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Matsumoto et al.

[11] **3,771,106**

[45] **Nov. 6, 1973**

[54] **SOCKET SUITED FOR REVOLVING THE LAMP ATTACHED THERETO**

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[73] Assignee: **New Nippon Electric Company Ltd.**, Osaka, Japan

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[21] Appl. No.: **241,962**

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Apr. 14, 1971 Japan ..... 46/28925 (utility model)

[52] **U.S. Cl.** ..... **339/52,** 240/51.11 R
[51] **Int. Cl.** **H01r 33/08**
[58] **Field of Search** ..... 339/5, 8, 20, 50, 339/52, 124, 176, 182, 191; 310/68, 71, 73; 355/67–70; 240/51.11 R

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Primary Examiner—Marvin A. Champion
Assistant Examiner—Terrell P. Lewis
Attorney—James Theodosopoulos

[57] **ABSTRACT**

A socket suitable for revolving a fluorescent lamp attached thereto comprises an insulating body having a first recessed portion therein for receiving a rotator in which a pair of base pins of the lamp can be inserted and having a pair of second recessed portions therein for receiving a stator to which lead-in wires for a power supply are connected, means for pivotally supporting the rotator within the first recessed portion, and a pair of conductive rings, insulated from each other, set around an insulating disc of the rotator and elastically engaged with conductive spring means of the stator so as to make electrical connection between the stator and the rotator.

3 Claims, 10 Drawing Figures

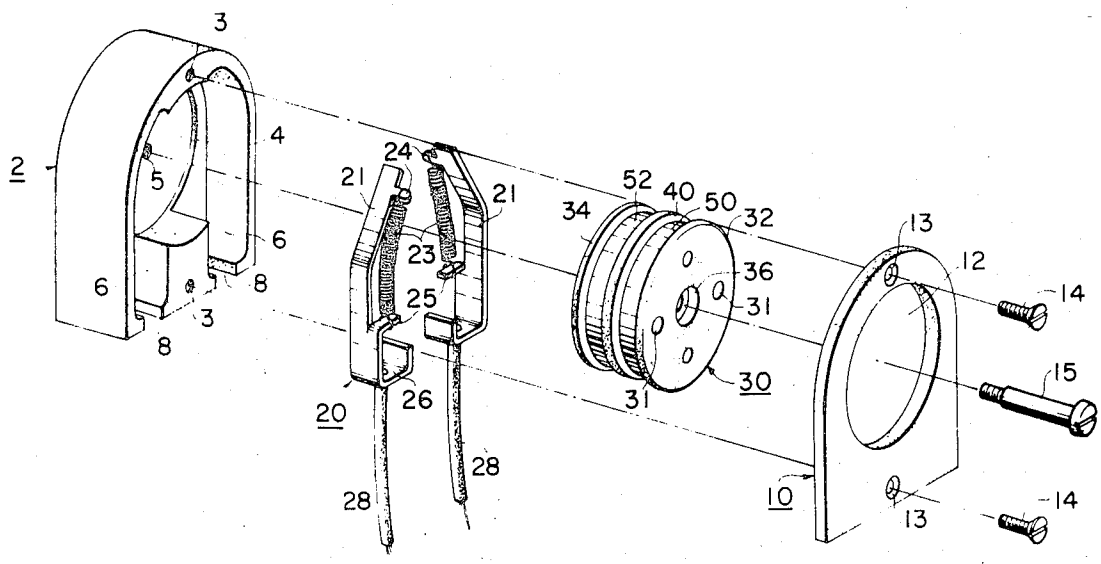


FIG. 1

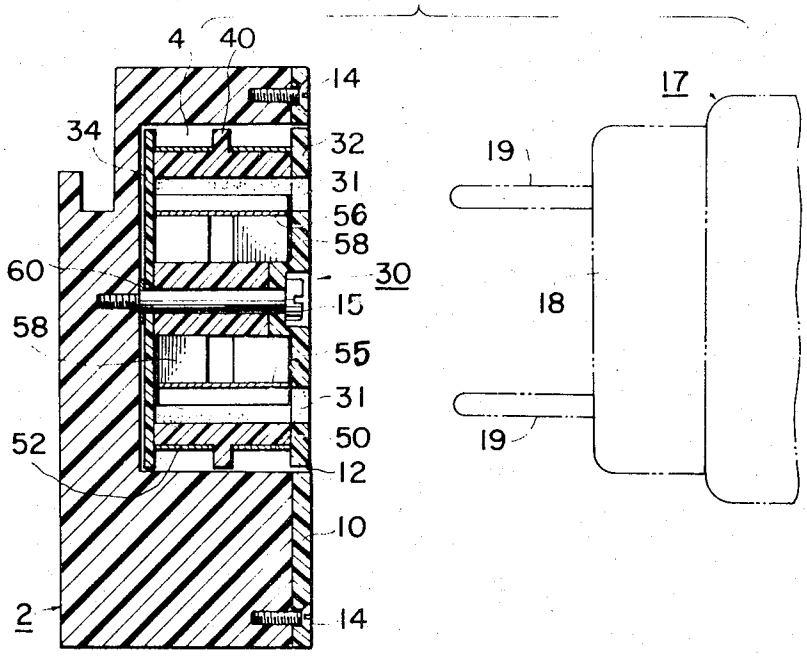

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FIG. 2

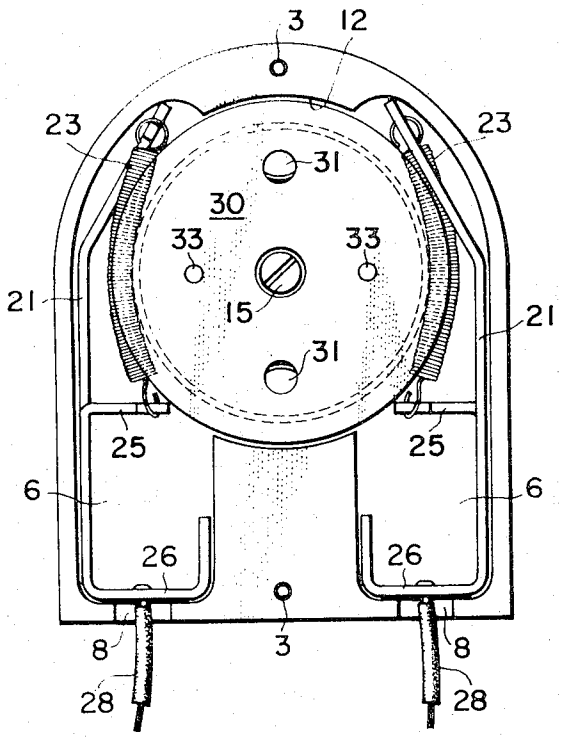

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FIG. 3

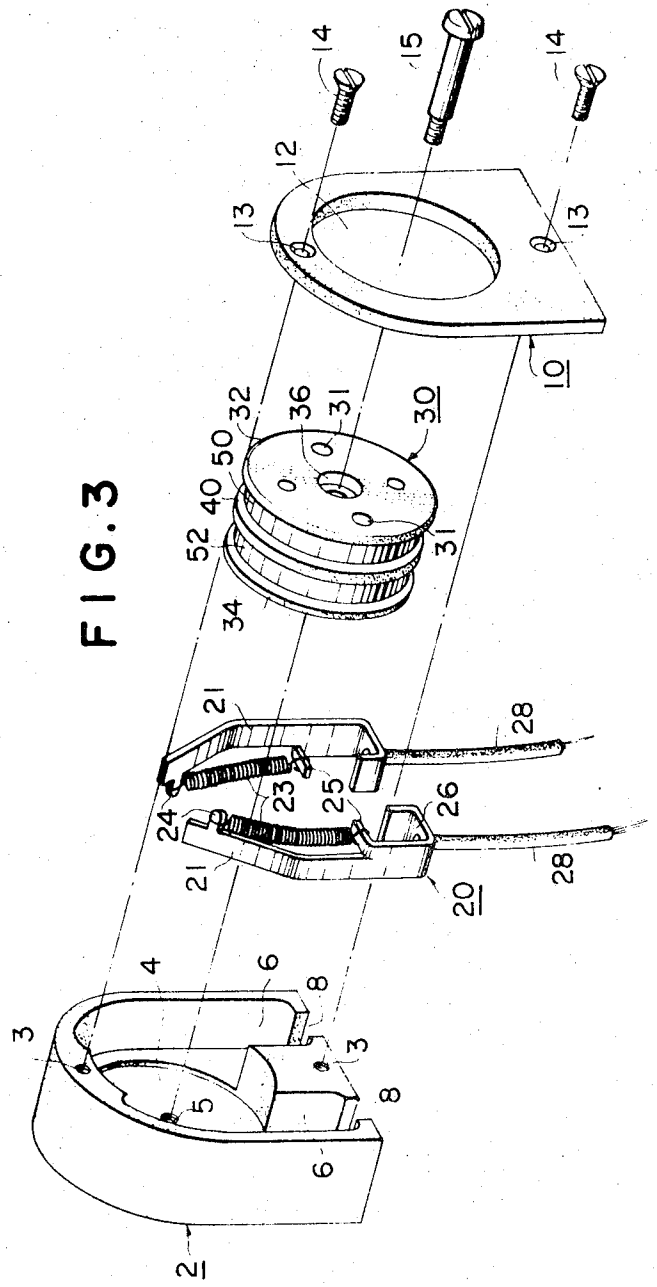

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FIG. 4

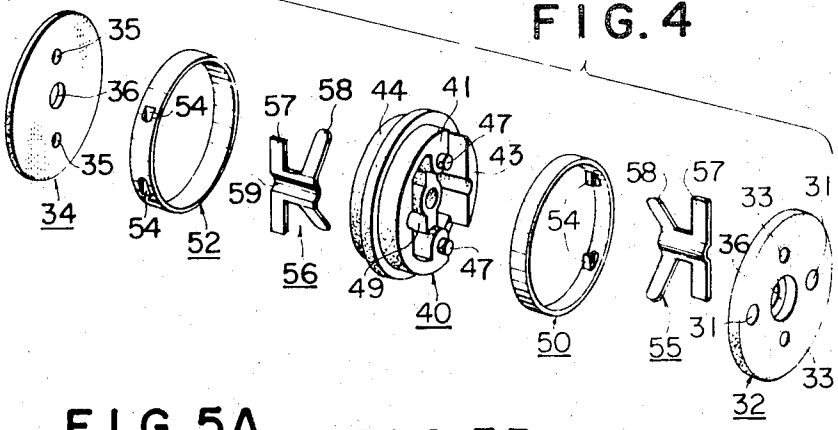


FIG. 5A

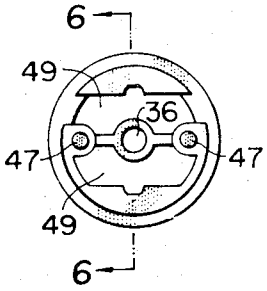


FIG. 5B

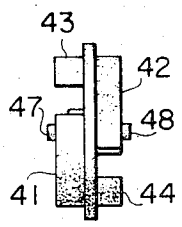


FIG. 5C

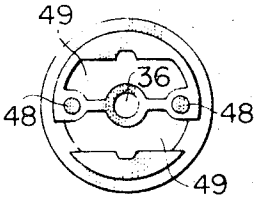


FIG. 6

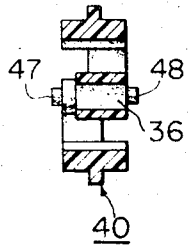


FIG. 7

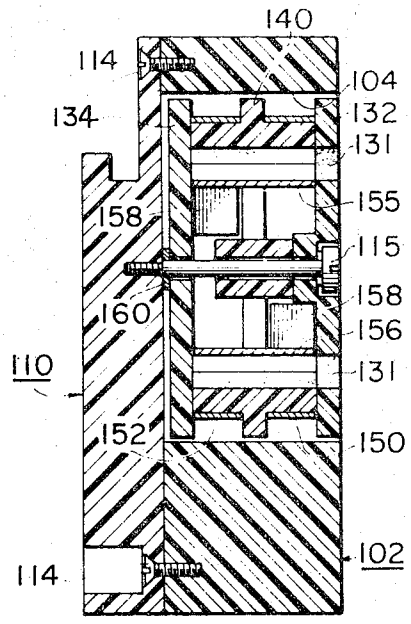
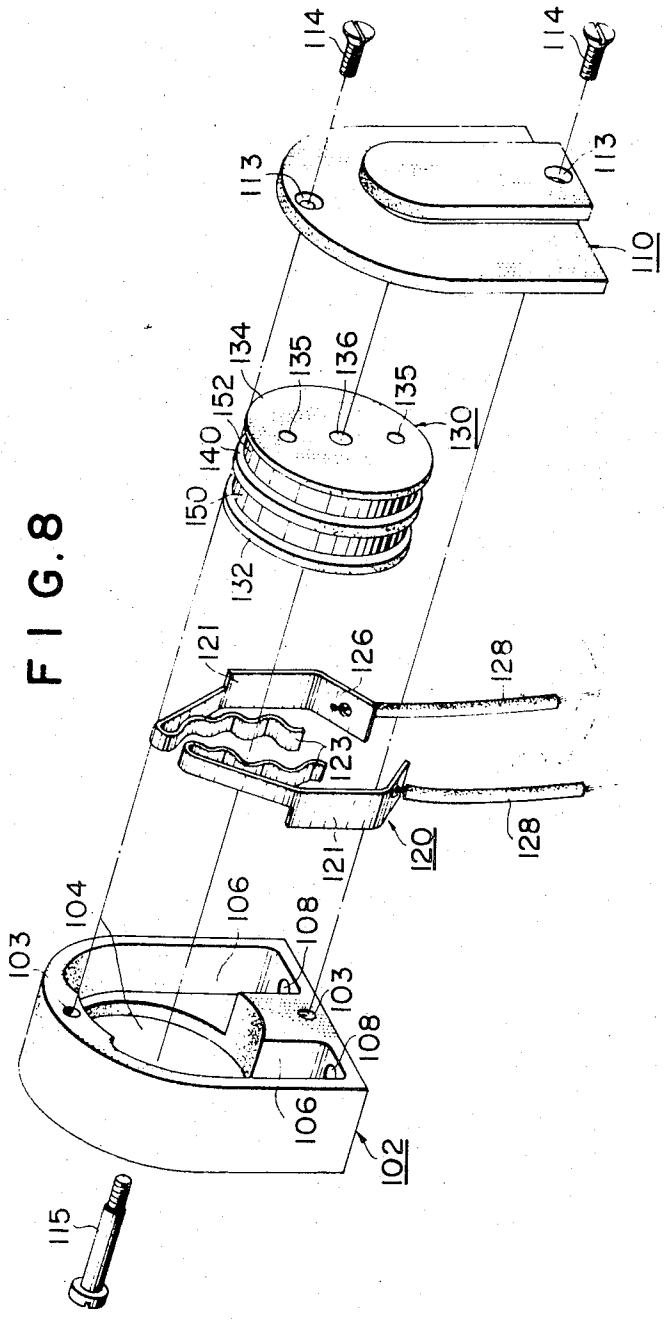


FIG. 8


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SOCKET SUITED FOR REVOLVING THE LAMP ATTACHED THERETO

SUMMARY OF THE INVENTION

This invention relates to a socket suitable for revolving a fluorescent lamp attached thereto, and especially to a particular structure of revolving socket which uses spring means for connecting the stator part of the socket with the rotator part.

In the structure of the socket of the present invention, the stator member comprises a pair of electrically conductive springs each held within a conductor and spanning a portion thereto so as to make resilient electrical engagement with a rotator member which comprises an insulating disc with a pair of apertures, a pair of resilient metallic contacts for receiving base pins of a fluorescent lamp and a pair of electrically conductive rings.

The advantage of this socket lies in improvement of the electrical connection between stator and rotator members and ease of assembly of the rotator part of the socket.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal cross section view of a rotatable socket in accordance with this invention.

FIG. 2 is a front view of the socket of FIG. 1 without the front cover.

FIG. 3 is an exploded view showing each element of the socket of FIG. 1.

FIG. 4 is an exploded view of the rotator member of the socket of FIG. 1.

FIGS. 5A to 5C are views of a disc of the rotator member of FIG. 4 showing a front view, a side view and a back view.

FIG. 6 is a sectional view taken along line 6 — 6 of FIG. 5A.

FIG. 7 is a longitudinal cross section view of another embodiment according to this invention.

FIG. 8 is an exploded view showing each element of the socket of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

So far various kinds of rotatable sockets have been proposed as lamp holders for electric apparatus such as copying machines having fluorescent lamps which can revolve. These sockets were complicated in construction, particularly as to the structure of a rotator and in effectively combining a rotator with a stator. For example, in the case of sockets whose rotators revolved smoothly by decreasing the contact pressure of electrical contact, long use reduced the effectiveness of the electric contact. On the other hand, in the case of sockets in which the contact pressure of electrical contact was high enough to get good electric contact for a long time, rotators were not able to revolve smoothly.

An object of this invention is to provide a socket in which the combination of a rotator member and a stator member results in improved and longer lived electrical contact. It is another object to provide a socket in which the rotator member can be easily assembled and in which electric contact between the stator and rotator is reliable.

As shown in FIGS. 1 to 3, a socket suitable for revolving a fluorescent lamp 17 comprises an insulating body 2 made of insulating material such as synthetic resin, a stator member 20, a rotator member 30, a cover 10 and axle 15 for rotatably supporting said rotator member 30. These parts are assembled integrally by means of supporting axle 15 and a pair of binding screws 14. The insulating body 2 of the socket includes a first recessed portion 4 for rotator 30, a pair of second recessed portions 6 for stator 20, and a pair of notches 8 for the passage of lead-in wires. Moreover, it has a tapped hole 5 for the threaded end of axle 15 and a pair of tapped holes 3 for binding screws 14. Cover 10 has an opening 12 for lamp 17 and a pair of holes 13 for binding screws 14. Stator 20 comprises a pair of durable and resilient conductors 21 and a pair of coiled springs 23 made of phosphor bronze or similar durable resilient metal. Springs 23 are hung by pairs of lugs 24 and 25 set symmetrically around each resilient conductor 21. Lead-in wires 28 are welded or soldered at fitting portions 26 of resilient conductors 21. Rotator 30 comprises first and second disc plates 32 and 34, and a main disc 40 is held freely to revolve by supporting axle 15 inserted into a center hole 36 passing through the whole. A pair of holes 31 receiving a pair of base pins 19 of a base 18 of fluorescent lamp 17 is formed in rotator 30, and a pair of ring-form conductors or conductive rings 50 and 52 which are each separate contact portions of rotator 30 is fixed to the main disc 40. When fixing supporting axle 15 to insulating body 2 during assembly of a socket, a sliding ring 60 is used, for smooth revolution of rotator 30, between second disc plate 34 and insulating body 2.

Next, the structure of the rotator 30 is described in reference to FIGS. 4 to 6. Rotator 30 comprises first front disc plate 32, second back disc plate 34, main disc 40, first front ring 50 and contact piece 55, and second back ring 52 and contact piece 56. Main disc 40 and the first and second disc plates 32 and 34 are fixed to each other by putting projections 47 and 48 in holes 33 and 35 receiving them. Each contact piece 55 and 56, made of resilient metal, has a touching portion 59 receiving each base pin 19 of fluorescent lamp 17, and is fixed within main disc 40 of rotator 30 at first extended portions 57 retained with tongues 54 of conductive rings 50 and 52 and at second extended portions 58 engaged within large holes 49 of main disc 40 so that it maintains electrical connection with the conductive rings. Conductive rings 50 and 52 are respectively attached around projecting portions 41, 42, 43 and 44 of main disc 40. Main disc 40, of insulating material, may be made of two half parts owing to its symmetrical structure. As shown in FIGS. 4 and 5, it has semicircular projecting portions 41 and 42, arch-shape projecting portions 43 and 44 and projections 47 and 48. Projections 47 and 48 are inserted in holes 33 and 35 of disc plates 32 and 34, and an adhesive may be used for more secure connection. Satisfactory electrical connection between the conductive rings and the contact pieces is established by the resiliency of the first extended portions 57 of the contact pieces. However, the contact pieces may be soldered or welded to the conductive rings, if desired.

Now, the assembly of the socket is described. Rotator member 30 is set in the cylindrical recessed portion 4 of insulating body 2 of socket and stator member 20, drawing apart coiled springs 23, is set in the other recessed portions 6. Then, cover 10 is attached in the front. These are combined by supporting axle 15 and screws 14. Rotator 30 is held by supporting axle 15 so

as to revolve quite freely in cylindrical recessed space **4** and coiled springs **23** resiliently contact conductive rings **50** and **52** to establish electrical connection therebetween.

When base pins **19** of fluorescent lamp **17** are inserted in holes **31**, they contact respectively touching portions **59** of contact pieces **55** and **56**, thereby establishing electrical connection to conductive rings **50** and **52**. On the other hand, as each conductive ring contacts coiled spring **23**, electricity can be supplied from lead-in wires **28** to fluorescent lamp **17** even while rotator **30** is revolving.

In another embodiment, lamp **17** is inserted into the socket through an opening in the back of insulator body **2** instead of through cover **10**. Such embodiment is shown in FIGS. **7** and **8**. Also, wavy spring means **123** may be used in place of coiled spring **23**. The numbers used in FIGS. **7** and **8** to designate structural elements correspond to these in FIGS. **1** to **6** but increased by one hundred.

As stated above, this invention is simple in construction and easy to assemble and reassemble; also it holds good electrical contact for a long time, even under comparatively low contact pressure, because the spring means conforms to the circumference of the conductive ring and touches in many points, establishing large contact area and the rotator revolves very smoothly.

Furthermore, according to the invention the rotator is easy to assemble because there is no need to combine the conductive ring and the contact piece by welding; they are combined mechanically and electrically by use of the projections on each conductive ring. It is easy also to repair because the conductive ring and the contact piece are easily disassembled.

We claim:

1. A rotatable socket for a fluorescent lamp having a pair of base pins at the end thereof, comprising an insulating body having first and second recessed spaces; a rotator mounted rotatably by a fixed supporting axis within said first space of the insulating body and receiving the end of said fluorescent lamp, said rotator comprising an insulating main portion, a pair of conductive rings insulated from each other and disposed around the periphery of said insulating main portion, a pair of pliable metallic contact pieces for receiving said base pins of said fluorescent lamp, each of said contact pieces connected electrically with each of said conductive rings and set within apertures formed in said insulating main portion; and a conductive stator fixed within the second recessed space and having a pair of resilient stiff conductor with terminals for a power supply and a pair of spring means with an uneven surface, each of said spring means being differently located at corresponding positions to each of said rings of said rotator, the uneven surfaces of said spring means being electrical connection with said conductive rings.

2. The socket of claim **1** wherein said spring means is a coiled spring.

3. The socket of claim **1** wherein each of said conductive rings has tongue portions electrically connecting and retaining each of said contact pieces.

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