

March 22, 1955

L. FLICKINGER ET AL  
FLAMEGUARD FOR FLINT-WHEEL

2,704,447

Filed May 1, 1953

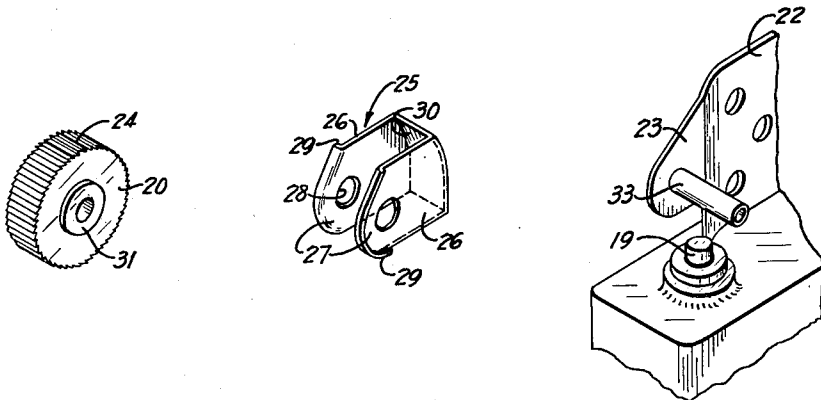
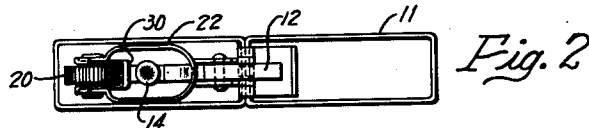
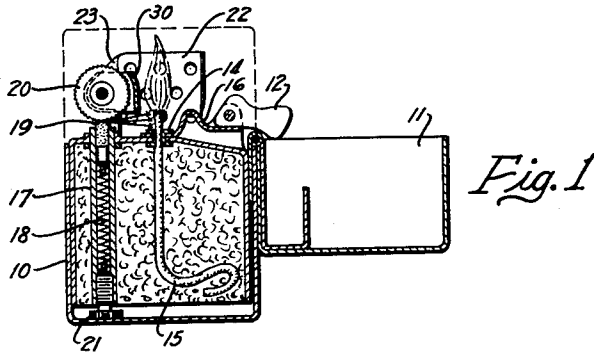


Fig. 3

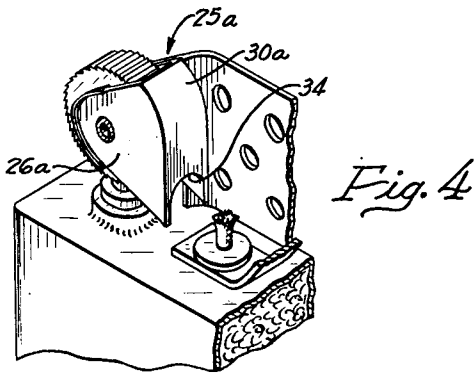


Fig. 4

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## FLAMEGUARD FOR FLINT-WHEEL

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Application May 1, 1953, Serial No. 352,442

5 Claims. (Cl. 67—7.1)

This invention relates to a flame guard for the flint-wheel of a portable lighter.

A primary object of the invention is to provide a flame guard located between the flame and the flint-wheel of a portable lighter to prevent the deposit from the flame onto the flint-wheel, of carbon or other soil-like substances. In lighters of usual construction, smoke from the flame reaches the vicinity of the flint-wheel and deposits material on the flint-wheel, which is transferred to the thumb of the user when he rotates the flint-wheel. By preventing the deposit of such material, the present invention keeps the flint-wheel relatively clean and free from substances deposited by the flame that would soil the thumb of the user.

Previous attempts have been made to protect the flint-wheel from being soiled by the flame, but these prior devices have involved complicated and expensive structures. The present invention involves the use of a very simple and effective flame guard which is located entirely within the wind screen of the lighter, and requires only a single extra part.

These and other objects and advantages of the invention will become apparent as the description proceeds.

In the drawings:

Fig. 1 is a longitudinal section through a lighter involving the invention.

Fig. 2 is a top plan view of the device of Fig. 1.

Fig. 3 is an exploded view showing details of the device.

Fig. 4 is a fragmentary perspective illustrating another form of the invention.

Referring to the drawings more particularly, it will be seen that the flame guard of the present invention is illustrated as applied to a well-known type of lighter sold under the registered trade-mark "Zippo." This lighter includes in general a casing 10, and a hinged cover 11, which is held in its closed position by a cam lever 12 as is fully described in Gimera et al., Patent No. 2,032,695.

The inner working body 13, which has a sliding fit in the casing 10, carries on its upper surface a bushing 14, through which the wick 15 projects. A leaf spring 16 is held at one end by the bushing 14, and has its opposite end engaged under the cam lever 12 so as to bias the hinged cover to closed position. The bushing 14 is located about midway laterally of the working body.

Near the forward part of the lighter, a flint tube 17 passes through the top wall of the working body, and a spring 18 in the flint tube biases a flint 19 upwardly against the disc-like flint-wheel 20. The lower end of the flint tube is closed by a thumb screw 21.

A wind screen 22 is formed by upward extensions of the sides of the working body 13 and the wind screen carries forwardly projecting ears 23, in which the flint-wheel 20 is mounted above the flint. The periphery of flint-wheel 20 is roughened or knurled as at 24. When operating a lighter of the type just described, the user rotates the flint-wheel with his thumb in a counter-clockwise direction as viewed in Fig. 1, thus causing sparks to fly from the flint to the wick as indicated in Fig. 1. These sparks ignite the lighter fluid carried by the wick. In the ordinary construction, there is no obstruction between the flame and the flint-wheel, and therefore since the flame is not confined, and it may be blown by the wind close to or against the flint-wheel, the flint-wheel may be soiled with carbon or other material from the flame. This soil on the flint-wheel may be transferred to the thumb of the user when he next operates the lighter.

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The present invention solves this problem by interposing a simple and effective guard between the flame and the flint-wheel, so that the flame cannot come in contact with the flint-wheel.

The guard, which is indicated in general by the reference numeral 25, can be seen best in Fig. 3. It can clearly be seen from Fig. 3 that the guard includes two side walls 26 which have forward extensions 27 shaped to correspond to the forward portions of the ears 23 of the wind screen. Each of the forward extensions 27 is formed with an opening 28 and the forward edges of the extensions 27 are bent outwardly to form flanges 29, which closely engage the ears 23 of the wind screen. The rear wall 30, which connects the two side walls, is curved in the vertical direction to conform in a general way to the curvature of the flint wheel. This guard is preferably formed from a single piece of metal which is resistant to heat and to a change of color from the heat of the flame.

As shown at the left side of Fig. 3, a brass bushing 31 has a rotative fit in the cylindrical opening in the flint-wheel, and this bushing 31 is of greater axial width than the width of the flint-wheel.

In assembling the device, the guard 25 is placed between the ears 23, and the flint-wheel, with its inserted brass bushing 31, is assembled inside the guard. These parts are positioned so that the opening 32 in the brass bushing is aligned with the openings 28, and the openings in the ears 23. A copper rivet 33 is then passed through the assembly, and its outer ends are peened down tightly against the outer sides of the ears 23, thus clamping the ears 23 and the forward extensions 27 of the guard tightly against the sides of the brass bushing 31. In this way, these parts are rigidly held together and the guard is firmly clamped in place so that it cannot rotate with turning movement of the flint wheel. The close engagement of the flanges 29 over the side edges of the ears 23 further insures against any rotative movement of the guard 25.

It will be seen from Fig. 2 that the rear wall 30 is wider than the flint-wheel. Fig. 1 shows that the lower edge of the rear wall 30 of the guard 25 is located above the vertical line passing from the top of the flint 19 to the wick 15, which is the path taken by sparks flying from the flint to the wick. Hence the guard does not interfere with the free passage of the igniting sparks. However, since the lower edge of the rear wall 30 of the guard is substantially on the horizontal level of the base of the flame formed on the wick, there is little likelihood of the flame reaching the flint-wheel below the rear wall 30. The upper edge of the wall 30 is on a level close to the top of the flint-wheel, and hence, there is small likelihood that the flame will contact the flint-wheel above the wall 30. Since the side walls 26 are, at their rear edges, of the same vertical extent as the rear wall 30, these side walls protect the sides of the flint-wheel, and therefore there is little likelihood that the flame can contact any portion of the flint-wheel. This is due to the fact that the guard 25 is substantially U-shaped in cross section and covers the entire area of the flint-wheel that is exposed to the flame.

While Figs. 1 to 3 inclusive illustrate a preferred form of the guard 25, it should be understood that the guard may be given different shapes while retaining the same essential features. Thus, Fig. 4 illustrates a modification in which the sides 26a extend downwardly farther than in the form illustrated in Fig. 3, and the rear wall 30a is provided with a cut-out 34 which permits the sparks to reach the wick. This form extends the protection farther down over the sides of the flint-wheel, but at the same time permits free access of the sparks to the wick. It is not essential in either form of the guard illustrated that the rear wall be curved vertically, since it may be desired in some cases to leave this wall straight in the vertical direction.

It will also be clear that any other simple and effective means may be used to hold the flame guard in place between the ears 23 of the windscreen. Thus, the side-walls of the flame guard may be brazed or soldered to the walls of the windscreen.

It will be clear from the above description that this

invention provides a simple and efficient flame guard for the flint-wheel. The guard is a single piece which is entirely inclosed and protected by the wind screen, and is mounted on the rivet which normally holds in place the bushing on which the flint-wheel rotates. Thus, there is little likelihood of the guard being bent out of place so as to interfere with other parts of the lighter. It should also be noted that this invention requires only the addition of a single simple part, all other parts of the lighter retaining their former simple construction. The invention therefore adds little to the cost, while adding materially to the operational characteristics of the lighter.

Prior attempts have been made to provide a guard for the flint-wheel. Thus, the French patent to Manach, No. 864,590, published April 30, 1941, attempts to provide such a guard. However, this guard requires a special type of flint-wheel with projecting rims to be contacted by the thumb of the user, and moreover, this guard cannot be located entirely within the wind screen.

In the drawings and the above description, the guard has been described as applied to a portable lighter, but it should be understood that the guard can be applied to any lighter having a flint-wheel close to the flame, and in which the windscreen completely surrounds the flame and a major portion of the flint-wheel.

According to the provisions of the patent statutes, we have explained the principle of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. In a lighter of the type in which the lighter body has projecting from its top end a windscreen and a flint, a wick located within the windscreen, the windscreen being formed with portions which extend to a position above the flint, and a flint wheel mounted on a rivet between the extended portions of the windscreen and having a portion which projects into the windscreen, the improvement which comprises: a flame guard having a flat side walls and a rear wall, the rear wall of the flame guard extending vertically from the horizontal level of the base of the flame formed on the wick to a level near the top of the flint wheel, the side walls of the flame guard being held against rotation in contact with said extended portions of the windscreen and carrying the rear wall of the flame guard, the flame guard being supported solely by its engagement with the rivet and with said extended portions of the windscreen, the flame guard completely protecting the portion of the flint wheel exposed to the flame.

2. A device as specified in claim 1 in which the flame guard is substantially U-shaped in horizontal cross section.

3. In a lighter of the type in which the lighter body has projecting from its top end a windscreen and a flint, a wick located within the windscreen, the windscreen having ears which extend to a position above the flint, a hollow bushing located between the ears, a rivet clamping the ears against the ends of the bushing, and a disc-

like flint wheel rotatably mounted on the bushing and having a portion which projects into the windscreen, the improvement which comprises: a one-piece flame guard having side walls which carry a rear wall, the rear wall of the flame guard being wider than the flint wheel and being curved vertically to conform to the curvature of the flint wheel, and extending vertically from the horizontal level of the base of the flame formed on the wick to a level near the top of the flint wheel, the side walls having at their rear ends a vertical height substantially equal to that of the rear wall, and having forward extensions which are clamped between the ears of the windscreen and the bushing by said rivet, the flame guard being supported solely by its engagement with the rivet and with said extended portions of the windscreen, the flame guard completely protecting the portion of the flint wheel exposed to the flame, but leaving the major portion of the flint wheel exposed to permit operation of the flint wheel by the thumb of the user.

4. A device as specified in claim 3 in which the forward extensions of the side walls of the flame guard carry outwardly extending flanges which engage the ears of the windscreen.

5. In a lighter of the type in which the lighter body has projecting from its top end a windscreen and a flint, a wick located within the windscreen, the windscreen having ears which extend to a position above the flint, a hollow bushing located between the ears, a rivet clamping the ears against the ends of the bushing, and a disc-like flint wheel rotatably mounted on the bushing, said flint wheel having flat sides and having a portion which projects into the windscreen, the improvement which comprises: a flame guard having flat side walls and a rear wall formed from a single piece of sheet metal, the rear wall of the flame guard being wider than the flint wheel and extending vertically from the horizontal level of the base of the flame formed on the wick to a level near the top of the flint wheel, each of the side walls of the flame guard being parallel to, and adjacent to, a corresponding flat side of the flint wheel, and having extensions that are clamped between the ears of the windscreen and the bushing by said rivet, the flame guard being supported solely by its engagement with the rivet and with said extended portions of the windscreen, the flame guard completely protecting the portion of the flint wheel exposed to the flame, but leaving the major portion of the periphery of the flint wheel exposed to permit operation of the flint wheel by the thumb of a user.

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