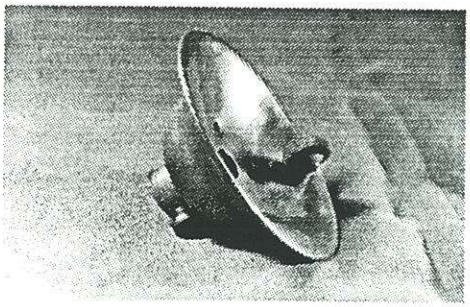
The Bell Reflector

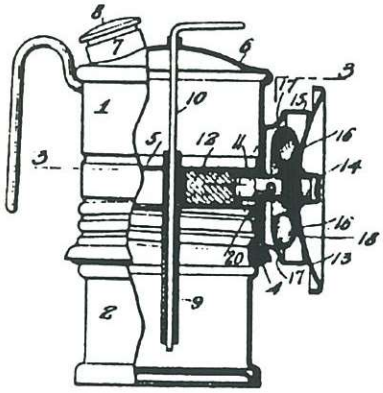
(and its relatives)

Dave Thorpe

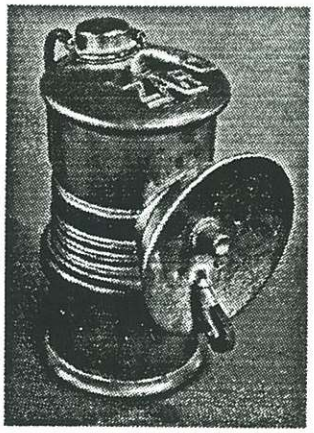
I'f you've collected cap lamps for a few years, chances are you have come across this set-screw reflector that is shaped like a bell. Although I have never seen an advertisement for it, its appearance on several unfired lamps establishes it as a Shanklin (Guys Dropper) product.



Various collectors have described it as a blaster's reflector, supposedly designed to keep the flame from blowing out during and explosive shock. This lore is in part due to the four small holes its face which outwardly resemble the appearance of a patented perforated reflector system specifically intended for that purpose.



Baldwin Patent No. 1,083,427.

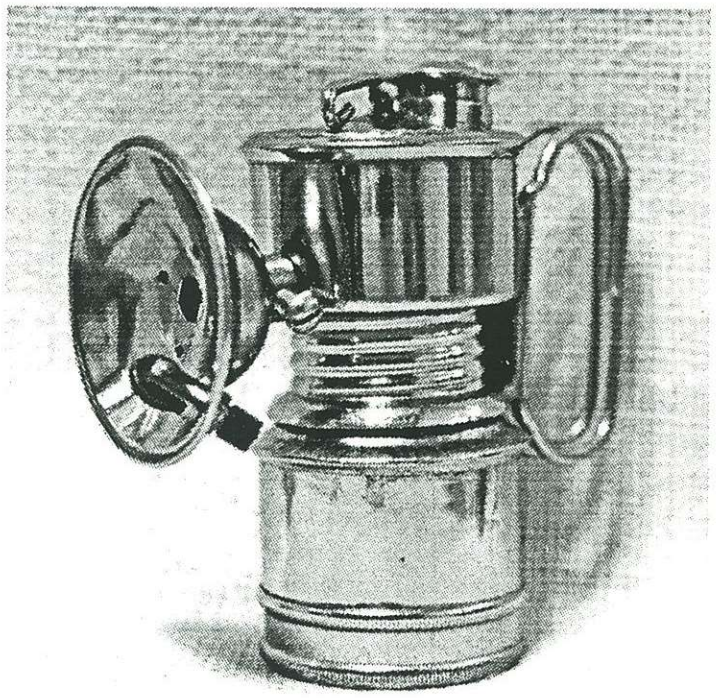


A ZAR lamp with perforated reflector.

The patent illustration shows a lamp resembling Baldwin's ZAR lamp. Most ZARs have holes in the reflector, but in this patent, they are used as channels to an elastic air bag hidden behind the reflector: When a blast occurred, the shock wave would compress the bag, and force air into the burner tube behind the flame giving it the extra surge needed to overcome the blast which otherwise would have driven the flame back into the burner, extinguishing it. No examples of this patented device have yet surfaced.Unfortunately, the Shanklin reflector is not equipped with an air bag. Its perforations are all that is shared with the Baldwin patent While collectors may describe this as a "blaster's reflector", its function must serve another purpose. In all likelihood, the bell reflector was designed to keep the flame protected and burning during windy conditions.

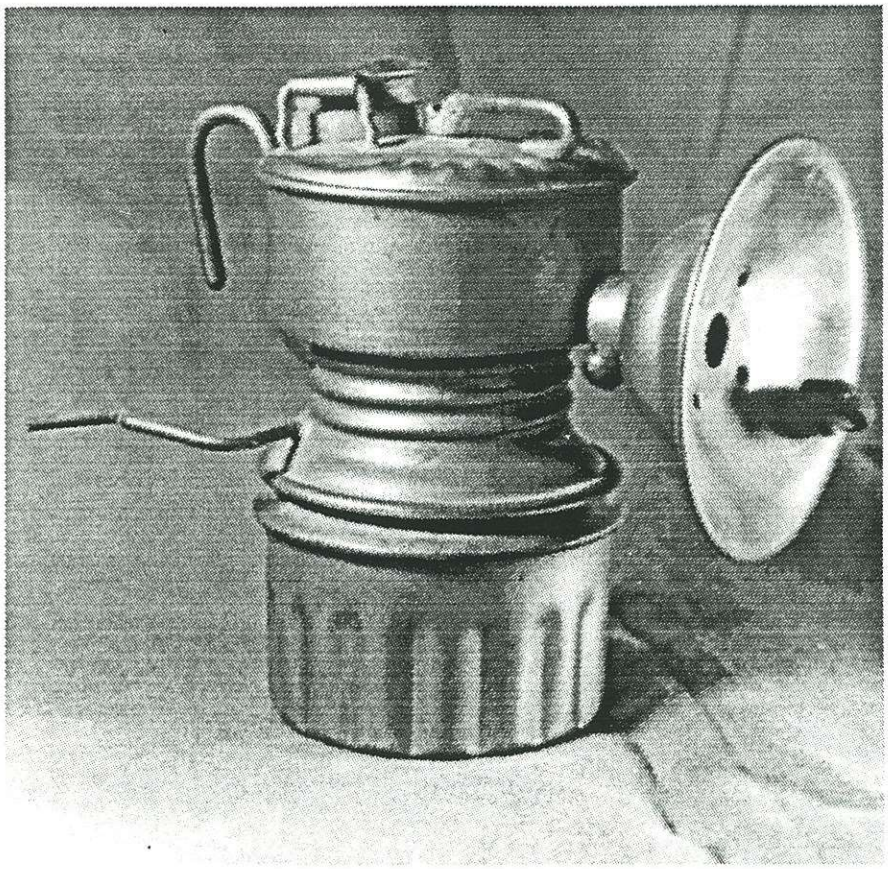
An enclosed reflector makes sense, but why the perforations? An understanding of the Venturi effect provides a possible answer. When air is blown through a chamber that is larger than the stream of gas, the air pressure is reduced within the chamber. An application of this principle is found in the ordinary carburator, where the reduction of pressure is used to "suck" a stream of gasoline into the flow of rushing air.

The problem with an encosed reflector is that the lowered pressure within it would distort the stream of acetylene



Guys Dropper superintendent's lamp with bell reflector (Dave Johnson collection and photo).

and disrupt the flame. Solution: perforate the reflector so that outside air can be drawn in to equalize the pressure. The holes are small enough to keep the wind out, but large enough to keep the pressure normal.



Guys Dropper cap lamp with bell reflector (Dave Thorpe collection and photo).

Examples of the Shanklin bell reflector are shown here. The unfired cap lamp shown above is of interest in that it deviates from the general rule that Shanklin set-screw lamps seem never to be equipped with cap braces. I have queried others regarding their cap lamps with bell reflectors and found that they too have cap braces. Perhaps the extra swinging weight of this relatively heavy reflector warranted some extra support.

I know of only three reflectors with holes in their reflectors. The ZAR and the Shanklin bell have been mentioned. The third is seen on Baldwin lamps with the deep-dish reflector. While most of the deep dish models did *not* have perforations, later examples did. There must have been an advantage to having these holes in a single surface reflector. To understand what that may have been, consider that the deep-dish reflectors were primarily designed to protect against windy conditions. Imagine a strong air current blowing across the face of such a reflector. By the Venturi effect again, the air pressure within the concavity would have been lowered, not by the acetylene stream, but by the wind current itself. This reduction in pressure would draw the wind into the bowl creating turbulent conditions and an erratic flame. A perforated reflector, however would equalize the pressure and keep the wind out.

A final question comes to mind as we return to the ZAR lamp with its perforations in a flat-faced reflector: why? Perhaps this lamp was originally designed for the elastic air-bag, just as shown in the patent illustration. Baldwin may have been overly ambitious in his hopes for a device that never saw production. But the dies had been formed and the external lamp produced just the same. Perhaps the air-bag itself was intended as an accessory. We may never know. But as I sit sometimes and look at lamps on the shelf and their peculiarities, I cannot help but wonder.

Baldwin cap lamp with perforated deep dish reflector (Dave Thorpe collection and photo.)