Dec. 20, 1966 E. E. LITTLE 3,292,668

FUEL CARTRIDGE AND SUPPORT THEREFOR

Filed Oct. 18, 1963 2 Sheets-Sheet 1

Fig. 1

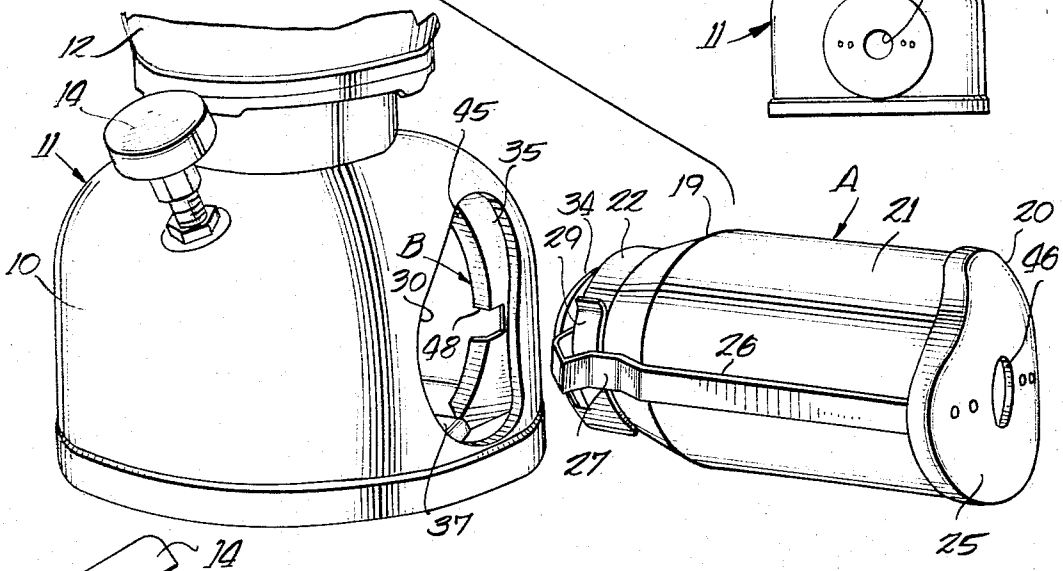

Fig. 2

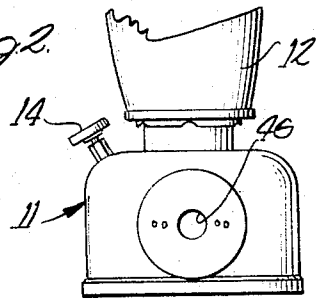

Fig. 3

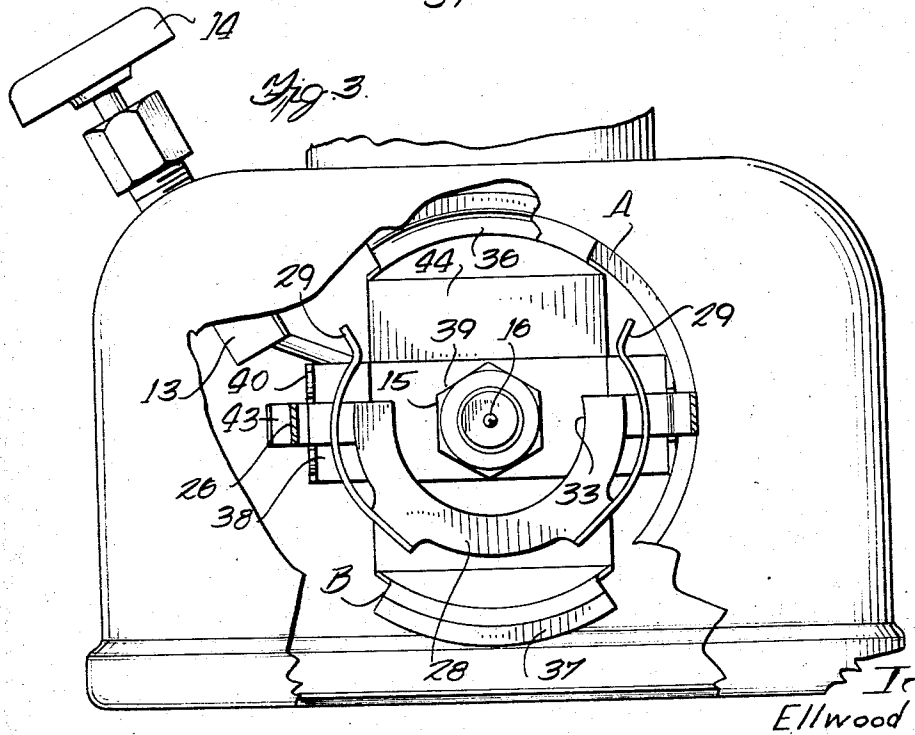

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Fig. 4

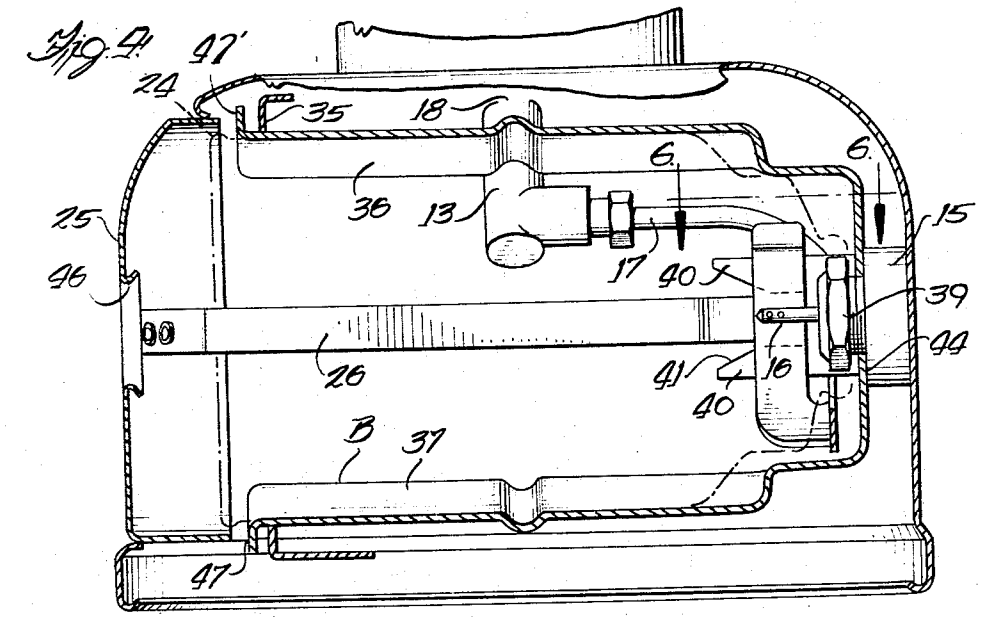


Fig. 5

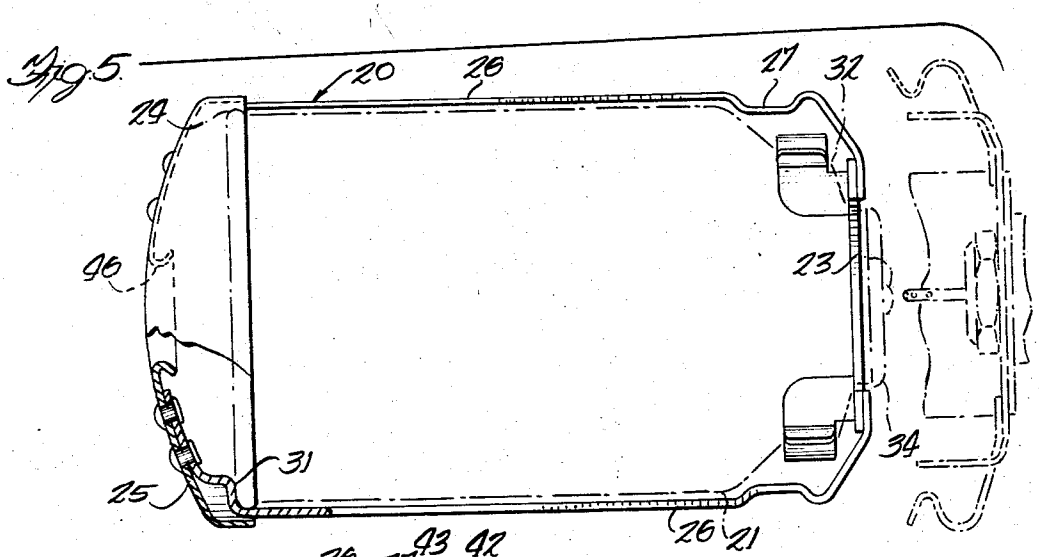
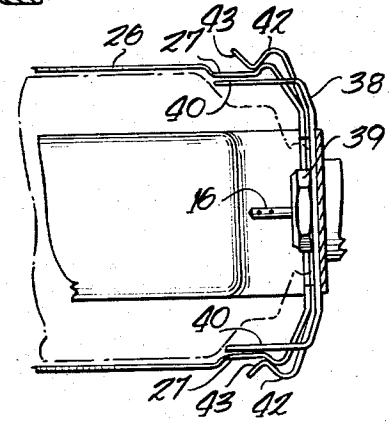


Fig. 6



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United States Patent Office 3,292,668 Patented Dec. 20, 1966

3,292,668

FUEL CARTRIDGE AND SUPPORT THEREFOR

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Filed Oct. 18, 1963, Ser. No. 317,374
8 Claims. (Cl. 141—330)

This invention relates to equipment for the burning of fuels contained in pressurized containers, and more specifically, to a structure which is particularly suitable for removably supporting a pressurized can of gaseous or liquid fuel in an applicance such as, for example, a lantern, or portable stove.

In the use of portable appliances which operate on fuels contained in pressurized cans, it is necessary that the cans be mounted so that they may be readily removed after their fuel is exhausted and may be quickly and easily replaced with full cans. In this connection, it is particularly important to provide means for precisely guiding the replaceable containers as they are urged into contact with the puncturing elements of the appliances and for securely holding the containers in place after they have been fully inserted and until removal is desired. Otherwise leakage of the highly-combustible fuels might occur, presenting a serious danger to users of the appliances.

Accordingly, it is a main object of the present invention to provide means for precisely guiding and orienting a pressurized fuel container in a fuel-burning device. Another object is to provide cooperating means for securely holding the container in place during use of the device, while at the same time providing a mounting which permits quick removal of the container when replacement is required. Another object is to provide a guide means of the character described in combination with a cartridge assembly which performs the dual functions of permitting quick removal and replacement of a pressurized container and also cooperates with support means to guide the container into a precise operating position and to hold it securely in place during such operation. Other objects will appear from the specification and drawings in which:

FIGURE 1 is a broken perspective view illustrating a fuel cartridge removed from the base of a lamp, the lamp being equipped with support means embodying the present invention;

FIGURE 2 is a broken rear elevational view on reduced scale illustrating the components in assembled condition;

FIGURE 3 is an enlarged elevational view taken partly in section showing the cartridge support means provided by the lamp base;

FIGURE 4 is an enlarged sectional side view of the lamp base with the cartridge inserted therein, the pressurized container being shown only in broken lines for clarity of illustration;

FIGURE 5 is an enlarged top plan view of the carrier component of the replaceable cartridge, a portion of the support means being illustrated in broken lines to show the relationship of parts immediately prior to puncture of a pressurized fuel container;

FIGURE 6 is a fragmentary top plan view on reduced scale illustrating the relationship of the cartridge and support means when the cartridge is fully inserted.

In the embodiment of the invention illustrated in the drawings, the letter A generally designates a fuel cartridge and the letter B designates support means for guiding and supporting that cartridge. The support means, as shown most clearly in FIGURES 3 and 4 and as described in detail hereinafter may be mounted within any suitable

fuel-burning device. In the illustration given, the support means B is shown within the base shell **10** of a lantern designated generally by numeral **11**. As in a conventional gas lantern, lantern **11** is provided with a transparent globe **12** enclosing a generator and burner cap (not shown), a valve **13** equipped with a control knob **14**, and a needle assembly **15** secured to the inner front wall of the base and provided with a rearwardly facing hollow needle **16** communicating with the valve through conduit **17**. As indicated in FIGURE 4, conduit **18** extends upwardly from the valve to carry fuel to a conventional burner cap and mantle within the transparent globe.

Cartridge A comprises two principal parts: a pressurized fuel container **19** and a carrier **20**. The fuel container consists of a cylindrical can containing a suitable fuel under pressure. Ordinarily, such fuel as pressurized in the container will be primarily in liquid form, and may be withdrawn as a liquid. Under normal temperatures and pressures the fuel will vaporize and be burned as a gas. The container itself is entirely conventional, having an elongated cylindrical body portion **21**, a reduced neck portion **22**, an axially-positioned and forwardly-projecting puncturable element **23** formed of rubber or any other suitable material and, at the rear end of its cylindrical body, having a circumferential bead **24** formed at the juncture of the body's cylindrical side wall and base.

Carrier **20** includes a cap **25** and a pair of arms extending forwardly alongside the fuel container. Near their forward ends, the paired arms are provided with indentations or recesses **27**. In front of the indentations, the arms turn inwardly (FIGURE 5) and are welded or otherwise permanently secured to a semi-circular end plate **28** having a pair of arcuate and integrally-formed spring elements **29** (FIGURE 3). The arcuate spring elements are adapted to flex laterally from the positions illustrated in FIGURE 3 to receive therebetween the neck portion **22** of a pressurized fuel container (FIGURE 1).

Cap **25** has an outer surface conforming with the outer contour of base **10** and is dimensioned to fit closely within an opening **30** provided in the side wall of the base. As indicated in FIGURES 2 and 3, both the opening and the cap are circular in shape; however, in the perspective view of FIGURE 1 the complex curvatures of the parts give the illusion that the opening and cap are non-circular.

The rear ends of arms **26** are riveted or otherwise securely connected to cap **25** (FIGURE 5) and, within the confines of the cap, provide shoulders **31** for abutting and supporting the beaded end of the pressurized fuel container **21**. The distance between shoulders **31** and the end plate **28** of the carrier is only slightly greater than the distance between the rear or bottom end of container **21** and the forward surface **32** of neck **22**. Consequently, when a pressurized fuel container is mounted within carrier **20**, axial movement of the container is substantially prevented by the shoulders **31** and end plate **28**.

Relative movement of a fuel container **21** with respect to carrier **20** is effectively prevented by end plate **28** and arms **26**. Referring to FIGURE 5, it will be seen that the distance between parallel arms **26** is substantially the same as the diameter of bead **24**. At the front end of the carrier, the horizontal inside dimensions of the semi-circular opening **33** defined by end plate **28** is the same size, or only slightly larger, than the beaded portion **34** at the container's front end. The container is therefore cradled against lateral movement at either end within carrier **20**.

Although the container is anchored against horizontal movement within the carrier, it may be moved vertically simply by lifting its front end with sufficient force to over-

come the force of spring arms **29**. It will also be noted from FIGURE 4 that the vertical internal dimensions of cap **25** are greater than the diameter of bead **24**. The spacing above and below the bead is important in providing the necessary clearance for permitting pivotal movement of container **21** as its front end is lifted upwardly from or pressed downwardly between spring elements **29**.

Support B comprises a rear mounting plate **35**, a pair of parallel upper and lower tracks **36** and **37**, and a U-shaped front plate **38**. The intermediate portion of the U-shaped front plate is apertured and is secured in place by the same nut **39** which holds hollow needle **16** in position. The rearwardly-extending laterally-spaced arms **40** of the plate are provided with forwardly tapering recesses **41**, as shown in FIGURE 4, for receiving the side arms **26** of the carrier (FIGURE 6). Secured to the intermediate portion of the U-shaped plate, and projecting laterally through recesses **41** and then rearwardly alongside arms **40** are a pair of spring members **42**. These spring members are provided with inwardly turned end portions **43** receivable within the recesses **27** of side arms **26** for holding the cartridge in place when it has been fully inserted into the base.

The parallel upper and lower tracks **36** and **37** of arcuate across section and, as shown in FIGURE 4, are spaced apart substantially the same distance as the cross sectional dimensions of the container's body portion. In the illustration given, the tracks are formed integrally and are connected at their forward ends by an apertured connecting portion **44** which is held in place by nut **39**. The rear ends of tracks **36** and **37** pass rearwardly through an opening **45** in rear wall **35** and flare outwardly behind that opening to provide flanges **47** and **47'**. At opposite sides of opening **45**, rear plate **35** is provided with guide recesses **48** which slidably receive the arms **26** of the carrier. Since upward and downward movement of the container is prevented by direct contact with tracks **36** and **37**, the container is precisely oriented during insertion for proper contact with piercing needle **16** and is restrained against transverse movement in any direction when the cartridge is fully inserted.

The cover **25** of the carrier also comprises means for removal of the cartridge and, for that purpose, is provided with a finger opening **46**. In FIGURES 4 and 5 it will be observed that the wall of the cap is flared inwardly about the opening to provide rounded edges for gripping and pulling the cap. It is important that shoulders **31** which engage the rear end of the pressurized fuel container are spaced forwardly from the central wall portion of the cap, thereby permitting a user to insert his finger through opening **46** for extracting the cartridge.

For use in conjunction with a gas lantern, it is preferred to employ the carrier **20** in combination with the track assembly **36**, **37**. The track assembly has utility in itself for guiding the insertion of the fuel container **21**.

While in the foregoing I have disclosed an embodiment of the invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

I claim:

1. A fuel cartridge and support combination, said cartridge comprising a carrier and a pressurized fuel container, said carrier having a cap and an end plate spaced axially from each other and connected by a pair of arms extending along opposite sides of said container, said support providing a pair of spring elements engaging said arms for releasably holding said container in operative relation with respect to a fuel discharge needle.

2. The structure of claim **1** in which said arms are disposed laterally with respect to said container, said support providing upper and lower tracks slidably engageable with said container for restraining vertical movement of the same, said carrier engaging opposite sides of said container for restraining horizontal movement of the same.

3. The structure of claim **1** in which said cap is apertured to provide a finger opening for the separation of said cartridge and support.

4. A fuel cartridge and support combination, said cartridge comprising a carrier and a pressurized fuel container, said carrier having a cap and plate at opposite ends thereof and having a pair of generally parallel arms extending therebetween, said arms adjacent said end plate being provided with a pair of recesses, said container being supported by said plate and said arms against transverse movement in one axially-extending plane, said support comprising a pair of tracks parallel with said arms and extending along a plane at substantially right angles thereto, said tracks slidably engaging opposite sides of said container, said support also being provided with spring elements engaging said arms within the recesses thereof for releasably holding said cartridge against axial movement and for restraining transverse movement of the same along said first-mentioned plane.

5. The structure of claim **4** in which said cap is apertured to provide a finger opening for the gripping and sliding of said cartridge with respect to said support.

6. The structure of claim **5** in which the apertured portion of said cap is spaced axially from said container.

7. A fuel cartridge adapted to be slidably received by a cartridge support assembly of a fuel-burning device, comprising a generally cylindrical pressurized fuel container, a carrier having an end plate and a cap spaced axially from each other and connected by a pair of arms extending longitudinally along opposite sides of said container, said arms defining shoulders adjacent said cap engaging said container at one end thereof and spacing said one end of said container from said cap, said end plate engaging said container at the opposite end thereof, and said cap being provided with a finger opening therein for the gripping and moving of said cartridge with respect to a support.

8. The structure of claim **7** in which said carrier is provided with spring elements adjacent said end plate for releasably engaging opposite sides of said container.

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