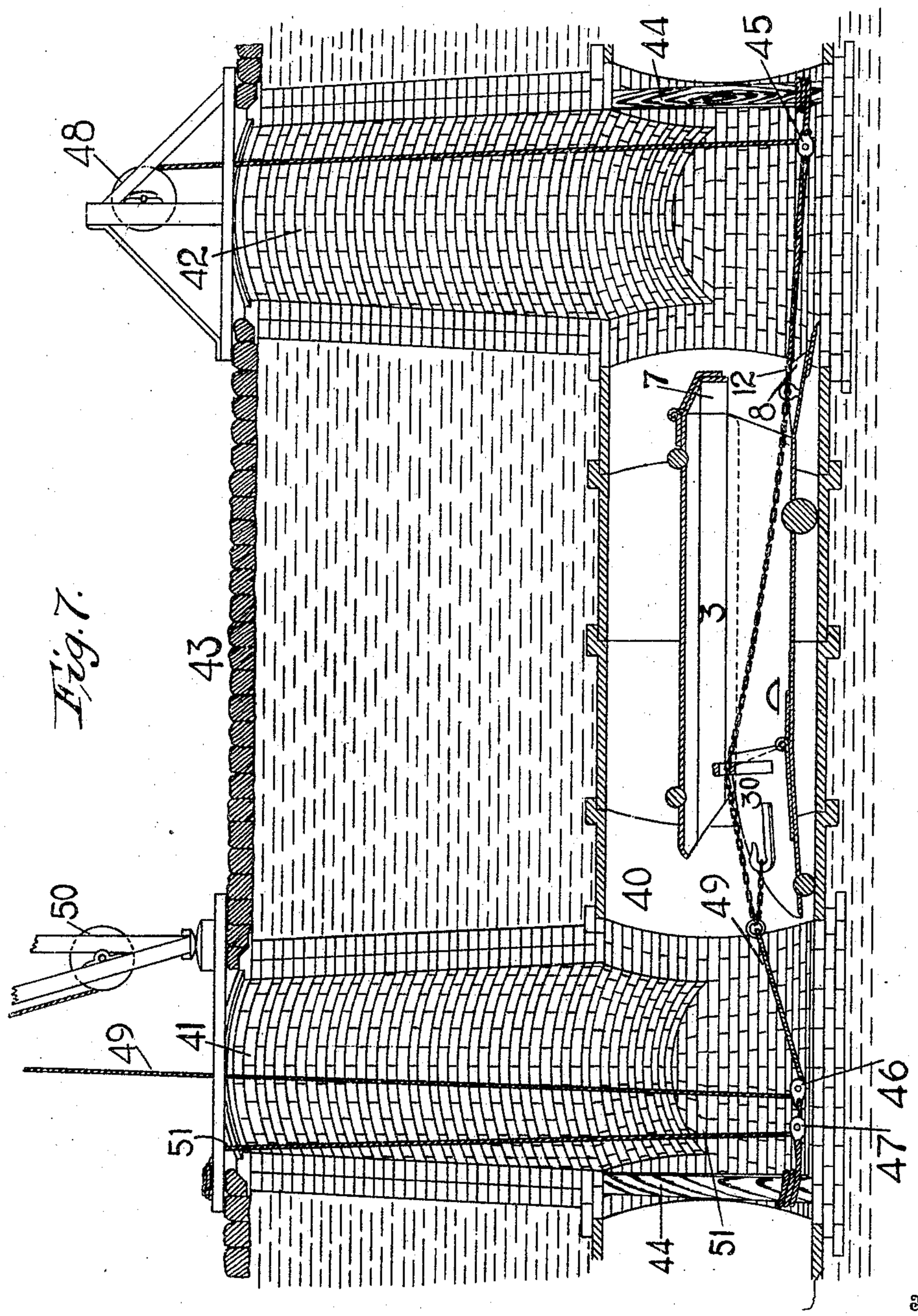

Fig. 7.

Witnesses

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No. 775,677. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

PATRICK J. HEALEY, OF HYDEPARK, MASSACHUSETTS.

MACHINE FOR CLEANING SEWERS.

SPECIFICATION forming part of Letters Patent No. 775,677, dated November 22, 1904.

Application filed October 12, 1903. Serial No. 176,656. (No model.)

To all whom it may concern:

Be it known that I, PATRICK J. HEALEY, a citizen of the United States, residing at Hydepark, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Cleaning Sewers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to machines for cleaning sewers, drains, and similar structures; and it consists, broadly, of a hollow body mounted on wheels closed at its rear end and provided at its open end with a shovel, together with means for operating the same.

The object of my invention is to secure a device which may be operated from the surface of the ground to remove all deposits—such as sand, gravel, clay, and other solid matter—from sewers, drains, and similar structures.

The two principal difficulties met with in cleaning sewers and drains are the presence of water and the prevalence of poisonous sewer-gas. Generally in cleaning sewers it is necessary to shut off the flow of water by damming or other means at some point above the section to be cleaned; but this involves delay and expense and a possibility of overflowage, and to avoid this is one of the objects of my invention, my machine being so constructed that it can be operated as well in a sewer full of water as in one that is dry. Furthermore, the prevalence of poisonous gases in sewers, and especially in those of large diameter, render it always dangerous and frequently fatal for workmen to enter them. In order to clean the larger sewers at the present time, the workmen are obliged to enter the sewers and work therein, which is an expensive and dangerous method, since the laborers can work only a short time, owing to the presence of the sewer-gas, and even while exercising the greatest care they are frequently and sometimes fatally poisoned by the gas. The use of my machine in cleaning these sewers makes it unnecessary for the workmen to enter the sewer, and this reduces the expense of cleaning and totally eradicates all danger to the workmen.

The following is a clear description of my machine, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a vertical longitudinal sectional view of the machine. Fig. 3 is a front elevation. Fig. 4 is a rear elevation. Fig. 5 is a cross-section on line 5 5 in Fig. 1. Fig. 6 is a cross-section on line 5 5, showing the top of the machine depressed; and Fig. 7 is a sectional view of a sewer, showing the method of using and operating my machine.

Similar numbers refer to similar parts throughout the several views.

Broadly, my machine consists of a hollow cylinder mounted upon wheels or rollers having its rear end closed by a hinged door and provided with a shovel or scoop attached to its front and open end, together with means for propelling the machine through the sewer, collecting the deposit, removing the machine with its load from the sewer, and discharging the load on the surface.

In the drawings the body 1 of my machine is shown substantially cylindrical in cross-section and constructed in two sections, the lower part 2 being semicircular in cross-section and the upper portion 3 having vertical sides and a slightly-curved top. The upper part 3 is made larger in diameter than the lower part 2, and the vertical sides of the former overlap the sides of 2 and are in sliding contact therewith in order to allow the top to be raised or lowered to increase or decrease the size and capacity of the body 1. To prevent the two sections becoming separated, I provide the horizontal strips 4 4, placed on the lower inside edges of 3, and similar strips 5 5 on the upper outer edges of 2, which act as stops. Any longitudinal displacement is guarded against by the vertical stops 6, attached to the inner surface of the upper portion 3.

The rear end of the body of my machine is provided with two hinged doors 7 and 8, the upper door, 7, being attached to 3 by the hinge 9 and swinging up and down thereon. In order to fasten the door 7 when closed, I provide a hook 10 on each side of 3, which engages a catch 25 on the door. The lower door

8 is attached to the bottom of 2 by means of the hinge 11 and is opened by drawing on the rope 12, which is fastened to the hooks 26 26, set in the outer sides of the door, or closed by pulling the chain 13, which is attached to the eyelet 14, set on the inner surface of the door, the chain 13 running through the body 1 of the machine and out through the open front. The door 8 is further provided with sharp teeth 15 15 for a purpose to be hereinafter explained.

For the purpose of rolling the machine through the sewer or drain I provide the lower part 2 with three wheels 20, 21, and 22, journaled in suitable hangers, 20 being centered in the rear and 21 and 22 mounted on the curved sides of 2 at the forward end and near the shovel, their vertical axes slanting outwardly, all the wheels being thus arranged in order to roll on the curved surface of the sewer or drain. On the upper surface of 3 I affix two smaller wheels 23 and 24 in order to prevent the top of the machine scraping the inside surface of the sewer and to present a rolling contact therewith.

On the front end of the body 1 is mounted the shovel or scoop 30, attached to the lower half of the body by the hinge 31. The shovel 30 may be of any size or shape, but is generally semicylindrical in cross-section. Near the point of the shovel is the small wheel 32, upon which the point of the shovel rolls when the machine is operated, and on the sides of the shovel are affixed two hooks 33 33, to which the chain 13 is connected by means of branch chains 27 27 for the purpose of drawing the machine forward. The sides of the shovel at the rear are connected and sustained by the curved band 34, to which a shorter band 35 is attached in such a manner as to form a loop 36, through which the chain 13 passes.

In Figs. 1 to 5, inclusive, I have shown my machine with the upper section 3 raised; but Fig. 6 shows 3 lowered, thus materially reducing the vertical diameter of the machine. The object of this construction is to reduce the size of the machine in order to draw it into the sewer over the deposit. It is not, however, necessary for the main purposes of my invention to construct the body of my machine in two sections, as it may be made of one piece; but it will materially assist in its operation if the vertical diameter of the machine or its size can be reduced when it is being operated in a sewer containing a considerable deposit.

The method of operating my machine is illustrated in Fig. 7, which is a sectional view of a portion of a sewer embracing two manholes and the sewer between. The machine is shown in the sewer midway between the manholes, together with the means of operating it. Although it may be operated by hand and ropes from the manholes, yet I have found it easier and preferable to operate the machine from the surface by means of winches and chains or ropes. In Fig. 7, 40 is the sewer, 41 and 42 are two manholes, and 43 is the surface of the street. 44 44 are two pieces of joists which are inserted obliquely and wedged in the sewer, one at each manhole, for the purpose of holding the sheaves 45, 46, and 47. The machine is lowered into the manhole, and the rope 12, attached to the rear end of the machine, is floated or carried through the sewer to the next adjoining manhole, run through the sheave 45, carried up to the surface of the ground, and attached to the windlass 48. The machine is then drawn backward into the sewer by turning the windlass, and the tension on the rope 12 causes the hinged door 8 to open downward and assume a nearly horizontal position. As the machine moves into the sewer the pointed teeth 15 15 on the door 8 are forced into the deposit in the bottom of the sewer and loosen it, and the onward motion of the machine causes a large proportion of the deposit to be forced into the machine. When the machine first enters the sewer, the top is lowered, which reduces its vertical diameter and permits it to be drawn over the deposit, and as the machine fills up with deposit the load forces up the top. As soon as the cleaner has been partially filled with deposit it is then drawn forward by means of the rope 49, which is fastened to the chain 13, passes through the sheave 46, and up to the winch or windlass 50. When the windlass 50 is operated, the tension on the chain draws up and closes the hinged door 8, and thus effectually closes the rear end of the machine, and then as it moves forward the shovel gathers in and scoops up the deposit remaining on the bottom of the sewer until the machine is completely filled. It is then drawn as closely as possible to the sheave 46, out into the manhole, and is hoisted to the surface of the ground and the contents discharged. In order to allow the machine to be raised from the bottom of the manhole, I attach the movable sheave 46 to the rope 51, which runs through the sheave 47, and by allowing the rope 51 to play out the sheave 46 and machine are drawn up together by the rope 49. When the machine is being operated, the sheave 46 is drawn up to the sheave 47 and held there by fastening the rope 51.

At the present time the most improved machinery for cleaning sewers simply conveys the deposit to the manhole, where it is either discharged or shoveled into pails and hoisted to the surface; but my machine effects a large saving in time and labor, since it can be hoisted to the surface and its load discharged directly into a dray or cart. The machine is raised to the surface and over a dray or cart with the shovel end uppermost, and then fastened or suspended in any suitable manner, as by passing a rope under the hooks 33 33 on the shovel in order to release the tension on

the chain 13 and allow the hinged door 8 to be forced open by the weight of the load, which is then discharged. The hooks 10 10, which secure the hinged door 7 on the top section of the machine, are at the same time unfastened, and thus the entire end of the machine is open.

Obviously my invention may be embodied in many different forms, and I do not intend to limit myself to any particular form therein of body or shovel or to a body made in sections, since, broadly speaking, my invention consists of a hollow body mounted on rollers and having attached thereto a shovel or scoop, and I desire to claim my invention in the broadest manner legally possible.

What I claim is—

1. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; and a shovel or scoop pivoted to the bottom portion of the outer end of said body.

2. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; a shovel or scoop pivoted to the bottom portion of the other end of said body; and a chain attached to the inner surface of said door and passing out the opposite end of said trough-shaped body through a guide centrally disposed therein.

3. In a sewer-cleaning machine, the combination of a hollow body open at both ends mounted on wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; and a shovel operatively attached to the other end of said body.

4. In a sewer-cleaning machine, the combination of a hollow body open at both ends mounted on wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; and a shovel pivotally attached to the bottom portion of the other end of said body.

5. In a sewer-cleaning machine, the combination of a hollow body open at both ends and mounted upon wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; a shovel or scoop pivoted to the bottom portion of the other end of said body; and a chain attached to the inner surface of said door and passing out the opposite end of said body through a guide centrally disposed therein.

6. In a sewer-cleaning machine, the combination of a hollow body open at both ends and mounted upon wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; a shovel operatively attached to the other end of said body; and means for operating all said mechanism.

7. In a sewer-cleaning machine, the combination of a hollow body open at both ends and mounted on wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; a shovel pivotally attached to the bottom portion of the other end of said body; and means for operating all said mechanism.

8. In a sewer-cleaning machine, the combination of a hollow body open at both ends and mounted upon wheels; a door hinged to the bottom portion of said body and designed to close one open end thereof; a shovel or scoop pivoted to the bottom portion of the other end of said body; a chain attached to the inner surface of said door and passing out the opposite end of said body through a guide centrally disposed therein; and means for operating all said mechanism.

9. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on wheels; a door hinged to the bottom portion of said body at one end thereof and designed to close said end; a shovel or scoop pivotally attached to the bottom portion of the other end of said body; and means for propelling and operating all said mechanism.

10. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on wheels; a door hinged to the bottom portion of said body at one end thereof and adapted to close said open end; a shovel or scoop pivotally attached to the bottom portion of the other end of said body; a chain attached to the inner surface of said door and passing out the opposite end of said trough-shaped body through a guide centrally disposed therein; and means for propelling and operating all said mechanism.

11. In a sewer-cleaning machine, the combination of a body vertically extensible, closed at one end and mounted on wheels; a shovel pivotally attached to the bottom portion of the open end of said body; and means for operating said body and shovel.

12. In a sewer-cleaning machine, the combination of a body vertically extensible, open at both ends and mounted on wheels; means for closing one end of said body; and a shovel or scoop pivotally attached to the bottom portion of the other open end of said body.

13. In a sewer-cleaning machine, the combination of a trough-shaped body closed at one end and mounted on wheels; a top for said body closed at one end; a shovel or scoop pivotally attached to the bottom portion of the open end of said body; and means for propelling and operating said machine.

14. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on rollers; means for closing one end of said body; a concave top for said body open at both ends; means for closing one end of said top; a shovel pivotally at-

tached to the bottom portion of the other open end of said body; and means for operating said device.

15. In a sewer-cleaning machine, the combination of a trough-shaped body open at both ends and mounted on rollers; means for closing one end of said body; a concave top for said body open at both ends, said body and said top being so arranged that the top may be raised or lowered to increase or decrease the capacity of the body; means for closing one end of said top; a shovel pivotally attached to the bottom portion of the other open end of said body; and means for operating said device.

16. In a sewer-cleaning machine, the combination of a body, open at both ends and mounted on wheels, said body consisting of a lower trough-shaped section and an upper concave part having vertical sides which are in sliding engagement with the upper outside edges of the said lower section so that said upper part may be raised or lowered to increase or decrease the capacity of said body; means for closing one end of said lower section; means for closing one end of said upper part; a shovel pivotally attached to the other open end of said lower section; and means for operating said combination.

17. In a sewer-cleaning machine, the combination of a body vertically extensible, open at both ends and mounted on wheels; a door hinged on the lower portion of said body and adapted to close one end thereof, said door having a sharpened edge; a shovel pivotally attached to the bottom portion of the other end of said body; and means for operating all said combination.

18. In a sewer-cleaning machine, the combination of a body, open at both ends and mounted on wheels, said body consisting of a lower trough-shaped section and an upper concave part having vertical sides in sliding engagement with the sides of said lower section and so arranged as to permit a limited vertical movement of said upper part; a hinged door for closing one end of said upper part; a hinged door for closing one end of said lower section, the latter door being provided with sharpened teeth; a shovel pivotally attached to the other open end of said lower section; together with means for operating said combination.

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

PATRICK J. HEALEY.

Witnesses:

E. A. ALLEN,

A. L. HODGDON.