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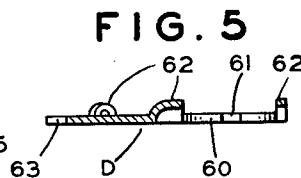
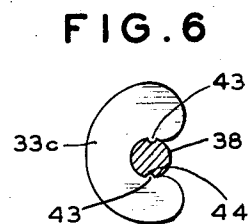
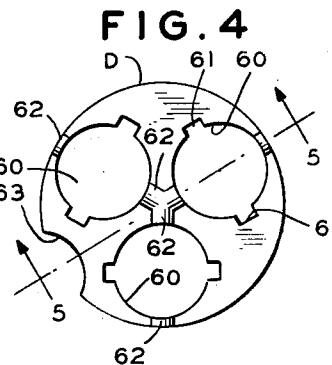
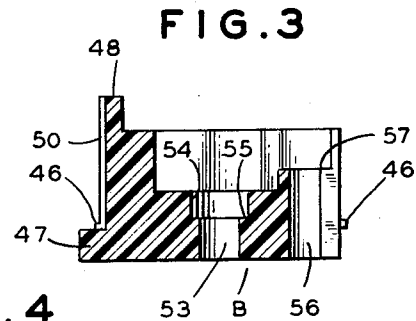
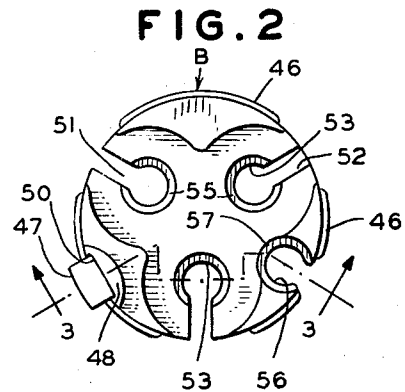
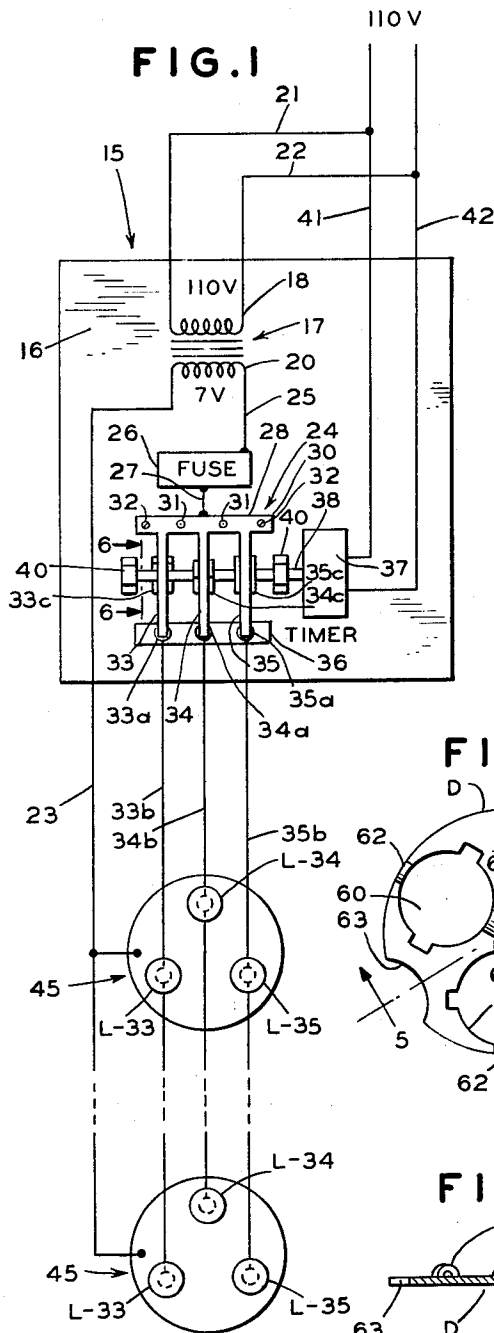
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3,002,174

DISPLAY LIGHTING APPARATUS

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2 Sheets-Sheet 1



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DISPLAY LIGHTING APPARATUS

2 Sheets-Sheet 2

FIG. 9

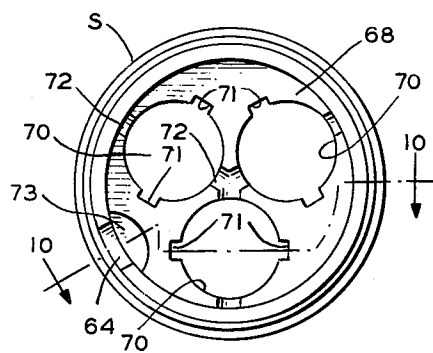


FIG. 8

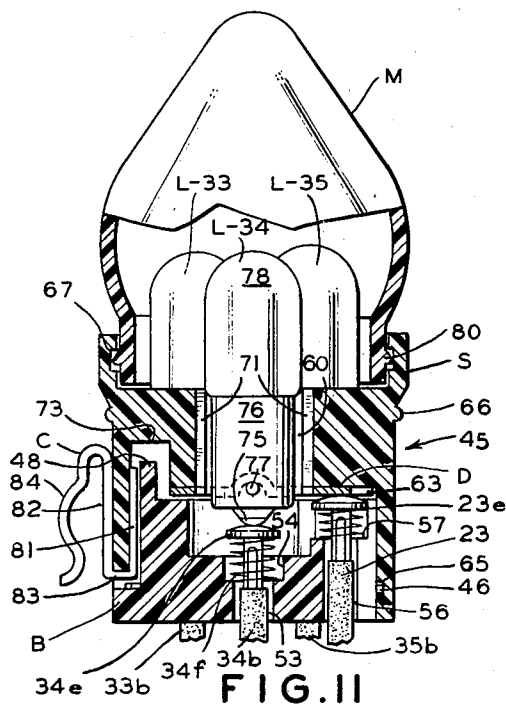


FIG. 10

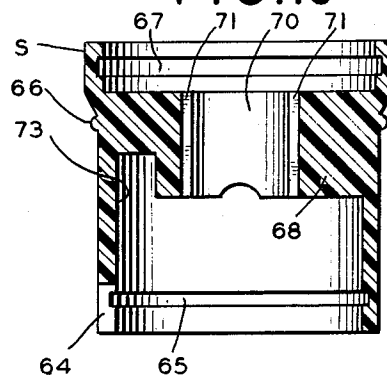
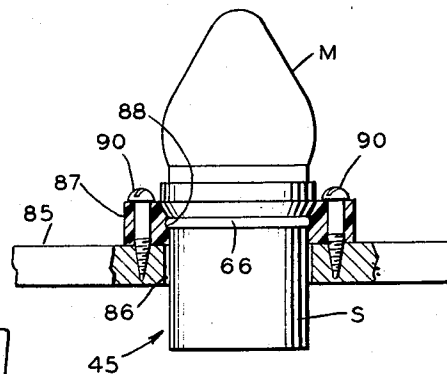


FIG. 12



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DISPLAY LIGHTING APPARATUS

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6 Claims. (Cl. 339-119)

This invention pertains to the art of illumination and, more particularly, to improved variegated electric lighting apparatus.

The apparatus of this invention has numerous specific applications. It is especially useful in the related fields of display and advertising lighting. In this connection, the apparatus may be advantageously employed to obtain a wide variety of attractive and ornamental illuminated display effects and attention-directing and pleasing advertising lighting effects.

The invention affords a number of important features, including the following:

(1) A single control unit determines the sequence and duration of energization of individual lamps in one or more lamp assemblies. The control unit is located outside of each lamp assembly and operates independently of the assembly. This eliminates the need for thermal controls for individual lamps or lamp assemblies and results in substantial savings in manufacturing costs.

(2) The timing of energization of particular lamps is positive and dependable. The parts of the apparatus are so constructed and arranged as to permit of ready changes in the color cycle of any lamp assembly without disturbing the color cycle of remaining lamp assemblies in a string of such assemblies. In fact, many color combinations may be attained in a single string of lamp assemblies, thereby affording a wide range of illumination effects with the same equipment.

(3) The apparatus of this invention includes a step-down transformer and low amperage lamps. The inclusion of these parts reduces the operating costs of the apparatus and avoids undesirable interference in radio and television reception.

(4) The parts of the lamp assembly of this invention are coupled together by simple, novel and improved snap-fit connections. As a consequence, the lamp assembly may be readily and quickly put together and individual lamps thereof may be easily replaced without the use of tools.

(5) The lamp assemblies of the apparatus may be located indoors or out-of-doors without being adversely affected by atmospheric elements or storms.

The primary object of this invention is to provide variegated electric lighting apparatus having improved structural and operational characteristics.

Another object of this invention is to provide display and advertising electric lighting apparatus including one or more lamp assemblies and a single control unit which is independent of each lamp assembly and which dependably controls the sequence and duration of energization of individual lamps in each assembly.

The invention has for a further object the provision of variegated lighting apparatus including at least one lamp assembly having a plurality of lamps, the parts of the assembly being so constructed and arranged as to permit of ready uniting of such parts and replacement of individual lamps without the use of tools.

A further object of the invention is to provide a display lighting lamp assembly of improved design and simplified construction.

A still further object of the invention is to provide apparatus of the character indicated that is simple and attractive in design, that is rugged and durable in construction, that is reasonable in manufacturing and main-

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tenance costs, that is economical in operating cost, and that is capable of performing its intended functions in a dependable and trouble-free manner.

The enumerated objects and additional objects, together with the advantages of the invention, will be readily understood by persons skilled in the art from the following detailed description and the annexed drawings which respectively describe and illustrate an arrangement of apparatus embodying the invention and a modification thereof.

In the drawings, wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is a partly diagrammatic view of an arrangement of apparatus constructed in accordance with this invention;

FIG. 2 is a top plan view of the core or base of a lamp assembly of this invention;

FIG. 3 is a view taken along staggered line 3-3 of FIG. 2;

FIG. 4 is a top plan view of an electrically conductive disc element which is a part of the lamp assembly;

FIG. 5 is a view taken along line 5-5 of FIG. 4;

FIG. 6 is a view in enlargement taken along line 6-6 of FIG. 1;

FIG. 7 is a top plan view of a lamp assembly of this invention, parts being omitted for better illustration of other parts;

FIG. 8 is a view of the lamp assembly taken along staggered line 8-8 of FIG. 7;

FIG. 9 is a bottom plan view of a sleeve which is an element of the lamp assembly shown in other views;

FIG. 10 is a view taken along staggered line 10-10 of FIG. 9 and inverted to illustrate the sleeve in normal upstanding position;

FIG. 11 is a top plan view of a modification of the invention; and

FIG. 12 is a view taken along staggered line 12-12 of FIG. 11.

Referring initially to FIG. 1, a combined transformer, timer and switch unit is generally identified by numeral 15. This unit includes a base 16 and a cover (not shown). The base supports a transformer 17 for reducing the voltage of electric current supplied thereto from 110 volts to 7 volts. To this end, the transformer is provided with a 110 volt primary coil 18 and a 7 volt secondary coil 20. Primary coil 18 is adapted to be connected by electric leads 21 and 22 to a 110 volt electric current supply (not shown). One end of secondary coil 20 is connected to a conductor wire 23 which serves as a common ground for parts that will be described further along herein. The other end of coil 20 is connected to a switch device 24 through the intermediary of a conductor wire 25, a fuse 26 and a conductor wire 27 which are arranged in series, as shown.

Switch device 24 is generally E-shaped and is made of a single piece of flexible, resilient, electrically conductive material, such as brass. The switch device includes a support member 28 which is connected to conductor wire 27 and is secured to an insulating bar 30 by rivets or the like 31. The insulating bar is attached to the base by screws 32. Device 24 also includes a plurality of parallel, resilient, finger-like switch members 33, 34 and 35, having free ends which overlie and normally contact electric terminals 33a, 34a and 35a, respectively. The electric terminals are carried by an insulating bar 36 which is mounted on base 16. Connected to terminals 33a, 34a and 35a are corresponding conductor wires 33b, 34b and 35b.

Switch members 33, 34 and 35 are adapted to be flexed individually in an upward direction and out of engagement with the electric terminals by an arrangement

of devices that will now be described. These devices include a motor driven electric timer 37 having a rotary shaft 38 which is positioned beneath the switch members. The shaft is mounted for rotation on a pair of spaced supports 40 that are secured to the base. The timer is adapted to be connected by electric leads 41 and 42 to the source of 110 volt electric energy supply. A plurality of spaced cams 33c, 34c and 35c are carried by and rotatable with shaft 38. One of the cams, namely cam 33c, is illustrated in detail in FIG. 6. This cam is arcuate in configuration and has a pair of oppositely disposed inner teats 43 which register with diametrically opposed recesses 44 in the shaft. The other cams are similarly constructed but have different outer edge configurations. It will be appreciated that the configurations of the cams determines the sequence and duration of upward flexing of corresponding switch members during each revolution of the shaft. Thus, by properly designing the cams, at least one of the switch members is in contact with its terminal during each increment of revolution of the shaft and various combinations of switch members are in contact with the terminals during other increments of shaft revolution.

Lead 23 and conductor wires 33b, 34b and 35b are connected to one or more lamp assemblies which are generally indicated by numeral 45 in FIG. 1 and which are illustrated in detail in other views. Each lamp assembly includes a core or base B, a ground disc D, a sleeve S, lamps L-33, L-34 and L-35, a mantle M and a spring clip C.

Base B is made of a suitable molded, electric insulating synthetic resin composition, such as the material made and marketed by Marlon Chemical Corp. under the trademark "Cycolac." The base is best shown in FIGS. 2 and 3 and has a generally right circular cylindrical outer surface. The base is provided with a plurality of outer arcuate ribs 46, a laterally projecting lug 47, and a vertically projecting extension 48. A recess 50 is formed in extension 48 and in the portion of the base between the extension and lug 47. Three symmetrically arranged vertical slots 51 are provided in the base. Each slot has a relatively narrow rectilinear outer portion 52 and a relatively wide arcuate inner portion 53. Each slot portion 53 includes an upper portion 54 of enlarged diameter (FIG. 3) which is partly defined by an arcuate shoulder 55. The base has an additional arcuate slot 56 which is similar to earlier described slot portion 53. The upper part of slot 56 is of enlarged diameter and is defined in part by a corresponding shoulder 57.

FIGS. 4 and 5 illustrate the configuration and construction of ground disc D. This disc is electrically conductive and is made of brass or other suitable metal. The disc has three symmetrically arranged through openings 60 which are adapted to be aligned with corresponding arcuate slot portions 53 of base B. The disc is provided with pairs of diametrically opposed notches 61 which merge with openings 60. The disc has a pair of upwardly arching aligned offsets 62 for each opening 60. Each pair of offsets is disposed at an angle of approximately 90° with respect to corresponding notches 61. The disc also has an arcuate outer notch 63 for reception of base extension 48 when the parts are assembled as shown in FIG. 8. This notch and extension arrangement serves to properly align the disc openings 60 with base slot portions 54.

Reference is next had to FIGS. 9 and 10 for an understanding of the construction of sleeve S. As in the case of base B, sleeve S is made of "Cycolac" or other suitable synthetic resin composition. The sleeve has, at its lower end, a notch 64 and an inner annular groove 65 and, at its upper end, an outer annular rib 66 and an inner annular groove 67. A partition 68 extends across the interior and intermediate the ends of the sleeve. The partition divides the interior of the sleeve into a lower compartment and an upper compartment. Formed in the partition are through openings 70, through notches

71 and recesses 72 which correspond, respectively, in number, location and configuration to openings 60, notches 61 and offsets 62 of disc D. Also formed in the partition is a recess 73 for receiving the upper end of base extension 48.

Base B, disc D and sleeve S are adapted to be assembled, as illustrated in FIG. 8, with disc D positioned intermediate the lower end of sleeve partition 68 and the upper end of the base and with the base positioned within the lower compartment of the sleeve. Base extension 48 extends through notch 63 in the disc and terminates in sleeve recess 50, thereby insuring proper positioning of the parts and alignment of the earlier described openings in the base, disc and sleeve. Base ribs 46 register with inner annular groove 65 of the sleeve to effect coupling engagement between the base and the sleeve.

Lamps L-33, L-34 and L-35 are best shown in FIG. 8. Each lamp includes a contact button 75 and a tubular contact member 76 which are spaced apart and connected to the lamp filament (not shown) in the usual manner. Tubular contact 76 has a pair of diametrically opposed, outwardly projecting pins 77. Each lamp also includes a translucent glass envelope 78. The glass envelopes of the lamps are colored differently, the envelope of lamp L-33 being colored red, the envelope of lamp L-34 being colored yellow and the envelope of lamp L-35 being colored blue. As is well known in the art, combinations of these primary colors result in corresponding secondary colors: Thus, a blend of red and yellow yields orange, a blend of red and blue yields purple and a blend of yellow and blue yields white. The lamps are adapted to be mounted in the assembly of base, disc and sleeve, as shown, with its tubular contact member 76 in registry with corresponding aligned openings 69 and 70. Each lamp is inserted downwardly through its sleeve opening in a manner that its pins 77 pass notches 71, after which the lamp is turned 90° so that its pins register with disc offsets 62. Each lamp is yieldingly maintained in the illustrating position through the medium of contacts carried by corresponding conductor wire 33b, 34b, and 35b. The contact of wire 34b is indicated at 34e in FIG. 8. This contact is normally urged upwardly and into engagement with lamp button contact 75 by a helical spring 34f which bears against base shoulder 53 and the contact. Like contact and spring arrangements are provided for the other lamps.

Ground lead 23 has a contact 23e which bears against disc D, as shown in FIG. 8. Contact 23e is yieldingly urged against the disc by a helical spring 23f.

Mantle M is made of a suitable synthetic resin composition. A preferred and recommended material for the mantle is one produced and marketed by Eastman Chemical Co. under the trademark "Tenite," which is understood to be an acetate type synthetic plastic. The mantle is translucent and flexible and, for best results, is pearl white in color. The mantle is provided with an annular rib 80 which registers with inner annular groove 67 in sleeve S to effect ready coupling or uncoupling engagement between the mantle and the sleeve.

Clip C is intended for use in attaching the lamp assembly to a support, such as a rod, bracket or the like. The clip is made of a suitable resilient metal and includes a generally U-shaped member consisting of an inner arm 81, an outer arm 82 and a web 83. Outer arm 82 has an extension 84 which is bent and curved. As illustrated in FIG. 8, clip arm 81 is disposed between the base and the sleeve and registers with base recess 50. Arm 82 bears against the outer face of the sleeve, while web 83 registers with sleeve notch 64.

FIGS. 11 and 12 illustrate a lamp assembly 45 removably mounted on a display lighting panel 85. The panel has a circular opening 86 for receiving sleeve S. A synthetic plastic ring 87 is provided with an inner annular groove 88. As is shown in FIG. 12, the lower portion of sleeve S extends through ring 87 and panel opening 86;

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and annular rib 66 registers with groove 88 to effect coupling engagement between the sleeve and the ring. The ring is affixed to panel 85 by screws 90.

For the purpose of outlining the operation of the embodiment of the invention shown in FIGS. 1 through 10, it is assumed that the parts are assembled, connected and in the relative position shown in the drawings. Leads 21 and 22 are connected to a source of 110 volt electric current supply, thereby placing the apparatus in active service. Transformer 17 reduces the voltage of the current supplied to leads 23 and 25 from 110 volts to 7 volts. Timer 37 is energized and its shaft 38 is rotated. Cams 33c, 34c and 35c, due to their configuration, allow switch members 33, 34 and 35 to remain in contact with corresponding terminals 33a, 34a and 35a during portions of each complete revolution of the shaft and flex the switch members to place the same out of contact with corresponding terminals during other portions of each revolution of the shaft. It will be appreciated that the corresponding lamps are placed into and out of active service during each revolution of the shaft. As a result and depending on the configuration of the cams, individual lamps and/or combinations of lamps are energized during each revolution of the shaft. For example, during part of each revolution of the shaft, only lamp L-33 (red) is energized, during another part only lamp L-34 (yellow) is energized, during another part only lamp L-35 (blue) is energized, during another part lamps L-33 and L-34 are energized and yield an orange color through the mantle, during another part lamps L-34 and L-35 are energized yielding white color through the mantle and during still another part lamps L-33 and L-35 are energized yielding a purple color through the mantle. The sequence and duration of energization of individual lamps and combinations of lamps may be varied, as desired, by proper cam design.

From the foregoing, it is believed that the construction, operation and advantages of this invention will be apparent to those skilled in the art without further description. It is to be clearly understood, however, that various changes in size, shape and minor details of construction may be resorted to without departing from the spirit, or sacrificing any of the advantages of the invention.

I claim:

1. In a socket assembly for receiving and supporting a plurality of electric lamps each of which includes a pair of spaced electric contacts, said socket assembly comprising an upstanding, one-piece sleeve including a partition dividing its interior into an upper compartment and a lower compartment, said partition having a plurality of through openings formed therein, a base positioned at least partly in the lower compartment, said base and sleeve comprising an electrical insulating material, an electrically conductive element intermediate the base and the partition and positioned wholly within the confines of the sleeve, a plurality of first electric terminals and a single second electric terminal in the lower compartment, said second terminal being electrically connected to the conductive element, each of said lamps being adapted to register with a corresponding opening in the partition with one of its contacts electrically connected to a corresponding first terminal and its other contact electrically connected to the conductive element.

2. In a socket assembly for receiving and supporting a plurality of electric lamps each of which includes a pair of spaced electric contacts, said socket assembly comprising an upstanding, one-piece sleeve including a partition dividing its interior into an upper compartment and a lower compartment, said partition having a plurality of through openings formed therein, said

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sleeve having an inner groove in the portion which defines the lower compartment, a base positioned at least partly in the lower compartment and including an outer rib which registers with the sleeve groove to effect coupling engagement between the base and the sleeve, said base and sleeve comprising an electrical insulating material, an electrically conductive element intermediate the base and the partition and positioned wholly within the confines of the sleeve, a plurality of first electric terminals and a single second electric terminal in the lower compartment, said second terminal being electrically connected to the conductive element, each of said lamps being adapted to register with a corresponding opening in the partition with one of its contacts electrically connected to a corresponding first terminal and its other contact electrically connected to the conductive element.

3. In a socket assembly for receiving and supporting a plurality of electric lamps each of which includes a pair of spaced electric contacts, said socket assembly comprising an upstanding, one-piece sleeve including a partition dividing its interior into an upper compartment and a lower compartment, said partition having a plurality of through openings formed therein, a base positioned at least partly in the lower compartment, said base and sleeve comprising an electrical insulating material, an electrically conductive element intermediate the base and the partition and positioned wholly within the confines of the sleeve, said conductive element comprising a disc having a plurality of through openings each of which is aligned with a corresponding opening in the partition, a plurality of first electric terminals and a single second electric terminal in the lower compartment, said second terminal being electrically connected to the conductive element, each of said lamps being adapted to register with corresponding aligned openings in the partition and the disc with one of its contacts electrically connected to a corresponding first terminal and its other contact electrically connected to the conductive element.

4. A socket assembly according to claim 3 wherein the lamp includes a tubular contact and a button contact, said tubular and button contacts being electrically conductive and adapted to be positioned within the confines of the sleeve with the button contact disposed below the conductive element and forming an electrical connection with a corresponding first terminal and the tubular contact forming an electrical connection with the conductive element.

5. A socket assembly according to claim 3 including a resilient clip for attaching the assembly to a support, said clip including a U-shaped member comprising first and second arms and a web, said first arm being positioned between the base and the sleeve, said web projecting outwardly of the sleeve, said second arm being positioned exterior of the sleeve, and a bent extension carried by the second arm.

6. A socket assembly according to claim 3 wherein the sleeve includes an outer annular rib, the assembly also comprising a ring having an annular groove formed therein and being adapted to be affixed to a support, said outer annular rib registering with the annular groove in the ring to effect coupling engagement between the sleeve and the ring.

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