No. 621,712. Patented Mar. 21, 1899.

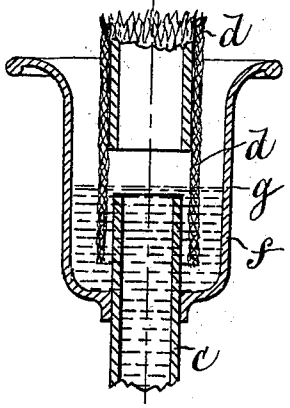
H. J. W. RAPHAEL & J. WEST.

OIL LAMP.

(Application filed Sept. 12, 1898.)

(No Model.)

Fig. 1



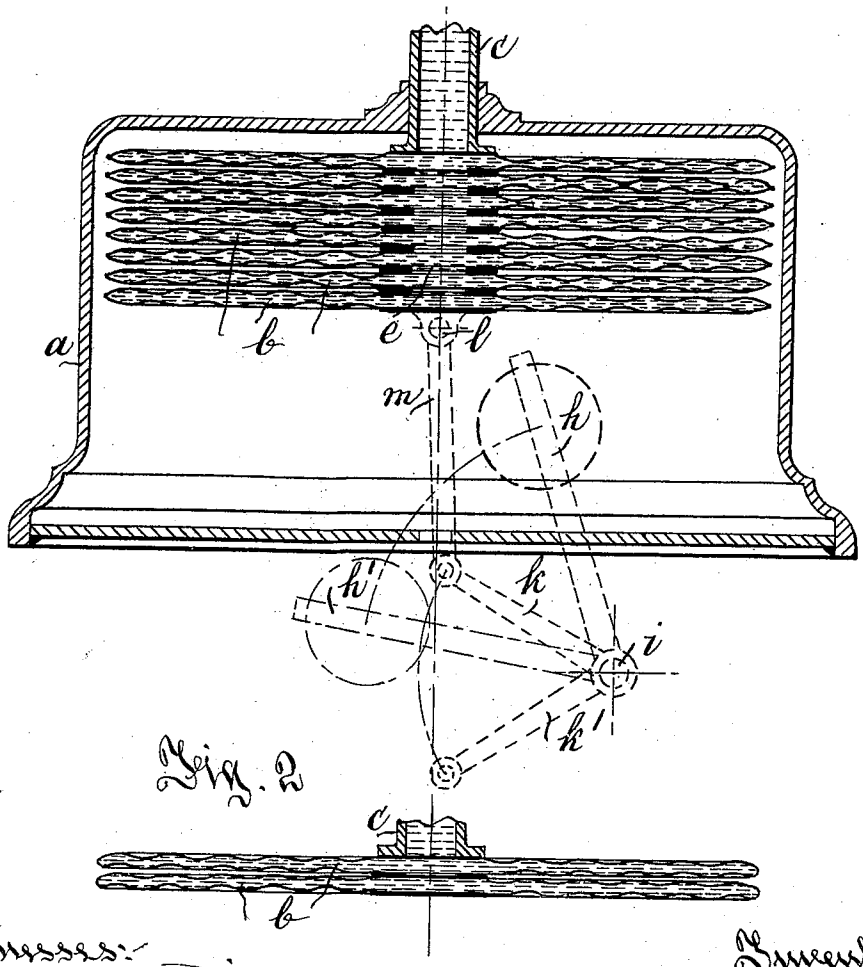


Fig. 2

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY JOSEPH WILBERFORCE RAPHAEL AND JAMES WEST, OF LONDON, ENGLAND.

OIL-LAMP.

SPECIFICATION forming part of Letters Patent No. 621,712, dated March 21, 1899.

Application filed September 12, 1898. Serial No. 690,816. (No model.)

To all whom it may concern:

Be it known that we, HENRY JOSEPH WILBERFORCE RAPHAEL and JAMES WEST, subjects of the Queen of Great Britain, residing at Highbury Grove, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Oil-Lamps; and we 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.

This invention relates to oil-lamps, and more especially to lamps burning mineral oil; and it has for its objects improved methods of construction of that kind of lamp in which the oil is automatically supplied to the wick or wicks of the lamp from a reservoir below, the oil being raised to a height at which the wick can conveniently absorb and use it, as in the case of independent-reservoir lamps, at the same time drawing the oil into the space below the piston, subsequently forcing the oil gradually up to the level of the wick by the elasticity of the spring. The use of cylinders and pistons with leather or other flexible packing and fittings is very objectionable, especially where mineral oil is used. It has also been proposed to use instead of a cylinder and piston a flexible diaphragm of leather or the like material; but such diaphragms have not proved effective in practice.

By the present invention an expanding and collapsing elastic chamber entirely of metal is used as a reservoir for the oil, which when the lamp is in operation is forced up by the elasticity of the chamber itself, while a fresh supply of oil is admitted into the chamber when necessary by the means hereinafter described.

The accompanying drawings are in illustration of the invention.

Figure 1 shows in vertical section the base of a lamp containing the expanding chamber and the parts connected with it, as well as the lower end of the wick. Fig. 2 shows a somewhat different construction of the expanding chamber.

a is the external base of the lamp. *b* is the expanding metallic chamber, hanging freely in the base *a* by the pipe *c*, through which the oil in the chamber *b* passes up to the wick *d*.

The chamber *b* consists of a sufficient number of circular chambers, each formed of two corrugated disks of the flexible and elastic metal, attached together at their outer circumference and having central apertures *e*, strengthened by external rings or washers by which the adjoining chambers are soldered or brazed together, the lowest or bottom disk being without a central opening. The length or height of the pipe *c* is determined in the manner hereinafter described, and its upper end terminates in a vessel *f*, through the bottom of which it is shown rising for a short distance and serving to keep in position the lower end of the tubular wick *e* of the lamp, which dips into the vessel *f*, while its upper end passes to a burner of any of the ordinary well-known kinds fitted with a chimney and globe and means for regulating the height of the wick, these parts not being shown in the drawings, as being similar to those ordinarily used in lamps.

When the several chambers constituting the expanding metal chamber *b* are filled with oil under pressure, they expand downward until they contain the required quantity of oil; but when the pressure upon the oil is removed the elasticity of the several corrugated plates constituting the chamber is sufficient to force the oil for a certain height up the tube *c* until the chamber *b* has completely collapsed. We make the length or height of the pipe *c*, which is connected with the expanding chamber *b*, such that the elasticity of the latter is sufficient (in contracting) to support a column of oil the top of which is slightly above the upper end of the pipe, as shown at *g*, the oil overflowing into the chamber *f*, from which the wick draws its supply.

The height of the upper edge of the vessel *f* above the top of the pipe *c* is such that if the vessel *f* is filled with oil the additional height of the column thus obtained gives sufficient pressure to again expand the chamber *b* and fill it with oil. The action of the lamp is therefore automatic, it being only necessary when the lamp requires replenishing with oil to pour the oil into the vessel *f*, keep-

ing the latter filled to a sufficient height to expand the chamber *b*. A weighted lever *h*, turning on a center *i*, may be used to aid the expansion of the expanding chamber and facilitate the filling of the latter with oil, as shown in dotted lines in Fig. 1, the arm *k* being connected to the bottom of the expanding chamber at *l* by a link *m*. As the chamber becomes expanded its increasing resistance is balanced by the weighted lever *h*, which takes a more horizontal position, as shown at *h' k'*.

As already pointed out, the accessories of the lamp—the wick-holder, wick-adjuster, gallery, chimney, and globe—may be of any of the ordinary well-known kinds, the present invention consisting simply in making the collapsible chamber *b* entirely of metal and connecting it with the vessel *f* by a pipe of such vertical height that when the vessel *f* is full, or nearly so, the pressure of the column of oil is sufficient to expand the chamber *b*, while when the top of the column only reaches to the level *g* above the upper end of the pipe *c* the elastic contraction of the chamber *b* is just sufficient to force the oil into the vessel *f*. As the oil is consumed, therefore, a fresh supply is gradually introduced into the vessel *f* and supplies the wick as it is needed.

The part of the pipe *c* in the vessel *f* which serves to guide the wick may be omitted or one or more holes may be made into it just above the bottom of the vessel.

The details of the lamp and the materials used may be varied as desired, and it is obvious that one or more flat wicks may be used instead of the tubular one shown. If the latter is used, provision is made in the usual way for admitting air to its interior.

The corrugated disks forming the chamber *b* may be arranged with their concentric corrugations parallel to each other, as shown in Fig. 2, instead of opposite, as shown in Fig. 1. The disks forming the chamber may be arranged vertically instead of horizontally.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. In oil-lamps, the combination of an expanding and collapsing chamber *b*, entirely of metal, consisting of a series of elastic corrugated metal disks, with an upper vessel *f*, into which the wick of the lamp dips, the chamber *b* and the vessel *f* being connected by a pipe *c* of such length that when the vessel *f* is filled with oil its pressure is sufficient to expand the chamber *b*, while as the oil in the chamber *f* is consumed to about the level *g* the elastic contraction of the chamber is sufficient to force the oil through the pipe *c* into the vessel *f* and retain it at about the same level, substantially as set forth.

2. The combination with the elastic metal disks closed at their edges, thereby forming an expanding and collapsing chamber *b* and pipe *c*, of the weighted lever *h*, arm *k*, and link *n*, substantially as set forth.

In testimony whereof we have hereunto affixed our signatures in presence of two witnesses.

HENRY JOSEPH WILBERFORCE RAPHAEL.
JAMES WEST.

Witnesses:
EDMUND EDWARDS,
ARTHUR E. EDWARDS.