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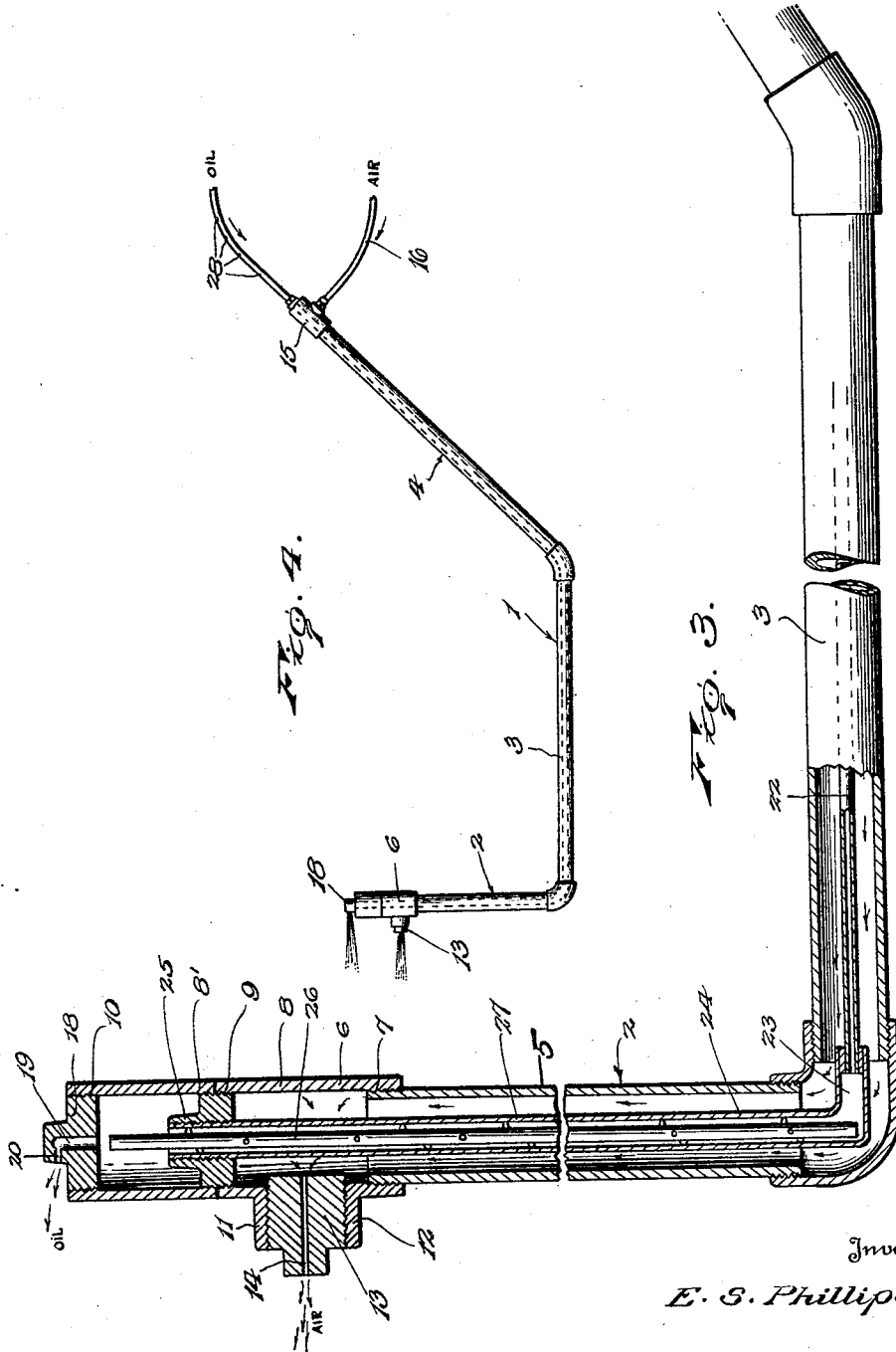
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APPARATUS FOR DESTROYING TREE STUMPS

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2 Sheets-Sheet 2



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APPARATUS FOR DESTROYING TREE STUMPS.

Original application filed November 21, 1918, Serial No. 263,566. Divided and this application filed October 12, 1922. Serial No. 594,085.

To all whom it may concern:

Be it known that I, EDWARD S. PHILLIPS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Apparatus for Destroying Tree Stumps, of which the following is a specification.

This invention relates to an improved apparatus for destroying tree stumps and constitutes a division of my application filed November 21, 1918, Serial No. 263,566, Patent 1,436,053, Nov. 21, 1922.

The primary object of the invention is to provide an apparatus by the use of which stumps may be completely destroyed in situ in a comparatively short space of time and in the most effective manner.

In the accompanying drawings:

Figure 1 is a view illustrating in a general manner the apparatus embodying the invention and the way in which the same is employed in destroying a stump;

Figure 2 is a perspective view of the burner nozzle of the apparatus;

Figure 3 is a detail vertical sectional view through the burner nozzle;

Figure 4 is a side elevation of the burner.

Briefly stated, the apparatus comprises a burner of special design, a source of liquid fuel supply, a source of compressed air, and a source of steam supply.

The burner of the apparatus is indicated in general by the reference numeral 1 and the same preferably comprises a nozzle section 2, a section 3 which leads substantially at right angles from the intake end of the nozzle section, and a section 4 which leads at a more or less obtuse angle from the section 3. The burner section 2 comprises an outer tube 5 to the upper end of which is fitted the branch 7 of a T-coupling 6. The opposite branch of the coupling, indicated by the numeral 8, is interiorly threaded as at 9, and an extension 8' is disposed endwise thereto and is interiorly threaded at its upper and lower ends, the threads at the upper end being indicated by the numeral 10 and serving a purpose to be presently explained. The third branch of the T-coupling indicated by the numeral 11 is interiorly threaded as at 12 and a tip 13 is threaded into this branch and is provided with a discharge bore or passage 14 of relatively small diameter and communicating at its

inner end with the interior of the coupling 6 and the burner tube 5 leading therefrom. In order that air may be supplied to the tube 5 for discharge through the tip 13, a T-coupling 15 has one branch fitted on to the end of the section 4, as shown in Figure 4, and an air supply pipe 16 leading from an air compressor 17, is fitted in the lateral branch of the coupling.

The numeral 18 indicates a tip which is fitted into the threaded upper end 10 of the extension 8' and is provided with a passage 19 and a lateral branch 20 arranged to discharge in substantially the same direction as the tip 13. As will presently be explained, under some conditions vaporized fuel will be discharged through the passage of the tip 18, and under other conditions steam will be discharged through this passage. Liquid fuel is conveyed by gravity from the supply tank 21 through a pipe 22 fitted into the remaining branch of the coupling 15 and this pipe extends axially within the sections 2, 3 and 4 of the burner. The end of this pipe terminates substantially at that end of the section 3 of the burner which is placed in communication with the lower end of the section 2, and this end of the pipe discharges into a tube 24 which extends axially within the section 2 and is fitted at its upper end into a bushing 25 which serves not only as a support for this end of the pipe but also as a connection between the branch 8 of the coupling 6 and the lower end of the extension 8' as clearly shown in Figure 3.

A heat conducting member comprising a rod 26, is arranged within the tube 24 and is of a diameter slightly less than the internal diameter of the said tube, this rod resting at its lower end within the lateral branch 23 from said tube 24 and to which branch the end of the pipe 22 is connected. In order to suitably space the rod 26 from the walls of the tube 24 and at the same time assist in conducting heat to the said rod, the rod is provided at intervals in its length with radially projecting spacing studs 27 contacting at their ends the inner surface of the wall of the said tube 24. At this point it will be understood that when the burner is in operation it will become more or less highly heated at least throughout its nozzle section 2, and that a portion of this heat will be conducted to the rod 26

thus elevating the temperature of the rod to a sufficient degree to immediately volatilize liquid fuel fed to the lower end of the tube 24 through the pipe 22.

5 In order to provide against the rapid feed of oil from the tank 21 because of any suction created in the pipe 22 or tube 24, it is preferable that the said pipe be provided, adjacent the tank 21, with one or
10 more small openings 28 located in its upper side so as to admit air and thus prevent the formation of a partial vacuum.

In Figure 1 of the drawings there is diagrammatically illustrated a source of steam supply indicated by the numeral 29, and a
15 pipe 30 leads from this source to the pipe 22 and communicates therewith at a point in advance of a cut-off valve 31 which is interposed in the said pipe 22, a similar cut-off valve 32 being interposed in the pipe 30.
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In order that the use of the apparatus may be readily understood, reference is now to be had to Figure 1 in which "A" designates a stump which is wholly or partly embedded
25 in the soil "B". Prior to setting up the apparatus a pit "C" is dug beneath the stump, and a quantity of fuel "D" is placed within this pit. Plates "E" and "E'" are arranged above the roots of the stump to span any
30 spaces between the roots and cover over the pit, and loose soil "F" is placed upon the plates to weight the same and hold them in place, loose soil indicated at "F'" being also employed as a packing about the section
35 4 of the burner. The burner is now placed in position as shown in said figure by introducing its nozzle "N" into the improvised fire box afforded by the pit "C". The loose soil "F'" is then deposited about the sections
40 3 and 4 of the burner so that these sections will be in a sense protected from the intense heat generated within the pit. The apparatus having been thus arranged, the valve 31 is opened thus permitting the
45 feed of liquid fuel to the burner, and when the fuel appears at the orifice 20, the combustible material "D" is ignited and the air compressor 17 is set in operation. After
50 the burner has been in operation for a short period of time, the roots and the portion of the body of the stump exposed to the flame will begin to exude sap and other volatile combustible substances contained therein thus affording an auxiliary fuel supply.
55 After a further period of operation, a state of incandescence will practically exist within the pit "C", and when this stage is reached the valve 31 will be closed to cut off the supply of fuel, and the valve 32 will be
60 opened to admit steam to the burner nozzle from which it will be discharged through the tip 8. This steam, in the presence of the incandescent carbon, will, as in the manufacture of water gas, produce carbon
65 monoxide and hydrogen which will then con-

stitute the fuel source in the further carrying out of the burning operation.

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

1. A burner including an outer air conducting tube having a lateral air discharge orifice and having a closed end beyond said orifice, a liquid fuel conducting tube within the first-mentioned tube and out of communication therewith and extending through
75 the closed end thereof, means for conducting heat to the liquid fuel conducting tube, and a discharge tip for the fuel issuing from the said liquid fuel conducting tube, said tip being supported by the end of the air tube.
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2. A burner including an outer air conducting tube having a discharge orifice opening through one side near the end thereof, a tip supported from the end of said tube and spaced from the orifice and out of communication therewith and positioned to discharge in the same direction as the said orifice, and a liquid fuel conducting tube extending within the first-mentioned tube but out of communication therewith and having
85 its discharge end at the said tip.
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3. A burner including an outer air conducting tube having a discharge orifice opening through one side near the end thereof, a tip spaced from and out of communication with the orifice and positioned to discharge in the same direction as the said orifice, a liquid fuel conducting tube extending within the first-mentioned tube but out of communication therewith and in communication with the said tip, and means
100 within the liquid fuel tube adjacent the discharge portion thereof for conducting heat thereto.
105

4. A burner including an outer air conducting tube having a discharge orifice opening through one side near the end thereof, a tip carried by the end of the tube spaced from the orifice and out of communication therewith and positioned to discharge in the same direction as the said orifice, a liquid fuel conducting tube extending within the first mentioned tube but out of communication therewith and in communication with the said tip, and a heat conducting rod
115 within the liquid fuel conducting tube terminating at one end beyond the liquid fuel tube and relatively close to the tip.
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5. A burner including an outer air conducting tube having a lateral discharge orifice, an inner fuel conducting tube extending beyond the air tube, a discharge tip for the fuel tube, and a heat conducting rod within the fuel conducting tube terminating relatively close to the said tip and provided with studs in contact with the fuel tube and maintaining spaced relation between said tube and the rod.
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In testimony whereof I affix my signature.

EDWARD S. PHILLIPS. [L. S.]