W. MELAS.

OIL FIRED PORTABLE RIVET HEATING FURNACE.

APPLICATION FILED MAR. 11, 1914.

1,130,185.

Patented Mar. 2, 1915.

2 SHEETS—SHEET 1.

FIG. I.

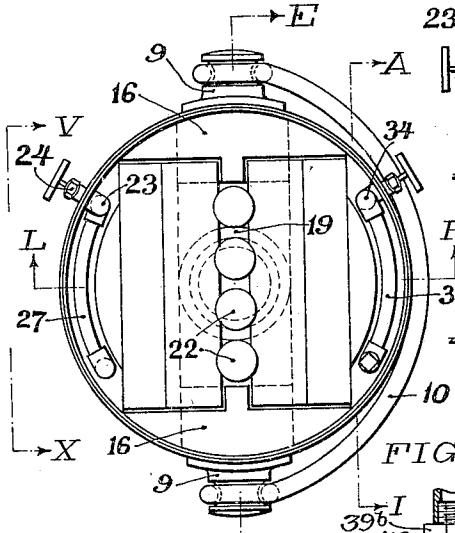



FIG. IV.

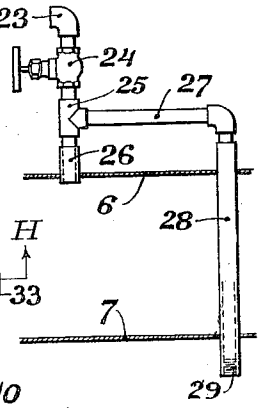



FIG. V.

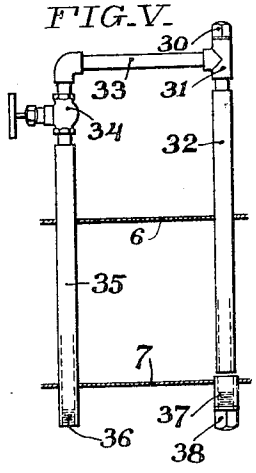



FIG. VI.

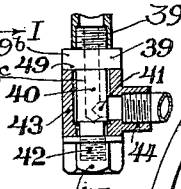



FIG. II.

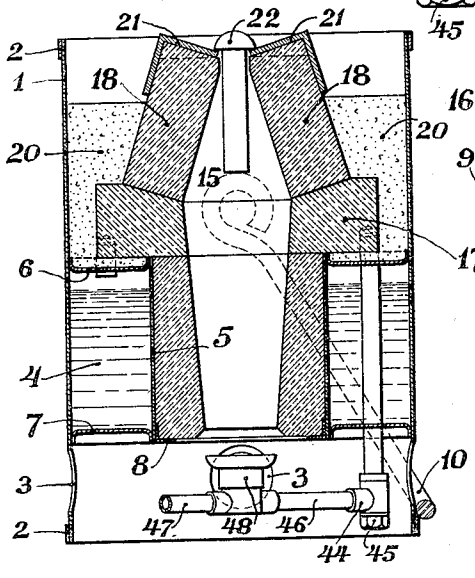
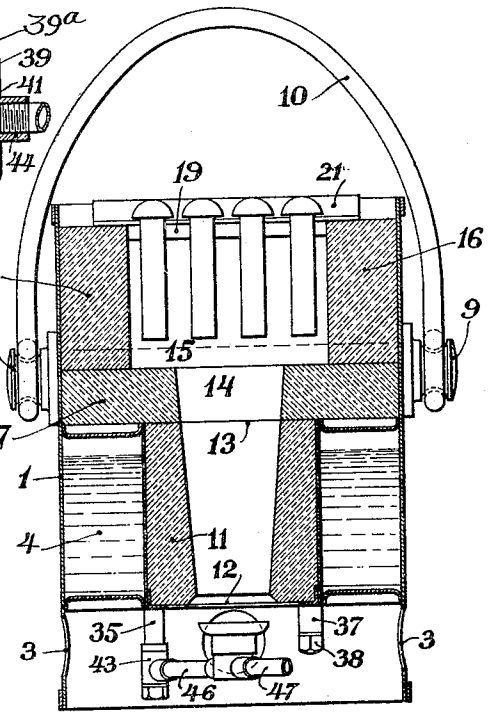



FIG. III.




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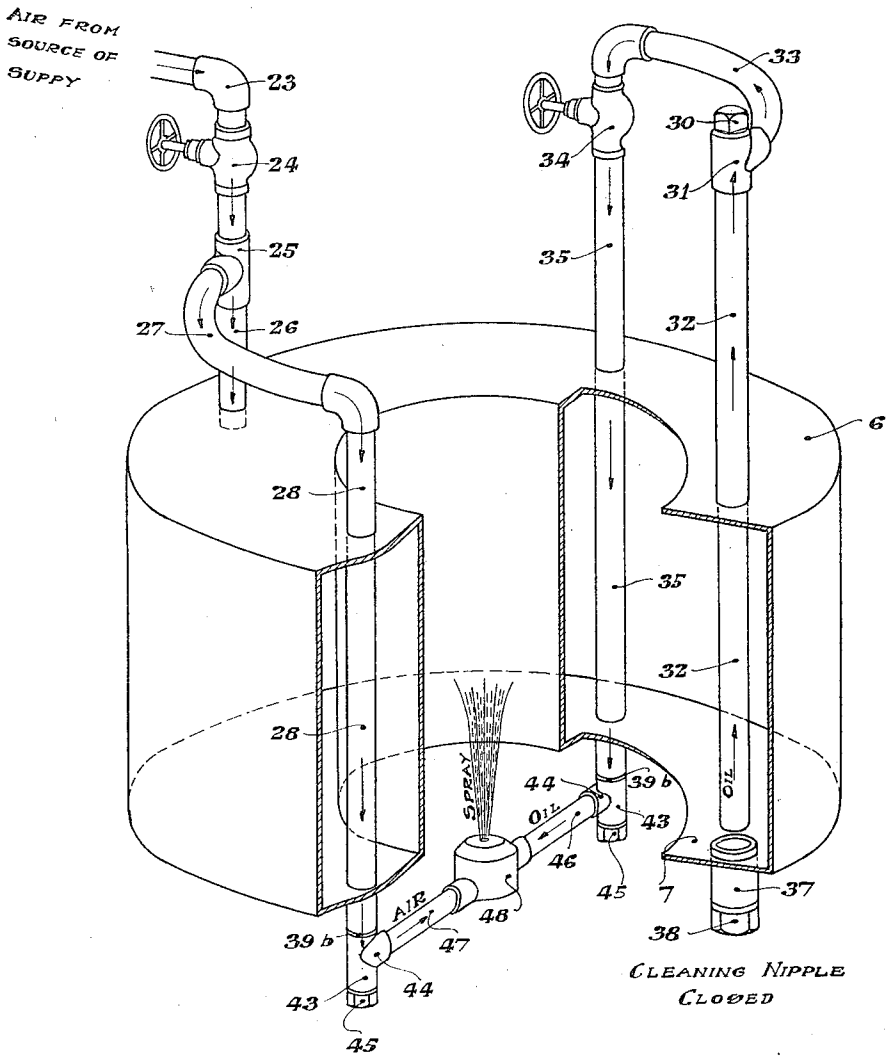
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2 SHEETS—SHEET 2.

FIG. VII.




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# UNITED STATES PATENT OFFICE.

WILLIAM MELAS, OF RIDLEY PARK, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO DAVID TOWNSEND, OF PHILADELPHIA, PENNSYLVANIA.

## OIL-FIRED PORTABLE RIVET-HEATING FURNACE.

1,130,185. Specification of Letters Patent. Patented Mar. 2, 1915.

Application filed March 11, 1914. Serial No. 823,959.

*To all whom it may concern:*

Be it known that I, WILLIAM MELAS, a citizen of the United States, residing at Ridley Park, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Oil-Fired Portable Rivet-Heating Furnaces, of which the following is a specification.

In assembling structural work for bridges, buildings, shops, etc., by riveting it is necessary to have means for the heating of the rivets, and it is desirable to have the means for this purpose as light as possible so that they can be easily carried to the place where the work is to be done. The riveting in field work of this character is usually done with tools operated by compressed air, and it is the purpose of my invention to provide a self contained, portable furnace with an internal fuel compartment, operated by liquid hydrocarbons and compressed air.

It is also my purpose to provide a furnace which is small, compact and of light weight; which may be brought into close proximity to the work; which has means provided for suspending same or for standing upon its own base, and which is simple in construction, of ample output for the work intended and in which the rivets are suspended into the heating chamber by their heads.

In the drawing Figure I is a top view of the furnace. Fig. II is a vertical section through the furnace along the line L H of Fig. I and viewed as indicated by the arrows. Fig. III is a vertical section through the furnace along the line E F of Fig. I and viewed as indicated by the arrows. Fig. IV is a partial vertical section through the heads of the fuel compartment, showing the air piping as viewed from V X of Fig. I. Fig. V is a partial vertical section through the heads of the fuel compartment, showing the oil piping as viewed from A I. Fig. VI is an enlarged vertical section through the burner connection with the compressed air and oil supply. Fig. VII is a perspective view of the oil and air piping showing same in relation to the fuel compartment.

In the drawing 1 denotes a cylindrical furnace casing, open at both ends, and having reinforcement strips 2 at the upper and lower end. The casing has a number of holes 3 at the lower part. Within the casing is the fuel tank 4, which has an inner, cylindrical shell 5, an upper head 6 and a lower head 7. The outer shell of tank 4 is formed by the furnace casing. On the lower part of 5 is a circular angle 8.

The parts aforementioned can be assembled by riveting, but on account of the smallness of the structure I prefer uniting them by one of the well known welding processes, and, therefore, have not shown any rivets on the drawing.

The furnace casing 1 has two trunnions 9 attached thereto, which trunnions carry a yoke 10. Within the inner shell 5 of tank 4, and supported by angle 8, is a refractory lining 11, forming a combustion chamber with a lower opening 12 and an upper opening 13. Within the upper part of the furnace casing is a heating chamber 15, composed of a refractory bottom slab 17, having a hole 14 to correspond with opening 13 of combustion chamber; of two refractory end tiles 16, and of two refractory side tiles 18 assembled in such a way as to leave a slot 19 on top. The space between the furnace casing and the refractory lining is filled with fire clay or other suitable refractory material, as indicated by 20, to keep the tiles 18 in place. On the slanting upper surfaces of tile 18 are wearing plates or angles 21 to support the heads of the rivets 22.

Fig. IV shows the arrangement of the air piping. At the elbow 23 connection is made to a source of supply of compressed air. The valve 24 admits the compressed air through the T 25 and nozzle 26 into the tank, thus putting the oil under pressure. The T 25 admits the compressed air also through pipe connection 27 into pipe 28 which is welded into the upper and lower head of the tank, and the lower end of which is internally threaded as indicated by 29.

Fig. V shows the oil piping. The pipe 32 is welded into the upper head 6 of the tank and ends near the lower head 7. It is in connection with a T 31, the upper branch of which is plugged by a removable plug 30. The side branch of T 31 is connected by piping 33 to a valve 34 and the latter is connected to a pipe 35 welded into both heads of the tank and having an internal thread 36 at the lower end. The nipple 37 is welded into the lower head of tank and is normally closed by plug 38. This is provided for cleaning the tank of any sediment or residue, which may accumulate in time from

certain oils, by flushing with some suitable solvent, such as kerosene, etc.

Fig. VI shows in an enlarged scale the connection of the end 29 of air pipe 28 to the burner pipe 47, which latter is shown in portion in Figs. II and III. In Fig. VI 39 represents a cylindrical plug, having an upper, threaded, portion $39^a$, a collar $39^b$ and a shank $39^c$ of smaller diameter than the collar; said shank having a threaded end 42. The plug 39 has an axial bore 40 extending through the upper, threaded, portion $39^a$, through the collar and through a part of the shank, leaving the lower portion of the shank solid. A side bore 41 through the shank communicates with bore 40. This plug is screwed tight with the upper portion $39^a$ into the threaded end 29 of air pipe 28. Over the shank $39^c$ of the plug slips loosely a T 43, having a threaded side branch 44. Into this side branch is screwed one end of pipe 47 (which pipe is shown in portion in Figs. II and III,) while the other end of said pipe 47 is connected to the burner 48. The T 43 aforedescribed can be pressed tightly against the shoulder 49 of collar $39^b$ of plug 39 by a closed nut 45 engaging the thread on the lower end 42 of shank $39^c$. A similar plug 39, T 40 and nut 45 are used to connect the end 36 of oil pipe 35 in a similar way with the burner pipe 46 shown in Figs. II and III. Unscrewing the nuts 45 of each connection permits of easy removal of the burner for cleaning, inspection, etc. The tank can be fitted with liquid fuel by removing plug 30, shown in Fig. V. The air contained within the tank is replaced by the liquid fuel as the tank is being filled and will escape through the combination 26, 25, 27 and 28 into bore 40 of plug 39, thence through side bore 41 into the annular space between shank $39^c$ and bore of T 43, surrounding said shank, and then through side branch 44 of said T into pipe 47 and finally through the burner into the atmosphere. It is to be understood, that through the filling operation the compressed air must be shut off by closing valve 24 (shown in Fig. IV). Compressed air is admitted to the burner by operating valve 24 when the air will pass through same elements as aforedescribed with the exception that the flow of air through nipple 26 (Fig. IV) into the tank will cease as soon as the air over the oil fuel in the tank has attained the same pressure as the air passing into T 25. The oil, being put under pressure, as aforedescribed, can be fed to the burner by opening valve 34 (Fig. V) when it will rise in pipe 32 and will pass through valve 34 into pipe 35 and thence through the elements already described into the burner.

The piping arrangement aforedescribed does not only contribute a simple and convenient means for regulating the oil and air pressure at the burner by operating the valves 24 and 34, but it also embodies certain features of safety as hereinafter set forth. The opening of valve 34 will not admit any oil to the burner if said oil is not under pressure. The opening of valve 24 will put the oil under pressure and will at the same time admit air to the burner; the tank pressure and air pressure is always the same but variable in magnitude according to the amount of free passage given by regulation of valve 24. The oil pressure at the burner can be regulated by operating valve 34.

The tank will always be relieved of any pressure when the burner is not in operation. If the air supply fails, or is disconnected at 23, or if valve 24 is shut down, the compressed air contained in tank will escape through combination 26, 27 and 28 into the burner and will relieve the oil pressure. From the foregoing it is clear, that under no circumstances can any unatomized oil leave the burner or enter the combustion chamber. This avoids accidents due to improper handling of valves.

Having thus described the purpose, usefulness and operation of my invention, I desire to secure Letters Patent for the following claims:

1. In an oil fired portable rivet heating furnace the combination of a cylindrical furnace shell, open at both ends and fitted with means for handling it; a liquid-fuel compartment of ring-shaped cross section contained within said shell; a refractory furnace lining supported by the fuel compartment and open at both ends; and a burner, connected by suitable piping to a compressed air supply and to the fuel compartment.

2. In an oil fired portable rivet heating furnace a closed fuel compartment of ring shaped cross section, containing a hollow, cylindrical combustion chamber, open at both ends; a heating chamber in communication with the combustion chamber and supported by the fuel compartment; a rectangular slot of equal width for the introduction of rivet shanks into said heating chamber, said width being larger than the shank diameter and smaller than the head diameter of the rivets; and a stationary, but removable burner at the lower end of the combustion chamber, connected to suitable means for the supply of compressed air and oil under pressure.

3. In an oil fired portable rivet heating furnace a closed liquid fuel compartment, with an inner shell, forming a combustion chamber; and an outer shell, extending above the upper head of said compartment and also extending below the lower head of said compartment; a burner below the lower head of said compartment and in axial aline-

ment with the combustion chamber; a pipe connection to a compressed air supply, a valve in said pipe connection said valve being in communication with two branches of piping, one branch communicating with the tank space above the liquid fuel, the other branch connecting with a burner; a liquid fuel pipe with a regulating valve, said pipe being in communication with the liquid fuel and with a burner; a refractory lining for the combustion chamber, open at both ends and supported by the fuel compartment; and a refractory heating chamber of triangular cross section located above the combustion chamber and in communication therewith, and an open slot of equal width on top of the heating chamber, said width being larger than the shank diameter and smaller than the head diameter of the rivets.

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

WILLIAM MELAS.

Witnesses:
HARRY P. GREEVES,
O. M. BOEHM.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**