

April 1, 1958

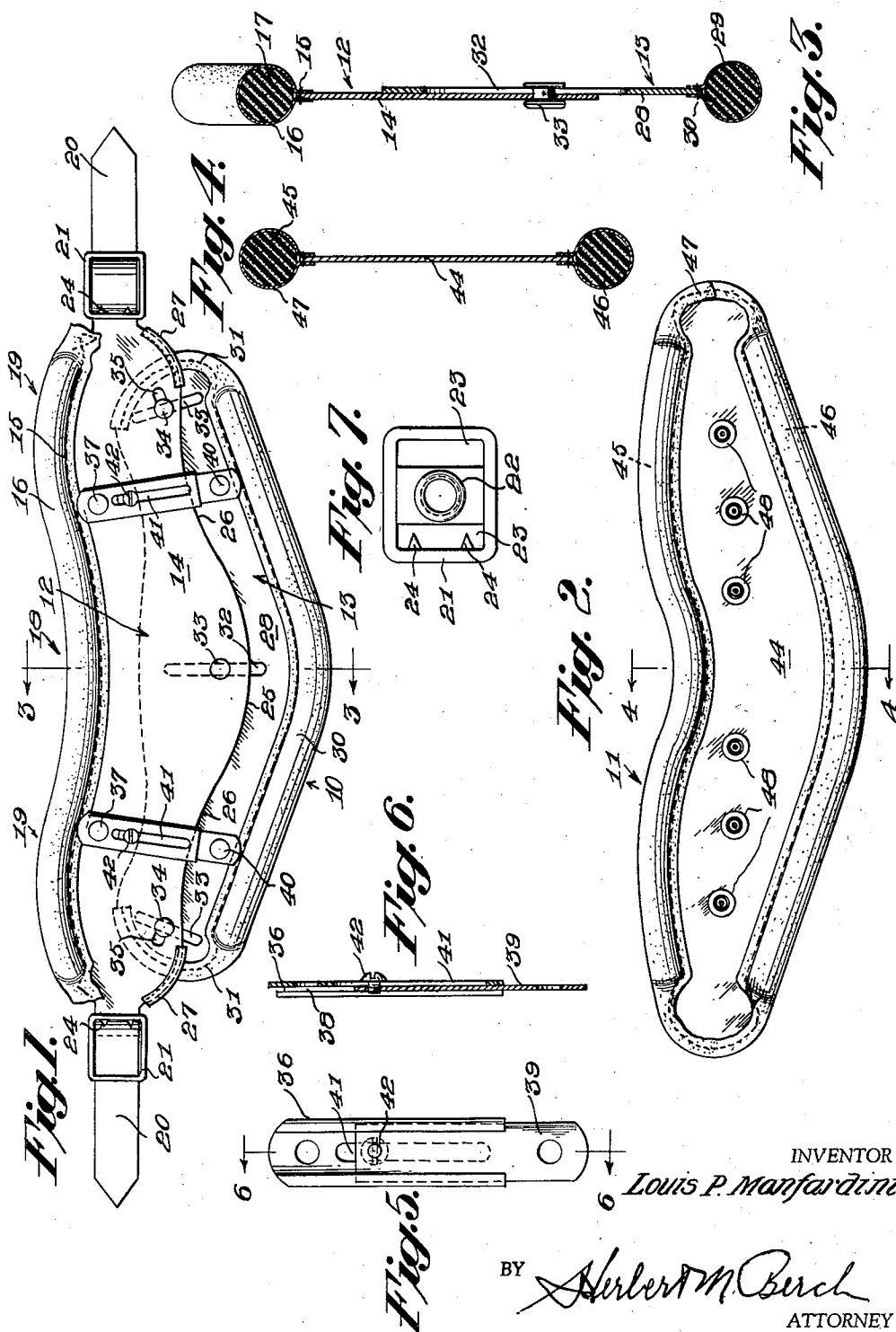
L. P. MONFARDINI

2,828,736

CERVICAL COLLARS

Filed Jan. 24, 1957

4 Sheets-Sheet 1



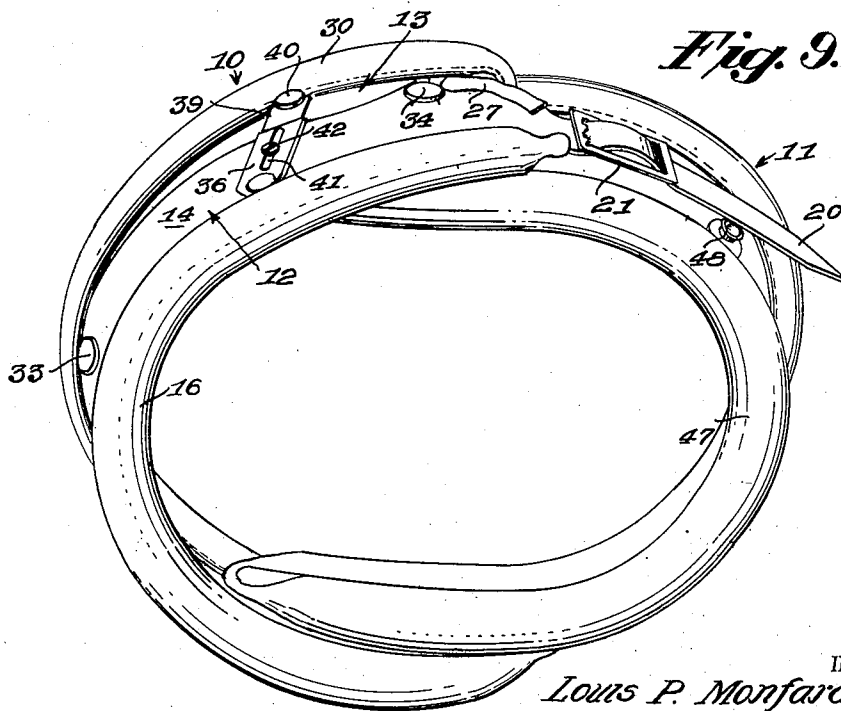
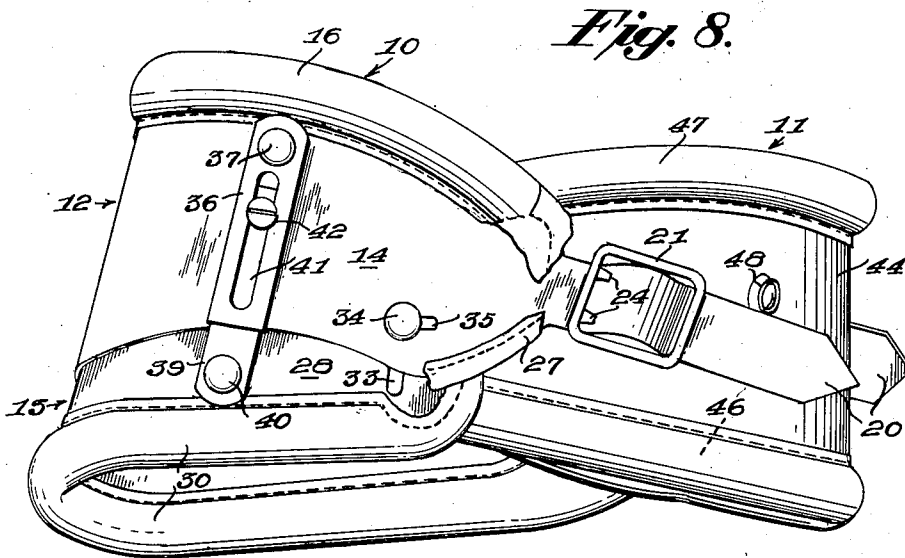
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4 Sheets-Sheet 2



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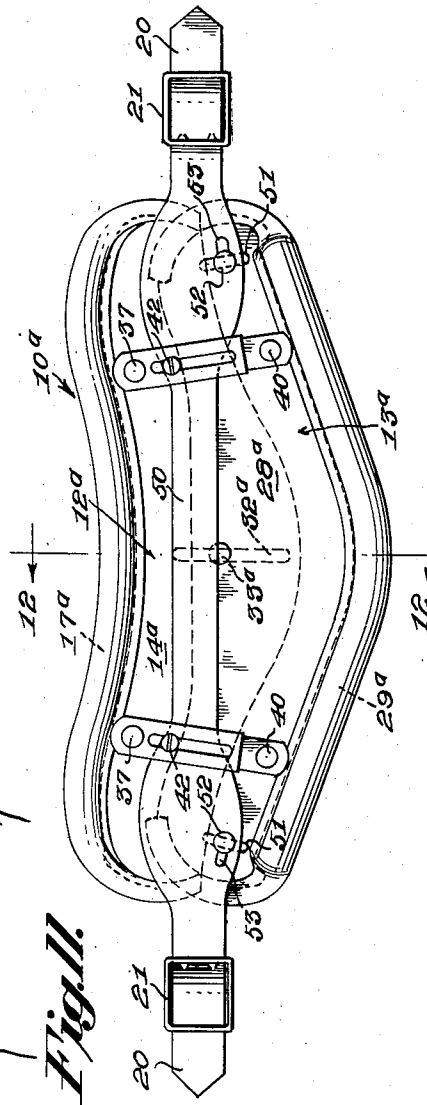
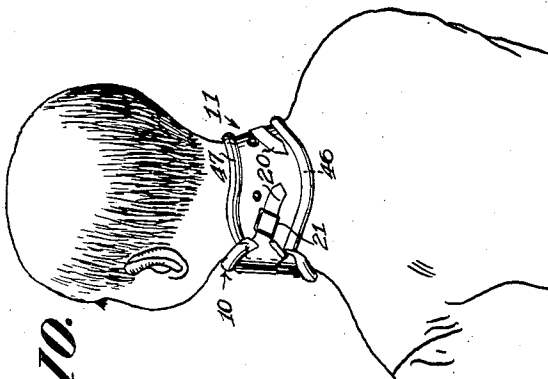
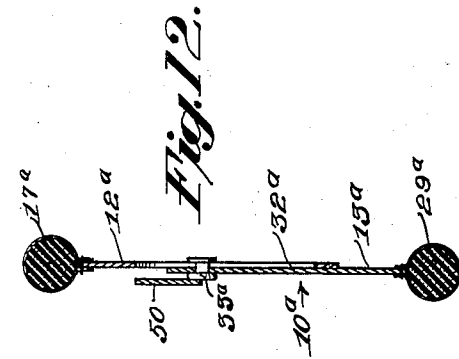
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CERVICAL COLLARS

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4 Sheets-Sheet 3



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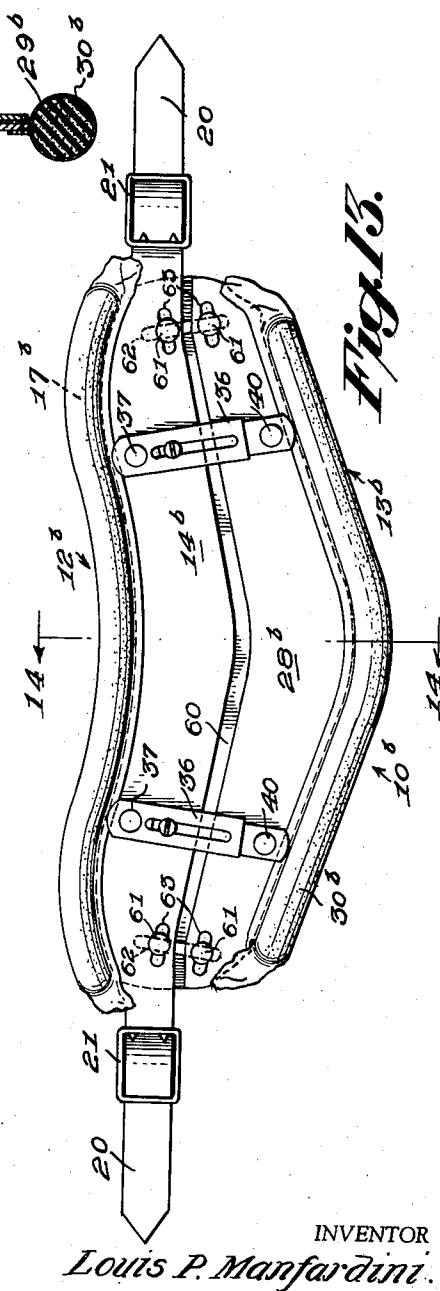
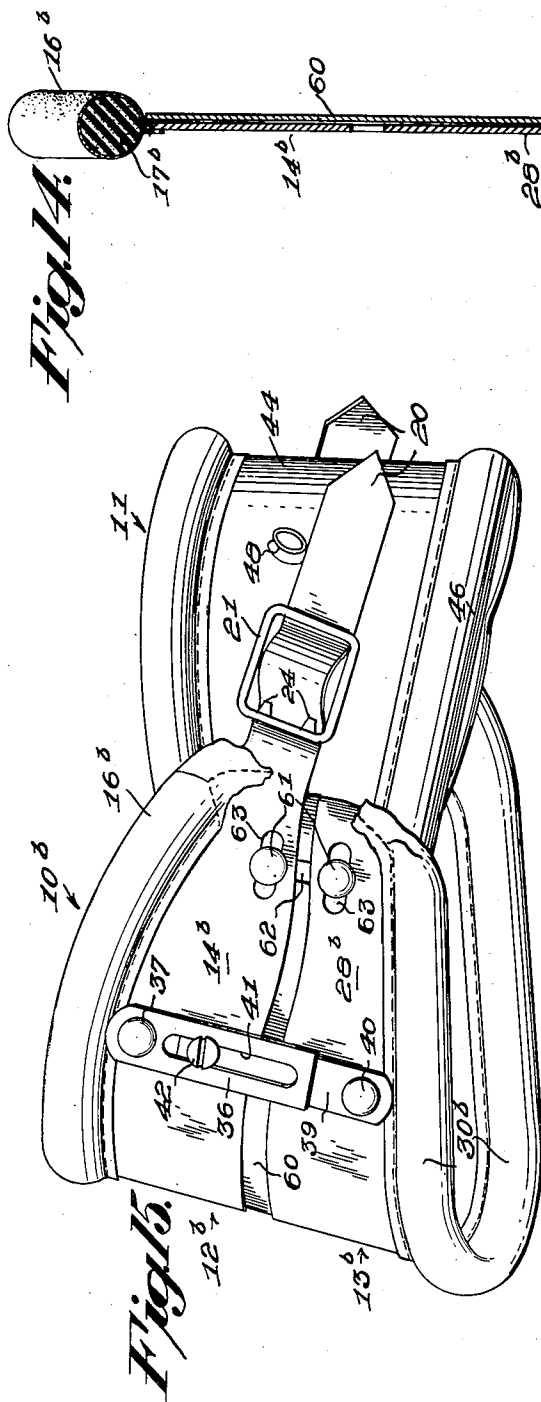
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CERVICAL COLLARS

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4 Sheets-Sheet 4



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2,828,736

CERVICAL COLLARS

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8 Claims. (Cl. 128—75)

This invention relates to a cervical collar.

The invention is more particularly concerned with a cervical collar for use in pathological conditions, such as arthritis, "wry neck" or torticollis, traumatic conditions, subluxations and dislocations, muscular strains, and for post-fracture treatment. The improved collar provides for both flexion and hyperextension and for limited restriction of head motion but not total immobilization, the function of the collar in general is to take the load off the neck muscles.

A primary object of the invention is to provide a cervical collar structure of light-weight material and which is readily adjustable for flexion, hyperextension and also for support of the head in a level position.

A further object of the invention is the provision of a cervical collar which is particularly characterized in a pair of units which are adjustable radially of the axis of the collar and which are pivotally connected on an axis transverse to said first axis.

A still further object of the invention is the provision of a cervical collar of the above-noted character wherein one of said units comprises vertically opposed adjustable sections.

Other objects and advantages of the invention will become apparent in the course of the following detailed description, taken in connection with the accompanying drawings, wherein:

Fig. 1 is an outer plan view of one of the units of the improved collar in a flat position;

Fig. 2 is an outer plan view of the other unit of the collar also in a flat position;

Fig. 3 is a transverse sectional view of the unit of Fig. 1 as observed in the plane of line 3—3 and being on an enlarged scale and with parts beyond the plane of section omitted for clarity in disclosure;

Fig. 4 is a transverse sectional view on an enlarged scale and as observed in the plane of line 4—4 on Fig. 2 and with parts beyond the section plane being omitted for clarity in disclosure;

Fig. 5 is an inner plan view of one of the adjusting elements and whose opposite ends are secured to the opposed sections of one of the units of the collar;

Fig. 6 is a central vertical sectional view as observed in the plane of line 6—6 on Fig. 5;

Fig. 7 is an inner plan view of one of the strap supporting buckles involved in the collar structure;

Fig. 8 is a side perspective view of the improved collar in an adjusted position for hyperextension;

Fig. 9 is a perspective view of the collar as observed from the top thereof;

Fig. 10 is a perspective view showing the cervical collar in an applied position;

Fig. 11 is an outer plan view of a modified form of collar unit corresponding to the unit of Fig. 1;

Fig. 12 is an enlarged vertical sectional view as observed in the plane of line 12—12 on Fig. 11 with elements in the section plane only being shown;

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Figure 13 is an outer plan view of a third embodiment of an adjustable collar unit, wherein the same is made with aligned or abutting edges and adjusting means therefor;

Figure 14 is a transverse cross section view taken along the line 14—14 of Figure 13;

Figure 15 is a side perspective view of the third embodiment of cervical collar combined with the second novel unit to form a complete collar.

Referring now in detail to the drawings, the improved cervical collar in accordance with a preferred structural embodiment thereof, comprises a pair of cooperating units 10 and 11, the former of which is shown in detail in Fig. 1 and the latter of which is shown in detail in Fig. 2. The unit 10 comprises a pair of upper and lower sections 12 and 13, respectively, which are connected for relative vertical adjustment as will hereinafter appear. The upper section 12 comprises an elongated sheet 14 preferably of nylon or cellulose acetate, and which is relatively thick to provide sufficient rigidity in use of the collar.

The sheet 14 has its upper edge stitched as at 15 between the free edges of a cover 16 for a transversely circular resilient core 17 which may be of sponge rubber and the cover 16 is preferably of leather. As is particularly indicated in Fig. 1 the upper edge of section 12 is so formed that the resilient cushioning core 17 curves downwardly intermediate its ends as at 18 and curves upwardly adjacent each end as at 19, thereby providing for proper head engagement with the cushion core.

The sheet 14 is provided with a strap 20 projecting from each end thereof and as shown in Fig. 1 the straps are preferably integral extensions of the sheet. Each strap 20 is provided with a buckle 21 which as indicated in Fig. 7 is of generally rectangular form and the buckle is provided centrally thereof and on the under side thereof with a female snap fastener element 22. The buckle is further provided with strap receiving openings 23 into one of which project a pair of strap penetrating prongs 24. The lower edge of sheet 14 is also curved in general conformation to the curve of its upper edge whereby such lower edge is convex centrally of the sheet as indicated at 25 and concave at each side thereof as at 26 and the sheet at each end thereof has its upper and lower edges rounded contiguous to the straps 20 and the rounded portions of the lower edge are preferably protected by folded tapes 27 which are stitched through the sheet.

The lower section 13 also comprises a cellulose acetate sheet 28 whose upper edge is curved in opposition to the curvature of the lower edge of sheet 14 as indicated in Fig. 1 and wherein it will be seen that substantial edge portions of the sheets 14 and 28 overlap with the major overlap centrally of the sheets and with sheet 14 overlying sheet 28. The lower edge of sheet 28 is also provided with a resilient cushion core 29 having a cover 30 whose edges are stitched to the lower edge of sheet 28 as at 31.

As is clearly indicated in Fig. 1 the body-engaging cushion core 29 is downwardly rounded centrally of the sheet and diverges upwardly therefrom to points adjacent the ends of the sheet 28. The leather cover material 30 for the resilient core 29 is extended, folded over and stitched to the opposite rounded end edges of the sheet 28 as indicated at 31 and which folded-over cover portions intersect the tapes 27.

The sheets 14 and 28 are adapted for vertical adjustment whereby the upper and lower cushioning cores are capable of being disposed at variable vertical distances from each other. For this purpose the lower sheet 28 is provided with a central vertical slot 32 and same is provided with a slot 33 adjacent each end thereof and which

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converge upwardly at a relatively small angle to the longitudinal axis of slot 32.

The upper sheet 14 is provided with a central fixed rivet 33 whose shank extends through slot 32 and such sheet is further provided with a longitudinally floating rivet 34 adjacent each end and whose shank extends through a respective slot 33 and the rivet is free to move in relatively short slots 35 in the upper sheet 14.

A pair of adjusting elements are provided for effecting and fixing the vertical adjustment of the sheets 14 and 28 and in a preferred form thereof each comprises an elongated member 36 whose one end is pivotally connected to the sheet 14 adjacent the upper edge thereof by a rivet 37 and whose opposite edges are turned inwardly in the provision of laterally opposed guide channels 38 in which are slidably disposed the opposite edges of a second flat elongated member 39 whose one end is pivotally connected to sheet 28 adjacent its lower edge by a rivet 40.

The member 36 is provided with an elongated slot 41 disposed intermediate of and parallel with channels 38 and a screw 42 extends through the slot 41 and has its free threaded end adjustably secured in a tapped opening in member 39 whereby upon tightening the screw, members 36 and 39 are drawn into frictional contact to hold the upper and lower sections 12 and 13 in any adjustment effected by the slots 32 and 33 and the cooperating rivets 33 and 34.

The unit 11 embodies a single unitary section which comprises an elongated sheet 44 of the same material as sheets 14 and 28 and of substantially the same gauge. The sheet 44 has its entire edge bound and the upper edge is provided with a covered resilient cushion core 45 of the general dual curvature of the core 17 on the upper edge of sheet 14 whereby it presents proper head contact and the lower edge of sheet 44 is also provided with a resilient cushion core 46 of the same general conformation as the core 29 on the lower edge of sheet 28. The cover material 47 for the cores 45 and 46 extends about the ends of sheet 44 and is stitched thereto throughout its perimeter.

The sheet 44 is provided externally thereof with a plurality of male snap fasteners 48 and which are shown as three in number at each side of the center of the unit but which may be of a greater or less number.

The assembled cervical collar is illustrated in Figs. 8 and 9 and wherein the unit 11 is adjustably secured to unit 10 by snap engagement of the fastener 22 on each buckle 21 with a corresponding fastener 48 on the unit 11. The buckles 21 and fasteners 48 provide for a wide range of radial adjustment of the collar since the buckles are not only capable of being engaged over any pair of fasteners 48 but the buckles themselves are capable of adjustment lengthwise of the straps 20.

From the above description it will be apparent that the improved cervical collar in accordance with the present invention is a three-piece structure, two of which are embodied in one unit which is pivotally and adjustably secured to the other single piece unit and that the two piece unit is vertically adjustable while the two units are radially adjustable thereby providing a structure which is readily adaptable for different thickness necks and which by the vertical adjustment of the two piece unit provides for any condition for head support to take the load off the neck muscles.

By the provision of the two units 10 and 11 the head is supported both at the back and the front and any degree of hyperextension can be effected by vertical adjustment of the two sections 12 and 13 of the unit 10. Furthermore, the collar is capable of adjustment whereby the head of a wearer is maintained level with neither flexion or hyperextension.

The modified form of unit 10^a illustrated in Figs. 11 and 12 differs from that of Figs. 1 and 3 mainly in that section 13^a overlaps section 12^a whereas in Figs. 1 and 3 section 13 underlaps section 12. Sections 12^a and 13^a

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have a single vertical adjustment connection which comprises an elongated slot 32^a in section 12^a and a rivet 33^a supported by section 13^a and whose shank extends through the slot 32^a. In this modified embodiment the opposite ends of sections 12^a and 13^a are free of each other. In this embodiment the straps 20 are not unitary with either section but same are constituted by the opposite ends of a strip 50 which is of the same material as the sheets 14^a and 28^a and which extends lengthwise of the unit substantially intermediate the upper and lower cushion cores 17^a and 29^a. The strip 50 is disposed between the sheet 28^a and the adjusting elements 36, 39 and the opposite ends thereof are adjustably connected to sheet 28^a by the following means, sheet 28^a is provided with a generally vertical slot 51 adjacent each end thereof and the strip 50 is provided with a rivet 52 adjacent each end thereof whose shank extends through the respective slot 51. The slots as shown however slightly converge upwardly and in order to provide for movement of the rivet shanks in the slots the strip is provided with a relatively short, generally horizontal slot 53 adjacent each end in which the rivet shanks can move.

An application of the improved cervical collar is illustrated in Fig. 10 adjusted for hyperextension.

The preferred structural embodiment of the invention as disclosed in Figs. 13, 14 and 15 is of the same general character as that disclosed in Figs. 1 to 8 but differs therefrom in a modified embodiment of the unit 10 and which modified unit 10^b is adapted for cooperation with the unit 11 of Figs. 1 to 8.

The modified unit 10^b comprises a pair of vertically opposed upper and lower sections 12^b and 13^b respectively which embody upper and lower sheets 14^b and 28^b whose upper and lower edges are provided with resilient cores 17^b and 29^b respectively having covers 16^b and 30^b respectively whose edges are stitched to the adjacent edges of the sheets in the manner above disclosed in connection with Figs. 1 to 8. Straps 20 project from opposite ends of sheet 14^b and same are provided with buckles 21. The sheets 14^b and 28^b do not however overlap at their inner edges as in the embodiments of Figs. 1 and 11 but are vertically aligned as indicated in Fig. 14 with their adjacent inner edges in vertically aligned non-lapping relation and which edges may abut or be in variably vertically spaced relation in the relative adjustments thereof.

The sections 12^b and 13^b are adjustably connected by the means 36 to 42 as in the previously described embodiments. The unit 10^b further comprises a relatively wide backing sheet 60 which laps the joint between sheets 14^b and 28^b and whose opposite ends are movably connected to the opposite ends of sheets 14^b and 28^b by means of rivets 61 whose shanks freely float in vertical slots 62 in opposite ends of sheet 60 and generally horizontal slots 63 in the opposite ends of sheets 14^b and 28^b.

The preferred structure of Figs. 13, 14 and 15 functions similarly to the embodiments of Figs. 1 to 9 and Figs. 11 and 12 and in all forms it is to be particularly observed that the cervical collar is reversible in use since the same may be worn as in Fig. 10 for hyperextension wherein the unit 10, 10^a or 10^b is disposed beneath the chin or for flexion wherein the unit 11 is disposed beneath the chin.

Furthermore, the improved collar in all embodiments thereof is radially adjustable and the unit 10, 10^a or 10^b which may be disposed under the chin or at the back of the neck, is vertically adjustable whereby any and all conditions are capable of being substantially satisfied by the improved collar in any of the several embodiments thereof herein disclosed.

While the present invention has been disclosed in accordance with certain specific structural embodiments thereof, such is to be considered as illustrative only, and not restrictive, the scope of the invention being defined in the subjoined claims.

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What I claim and desire to secure by U. S. Letters Patent is:

1. A cervical collar comprising a pair of diametrically opposed units, one of said units being provided with a strap projecting from each end thereof and being provided with an element of a snap fastener and the other unit being provided with a plurality of spaced cooperating snap fastener elements selectively engageable with the fastener element on each buckle whereby the diameter of the collar is capable of adjustment through a relatively large range.

2. In a cervical collar comprising a pair of diametrically opposed units, one of said units comprising a pair of upper and lower sections adjustable with respect to each other and having adjacent portions thereof in overlapped relation, means securing said overlapped portions for vertical adjustment of the sections, and means engaged with said sections for locking same in any vertically adjusted position, said means comprising a pair of elements each including an elongated member having one end thereof connected to one of said sections, a second elongated member having one end thereof connected to the other section, said first member having its opposite edges turned over and providing a pair of channels in which said second member is slidably disposed, said first member being provided with an elongated slot intermediate said channels, and a screw whose threaded shank extends through said slot and is adjustably threaded in a tapped opening in said screw member and the other of said units being formed of a section of relatively greater width than either the upper or the lower section of the first unit.

3. In a cervical collar, comprising a pair of diametrically opposed units, one unit comprising a pair of upper and lower sections having opposed abutting edges, a protector sheet disposed beneath said sections in lapping relation to the joint between same, means for vertically adjusting said sections, means connecting said protector sheet to said sections while providing for adjustment thereof, and a flexible connection between each unit to provide for adjustment of the diameter of the collar.

4. In a reversible cervical collar, a pair of diametrically opposed curved units one unit comprising a pair of upper and lower sections having vertically aligned spaced edges, and means for adjusting said sections to thereby vary the spacing between said edges, said other

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unit being in one section, whereby each unit is diametrically reversible for providing hyperextension in one position thereof and flexion in the opposite reverse position thereof.

5. A reversible cervical collar comprising a pair of diametrically opposed units of relatively different widths, one unit being adjustable to vary the width thereof, and flexible means projecting from each end of said first unit for adjustably and flexibly connecting with means carried by each end of the other of said units to join said units together, whereby the diameter of the collar is capable of adjustment.

6. A reversible cervical collar comprising a pair of diametrically opposed units, one of said units being provided with a strap projecting from each end thereof and being provided with an element of a fastener means and the other unit being provided with an element of said fastener means for adjustable engagement of each respective element of each unit, whereby the diameter of the collar is capable of adjustment to the neck of the wearer.

7. A cervical collar for encircling a wearer's neck comprising diametrically opposed units, one unit comprising a pair of upper and lower sections having aligned spaced edges, means for adjusting said sections of the first unit, to thereby vary the spacing between said edges and the overall width of said unit, said first unit being reversible with respect to said other unit of said pair for providing hyperextension in one position thereof and flexion in the opposite reversed position thereof.

8. The cervical collar described in claim 7, wherein the said aligned spaced edges are maintained out of contact with the neck skin by a protective backing sheet.

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