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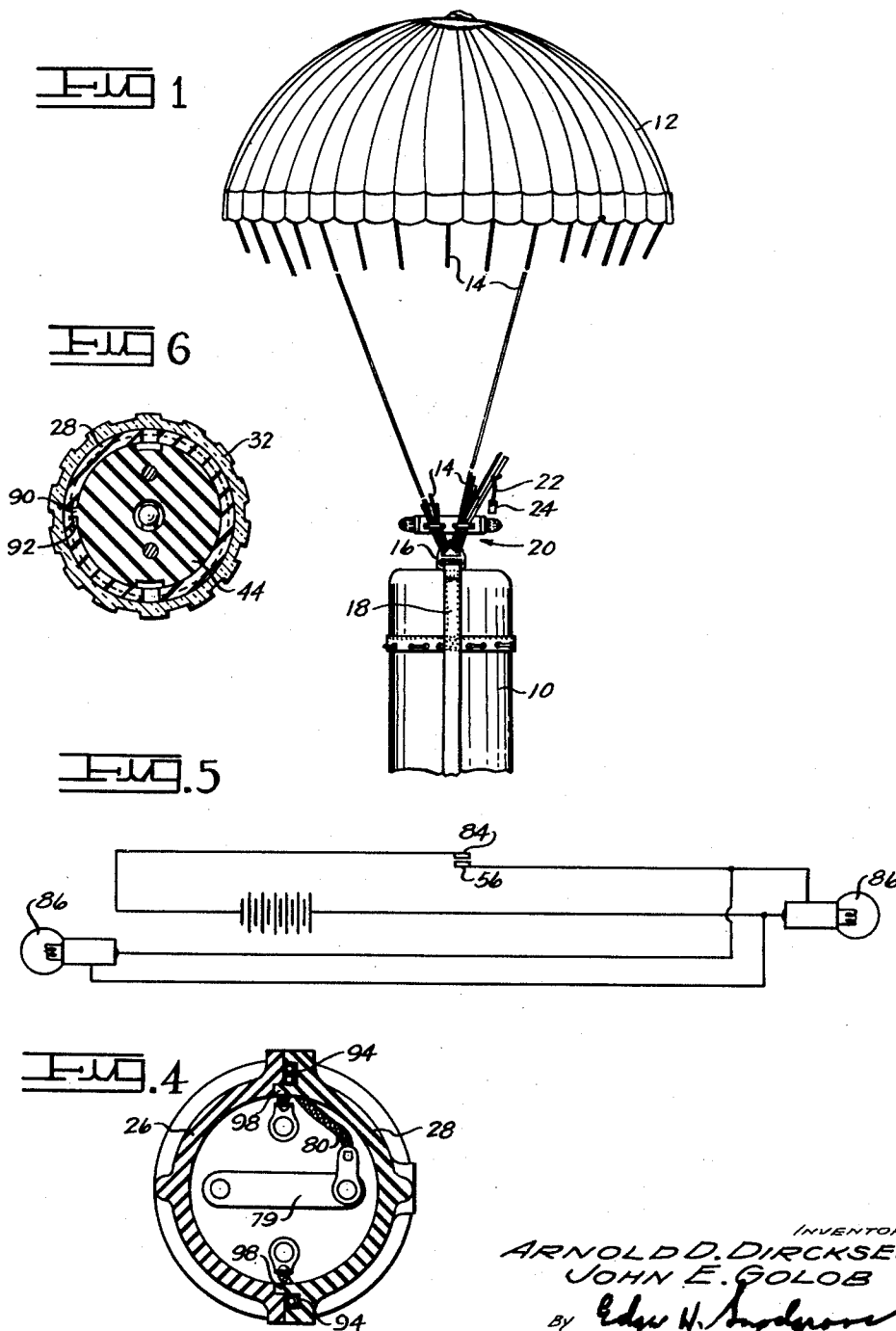
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2,376,330

IDENTIFICATION LIGHT FOR AERIAL DELIVERY CONTAINERS

Filed Aug. 5, 1942

2 Sheets-Sheet 1



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FIG. 2

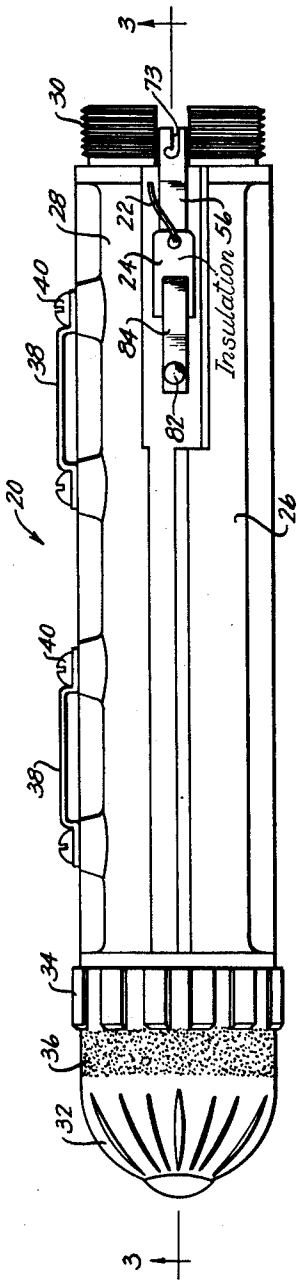
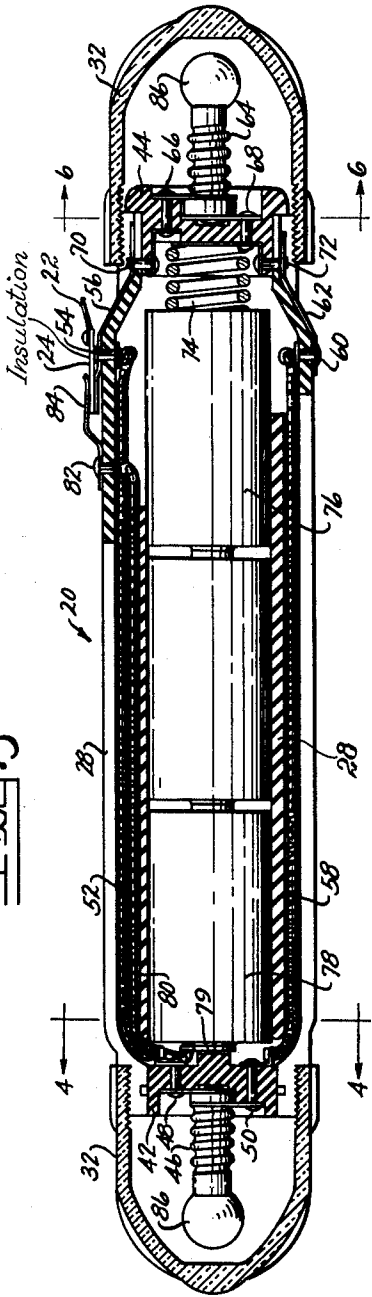


FIG. 3



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IDENTIFICATION LIGHT FOR AERIAL
DELIVERY CONTAINERSArnold D. Dirksen and John E. Golob,
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2 Claims. (Cl. 177-329)

This invention relates to a battery-operated electric lamp, and more particularly to a lamp of the type which is suitable for use as an identification light on an aerial delivery container adapted to be dropped from an aircraft by means of a parachute.

The identification light is intended to be attached to an aerial delivery container so as to clearly indicate its position and the nature of its contents during operations carried out in the nighttime. The latter objective is attained by using lenses of different colors on the lamp to thereby indicate the type of equipment embraced within the container. One of the salient features of our improved form of lamp lies in the fact that it is provided with a novel means for automatically closing the electrical circuit and causing the lamp to be lighted when the parachute, which lowers the container to the ground, opens during the descent of the container. We are aware that we are not the first to provide an automatic means for causing the electric lamp carried by an aerial container to be lighted when the parachute opens, this type of device being shown and described in German Patent #546,997, issued to L. Vinay on March 17, 1932. According to this patent, a cord is tied between the parachute canopy and a bell crank lever mounted on the aerial container, the lever being adapted to close the circuit of a battery-operated lamp carried by the container when the cord is stretched taut. Accordingly, the cord must be of such a length as to move the lever just enough to close the switch when the parachute opens. It is apparent that the length of the cord is quite critical for if it is slightly too long it will not operate the switch to close the circuit, whereas if it is too short it will pull in on one side of the canopy and cause the parachute to sideslip and to behave in a generally unsatisfactory manner during the descent to the ground.

One of the objects of our invention is, therefore, to provide an automatic circuit-closing means for a battery-operated lamp carried by an aerial delivery container in which this difficulty is not present. For this purpose we provide a pair of contacts fastened to the outside of the lamp case, which contacts are connected in series with the lighting circuit of the lamp. An interponent of electrically nonconductive material is normally maintained between the contacts, which are spring urged toward one another, so as to prevent the lamp from being lighted when the apparatus is not in use. A

cord tied between the interponent and the parachute serves to pull the interponent from between the contacts when the parachute opens during the descent of the container, thus allowing the contacts to close and the lamp to be lighted. Hence, the length of the operating cord is not critical, the only requirement being that the length of the cord is somewhat less than the distance between the point on the parachute to which the cord is tied and the contacts mounted on the container. Hence, the difficulties enumerated in connection with the German patent are avoided and a very simple and satisfactory means for causing the lamp to be automatically lighted is provided.

Another object of our invention lies in a novel type of lamp construction in which a pin and bayonet slot contact device is used for retaining the end cap of the battery case in place. A battery retaining spring of conventional design is located within the lamp case where it serves to press the pins against the edge of the bayonet slots and, hence, insure that a good electrical contact will be made between the pins and the metallic strips in which the slots are cut.

Another object of our invention is to provide an improved method for constructing an electric lamp having a battery casing formed of molded plastic material with an incandescent lamp mounted on each end of the casing. In a lamp of this nature it is necessary to have one or more wires extending from one end of the lamp to the other in order to complete the electrical circuit between the two incandescent lamps. In order that this end-to-end wiring may be completely enclosed and protected from injury, and also for the purpose of facilitating the wiring of the electrical circuits of the lamp, we have devised what we believe to be a new and novel method of lamp construction wherein the cylindrical battery casing is formed in two halves with channels molded in the longitudinal edges of one of the halves for receiving the end-to-end wiring. The wiring is placed in the channels and the electrical circuits are completed after which the halves are cemented together to form the completed casing.

A further object of our invention lies in the provision of a novel plastic lamp case, formed of a pair of semi-cylindrical members, one of which is provided with a recess extending longitudinally along one or both of its edges so as to form a wire-accommodating passageway through the wall of the case when the members are placed together to form a cylindrical lamp

casing. Hence, the electrical wiring of the lamp circuit will be completely enclosed within the wall of the casing and so protected against injury which might occur if the wiring were left exposed.

Still a further object of our invention lies in the application of a phosphorescent coating of the long-persistent type around the periphery of the lamp lenses whereby a luminous glow will be emitted in the nighttime by the lenses even though the lamp should, for some reason, become extinguished. This constitutes a very desirable feature of our lamp for if it should happen that the lamp were broken or otherwise rendered inoperative before the container could be found on the ground, the phosphorescent material would glow for a considerable period of time and greatly facilitate the finding of the lamp and the container.

With these and other objects in view, which will become more apparent as the description proceeds, we shall now describe our invention fully, it being understood that the specific embodiment of our invention which is to be described may be varied in its various details without departing from the spirit and scope of the appended claims.

In the drawings:

Figure 1 is a side elevation showing the aerial delivery container suspended beneath an open parachute with the identification lamp mounted in position on the container.

Figure 2 is a side elevation of our novel design of identification lamp with one of the lenses and one of the end caps removed so as to show more clearly the bayonet slot arrangement for holding the removable end cap in place on the end of the lamp casing.

Figure 3 is a cross-sectional view of the complete lamp taken on the line 3—3 of Figure 2.

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 3 showing some of the details of the lamp-case construction and also the electrical connections which are found in the left-hand end of the lamp case.

Figure 5 is a wiring diagram showing the manner in which the two incandescent lamps are connected in parallel with the battery while the contacts, which control the lighting circuit of the lamp, are shown connected in series therewith.

Figure 6 is a cross-sectional view taken on the line 6—6 of Figure 3 showing some of the constructional details of the right-hand end of the lamp casing.

In Figure 1 is shown an aerial delivery container 10 suspended below an open parachute 12, the shroud lines 14 of the parachute being brought together at their lower ends and passed through a ring 16 which is secured to the supporting strap 18 which passes around the container in the direction of its length. As shown in Figure 1, our novel identification lamp 20 may be secured to the shroud lines just above the container 10, or it may be mounted in some other suitable manner in a vertical position on the side of the container where it is lashed. The operating cord 22, the lower end of which is attached to the non-conductive interponent 24, may be tied to one of the shroud lines at a point above the lamp.

As shown in Figures 2, 3, and 4, our novel identification lamp is comprised of a lamp casing which consists of a pair of semicylindrical members 26 and 28 which are placed together to form

a cylindrical lamp casing. These members are preferably constructed of a molded plastic material and are cemented together with a suitable plastic cement to form the completed lamp casing. On each end of the casing is provided a reduced portion on which threads 30 are molded. The transparent plastic lenses 32 are provided with internal threads so as to enable them to be screwed on the threads 30 on each end of the casing. The lenses 32 are colored to correspond with the color of the aerial delivery container, it being customary to identify the contents of the container by means of a distinctive color applied to the exterior thereof. Hence, by using lenses which are colored to match the container, the contents of the latter may be quickly and easily identified during either the nighttime or the daytime. Projections 34 are formed around the perimeter of each lens 32 so as to facilitate screwing the lenses on and off of the ends of the lamp casing.

It has been found highly desirable to apply a coating of phosphorescent paint to the peripheral portion 36 of each lens as an additional factor of safety in the event that the lamp should be broken or otherwise disabled upon its descent to the ground. Should this happen, the luminous glow emitted by the phosphorescent coating will be of considerable aid in locating the lamp and container during the nighttime. The luminous coating should be of the long-persistent type and may be applied to either the outside or the inside of the lens. The latter is probably the most preferable location since the coating will then be protected from dirt and grease and will not be so likely to be marred or scraped off.

Two keepers 38 are secured to the lamp case by means of the screws 40, these keepers serving as a means for attaching the lamp to the aerial container. An end cap 42 is permanently secured in the left-hand end of the lamp casing and a removable end cap 44 is secured in the right-hand end of the casing. Both caps are constructed of plastic or other electrical insulating material and serve as a means for supporting the lamp receptacles provided at each end of the casing. A lamp receptacle 46 is secured to the cap 42 at the left-hand end of the casing by means rivets 48 and 50. The rivet 48 is electrically connected to the center contact of the receptacle while the rivet 50 is electrically connected to the threaded portion of the receptacle. The rivet 48 is electrically connected with another rivet 54 located at the right-hand end of the casing by means of a wire 52 passing through a recess provided within the wall of the container. The rivet 54 serves to secure the contact strip 56 to outer surface of the casing and is electrically connected to this strip. The rivet 50 is electrically connected with another rivet 60 located at the right-hand end of the casing by means of a wire 58 which passes through a second channel located within the wall of the casing. The rivet 60 makes electrical contact with the strip 62 and serves to secure this strip to the outside of the casing. A lamp receptacle 64 is secured to the removable end cap 44 by means of rivets 66 and 68. The rivet 66 is electrically connected with the threaded portion of the receptacle and also with a pin 70 projecting laterally from one side of the cap 44. The rivet 68 is electrically connected with the center contact of the receptacle and also with a pin 72 projecting laterally from the opposite side of the cap 44. The right-hand end of the contact strip 56 is pro-

vided with a bayonet slot 73 which cooperates with the pin 70 for the purpose of holding the cap securely in place in the end of the casing and also for making electrical contact between the pin and other portions of the wiring circuit. A similar bayonet slot is provided in the metallic strip 62, this second slot cooperating with the pin 72 for a similar purpose. A helical spring 74 is located in the right-hand end of the casing, one end of this spring bearing against the negative terminal of an electrical cell 76 located within the casing, and the other end bearing against a metal plate which is electrically connected with the rivet 88. The electrical cell 78 at the left-hand end of the lamp casing has its positive terminal pressed against the metallic strip 79 by action of the spring 74. The strip 79 is electrically connected to a rivet 82 located in the right-hand end of the casing by means of a wire 80 passing through the upper channel in the lamp casing. This rivet serves to hold a contact strip 84 in position on the outside of the casing as well as to make electrical contact with the strip. The interponent 22 is normally positioned between the contacts 56 and 84 so as to interrupt the electrical circuit of the lamp and prevent the incandescent lamps 86 from being illuminated. It will be observed that the helical spring 74 serves not only to retain the electrical cells in position within the casing, but that it also presses against the end cap 44 to thereby press the pins 70 and 72 firmly against the edges of the bayonet slots 73 formed in the metallic strips 56 and 62, thereby insuring that a good electrical contact will be made between the pins and the strips.

It should be observed that the lamps 86 are so mounted on the end caps as to place them near the outer ends of the lenses 32 thus providing substantially a 360 degree angle of light radiation from the lamps. This enables one to observe the light being emitted by the lamps irrespective of the angle from which they are viewed and, hence, greatly increases the probability of their being readily seen and located.

The wiring circuit of the lamp is shown at Figure 5 where it will be seen that the contacts 84 and 56 are connected in series with the lighting circuit, while the two lamps 86 are arranged to be operated in parallel by the battery. So long as the interponent 24 is in position between the contacts 84 and 56, the circuit to both of the lamps will be interrupted and the lamps will remain unlighted. Upon removal of the interponent from between the contacts, however, the circuit to both of the lamps 86 will be established and they will then be lighted. It should be noted that the contact strips 84 and 56 are constructed of spring brass and that they will normally tend to engage with one another.

It is very desirable to obtain a high light output from the lamps 86 in order to facilitate the locating of the container and the identification of its contents by the color of the light passing through the lenses 32. This might be found a difficult task on a night when the sky is studded with stars were it not for the high intensity of the light emitted by our improved form of lamp. This high light output is obtained by operating the lamps 86 at a considerable over-voltage so as to greatly increase their luminosity. For example, we have found it very satisfactory to operate two 2.3 volt (two cell) lamps in parallel from three 1.4 volt electric cells. The life of the lamp is, of course, somewhat shortened by this pro-

cedure but this is of no particular consequence since under actual service conditions, operation of the lamp for several hours is all that is ever required.

By connecting the lamps in parallel with the battery, a safety factor in the continued operation of the identification lamp is obtained, for if one of the lamps 86 should burn out or be broken, the other lamp would continue to operate and, hence, enable the container to be located and identified.

As shown in Figure 6 the removable end cap 44 is provided with a projection 90 thereon which is so positioned as to register with a slot 92 formed in the end of the lamp casing when the cap is in its Figure 3 position. This is for the purpose of insuring that the cap 44 will not be inserted in the end of the casing with the pins 70 and 72 reversed.

As was mentioned earlier in this description the lamp casing is provided with channels extending lengthwise through the wall thereof for the purpose of accommodating the wires 52, 58, and 60. The production of these channels is facilitated by making the lamp casing in two halves 26 and 28. The half 28 is provided with longitudinally extending recesses 94 molded in both of its edges and also with longitudinal tongues 98 molded along the inner edges of the recesses. The half 26 is provided with grooves to receive the tongues 98 and, as will be seen from Figure 4, when the two halves are placed together they will form a completed lamp casing having tightly sealed channels 94 and 96 which extend lengthwise through the wall of the casing. The wires of the lighting circuit are inserted in these channels and the wiring circuits completed before the halves are placed together and cemented. This greatly simplifies the wiring of the lamp and, at the same time, affords a completely enclosed conduit for the wires where they will be well protected from injury.

Referring once again to Figure 1, it will be observed that the operating cord 22, which is tied between the parachute and the interponent 24, need not be of any definite length so long as it is short enough to cause the interponent to be pulled from between the contacts when the parachute opens. Hence, a very simple and reliable means for automatically closing the lighting circuit of the lamp is provided.

Having now described our invention and its intended mode of operation, what we claim as new and desire to secure by Letters Patent is:

1. In an aerial container of the type wherein a parachute has shroud lines attached to the container for lowering it to the ground at reduced speed, the combination of an electrical lamp which is supported by the shroud lines of the parachute upon the top of the container, a pair of contacts on the lamp disposed in series with the electrical circuit of the lamp, said contacts being constantly resiliently urged toward contact-making position, an electrical non-conductive member normally disposed between contacts to prevent their engagement, and a cord having one of its ends attached to said parachute and the other of its ends attached to said non-conductive member and being of proper length for pulling said member from between said contacts when the parachute opens during descent of the container, thereby enabling the contacts of engage for closing the circuit to light the lamp.

2. In an aerial container of the type wherein

a parachute has shroud lines attached to the container for lowering it to the ground at reduced speed, said container being significantly colored for daytime identification, the combination of an electrical identification lamp including means 5 wherethrough extend the shroud lines of the parachute to support the lamp in full view upon the top part of the container, a pair of contacts on said lamp connected in series with the electrical circuit of the lamp, said contacts being inherently resilient to constantly urge them toward contact-making position, an electrically 10 non-conductive member normally disposed between said contacts to prevent their engagement,

and a cord having one of its ends attached to the parachute and the other of its ends attached to said non-conductive member and being of a length to pull said member from between said contacts when the parachute opens during descent of the container, thereby enabling the contacts to engage for closing the circuit to light the lamp, said lamp having a lens of the same color as the container and also having a long-persistent luminous material applied to the lens whereby the container may be readily located in the night time.

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