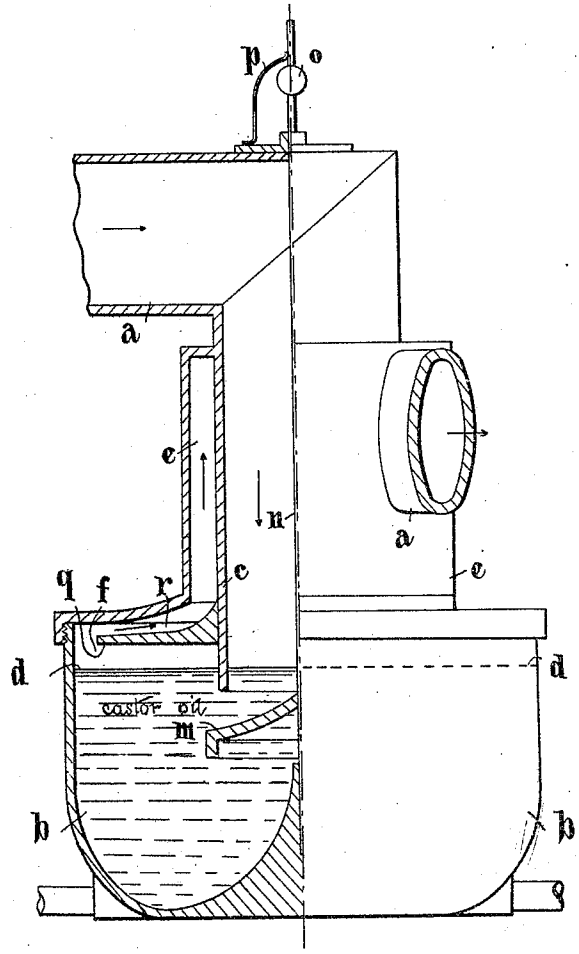
A. C. IONIDES, Jr.

MEANS FOR PREVENTING THE BACKWARD PROPAGATION OF FLAME ALONG A CONDUIT CONVEYING COMBUSTIBLE GASEOUS MIXTURES.

APPLICATION FILED OCT. 4, 1912.

1,068,904. Patented July 29, 1913.




Witnesses.
B. A. Hannay
R. L. Sheets

A. C. Ionides Jr.
Inventor.
By Mason Fenwick & Lawrence
Attorneys.

# UNITED STATES PATENT OFFICE.

ALEXANDER CONSTANTINE IONIDES, JR., OF LONDON, ENGLAND.

## MEANS FOR PREVENTING THE BACKWARD PROPAGATION OF FLAME ALONG A CONDUIT CONVEYING COMBUSTIBLE GASEOUS MIXTURES.

1,068,904. Specification of Letters Patent. Patented July 29, 1913.

Application filed October 4, 1912. Serial No. 723,970.

*To all whom it may concern:*

Be it known that I, ALEXANDER CONSTANTINE IONIDES, Jr., a subject of the King of Great Britain and Ireland, and residing at 34 Porchester Terrace, London, W., England, have invented certain new and useful improvements in and relating to means for preventing the backward propagation of a flame along a conduit conveying combustible gaseous mixtures, of which the following is a specification.

This invention relates to devices for preventing the backward propagation of flame in a conduit conveying a mixture of combustible gas and a supporter of combustion, and particularly to those of the type employing a non-return valve which is closed by the pressure resulting from the backward propagation. In such devices as at present proposed, much trouble arises from leaking of the valve after continued use, or merely on account of grit settling between the valve and its seating. Thus quite frequently such devices fail to prevent passage of the flame, even although the valve has been closed.

The object of the present invention is to overcome this disadvantage and to provide an improved form of device which shall always be reliable in action.

The invention consists in a device of the above type, in which a liquid, displaced through the open valve by the pressure of the backwardly propagated flame, seals the valve on both sides thereof when closed.

The invention also consists in the improved device for preventing the propagation of a back fire as hereinafter described.

According to the method of carrying the invention into effect illustrated in the accompanying drawing, which shows in sectional elevation a form of device according to the present invention, there is provided at a suitable point in a conduit, *a*, between the source of the combustible gaseous mixture and the place where ignition takes place a chamber, *b*, containing a liquid, usually castor oil, the surface area of which is considerably greater than the cross sectional area of the conduit, *a*. The incoming part *c* of the conduit, *a*, projects below the level, *d*, *d*, of the liquid in the chamber, *b*, while the outgoing part, *e*, communicates with the space, *f*, above said liquid, the conduit part, *e*, being formed concentrically with the incoming part, *c*, for some distance along the latter. A simple non-return valve, *m*, which utilizes as a seating the end of the immersed conduit part, *c*, is mounted upon a guided spindle, *n*, which passes axially through the conduit part, *c*, and carries at its upper end suitable automatic means such as an enlargement, *o*, which engaging with a spring, *p*, holds the valve, *m*, on its seating when the valve attains the uppermost position. The valve, *m*, is preferably of circular cross section which increases in area toward the end immersed in liquid and has an external surface preferably of such a form as to provide between the same and its seating a passage of as nearly as possible constant cross sectional area when the valve is fully open.

In order that the large surface area of the liquid in the chamber, *b*, may be utilized to the best advantage, suitable deflecting means such as a plate *q* attached to the conduit part, *c*, may be provided to direct the backwardly propagated flame toward the periphery of such liquid surface. Such a plate, *q*, when provided, should if possible be arranged to maintain a passage, *r*, of substantially constant cross sectional area for the flow of mixture in either direction. When the device thus modified is in operation the non-return valve, *m*, remains open and the pressure of the incoming mixture depresses the liquid within the immersed conduit part, *c*, until the mixture passes freely into the space, *f*, above the liquid, and from thence to the other conduit part, *e*, the direction of flow being indicated by the arrows.

On the occurrence of a back fire the liquid is displaced into the immersed conduit part, *c*, but at the same time the pressure exerted on the valve, *m*, closes the latter which remains closed on account of the spring, *p*, now engaging the enlargement, *o*, on the valve spindle, *n*. The conduit is thus completely closed by a valve, *m*, which is sealed on both sides by liquid. Consequently, the backward propagation of flame along the conduit is prevented and until the valve, *m*, is opened by hand, there is no flow of mixture along the conduit, and no leakage past the valve, even although grit may settle between the same and its seating.

Many further modifications, it will be

seen, can be made in the details of carrying the invention into effect without in any way departing from the spirit of the same.

I claim:

1. A device for preventing the backward propagation of flame along a conduit conveying combustible gaseous mixture, comprising in combination a chamber situated between the ends of said conduit, and forming part thereof, said chamber containing a liquid which seals the incoming part of the conduit, a non-return valve adapted to close said incoming part, said liquid being contained in an annular channel, the surface of which is curved to form a central raised part immediately below said valve, whereby on the occurrence of a backwardly propagated flame, some of the liquid seals the incoming conduit part while some, in sweeping around said curved surface, closes said valve which is thus sealed by the liquid.

2. A device for preventing the backward propagation of flame along a conduit conveying combustible gaseous mixture, comprising in combination a chamber situated between the ends of the conduit and forming a part thereof, said chamber containing a liquid which seals the incoming part of the conduit, a non-return valve adapted to close said incoming conduit part, said liquid being contained in an annular channel, the surface of which is curved to form a central raised part below said valve, means directing a backwardly propagated flame toward the periphery of the liquid surface, and means for holding the valve in the closed position until released by hand, whereby on the occurrence of a backwardly propagated flame, the non-return valve closes the conduit and is sealed by liquid.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALEXANDER CONSTANTINE IONIDES, JR.

Witnesses:
O. J. WORTH,
CARL R. LOOP.