(No Model.)

F. B. MEYERS.

HYDROCARBON BURNER.

No. 433,871. Patented Aug. 5, 1890.

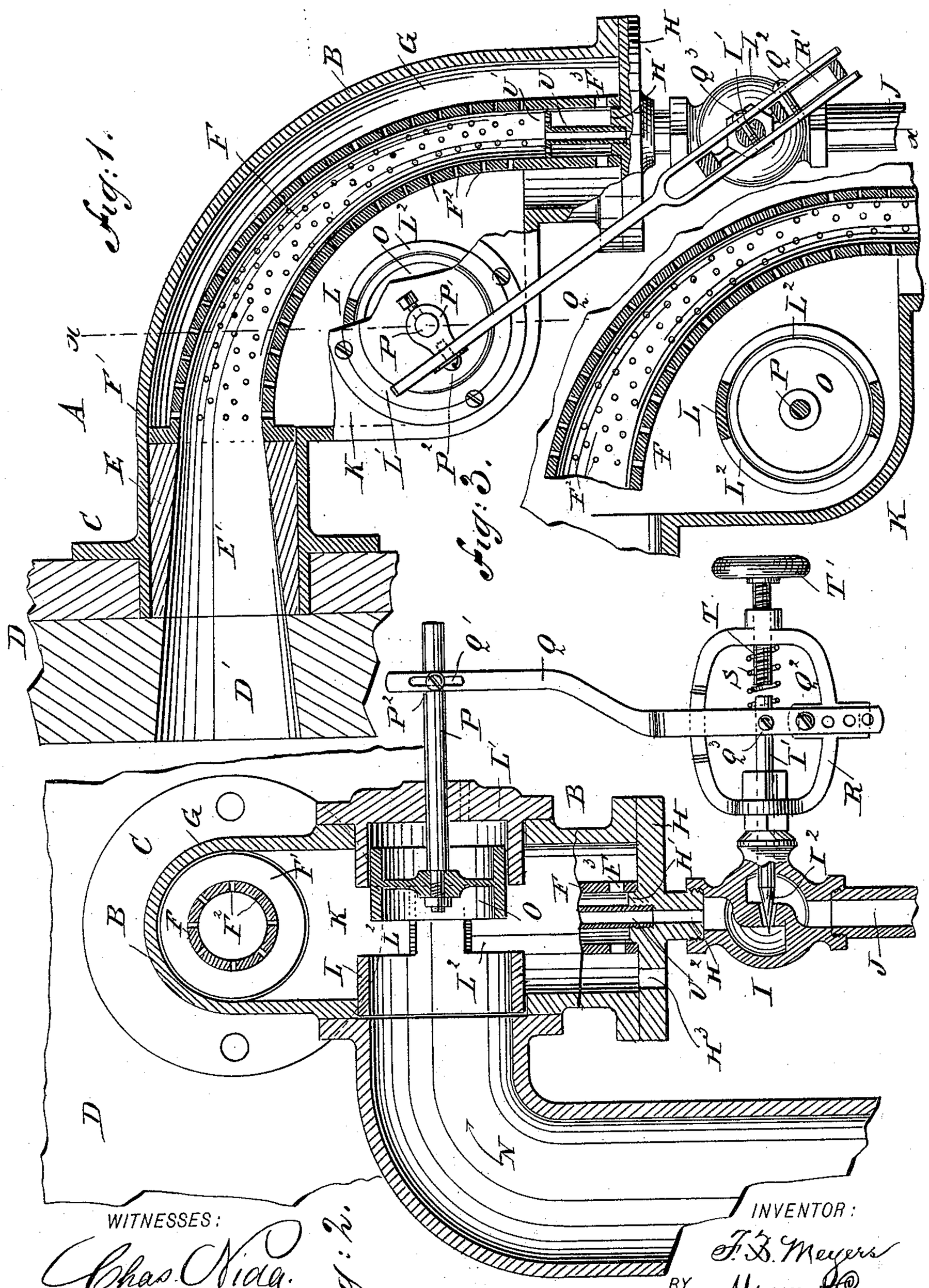

Fig. 1.

Fig. 3.

Fig. 2.

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HYDROCARBON-BURNER.

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To all whom it may concern:

Be it known that I, FRANK B. MEYERS, of Fort Plain, in the county of Montgomery and State of New York, have invented a new and Improved Hydrocarbon-Burner, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hydrocarbon-burner which is simple and durable in construction, insures a perfect atomizing and mixing of the oil and air, and automatically shuts off the oil-supply when the air-supply ceases, to prevent the oil from flowing into the furnace on which the burner is applied, thereby avoiding the consequent ignition and explosion of the oil and destruction of the works.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement with parts in elevation. Fig. 2 is a transverse section of the same on the line *x x* of Fig. 1; and Fig. 3 is a sectional side elevation of part of the casing, the piston, and the tube.

The improved hydrocarbon-burner A is provided with a casing B, formed near one end with a flange C, adapted to be secured to the wall D of the furnace on which the burner is to be applied. In the wall D of the furnace is arranged a conical opening D′ in line with a conical opening E′, formed in a fire-proof material E, held in the end of the shell or casing B, having the flange C, as shown in Fig. 1. On the inner end of the fire-proof material E abuts the flange F′ of a tube F, of cone shape and provided with apertures F^2, through which a fluid under pressure can pass through the shell into the interior of the said tube. The tube F forms with the shell B a space G, into which the fluid under pressure, preferably compressed air, is passed, as hereinafter more fully described, so that this fluid can readily pass at any time through all the perforations F^2 to the interior of the tube. The large end of the latter is provided with the flange F′, which abuts against the fire-proof material E, the opening of the tube F, the fire-proof material E, and the opening D′ in the wall D forming a continuous cone-shaped opening, as is plainly shown in Fig. 1. The small end of the tube F fits onto the boss H′, formed on the inside of the cover H, secured to the other end of the shell B. In the middle of this cover H is formed an inlet-opening H^2, connected with a valve I, into which leads the oil-supply pipe J, connected with a suitable source of oil-supply.

On one side of the casing B is formed a hollow offset K, the interior of which opens into the space G, and in which is fitted a transversely-extending cylinder L, closed at one end by a cap L′, secured to the outside of the offset K. The other end of the cylinder L is open and opens into an air-supply pipe N, fastened to the outside of the offset K opposite the cap L′. In the cylinder L operates a piston O, adapted to slide transversely to open and close large ports L^2, formed in cylinder L and opening into the interior of the casing K—that is, to the space G. The piston O is provided with the piston-rod P, held to slide in the cap L′ and carrying an adjustable collar P′, secured in any desired place on the said piston-rod by a suitable set-screw. (See Fig. 1.)

On the collar P′ is held a screw P^2, passing through a slot Q′ in a lever Q, fulcrumed on a pin or screw Q^2, passing through a slot R′, formed in a frame R, attached to the valve I. The lever Q is provided with a pin Q^3 between the fulcrum Q^2 and the screw P^2, and this pin Q^3 is secured or passed through an aperture in the valve-stem I′ of the valve I and carrying the usual valve-point I^2. A spring S is coiled partly around the outer end of the valve-stem I′, pressing against the lever Q, the other part of the said spring being held around the screw T and resting at its outer end on part of the frame R. The screw T screws into the said frame, extends in line with the valve-stem I′, and is screwed into and out of the said frame by a suitable hand-wheel T′, secured on the outer end of the screw. The screw T serves to limit the movement of the valve-stem I′, as by screwing the screw outward the valve-stem I′ is free to slide farther outward, so that the valve I^2 is

more fully unseated from its seat in the valve I. When the screw T is screwed inward, the valve I^2 can only open a short distance—that is, until the stem I′ abuts at its outer end against the inner end of the screw T.

In the boss H′ of the cover H screws a pipe U, opening into the opening H^2, leading to the oil-supply valve I. The said pipe U extends a short distance into the tube F, and is provided at its upper end with a disk U′, having a series of perforations. Between the disk U′ and the small end of the tube F are arranged a series of openings F^3, which are considerably larger than the perforations F^2 of the said tube, which said perforations commence a short distance above the disk U′. The cover H is also provided with an opening H^3, adapted to be connected with a pipe leading back to the oil-supply tank, so that any drip-oil within the casing B or the tube F can readily flow through the pipe H^3 back to the oil-supply tank.

The operation is as follows: When the several parts are in place, the spring S holds the valve I^2 closed, so that no oil can pass from the oil-supply pipe J to the interior of the tube F. The pressure of the spring S also holds the lever Q in an innermost position, so that the piston O closes the ports L^2, so as to disconnect the interior of the shell B from the air-supply pipe N. Now, when the device is to be used and air or other fluid under pressure passes through the pipe N into the open end of the cylinder L, the said fluid exerts a pressure against the spring-pressed piston O, so that the latter slides to one side and opens the ports L^2 to permit the fluid under pressure to pass to the interior of the casing B. The sliding movement of the piston O causes an outward swinging of the lever Q, and the latter, by the pin Q^3, imparts an outward sliding motion to the valve-stem I′, so that the valve-point I^2 is unseated and the oil from the supply-pipe J is permitted to pass through the valve I into the opening H^2, and from the latter into the pipe U, to flow onto the disk U′ within the tube F. The air under pressure within the casing B passes through the large openings F^3 into the small end of the tube F and passes through the perforations in the disk U′ into the oil on top of the said disk, thus taking with it the oil, atomizing it on its way through the tube F, the fire-proof material E, and the opening D′ into the furnace D. The air within the casing B also passes at the same time through the perforations F^2 into the tube, so as to further atomize the oil already in mixture with the air and carried along by the same, it being the natural tendency of the compressed air to pass toward the enlarged end of the tube and through the openings E′ and D′ to the furnace. The oil carried along by the air is thus brought in contact with the fresh air passing to the interior of the tube F through the perforations F^2, which extend clear up to the flange F′ of the said tube. The oil is thus completely atomized and passes in this state through the openings E′ and D′ to the furnace, in which it is burned in the usual manner. As shown in the drawings, the shell B, as well as the tube F, is segmental in shape; but this feature is not essential, as the casing B, as well as the tube F, may be straight. It will be seen that the amount of air passing through the ports L^2 has a proportionate relation to the amount of oil permitted to flow through the valve I to the interior of the tube F, as previously described. It will be seen that when the piston O is forced far outward and a larger amount of air is permitted to pass from the pipe N to the interior of the casing B a consequent further opening of the valve I^2 takes place, so that a larger amount of oil is permitted to pass to the interior of the tube. Now when the pressure of the air in the pipe N ceases for any reason whatever the piston O slides back to its former position by the action of the spring S on the lever Q, connected with the piston-rod P, whereby the ports L^2 are closed and the valve I^2 is again seated, so as to shut off the flow of oil to the tube F. Any oil remaining within the casing B or tube F at this time can readily flow through the opening H^3 in the cover H back to the oil-supply tank, as previously described. It will thus be seen that a perfect atomizing and mixing of the oil and air takes place, and the oil-supply is automatically shut off when the air-supply ceases.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hydrocarbon-burner, the combination, with a casing connected with an air-supply, of a perforated conical tube held within the said casing and adapted to be connected at its large end with the interior of the apparatus on which the burner is to be applied, and an oil-supply pipe leading into the small end of the said tube and carrying at its inner end a perforated disk located above some of the perforations of the said conical tube to permit the fluid under pressure to pass under and through the said perforated disk, substantially as shown and described.

2. In a hydrocarbon-burner, the combination, with a casing provided with an air-inlet, of a conical perforated tube held therein, an oil-supply pipe extending into the small end of the said tube and provided with a perforated disk extending above some of the perforations in the said tube, a valve held in the said oil-supply pipe, and a mechanism, substantially as described, for automatically controlling the said valve and the inlet of the air to the said casing, substantially as shown and described.

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