(No Model.)

S. C. REILLY.

HYDROCARBON BURNER.

No. 432,080. Patented July 15, 1890.

Fig 1

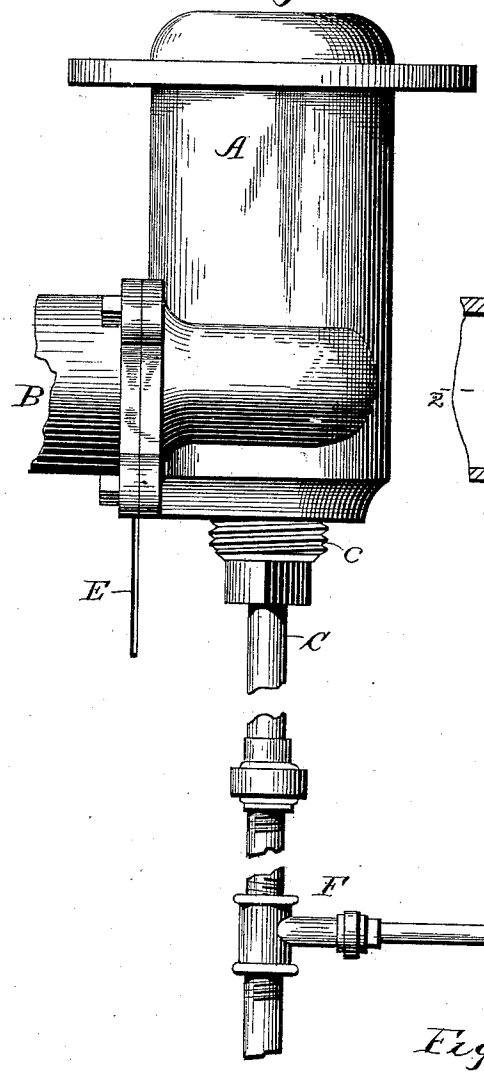


Fig 2

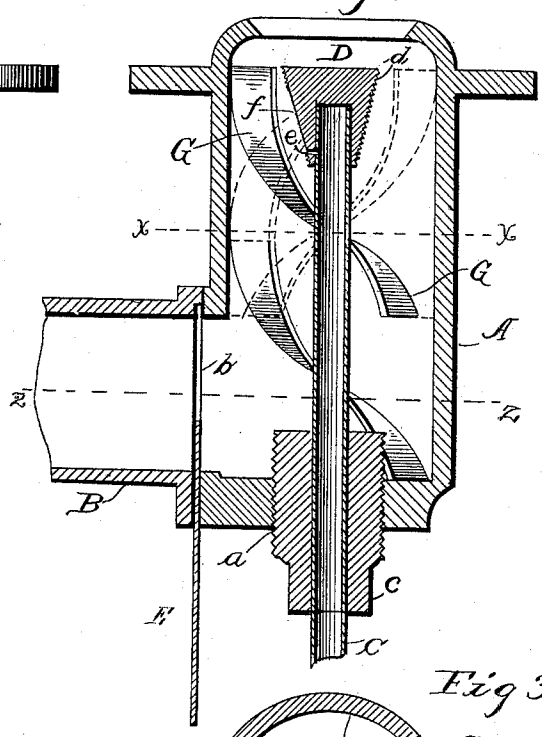


Fig 3

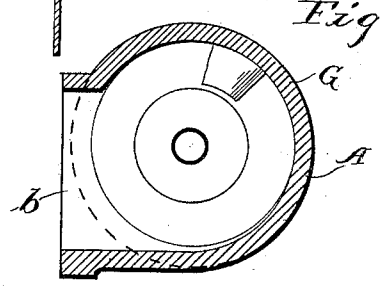


Fig 4

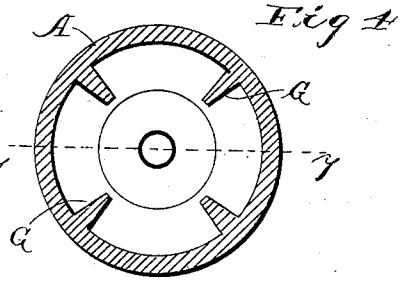
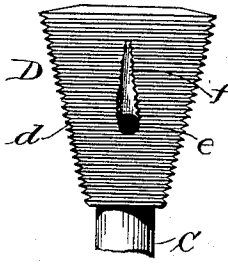


Fig 5.



Witnesses
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By his Attorneys
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UNITED STATES PATENT OFFICE.

SUMNER C. REILLY, OF TERRE HAUTE, INDIANA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 432,080, dated July 15, 1890.

Application filed February 28, 1890. Serial No. 342,038. (No model.)

To all whom it may concern:

Be it known that I, SUMNER C. REILLY, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to hydrocarbon-burners or burners for burning liquid fuel, and has particular reference to the means employed for atomizing or spraying the oil or other liquid used, and for evenly mixing therewith air or steam, the object being to secure an even and steady flame; and the invention consists in the construction hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 represents the burners in elevation. Fig. 2 represents a central vertical section on the line *y y*, Fig. 4. Fig. 3 is a horizontal section on the line *z z* of Fig. 2. Fig. 4 is a similar section on the line *x x* of Fig. 2, and Fig. 5 a side view of the corrugated cone for spraying the oil.

The same reference-letters designate like parts in all the figures of the drawings.

A designates the shell or case, which consists of a hollow cylindrical casting having an open but slightly-contracted upper end, with its lower end provided with a central screw-threaded opening *a*, and having near the lower end a side opening *b*, with which the air or steam supply pipe B is connected.

C designates the oil-supply pipe, which projects through the bottom of the case A and extends up centrally within the case to near the top, as shown in Fig. 2.

A screw-plug *c*, through which the pipe C passes and which fits the opening *a*, is in the bottom of the case A. This plug is cast or otherwise securely fixed upon the pipe C, so that by screwing it up or down in the opening *a* the end of the pipe C will be adjusted toward or from the mouth of the case A, as desired.

D designates an inverted cone, which is fixed upon the end of the pipe C, being formed with an opening into which the pipe projects. This cone is circumferentially grooved or finely corrugated, as shown at *d*, for a purpose to be hereinafter explained.

Interiorly the case A is provided with spiral wings or vanes G, one or more of which start from the bottom and the others from about the plane of the upper side of the opening *b*, and all extending upward to within a short distance of the mouth of the case. These wings are for the purpose of giving a spiral motion to the air or steam in its passage through the case. They may be made of sheet metal and attached to the case or to the pipe C; but I prefer to cast them solid with the case as an integral part thereof.

As represented in Fig. 3, the air-inlet *b* does not open centrally into the case, but is located somewhat to one side of the center, so that the current of air or steam on entering the case will impinge against the curved wall and will be deflected thereby and started on its rotary course. At the same time the current of air is taken up by the wings G, that extend to the bottom of the case, and is thereby deflected upward through the case. By starting a greater part of the wings from the upper side of the opening *b* the lower part of the case is left unobstructed for the free entrance of the current of air or steam, which is guided upward to the wings above by the projecting wings extending to the bottom of the case.

E is a sliding gate or cut-off for regulating and controlling the supply of air or steam to the burner, and F is a valve or stop-cock in the oil-supply pipe C, whereby the flow of oil is regulated and controlled. There is an opening or passage *e* through the pipe and through the side of the cone D, through which the oil escapes from the pipe C, having a channel *f* extending upward from the opening which gradually decreases in depth toward the top. As the oil escapes from the opening into the channel, it is carried upward by the current of air or steam, and by reason of the rotary direction of the latter it is thrown into the open ends of the circumferential grooves when the atomizing or spraying begins, as already explained.

The operation of this burner is as follows: The pipe B being connected with an air or steam supply and with means for forcing air or steam therethrough under pressure, the

gate E being open, the air or steam will be forced into and through the case A, and its passage through the same will be given a spiral movement according to the pitch of the wings G. The oil-supply pipe C being connected with a reservoir of oil, which must either be higher than the burner or be provided with means for forcing the oil through the pipe, and the valve F being open, oil will flow through the pipe and will escape through the opening *e*. As soon as it escapes therefrom it will be taken up by the spiral current of air or steam, which in passing through and from the case A, surrounds and envelops the pipe C and cone D, and will be carried forward spirally over the corrugated surface of the cone. As it is carried forward, it will, by reason of the shape of the cone, be thrown successively against the circumferential ribs which form the corrugations, and will thus be divided or atomized and converted into fine spray, which, commingling with the air or steam, will be thrown off and out of the burner in a thin and unbroken sheet.

I am aware that various devices have heretofore been used for spreading the oil after it passes from the oil-supply pipe, and that among such devices longitudinally-corrugated and spiral cones have been employed. These, however, do not break up and spray the oil to a sufficient extent, but allow it to be delivered in a comparatively solid and unbroken volume. The circumferential ribs or corrugations of my cone receive in succession the impact of the oil as it is forced forward by the current of air or steam and effect a spraying or breaking up which cannot be effected by the forms of sprayers above referred to. It will therefore be understood that I regard the circumferentially-corrugated cone as an essential part of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a hydrocarbon-burner, the combination, with a case having an open mouth and provided with interior spiral wings and an air or steam inlet, of an oil-supply pipe having an inverted and circumferentially-corrugated cone on its end within the open mouth of the case, the said pipe and cone having an oil-outlet through their sides, substantially as shown and described.

2. The combination, with a case having an open mouth and provided with interior spiral wings and an air or steam inlet, of an oil-supply pipe having an inverted and circumferentially-corrugated cone on its end within the open mouth of the case, the said pipe and cone having an oil-outlet through their sides and being adjustable to and from the mouth of the case, substantially as shown and described.

3. The combination, with the case having a contracted mouth and an air or steam inlet and interior spiral wings, one or more of the wings extending from the bottom of the case and the others approximately from the plane of the upper side of the air or steam inlet, and all extending nearly to the mouth of the case, of an oil-supply pipe projecting into the case through a central opening in the end thereof, a circumferentially-corrugated cone on the end of the oil-supply pipe within the mouth of the case, the pipe and cone having an oil-outlet through their sides registering with each other, substantially as shown and described.

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

SUMNER C. REILLY.

Witnesses:

ROBERT NIXON,

HENRY A. URBAN.