body 28 without the aid of adhesives. The insert 30 is cast in place over the weight unit 46, and, after the insert material 30 has been placed in the spherical countersink portion the entire lens 20 is subjected to heat to fuse the components together and firmly embed the weight unit 46 in place.

In this manner, there is no danger of adhesives leaching out to damage the wearer of the lens, and there is no danger of any metallic residues or reaction products coming into contact with the eye as long as the integrity of the lens unit is maintained.

In the preferred constructoin, the weight unit 46 is colored to match the iris or colored portion of the eye of the intended wearer, and tests with humans have shown that the weight unit, when so colored, is invisible in use. Suitable coloring materials in the form of non-toxic pigments which are acceptable for use in the optical industry are known to those skilled in the art.

In the preferred construction, the metallic insert is metallic platinum. Although the invention is not intended to be so limited, platinum has the advantages of very great density, very low chemical reactivity and high malleability. Thus, any suitably dense, non-toxic metal of low chemical reactivity might be used, platinum is preferred, for the reasons set forth.

Likewise, it is not necessary that the insert 30 be fused to the lens body 28, but such construction has a number of advantages which are apparent to those skilled in the art.

Ordinarilly, a typical bifocal contact lens of the present invention comprises a lens body 28 which is about 8–11 millimeters in diameter, with a central thickness of about .2–.7 millimeters but which may vary considerably depending upon the prescription. A platinum weight unit 46 is selected so as to suitably rotate the lens to the desired position in use, and such weight unit preferably should at least weigh about 6 milligrams, and preferably about 7.5 milligrams or more. In a typical contact lens of the present invention, the insert is about 0.008 inch thick, about .022 inch high, and about 0.100 inch wide, the dimensions being given in normal position of use, and as shown in FIG. 1 for example. The weight unit is disposed near an outer edge, preferably, to give the greatest moment about the central axis, so that the lens may best be oriented with the minimum amount of weight. The more dense material, such as platinum, are greatly preferred, inasmuch as a more nearly "point" location can be achieved therewith, that is, the weight need only occupy a small volume, and may be precisely placed relative to less dense materials, which not only take longer to orient in use, but which must occupy a great volume and which have a smaller moment for the same weight. The process of the present invention is illustrated in FIGS. 3–8, inclusive.

In this process, a blank of body material 28, such as the acrylic plastic referred to above is formed into a right circular cylinder, shown in elevation in FIG. 3. A cutout surface or spherical countersink portion 36 is cut therein, as shown in FIG. 4, to accommodate the more dense optical material insert 30.

At this point, as shown in FIG. 5, the platinum insert 46 having been previously colored, is placed therein, near the outer edge of the lens blank 60. The weight unit 46 is placed preferably with the rounded front surface 48 face down against the cutout surface 36. Thereafter, the second material 30 of the insert is cast in place, covering the weight unit 46.

After the plastic insert 30 has set, the entire unit is cured in order to fuse the two portions into an integral lens unit containing the weight orienting unit 46. Thereafter, the lens maker lays out the desired lines of curvature 62 on the blank, and cuts the lens to the desired prescription. The platinum containing, self-orienting, nonconcentric bifocal lens unit of the present invention is obtained, as shown in FIG. 8. Although the platinum



used to produce the self-orienting effect is a precious metal, the cost of an amount typically used in such lenses is only about 30¢–40¢, which is very small in comparison to the other costs involved in providing contact lenses.

Thus, it can be seen that the lens of the present invention has all the advantages desired in a contact lens, and is made by a simple and ingenious process, resulting in a simple but substantially foolproof, safe, and sturdy construction.

Referring now to FIGS. 10–12, there are shown prior art constructions in greater detail.

FIG. 10 shows a concentric bifocal contact lens which undesirably includes exterior beveled or prismatic edge therein, and which is not suitable for satisfactory viewing of distant objects which are above or to the side of the user.

FIG. 11 shows concentric bifocal contact lens which undesirably contains unsafe and inconvenient inner beveled edges, 66 which are shown somewhat exaggerated for clarity. This construction also has all the disadvantages of the form shown in FIG. 10.

FIG. 12 shows a nonconcentric bifocal contact lens, which has the advantages of non-concentricity, but which has the disadvantages of the prismatic effect caused by the thicker lower edges 68, and which, by reason of having only a slightly greater mass at the bottom thereof, orients undesirably slowly, which has a relatively thicker lower portion 70, and which is uncomfortable and which tends to rotate in use especially when the upper lid grasps the thicker portion thereof.

The advantages of the novel lens unit are best appreciated when considered in conjunction with the problem of aircraft pilots and the like. If a pilot uses a concentric bifocal, his distant field of vision is sharply reduced, due to the presence of a bifocal segment on all outside edges of the lens. If a nonconcentric but prismatic lens is used, the peripheral field of vision is adequate, but the prismatic effect causes extremely poor space orientation, and, when judging the height of landing fields, for example, the pilot is at a gravely serious disadvantage. Thus, the lens of the present invention is the only wide field of vision bifocal lens which allows proper space orientation.

In addition, the advantages of the lens of the present invention are obvious when it is considered that many optical patients desire to have lenses which correct astigmatism, whether or not such lenses are bifocal lenses.

It will thus be seen from the foregoing description considered in conjunction with the accompanying drawings, that the present invention provides a novel lens unit and lens blank, and method of making them, and thus has desirable advantages and characteristics and accomplishes its intended objects, including those hereinbefore set out and those which are inherent in the invention.

I claim:

1. A method of making a bifocal contact lens unit comprising the steps of providing a lens blank of a transparent material having a first index of refraction, cutting a curvilinear surface defining a conutersink portion in one end of said blank and at least partially adjacent a radially outer edge portion of said lens blank, placing a dense metal insert portion on said curvilinear surface near a radially outer edge portion of said countersink portion, providing a liquid, optically transparent plastic material which, when cured, has an index of refraction differeing from said first index of refraction, pouring said liquid plastic material into said countersink portion, thereby completely covering said metal insert portion while said metal insert portion is held in place closely adjacent said curvilinear surface, allowing said liquid plastic material to dry in place in said countersink portion, and grinding a bifocal contact lens from the composite lens blank thus formed.