

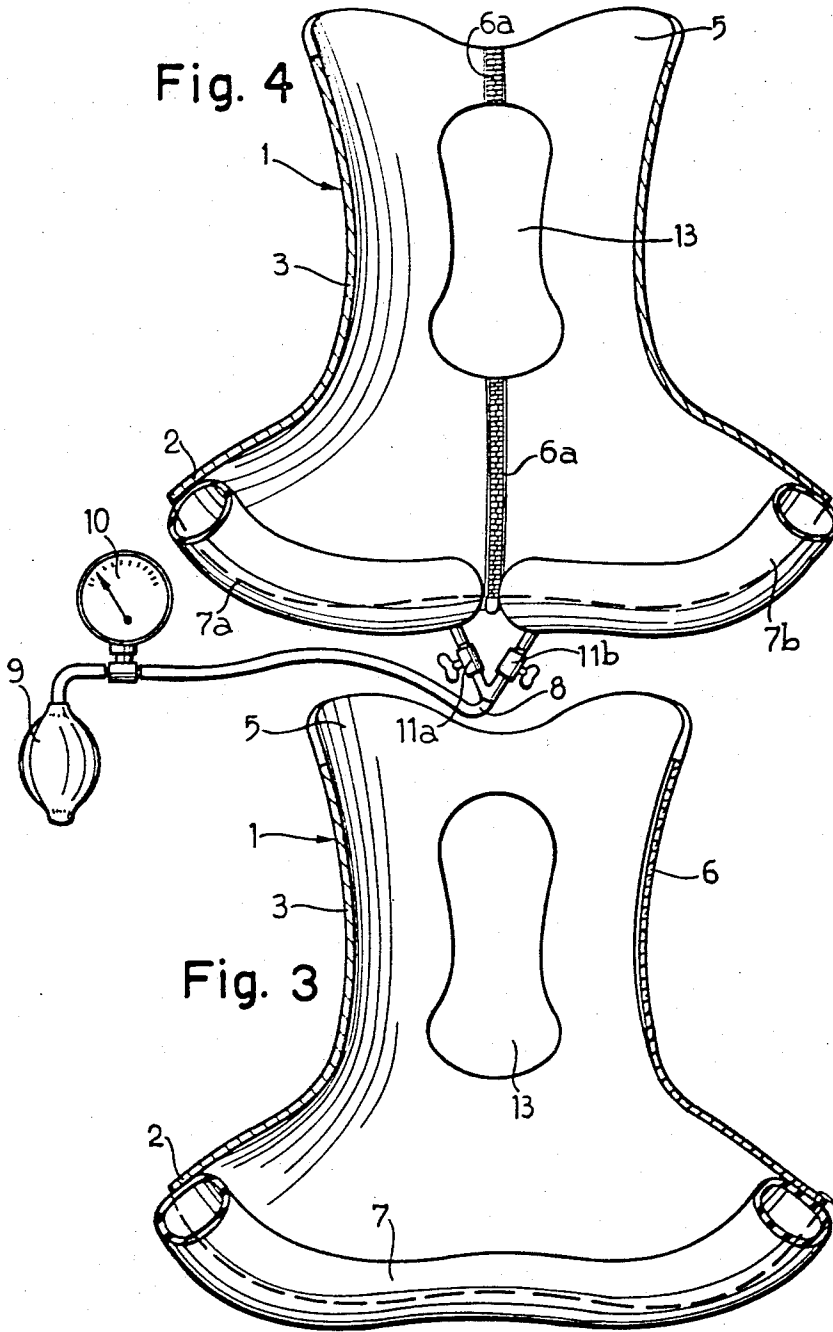
Sept. 26, 1967

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ORTHOPAEDIC APPARATUS FOR IMMOBILIZING AND
STRETCHING THE CERVICAL COLUMN

3,343,532

Filed Feb. 2, 1965

4 Sheets-Sheet 2



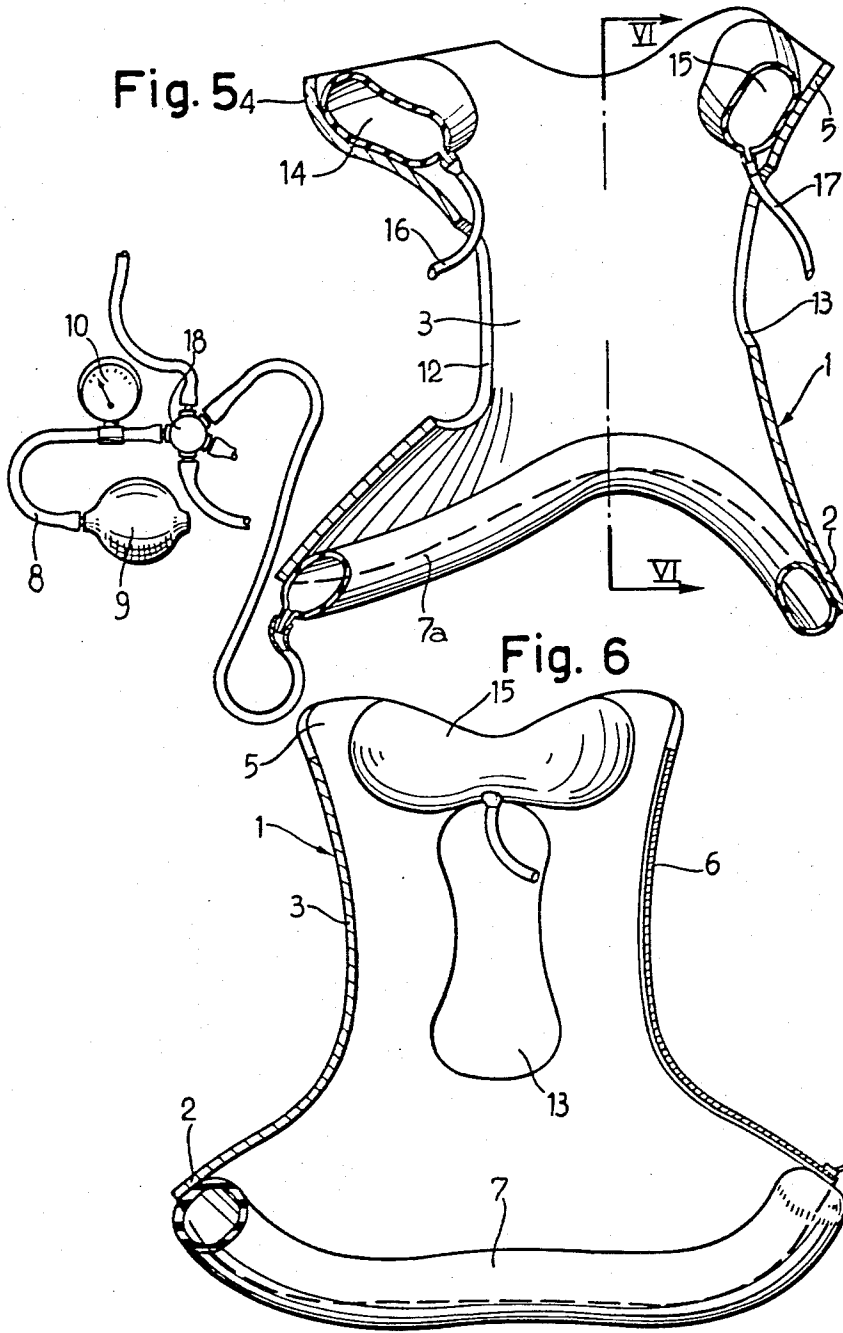
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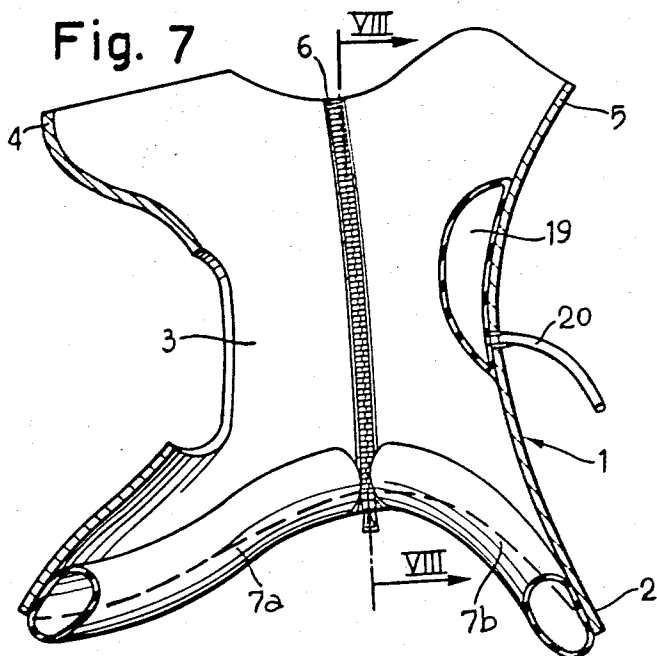
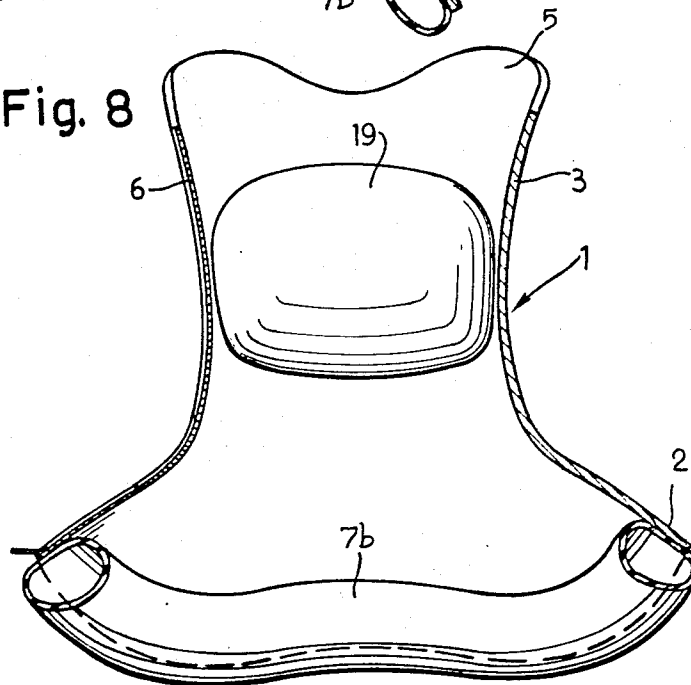


Fig. 8



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3,343,532

ORTHOPAEDIC APPARATUS FOR IMMOBILIZING AND STRETCHING THE CERVICAL COLUMN

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2 Claims. (Cl. 128—75)

This invention relates to an orthopaedic apparatus for immobilizing and stretching the cervical column.

At the present time it is difficult to provide an efficient and appropriate therapy in the field of orthopaedic and traumatological pathology of the cervical rachis.

In order to immobilize and stretch the cervical column, orthopaedic apparatus of various types have been suggested heretofore, which are complex and tedious to manufacture, uncomfortable to wear, and which are so clumsy as to lack practical usefulness. Other types of apparatus are difficult to adjust and requires an expert to make the necessary adjustments.

This invention obviates the above drawbacks by providing an orthopaedic apparatus for immobilizing and stretching the cervical column, which is simple and rugged in construction, quickly fitted, easily adjusted and comfortable even during prolonged use.

The apparatus according to this invention comprises in combination:

A semi-rigid anatomically shaped cast of synthetic resin of a known type, having a lower portion adapted to rest on the clavicular region and a top portion on which the submandibular and occipital regions rest,

A substantially annular air tube, adapted to be interposed between the clavicular region of the patient and the bottom portion of the semi-rigid cast, which, when inflated, acts to stretch the cervical rachis and

An inflating appliance comprising a pump and a valve unit of the sphygmanoametric type for inflating the air tube.

Further characteristic features and advantages will be understood from the appended detailed description and the accompanying drawings, given by way of example, wherein:

FIGURE 1 is a perspective view of an orthopaedic apparatus according to this invention,

FIGURE 2 is a sectional view on line II—II of FIGURE 1,

FIGURE 3 is a sectional view on line III—III of FIGURE 1,

FIGURE 4 is a view similar to FIGURE 3 showing the apparatus fitted with an air tube comprising two independent sectors,

FIGURE 5 is a view similar to FIGURE 2 showing the apparatus fitted with a mental and an occipital air tube,

FIGURE 6 is a sectional view on line VI—VI of FIGURE 5,

FIGURE 7 is a view similar to FIGURES 2 and 5 showing the use of a retro-cervical air tube, and

FIGURE 8 is a sectional view on line VIII—VIII of FIGURE 7.

A semi-rigid cast **1** of synthetic resin comprises a bottom portion **2** adapted to bear on the clavicular region, a middle portion **3** encircling the neck and a top portion provided with a mental rest **4** for the sub-mandibular region and a back rest **5** for the occipital region.

The bottom portion **2** is outwardly flared from the middle portion **3** and shaped to be supported on the patient's shoulders, upper part of the chest and the upper part of the back. Strips of fiberglass are used to reinforce the bottom portion **2** of the plastic resin cast **1** in order to

provide increased stiffness to this portion for support of the remainder of the cast. The middle portion **3** is somewhat resilient and is provided with two openings **12, 13** cut therethrough. The upper or top portion flares outwardly form the middle portion **3** and is reinforced with fiberglass strips to provide increased stiffness for the support of the patient's sub-mandibular region in the mental rest **4** and the occipital region by the back rest **5**. In order to fit the apparatus to the patient, the cast is slotted on one side, the facing edges of the slot being provided with a closure, such as a sliding clasp fastener **6**.

As shown in FIGURE 1, the apparatus comprises an air tube **7** adapted to be interposed between the lower portion **2** of the armature and the clavicular region of the patient. The air tube **7** is of substantially annular shape and is connected by a conduit **8** and valve **11** to an inflating appliance comprising a pump **9** and a pressure gauge **10** of type employed in blood pressure measuring apparatus (sphygmomanometers).

Air is pumped by the pump **9** into the air tube **7** which grows thicker, resulting in an upward pull starting at the clavicular region and acting through the cast **1** on the mandibular and occipital regions of the patient. The cervical rachis is thus subjected to a traction proportional to the thickness acquired by the air tube **7**, which results in a diastasis of the vertebral intersomatic joints. The patient is in a condition to check the pulling force by means of the pressure gauge **10** which is provided with a maximum and minimum scale.

The apparatus is advantageously used in treatment of all painful diseases of the cervical rachis which requires, in addition to full immobilization of the rachis, traction and extension of a permanent character.

The apparatus is thus quite simple and exerts a more efficient and comfortable traction through the resiliency afforded by the bottom air tube **7** than was heretofore known.

The air tube contours to fit bony projections at the clavicular region and by virtue of being interposed between the latter and the semi-rigid cast **1** it affords a rest which is comfortable to the patient even during prolonged periods of time.

As a general rule the semi-rigid cast **1** is individually prepared from a plaster pattern cast which is molded directly on the patient. However, the provision of the air tube **7** make it possible to suit the same apparatus to a plurality of patients. By making the apparatus of three different sizes, a fairly wide range of types can be obtained to suit any requirement.

This affords useful possibilities in the traumatological field. For instance, the apparatus can be provided as regular equipment at first-aid posts for use in the case of suspected fracture or dislocation of ribs of the cervical section. It should be noted that the synthetic resin cast is fully permeable to X-rays. Clinical and X-ray examinations can therefore be made in full safety and without compelling the patient to be confined to a bed.

The apparatus can be employed during the full period of required immobilization with a safety equivalent, at least, to plaster and with largely improved comfort to the patient.

The apparatus according to this invention is further useful in the therapy of muscular, obstetrical or spastic torticollis, more particularly during the post-operative recovery period to resist the extraordinary tendency of this deformity towards relapse.

For such use the head should be bent to the side opposite its inclination before the operation and should further be rotated in the direction of the sick side. The lateral bending of the head can be effected by sliding beneath the base **2** of the cast an air tube subdivided into two semi-circular independent sectors **7a, 7b**, such as

3

shown in FIGURE 4. The sectors 7a, 7b are each provided with a conduit and valve 11a, 11b, both derived from the same inflating appliance 9. By adjusting the valves 11a, 11b, a differential pressure can therefore be set up in the sectors to incline the patient's head to the desired position.

To rotate the head to the sick side, the cast 1 should be shaped to match the position of maximum possible correction, by a strictly individual manufacturing technique. In this embodiment the slot in the cast should be formed at the back and provided with a conventional closure, such as a sliding clasp fastener 6a or the like.

As shown in FIGURES 5 and 6, the cast 1 may be further provided with two air tubes 14, 15 fitted to the mental region 4 and occipital region 5, respectively, both provided with individual conduits 16 and 17, respectively, leading through a multi-way connector 18 to the inflating appliance.

This results in improved comfort and a still wider margin of adaptability of the apparatus and a greater possibility of bending and extending the skull on the cervical column.

FIGURES 7 and 8 show a cast fitted at its retro-cervical region with a further air bag 19 connecting through a conduit 20 with the inflating appliance. The air bag 19 is very useful whenever, in addition to traction and immobilization, a hypertraction of the cervical rachis is desired. In this embodiment, the cast 1 is preferably deprived of the rear slot 13.

What I claim is:

1. A cervical brace for immobilization and traction of the cervical rachis comprising in combination: a semi-rigid shell of synthetic resin material comprising a middle portion, an upper portion, and a bottom portion, said bottom portion shaped to abut the shoulders, the upper part of the chest and the upper part of the back, said upper portion shaped to form rests for the sub-mandibular region in front and for the occipital region in the back, and said middle portion shaped to surround the neck; an inflatable tube secured to and extending along said bottom portion of said shell, and confined between said abutting body parts and said shell and adapted to partially project downwardly and outwardly from the latter when inflated, said inflatable tube comprising two independent semi-circular sections each arranged on opposite sides of a longitudinal middle plane of symmetry through said shell; a longitudinal slot extending through said shell along said longitudinal middle plane and provided with closure means therealong, whereby said brace may be applied to and removed from a patient; an inflating appliance for inflating said tube comprising a pump, a pressure gauge and a valve unit of the sphygmomanometric type; and a conduit connected to each of said inflatable sections and said inflating appliance, each of said conduits having a valve for controlling the fluid flow therethrough, whereby said inflatable sections may be independently inflated to control the lateral inclination of the skull.

2. A brace as claimed in claim 1, comprising an inflatable bag secured to the inner wall of said upper portion of said shell adjacent the front thereof, a second inflatable bag secured to the inner wall of said upper portion of said shell adjacent the rear thereof, said first inflatable bag shaped to form a rest for the sub-mandibular region and said second inflatable bag forming a rest for the occipital region, a multi-way connector connected to said inflating appliance, and a pair of individual conduits each secured to and communicating with one of said bags and said multi-way connector for connecting said conduits to said inflating appliance.

References Cited

UNITED STATES PATENTS

1,884,927	10/1932	Raalte	128—83
2,389,690	11/1945	Schreiber	128—87
2,699,165	1/1955	Ferrier	128—60
2,747,570	5/1956	Jobst	128—260
2,806,471	9/1957	Breese	128—87
2,830,585	4/1958	Seiss	128—166
3,164,151	1/1965	Nicoll	128—75

FOREIGN PATENTS

549,294	11/1942	Great Britain.
80,393	1956	Netherlands.

OTHER REFERENCES

Orthopaedics Appliance Atlas, 1952, p. 95.

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