United States Patent [19]

Kampman

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[54] **PROTECTIVE CAP FOR INFANTS**

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[52] **U.S. Cl.** **2/15,** 2/2

[51] **Int. Cl.** **A61f 9/00**

[58] **Field of Search** 2/2, 9, 15, 173, 2/174, 206, 209.1

[56] **References Cited**

UNITED STATES PATENTS

843,486	2/1907	Otto	2/206
945,839	1/1910	Brisbane	2/15 UX
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699,548	1953	Great Britain	2/15

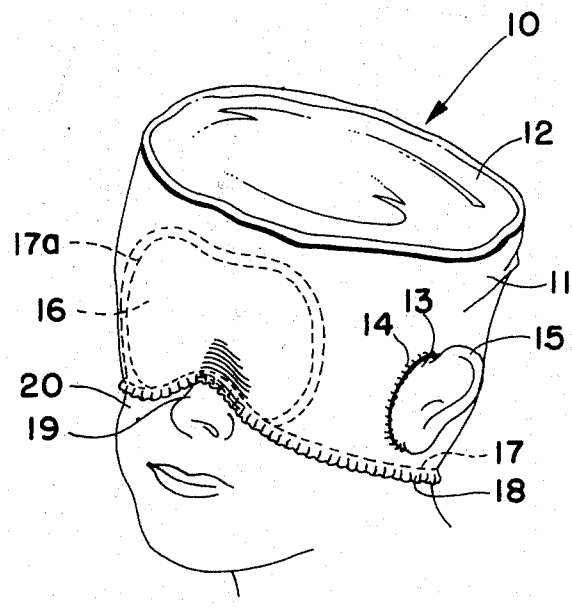
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[57] **ABSTRACT**

A protective cap for enclosing substantially the entire upper portion of an infant's head has radiation blocking material in the front thereof to prevent radiation from injuring the eyes. The top of the cap and ear openings in the sides of the cap cooperate to facilitate application while effectively retaining the cap in proper position on the head, and resilient material in a hem portion of the cap provides for snug fitting against the face without restricting circulation.

15 Claims, 6 Drawing Figures



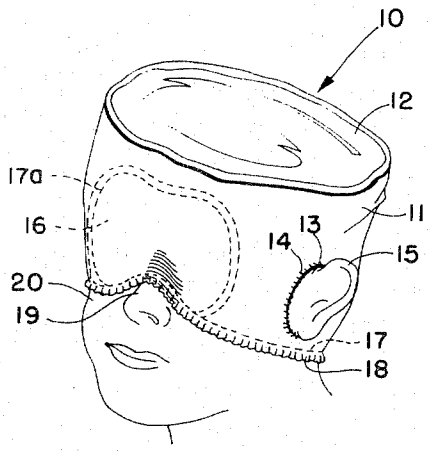


Fig. 1

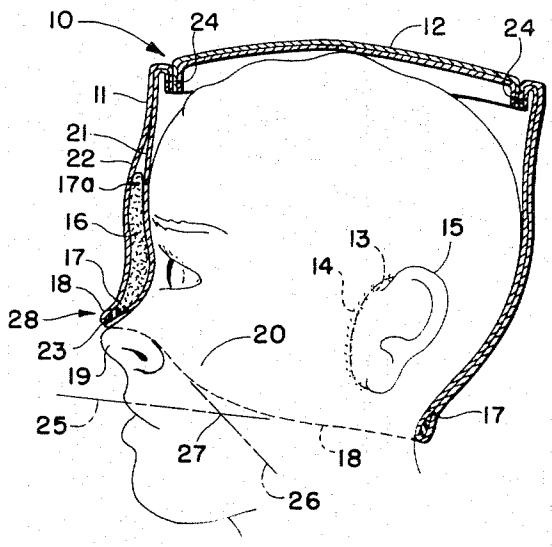


Fig. 2

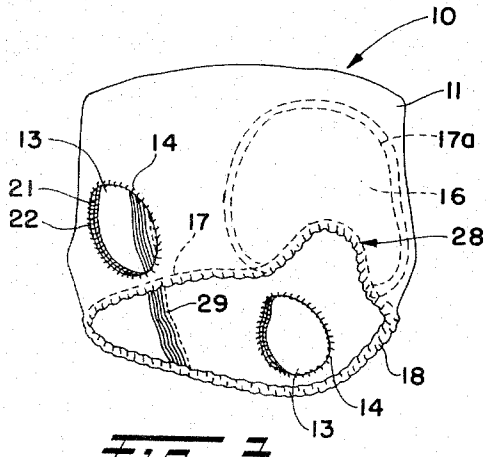


Fig. 3

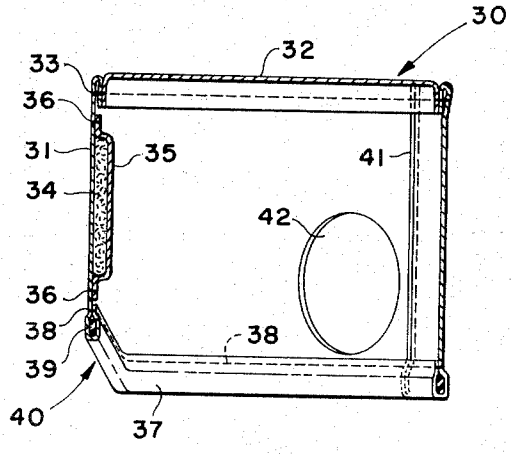


Fig. 4

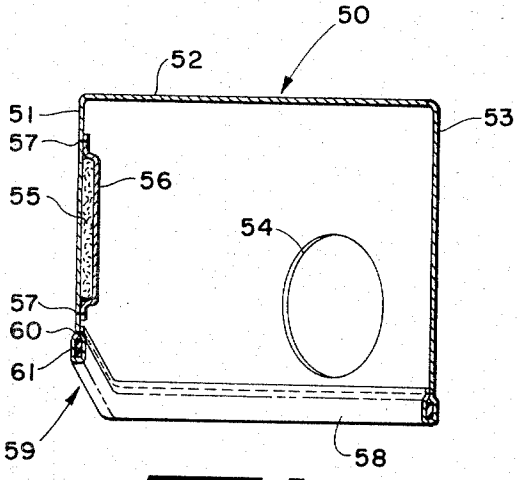


Fig. 5

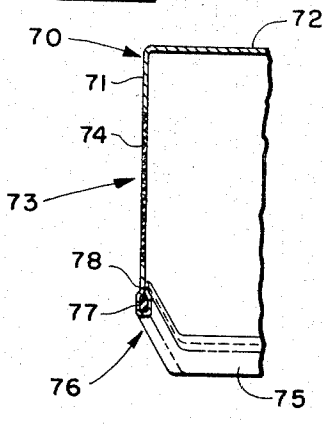


Fig. 6

PROTECTIVE CAP FOR INFANTS

BACKGROUND OF THE INVENTION

This invention relates to a protective cap for infants and more specifically to such a cap that provides eye shielding protection from ultraviolet or other radiation.

Many new born infants having bilirubinemia are subjected to irradiation with ultraviolet light as a treatment therefor. The eyes of the infant, however, must be shielded from such radiation to prevent damage to the eyes, and it is also recommended that the top of the head be shielded from intense ultraviolet radiation because the fontanel is not closed, the possible ill effects of ultraviolet radiation on the relatively fragile head not currently being known.

In the past eye shielding protection for infants having to undergo ultraviolet or similar irradiation has been provided by cotton pads applied over the eyes with bandages wrapped about the head to maintain the pads in place. The drawbacks to such method are numerous including the lengthy time required to apply such bandages, the possibility of accidents occurring during application, and the discomfort or damage that may occur due to a too tightly wrapped applied bandage. Also, discomfort may occur when the pad is applied to an open eye or the bandage is wrapped holding an ear in a folded position. The application of such eye pads and bandages is difficult because tape cannot be used on infants due to skin sensitivity, and there is no means to retain the bandage in position once applied. Often an infant turns its head while under the ultraviolet lamp causing the bandages and pads to move from proper protective position, thus exposing the eyes to radiation or producing pressure on the nose that impedes breathing.

One prior art device that provides eye shielding protection for infants is described in U.S. Pat. No. 3,541,608. The device described in that patent, however, does not provide full shielding protection for the top of the head, and it requires the use of a chin strap and a detachable fastening strap to retain the device in position on the head. Such a chin strap may cause choking or impede breathing. The chin strap also may hinder the often required suctioning to clear mucous in the air passages, and the fastening strap may detach permitting the device to move from its eye shielding position on the head.

SUMMARY OF THE INVENTION

Accordingly, a primary object of the invention is to provide a cap for infants to shield the eyes from radiation.

Another object of the invention is to provide a disposable eye shielding cap for protecting an infant from radiation.

An additional object of the invention is to provide a protective cap for shielding the eyes and upper head of an infant from radiation.

A further object of the invention is to provide a radiation shielding cap for an infant which is retained in position on an infant's head by its ears.

Still another object of the invention is to provide a snugly fitting radiation shielding cap for an infant to prevent irradiation of the eye.

Still an additional object of the invention is to provide a disposable protective cap for infants formed of

sterile, absorbent, light weight, durable, and ventilating material.

These and other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but several of the various ways in which the principals of the invention may be employed.

BRIEF DESCRIPTION OF THE DRAWING

In the annexed drawing:

FIG. **1** is a perspective view of a protective cap positioned on the head of an infant;

FIG. **2** is a section view taken through the center of the protective cap of FIG. **1** showing the two layers of material forming the cap;

FIG. **3** is a perspective view of the protective cap of FIG. **1** showing one of the seams thereof;

FIG. **4** is a section view of a modified single layer protective cap;

FIG. **5** is a section view of a further modified protective cap formed of a single piece of material; and

FIG. **6** is a fragmentary section view of another modified protective cap with opaque material at the eye shielding portion.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing wherein like reference numerals refer to like elements in the several figures, a protective cap generally indicated at **10** is shown positioned on an infant's head in FIG. **1.** The cap **10** is formed of two elements to define a head enclosure, the first element being a generally cylindrical circumferential side portion **11** and the second element being a generally circular top portion **12.** The top **12** of the cap **10** is substantially continuous to provide radiation shielding protection for the top of the head as well as to distribute the forces produced by the cap evenly over the top of the head. An ear opening **13,** only one of which is shown in this figure although there is preferably one for each ear, in the circumferential side portion **11** with means, such as for example, stitching **14,** therearound to prevent fraying and to avoid sharp edges, permits the infant's ears **15** to extend therethrough for retaining the cap in position on the head.

An eye shielding portion **16** is fixed in position at the front of the cap to cover the infant's eyes for blocking radiation therefrom. Such eye shielding or protective portion **16** may be, for example, a regulation shielding pad, such as cotton or other material that prevents radiation from reaching the infant's eyes, and may be, for example, sewn in position to the appropriate area proximate the front of the circumferential side portion **11** by stitching **17, 17***a*. A hem portion **18** formed at the lower section of the circumferential side portion **11** extending about the perimeter thereof includes some resilient material, such as for example elastic material, for maintaining the cap snugly against the bridge of the nose **19** and cheek **20** of the infant to prevent radiation from penetrating beneath the cap to the eyes, although the resilient material may be formed as part of the cap or otherwise fastened to the cap.

Infants with bilirubinemia often undergo treatment for 48 hours, and the cap should be removed for feedings that occur approximately at 6 hour intervals. The cap **10** preferably is sterile and disposable, whereby after a single use it may be discarded, another cap being used for the next treatment to maintain sterile conditions. It is important that the cap be relatively soft to avoid discomfort to the infant; and preferably the cap is formed of non-woven fabric or paper material, which is soft to avoid discomfort, absorbent to absorb perspiration, light weight to permit the infant easily to move its head, durable and somewhat deformable to withstand application and rubbing, and porous to permit ventilation and air circulation therethrough. It has been found that the absorbent and ventilating properties tend to provide a cooling effect for the head to balance the heat produced by the ultraviolet lamp used in the irradiation treatment.

Turning now more specifically to FIG. **2** in which the ear opening **14** and the side of the hem **18** are shown for clarity, the cap **10** has the circumferential side portion **11** formed by a single piece of material folded at the hem **19** to provide a double layer of material surrounding the head. Between the inner and outer layers **21, 22** is positioned the regulation eye pad **16,** such as cotton or other material as described above; and means, such as for example, the stitching **17** through both layers, maintains the eye pad in position between the two layers while defining the hem portion **18** within which the resilient or elastic material **23** is retained. The circular top portion **12** of the cap **10** is also formed of two layers of material, for example, sewn to the circumferential side portion **11** by the stitching **24.** The lower edge of the hem portion **18** at the sides and the back of the head defines a first generally horizontal plane **25,** as shown, and the edge of the hem portion at the bridge of the nose **19** and the cheek **20** defines a second plane **26** angled with respect to the first, both planes intersecting at a location **27** between the front and back of the cap **10.** This arrangement provides for snug fitting against the face especially at the nose portion **28** of the cap without producing circulation restrictions because the forces produced by the resilient or elastic material **23** do not act on the head in only a continuous single plane. The stitching **17** about the perimeter of the cap **10** defines the hem portion **18** and together with the stitching **17*a*** retains the eye pad **16** and the resilient material **23** in position between the two layers of material **21, 22** in the circumferential side portion **11.**

Referring now to FIG. **3,** the cap **10** is shown in perspective to illustrate the seam **29** at which the edges of the circumferential side portion **11** are fastened at the back of the cap to form the generally cylindrical shape thereof. The stitching **14** at the ear openings **13** in the sides of the cap **10** fastens the two layers of material **21, 22** in the circumferential side portion **11** to prevent abrasions of the infant's ears. The hem portion **18** extends about the entire perimeter of the lower section of the circumferential side portion **11** of the cap **10** with resilient material therein, and the eye pad **16** at the front of the cap is fastened in position by the stitching **17** and **17*a*** to protect the eyes from radiation.

In the modified form of protective cap shown generally at **30** in FIG. **4,** the circumferential side portion **31** and the circular top portion **32** are formed from respective single layers of material fastened together by stitching **33** at the top of the cap. The eye pad **34,** similar to that described above, is retained in position by a piece of material **35,** which is fastened to the circumferential side portion **31** by stitching **36,** although, if desired, the eye pad itself may be sewn directly to the circumferential side portion. The lower hem portion **37** is formed by the lower section of the circumferential side portion **31** which is folded over and sewn to itself by stitching **38** with the resilient or elastic material **39** in position within the hem. The hem portion **37** curves upward at the nose portion **40** as described above. The circumferential side portion **31** is sewn together at the seam **41** near the back of the cap behind the ear openings **42** to define the generally cylindrical shape of the cap described above. Since the circumferential side portion **31** is a single layer of material, no stitching is required at the ear openings for fastening purposes as described above with respect to the multilayer cap **10,** although such stitching may be used, if desired, to prevent abrasions to the ear and to prevent fraying.

The modified protective cap **50,** illustrated in FIG. **5,** has the circumferential side portion **51** and the generally circular top portion **52** formed by a single piece of material **53,** such as that described above. The cap **50** may be formed, for example, by molding, pressing, stamping, or other similar method obviating the need to sew the top and side together. The ear openings **54** are cut out from the sides of the cap and may include stitching about the perimeters thereof to avoid fraying and/or abrasions as described above. The eye pad **55** is maintained in position in the front of the cap **50** by a piece of material fastened to the cap by stitching **57.** The lower hem portion **58** curved upward at the nose portion **59** is defined by the lower section of the circumferential side portion **51** folded over and sewn to itself by stitching **60** to hold the resilient or elastic material **61** in position.

A portion of a modified protective cap **70** is shown in FIG. **6** as a single element or piece of material forming the circumferential side portion **71** and the generally circular top portion **72** of the cap similar to the cap **50** in FIG. **5.** The front **73** of the cap, which overlaps the eyes of the infant, is formed of opaque material **74,** such as for example, an opaque dye or other opaque substance to prevent ultraviolet radiation from penetrating the material to the eyes. The hems **75** curved upward at the nose portion **76** is formed by the lower section of the circumferential side portion **71** folded over the resilient or elastic material **77** and sewn to itself by the stitching **78.**

While the various parts of the cap have been described above as being sewn together, such parts also may be fastened together by glueing, press-fitting, or other means for fastening the material together.

The above described caps may be pulled into position over the top of the head, and the ears are slightly folded and pulled through the ear openings. Thus, the generally circular top portion of the cap does not permit the cap to slide down over the face to cover the nose or mouth, and the ears protruding through the respective ear openings retain the cap on the head keeping same from sliding off or from rotating to a position where the eyes woud no longer be protected. The stitching about the ear openings protects the ears from abrasions.

The generally circular continuous top portion of the cap also distributes the pressure thereof substantially evenly over the top of the head, which is fragile and

often lumpy due to the traumas incurred at birth. The forces applied by the resilient or elastic material in the hem portion of the cap retain the front of the cap in snug eye protecting position along the bridge of the nose and cheek, generally following the contours of the face without applying excessive pressure. While the cap itself fits snugly against the face, the eye pad or other radiation blocking portion does not place undue pressure on the eyes, thus permitting opening and closing thereof at the whim of the infant. The eye pads illustrated in FIGS. **1** through **5** as well as the opaque material shown in FIG. **6** absorb or reflect radiation to prevent same from reaching the eyes.

Thus, as now may be understood, the invention provides a protective cap for infants to shield the eyes and head thereof from radiation, such as ultraviolet radiation used in the treatment for bilirubinemia. The cap is easily applied, efficiently retained in position without complicated fastening elements, comfortable, sterile and disposable.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A protective cap for infants comprising head enclosure means including a continuous top portion and a circumferential side portion for enclosing the upper part of the head, openings formed in the sides of said side portion for permitting the ears to extend therethrough to maintain said cap in position on the head, resilient means for retaining said cap snugly against the face, and radiation shielding means at the front of said cap for shielding the eyes against radiation.

2. A protective cap for infants as set forth in claim **1** wherein said radiation shielding means comprises opaque dye in said front of said cap.

3. A protective cap for infants as set forth in claim **1** wherein said radiation shielding means comprises opaque material.

4. A protective cap for infants as set forth in claim **1** wherein said radiation shielding means comprises pad means for blocking radiation.

5. A protective cap for infants as set forth in claim **4** wherein said pad means comprises cotton.

6. A protective cap for infants as set forth in claim **4** wherein said pad means comprises a radiation blocking pad means sewn to said front of said cap.

7. A protective cap for infants as set forth in claim **1** further comprising means for preventing abrasions positioned about the perimeter of said openings.

8. A protective cap for infants as set forth in claim **1** wherein said circumferential side portion comprises a lower section, and hem means formed at said lower section for containing said resilient means.

9. A protective cap for infants as set forth in claim **8** wherein said hem means extends about the remote perimeter of said lower section and defines a first plane extending at least from the back of said cap toward said front thereof and a second plane at an angle with respect to said first plane extending from said front of said cap proximate a nose portion thereof to a location between said front and back of said cap at which said second plane intersects said first plane.

10. A protective cap for infants as set forth in claim **9** wherein said resilient means comprises elastic material.

11. A protective cap for infants as set forth in claim **1** wherein said head enclosure means comprises a single layer of material.

12. A protective cap for infants as set forth in claim **1** further comprising stitching for fastening together said continuous top portion and said circumferential side portion.

13. A protective cap for infants as set forth in claim **1** wherein said continuous top portion and said circumferential side portion comprise a single piece of material.

14. A protective cap for infants as set forth in claim **1** wherein said head enclosure means comprises absorbent ventilating material.

15. A protective cap for infants as set forth in claim **1** wherein said continuous top portion and said circumferential side portion each comprise two layers of material, said radiation shielding means being positioned between said two layers of material forming said circumferential side portion.

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