March 9, 1954 J K. TRIPLETT 2,671,221

EAR MUFF

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FIG. 1

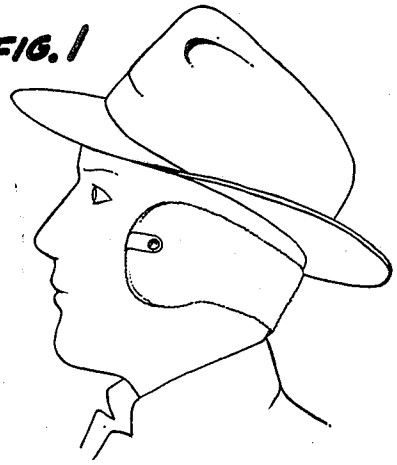


FIG. 8

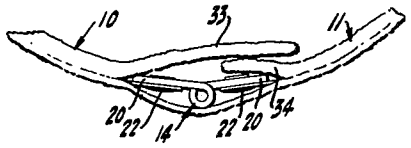


FIG. 2

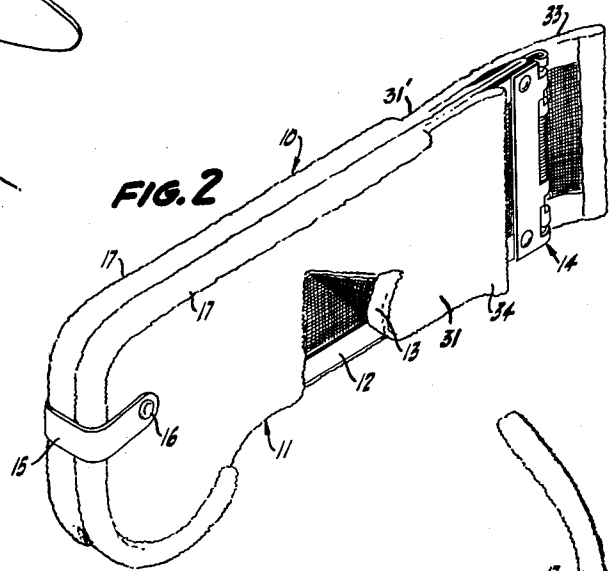


FIG. 3

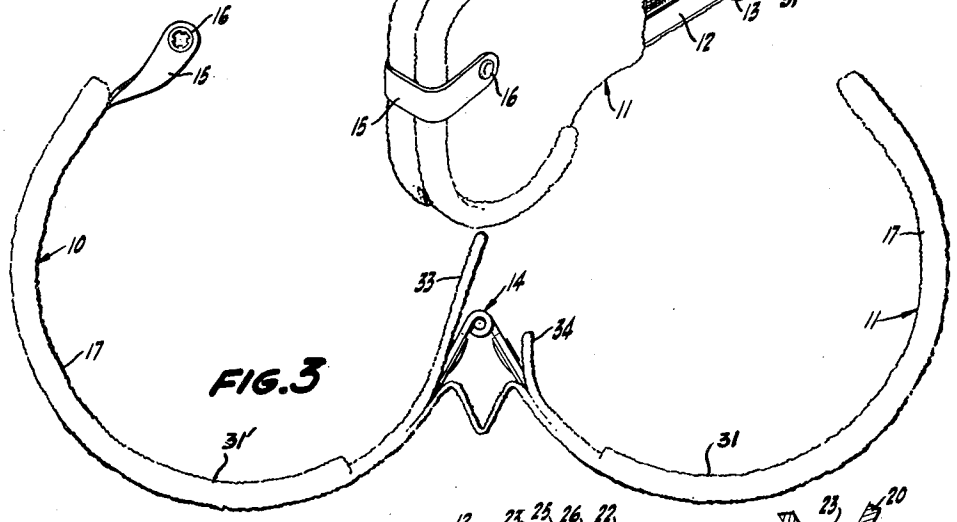


FIG. 4

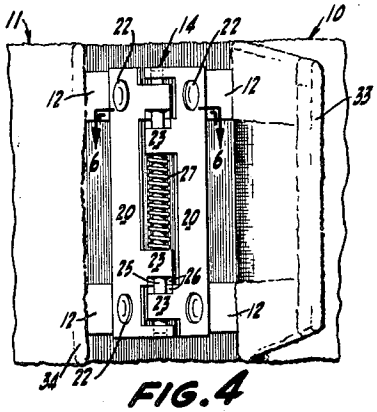


FIG. 5

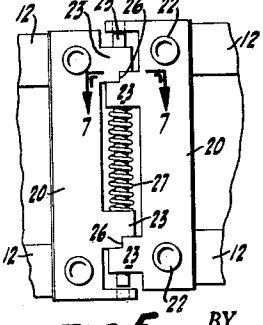


FIG. 6

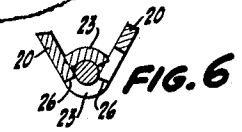
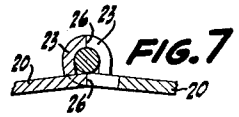


FIG. 7



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FIG. 9

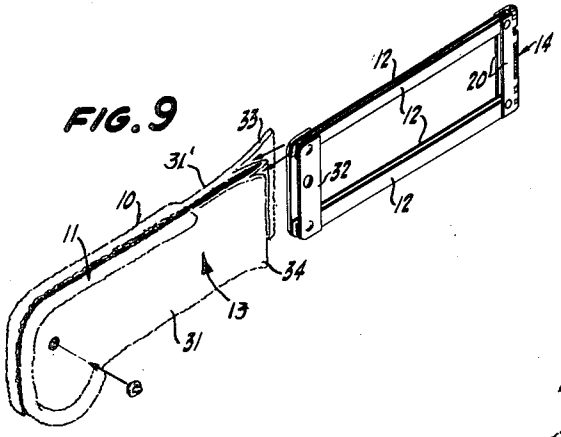


FIG. 10

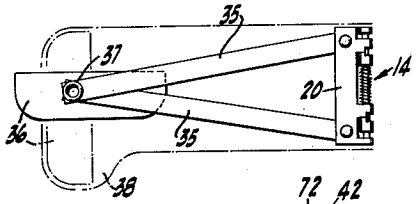


FIG. 11

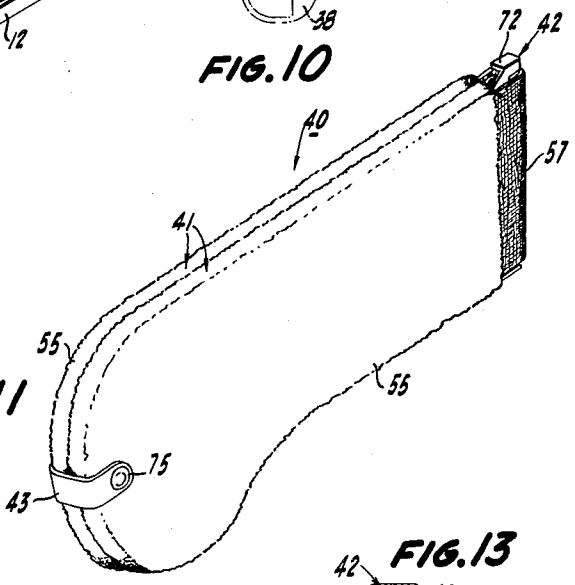


FIG. 12

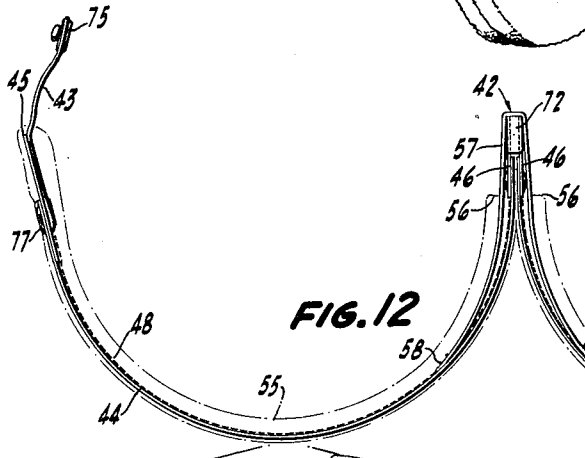


FIG. 13

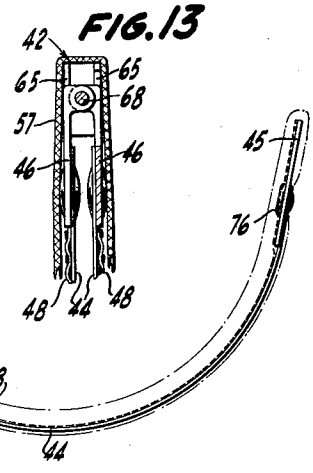
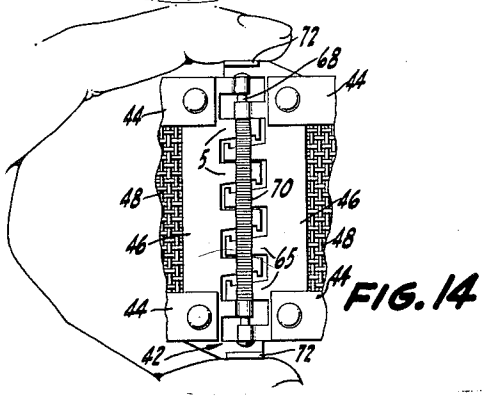


FIG. 14



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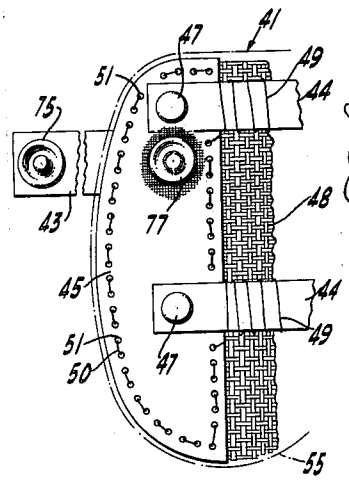


FIG. 19A

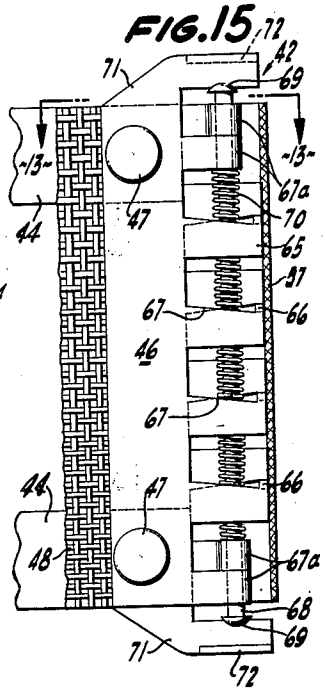


FIG. 15

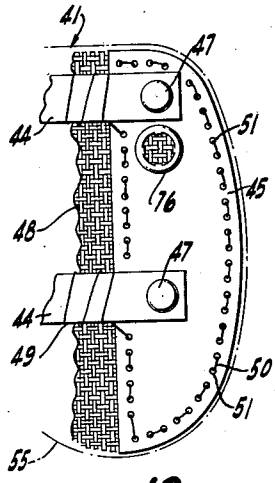


FIG. 19B

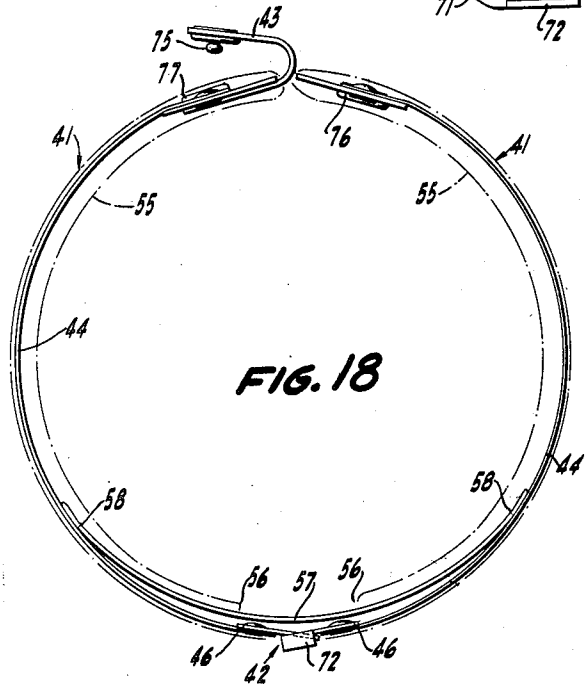


FIG. 18

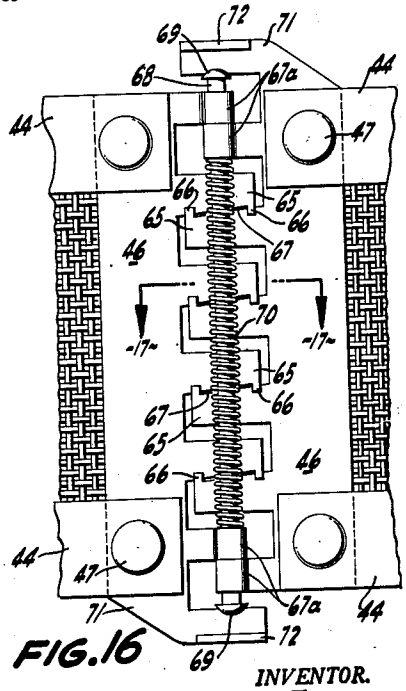


FIG. 16

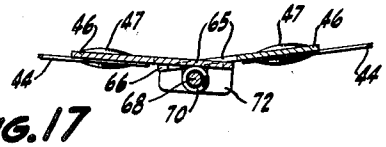


FIG. 17

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Patented Mar. 9, 1954 2,671,221

UNITED STATES PATENT OFFICE

2,671,221

EAR MUFF

J Karrol Triplett, Chicago, Ill.

Application March 6, 1950, Serial No. 147,886

5 Claims. (Cl. 2—208)

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This invention relates to ear muffs and is particularly concerned with an ear muff which may be readily converted from substantially semi-circular operative position to a flat article which may be conveniently carried in the pocket or otherwise stored for future use.

It is therefore among the primary objects of the invention to provide a novel and improved ear muff which may be foldable from operative to inoperative position.

Another important object of the present invention is to provide a device of the character set forth in which means are provided by which the structure is automatically locked in operative position so as to retain such operative position without danger of inadvertent movement therefrom.

Another object of the prsent invention is to provide in a device of the character described means by which the device may be retained in a flat, inoperative position.

A further object of the present invention is to provide an ear muff, including a neck engaging and protecting portion such that the efficiency and effectiveness of the device is materially enhanced.

A further object of the present invention is to provide in an ear muff, spring means by which the device will function to retain itself in operative position on the wearer with minimum danger of accidental displacement therefrom.

A further object of the present invention is to provide in a device of the character described novel and improved hinge means whereby the device may be readily moved from inoperative position to operative position and vice versa and one in which such hinge means provide for the automatic securement of the device in operative position after it has been so moved.

Numerous other objects and features of the present invention will be apparent from consideration of the following specification taken in conjunction with the accompanying drawings, in which

Figure 1 is a perspective view of an ear muff of the present invention in operative position upon a wearer.

Figure 2 is a perspective view of one form of the present invention shown in its flat inoperative position.

Figure 3 is a top plan view of that form of the invention shown in Figure 2 showing the device partially opened and intermediate the operative and inoperative position.

Figure 4 is a detail inner elevation of the hinge

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of the device shown in Figures 2 and 3 with the hinge in semi-open position as illustrated in Figure 3.

Figure 5 is a view similar to Figure 4 showing the hinge in fully open position.

Figure 6 is a sectional view taken along the line 6—6 of Figure 4.

Figure 7 is a similar section taken along the line 7—7 of Figure 5.

Figure 8 is a top plan view of the hinge shown in the position of Figure 5.

Figure 9 is a view illustrating the manner of applying the internal spring structure to the cover material of the device.

Figure 10 illustrates a modified form of spring structure and illustrates the mode of securing such modified structure.

Figure 11 is a perspective view of a modification of the invention shown in flat, inoperative position.

Figure 12 is a view similar to Figure 3 of the structure disclosed in Figure 11.

Figure 13 is a sectional view taken along the line 13—13 of Figure 15 showing the hinge of the device of Figure 11 with the hinge closed.

Figure 14 is a view of the hinge of the device shown in Figure 11, showing the hinge parts moved in preparation for completion of the hinged movement.

Figure 15 is a side elevation of the hinge shown in the positions indicated in Figures 11, 12 and 13.

Figure 16 is a view similar to Figure 14 showing the hinge in locked position.

Figure 17 is a section taken along the line 17—17 of Figure 16.

Figure 18 is a top plan view of the device of Figure 11 showing the hinge in fully open position, and

Figures 19*a* and 19*b* are detail views of the opposite ends of the ear muff shown in Figure 11.

The ear muff of the present invention is characterized by the provision of a pair of hingedly united wings indicated generally by numerals 10 and 11 in Figures 2 and 3, each wing includes a normally semi-circular spring frame indicated by the numeral 12 in Figure 2 upon which is mounted a suitable covering 13. The frames are hingedly joined by a hinge means generally indicated at 14. When the hinge 14 is in closed position, as in Figure 2, the wings may be flexed to parallelism against the tension of the frame 12 and secured in such parallelism by a suitable strap 15 and button 16. The top and ends of the wings may be provided with a suitable bead 17 which

is designed to partially encircle the ear of the wearer so as to aid in snugly embracing the ear to guard the wearer from the elements.

The hinge of that form of the invention shown in Figures 2 and 3 comprises a pair of hinge plates **20** which are suitably secured to parallel upper and lower spring frame members **12** by rivets **22**; each hinge plate includes an inwardly extending pair of hinge ears **23** provided with aligned bores adapted to receive a hingle pintle **25**. As seen more clearly in Figure 5, the mating faces of the ends of the ears of one side and those of the other side are correspondingly cut away to form semi-circular steps **26**. Between such pairs of ears there is provided an expansion spring **27** mounted upon the pintle **25**, one end of which abuts the inner face of one ear of one hinge plate while the opposite end abuts the inner face of an opposite ear of the opposite plate in such manner as to provide for normal tension urging the pairs of ears towards each other. As mentioned above and as will be noted more particularly in Figures 6 and 7 the pintle engaging ears of the hinge plates are circular in transverse cross-section and the steps formed therein are of half-round configuration and thus when in registration the steps will cause the hinge ears to be outwardly spaced with respect to each other against the tension of the springs. When, however, the half-round step **26** of one pair of hinge ears is rotated out of abutting relation with the companion step of the opposite ear the hingle plates may move towards each other interengaging the lugs.

As illustrated, the half-round steps in the ears of the hinge plates are arranged so that the flat portions thereof are substantially normal to the plane of the hinge plates to which they are attached and by this arrangement it will be seen that the steps of one pair of hinge ears will be out of abutting relation with the steps of the hinge ears oppositely only when the hinge plates are substantially lying in the same plane and in which position the wings of the ear muff are in operative position. When the lugs are in such interrelation it will be seen that the intermediate spring therebetween will have forced the lugs together into interengagement, as indicated in Figure 5, and the spring will retain the lugs in this mutual plane. When it is desired to re-fold the hinge the hinge plates with their lugs are moved away from each other as by an upward pressure on one hinge plate and a downward pressure on the other against the tension of the spring. In so moving the hinge plates the steps of the lugs will be out of the mutual transverse plane of the steps of the other lugs and thus the hinge will be released to permit relative rotation of the hinge plates and the hinge may be closed.

In use of the device shown in Figure 2, it will be understood that for carrying purposes the device is in the position shown in Figure 2 with the hinge closed, that is with the hinge plates lying parallel and with the strap **15** secured by the button **16** retaining the wings in flat parallelism against the tension of their spring frame. When the device is to be used the button **16** is released and the wings will assume the semi-circular position shown in Figure 3 and the hinge may then be opened until the hingle plates attain the substantial parallel position at which time the ear steps of one hinge plate will be out of abutment with the ear steps of the other plate and the spring will force the plates together longitudinally of the pintle to secure them against inadvertent closing. In this position the normal disposal of the wings is such as to form a substantially complete circle, as may be noted in Figure 18. However, when the device is applied, as shown in Figure 1, it is sprung to form a substantial semi-circle which terminates at the ears of the wearer while the back of the device engages the wearer's neck to protect the same.

When the device is removed it will resume its substantial circular position and may be refolded in flat position only after pressure is exerted on the opposite plates to move the ears out of their mutual plane against the tension of the spring, thus permitting relative rotation of the hinge plates so that they may be closed. It will be noted that in so closing the hinge the steps are again in abutment thus retaining the spring under compression and the parts separated longitudinally of the pintle in which position they are retained until the device is again opened. After the hinge has been so released and the hinge moved to the closed position, as indicated in Figure 3, the wings are again flexed into a straight position lying parallel to each other and are thus secured by the strap **15**.

Referring now more particularly to Figure 9, it will be seen that in one form of the invention the flexible frame member **12** may comprise a pair of spaced longitudinally extending frame bars secured to the hinge plates **20** and extending outwardly to the end of the envelope-like covering **13** of the wings. The outer ends of the bars are riveted or otherwise secured to an end plate **32** and in this form of the invention the wing coverings are formed by two parallel pockets **31** and **31'**, the backs of which are formed by a single piece of material and between the pockets there is formed a flap **33** on one pocket which is adapted to overlie a smaller flap **34** on the opposite pocket so as to provide a covering for the hinge protecting the wearer from contact therewith when the device is in use. In assembling this form of the invention the wing frames are flexed in flat parallel position and simply slipped into the parallel pockets to which they may be then secured by a suitable stitching. It will be readily seen that this form of assembly provides a convenient means for rapidly inserting the frames within said pockets and provides ease for removal of the covering should it become worn or soiled.

By referring more particularly to Figure 10, it will be seen that in this form of the invention the wing frames are formed by a pair of converging flexible metal straps **35** which are secured to the hinge plates **20** and extend outwardly towards each other to engage an end plate **36** substantially at the center thereof, as indicated at **37**. In this form of the invention the plate **36** is pivotally mounted at the joined ends of the straps **35** and may be pivotally moved to extend substantially parallel therewith as the wing frames are inserted within the pockets of the wing coverings. As the end **36** approaches the end of the pockets the closed ends thereof will engage the plate to pivotally move it to a vertical position parallel with the plate **20** and in this manner the plate may be inserted although substantially wider than the body of the pocket thus to provide a suitable end stiffening member completely filling the enlarged ends **38** of the pockets.

Referring now to the modification shown in Figures 11 to 18, the ear muff generally desig-

nated as 40 comprises two substantially identical pads 41 connected at one end by a hinge assembly 42 and held in flat, folded side by side relationship by means of a strap 43.

Referring now to Figures 19A and 19B, a frame work for each pad 41 is provided by a pair of parallel spring steel strips 44 which are fixed at their outer ends to an outer end plate 45 and at the inner ends to an inner end plate 46 by any suitable means, such as rivets 47. A mesh or web 48 is provided which is fixed to the frame by any suitable means, as by means of threads 49 passing around the spring steel strips 44 and threads 50 passing through holes 51 punched in the outer end plates 45. Linings or coverings 55 of felt or other suitable material are provided, one for each of the pads 41, and these coverings 55 terminate at their inner ends at 56 somewhat short of the hinge assembly 42. An elastic band 57 is provided which bridges the hinge assembly 42 and is stitched or otherwise secured at 58 to the frame-work of the pads 41. The inner ends of the coverings 55 are left open so that the elastic band 57 is free to pass therethrough in the manner and for the purpose described hereinafter.

Referring to Fig. 16, each inner end plate 46 is formed with outwardly extending fingers 65 each of which is tapered outwardly at 67 and has an ear 66 projecting at a right angle to the finger. The inner end plates 46 are also formed with bushings 67*a* to slidably receive a hinge pin 68 having knobs or buttons 69 at opposite ends thereof. As will be seen, the hinge pin 68 is of somewhat greater length than the distance between the outermost bushings 67*a* when the latter are arranged in end to end and staggered relationship as illustrated. It will also be seen the fingers 65 and the ears 66 are arranged in alternating relationship so that the tapered surfaces 67 are in contact with one another and the ears 66 are in interlocking relationship with the fingers 65. An expansion spring 70 is also provided, and it is compressed between the inner bushings 67*a*, one of which is fixed to the right-hand end plate 46, as viewed in Figure 16, and the other is fixed to the left-hand end plate 46. The end plates 46 are also formed with brackets 71 terminating in buttons 72 which are arranged in axial alignment with the hinge pin 68.

In operation, and assuming that the ear muff 40 is folded as shown in Figure 11, the snap fastener element 75 on strap 43 will be released from its mating snap fastener element 76 (shown in Figures 19A and 19B). Upon release of the pads 41 they will automatically spread apart under the force of springs 44 to assume the double U shape shown in Figure 12. In this position the interlocking fingers 65 and their ears 66 will assume the positions shown in Figure 15, in which the tapered edges 67 of the fingers 65 will overlap and the ears 66 will overlap the fingers 65; thus, effectively locking the hinge assembly 11 in the partially opened position shown in Figure 12. The buttons 72 will then be grasped between the thumb and index finger, as shown in Figure 14, and will be pressed inwardly toward one another. It will be apparent that the adjacent bushings 67*a* will be spread apart against the expansive force of the spring 70 and that the interlocking fingers 65 and ears 66 will be disengaged from one another so that, as long as the buttons 72 are thus pressed together, the two pads 41 may be swung in either direction about the hinge pin 68.

To further open the ear muff, and while still holding the buttons 72 in the manner illustrated in Figure 14, the operator will swing the brackets 71 so as to bring the pads 41 into the fully open position shown in Figure 18. The strap 43 will then be fastened by means of its snap fastener element 75 to a co-operable snap fastener element 77 so as to be secure and out of the way. The two pads 41 will then be spread apart sufficiently to allow the ear muff to be slipped over the rear of the wearer's head, as shown in Figure 1.

It will be apparent that with the pads 41 in the position shown in Figure 18, the interlocking fingers 65 and ears 66 of the hinge assembly will be interlocked in the manner shown in Figure 16, thus preventing reverse movement of the pads to closed position.

Collapsing the pad merely necessitates performing the same operations in reverse order. Thus, the two buttons 72 will be grasped and operated, as shown in Figure 14. The two pads 41 will be swung from the position shown in Figure 18 to that shown in Figure 12 and the buttons 72 will be released. Then the ends of the pads 41 will be grasped by hand and forced against the urging of the springs 44 into a flat, side-by-side relationship, as shown in Figure 11, and they will then be secured in this position by means of the strap 43.

It will thus be apparent that an ear muff has been provided which is simple in its construction and operation. Among the manifold advantages of this ear muff may be mentioned the following:

It is easily operated to be folded into a compact flat condition so that it can be carried in a pocket. It is equally easily opened to operative position for wearing. Also, the pads 41 are automatically locked in either open or closed position by means of the interlocking elements of the hinge assembly. Attention is further directed to the fact that the pads 41 have a considerable width and provide a desirable protection for the wearer's neck. The elastic band 57 cooperates to achieve this desirable result. Thus, the elastic band 57 overlies the critical portion at the rear of the ear muff, thereby protecting the nape of the neck. Since the band 57 is elastic and slidable through the open ends of the coverings 55, it readily adjusts itself to different spacings of its anchor points 58 owing to different positions of the pads 41.

In the practice of the present invention it will be understood that the invention is not confined to the specific structural details here shown but that numerous changes, modifications and the full use of equivalents may be resorted to without departure from the spirit or scope of the invention as outlined in the appended claims.

Having thus described my invention, what I claim and desire to obtain by Letters Patent is:

1. An ear muff, comprising a pair of flexible normally semi-circular spring frames hingedly connected to each other at one pair of ends for swinging movement about an axis perpendicular to the plane in which the frames are curved from a first position where the frames have a generally common center of curvature outwardly to a second position where the convex side of the frames abut, a covering mounted on the free end portions of the frames thereby providing wings, means for releasably locking the wings in said first position, and means on said covering for releasably locking the free ends of the wings to-

gether after the wings have been swung to said second position and flexed flat in back-to-back relation to provide a small flat package.

2. An ear muff, comprising a pair of flexible normally semi-circular spring frames hingedly connected to each other at one pair of ends for swinging movement about an axis perpendicular to the plane in which the frames are curved from a first position where the frames have a generally common center of curvature outwardly to a second position where the convex side of the frames abut, a covering mounted on the free end portions of the frames thereby providing wings, means for locking the wings in said first position responsive only to relative movement between the wings in a direction parallel to their pivotal axis to release the wings for piovtal movement to said second position, and means on said coving for releasably locking the free ends together after the wings have been swung from said first to said second position and flexed flat in back-to-back engagement to provide a small flat package.

3. An ear muff, comprising a pair of flexible normally semi-circular spring frames hingedly connected to each other at one pair of ends for swinging movement about an axis perpendicular to the plane in which the frames are curved from a first position where the frames have a generally common center of curvature outwardly to a second position where the convex side of the frames abut, a covering mounted on the free end portions of the frames thereby providing wings, means for locking the wings in said first position responsive only to relative movement between the wings in a direction parallel to their pivotal axis to release the wings for pivotal movement to said second position, spring means urging said wings against movement in the direction to unlock said wings, and means on said covering for releasably locking the free ends of the wings together after the wings have been swung from said first to said second position and have been flexed flat in back-to-back engagement to provide a small flat package.

4. An ear muff, comprising a pair of flexible normally semi-circular spring frames hingedly connected to each other at one pair of ends for swinging movement about an axis perpendicular to the plane in which the frames are curved from a first position where the frames have a generally common center of curvature outwardly to a second position where the convex side of the frames abut, a covering mounted on the free end portions of the frames thereby providing wings,

means for locking the wings in said first position responsive only to relative movement between the wings in a direction parallel to their pivotal axis to release the wings for pivotal movement to said second position, spring means urging said wings against movement in the direction to unlock the same, and a strap secured to said covering on the concave side of one wing adjacent the free end thereof and carrying a snap member adapted for releasably locking engagement with a complemental snap member secured to said cover on the concave side of the other wing adjacent the free end thereof, when the wings are swung from said first to said second position and then flexed flat in back-to-back engagement, to hold the wings in a flat condition.

5. An ear muff, comprising a pair of flexible normally semi-circular spring frames, hinged means joining the frames at one pair of ends for pivotal movement about an axis perpendicular to the plane in which the frames are curved from a first position where the frames have a generally common center of curvature outwardly to a second position where the convex sides of the frames abut, a covering mounted on the free end portions of the frames thereby providing wings, said hinged means comprising a hinge pin, interlocking fingers including a finger fixed to one of the wings and another finger fixed to the other wing, said wings being mounted on said hinge pin for relative movement in one direction axially of the pin to separate the fingers from one another, yieldable means urging said wings in the opposite direction, said fingers being arranged to engage one another when said wings are swung to their first position to releasably lock the wings in said position, and means for releasably locking the free ends of the wings together after the wings have been swung from their first position to their second position and have been flexed flat in back-to-back engagement to provide a small flat package.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
184,006	Edgar	Nov. 7, 1876
375,594	Basch	Dec. 27, 1887
397,583	Cohn	Feb. 12, 1889
836,087	Callahan	Nov. 20, 1906
2,184,996	Jacobs	Dec. 26, 1939
2,246,031	Baritz et al.	June 17, 1941
2,464,331	Mason	Mar. 15, 1949