

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199743164 B2
(10) Patent No. 736385

(54) Title
Stamper for two layered disc

(51)⁷ International Patent Classification(s)
B32B 003/00

(21) Application No: **199743164**

(22) Application Date: **1997.09.05**

(87) WIPO No: **WO98/09806**

(30) Priority Data

(31) Number	(32) Date	(33) Country
08/708454	1996.09.05	US

(43) Publication Date : **1998.03.26**

(43) Publication Journal Date : **1998.05.21**

(44) Accepted Journal Date : **2001.07.26**

(71) Applicant(s)
WEA Manufacturing, Inc.

(72) Inventor(s)
Harold Jenkins

(74) Agent/Attorney
F B RICE and CO,605 Darling Street,BALMAIN NSW 2041

(56) Related Art
US 5540966

OPI DATE 26/03/98 APPLN. ID 43164/97
AOJP DATE 21/05/98 PCT NUMBER PCT/IB97/01225



AU9743164

IN

(51) International Patent Classification ⁶ : B32B 3/00	A1	(11) International Publication Number: WO 98/09806 (43) International Publication Date: 12 March 1998 (12.03.98)
---	-----------	--

(21) International Application Number: PCT/IB97/01225

(22) International Filing Date: 5 September 1997 (05.09.97)

(30) Priority Data:
08/708,454 5 September 1996 (05.09.96) US

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

(72) Inventor: JENKINS, Harold; 803 Kosciuszko Street, Nanticoke, PA 18634 (US).

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

(81) Designated States: AU, JP, SG, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

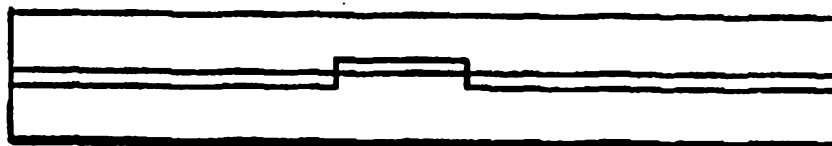
Published

*With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.*

(54) Title: STAMPER FOR TWO LAYERED DISC

(57) Abstract

Because of peculiarities of the second layer of the DVD compact disc a Mother is used as a Stamper to replicate the proper pit structure and sequence. This has the advantages of incurring no additional cost at Mastering or Plating other than the cost of replicating additional Mothers, and of allowing the manufacturer to use either layer of data as the upper or lower DVD layer.



STAMPER FOR TWO LAYERED DISCField Of The Invention

This invention relates to the manufacture of compact discs in which two layers of optical data are read from one side of the disc. In particular the invention relates to a process for molding data pits onto such a product.

Background Of The Invention

Compacts discs, called DVD (Digital Versatile Disc) have been proposed in which there are two surfaces of data both of which can be read from a single side of the disc. This is obtained by putting a semi-transmissive coating on the top of the bottom layer and using an optically clear adhesive to glue both sides together. The top side is then coated with a normal amount of aluminum.

The various steps in the manufacturing of the data surfaces by photo lithographic and molding processes are well known and employ the construction of masters. The DVD double-sided disc would have a capacity of about ten gigabytes of data and have two 0.6 mm thickness discs, having a reflective layer on a signal layer and bonded so that the signal layers face each other with a small space of bonding resin layer.

One problem is in the sense of rotation of the second side. It has to be the same as the sense of rotation of the first side. This is accomplished by reversing the spindle motor

during mastering.

Brief Description of the Invention

5 In a first aspect there is provided a method of fabricating a two sided digital video disc comprising the steps of:

providing a first layer;

providing a second layer;

stamping a top surface of the first layer with a first master stamper;

stamping a bottom surface of the second layer with a mother stamper;

10 and

joining the top surface of the first layer to the bottom surface of the second layer to form one side of the two sided digital video disc.

In a related aspect there is provided a two sided digital video disc fabricating apparatus comprising:

15 means for providing a first layer;

means for providing a second layer;

means for stamping a top surface of the first layer with a first layer with a first master stamper;

20 means for stamping a bottom surface of the second layer with a mother stamper; and

means for joining the top surface of the first layer to the bottom surface of the second layer to form one side of the two sided digital video disc.

In a further aspect there is provided a two sided digital video disc comprising:

25 a first layer having a top surface imprinted with pits by a first master stamper; and

a second layer having a bottom surface imprinted with pits by a mother stamper, said bottom surface affixed to the top surface of the first layer.

30 The reversal of the spindle motor during mastering, which produces a distinct master usable only in the manufacture of a particular data surface of the two surfaced disc is avoided by employing the mother image formed during electro-forming as a stamper in the injection molding process.



This provides the advantage that two stamper libraries (one clockwise, one counterclockwise) don't have to be maintained. Furthermore the two sides of the disc may be interchangeable during the manufacturing process allowing additional combinations of information during that process.

5 Perhaps most important, existing libraries of metal masters that has been generated in the past for the original CD or CD-ROM can be used without having to cut a new master.

Brief Description of the Drawings

10 Fig. 1-a depicts in cross section a 2-layer DVD disc.

Fig 1-b depicts in cross section the top layer of a DVD disc pressed from a stamper with the read side on top.

Fig 1-c depicts in cross section the second layer of the DVD disc pressed from a Mother with the read side on top.

15 Fig.2 is a schematic representation of the orientation of a bit pattern on the various generations and on the DVD discs obtained by using them as molds.



Detailed Description Of A Preferred Embodiment

In the manufacture of a 2-layer DVD disc, geometry dictates that the pit structure on the second layer must be reversed with respect to the first layer, while the same
5 direction of pit track layout must be present on each layer. In the past, this has been dealt with by reversing the direction of mastering on the second layer. However the requisite geometry may be achieved by using a Mother as a Stamper for the second layer.

10 In a 2-layer DVD disc, the pit geometry of the first layer is the same as the geometry of a standard CD, albeit with 0.6 mm thickness of polycarbonate instead of 1.2 mm. The metalization on the first layer is semi-transparent and is separated from the second layer by an optically transparent
15 adhesive. The pits on the second layer are also placed at a distance of approximately 0.6 mm from the read side of the DVD disc, and the metalization layer is read directly - effectively, on the second layer the DVD lens reads what would be the "inside" of a CD's pits. The flat side of the second layer - the "read"
20 side on the top disc, or any normal CD - is the "print" side of the CD disc.

Consider a selection consisting of a Master cut with a single pit. A 2-layer DVD disc that consists of the same data (Fig 1-a) is constructed. On a stamper, the mastering pit
25 becomes a "bump". The bump presses a pit into the molded disc.

This disc is metalized, and the laser reads a "bump" through the flat face of the disc (Fig. 1-b).

In the Mother of this same selection, the pit is replicated as a pit. When this Mother is then used as a Stamper in the molding process, the replica will consist of a single "bump". This "bump" is then metalized. In a normal CD player, the laser would read the "bump" as a pit. But in the second layer of the DVD disc, the metalization layer is read directly, so the "bump" is read as a "bump" (Fig. 1-c). Thus both layers of this DVD disc contain the same information, which is the expectation desired.

Consider a master consisting of the numbers 1,2,3,4,5 spiraling in a clockwise direction from center to edge. The stamper will consist of the reversed images of the numbers 1,2,3,4,5 spiraling in a counter-clockwise direction from center to edge, while the Mother will be identical in appearance to the Master. When the Stamper is used to make a disc, the disc as seen by the laser will consist of the numbers 1,2,3,4,5 spiraling in a clockwise direction from center to edge. When the Mother is used to press the second-layer DVD disc, the metalized side will be seen by the DVD laser to also consist of the numbers 1,2,3,4,5 spiraling in a clockwise direction from center to edge. (Fig. 2)

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
as defined in the claims.

5

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of fabricating a two sided digital video disc comprising the steps of:

- 5 providing a first layer;
 providing a second layer;
 stamping a top surface of the first layer with a first master stamper;
 stamping a bottom surface of the second layer with a mother stamper;

and

10 joining the top surface of the first layer to the bottom surface of the second layer to form one side of the two sided digital video disc.

2. The method of claim 1 further comprising the step of:

 stamping a top surface of the second layer with a second master stamper to form a second side of the two sided digital video disc.

15 3. The method of claim 1 wherein the mother stamper is a negative of the first master stamper.

4. A two sided digital video disc fabricating apparatus comprising:

 means for providing a first layer;
 means for providing a second layer;
 means for stamping a top surface of the first layer with a first layer with
 20 a first master stamper;

 means for stamping a bottom surface of the second layer with a mother stamper; and

 means for joining the top surface of the first layer to the bottom surface of the second layer to form one side of the two sided digital video disc.

25 5. The apparatus of claim 4 further comprising:

 means for stamping a top surface of the second layer with a second master stamper to form a second side of the two sided digital video disc.

6. The apparatus of claim 4 wherein the mother stamper is a negative of the first master stamper.

30 7. A two sided digital video disc comprising:

 a first layer having a top surface imprinted with pits by a first master stamper; and

 a second layer having a bottom surface imprinted with pits by a mother stamper, said bottom surface affixed to the top surface of the first layer.



8. The video disc of claim 7 wherein a top surface of the second layer is imprinted with pits by a second master stamper to form a second side of the two sided digital video disc.

5 9. The method of claim 7 wherein the mother stamper is a negative of the first master stamper.

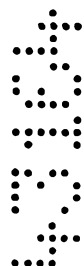
10. A method for fabricating a two sided digital video disc substantially as hereinbefore described with reference to the accompanying drawings.

Dated this fifth day of June 2001

WEA Manufacturing Inc.

Patent Attorneys for the Applicant:

F B RICE & CO



1 / 2

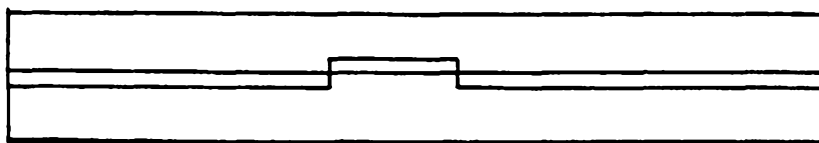


FIG. 1a



FIG. 1b



FIG. 1c

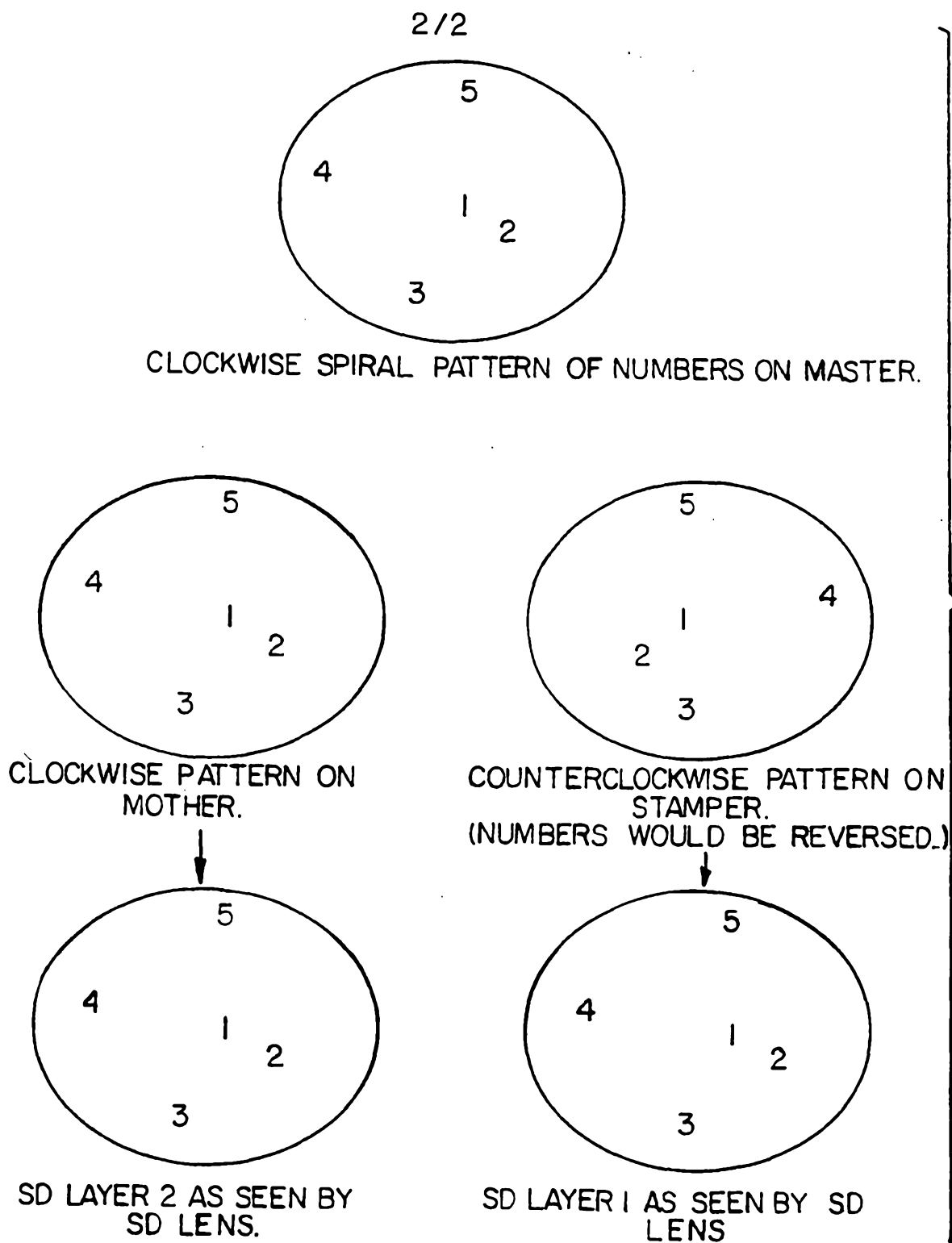


FIG. 2