2 Sheets—Sheet 1.

D. R. HARDER.

SAFETY-LAMP.

No. 190,432. Patented May 8, 1877.

Fig1.

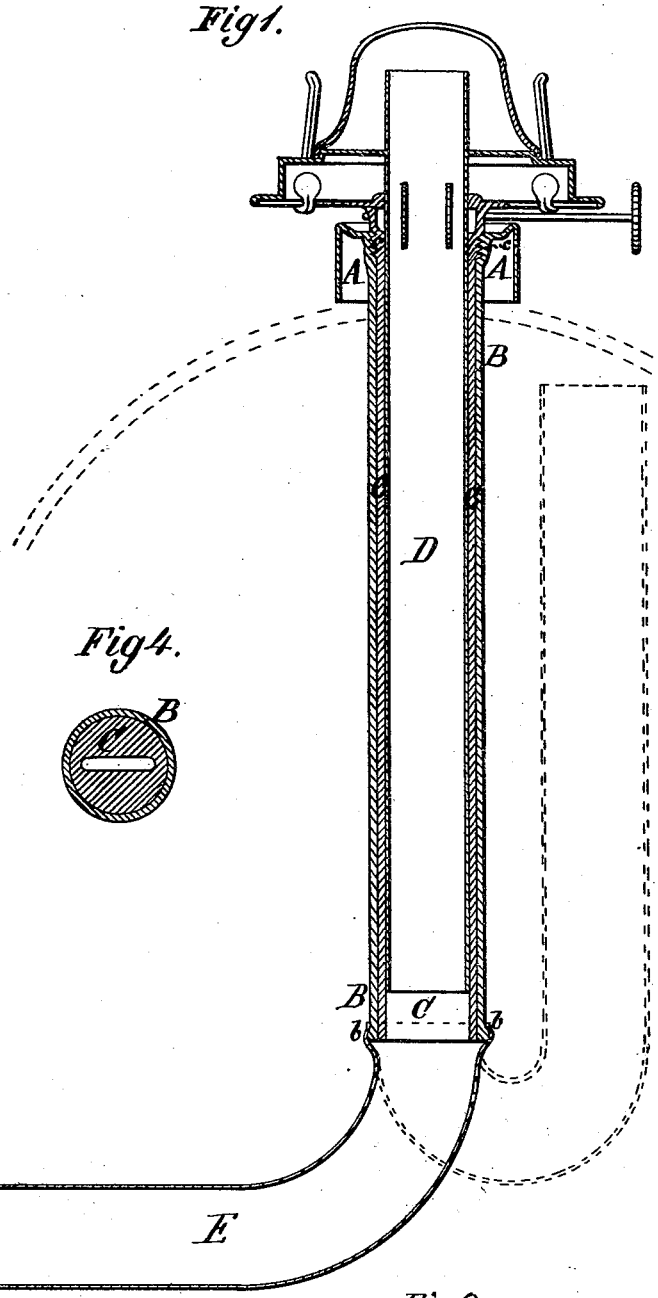
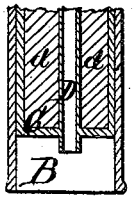


Fig4.

Fig2.

Fig3.



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2 Sheets—Sheet 2.

D. R. HARDER.

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Fig 5.

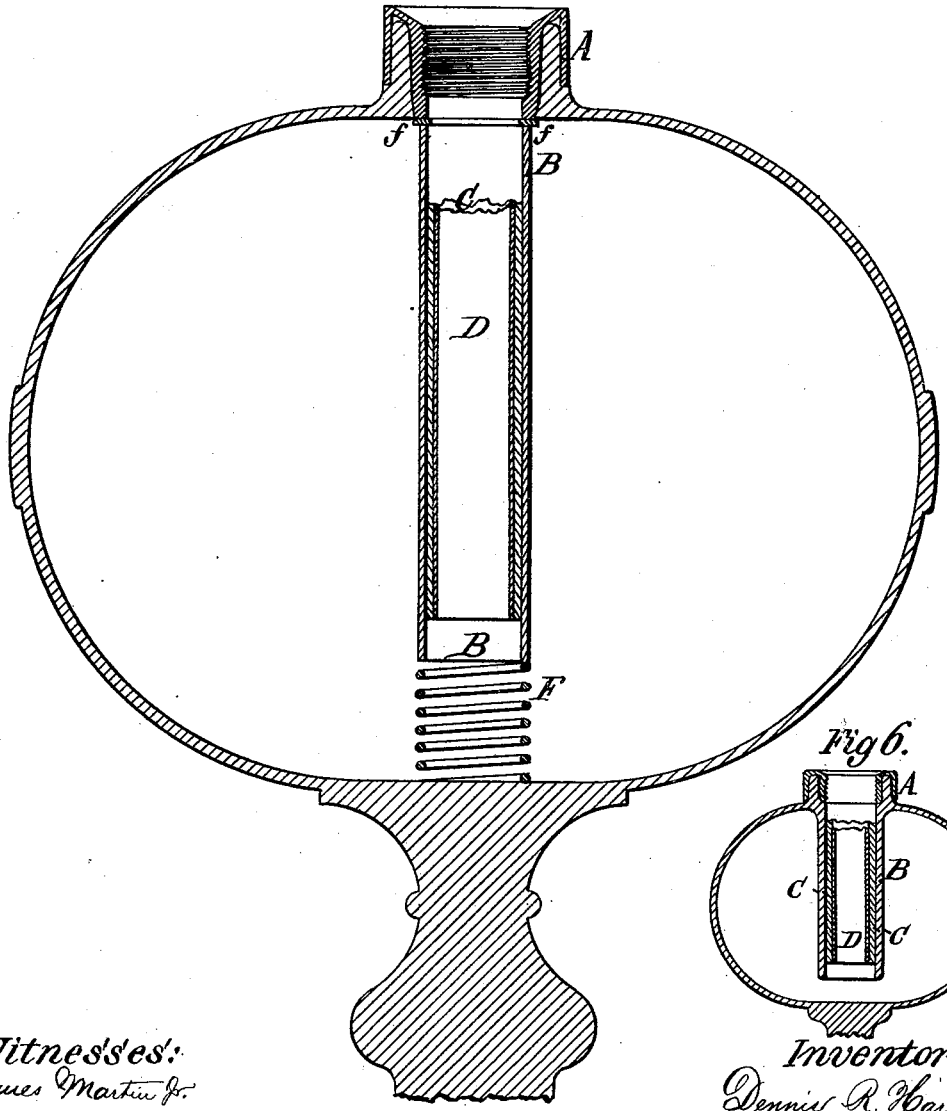
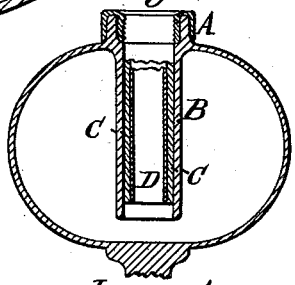


Fig 6.



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UNITED STATES PATENT OFFICE.

DENNIS R. HARDER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN SAFETY-LAMPS.

Specification forming part of Letters Patent No. **190,432**, dated May 8, 1877; application filed March 30, 1877.

To all whom it may concern:

Be it known that I, DENNIS R. HARDER, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Safety-Lamps for Burning Coal-Oil, which Improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is a vertical central section of the main parts of a lamp constructed according to my invention. Fig. 2 is a horizontal cross-section through the wick-tube and its inclosing safety-tube. Fig. 3 is a vertical central section of the lower part of the said tubes made at a right angle to the section, as represented in Fig. 1. Figs. 4, 5, and 6 are modifications of certain details of the invention.

The nature of my invention consists in certain improved constructions, combinations, and arragements of parts, as hereinafter described and specifically claimed, whereby a coal-oil lamp is produced which, in any position it occupies, prevents the escape of gas from the lamp-globe toward the flame, thereby avoiding tha danger of explosion.

In the drawings, A, Fig. 1, represents the collar of a lamp-globe, which is partly represented by dotted lines in said figure. B is a tube, which forms the extension of the inner part of the said collar A. C is a tube, containing the wick-tube D. This tube C is fitted into the lamp-tube B, and at its top supports the burner and other ordinary attachments. A screw-thread, *c*, is formed on the inside of the collar A, and a male screw-thread formed on the outside of the tube C, fits into it, and by this means the tube C, with the aid of its long bearing in the lamp-tube B, is held in position. The lamp-tube B, at its lower end, may be provided with an annular swell or rim, *b*, over which the end of a rubber tube, E, is drawn, which tube E, by its own weight, lies at the bottom or lowest part of the globe, and consequently admits oil as long as there is any, no matter in what position the lamp-globe may be placed; for if such lamp or globe should be turned to a horizontal position, or turned upside down, the tube E, which is made very limber or flexible, would always adjust itself toward the lowest part, where the oil is, and thus insure the supply of oil, and at the same time prevent the admission of any gas from the lamp-bowl into the wick-tube. The end of the tube E might be weighted with a metal ring, or otherwise, to enforce its downward tendency. The space between the inner tube C and wick-tube D is filled with asbestus or other non-conducting material, as seen at *d* in Figs. 2 and 3; or, instead of the filling *d* the tube C and the wick-tube D might be made of one piece, as illustrated by the horizontal section of Fig. 4, and just fill the entire diameter of the tube B.

By the modification shown by Fig. 5, it is seen that the lamp-tube B might be introduced into the lamp as a separate piece, under which construction it is made to bear upwardly by means of a spring, F, attached to its lower end and resting on the bottom of the oil-chamber against a rubber packing-ring, *f*, on the under side edge of the collar A. By this construction the tube is held in place and packed air or gas tight by the india-rubber washer *f*, or its equivalent. Instead of having separate lamp-tubes, either as in Fig. 1 or Fig. 5, the lamp may be provided with a tube, B, as in Fig. 6, of the same material as the globe, which tube is formed at the time the globe is made. A flexible tube, E, would be attached to the lamp-tube B in this case, by inwardly clamping it near the foot of the lamp-tube B by means of an elastic expansible tension ring or collar before the tube C is inserted. In all of the plans of construction shown the principle of the invention is strictly adhered to, namely, providing a lamp-tube which excludes gas from the wick for tightly inclosing the wick-tube along its whole length, said lamp and wick tubes extending very nearly to the bottom of the oil-reservoir. For ordinary household-lamps the flexible tube would not be very necessary, but in railroad and other lamps lable to be subjected to violent jolting and swinging movements it is important.

It will be seen that by my construction the following advantages are gained: First, the fastening-screw and joint of the burner and lamp-collar are not subjected to leakage of gas accumulating in the lamp-globe above the surface of the oil, this being due to the elongation of the inner part of the collar, so that its lower end is submerged in the oil, and that the gas

between it, the globe, and the oil is prevented from escaping, the collar being under all circumstances hermetically fastened upon the globe; second, if the surface of the oil should accidentally, either from want of supply or by change of position of the lamp, leave the end of the tubes B or E exposed to the gas in the globe, the joint or fit of the pipes B C would prevent the entrance of gas, while the saturated wick in the wick-tube prevents the escape of gas through the wick-tube; and if the joint between the pipes B C should not be absolutely hermetic, there would be a very small space at the said joint, which, by capillary attraction, would be constantly filled with oil, which would prevent the escape of gases like a packing. The wick-tube and the tube C are of such construction as to make the escape of gas between them impossible, and thus an explosion from any other cause than the breaking of the globe is entirely prevented by my improved construction. The outside or lamp-tube could be constructed to rest on the bottom of the lamp-globe, but in such case the extreme lower end would have holes or notches around it and in its bottom edge. Thus, having the tube rest on the bottom would help to steady it.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the lamp-tube B, of the wick-tube C *d*, which has only a wick-passage, D, through it, and is made from the lamp-collar to its lower end of a diameter which fits snug to the interior surface of the lamp-tube all around, substantially in the manner shown and described.

2. In an oil-lamp, the combination of the lamp-tube B, wick-tube C, and flexible tube E, substantially as set forth.

Witness my hand in the matter of my application for a patent for an improved safety-lamp.

DENNIS R. HARDER.

Witnesses:

E. P. HILLIARD,

J. F. SNYDER.