(No Model.)

C. H. WIDGER, G. H. RICH & J. D. NORTH.

Illuminating Torch.

No. 242,241. Patented May 31, 1881.

Fig. 1.

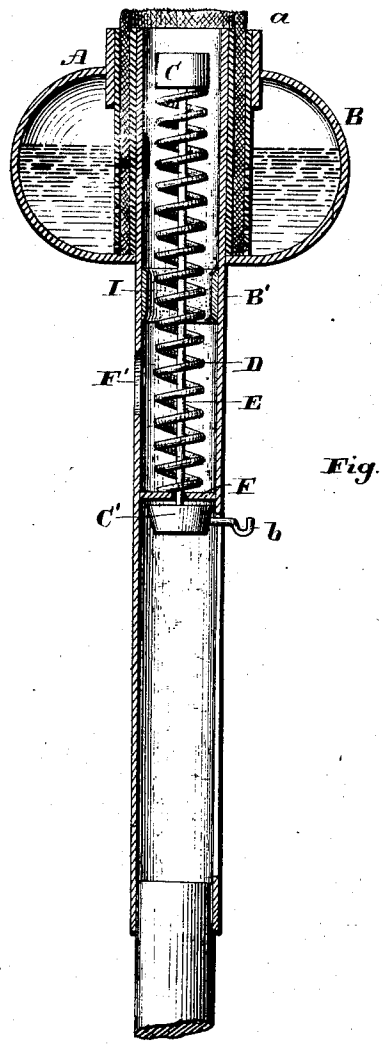


Fig. 3.

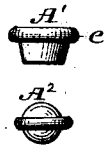
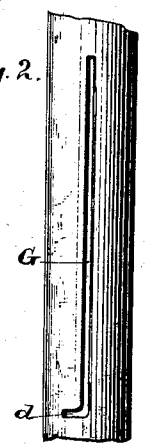


Fig. 2.



Attest:
J. Henry Kaiser.
A. H. Norris.

Inventors:
Charles H. Widger.
George H. Rich and
James D. North.
By Chas. B. Tilden
Atty

UNITED STATES PATENT OFFICE.

CHARLES H. WIDGER, GEORGE H. RICH, AND JAMES D. NORTH, OF LYNN, MASSACHUSETTS.

ILLUMINATING-TORCH.

SPECIFICATION forming part of Letters Patent No. 242,241, dated May 31, 1881.

Application filed September 29, 1880. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. WIDGER, GEORGE H. RICH, and JAMES D. NORTH, all of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Illuminating-Torches, of which the following is a specification.

Referring to the drawings forming part of this application, Figure 1 is a central longitudinal section of a torch in which our invention is embodied. Fig. 2 is a side elevation, showing certain details in construction. Fig. 3 is an illustration of the principal form of pyrotechnic signals or fire-balls used in connection with this invention.

This invention relates to a torch for illuminating and pyrotechnic display; and it consists in a structure which is illustrated in the accompanying drawings, and pointed out in the claim.

A in the drawings indicates any suitable pattern of illuminating-torch, in which *a* is the wick-tube, communicating with a surrounding oil-reservoir, B. This wick-tube should surround an inner tube, B′, which extends downward below the oil-reservoir for some distance, and has a clear straight bore from end to end. Within this tube B′, and occupying somewhat more than half its length, is placed a strong spiral spring, D, having a head or plunger, C, from the center of which a straight rod or wire, E, extends downward to the bottom coil of the said spring, where it passes through an aperture in a rigidly-attached plate or block, F, upon which the spring D rests. Beneath this block may be inserted a second plunger-head, C′, to which the lower end of the rod E is secured. Both the plunger C and the head C′ are of diameter slightly smaller than the diameter of the tube B′ inside, in order to avoid binding or scraping. The spring D is so located that it occupies the upper portion of the tube when not compressed, bringing the plunger C just beneath the open mouth of the tube and below the plane of the wick. The lower half of the tube is empty, leaving space for the movement of the lower plunger, C′, which is adapted to move downward with the rod E when the spring is compressed. The spring may be compressed by any convenient means—as, for example, by a pin, *b*, which is attached to the lower plunger, C′, or to the rod E, and projects through a slot in the tube or barrel B′. (Shown at G in Fig. 2.) By drawing this pin to the bottom of the slot G the spring will be compressed to its highest tension, and in order to retain it at that point an offset or detent-slot, *d*, Fig. 2, may be formed in the edge of the vertical slot G, into which the pin *b* may be caught and held until the moment comes to release it.

F′ is an opening in the wall of the tube B′, of sufficient size to admit a fire-signal or pyrotechnic projectile of the kind we propose to use. This opening may be covered by an automatic slide or gate actuated by the descending plunger C, or it may be so located that when the pin *b* is caught by its detaining notch or detent said opening F′ shall be below the level of the plunger C, in which case the detent notch or slot *d* should be placed a little above the point of lowest descent of the plunger, in order that the latter may be drawn below the opening to receive the projectile, and when held by the detent may lie so far above its lowest edge that the said projectile cannot fall out by reason of the accidental inclination of the torch.

A′, Fig. 3, is a representation of the form of fire-ball mentioned above, and which resembles, in many respects, those used in Roman candles and similar fire-works. These balls are generally cylindrical in shape; but they may be made spherical, as shown at A^2, Fig. 3. In the form first mentioned we apply to the upper end of the ball or projectile a friction-paste of any suitable kind. Many different compositions of this character are well known in the market, and many of those best known would fully answer our purpose, as we only require a paste which will kindle surely and quickly upon being exposed to a short, sharp friction. We apply the friction-paste to the ball, as shown in Fig. 3 at *e*, in such manner that it will project beyond the periphery of the ball somewhat, (the degree of projection being exaggerated in the drawings.) The diameters of this projectile and of the tube B′ are respectively such that the former can pass through the latter without binding or crowding.

Within the tube B′, and just above the point

where the plunger C stands when the spring is compressed, we place a section of frictional material, I, which lies against the inner face of the tube B′, and at that particular point contracts its diameter somewhat. The degree to which this contraction takes place is such that the ball A′ cannot pass upward without the friction-coating *e* coming into contact with the frictional lining I, whereby the said paste is instantly ignited and the fire is communicated to the powder of the ball.

The operation of this device is as follows: When the torch is lighted the flame from the wick surrounds the open end of the tube B′, but leaves a clear orifice for the passage of the ball. In order to load the tube the finger is placed upon the pin *b* and it is drawn to the lowest point of the slot G, where the plunger will lie below the opening F′, thereby giving ready admission to the projectile. The latter being inserted, the pin *b* is set in the detent *d* until the ball is to be discharged, when it is merely thrown out of the said detent and into the vertical slot G. After its insertion the ball lies just below the friction-lining I, and as the pin is released and the spring D projects the ball through the tube the first motion drives the crown or ring of friction-paste violently over the frictional surface I, thereby igniting it. Within an instant, and before the fire can reach the powder, the spring projects the ball from the mouth of the tube and drives it high into the air, where its combustion may be seen from a great distance.

Instead of the cylindrical form of ball shown at A′, Fig. 3, it may be found desirable to use a spherical ball—as, for instance, that shown in Fig. 3 at A^2. In this form the friction-paste should be applied to the ball in the manner shown in the drawings—viz., in a thick stripe passing around the ball at its largest diameter.

The operation of this device is wholly noiseless, and in every sense devoid of the slightest danger either to the operator or to the spectators. The display usually made by a torch-light procession may be enhanced more than a hundredfold by furnishing each torch with our invention.

We do not here claim the process set forth of lighting and throwing into the air a pyrotechnic projectile, nor do we here claim the described fire-ball, as such will form the subject-matter of a separate application for Letters Patent.

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

A torch for illuminating and pyrotechnic display, consisting of a tube extending within the wick-tube of an oil-lamp, said tube containing a plunger adapted to be moved by an elastic medium, and also provided with a friction-lining, and having a suitable aperture for the introduction of the projectile, substantially as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES H. WIDGER.
GEORGE H. RICH.
JAMES D. NORTH.

Witnesses:
CHAS. B. TILDEN,
E. F. MCQUIRE.