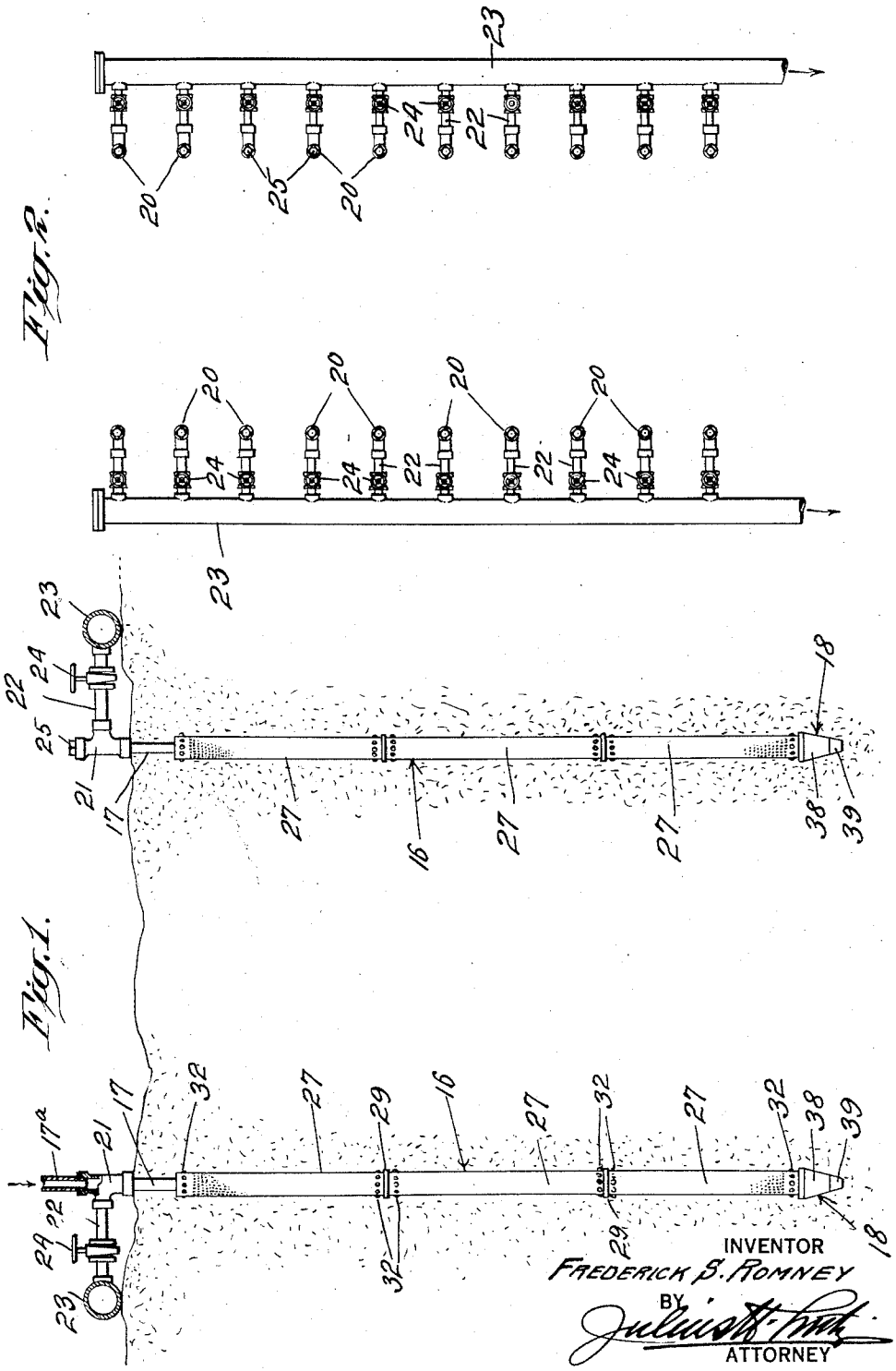
Oct. 23, 1928. 1,688,356

F. S. ROMNEY

APPARATUS FOR DRAINING LAND

Filed Oct. 20, 1925 3 Sheets-Sheet 1



Oct. 23, 1928. 1,688,356

F. S. ROMNEY

APPARATUS FOR DRAINING LAND

Filed Oct. 20, 1925 3 Sheets-Sheet 2

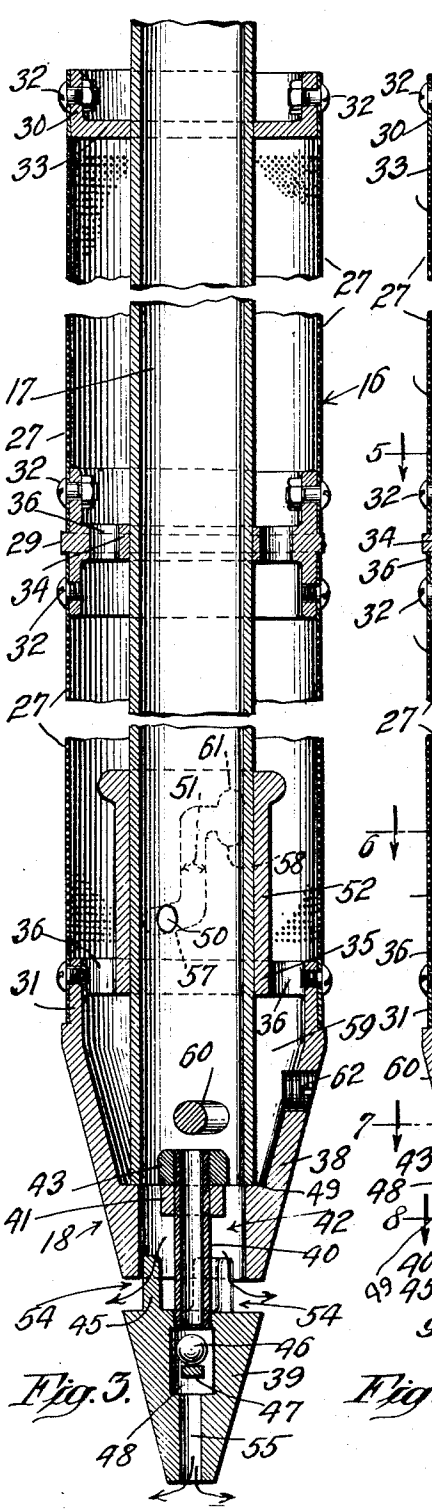


Fig. 3.

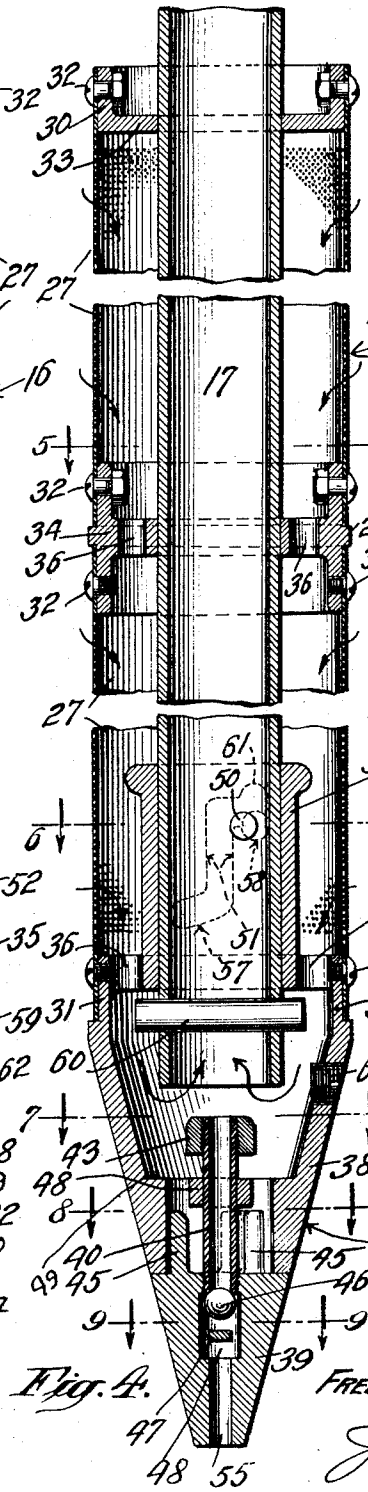


Fig. 4.

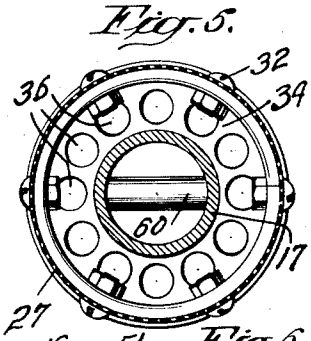


Fig. 5.

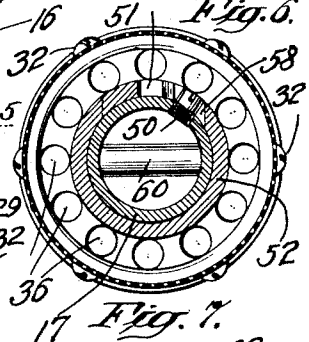


Fig. 6.

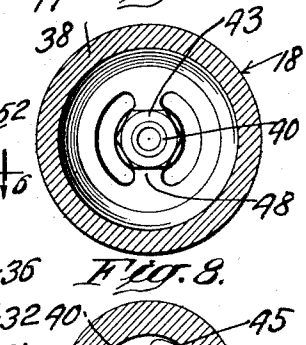


Fig. 7.

Fig. 8.

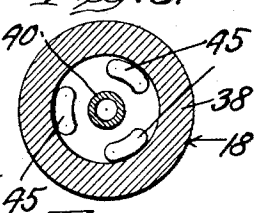
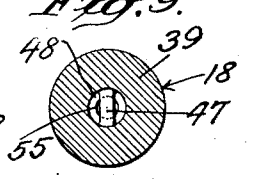


Fig. 9.



INVENTOR
FREDERICK S. ROMNEY
BY
ATTORNEY

Oct. 23, 1928. 1,688,356

F. S. ROMNEY

APPARATUS FOR DRAINING LAND

Filed Oct. 20, 1925 3 Sheets-Sheet 3

Fig. 10.

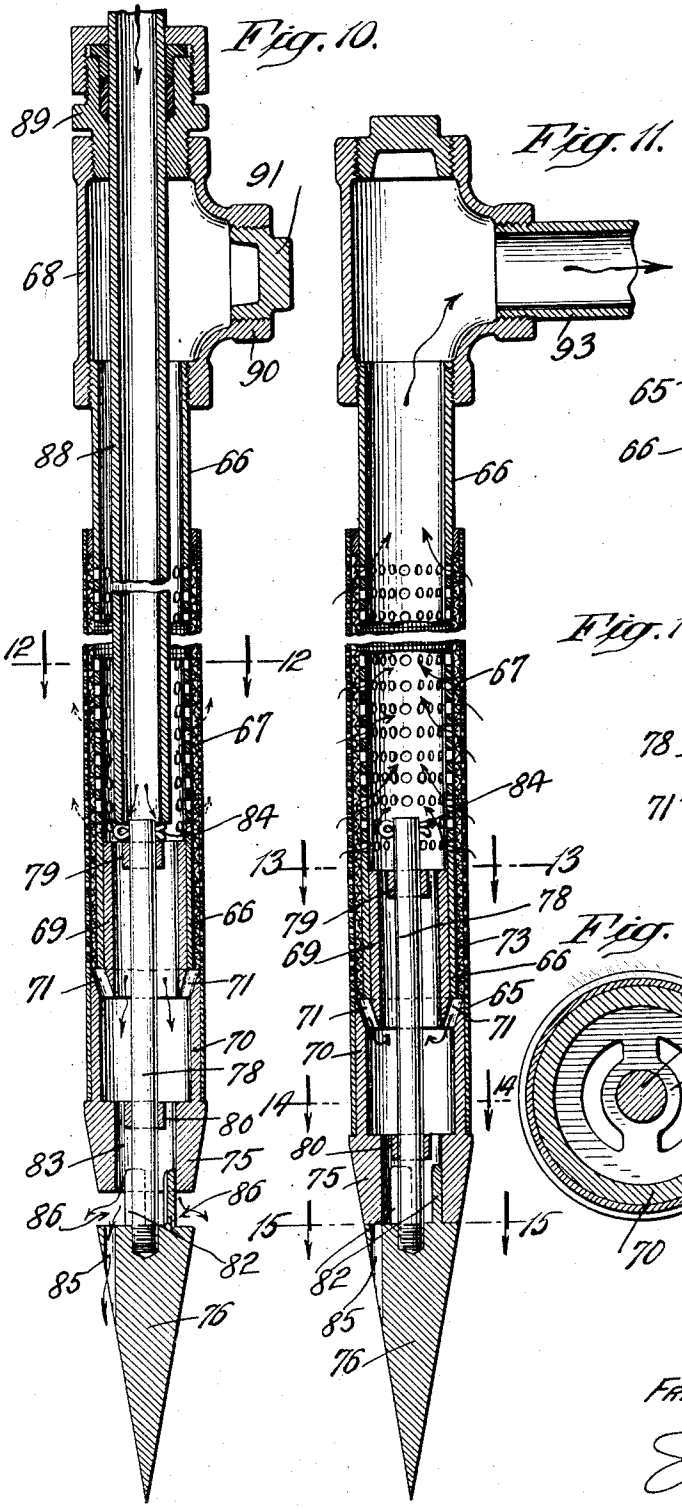


Fig. 11.

Fig. 12.

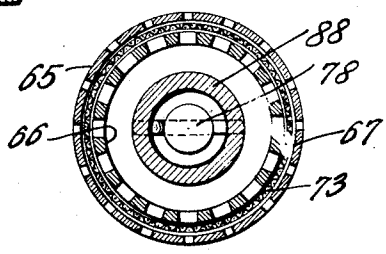


Fig. 13.

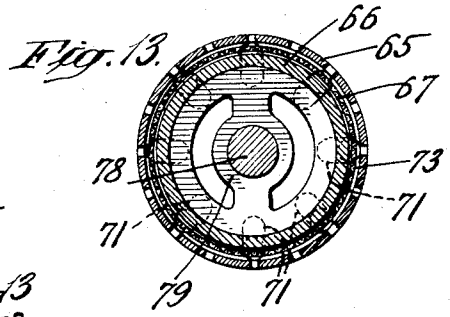
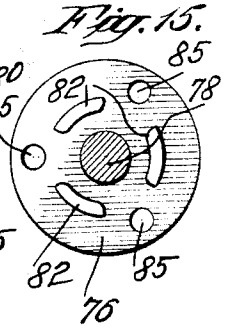


Fig. 14.

Fig. 15.



INVENTOR
FREDERICK S. ROMNEY
BY
ATTORNEY

Patented Oct. 23, 1928. 1,688,356

UNITED STATES PATENT OFFICE

FREDERICK S. ROMNEY, OF NEW YORK, N. Y.

APPARATUS FOR DRAINING LAND.

Application filed October 20, 1925. Serial No. 63,802.

The invention relates to an improvement in apparatus for draining land.

It is common practice at the present time to drain the surface waters to a predetermined depth from swamps, marshes and other more or less permanently saturated lands by means of apparatus consisting of one or more perforated pipes, or "points" as they are called, driven into the soil and connected at their upper ends with a pump. Considerable difficulty is somtimes experienced in driving the pipes or units of the draining apparatus into the ground, especially if the soil is composed of very fine sands known as "quick" sands. One object of the present invention is to produce an improved land drainage apparatus having provision whereby it may be more easily and expeditiously driven into the ground to be drained than is possible with such apparatus as at present constructed. Another object of the invention is to improve the construction and arrangement of the parts of drainage apparatus of this type so as to effect a quicker and more efficient drainage of the land. With these objects in view the invention consists in the improved apparatus for draining land hereinafter fully described and particularly pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a diagrammatic view in side elevation of two series of units of the improved apparatus driven into the ground or soil to be drained, and shown connected with manifolds which lead to the intake of the drainage pump; Fig. 2 is a plan of the parts shown in Fig. 1; Fig. 3 is a longitudinal section of an enlarged scale through a single unit of the apparatus, with the parts in position for driving the unit into the ground; Fig. 4 is a view similar to Fig. 3, with the parts of the unit in draining position; Figs. 5 to 9 inclusive are transverse sections taken on the lines 5—5, 6—6, 7—7, 8—8 and 9—9, respectively, of Fig. 4; Fig. 10 is a longitudinal section through a modified form of unit, with the parts in position for driving into the ground; Fig. 11 is a view similar to Fig. 10, with the parts in draining position; and Figs. 12 to 15 inclusive are sections taken along the lines 12—12, 13—13, 14—14 and 15—15, respectively, of Figs. 10 and 11.

The preferred form of the improved land drainage apparatus of the present invention, as illustrated in Figs. 3 and 4, comprises a perforated outer shell 16 through which the water passes into the interior of the apparatus, a pipe 17 movably supported in the shell 16 and through which the water is drawn to the surface of the land, and a hollow, cone-shaped driving point 18 connected with the lower end of the shell 16. These parts constitute a single unit which may be used alone or as one of a series of such units. Where a considerable area of land is to be drained, a number of these units will be arranged in series as indicated at 20 in Fig. 2. According to the width of the piece of land to be drained there may be one or more of such series of drainage units. When the drainage units are used in series the upper ends of the pipes 17 are connected with the lower arms of T-elbows 21. The lateral arm of which elbow is connected by a short pipe 22 with a manifold 23 which is closed at one end and is connected at the other end with the intake of the pump used for draining the land. In each connecting pipe 22 is located a valve 24. The upper arms of the elbows 21 are normally closed by plugs 25.

The outer shell 16 consists of a number of relatively short, cylindrical pipe sections 27 formed from sheets of thin, perforated metal. The number of sections 27 to be used in making up the shell 16 will be determined by the depth to which the land is to be drained. The sections 27 of the shell 16 are strengthened and held connected together by means of a series of collars or rings 28, of which only one is shown in Figs. 3 and 4. Each ring 28 is provided with an annular shoulder 29 against the upper edge of which the lower end of a shell section abuts, and against the lower edge of which the upper end of a shell section abuts. The upper end of the uppermost shell section embraces a ring 30, and the lower end of the lowermost shell section embraces the reduced cylindrical portion 31 of the point 18. The shell sections are secured to the rings and to the point 18 by means of the screws 32. Each apparatus unit may be lengthened or shortened by adding or taking away one of the intermediate rings 28 and a shell section.

The pipe 17 is supported in the shell 16 so as to be moved axially thereof. For this purpose the pipe 17 is loosely embraced by the web or flange 33 extending inwardly from the ring 30, by the perforated web 34 extending

inwardly from each collar or ring 28, and by the perforated web 35 extending inwardly from the upper end of the point 18. The web 33 is solid, and with the pipe 17 closes the upper end of the shell part 16 of the apparatus. The webs 34 and 35 are provided with holes 36 which establish communication throughout the length of the apparatus.

The hollow, cone-shaped point 18 is made in two parts or sections, of which the larger, upper part or section 38 is secured to the lower end of the shell 16, and of which the lower end or section 39 is movably connected with the section 38. The connection between the section 38 and the section 39 of the point 18 comprises a pipe or tube 40 slidingly received in a cross-piece 41 extending across the central opening 42 in the lower end of the point section 38. The upper end of the tube 40 is provided with a nut 43 adapted to rest against the upper side of the cross-piece 41 when the parts of the apparatus are in driving position, as shown in Fig. 3. The lower end of the tube 40 is threaded into the upper end of the point section 39. Projecting upwardly from the upper surface of the section 39 are three lugs 45 which are loosely received in the hole 42 and serve to guide the section 39 in its in-and-out movements on the section 38. In a chamber 48 in the section 39 of the point is a ball valve 46 which is adapted to close the lower end of the tube 40 when the parts of the apparatus are in draining position, as shown in Fig. 4. A cross-piece 47 supports the ball 46 when the parts of the apparatus are in driving position, as shown in Fig. 3.

When the apparatus is to be driven into the ground to be drained the pipe 17 is moved axially of the shell 16 until the lower end thereof is forced against an annular shoulder 49 in the lower contracted end of the section 38 of the point 18. The lower end of the pipe 17 is now cut off from communication with the perforations in the shell. The pipe is held in this position relatively to the shell by means of a bayonet catch consisting of a pin 50 projecting laterally from the pipe and received in a slot 51 formed in a sleeve 52 which projects upwardly from the web 35 and loosely embraces the pipe. With the parts of the apparatus in this condition the upper end of the pipe is connected with a pump which forces water down through the pipe under a pressure of about eighty pounds. The workman then grasps the apparatus and forces it into the ground. The force of the water descending through the pipe 17 keeps the section 39 of the point separated from the section 38 so that the water passes out through the opening 54 between the point sections and drives the loose soil aside, permitting the workman to force the apparatus into the ground easily. The body of water forced through the point section 38 also acts as a guard or cushion in eliminating frictional contact between the lower end of the apparatus and the soil as the workman forces it into place.

The water issuing out of the hole or opening 42 and the space 54 stirs up the loose sand or other soil in advance of the apparatus in such a manner that the resistance of the soil under the section 39 of the point is negligible. Moreover a portion of the water passing down through the pipe 17 enters the tube 40 and passes out through the hole 55 in the lower end of the point section 39. The water issuing from the hole 55 has the same effect on the soil with respect to the point section 39 as the water issuing through the opening 54 has on the soil with respect to the point section 38 and the shell 16. It is difficult to state just exactly what the action is which takes place when the water is forced down through the pipe 17 in driving the apparatus into the soil. The fact is, however, that by forcing a stream of water under the requisite degree of pressure into the soil in advance of the apparatus, the apparatus can be very easily driven into soils composed of quick sands which have heretofore been found exceedingly difficult to drive a pipe or drainage unit into.

When a single unit or series of units of the apparatus have been driven into the soil in the manner described above, the pipe 17 of each unit is turned to free the pin 50 from locking engagement with the lower end 57 of the slot 51, and then the pipe 17 is lifted to disengage the lower end thereof from the shoulder 49 of the point section 38. The pipe 17 is held in its raised position by the engagement of the pin 50 with the shoulder 58 in the upper end of the slot 51. The upper ends of the pipes 17 are now connected with the manifold or manifolds 23, and the latter are connected with the intake of the drainage pump which is now started in operation. The water in the soil is sucked through the perforations in the shell 16 and falls into the space 59 in the point section 38 whence it is drawn up through the pipe 17 and is discharged through the pump.

At the beginning of the action of the pump the exhaustion of the air from the interior of the apparatus causes the ball valve 46 to be drawn up against the lower end of the tube 40, the two parts of the point having moved together on the completion of the driving operation by reason of the weight of the apparatus. If the perforations in the shell 16 become clogged during the drainage operation the action of the pump may be reversed to force water from the interior of the apparatus outwardly through the shell 16 to clear the perforations. If the action of the pump cannot be reversed, the plugs 25 are removed from the elbows 21 and pipes 17^a (only one being shown in Figure 1) connected with a pressure pump are inserted in the elbows. The pressure pump is then started in opera-

tion and water forced down into the pipe 17 and out through the perforations in the shells 16, thereby effectually clearing the perforations from all obstructions.

When the soil has been properly drained the units of the apparatus are disconnected from the manifolds and each unit in turn drawn from the soil. In drawing each apparatus unit out of the soil the workmen grasp the upper end of the pipe 17 and pull upwardly on it. In the lower end of each pipe 17 is a transverse pin 60 which is adapted to bear against the under surface of the web 35. It will be observed that the space between the top of the pin 60 and the under surface of the web 35 is less than the space between the upper end of the pin 50 and the top end 61 of the slot 51 so that the pin 60 is permitted to engage with the web 35 while the pin 50 does not strike the upper end of the slot 51. The pin 60 is forced into place in the lower end of the pipe 17 through a hole in the side of the point section 38, which hole is closed by the screw 62.

In the modified form of apparatus illustrated in Figs. 10 and 11 the cylindrical shell part of the apparatus consists of an upper member 65 and lower inner member 66. The overlapping portions of the shell members or sections 65 and 66 are perforated and between them is interposed a wire gauze 67. The upper end of the shell section 66 is threaded into the lower arm of a T-elbow 68. The lower end of the shell section 66 tightly embraces the reduced portion 69 of a hollow sleeve 70 which is tightly embraced by the lower end of the outer shell section 65. At the point of junction between the reduced portion 69 and the enlarged part of the sleeve 70 is a series of obliquely-disposed holes 71 which afford communication between the interior of the sleeve and the perforations in the part 73 of the shell section 65.

The point part of the modified form of apparatus is made in two separable parts of which the section 75 is hollow and constitutes a downward extension of sleeve 70, and of which the section 76 is solid and is slidingly connected with the section 75. In the upper end of the point section 76 is threaded a rod 78 slidingly supported at its upper end in the cross-piece 79 extending across the part 69 of the sleeve 70 and at its lower end in the cross-piece 80 extending across the upper end of the point section 75. The point section 76 is guided in its in-and-out movements in the point section 75 by the lugs 82 extending upwardly from the upper surface of the point section 76 and loosely received in the central hole 83 in the point section 75. A cotter pin 84 in the upper end of the rod 78 limits the downward movement of the point section 76 by its engagement with the upper surface of the cross-piece 79. In the upper or base portion of the cone-shaped point section 76 are three holes 85 which lie beyond the outer edge of the central hole 83 in the point section 75, so that when the two sections of the point are in abutment, as shown in Fig. 11, the lower end of the shell is closed. When, however, the two sections of the point are separated for the driving operation, as shown in Fig. 10, some of the water issuing through the hole 83 in the point section 75 and out through the space 86 between the point sections will pass down through the hole 85 to stir up the soil around the point section 76 and also act as a cushion for it during the driving operation.

When the modified form of apparatus is to be driven into the soil a pipe 88 is inserted into the upper end of the shell part of the apparatus and a water-tight connection is made between it and the upper arm of the T-elbow 68 by means of a gland 89. The lateral arm 90 of the T-elbow is then closed by a plug 91. Water under the requisite degree of pressure is now forced down through the pipe 88 and issues out of the opening 86 between the point sections, thereby facilitating the driving of the apparatus into the soil. When the apparatus has been driven into the soil the proper depth the pipe 88 and gland 89 are removed and the upper end of the elbow 68 is closed by the plug 92. The plug 91 is then removed and the apparatus is connected by the pipe 93 directly with the pump or with a manifold which is connected with the pump. When the pipe 88 is removed the weight of the apparatus forces the two point sections together thereby closing the lower end of the shell part of the apparatus so that the water in the ground is drawn through the overlapping perforated portions of the shell sections, as indicated by the arrows in Fig. 11. Some water is also drawn through the holes 71 and passes upwardly through the sleeve section 69.

Having thus described the invention what I claim as new is:—

1. An apparatus for draining land embodying, in combination, a shell composed of a plurality of sections, each perforated substantially over its entire area, a point having a connection with the lower end of the shell, an imperforate pipe supported axially within said shell sections and spaced therefrom to provide between the pipe and shell a suction compartment, means for closing the upper end of this compartment, said pipe being movable axially to alternately connect with the point and with said suction chamber.

2. An apparatus for draining land comprising a perforated shell adapted to be driven into the soil to be drained, a pipe mounted in the shell and projecting upwardly therefrom, a series of webs loosely supporting the pipe from the shell, the uppermost web forming with the pipe a closure for the upper end of the shell, the other webs having holes establishing communication throughout the

length of the shell, a hollow point consisting of two separate parts one of which is connected with the lower end of the shell and has a shoulder against which the lower end of the pipe is adapted to abut, a tube slidingly mounted to connect the two parts of the point, a valve for closing the lower end of the tube, and a sleeve supported on one of the webs and having a part cooperating with the pipe to hold the latter above the shoulder when the apparatus is in draining position.

3. An apparatus for draining land embodying, in combination, a shell composed of a plurality of sections, each perforated substantially over its entire area, a point having a connection with the lower end of the shell, an imperforate pipe supported axially within said shell sections and spaced therefrom to provide between the pipe and shell a suction compartment, means for closing the upper end of this compartment, said pipe being movable axially to alternately connect with the point and with said suction chamber, a web member connecting each of said sections and having a supporting contact with said axially-disposed pipe, the upper web being disposed above the perforations in the upper section and being imperforate to close the suction compartment and the lower webs being perforated to provide a communication between the sections.

In witness whereof, I have signed my name to the foregoing specification.

FREDERICK S. ROMNEY.