SINGLE SURFACED SUPER-DENSITY OPTICAL DISCS

Field of Invention

This invention relates to the shaping of plastic compact discs (CD's) by injection molding for storing data in an optical medium. In particular it relates to the provision of super-density compact discs where only one surface is required for the storage of information.

Background Of The Invention

Plastic discs having a pit optical track structure are well known as compact discs. Double sided discs in which information is recorded on two sides of such a structure formed by binding two compact discs and apparatus for playing such discs is also well known, as in U.S. patents 4,903,140; 4,939,011; 5,097,465; 4,811,324.

The term compact disc as used in this application includes any disc shaped recorded medium having pits and lands forming an optical track structure on a data information recording planar surface. Thus it includes such discs where the information stored as pits and lands is digital information or analog information.

Digital information may be encoded into the pits and lands as pits of quantized lengths interpretable as a stream of digital data, wherein the length of each pit or land segment may

be, for example, related to the number of 1's or 0's in a data stream. An example of such a system is the compact disc ("CD") audio or video disc. Analog information may be encoded into the pits and lands as pit lengths that may vary over a continuum of values, wherein the length of each pit or land segment may be, for example, related to a voltage level in a desired output. An example of such a system is the laser disc video recording system.

Brief Description Of The Invention

The present invention is a novel compact disc. Such discs are known to be plastic discs having pits and lands representing optically recorded data on an internal surface in which the internal surface carries a light reflective film and is overcoated by a transparent layer, that exposes a flat surface. In very high density applications two such discs are bonded to each other back to back. Where there is only the need for one surface to carry data the second disc is blank. Thus a technology for providing large data storage is employed even where it is not necessary. The present invention provides a way to economize on the steps required for the manufacture of such discs.

In the present invention, the disc has two thickness regions. The first thickness region is a central cylindrical

region. The second thickness region is the remaining annular region of the disc and has only a fraction of the thickness of said first region, said fraction being less than 3/4 and more than 1/4. The second annular region is overcoated with materials of different composition.

Brief Description Of The Drawings

Figure 1 depicts a prior art system employing a thin compact disc bonded to a blank compact disc to result in a disc that is usable in a double sided system even though all the data is present on only one side thereof.

Figure 2 depicts a preferred embodiment of the present invention using a compact disc the plastic portion of which has substantial variations in thickness.

Detailed Description Of A Preferred Embodiment Of The Invention

The invention comprises a plastic disc having pits and lands representing optically recorded data on an internal surface thereof, the internal surface having a light reflective film thereon, and the surface being overcoated by a transparent layer exposing a flat surface. The disc has first and second thickness regions. The first thickness region is a central cylindrical region of a first predetermined thickness. The second thickness region comprises the remaining annular region of the disc and has

a fraction of the thickness of said first region, the fraction being less than 3/4 and more than 1/4. The annular region is then overcoated with materials of different composition.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention, which is specified in the following claims.

I claim:

1. A plastic disc having pits and lands representing optically recorded data on an internal surface thereof, the internal surface having a light reflective film thereon, and the surface being overcoated by a transparent layer exposing a flat surface, said disc comprising

first and second thickness regions, said first thickness region comprising

a central cylindrical region of a first predetermined thickness, said second thickness region comprising

a remaining annular region of the disc having a fraction of the thickness of said first region,

said fraction being less than 3/4 and more than 1/4.

2. The plastic disc of claim 1 wherein remaining annular region is overcoated with materials of different composition from the composition of said disc.

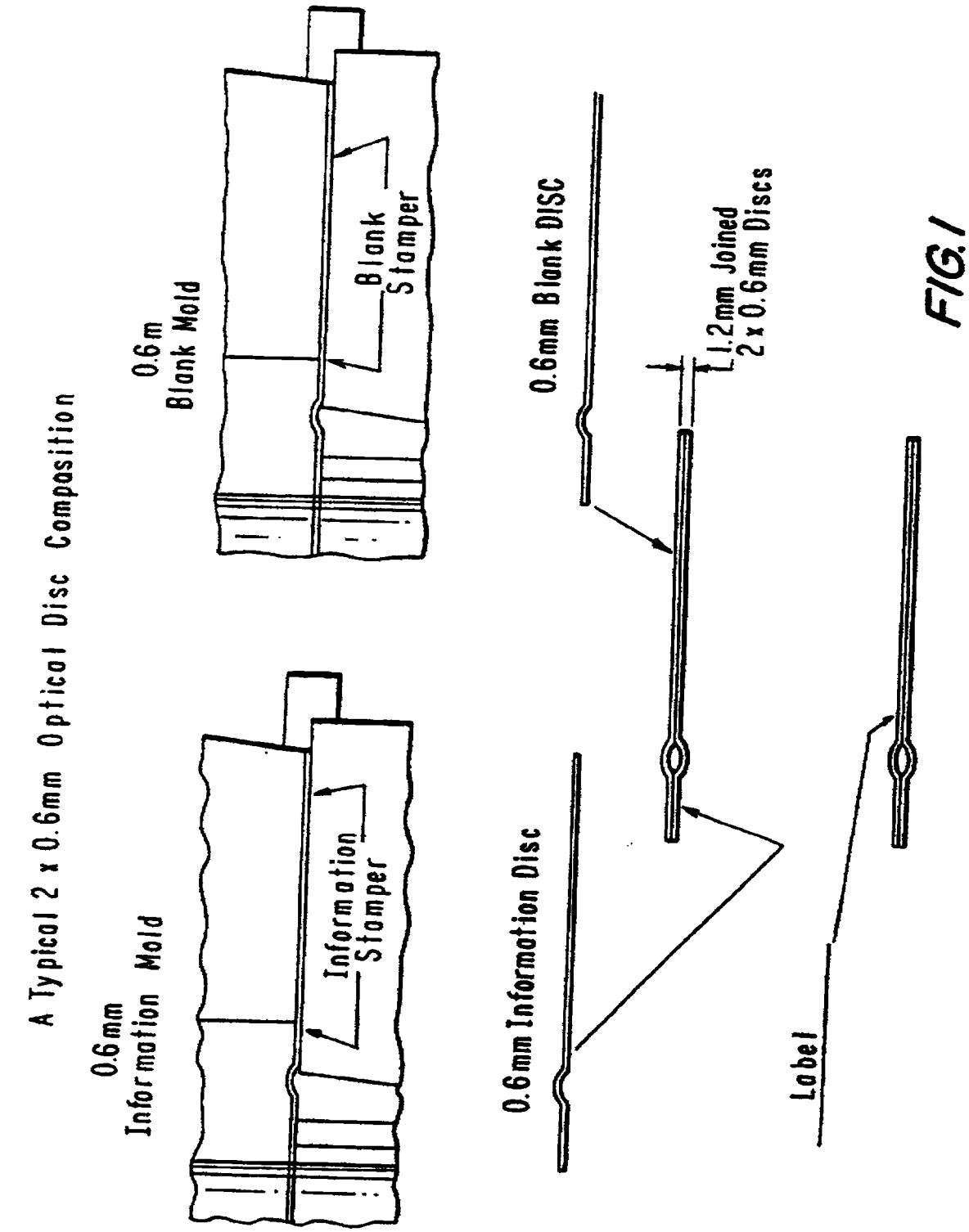

A Typical 2 x 0.6mm Optical Disc Composition
0.6mm Information Mold
Information Stamper
0.6m Blank Mold
Blank Stamper
0.6mm Information Disc
0.6mm Blank DISC
1.2mm Joined 2 x 0.6mm Discs
Label

FIG. 1

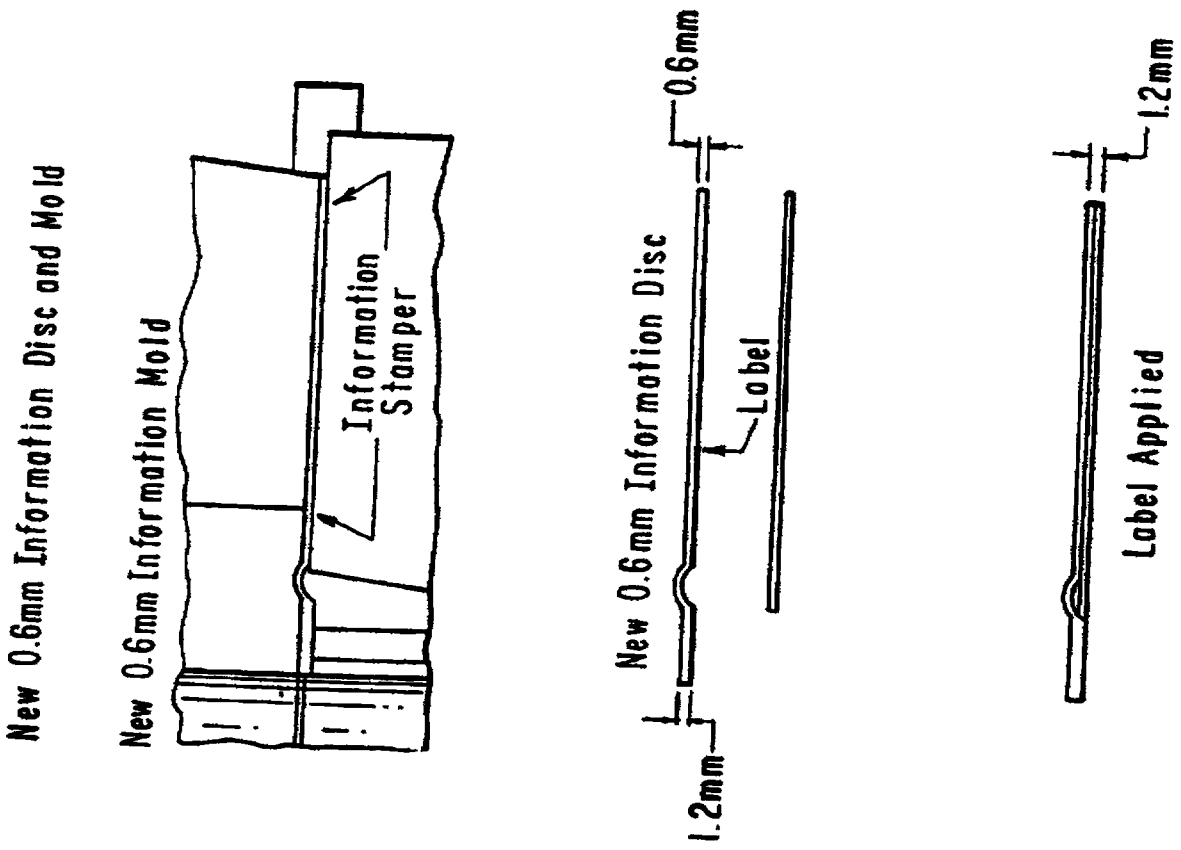

New 0.6mm Information Disc and Mold
New 0.6mm Information Mold
Information Stamper
New 0.6mm Information Disc
0.6mm
Label
1.2mm
1.2mm
Label Applied

FIG.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB97/01237

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G11B 7/24; G11B 3/70; B32B 3/02; G03C 5/00
US CL :369/280,272; 428/64.4; 430/321
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 369/280,272, 275.1, 275.2, 275.3, 281, 282, 283, 288; 428/64.4, 64.1, 64.9; 430/321, 320

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2,846,230 A (RICHTER) 05 August 1958, figure 2, central region 6, second region 8 and column 1, line 66 to column 2, line 30.	1,2
A	US 3,132,866 A (NITTI et al.) 12 May 1964, figures 1-5.	1,2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 DECEMBER 1997	05 FEB 1998

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	TAN XUAN DINH
Facsimile No. (703) 305-3230	Telephone No. (703) 308-4859

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Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

A compact disc with digital data optically recorded thereon has two thickness regions. The first thickness region is a central cylindrical region (1.2 mm), the second thickness region is the remaining annular region of the disc (0.6mm) having a label area (label applied) and has a fraction of less than 3/4 and more than 1/4 with the thickness of the first region.

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(71) Applicant: WEA MANUFACTURING, INC. [US/US]; 1444 East Lackawanna Avenue, P.O. Box 321, Olyphant, PA 18447 (US).

(72) Inventor: MUELLER, William; 2007 Terra Drive, Clarks Summit, PA 18411 (US).

(74) Agent: RUBENSTEIN, Allen, I.; Gottlieb Rackman & Reisman, P.C., 270 Madison Avenue, New York, NY 10016-0601 (US).

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(57) Abstract

A compact disc with digital data optically recorded thereon has two thickness regions. The first thickness region is a central cylindrical region (1.2 mm), the second thickness region is the remaining annular region of the disc (0.6 mm) having a label area (label applied) and has less than 3/4 and more than 1/4 with the thickness of the first region.

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