Aug. 20, 1940. R. M. WILCOX 2,212,359

ILLUMINATED CLOCK

Filed Oct. 28, 1938

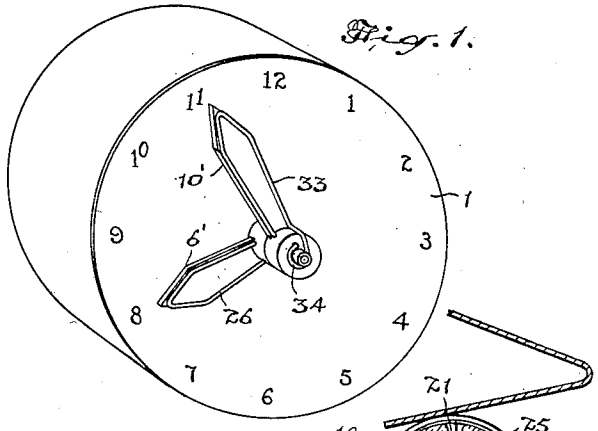


Fig. 1.

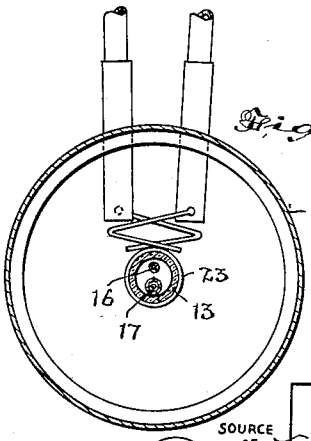


Fig. 7.

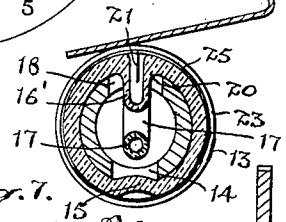


Fig. 5.

Fig. 2.

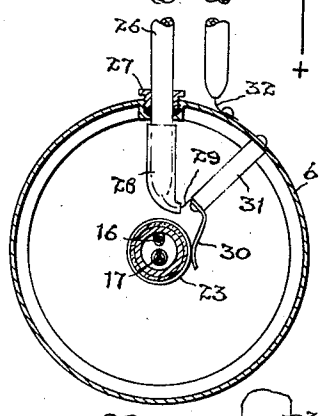


Fig. 6.

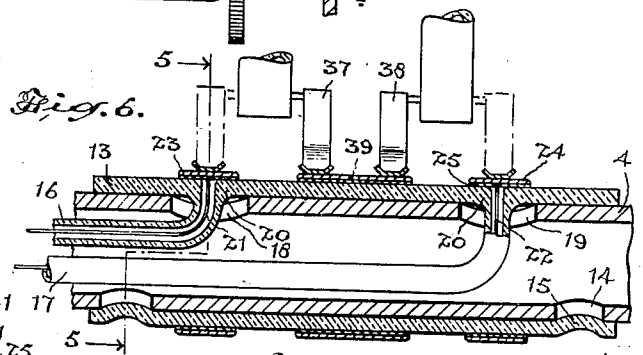


Fig. 4.

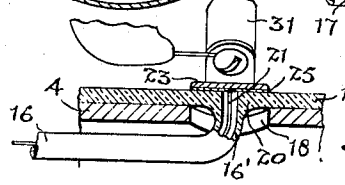


Fig. 3.

Inventor:
Roy M. Wilcox.
by H. S. Drummond
atty

Patented Aug. 20, 1940

2,212,359

UNITED STATES PATENT OFFICE

2,212,359

ILLUMINATED CLOCK

Roy Milton Wilcox, Toronto, Ontario, Canada

Application October 28, 1938, Serial No. 237,481

15 Claims. (Cl. 58—50)

The invention relates to electrically illuminated clocks of the type in which tubular gaseous lamps are arranged respectively to simulate the hour and minute hands of a clock and it is an important object of the present invention to provide a safe and dependable means which will ensure the transmission of the required high tension current to the constantly moving lamps without danger of short circuits.

A further and important object of the invention is to eliminate the objection of exposed contacts in a device of this kind, while at the same time providing for the ready access thereto for inspection.

The principal feature of the invention resides in the novel construction and arrangement of parts whereby the high tension current is conducted through individual dielectric tubes which lead through the hollow shaft on which the clock hands are mounted, said tubes being secured and sealed with fused joints to a shaft-encircling dielectric tube which carries encircling ring contacts for feeding electric current to the tubular lamps mounted on the clock hands.

A further and important feature resides in the novel manner of mounting the tubular lamps on hollow mating hub members carrying the clock hands, said hub members being individually removable from the shaft and co-operating to form a complete enclosure about the ring and brush contacts.

In the drawing, Figure 1 is a perspective view of the face side of a clock illustrating the present invention applied thereto.

Figure 2 is an enlarged vertical mid-sectional view illustrating important features of the present invention.

Figure 3 is an enlarged fragmentary part sectional view showing the dielectric insulation of the electrical connection to the tubular lamp illustrated in Figure 2.

Figure 4 is an enlarged sectional elevational view through a portion of the shaft showing a modified arrangement of connections to the tubular lamps and the insulation of the high tension lead-in wires and the mounting of the contact rings.

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 2.

Figure 7 is a cross sectional view on the line 7—7, Figure 2 showing a modified form of brush contacts similar to those illustrated in Figure 4.

The use of electric lamps of the tubular gas-filled type in association with the hands of a clock involves special problems in the supplying of the high tension current thereto for their operation and it is desired to provide a neat and compact arrangement wherein the high tension current may be conducted directly through the interior of the hand-mounting shaft to the terminals or electrodes of the tubular lamps revolving thereabout without fear of short circuits developing.

In the form of invention illustrated the dial face 1 of a clock is here shown carrying a bushing 2 axially thereof in which the tubular shaft 3 for mounting the "hour" hand of the clock is journalled.

A tubular shaft 4 for mounting the "minute" hand is rotatably mounted within the tubular shaft 3. A suitable train of gears connects the "hour" and "minute" hand shafts with a clock mechanism 5 so that they rotate at a twelve to one ratio.

A cylindrical hub member 6 provided with a boss 7 is secured on the end of the shaft 3 extending outwardly from the clock face and its outward edge is preferably formed with an inturned flange 8, here shown provided with an annular groove 9. A second cylindrical hub member 10 provided with a boss 11 is secured on one end of the "minute" shaft 4 and extends inwardly toward the hub 6, its inward edge being preferably formed with a grooved flange 12 similar to the flange 8 of the other hub. A suitable packing ring is inserted in the mating grooves of the flanges 8 and 12 to form a dust and water-tight joint while permitting free relative rotation of the hubs.

Housed within the hubs 6 and 10 and encircling the tubular shaft 4 is a sleeve 13 of a suitable dielectric material, preferably glass. The shaft 4 has one or more holes 14 bored therein and the sleeve 13 is held securely from rotation on the shaft by being heated and indented, the indents 15 engaging the walls of the holes.

Lengths of glass or other suitable dielectric tubing 16 and 17 are here shown arranged in the interior of the tubular shaft 4 and the outer ends thereof are turned laterally to pass through holes 18 and 19 bored in the metal shaft. The outturned ends 16' and 17' of the tubes 16 and 17 extend through the holes in the shaft and are integrally connected with the sleeve 13 in a fused joint 20 as illustrated particularly in Figures 3, 4 and 5. The sleeve 13 is perforated in register with each tube opening when it is connected with the sleeve to provide for the passage of the high tension leads 21 and 22 therethrough, which

leads extend through the glass tubes 16 and 17.

Contact rings 23 and 24, preferably formed of very thin bronze, encircle the glass sleeve 13 and are electrically connected with the leads 21 and 22. The rings 23 and 24 are preferably first tinned on the inward periphery, and are positioned respectively in alignment with the laterally turned ends of the glass tubes 16 and 17, and when placed in position, a packing 25 of solder may be flowed thereunder, thereby permanently uniting the high tension leads therewith and through the shrinkage of the metals in cooling to effect a snug fitting and securing of the contact rings around the glass tube 13 which is necessarily of uneven dimensions. The thin, light nature of the rings 23 and 24 will preclude any possibility of their shrinkage causing rupture of the glass sleeve.

Each of the hub members 6 and 10 are provided with rigid "hand" members 6' and 10' and the tubular lamp 26 mounted on the hour "hand" 6' is supported in the hub shell 6 by a packing gland 27 through which it extends. The inner end of the lamp, within the hub is enclosed by a glass tube 28 and the electrode connection 29 passing through the narrowed end of said tube 28 is connected with a brush contact 30 mounted on an insulating stud 31 secured to and extending inwardly from the inner cylindrical wall of the hub.

The brush 30 engages in electrical contact with the contact ring 23 and the outer terminal 32 of the tubular lamp is grounded to the hub 6.

The tubular lamp 33 of the "minute" hand is supported by the "hand" member 10' and one terminal is grounded to the hub shell 10 while the other end is preferably formed into a loop 34 which encircles the end of the shaft 4 and enters the end wall of the hub 10 through a packing gland 35 and the terminal 36 is connected to a brush contact engaging the contact ring 24, the said brush being mounted in a manner similar to the brush 30.

The mounting of the contact brushes in the manner described maintains the electrical connections a suitable distance from all metallic parts so that the current will not "short" across to the hand hubs and the glass tube 13 extends a sufficient distance beyond the contact rings carried thereon to prevent a "short" to the shaft 4 or to the end walls of the cylindrical hubs of the clock hands.

In the modification of the structure illustrated in Figures 4 and 5, both terminals of each lamp are extended into the interior of the "hand" hubs and each terminal is provided with a spring brush. The current is directed through the outer pair of brushes, as illustrated in Figure 4, to and through the lamps to the inner brushes 37 and 38, which engage a ring contact 39 mounted on the glass tube 13 midway between the outer contact rings 23 and 24.

It will be readily understood that the brushes may be slipped into position to engage the rings as the edges of the brushes are rounded and readily ride up over the very thin edges of the contact rings. This enables the easy placing of the "hands" in position by simply slipping them endwise off the shaft.

The shaft 4 has mounted on its inner end, which extends through the clock face 1, a flange 40 which carries a cylindrical box 41 of insulating material and the ends of the glass tubes 16 and 17 extend well beyond the end of the shaft 4, one of the tubes 16 having its high tension lead connected to a centre contact 42 mounted on the box 41, and the other tube 17 has a loose bent extension 43 carrying the lead to a ring contact 44 mounted on the box 41.

Suitable brushes connected with leads from a high tension transformer engage the contacts 42 and 44 and establish electrical connnection through the high tension leads through to the lamps and the dielectric tubes carrying said leads ensure the conduction of the current without danger of short circuits as the said tubes are connected with the glass tube 13 carrying the ring contacts in fused, sealed joints.

It will be readily understood that a structure such as herein described enables the safe mounting of moving members in a simple and economical manner and the contacts are housed securely against moisture and dust and they can be readily removed for repairs and can be easily and quickly assembled.

What I claim as my invention is:

1. In an illuminated clock, the combination of a tubular driving shaft, hand members operatively connected with said shaft and including high tension lamp members, and means for conducting high tension current through said driving shaft free of short circuiting with the latter to said high tension lamps, including glass enclosures disposed in separating relation to the shaft and conducting means.

2. In an illuminated clock, the combination of a tubular driving shaft for the hands, hand members operatively connected with said shaft and including high tension gas-filled lamps, high tension conductors leading from a source of high tension current through said tubular shaft, contact means interposed between said conductors and said lamps including contact rings encircling said shaft, and an integral body of insulating material of high dielectric characteristic interposed between said contact rings and said shaft and extending uninterruptedly through the interior of said shaft to a point external thereof in surrounding relation to said conductors.

3. Means as claimed in claim 2 in which said contact rings comprise thin sleeves of metal bonded peripherally of said insulating body.

4. Means as claimed in claim 2 in which said contact rings comprise thin metallic sleeves encircling said insulating body and having a moldable medium disposed between said rings and said insulating body.

5. Means as claimed in claim 2 in which said contact rings comprise thin sleeves of metal, and a molded stratum of low-fusing metal is interposed between the sleeves and insulating body.

6. Means as claimed in claim 2 in which said body of insulating material comprises a glass sleeve non-rotatably encircling the said shaft and on which said contact rings are mounted, the portion of said insulating body extending through the shaft and surrounding the high tension conductors comprising glass tubes having fused connections with said glass sleeve.

7. In an illuminated clock, a tubular driving shaft for the hands, hand members operatively connected with said shaft and including high tension tubular gas-filled lamps, a glass sleeve encircling said tubular shaft and having contact rings mounted thereon for supplying current to said lamps, tubular glass extensions from said sleeve fused thereto in a homogeneous connection, high tension supply leads extending through said tubular glass extensions and protected from short circuit with the shaft thereby and extend-

ing through said glass sleeve and connected with certain of said contact rings, and means for directing a flow of high tension current to said leads.

8. In an illuminated clock, a tubular driving shaft having holes therethrough, a glass sleeve encircling said shaft and having holes therethrough in register with the holes in said shaft, glass tubes arranged within said shaft having ends bent to extend through the holes in said shaft, said ends being fused to the inner wall of said glass sleeve surrounding the holes therethrough, electric contact rings encircling said glass sleeve and overlying the holes therein, high tension leads extending through said glass tubes and sleeve and electrically contacting said rings, hub members carrying clock hands operatively connected with said shaft, high tension lamps carried by said hub members, and contacts connected with said lamps engaging said contact rings.

9. Means as claimed in claim 2 in which said insulating material includes a glass sleeve, said sleeve being locally depressed or indented into locking relation with said tubular shaft.

10. In an illuminated clock, minute and hour shafts, tubular high tension lamps mounted respectively on said shafts to simulate the minute and hour hands of a clock and having spring contact terminals, a plurality of contact rings mounted on and insulated from said minute shaft, one engaging one terminal of each of said tubes, the other rings respectively engaging the remaining spring terminals of said tubes, high tension leads connected with a source of high tension current and extending through said hollow shaft and connected respectively with said last-mentioned contact rings, and insulation of sufficiently high dielectric strength to resists short circuiting of the high tension current within said shaft interposed between said high tension leads and said shaft.

11. In an illuminated clock, tubular minute and hour shafts telescopically disposed, a pair of mating hub members forming an enclosure about the tubular minute shaft and operatively secured respectively to said shafts, tubular gaseous lamps of the high tension type mounted respectively on said hub members to simulate the hour and minute hands of a clock, a source of high tension current, high tension conducting leads extending from said source through said tubular shafts into said hub-formed enclosure, contact means within said hub members connecting said tubular lamps with said high tension conducting leads, and dielectric insulating means interposed between said tubular shafts and said high tension conducting leads of sufficient dielectric strength to prevent short circuiting of the high tension current supplied to said lamps, said tubular shafts being adapted to provide a return circuit for the high tension current.

12. Means as claimed in claim 11 in which said respective hubs are provided with adjacent contacting portions, and means forming an effective seal against the entry of water or other foreign matter between said contacting portions.

13. A device as claimed in claim 2 in which the body of dielectric material includes tubes extending beyond the end of the shaft, a hollow insulating member mounted on the shaft and enclosing the ends of said tubes, electric contacts mounted on said hollow insulating member and connected with the high tension conductors, and means connecting the contacts on said hollow insulating member with a source of high tension current.

14. A device as claimed in claim 11, in which the lamps extend through said hub members and said contact means include insulating posts mounted inside said hubs, brushes mounted on said posts electrically connected with the electrodes of said lamps, and contact rings connected with the high tension leads and mounted on the minutes shaft.

15. A device as claimed in claim 11 in which the mounting of the tubular lamps on the hub members includes packing glands secured in the hubs.

ROY MILTON WILCOX.