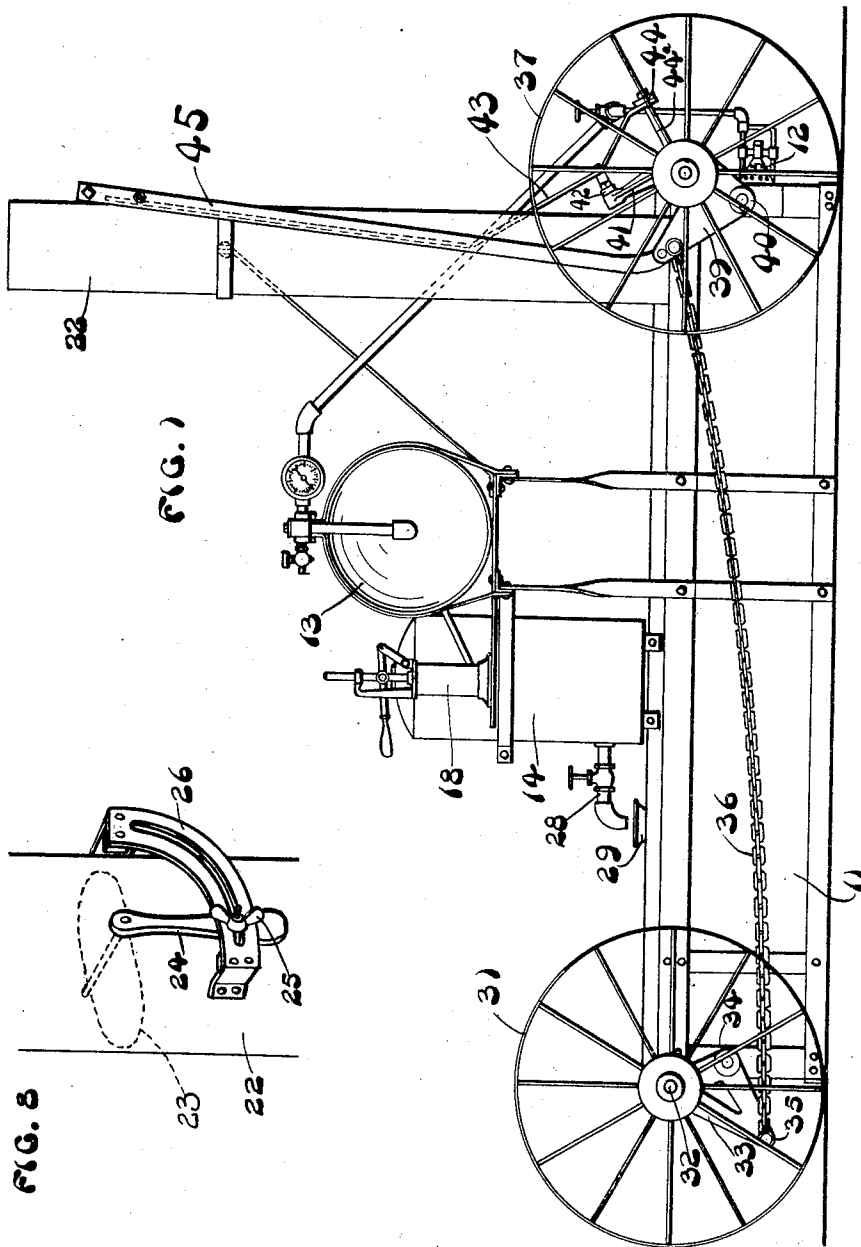


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W. MACLEOD.
SURFACE HEATER.
APPLICATION FILED APR. 26, 1911.

Patented May 27, 1913.

4 SHEETS—SHEET 1.



Inventor

Walter Macleod.

By

Walter J. Murray

Attorney

Witnesses

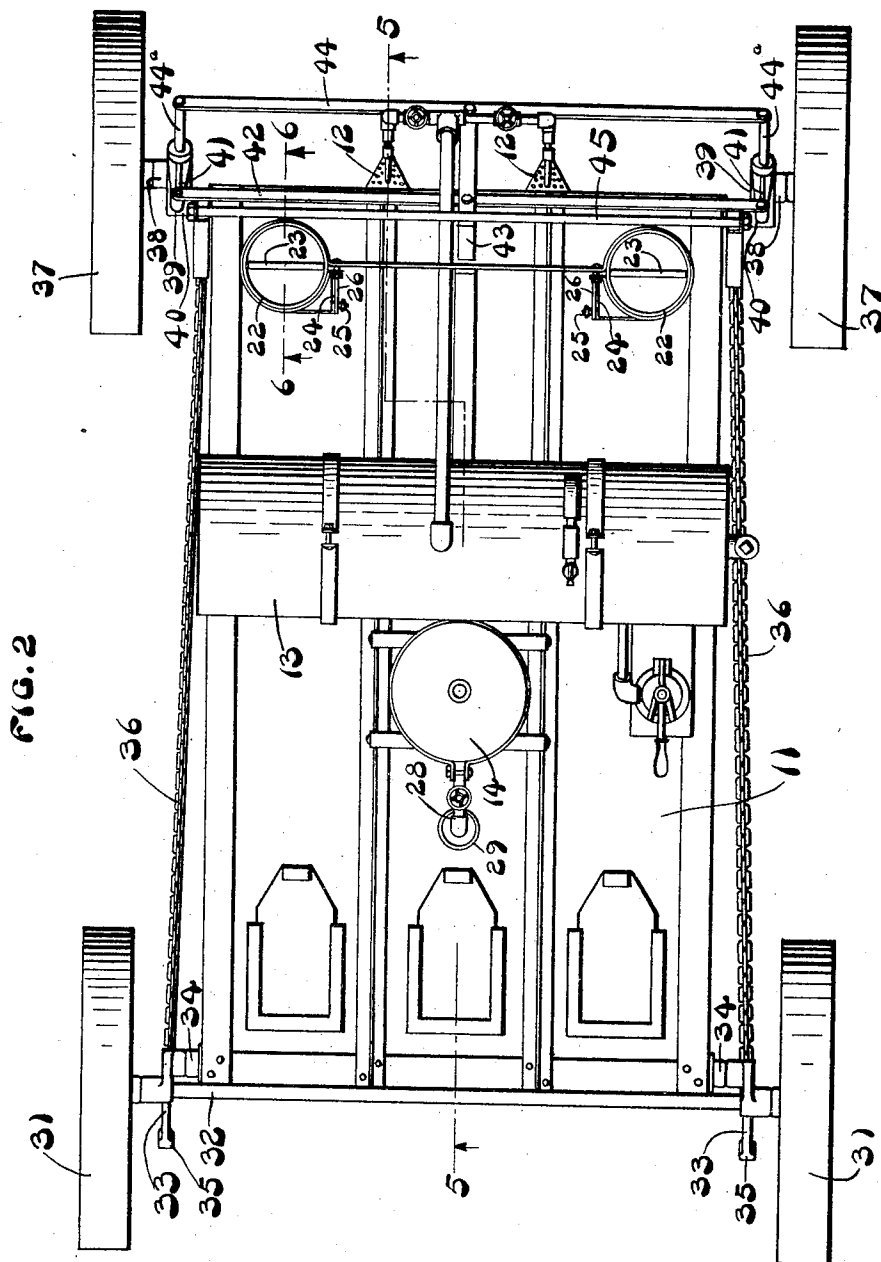
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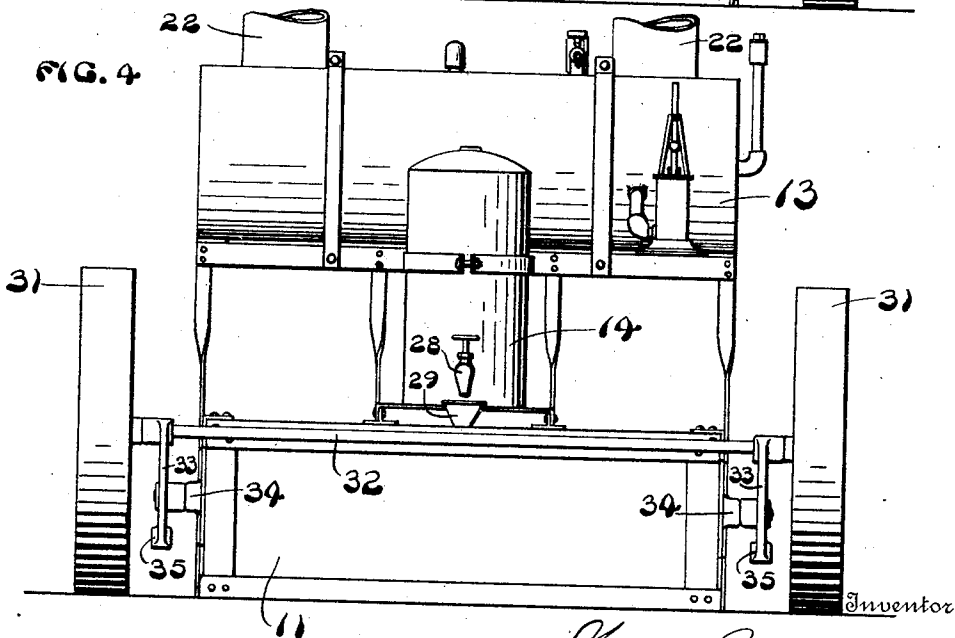
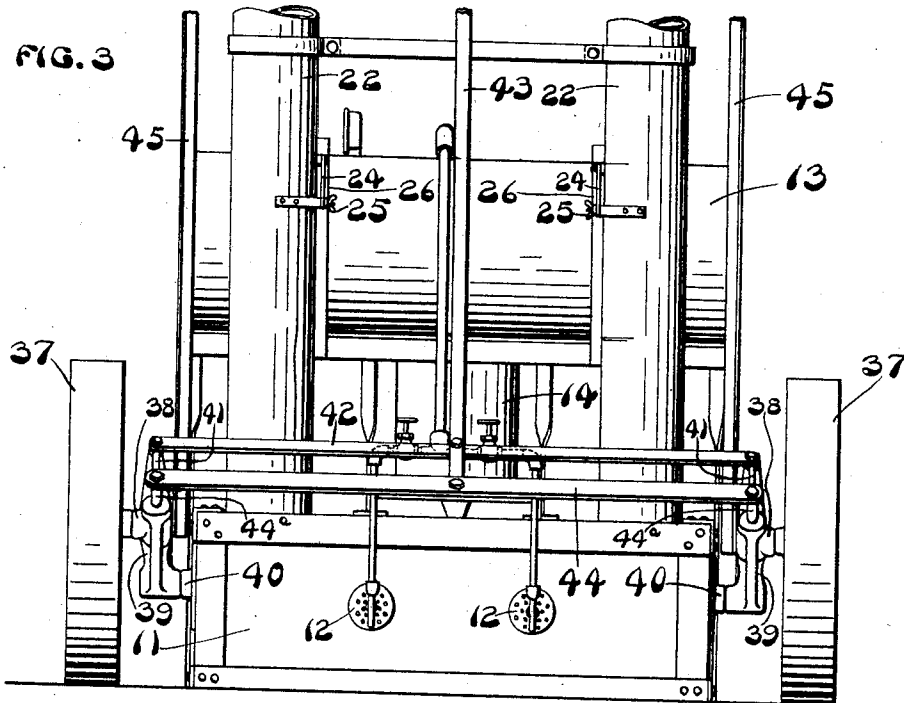
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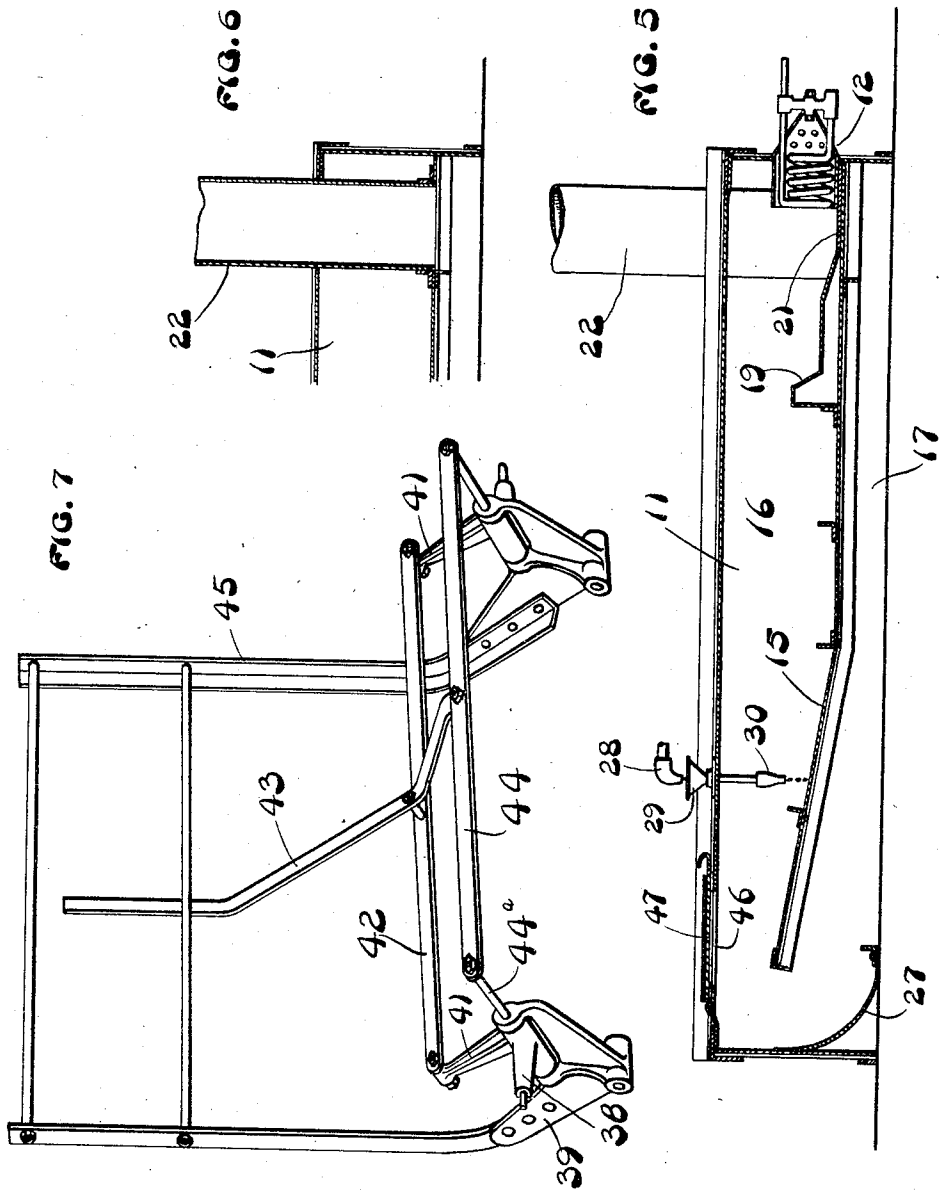
By

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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

WALTER MACLEOD, OF CINCINNATI, OHIO.

SURFACE-HEATER.

1,062,655.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed April 26, 1911. Serial No. 623,512.

To all whom it may concern:

Be it known that I, WALTER MACLEOD, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, and State of Ohio, have invented certain new and useful Improvements in Surface-Heaters, of which the following is a specification.

This invention relates to surface heaters for bitumen or asphalt pavements and streets, and has for an object to produce a heater in which means are employed for heating the surface of the pavement or street, without subjecting it to burning gases or burning fuel.

A further object is to provide an improved portable surface heater.

A further object is to produce a portable surface heater, in which means are employed for subjecting the surface to be heated to the sensible heat of the products of combustion, and in which means are employed for varying the percentage of moisture carried by the products of combustion.

These and other objects I attain in a heater embodying the features herein described, and illustrated in the drawings accompanying and forming a part of this application.

In the drawings, Figure 1 is a side elevation of a heater embodying my invention. Fig. 2 is a plan view of the heater illustrated in Fig. 1. Figs. 3 and 4 are respectively front and rear elevations of the heater illustrated in Figs. 1 and 2. Fig. 5 is a sectional view of the hood of the heater along the line 5—5 of Fig. 2. Fig. 6 is a fragmental sectional view of the hood taken along the line 6—6 of Fig. 2. Fig. 7 is a perspective view illustrating the steering gear employed with the heater illustrated. Fig. 8 is a fragmental perspective view of a stack, and illustrates the means employed for adjusting the position of the damper with which the stack is provided.

The heater illustrated as an embodiment of my invention includes a hood 11, burners 12, a fuel tank 13 mounted on the hood for delivering fuel to the burners, a water tank 14 mounted on the hood, and wheels mounted on the hood for the purpose of transporting or moving it from place to place.

The hood illustrated consists of a rectangular metal box, open at the bottom, and provided with a partition 15, which extends from the front to a point near the rear end

of the hood and divides the interior of the hood into an upper or combustion chamber 16, and a lower or vent chamber 17.

The burners 12 may be of any suitable type and are located at the front of the hood above the partition 15. I preferably employ oil burners, to which the oil is supplied under pressure. In the drawings, I have illustrated two burners 12, each of which communicates with the supply tank 13, through a separate branch pipe, which is provided with a regulating valve. With this arrangement, one or both of the burners may be employed, as desired, and each burner may be regulated independently.

The tank 13 is provided with a pump 18, for the purpose of pumping air into the tank and maintaining the oil or liquid fuel, contained in the tank, under pressure. The usual accessories of such a pressure tank are employed.

A bridge wall 19, of suitable construction, is located on the partition 15, and extends across the hood in front of the burners 12. The rear portion of the partition 15 is inclined upwardly, so as to deflect the gases traversing the chamber 16. I preferably employ heat insulating material, such as asbestos 21, on the front portion of the partition, so as to protect it from the excessive heat encountered adjacent to the burners. Any desired number of burners may be employed.

Stacks 22 are located on the front portion of the hood and extend through the combustion chamber 16 and communicate with the vent chamber 17. The hood illustrated is provided with two stacks 22, and they are located on each side of the burners 12. A damper 23 is provided in each stack, and each damper is provided with an operating arm 24, which carries a wing-nut 25, adapted to engage a segment 26, for the purpose of securing the damper in an adjusted position. A curved directing plate 27 is located at the rear end of the hood, for the purpose of directing the flow of gases passing from the combustion chamber 16 into the vent chamber 17. The water tank 14 is adapted to deliver a regulable flow of water into the interior of the hood 11, and is provided with a valve-pipe 28, adapted to deliver water into a cup or funnel 29, which communicates with one or more discharge nozzles 30, located in the interior of the hood, above the partition 15. The nozzles

30 are adapted to discharge small quantities of water into the path of the hot gases passing through the combustion chamber 16, for the purpose of raising the percentage of
5 vapor or moisture carried by the gases.

The wheels of the heater are so arranged that the hood may be lowered to rest upon the surface to be heated during the heating operation, and may be raised from the sur-
10 face of the pavement or street, for the purpose of transporting or moving the heater from place to place. In accomplishing this, I mount the wheels on rockers, which are journaled on trunnions mounted on the
15 hood. The rear wheels 31 are journaled on an axle 32, which extends across the rear end of the hood, and is carried by rockers 33, located on each side of the hood. Each rocker 33 is journaled on a trunnion 34,
20 which is suitably mounted on the hood, and each rocker is provided with an extension 35, to which an operating chain 36 is secured. Each front wheel 37 is journaled on a separate trunnion 38, which is in turn
25 journaled on a separate rocker 39. The rockers 39 are journaled on trunnions 40, which are mounted on the hood 11. Each wheel-carrying trunnion 38 is provided with an integrally formed arm 41, and the
30 arms 41 are secured together by means of a rod 42 which extends between and is pivotally connected to them. A steering lever 43 is fulcrumed on a rod 44, which extends between and is secured to pins 44^a, carried by
35 the rockers 39, and upon which the trunnions 38 may be journaled. The lever 43 is pivotally secured to the rod 42, and by shifting the rod is adapted to turn the trunnions 38 about their pivotal points and to
40 thereby steer the heater during the operation of transporting it from place to place, by shifting the direction of the axes of the wheels 37. Each rocker 39 is provided with an extension to which a handle 45 is secured
45 and to which one of the chains 36 is secured. The fulcrum points of the rockers are so located relatively to the wheel journals, that the wheels will be moved in a substantially vertical direction relatively to the hood,
50 when the rockers are turned about their trunnions. When the hood is lowered, that is, when it rests on the surface to be heated, the rear rockers 33 are swung around the mounting trunnions 34, so that the exten-
55 sions 35 are moved to positions below the trunnions 34, and the axle 32 to a position above the trunnions 34. The front rockers 39 are also turned about the trunnions 40, so that the wheel trunnions 38 are raised
60 above the trunnions 40, and the handle 45 assumes a substantially upright position, as illustrated in Figs. 1 and 7. In raising the hood, the handle 45 is moved from the upright to a substantially horizontal position,
65 and this motion turns the rocks 39 about

the wheel-supporting trunnions 38 and lifts the hood 11. The lifting operation turns the rockers 39 about the trunnions 40, and, consequently turns the rockers 33 about their trunnions 34, through the agency of
70 the chains 36. The turning of the trunnions 33 shifts the position of the axle relatively to the hood and raises the rear end of the hood. It will be understood that all of the
75 rockers are turned simultaneously and consequently the front and rear ends of the hood are lifted at the same time. In lowering the hood, the handle 45 is raised to the upright position. This turns the rockers 39
80 about the trunnions 38 and releases the tension on the chains 36, and thereby permits the hood to drop by its own weight.

The operation of starting the heater is as follows:—The hood 11 is lowered over the
85 portion of the surface of the pavement or street to be heated and vents 46, located in the top of the hood, are opened. In the apparatus illustrated, the vents 46 are provided with sliding covers 47. After the
90 vents are opened, the burners are started, and when they are in full operation, the vents are closed and the dampers 23 in the stacks 22 are adjusted, so as to give the desired intensity of heat in the hood. The
95 flames produced by the burners 12 are blown into the combustion chamber 16 against the bridge wall 19. The bridge wall to some extent obstructs the free passage of the gases through the combustion chamber and renders the temperature throughout the
100 chamber more uniform. The hot but inert products of combustion, after traveling toward the rear end of the hood are delivered around the rear end of the partition 15 and travel in a reverse direction through the
105 chamber 17, below the partition 15, and across the surface to be heated. The gases are finally discharged from the chamber 17, through the stacks 22. With this arrangement, the surface to be heated is directly
110 subjected to the hot but inert gases, and, consequently the heater is capable of subjecting the surface to be heated to high temperatures, without the danger of setting the material to be heated on fire.
115

If desired, water can be introduced into the chamber 16 during the heating operation, for the purpose of creating a more humid and therefore a more penetrating
120 heat.

The intensity of the heat within the hood may be varied by varying the number of burners employed or by regulating the burners, and also by adjusting the dampers 23. In addition to this, the intensity of the heat
125 at different points within the hood may be varied by varying the adjustment of the dampers 23, so that the flow of gases through the chamber 17 is thrown from one side or the other of the chamber.
130

What I claim is:—

1. A surface heater comprising, an open bottom hood, a partition dividing the hood into upper and lower chambers, means for heating the upper chamber, and a vent passage communicating with the lower chamber and extending upwardly through the hood.

2. A surface heater comprising, an open bottom hood, a partition extending partially across the hood, and vent passages communicating with the hood below the partition and extending upwardly through the hood.

3. A surface heater comprising a hood, means for delivering hot gases and products of combustion to the hood, and means for causing the gases and products of combustion to travel across the upper portion of the hood in one direction and then diverting the gases downwardly and causing them to travel back across the lower portion of the hood in the other direction.

4. A surface heater comprising an open bottom hood, a partition extending partially across the interior of the hood, burners located above the partition, and a stack mounted on the hood and communicating with the interior of the hood below the partition.

5. A surface heater comprising an open bottom hood, a partition for dividing the interior of the hood into an upper, or combustion and a lower, or vent chamber, and a stack communicating with the vent chamber.

6. A surface heater comprising an open bottom hood, a partition within the hood for dividing it into an upper, or combustion chamber, and a lower communicating vent chamber, the latter located below the combustion chamber and adjacent to the surface to be heated.

7. A surface heater comprising an open bottom hood adapted to be located on the surface to be heated, means for injecting hot gases and the products of combustion into the hood, a stack for discharging the gases from the hood, and a partition located within the hood for directing the flow of gases across the upper portion of the hood downwardly and in a reverse direction across the surface to be heated.

8. A surface heater comprising a hood, a deflector located in the hood for directing the products of combustion away from the surface to be heated and means for causing

the products of combustion to travel across the surface to be heated after they have moved across the deflector.

9. A surface heater comprising a hood, rockers journaled on the hood, trunnions journaled on the rockers, wheels journaled on the trunnions, means for turning said rockers to raise and lower said hood, and means for shifting said trunnions.

10. A surface heater comprising, an open-bottomed hood, a deflector located in the hood and dividing it into an upper and lower chamber, burners communicating with the upper chamber of the hood, means for delivering water into the upper chamber of the hood and a vent communicating with the lower chamber of the hood.

11. A surface heater comprising a hood, a partition dividing the hood into a combustion and a vent chamber, a burner located above the partition, a bridge wall mounted on the partition, a stack mounted on the hood and communicating with the vent chamber, and means for delivering regulable amounts of water to said combustion chamber within the path of travel of the gases passing therethrough.

12. A surface heater comprising an open bottom hood, means for heating the interior of the hood, a stack communicating with the interior of the hood, and a damper located in said stack for varying the intensity of heat within the hood.

13. A surface heater comprising an open bottom hood, a partition dividing the interior of the hood into an upper and lower chamber, stacks communicating with the lower chamber, and dampers provided for said stacks, and means for securing said dampers in adjusted positions.

14. A surface heater comprising a hood, a partition extending across the hood and dividing it into an upper and a lower chamber, burners adapted to inject hot gases into the front of the upper chamber and a chimney communicating with the lower chamber below the partition, whereby a current of hot gases is created across the upper chamber back across the lower chamber and out through the chimney.

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Witnesses:

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