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(54) Title: EQUIPMENT FOR EXCHANGE OF OPTIC-EFFECT ELEMENTS

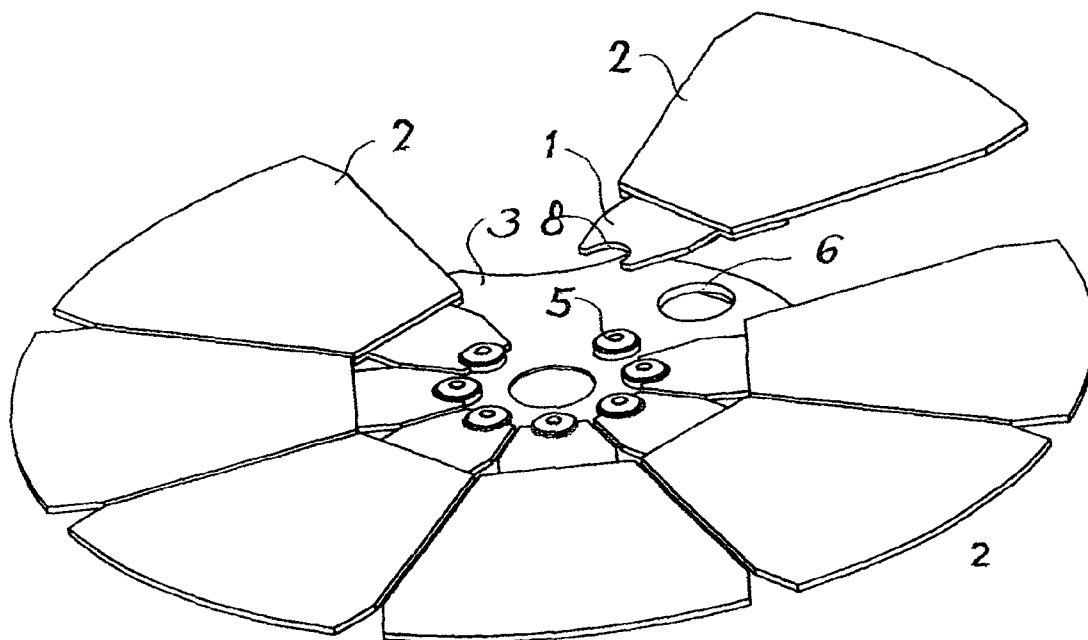


Fig. 1

(57) Abstract: For the lighting equipment used especially for theatre and show stages and platforms there is designed equipment for exchange of optic effect with a carrier of exchangeable segments holding optic effect elements and means for attachment of the segments (1) at the carrier which are provided with permanent magnets (7), while the carrier consisting of two bases (s,4) and/or the segments (1) are at least partially made of ferromagnetic material.

EQUIPMENT FOR EXCHANGE OF OPTIC-EFFECT ELEMENTS

Technical Field

The invention relates to equipment for exchange of optic-effect elements
5 provided with a carrier of exchangeable segments holding optic effect
elements and means for attachment of the segments at the carrier.

Background of the Invention

To improve performance of lighting apparatus used for theatre show-program
10 stages, optic-effect elements of various kinds are incorporated into an optical
path of a projector. The optic-effect elements, otherwise known as gobos,
generally cover items like colour discs, glass plates of various designs and
structures etc. which deform an image projected at a relatively great
distance. Due to high temperature of used light source such an image is
15 created on a metal, glass or any other suitable support. To increase the
impact there are used devices with rotating optic-effect elements as a moving
picture attracts spectator attention more than static ones. Nevertheless even
such elements need not to rotate continuously and an activation of a driving
unit is therefore necessary. Basically there are used two systems of
20 attachment of the elements the systems being applied with larger or less
differences. by the first system the optic-effect elements are attached at
a rotary disc and the elements are manually changes as the need may be.
This solution is simple and cheap but uncomfortable from the practical point
of view. A device of the kind manifests little space for manipulation with the
25 elements and tools are always necessary. Such a design which is mostly
used in simple lighting devices is described e.g. in the paper DE2263689.
By modern and more complex devices, such as those with rotating optical
effects, the mutually independent segments, each of them holding an
individual element, are attached at a disc carrier and always there are
30 changed the complete segments. Solutions of this type are described e.g. in
papers US 6,601,973 and WO 03/000584. Here the said optic-effect
elements are attached at a carrier disc by means of a lamella inserted in to

a resilient holder located in the disc centre. A long-time operation results in weariness of the resilient holder and consequently segments are undesirably spontaneously loosened.

It is an object of the invention to simplify the construction of attachment of the
5 optic-effect elements on a carrier disc and make their exchange less time
and work costly by both the stationary and the rotation systems

Disclosure and Object of the Invention

The foregoing object is achieved by equipment for exchange of optic-effect
10 elements provided with a carrier of exchangeable segments with optic effect
elements and means for attachment of the segments at the carrier, which in
accordance with the present invention are provided with permanent magnets,
while the carrier and/or the segments are at least partially made of
ferromagnetic material. Further in accordance with the present invention the
15 carrier comprise a first base of ferromagnetic material and a second base of
non-ferromagnetic material, the second base being arranged side by side
with the first base and provided with a plurality of apertures having their
centres located at a first pitch circle, while the means for attachment of the
segments at the carrier comprise permanent magnets attached at each of the
20 segments, the magnets showing cross-section which corresponds the shape
of the apertures and length corresponding to mutual distance of both bases.
The means for attachment of the segments at the carrier further comprise
first means for segment setting arranged at the second base and second
means for segment setting arranged at each of the segments. In a preferred
25 embodiment the first means for segment setting are provided for by a
plurality of pins the centres of which are located at the second pitch circle
having a diameter different to the one of the first pitch circle, while the second
means for segment setting are provided for by a recess the shape of which
corresponds to at least a part of the pin cross-section. In another preferred
30 embodiment both bases are mutually spaced apart.

The invention offers very simple attachment of the segments with optic-effect
elements at the carrier in an exactly defined position, while any exchange of

the segments is easy and fast. The whole design manifests also simple manufacture technology feasible by low costs.

Brief Description of the Drawings

- 5 By way of examples the invention will be now described in details with reference to the accompanying drawings. Fig. 1 shows a top axonometric view on a carrier having seven segments holding colour filters, one of the segments being in a released position and on Fig. 2 there is an underneath axonometric view on the carrier according to Fig. 1. Fig. 3 represents an
10 axonometric view on one segment and on Fig. 4 there is an axonometric view on a carrier with a single attached segment.

(Detailed) Description of Preferred Embodiments

- Referring to the drawings there is shown equipment for exchange of optic-effect elements. On all the drawing the said elements are for simplicity
15 presented only as white areas. The equipment shows seven positions occupied by the optic-effect elements, the eighths one is designed to direct lighting by plain white light. Referring to the drawings there is shown equipment consisting of a carrier with attached exchangeable segments 1
20 holding optical-effect elements such as colour filters 2. The elements are secured attached on the carrier through means for attachment of the segments 1.

- According to the invention the carrier consists of a first base 3 made of ferromagnetic material and a second base 4 made of non-ferromagnetic
25 material. The second base 4 is arranged plane-parallel, i.e. side by side and mutually spaced apart from the first base 3. Both bases 3,4 having a shape of flat discs are mutually connected by pins 5. The second base 4 is furnished with a plurality of apertures 6 having their centres located at a first pitch circle. Number of apertures 6 corresponds to the number of segments 1
30 attached at the carrier.

The said means for attachment of the segments 1 comprise on the one hand permanent magnets 7, fixed at each of the segments 1, on the other hand

means for segment setting, i.e. means allowing for a correct positioning of the segments 1 at the carrier. The permanent magnets 7, having a cross-section corresponding to the shape of apertures 6 and length corresponding to space between faces of both bases 3,4, are preferably stacked on the segments 1. It is obvious they can be fixed at the segments by any other way known as such. As a suitable material for the permanent magnets 7 there can be named e.g. NdFeB.

By the embodiment shown on the drawings the first means for segment setting comprise a plurality of the pins 5, keeping both bases together and having heads which protrude from the outside face surface of the first base 3 of the carrier. Centres of all the pins 5 are located at a second pitch circle, the radius of which is different to the one of the first pitch circle, while angular spacing of the pins 5 is the same as angular spacing of apertures 6 of the second base 4. The second means for segment setting, located at each of the segments are provided for by a recess 8, the shape of which corresponds to at least a part of the pin 5 cross-section.

When being put on the carrier the segment 1 rests by its recess 8 on respective pin 5 and its permanent magnet 7 fits into respective aperture 6 in the carrier second base 4. The segment is held in its position by magnetic forces drawing the segment toward the first base 3. The non-magnetic material of the second base 4 makes the insertion of the segment 1 on the carrier easier. The permanent magnet portative force is fully sufficient and withstands even very rough manipulation during transport. The position of the segment 1 and therefore also the optic-effect element hold by the segment 1 on the carrier is by the above described system unambiguously defined.

From the above description it is obvious that the permanent magnet 7 can be alternatively fixed at the carrier and fit into a hole in the segment 1. Similarly the permanent magnet 7, irrespective to its location, need not to fit in a hole in the opposite part, but only attracted toward the part. Nevertheless in such a case it is necessary to provide for a mechanical securing against the segment 1 side movement. Instead of pins 5 there can alternatively be used

separate mechanical means, known as such, allowing for proper positioning of the segment 1 on the carrier.

Industrial applications

- 5 The present invention is designed for lighting equipment especially for the equipment used for theatre and show stages and platforms etc.

C L A I M S

1. Equipment for exchange of optic effect elements provided with a carrier of exchangeable segments holding optic effect elements and means for attachment of the segments at the carrier, **characterized in, that** the means for attachment of the segments (1) at the carrier are provided with permanent magnets (7), while the carrier and/or the segments are at least partially made of ferromagnetic material.
2. Equipment for exchange of optic effect elements according to claim 1, **characterized in**, that the carrier comprise a first base (3) of ferromagnetic material and a second base (4) of non-ferromagnetic material, the second base (4) being arranged plane-parallel with the first base (3) and provided with a plurality of apertures (6) having their centres located at a first pitch circle, while the means for attachment of the segments at the carrier comprise permanent magnets (7) attached at each of the segments (1), the permanent magnets (7) showing cross-section which corresponds the shape of the apertures and length corresponding to mutual distance of both bases, provided the means for attachment of the segments at the carrier further comprise first means for segment setting arranged at the second base (4) and second means for segment setting arranged at each of the segments (1)
3. Equipment for exchange of optic effect elements according to claim 2, **characterized in**, that the first means for segment setting are provided for by a plurality of pins (5) the centres of which are located at the second pitch circle having a diameter different to the one of the first pitch circle, while the second means for segment setting are provided for by a recess (8) the shape of which corresponds to at least a part of the pin cross-section
4. Equipment for exchange of optic effect elements according to claim 2 or 3, **characterized in**, that both bases (3,4) are mutually spaced apart.

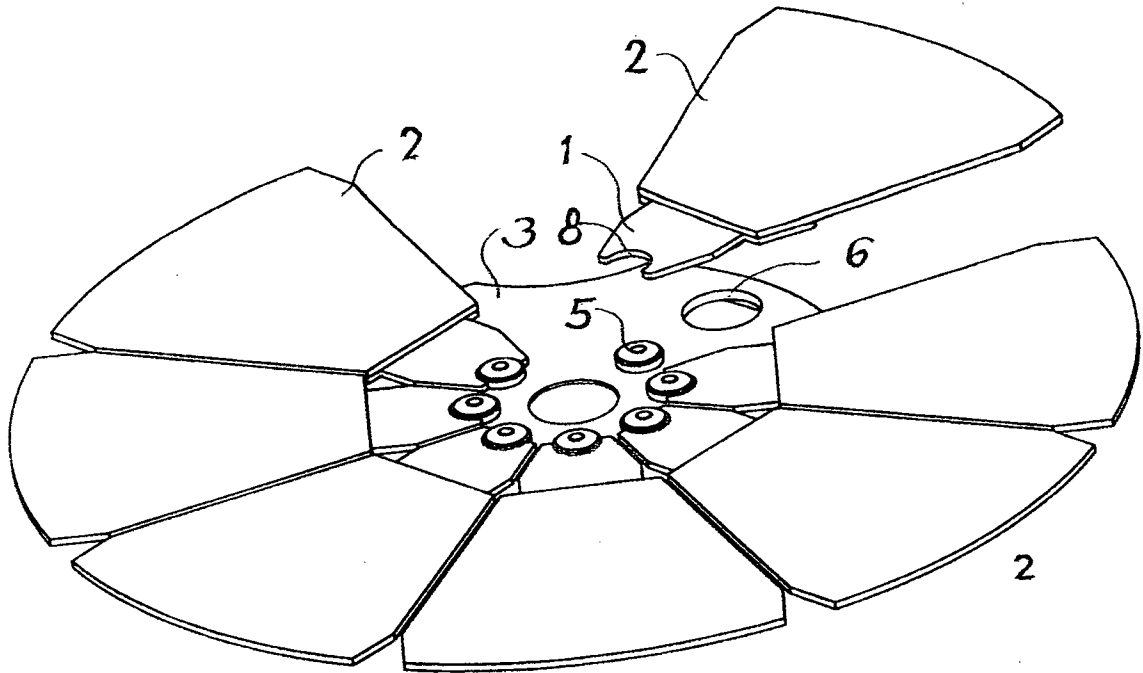


Fig. 1

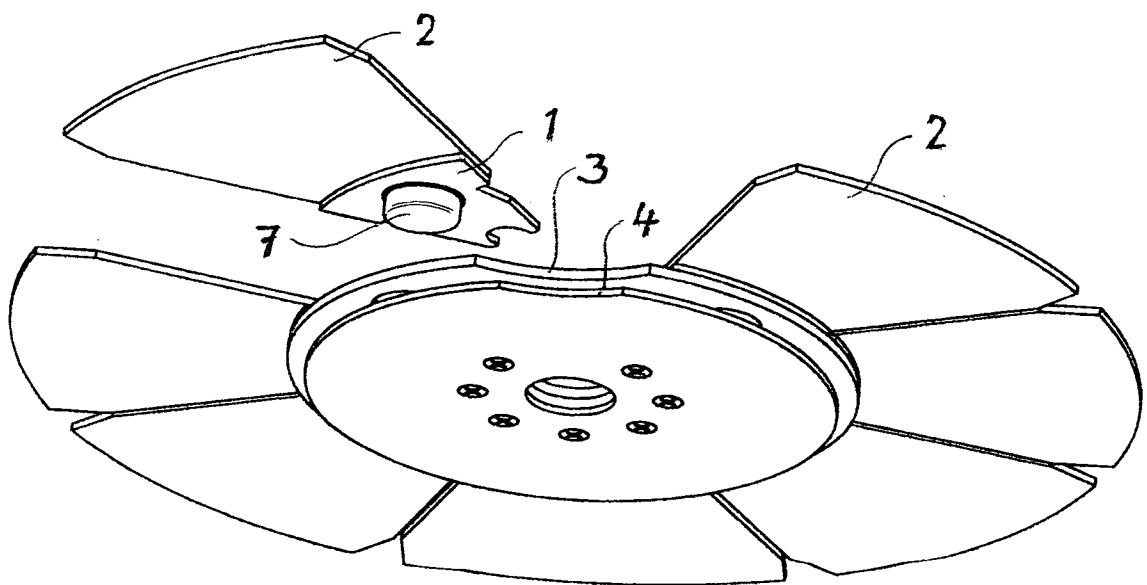


Fig. 2

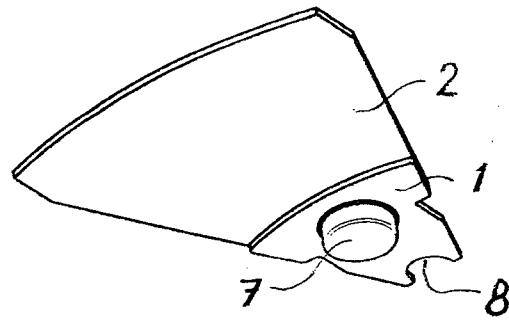


Fig. 3

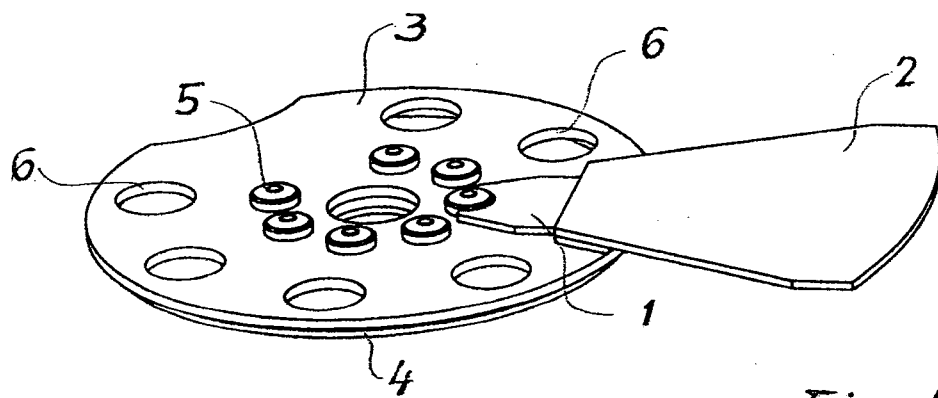


Fig. 4