Commissioner's Decision

Obviousness:

The circuitry and vision features provided by a pattern of metallic ink on a double lens visor to obtain a defogging and deicing shield for a helmet were found to be an advance in the art, and amended claims were accepted. Rejection modified.

This decision deals with the Applicant's request that the Commissioner of Patents review the Examiner's Final Action on application 514,732 (class 309-5) filed July 25, 1986, entitled DEFOGGING AND DEICING SHIELD STRUCTURE. The inventor is James M. Hollander.

The Examiner in charge issued a Final Action on May 3, 1989 refusing to allow the application to proceed to patent.

In reviewing the application, the Patent Appeal Board held a Hearing on January 24, 1989, at which the Applicant was represented by Mr. Kevin P. Murphy, the Patent Agent. Subsequent to the Hearing, the Applicant submitted a letter dated January 26, 1990 including an amended set of claims.

The invention relates to deicing means for a dual plastic lens visor in a helmet. As depicted in figure 3 below, the visor has a top 17, and sidewalls, not shown, all having grooves or channels 23 and 24 to receive the edges of, and space, weather lens 13 and face lens 14, respectively, the bottom portions of the lenses being joined as at 26. On the inner surface 25 of lens 14 a pattern of circuitry 27 is printed using an ink having a metallic content to provide the desired resistance and power, and the vision, characteristics. Figure 1 shows the visor attached to a helmet.

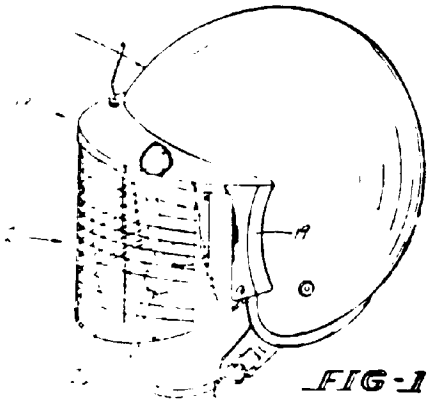

FIG-1

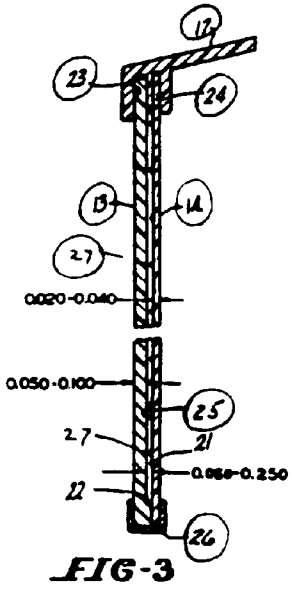

FIG-3

In the Final Action, the Examiner cited the following references:

Patents
United States
3,027,561 April 3, 1962 Senne

Canada
1,011,792 June 7, 1977 Plumat et al
(corresponding to United States Patent 3,900,634)

Publications
"Double-Lens Vari-Shield"
Snowmobiler's Race & Rally, Winter 1978-79, page 12

Product Information Sheet
Hysol Conductive Silver Inks; Bulletin SP-140
(no. 140-18-Q)
Hysol Division, The Dexter Corporation September 1981

The Examiner considered these references in the following terms:

Senne teaches a face plate for skin diving having an outer pane 16, preferably made of tempered glass, and an inner pane 17, made of transparent plastic. The inner pane has heating wires 70 to eliminate condensation. (Figure 2 below)

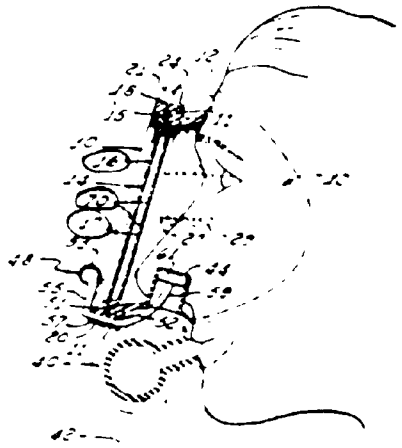

Fig. 2.

The double-lens Vari-Shield is a curved injection moulded plastic face shield for snowmobilers. An inner and outer lens forms a dead air space between the lenses. (shown below)

Hysol, a conductive silver ink, is formulated for air drying for use on a variety of plastic materials. It is designed primarily for screen printing. (No depiction)

Plumat et al teach a glazing panel with conductive strips to keep the panel free of mist and ice. The strips are applied by a cerographic technique. The glazing panel may include one or more glass sheets with the strips sandwiched in-between. (Figure 1 shown below)

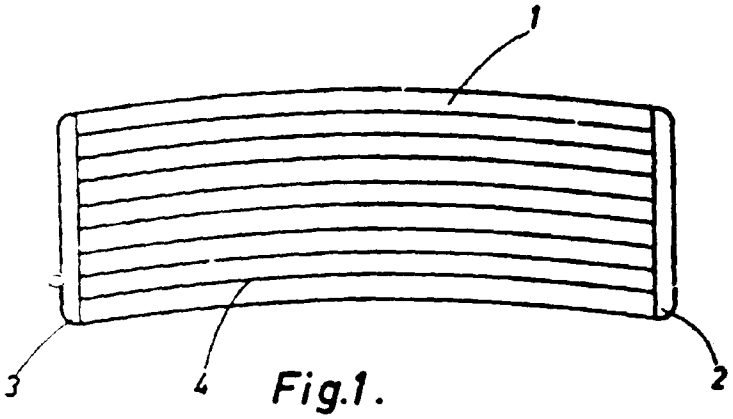

Fig.1.

The Examiner rejected claims 1 to 49 in view of the Double-lens Vari-Shield and common knowledge in the resistor/conductor art, in the following terms, in part:

> ...
> As stated in the previous action, Senne used heating wires embedded in a plastic pane, since silk screened conductive lines, which were known at that time, required an elevated curing temperature which is not suitable for plastic material. With the development of Hysol inks, which were designed for air drying on a variety of plastic materials, it is obvious to substitute this improved material for the heating wires. There is held to be no invention in substituting a material for a purpose for which it was designed to be used.
>
> Applicant replied to the previous action, in part, that he had not substituted a newly developed material for an older material in a resistance heated face shield. The conductive silver preparations are not newly developed as is evident from the DuPont technical information publication submitted here. They have been available for more than 20 years, and in spite of their availability have not been employed in the manner developed by the present invention.
>
> If the silver conductive inks are such an obvious choice, then it is certainly surprising that they have not been employed in the manner of the present invention, even though there has been much development in the art of protective face shield elements, including defogging or deicing functions. The reason

> is, of course, that invention was involved in making the development, such invention being the subject of the present application.
>
> In the previous action the examiner also stated that screen printed horizontal resistance wires had been used since the mid-seventies on automobile rear windows. Thus the idea of using screen printed conductor to eliminate fogging was generally known in view of the widespread use of automobiles. The reference of Plumat et al is cited not as a new ground of objection but rather to support the statement in the previous action. On page 8 of the Plumat reference a common failure made of early screen printed conductors is described which consisted of local overheating and subsequent failure of the conductors.
>
> Applicant states that the DuPont preparation has been available for more than 20 years. He concludes that the use of screen printed conductors on face masks cannot be obvious since such inks have been around for a long time but have not been used on face masks before.
>
> Another explanation is that the air dying inks that were available were not suitable for the particular application applicant has in mind. Plumat et al describe reliability problems which occurred with early preparations. The Declaration of the Inventor, received November 9, 1987, states that a period of 6 months was needed to evaluate the products of various manufacturers. The Hysol Product Information sheet clearly recommends the use of that ink for plastic materials.
>
> In summary, as shown by the references, double-lens plastic shields have been used for some time. Senne had taught the usefulness of resistance wires to prevent shields from fogging. When the Hysol product came on the market, which specifically points to use with plastic materials, it became very plain to use the ink in an improved application that had been thought of earlier with more complex materials. Applicant's efforts thus lack ingenuity and are better described as workshop improvements.
> ...

In the response to the Final Action, the Applicant argued the merits of the invention in the following terms, in part:

> The invention in its broadest sense is concerned with an improved face shield comprising at least two spaced, plastic lenses, one of which has a surface imprinted with an electrically conductive circuit, in the form of a pattern of spaced, continuous, generally parallel lines. The circuit has sufficient electrical resistance to create heat effective to inhibit formation of fog, ice or frost upon the face shield.
> ...

> ...
> There are claims to specific embodiments in which the width and spacing of the lines is such that they occupy no more than 8%, per unit area, of the field of view so as to provide a clear field of view, and claims which specify the power density range for the circuit pattern of 0.3 to 0.60 watts per square inch of the face plate.
> ...
>
> The heating effect of the described Hysol ink is evaluated in the accompanying Affidavit of James M. Hollander, particularly in paragraphs 9 and 10, from which it is evident that the information in the Hysol publication is not of assistance in the present invention. Utilization of the criteria identified in the Hysol publication, for example, the resistance figure in ohm/inch would result in a heating effect which would melt the plastic or the ink line would immediately "open-circuit".
> ...
>
> ...The preparations employed by Plumat comprise a paste of tiny glass particles mixed with conductive metals for silk screening on glass substrates, with the glass being "fired" in order to melt the glass particles of the paste so that they will fuse to the glass substrate. The problems identified by Plumat at page 2 are the difficulty in obtaining uniformity and reproducibility in mass production manufacture, without resorting to complex and expensive production methods. Plumat does not teach air drying inks at all and the problems associated with pastes of the kind with which Plumat was concerned are irrelevant to inks such as those of DuPont and Hysol....
> ...

The Applicant further argued in his submission at the Hearing that the cited references did not suggest the invention, in part, as follows:

> ...
> There is no basis for the Examiner's position that Senne used heating wires embedded in the pane because silk screen conductive lines known at the time required an elevated curing temperature which is not suitable for plastic material.
> ...
>
> ...The applicant in an earlier Affidavit has also reported on his discussions with John Jandrey, the Market Development Manager, Electronics Material Division of The Dexter Corporation, manufacturers and sellers of Hysol conductive inks, in which Mr. Jandrey indicated that the inks were not intended for low temperature resistance heating application but were intended to serve the electronics industry where a conductive polymer film is required such as in the repair of broken circuit board tracers. Mr. Jandrey also indicated that the proposed Application on a face shield seemed odd and totally unsuitable for Hysol inks. This evidence directly contradicts the "assumptions" made by the Examiner.
> ...

The issue before the board is whether or not the application is directed to patentable subject matter in view of the cited art.

During the Hearing, Mr. Murphy presented a video showing the effects on a plastic visor that had lines of the small dimensions and material called for by the Applicant. The presentation discussed the greater current that would have to be carried by the lines as derived from the currents carried by the known circuits in the art which were considerably greater than the Applicant's. It showed that when such a greater current was passed through the Applicant's circuitry, that current first distorted the plastic due to the heat developed, then burned out the small dimensioned metallic ink lines and broke the circuit.

Mr. Murphy pointed out the features of the Applicant's invention that resulted from laying down a pattern of circuitry using metallic ink having the characteristic of carrying only a small current in comparison to the circuits and currents taught by the cited art. Quoting from information he had obtained from General Electric in 1984 with respect to work that company had done in testing electric wires placed in Lexan plastic, he described how it had been found that the plastic distorted when current was passed through the wires. He likened the tests to an effort to make a structure set out in the Senne Patent. He called attention to discontinuance of the General Electric tests because of distortion, bubbling, and optical problems that occurred in the plastic due to the high current, and for these reasons he pointed out the Applicant's invention was an advance over the cited art.

Having the benefit of the information presented at the Hearing, the Board acknowledged the presence of inventive matter in the

application with respect to the circuitry and vision aspects provided by the metallic ink, and discussed the claims with the Agent to determine whether or not they defined the inventive features. It was found that some claims set forth the features that provided clear vision, but none defined the circuitry of metallic ink of such dimensions to obtain both the deicing, and the vision characteristics described by the application on page 8 as being the invention, and shown as part of the presentation. Mr. Murphy requested time to prepare an amended set of claims that would reflect the proper scope of claiming, and the Board agreed. On January 26, 1990 revised claims were submitted, and amended claim 1 reads:

> In a protective helmet and face shield assembly including fastener means for securing the shield releasably to the helmet and hinge means between the fastener means and the shield permitting relative motion between the shield and the helmet an improved face shield comprising:
>
> at least two spaced, plastic lenses providing a field of view , one lens defining a face lens and another lens defining a weather lens, a surface of one of said lenses being printed with an electrically conductive circuit of an ink having a metallic content substantially throughout said field of view, said circuit being arranged upon said surface in accordance with a pattern of spaced, continuous, generally parallel lines, said lines at maximum width and minimum spacing occupying no more than about eight percent (8%), per unit area, of said field of view, said circuit having sufficient electrical resistance to create heat effective to inhibit formation of fog, ice or frost upon the face shield, and said pattern of lines being effective to provide maximum light transmission and visibility therebetween through said shield.

The Board is satisfied that the amended claims define the invention described in the application in terms that overcome the cited art. Recommendation is made, therefore, that the application containing the claims as amended after the hearing be accepted.

M.G. Brown
Acting Chairman
Patent Appeal Board

I concur with the findings and the recommendation of the Patent Appeal Board. Accordingly, I remand the application for prosecution consistent with the recommendation.

J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec
this 23 day of March 1990