Jan. 20, 1925. 1,523,975

W. S. LITTLE

BURNER

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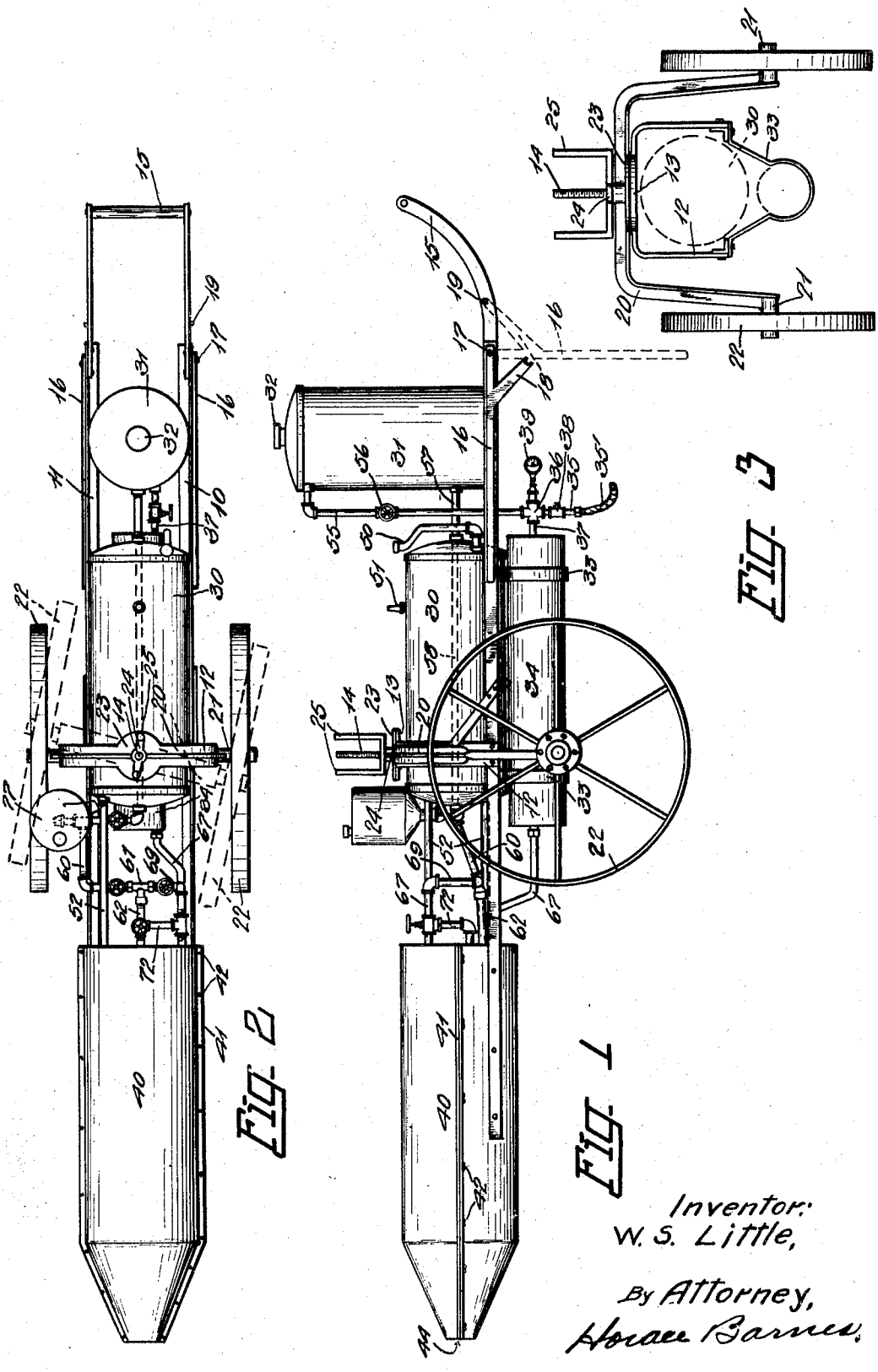


Fig. 2

Fig. 1

Fig. 3

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Fig. 5

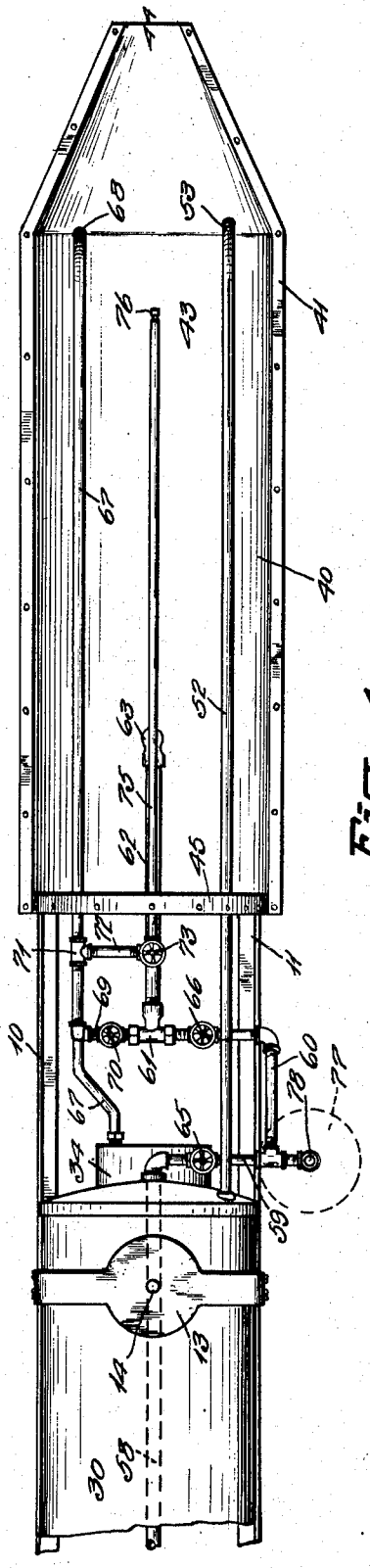
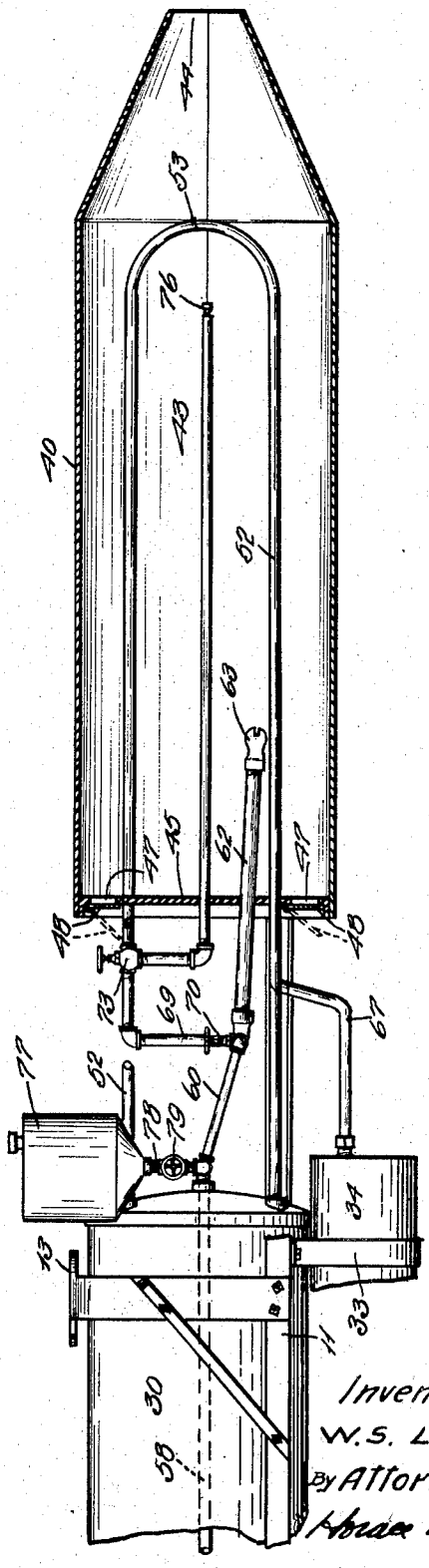


Fig. 4



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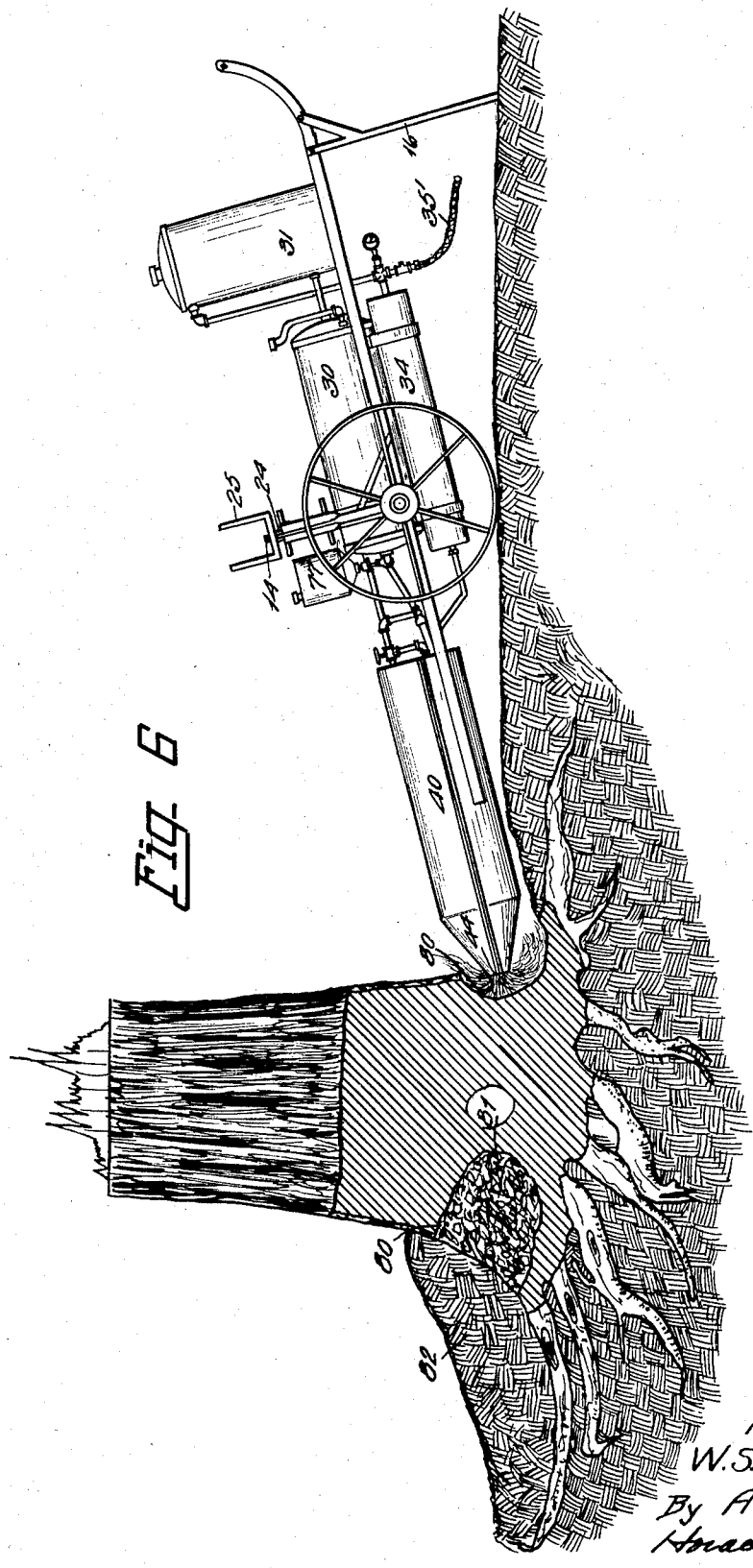


Fig 6

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UNITED STATES PATENT OFFICE.

WALTER S. LITTLE, OF PORTLAND, OREGON.

BURNER.

Application filed October 17, 1923. Serial No. 669,009.

To all whom it may concern:

Be it known that I, WALTER S. LITTLE, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Burners, of which the following is a specification.

This invention relates to torches for burning stumps, weeds, and the like.

The object of the invention is to provide portable apparatus of relatively simple, light and inexpensive construction that is adapted to generate a flame of remarkable length and magnitude, and of great heat intensity with a consequent destructive power that may be readily directed and applied for the purpose of consuming or initiating the combustion of stumps, or which may be freely and easily manipulated to consume or destroy weeds and brush over large areas of waste land, and for other similar purposes.

A further object of the invention is the provision of a torch of novel construction and organization utilizing the heavier and cheaper hydrocarbon oils whereby an intensely hot flame is produced, together with means to develop and extend said flame by means of an air-blast to effectually increase the destructiveness and area covered by the flame, or to make it more potent in close application to the object to be burnt.

A still further object of the invention is the provision of improved means to pre-heat and supply an adequate quantity of air under pressure to the burner and to said blast-pipe.

A still further object of the invention is to provide simple and novel means to pre-heat and feed the oil to the burner in a most suitable condition to support combustion.

It is the province of my invention to improve generally and to promote the utility of the class of apparatus to which the invention appertains and further objects and advantages residing therein will be clearly disclosed in the detailed description hereinafter given.

In the accompanying drawings:

Figure 1 is a view in side elevation of burning apparatus embodying my invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is a view in transverse section of said apparatus.

Fig. 4 is a fragmentary view on an enlarged scale of the apparatus removed from its carriage, shown partly in side elevation and partly in vertical section.

Fig. 5 is a top plan view of the apparatus similar to Fig. 4 with the upper portion of the sectional torch-casing removed.

Fig. 6 is a pictorial view, partly in section, illustrating my improved process of burning stumps, the apparatus being shown in side elevation in process of burning a cavity in the side of a stump, while another cavity is shown filled with combustible material and covered to confine the combustion.

Referring to said views, wherein similar characters of reference indicate like parts in the several views, the reference numerals 10 and 11 indicate substantially parallel frame-members rigidly connected in spaced relation. An inverted U-shaped yoke 12 is fixedly connected transversely of the frame adjacent its middle portion and is formed or provided medially at its upper side with a horizontally directed, flat-topped plate 13 having a fixed screw-threaded post 14 in its center.

The rear end of the frame is provided with handlebar 15 with which the burning apparatus may be manipulated or secured to the rear end of an automobile truck, not shown, for locomotion on occasions to be hereafter more fully described. Legs 16 are pivotally mounted at 17 and are adapted to be folded parallel with the frame-members 10 and 11 as shown in full lines in Figs. 1 and 2, or utilized in their operative positions as shown in broken lines in Fig. 1. Said legs are provided with a brace 18 engageable with a pin 19 when the legs are lowered in operative position.

A carriage is provided for said frame consisting in an inverted substantially U-shaped beam 20 having spindles 21 at the lower end of each of its legs upon which wheels 22 are rotatably mounted. The upper, intermediate portion of said beam is provided with rigid, centrally apertured plate 23 with a plane under face arranged

to bear against said plate 13 when juxtaposed to provide a swinging bearing for the frame upon the carriage.

A screw-threaded nut 24 is associated with said post 14 above said beam having extended handles 25 whereby the frame may be raised or lowered with respect to the carriage.

A water-tank 30 is secured approximately midway of the frame between said members and to the rearward thereof an oil-supply container 31 is mounted having a filling-opening at its top closable by a screw-cap 32. Slung below said tank 30 in rigid position, as by straps 33, is an air-reservoir 34 adapted to receive compressed air from a suitable air-compressor, not shown, through an inlet pipe 35 leading to a cross-T 36 and pipe 37. Said air compressor may be positioned upon an automobile truck at a convenient distance and is connected communicably to said pipe 35 by a flexible hose 35'. A check-valve 38 admitting air under pressure into said reservoir and closable under contrary pressure is interposed in said pipe 35, and a pressure-gauge 39 is connected to the fitting 36 to indicate the active pressure in the reservoir and immediate connections.

Rigidly mounted between the forward ends of said frame-members is a torch-casing 40 comprised of two half-sections having horizontally disposed side flanges 41 through which the sections are detachably connected together by bolts 42, or the like. The lower of said sections is connected to the frame-members and the upper section is readily removable for repairs within the chamber 43 interiorly thereof or for the replacement of the upper section which sustains a greater temperature than the lower section. Said casing is desirably made of cast-iron and is formed with a tapered forward end terminating in an opening 44. The rear end of said casing is closed by a cast wall 45 or may be made in two parts of semi-circular configuration integral with said half-sections, as will be readily understood. Hand-size openings 47 for the admission of air within the chamber 43 to support combustion therein are formed in said wall 45 and dampers 48 are provided to control the inlet of air.

The water-tank 30 is maintained substantially filled with water through an open filling tube 50 into which a funnel, not shown, may be inserted. Steam generated in the tank may escape at any desired tension through a suitable relief-valve, indicated at 51. 52 designates a pipe-coil communicating at its opposite ends with the upper and lower portions of said tank, respectively, and extends in its intermediate portion through the wall 45 of the torch-casing into the chamber 43 to near the forward end thereof and making a return bend 53 in a vertical plane upon one side of the longitudinal axis of the casing and wherein water circulating from said tank will receive heat from the combustion of oil within said chamber and returning to the tank will maintain the water therein at a high temperature.

Air in compressed storage in said reservoir or received from said compressor is conveyed through pipe 55 to within the top of the oil-container 31 as controlled by valve 56. The oil is conducted from the container under desired pressure through pipe 57 extended, as indicated at 58, through the hot-water tank 30 where the temperature of the oil is raised by conduction from said water to a suitable degree and thence continues by pipe connections 59 and 60 to an atomizer 61 wherein the oil is atomized by heated compressed air, as will be more fully described, and thence passes in a finely divided state through a mixer-pipe 62 to a burner-tip 63 in the vertical plane with the longitudinal axis of the casing 40 from whence it escapes in a highly combustible mixture into the combustion-chamber 43 where it is ignited. Cut-off valves 65 and 66 are interposed in said pipes 59 and 60, respectively.

Numeral 67 designates a pipe communicating with the interior of the air-reservoir 34 and extending into the chamber 43 in somewhat similar manner to the pipe 52 and upon substantially parallel lines therewith upon the opposite side of the longitudinal axis of the casing 40, making a return bend 68 and connected by pipe 69 with the atomizer 61 delivering air heated in the combustion-chamber under pressure to the atomizer and therein mixing with the oil and causing a fine division thereof in the mixer-pipe 62. Said atomizer and burner-tip may be of any suitable type or design, and may be readily obtainable in the open market. A valve 70 is placed in pipe 69 to control the supply of air to the atomizer.

At the point of connection between pipes 67 and 69 I position a T-fitting 71 affording communication with a pipe 72 having a valve 73 therein which conveys heated air under pressure to a blast-tube 75 extending through the wall 45 and to near the forward end of the chamber 43 in approximately the longitudinal axis of the casing where it terminates in a nozzle 76 having a relatively small adjustable orifice whence a stream of pre-heated air is directed toward the opening 44 and into the flame generated by the combustion of oil from the burner-tip 63.

For convenience in starting combustion when the apparatus is cold I provide an

auxiliary oil-container 77 to contain kerosene or other light, readily inflammable oil, which is conveyed by pipe 78 having a control-valve 79 into the pipe 60 and is thereby conducted to the burner.

The operation of my burning apparatus will be readily understood from the foregoing description taken with the drawings. After combustion is induced in the chamber 43 by means of the lighter oil from the tank 77, if the apparatus be cold, the proper valves are opened upon the oil-line from the container 31 to the burner-tip to support the desired flame, and in similar fashion the air-supply from the reservoir 34 is controlled to properly atomize the oil and furnish a part of the oxygen to maintain combustion. Said air being superheated by previously passing through the pipe 67 within the combustion-chamber, expels from the burner-tip with the accompanying oil with considerable force and combines with the air entering the chamber through the openings 47 being most thoroughly consumed within the combustion-chamber forwardly of said tip and is emitted in an intensely hot flame from the opening 44.

The high temperature maintained within the combustion-chamber 43 is communicated to the pipe coil 52 to heat and circulate water to and from the tank 30 and which in turn serves to pre-heat the oil fed to the burner-tip from pipe 58 so that the heaviest and cheapest hydrocarbon oils may be used. Similarly, the air conducted from the reservoir 34 to the burner-tip passes through the pipe 67 within the chamber 43 where it is intensely heated and thus served to the burner-tip and to the blast-pipe 75.

Under some conditions and for certain purposes a sufficient flame and temperature may be created without the employment of the air-jet from the nozzle 76, but where a long flame is desired or where the flame is to be applied to an object with force and intensive effect the air is emitted from said nozzle into the flame at a point between the burner-tip and the opening 44 to give the maximum effect and is directed towards said opening affording more rapid, complete combustion and brushing out into a lengthened and consuming flame the jet as it issues from said tip which will effectually cover a long range from said opening extending at times to ten or more feet thus rendering the apparatus much more useful for burning weeds covering and sweeping a wide area. Upon close application to a more solid object to be burnt, such as a stump, said air-blast will cause the flame to strike thereupon with a strong impact and by rapidly blowing away the sparks and other products of combustion from the point of application will cause the stump to be much more quickly destroyed or penetrated than otherwise.

The provision of the carriage having the U-shaped beam 20 mounted for locomotion on its wheels and supporting the yoke 12 for side-swinging and tilting movements admits of much flexibility of action in directing the torch-casing 40 to apply the flames emitted therefrom to the various uses for which it is adapted. Said frame may be swung through a relatively wide arc between the wheels without shifting the latter, as will be seen diagrammatically in broken lines in Fig. 2. Also the provision of the bearing plates upon the beam 20 and yoke 12 afford a reliable support for the swinging movements under ordinary conditions, and the whole frame may be lowered relative to the carriage by unscrewing the nut 24 upon the post 14 so that the torch may be used in close application to the ground, as illustrated in Fig. 6.

Stumps may be readily destroyed by the use of my improved burner torch by first digging away the earth from about a side of the stump, as shown in Fig. 6, and applying the opening 44 of the torch to within a short distance therefrom at the base of the stump. With the flame and air-blast in active operation and in close application to the stump it will be penetrated for a considerable depth in a short time, the force of the flame assisting materially in the destructive action by blowing away the cinders and sparks of unconsumed wood as well as the gaseous product of combustion and drying and heating the earth piled about the stump for a considerable distance. When the forceful, induced combustion thus directed forms a glowing pocket 80 of sufficient depth I fill it with fuel of active combustible properties, such as pitch-wood or charcoal, indicated at 81, and after thorough ignition I cover the pocket and lower part of the stump previously uncovered with the heated earth in the vicinity, as indicated at 82, with the result that combustion will continue therein indefinitely, oftentimes eating into the stump and its roots until it is entirely consumed.

Another application of the invention is in clearing land of weeds to prevent the spreading of weed-seeds, as on railway right-of-ways, city lots and parkings strips. The apparatus is attached to the rear of an automobile truck, not shown, upon which the air-compressor above referred to may be mounted. The apparatus may be attached with the opening 44 directed rearwardly and at an angle to the path of progress of the truck and carriage of the apparatus whereby the flames may be sprayed over the ground at the desired elevation covering a path parallel and lateral to that of the vehicle.

Having described my invention, what I claim, is:—

1. Apparatus of the class described, consisting in combination with a frame, of a chambered torch-casing rigidly mounted on the forward end of said frame, an oil container carried upon said frame, a pipe-line extending from said container to said torch terminating in an atomizing burner, means to supply air under pressure within said container, and means to supply pre-heated air under pressure to said burner, consisting in a reservoir adapted to receive air under pressure, and a pipe-coil communicating with said reservoir extending into said torch-chamber and thence connected to said burner.

2. Apparatus of the class described, consisting in combination with a frame, of a chambered torch-casing rigidly mounted on an end of said frame, an oil container carried upon said frame, a pipe-line extending from said container to said torch terminating in an atomizing burner, means to supply air under pressure within said container, means to supply pre-heated air under pressure to said burner, and means to heat said oil in its passage to the burner, consisting in a water-filled tank through which said pipe-line extends, and a water-coil communicating with said tank extending into said torch-casing and establishing a water circulation including said tank.

3. Apparatus of the class described, consisting in combination with a frame, of a chambered casing rigidly mounted on an end of said frame having a tapered open end, an oil container carried on said frame, a pipe-line extending from said container to said chamber terminating in an atomizing burner, means to supply air under pressure within said container, a pipe-coil receiving air-pressure from a source of compressed air supply extending into said chamber and thence connected to said burner, and a blast-pipe communicating with said air-pipe coil terminating in a nozzle within said chamber directed towards said open end of the casing forwardly of said burner.

4. Apparatus of the class described, consisting in combination with a frame, of a chambered torch casing rigidly mounted on an end of said frame having a tapered open end, an oil container carried on said frame, a pipe-line extending from said container to said chamber terminating in an atomizing burner, a reservoir adapted to receive air under pressure, means to supply compressed air to said reservoir, means to supply air pressure from said reservoir within said container, a water-filled tank through which said pipe-line conveying oil to the burner extends, a water-coil communicating with said tank and extending into said chamber establishing a hot-water circulation including said tank, a pipe-coil communicating with said reservoir extending into said chamber and thence communicatively connected to said burner, and a blast-pipe communicating with said air-pipe coil terminating in a nozzle within said chamber directed towards said open end of the casing forwardly of the burner.

5. Apparatus of the class described, consisting in a portably supported frame, a torch-casing rigidly mounted on said frame having a cylindrical chambered body and a tapered forward open end, an oil container mounted on said frame, an oil-burner projecting into said chamber, communicating oil-supply connections between said container and said burner, and an air-supply pipe extending from a source of air supply under pressure into said chamber forwardly of the burner and thence connected to said burner.

6. Apparatus of the class described, consisting in a portably supported frame, a torch-casing rigidly mounted on said frame having a chambered body and a tapered forward open end, an oil container mounted on said frame, an oil-burner projecting into said chamber, communicating oil-supply connections between said container and said burner, a pipe extending from a source of air-supply under pressure into said chamber forwardly of said burner and thence connected to said burner, and an air-blast pipe receiving air from said air-supply pipe having an outlet nozzle directed toward said opening in the casing between said burner and said opening.

7. Apparatus of the class described, consisting in a portably supported frame, a torch-casing rigidly mounted on said frame having an interior chamber with a forward open end, an oil container mounted on said frame, an oil-burner projecting into said chamber, communicating oil-supply connections between said container and said burner, means to pre-heat the oil-supply to said burner, a pipe extending from a source of air-supply under pressure into said chamber forwardly of said burner and thence connected to said burner, and an air-blast pipe receiving air from said air-supply pipe having an outlet nozzle directed toward said opening in said casing between said burner and said opening.

8. In apparatus of the class described, a torch-casing having an interior chamber, said chamber having a tapered opening at one end and a dampered opening at its other end, an oil atomizer and burner extending into said chamber directed towards said first named opening, and an air-blast pipe having a nozzle within said chamber directed towards said first named opening forwardly of said burner.

9. In apparatus of the class described, a

torch-casing having an open forward end, an oil-burner extending into said casing directed toward said opening, an air-supply pipe extending from a source of air supply under pressure into said casing forwardly of the burner and thence connected to the burner, and an air-blast pipe receiving preheated air from said air-supply pipe having an outlet nozzle directed toward said opening in the casing between the burner and said opening.

In testimony that I claim the foregoing as my invention, I have signed these presents the 15th day of September, 1923, at Portland, Oregon.

WALTER S. LITTLE.