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2,935,984

ABDUCTION SPLINT FOR CORRECTING HIP DYSPLASIA

Filed Sept. 5, 1958

2 Sheets-Sheet 1

FIG. 1.

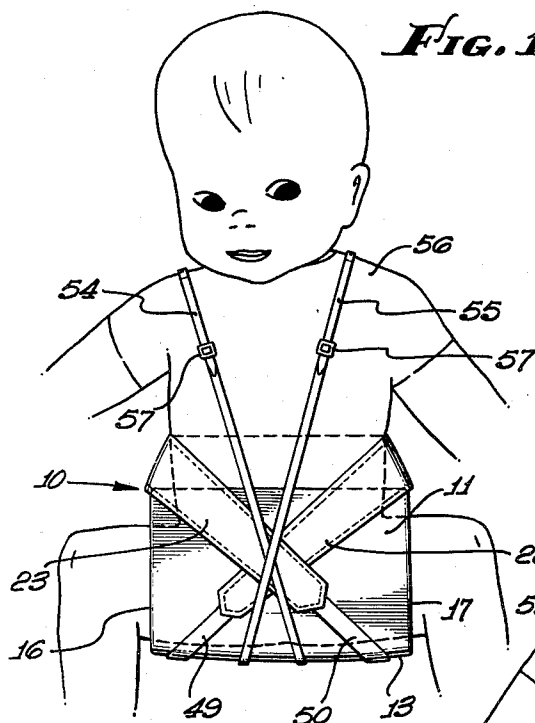


FIG. 2.

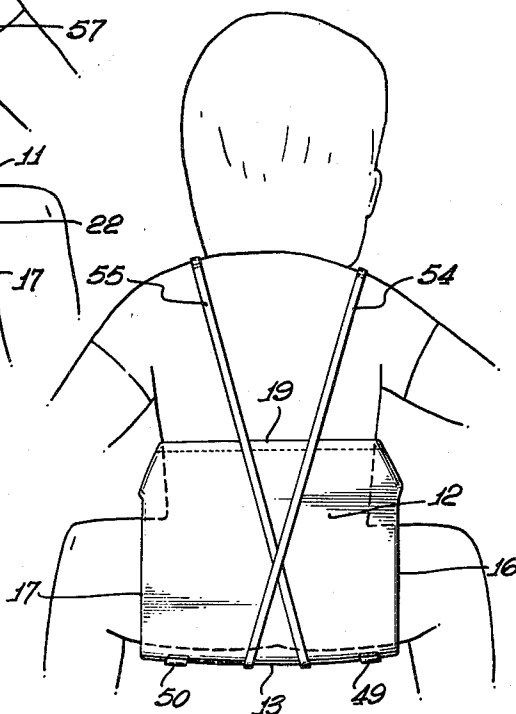
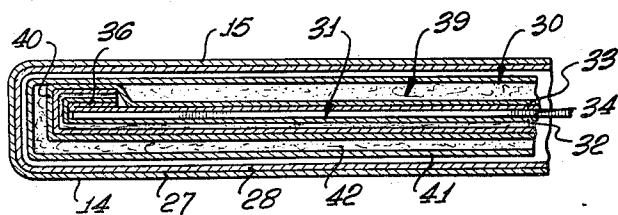


FIG. 6.



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Fig. 3.

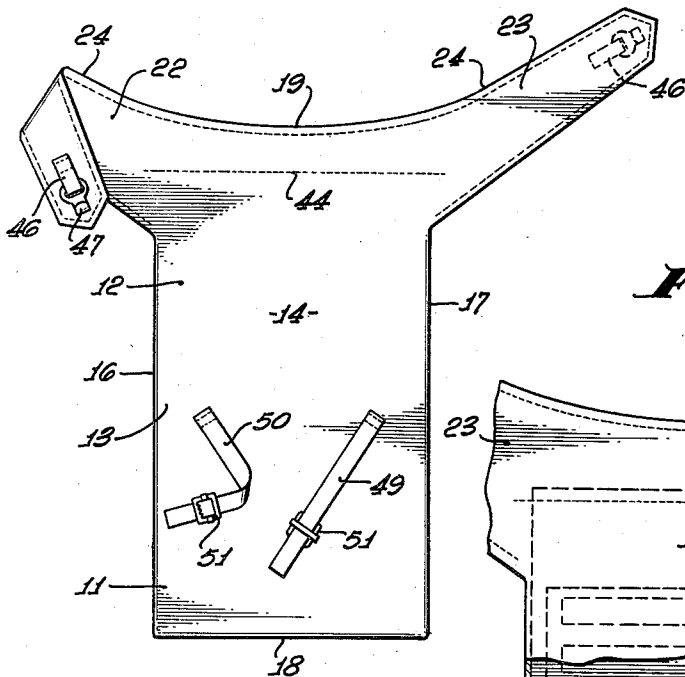


Fig. 4.

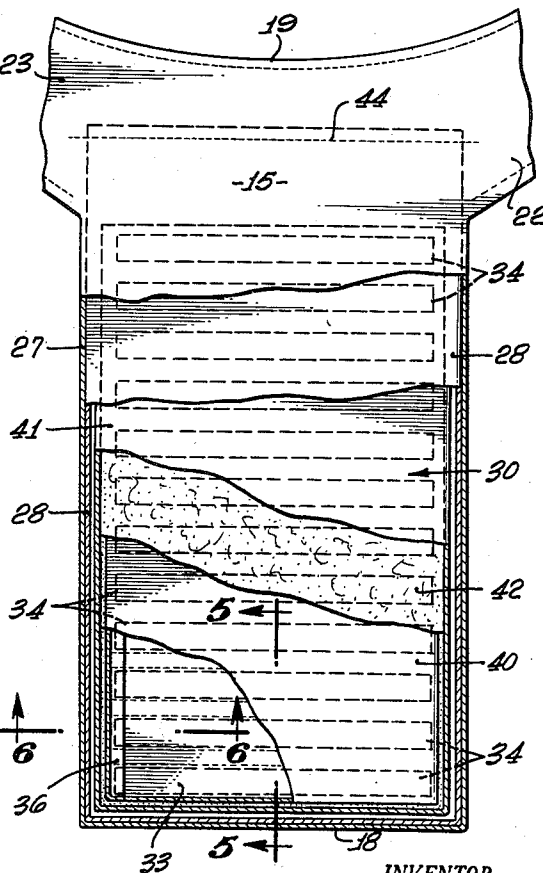
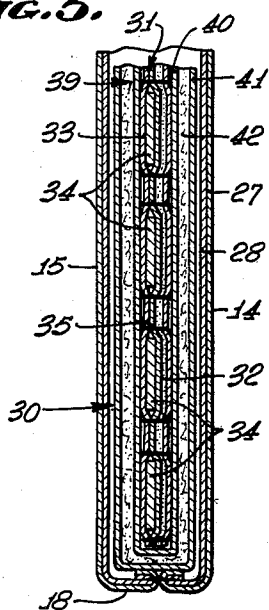


Fig. 5.



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ABDUCTION SPLINT FOR CORRECTING HIP DYSPLASIA

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5 Claims. (Cl. 128—87)

This invention relates to orthopedics, and more particularly to an appliance, hereinafter called a splint, for correcting hip dysplasia in infants or children.

At birth a baby's hip and thigh bones are cartilaginous in the regions of the hip joints. During the development before and following birth, in the case of a normal child, a ball portion grows on the upper end of each thigh bone and a socket grows in each hip bone for receiving respective ball portions of the thigh bones to form the hip joints. In certain abnormal cases, at birth the thigh bones are spaced too far apart from the hip bones or are not properly aligned with the hip bones whereby a secure ball and socket joint in the hip does not develop. Such abnormal cases are known as hip dysplasia.

Heretofore it has been a recognized practice for treatment of hip dysplasia cases to build a cast of plaster of Paris or fashion a splint of metal cuffs or bands, around the lower part of the patient's trunk and around his thighs to hold the thighs in abduction, i.e. in spread apart relationship, thereby to move the upper ends of the thighs toward their respective hip bones and to maintain the hips immobilized for allowing development of proper hip joints. Such casts are objectionable for many reasons. They are uncomfortable, they are expensive, they require periodic replacement as the child grows, they require the services of a skilled doctor, and in the case of an infant in diapers the many difficulties in attending to the personal hygiene of the infant are obvious.

It is an object of this invention to provide a splint for hip dysplasia cases which may be applied by a doctor to the patient and be removed and reapplied by a layman.

Another object of this invention is to provide an improved splint for young children afflicted with hip dysplasia which serves to maintain the thighs in abduction, allows the child to sit with comfort and to lie in either prone or supine positions, and which may be applied, adjusted and removed by the patient's mother.

Another object of this invention is to provide a splint of the above mentioned character which accommodates growth of the patient and permits the use of conventional diapers for infants.

Further objects and advantages of this invention will appear during the course of the following part of this specification wherein the details of construction and mode of operation of a preferred embodiment are described with reference to the accompanying drawing in which:

Fig. 1 is a front view of a young child wearing a splint of this invention;

Fig. 2 shows the back of the child;

Fig. 3 is a view of the outside of the splint when laid flat;

Fig. 4 is a plan view of the splint with portions thereof being cut away to show the various layers of the splint; and

Figs. 5 and 6 are detail sections taken along lines 5—5 and 6—6, respectively, of Fig. 4.

Referring to the drawing in greater detail, there is shown a child wearing a splint of this invention, the splint com-

prises a body, which is designated generally by reference numeral 10, and straps for securing the body upon the patient. The splint body comprises layers of cloth, stiffener and padding as will be brought out herein, to provide a front portion or flap 11, a back portion or flap 12 and a seat or crotch portion 13 intermediate the flaps. In order to facilitate easy explanation of the various parts of the splint body, it is said to be defined by an outside surface 14, an inside surface 15, side edges 16 and 17, and front and back end edges 18 and 19, respectively.

The splint body is of a length such that it will extend from back to front with the back end edge 19 disposed in the waist region of the patient and preferably above the waistline, and with the front end edge 18 disposed at or slightly below the waistline. For standardization purposes splints may be made to various lengths starting at about fourteen inches and increasing in length at about two inch increments.

The width of the splint, i.e. dimension between side edges 16 and 17, is such that the side edges will extend to or proximate the insides of the knees when the thighs are fully spread apart and the knees are in flexion position. In its smallest sizes the splint may be about seven inches in width and the standard sizes increase to about fourteen inches in width.

There are two strap portions 22 and 23 which extend outwardly and slightly upwardly from the side edges 16 and 17 at respective upper corners of the back flap. A side edge 24 of each strap portion is continuous with the back end edge 19 making the outline of the back end edge and the side edges 24 of the strap portions a concave curve.

The splint body comprises a cover layer 27 which is preferably formed of soft plastic sheet so that the inside and outside surfaces of the splint will be waterproof and easily washable. The cover layer is lined with a lining 28 of muslin or the like to give strength and support to the cover sheet.

The cover sheet and its lining encloses a padding 30. Such padding comprises an insert 31 formed of a quilted layer 32 and a muslin layer 33. Between the layers 32 and 33 there is a stiffener of resilient material which in the illustrated embodiment is constituted of a plurality of transversely extending stays 34. The stays are flat and may be formed of steel or hard plastics and the like and may be of about one half inch in width. The ends of the stays are preferably rounded. They are received in respective pockets formed by stitching as along lines 35 whereby the stays are in parallel relationship spaced apart by about one fourth of an inch. The plurality of stays extends throughout the length of the insert, each stay being of a length such as to permit the quilted layer 32 and the muslin layer 33 to be folded over the ends of the stays as at 36 thereby to increase the thickness of padding at the ends of the stays.

Insert 31 is enclosed in a padding wrap 39 of quilted material comprising two cloth sheets 40 and 41 with a filler 42 of wool, cotton or the like.

Cover layer 27 and its lining may be stitched along both side edges 16 and 17 and along front and back end edges 18 and 19 to enclose the padding, and the padding may be secured within the cover layer as by stitching along line 44.

Referring again to the strap portions 22 and 23, each has a loop 46 sewn to the inside surface thereof to attach a fastener 47 to each strap. The strap portions are adapted to be crossed one over the other and over the front flap of the splint. Thus, when the splint is put on a patient with the strap portions in crossed relationship over the front flap, the side edges 16 and 17 will define openings through which the legs extend with the seat or crotch portion of the splint extending substan-

tially perpendicular to the trunk of the patient. There are strap portions 49 and 50, each having one end thereof secured as by sewing to the outside surface of the splint body in the crotch portion and proximate respective side edges of the splint body for connection as with adjustable buckles 51 to respective fasteners 47.

As thus far explained, it will be apparent that the strap portions 22 and 23 become positioned over the upper parts of the hip bones and because they are crossed and adjustably secured to strap portions 49 and 50 which in turn are fastened in the seat or crotch portion of the splint, the straps will hold the legs spread outwardly and will maintain the hip bones relatively immobilized with respect to the thighs to allow proper growth and development of the hip joints.

For infants, it is intended that the splint of this invention be placed over the infant's diaper. A conventional diaper cover of waterproof material may also be used over the diaper before applying the splint. Inasmuch as the splint may be removed easily and quickly, i.e. merely by disengaging the fasteners 47 from the buckles 51, an infant's diaper may be changed by his mother and the splint replaced over the diaper by the mother.

Because the front flap of the splint is free from the back flap, the splint does not uncomfortably bind the patient and allows for uninhibited moving and breathing. Also, adjustment of the front flap through manipulation of the straps allows for expansion of a baby's abdomen when he eats, and allows for growth of the baby.

For very active children it is preferred to provide shoulder straps 54 and 55 which may be sewn to an undershirt 56 at the shoulders thereof. These shoulder straps extend from around the back and to the front where their length is adjusted as by buckles 57 to hold the splint body up to fit snug against the baby's seat.

While the instant invention has been shown and described herein, in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims.

What I claim is:

1. A splint for correcting hip dysplasia in a patient comprising a body of flexible material having opposed side edges and opposed end edges defining a front flap, a back flap and a crotch portion intermediate the flaps, the crotch portion being of from about seven to fourteen inches in width whereby when the splint is put on the patient with the end edges defining a trunk opening and the side edges defining thigh openings respectively, the crotch portion will extend to proximate the insides of the knees respectively of the patient with the thighs of the patient spread apart and with the patient's knees in flexion, resilient means in the crotch portion for resiliently maintaining the crotch portion substantially straight in a direction between said thigh openings thereby restraining against movement of the thighs toward each other, and adjustable straps secured at one end thereof to opposite sides respectively of a flap and at the other end thereof to the crotch portion and adapted to be crossed over each other over the front flap.

2. A splint for correcting hip dysplasia in a patient comprising a body and straps for holding the body on the patient, the body having a cover sheet and a padding enclosed in the cover sheet, the cover sheet having two end

edges and two side edges, the padding having side edges disposed contiguous and within respective side edges of the cover sheet, the padding being of from about seven to fourteen inches in width whereby when the splint is put on the patient with said end edges defining a trunk opening and with the side edges of the cover sheet defining thigh openings respectively, the padding will extend in a direction transversely with respect to said side edges to proximate the insides of the knees respectively of the patient with the thighs of the patient being spread apart, the padding having resilient means therein for stiffening the splint in said transverse direction, the cover sheet and padding being flexible in a direction perpendicular to said transverse direction whereby they will extend from the back of the patient as a back flap, through the crotch of the patient as a crotch portion, and to the front of the patient as a front flap, the back flap having two straps integral therewith at respective opposite side edges of the back flap, the crotch portion having two straps secured thereto proximate respective side edges of the cover sheet, and fasteners on the straps for adjustably interconnecting the crotch straps to the flap straps respectively with the flap straps crossed over the front flap.

3. A splint according to claim 2 in which said resilient means comprises a plurality of parallel spaced apart flat stays in said transverse direction.

4. A splint according to claim 2 comprising adjustable shoulder straps for extending over the shoulders of the patient and through the crotch of the patient over the cover sheet.

5. A splint for correcting hip dysplasia in a patient comprising a body having opposite side edges and opposite end edges defining a front portion, a back portion and a crotch portion intermediate the front and back portions, adjustable straps secured to the body for maintaining the body in a wearing position in which said end edges define a trunk opening and the side edges define thigh openings respectively, the thigh openings being axially aligned and the axis of the thigh openings being substantially perpendicular to the axis of the trunk opening, the body having resilient material therein for resiliently maintaining the crotch portion substantially straight throughout that extent of the crotch portion between said side edges in the direction of said axis of the thigh openings, the crotch portion being of greater extent in said direction than the diameter of the trunk opening, whereby when the splint is being worn with the trunk of the patient in said trunk opening and with the thighs of the patient extending through said thigh openings respectively, the crotch portion will be substantially stiff under the buttocks of the patient to proximate the insides of the knees of the patient and the splint body will restrain against movement of the thighs toward each other.

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