S. D. MOTT.

COMBINED HELMET AND PARACHUTE FOR AVIATORS' USE.

APPLICATION FILED JAN. 18, 1918.

1,330,274.

Patented Feb. 10, 1920.

6 SHEETS—SHEET 1.

Fig. 1.

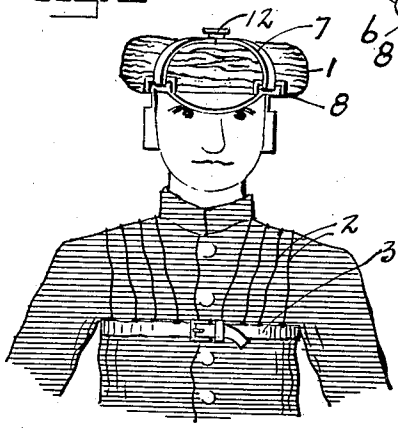


Fig. 3.

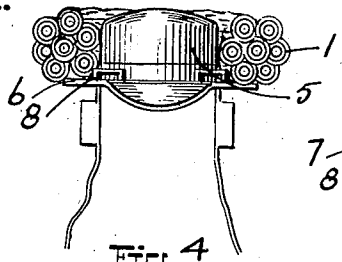


Fig. 4.

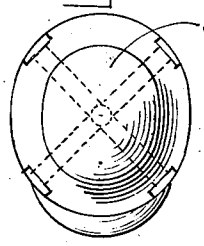


Fig. 2.

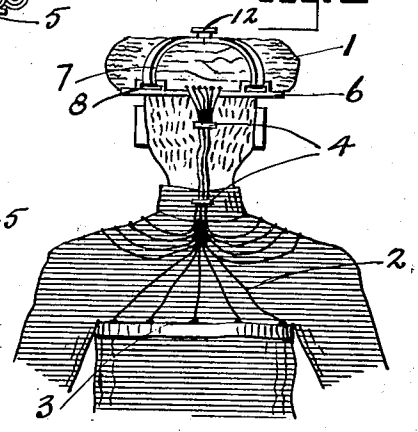


Fig. 5.

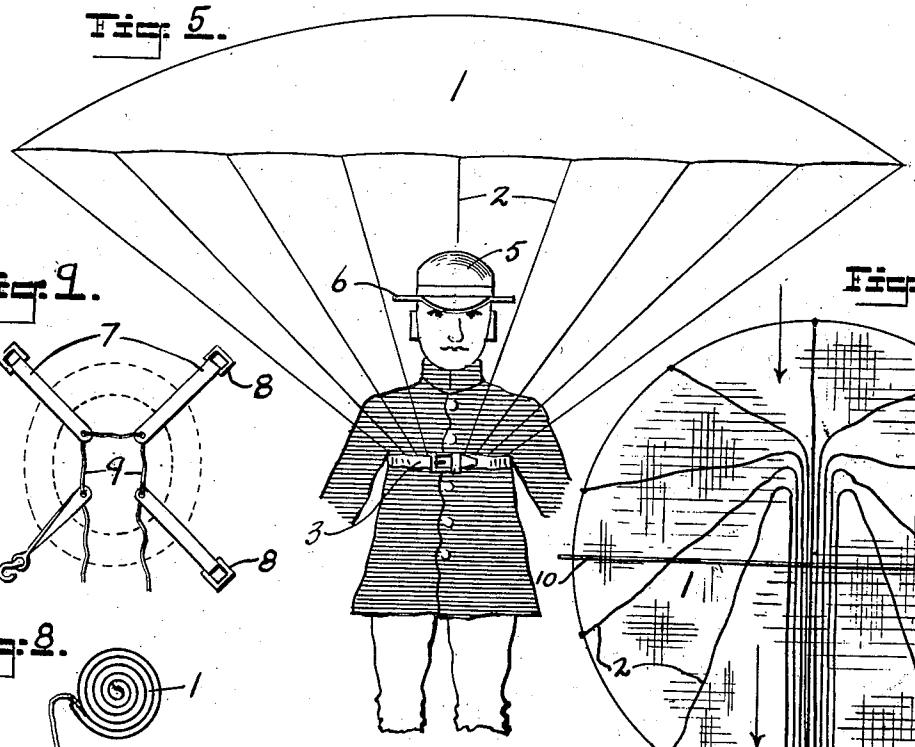


Fig. 9.

Fig. 6.

Fig. 8.

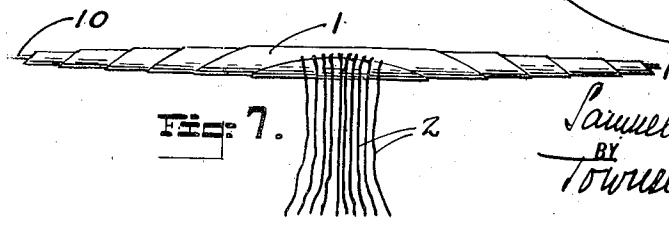


Fig. 7.

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6 SHEETS—SHEET 2.

Fig. 10

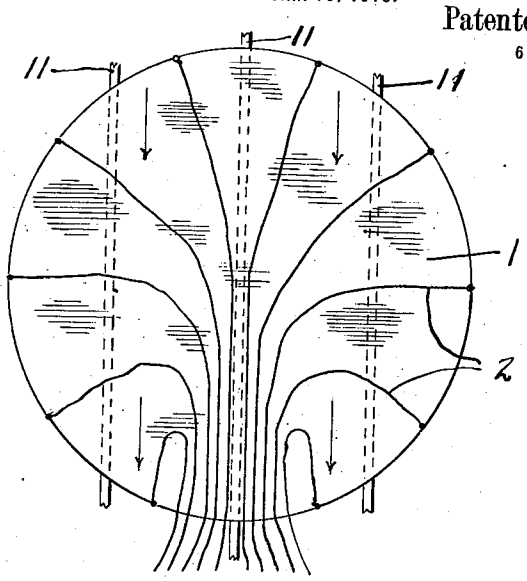


Fig. 13

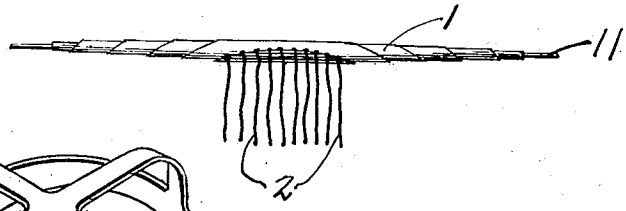


Fig. 11

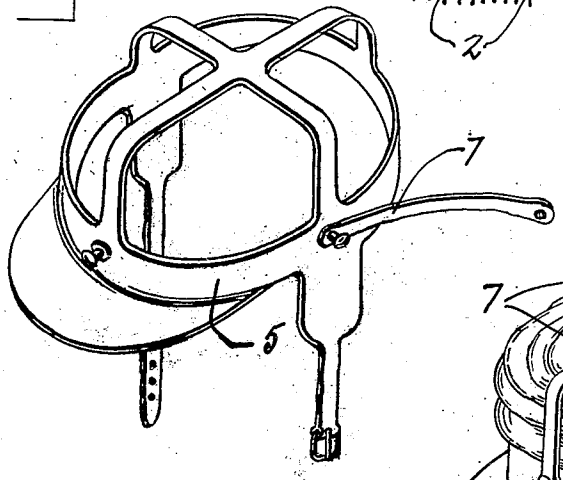
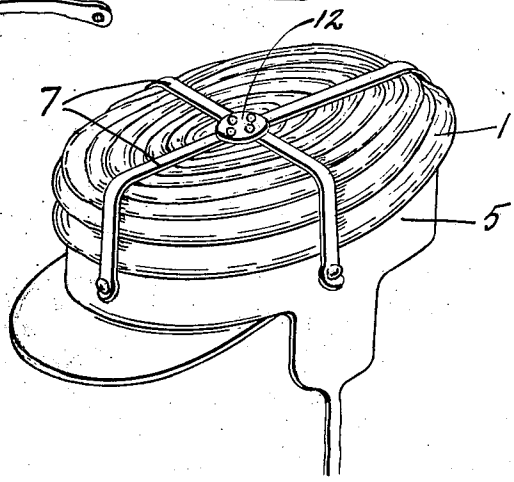


Fig. 12.



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6 SHEETS—SHEET 3.

Fig. 14.

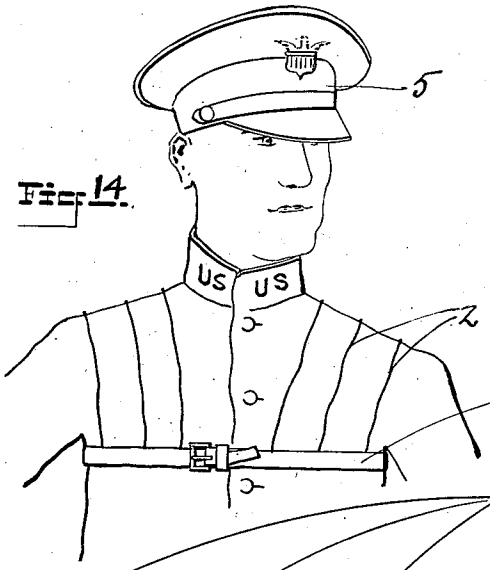


Fig. 15.

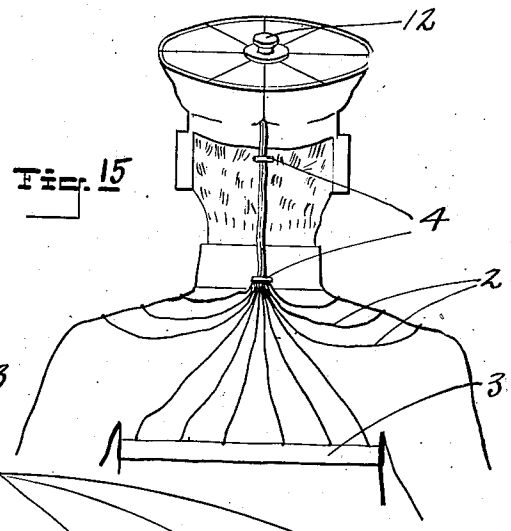


Fig. 16.

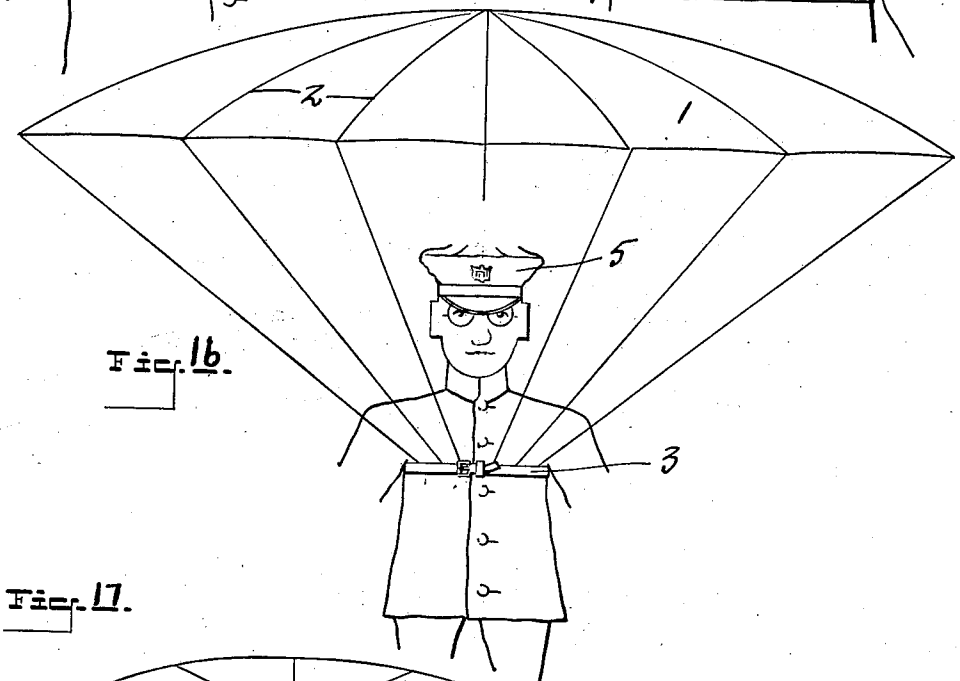
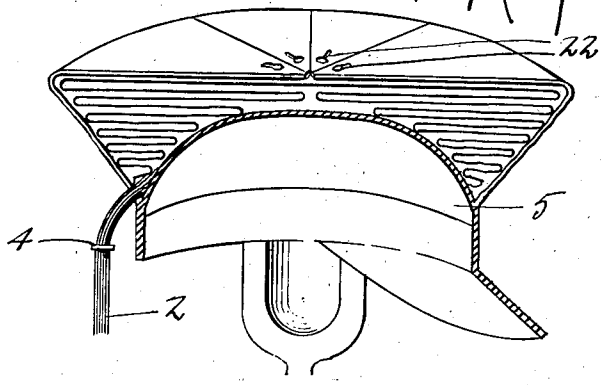


Fig. 17.



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6 SHEETS—SHEET 4.

Fig. 18.

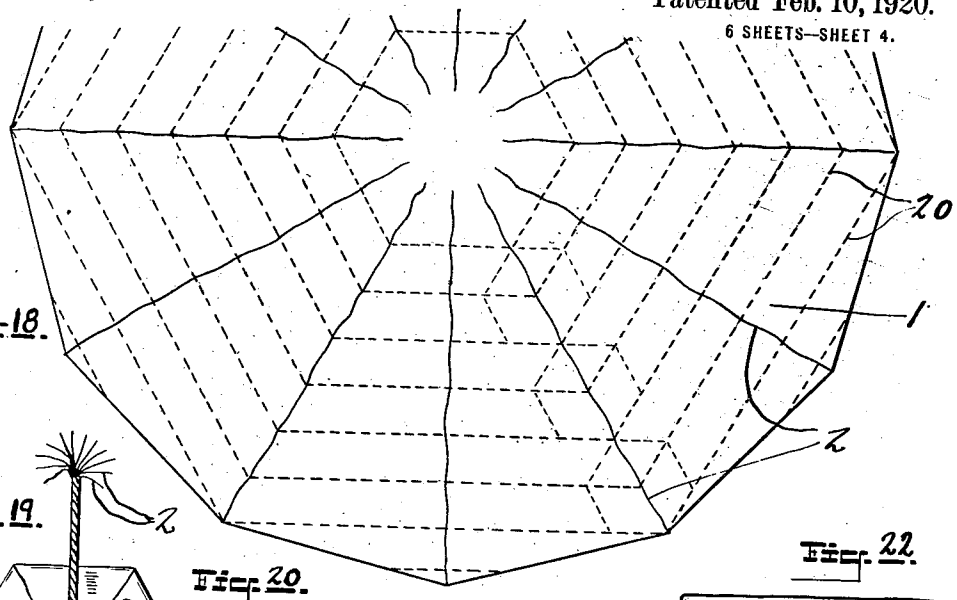


Fig. 19.

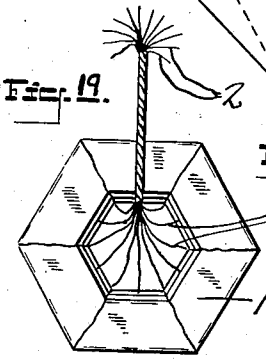


Fig. 20.

Fig. 21.

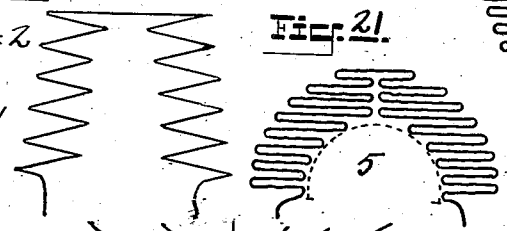


Fig. 22.

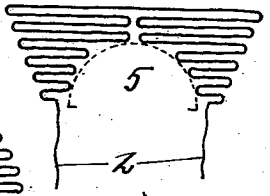


Fig. 23.

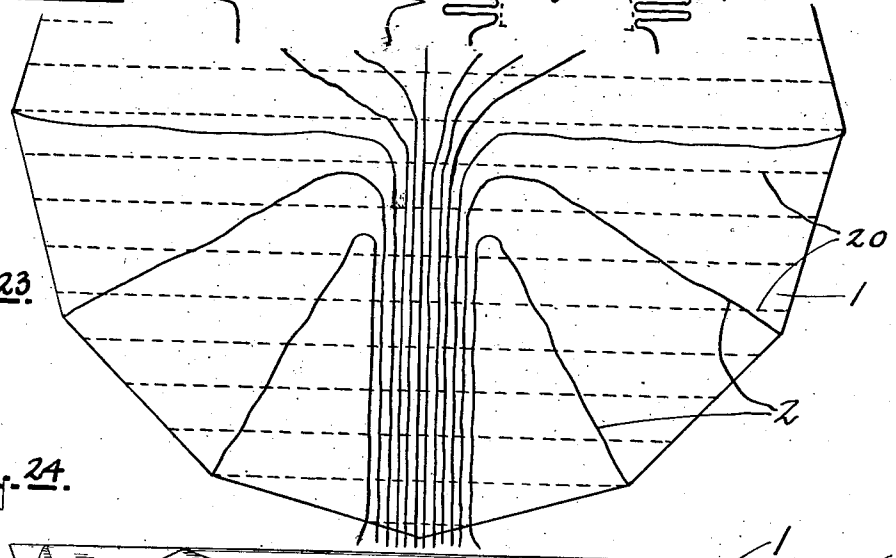
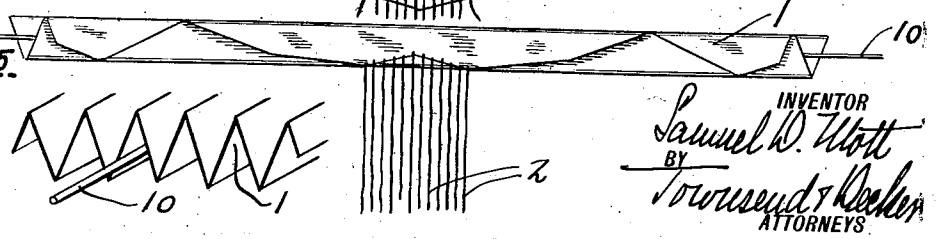


Fig. 24.

Fig. 25.



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6 SHEETS—SHEET 5.

Fig. 26.

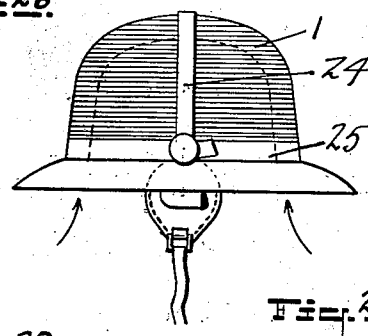


Fig. 27.

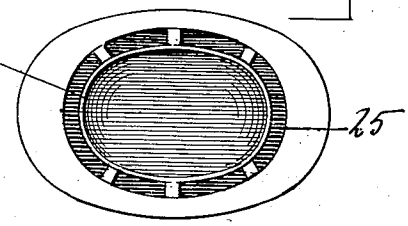


Fig. 28.

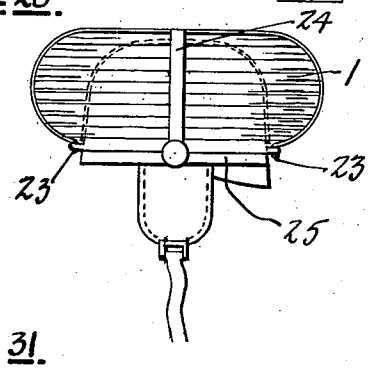


Fig. 29.

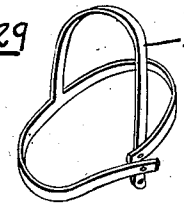


Fig. 30.

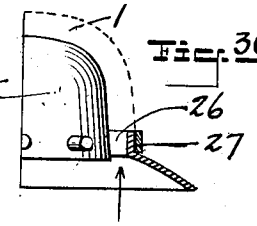


Fig. 33.

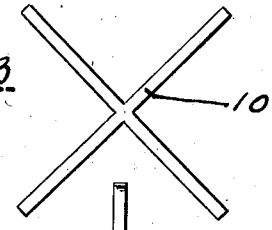


Fig. 31.

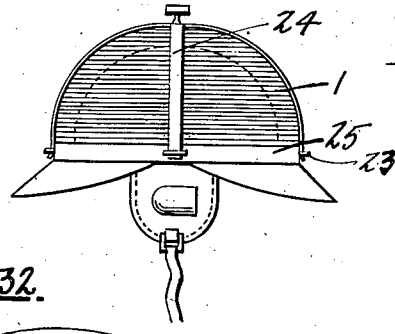


Fig. 34.

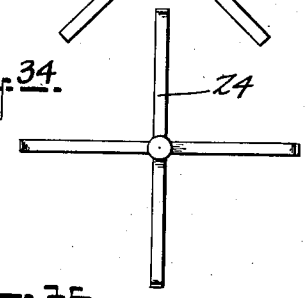


Fig. 35.

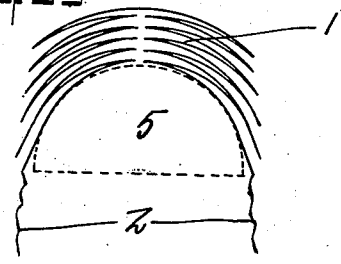
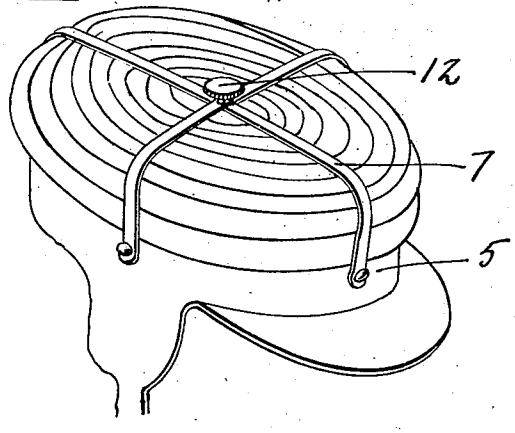


Fig. 32.



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6 SHEETS—SHEET 6.

Fig. 36.

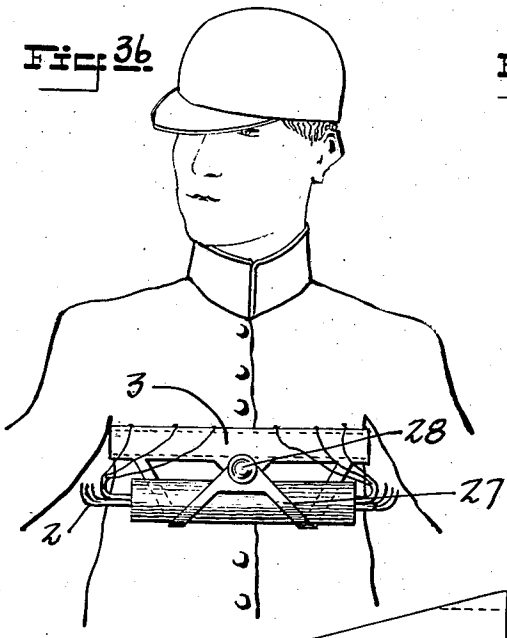


Fig. 37.

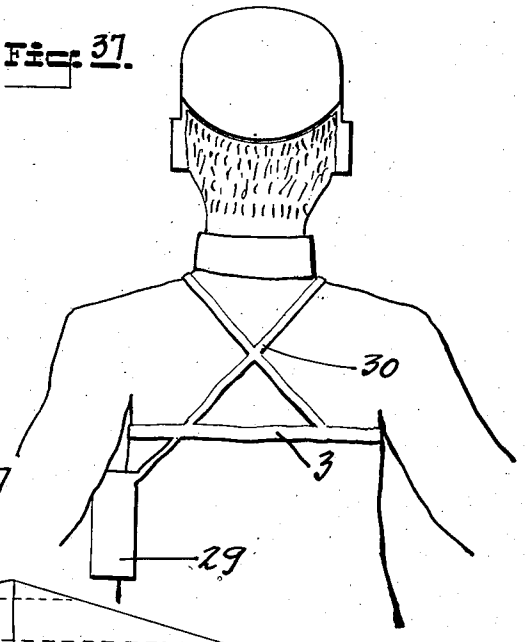
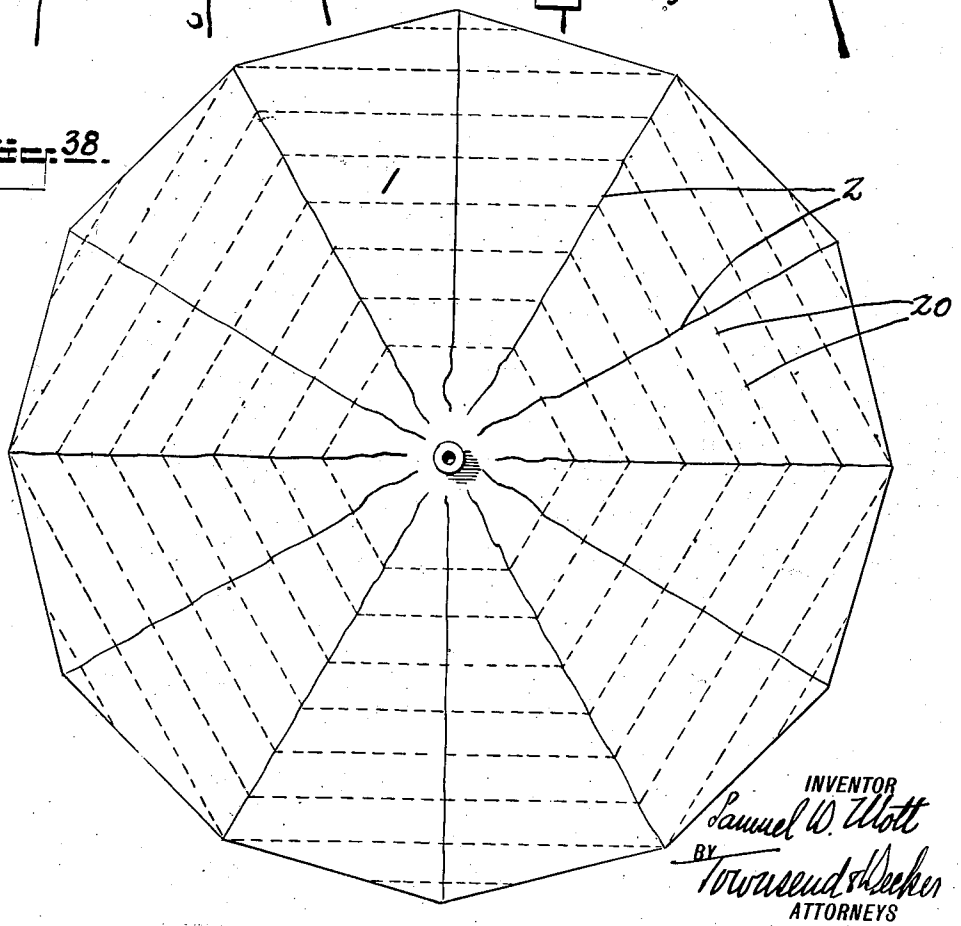


Fig. 38.



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UNITED STATES PATENT OFFICE.

SAMUEL D. MOTT, OF PASSAIC, NEW JERSEY.

COMBINED HELMET AND PARACHUTE FOR AVIATORS' USE.

1,330,274. Specification of Letters Patent. Patented Feb. 10, 1920.

Application filed January 18, 1918. Serial No. 212,511.

To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, a citizen of the United States, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Combined Helmets and Parachutes for Aviators' Use, of which the following is a specification.

My invention relates to parachutes designed for use by aviators and more particularly to the manner of folding or arranging the fabric or umbrella portion of the same to adapt it to be readily carried by the aviator either as a portion of his head covering or otherwise and in such manner that the parachute may be readily released in case of emergency and so that it will assume immediately effective position for checking the descent of the user.

A further object is to so construct or arrange the device that it may be essentially a part of the head covering or helmet worn by the aviator.

One part of my invention consists essentially of a parachute the fabric portion of which is rolled or folded and then coiled into the substantial form of a turban so that it may be worn or applied as a turban either directly or upon a skeleton helmet or cap as will be hereinafter more particularly described.

The invention further consists in the combination with the helmet of means for temporarily securing the fabric portion of the parachute carried thereby in its folded form, said means being adapted to be readily released by the user in case of emergency.

The invention consists also of a parachute having its fabric portion rolled or folded in a form adapting it to be readily carried by the aviator and combined with an expanding strip or device incorporated therein and adapted to unroll or unfold it when released.

The invention further consists of a parachute having its fabric portion coiled into a spiral and having an expanding strip incorporated in the spiral to cause it to unwind or open.

The invention also consists in the particular manner of folding the fabric portion to adapt it to readily assume effective position when released as will be hereinafter more particularly described.

Other features constituting my invention will be more particularly specified in the claims.

In the accompanying drawings Figure 1 is a front view of the device embodying my invention as worn by an aviator.

Fig. 2 is a rear view of the apparatus as worn.

Fig. 3 is an elevation of a form of helmet adapted for use with my invention and showing the turban portion of the device in vertical section.

Fig. 4 is a plan of the helmet portion with the turban removed.

Fig. 5 shows the parachute as expanded and supporting an aviator.

Fig. 6 shows the fabric portion of the parachute as laid out preparatory to rolling.

Fig. 7 shows the fabric portion rolled and Fig. 8 illustrates the roll as formed into a spiral or volute so that it shall be compact and adapted to be worn or supported upon the helmet or head piece or otherwise borne or carried by the aviator when it is not required for actual use.

Fig. 9 shows in plan the devices which may be employed for securing the parachute in its rolled and coiled condition and adapted to release the same when the parachute is required to be used.

Fig. 10 is a plan of the fabric portion as arranged for rolling up with an expanding strip or device adapted to unroll the fabric when the roll is released from its spirally wound condition.

Fig. 11 shows in perspective a helmet of skeleton form adapted to receive the rolled and coiled parachute so that the latter may form a protection like that of the solid helmet.

Fig. 12 shows the skeleton helmet with the parachute turban applied.

Fig. 13 shows the parachute fabric arranged as in Fig. 10 after the same has been rolled up.

Fig. 14 shows in front view another form of helmet or head piece having the parachute incorporated therewith.

Fig. 15 is a rear view of the same.

Fig. 16 shows the parachute expanded and supporting the aviator.

Fig. 17 is a vertical section through the head piece and parachute illustrated in Fig. 15.

Fig. 18 illustrates the manner of folding

up the parachute fabric into the form shown in Fig. 17.

Fig. 19 is a plan view of the fabric portion after folding.

Figs. 20, 21 and 22 illustrate modifications in the manner of folding.

Fig. 23 illustrates a modification in the manner of folding shown in Fig. 18.

Fig. 24 shows the fabric portion folded in the manner illustrated in Fig. 23 when combined with an expanding strip or device and Fig. 25 is a perspective view of the edge of the fabric portion partially opened out by the action of the expanding strip which operates to uncoil the folded part after being wound into a spiral.

Fig. 26 is a side elevation of a modified form of helmet, adapted to carry a parachute folded in the manner illustrated in Fig. 18.

Fig. 27 is an inverted plan view of said helmet.

Fig. 28 shows another form of helmet and Fig. 29 shows the retaining means detached.

Fig. 30 is a partial vertical section of the helmet shown in Fig. 26.

Figs. 31 and 32 show other modifications in the form of helmet and Fig. 33 shows an expanding strip or device detached.

Fig. 34 is a plan of the retaining means detached.

Fig. 35 shows a further modification in the manner of folding the fabric portion.

Figs. 36 and 37 show a modification in the manner of carrying the parachute by the aviator.

Fig. 38 illustrates the manner of folding up the fabric portion of the parachute preparatory to rolling it into the form for carrying as illustrated in Figs. 36 and 37.

1 indicates the umbrella or fabric portion of the parachute and 2 the supporting cords or stays joined in a belt or harness 3 or other device by which the aviator may be supported as shown in Fig. 5 when the umbrella or fabric portion is expanded. In practice and during wear of the turban the various cords 2 are preferably assembled and held together in assembled position by means of readily frangible bands 4 (see Fig. 2) which are adapted to break on the forcible expansion of the fabric or umbrella part 1 after the parachute has been released from its confined condition. This permits the assembled cords to be carried down from the rear of the helmet or head piece to the shoulders of the wearer so that they will be inconspicuous in ordinary wear.

5 indicates a helmet or head piece adapted to be worn by the aviator and made either of leather or of any other suitable material. In the form of my invention shown in Fig. 3 said helmet covers the top of the aviator's head and the parachute wound into a turban surrounds the head piece and is supported upon a suitable ledge 6 of the head piece but, as will hereinafter appear, the top portion of the helmet might be open and the turban arranged to cover the head of the wearer.

Fig. 6 shows the fabric portion of the parachute laid out with the cords 2 properly disposed to permit the fabric to be rolled up into a roll such as indicated in Fig. 7. As will be understood, the fabric should be very light and strong to allow compactness in the roll. The roll thus formed is then wound into a spiral or volute for further compactness and to permit the roll to be applied preferably as a part of the head covering of the aviator and as indicated in Figs. 1, 2 and 3, in which condition it is carried when not required for use and secured in such condition by means temporarily holding it but adapted to be readily released to free the umbrella or fabric part and allow it to expand into operative form as illustrated in Fig. 5. Such means for securing the parachute in its turban shape may comprise, as illustrated in Fig. 9, a number of straps or bands 7 permanently secured at one end to the eyes or brackets 8 on the head piece and at their opposite or free ends held together by means of a fastening cord 9 threaded through openings in said free ends. Fastening cord 9 would ordinarily be tied or secured together at its ends in such way as to permit them to be readily released, thus freeing the parachute from the restraint of the straps or bands 7 so that it may free itself from the head piece and uncoil itself and unroll so as to become effective as a support in the air.

Preferably I incorporate with the coil a suitable expanding strip indicated at 10, Figs. 6 and 7. Said strip may be a piece of thin elastic or spring steel or even a piece of light wood which will not unduly interfere with the winding of the roll into spiral shape but will nevertheless act to open out or uncoil the spiral, so that the roll or fabric may unroll. The expanding strip 10, instead of being of springy material, might be a cord or strip of elastic material like rubber incorporated in the spiral under tension so as to have the same effect of uncoiling the spiral or turban. To assist in the unrolling of the fabric after the spiral has opened out, it is frequently desirable to incorporate therewith one or more similar strips 11 as indicated in Fig. 10. These may be, as in the case of the strip 10, either flexible spring strips or flexible elastic strips or pieces rolled up under tension. As will be understood, the strips 10 and 11 automatically detach themselves when the turban or spiral opens out and unrolls.

In Fig. 11 the head piece or helmet is shown in skeleton form and the parachute is rolled and wound into a spiral or volute

in such way as to form in effect a turban covering the sides and top of the wearer's head. In this form the top portion of the spiral or volute takes the place of the protective top 5, Fig. 3, and in such form the turban will have a less bulky appearance than in the form where it is assembled wholly on the sides of the helmet. To secure the turban in position, straps 7 may be employed as already indicated, said straps having their free ends secured over the turban by means of a snap button 12 provided with four spring sockets adapted respectively to receive four studs arranged respectively on the ends of the straps 7. This button may be readily removed to free the turban when occasion requires.

I do not, however, limit myself to any particular means for securing the parachute fabric in turban or coiled form nor do I limit myself, so far as the rolled and coiled parachute is concerned, to the use of the same as a turban or head gear or covering.

Instead of rolling up the fabric portion of the parachute in a manner already indicated as being employed preparatory to forming it into the spiral it may be folded in zigzag fashion or into folds like accordion folds. The folding may progress from edge to edge taking in the whole extent of the fabric, that is to say, with the lines of fold extending clear across the same as indicated in Fig. 23 but preferably the fabric is folded as indicated in Fig. 18 wherein the fabric part laid out upon a suitable floor or support is folded up in segments or sectors of which there may be, as illustrated in this figure, six segments or sectors. The line of fold for each sector is indicated by the straight dotted lines 20 and the fold proceeds, in the case of each sector, from the outer edge of the fabric inwardly toward the center, the supporting cords being disposed preparatory to the folding operation upon the top of the fabric when laid out. To conduct this operation one fold is formed in each segment at a time, proceeding around the periphery thereof and after completing the one fold for each segment the operation is repeated until finally an assemblage of the folds in zigzag or accordion form results such as illustrated in Figs. 19, 20, 21 and 22, the disposition of the folds with relation to one another or the width of each fold being varied as desired and indicated in those figures. The result of the folding is shown in plan in Fig. 19.

As will be seen, the folds of the segments will overlap at the edges of the segments, the results of this being to keep the folds apart which is desirable in order to prevent the packing of the fabric and enable the same to expand more regularly when occasion requires. After folding as described, the parachute may be placed upon the head piece as illustrated in Figs. 21 and 22.

Fig. 21 shows the width of folds varying from the edge toward the center to produce a turban or head covering having a general conical or spherical form while Fig. 22 shows the folds as increasing in width to produce a head piece or covering of flaring shape.

As shown in Fig. 18 the supporting cords 2 may be disposed on the dividing lines between the segments and sectors as to some of them and as to others may be disposed or laid on radial lines through the centers of the segments. The number of segments or sectors obviously may be varied as desired and the disposition of the cords therein may be also varied so that all of said cords will be disposed in the centers of the segments or may be disposed on the dividing lines between them. After the folding up by segments or sectors, as described, the parachute may be placed in a cap or helment and retained by the corresponding segment-shaped flaps 20 as indicated in said figure, said flaps being held together at the center by a cord passing through the eyelets or openings 22 (see Fig. 17) in said retaining segments after the manner of the cord 9 shown in Fig. 9. Said retaining segments 20 may be part of the fabric of the cap or helmet, said fabric being secured to the frame or edge of the cap as indicated.

Instead of folding by segments in the zigzag fashion described, the folding may proceed from edge to edge of the whole fabric portion as indicated in Fig. 23, thus producing an elongated roll or fold which may be coiled up in the manner already described. The edges of said folds are shown in Fig. 25 and an expanding strip 10 may be incorporated in the folded fabric between the folds, preferably near the center, so that after the coiling of the roll, said strip will be under tension which will act to uncoil the coil and place the roll of fabric in condition in which it may readily open by the action of the air upon the zigzag or accordion folds.

As shown in Figs. 26, 27 and 28, the helmet or head-piece may be provided at its edge with studs 23 adapted to receive and hold the ends of detachable retaining bands 24 for holding the folded fabric upon the helmet 25. A space as indicated at 26 may be provided between the helmet proper and an outer rim 27 for the entrance of air which, by engaging the folded fabric, will help to detach the same from the helmet after the fabric has been freed from the retaining bands 24. To assist in this action an expanding or flexible detaching elastic piece 10 may be placed beneath the folded parachute when it is applied to the helmet and fastened down by the retaining strips.

In Fig. 32 the parachute, after folding of

its fabric part in zigzag fashion and the coiling of said folded fabric into spiral or turban form is shown as applied on the helmet or head piece and as retained in place by devices similar to those already described.

Fig. 35 shows the fabric as folded up in zigzag fashion with folds of substantially uniform width but wider than illustrated in Fig. 18 and so that the folded fabric may lie loosely and more readily conform itself to the shape of the head piece.

As illustrated in Fig. 36, the supporting belt encircling the aviator may be provided with a supporting strap 57 by which the parachute, after folding or rolling in any of the ways already described, may be sustained on his body until said strap is released by detachment of the fastening button indicated at 28. In Fig. 37, 29 is a case like the case of a field-glass supported by a shoulder strap 30 and this case may be used to hold the folded and rolled parachute.

What I claim as my invention is:—

1. A parachute having its fabric portion folded and wound into a spiral to form a turban-like head gear or covering combined with an expanding strip incorporated in the coils of the turban as a volute, means for sustaining the spiral upon the head of the aviator and means for temporarily holding the spiral against uncoiling.

2. A parachute having its fabric portion folded and wound into a spiral combined with a helmet having means for temporarily securing said fabric in its folded and wound form and means incorporated with the fabric portion for unwinding the spiral and opening out the folded portion when the spiral is unwound.

3. An aviator's head piece made in skeletion form and provided with means for temporarily securing in place thereon the fabric portion of a parachute rolled or folded into turban form and an elastic strip wound into the turban as a volute following the volute of the turban as and for the purpose described.

4. A head piece or helmet for aviator's use combined with a parachute the fabric portion of which is folded and then wound into spiral for turban-like form and is temporarily secured in such form upon said head piece the folded portion of said fabric having incorporated therewith an elastic expanding strip arranged to follow the folds of the fabric.

5. A parachute wound spirally into the form of a turban, combined with fastening means for temporarily holding it in turban shape or releasing it at will and a skeleton headpiece provided with means for supporting the spiral on the outside thereof.

6. A coiled parachute having incorporated with it suitable expanding means, said expanding means being arranged as a volute incorporated in and following the coils of the parachute, means for uncoiling it automatically when released.

7. A parachute having its fabric portion folded and coiled as described and having an expanding strip incorporated with the coiled portion and disposed therein as a volute, and a helmet adapted to support the fabric portion as a turban upon the head of the aviator as and for the purpose described.

8. A parachute having its fabric portion folded and coiled and provided with expanding means incorporated in both the folded and coiled portion thereof, said expanding means being folded in to follow the folds of the fabric and being arranged in the coils as a volute as and for the purpose described.

9. A parachute having its fabric portion folded and then wound spirally into the form of a turban, combined with a helmet having an annular ledge or support adapted to receive and support the coils externally of the helmet.

10. A parachute having its fabric portion folded up in zigzag or accordion folds and provided with expanding means for opening or expanding the folds, said expanding means comprising a strip folded in to follow the folds of the fabric.

11. A parachute having its fabric portion folded in zigzag or accordion folds and wound, as folded, into a spiral combined with an expanding device laid between the folds parallel with the same and acting to expand the spiral when released.

12. A parachute having its fabric portion folded segment by segment into zigzag or accordion folds proceeding from the edge toward the center combined with a headpiece for supporting the same, a flexible elastic detaching piece interposed between the folded parachute and the helmet and means for fastening down the folded fabric portion upon the helmet.

13. A combined parachute and headpiece for aviators, comprising a headpiece having an outer or false rim separated from the headpiece by an air space and a parachute folded and sustained thereon in position to be engaged by a current of air passing between the headpiece and rim.

Signed at New York, in the county of New York and State of New York, this 16th day of January, A. D. 1918.

SAMUEL D. MOTT.

Witnesses:

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