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LIGHT FIXTURE

3,140,053

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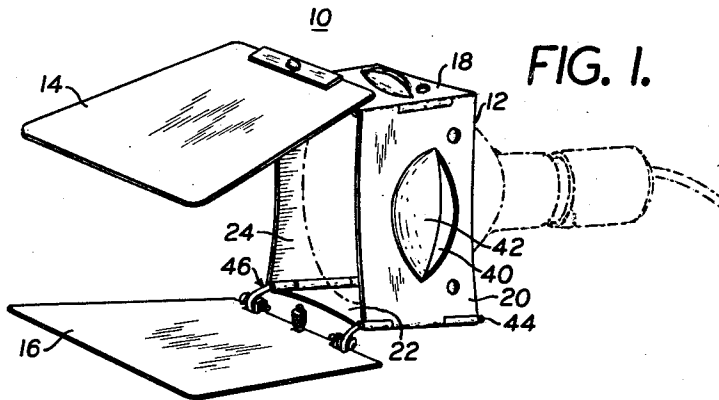


FIG. 1.

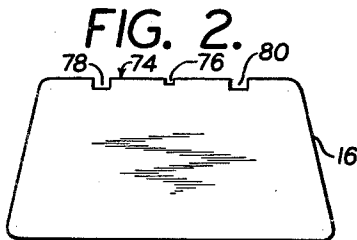


FIG. 2.

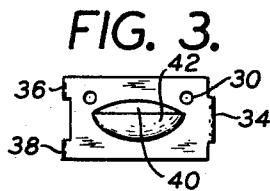


FIG. 3.

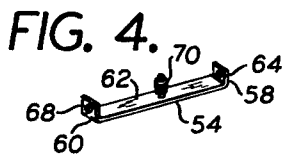


FIG. 4.

FIG. 5.

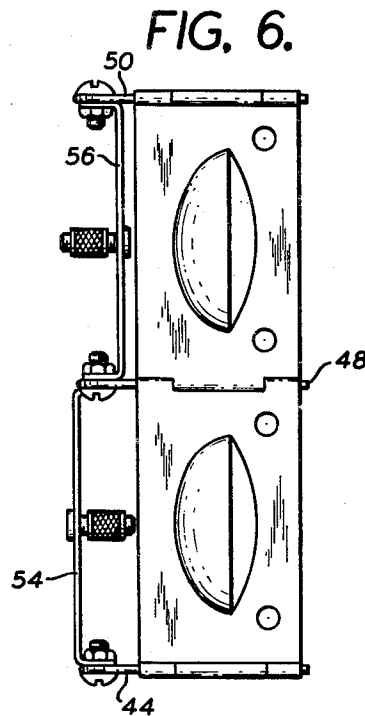


FIG. 6.

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LIGHT FIXTURE

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8 Claims. (Cl. 240-1.3)

My invention relates in general to improvements in devices for limiting the amount and direction of light emanating from a light bulb and more particularly to improvements in those devices used in the photographic industry for that purpose and known in that industry as "barn doors."

It is desirable for a "barn door" to be economical, simple, strong and easy to maintain. These features are generally obtained within practical limitations on "barn doors" now in use. Those now in use however lack the essential qualities of a high degree of portability and storability. The modern photographer or cinematographer must take many of his pictures "on location" where the subject matter is situated. Furthermore the high standards of contemporary photography often preclude the taking of pictures with "available light." Therefore, artificial high level lighting is required. This lighting must be controlled and unwanted shadows prevented and so "barn doors" are necessary. Presently available barn doors occupy substantial cubic space. Hence transporting a large number of such barn doors which are not collapsible poses a formidable problem.

It is therefore an object of my invention to provide a highly portable "barn door" which may be easily carried in large numbers to and from location.

It is another object of my invention to provide a "barn door" which will fold flat to facilitate storage.

Another object of my invention is to provide a "barn door" which mounts on the rim of an "internal reflector" flood lamp of the type in common use for photographic purposes thereby eliminating the excess weight and bulk attendant with the special connectors normally used to mount "barn doors."

A still further object of my invention is to provide "barn doors" which may be rotated around the axis of the flood lamp to control the angle of the shadows as well as the amount of light emanating from the flood lamp.

Yet another object of my invention is to provide a "barn door" which resiliently clamps on the rim of the flood lamp and yet provides for sufficient heat transfer through the clamp to prevent damage to the lamp.

Another object of my invention is to provide a clamp for the "barn door" which mounts on the rim of a flood lamp and masks off all light not controlled by the doors of the barn door while still providing sufficient heat transfer through the clamp to prevent damage to the flood lamp.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings in which:

FIG. 1 shows a perspective view of the "barn door" and illustrates its mounting on the rim of a flood lamp of an internal reflector type.

FIG. 2 is a plan view of the door member.

FIG. 3 is a plan view of one of the plates of the clamping portion of the barn doors which serves to illustrate any one of the four sides of the clamping portion in the preferred embodiment of this invention.

FIG. 4 is a perspective view of the pivotally mounted bracket which pivotally secures the door member to the clamping portion of the barn door.

FIG. 5 is a perspective view of the pivot pin used to secure the sides of the clamping portion and to secure the mounting bracket; and

FIG. 6 is a plan view of the clamping portion of the "barn door" folded for transport and storage.

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With reference to the drawings the "barn door" is indicated generally by the reference numeral 10. As illustrated its basic components are a clamping portion 12 and a pair of hinged doors, 14 and 16.

The illustrated clamping portion 12 is comprised of four hingedly connected plates 18, 20, 22 and 24 each fabricated from material characterized by its high degree of resilience and heat conduction such as, for instance, sheet steel or resilient alloy aluminum, although other metals and some other sheet materials may be employed.

Since all four plates are identical only one will be described in detail. This plate 18, which is shown in FIG. 3, is generally rectangular in shape and is provided with a centrally located hinge barrel 34 along one side and two spaced apart hinge barrels 36 and 38 along the opposite side, the space between the barrels 36 and 38 being of sufficient size to receive a barrel 34 from an adjacent plate with slight clearance. As is preferred and as is illustrated, the hinge barrels are formed integrally with the balance of plate 18. However they may be formed separately therefrom and be secured thereto.

Plate 18 is also provided with a concave surface portion 42 which is generally complementary to a surface portion of a photoflood bulb, and a cut-out portion 40 right adjacent the concave portion 42. As shown, the perimeter of cut-out portion 40 is defined by a straight line adjacent concave portion 42 and the edge of concave portion 42 by an arcuate line whereby to permit a standard photoflood bulb to extend partially therethrough. Preferably, the straight line dividing the concave portion 42 from cut-out 40 is adapted to lie coplanarly with the upper edge of the internal reflector of the lamp bulb, or, in the alternative, within the projected volume of such reflector.

Four pivot pins 44, 46, 48, and 50, each identical to the other, are formed of any suitable wire stock of sufficient diameter to form a tight working fit with the inside of the hinge barrels 34, 36, and 38, when inserted therein. As illustrated by pivot pin, 44, shown in FIG. 5, each pin has a loop 52 formed in one end for reasons which will become apparent hereinafter.

Plates 18, 20, 22 and 24 are assembled into a collapsible square by nesting the appropriate hinge barrels on each adjacent plate to form a hinge and then inserting a pivot pin in each of the four hinges so formed. The plates are positioned so that each of the arcuate stampings, 40, project outwardly from the unit. This unit when assembled comprises clamping portion 12 of the barn door 10. The pivot pins are all inserted so that the loops 52, are all projecting forward of clamping portion, 12.

Two identical generally U-shaped brackets 54 and 56 are formed from strips of sheet metal or other suitable material. As illustrated by bracket 54, shown in FIG. 4, the legs of the U, 58 and 60, are formed preferably by bending ends of the strip up at right angles from the plane of the bottom portion 62 of the bracket 54 although, of course, they may be separate lugs secured to portion 62. Holes 64 and 68 are centrally pierced in legs 58 and 60 respectively so that they are aligned. A threaded hole not shown, is provided in the center of the bottom portion 62 to accommodate a thumb screw 70 which, when inserted, projects in the same direction as the legs 58 and 60.

The loops 52 of pivot pins 44 and 46 are axially aligned with the holes 64 and 68 in bracket 54 and the bracket is pivotally attached to pivot pins 44 and 46 by any suitable means such as a pair of nuts and bolts. Bracket 56 is similarly attached to loops 52 of the pivot pins 48 and 60. If desired, the pivots between the brackets and the looped ends of the pivot pins may be spring loaded to insure evenness of operation and proper tension between the relatively pivotal parts.

The identical doors 14 and 16 are formed from any suitable sheet material which preferably has been darkened by any suitable process such as to produce a non-reflective surface. Anodized aluminum is the presently preferred door material. Door 16, as shown in FIG. 2, will be described. It is trapezoidal in shape with its short base 74 being larger than the width of the clamping portion 12. A slot 76 is cut in the center of the base 74 of sufficient width to accommodate the threaded portion of thumb-screw 70. Slots 78 and 80 are cut equidistant from slot 76, sufficiently separated and of sufficient width to accommodate the legs 58 and 60 of bracket 62. The slots are cut with sufficient depth to allow the door to be locked to the inside of the brackets by sliding the slots 76, 78, and 80 around the projections on the bracket 62 which they were made to accommodate and then tightening thumb-screw 70 to press the door into locking engagement with the bracket.

The barn door is assembled by opening the collapsed clamping portion and attaching the doors 14 and 16 to brackets 56 and 54 in the manner described above. The clamping portion may now be forced over the rim of the flood lamp until the rim engages the arcuate surface portions and slots in each plate. Due to the resilient nature of the plate material this may be done without damage to the lamp. Furthermore this resilience maintains a tight fit between the clamping portion and the rim of the flood lamp allowing the barn door to be rotated around the rim of the lamp and held by friction in any desired position.

In operation, the doors will be held in any desired position in front of the lamp due to friction between the pivot pin loops 52 and the bracket legs, 58 and 60 created by pressure exerted upon them by the nuts and bolts or other suitable means used to pivotally mount the brackets on the pivot pins, or due to a spring means included in the pivot for applying a tension between the relatively pivotal parts.

For storage the "barn door" is removed from the flood lamp, the thumbscrews are loosened and the doors disengaged from the brackets. The clamping portion is then collapsed to form a flat easily storable unit.

In addition to the storability of my device due to the removability of the doors from the base, the removability has certain other desirable results which should be noted. Particularly, by rendering the doors removable should one be damaged it may be readily replaced without necessitating the purchase of an entire new fixture as would be required in the standard prior art fixtures having welded, soldered, riveted or otherwise permanently secured doors. In addition, in the prior art devices having permanently secured doors it is often desirable to move one door completely out of the way of the operation of the device as it interferes either with the placement of the device or delimits an edge of a picture being taken as it extends away from the fixture and may be within the field of the camera. This often requires a slight shift of the camera position which might be undesirable. It will be noted that my device solves the problem of non-interference with the camera in two alternative ways. In the first place as already indicated above, the potentially interfering door may be removed. However, in the alternative, due to the fact that the doors are offset from the planes of the plates forming the base, the doors are permitted to rotate 270° and hence can be rotated substantially into the plane of one of the plates forming the base whereby to be completely out of the field of the camera. In prior art devices of which I have knowledge this 270° rotation feature is not available and thereby creates the problem of interference with the field of the camera.

Although I have herein described the preferred form of my invention it will be understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be re-

sorted to without departing from the spirit and scope of the invention as hereinafter claimed.

What I claim is:

1. An illumination device for use in combination with a bulb, comprising a base including at least four substantially identical resilient plates pivotally mounted to one another to form a collapsible hollow regular polygonal body with a front opening, each of said plates having a concave surface portion adapted to receive a portion of the bulb therewithin for detachably clampingly mounting said base on the bulb, and a plate-like member pivotally mounted on said base for movement into and out of overlying relation with said front opening.

2. An illumination device for use in combination with a bulb, comprising a base including at least four substantially identical resilient plates pivotally mounted to one another to form a collapsible hollow regular polygonal body with a front opening, each of said plates having a concave surface portion and a cut-out disposed immediately adjacent and extending rearwardly of said concave surface portion, said concave surface portions and cut-outs together being adapted to receive a portion of the bulb therewithin for detachably clampingly mounting said base on the bulb, and a plate-like member pivotally mounted on said base for movement into and out of overlying relation with said front opening.

3. An illumination device for use in combination with a bulb, comprising a base including at least four resilient plates, each of said plates being pivotally mounted to one another to form a collapsible hollow regular polygonal body with a front opening, at least two of said plates having a concave surface portion adapted to receive a portion of a bulb therewithin for detachably clamping said base on the bulb, and a plate-like member detachably connected to said base for pivotal movement therewith into and out of overlying relation with said front opening.

4. An illumination device for use in combination with a bulb, comprising a base including at least four resilient plates, each of said plates having an integrally formed hinge barrel along each side edge thereof, said plates being arranged in side edge-to-side edge relation with adjacent hinge barrels in registry to define a hollow regular polygonal body with a front opening, a plurality of pivot pins, one for each corner of said body, passing through the registered barrels to pivotally mount said plates to one another whereby to render said body collapsible, each of said plates having a concave surface portion and a cut-out disposed immediately adjacent and extending rearwardly of said concave surface portion, said concave surface portions and cut-outs together being adapted to receive a portion of the bulb therewithin for detachably clampingly mounting said base on the bulb, a U-shaped bracket pivotally mounted on a pair of adjacent pivot pins at their ends adjacent said front opening, and a plate-like member detachably connected to said bracket for pivotal movement therewith into and out of overlying relation with said front opening.

5. An illumination device for use in combination with a bulb, comprising a base including four substantially identical resilient plates each having integrally formed along their side edges a hinge barrel, said four plates being arranged in side edge-to-side edge relation with adjacent hinge barrels in registry to form a hollow square having a front opening, four pivot pins, one for each corner of said square, passing through said registered barrels to render said square collapsible, two U-shaped brackets, one of said brackets being pivotally mounted on two adjacent pivot pins adjacent said front opening and the other of said brackets being pivotally mounted on the other two of said pivot pins adjacent said front opening, a pair of plate-like members, one for each of said brackets, said plate-like members being detachably connected to said brackets for pivotal movement therewith into and out of overlying relation with said front opening, each of said plates forming said base having a concave surface portion

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and a cut-out immediately adjacent to and rearwardly of said concave surface portion for receiving a portion of said bulb whereby to adapt said base for detachable clamping engagement on said bulb.

6. In combination with a light bulb, an illumination device comprising a base including at least four plates pivotally mounted to one another to form a peripherally continuous body with a front opening, at least two of said plates detachably engaging the bulb for detachably mounting the base thereon, and a plate-like member pivotally mounted on said base for movement into and out of overlying relation with said front opening.

7. In combination with a light bulb, an illumination device comprising a base including at least four substantially identical resilient plates pivotally mounted to one another to form a collapsible hollow regular polygonal body with a front opening, said plates detachably clampingly engaging said bulb for mounting the base thereon, and a plate-like member pivotally mounted on said base for movement into and out of overlying relation with said front opening.

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8. In combination with a light bulb, an illumination device comprising a base including at least four plates pivotally mounted to one another to form a peripherally continuous body with a front opening, said plates clampingly engaging said bulb for mounting the base thereon, and a plate-like member detachably pivotally mounted on said base for movement into and out of overlying relation with said front opening.

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