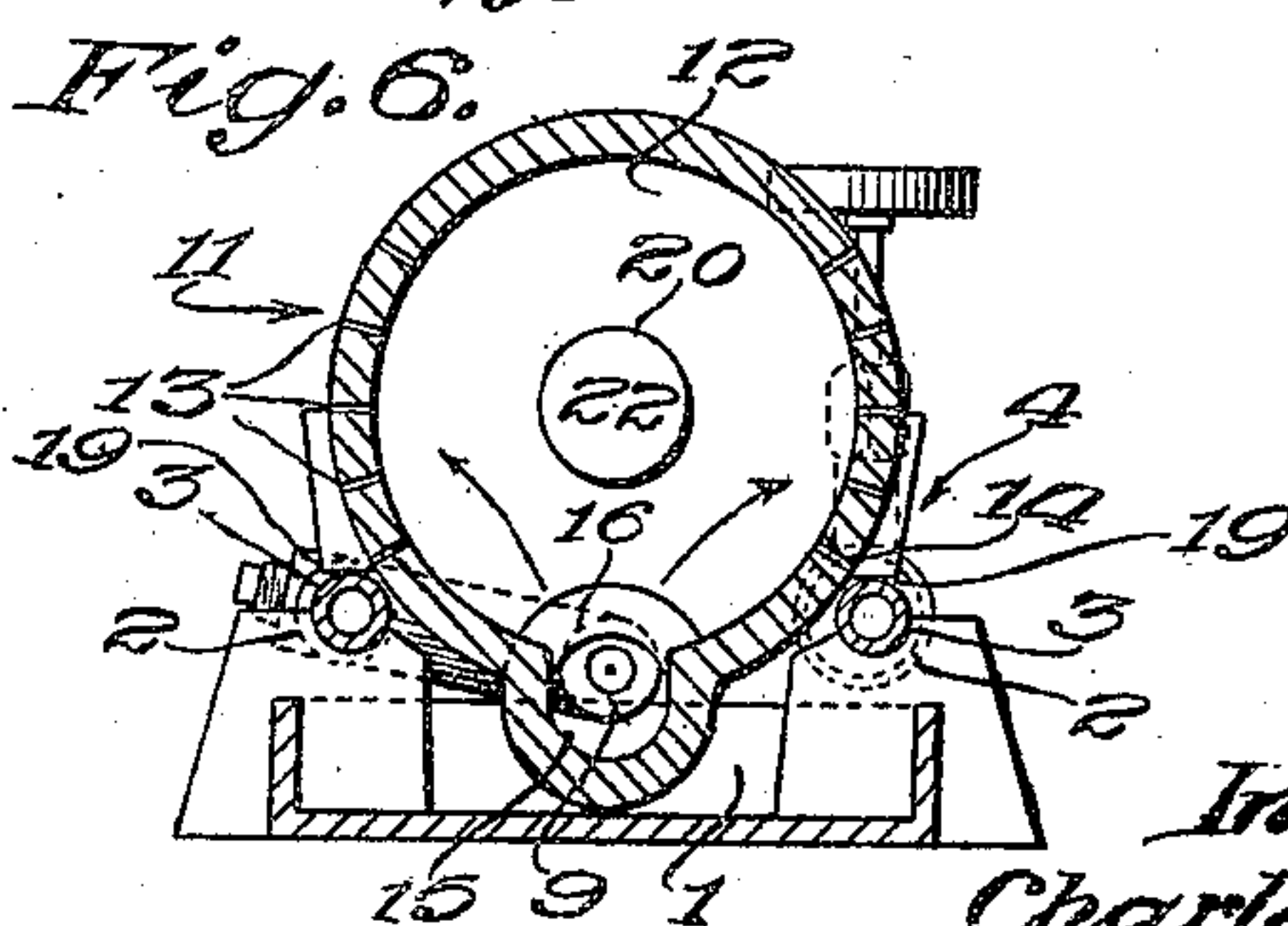
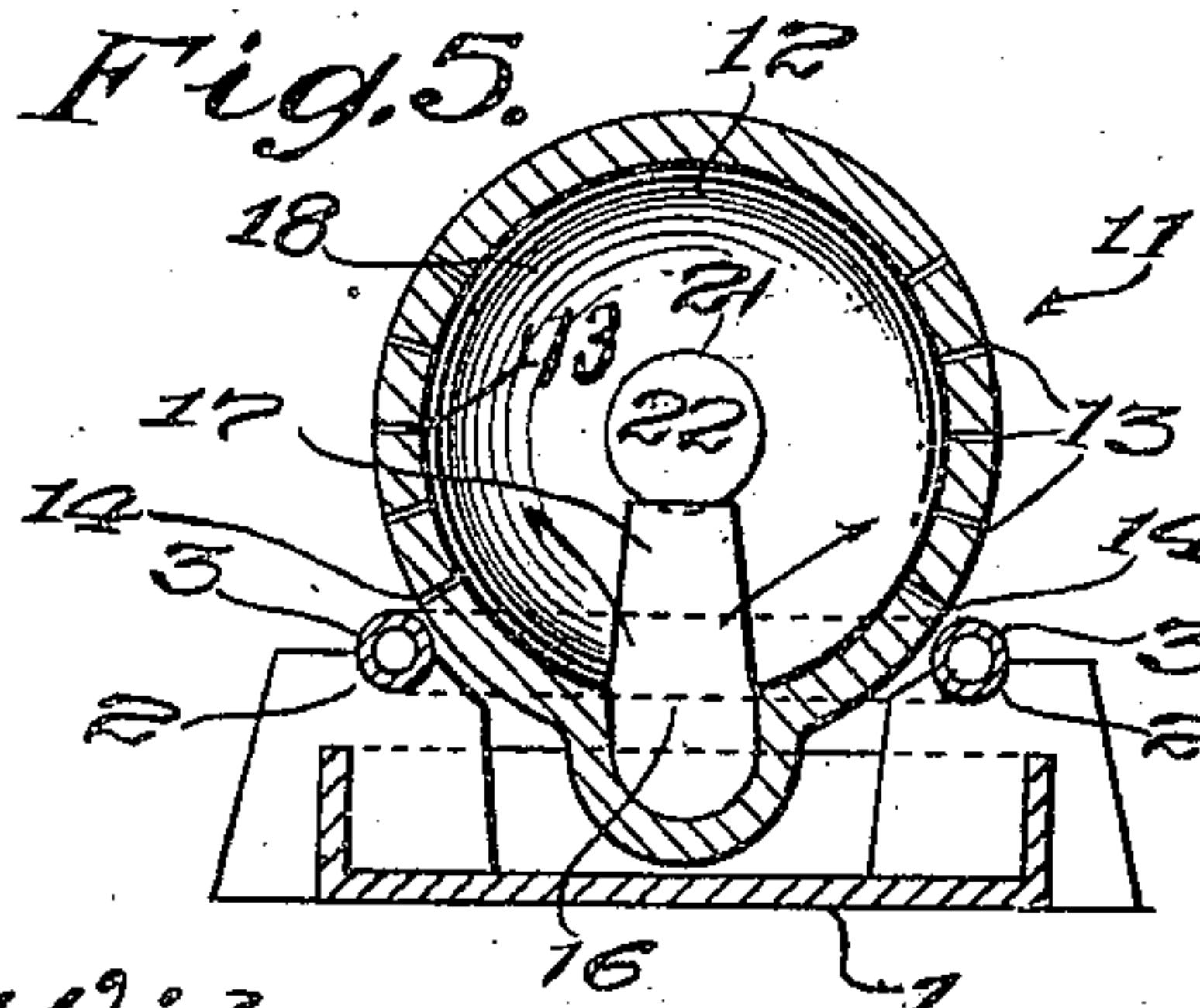
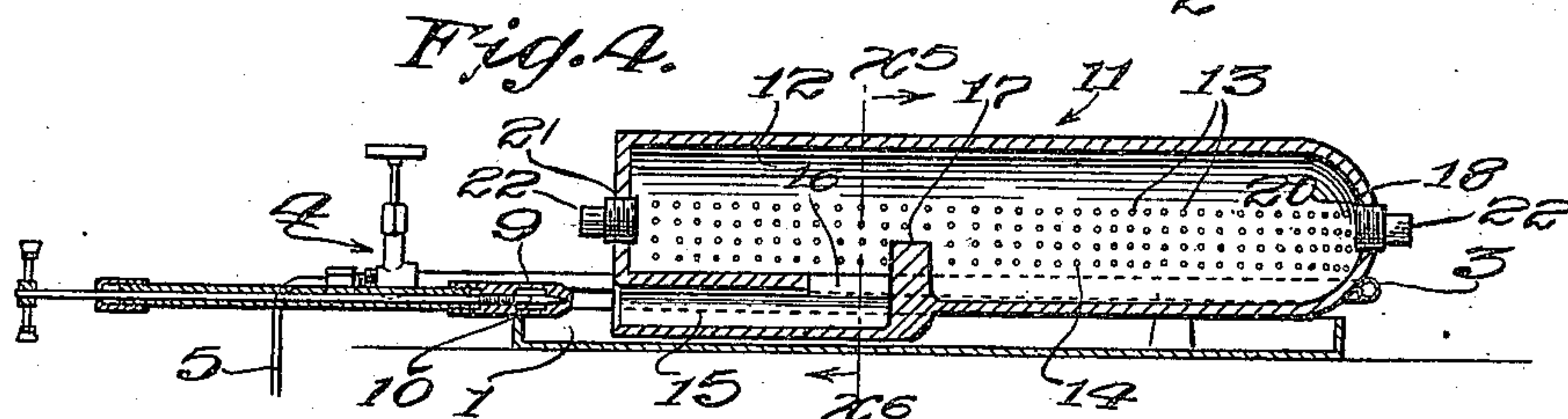
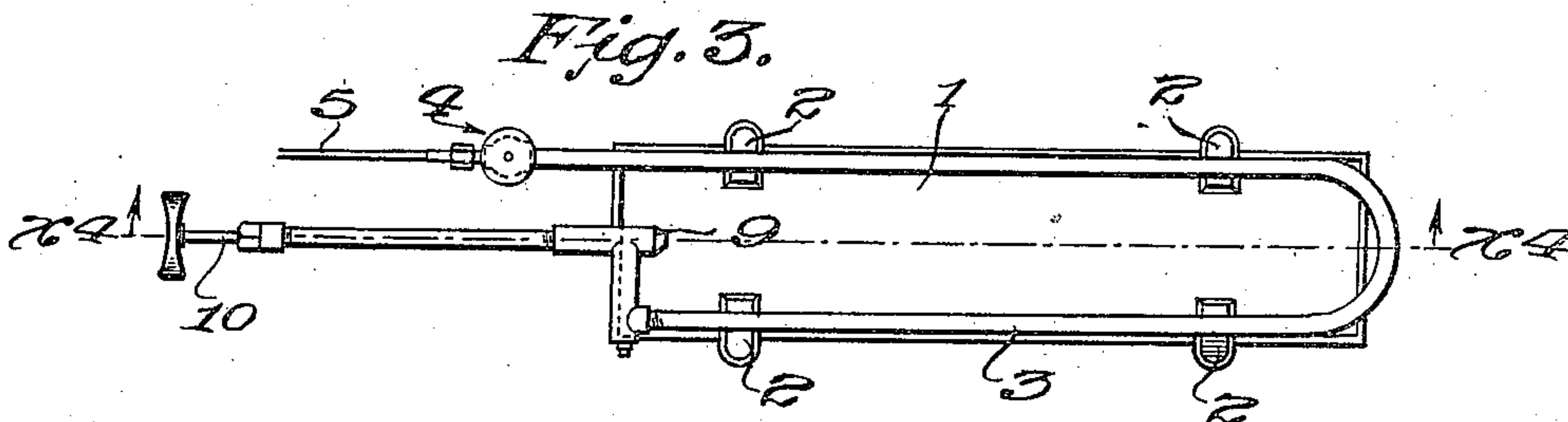
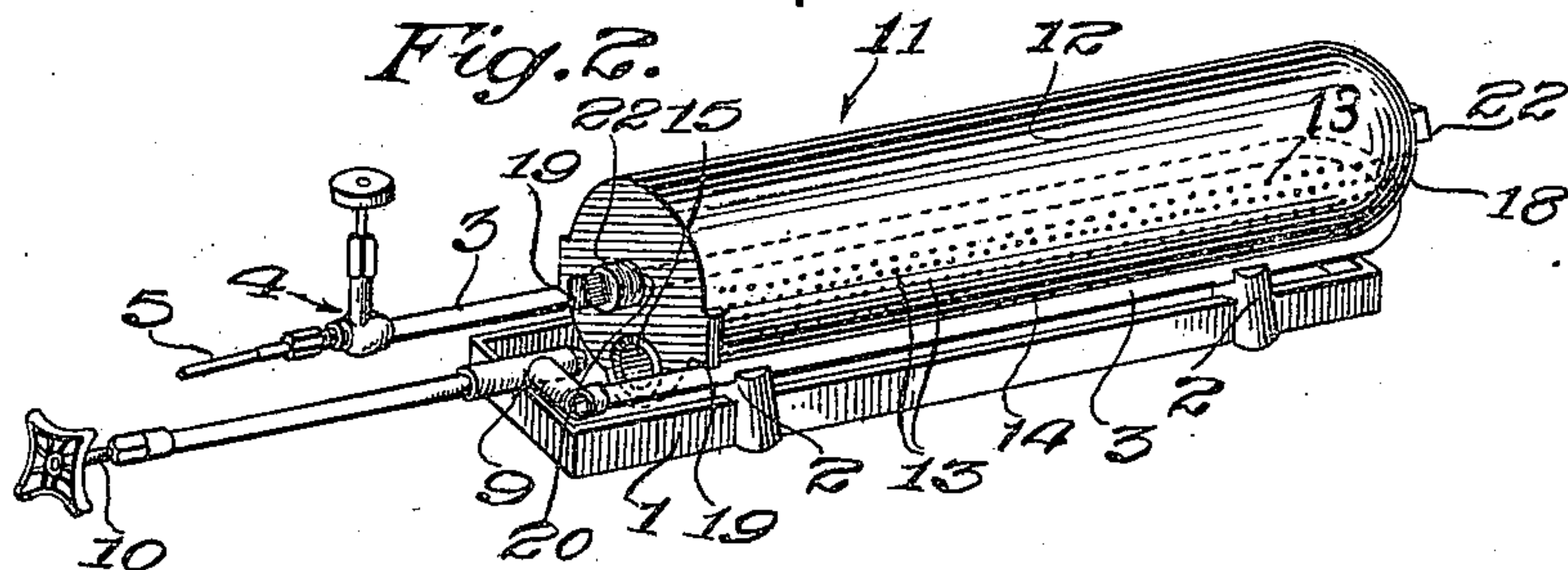
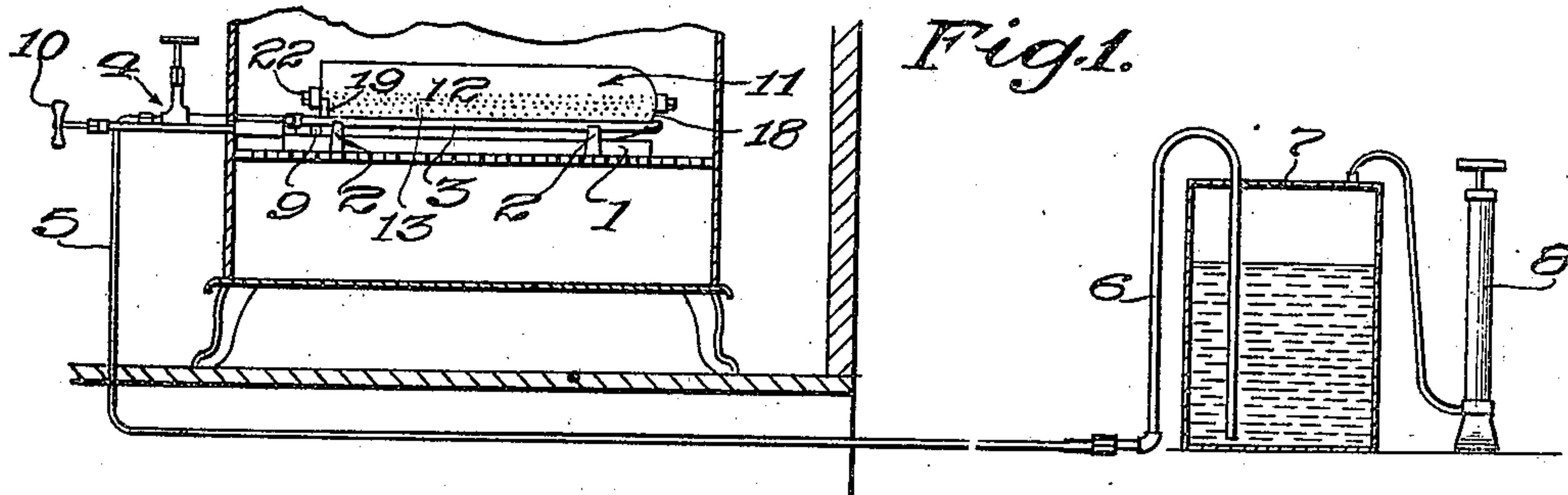


C. J. DUFF, C. V. PHELPS & B. W. PITTS.
DISTILLATE BURNING APPARATUS.

APPLICATION FILED JULY 28, 1908. RENEWED APR. 2, 1910.

975,221.

Patented Nov. 8, 1910.



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UNITED STATES PATENT OFFICE.

CHARLES J. DUFF, OF SAN BERNARDINO, CROLY V. PHELPS, OF RIALTO, AND BENJAMIN W. PITTS, OF SAN BERNARDINO, CALIFORNIA; SAID DUFF AND PITTS ASSIGNORS TO BLUE FLAME DISTILLATE BURNER COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION.

DISTILLATE-BURNING APPARATUS.

975,221.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed July 28, 1908, Serial No. 445,797. Renewed April 2, 1910. Serial No. 553,140.

To all whom it may concern:

Be it known that we, CHARLES J. DUFF, a citizen of the United States, residing at San Bernardino, in the county of San Bernardino and State of California; CROLY V. PHELPS, a citizen of the United States, residing at Rialto, in said county and State, and BENJAMIN W. PITTS, a citizen of the United States, residing at San Bernardino, in said county and State, have invented a new and useful Distillate-Burning Apparatus, of which the following is a specification.

This invention relates to a device for burning hydrocarbon oils.

An object of the invention is to provide means whereby the products known as distillate oils may be burned in a satisfactory, economical, safe and convenient manner, without clogging any of the parts of the burning apparatus and without the emission of smoke after the burner has been started into operation.

Other features are noiselessness, ready assembling and disassembling, and ready replacement of parts in case of damage.

Other advantages are the reduction to a minimum the liability of damage to any of the parts through constant use of the burner, and ready removal and cheap replacement of the only part that is liable to become clogged or injured by use.

The invention is applicable for installation of the burner in cooking-stoves and other fire-boxes in furnaces and in the open air, provision being made against such drafts as might extinguish the flame in case of low fire. Provision for safety is made.

The accompanying drawings illustrate the invention.

Figure 1 is a view of the apparatus with the burner installed in the fire-box of a stove, a portion of which is shown. Connection through a thin, hollow wire and a siphon with a storage tank having means for applying air pressure thereto, is shown. Fig. 2 is a perspective view of the burner proper and immediate attachments. Fig. 3 is a plan of the generating-tube on the generating-pan and with valve in place. The air-mixer and burner proper are omitted.

Fig. 4 is a longitudinal axial section on line x^4 , Figs. 3, 5 and 6. Fig. 5 is a section on line x^5 x^6 , Fig. 4, looking toward the abutment. Fig. 6 is a section on the same line looking in the other direction.

1 designates the base of the burner, the same being preferably a casting in the form of a pan provided with recessed shoulders 2 that support a U-shaped or looped generating tube 3 which is connected at one end by a valved union 4 with a hollow wire 5 that is connected with a pipe 6 that extends from the closed top of a storage tank 7 to near the bottom of said tank to receive oil when the same is forced therein by air pressure applied to the top of the tank by an air-pump 8. The looped tube 3 is provided at its farther end with a valved nozzle 9 controlled by a needle-valve 10.

11 is an air-mixer, burner and heater comprising a hollow cylindrical body 12 adapted to rest on the U-shaped tube and provided with perforations 13, 14, arranged in rows along the opposite sides of the pipe. The lower rows 14 of said perforations are about the level of, and are directed at, the top of the generating tube.

15 designates an inlet mixing tube extending along the lower side of the body 12, and open at one end of said body in front of the nozzle 9 to receive the jet of vapor therefrom. Said air-mixing tube is connected by a vertical slot 16 with the hollow burner-body 12 to allow the vapor to enter said body.

17 is an upright abutment located at the inner end of the slot 16 and extending upwardly into the cavity of the body and terminating above the floor of said body intermediate the ends thereof to intercept the jet of vapor and intermingled air and direct the same upward into the top of the hollow body near the middle thereof, whence the mixture will become distributed in all directions throughout the hollow body so as to flow out evenly through the perforations 13, 14.

In practical use the tank 7, with the siphon-pipe 6, may be placed outside the building in which the fire is required, and the connection with the looped generating-

tube 3 will be effected by means of the hollow wire. Said hollow wire can be readily let into the house through a small opening, and affords an unobtrusive connection with the burner, and will supply to the burner the distillate in any quantity required for an ordinary heating and cooking stove.

When a fire is to be started, the valve at 4 and the needle-valve 10 may be opened, thus allowing a quantity of the fuel to flow through the tube 3 and the nozzle 9 into the pan 1 where it may be ignited after the needle-valve 10 has been closed. The flame from the pan will flow upward around the cylindrical body 12 and also around the looped generating-tube 3, thus heating the same and generating gas in the tube 3, whereupon the needle-valve 10 may be opened, and thereupon a jet will flow through the nozzle 9 into the mixing-tube 15, entraining air with the jet and striking the deflector 17, thereby introducing into the hollow body 12 through the slot 16, the mixture of gas and air which becomes heated in the hollow body 12 and flows out through the perforations 13 and 14, where the mixture ignites outside the body, thus producing the required fire. The jets from the lower outlets 14 impinge upon the looped generating-tube 3, thereby continuously keeping the same heated. The body 12 is rounded at one end, as shown at 18, to rest upon the end of the loop 3, and is provided at the other end with shoulders 19 to rest on said loop 3. The supports thus formed for said body are arranged to hold the body spaced apart from the generating-tube 3, thus to allow air to flow up between the body and the tube, to supply oxygen to the jets of gas from the outlets 14 and 13. In casting the hollow body 12, orifices 20 and 21 may be left for convenience of casting, and afterward closed by detachable plugs 22. It is thus seen that the U-shaped tube may be simply formed of a piece of iron pipe bent near the middle to bring the two side limbs of the U parallel with each other, one end of the tube thus formed being screwed into the nozzle-piece; and that said tube rests loosely upon and is removable from the base; and that the perforated burner-body rests loosely upon the U-shaped tube and is readily removed therefrom, so that great convenience of construction, installation and repair is afforded, the parts being readily removed and replaced independently of each other. By making the burner-body 12 tubular and elongate as shown, and providing the same with the mixing-tube 15, great simplicity of construction and ease of installation are secured, and the interior of the pan can be readily exposed for cleaning when desired, by simply lifting the burner-body off of the generating-tube.

We claim:—

1. In a burning apparatus, a looped generating tube formed of a bent piece of pipe, a base supporting said tube, a hollow cylindrical perforated burner body supported on said tube, an air inlet tube in the bottom of said burner, a valved nozzle on the end of the generating-tube to discharge into said air inlet tube, a fuel tank, a supply tube connecting the fuel tank with the generating tube, and means for pumping fuel from said tank through said supply tube to said generating tube.
2. A burner of hollow cylindrical form, provided with an air inlet at one end and with perforations in its sides, a U-shaped generating tube supporting said burner and connected with a fuel supply tank, a valved nozzle facing said air inlet, and a base forming a pan, said generating tube extending along the sides of the burner and around one end thereof and being between the pan and the burner.
3. In a burning apparatus, the combination of a base forming a pan, a U-shaped tube supported horizontally on the base, a supply-pipe connected with one end thereof, a nozzle at the other end of the tube, and a cylindrical burner resting horizontally upon said tube and provided with perforations along its side and with an air-inlet at its end facing said nozzle, said inlet communicating with the interior of the burner.
4. In a distillate burning apparatus, the combination with a fuel tank, a supply pipe, air pressure means and siphon means for forcing liquid fuel into and through said supply pipe, of a base forming a pan, a U-shaped tube supported horizontally thereon and connected with said supply pipe by a supply valve, a valved nozzle at the end of said U-shaped tube, a cylindrical burner resting horizontally upon said tube and provided with perforations along its sides, and an air inlet in its end facing said nozzle.
5. A burning apparatus comprising a pan, a tube carried by said pan, a hollow body provided with shoulders to rest on said tube and with perforations to direct jets upon said tube and provided with an inlet for gas or vapor, means connected with the tube to supply liquid fuel thereto, and means connected with the tube to discharge into the inlet a jet of gas or vapor and thereby entrain air and force the same into said hollow body.
6. A burner comprising a U-shaped generating tube and a hollow body provided with shoulders to rest on said tube and also provided with an inlet tube and with a slot communicating between the inlet tube and interior of the body, and with an upright abutment at the end of the inlet tube and also with perforations, some of which are

directed toward the generating tube, and a nozzle connected with the generating tube and arranged at a distance from the inlet tube to discharge gas or vapor into said inlet tube and against the abutment.

7. In a burning apparatus, a U-shaped generating tube and a tubular elongated perforated burner body surrounded on two sides and one end by said tube and adapted to receive vapor from said tube and to discharge jets onto said tube; said burner-body being removable from said tube.

In testimony whereof, we have hereunto set our hands.

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CROLY V. PHELPS.

BENJAMIN W. PITTS.

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