

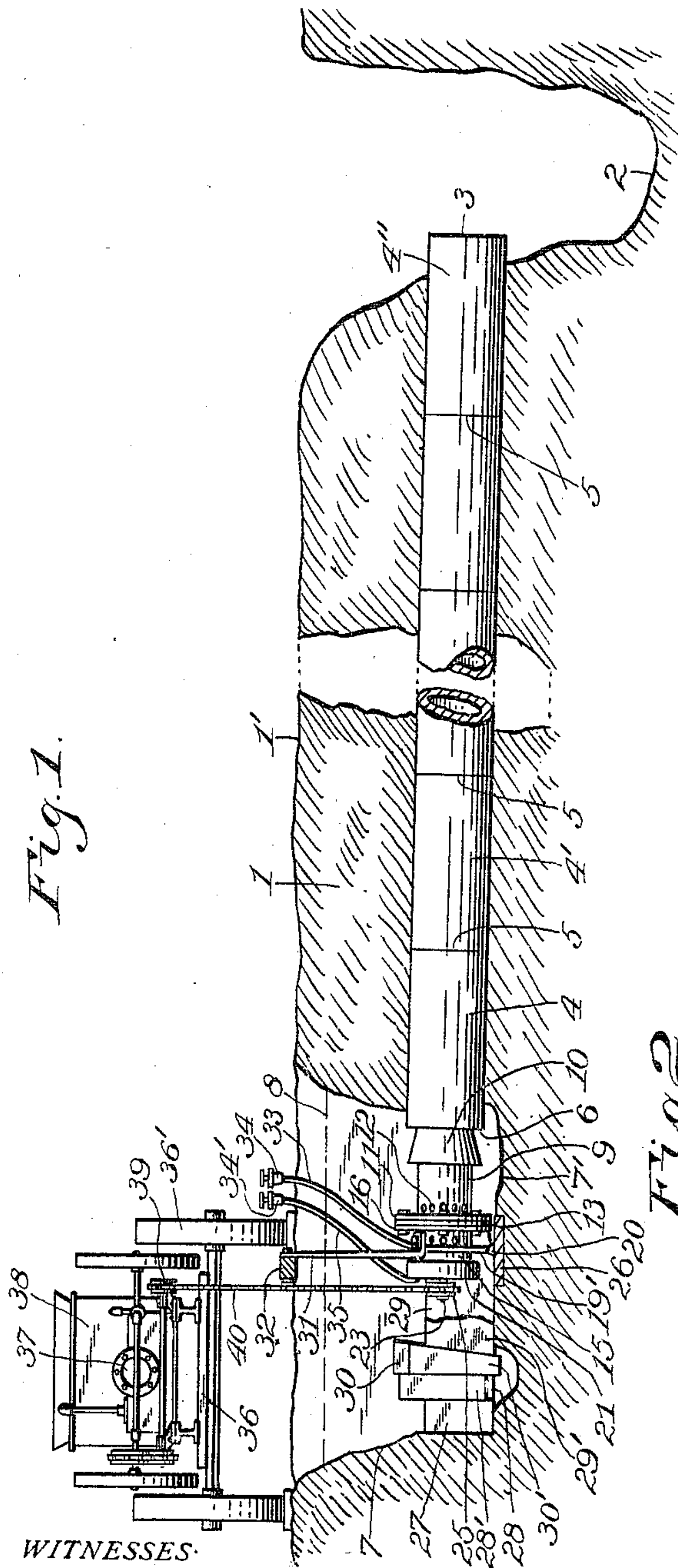
A. N. HADLEY.  
 MEANS FOR CLEARING OBSTRUCTED DRAIN PIPES.  
 APPLICATION FILED AUG. 30, 1909.

995,404.

Patented June 13, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES.

*J. A. Gardner.*  
*H. B. Wooddell.*

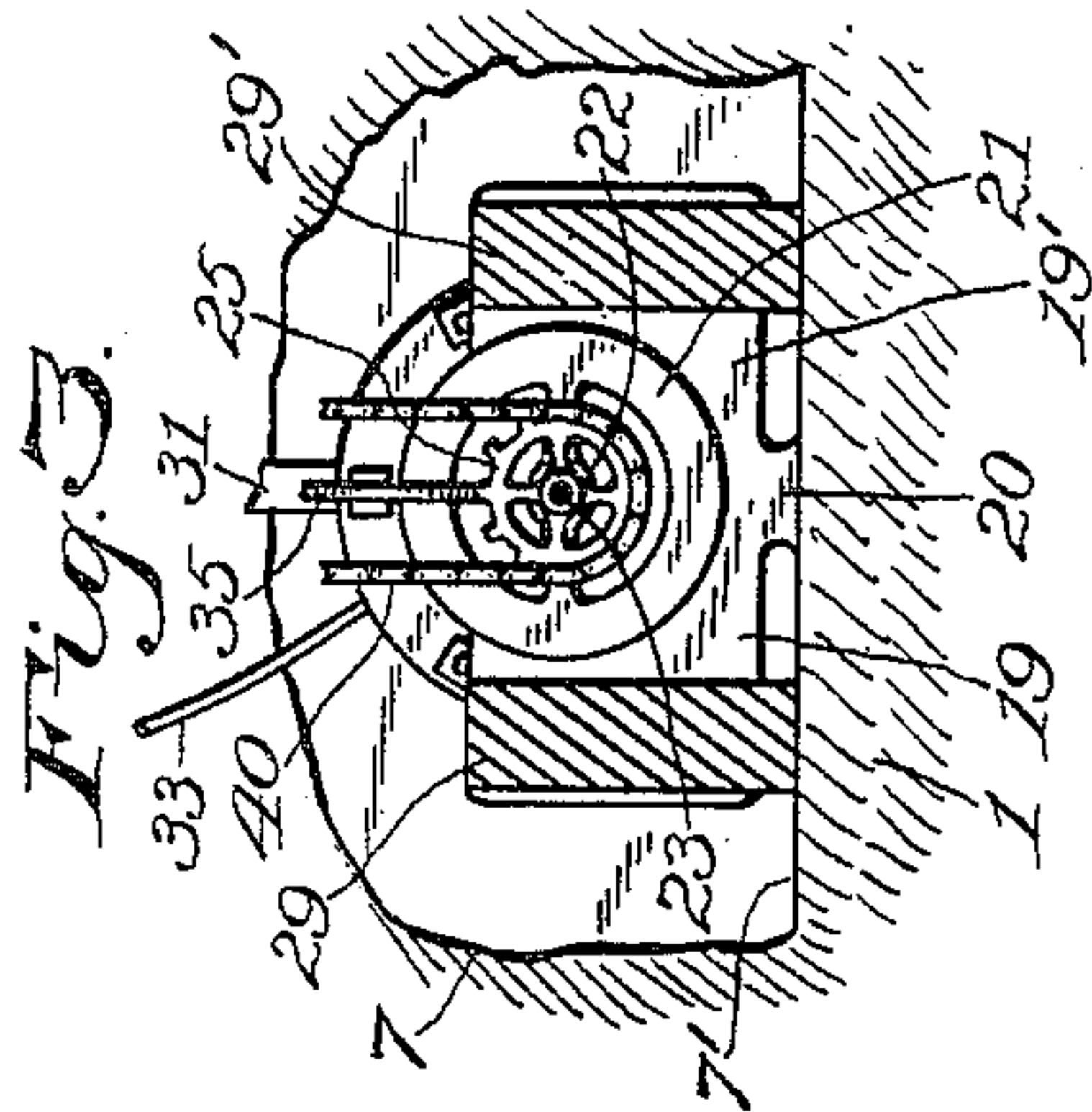
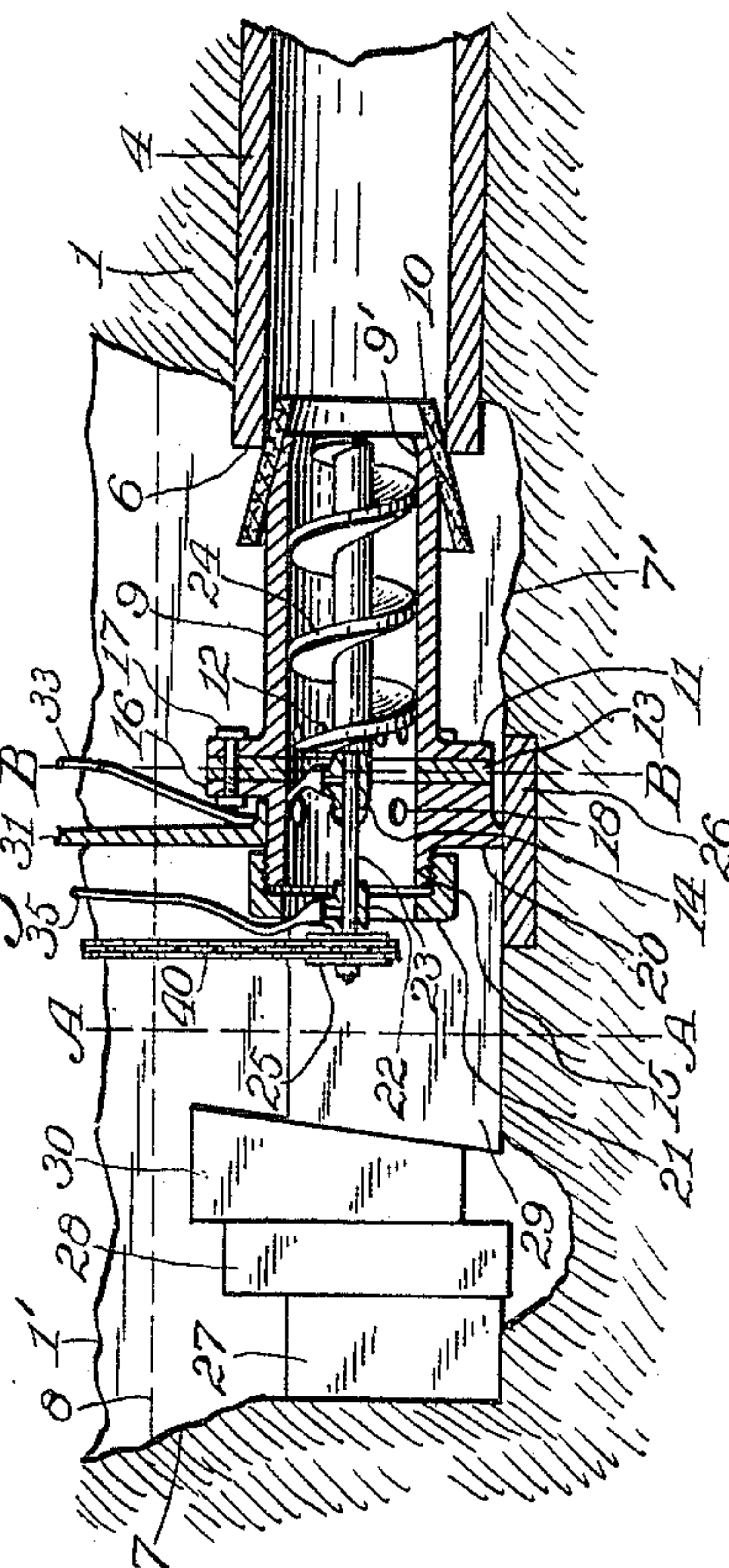


Fig. 2.



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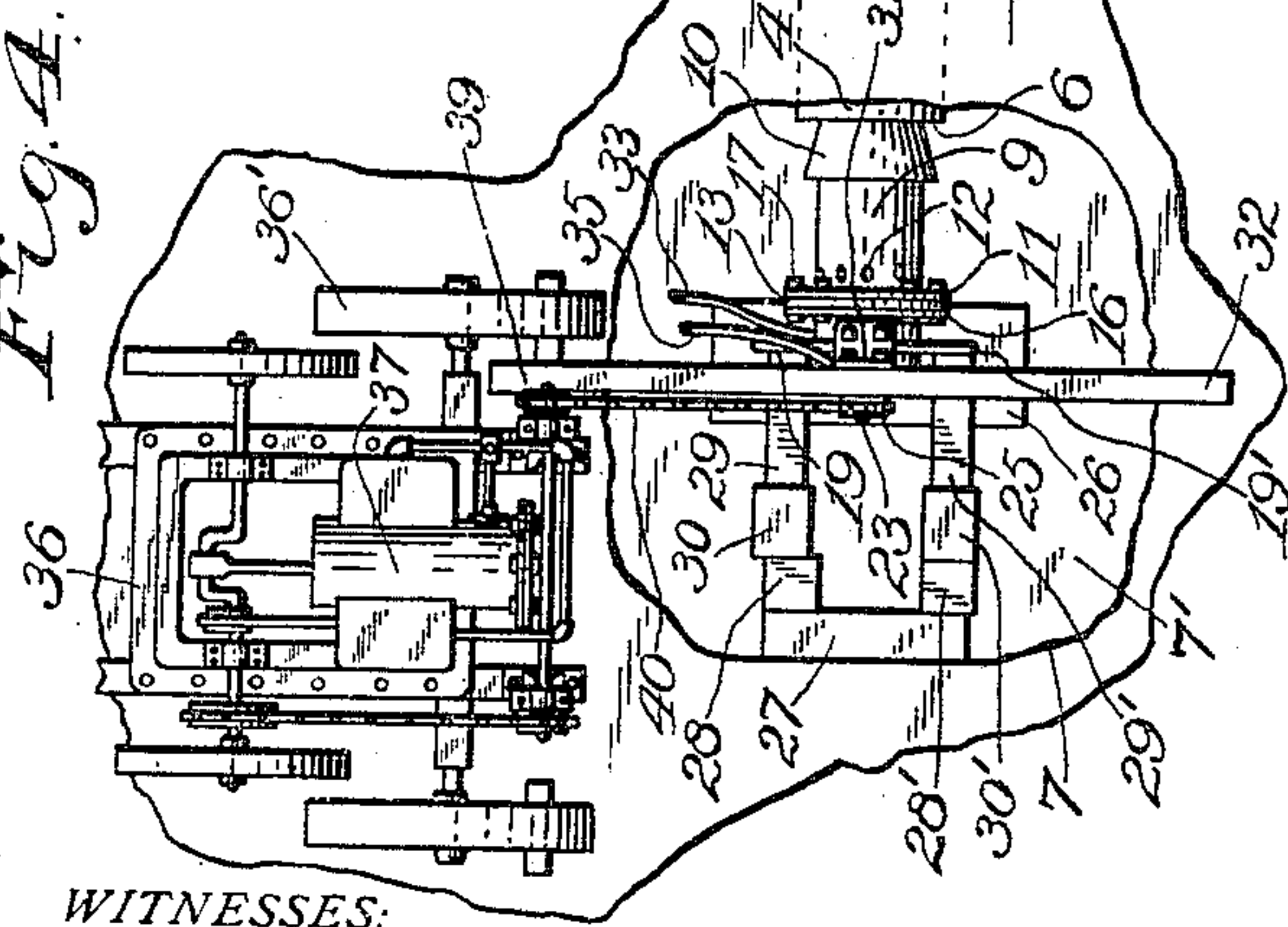
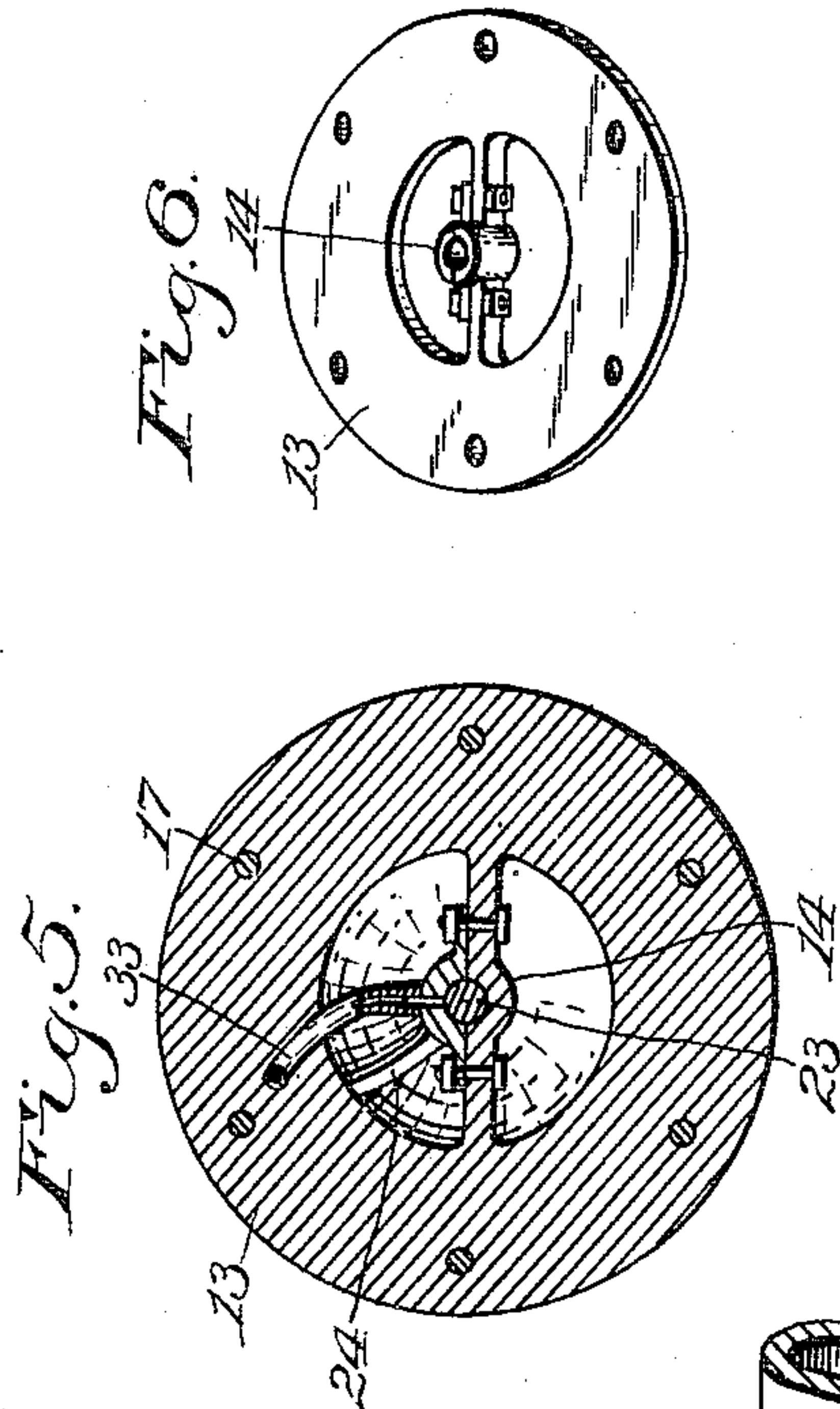
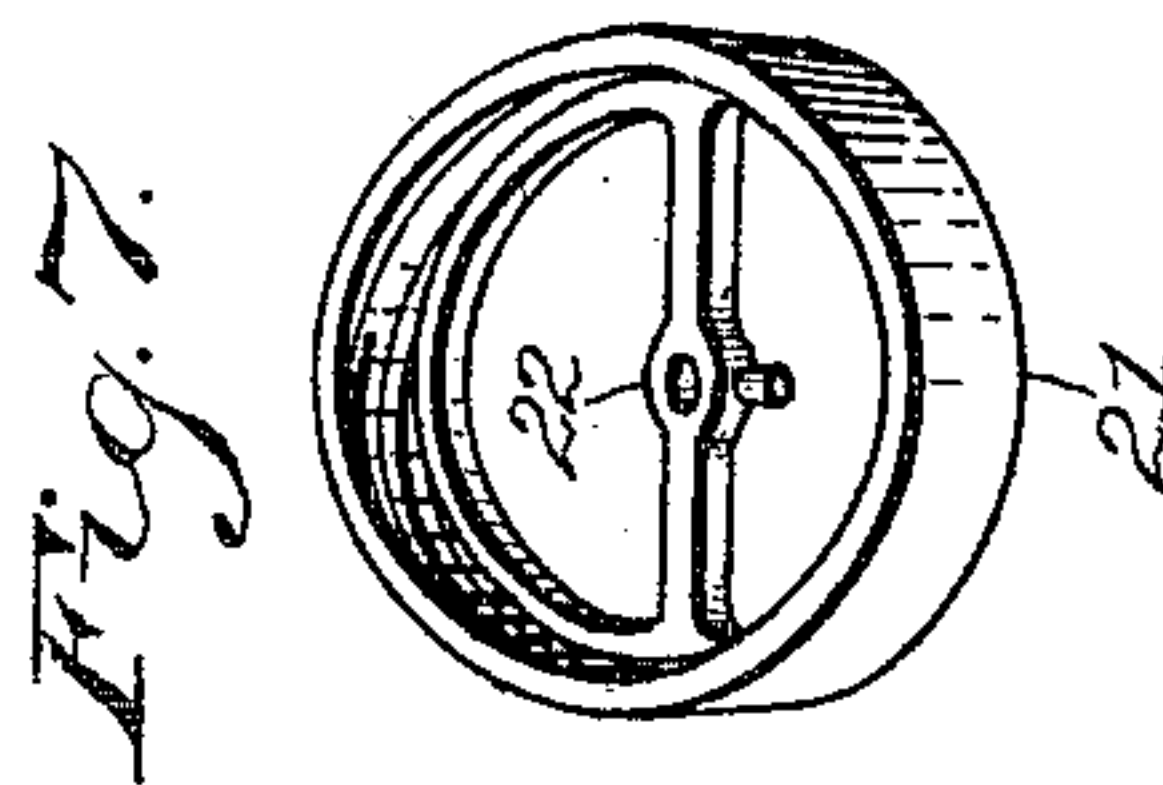
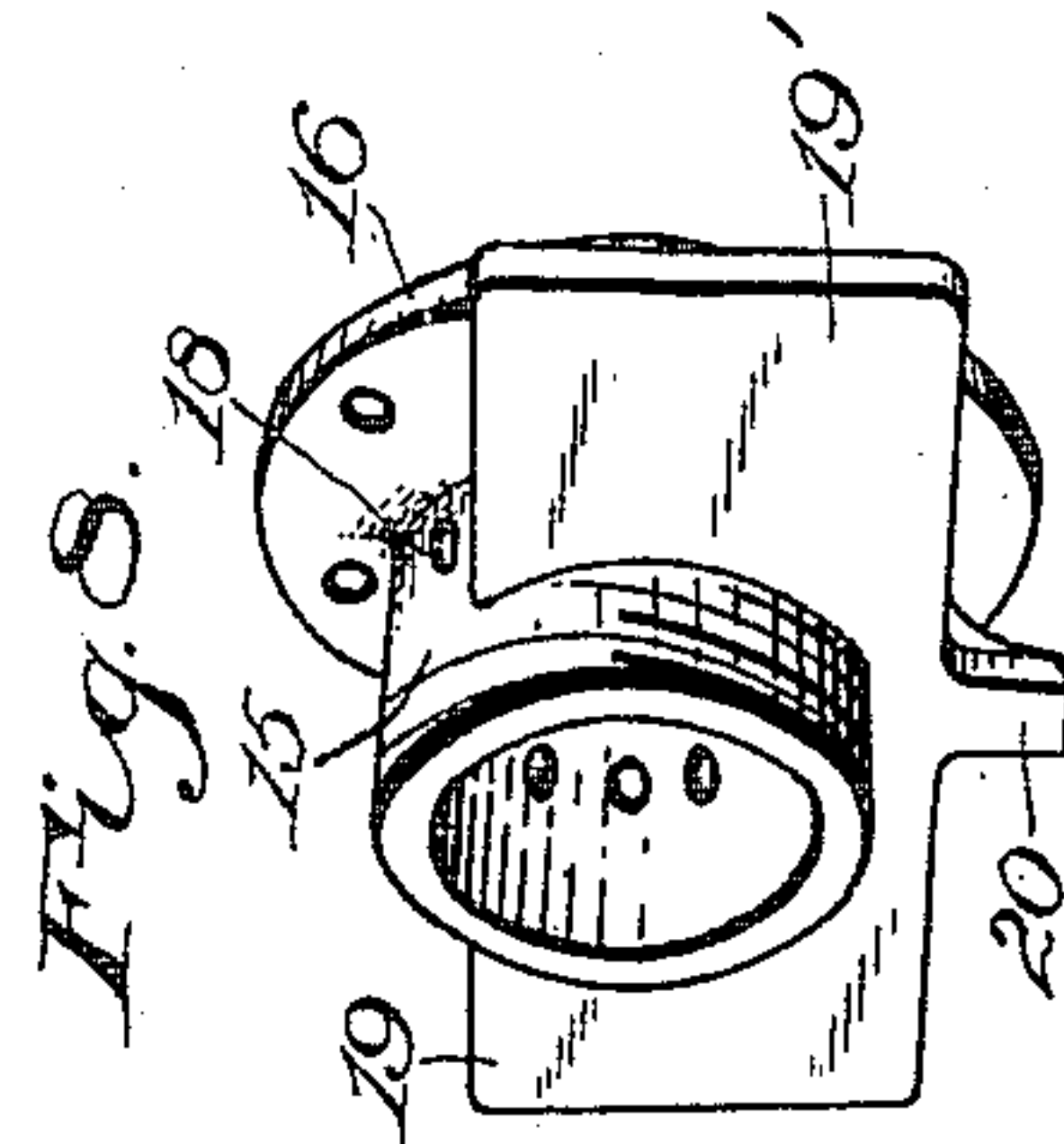
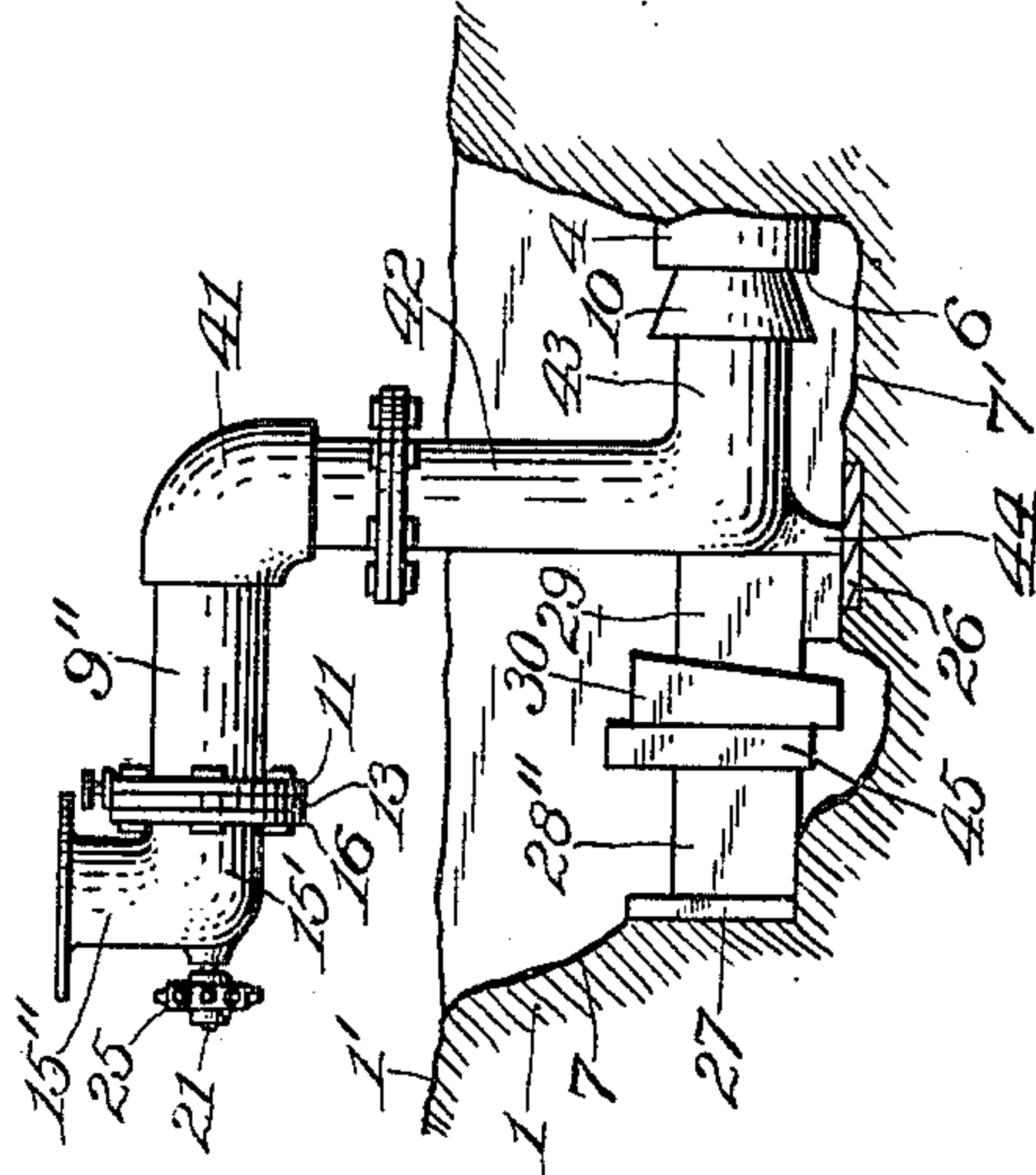


Fig. 9.



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# UNITED STATES PATENT OFFICE.

ARTEMUS N. HADLEY, OF INDIANAPOLIS, INDIANA.

MEANS FOR CLEARING OBSTRUCTED DRAIN-PIPES.

995,404.

Specification of Letters Patent. Patented June 13, 1911.

Original application filed May 28, 1908, Serial No. 435,548. Divided and this application filed August 30, 1909. Serial No. 515,186.

*To all whom it may concern:*

Be it known that I, ARTEMUS N. HADLEY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Means for Clearing Obstructed Drain-Pipes; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to the subject of land draining by means of tile drains laid under the ground surface for collecting and conducting water from the land which, from various causes, may retain so much water as to render it unfit for cultivation and production of crops; the invention having reference particularly to means whereby tile drains may be cleared, and kept clear, of silt or sedimentary matter that may enter the tiles or drain-pipes at the joints between the sections comprising the drainage lines, in order that the efficiency of the drainage systems may not be impaired.

The subject-matter of the present invention was disclosed in an application for Letters Patent filed by me on May 28, 1908, Serial No. 435,548, from which the present application was divided.

As is well known, in drainage systems tile-drains are constructed of sections of tiling formed as short tubes and laid in the ground at suitable distances from the ground surface with the ends of the sections abutting loosely or close together, but so that the water in the ground may ooze through the joints and enter the pipes and flow away to streams or ditches, the lines of the pipes having more or less inclination so as to induce a flow of water therethrough, but in some sections of the country it is found to be impracticable to provide as much inclination as is desired in the lines of pipe to wash out the silt and keep the drains clear; and furthermore, in some land there is greater tendency than in other lands of the soil to pass through the joints of the drain-pipes, so that heretofore it has been found impracticable to drain certain kinds of lands, or such as are peculiarly situated, by the use of drain-tiling of the above mentioned character, for the reason that the lines must

necessarily be nearly level and owing to peculiarities of the soil would soon be choked by the silt, and therefore, become useless.

The object of the invention is to provide means whereby drainage lines may be expeditiously and cheaply cleared of obstructions arising from deposits of silt or sedimentary matter, which may be caused partly by reason of sluggish flow of the drainage water through the line resulting from conditions requiring lines to be laid with relatively little inclination; a specific object being to provide drain-clearing apparatus that will be adapted to be readily connected to, or disconnected from, the head end or a section of drain tile or pipe having no special provision for attaching or connecting a pipe or device to it, such sections having plain ends devoid of screw threads or flanges; a further object being to provide means for temporarily holding the drain-clearing apparatus in connection with the drain-line, and adapted to be used under water.

The invention consists in apparatus comprising means for forcing water into a line of embedded drain-pipe, novel means for connecting the apparatus to a section of pipe having a plain end, and novel means for holding the apparatus in connection with the pipe-section, for injecting water into, and holding and agitating the water in the drain line as a medium for dissolving the obstructive matter and forming a solution that may be forced out of the line by further use of the apparatus; and the invention consists further in the parts and combinations and arrangements of parts, as hereinafter particularly described and then defined in the appended claims.

Referring to the drawings, Figure 1 is a fragmentary vertical sectional view of land having a drain-line therein and drain-clearing apparatus connected therewith, substantially in accordance with the invention; Fig. 2, a fragmentary sectional view showing a portion of the apparatus and drain on an enlarged scale and in vertical section; Fig. 3, a transverse vertical sectional view on the line A—A in Fig. 2; Fig. 4, a fragmentary top plan illustrating the apparatus in operative position; Fig. 5, a sectional view on the line B—B in Fig. 2; Fig. 6, a perspective view of the principal part shown in the preceding figure; Fig. 7, a perspective view of a part of the pump employed for



forcing water; Fig. 8, a perspective view of another portion of the pump; and Fig. 9, a fragmentary sectional view showing a modified form of pump, which in some cases may be employed.

Similar reference characters in the different figures of the drawings indicate corresponding elements or features herein referred to.

In the drawings the numeral 1 indicates the land to be drained, 1' being the surface thereof, and the numeral 2 indicates a ditch to receive and carry off the drainage from the lower end of the line 3 of the drain-pipe, the line comprising a plurality of sections, as 4, 4', 4'', of pipe composed of any suitable material and arranged end to end with butt-joints 5, which being rough joints permit water to percolate through, as will be understood, and in most cases carrying more or less silt with it to the interior of the pipes, 6 indicating the higher or head end of the line of the pipe.

When it is desired to clear the drainage pipe, a suitable excavation 7 is made at the head end of the line of the pipe to form a pit of suitable dimension and depth so that the bottom 7 of the excavation will be lower than the mouth of the pipe, and in most cases water will stand in the pit, 8 indicating the probable water line, and when sufficient water cannot be obtained from the surrounding ground for carrying out the objects of the invention, water may be brought in any suitable manner into the excavation, it being preferable to use such water as can be found conveniently in the ground for the purpose of clearing the drain-pipe, and in order to force the water into the pipe any suitable pump may be employed that will be adapted to be submerged in the water or be connected readily under water to the head end 6 of the drain-pipe. It should be understood, of course, that when a very long line of pipe is to be cleared an excavation may be made at any suitable point between the ends of the line and a few sections of pipe be taken up so that the pump may be connected to the lower portion of the line, and thus in some cases the line may be more conveniently cleared by sub-dividing the line into sections.

A suitable form of pump for the purpose comprises a pump barrel or cylinder 9 having preferably an externally tapering nozzle end 9' adapted to fit closely into the end 6 of the drain-pipe, and in order to make connection with larger sizes of drain-pipe a packing ring 10 is provided which is of conical shape so as to fill the space between the nozzle end 9' of the pump barrel and the interior of the end 6 of the drain-pipe, and it will be understood that while one packing ring may suit for several sizes of drain-pipe, thicker packing rings may be provided for

use with larger drain-pipe. The opposite end of the barrel has a flange 11 and preferably has apertures 12 in the wall of the barrel adjacent to the flanges, an annular plate 13 being placed against the end of the barrel and having a journal bearing 14 supported in the opening of the plate, the barrel comprising also an end part 15 having a flange 16 that is placed against the plate 13 and both secured by bolts 17 to the flange 11, the part 15 preferably having apertures 18 in the wall thereof to freely admit water into the barrel, the end of the part 15 being partially obstructed. The part 15 of the barrel has two lateral projections 19 and 19' and also a foot 20 for supporting the barrel, and a bearing support 21 is suitably attached to the end of the part 15 and supports a bearing 22 in which a rotative shaft 23 is journaled, the shaft being journaled also in the bearing 14, and it has a spiral blade 24 thereon that is rotative by the shaft within the pump barrel so as to force the water out of the nozzle end 9' that may be admitted through the apertures 12 and 18 and around the bearing 22. A sprocket wheel 25 is secured to the shaft 23 at the outer side of the bearing 22 whereby to rotate the shaft and the blade 24. This comprises a simple and efficient rotary pump or apparatus for injecting water in large volume into the drain-pipe, but it is evident that a pump may be otherwise constructed if desired.

In order to properly support the pumping apparatus a suitable timber 26 is placed on the bottom of the pit as a foundation and the foot 20 rests thereon, and various devices may be employed for holding the pump barrel tightly in connection with the end 6 of the drain-pipe, a simple and effective means comprising suitable pieces of timber or blocks, as 27, placed against the side of the pit opposite to the end of the shaft 23, other blocks as 28 and 28', and two blocks 29 and 29' placed against the projections 19 and 19', and wedges 30 and 30' driven in between the blocks 28 and 29 and the blocks 28' and 29' respectively; also, preferably the pump barrel is provided with an arm 31 that extends upward and is attached to a beam 32 placed on the top of the ground and extending across the pit, to assist in steadying the pumping apparatus and preventing it from turning or shifting while in operation.

The bearing 14 may have a pipe 33 connected thereto, to which a grease-cup 34 is attached, and the bearing 22 may have a pipe 35 connected thereto, to which is attached a grease-cup 34', so that any suitable lubricant may be forced onto the bearings if desired.

A suitable vehicle 36 having wheels 36' or other means of conveyance is provided, on



which is mounted an engine 37, preferably an explosive engine, and provided with a gasolene tank 38, the engine driving a sprocket wheel 39 that is mounted on the vehicle and has a sprocket chain 40 connected therewith that is connected also with the sprocket wheel 25, so that the vehicle may be anchored adjacent to the pit and readily connected with the pumping apparatus in the pit or disconnected therefrom, and it will be apparent, of course, that the pumping apparatus may be loaded onto the vehicle for transportation from place to place.

When sufficient water for the purpose can not be found in the ground after digging a pit, and if it is preferable under the circumstances to convey water directly to the pump from other sources, the pump may be slightly modified as shown in Fig. 9, in which 9'' indicates the pump barrel similar to the main portion of the barrel 9, but is imperforate, and is connected to an elbow 41 that is connected to a stand-pipe 42 having a nozzle portion 43 at its lower end which is connected to the end 6 of the pipe section 4, preferably with the packing ring 10, the stand-pipe 42 having a foot 44 that rests on the foundation timber 26. The barrel 9'' has the flange 11, the plate 13 connected thereto and an imperforate end part 15' that is provided with the flange 16, the shaft 23 as hereinbefore described extending through the part 15' and journaled therein and having the sprocket wheel 25 thereon, the part 15' having a branch part 15'' to which a supply-pipe may be connected for conducting water to the pump. The stand-pipe 42 is held in place substantially as hereinbefore described as by means of blocks 27, 28'', 29, 45 and a wedge 30, all arranged between the stand-pipe and the opposite side of the pit.

In some instances where it may be more convenient it is evident that any suitable portable pumping apparatus may have its delivery-pipe connected to the stand-pipe 42, in which case, of course, the pump hereinbefore described will be disconnected from the stand-pipe, it being immaterial to the invention as to the type of pumping apparatus that may be employed for the purpose, it being requisite, however, that the apparatus be adapted to be readily connected and temporarily anchored in connection with an open end of a section of the drain-pipe, it being understood that such drain-pipe sections are not provided with couplings nor adapted to have pipe or other connections coupled thereto, and furthermore, it is preferable and in some cases necessary to use a large volume of water and with rapid flow although not necessarily under great pressure, so that the screw type of pump is well adapted for the purpose.

In practical use the object is carried out

by forcing water into the drain-pipe and in contact with the sedimentary obstruction, the water saturating and softening, therefore mixing with the matter and all being confined in the drain-pipe and agitated by the action of the pump, the matter becomes suspended in the water and in turn aids in erosion of the more solid contents of the pipe, the action progressing until all the matter in the pipe becomes in a measure dissolved or held in suspension by the water and finally passing out with the water from the outlet end of the drain-pipe, this result being obtained by the action of the apparatus hereinbefore described, or other suitable apparatus. After clearing a line of drain-pipe the apparatus may be quickly disconnected from the drain-pipe and conveyed to another line and quickly connected thereto, as has been described, so that a large number of lines may be cleared in a short time and at comparatively little expense, and in some cases the pits at the head ends of the drainage lines may be left open for future use and the pipes may be either plugged or left open, depending upon circumstances.

It will be understood that the progressive saturation of the silt from the head end toward the outlet end of the drain-pipe is accelerated by the agitation of the water and silt in suspension due to the rapid flow of the water through the portions of the pipe in which the silt has been loosened and partially dissolved, and the fact that more or less surging of the water may be produced by reversing the motion of the pump to create vacuum, and by variation in pressure which may arise on account of variation in speed of the engine that drives the pump, as when maximum pressure has been attained the pump will slacken and the pressure fall, permitting slight reaction of the water in the pipe, this especially being the case when the screw or a rotary pump is used instead of the piston pump.

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

1. Apparatus, for clearing a drainage pipe line embedded in the ground, including a water-delivering machine provided with a delivery end adapted to be placed unattachably to the end of a section of the pipe line, and means independent of the pipe line for holding the delivery end forcibly in contact with the end of the section.

2. Apparatus, for clearing a drainage pipe line embedded in the ground, including a water-delivering machine provided with a delivery end to be connected removably to the head end of the pipe line, and means to cooperate with the ground for holding the delivery end of the machine in connection with the end of the pipe line.

3. Apparatus, for clearing a drainage pipe line embedded in the ground, including



a delivery pipe to be connected removably to the head end of the pipe line, means abutting the ground for holding the delivery pipe in connection with the end of the pipe line, and a water-delivering machine connected to the delivery pipe.

4. Apparatus, for clearing a drainage pipe line embedded in the ground, including a delivery pipe to be connected removably to the head end of the pipe line and provided with means to cooperate with the ground for holding the delivery pipe in connection with the end of the pipe line, and a water-delivering machine connected to the delivery pipe.

5. Apparatus, for clearing a drainage pipe line embedded in the ground, including a water-delivery machine provided with a delivery end that is adjustable for connection with the head end of the pipe line, and means cooperating with the ground to hold the adjustable end of the machine in connection with the end of the pipe line, the pipe line being devoid of a coupling.

6. The combination, with a drainage pipe line embedded in the ground, and exposing an opening in a pit in the ground, of a water-delivering machine, means for connecting the machine to the pipe line in the pit, and means cooperating with the ground in the pit to hold the connecting means in connection with the pipe line.

7. The combination, with a drainage pipe line embedded in the ground, and exposing an opening in a pit in the ground, of a water-delivering machine, means for connecting the machine removably to the opening of the pipe line in the pit, means cooperating with the side of the pit opposite to the end of the pipe line for holding the connect-

ing means in connection with the pipe line, and means for operating the water-delivering machine.

8. The combination, with a drainage pipe line comprising abutting tubular sections embedded in the ground and devoid of couplings, of a water-delivering machine including a conduit having a delivery end adapted to be connected removably to the open end of one of the sections, and means for forcibly holding the delivery end of the conduit in contact with the end of the section, and for forcing the adjacent abutting sections closely together.

9. The combination of a water-delivering machine including a delivery conduit having an externally tapering terminal adapted to be inserted into the open end of a drain-tile and close the interior thereof to the atmosphere, with a drainage pipe line into which said terminal is inserted, and means for removably holding said terminal in position in contact with the pipe line.

10. In apparatus for clearing drainage pipe lines composed of abutting non-coupled tubular sections embedded in the ground, the combination with a water-delivering machine, of a tubular conduit connected with the machine and having an externally tapering end portion adapted to be inserted and held removably in one end of one of the sections and form contact with the wall thereof, and to hold the adjacent abutting sections closely together.

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

ARTEMUS N. HADLEY.

Witnesses:

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E. T. SILVIUS.