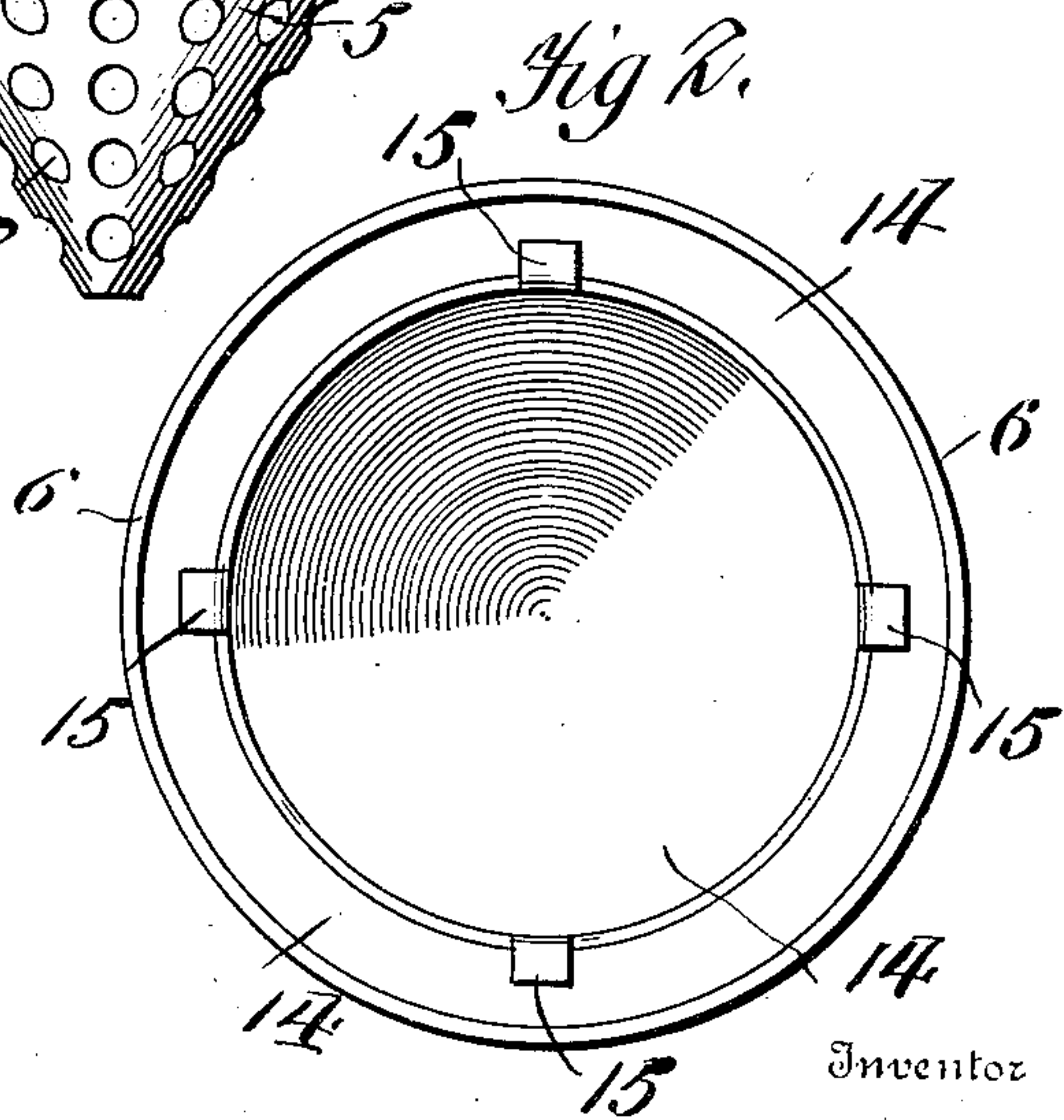
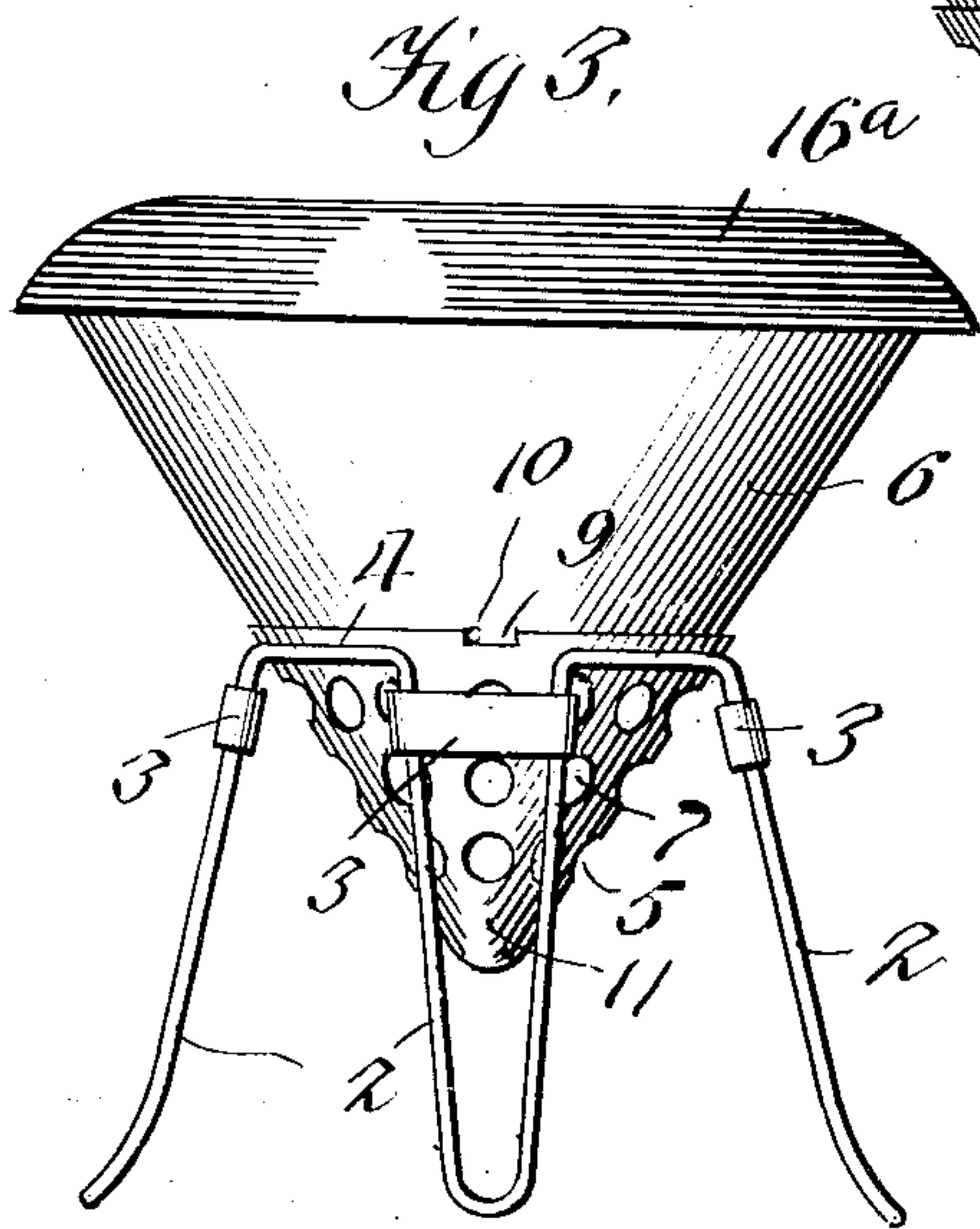
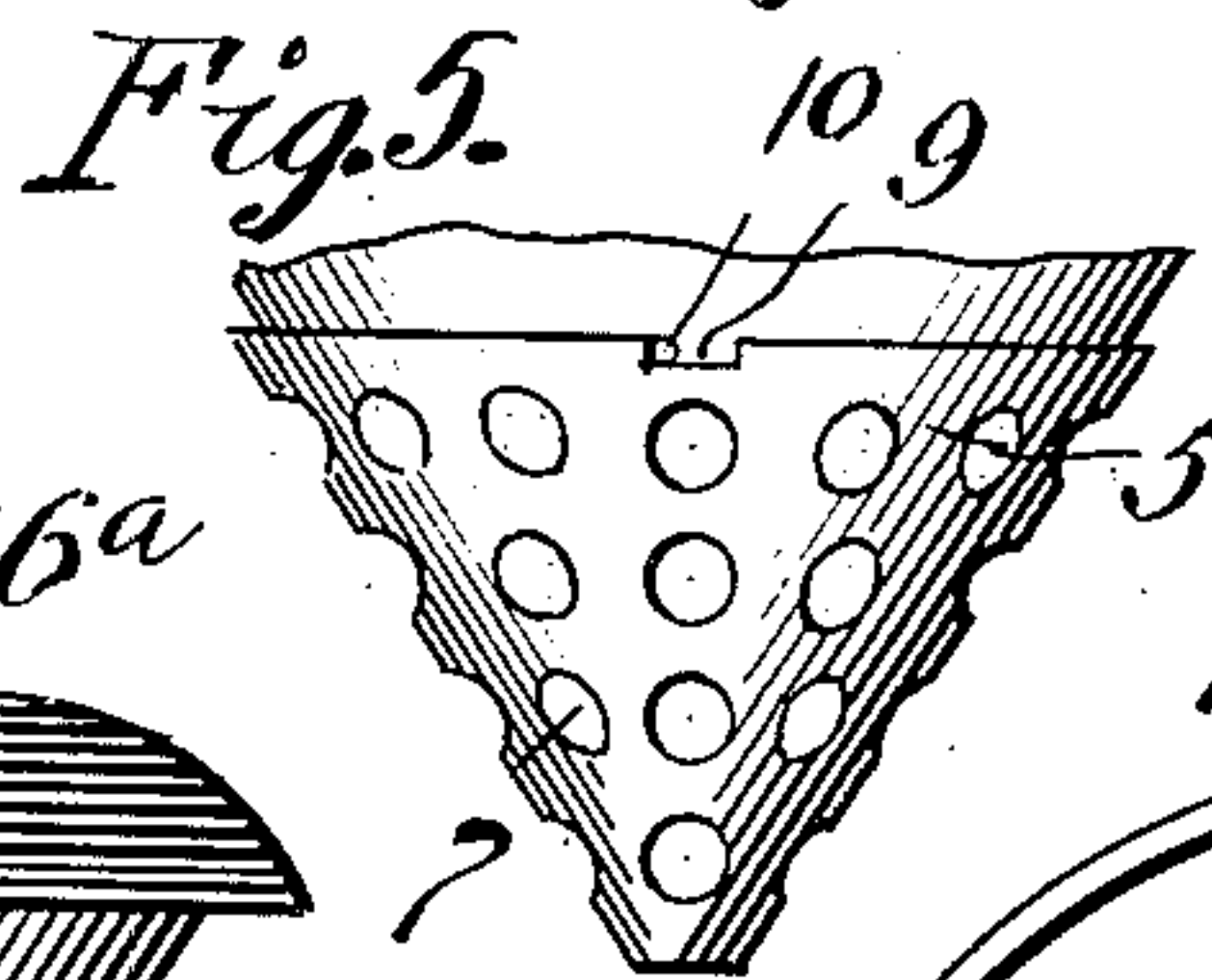
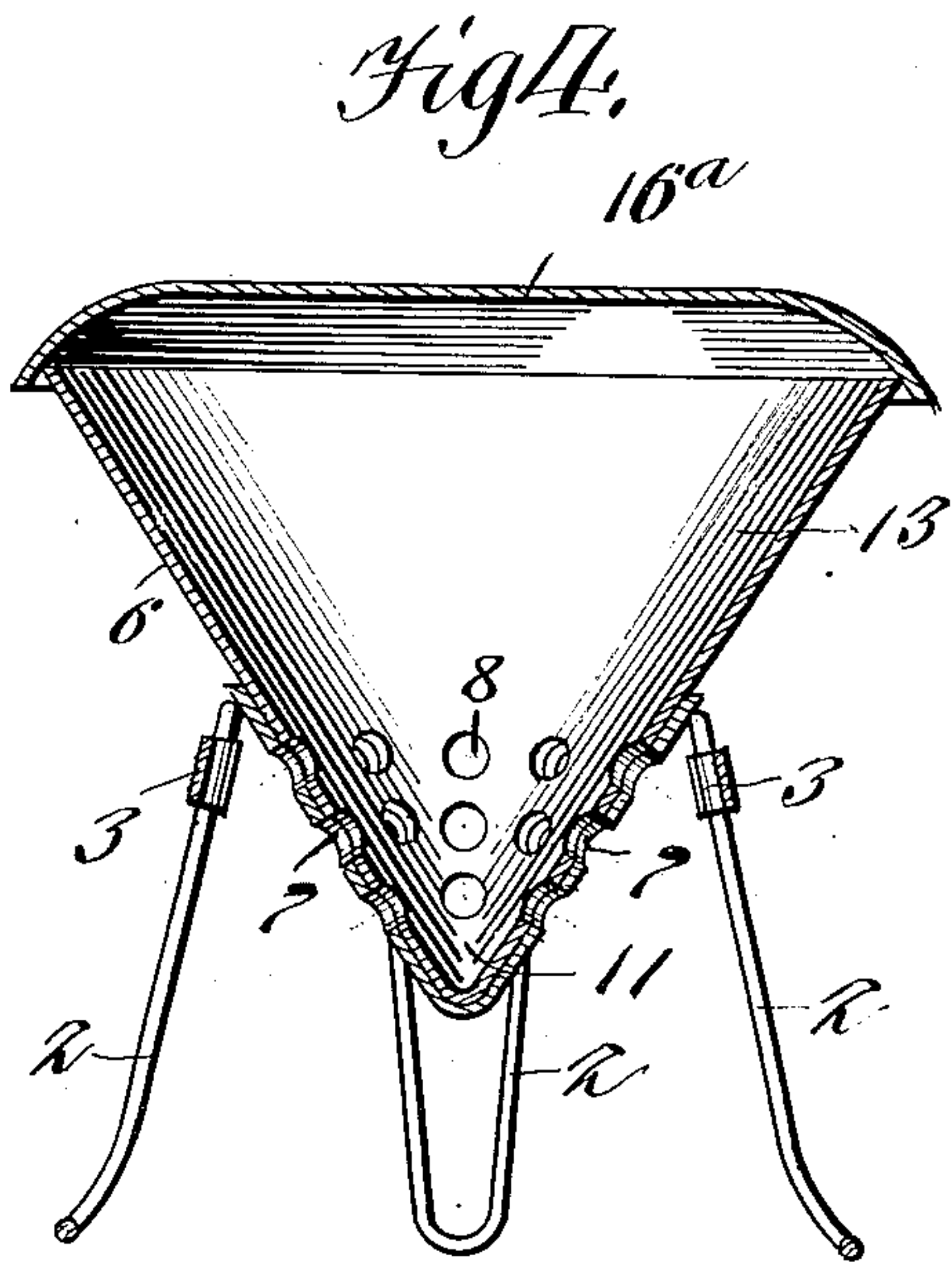
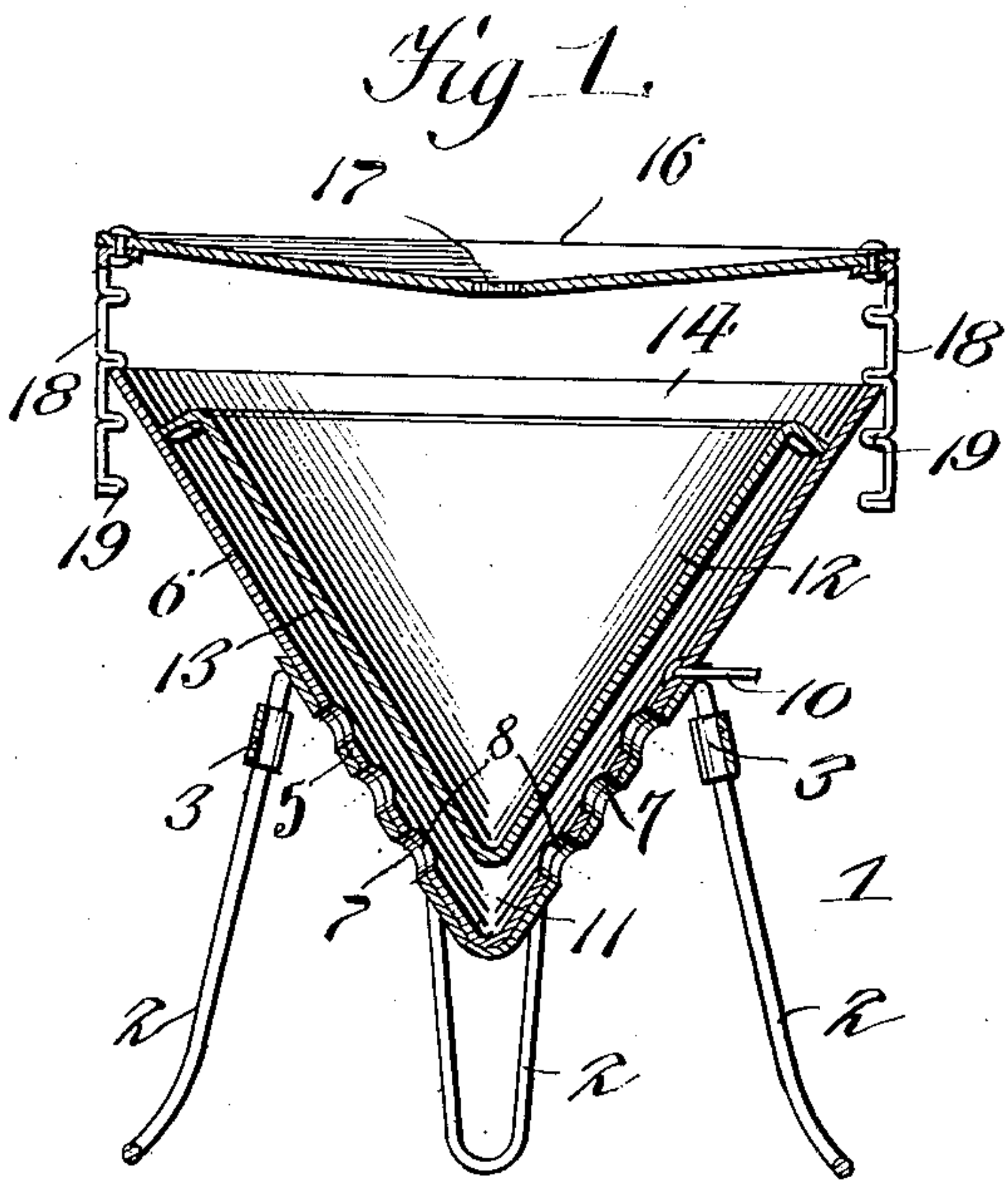


F. E. BARNEY.  
 ORCHARD HEATING DEVICE.  
 APPLICATION FILED OCT. 23, 1908.

931,557.

Patented Aug. 17, 1909.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## ORCHARD-HEATING DEVICE.

No. 931,557.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed October 23, 1908. Serial No. 459,175.

*To all whom it may concern:*

Be it known that I, FRANK E. BARNEY, a citizen of the United States, residing at Grand Junction, in the county of Mesa and State of Colorado, have invented new and useful Improvements in Orchard-Heating Devices, of which the following is a specification.

This invention relates to a heating device for raising the atmospheric temperature in orchards, vineyards, gardens, etc., to prevent freezing of the fruits or vegetables, the object of the invention being to provide a simple, convenient, effective and inexpensive device of this character which is adapted by slight variations for burning solid fuel such as coal, or liquid fuel, such as oil, in which provision is made for the ready insertion of the fuel, for the ready ignition and regular and even burning of solid fuel, and for the automatic feeding of such fuel as the latter is consumed and discharge of the ashes or incombustible residue.

A further object of the invention is to provide a heater which is composed of comparatively few parts not liable to get out of shape from expansion or contraction, which is adapted to afford free draft while preventing admission of gusts of air with sufficient force to put the fire out, and which, in addition to being light, strong and durable, is adapted to be easily handled and to effectually protect the fuel during rainy weather and to permit the rain water to drain off.

A still further object of the invention is to provide a heater which when adapted for burning oil may be closed to cover and protect the oil from evaporation by the heat of the sun, and which, when in use, will afford a perfect draft for combustion of the fuel and radiate the heat therefrom in the most effective manner.

In the accompanying drawing, illustrating the invention, Figure 1 is a central vertical transverse section of the device as arranged for use as an oil burner, the cover being inverted as in operation. Fig. 2 is a top plan view of the same with the cover removed. Fig. 3 is a side elevation of the device as arranged for burning solid fuel. Fig. 4 is a vertical transverse section of the same. Fig. 5 is a fragmentary section of the base support, showing a slight modification in the construction.

Referring to the drawing, 1 designates a supporting stand for holding the heater elevated above the surface of the ground, said stand being preferably formed of stout wire and comprising a series of annularly arranged and spaced supporting legs 2, each of loop form and having the upper ends of its arms connected by a transverse brace 3. The arms of the respective legs are connected at their upper ends by coupling portions 4 of the wire, which are curved to provide an open annular support for the reception of the base portion of the body of the heater.

In the form of the invention shown in Figs. 1 and 2, wherein the heater is constructed and arranged for burning a liquid fuel, such as oil, the heater is composed of an inverted conical base receptacle 5, which is removably fitted in the receiving opening formed by the upper portion of the stand and is supported therein at a suitable elevation above the surface of the ground. Within this base receptacle is fitted the lower portion of an inverted conical vessel 6, which is loosely mounted therein for ready removal. The base receptacle 5 is provided with a series of draft openings or inlets 7 arranged in rows or series at different elevations and extending entirely around the same for the admission of air from all quarters. The lower portion of the vessel 6 is provided with correspondingly arranged inlets or openings 8, which are adapted to register with the openings 7 when said vessel is in a prescribed position. Formed in the upper edge of the base receptacle, at one side thereof, is a notch or recess 9 which receives a pin or projection 10 extending laterally from the vessel 6. This pin may be provided with a suitable operating handle or adapted to be gripped by a pair of pliers, whereby said pin may be moved in one direction or the other in the notch or recess to turn said vessel so that the openings 8 may be moved into registry with the openings 7 to a full or partial degree for the purpose of regulating the draft, or moved out of registry therewith to entirely cut off the draft. In one position of the vessel 6, the pin 10 abuts against one of the end walls of the recess, and in the other position against the other end wall of the recess, thus enabling the operator to determine when the draft openings are arranged in and out of registering



relation. The perforations 8 may terminate above the vertex portion of the vessel 6, as shown in Figs. 1, 3 and 4, to provide an imperforate pocket or receptacle 11 formed by said vertex portion in which oil or any other readily combustible substance may be placed when the device is used for burning solid fuel, to serve as a starting charge which may be preliminarily ignited through the lower set of registering openings 7 and 8 for the purpose of starting combustion of the body of solid fuel within the vessel, or, as shown in Fig. 5, the series of openings 7 and 8 may extend fully down to the vertex portions in order to increase the number of draft openings, under which arrangement the body of fuel within the vessel 6 will be ignited in some other manner. It will be understood that it is not necessary to terminate the openings 7 in the base receptacle above its vertex portion under either condition of service, but such a construction may be employed if desired.

An inverted conical inner fuel or storage vessel or receptacle 12 is arranged within the vessel 6, in the use of the device as an oil burner, for holding the liquid fuel. This inner vessel or receptacle is removably fitted within the vessel 6, is imperforate throughout, and is of less length and diameter than said vessel 6, so that it may be held therein in spaced relation thereto to provide an intervening surrounding draft channel 13 and an upper substantially annular flame exit aperture 14. The said fuel receptacle may be supported within the vessel 6 in any preferred manner. In the present instance, it is shown provided at its upper end with a series of outwardly projecting supporting lugs or arms 15 bent at a slight downward angle to bear against the inner wall of the vessel 6, to support the fuel receptacle concentrically within the vessel and to provide between the lugs slots or apertures communicating with the flame exit space 14.

A dished or concavo-convex cover 16 is provided to close the top of the vessel 6 when the heater is not in use and to serve as a deflector when the heater is in use. This cover is shown in Fig. 1 inverted from its normal position to serve as a deflector but it will be understood that when it is employed to close the top of the vessel 6 its concave side faces downwardly so that its rim edge will rest upon the upper edge of the vessel 6 and close the same, thus preventing access of foreign substances to the heater to contaminate the store of oil, as well as to prevent evaporation of the oil from the heat of the sun. When so arranged, it will be understood that the space or channel 13 between the vessel and oil receptacle and the space or channel 14 between said receptacle and the cover 16, will prevent to a large extent transmission of the absorbed

heat of the sun to the oil to reduce the amount of evaporation thereof to a minimum degree. The cover is provided with a central opening 17, which permits of the escape of any vapor which may possibly be formed by evaporation of the oil, and which also serves in the operation of the heater as a draft opening.

From the foregoing description, it will be understood that when the cover is in position to close the receptacle 6, and the latter is adjusted to throw the draft openings 7 and 8 out of registry, the heater will be closed securely against the access of dust and dirt, as well as the access of any appreciable amount of moisture during rainy weather, the conical form of the cover permitting the rain water to flow off, thus protecting the oil from injury. Arranged at diametrically opposite sides of the cover and projecting at right angles beyond the convex side thereof are supporting arms 18, each of which is provided with a series of regularly spaced inwardly projecting shoulders 19. These shoulders are adapted to be engaged with the rim edge of the vessel 6 to support the cover in inverted position at different elevations above the top of the vessel 6, as circumstances may require according to the strength of the draft, to allow the flames produced by the burning of the oil in the receptacle 12 to pass laterally outward to secure an effective radiation of the heat from all sides of the heater. The flames issuing upwardly from the ignited top surface of the body of oil also strike against the convex lower surface of the cover and are thereby deflected outward in an effective manner. The arms 18 are composed of strips of flexible metal so that they may be readily and conveniently manipulated to engage the supporting shoulders thereof with the rim of the vessel 6.

It will be understood, of course, that a number of the heaters will be arranged at different points throughout the orchard, vineyard or garden to heat the surrounding atmosphere during frosty weather for the purpose of preventing injury to the fruit or vegetables, and that the heaters are kept in condition for use at any time by maintaining a store of oil therein. When starting each heater into operation, the vessel 6 is turned in the manner described to bring the draft openings 7 and 8 into communication, and then the cover is inverted and supported in the manner shown in Fig. 1, after which the body of oil within the receptacle 12 is ignited at the top, so that the flames will be deflected and projected in the described manner. As the store of oil in the receptacle 12 is consumed the heat within the receptacle 12 is correspondingly increased, and will be radiated to the space 13, thus heating the air passing upward therethrough. A proper



draft is afforded by the upward passage of air through the openings 7 and 8, the channel 13, the flame exit space 14 and the lateral spaces below the cover, as well as through the opening 17 therein.

In Figs. 3 and 4 a form of the invention is shown which is adapted particularly for burning solid fuel such as coal. In this form of the invention, the construction of the supporting stand, base receptacle and vessel 6 is the same, but the fuel receptacle 12 is dispensed with and a modified form of cover employed. The solid fuel in this form of the invention is placed directly within the vessel 6 and is ignited at the base through the apertures 7 and 8, the openings 8 in said vessel terminating above the lower conical end or vertex portion of said vessel, as hereinbefore described, to form the pocket or chamber 11 within which a slight amount of oil or other readily combustible fuel may be stored for ignition to set fire to the body of the fuel in order that the heater may be readily and quickly set into operation. The cover 16<sup>a</sup> employed in this mode of use of the heater is preferably bowl-shaped or saucer-shaped so that the rim portion thereof will fit down upon the rim edge of the vessel 6 and project beyond the same to tightly close said vessel and form sloping surfaces for the free drainage off of water during rainy weather whereby the fuel contained within the vessel will be protected.

In starting the heater into operation, the vessel 6 is turned to bring the draft openings 7 and 8 into registry, the starting charge of fuel ignited to set fire to the main body of fuel, and the cover 16<sup>a</sup> removed, to allow air to freely enter through the said draft openings and pass upwardly through the body of the fuel to secure free and perfect combustion. As the fuel is consumed at its base, the ashes therefrom discharge through the weight of the body of fuel, which automatically feeds downward, through the openings 7 and 8, by which the latter are kept clear and a free automatic downward feed of the fuel insured to maintain a hot fire. If, from any cause, the ashes should fail to freely discharge and the draft opening should become choked, by simply oscillating the vessel 6 through the medium of the projecting pin 10, the draft openings may be freed from the material clinging therein and the contained ashes caused to discharge therethrough. The fire may be put out at any time and the remainder of the fuel preserved for future use after danger of injury to the fruit is passed, by simply adjusting the receptacle to close the draft openings and reapplying the cover 16<sup>a</sup>. The sloping sides of the vessel insure perfect radiation of the heat outward and downward in both forms of the invention, while in the use of the device, as shown in

Figs. 3 and 4, the sloping sides also adapt the coal to feed downward in such manner as to keep the center of the charge of coal partially or fully open, allowing the fuel to be quickly ignited and to burn evenly throughout.

A heater constructed in accordance with my invention may, as will be seen, by slight changes of construction, be adapted for burning liquid or solid fuel, is composed of comparatively few parts which are not liable to be distorted by the heat and which enable the device to be conveniently and inexpensively manufactured. As the draft holes in the base receptacle and vessel 6 extend completely around the same, it will be apparent that a supply of air will be afforded irrespective of the direction in which the wind is blowing and that in a heavy wind only a portion of the number of holes will be exposed, so that the fire cannot be blown out.

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

1. An orchard heating device comprising a stand, an inverted conical base receptacle supported by the stand, said receptacle being provided around its sides with draft openings, an inverted conical vessel adapted to fit at its reduced end within said receptacle, said vessel having its lower reduced portion provided with openings to register with the openings in the receptacle, and a cover for closing the upper enlarged end of said vessel.

2. An orchard heater comprising a supporting stand, a base receptacle of conical form carried by the stand and provided with draft openings, a conical vessel adapted to fit at its lower portion within said receptacle and provided with corresponding openings, means for turning said vessel to throw the openings into and out of registry and for limiting the turning movement thereof, and a cover for said vessel.

3. An orchard heating device comprising a stand, a conical base receptacle supported by the stand and provided with draft openings, a conical vessel fitted at its lower portion within said receptacle and having corresponding openings, the openings in said vessel terminating above the apex thereof to leave an imperforate pocket, and a cover for said vessel.

4. An orchard heater comprising a stand, a base receptacle of conical form carried by the stand and provided with annular rows of draft openings and with a notch or recess in its upper edge, a conical vessel fitted at its lower portion within said receptacle and having corresponding rows of openings, a pin projecting from said vessel and movable in said notch or recess, and a cover for the vessel.

5. An orchard heater comprising a stand, an inverted conical base receptacle supported by the stand, said receptacle being provided



with rows of draft openings, an inverted conical vessel having an imperforate upper portion and a lower reduced portion of proper size to fit within said receptacle, said reduced portion of the vessel being provided with draft openings, to register with the openings in the receptacle, means for turning said vessel, and means for limiting the turning movement thereof.

6. An orchard heater comprising a supporting stand, a conical base receptacle carried by and projecting downward through the top of the stand and supported in an elevated position thereby, said receptacle being provided around its sides with draft openings, a conical vessel fitted at its lower portion within said receptacle and having cooperating draft openings, cooperating means upon said receptacle and vessel whereby the latter may be turned to a limited degree to throw the opening into and out of registry, and a cover for said vessel.

7. An orchard heater comprising a stand, a conical vessel supported by the stand and provided with draft openings, a conical receptacle concentrically supported within said vessel, and a cover for the vessel adapted to tightly close the same and provided with means for supporting it in an elevated position upon said vessel and at an elevation above the same.

8. An orchard heater comprising a stand, a conical vessel supported by the stand and provided with draft openings at the base thereof, an imperforate conical receptacle provided at its upper end with means to engage the vessel and support said receptacle concentrically therein, said means being arranged to provide draft passages communicating with the space between the vessel and receptacle, and a cover for the top of the vessel adapted in normal position to close the same, said cover being provided with means for supporting it in an inverted position at an elevation above said vessel.

9. An orchard heater comprising a stand, a conical base receptacle carried by the stand and provided with draft openings, a conical vessel fitted at its lower portion within the receptacle and provided with cooperating openings, a conical receptacle adapted to be arranged within said vessel and to be supported concentrically therein to provide an intervening draft passage, a cover for said vessel, and means for supporting said cover at an elevation above said vessel.

10. An orchard heater comprising a stand, a conical base receptacle carried by the stand and provided with draft openings, a conical vessel fitted at its lower portion within said receptacle and provided with corresponding openings, means for turning said vessel to throw the openings into and out of registry, an inner conical receptacle concentrically

supported within the vessel, and arranged to provide an intervening draft passage, a cover for the vessel, and means applied to the cover whereby the latter may be supported at varying elevations above and upon said vessel.

11. An orchard heater comprising a stand, a conical vessel supported by the stand and provided with draft openings, a conical receptacle concentrically supported within said vessel, a cover for said vessel, and means for supporting said cover at different elevations above said vessel.

12. An orchard heater comprising a stand, a conical vessel supported by the stand and provided with draft openings, a conical receptacle concentrically supported within said vessel and forming an intervening draft passage, a conical cover adapted to rest upon said vessel, and means for supporting said cover upon the vessel in an inverted position.

13. An orchard heater comprising a stand, a conical vessel supported by the stand and provided with draft openings, a conical receptacle concentrically supported within said vessel and forming an intervening draft passage, a conical cover for the vessel adapted to rest upon the same and provided with an opening in the apex thereof, and means for supporting said cover upon the vessel in an inverted position.

14. An orchard heater including an inverted conical vessel provided with draft openings in the reduced lower end thereof, a cover for closing the top of said vessel, and means for supporting said cover at different elevations upon the vessel.

15. An orchard heater including an inverted conical vessel having draft openings in the lower reduced end thereof, a conical cover adapted to rest upon said vessel and provided with an opening therein and means for supporting said cover in an inverted position upon said vessel and at an elevation above the same.

16. An orchard heater comprising a stand, a conical base receptacle carried by the stand and provided with draft openings, a conical vessel fitted at its lower portion within said receptacle and provided with corresponding openings, means for turning said vessel to throw the openings into and out of registry, a cover for the vessel, and means for supporting the cover at varying elevations above and upon said vessel.

17. An orchard heater comprising a stand, an inverted conical receptacle supported thereby and provided with draft openings, an inverted conical vessel fitted at its lower reduced portion in said receptacle and provided in said portion with draft openings, to register with those in the receptacle, and cooperating means upon the vessel and receptacle for oscillating said vessel and limiting the oscillating movement thereof.



18. An orchard heater including an inverted conical vessel provided with draft openings in the lower reduced end thereof, an inverted conical receptacle concentrically supported within said vessel and spaced therefrom to provide an intervening draft vessel, a conical cover adapted to rest upon the vessel and provided with an opening therein, and means for adjustably support-

ing said cover in an inverted position upon and above said vessel.

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

FRANK E. BARNEY.

Witnesses:

FRANK A. LYONS,  
R. L. MAGILL.