C. H. TRUE.

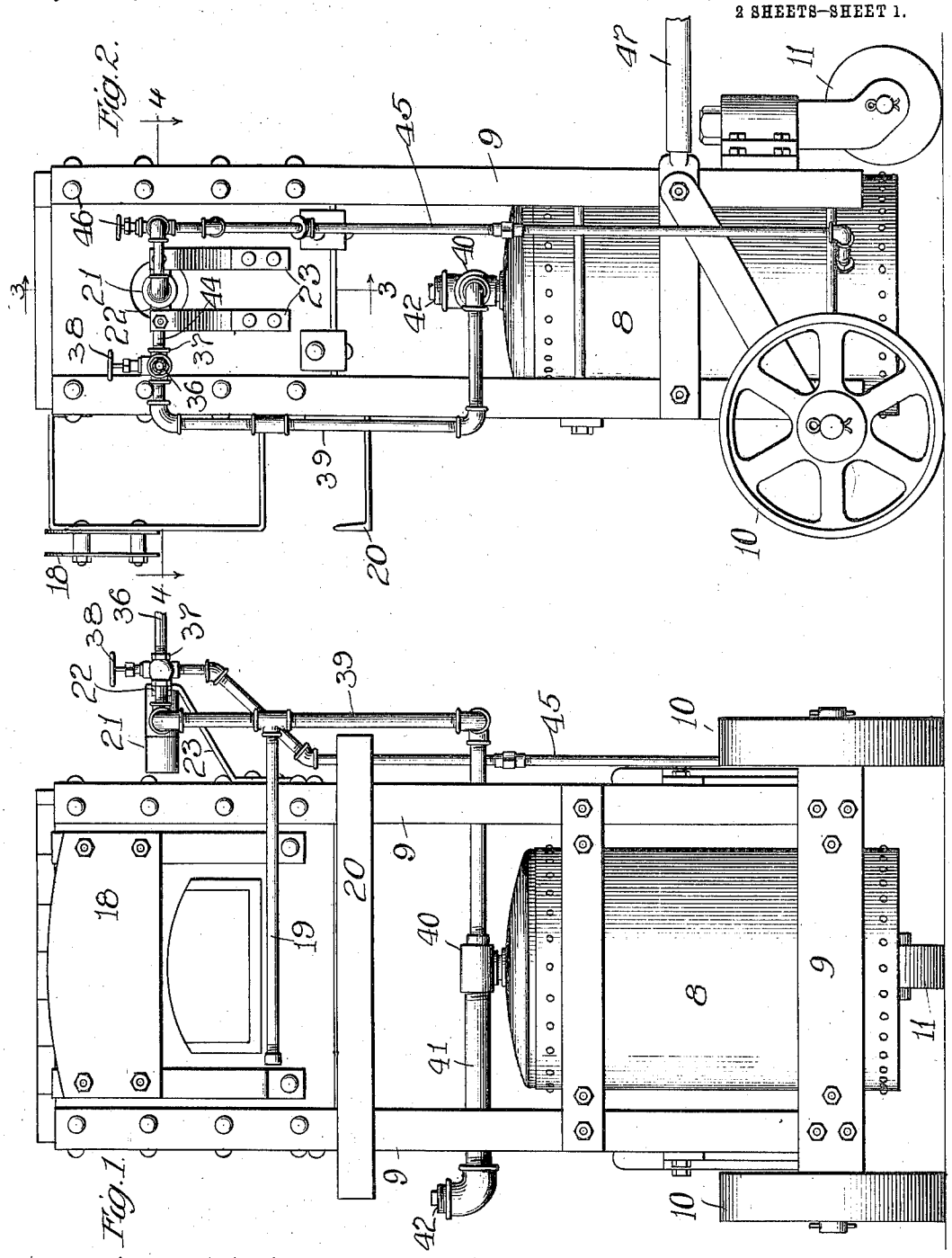
BURNER FOR OIL FURNACES.

APPLICATION FILED SEPT. 2, 1909.

1,093,364.

Patented Apr. 14, 1914.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

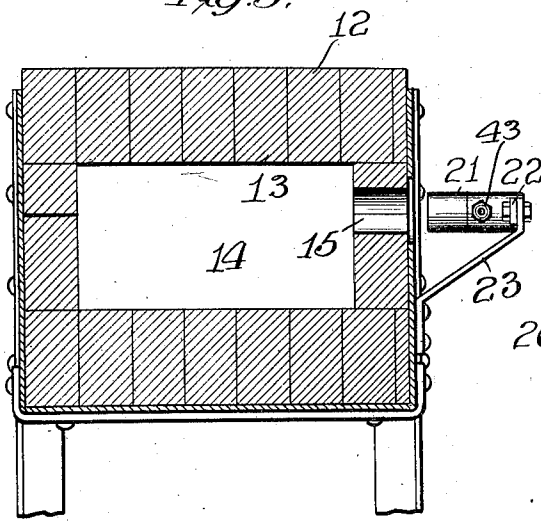


Fig. 4.

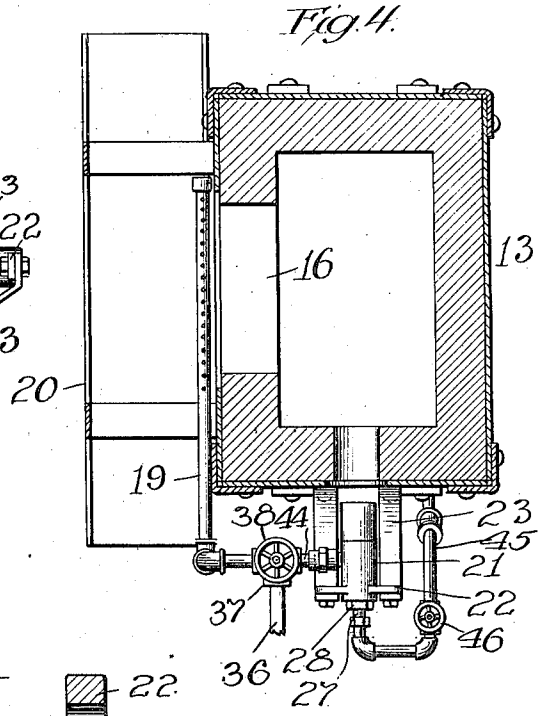


Fig. 5.

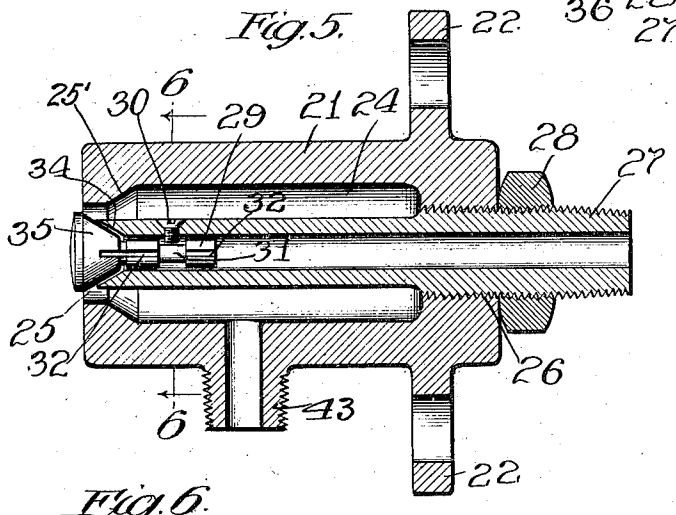


Fig. 6.

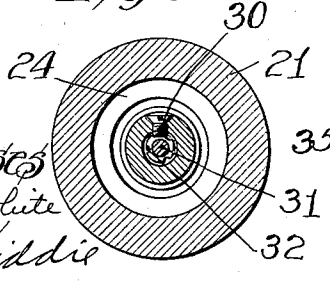
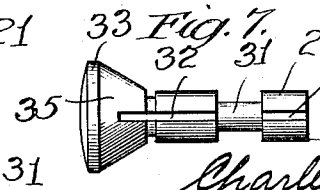


Fig. 7.



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UNITED STATES PATENT OFFICE.

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BURNER FOR OIL-FURNACES.

1,093,364. Specification of Letters Patent. Patented Apr. 14, 1914.

Application filed September 2, 1909. Serial No. 515,836.

To all whom it may concern:

Be it known that I, CHARLES H. TRUE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Burners for Oil-Furnaces, of which the following is a specification.

This invention relates in general to burners for oil furnaces and more particularly to burners which receive the fuel under pressure and has for its particular object to provide a burner of the type described for use in portable rivet furnaces and the like, it being understood, however, that the burner is capable of wide application and is adaptable to furnaces of various types.

In the accompanying drawings Figure 1 is a front elevation of the furnace. Fig. 2 is a side elevation. Fig. 3 is a vertical sectional view through the heating chamber on the line 3—3 of Fig. 2. Fig. 4 is a horizontal sectional view through the heating chamber on the line 4—4 of Fig. 2. Fig. 5 is a detail enlarged sectional view of the burner. Fig. 6 is a transverse sectional view of the burner on the line 6—6 of Fig. 5. Fig. 7 is a detail view of the burner cap.

Referring to the drawings, 8 is a tank of suitable size and construction for containing a supply of fuel oil. This tank is supported in a frame 9 which is mounted on two carrying wheels 10 and a swiveled steering wheel 11. A furnace 12 lined with suitable fire brick 13 and comprising a heating chamber 14 is mounted on the frame 9 above the fuel tank. The furnace has an opening 15 at one end and an opening 16 in one side. The opening 16 is provided to permit the insertion and removal of rivets or other articles from the heating chamber and to facilitate this operation the furnace is provided with a shield 18 and a perforated air pipe 19 to protect the workmen from the heat of the furnace. A tray 20 is mounted on the frame below the opening 16 in the furnace. A burner is supported on the frame opposite the opening 15 in the furnace and this burner comprises a shell 21 provided with ears 22 which are bolted to the bracket arms 23 suitably fastened on the furnace or on the frame. The shell 21 has an enlarged chamber 24, an opening 25 at one end and a screw-threaded opening 26 at the other end (Fig. 5). The end of the chamber 24 adjacent the opening 25 is preferably tapered as at 25′ and the bounding surface of the opening 25 itself is preferably cylindrical. A hollow tube 27 is screw threaded in the opening 26 in the shell and is secured in adjusted position relative to the shell by a lock nut 28. A deflector 29 is arranged in the outer end of the stem 27 and is secured therein by a screw 30 passing through the stem and entering an annular groove 31 in the deflector, this groove being of greater width than the screw to permit a limited longitudinal movement of the deflector relative to the stem. The parts are constructed so that the screw will not bind the deflector and therefore the latter is capable of a rotary movement as well as a longitudinal movement in the stem. Longitudinal grooves 32 are provided in the deflector to facilitate the passage of oil, although the deflector does not fit snugly in the stem and oil may escape around it as well as through the grooves. The head 33 of the deflector is of larger diameter than the diameter of the outer or discharge end 34 of the stem. The deflector is tapered or conical shaped at 35 to fit in the tapered or conical shaped discharge end 34 of the stem.

An air pipe 36 connected to a source of compressed air supply is connected to a T 37 which is provided with a globe valve 38. A pipe 39 is connected to the T 37 and to the top of the tank at 40. Another pipe 41 is also connected to the top of the tank at 40 to enable the tank to be filled with oil, and this pipe has a removable screw cap 42 at its outer end. The burner shell has a nipple 43 which communicates with the chamber 24 and a pipe 44 is connected to the T 37 and to said nipple. The perforated air pipe 19 is connected to the pipe 39. An oil pipe 45 is connected to the tank at or adjacent to the bottom thereof and to the hollow stem 27 of the burner. This oil pipe is provided with a valve 46 to shut off the flow of oil from the burner.

The frame and carrying wheels constitute a truck on which the furnace and oil supply tank are supported and this truck is preferably provided with handles 47 of any suitable character to facilitate moving the truck about.

In practice the valve 38 is opened and air is admitted from the supply through pipe 36. A part of the air will pass down through pipe 39 into the oil tank and force the oil out of the bottom of the tank and up

through the pipe 45 into the hollow oil stem of the burner at the rear end thereof and out at the front end thereof beneath the head 35 of the deflector. Some of the air passes through the pipe 44 and nipple 43 into the air chamber 24 of the burner. The chamber is of sufficient size to permit the air to expand therein and this air escapes from the burner through the opening 25 and in combination with the oil which issues in a thin film around the head 35 of the deflector. As the air escapes through the opening 25 it is diverted toward the deflector 29 as it passes over the inclined surface 25′ and the deflector 29 diverts it again outwardly from its longitudinal center in all directions. The air is thus thrust forcibly across the direction of travel of the fuel and then continues with it so that the fuel and air leave the burner along substantially the same path. The result of this forcible contact of the air with the thin film of oil escaping between the tapered deflector and the tapered discharge end of the hollow stem is to atomize the oil at the discharge end of the burner and this promotes perfect combustion, and as the oil in leaving the burner travels with the air no opportunity is provided for unburned oil to pass across the moving air and fall unvaporized and unburned outside the furnace. A part of the air passes through pipe 39 into pipe 19 and issues in jets in front of the door opening 16 of the furnace to protect the operator from the intense heat of the furnace.

Furnaces heretofore generally in use for heating rivets and other small articles have been so constructed that they must be bodily lifted from the ground or floor when a shifting of position was desired, making it impossible for one man to operate them; and they have required a high degree of air pressure, from eighty to ninety pounds, to operate them, rendering them both dangerous and noisy. They have been objectionable for the reason that they can not be readily moved about, and this is especially important because these furnaces are usually operated by boys; because they have proven too heavy a drain on the compressed air equipment of the shop in which they are used, which makes them very expensive to operate; and because they are too noisy in operation. My invention entirely overcomes these objections for the reason that it is light in weight and can be easily moved about by a boy; it can be operated from an air line pressure as low as fifteen or twenty pounds per square inch and requires very little air in its operation; and because the noise of operation is reduced to a minimum. The furnace is light in construction and it is so balanced that it can be easily pushed or pulled about to any position in a shop. The construction of the apparatus is such that the supply of oil is controlled by the pressure of the air and only as much oil will escape around the head of the deflector as the air escaping from the chamber 24 is capable of effectually atomizing. This insures the delivery of the oil in the proper condition for perfect combustion and avoids dripping from the burner. The construction of parts and particularly of the burner without sharp edges and corners is such that violent mechanical re-actions when the oil is atomized are entirely avoided and thereby the noise when the furnace is in operation is reduced to a minimum. The flow of oil to the burner depends upon the air pressure admitted to the tank and is regulated and controlled entirely by this air pressure. When the pressure is applied the oil begins to flow and just as soon as the pressure is shut off from the tank the oil stops flowing to the burner. In this way I avoid regulating the feed of oil at the burner and control it entirely and automatically by the air pressure which is utilized not only for the purpose of inducing a flow of oil but for the purpose of atomizing the oil and providing the air jet in front of the furnace door. Therefore when the air is shut off from the valve 38 or if the air pressure fails for any reason the flow of oil stops for as the oil in the pipe 27 recedes into the tank the deflector 35 is drawn against the seat 34 by suction created by the receding oil. Therefore there can be no leakage of oil at the burner.

While my invention is designed, primarily, for heating rivets it may also be used for heating other small articles in the same manner and I do not wish to be understood as limiting myself to any particular use of the furnace.

The deflector is movably secured in the stem of the burner so that it will not stick and prevent the escape of oil from the stem. If the deflector were fastened rigidly in the stem the space between the deflector and the stem at the discharge end of the stem might become stopped up or might be accidentally adjusted so that it would prevent the free egress of oil. By making the deflector longitudinally movable relative to the stem the deflector can adjust itself to permit the free passage of the oil.

What I claim and desire to secure by Letters Patent is:

1. A burner for an oil furnace comprising a compressed air chamber having inlet and outlet openings, a fuel delivery tube disposed through said chamber and having an open end disposed adjacent to and centrally of said outlet opening, a deflector having a stem disposed in said tube and freely movable longitudinally thereof, and means disposed through said tube for limiting the longitudinal movement of said deflector.

2. A burner for an oil furnace comprising

a compressed air chamber having inlet and outlet openings, a fuel delivery tube disposed through said chamber and having an open end disposed adjacent to and centrally of said outlet opening, and a deflector having a stem disposed in said tube and a frusto-conical head disposed adjacent the end of said tube, said head and stem being provided with grooves extending longitudinally thereof from points intermediate of the ends of said head throughout the length of the said stem.

3. A burner for an oil furnace comprising a compressed air chamber having inlet and outlet openings, a fuel delivery tube disposed through said chamber and having an open end disposed adjacent to and centrally of said outlet opening, a deflector having a stem disposed in said tube and freely movable longitudinally thereof, and means disposed through said tube for limiting the longitudinal movement of said deflector, said deflector being disposed partly within the open end of said tube and partly within said outlet opening of the said chamber without said tube.

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M. A. KIDDIE.