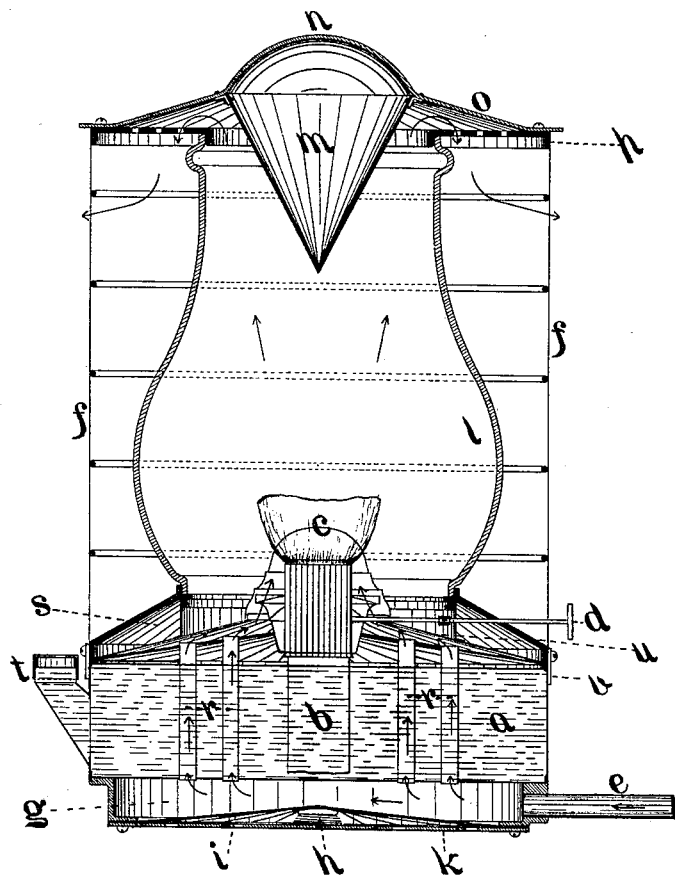


(No Model.)

T. SHAW.  
MINER'S SAFETY LAMP.

No. 386,661.

Patented July 24, 1888.



Witnesses.  
J. Logan Pitts.  
Cora J. Shaw.

T. Shaw, Jr., & Co., Inventors.

# UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA, PENNSYLVANIA.

## MINER'S SAFETY-LAMP.

SPECIFICATION forming part of Letters Patent No. 386,661, dated July 24, 1888.

Application filed November 2, 1887. Serial No. 251,060. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented Improvements in Miners' Safety-Lamps; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates to that class of lamps, portable or stationary, used in mines; and my invention consists in the construction of a miner's lamp, as fully set forth hereinafter, so as to more perfectly prevent the access of mine-gases to the flame, prevent the latter from being extinguished by concussions of the air or drafts, and so as to generally secure increased safety and efficiency over the constructions heretofore employed.

The drawing shows in vertical section a miner's lamp illustrating my invention.

The burner *A* may be of any suitable character adapted to burn gas or liquids. As shown, it is an oil-burner, provided with a wick-tube, *b*, supported in a lower casing containing a reservoir, *a*, and a chamber, *g*, the bottom or other wall of which consists of a flexible diaphragm, *i*, above a perforated base-plate, *k*, between which and the diaphragm is centrally arranged a spring, *h*, for elevating the diaphragm. The top of the reservoir or casing is conical, as shown. A pipe, *c*, provided with suitable cocks communicating with a supply of air under a slight pressure, either a reservoir in the mine or a blower or pump outside of the mine, and also with the chamber *g* and tubes *r*, extends through the reservoir and conducts the air from the chamber *g* to the top of the reservoir, where it can flow to the burner, and thus supply the air requisite for combustion. A conical deflector-plate, *u*, extends over the top of the reservoir *a* and directs the air-currents inward.

In order to exclude the mine-gases from the flame, I inclose the burner in a casing or hood wholly or partly of transparent material. As shown, the casing consists of an ordinary chimney, *l*, and a plate, *s*, having a flange fitting around the top of the reservoir and secured thereto by screws, and with a seat for the lower edge of the chimney, and the upper end of the

latter is covered by a cap-plate, *O*, having a central downwardly-projecting cone, *m*, which serves as a soot-collector and to partially close the aperture at the top of the chimney.

As the air is admitted to the chamber *g* and flows through the casing inclosing the burner at a pressure in excess of that in the mine, the said air fills the space around the flame and prevents the access of mine-gases thereto, while all the products of combustion can readily escape without permitting the entrance of the mine-gases.

To avoid the effects of drafts and currents of air, the cap-plate *O* is set upon a perforated plate, *p*, extending laterally from the top of the chimney, and a wire-cloth cylinder, *f*, is supported by the plate *p* and the base-plate *s* and surrounds and guards the chimney.

To permit the ready removal of the casing and access to the burner when necessary, the plate *s* supports the chimney and parts around and above it, and is detachably connected to the reservoir, as described. A lifting-shaft, *d*, is used to raise and lower the wick and is in two coupled sections, one supported by the reservoir and one by the base-plate *s*, with clutches at the adjacent ends to connect the sections when all the parts are in place, as shown. A side tube, *t*, with a detachable cap, permits the reservoir to be filled from the outside of the lamp.

The lamp, constructed as above described, can be used without risk or danger regardless of the character or condition of the gases in the mine, as the air for combustion is supplied from a source independent of the mine and as the pressure within the lamp and around the burner is in excess of that of the gases external to the lamp, so that the latter cannot flow inward to the flame.

Because of the superior internal pressure the flame is not affected by external currents of air, and the cap-plate *O* prevents downward currents entering the mouth of the chimney or casing, while the passage between the cap-plate and casing permits the ready escape of the products of combustion. The cone *m*, by collecting the soot, prevents the escape of incandescent particles of carbon with the products of combustion.

Lamps as ordinarily constructed are liable

to be extinguished by sudden concussions resulting from blasts, &c. This I prevent by so constructing the lamp, as above described, that the pressure or condensation of the air shall  
5 be as great within the lamp around the burner as outside of the lamp and in the casing or chimney, while at the same time preventing the entrance of the mine-gases from below the burner and to the flame. Thus if an explosion  
10 occurs, tending to drive the gases back and down the chimney above the burner, it will also increase the pressure on the lower face of the flexible diaphragm *i* and lift the latter, so as to increase the pressure correspondingly  
15 within the chamber *g* and below the burner, so that the pressure above and below the burner is equalized and no detrimental effect is produced in the flame. At the same time the flexible portion of the casing effectually pre-  
20 vents the inflow of mine-gases to the flame.

A gas-burner supplied by pipes extending to a gas-reservoir may be substituted for the oil-burner.

The lamp can be fixed or used as a portable lamp with suitable flexible connections with 25 the reservoir.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with the burner and 30 casing of a miner's lamp, of a chamber below the burner, an air-tube communicating therewith, and a flexible wall to said casing, substantially as described.

2. The combination of the lower casing con- 35 taining a reservoir and air-chamber, an air-tube communicating with the chamber, a flexible wall to said chamber, passages from the air-chamber to the top of the casing, a burner, and surrounding transparent casing, substan- 40 tially as described.

THOMAS SHAW.

Witnesses:

CORA I. SHAW,  
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