

May 2, 1944.

L. W. ALBAN

2,347,867

DIAPER

Filed Nov. 16, 1940

2 Sheets-Sheet 1

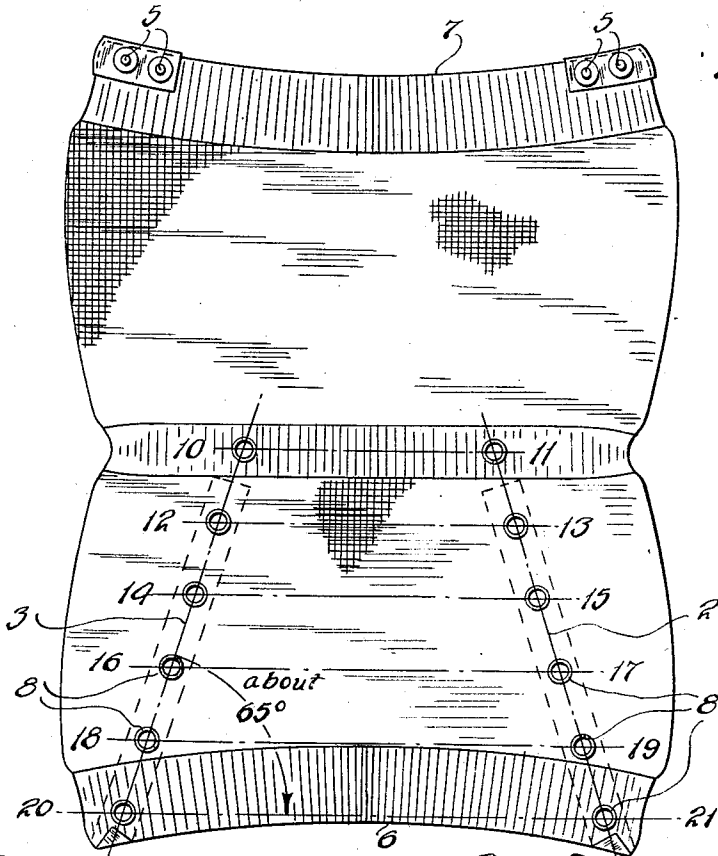


Fig. 1.

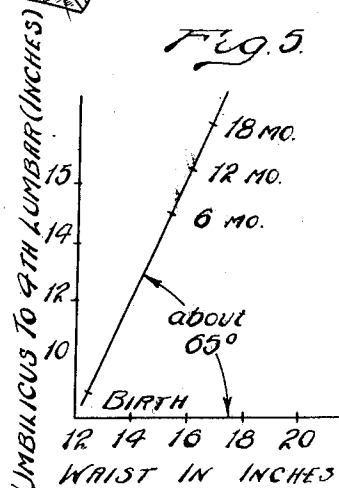
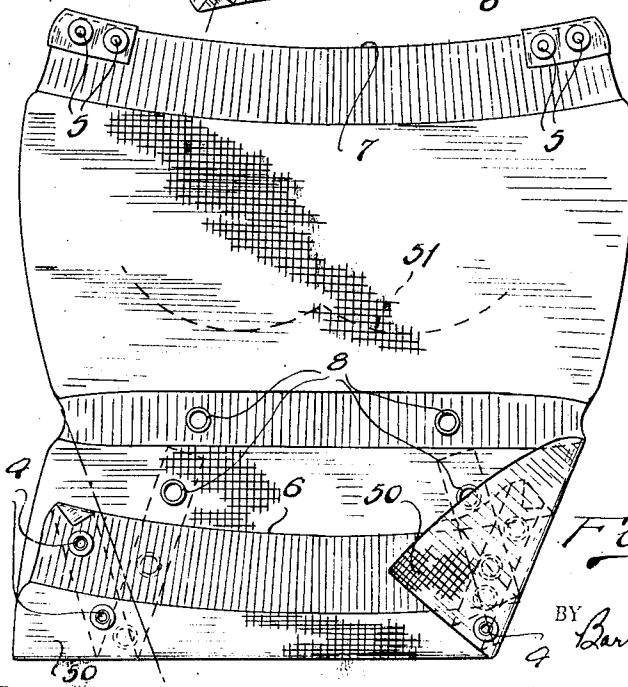


Fig. 5.

Fig. 2.

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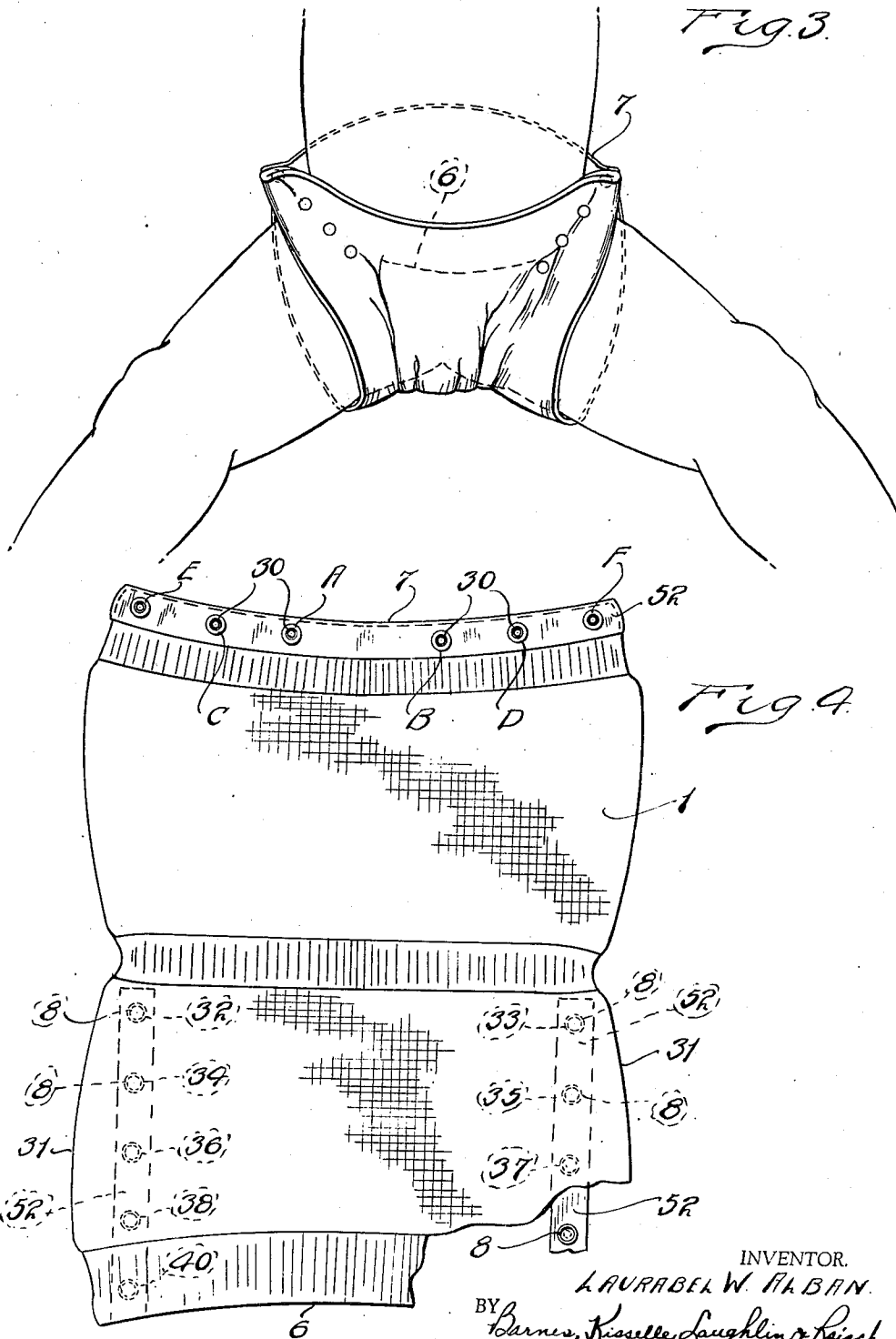
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

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DIAPER

Laurabel W. Alban, Pontiac, Mich.

Application November 16, 1940, Serial No. 365,883

2 Claims. (Cl. 128-284)

This invention relates to a diaper.

Diapers heretofore known and on the market come in a single size and no provision is made for fitting the same to the baby as it grows from day to day except by the use of pins. The adjusting of this single size diaper to the growing baby is usually more or less of a hit and miss proposition with the result that if the diaper is pulled tightly around the waist it will either be too tight or too loose through the crotch.

It is the object of this invention to produce a diaper of any given predetermined size which is arranged so that it will fit the baby regardless of size at birth until it ceases to use diapers. This object is achieved by arranging the diaper so that it will compensate for the increase in waist measurement and the increase in the measurement from the umbilicus through the crotch to the fourth lumbar vertebra. These are the true critical measurements which I have found important in fabricating a diaper which will fit the infant at birth and throughout the diaper using period.

In the drawings:

Fig. 1 is a plan view of the diaper, the top side being the side which contacts with the baby's body.

Fig. 2 is a view similar to Fig. 1 with a portion of the diaper folded over the top side to compensate for the size of the infant.

Fig. 3 shows the diaper applied to an infant.

Fig. 4 is a view of a modified form of diaper.

Fig. 5 is a chart showing the average waist measurement and the measurement from the umbilicus through the crotch to the fourth lumbar vertebra from birth through eighteen months.

Referring more particularly to the drawings there is shown a diaper I made from any suitable diaper material such, for example, as knitted cotton. The diaper I will be made in any suitable size such, for example, as ten inches by twenty inches.

In arriving at the average measurement around the waist of the baby and the average distance from the umbilicus or navel through the crotch to the fourth lumbar vertebra, I took the averages of many measurements of babies of both sexes. These measurements were obtained from hospital records. The averages of many measurements of both sexes of babies are as follows:

Chart 1

Age, months	Waist measurement, inches	Umbilicus to fourth lumbar, inches
Birth.....	13.1	8.5
6.....	17.0	13.0
12.....	18.0	14.0
18.....	19.0	15.0

The measurement around the waist for the above age range, that is, birth through eighteen months, varied from twelve inches to approximately twenty inches. The increase around the waist after six months up to eighteen months is small and uniform. The measurement from the fourth lumbar vertebra to the umbilicus also increases greatly from birth to six months. The research also brought out that when the waist measurement is plotted against the measurement from the umbilicus to the fourth lumbar vertebra, a substantially straight line is obtained (Fig. 5). This indicates that the ratio of waist measurement to the measurement from the umbilicus to the fourth lumbar is substantially constant and independent of age up to eighteen months. This fact was taken into consideration in locating the fastening devices.

To make this standard diaper so that it will fit the infant from birth through eighteen months or longer, I have accomplished this result by properly locating the fastening devices and by a method of folding the diaper. Preferably the fastening devices are arranged along two converging diagonals 2 and 3. I prefer to use snap fasteners but other suitable fastening means, such as hook and eyes, buttons and buttonholes, and ties can be used. As shown, the socket members 4 of the snap fasteners are arranged along the diagonal lines 2 and 3 which converge inwardly from edge 6 of the diaper. The sockets themselves are on the underside of the diaper as viewed in Fig. 1. As viewed in Fig. 1, only the back side or retaining rings 8 of the socket members 4 can be seen. The stud members 5 are positioned along the opposite edge 7 of the diaper. As viewed in Fig. 1, the studs 5 are positioned on the top side of the diaper 1. The retaining rings 8 for the studs 5 are shown in Fig. 3. Knowing the growth rates of the respective measurements, the diagonals can be determined from chart 2.

Chart 2

Original diaper width	Child waist or circumference	Umbilicus to fourth lumbar	Diaper width compensated by distance between diagonals
Inches.	Inches	Inches	Inches
10	13.1	8.5	3.1
10	17.0	13.0	7.0
10	18.0	14.0	8.0
10	19.0	15.0	9.0

The diagonals and angles of convergence are determined from chart 2.

Referring to Fig. 1, at birth for the smallest baby I use sockets 10 and 11 with the pair of outside studs 5, Fig. 1. The inner pair of studs 5 can be used instead if the baby is unusually small around the waist. The diaper is folded

along the desired fold lines 10—11, 12—13, 14—15, 16—17, 18—19, depending on the size of the baby. As shown in Fig. 2, the diaper has been folded along fold line 16—17. The excess material below fold line 16—17, Fig. 1, is preferably folded back over the top side of the diaper toward edge 7 so that it rests against the front of the baby when the diaper is on the baby. The diaper material between the fold line and edge 6 and outside the lines 2 and 3, which is identified by the numeral 50, can then be folded over and inwardly, as shown in Fig. 2. The line on which the diaper is folded will depend upon the baby's measurement from the umbilicus to the fourth lumbar vertebra and what its waist measurement is. Assuming that the baby's measurement from the umbilicus to the fourth lumbar is equal to the distance from edge 7 through fold line 16—17, then, according to the chart shown in Fig. 5, the baby's waist measurement will be the distance between the outer or inner studs 5 plus the distance from socket 16 to 17.

After the diaper has been folded over, as shown in Fig. 2, the baby is preferably positioned on the top side of the diaper with its buttocks in the position indicated by the dotted lines 51. This position is also shown in Fig. 3. The diaper is then folded back over the front of the baby and the sockets 16 and 17 snapped into engagement with studs 5.

In Fig. 4 a modified form of the invention is shown. In this form of the invention the sockets 30 are positioned in a row extending across the edge 7 of the diaper. The studs are positioned in parallel rows extending inwardly from edge 6 of the diaper along the side edges 31. In using this diaper the same will be folded along fold lines 32—33, 34—35, 36—37, etc. The measurement from the umbilicus to the fourth lumbar in this case will be the distance from any fold line to edge 7. The waist measurement will be the distance between the parallel lines of the sockets, that is, the distance from stud 32 to stud 33 plus the distance between studs A and B, or C and D, or E and F. Thus, it is evident from the above that there is shown a diaper which will fit a baby from birth through the diaper wearing period.

Separate strips 52 of fabric or other suitable material, either diagonal or parallel, containing the required number of studs and sockets may be applied to a plain diaper of the proper size and material.

I claim:

1. In combination with a diaper, two fastener members spaced laterally of the diaper a predetermined distance, two spaced rows of fastener

members, the fastener members in one row being arranged to selectively cooperate with one of the above two fastener members and the fastener members in the other row being arranged to selectively cooperate with the other of the above two fastener members, said rows extending generally lengthwise of the diaper, each fastener member in the one row being laterally spaced from a correspondingly positioned fastener member in the other row and also positioned lengthwise of the diaper from its respective cooperating fastener member of the said two fastener members, the sum of the distance between the said first mentioned two fastener members and the distance between any selected two corresponding fastener members in the said rows being equal to the waist length of an average baby at a given age and the longitudinal distance between each of said first mentioned two fastener members and its respective cooperating fastener member of said selected two corresponding fastener members being equal to the distance between the umbilicus through the crotch to the fourth lumbar vertebra of the said average baby at the same given age.

2. In combination with a diaper, two fastener members positioned adjacent one end of the diaper and spaced laterally of the diaper a predetermined distance, two spaced rows of fastener members, the fastener members in one row being arranged to selectively cooperate with one of the above two fastener members and the fastener members in the other row being arranged to selectively cooperate with the other of the above two fastener members, said rows extending lengthwise from adjacent the opposite end of the diaper and converging from the opposite end of the diaper, each fastener member in the one row being laterally spaced from a correspondingly positioned fastener member in the other row and also positioned lengthwise of the diaper from its respective cooperating fastener member of the said two fastener members, the sum of the distance between the said first mentioned two fastener members and the distance between any selected two corresponding fastener members in the said rows being equal to the waist length of an average baby at a given age and the longitudinal distance between each of said first mentioned two fastener members and its respective cooperating fastener member of said selected two corresponding fastener members being equal to the distance between the umbilicus through the crotch to the fourth lumbar vertebra of the said average baby at the same given age.

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