The Light Visor

Disclosure of General and Technical Information

The overall intent of this web site is to explain both why no licensing agreement for the Light Visor patent rights was previously reached, and what the Light Visor patent rights might include if licensed for the remainder of the patent life. I have thus included this updated Disclosure of General and Technical Information to help explain to any prospective manufacturer in detail what is known or believed to be true to date about the various embodiments that might be produced within the scope of the specification and claims of the patent. Please also read Issues and Questions Concerning the Light Visor for additional information not included in this updated Disclosure.

I have been a police officer and traffic accident investigator since 1971, and have often seen tragic vehicle collisions caused both by sun-blinded drivers, and by drivers attempting to adjust their vehicle sun visors from a frontal position to a side position and then back to the frontal position. I have noticed through the years that many drivers, including myself, rather than going through this awkward visor-position switching routine, often choose instead to simply raise their open hand to track and block the changing position of the sun's rays. It is a tiring method of eliminating the focal glare, but the alternative is worse. Even the newer type of automotive sun visors which provide a second swivel visor that can be positioned to the left side of the driver still require an awkward motion back and forth past the driver's head. Moreover, these added visors do not effectively cover all of the possible changing angles of incoming sunlight as a driver turns and changes position relative to the sun.

It occurred to me in the early 90's that it would be highly useful to have a safe and practical mechanical substitute for this tiring arm and hand positioning. I thought it should be possible to design a small auxiliary sunshade that would be as mobile as my own arm and hand movement, and that would be easily positioned toward all the angles where bright sunlight could affect my driving. On and off through the following years, I experimented with a variety of devices until I eventually determined a safe and effective way to produce such a device.

When I eventually applied for a patent for an auxiliary automotive shade invention using a flexible stay-put tube interconnection between a visor mount and a miniature shade, I named it **The Light Visor**, because it was obvious that it could be embodied as both a miniature auxiliary visor and as an auxiliary map/emergency light as well.

The Light Visor patent 5,564,771 was issued on 10-15-1996 and will expire on 11-15-2015.

The Non-Electric Light Visor Prototype

The non-electric Light Visor prototype is a proof of concept device that is both effective and safe to use, and serves as a model example of how the various embodiments would operate as an auxiliary sun-blocking device. The prototype has three primary user parts: a 2" wide compressive, levered mounting clip with a 1" opening range and a 1.25" reach; a rotatable, miniature (2"x5"x1/8") fabric material "flag shade;" and, an interconnecting, flexible, stay-put tube, or "flextube." A 3" square "mounting sheath" is provided to protect the fabric of the

vehicle sun visor. The prototype was constructed using standard hardware and loop fabric supplies, with the exception of the interconnecting 16”x.25” OD length of flexible tubing, which was obtained from Vermont Flexible Tubing, Inc. (1 802 626 5723), and which is described as Type VVT .25”OD .16” ID Nickel Chrome.

The Light Visor prototype is installed by attaching its levered-compression mounting clip to the lower hinge-rod edge of a typical vehicle sun visor. Sample Instructions for a Non-Electric Light Visor prototype are shown elsewhere on this web site. Once installed, the Light Visor is then able to be easily stored flat on the underside of the vehicle sun visor, so that the vehicle sun visor may be used without obstruction. The mounting clip is mounted so that the flexible tubing and flag shade always face inward toward the rear of the vehicle. Such a mounting position allows for an easy extended reach to the front and either side of the driver’s (or passenger’s) head, and also over the head if the vehicle has a sunroof.

The current sample non-electric prototype has an adequate, but not an ideal mounting clip. An ideal mounting clip would have a built-in mounting sheath, and would either: a. be a preformed mounting clip that has frontal, lateral opening edges that would allow for the clip to be slid forward on the hinge rod edge of the visor without levered compression of the clip; or, b. would be a levered compression clip comparable to the sample clip, but with removably insertable clip levers of a simpler design than the current clip. The clip used in the prototype has clip levers that are difficult to release and remove, and which thus require the vehicle sun visor to be manipulated in an awkward way during the installation of the device. Currently, as explained below, the compression levers must be either laid flat against the flat sides of the vehicle sun visor (or removed after laying the levers flat), so that the vehicle sun visor may be used without hindrance. An ideal mounting clip would also have a flextube-retaining means that eliminated the need for the use of an Allen screw head within the clip.

Another alternate mounting clip, which would be valid under the under the Doctrine of Equivalents for the main independent claim, which recites, “a compression clip mounting means suitable for detachably mounting said device to a vehicle sun visor…” could be done as a spring-loaded or screw-tightened slidable bracket such as depicted in the Sample Instructions for an Electric Light Visor. Such a bracket mounting clip would serve to capture the edges of a vehicle sun visor without obstruction. Such a bracket would also eliminate the compression levers and clip arrangement shown in the sample prototype photos.

The miniature fabric flag shade is deployed from its non-obstructive storage position on the vehicle sun visor by pulling downward on the flag shade’s steering edge where it is rotatably attached by a plastic coupling to the end of the flextube. The flexible tubing then acts like an artificial arm, and the miniature flag shade acts like a raised hand to block direct sunlight from the driver’s eyes whenever, and from whatever angle it appears. The flag shade may then be swiftly and easily steered into any required temporary shading position, or back into its non-obstructive storage, all in a fraction of a second. The miniature flag shade is in the approximate form of a 2”x5”x1/8” rectangle with blunt cut or rounded edges.

The fabric flag shade of preference is made of Aplix double-sided loop material, i.e., a durable fabric material, which will rigidly extend, but also bend, i.e., be foldable or collapsible, under the slightest direct urging pressure to its edges, and so prevent injury to the eyes or other body parts, as well as avoid any possibility whatever of being captured by the steering wheel or other vehicle parts. Thus, during unusual force circumstances, such as an accidental blow to the

flag shade, or during a traffic collision, the flag shade will be urged to fold and collapse and so avoid injury to the user. The ends of the fabric flag shade, as mentioned, are typically blunt cut or rounded to eliminate angular edges near the user.

The miniature flag shade is easily steered using the provided flexible stay-put tubing, or flextube, and stays wherever you place it. If you bump into it, it causes no injury and simply moves away on its flexible tube. And yet, it is so stable that it will not drop into your line of sight even when traveling over rough roads. And even if it should accidentally appear in your line of sight, its small size allows you to look around it, and, unlike the larger order vehicle sun visor, it is easily moved away within a fraction of a second. Also, because of its short drop length from the vehicle sun visor, and because its flag shade folds and collapses when pushed or twisted, as mentioned, the device cannot be captured by the steering wheel.

The Light Visor prototype utilizes a "mounting sheath," typically a 3" square of fabric or plastic material to prevent damage to the fabric of the vehicle sun visor from the sliding action or compression of the mounting clip. The mounting sheath shown in various photos in other pages of this web site is a 3" square of Wiman Corporation (320-259-2554) black Leatherette 3/16" foam, although any thin fabric, cardboard, or plastic material may serve essentially the same function.

The Market

There are no existing mechanical alternatives in the prior art that do precisely what the Light Visor invention does. Other methods of auxiliary vehicle sun shading are well known, e.g., extendible or clip-on plastic visor extensions, but these alternative methods do not provide for an almost immediate shading of focal light coming into a vehicle from any angle as does the Light Visor.

The Light Visor invention is primarily intended for road-type vehicles. If successfully test marketed in its portable, non-electric version, it will presumably lead to improved electric-light portable versions such as is shown in the Sample Electric Light Visor Instructions, wherein a light source is provided at the end of the flextube powered by batteries. Obviously, if permanently installed in a vehicle, it could be powered by the vehicle electrical system.

The product line of the Light Visor could also easily extend to custom colored mounting clip covers, flag shades, flextube covers, and so on. The invention may or may not also eventually extend to watercraft and aircraft adaptations. Commentary on such uses will be given below.

Thus far, there have been no attempts made toward any commercialization of the invention. I am financially unable to enter into business for myself to produce and distribute Light Visor devices, and so have only sought to license the production and distribution of the Light Visor to an established manufacturer. All written material herein offered concerning any tentative commercialization is wholly speculative and only represents the inventor's thoughts on how the Light Visor patent might be exploited.

The suggested, tentative trademark name for the invention, Light Visor, was searched for prior use. The phrase "Light Visor" was once used as a business name for an entirely different purpose, and so could in principle be registered as a trademark.

The potential market for the Light Visor is obvious: There are literally millions of drivers and passengers who would benefit from the use of the device, and who daily recognize

the problem which the device solves, and who would, presumably, be willing to purchase the device if it were offered for a reasonable price.

Technical Issues Concerning the Light Visor Patent and Claims

After reviewing the allowed claims, you may wonder why the flextube thickness was limited to a 5/16" outside diameter in the independent claim. During the prosecution of the Light Visor patent, the examiner and I reached an impasse with respect to the independent claim limitation of a maximum flexible tubing thickness.

This was so because the examiner cited a prior art patent from England which showed a device with a large flag shade, large spring clip, and thick flexible tubing connection for the purpose of shading an infant in a crib or car carrier. He also cited other prior art patents from the turn of the century related to clamp mounts for a steering wheel post, thick flexible tubing, and a tinted flag shade used to eliminate light glare. All of the prior art patents respectively showed a thicker (3/8" or better) flexible tubing being supported in a vertical manner of mounting so that the clip was always at the bottom and the flag shade at the top of the vertical reach of the tube.

The examiner suggested that, in view of this prior art regarding flag shades and mounting means in general, that a specific tube thickness limitation should be set forth in the independent claim, despite the fact that no known or cited prior art utilizing flexible tubing directs itself to a use with a miniature shade and compression clip to be placed on a vehicle sun visor. Or again, there has been no cited prior art whose specifications or claims anticipate this invention, i.e., and this particular combination of elements for the specific purposes given.

The seemingly narrow limitation of a 5/16" outside diameter (the thickness of a BIC ball point pen, or a cigarette) for the flexible tube of the invention in the independent claim is, however, a reasonable and acceptable compromise because experimentation has shown that any flexible stay-put tubing used for the device should be .25" OD or less in order to function correctly both in terms of the required radius of curvature (RoC) to be attained on a regular use and storage basis, and to eliminate any potential near/far visual field distortion.

As the diameter of a length of flextube used increases beyond .25", a "near/far visual distortion effect" occurs if the flextube moves into the user's line of sight. That is, the user's eyes tend to occasionally focus alternately on the flextube and then in the distance rather than bypassing a view of the tube. If the flextube is kept to less than 5/16" this problem does not occur.

The prototype's flextube is approximately 16" long and .25"OD. This diameter for the flextube is the most preferable to avoid stiffness of use and to fulfill the radius of curvature requirements, while remaining movably controllable, and supportively interconnecting the flag shade and the mounting means.

Similarly, a 16" length of the flextube was found to be the average length necessary for most vehicles, i.e., cars and small trucks, to reach from the visor mount position to all required shading positions. The .25" OD flexible metal tubing currently being used collapses at 28" when horizontally extended; but at 20" or less, even with a flag shade weight of typically .5 ounce (as provided in the prototype loop material flag shade), horizontal extension is maintained during normal road bounce effects. The higher valued radius of curvature (RoC) of a thicker flexible support arm would make the device inoperable with respect to the required radius of curvature of the thinner flextube of .25" used in the invention, especially during

rearward extension for peripheral shading where the flextube is easily, but tightly bent for accuracy of placement.

For example, the RoC of a .5” OD flexible tube is minimally 1.75” when forced, and 2.25” under normal use conditions. The RoC of a .25” OD flexible tube is .5” when forced, and 1.13” under normal use conditions. Or again, a flextube OD greater than 5/16” could not be satisfactorily curved to meet either the requirements of temporary curvature adjustments and positionings to confront light rays coming from any angle into the vehicle, or meet to satisfactorily meet the requirements of tight curvature for storage on the vehicle sun visor.

Additionally, as previously noted, a tube thickness greater than 5/16” could be construed as infringing on existing and in force patents in this and other countries.

Knock-offs which might be made with the tube thickness exceeding 5/16” would not function in the required manner described herein, and would appear aesthetically displeasing when compared to the patented product. Moreover, any knock-off device made with a greater than 5/16” OD would: a) infringe the Light Visor patent claims by being equivalent in structure, function and result to the Light Visor, thus violating the patent law Doctrine of Equivalents; b) infringe patents which are currently in force, but not intended for use in the manner and method of the Light Visor patent. More specific information regarding tube thickness performance will be discussed further later in this disclosure.

The preferred sizing of the flag shade is anywhere from 5”-6” long, and 2” wide, because that is the actual set of experimental sizing values which proved to be most appropriate for resolving the combined parallax and normal inertial force problem resolution, i.e., during normal head movements and during normal road bounce effects. Any larger sizing of the flag shade would be obstructive and overly large and weighty relative to what is actually needed; any lesser sizing tends to require more flag shade steering accuracy for proper placement.

For typical daytime use, the flag shade is preferably opaque because opacity eliminates the possibility of optical light flaring under all circumstances of intended use. A miniature opaque flag shade positioned just above the user’s line of sight, or away from the main line of sight to the road, will block any focal sunlight entering the vehicle from any angle without causing a visual obstruction. Moreover, when the shade is kept at this minimal size it does not obstruct a view of any potential driving hazards.

Numerous night and daytime experiments were conducted involving various types and thicknesses of variously tinted, transparent plastic flag shades. The conclusions reached were: 1. Due to light flaring, an opaque flag shade is more practical during the day; 2. A tinted flag shade will not work wholly effectively during the day to stop focal light rays; 3. The use of a tinted plastic flag shade at night to ward off headlamp glare from oncoming vehicles is not safe and would be a liability. A darkly tinted flag shade used at night to ward off headlamp glare from oncoming vehicles causes optical near/far focusing problems because one must look through and past the flag shade simultaneously, or place it right before the eyes, and so make it equivalent to the use of sunglasses at night. This is not true if a tinted flag shade device is positioned over the inside or outside rear view mirrors to ward off the intensity of headlamp glare from vehicles approaching from the rear. It should be made clear by written warning on the packaging and instructions that the device is not intended for shading use for oncoming headlamp glare for the cited reasons.

When the flag shade is used in its normal horizontal method at a right angle to the flextube, the device may be used without having the flextube in a user’s line of sight. Placing

the flag shade directly in line with the flextube (as opposed to being at a right angle) is not a workable idea, and also causes the flextube to come into the user's line of sight.

Please note that the form of the flag shade being recommended for manufacture is not the form of the shade shown in the patent drawing. Although it had been experimentally determined that the "flag" type of shade is generally more practical than the inverted T-type of shade shown in the formal patent drawing, the patent application was filed with the inverted T-type drawing citing and claiming the flag-type shade as a variation of the inverted T-type. The flag-type of shade is thus an allowed claim in the patent as a permitted variation of the inverted T-type, and thus both shade forms are adequately protected.

Because the end cap at the shade end of the flextube on the non-electric version of the device is a simple pressure insertion cap which can be slid off the end of the flextube if required, the flag shade may be slid free of the flextube so that a new, equivalently connected replacement flag shade, e.g., of a different color or material, may be attached to the flextube.

Peripheral shading problems were noted during typical passenger vehicle use only if the user had especially long legs and was able to move the seat back to a point where the normal 16" flextube would not reach. As stated before, a longer flextube would require the trade-off of requiring a stiffer flextube.

Various experiments with the flag-type shade along the upper horizontal edge of the driver and passenger's windows, respectively, were conducted in various types of vehicles with the windows down to determine if wind buffeting would produce any type of hazardous effects on the use of the device. Generally, the rush of the wind past the flag shade causes no problems until the flextube is completely extended, at which time bounce effects and side wind gusts can cause the flextube to vibrate or may push the flag shade slightly inward.

All in all, no particular safety issues have ever reported by anyone thus far using the prototype as an auxiliary sun visor. Inadvertently bumping into either the edges or sides of the prototype did not raise any safety issues.

Overall Alternate Embodiments

After reviewing the allowed claims, you may also wonder why drawings and claims were not specifically directed toward various alternate embodiments mentioned in the patent specification, e.g., dual opposing flag shade/clips; any permanent mounting of the device to the vehicle sun visor, i.e., with a non-removable flextube connection and/or shade; any fiber optic wiring system; or any combination of the preceding. Whereas it seemed prudent to mention these alternate embodiments in the specification to preclude the possibility of another person filing an application for such an alternate embodiment, none of the preceding alternate embodiments listed was deemed to be practical if reduced to practice. Moreover, the claims as written are sufficiently broad to cover any practical applications of the device in various alternate embodiments.

A dual opposing flag shade/clip device tends to be difficult to operate and properly place on the vehicle sun visor since the clip must be opened each time used, rather than mounting it one time and leaving it be. Additionally, the rigid flag shade/clip combination would be hazardous to the user; and, the dangling flextube along the length of the visor would as well be a visual distraction.

Fiber optic wiring systems were also neither drawn nor claimed because they were deemed to be similarly impractical and expensive, and an add-on element to the independent

claim requirements of a standard lighting circuit. The strength of the allowed claims and the Doctrine of Equivalents should protect anything indicated in the enclosed papers as currently viable ideas for product manufacture.

Direct installation of the mounting means within the structure of the vehicle sun visor, as a permanent feature to be mounted within the vehicle sun visor, whether by a car manufacturer or as an after-market kit, has always seemed to me to be unnecessary. At the time that the Light Visor patent application was drafted, I was of the opinion that the mounting means for a Light Visor should be enabled to detach under the excessive force circumstances of a traffic collision. After the application was filed, I began to realize with further experimentation that it was virtually impossible for the Light Visor flextube to be captured during a vehicle collision. There simply is no physical item in the interior of a vehicle, which could capture the currently proposed flextube during a collision. And clearly, the flextube would slide past anything that made contact with it. And if a driver should inadvertently reach out and grab the flextube during a collision, the tube would either slide harmlessly through his grasp, or slide off the vehicle sun visor and still pose no threat.

Nonetheless, I remain of the opinion that any production version of the Light Visor should be attachably removable to a vehicle sun visor simply because it should be the driver's option to have or not have the device on the sun visor of his vehicle. Moreover, once a Light Visor is installed on a vehicle sun visor, it is virtually permanently mounted until the user removes it. And also, if the Light Visor is provided with an electric lighting system, the device should be removable from the vehicle sun visor so that the lighting system can be carried outside the vehicle. I thus now believe that a non-slidable, but easily removable mounting of the Light Visor to a vehicle sun visor, such as the bracket mount shown in the Sample Electric Light Visor Instructions is a preferable mounting means. The bracket clip provides a more secure connection than a mounting clip, and is much easier to install and remove.

As shown in the above indicated Sample Electric Light Visor Instructions, the Light Visor may alternately be made to double as an auxiliary emergency light and map light with the addition of a tiny light bulb or other light source, e.g. an LED, at the flag shade end of the flextube, and interconnecting wires threaded through the flextube to a battery and switch housed in an alternate mounting clip. Electric contacts within the vehicle sun visor leading from the vehicle electrical system through receptacle contacts in the mounting clip using a rechargeable battery in a detachable clip still seems to me to be impractical, and an unnecessary expense to the vehicle owner. Also, such a claim would also have been superfluous to the claim of an electric lighting circuit since it adds an additional element to the claim.

Similarly, claims specifically directed toward the use of hook and loop-type fasteners, or a secondary mounting clip on the first, and other various add-ons mentioned in the specification are also superfluous to the allowed claims. Obviously, as mentioned above, a different clip of plastic or metal design could be manufactured in accord with the specific use intent, e.g., type of vehicle, and type of device, electric or non-electric, and so forth.

Also, as suggested in the specification and claimed, the shading means and/or flextube and/or mounting means could possibly be respectively manufactured from a plastic-type material which has the required properties necessary to fulfill the objects of the invention. Such a plastic-type device would be produced in pieces to be snapped together, or as a unitary device made of one piece of plastic-type material.

Other Vehicle Considerations

No attempted variation of the device was found to be suitable for use with a motorcycle, with or without a windshield in place. The device interferes with motorcycle steering however placed or used, and there is no way to avoid severe wind buffeting and loss of effective positioning. Attempts to use the device with motorcycle helmets and other types of headwear also proved to be ineffective and hazardous to the user's vision.

No attempts were made to use the device with watercraft or aircraft. Any small craft on the water tends to have erratic up and down movements, which cause a changing line of sight with respect to the sun, and so negates any use of a fixed shading device.

Whereas an aircraft may often have a stable line of sight, and a pilot possibly have some use for the device on its visor, commercial aircraft pilots are prohibited by FAA regulations from having opaque devices anywhere near their line of sight. Commercial aircraft typically use shading devices such as 6"x l0" tinted Plexiglas visors, which are clipped onto bars provided about the windshield area. However, I have had light aircraft pilots tell me they see a use for the device if it were made with a tinted flag shade system.

No attempts were made to use the device with heavy machinery, e.g., earthmovers, etc., because it was thought the continuous bouncing and change of line of sight to the sun would make the device ineffective. The device was used and worked reasonably well within semi-truck cabs, except for peripheral shading which requires a longer flextube length in some truck cabs.

For all of the reasons previously noted, simpler seems better, less expensive to produce, and more probable to attract consumer interest.