

INTEGRATED CHUCK HOLDER AND CHUCK PLATE FOR OPTICAL DISC PLAYER

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5 FIELD OF THE INVENTION

This invention relates the field of optical disc drives, and particularly to an integrated chuck holder and chuck plate, called chuck cup, for a chucking mechanism which is used to clamp the optical disc before it is
10 rotated in an optical disc player.

BACKGROUND OF THE INVENTION

Optical disc drives and disc loading mechanism are generally well
15 known to those skilled in the art. In the recent years, many improvements have been made to the loading mechanism to make the optical disc drive system more stable, reliable, less complex, cheaper, etc. There are two major movements during the loading of an optical disc into an optical disc drive. The first is the sliding movement of the loader tray into the drive. The
20 second is the movement by which the optical reader is placed in position to read the disc. The second movement is often accomplished by pivoting up the tray which supports the optical reader from an lowered position to a raised position. The optical reader has a spindle turn table which makes contact with the optical disc. The function of the turn table is to spin the disc
25 at the appropriate speed so that the data on the disc can be read by the optical reader.

To secure the disc to the turn table, a chucking mechanism is provided in the drive. The chucking mechanism basically includes a spindle motor turn table, which is located on the bottom side of the disc, and

a chucking plate on the other side of the disc. In the middle of the turn table is a magnet which, when the disc is in place, rests inside the hole of the optical disc. In the middle of the chucking plate is a chuck holder which holds a metal plate which is attracted by the magnet on the spindle motor.

- 5 To clamp the disc in place, the magnet and the metal plate are placed together while the chucking plate engages the disc.

In light of the continual evolution of the optical disc drives, there is a need for an improved chuck holder and chuck plate combination which is simpler in design, more durable, and which is highly adaptable for high-
10 volume manufacturing.

OBJECT OF THE INVENTION

It is the object of the present invention to provide an integrated chuck
15 holder and chuck plate apparatus, called chuck cup, which is simpler, more durable, and which is more adapted for mass manufacturing.

SUMMARY OF THE INVENTION

20 The present invention is an integrated chuck holder and chuck plate apparatus, or chuck cup, which facilitates the clamping of an optical disc. When an optical disc is placed inside a optical disc drive, it must be rotated a high speed in order for the optical disc to read the data off the disc. But before the disc begins to spin, the disc must firmly clamped into place by a
25 chucking mechanism which is found in all current optical disc drives. The basic function of the chucking mechanism is to clamp the optical disc to the spindle turn table to prevent the disc from vibrating or disengaging. Almost

all of the current high-speed optical disc drives utilize magnetic force as the principal clamping force in their chucking mechanism.

The optical disc reader has a spindle motor turn table which spins the disc. In the middle of the turn table is raised portion with a magnet placed in the center. The magnet portion is designed to fit inside the center hole of the optical disc. The chuck cup has an indented center portion which is adapted to receive the magnet. The shape and dimension of the center portion should be substantially similar to the raised portion on the turntable so there would be a relatively snug fit. The chuck cup also includes flat portions which make direct contact with the optical disc to clamp it in place, and cavities adjacent to the flat portions. To clamp the disc in place, the chuck cup is brought forward towards the magnet from the other side of the disc. The disc is clamped in place when the magnet is inserted into the indented center portion, and the flat portions makes solid contact with the disc.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective diagram of a typical optical disc reader disposed inside a optical disc drive.

FIG. 2 is a perspective diagram of an optical disc drive incorporating the present chuck cup.

FIG. 3A and FIG. 3B are perspective diagrams showing the opposite sides of the chuck cup.

DETAILED DESCRIPTION OF THE DRAWINGS

When an optical disc is placed inside a optical disc drive, it must be
5 rotated a high speed in order for the optical disc to read the data off the disc.
But before the disc begins to spin, the disc must be firmly clamped into
place by a chucking mechanism which is found in all current optical disc
drives. The basic function of the chucking mechanism is to clamp the
optical disc to the spindle turn table to prevent the disc from excessively
10 vibrating or disengaging. Almost all of the current high-speed optical disc
drives utilize magnetic force as the principal clamping force in their
chucking mechanism.

FIG. 1 illustrates a typical optical disc reader 20 found in many
current optical disc drives. The optical disc reader has a spindle motor turn
15 table 10 which spins the disc. In the middle of the turn table 10 is a raised
portion with a magnet 12 placed in the center. The magnet portion is
designed to fit inside the center hole of the optical disc. To clamp the disc in
place, a chuck plate with a metal plate inside a chuck holder is brought
forward towards the magnet from the other side of the disc. When the
20 magnet and the metal plate make contact, the disc is clamped in between
the magnet and the chuck plate.

In most of the current designs, the metal plate is held inside a plastic
chuck holder, and the plastic chuck holder is a separate component from
the chuck plate. Because the current chuck holders are made of both metal
25 and plastic, and also because the chuck holder and the chuck plate are not
integrated into a single component, the manufacturing process must incur
the steps of combining the chuck holder to the chuck plate, and inserting the
metal plate inside the chuck holder. These steps can be eliminated when

manufacturing the present invention, as the chuck holder and the chuck plate are entirely integrated and made from a single metal material.

FIG. 3A and FIG. 3B illustrate the two sides of this improved single-piece chuck cup 30. FIG. 2 illustrates the chuck cup 30 disposed in an optical disc drive and clamping down on the optical disc 40. The shape of the chuck cup 30 is substantially similar to the previous chuck holder/chuck plate combination. Referring to FIGS. 3A and 3B, the chuck cup 30 has a generally circular main body 31. It has a indented center portion 32 which is adapted to receive the magnet from the spindle motor turn table. The shape and the dimension of the center portion 32 should be substantially similar to the raised portion on the turntable so there would be a relatively snug fit. The chuck cup 30 also includes flat portions 34 which make direct contact with the optical disc to clamp it in place. In between the flat portions 34 are cavities 36. Although it is possible to eliminate the cavities 36 and have the flat portions 34 be of one solid surface, providing the cavities 36 reduces material and lightens the chuck cup. Hence they are desirable. Although in this diagram, four cavities are provided, one skilled in the art should understand that various other numbers, sizes, and shapes are possible without substantially deviating from the scope of this invention.

The present chuck cup is much more durable than the traditional 2-piece chuck holder. Moreover, it greatly simplifies the manufacturing process. Unlike the previous chuck holder/plate combination that required multiple manufacturing steps, the present chuck cup can essentially be made by punching a metal plate.

While the present invention has been described in detail herein in accord with certain preferred embodiments thereof, many modifications and changes therein may be effected by those skilled in the art. Accordingly, it is

intended by the appended claims to cover all such modifications and changes as falling within the true spirit and scope of the present invention.

CLAIMS**We Claim:**

- 1 1. A chuck cup for a chucking mechanism in an optical disc drive, said
2 drive having a turn table with a raised portion, said raised portion having a
3 magnet, said chuck cup comprising:
4 an integrated main body, said body having an indented center
5 portion adapted for snugly receiving said raised portion and magnetically
6 mating with said magnet, and a flat portion adapted for making contact with
7 said disc.
- 1 2. The chuck cup recited in claim 1 further comprising at least one
2 cavity.
- 1 3. The chuck cup as recited in claim 1 wherein said chuck cup is
2 circular in shape.
- 1 4. The chuck cup as recited in claim 2 wherein said integrated body has
2 four cavities and four flat portions, each of said cavities disposed in between
3 said flat portions.