April 16, 1963 R. MOHR ET AL 3,085,412

GAS LIGHTER

Filed Dec. 21, 1959 2 Sheets-Sheet 1

Fig.1

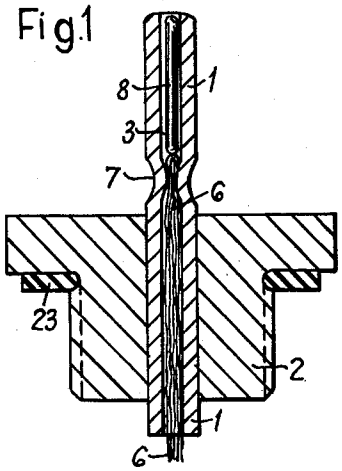


Fig.2

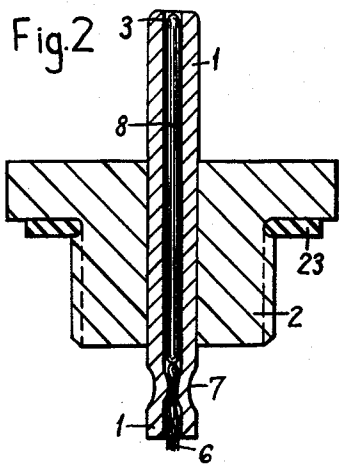
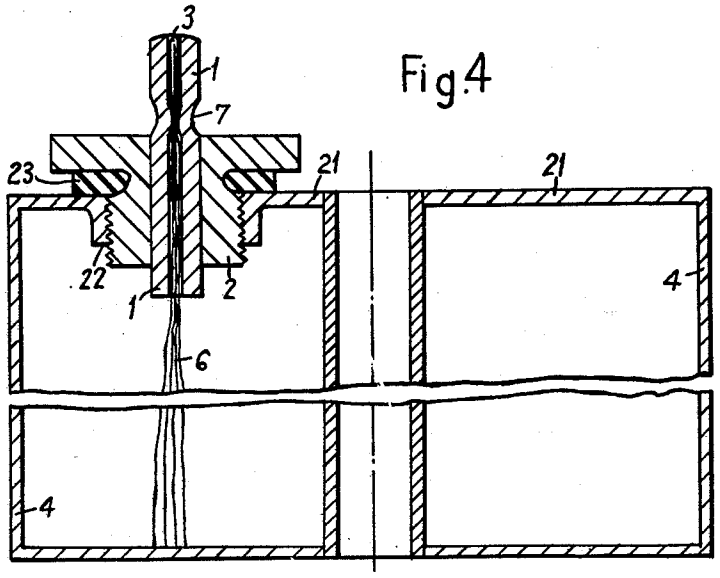


Fig.4



Inventors
R. Mohr
H. H. Quandt

By Howson, Sutherland & Britton
Attorneys

April 16, 1963 R. MOHR ET AL 3,085,412

GAS LIGHTER

Filed Dec. 21, 1959 2 Sheets-Sheet 2

Fig. 3

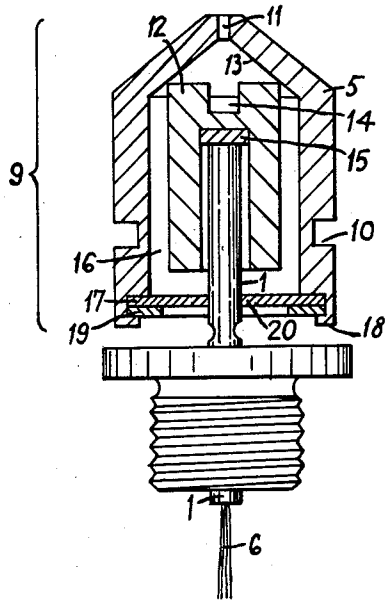


Fig. 5

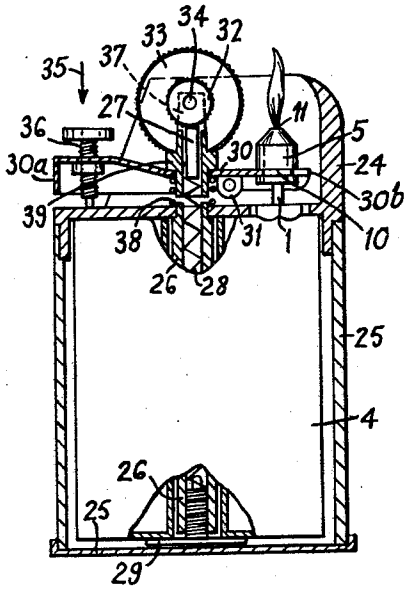
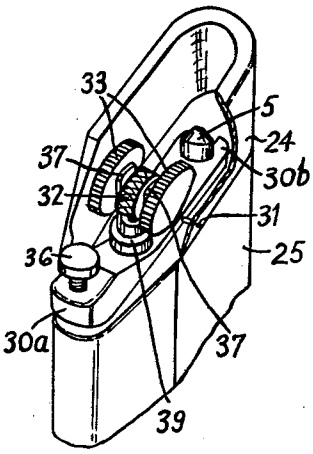


Fig. 6



Inventors
R. Mohr
H. H. Quandt
By Holcomb, Whittemore & Rhodes
Attorneys

United States Patent Office 3,085,412 Patented Apr. 16, 1963

3,085,412

GAS LIGHTER

Rudolf Mohr, Hoffstrasse 1, Karlsruhe, Germany, and Hans Hubert Quandt, Friesenbergstrasse 5, Baden-Baden, Germany

Filed Dec. 21, 1959, Ser. No. 861,143
Claims priority, application Germany Dec. 20, 1958
13 Claims. (Cl. 67—7.1)

Lighters of many constructions are known which, instead of using petrol, employ a combustible gas, such as for example butane, which is kept in the liquid state in a container and is fed in gaseous form at reduced pressure to a burner where it is ignited by known means. In this connection a pressure reducing device having a valve has been built in the container. Both parts require great precision and are therefore expensive, and it would thus be too costly to throw away the containers when they are empty. This impedes a wider use of such gas lighters.

The object of the inventors is to provide a new type of gas lighter which can function in an absolutely safe manner, which is of simple construction and therefore not likely to give rise to trouble, and which may also be manufactured so cheaply that gas lighters according to the invention are within the reach of the widest circle of customers. To this end, the invention provides a novel throttle device which has absolutely no moving parts, and which needs no particular precision and therefore may be cheaply manufactured. It is associated with the fuel container and consists in a special construction of its gas outlet channel. The invention also provides a novel burner head which serves at the same time as an expansion chamber, as a burner and as a shut off seal. By means of the construction of the burner head according to the invention, sealing is effected at a position which cannot be reached by particles from the flint. The burner head is associated with the lighter head in such a manner that the outlet aperture of the gas channel projecting out of the supply container is always seated in it.

FIG. 1 is, on an enlarged scale, a section through one embodiment of a throttle device according to the invention,

FIG. 2 is another embodiment of the throttle device,

FIG. 3 is an embodiment of the burner head according to the invention,

FIG. 4 shows a fuel container,

FIG. 5 is a view, partly in section, of a gas lighter according to this invention.

FIGURE 6 is a perspective view, partly cut away, of the top part of the lighter shown in FIGURE 5.

A section of a metallic pipe **1** having a thick wall and of which the inside diameter is small is permanently joined to the part **2** provided with an external thread, from which it projects at both ends. The pipe section serves as gas channel **3** from the supply container **4** to the burner head **5** at its outlet end. In the gas channel **3** absorbent threads **6** are inserted along a part of its length adjacent its inlet end, said threads projecting into the container **4** and, among other things ensuring that there is always liquid fuel in the gas channel **3**. In order to adjust the amount of liquid fuel flowing out, in spite of variations in dimensions of the pipe sections and of the threads, in such a manner that the flame is of a normal size at the burner head at room temperature, the gas channel with all the threads contained therein is squeezed together at a zone **7**. It is also within the scope of the invention to provide a plurality of pinched zones or, if there is only one pinched zone, to effect the pinch along a larger length of the pipe section **1**, it being possible to effect the pinching at any position of the gas channel so long as it is spaced from the outlet end. The part of the gas channel which is situated between the pinched zone **7** and the outlet end acts as an expansion chamber. In order to prevent when the lighter is not in use, liquid fuel from collecting in the gas channel above the pinched zone, it is to a large extent filled with a pin **8** consisting for example of a material which is non-absorbent, such as for example metal. In this case the burner head takes over the function of the expansion chamber.

FIGURE 2 shows another embodiment of the throttle device. Here in the gas channel **3** absorbent threads are again inserted but the pinched zone **7** is situated on the part of its length which projects in the fuel container, both the inlet end of the gas channel and the inner ends of the absorbent threads being located, when the container is held with the gas channel uppermost, above the level of the liquid in the container. This embodiment is provided for gas lighters adapted to supply a small flame for cigarette smokers, and a much larger flame for pipe smokers. For such lighters the gas channel is squeezed only so far that at the burner head **5** there is obtained a normally large flame if only gaseous fuel flows through the pinched zone. However if such a lighter is held in the hand in such a manner that the gas channel **3**, and therefore also its inserted absorbent threads **6**, come into contact with liquid fuel, the flame immediately becomes larger at the burner head. Also here a pin **8** of non-absorbent material is introduced in the part of the gas channel which is situated above the pinched zone.

FIGURE 3 shows, on an enlarged scale, an embodiment of burner head **5** according to the invention, it being at the same time shown how this burner head cooperates with the channel **3** of the fuel container. The burner head **5** consists of a bell shaped external body **5** which opens downwards and has an external annular groove **10** and a burner aperture **11**. In the external body **5**, and spaced from its internal wall to form a chamber **16**, is disposed a further bell shaped hollow body **12**, which is open at its bottom end and bears at its upper end against the internal conical face **13** of the external hollow body and, for example, is provided at its upper end with a transverse slot **14** to provide a passage between the chamber **16** and the burner aperture **11** for the outlet of gas. Internally on its top wall, the internal hollow body **12** is provided with a flexible sealing disc **15**. In the internal hollow body **12**, the pipe section **1** with a gas channel **3** from the supply container projects up to the sealing disc **15**.

If the external hollow body **5** is raised then the gas, which is under pressure, presses the internal hollow body **12** upwardly and the gas flows into the chamber **16** of the external hollow body, where its pressure falls. In order that the gas cannot escape downwardly out of the external hollow body **5**, a flexible sealing membrane **17** is provided to close the bottom of the chamber **16**, said membrane being secured in a suitable manner, for example by means of a washer **19** retained by the spun-over flange **18**. The membrane **17** is provided with a central aperture **20** through which passes the pipe section **1**. In this manner the gas is forced to flow towards the burner aperture **11** where it is ignited by known means.

FIG. 4 shows on an enlarged scale, a fuel container **4** having in its top wall an aperture **22**, provided with internal threads, in which a throttle member according to FIG. 1 is screwed with the interposition of a flexible sealing ring **23**.

FIG. 5 shows, in partial section, an embodiment of a gas lighter according to the invention. It consists of a head part **24**, the fuel container **4** having a pipe section **1** and the gas channel extending therein, as well as a casing **25** which encloses the container **4** and is secured to the head part **24**. On the head part **24** is secured a tube **26** provided at its bottom with an internal thread, said tube projecting through a tubular passage through

the container 4, and aligned at its upper end with a flint holder 39 carried by a lever 30 and serving for receiving the flint 27. A spring 28 in the tube 26 presses against the flint 27, the screw 29 forming the outer support for the pressure spring 28 and at the same time securing, by means of its wide head, the container 4 in position on the head part 24. In the head part 24 is tiltably mounted at 31 the lever 30 with arms 30*a* and 30*b*. The lever arm 30*a* carries the small friction wheel 32 as well as two knurled driving wheels 33, which are rotatably mounted at 34 on arms 37 projecting upwardly from the flint holder 39 carried by the lever 30 (see also FIGURE 6). The other lever arm 30*b* carries at its extremity the burner head 5. The end of this lever arm is, for this purpose, suitably constructed as a fork in which the burner head is held by means of its annular groove 10, but with sufficient freedom as to allow the sealing disc 15 to seat on the outlet end of the gas channel. The lever 30 is urged by the spring 38, which surrounds the opposing ends of the flint holder 39 and the tube 26, to move the burner head to its lowered or gas sealing position.

If the lever arm 30*a* is pressed down, then the burner head 5 is raised. The internal hollow body 12 with the sealing disc 15 is raised from the outlet end of the channel, and the gas flows towards the burner aperture 11. If the user of the lighter operates the friction wheel, then the finger pressure used for this purpose suffices to move the lever arm 30*a* in the direction of the arrow 35 and thereby to release the gas flow. Therefore, gas is already present, when the friction wheel produces sparks from the flint. This is important in order to achieve immediate reliable ignition. The gas continues to flow for so long as the user holds the lever arm 30*a* pressed down by the thumb which slides off from the driving wheels. When the lever arm is released the gas supply is immediately stopped.

The pressure and therefore also the amount of gas flowing through the pinched zone depends upon the temperature of the liquid fuel in the supply container which may vary considerably in accordance as to whether the lighter is used in countries having a particularly hot climate or in countries having a particularly cold climate. Therefore it is desirable to be able to adjust the size of the flame within certain limits. This is made possible by effecting an adjustable limitation of the possible travel of the lever arm 30*a* in a downward direction. Such a limitation of the possible travel may for example be effected by arranging a stop of which the height is adjustable, for example a screw 36, on the lever arm 30*a* as is shown in FIG. 5.

We claim:

1. A gas lighter comprising a fuel container containing liquified gas under pressure, a metal tubular member having a thick wall and a capillary bore extending from an inlet end within the container to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, at least one absorbent thread in said bore and extending from a point between said outlet end and the pinched zone, and spaced from said outlet end, through the pinched zone towards the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel wall where it passes through the pinched zone, the portion of the bore between the pinched zone and the outlet end forming a gas expansion chamber, means for igniting the gas leaving said outlet end, and a closure member for closing said outlet end.

2. A gas lighter comprising a fuel container containing liquified gas under pressure, a metal tubular member having a thick wall and a capillary bore extending from an inlet end within the container to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, at least one absorbent thread in said bore and extending from a point between said outlet end and the pinched zone, and spaced from said outlet end, through the pinched zone towards the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel wall where it passes through the pinched zone, the portion of the bore between the pinched zone and the outlet end forming a gas expansion chamber, means for igniting the gas leaving said outlet end, and a closure member for closing said outlet end and comprising a hollow burner head adapted to receive the outer end of the tubular member, said burner head having a burner aperture at its upper end and sealing means at its lower end for preventing leakage of gas between the burner head and the outer end of the tubular member while permitting the burner head to move up and down relative to the tubular member, and a flexible seal within the burner head which is adapted to close the outlet end of the gas channel when the burner head is in its lowered position and to allow gas to pass out from said outlet end and the burner aperture when the burner head is raised.

3. A gas lighter as claimed in claim 2, wherein the burner head is raised by means of a double-armed lever which is tiltably mounted on the lighter, spring-actuated means being provided for maintaining the burner head in its lowered position.

4. A gas lighter as claimed in claim 3, wherein the burner head is connected adjacent the end of one of the arms of the lever and the other arm of the lever carries a friction wheel, a flint, and means resiliently pressing said flint against said wheel, said friction wheel and flint being positioned so that the sparks produced when the friction wheel is actuated will ignite gas issuing from the burner head.

5. A gas lighter according to claim 4, wherein said lever is provided with an adjustable stop means to limit the distance by which the burner head can be raised.

6. A gas lighter comprising a fuel container containing liquified gas under pressure, a metal tubular member having a thick wall and a capillary bore extending from an inlet end within the container to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, at least one absorbent thread in said bore and extending from a point between said outlet end and the pinched zone, and spaced from said outlet end, through the pinched zone towards the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel wall where it passes through the pinched zone, the portion of the bore between the pinched zone and the outlet end forming a gas expansion chamber, means for igniting the gas leaving said outlet end, and a closure member for closing said outlet end and comprising a hollow burner head adapted to receive the outer end of the tubular member, said burner head having a burner aperture at its upper end and sealing means at its lower end for preventing leakage of gas between the burner head the outer end of the tubular member while permitting the burner head to move up and down relative to the tubular member, and a flexible seal within the burner head which is adapted to close the outlet end of the gas channel when the burner head is in its lowered position and to allow gas to pass out from said outlet end and to the burner aperture when the burner head is raised, said flexible seal being mounted in a hollow in a cup shaped body which fits over the outlet end of the tubular member and is freely movable with play within the hollow cavity of the burner head.

7. A gas lighter as claimed in claim 6, wherein the burner head is raised by means of a double-armed lever which is tiltably mounted on the lighter, spring-actuated

means being provided for maintaining the burner head in its lowered position.

8. A gas lighter as claimed in claim 7, wherein the burner head is connected adjacent the end of one of the arms of the lever and the other arm of the lever carries a friction wheel, a flint, and means resiliently pressing said flint against said wheel, said friction wheel and flint being positioned so that the sparks produced when the friction wheel is actuated will ignite gas issuing from the burner head.

9. A gas lighter comprising a fuel container containing liquified gas under pressure, a metal tubular member having a thick wall and a capillary bore extending from an inlet end within the container to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, at least one absorbent thread in said bore and extending from a point between said outlet end and the pinched zone, and spaced from said outlet end, through the pinched zone towards the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel wall where it passes through the pinched zone, the portion of the bore between the pinched zone and the outlet end forming a gas expansion chamber, a pin of non-absorbent material positioned in and partially filling said bore between its outlet end and the pinched zone, means for igniting the gas leaving said outlet end, and a closure member for closing said outlet end and comprising a hollow burner head adapted to receive the outer end of the tubular member, said burner head having a burner aperture at its upper end and sealing means at its lower end for preventing leakage of gas between the burner head and the outer end of the tubular member while permitting the burner head to move up and down relative to the tubular member, and a flexible seal within the burner head which is adapted to close the outlet end of the gas channel when the burner head is in its lowered position and to allow gas to pass out from said outlet end and to the burner aperture when the burner head is raised.

10. For a gas lighter, a disposable fuel container containing liquified gas under pressure, a metal tubular member having a thick wall and a capillary bore extending from an inlet end within the container to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, and at least one absorbent thread in said bore and extending from a point between said outlet end and the pinched zone, and spaced from said outlet end, through the pinched zone towards the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel walls where it passes through the pinched zone.

11. A gas lighter comprising a fuel container containing liquified gas under pressure, a metal tubular member sealed in the top wall of said container, said tubular member having a thick wall and a capillary bore extending from an inlet end within the container and just below said top wall to an outlet end outside the container and serving as a gas supply channel, the bore of the gas channel being reduced by pinching together the channel wall at a zone spaced from said outlet end of the bore, at least one absorbent thread in said bore and extending from a point between said outlet end, and the pinched zone, and spaced from said outlet end, through the pinched zone and terminating adjacent the inlet end of the bore, said at least one absorbent thread being compressed by the pinched channel wall where it passes through the pinched zone and both said inlet end and the adjacent end of said at least one absorbent thread being located, when the container is held with the gas supply channel uppermost, above the level of the liquefied gas in the container, means for igniting the gas leaving said outlet end, and a closure member for closing said outlet end.

12. A gas lighter as claimed in claim 2, wherein the inlet end of the gas supply channel and also the inner end of said at least one absorbent thread are located, when the container is held with the gas supply channel uppermost, above the level of the liquid in the container.

13. A gas lighter comprising a fuel container for containing liquefied gas under pressure, a capillary gas supply channel extending from an inlet end opening directly into said container to an outlet end outside the container, means for igniting gas leaving said outlet end, a closure member for closing said outlet end, and at least one absorbent thread in said channel terminating at one end at a point within said channel intermediate said inlet and outlet ends and extending from said point longitudinally of said channel to a point adjacent said inlet end at which it is directly exposed to the fuel in said container, the internal diameter of the channel being constricted at a zone spaced from said outlet end and intermediate the ends of said at least one absorbent thread, whereby said at least one absorbent thread is compressed at said zone, the inlet end of the gas supply channel and the adjacent end of said at least one absorbent thread being located, when the container is held with the gas supply channel uppermost, above the maximum level of the liquid in the container, whereby when the container is inverted said inner end of said at least one absorbent thread comes promptly into direct contact with the liquid in the container, while when the container is upright it is fed only by gaseous fuel above the level of liquid in the container.

References Cited in the file of this patent

UNITED STATES PATENTS

2,565,903	Zellweger	Aug. 28, 1951
2,669,108	Reilly	Feb. 16, 1954

FOREIGN PATENTS

727,195	Great Britain	Mar. 30, 1955
70,495	France	Dec. 8, 1958
1,210,565	France	Sept. 28, 1959