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Jurik et al.

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(54) **DUAL GRAPHIC WHEEL FOR AN AUTOMATED LUMINAIRE**

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(60) Provisional application No. 61/471,683, filed on Apr. 4, 2011.

(51) **Int. Cl.**

F21S 10/00	(2006.01)
F21V 11/08	(2006.01)
F21W 131/406	(2006.01)

(52) **U.S. Cl.**
CPC ***F21S 10/007*** (2013.01); ***F21V 11/08*** (2013.01); *F21W 2131/406* (2013.01)

(58) **Field of Classification Search**
USPC 362/282, 283, 284
See application file for complete search history.

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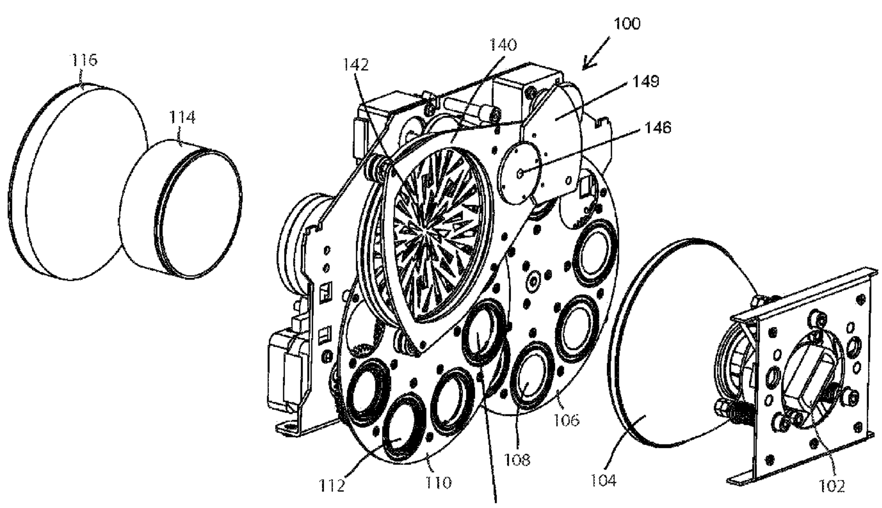
(57) **ABSTRACT**

An automated luminaire with dual over-sized graphic wheels that can be inserted and positioned into or out of the light path of the luminaire together as a unit and each graphic wheel can be rotated independent of the other wheel.

19 Claims, 12 Drawing Sheets



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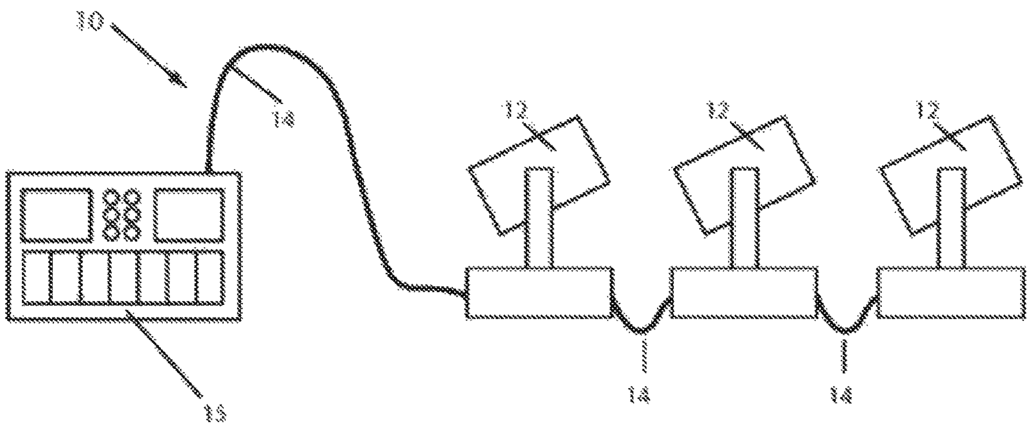

FIG 1

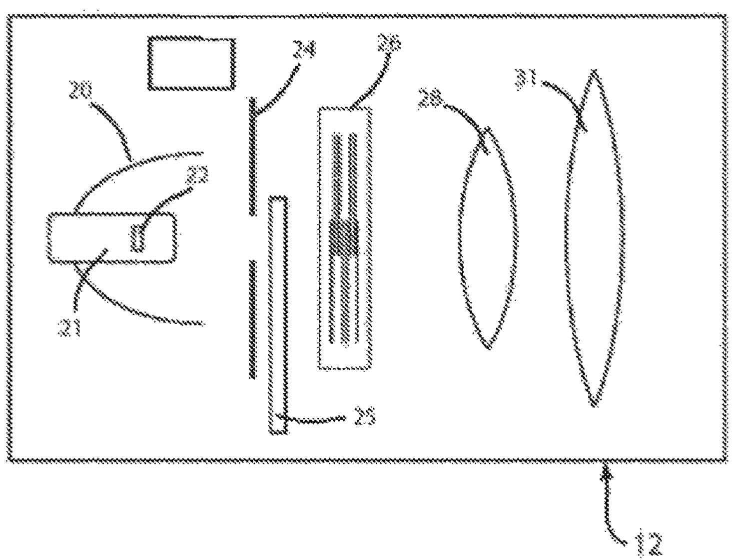

FIG 2

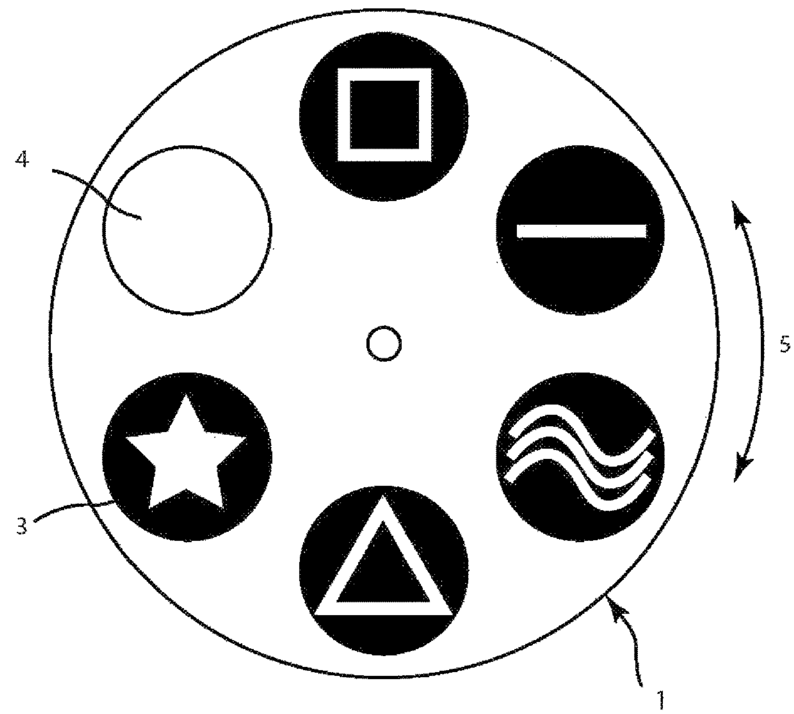

FIG 3
(prior art)

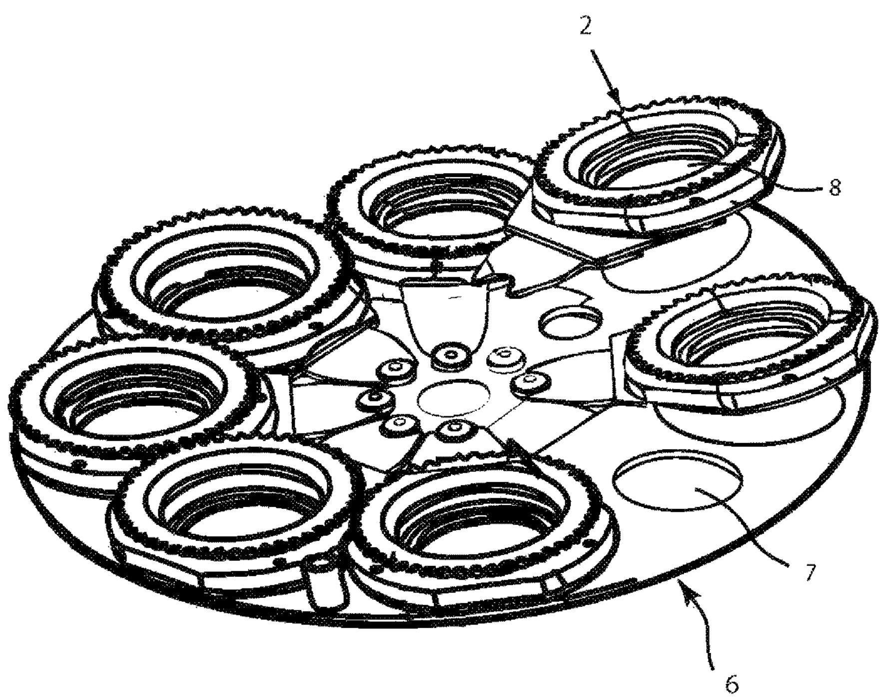

FIG 4
(prior art)

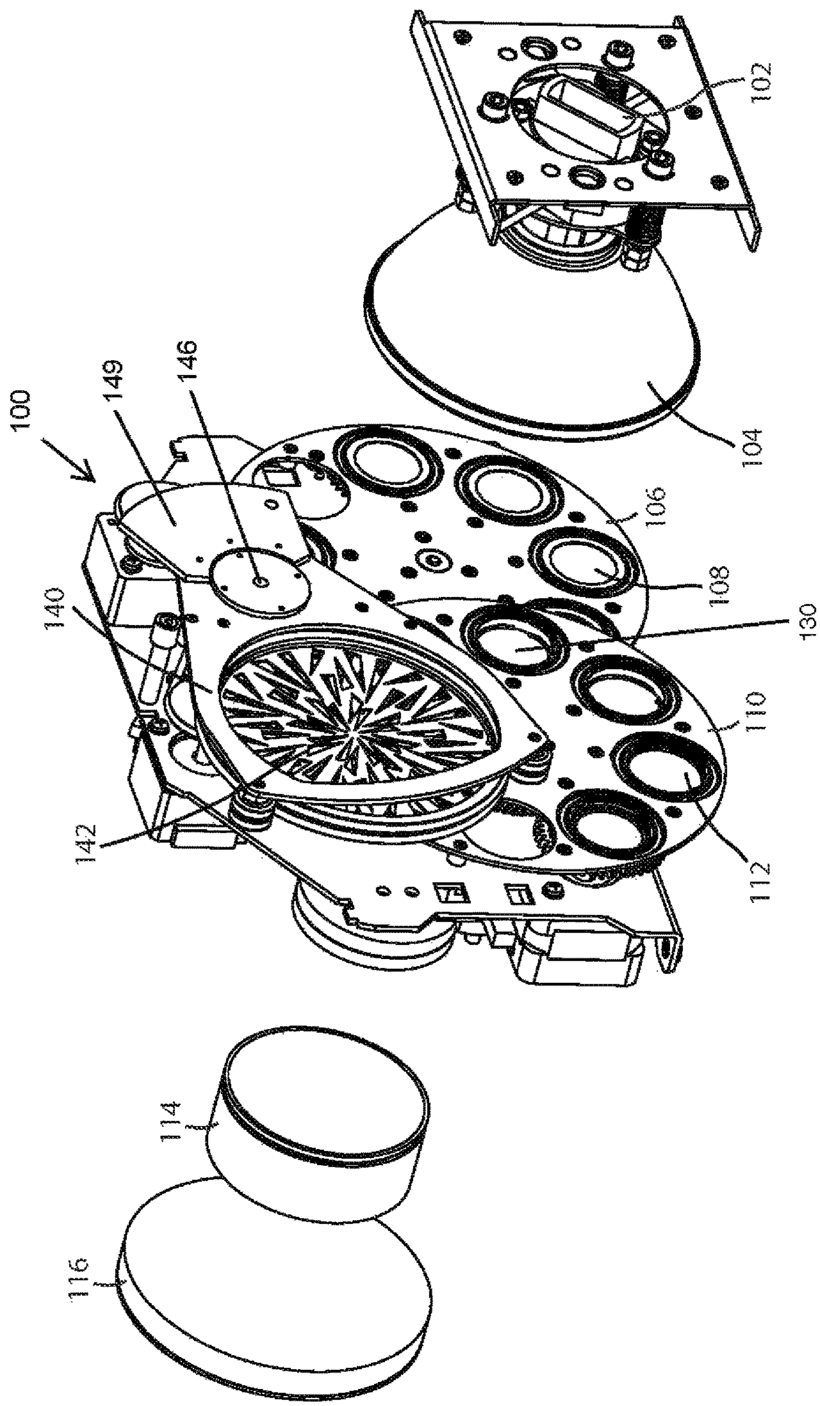

FIG 5

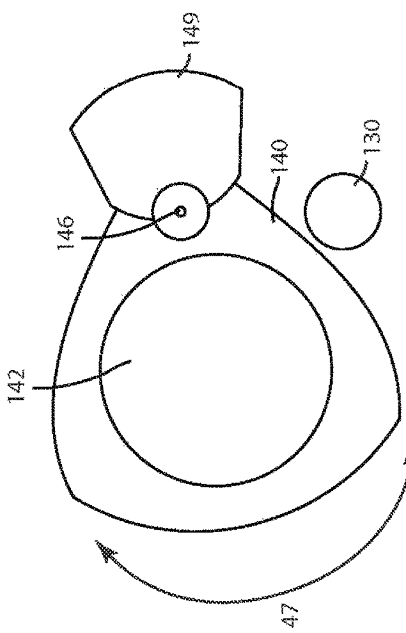

FIG 6a

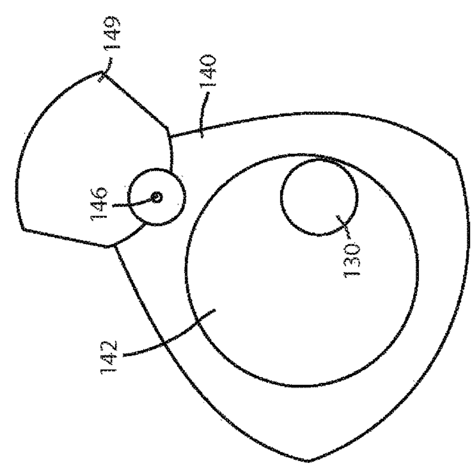

FIG 6b

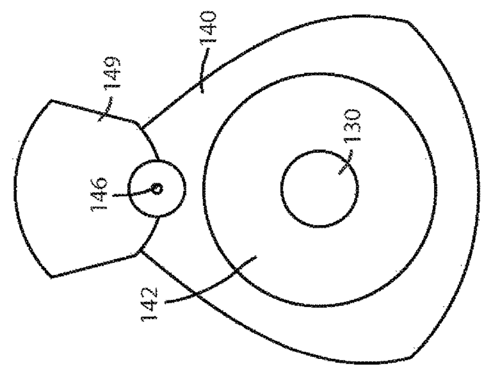

FIG 6c

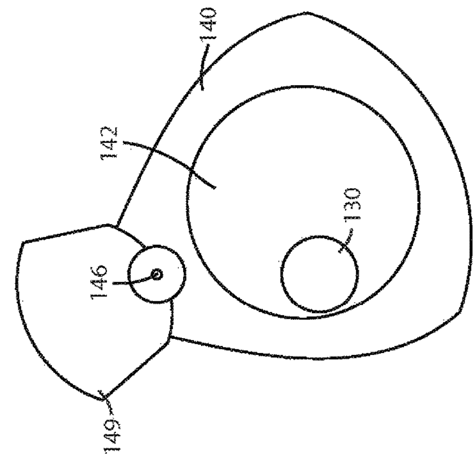

FIG 6d

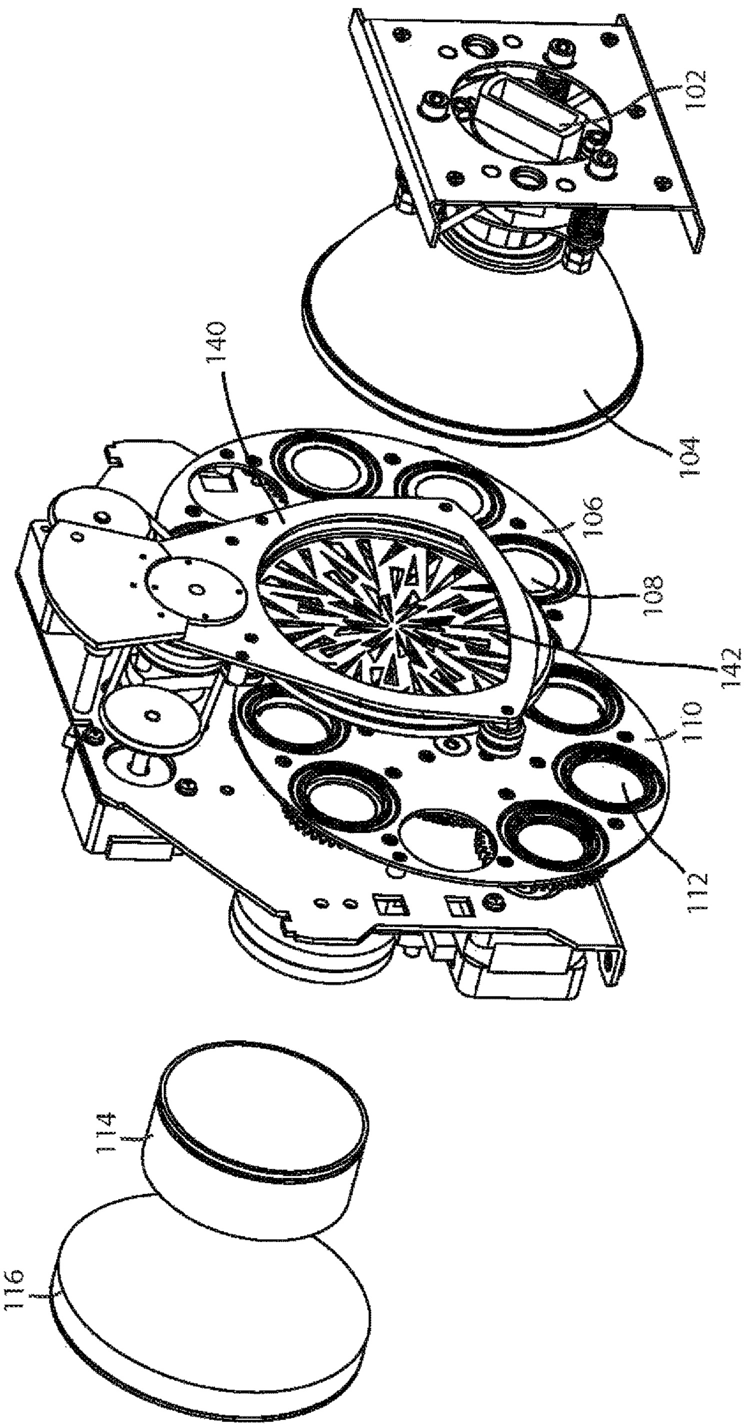

FIG 7

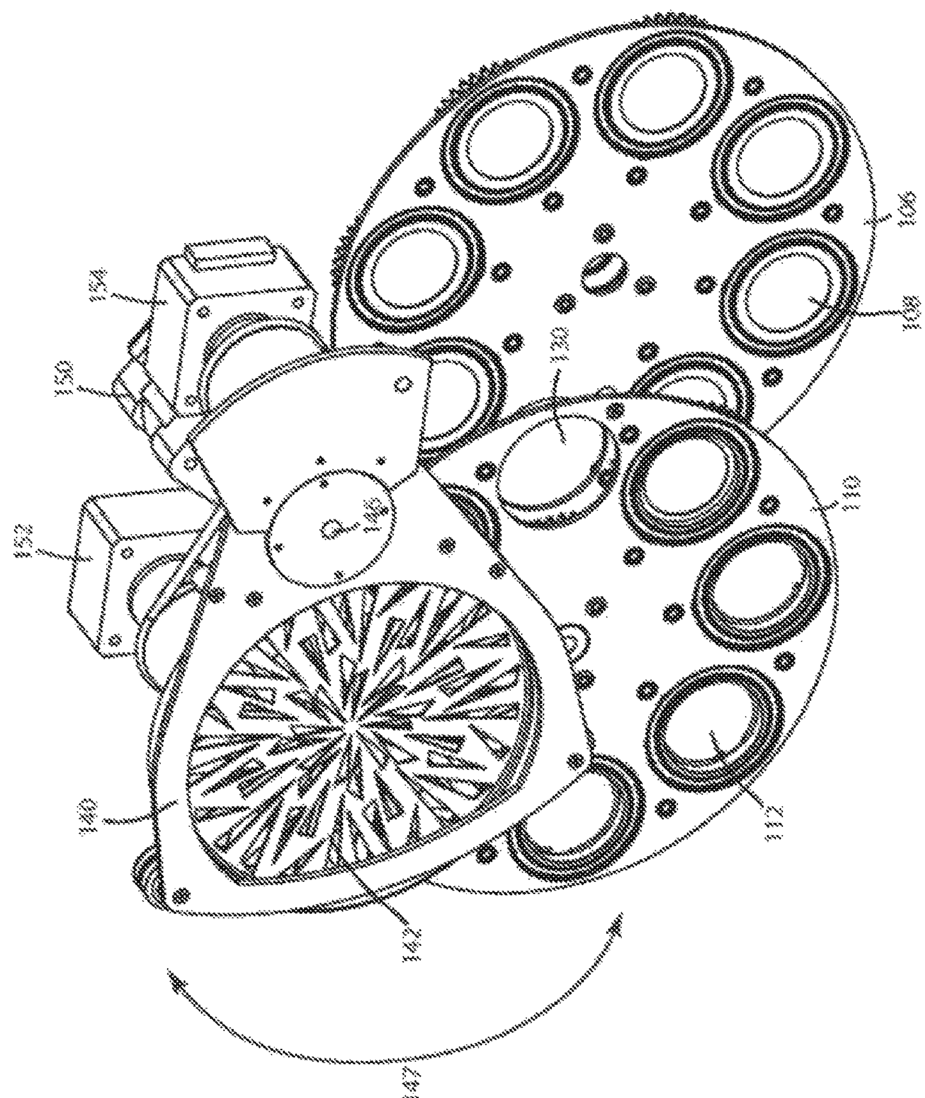

FIG 8

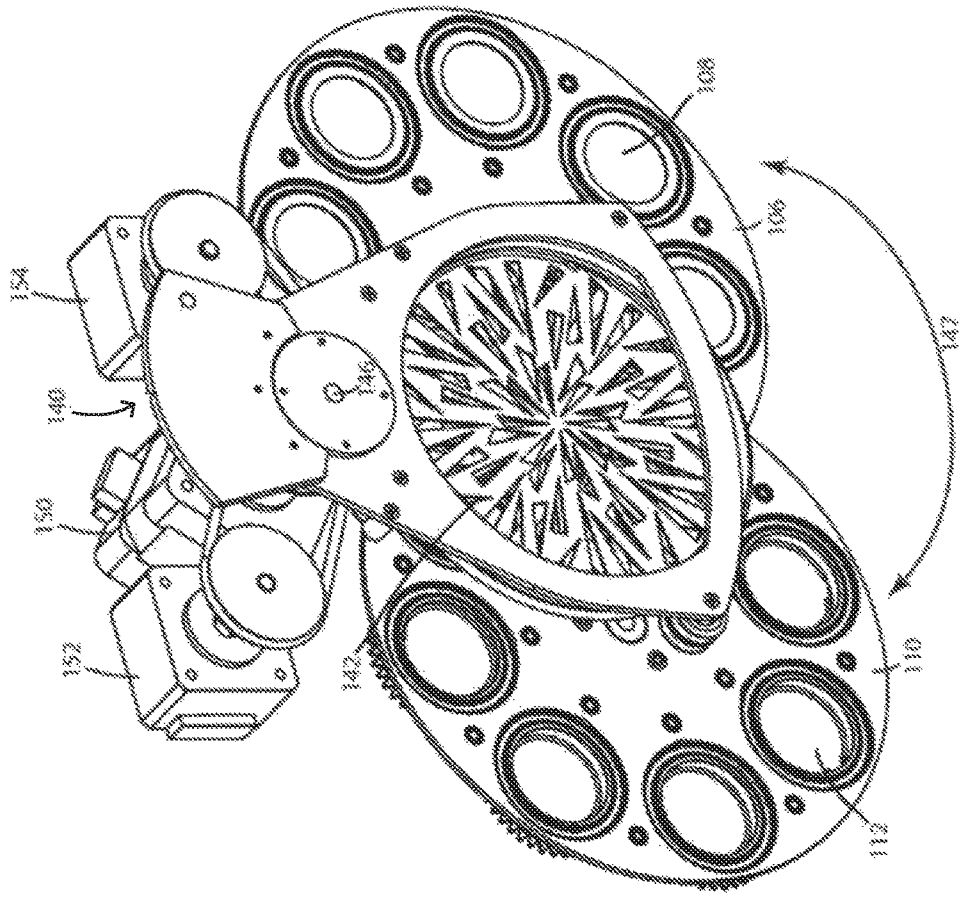

FIG 9

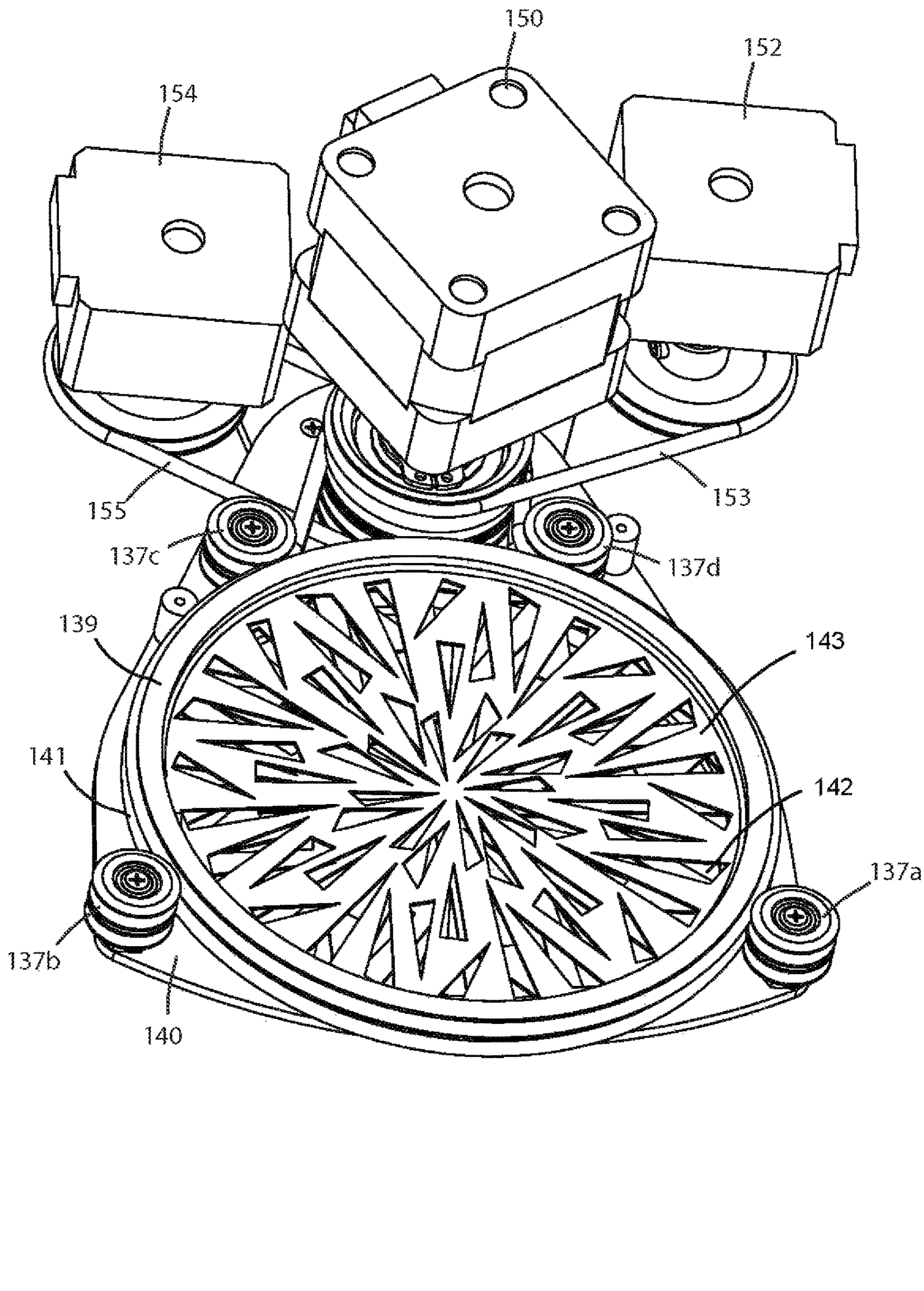

FIG 10

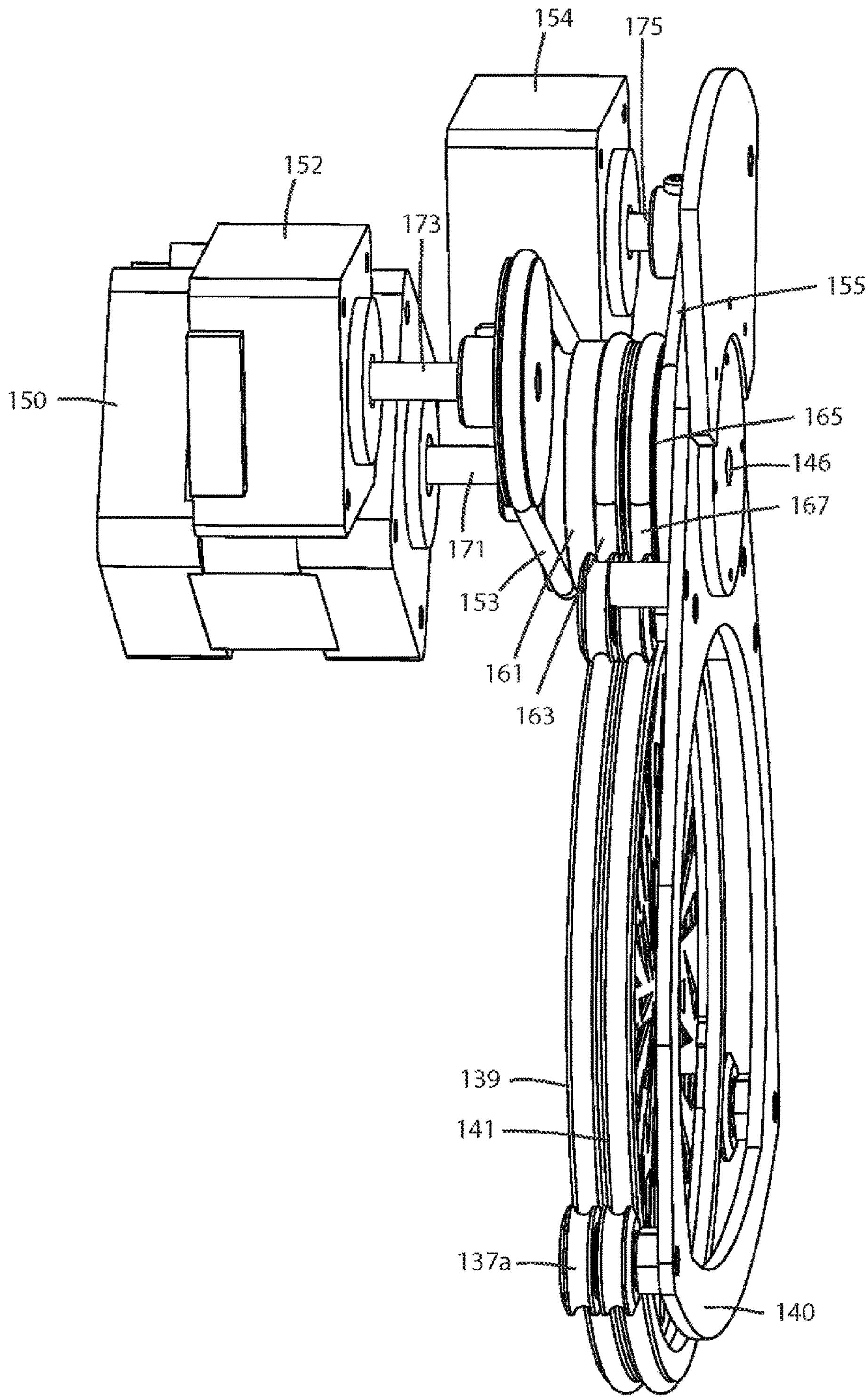
154
175
152
173
155
150
165
146
167
171
153
161
163
139
141
137a
140

FIG 11

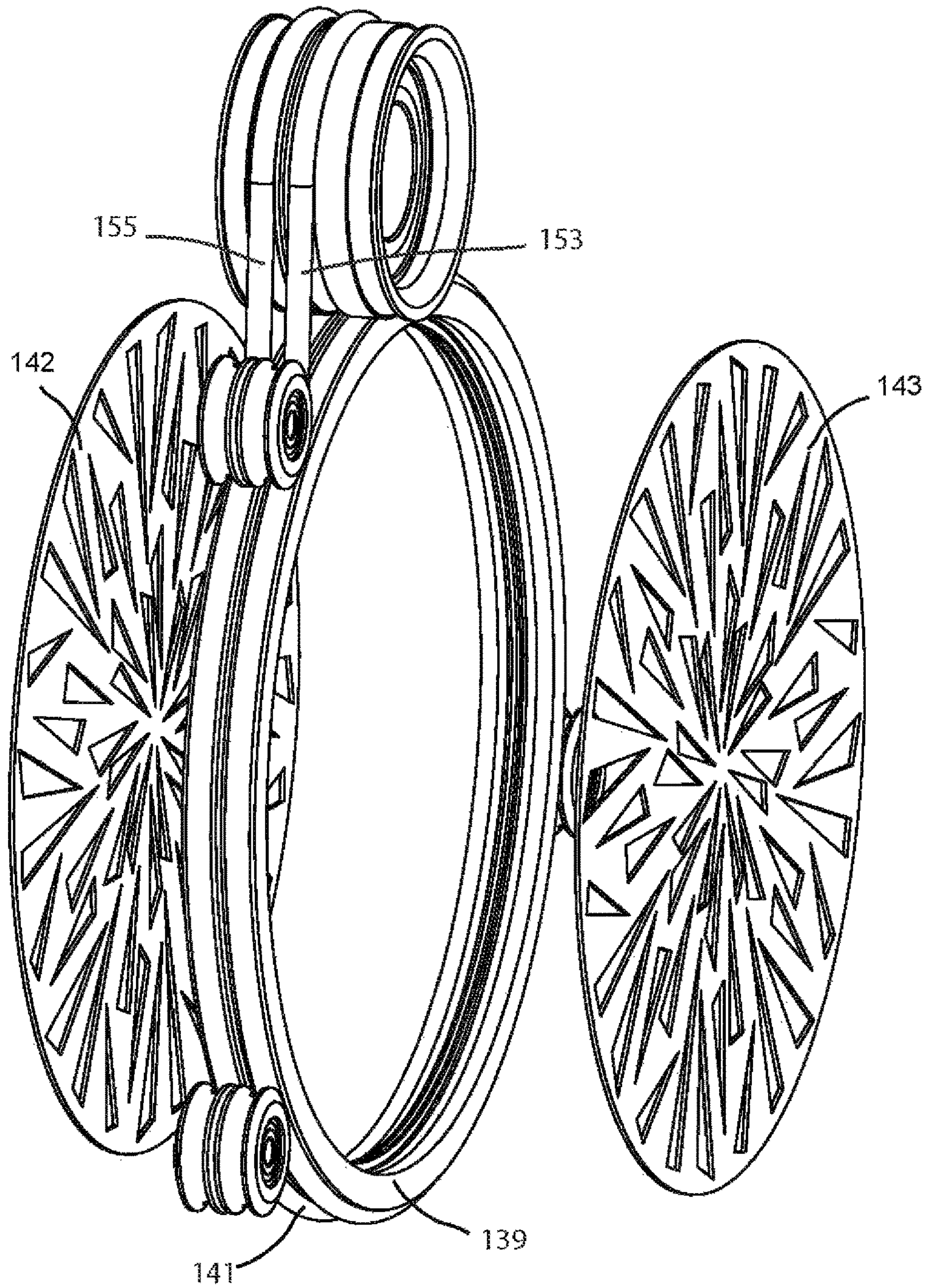

FIG 12

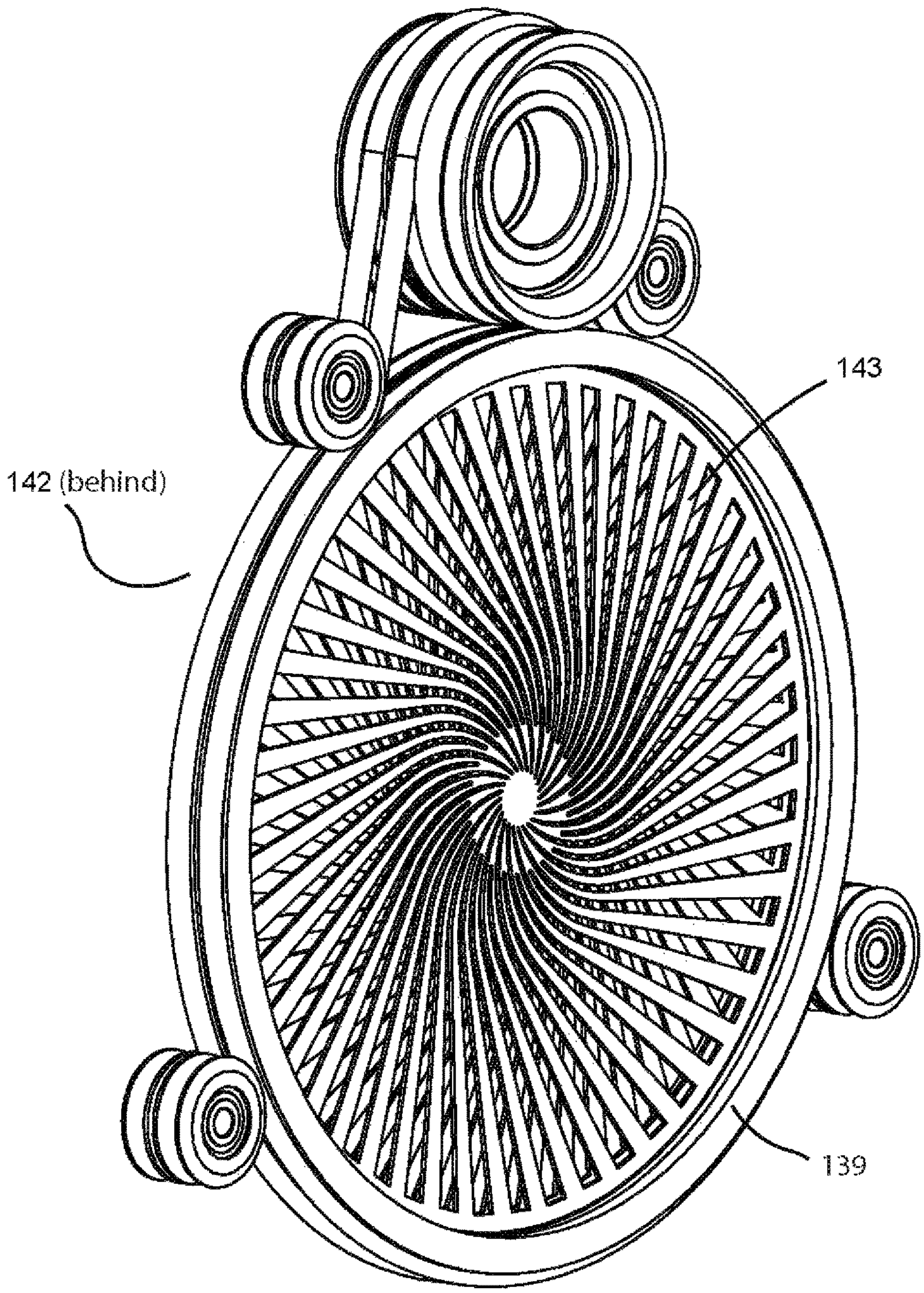

FIG 13

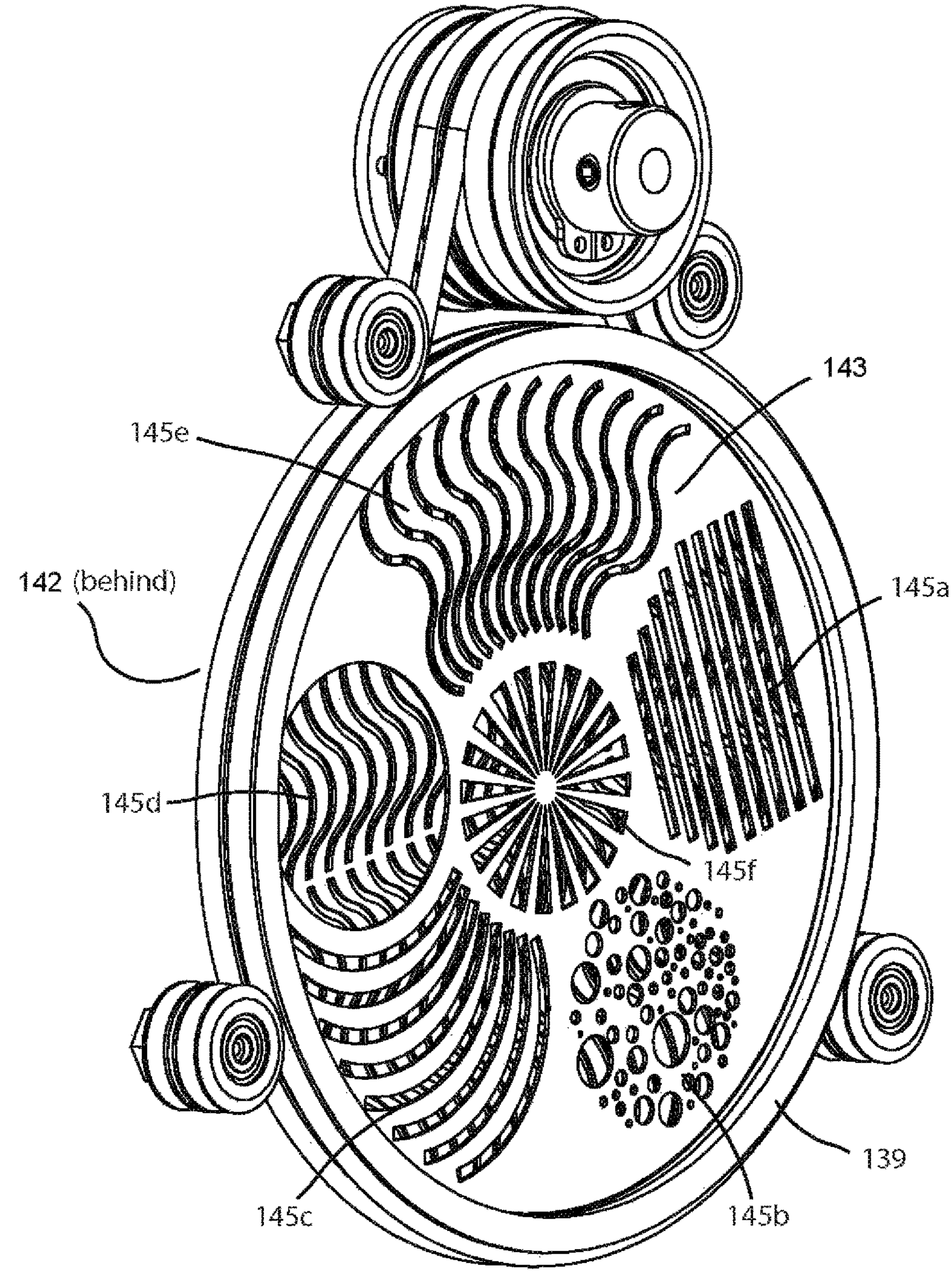

FIG 14

DUAL GRAPHIC WHEEL FOR AN AUTOMATED LUMINAIRE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 14/495,856, filed Sep. 24, 2014 by Pavel Jurik, et al. entitled, "Dual Graphic Wheel for an Automated Luminaire", which is a continuation of U.S. patent application Ser. No. 13/438,841, filed Apr. 3, 2012 by Pavel Jurik, et al. entitled, "Dual Graphic Wheel for an Automated Luminaire", which claims priority to U.S. Provisional Application No. 61/471,683 filed Apr. 4, 2011 by Pavel Jurik, et al. entitled, "Dual Graphic Wheel for an Automated Luminaire".

TECHNICAL FIELD OF THE INVENTION

The invention relates to equipment for the selection and movement of images or gobos within an automated luminaire.

BACKGROUND OF THE INVENTION

Luminaires with automated and remotely controllable functionality are well known in the entertainment and architectural lighting markets. Such products are commonly used in theatres, television studios, concerts, theme parks, night clubs, and other venues. A typical product will commonly provide control over the pan and tilt functions of the luminaire allowing the operator to control the direction the luminaire is pointing and thus the position of the light beam on the stage or in the studio. Typically, this position control is done via control of the luminaire's position in two orthogonal rotational axes usually referred to as pan and tilt. Many products provide control over other parameters such as the intensity, color, focus, beam size, beam shape, and beam pattern. The beam pattern is often provided by a stencil or slide called a gobo which may be a steel, aluminum, or etched glass pattern. The products manufactured by Robe Show Lighting such as the ColorSpot 700E are typical of the art.

Such gobos are typically the size of the luminaire's optical aperture and systems may be provided to select between different gobos, often mounted on a wheel, or to rotate a gobo once selected. The optical systems of such luminaires may further include gobos, patterns, or other optical effects which are larger than the optical aperture and may allow movement across or through the beam to produce effects such as rainfall or fire. Such devices are often termed animation wheels and may be included in addition to gobos so as to further modify the light beam. FIG. **1** illustrates a multiparameter automated luminaire system **10**. These systems commonly include a plurality of multiparameter automated luminaires **12** which typically each contain on-board a light source (not shown), light modulation devices, electric motors coupled to mechanical drive systems, and control electronics (not shown). In addition to being connected to mains power either directly or through a power distribution system (not shown), each luminaire **12** is connected is series or in parallel to data link **14** to one or more control desks **15**. The automated luminaire system **10** is typically controlled by an operator through the control desk **15**.

FIG. **2** illustrates an automated luminaire **12**. A lamp **21** contains a light source **22** which emits light. The light is reflected and controlled by reflector **20** through an aperture

or imaging gate **24** and through an animation wheel **25**. The resultant light beam may be further constrained, shaped, colored, and filtered by optical device **26** which may include dichroic color filters, gobos, rotating gobos, framing shutters, effects glass, and other optical devices well known in the art. The final output beam may be transmitted through output lenses **28** and **31** which may form a zoom lens system.

FIG. **3** illustrates a prior art gobo wheel **1** containing five gobos **3** and an open aperture **4**. The gobo wheel **1** may be rotated, as shown by arrow **5**, such that any of the gobos **3** may be positioned across the optical aperture of the luminaire **12**.

FIG. **4** illustrates a further prior art gobo wheel **6**. In this version the gobos **8** are contained within carriers **2** that may be rotated through gears. The gobo wheel **6** may be rotated such that any of the gobo carriers **2** containing a gobo **8** are positioned across an optical aperture of the luminaire and said selected gobo carrier **2** may then be rotated around the optical axis of the luminaire producing a dynamic effect in the output beam.

In both examples, to change gobos from a first gobo to a second, non-adjacent gobo requires that the wheel be rotated through all the gobos in between the first and second gobos. It would be advantageous if a gobo system could change from a first gobo to any second gobo without having to pass through intermediate gobos.

In addition, it would be advantageous if gobos larger than the optical aperture could be inserted and removed from the optical aperture in any position or orientation. It would further be advantageous if two serially mounted gobos could be inserted and removed from the optical aperture such that overlay and moiré effects could be created.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying drawings in which like reference numerals indicate like features and wherein:

FIG. **1** illustrates a typical automated lighting system;

FIG. **2** illustrates a typical automated luminaire;

FIG. **3** illustrates a prior art gobo wheel;

FIG. **4** illustrates a prior art rotating gobo wheel;

FIG. **5** illustrates an embodiment of the positioning of the dual wheel among other light modulators in an automated luminaire;

FIGS. **6***a-d* illustrate various operational positions of the dual wheel;

FIG. **7** illustrates an embodiment of FIG. **5** with the dual wheel in another position;

FIG. **8** illustrates alternative viewing of positioning of components of the embodiment illustrated in FIG. **5**;

FIG. **9** illustrates alternative viewing of positioning of components of the embodiment illustrated in FIG. **7**;

FIG. **10** illustrates an embodiment of the drive system of the dual graphics wheel;

FIG. **11** illustrates a slightly offset view of the drive system embodiment illustrated in FIG. **10**;

FIG. **12** illustrates an embodiment of a subset of the components of the embodiment illustrated in FIG. **10**;

FIG. **13** illustrates an alternative embodiment of the graphic wheels; and

FIG. **14** illustrates another alternative embodiment of the graphic wheels.

DETAILED DESCRIPTION OF THE INVENTION

Preferred embodiments of the present invention are illustrated in the FIGUREs, like numerals being used to refer to like and corresponding parts of the various drawings.

The present invention generally relates to an automated luminaire, specifically to the configuration of a graphic wheel within such a luminaire such that gobos larger than the optical aperture may be utilized, such that serially mounted gobos may be overlaid, and such that selection may be made between any two gobos, adjacent or non-adjacent, without the need to pass through intermediate gobos.

FIG. **5** illustrates an embodiment of the positioning of the dual wheel among other light modulators in an automated luminaire. Lamp **102** is mounted within reflector **104** and directs a light beam through prior art rotating gobo wheels **106** and **110**. Rotating gobo wheel **106** may be rotated such that any of the gobos **108** are positioned across the optical aperture and rotating gobo wheel **110** may be rotated such that any of the gobos **112** are positioned across the optical aperture **130**. The resultant light beam is directed through output lenses **114** and **116** which may be adjusted so as to move the focal point of the system such that any optical component is in focus in the output beam. A dual graphic wheel **100** includes a carrier plate **140** which carries the graphic wheels **142** and **143** (**143** not identified in this view). Carrier plate **140** may be rotated about axis **146** such that graphic wheel **142** is positioned across the optical aperture **130** of the luminaire. In the position illustrated in FIG. **5**, graphic wheel **142** is outside of the optical path and not across the optical aperture **130**.

FIGS. **6***a*-*d* illustrate various operational positions of the dual wheel. Graphic wheel carrier plate **140** contains a graphic wheel **142**. Graphic wheel **142** may be a single pattern or incorporate multiple patterns and may be replaceable on carrier plate **140**. Carrier plate **140** may be rotated, as shown by arrow **147**, around pivot axis **146** such that graphic wheel **142** is moved across the optical aperture **130** of the luminaire. Graphic wheel **142** may be substantially larger than the optical aperture **130**. In the embodiment shown, the diameter of the graphic wheel **142** is over three times the diameter of the optical aperture **130**. Other relative sizes are also possible but for the desired effect and functionality the relative size should be substantially larger than the relative size of the gobos in the prior art gobo wheels illustrated in FIG. **3** and FIG. **4**. Carrier plate **140** may have a counterweight **149** such that the assembly is substantially balanced around axis **146**.

FIG. **6***a* shows carrier plate **140** positioned such that graphic wheel **142** is outside the optical aperture **130** and thus has no effect on the projected light beam.

FIG. **6***b* shows carrier plate **140** positioned such that graphic wheel **142** is across the optical aperture **130**. In this position the focus mechanism of the luminaire may be adjusted such that the patterns or images on graphic wheel **142** are in focus in the projected image or are out of focus in the projected image. The edge of graphic wheel **142** is adjacent to optical aperture **130** such that graphic wheel **142** may be rotated around its centre point (not identified) to provide an arc movement of the pattern across the optical aperture **130**.

FIG. **6***c* shows carrier plate **140** positioned such that graphic wheel **142** is across the optical aperture **130**. In this position the focus mechanism of the luminaire may be adjusted such that the patterns or images on graphic wheel **142** are in focus in the projected image or are out of focus in the projected image. The centre of graphic wheel **142** is coincident/concentric with the centre of optical aperture **130** such that graphic wheel **142** may be rotated around its centre point to provide a rotation movement of the pattern around the centre of the optical aperture **130**.

FIG. **6***d* shows carrier plate **140** positioned such that graphic wheel **142** is across the optical aperture **130**. In this position the focus mechanism of the luminaire may be adjusted such that the patterns or images on graphic wheel **142** are in focus in the projected image or are out of focus in the projected image. The edge of gobo **142** is adjacent to optical aperture **130** such that graphic wheel **142** may be rotated around its centre point to provide a movement of the pattern across the optical aperture **130**. Graphic wheel **142** is positioned such that the opposite edge to the position illustrated in FIG. **6***b* is across the optical aperture **130**. Thus, for the same rotation direction of graphic wheel **142**, arc movement of the pattern across the optical aperture **130** will be in the opposite direction.

Although three positions have been illustrated, the invention is not so limited and graphic wheel carrier plate **140** may be positioned by rotation around axis **146** such that any portion of graphic wheel **142** defined by an arc drawn around axis **146** may be placed across optical aperture **130**.

FIG. **7** illustrates an embodiment of FIG. **5** with the dual wheel in another position. Lamp **102** is mounted within reflector **104** and directs a light beam through gobos in rotating gobo wheels **106** and **110**. Rotating gobo wheel **106** may be rotated such that any of the gobos **108** are positioned across the optical aperture and rotating gobo wheel **110** may be rotated such that any of the gobos **112** are positioned across the optical aperture. The resultant light beam is directed through output lenses **114** and **116** which may be adjusted so as to move the focal point of the system such that any optical component is in focus in the output beam. Graphic wheel carrier plate **140** may be rotated such that graphic wheel **142** is positioned across the optical aperture of the luminaire. In the position illustrated in FIG. **7** graphic wheel **142** is inside the optical path and is positioned across the optical aperture (not seen in FIG. **7**). In this position output lenses **114** and **116** may be adjusted such that any of the optical elements including gobo wheel **106**, gobo wheel **110**, and graphic wheel **142** are in focus in the output beam.

FIG. **8** illustrates a more detailed view of an embodiment of the invention. Rotating gobo wheel **106** may be rotated such that any of the gobos **108** are positioned across the optical aperture **130** and rotating gobo wheel **110** may be rotated such that any of the gobos **112** are positioned across the optical aperture **130**. Graphic wheel carrier plate **140** may be rotated, as shown by arrow **147**, by motor **150** around axis **146** such that graphic wheel **142** is positioned across the optical aperture **130** of the luminaire. In the position illustrated in FIG. **8** graphic wheel **142** is outside of the optical path and not across the optical aperture **130**.

FIG. **9** illustrates the same system depicted in FIG. **8** showing a situation where graphic wheel carrier plate **140** has now been rotated, as shown by arrow **147**, by motor **150** around axis **146** such that graphic wheel **142** is positioned across the optical aperture (not seen in FIG. **9**) of the luminaire. In this position light will travel through graphic wheel **142** as well as gobos on rotating gobo wheels **106** and

110. Further, graphic wheel **142** may be rotated, as shown by arrow **147**, around its own centre by motor **154** as further described below.

FIG. **10** illustrates a detailed backside view of the graphic wheel mechanism of an embodiment of the invention. In this embodiment graphic wheel carrier plate **140** carries two serially mounted, concentric graphic wheels **143** and **142**. Graphic wheel **143** is mounted within rim **139** and graphic wheel **142** is mounted within rim **141**. Graphic wheels **143** and **142** are concentric and will move together with carrier plate **140** such that both of them will be moved across the optical aperture together. Rim **139** and rim **141** are constrained by, but free to rotate within, dual bearings **137***a*, **137***b*, **137***c* and **137***d*. Each dual bearing **137***a*, **137***b*, **137***c* and **137***d* allows individual rotation of rim **139** from rotation of rim **141**. Rim **139**, and thus contained graphic wheel **143**, is connected by belt **153** to motor **152**. Similarly rim **141**, and thus contained graphic wheel **142**, is connected by belt **155** to motor **154**. Rotation of motor **152** will cause rotation of rim **139** and contained graphic wheel **143**. Rotation of motor **154** will cause rotation of rim **141** and contained graphic wheel **142**. Rotation of motor **150** will rotate the carrier plate **140** across or away from the optical aperture as previously described. Motors **150**, **152** and **154** may be of a type selected from a list comprising, but not limited to, stepper motors, servo motors, and linear actuators.

Through this mechanism, by coordinated and separate adjustment of motors **150**, **152** and **154**, carrier plate **140** and attached graphic wheels **142** and **143** may be positioned such that the desired area of graphic wheels **142** and **143** are positioned across the optical aperture. Once in position either or both of graphic wheels **142** and **143** may be independently and separately rotated about its own centre point. Graphic wheels **142** and **143** may contain the same pattern or different patterns. The patterns may be chosen such that the movement of graphic wheel **142** relative to graphic wheel **143** produces moiré, kaleidoscopic, or other interference effects. Such effects may be produced independently or in conjunction with gobos on prior art gobo or rotating gobo wheels or other optical devices in the luminaire as well known in the art.

FIG. **11** illustrates a slightly offset view of the drive system for the graphic wheels **143** and **142** illustrated in FIG. **10**. The rotation of carrier plate **140** is driven by motor **150** via shaft **171** about axis **146**. Shaft **171** also supports idler pulleys **161** and **165** but does not impede rotation of the idler pulleys **161** and **165**. Idler pulley **161** has two grooves for accepting drive belts **153** and **163**. While idler pulley **165** has two grooves for accepting drive belts **167** and **155**. In this way, drive belts **163** and **167**, which drive rotation of the rims **139** and **141** respectively, which in turn rotate graphic wheels **143** and **142** respectively, are right next to each other so that the graphic wheels **142** and **143** are right next to each other. Rotation of rim **139** and graphic wheel **143** is driven by motor **152** which rotates shaft **173** which drives belt **153** which rotates idler pulley **161** which drives belt **163**. Rotation of rim **141** and graphic wheel **142** is driven by motor **154** which rotates shaft **175** which drives belt **155** which rotates idler pulley **165** which drives belt **167**. The rims **139**, **141** are held in place by dual idler bearings **137***a*, **137***b* (not identified in FIG. **11**, **137***d* (not identified in FIG. **11**) and **137***c* (not seen in FIG. **11**) as previously described above.

FIG. **12** illustrates an exploded view of an embodiment of the invention. Graphic wheel **142** mounts within first rim **141** which may be rotated about its centre point by first belt **153**. Graphic wheel **143** mounts within second rim **139** which may be rotated about its centre by second belt **155**. Graphic wheels **142** and **143** may be easily removed and replaced such that the user can change the effect produced.

FIG. **12** illustrates an embodiment of the invention where graphic wheels **143** and **142** have patterns that provide a moiré or kaleidoscopic effect.

FIGS. **13** and **14** illustrate the reverse and obverse views of an embodiment of the invention. In this embodiment graphic wheel **143** contains a plurality of smaller patterns within it, **145***a*, **145***b*, **145***c*, **145***d*, **145***e*, and **145***f*. By coordinated and separate adjustment of the motors first graphic wheel **143** may be positioned and rotated such that any of the smaller patterns **145***a*, **145***b*, **145***c*, **145***d*, **145***e*, or **145***f* is positioned across the optical aperture of the luminaire. In such position the graphic wheel **142** may contain a break up pattern as illustrated herein. By altering the focal position of the optical system the user can superimpose or overlay this break up pattern over the pattern from graphic wheel **143**. By rotating graphic wheel **142** an effect may be created to simulate fire or water movement. It can further be seen that by positioning graphic wheel **143** prior to moving it across the aperture it is possible to directly select any of the smaller patterns **145***a*, **145***b*, **145***c*, **145***d*, **145***e*, or **145***f* without the need to pass through any other gobos. Further, to move from a first small pattern chosen from **145***a*, **145***b*, **145***c*, **145***d*, or **145***e* to a second small pattern chosen from **145***a*, **145***b*, **145***c*, **145***d*, or **145***e*, the user may choose to either move directly to the second small pattern without concern for intervening patterns or may choose to first remove graphic wheel **143** from the optical aperture using motor **150** before continuing to select a second small pattern. Thus, the operator has complete control over the route taken from a first pattern to a second pattern.

The specific mechanism illustrated herein using belts and bearings is illustrative only and not a limitation of the invention. Other mechanisms well known in the art to move carrier plate **140** and rotate graphic wheel **143** and graphic wheel **142** may be used without departing from the spirit of the invention.

In further embodiments, either or both of first and second graphic wheels **143** and **142** may comprise a piece of optical filter glass with, for example, lenticular lens pattern or prisms. Rotation of such a filter by motors **152** or **154** will cause a rotation of the optical effect caused by the optical filter glass.

In further embodiments, the separation along the optical axis of the first gobo wheel, second gobo wheel and rotating gobo wheels may be minimized such that the optical system can focus on more than one of these optical elements at the same time.

In a further embodiment, software in the automated luminaire may provide automated or semi-automated selection of motor control parameters, such that a single control selection by the user will recall combinations of positions of the rotating gobo wheels, graphic wheel carrier plate, first gobo rotation position, second gobo rotation position, and other optical component parameters in order to provide a pleasing pre-defined effect. The user may then switch between many complex pre-defined effects through operation of this single control.

While the invention has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of this invention, will appreciate that other embodiments may be devised which do not depart from the scope of the invention as disclosed herein. Accordingly, the scope of the invention should be limited only by the attached claims.

What is claimed is:

1. An automated luminaire comprising:

a plurality of light modulating wheels, concentrically mounted on a carrier,

the carrier comprising a plurality of bearings configured to mechanically couple to the light modulating wheels at their respective rims,

where the carrier is configured to (i) independently rotate the light modulating wheels about their centers, (ii) move the light modulating wheels together into a light beam of the automated luminaire, and (iii) move the light modulating wheels together completely out of the light beam.

2. The automated luminaire of claim **1**, wherein the carrier is configured to drive the independent rotation of the light modulating wheels at their respective rims.

3. The automated luminaire of claim **1**, wherein the carrier is configured to rotate to a first position, where the light modulating wheels are completely out of the light beam, and to a second position, where the light beam passes through first portions of the light modulating wheels.

4. The automated luminaire of claim **3**, wherein:

the light beam has a first diameter and the light modulating wheels have a common second diameter, where the second diameter is larger than the first diameter;

the first portions of the light modulating wheels include a center of each of the light modulating wheels; and

the carrier is configured to move the light modulating wheels to a third position, where the light beam passes through second portions of the light modulating wheels, the second portions of the light modulating wheels adjacent to first edge portions of the light modulating wheels.

5. The automated luminaire of claim **4**, wherein the second diameter is at least three times as large as the first diameter and the carrier is configured to move the light modulating wheels to a fourth position where the light beam passes through third portions of the light modulating wheels, the third portions of the light modulating wheels adjacent to second edge portions of the light modulating wheels, the second edge portions of the light modulating wheels located on an opposite side of the light modulating wheels from the first edge portions of the light modulating wheels.

6. The automated luminaire of claim **1**, further comprising a gobo wheel configured to position a selected one of a plurality of gobos in the light beam.

7. The automated luminaire of claim **6**, wherein the gobo wheel is configured to rotate the selected gobo while the selected gobo is positioned in the light beam.

8. The automated luminaire of claim **1**, where a first light modulating wheel of the plurality of light modulating wheels comprises a plurality of patterns, the carrier configured to rotate the first light modulating wheel to position a selected one of the plurality of patterns in the light beam.

9. The automated luminaire of claim **8**, where the carrier is configured to rotate a second light modulating wheel of the plurality of light modulating wheels continuously while the first light modulating wheel is positioned with the selected one of the plurality of patterns in the light beam.

10. A multiparameter automated luminaire, comprising:

a light source configured to emit a first light beam;

a plurality of optical elements optically coupled to the light source and configured to receive the first light beam and to emit a second light beam, the plurality of optical elements including a dual graphic wheel system, the dual graphic wheel system comprising two light modulating wheels, concentrically mounted on a carrier, where the carrier is configured to (i) independently rotate the two light modulating wheels about their centers, (ii) move the two light modulating wheels together into the first light beam, and (iii) move the two light modulating wheels together completely out of the first light beam;

an output lens, optically coupled to the dual graphic wheel system, the output lens configured to receive the second light beam and to project an image, the output lens configured to move to adjust a focus of at least one of the plurality of optical elements in the projected image.

11. The multiparameter automated luminaire of claim **10**, wherein the carrier comprises a plurality of bearings configured to mechanically couple to the light modulating wheels at their respective rims.

12. The multiparameter automated luminaire of claim **11**, wherein the carrier is configured to drive the independent rotation of the light modulating wheels at their respective rims.

13. The multiparameter automated luminaire of claim **10**, wherein the carrier is configured to rotate to a first position, where the two light modulating wheels are completely out of the first light beam, and to a second position, where the first light beam passes through first portions of the two light modulating wheels.

14. The multiparameter automated luminaire of claim **13**, wherein:

the first light beam has a first diameter and the two light modulating wheels have a common second diameter, where the second diameter is larger than the first diameter;

the first portions of the two light modulating wheels include a center of each of the light modulating wheels; and

the carrier is configured to move the two light modulating wheels to a third position, where the first light beam passes through second portions of the two light modulating wheels, the second portions of the two light modulating wheels adjacent to first edge portions of the two light modulating wheels.

15. The multiparameter automated luminaire of claim **14**, wherein the second diameter is at least three times as large as the first diameter and the carrier is configured to move the two light modulating wheels to a fourth position where the first light beam passes through third portions of the two light modulating wheels, the third portions of the two light modulating wheels adjacent to second edge portions of the two light modulating wheels, the second edge portions of the two light modulating wheels located on an opposite side of the two light modulating wheels from the first edge portions of the two light modulating wheels.

16. The multiparameter automated luminaire of claim **10**, wherein the plurality of optical elements further comprises a gobo wheel configured to position a selected one of a plurality of gobos in the first light beam.

17. The multiparameter automated luminaire of claim **16**, wherein the gobo wheel is configured to rotate the selected gobo while the selected gobo is positioned in the first light beam.

18. The multiparameter automated luminaire of claim **10**, where a first one of the two light modulating wheels comprises a plurality of patterns, the carrier configured to rotate the first light modulating wheel to position a selected one of the plurality of patterns in the first light beam.

19. The multiparameter automated luminaire of claim **18**, where the carrier is configured to rotate the second light modulating wheel of the two light modulating wheels continuously while the first light modulating wheel is positioned with the selected one of the plurality of patterns in the light beam.

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