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PROVISIONAL SPECIFICATION

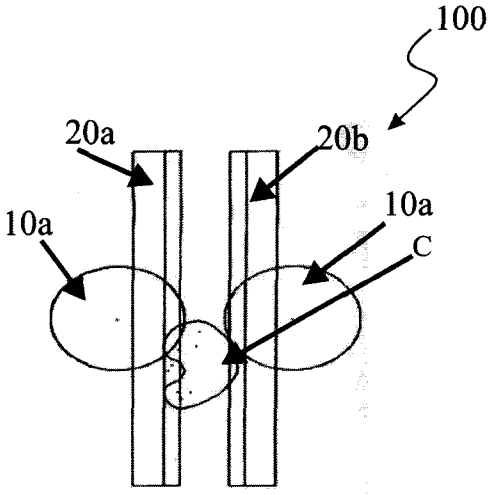

FIGURE 1a
(PRIOR ART)

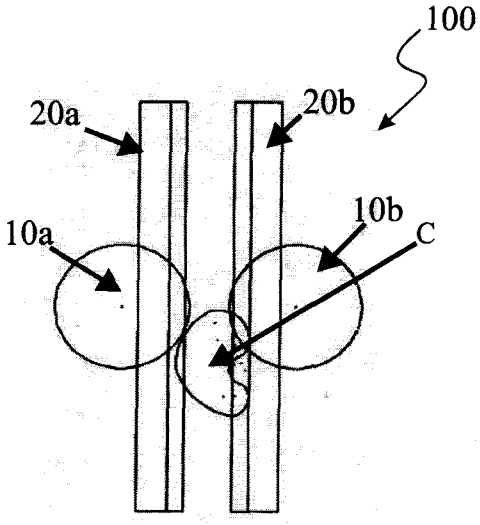

FIGURE 1b
(PRIOR ART)

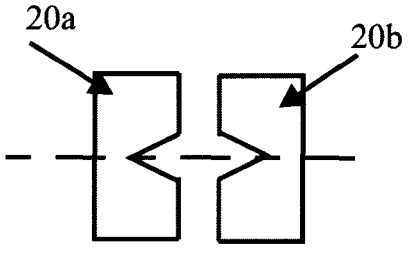

FIGURE 1c
(PRIOR ART)

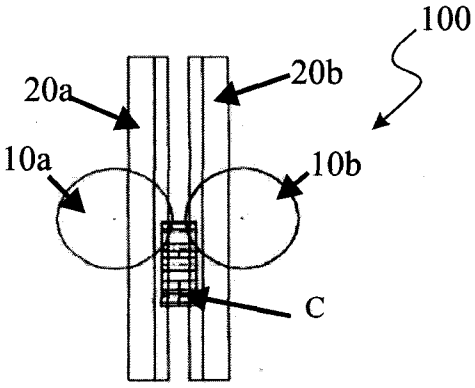

FIGURE 1d
(PRIOR ART)

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PROVISIONAL SPECIFICATION

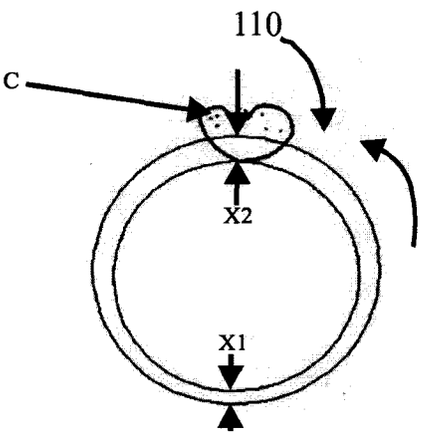

FIGURE 2a

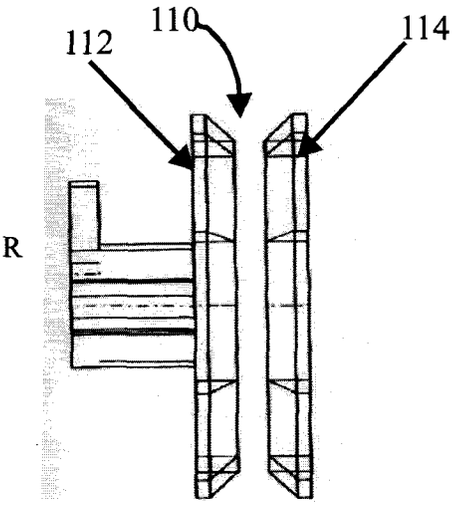

FIGURE 2c

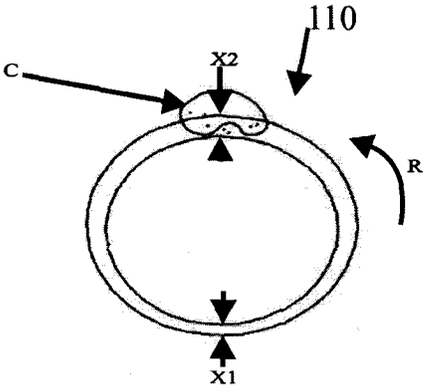

FIGURE 2b

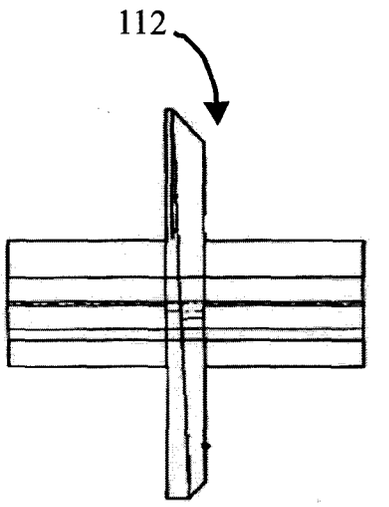

FIGURE 2e

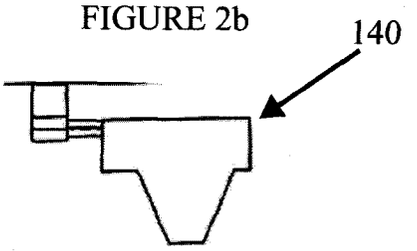

FIGURE 2d

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PROVISIONAL SPECIFICATION

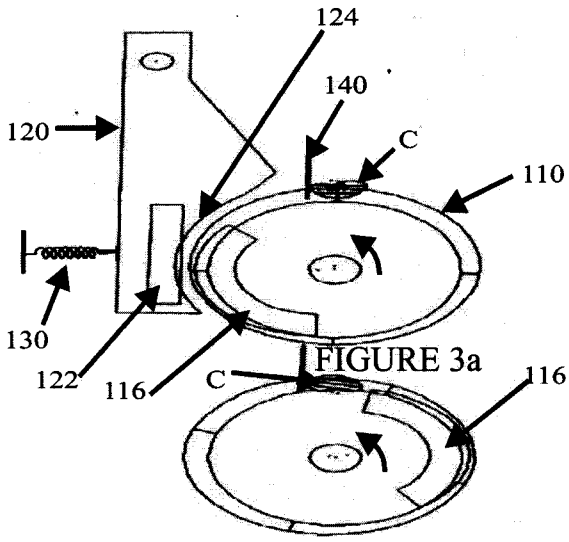

FIGURE 3a

FIGURE 3c

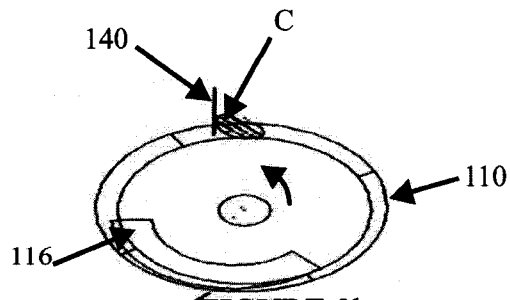

FIGURE 3b

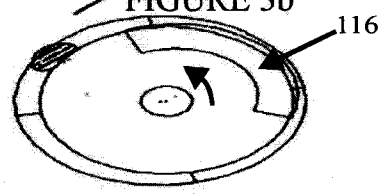

FIGURE 3d

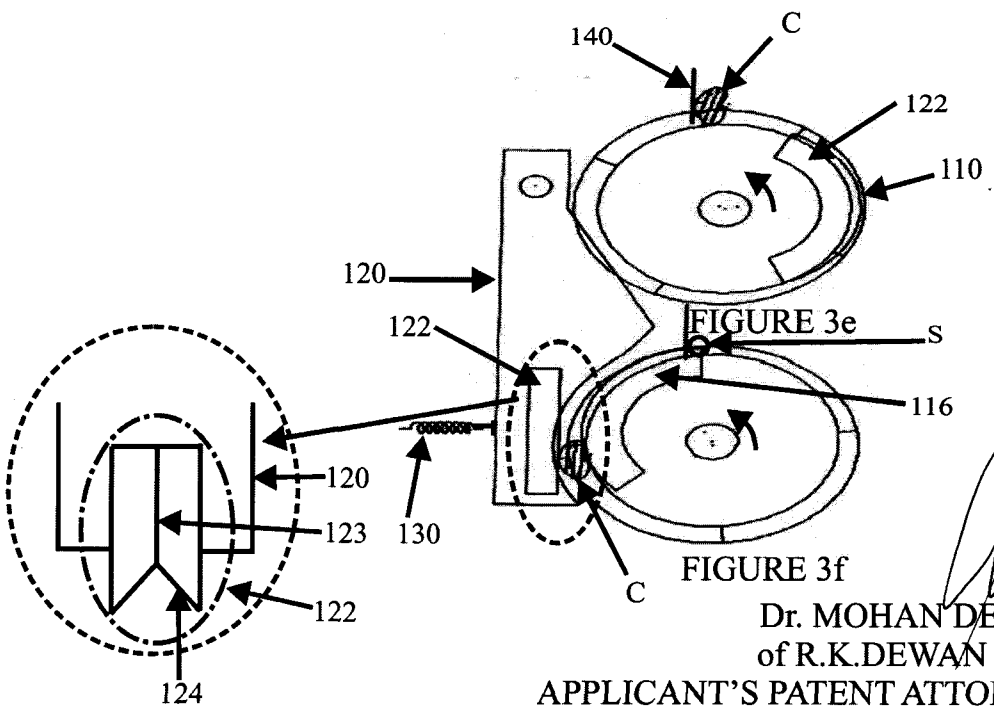

FIGURE 3e

FIGURE 3f

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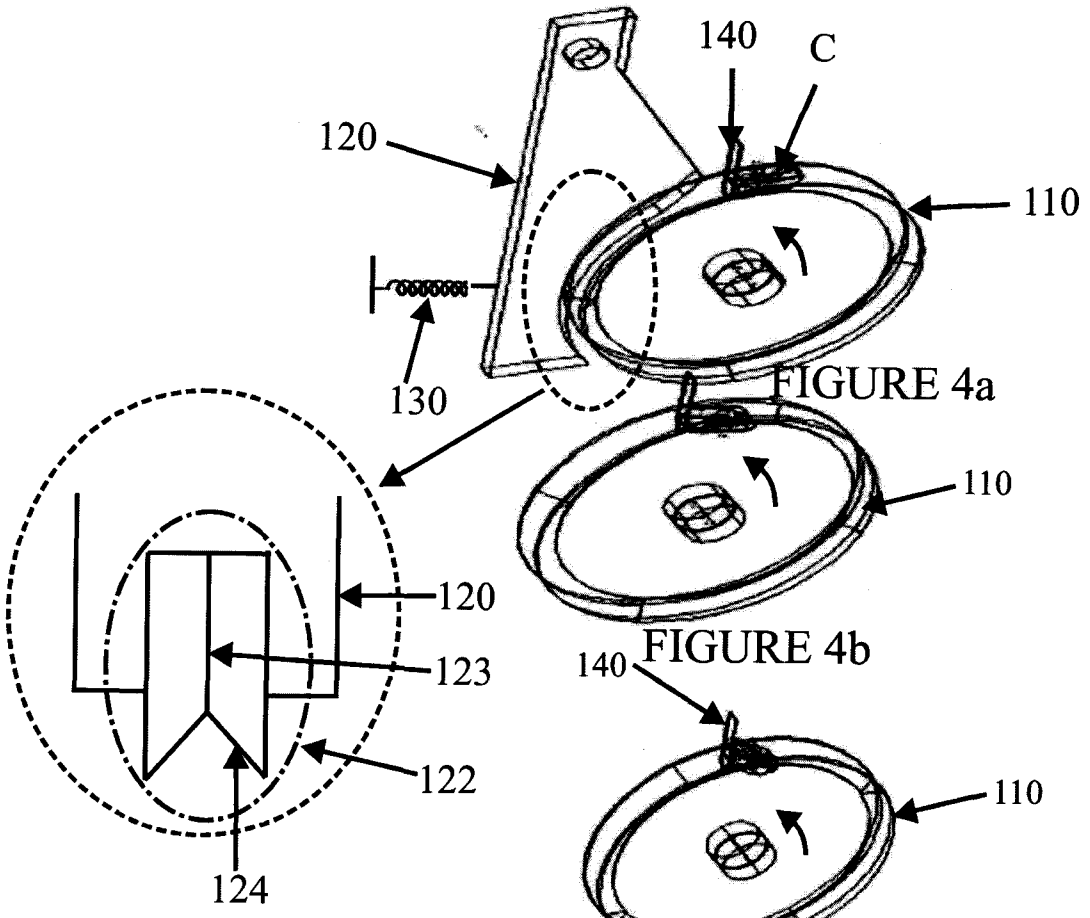

FIGURE 4a

FIGURE 4b

FIGURE 4c

FIGURE 4d

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PROVISIONAL SPECIFICATION

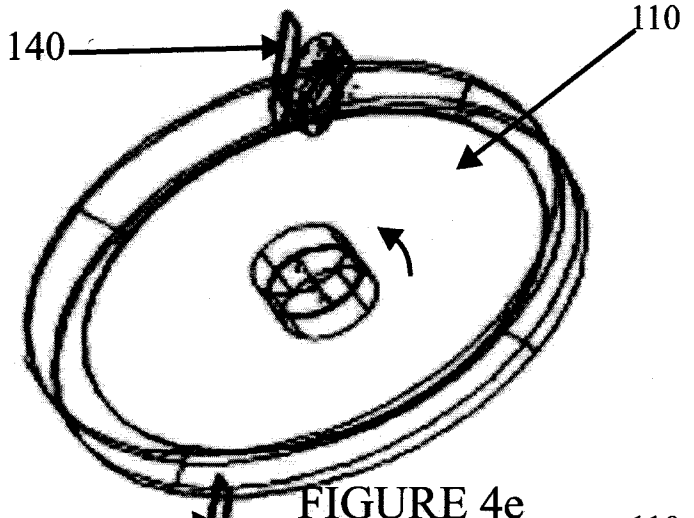

FIGURE 4e

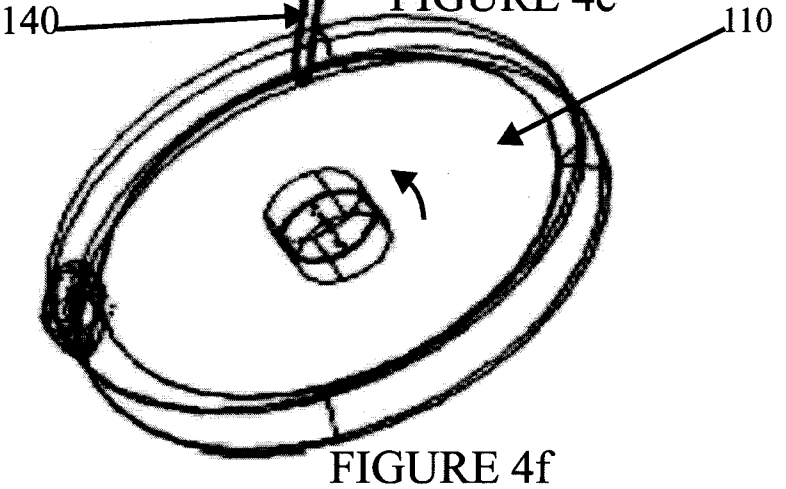

FIGURE 4f

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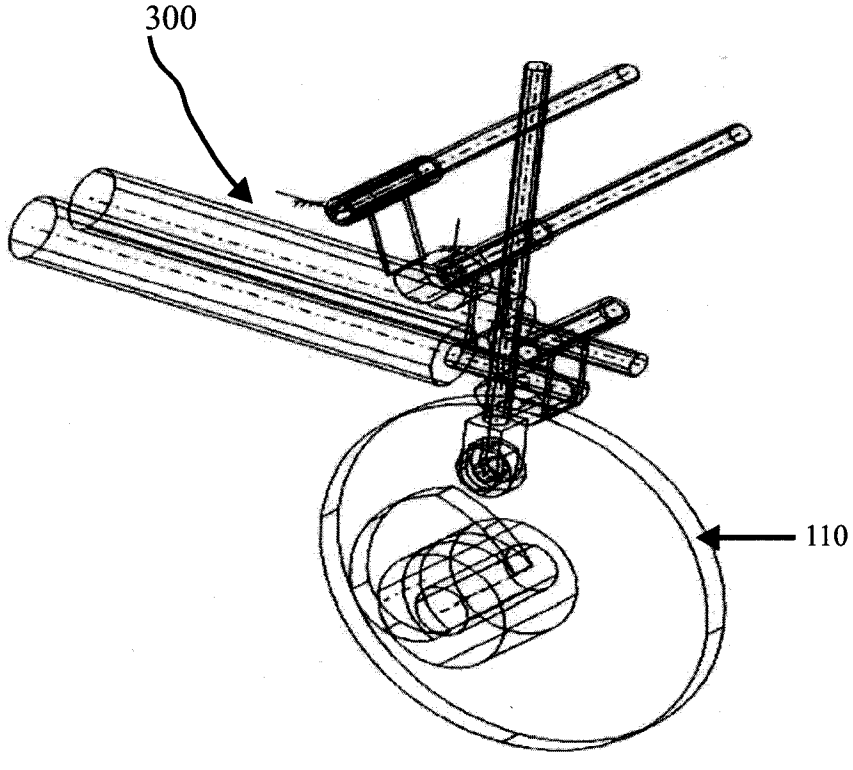

FIGURE 5

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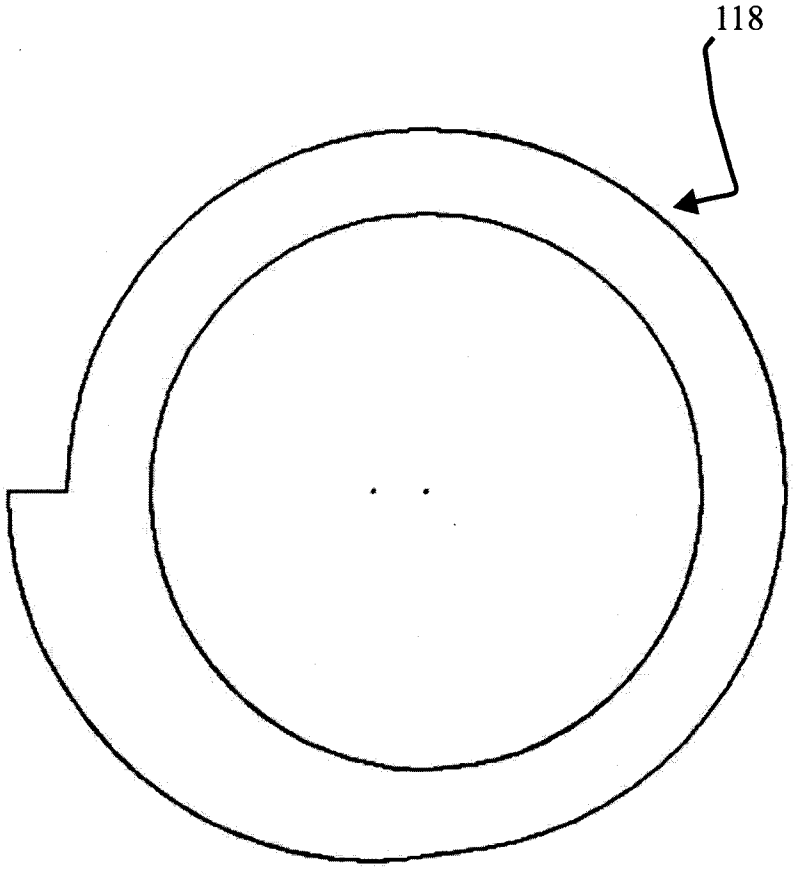

FIGURE 6

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SHEET NO. : 08

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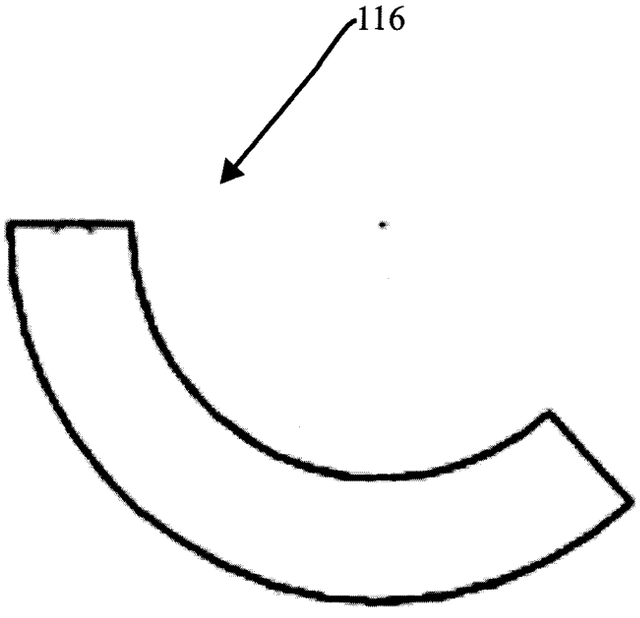

FIGURE 7

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PROVISIONAL SPECIFICATION

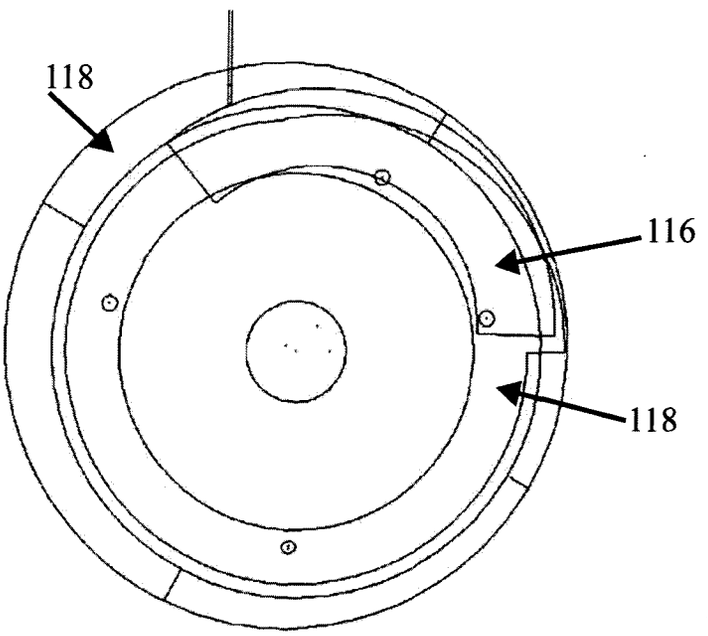

FIGURE 8a

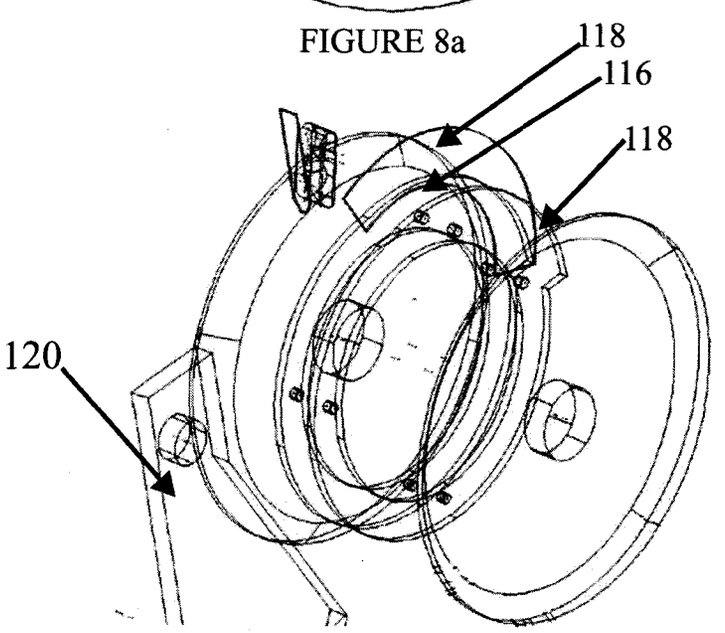

FIGURE 8b

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FIELD OF THE INVENTION

The present disclosure relates to a method and an apparatus for de-shelling shelled articles. More specifically, the present invention relates to a method and apparatus for removing a shell of a shelled article without damaging the article.

BACKGROUND

A large number of dry fruits such as raw cashew-nuts, pistachios and walnuts are present in form of a kernel contained within a hull, pod, husk, or shell in which the same is naturally encapsulated. More specifically, the shell is having two parts exocarp and a mesocarp, the shell is joined at the line of dehiscence. Such dry-fruits are in great demand throughout the world and are exported in both shelled and de-shelled states. However, most of the dry-fruit wholesalers and retailers propose to package and sell dry-fruits in de-shelled state, wherein said shells are removed from the kernel. In the cashew-nut industry, most of the processes including the cashew-nut de-shelling process are manual processes. In case of manual de-shelling of cashew-nuts, a crushing force is applied on the cashew-nut to break open the shell, however, the crushing force may also damage the cashew-nut encapsulated in the shell. Further, in case of manual de-shelling of cashew-nuts, the speed of de-shelling is very slow and cannot be maintained at a desired speed. The de-shelling of large numbers of shelled kernels by hand is a tedious, time consuming and hence expensive operation. In accordance with another manual method for de-shelling cashew-nuts, the cashew-nut to be de-shelled is held below a cutting blade and force is manually applied on the cutting blade for piercing the shell of the cashew nut. However, in case of such manual method for de-shelling cashew-nuts, the force applied on cutting blade cannot be properly controlled and if the force is not appropriately applied, and the seed inside the shell may get damaged and ultimately leading to financial losses. Further, manual de-shelling of the raw cashew-nut requires

skilled labour for making alignment of the raw cashew-nut and for striking the shearing blade at the line of dehiscence of the raw cashew-nut. Still further, manual de-shelling have been proven unsafe, labor-intensive, complicated and expensive. The manual de-shelling of the shelled kernels require handling of sharp edged shearing tools that may cause injury to the workers, as such the working environments in case of manual de-shelling are not safe. Further, manual handling of the cashew-nuts is not advisable, as manual handling of the cashew-nuts by workers may lead to contamination of such food-products.The use of gloves for protecting the fingers of the workers hampers efficient handling of the cashew nuts and significantly reduces the speed and accuracy of the de-shelling operation.

Mechanical de-shelling machines have also been suggested in the prior art. In case of mechanical de-shelling machines, hopper supplies cashew nuts to be de-shelled one by one. The cashew-nut to be de-shelled is held in-between a pair of blade guides. The blade guides are notched for facilitating holding of the cashew-nut and a pair of sharp edged blades approaches the cashew-nut from the either sides, till both the blades guided through the blade guides pierce through the shell of the cashew-nut held between the pair of blade guides. In case of the conventionally known mechanical de-shelling machines, there is no provision for aligning the cashew nuts to be de-shelled for appropriately positioning or orienting the cashew nut as the shearing blade strikes the raw cashew-nut. This may cause the shearing blade to form an inappropriate cut on the cashew-nut shell. Further, in case of the conventionally known mechanical de-shelling machines, the orientation of the cashew-nut changes as it travels or as it is being handled, such changing of the orientation of the cashew-nut is also not desirable and may cause formation of inappropriate cuts. The conventionally known mechanical de-shelling machines can handle cashew-nuts of a given size range and adjustments are required for handling cashew-nuts of different size

range. Accordingly in case of conventionally known mechanical de-shelling machines, the cashew-nuts are required to be graded according to size before feeding. The grading of the cashew-nuts before feeding to the mechanical de-shelling machine is done manually or with the help of an automatic grading machine and accordingly, the mechanical de-shellers of the prior art fail to minimize dependency on manual work. Also, it is hard to and non-value adding too to grade the cashew nuts to the extent of required precision either by size or by shape.

Accordingly, the conventionally known mechanical de-shelling machines are inaccurate and still require skilled labor for the operation thereof. More specifically, in case of the mechanical de-shelling machines, the shearing blades have to handle cashew nuts or shelled articles in different orientations. Accordingly, the shelled article or cashew-nut is not appropriately positioned or oriented as the shearing blades strike the raw cashew-nut from the "hump side" and the "ends side" of the raw cashew nut. This may cause the shearing blade to form inappropriate cuts on both sides i.e. the "hump side" and the "ends side" of the cashew-nut and the shell of the cashew nut is either left uncut or provided with a much deeper cut than required on either one side. More specifically, if the shearing blade traverses more through the shell at the "hump side" it may cause damage to the kernel and if the shearing blade traverses less through the shell at the "hump side" it may leave the shell uncut. However, both instances are not desirable. More specifically, in case the cashew nut shell is left uncut, the breaking of the shell to access the kernel is difficult and in case the cut is deeper that required, the shearing blade may damage the kernel. Further, with the conventionally known configuration, the shearing blades approach the cashew nut shell from both sides and are adapted to travel by same distance and form same depth of cut on both sides of the cashew-nut shell. However, such a configuration also may cause the shearing blades to either leave the shell of the

cashew nut uncut or provide a much deeper cut than required. More specifically, in case of manual de-shelling, about 2-25 percent of the kernels are damaged due to deeper cut of shearing blades striking and damaging the kernel. Further, in case of conventional de-shelling machines, about 10-60 percent of the shells of the cashew-nuts are left uncut due to inappropriate cuts. Due to inability of the conventional de-shelling machines to appropriately position the cashew nut to cause the shearing blades to strike the "hump side" and the "ends side" of the cashew-nut, the cuts formed by the shearing blades are inappropriate, thereby causing un-cut shell or damage to the kernel due to over-penetration of the shearing blades. Accordingly, the yield in case of the conventional de-shelling machines is low. In nut shell, the manual de-shelling as well as conventional mechanical de-shellers for de-shelling the nuts have several drawbacks associated there-with.

According, there is a need for a mechanical de-sheller for de-shelling the nuts that is simple and convenient to use. Further, there is a need for a mechanical de-sheller machine that eliminates the drawbacks associated with the conventionally known mechanical de-shelling machines. More specifically, there is a need for a mechanical de-shelling machine that enables appropriate positioning and orienting of the cashew nut to be de-shelled with respect to line of dehiscence for ensuring that the shearing blades strike the raw cashew nut along the line of dehiscence of the raw cashew-nut, thereby enabling the shearing blades to form appropriate cuts on both sides of the cashew-nut shell. Further, there is a need for a mechanical de-shelling machine that enables the shearing blades disposed on either sides of the cashew nut to form appropriate cuts on both sides of the cashew-nut shell, thereby reducing chances of un-cut shell or damage to the kernel due to over-penetration of the shearing blades. Further, there is a need for a mechanical de-shelling machine that increases yield and productivity. Furthermore, there is a need for a mechanical de-shelling

machine that can handle different sized cashew-nuts and eliminates the need to grade the cashew-nuts according to size before feeding the cashew-nuts to the mechanical de-shelling machine.

Objects:

Some of the objects of the present disclosure which at-least one embodiment is able to satisfy, are described herein below:

It is an object of the present disclosure to ameliorate one or more problems of the prior art or to at least provide a useful alternative.

An object of the present disclosure is to provide an automatic de-shelling machine that enables appropriate positioning and orienting of a raw cashew nut to be de-shelled with respect to line of dehiscence for ensuring that a pair of shearing blades strike the raw cashew nut along the line of dehiscence of the raw cashew-nut at both sides i.e. the "hump side" and the "ends side", thereby enabling the shearing blades to form appropriate cuts on both sides of the cashew-nut shell.

Another object of the present disclosure is to provide an automatic de-shelling machine that forms appropriate cuts on both sides of the cashew-nut shell, i.e. the "hump side" and the "ends side" by strategically providing unequal depth of cuts at the "hump side" and the "ends side" of the cashew nut.

Still another object of the present disclosure is to provide an automatic de-shelling machine that forms appropriate cuts on both sides of the cashew-nut shell, i.e. the "hump side" and the "ends side", thereby reducing chances of un-cut shell or damage to the kernel due to over-penetration of the shearing blades.

Still another object of the present disclosure is to provide an automatic de-shelling machine that continuously de-shells cashew-nuts, irrespective of size of cashew-nuts fed there-to.

Another object of the present disclosure is to provide an automatic de-shelling machine that can handle cashew-nuts of any size, thereby eliminating the need to grade the cashew-nuts before feeding to the automatic de-shelling machine.

Another objective of the present disclosure is to provide an automatic de-shelling machine that automatically adjusts position and orientation of a "hump side" and an "ends side" of a cashew nut with respect to the shearing blades and according adjusts the depth of cut to be provided at the "hump side" and the "ends side" of the cashew nut.

Yet another object of the present disclosure is to provide an automatic de-shelling machine that requires less power for operation thereof.

Still another object of the present disclosure is to provide an automatic de-shelling machine that maximizes recovery of kernels naturally encapsulated within the shell and accordingly increases the yield.

Another object of the present disclosure is to provide an automatic de-shelling machine that eliminates manual handling of the nuts and the drawbacks associated with manual handling.

Still another object of the present disclosure is to provide an automatic de-shelling machine that optimizes and / or maximizes the yield.

Still another object of the present disclosure is to provide an automatic de-shelling machine that facilitates cracking and de-shelling action to be performed automatically and in continuous fashion.

Another object of the present disclosure is to provide an automatic de-shelling machine that reduces chances of damage to kernel held inside the shell due to uncontrolled piercing depth of blade in to the shell and uncontrolled piercing forces acting on the shell.

Yet another object of the present disclosure is to provide an automatic de-shelling machine that reduces financial losses occurring due to damage to the kernel held inside the shell due to uncontrolled piercing of the blades in to the shell during the de-shelling operation.

Another object of the present disclosure is to provide an automatic de-shelling machine that restrains handling of nuts by workers during processing thereof, thereby reducing chances of contamination.

Still another object of the present disclosure is to provide an automatic de-shelling machine that carries out the de-shelling operation in a fully automatic manner without much human intervention.

Still another object of the present disclosure is to provide an automatic de-shelling machine that is easy to use and maintain.

These and other objects of the present disclosure are dealt in great extent by the accompanying drawings and the descriptive matter, in which are illustrated exemplary embodiments of the invention.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWING

The automatic de-shelling machine of the present disclosure will now be described in relation to the accompanying drawings, in which:

Figure 1a illustrates a conventional mechanical de-shelling machine, wherein a pair of shearing cutters is guided through a pair of blade guides to strike a cashew nut held between the blade guides with its "hump side" pointing operatively rightwards;

Figure 1b illustrates a conventional mechanical de-shelling machine, wherein the cashew-nut is held between the blade guides with its "ends side" pointing operatively rightwards;

Figure 1c illustrates a cross-sectional view of the pair of blade guides of the conventional mechanical de-shelling machine of **Figure 1a**, wherein the blade guides are provided with notches formed thereon to hold the cashew nut;

Figure 1d illustrates a top view of the conventional mechanical de-shelling machine of **Figure 1a**;

Figure 2a illustrates a front view of a modified v- belt pulley for a mechanical de-shelling machine in accordance with an embodiment of the present disclosure, wherein depth of the v-notch configured along the periphery varies along the periphery of the pulley, the v-notch receives the cashew nut with the "ends side" pointing operatively upwards;

Figure 2b illustrates a front view of a modified v-belt pulley of **Figure 2a**, wherein the v-notch receives the cashew nut with the "hump side" pointing operatively upwards;

Figure 2c illustrates a side view of the modified v-belt pulley of **Figure 2a** configured by assembling two portions;

Figure 2d illustrates one half configuring the modified v-belt pulley of **Figure 2c**;

Figure 2 e illustrates a swinging door disposed over the modified v-belt pulley of the mechanical de-shelling machine;

Figure 3a – Figure 3f illustrates schematic representation depicting different stages during the operation of the mechanical de-shelling machine, wherein the cashew-nut to be de-shelled changes it's position with respect to a first shearing blade mounted on the modified v-belt pulley and a second shearing blade mounted on arcuately extending v-notch;

Figures 4a – Figure 4f illustrates isometric views of the mechanical de-shelling machine during different stages of operation as illustrated in **Figure 3a – Figure 3f** respectively;

Figure 5 illustrates a one-by one feeder for the automatic mechanical de-shelling machine, wherein the one-by one feeder feeds the cashew nut one by one into the mechanical de-shelling machine;

Figure 6 illustrates a schematic representation of a blade guide of the pair of blade guides held between the half portions configuring the modified v-belt pulley of the mechanical de-shelling machine;

Figure 7 illustrates a schematic representation of a first shearing blade disposed between the pair of blade guides held between the half portions configuring the modified v-belt pulley; and

Figure 8a and **Figure 8b** illustrates schematic representation of a first shearing blade disposed between the pair of blade guides held between the half portions configuring the modified v-belt pulley.

DETAILED DESCRIPTION

An automatic mechanical de-shelling machine of the present disclosure will now be described with reference to the embodiments which do not limit the scope and ambit of the disclosure. The description provided is purely by way of example and illustration. The embodiment herein and the various features and advantageous details thereof are explained with reference to the non-limiting embodiments in the following description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

Figure 1a illustrates a conventional mechanical de-shelling machine **100**, wherein a pair of shearing cutters **10a** and **10b** are guided through a pair of blade guides **20a** and **20b** to strike a cashew nut "C" held between the blade guides **20a** and **20b** with its "hump side" pointing operatively rightwards. **Figure 1b** illustrates a conventional mechanical de-shelling machine **100**, wherein the cashew-nut "C" is held between the blade-guides **20a** and **20b** with the "ends sides" of the cashew nut "C" pointing operatively rightwards. **Figure 1c** illustrates a cross-sectional view of the pair of blade guides **20a** and **20b** of the conventional mechanical de-shelling machine **100**, wherein the blade guides **20a** and **20b** are provided with notches **21a** and **21b** formed thereon to hold the cashew nut "C". **Figure 1d** illustrates a top view of the conventional mechanical de-shelling machine **100**.

Figure 2a illustrates a front view of a modified v-belt pulley **110** for a mechanical de-shelling machine, wherein depth "X" of the v-notch "N" configured along the periphery of the modified v-belt pulley **110** varies along the periphery of the modified v-belt pulley **110**. More specifically, at certain portion of the periphery, the v-notch "N" has a depth "X1" whereas at other portion of the periphery the v-notch "N" has a depth "X2". The v-notch "N" either receives the cashew nut "C" with the "ends side" pointing operatively upwards as illustrated in **Figure 2a** or with the "hump side" pointing operatively upwards as illustrated in **Figure 2b**. If the cashew nut "C" is received inside the v-notch "N" in the configuration illustrated in **Figure 2b**, the cashew nut "C" is in stable configuration as it is having two-point support and remains in that configuration. If the cashew nut "C" is received inside the v-notch "N" in the configuration illustrated in **Figure 2a**, the cashew nut "C" is in unstable configuration as it is supported at single point and due to rotation of the modified v-belt pulley **110** and due to configuration of the V-notch, the cashew nut "C" overturns and is brought to the stable configuration as illustrated in **Figure 2b**. More specifically, a swinging door **140** as illustrated in **Figure 2e** acts as a stopper to hold the cashew nut "C" and as the modified v-belt pulley **110** rotates, the cashew nut moves from the unstable configuration to the stable configuration illustrated in **Figure 2b.** Due to such configuration of the modified v-belt pulley **110** for the mechanical de-shelling machine, appropriate positioning and orienting of the raw cashew nut "C" to be de-shelled with respect to line of dehiscence is achieved. Further, such configuration ensures that shearing blades **116** and **122** strike the raw cashew nut "C" along the line of dehiscence of the raw cashew-nut "C" at both sides i.e. the "hump side" and the "ends side", thereby enabling the shearing blades **116** and **122** to form appropriate cuts on both sides of the cashew-nut shell. With such configuration, it is possible to provide more depth of cut at the "hump side" than at the "ends side". More specifically, such configuration enables in strategically providing

unequal depth of cuts at the "hump side" and the "ends side" of the cashew nut "C", thereby providing various advantages such as prevention of un-cut shell or damage to the kernel due to over-penetration of the shearing blades **116** and **122** and also resulting in less power consumption for operation of the mechanical de-shelling machine. Further, such configuration facilitates in adjusting position and orientation of the "hump side" and the "ends side" of the cashew nut "C" with respect to the shearing blades **116** and **122** and according adjusts the depth of cut to be provided at the "hump side" and the "ends side" of the cashew nut "C".

Figure 2a illustrates a front view of a modified v-belt pulley **110** for the mechanical de-shelling machine, wherein depth of the v-notch "N' configured along the periphery of the v-belt pulley **110** varies along the periphery of the v-belt pulley **110**. The v-notch "N" receives the cashew nut "C" either in configuration illustrated in **Figure 2a** or in configuration illustrated in **Figure 2b**. Referring to **Figure 2c,** the modified v-belt pulley **110** is illustrated. The modified v-belt pulley **110** for a mechanical de-shelling machine **100** is formed by assembling together a first half portion **112** and a second half portion **114**. Referring to **Figure 2d,** one half portion **112** configuring the modified v-belt pulley **110** is illustrated. With such configuration a first shearing blade **116** along with a pair of the blade guide **118** is held between the first half portion **112** and the second half portion **114** of the modified v-belt pulley **110**. **Figure 2 e** illustrates a swinging door disposed over the modified v-belt pulley 110 of the mechanical de-shelling machine to facilitate entry of the cashew nut "C" one at a time into the v-notch "N" of the v-belt pulley 110. More specifically, as the cashew nut "C" is received over and advances over the v-notch "N", due to rotation of the v-belt pulley **110,** the contact between the cashew-nut "C" and the side walls of the v-notch "N" of the v-belt pulley **110** breaks and the cashew-nut "C" advances over and is supported by the pair of the blade guides

118 such that cashew nut "C" advances along the line of dehiscence of the cashew-nut "C" over the line of contact between of the blade guides **118**. As the cashew nut "C" advances over the blade guides **118** along the line of dehiscence, the first shearing blade **116** mounted on the modified v-belt pulley **110** strikes the "ends side" of the cashew nut "C" and the second shearing blade **122** mounted on the arcuately extending v-notch of the pressing arrangement **120** strikes the "hump side" of the cashew nut "C". The first shearing blade **116** is adapted to form a cut having greater depth of cut than the cut configured by the second shearing blade **122**. Such a configuration enables in automatically adjusting position and orientation of the "hump side" and an "ends side" of a cashew nut "C" with respect to the first shearing blade **116** and the second shearing blade **122**, according controlling and adjusting the depth of cut to be provided at the "hump side" and the "ends side" of the cashew nut "C" is achieved. Referring to **Figure 3b**, an enlarged view of the second shearing blade **122** mounted over the pressing arrangement **120** is illustrated. The second shearing blade **122** has an inverted y configuration, with such a configuration as the cashew nut "C" advances along the "line of dehiscence" of the cashew-nut "C" over the line of contact between of the blade guides **118**, a straight portion 123 of the second shearing blade **122** engages with the "ends side" of the cashew nut "C" along the "line of dehiscence" and a pusher pushes the cashew nut "N" from behind to cause the diverging arms 124 to split open the shell of the cashew nut "N" along the "line of dehiscence".

Figure 3a – Figure 3f illustrates schematic representation depicting different stages during the operation of the mechanical de-shelling machine **200**, wherein the raw cashew-nut "C" to be de-shelled changes it's position with respect to the first shearing blade **116** mounted on the modified v-belt pulley **110** and a second shearing blade **122** mounted on arcuately extending v-notch **124** configured on the pressing arrangement **120** and is ultimately guided to be held between the

first shearing blade **116** and the shearing blade **122**, wherein the first shearing blade **116** and the shearing blade **122** form cuts on the "ends side" and the "hump side" of the cashew nut "C". The second shearing blade **122** of the pressing arrangement **120** is pressed against the cashew nut "C" held in over the blade guides **118** by using a spring based arrangement **130**. More specifically, the spring based arrangement **130** applies more urging pressure on the second shearing blade **122** to apply more shearing force over the cashew nut "C" as the cashew nut "C" is sheared by the straight portion **123** of the second shearing blade **122** as compared to when the cashew nut "C" is sheared by the diverging arms **124** of the second shearing blade **122**

Figures 4a – Figure 4f illustrates isometric views of the mechanical de-shelling machine **200** during different stages of operation as illustrated in **Figure 3a – Figure 3f** respectively. **Figure 5** illustrates a one-by one feeder **400** for the automatic mechanical de-shelling machine **200**, wherein the one-by one feeder **400** feeds the cashew nut one by one into the mechanical de-shelling machine **200**.

Figure 5 illustrates a one-by one feeder 300 for the automatic mechanical de-shelling machine, wherein the one-by one feeder 300 feeds the cashew nut "C" one by one into the mechanical de-shelling machine.

Figure 6 illustrates a schematic representation of a blade guide **118** of the pair of blade guides **118** held between the half portions 112 and 114 configuring the modified v-belt pulley 110 of the mechanical de-shelling machine. **Figure 7** illustrates a schematic representation of a first shearing blade 116 disposed between the pair of blade guides 118 held between the half portions 112 and 114 configuring the modified v-belt pulley 110.

Figure 8a and **Figure 8b** illustrates schematic representation of a first shearing blade 116 disposed between the pair of blade guides 118 held between the half portions 112 and 114 configuring the modified v-belt pulley 110. The mechanical de-shelling machine can also perform peeling operation on the kernels that are obtained after performing the de-shelling operation, wherein the first and second shearing blades are replaced with peeling brushes and the kernels are passed through the mechanical de-shelling machine with first and second shearing blades thereof replaced with peeling brushes.

TECHNICAL ADVANCEMENTS AND ECONOMIC SIGNIFICANCE

The automatic mechanical de-shelling machine for facilitating recovery of a kernel naturally encapsulated within a shell of a cashew nut in accordance with the present disclosure has several technical advantages including but not limited to the realization of:

- an automatic de-shelling machine that enables appropriate positioning and orienting of a raw cashew nut to be de-shelled with respect to line of dehiscence for ensuring that a pair of shearing blades strike the raw cashew nut along the line of dehiscence of the raw cashew-nut at both sides i.e. the "hump side" and the "ends side", thereby enabling the shearing blades to form appropriate cuts on both sides of the cashew-nut shell;

- an automatic de-shelling machine that forms appropriate cuts on both sides of the cashew-nut shell, i.e. the "hump side" and the "ends side" by strategically providing unequal depth of cuts at the "hump side" and the "ends side" of the cashew nut;

- an automatic de-shelling machine that forms appropriate cuts on both sides of the cashew-nut shell, i.e. the "hump side" and the "ends side",

thereby reducing chances of un-cut shell or damage to the kernel due to over-penetration of the shearing blades;

- an automatic de-shelling machine that continuously de-shells cashew-nuts, irrespective of size of cashew-nuts fed there-to;
- an automatic de-shelling machine that can handle cashew-nuts of any size, thereby eliminating the need to grade the cashew-nuts before feeding to the automatic de-shelling machine;
- an automatic de-shelling machine that automatically adjusts position and orientation of a "hump side" and an "ends side" of a cashew nut with respect to the shearing blades and according adjusts the depth of cut to be provided at the "hump side" and the "ends side" of the cashew nut;
- an automatic de-shelling machine that requires less power for operation thereof;
- an automatic de-shelling machine that maximizes recovery of kernels naturally encapsulated within the shell and accordingly increases the yield;
- an automatic de-shelling machine that eliminates manual handling of the nuts and the drawbacks associated with manual handling;
- an automatic de-shelling machine that optimizes and / or maximizes the yield;
- an automatic de-shelling machine that facilitates cracking and de-shelling action to be performed automatically and in continuous fashion;
- an automatic de-shelling machine that reduces chances of damage to kernel held inside the shell due to uncontrolled piercing depth of blade in to the shell and uncontrolled piercing forces acting on the shell;

- an automatic de-shelling machine that reduces financial losses occurring due to damage to the kernel held inside the shell due to uncontrolled piercing of the blades in to the shell during the de-shelling operation;
- an automatic de-shelling machine that restrains handling of nuts by workers during processing thereof, thereby reducing chances of contamination;
- an automatic de-shelling machine that carries out the de-shelling operation in a fully automatic manner without much human intervention;
- an automatic de-shelling machine that is easy to use and maintain.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

The use of the expression "at least" or "at least one" suggests the use of one or more elements or ingredients or quantities, as the use may be in the embodiment of the disclosure to achieve one or more of the desired objects or results.

Wherever a range of values is specified, a value up to 10% below and above the lowest and highest numerical value respectively, of the specified range, is included in the scope of the disclosure.

The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is

to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the embodiments as described herein.

Dated this 24th day of October, 2013

MOHAN DEWAN

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APPLICANTS' PATENT ATTORNEY