

Oct. 14, 1952

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2,613,478

APPARATUS FOR HEATING ORCHARDS AND THE LIKE

Filed Dec. 16, 1946

3 Sheets-Sheet 1

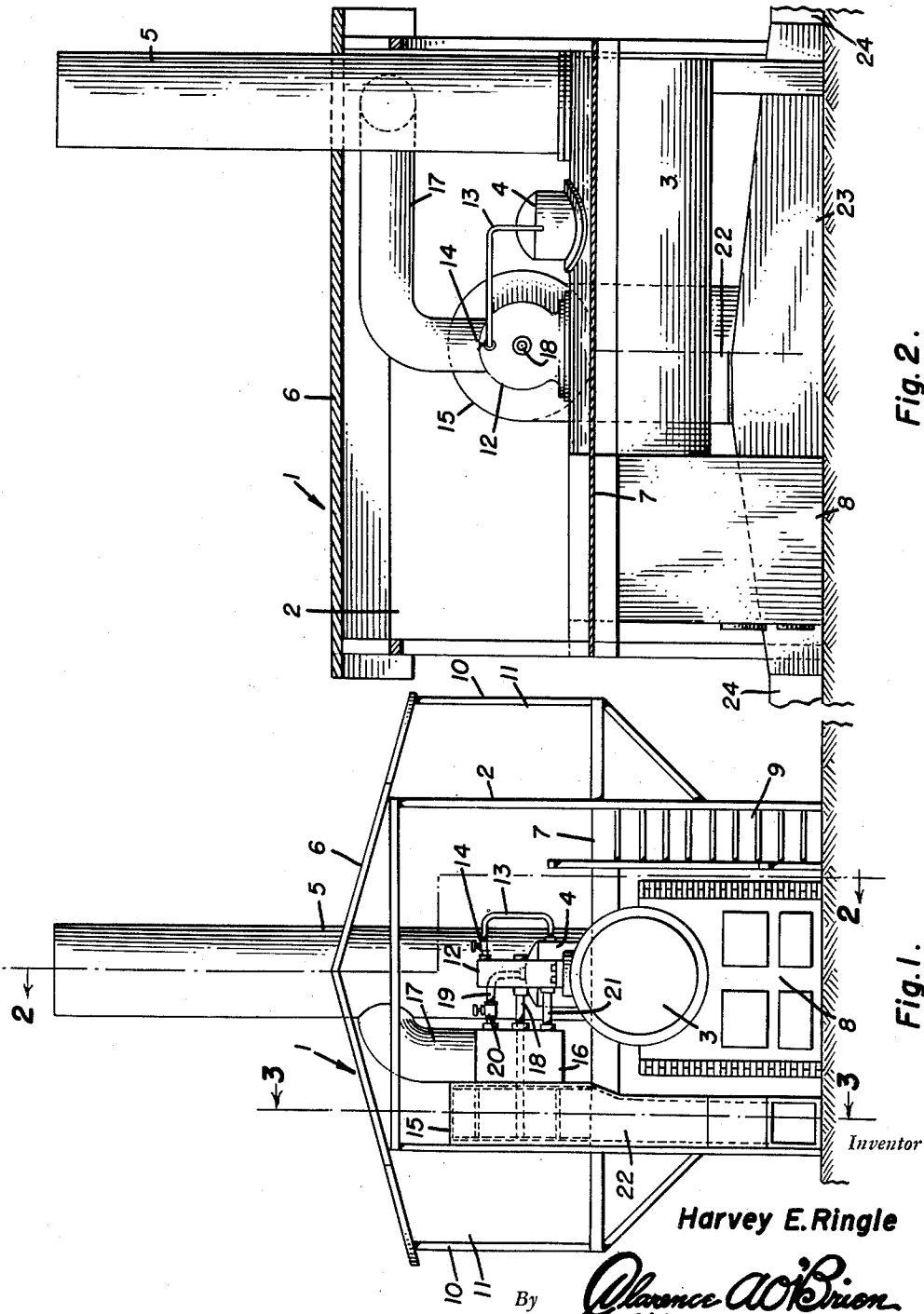


Fig. 1.

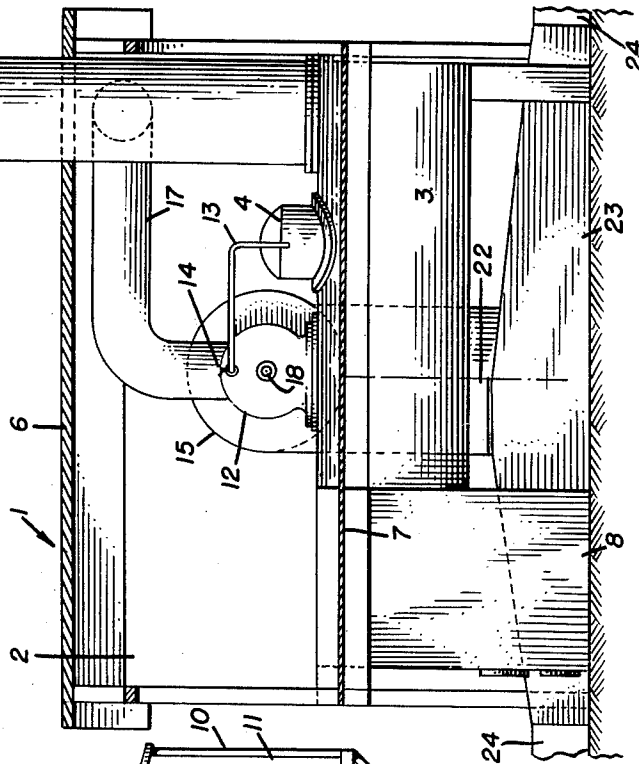


Fig. 2.

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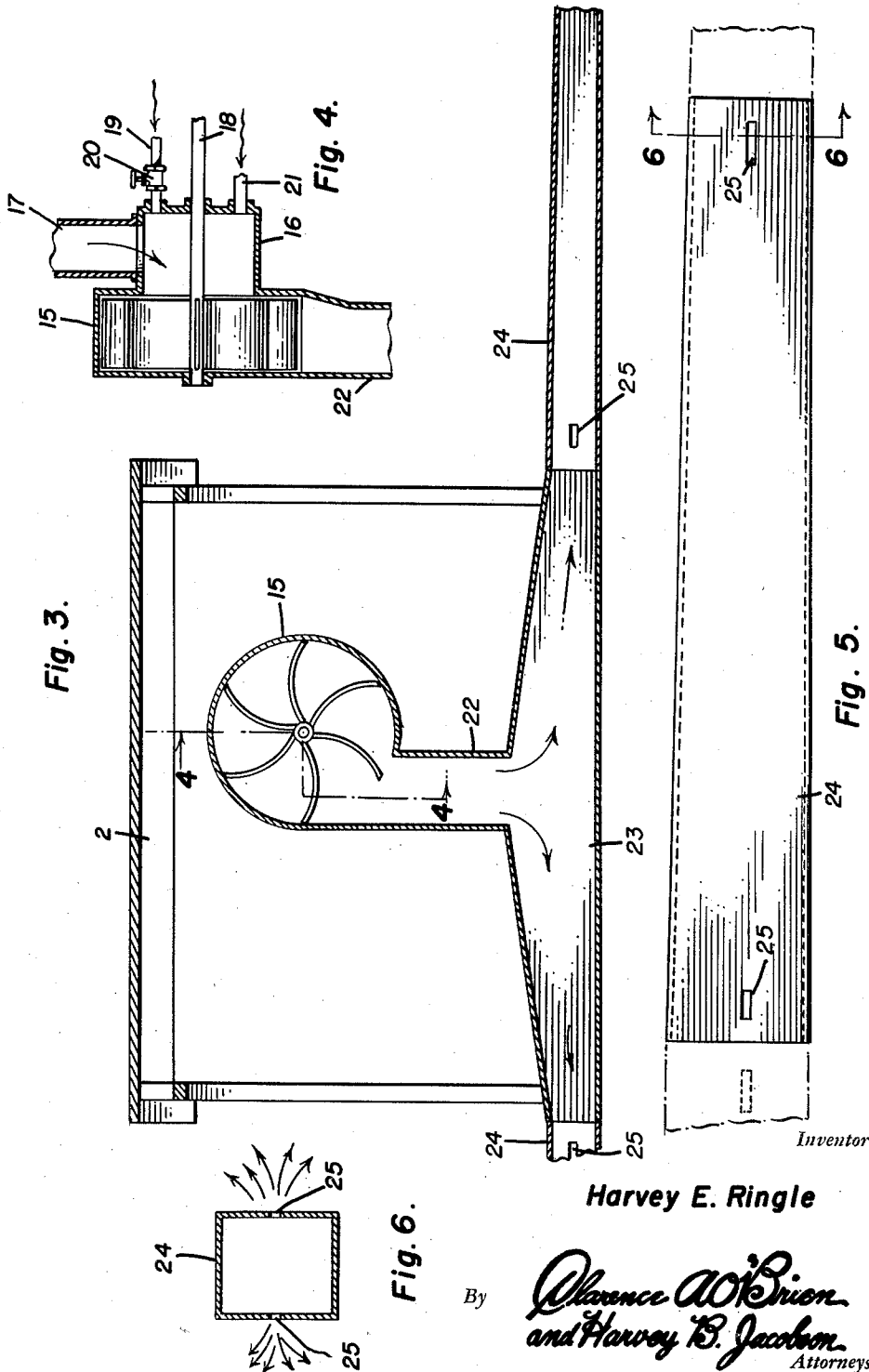
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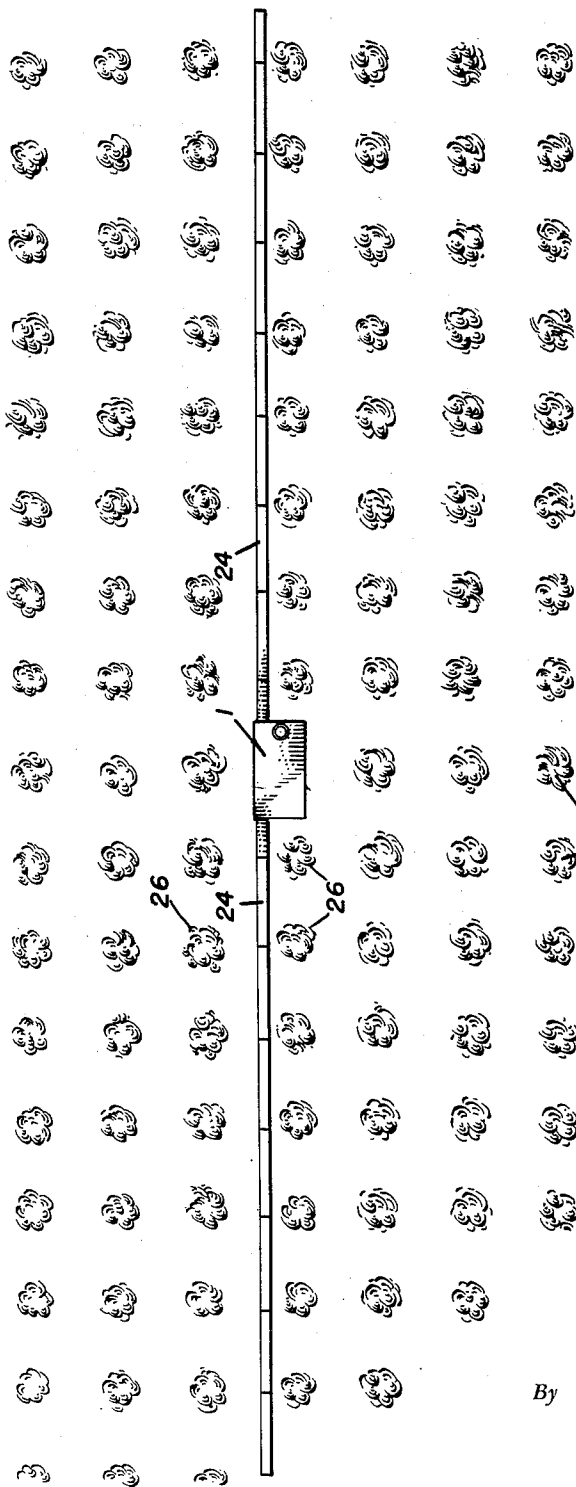


Fig. 7.

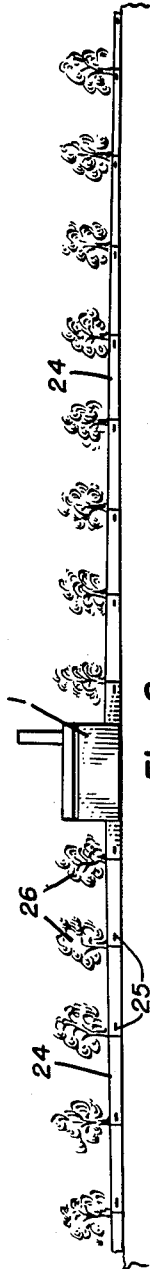


Fig. 8.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR HEATING ORCHARDS
AND THE LIKE

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Application December 16, 1946, Serial No. 716,459

1 Claim. (Cl. 47—2)

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My invention relates to improvements in apparatus for heating orchards, and the like, to protect the same against damage from frost.

The invention is designed with the primary object in view of providing efficient apparatus of simple form and comparatively inexpensive construction to take the place of the usual smudge pots, and for completely enveloping an orchard or the like in a warm steam fog so as to uniformly heat the entire orchard instead of heating the same in spots or zones as with the usual smudge pots with consequent inadequate heating in different zones.

Another object is to provide apparatus of the type and for the purpose above set forth which is easy to install and remove, and inexpensive to operate and service.

Other and subordinate objects also comprehended by my invention, together with the precise nature of my improvements, and the advantages thereof, will be readily understood when the succeeding description and claim are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a view in rear elevation of my invention in a preferred embodiment thereof, illustrating in detail the fog generating and supplying unit;

Figure 2 is a view in vertical longitudinal section taken on the line 2—2 of Figure 1;

Figure 3 is a similar view taken on the line 3—3 of Figure 1;

Figure 4 is a fragmentary view in vertical section taken on the line 4—4 of Figure 3;

Figure 5 is a view in side elevation of one of the distributing conduit sections drawn to a larger scale;

Figure 6 is a view in transverse section taken on the line 6—6 of Figure 5;

Figure 7 is a schematic view illustrating the apparatus installed in an orchard and drawn to a smaller scale;

Figure 8 is a view in side elevation of the same.

Referring to the drawings by numerals, my improved apparatus, as shown, comprises, as the basic component thereof, a fog generating and discharging unit designated generally by the reference numeral 1. The fog generating and discharging unit 1 comprises a suitable shed 2 for a steam generating boiler 3 of the usual horizontal flue type, with a steam dome 4, and which is provided at one end with a large diameter smoke stack 5 designed to extend upwardly out of the top 6 of the shed 2 for a considerable distance

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above the tops of trees in an orchard in which the apparatus is installed. A horizontal platform 7 in the shed 2, above the firebox 8 of the boiler 3, and through which the boiler 3 extends, part-way, serves as a control stand for manipulation of valves presently described. A stairway 9 in the shed 2 provides for reaching the platform 6. Elevated side structures 10 embodied in the shed 2 provide storage chambers 11 for distributing conduit sections, when not in use, and presently described.

A high speed steam turbine 12, of any suitable type, is suitably mounted on top of the boiler preferably. A steam supply pipe 13 with a suitable control valve 14 therein extends from the steam dome 4 to the intake side of said turbine.

A suction and blower fan 15 is provided in the shed 2 at one side thereof and with a side intake casing 16 to which a downtake pipe 17 extends from the smokestack 5. As will be seen, the intake casing 16 forms a pre-mixing chamber in which the steam, air and products of combustion are mixed under suction from the fan 15 and subsequently mixed in the fan 15 by rotary agitation thereof. The steam turbine 12 is operatively connected in any suitable manner to the suction and blower fan 15 for direct drive of said fan by said turbine, the drive shaft 118 of said turbine extending through the casing 16 into said fan 15 as shown in dotted lines in Figure 1. A steam supply pipe 19 extends from the steam dome 4 to the intake casing 16 of the suction and blower fan 15 with a control valve 20 therein. A supplemental steam supply pipe 21 extends from the exhaust side of the steam turbine 12 to said casing 16. A discharge flue 22 depends from the output side of the suction and blower fan 15 to a horizontal, discharge, manifold conduit 23, said flue 22 opening into said conduit 23 intermediate the ends of the same, and said conduit 23 being preferably disposed at the ground level alongside the firebox 8 with its ends extending out of the shed 2 for convenient access thereto.

A string of fog distributing conduit sections 24, or pipes, extend from each end of the manifold conduit 23 in end-to-end, detachably connected relation in the string, or line, with suitable side discharge apertures 25 in the sections adjacent each end of each section. Preferably, all the conduit sections 24 are of square cross-section and formed of a heat retaining material.

As best shown in Figure 7, the described apparatus is designed to be installed in an orchard between two rows of trees 26 with the distributing conduit sections 24 extending from each end of

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the shed 2 in alignment between said rows and resting on the ground as shown in Figure 8.

Referring now to the operation of the described apparatus, the steam generated in the boiler 3 operates the turbine 12 which in turn, operates the suction and blower fan 15 to draw in steam from the dome 4 and supplemental exhaust steam from the turbine 12 by way of the supplemental steam supply pipe 21. At the same time, air, and products of combustion, are drawn into said suction and blower fan 15 through the downtake pipe 17. The steam is thus partially condensed into a wet, hot fog which is discharged through the strings, or lines, of distributing conduits 24 and out of the apertures 25 to issue from such apertures and also out of the outer ends of the endmost distributing conduit sections 24 to be dispersed in the air so as to settle in and over the orchard and envelope the trees 26 therein. Thus, the orchard is heated more uniformly than with present-day apparatus as will be clear.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention, without further explanation.

Manifestly, the invention, as described, is susceptible of modification, without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the appended claim.

What I claim is:

Apparatus for heating orchards comprising a steam generating unit including a boiler having a stack, and adapted to be disposed in the

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orchard, distributing conduit lines adapted to be disposed on the ground in the orchard and having outlet apertures therein, means for feeding steam through said lines from said boiler together with air under pressure, comprising a combined suction and blower fan having a side intake casing opening into said fan, a steam line for feeding steam from said boiler into said side intake casing, a steam turbine for driving said fan supplied with steam by said boiler, and an auxiliary steam supply line from the exhaust side of said turbine to said side intake casing, said stack having a downtake pipe extending therefrom to said side intake casing, said side intake casing forming a pre-mixing suction chamber in which the suction created by said fan pre-mixes the steam with air and products of combustion from said stack for subsequent mixing in the fan by rotary agitation thereof.

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