

F. E. NELSON.
 LIQUID FUEL BURNING APPARATUS.
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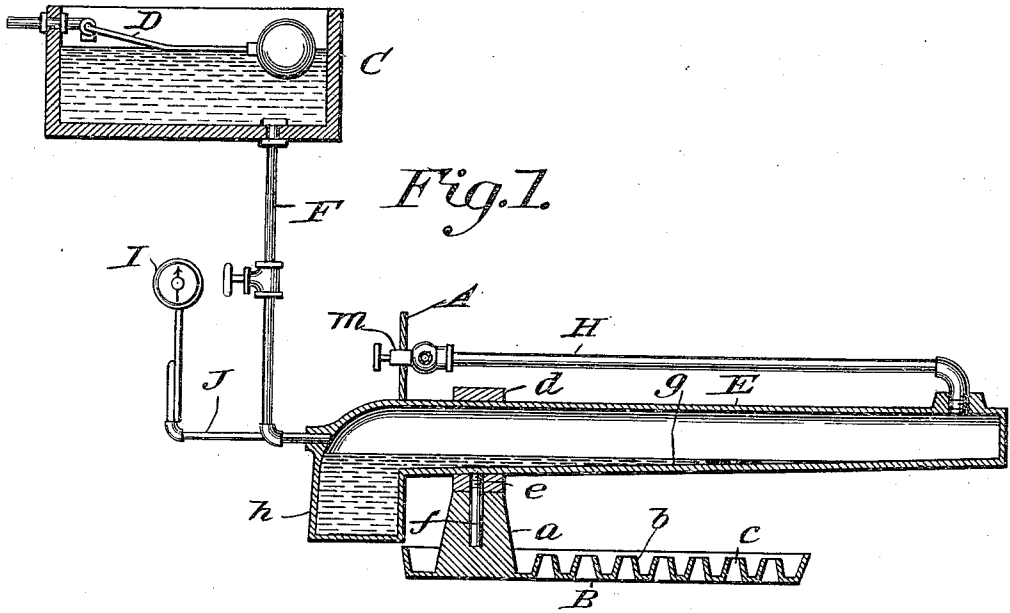


Fig. 1.

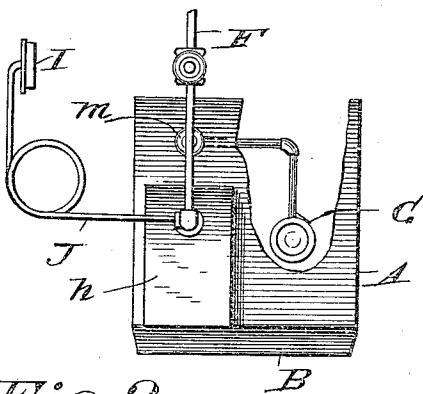


Fig. 2.

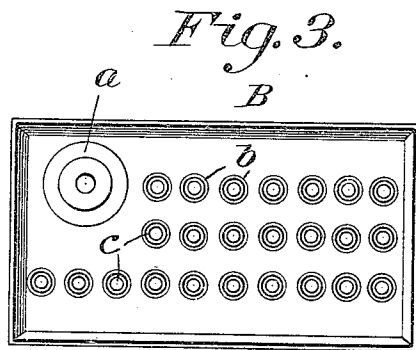


Fig. 3.

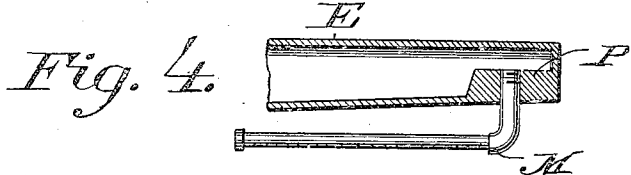


Fig. 4.

Witnesses
 Phil E. Barnes
 J. J. Sheehy

By

Inventor
 Frank E. Nelson
 James J. Sheehy
 Attorney

UNITED STATES PATENT OFFICE.

FRANK E. NELSON, OF LOS ANGELES, CALIFORNIA.

LIQUID-FUEL-BURNING APPARATUS.

952,932.

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To all whom it may concern:

Be it known that I, FRANK E. NELSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Liquid-Fuel-Burning Apparatus, of which the following is a specification.

My invention pertains to liquid-fuel-burning apparatus; and it has for its general object to provide such an apparatus embodying a generator of high capacity adapted for the generation of vapor, and one which as a whole is possessed of high efficiency.

Another object of the invention is the provision of a generator of the kind stated possessed of characteristics which assure the liquid fuel to be vaporized dropping into a body of liquid fuel of comparatively low temperature in a portion of the generator and being gradually heated as it travels in a thin body along the bottom of the generator, this being materially advantageous in that it renders the generator gentle and steady in operation and increases the capacity of the same.

Another object is the provision of improved means for supporting the generator and its appurtenances in such manner that the products of combustion may be directed to different points in a fire-box.

With the foregoing in mind the nature and the details of my invention will be fully understood from the following description and claims when the same are read in connection with the drawings, accompanying and forming part of this specification, in which:

Figure 1 is a vertical section illustrative of the apparatus constituting the best embodiment of my invention of which I am cognizant. Fig. 2 is an elevation illustrating a wall which may form the door shield of a fire-box and also illustrating the parts of my improvements resting outside of and adjacent to the said wall or shield. Fig. 3 is a plan view illustrating the starting pan of the apparatus. Fig. 4 is a detail section illustrative of a modification hereinafter referred to in detail.

Referring by letter to the said drawings, and more particularly to Figs. 1 to 3 thereof: A is a wall which may form what is commonly known as the door shield of a fire-box, and B is the starting pan of my

improvements. The said starting pan is designed to be located within the fire-box and is provided with a pedestal *a* for a purpose presently set forth, and also with upwardly extending projections *b* of truncated cone shape. The said projections *b* are scattered throughout the area of the bottom of the pan, and are hollow and provided in their upper ends with apertures *c*, whereby it will be manifest that when oil is burning in the pan the projections *b* will prevent waste of oil from the pan and at the same time the air passing up through the projections *b* and out of the aperture *c* thereof will thoroughly support combustion of the oil. This latter is due in a measure to the fact that because of the projections *b* being tapered upwardly, the air will be forcibly directed in jets up through the flame and against the generator, presently described.

C is a liquid fuel tank which may be of any construction consonant with the purpose of my invention though it is shown as having a float valve D for controlling an induction orifice, and E is the generator which constitutes the most important feature of my invention. The said generator E is mounted in a collar *d*, and is fixed with respect to the collar through the medium of a set screw *e* which depends from the collar in the form of a pivot pin *f*, and the said pivot pin *f* bears in the before mentioned pedestal *a*, whereby it will be manifest that the generator E and the burner, presently described, may be swung horizontally so as to enable the said burner to direct the flame to various parts of the fire-box. The generator E forms as stated the most important feature of my apparatus because its bottom wall *g* is inclined downward and outward and also because it is provided at its outer end and without the wall A with a depending leg *h*; the said leg *h* being connected with and arranged to receive liquid fuel from a valved conduit F which extends intermediate the generator and the tank C, and which, when the generator is mounted to swing, is formed of flexible material. By virtue of the depending leg *h* of the generator being positioned as described, it will be seen that the liquid fuel to be vaporized is supplied to a partially heated body of liquid fuel in the leg *h*, and that the liquid fuel is heated gradually as it travels in a thin body along the bottom of the generator

toward the inner end thereof. It will also be seen that liquid fuel is not permitted to enter the generator in a great volume, this because the inward and upward inclination of the bottom of the generator permits but a thin layer of liquid fuel to meet the increasing heat incidental to its advance along the generator, and that because of the leg *h* being disposed without the fire-box, the said leg *h* is virtually outside of the influence of the fire in the fire-box, so that no matter how intense the said fire may be there is always liquid fuel in the leg *h* with the result that the pressure is under all conditions stationary. It will further be appreciated that the inner part of the generator *E* is the hottest part thereof, while the outer portion of the generator—*i. e.*, the portion outside of the wall *A* when the same forms part of a fire-box, is the coolest portion. Another advantage following from the construction of my novel generator lies in the fact that the said generator cannot be flooded except by leaving the valve in the conduit *F* open when the fire is greatly reduced or when the fire is out, and still another advantage lies in the fact that when the said valve of the liquid fuel supply pipe *F* is open there is nothing to prevent liquid fuel entering the generator as needed except a balance of pressure.

In addition to the elements enumerated my novel apparatus comprises a burner *G* of the conventional construction or of any other construction compatible with the purpose of my invention, a pipe *H* leading from the inner portion of the generator *E* to a point adjacent the wall or door shield *A* and thence laterally to the burner *G* and having a valve as *m* the handle of which extends through an opening in the said door shield, and a gage *I* connected through a pipe or tube *J* with the generator *E*.

In the practical operation of my novel apparatus, the generation is started by admitting oil to the pan *B* and burning such oil until the generator *E* is hot. Liquid fuel is then supplied to the generator through the conduit *F*, and this fuel soon overflows from the leg *h* and passes inward along the bottom of the generator whereupon the gage *I* begins to register. Gas may then be permitted to pass through the conduit *H* to the burner *G* to provide the flame alongside the generator. With this done the valve in the conduit *F* may be opened to the full extent and left in that position, and in consequence the gage *I* will in a short time register at a predetermined point and remain at such point. This point is determined by the height of the tank *C* above the generator *E*. For instance if the tank *C* is ten feet above the generator *E* there will be approximately five pounds of pressure in the generator. After the valve in pipe *F* is opened

to the full extent it will be understood that when the pressure in the generator rises above five pounds it will find relief through the pipe *F* to the tank *C*. The pressure in the generator will not fall below five pounds, for the instant that it tends to do so more fuel enters the generator until the pressure is raised to balance or offset the gravity pressure from the tank *C*.

When it is expedient to use light oil only the pipe *H* and its appurtenances may be omitted, and a pipe *M* such as shown in Fig. 4 employed for the purpose of conducting the vapor to a point below the generator where the same is consumed to heat the generator. The pipe *M* extends upward into the inner portion of the generator, and its receiving end is surrounded by a body *P* or else said receiving end is merely extended to a point adjacent to the top wall of the generator, this being advantageous since it prevents heavy matter in the oil from finding its way into the pipe *M* and thereby assures the supply of dry vapor to the said pipe *M* under all conditions.

I have entered into a detailed description of the present and preferred embodiments of my invention in order to impart a full, clear and exact understanding of the said embodiments. I would have it understood, however, that I do not confine myself to the specific constructions herein disclosed, inasmuch as in the future practice of the invention such changes in the form, construction and relative arrangement of parts may be made as fairly fall within the scope of my invention as defined in the claims appended.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. In an apparatus of the character described, the combination of a wall, and a generator extending through the wall and having a depending portion or leg disposed outside of the wall and also having its bottom wall inclined downwardly to the said depending portion or leg.

2. In an apparatus of the character described, the combination of a pedestal, a generator, a collar surrounding the generator, and a set screw fixing the collar to the generator and having a portion socketed in the pedestal and pivotally connecting the generator with said pedestal.

3. In an apparatus of the character described, the combination of a wall, a generator extending through the wall and having a depending portion or leg arranged outside the wall, a source of liquid supply, a conduit intermediate said source of supply and the said outer portion of the generator, and a pipe leading from the inner portion of the generator and arranged to discharge at a point adjacent the generator.

4. In an apparatus of the character described, the combination of a wall, a generator extending through the wall and having a depending portion or leg arranged
5 outside the wall and also having its bottom inclined downward to said depending portion or leg, a source of liquid supply connected with the said outer portion of the generator, and a pipe leading from the inner
10 portion of the generator and arranged to discharge at a point adjacent to the generator.

5. In an apparatus of the character described, the combination of a starting pan
15 having a plurality of apertured projections extending upwardly from its bottom and also having a pedestal, of greater height than said projections, also extending upwardly, and a generator mounted on the

pedestal and overhanging the said projections.

6. In an apparatus of the character described, the combination with a starting pan having a plurality of apertured projections extending upwardly from its bottom and
25 also having a pedestal, of greater height than said projections, also extending upwardly, of a generator pivotally mounted on the pedestal and overhanging the projections and adapted to be swung above the
30 same.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK E. NELSON.

Witnesses:

GEO. RUSSELL,
ROGER S. PAGE.