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Patented June 3, 1902.

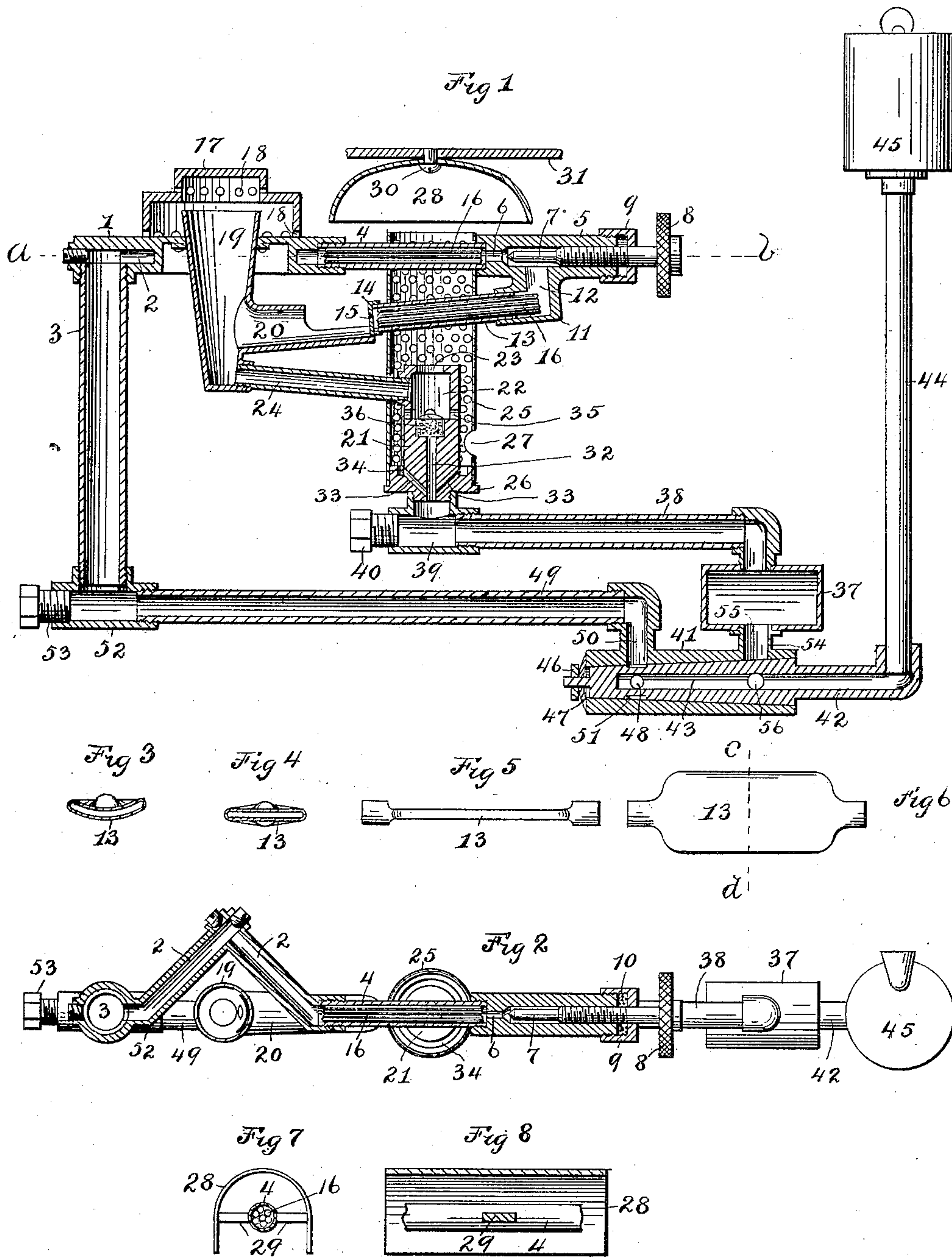
J. H. FINK & R. ANDLAUER.

VAPOR STOVE.

(Application filed Mar. 11, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

Wm. F. Wilkins.
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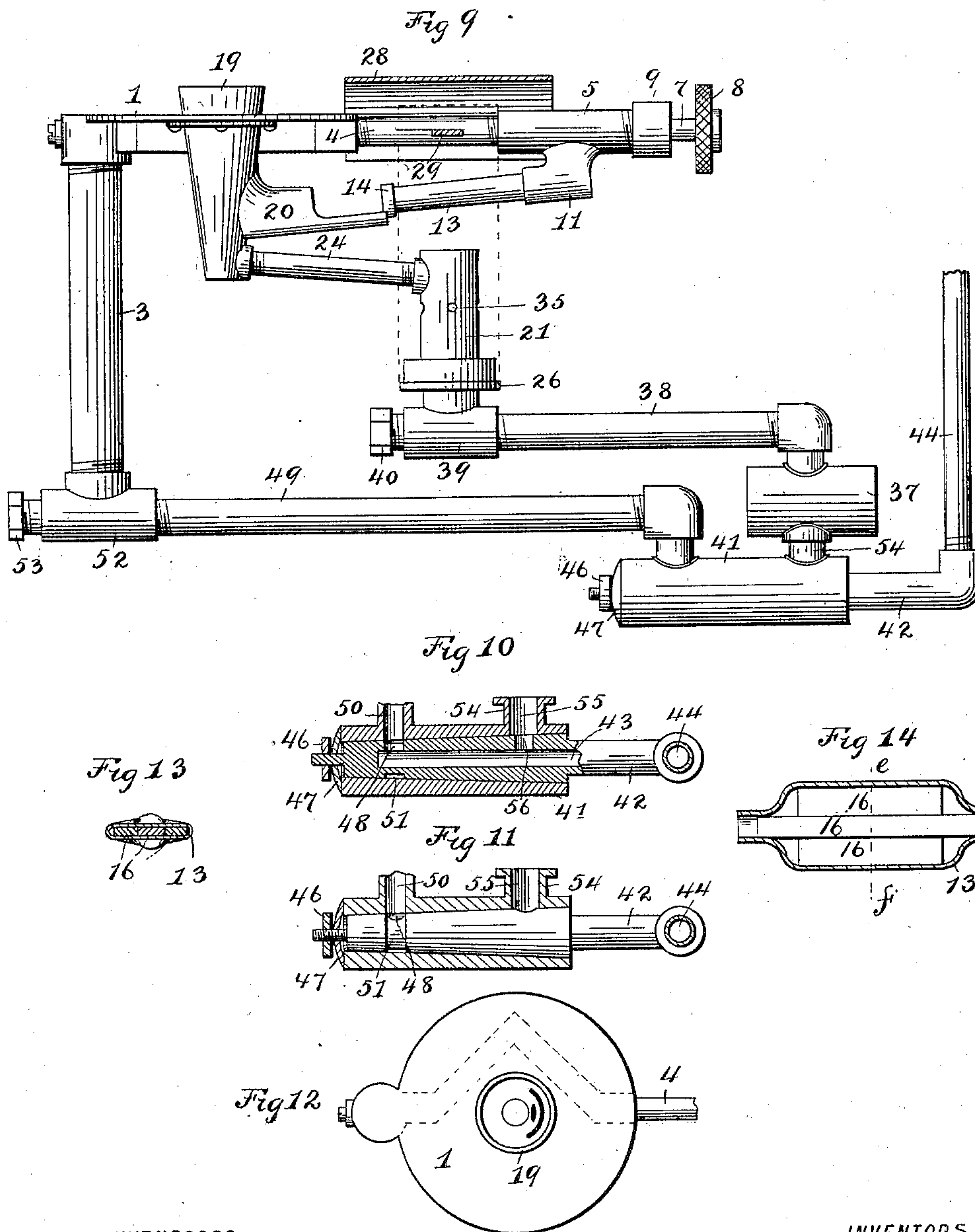
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UNITED STATES PATENT OFFICE.

JOSEPH H. FINK, OF KANSAS CITY, MISSOURI, AND RAYMOND ANDLAUER,
OF KANSAS CITY, KANSAS.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 701,475, dated June 3, 1902.

Application filed March 11, 1901. Serial No. 50,558. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH H. FINK, residing in Kansas City, in the county of Jackson and State of Missouri, and RAYMOND ANDLAUER, residing in Kansas City, in the county of Wyandotte and State of Kansas, citizens of the United States of America, have invented a new and useful Improvement in Vapor-Stoves, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof.

Our invention relates to improvements in vapor-stoves; and its object is to provide a vapor-stove that is safe to use and in which the gasolene may be turned on and ignited and left to run uninterruptedly without turning off until the operator desires to cease using the stove for the time being.

Our invention consists in the peculiarities of construction hereinafter fully described and claimed.

In the accompanying drawings, which illustrate our invention, Figure 1 is a vertical sectional view of the mechanism, showing the supply-tank in the raised position. Fig. 2 is a horizontal sectional view taken on the dotted line *a b* of Fig. 1. Fig. 3 is a cross-section view of one form of our generator. Fig. 4 is a corresponding view of another modification of generator, taken on the dotted line *c d* of Fig. 6. Fig. 5 is a side elevation view of the generator shown in Figs. 4 and 6. Fig. 6 is a plan view of the same. Fig. 7 is an end elevation view of the form of deflector shown in Figs. 8 and 9. Fig. 8 is a longitudinal vertical sectional view of the same. Fig. 9 is a side elevation view of the stove mechanism, with the deflector shown in vertical section and the supplemental-burner casing shown in dotted lines, the supply-tank and a portion of its pipe being removed. Fig. 10 is a longitudinal vertical sectional view of the supply-controlling valve, the valve being shown turned to the position occupied by it when the supply-tank is in the lower position. Fig. 11 is a similar view to that shown in Fig. 10, the rotary member of the valve being shown in elevation instead of in section. Fig. 12 is a top view of the main generator and the mixing-chamber. Fig. 13 is a cross-section taken on the dotted line *e f* of Fig. 14 and repre-

sents another modified form of supplemental generator. Fig. 14 is a horizontal sectional view of the form of generator shown in Fig. 13.

Similar numerals of reference indicate similar parts.

1 indicates the main generator, comprising a horizontal disk having oil-passages 2 leading from a pipe 3 to a horizontal pipe 4, one end of which is secured to the disk 1 and the other end to a valve-casting 5, which is provided with an oil-passage 6, adapted to be closed by an ordinary valve-stem 7, to the outer end of which is secured a thumb disk or head 8. An ordinary stuffing-box 9 encircles the valve-stem and has screw-threaded connection with the outer end of the valve-casting 5. The packing for the stuffing-box is indicated in Fig. 2 by 10. The underside of the valve-casting 5 is provided with a projection 11, having an internal passage 12 communicating with the passage 6 and having secured in the left end a downwardly-inclined generator-tube 13, upon the outer end of which is secured a cap 14, having a small discharge-hole 15. To more quickly generate vapor from the oil, the tubes 4 and 14 may be filled with fine wires 16.

In lieu of a cylindrical generator-tube, as shown in Figs. 1, 2, and 9, the tube 14 may have the forms shown in Figs. 3, 4, 5, 6, 13, and 14. In the forms shown in Figs. 4, 5, and 6 the tube has a flattened portion, the sides being pressed toward each other until a wide passage is formed with but little depth. As shown in Fig. 3, the flattened portion may also be curved. Filling-wires may or may not be inserted, as desired. In the preferred form of our invention the flattened portion, as shown in Figs. 13 and 14, has inserted therein three flat rods, the center one having a diameter slightly less than the interior of the cylindrical ends. The rods indicated by 16 in this form must not, of course, entirely fill the interior of the tube; but a small passage or passages must be left between them for the oil.

Upon the top of the disk 1 is placed the ordinary burner consisting of a cap 17, having lateral openings 18. Directly below and concentric with the cap or main burner 17 the

disk 1 is provided with a central opening in which is secured the upper end of the mixing-chamber 19, comprising a vertical flaring tube, the large end being at the top. The mixing-chamber 19, near the lower end, is provided with a lateral opening through which discharges a downwardly-inclined conductor 20, the upper and outer end of which is under the cap 14, so as to receive therefrom any liquid oil passing from the generator-tube 13. The upper outer part of the conductor 20 is cut away, so that air may be taken in with the vapor which is emitted from the pipe 13 when the oil has begun to generate into vapor.

Located directly below the pipe 13, which we term the "primary generator," is the supplemental burner 21, comprising a body portion cylindrical in form and having a chamber 22 in the upper part, from which leads an opening 23 in the top of the said supplemental burner. The said chamber is connected with the mixing-chamber 19 by an inclined pipe 24, the said pipe connecting with the mixing-chamber below the lateral opening therein.

Encircling the burner 21 is a tubular casing 25, preferably of perforated sheet metal, to admit air, but preventing the flame from the burner passing laterally outward. This casing rests upon a flange 26 on the lower end of the burner and extends vertically to a point above the tube or pipe 4, openings being provided in its sides for the extension therethrough of the pipe 4 and the primary generator-tube 13, as well as the inclined pipe 24. An opening 27 is provided near the bottom for the insertion of a lighted match for igniting the gasolene in the burner 21.

Above the casing 25 is a curved deflector 28, which deflects the flame of the oil burning in the casing to the burner 21, thus igniting the vapor passing therefrom when vapor begins to pass from the primary generator 13. This deflector can be in the form of a curved disk, the concave side being down, as shown in Fig. 1, or it may be in the form shown in Figs. 7, 8, and 9—that is, in the form of a trough with the concave side down and the channel formed thereby being parallel with the tube 4, to which the deflector may be secured by means of two horizontal arms 29, extending from the sides of the pipe 4 and secured at their ends to the sides of the deflector. In the form of deflector shown in Fig. 1 the deflector 28 may be secured by a screw 30 to the under side of the stove-frame, a part of which is shown in section in Fig. 1 and indicated by 31.

From the lower end of the chamber 22 of the supplemental burner 21 through the body of the burner extends a vertical internal oil-passage 32. Connecting therewith are inclined passages 33, which lead upwardly therefrom to a horizontal annular groove 34, which encircles the periphery of the burner 21. Lateral passages 35 lead from the lower end of the chamber 22 to the exterior of the burner.

In the passage 32 may be placed asbestos wool 36, which restricts the passage of oil through this passage. Thus when the oil enters the chamber 22 through the inclined pipe 24 the restricted passage 32 will not convey all the oil that enters the chamber, and most of the oil will pass through the openings 35 to the outside of the burner, where it can be ignited by inserting a match through the opening 27 in the casing 25. In the event that the valve 7 leaks or is not tightly closed when the stove is not in use the oil entering the chamber 22 after passing through the generator 13, inclined conductor-pipe 20, mixing-chamber 19, and pipe 24 will pass through the internal passage 32, which is sufficiently large to carry a small amount of oil.

Located below or lower than the burner 21 is a closed vessel or receptacle for waste oil, (indicated by 37,) which is connected by a horizontal pipe 38 by means of a T-joint 39 with the lower end of the burner 21, so as to receive the oil passing through the passages 32 and 33. A plug 40 closes the end of the T-joint opposite the pipe 38 when only one burner is used. It is obvious, however, that the pipe 38 may be connected to other burners constructed like the burner 21 by inserting a pipe in place of the plug 40.

Below the waste-receptacle 37 is a valve comprising an outer casing 41, which is provided through its length with a tapering bore in which is rotatably fitted a rotary member 42, provided, as shown in Figs. 1, 10, and 11, with a longitudinal axial opening 43, which connects interiorly with a vertical pipe 44, which is rigidly secured at its lower end to the right end, as shown in Fig. 1, of the rotary member 42. To the upper end of the pipe 44 is secured a supply-tank 45. The opposite end of the member 42 is screw-threaded and has mounted thereon a nut 46, which bears upon a concavo-convex spring-washer 47, which in turn rests against the end of the member 42. The spring tension of the washer holds the tapered member 42 snugly against its seat in the outer shell or casing 41, thus preventing leakage in the valve at this point. The opening 43 does not extend clear through the member 42, but is connected near its left end, as viewed in Fig. 1, by means of an opening 48, with an annular peripheral groove 51 in the member 42. Through the casing 41 of the valve and connecting interiorly with a horizontal pipe 49, secured at its right end to the valve-casing 41, is an opening or passage 50, disposed opposite the groove 51 of the rotary member. The left end of the pipe 49 is connected to a T-joint 52, which in turn is secured to the lower end of the vertical pipe 3. A plug 53 closes the end of the T-joint opposite the pipe 49; but this may be displaced by a pipe when the apparatus employs another vapor-burner. It will thus be seen that the supply-tank 45 may supply oil to several burners and the waste-receptacle may be employed to receive oil discharged

from a plurality of burners constructed the same as the one shown in Fig. 1. Inasmuch as the other burners or burner mechanisms would be simply duplicates of the one shown in Fig. 1, it is deemed unnecessary to show such in the drawings.

Our invention is operated as follows: Oil is first placed in the supply-tank 45, from which it flows when the tank is in the position shown in Fig. 1 through the pipe 44, thence into the opening 43, thence through the opening 48, groove 51, and opening 50 into the pipe 49. From this pipe it flows through the T-joint 52 and pipe 3 into the passages 2 of the generator-disk 1. From here it passes through the pipe 4 into the oil-passage 6 in the valve-casting, where it is held by the valve 7. If now the valve be opened by turning the stem 7 through the intermediary of the thumb-piece or head 8, the oil will pass past the valve-stem 7 into the passage 12 and thence into and through the supplemental or primary generator 13, from which it escapes by means of the small pin-hole 15 of the cap 14. After passing from the generator the oil will be carried downward by means of the conductor 20 through the lateral opening of and into the mixing-chamber 19, from which it will pass by means of the pipe 24 into the chamber 22 of the burner 21. Most of the oil will be carried from there through the openings 35 to the exterior of the burner-body 21, where it is ignited by inserting a lighted match through the opening 27 of the perforated casing 25. If all the oil is not consumed as fast as it passes to the exterior of the burner, the surplus or waste will pass into the groove 34 and thence by means of the passages 33 into the T-joint 39, from which it passes to the waste-receptacle 37 by the pipe 38. The bottom of the receptacle 37 is provided with an opening, in which is secured a projection 54 on the casing 41, provided with a vertical hole 55, extending through the casing 41 and adapted to register with a hole 56, which extends through the rotary portion of the valve from one side and connects with the axial opening 43 therein. The hole 56 registers with the hole 55 when the rotary member 42 is turned as shown in Figs. 10 and 11 or at right angles to the position indicated in the view shown in Fig. 1. When the valve member 42 is turned to the position shown in Figs. 10 and 11, the supply-tank 45 and pipe 44 will be turned to the horizontal position, in which position the gasoline may be poured into the tank 45. After the tank is filled the supply-tank is raised to the vertical position shown in Fig. 1, thus rotating the valve member 42 and shutting off connection between the holes 55 and 56. After the lighted match has been applied to the gasoline passing through the burner 21, as already described, no further attention need be directed to regulating or shutting off the gasoline by turning the valve-stem 7 until the operator has finished with

using the stove. The oil passing from the generator 13 will continue passing through the pipe 24 into the burner 21 until the generator-pipe 13 is heated sufficiently by the oil burning in the casing 25 to cause the oil in the generator 13 to turn into vapor, which, emitted from the opening 15 in the cap 14, will pass into the mixing-chamber 19, carrying with it a sufficient amount of air for perfect combustion. The mixed vapor and air will pass from the top of the mixing-chamber into the burner 17, from which it will pass through the openings 18. The flame of the gasoline burning in the casing 25 will be deflected by the deflector 28 against the vapor emitted from the holes 18 of the burner 17, thus igniting the vapor, which can then be used for heating or cooking purposes. The heat from the burner 17 will by conduction heat the disk 1 in a short time sufficiently to cause the oil passing through the passages 2 to be generated therein into vapor, and the vapor generation from this time on will be done in the main generator or passages 2. The vapor generated therein will pass through the same channels as the oil to the generator-pipe 13, which at this time becomes simply a conductor for the vapor. The oil of course will cease passing into the burner 21 when the vapor is first generated in the pipe 13, and the flame in the burner 21 will soon burn out, there being no oil-supply therein to feed the flame after the oil ceases to enter the chamber 22. It will be noted that in the construction of the burner 21 there is provided no means by which a pool of oil can collect. If more oil enters than is immediately burned, the excess passes, as described hereinbefore, through the openings 33 and thence into the waste-receptacle, where it remains until the supply-tank 45 is disposed in the lower position, at which time the position of the valve member 42 is such that all the oil will pass from the waste-receptacle 37 into the supply-tank. It will be observed that it is wholly unnecessary for the valve 7 to be turned off during the whole time the stove is in use. The excess oil passing through a closed conductor into the waste-receptacle prevents any danger arising from oil passing in a liquid state into the mixing-chamber. So, also, if the valve 7 should leak or be left open and the burner not ignited no possible harm could follow, as the oil would pass into the waste-receptacle and not flow out on the floor of the room containing the stove. The waste-receptacle may be made sufficiently large to hold all the oil that would pass from the supply-tank 45 and pipe 44. Thus if the valve should leak badly or be left open unintentionally and the burner 21 not ignited no bad result would happen. The oil would all pass into the receptacle 37. If, then, the tank 45 were placed in the lower position, then the oil would run from the waste-receptacle into the tank, which could then be raised, after which the oil would pass again into the generators, as described. If when the tank 45 is

lowered to fill with gasoline the valve 7 should not be closed and the burner 17 were left burning, no bad effects could be produced, for the reason that when the tank 45 is in the lower position as well as in the raised position the connection between the passage 43 of the rotary member 42 and the passages leading to the generators is unbroken and the pressure of the vapor in the generator-passages would force the gasoline into the supply-tank 45 and the flame of the burner 17 would be immediately extinguished owing to lack of vapor-pressure. Were the supply-tank 45 cut off from the generator-passages when the tank is in the lower position the pressure of the vapor in the generator-passages would cause the burner 17 to continue to burn for some time, thus presenting a possible chance for the vapor from the filling-can to become ignited from the flame of the burner 17, with disastrous results, may be.

By having the mixing-chamber flaring or increasing in size toward its mouth or discharge end a much better mixture of vapor and air is produced than by having a chamber having a discharge-opening of smaller area than the admission-opening. The tendency of the compressed vapor issuing from the generator-pipe 13 is to expand, and by increasing the size of the mixing-chamber toward its outlet end the resistance to this disposition of the vapor to expand is reduced, resulting in a greater intake of air, and thus affording better combustion. By permitting the gasoline to flow continuously through the burner 21 instead of collecting in pockets or pools the excess of carbon in the flame from the burner 21 is prevented, and the flame is practically smokeless and void of noxious odors and the emission of soot. It will thus be seen that our invention provides a construction of vapor-stove that is quite safe to use and requiring little attention in its manipulation.

Our invention may be variously modified from the construction shown without departing from its spirit.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a vapor-stove, the combination with a generator, of a waste-receptacle, means for conveying liquid oil emitted by the generator into the waste-receptacle, an oil-supply tank located normally higher than the generator and the waste-receptacle, but adapted to be disposed in a position lower than the waste-receptacle and the generator, an oil-conductor provided with an always-open passage connecting the supply-tank with the generator, an oil-conductor provided with a passage connecting the waste-receptacle with the supply-tank, and having means for closing the latter passage when the supply-tank is in the raised position, substantially as described.

2. In a vapor-stove, the combination with a generator, of a waste-receptacle, means for

conveying liquid oil emitted by the generator into the waste-receptacle, an oil-supply tank located normally higher than the generator and the waste-receptacle, but adapted to be disposed in a position lower than the waste-receptacle and the generator, an oil-conductor provided with an always-open passage connecting the supply-tank with the generator, an oil-conductor provided with a passage connecting the waste-receptacle with the supply-tank and having a valve for closing the latter passage when the supply-tank is in the raised position, substantially as described.

3. In a vapor-stove, the combination with a generator, of a waste-receptacle, a burner disposed intermediate the generator and the waste-receptacle in a position adjacent to the generator, means for conducting the liquid oil emitted from the generator to the said burner and thence into the waste-receptacle, an oil-supply tank located normally higher than the generator and the waste-receptacle, but adapted to be disposed in a position lower than the generator and the waste-receptacle, an oil-conductor provided with an always-open passage connecting the supply-tank with the generator, an oil-conductor provided with a passage connecting the waste-receptacle with the supply-tank, and having means for closing the latter passage when the supply-tank is in the raised position, substantially as described.

4. In a vapor-stove, the combination with the burner, of a generator, means for mixing air with the vapor emanating from the generator and conducting the mixture to the burner, a waste-receptacle, a supplemental burner intermediate the generator and the waste-receptacle, and means for conveying liquid oil emitted from the generator to the supplemental burner and from thence into the waste-receptacle, substantially as described.

5. In a vapor-stove, the combination with the burner, of a generator, means for mixing air with the vapor emitted from the generator and conducting the mixture to the burner, a waste-receptacle, a supplemental burner intermediate the generator and the waste-receptacle, means for conveying liquid oil emitted from the generator to the supplemental burner and from thence into the waste-receptacle, and a casing encircling the supplemental burner for conveying heat therefrom to the generator, substantially as described.

6. In a vapor-stove, the combination with a generator, of a burner, means for mixing air with the vapor emanating from the generator and conveying the mixture to the burner, a waste-receptacle, a supply-tank located normally higher but adapted to be disposed in a position lower than the waste-receptacle and the generator, a supplemental burner intermediate the generator and the waste-receptacle, means for conveying liquid oil emitted from the generator to the supple-

mental burner and from thence into the waste-receptacle, an always-open oil-conductor connecting the supply-tank with the generator, an oil-conductor connecting the waste-receptacle with the supply-tank, and provided with means for closing the latter conductor when the supply-tank is in the raised position, substantially as described.

7. In a vapor-stove, the combination with a generator, of a waste-receptacle, a burner intermediate the generator and the waste-receptacle, means for conveying liquid oil emitted from the generator to the burner and thence into the waste-receptacle, a supply-tank located normally higher than the generator and the waste-receptacle, but adapted to be disposed in a position lower than the waste-receptacle and the generator, a conductor provided with an always-open passage connecting the supply-tank with the generator, a conductor provided with a passage connecting the waste-receptacle with the supply-tank, and having means for closing the latter passage when the supply-tank is in the raised position, substantially as described.

8. In a vapor-stove, the combination with a generator, of a waste-receptacle, a burner intermediate the waste-receptacle and the generator, means for conveying liquid oil emitted from the generator to the burner and thence into the waste-receptacle, a supply-tank located normally higher than the generator and the waste-receptacle, but adapted to be disposed in a position lower than the generator and the waste-receptacle, a casing encircling the burner for conveying heat to the generator, a conductor provided with a passage connecting the waste-receptacle and the generator with the supply-tank, and having means for closing the passage to the waste-receptacle when the supply-tank is in the raised position, substantially as described.

9. In a vapor-stove, the combination with a generator, of a mixing-chamber for receiving vapor emitted from the generator, a waste-receptacle, a burner disposed intermediate the waste-receptacle and the mixing-chamber, means for conveying liquid oil from the mixing-chamber into the burner and thence into the waste-receptacle, and an inclined conductor for carrying downward liquid oil emitted from the generator into the mixing-chamber, substantially as described.

10. In a vapor-stove, the combination with a generator, of a mixing-chamber for receiving vapor emitted from the generator, a waste-receptacle, a burner located intermediate the waste-receptacle and the mixing-chamber, a casing encircling the burner for conveying heat therefrom to the generator, an inclined conductor for conveying liquid oil from the generator downward into the mixing-chamber, and means for conveying liquid oil passing into the mixing-chamber to the burner and thence into the waste-receptacle, substantially as described.

11. In a vapor-stove, the combination with

a generator, of a burner, means for conveying vapor emitted from the generator to the burner and mixing with air, a waste-receptacle, a supplemental burner disposed between the generator and the waste-receptacle, means for conveying liquid oil emitted from the generator to the supplemental burner and thence into the waste-receptacle, a casing encircling the supplemental burner for conveying heat therefrom to the generator, and a deflector disposed above the casing in a position such as it will deflect the flame in the casing to the main burner, substantially as described.

12. In a vapor-stove, the combination with a generator, of a waste-receptacle, a burner disposed intermediate the generator and the waste-receptacle, an oil-conductor leading to the waste-receptacle from the burner, a mixing-chamber provided with a lateral opening for receiving air and also for receiving vapor discharged from the generator, and provided with an opening for the discharge of mixed vapor and air, an inclined oil-conductor for conveying oil downward from the generator through the said lateral opening into the mixing-chamber, and a conductor leading from the mixing-chamber to the said burner, substantially as described.

13. In a vapor-stove, the combination with a generator, of a waste-receptacle, a conductor for oil leading to the waste-receptacle, a burner provided with an oil-receiving chamber having an internal oil-passage leading to the said conductor, and having oil-passages leading from the chamber to the exterior of the burner for carrying oil to the outside thereof and an oil-passage leading from the exterior of the burner into the said waste-receptacle conductor, and means for conveying liquid oil from the generator into the said chamber, substantially as described.

14. In a vapor-stove, the combination with a burner provided with an oil-receiving chamber and having an internal oil-passage leading therefrom and a passage leading to the exterior thereof, and a groove for receiving the oil passing to the outside of the burner, of an oil-conductor connected to the said groove and the said internal passage, and an oil-conductor leading to the said chamber, substantially as described.

15. In a vapor-stove, a burner comprising a body provided with a chamber having an oil-inlet leading thereto, an internal discharge-passage, passages leading from the chamber to the exterior thereof, a groove in the exterior of the body to receive the oil discharged upon the exterior, and a passage leading from the said groove to the said internal passage, substantially as described.

16. In a vapor-stove, the combination with a supply-tank, of a valve member provided with a tapering bore therethrough and having two openings leading therefrom to the exterior thereof, a rotary member fitted to the said tapering bore and provided with an in-

- ternal oil - passage always communicating with one of the said openings and communicating with the other opening when the valve member is rotated to a certain position, and
5 a pipe connecting the supply-tank with the said rotary member and communicating interiorly with the tank and the internal oil-passage of the said rotary member, substantially as described.
- 10 17. In a vapor-stove, the combination with a generator, of a burner so disposed as to impart heat to the generator and to receive vapor discharged therefrom, a supplemental burner, a waste-receptacle, and means for
15 conducting liquid oil emitted from the generator to the supplemental burner and thence into the waste-receptacle in a continuous flow and without the formation of oil pools, substantially as described.
- 20 18. In a vapor-stove, the combination with a generator, of a burner, a waste-receptacle, means for conducting oil to the generator, means for conducting oil from the waste-receptacle to the said oil-conducting means, and
25 means for conducting liquid oil emitted from the generator to the burner and thence into the waste-receptacle in a continuous flow and without the formation of oil pools, substantially as described.
19. In a vapor-stove, the combination with 30 a generator, of a burner so disposed as to impart heat to the generator and to receive vapor discharged therefrom, a supplemental burner, a waste-receptacle, means for conducting oil to the generator, means for con- 35 ducting oil from the said waste-receptacle to the said oil-conducting means, and means for conducting liquid oil emitted from the generator to the supplemental burner and thence into the waste-receptacle in a continuous flow 40 and without the formation of oil pools, substantially as described.
- In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.
- JOSEPH H. FINK.
RAYMOND ANDLAUER.
- Witnesses:
WARREN D. HOUSE,
JESSIE R. COMSTOCK.