Dec. 13, 1927. 1,652,776

E. N. GALANIS

MINER'S CAP

Original Filed Jan. 5, 1923 2 Sheets-Sheet 1

Fig. 1.

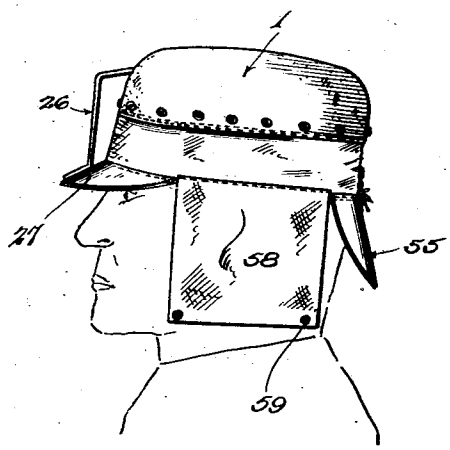


Fig. 2.

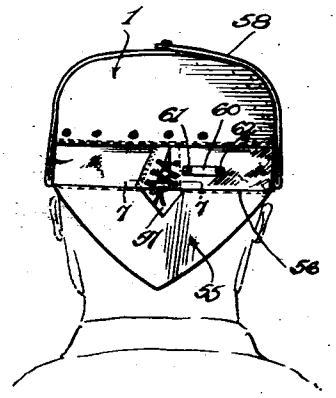
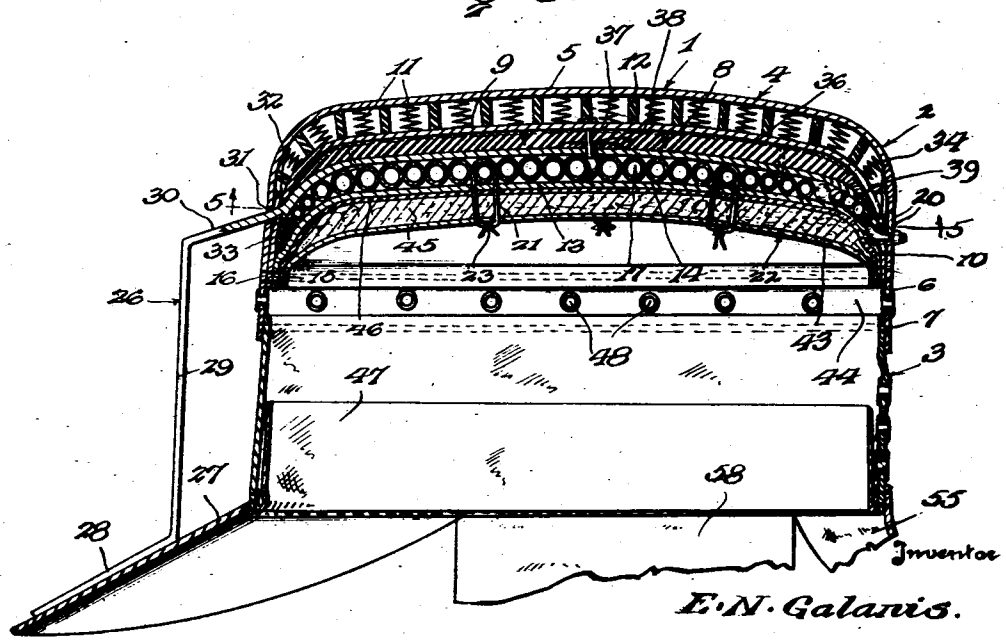


Fig. 3.



Inventor

E. N. Galanis.

By Aaron L. Applebaum

Attorney

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Fig. 4.

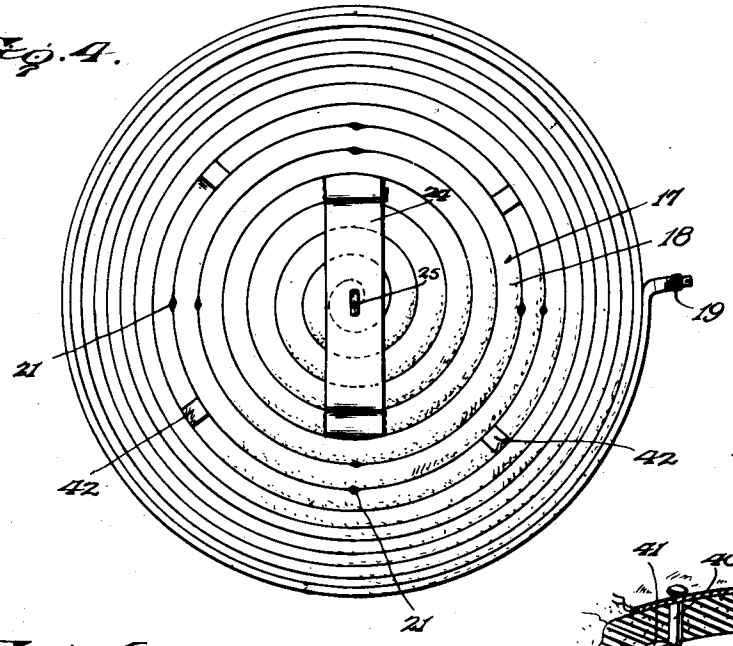


Fig. 5.

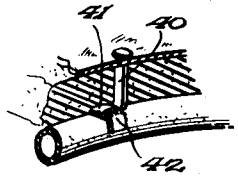
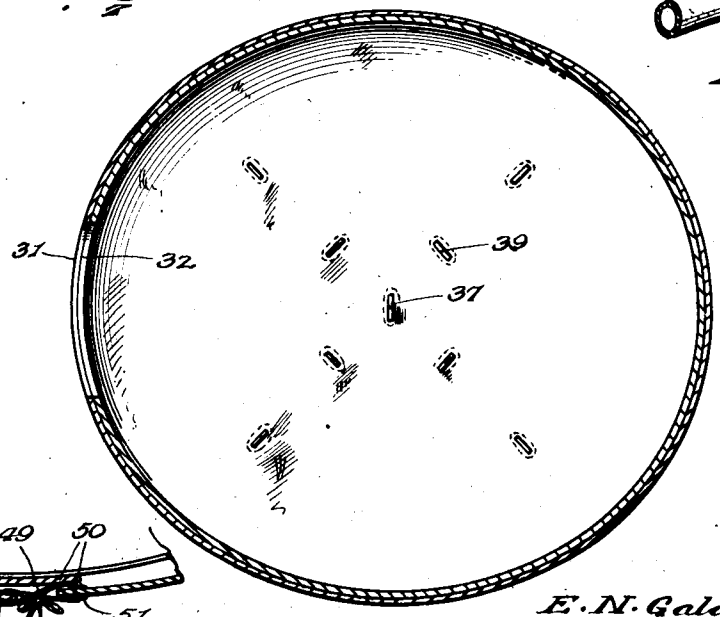


Fig. 6.



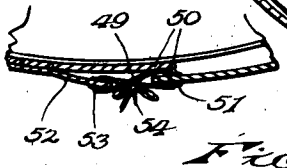


Fig. 7.

Inventor

E. N. Galanis.

By Aaron L. Applebaum

Attorneys

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UNITED STATES PATENT OFFICE.

EMANUEL N. GALANIS, OF NEW YORK, N. Y.

MINER'S CAP.

Refiled for abandoned application Serial No. 610,837, filed January 5, 1923. This application filed January 11, 1927. Serial No. 160,512.

This invention relates to improvements in miners' caps and has as one of its primary objects to provide a cap the crown of which will be of such construction as to effectually protect the head and prevent injury thereto through falling lumps of coal or ore, falling timbers, débris, and the like. The invention also contemplates so constructing the crown of the cap that injury to the head will be prevented should the miner come in contact with a beam or timber or any other unyielding object.

Another object of the invention is to so construct the crown of the cap that its top portion will possess gradually increasing degrees of yieldability and resiliency from the exterior to the interior so that while the exterior of the crown is capable of effectually resisting impacts and receives the greatest force of impact, the inner portion of the crown, or in other words the portion next to and in contact with the head of the wearer, will be more yieldable and resilient thus finally absorbing the shock of impact and at the same time rendering the cap comfortable to wear.

Another object of the invention is to so construct the cap that the wearer will be protected from shocks and injuries which might otherwise result from his head coming in contact with exposed electric wires or other conductors.

Another object of the invention is to provide a cap which will not only protect the skull but also, in one embodiment, will afford protection for the back of the neck so that practically all vital parts will be afforded the necessary protection.

Another object of the invention is to generally so construct the cap that it will be comparatively light in weight and substantially as comfortable to wear as the ordinary miner's cap which embodies no protective device in its structure.

Another object of the invention is to so construct the cap that it may be made practically in a standard size and readily adapted to fit the head of the purchaser regardless of head measurements, within reasonable limits.

Another object of the invention is to provide for the union of the usual lamp supporting member with the cap in such a manner as to insure against any impairment of the yieldability and cushioning effectiveness of the cap, by reason of the presence of said means.

In the accompanying drawings:

Figure 1 is a side elevation of the cap embodying the invention illustrating the manner in which the same is to be worn under working conditions;

Figure 2 is a rear elevation, the face protecting flaps being arranged in inactive position;

Figure 3 is a detail vertical front to rear sectional view through the cap;

Figure 4 is a plan view of the pneumatic cushioning medium of the cap before assemblage with the other parts comprising the cap;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 3 looking in an upward direction;

Figure 6 is a fragmentary sectional perspective view illustrating a portion of the crown structure;

Figure 7 is a detail transverse sectional view taken substantially on the line 7—7 of Figure 2.

The crown of the cap is indicated in general by the numeral 1 and comprises two sections, one of which, indicated in general by the numeral 2, constitutes a cushioned protective covering for the top of the head, and the other section, indicated by the numeral 3, constitutes a band section to surround the head. The said upper section 2 comprises a shell 4 which is preferably formed of sole leather, vulcanized fiber, or any other relatively stiff material either molded or otherwise shaped to dome-like form and embodying a top portion 5 and a depending circumferential portion 6 which latter is stitched at its lower margin, as at 7, to the upper margin of the body of the band section 3, the two sections of the cap being in this manner permanently connected together. The upper section of the crown further comprises a shell 8 which may be formed from fiber, sole leather, or any other relatively stiff material and pressed or otherwise shaped to approximately the same form as the shell 4 although of less height so that when the shell 8 is arranged within the shell 4, the top portion 9 of the said shell 8 will be spaced below the top portion of the shell 4 although the

depending circumferential portion 10 of the said shell 8 will fit snugly within the circumferential portion 6 of the shell 4, these two parts being united by stitching or otherwise. The numeral 11 indicates a number of coil compression springs which are arranged within the space between the shells 4 and 8, and also arranged within this space and interspersed with the said springs are yieldable cushioning elements 12 preferably in the form of small pillars of semi-soft rubber, the pillars being united at their ends to the opposing surfaces of the shells, in any suitable manner.

The numeral 13 indicates in general another shell which is positioned within the shell 8 and comprises a top portion 14 and a depending circumferential portion 15, this shell being made of leather or other material possessing a medium degree of flexibility. The stitches which unite the depending circumferential portion 10 of the shell 8 with the corresponding portion of the shell 4 also unite the depending portion 15 of the shell 14 with the two first-mentioned shells, as indicated by the numeral 16. The shell 13 is of less height than the shell 8 so that its top portion 14 will be spaced below the top portion 9 of the said shell 8 so as to provide a compartment within which certain cushioning means is housed. One of the means employed is indicated in general by the numeral 17 and comprises a tube 18 which is of suitable length and of soft rubber and is closed at one end and gradually tapered from said end towards its opposite end, which latter end is supplied with an inflating valve 19. The tube 18 is wound to spiral form to provide a substantially flat pneumatic cushion, the major end of the tube being located at the center of the cushion and the minor or smaller end thereof being extended through openings 20 in the shells 4 and 8, and the valve 19 thus held in position where access may be conveniently had thereto for the purpose of inflating the tube. The tube, in forming the cushioning body 17, is wound spirally as stated, and upon the upper surface of the top portion 14 of the shell 13, and the said cushion is retained upon the shell by means of tapes 21 which are looped over the coils of the tube and are passed through openings in the top portion of the shell 13 and through the corresponding portion of a lining shell which is indicated in general by the numeral 22 and which will hereinafter be more fully described, the ends of the tapes being tied in a knot, as at 23, beneath the under side of the said shell 22. Of course, any suitable pump may be employed for inflating the tube 18 and the tube may be inflated to any desired pressure. For a purpose to be presently explained, a strip 24 of leather or any other suitable material is disposed diagonally of the central portion of the cushioning medium 17 and is cemented at its ends to the coils of the tube 18 comprising the said cushion, the intermediate portion of the strip being, however, left disconnected from the tube and being formed with a slot 25 for a purpose to be presently pointed out.

The lamp support for the cap is indicated in general by the numeral 26 and the same may be formed from a stiff piece of sole leather, fiber or the like, disposed and secured at one end upon the upper side of the visor 27 of the cap as indicated by the numeral 28, the supporting member including a portion 29 which upstands in front of the crown of the cap, and a portion 30 which extends rearwardly from the upper end of the supporting portion 29 and through slots 31 and 32 formed in the front portions of the shells 4 and 8 respectively. Where the supporting member 26 is formed of sole leather or the like it will be skived, as at 33, at a point rearwardly of the opening 32 so as to form a lip to engage against the inner side of the said shell 8 and thus prevent forward displacement of the portion 30 of the said supporting member. From the opening 32 the said portion 30 extends in a rearward direction diametrically across the upper side of the cushion 17 and at its rear end is projected through a slot 34 formed in the shell 8, this end of the said portion 30 being also skived as at 35 to provide a lip engaging against the rear outer side of the said shell 8 and being in this manner anchored. A cushion 36 of soft or sponge rubber is arranged within the space between the under side of the top 9 of the shell 8 and the upper sides of the cushion 17 and portion 30 of the lamp supporting member, and an anchoring element 37 is secured through the intermediate portion of the top 9 of the said shell 8 and extends through the slot 25 in the strip 24 and through a similar slot 38 in the portion 30 of the lamp supporting member, the said portion 30 extending beneath the said strip 24 as clearly shown in Figure 3 of the drawings. In this manner the parts are connected together and restrained against relative displacement without, however, detracting from their yieldability. Moreover, the lamp support is anchored within the cap in such a manner as to form an additional reinforcement for the cap and also very effectually sustain the weight of the lamp without distorting the cap or pulling away therefrom. In order to suitably anchor the central portion of the cushioning pad 36, prongs 39 are secured through the top portion 9 of the shell 8 and are embedded in the said cushioning pad 36 as shown in Figure 5. The outer portions of the cushioning pad 36 and the cushion 17 are anchored against displacement by means of

anchoring elements 40 which are secured through the top portion 9 of the shell 8 and extend through the outer marginal portion of the cushioning pad 36 and have their lower ends bent and engaged, as at 41, through loops 42 provided upon the coils of the tube 18.

The shell 22 heretofore referred to is of less height than the shell 13 within which it is arranged and therefore its top portion, which is indicated by the numeral 43, is spaced below the top portion 14 of the said shell 13, its depending marginal portion 44 being secured by stitches 16 to the marginal portions of the other shells. The shell 22, as previously stated, constitutes the lining shell and may be made of any suitable waterproof material such as water proofed canvas or leather and is relatively flexible, and in the space between the top portion of this shell and the top portion 14 of the shell 13, there is arranged a padding 45 of felt or any other suitable padding material.

A sheet 46 of rubber or any other suitable flexible insulating material is preferably arranged within the shell 13 and between the inner surface thereof and the padding 45 and serves to insulate and protect the head of the wearer of the cap in the event the crown of the cap comes in contact with an exposed electrical conductor.

A head band section 3 of the cap is preferably of leather of a relatively flexible quality and is provided interiorly with a sweat band indicated by the numeral 47. It will be observed that a space is provided between the sweat band 47 and the lower edges of the depending circumferential portions of the several shells heretofore described with which space ventilating eyelets 48 are in communication so as to afford ample ventilation within the cap. To adapt a single standard size of cap for application to persons who would otherwise require different sizes of caps, the head band section 3 is formed at the rear with an incision 49 to provide overlapping end portions 50, one of which has lacing eyelets 51 secured therein. The other portion 50 has secured upon it a lacing flap 52 likewise provided with eyelets indicated by the numeral 53, and a lacing string 54 is suitably threaded through the eyelets 51 and 53 and may be adjusted to vary the diameter of the section 3.

In order to protect the back of the neck and base of the skull, a protecting apron 55 is attached at its upper edge, as at 56, to the lower margin of the head band section 3 of the cap at the rear side thereof and depends rearwardly of the back of the head and neck as best shown in Figures 1 and 2 of the drawings. If desired this apron may be formed with a V-shaped incision 57 at the point of location of the incision 49 in the head band section 3 so as to not interfere with adjustment of the said section 3 to various diameters. The protective apron 55 may be made of relatively stiff leather or any other material found suitable for the purpose and will afford a degree of protection from falling lumps of coal or the like. However, if desired and if the apron should be intended merely as a protection from contact with exposed electrical conductors, it might be formed of insulating material of a flexible nature and would, therefore, be adapted to be turned up toward the top of the cap and secured in any suitable manner when its use was not required.

In order to protect the sides of the face and neck from contact with exposed electrical conductors, depending protective aprons 58 are secured at their upper margins to the lower margin of the head band section 3 at opposite sides of the cap and depend therefrom as shown clearly in Figure 1 of the drawings. The free lower margins of these aprons are provided with the elements of snap fasteners 59 and by reference to Figure 2 it will be observed that when the aprons are not required to be used they may be turned up over the top of the cap and the fastener elements 59 engaged to retain the aprons in this position.

From the foregoing description of the invention it will be understood that inasmuch as the shells 4 and 8 are of relatively stiff material and the cushioning elements 11 and 12 interposed therebetween are yieldable although capable of offering some appreciable resistance to impact, the exterior portion of the crown of the cap will be capable of effectually absorbing the initial shock of impact in the event of a mishap. The cushion 36 of sponge rubber, and the pneumatic cushion 17, possess a higher degree of yieldability and resiliency and therefore are adapted to practically absorb the force of impact which is not absorbed or taken up by the elements 11 and 12 and the shells 4 and 8. Finally the padding 45 of felt or other soft material will perform effectually its function of cushioning the top of the skull and further absorbing the residual force of impact delivered initially to the shell 4.

It is at present customary for miners to carry storage batteries and to have their caps equipped with electric lamps, wires being led from the storage battery to the lamp, and in order that conductor wires may be most conveniently retained in place so as not to cause annoyance to the wearer of the cap, it is preferable that a short leather strap 60 be secured at one end, as at 61 to the section 3 of the cap at the rear thereof and separably connected at its other end by snap fasteners or the like 62 with the said section 3. The last-mentioned end of the strap is adapted to be disengaged so as to

permit of the introduction of the conductor wires therebeneath after which the end is reengaged with the section 3 so as to retain the wires in place.

This application is a substitute for my abandoned application Sr. No. 610,837, filed January 5, 1923.

Having thus described the invention, what is claimed as new is:

1. A cap having a crown forming the outermost member of the cap and embodying a relatively stiff and non-yielding outer shell, a relatively flexible and yieldable inner shell secured at its margin to the outer shell, and cushioning media arranged in superposed relation between the shells and of increasing degrees of resiliency in a descending order.

2. A cap having a crown forming the outermost member of the cap and embodying a relatively stiff and non-yielding outer shell, a relatively flexible and yieldable inner shell secured at its margin to the outer shell, and cushioning media between the shells arranged in superposed relation, the media nearer the first-mentioned shell possessing minimum degree of yieldability, and the media nearer the second-mentioned shell possessing maximum degree of yieldability.

3. A cap having a crown forming the outermost member of the cap and embodying an outer shell of relatively stiff and non-yielding material, an inner shell arranged within the first mentioned shell and of a similar material and secured at its margin to the outer shell, spaced rubber spacing and cushioning elements arranged within the space between the shells and extending between their opposing faces, and a relatively yieldable cushion within the inner shell.

4. A cap having a crown forming the outermost member of the cap and embodying an outer shell of relatively stiff and non-yielding material, an inner shell arranged within the first-mentioned shell and of a similar material and secured at its margin to the outer shell, spaced rubber spacing and cushioning elements arranged within the space between the shells and extending between their opposing surfaces, coil springs arranged in the spaces between the said elements, and a relatively yieldable cushion within the inner shell.

5. A cap having a crown forming the outermost member of the cap and embodying a plurality of shells arranged one within another and constituting the top of the crown, said shells being secured together at their margins and cushioning media arranged between the several shells, the medium nearer the outermost shell comprising alternating resilient and elastic elements of a minor degree of yieldability, the next lower medium comprising a layer of soft rubber, the next medium comprising a pneumatic cushion, and the next and lowermost medium comprising a pad of felt.

6. A cap having a crown embodying a plurality of superposed cushioning media in its top, a visor, and a lamp supporting member secured to the visor and having a portion upstanding in front of the crown and another portion extending into the crown in a rearward direction between adjacent media and anchored within the crown.

7. A cap having a crown embodying a plurality of superposed layers of cushioning media in its top, and a lamp carrier on the front of the cap and having a portion extending rearwardly through the front of the cap and between two layers of cushioning media and provided with projections on its side to engage adjacent portions of the crown and prevent withdrawal.

8. A cap having a crown, a plurality of superposed shells secured within the crown, cushioning media between the shells, an intermediate one of said media consisting of a wound pneumatic tube, fastening devices engaged with said tube and extending through the superposed media to connect the tube with an upper shell, and fastening devices engaged with the tube and passing through a subjacent media to connect the tube with a lower shell.

This specification signed this 10th day of January, A. D. 1927.

EMANUEL N. GALANIS.