display and the entire input area of the touch switch **4**. If clear adhesive having a refractive index of 1.47 to 1.57 after hardening is used, the reflection between the touch switch **4** and the liquid crystal display is almost eliminated and the image quality of the display unit is improved because it is almost equal to the refractive index of the glass substrate (i.e., 1.52).

It is also most preferable to use a clear adhesive whose refractive index after hardening is equal to the refractive index of glass of 1.52. That is, because the refractive index of the glass to which the touch switch is adhered and that of the clear adhesive after hardening are equal, reflection between the touch switch and the liquid crystal display is eliminated and the image quality is improved considerably.

The touch switch used here is not confined only to that of the analog resistance film type, and other types of touch switches, such as a resistance film digital type or an ultrasound type, may be used.

[Second Embodiment]

FIG. **2** shows a second embodiment of the inventive display unit. The basic structure thereof is the same as that of the first embodiment. Because the clear adhesive **5** for adhering the touch switch **4** to the liquid crystal display has a hardening shrinkage factor of about 5%, there is a possibility that the touch switch and the liquid crystal display warp and cause an unevenness on the display screen when the adhesive is hardened. Therefore, in this embodiment clear fillers **6** are mixed in the clear adhesive **5** to lower the hardening shrinkage factor to prevent warping of the touch switch and the liquid crystal display.

The clear fillers **6** of the present embodiment are preferably true spherical plastic particles whose diameter is 12 microns and whose refractive index is 1.47 to 1.57. That is, it is preferable to use clear fillers having a refractive index close to the refractive index of the clear adhesive after hardening.

The percentage of the fillers mixed in the adhesive is set at 2 wt %. When they are mixed more than that, the adhesive layer becomes cloudy, thus degrading the image quality. However, it is possible to mix more when the refractive index of the fillers and the adhesive are almost same (e.g. 1.52) because the cloudiness of the adhesive layer is reduced.

[Third Embodiment]

FIG. **3** is a flowchart and FIGS. **4**(A)–**4**(C) are a sequence of steps showing a method for manufacturing a display unit according to the present invention having a transparent touch switch **4** and a liquid crystal display **11**. First, the transparent touch switch **4** is flipped back and a blob of clear adhesive **5** is applied centrally on a predetermined area of a rear surface **4***a* of the transparent touch switch (FIG. **4**(A)). Preferably, the clear adhesive **5** is applied to at least an input area of the transparent touch switch. A degassed clear adhesive may be used, as necessary. The clear adhesive **5** can be, for example, an ultraviolet hardening clear adhesive of which about 0.7 g is applied in the case where the liquid crystal display has a length of about 6 inches.

Next, as shown in FIG. **4**(B), the transparent touch switch **4** is turned upside down and aligned in registry with a display surface **11***a* of the liquid crystal display **11** so that the rear surface **4***a* of the transparent touch switch **4** confronts the display surface **11***a* of the liquid crystal display. As the adhesive **5** begins to drip and forms a drop **5***a*, the transparent touch switch **4** is laminated on the liquid crystal display **11**. During the lamination step, the transparent touch switch **4** is slowly and continuously moved toward the liquid crystal display **11** so that bubbles are not produced when a surface **5***b* of the drop **5***a* contacts the display surface **11***a* of the liquid crystal display (FIG. **4**(C)).

As shown in FIG. **5**, for example, the surface **5***b* of the drop **5***a* which contacts the display surface **11***a* of the liquid crystal display becomes bumpy and uneven if the transparent touch switch **4** is moved too quickly toward the display surface **11***a* of the liquid crystal display **11**. The bumps produce bubbles in the adhesive which prevent formation of a uniform adhesive layer and which ultimately lowers the strength and the image quality of the display unit. In order to avoid this problem, according to the method of the present invention, the transparent touch switch **4** is moved slowly and continuously towards the liquid crystal display **11** during the lamination step until the surface of the drop **5***a* contacts the display surface **11***a* of the liquid crystal display and the adhesive **5** expands and spreads over the display surface to an area preferably substantially equal to the area of the rear surface **4***a* of the transparent touch switch covered by the adhesive during the adhesive application step. The transparent touch switch **4** and the liquid crystal display **11** are then maintained in this position for a predetermined period of time to allow the adhesive **5** to flow slowly between the transparent touch switch and the liquid crystal display, without the application of an external pressure, until the adhesive expands and spreads to a predetermined area on the display surface **11***a* of the liquid crystal display and forms a continuous adhesive layer (FIGS. **1**, **2**).

The amount of time which the adhesive **5** is left to expand and spread between the transparent touch switch **4** and the liquid crystal display **11** depends on the viscosity of the adhesive selected. Other factors include the weight of the transparent touch switch **4** and the quantity of the adhesive applied. For example, when the viscosity of the adhesive is preferably within a range of 1000 to 6000 cp., the transparent touch switch **4** and the liquid crystal display **11** are left for about 30 to 60 minutes in order to allow the adhesive to expand between the transparent touch switch and the liquid crystal display by normal expansion of the adhesive without application of an external pressure.

After confirming that the adhesive **5** has expanded to a predetermined area on the display surface **11***a* of the liquid crystal display **11**, the adhesive is cured by, for example, irradiating ultraviolet rays uniformly from the top thereof to harden it. In the present embodiment, the thickness of the resulting adhesive layer is about 0.1 mm to 0.2 mm, which is thinner than the thickness of 0.4 mm to 0.8 mm. in the resulting adhesive layers of prior art display units. This allows for miniaturization of the display unit by reducing the overall thickness of the display unit.

When the viscosity of the adhesive is high, e.g. 10000 cp., it will not expand and spread between the transparent touch switch and the liquid crystal display to form a desired adhesive layer. However, since the viscosity of the adhesive lowers by the application of heat, an adhesive having an initial viscosity of about 20000 cp. may expand to form a desired adhesive layer if heat is applied to the adhesive during the predetermined period of time which the adhesive is left to expand between the transparent touch switch **4** and the liquid crystal display **11**.

The adhesive **5** is not limited only to an ultraviolet hardening type adhesive. That is, the adhesive **5** may be a two-liquid type epoxy adhesive so long as it generates almost no gas. However, a thermal hardening type adhesive having a high viscosity which requires heat treatment cannot be used because hardening of the such adhesive advances when heat is applied while the adhesive is left to expand between the transparent touch switch **4** and the liquid crystal display **11**.