[0056] Such displays provide a three dimensional quality the scene viewed by an observer, as described in the applicants co-pending patents PCT No. PCT/NZ98/00098 and PCT/NZ99/00021, incorporated by reference herein.

[0057] As previously discussed, a number of practical considerations need to be overcome to produce a functional display of this type including the reduction or elimination of moiré interference effects, coloured fringes, and crossed-polarisers, which are addressed in a number of ways including the use of diffusers, optical retarders and other optical materials and/or material finishes. However, these are not specifically germane to the present invention.

[0058] Thus, for the sake of clarity and to aid understanding of the present invention, the display (1) and associated display screens (2,3) are shown in simplified, schematic form in the drawings; elements not essential to illustrate the present invention are omitted from the drawings to aid comprehension.

[0059] Although the visual colour anomalies and the viewer's perception of the tracery on the rear screen arc remedied by use of a bi-refringent film with an optically diffusive matt surface etched onto one side of the film, further difficulties result from this configuration.

[0060] Due to the intrinsic diffusive nature of the bi-refringent film, a slight blurring of the image on the rear LCD screen (2) renders the appearance of moiré interference patterns invisible or insignificant However, further diffusion or blurriness is detrimental to the clarity of the image perceived by an observer.

[0061] The blurring of the rear screen (2) is compounded by the current production techniques and practices employed by LCD manufacturers.

[0062] Currently, the predominant majority of LCD screen manufacturers produce screens that have a matt surface on one or both sides intended to reduce glare. However, this matt surface applied to the front and or rear surface increases the diffusion of the light being emitted by the rear screen (3) when used with the applicant's display technology blurring and thus degrading the resultant display (1) image. The present invention addresses this problem by altering the matt surface to provide the front screen with an optically smooth surface.

[0063] The applicant investigated a number of ways to achieve this effect. The applicant initially tried to even the surface of the screen through polishing, though unfortunately, this was found to be impractical due to the hardness of the materials from which the screens (2,3) are made.

[0064] **FIG. 1** shows a first embodiment in which the front layer (6) of the front screen (2) is formed with a matt surface (7), depicted with exaggerated proportions to aid understanding of the invention. In the embodiment shown, the front layer (6) of the front screen (2) is a comprised of a polariser (8), encapsulated within a protective laminate (9).

[0065] According to one aspect of the present invention there is provided a method of altering the matt surface (7) of the front screen (2), to an optically smooth surface by applying an at least partially transparent coating (10) to the matt surface (7).

[0066] The applicant then looked at the application of various flowable substances to the screen. While all oil based substances tested (for example silicon grease) provided the optical requirements, they are impractical in that they can be readily rubbed off from the screen.

[0067] As the matt surface (7) consists of optical irregularities, distortions, protrusions, or discontinuities, the coating (10) is applied in a flowable form to cover these irregularities to a depth sufficient to form a substantially optically flat outer surface (11).

[0068] Therefore, the coating is applied as a flowable substance and subsequently hardened to form an optically flat outer surface.

[0069] The coating (10) may be applied by a variety of methods including painting, spraying, sputtering, vapour deposition, slurry coating, chemical deposition, screen printing or roll coating.

[0070] The applicant determined that the coating required would preferably have the is following qualities.

[0071] To be capable of covering all the surface irregularities of the matt surface (7) without forming any voids or optical distortions.

[0072] To posses substantially the same refractive index as the material having the matt surface.

[0073] Be readily applied, and thereupon hardening to a resilient finish.

[0074] To provide an optically homogenous finish.

[0075] To be durable and resistant to temperature variations and stress.

[0076] The applicant has discovered that one material that meets all of these requirements is a lacquer or two-pot epoxy resin. While many epoxy resins are suitable, one example is that sold under the brand name of DuPont Centuri 690S 2PAC High Build Clear.

[0077] While this material works particularly well, it should be appreciated that other materials which have the required properties may also be used.

[0078] **FIG. 2**. shows a further embodiment in which the coating (10) is replaced,—both physically and operationally by an optically smooth transparent film (11) and a transparent adhesive (12) interposed between the film and the matt surface.

[0079] The adhesive (12) may be applied to a lower surface of the film (11) prior to being applied (in conjunction with the film 11) to the matt surface (7), though alternatively, the adhesive (12) may be applied to the matt surface (7) independently from the film (11).

[0080] This second embodiment is still required to fulfil the above-listed criteria given for the first embodiment. Consequently, the adhesive (12) and film (11) are formed from materials having substantially the same refractive index as the material (9) having the is matt surface (7).

[0081] Preferably, the adhesive is capable of flowing over, around and/or inside any optical irregularities, distortions, protrusions, or discontinuities of said matt surface to a sufficient thickness to form a substantially optically flat outer surface.