F. M. MOORE.

LIGHTING DEVICE OR TORCH.

APPLICATION FILED JUNE 7, 1906.

902,504. Patented Oct. 27, 1908.

2 SHEETS—SHEET 1.

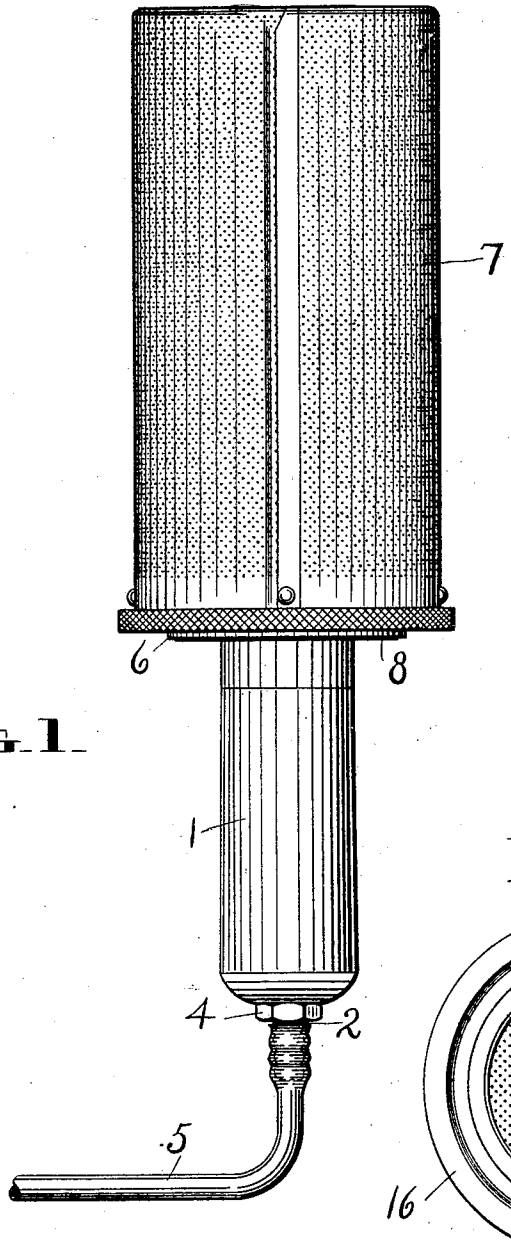
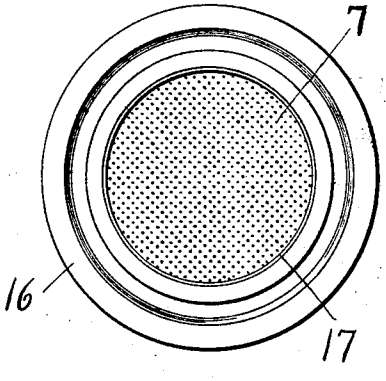


FIG. 1.

FIG. 2.



Witnesses
A. P. Fairbanks
H. F. Fletcher

Inventor
Frank M. Moore,
by Webster & Co.,
Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

F. M. MOORE.

LIGHTING DEVICE OR TORCH.

APPLICATION FILED JUNE 7, 1906.

902,504. Patented Oct. 27, 1908.

2 SHEETS—SHEET 2.

FIG. 3.

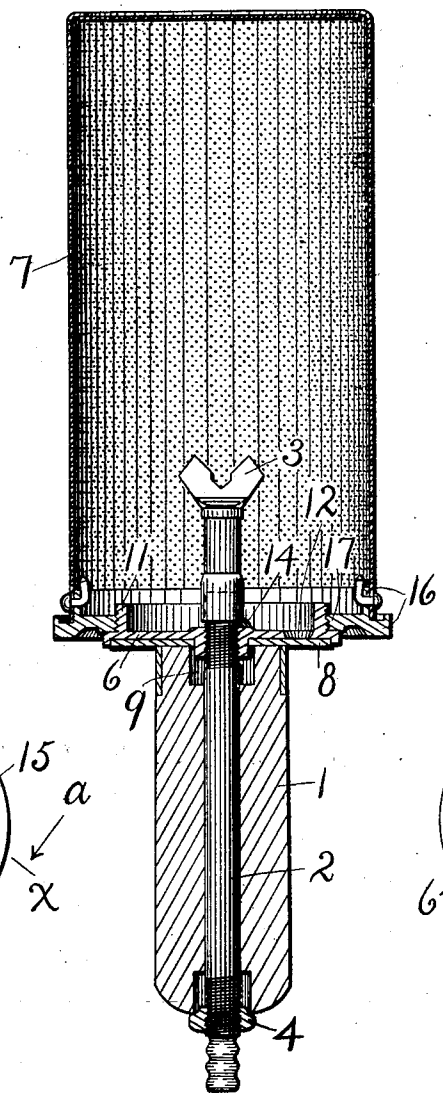


FIG. 4.

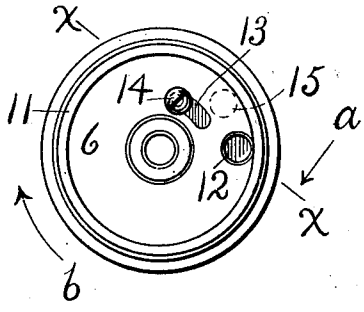


FIG. 5.

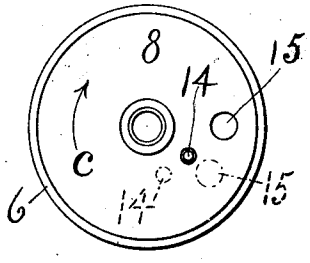
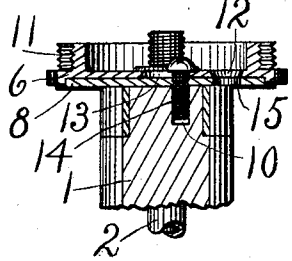


FIG. 6.



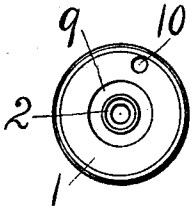


FIG. 7.

Witnesses

G. P. Fairbanks

H. F. Fletcher.

Inventor

Frank M. Moore,

by Webster & Co.

Attorneys.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK M. MOORE, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR TO INTERNATIONAL GENERATOR COMPANY, OF WESTFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LIGHTING DEVICE OR TORCH.

No. 902,504. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed June 7, 1906. Serial No. 320,643.

To all whom it may concern:

Be it known that I, FRANK M. MOORE, a citizen of the United States of America, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Lighting Device or Torch, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in safety lighting devices and portable lights and comprises the construction and arrangement herein set out. This device as herein illustrated and described is designed particularly for the utilization of acetylene gas which gas is believed to be the only illuminating medium except electricity that will burn satisfactorily in whatever position it may be placed, hence the burner employed in said device as herein shown is of the acetylene gas variety.

The objects of my invention are to furnish a simple, compact and inexpensive safe lighting device and also an acetylene gas lamp or torch which can be moved about and held in any desired position, the same being particularly applicable for use on or with automobiles since it can easily and quickly be connected with the generator for the ordinary lamps of the machine whenever necessary, although it may be employed to advantage in and around gas containers, in mines, almost any place in fact where a safety lamp is required or a portable light is needed and acetylene gas is available; and to produce a device of this kind which, while giving a sufficient amount of light, is absolutely safe under any and all circumstances.

Other objects of secondary importance are to furnish the torch with a safe and convenient ignition port and to provide adequate means of attachment and detachment between the various members which enter into the construction of the device and for such adjustment as may be required.

I have discovered that in order to secure absolute safety without sacrificing too much of the illuminating power in a lamp of this character it is necessary that the size of the perforated cover for the burner or what is termed the cage be properly proportioned to the burner, meaning of course to the flame which said burner is capable of producing or to the gas which can be consumed at the burner, and it is also necessary that the right amount of air be admitted to the cage. If a 60-candle-power acetylene gas burner is employed the proportions of the parts should be substantially as illustrated in the drawings, the perforations in the cage should be substantially as fine as it is practicable to punch holes in the sheet-metal out of which said cage is made, and said perforations should number some 640 to the square inch, more or less. Reckoning the gas which enters the cage at the burner at 15%, in order to have perfect combustion 85% of air must enter said cage through its perforations, therefore for convenience and result the cage should be just large enough to supply this amount of air to the burner or to the flame. Perfect combustion cannot take place in a cage which is too small, moreover the use of such a cage would be dangerous because smoke is produced from the gas burning therein and the resulting carbonaceous residuum is deposited not only on the inside but also on the outside of the cage and will ignite and burn on the outside, which at once destroys the usefulness of the device. When the cage is too large the combustion appears to be nearly or quite normal, but for some reason difficult to explain although the fact is clearly apparent to the eye the reflection of light is interfered with so that the illuminating power of the torch is less than that of one which differs only in having a cage of the proper size. Insufficient perforation of the cage cuts off the supply of air to the burner and either prevents combustion altogether or interferes with it to such an extent as to make the flame so poor as to render the light useless; on the other hand, the perforations must be so small as to prevent ignition therethrough. Perforated sheet-metal is better for the cage than woven-wire for the reason that the latter will not stand the heat generated by acetylene gas flame as well as the perforated metal and is very liable to become injured by having the meshes spread apart so as to make the device unsafe. The acetylene gas causes a very brilliant and steady light, and is superior to any other for my purpose; the light rays projected through the cage are reduced only about one-half provided the device is properly proportioned.

I attain the objects and secure the advantages above pointed out by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a torch embodying a practical form of my invention; Fig. 2, a bottom view of the cage; Fig. 3, a vertical section through the torch; Fig. 4, a plan view of the connecting member between the cage and the rest of the device; Fig. 5, a bottom view of said member and of the shutter; Fig. 6, a section through the connecting member and shutter taken on lines *x*—*x*, Fig. 4, looking in the direction of the arrow *a*, and also through a portion of the handle, showing the lighting port mechanism, and, Fig. 7, a plan view of the upper end of the handle.

The lighting port is closed in Figs. 3 and 4 and open in Figs. 5 and 6, in this last mentioned view the operating and stop member for the shutter having been moved to the opposite end of the slot from that which it occupies in Fig. 4 and the port having been opened in consequence.

Similar characters designate similar parts throughout the several views.

Passing now to a detailed description of the torch illustrated in the drawings it will be observed that a handle 1 is provided of suitable size and shape for grasping with the hand, through which lengthwise extends a tube 2 screw-threaded at its upper terminal for a burner 3 and at its lower terminal for a nut 4. Below the lower threaded part of the tube 2 said tube terminates in a nipple for one end of a flexible tube 5 leading to the generator (not shown). The tube 2 projects beyond both ends of the handle. A support 6, for a perforated cage 7, is rigidly fastened on the tube 2 near the top, and the handle 1 is held in place on said tube between and by said support and the nut 4, a shutter 8 being, however, interposed between the under-side of the support and the adjacent end of said handle. In the top of the handle is a recess 9 adapted to receive a hub or flange on the bottom of the support 6, and a recess or hole 10 for the purpose explained hereinafter. It will now be seen that the handle can be turned independently of the tube upon which it is mounted, by exerting enough force to overcome whatever frictional resistance is offered by the confining members at the ends, and that the amount of such frictional resistance may be increased or decreased by loosening the nut 4.

The support 6 is provided with an upwardly extending, externally screw-threaded flange 11, and has an opening or port 12 for igniting purposes, and a slot 13 therethrough. The shutter 8 is let into the under side of the support, and an operating stop member 14 in the form of a screw passes through the slot 13 in said support into and through said shutter, said member being in threaded engagement with the shutter. The lower projecting end of the operating stop 14 is received into the recess 10 in the handle 1, when the parts are properly assembled, hence said handle carries the shutter 10 with it when rotated, both moving independently of the support 6 until one end or the other of the slot 13 is reached by said stop. There is an opening or port 15 so arranged in the shutter as to be brought into alinement with the port 12 in the support when said shutter is turned by the handle in the direction of the arrow *b*, in Fig. 4, to bring the operating stop 14 against that end of the slot 13 which is adjacent said port 12. The arrow *c*, in Fig. 5, indicates the direction taken by the shutter to move its port 15 out of alinement with the port 12.

As before mentioned, the shutter 8 is closed, that is, said shutter stands so as to cover the port 12, in Figs. 3 and 4, while in the next two views the shutter is so positioned that the ports 12 and 15 coincide, the dotted lines in Fig. 5 indicating the positions of the port 15 and the operating stop 14 when the port 12 is closed. When the port 12 is open a match can be inserted into the cage 7 for the purpose of lighting the gas at the burner 3, then the shutter is turned by the operator through the medium of the handle to close said port to exclude gas and other elements from said cage, except such as enter at the burner to be consumed and whatever air passes through the interstices in the cage.

The open end or base of the cage 7 is provided with a collar 16 having a screw-threaded flange 17 which is adapted to engage the threaded flange 11 of the support 6. In screwing the flange 11 into the flange 17, or the latter onto the former, the operating stop 14 plays an important part, since it is by means of this stop when at the end of the slot 13 which is next to the port 12 that motion is imparted to the support from, or that the latter is held while the cage is rotated, by the handle, until said flanges are so tightly engaged that some little force is required to start to disengage them. When the stop is at the opposite end of the slot, by exerting the necessary amount of force in the right direction, the flanges 11 and 17 can be unscrewed and the cage removed. By holding the cage with one hand and turning the support in the direction of the arrow *c*, the parts may be screwed together, and by so holding said cage and turning said support in the direction of the arrow *b* said parts may be unscrewed. All needed movement of the shutter is provided for by the lost motion permitted to the shutter by the slot for the stop, so that the shutter can be opened and closed without disturbing the connection

between the support and cage, it being understood, of course, that the frictional resistance between the flanges when screwed tightly together should be greater than the frictional resistance between the shutter and support produced by the nut 4.

It will be seen from the foregoing that the arrangement of parts is such that the lighting port is always closed during the process of screwing the cage and support together, and that whenever the shutter is turned to close said port after opening it the tendency is to tighten the connection between said cage and support, never to loosen it, which is a feature of safety; in other words, the tightening of the aforesaid connection closes the port and the closing of the port may have a tendency to tighten the connection and in any event cannot possibly loosen it, therefore the liability of accidentally opening the port or leaving it open and of loosening the cage when the port is closed is greatly reduced on the one hand and entirely obviated on the other.

While the requisite amount of frictional resistance for the shutter may be maintained by the nut 4, other means may be employed for this purpose and I do not in any manner limit myself to the specific construction of this feature of my invention.

While the cage 7 should be constructed of finely perforated sheet-metal having bright surfaces capable of reflecting the interior light to the best advantage, (such as brass nickel-plated both within and without for example), the shape of the cage may vary although the cylindrical formation is very satisfactory. The proportion of the cage relative to the burner and the perforations in the sides and top of said cage are matters which must be attended to with great care, as elsewhere explained at some length.

It will be readily observed by those familiar with acetylene gas burners and with safety lamps that a device constructed as set forth herein will be light, easily handled, and may be held in any position and moved to any extent within the range of the gas supply tube, and that danger of explosion or fire when the torch is brought into the presence of gasolene vapor or other inflammable or explosive gases or liquids is avoided.

The best form and proportions, as at present advised, resulting from a long series of tests, are found to be a cage of cylindrical shape provided with an acetylene burner known as sixty candle power standard; the cylinder should be about three and one-half inches in diameter and about six and three-fourths inches in length, and the side walls of the cylinder and the end opposite the handle end should be provided with perforations or openings of a size about equal to the size of an opening made by a No. 60 standard drill and with about six hundred and forty of such openings to the square inch of superficial area, and the burner should be mounted from one and one-half or two inches above the base or handle end. The cage should be made of perforated sheet metal as it is found that wire gauze will not withstand the heat of the burner, is easily bent and buckled, and does not produce a device safe to handle in the presence of inflammable gases. I find also that with a device constructed as herein described the combustion inside the cage is perfect and that the projection of light therefrom is ample under all ordinary conditions.

I am unable to define herein at the present time any more exact proportions than stated. I am also unable at the present time to explain why the results when the device is so constructed are more satisfactory and complete than when these proportions are varied, but I do not desire to limit myself to these exact proportions, as one skilled in the art to which this invention appertains may construct a device having the same advantages but of different proportions without departing from my invention.

What I claim and desire to secure by Letters Patent, is—

1. A safety torch comprising a reflective sheet of perforated metal in tubular form having a closed lower end with an acetylene gas burner mounted therein and a handle attached thereto, the opposite end being closed by perforated sheet metal, the perforations being sufficiently small to prevent ignition outside the cage or cylinder from a flame within the same, and sufficient in number to admit air to the interior of the cage requisite for combustion at the burner therein, substantially as shown.

2. A lighting device comprising an acetylene gas burner, a supply conduit leading to the burner, and a perforated sheet-metal cage surrounding the burner, said cage having an inner polished surface between the perforations, substantially as shown.

3. The combination, in a torch of the class described, of a suitable handle, a tube for gas extending through said handle, a burner connected with said tube, a support, provided with a screw-threaded part, also connected with the tube and having a lighting port therein, a shutter frictionally held between said handle and support and operatively connected with the handle, said shutter also having a lighting port therein, and a perforated cage having a screw-threaded part for engagement with the screw-threaded part of the support, the members being so arranged that movement in the same direction is required to close the port in the support and to screw the cage and support together.

4. The combination, in a torch of the class described, of a suitable handle, a tube for gas extending through the same, a burner con-

nected with said tube, a support also connected with the tube, said support having a lighting port therein, a shutter frictionally held between said handle and support and having a limited independent rotary movement, said shutter also having a lighting port therein, operating means between the handle and shutter for the latter, and means to frictionally retard the shutter intermediate of the limits of its independent movement.

FRANK M. MOORE.

Witnesses:
F. A. CUTTER,
J. M. STERNS.