

[54] AIR-CUSHION SOCKS

[76] Inventor: Yvan Dall Ava, 54 Cite' Belle Marie, 32 Eauze, France

[22] Filed: **May 4, 1971**

[21] Appl. No.: **140,132**

[30] **Foreign Application Priority Data**

May 5, 1970	France	70.16269
Apr. 26, 1971	France	71.14749

[52] U.S. Cl. **36/29**

[51] Int. Cl. **A43b 13/20**

[58] Field of Search..... 36/29, 43, 3 R, 3 A, 3 B

[56] **References Cited**

UNITED STATES PATENTS

2,007,803	7/1935	Kelly	36/29
1,304,915	5/1919	Spinney	36/29
2,080,469	5/1937	Gilbert	36/29

Primary Examiner—Patrick D. Lawson
Attorney, Agent, or Firm—Edward F. Levy

[57] **ABSTRACT**

This sock is of the type described in the head patent i.e. arranged to constitute air cushions interposed between the wearer's foot and the boot.

It consists of a thin, flexible and air-impervious envelope divided longitudinally into a number, for example five, of internal, air-tight compartments of relatively great dimensions, each of them forming an air cushion, since air is contained in each of them, this air being adapted to flow from one compartment to another through throttling passages.

These socks can easy by the manufactured commercially scale, in a trouble-free manner, and are adapted to prove entirely satisfactory to the wearer.

1 Claim, 12 Drawing Figures

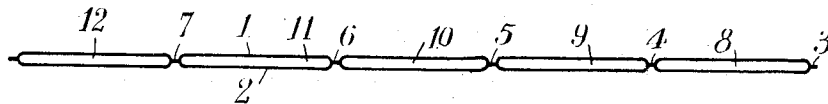


Fig.1.

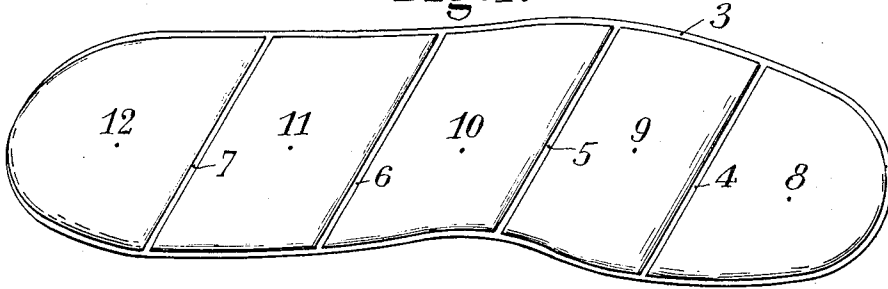


Fig.2.

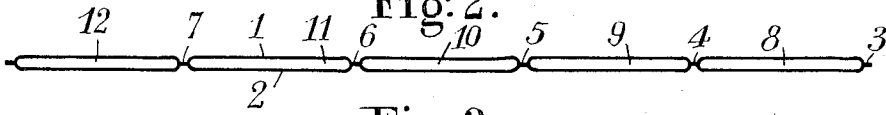


Fig.3.

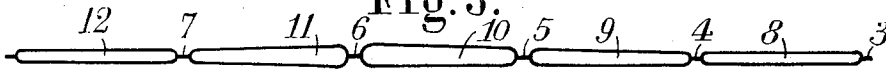


Fig.4.

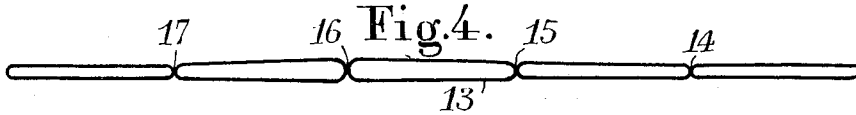


Fig.5.

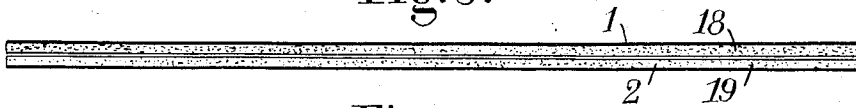


Fig.6.

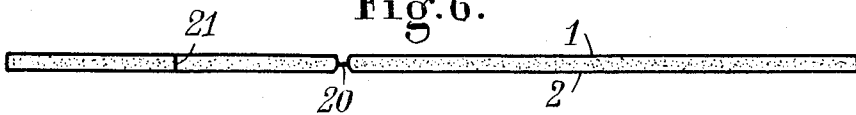


Fig.7.

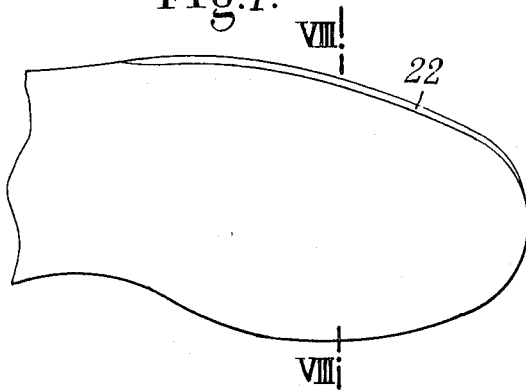


Fig.8.



Fig. 9.

Fig. 10.

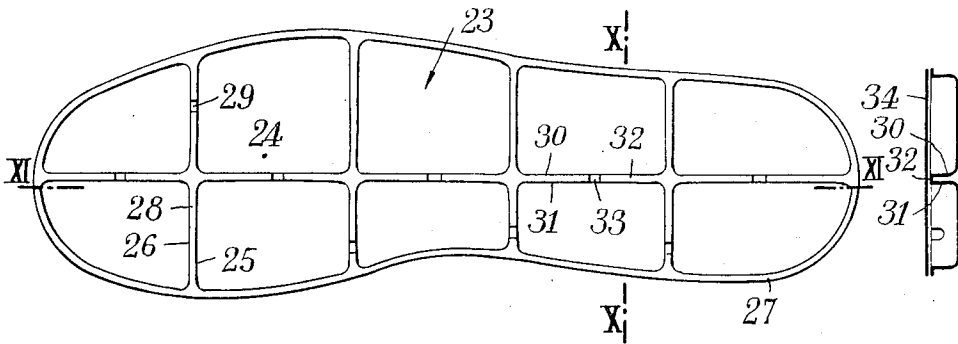


Fig. 11.

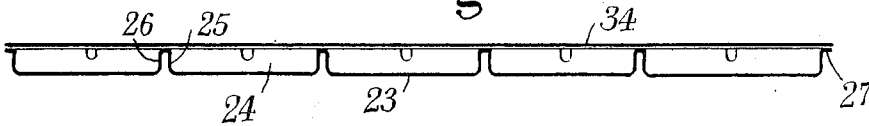
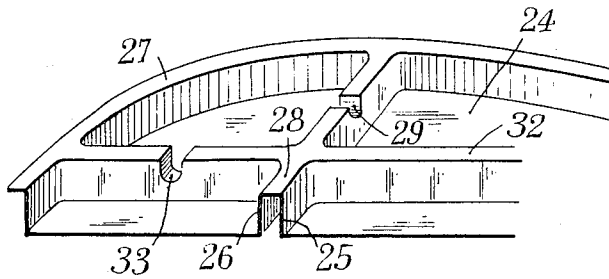


Fig. 12.



AIR-CUSHION SOCKS

SUMMARY OF THE INVENTION

The present invention relates in general to socks, that is, complementary inner soles utilized sometimes in boots, shoes and other footwears for modifying or rendering more comfortable these boots or the like, and more particularly to an improved sock of this type, characterized in that it consists of a relatively thin envelope of flexible, air impervious material, divided in the longitudinal direction into a plurality of air-tight compartments, for example five in number of relatively large dimensions and forming each an air cushion, since each compartment is filled with air adapted, if desired, to flow from one compartment to another through a relatively narrow or throttled passage adapted to retard this flow.

According to a preferred form of embodiment of this invention the air-cushion sock constituting the subject-matter thereof comprises two relatively thin superposed sheets of p.v.c. or other suitable heat-weldable resin materials, these sheets being die-cut to the desired shape and welded along their edges to form the afore said separate compartments each containing a sufficient quantity of air.

These two thin superposed sheets of resin material may be obtained from two separate webs or from a single but tubular piece of extruded material; in the last case the transverse weld seams assembling the two sheets may be formed directly during the extrusion process.

Flat sheets may be used as such; in certain cases, one or both of a pair of thin, air-impervious sheets may be heat-shaped in such a manner that each compartment may have the same thickness along its edge and in its central portion.

If desired, means may be implemented for causing the air pressure to differ from one compartment to another, so that each compartment be "inflated" at the pressure best suited to the weight to be supported during the actual use of the sock. This result may be obtained directly from the welding operation by simply causing these two sheets to adhere, for example by suction, to patterns or forms having the desired contour, except of course along the weld seams; thus by properly selecting the curvature of these patterns or forms, it is possible to adjust with a high degree of precision the pressure values obtained in the various compartments.

BRIEF DESCRIPTION OF THE DRAWING

The attached drawing illustrates diagrammatically by way of example several forms or embodiment of the present invention. In the drawing:

FIG. 1 is a perspective view of a sock;

FIGS. 2, 3 and 4 are longitudinal sections showing different forms of embodiment of this sock;

FIG. 5 is a sectional view showing the possibility of utilizing a different material for the sheet material constituting the envelope of the sock;

FIG. 6 is a similar view showing different way of utilizing this sheet material;

FIG. 7 is a fragmentary view showing the toe end of the sock with a modified detail;

FIG. 8 is a section taken along the line VIII—VIII of FIG. 7;

FIG. 9 is a plane view showing a modified form of embodiment of one of the sheets constituting a sock according to this invention;

FIGS. 10 and 11 are sections taken along the lines X—X and X—XI of FIG. 9, respectively, and

FIG. 12 is a fragmentary perspective view showing on a larger scale the sock illustrated in the preceding FIGS. 9 and 10.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The sock shown in the various figures of the drawing comprises essentially two relatively thin sheets 1, 2 of a flexible, air-impervious material, such as p.v.c., these sheets being welded along their peripheral edge 3 and also along transverse lines 4, 5, 6 and 7 to form air-tight compartments 8, 9, 10, 11 and 12 filled with air so as to have a certain thickness.

As shown in FIG. 3, the quantity of air contained in each compartment may differ, according to the weight to be supported thereby and also to the particular contour of the wearer's foot.

This result may be obtained very easily by welding the two sheets 1, 2 along their edges 3 and along transverse lines 4 to 7 while these sheets are caused to adhere by suction, except of course along the weld seams or lines, against registering surfaces of a pair of forms or patterns leaving therebetween a more or less considerable free space for the air.

Instead of being formed from two separate sheets 1 and 2 as described hereinabove, the flexible and air-impervious envelope constituting the sock according to this invention may be obtained from a tubular blank or web 13 in which the compartments are formed either by means of the transverse weld seams or lines 4 to 7, as in the preceding case, or by means of integral joints 14, 15, 16 and 17 formed directly during the extrusion process.

In certain cases these sheets 1 and 2 of flexible, air-impervious material may be lined with a relatively thin sheet of foam 18, 19 in which air is retained (closed-cell foam structure), as shown in FIG. 5.

As in the preceding case and as illustrated in FIG. 6, these two sheets are welded together along their edges and also along transverse lines 20, unless these transverse lines are obtained directly by extrusion in the form of a small partition 21 interconnecting the sheets.

In certain cases the sock may be reinforced by providing a stiff edge 22 along the more strained side, that is, as a rule, the outer side.

According to a modified form of embodiment illustrated in FIGS. 9 to 12 the sheets of thin flexible, air-impervious material may be heat-shaped to comprises a number of separate longitudinal compartments 24 between which a double partition 25, 26 is formed to an inverted U configuration, as shown, in the case of the lower sheet, and comprises a marginal flange 27 coplanar with the top or upper face 28 of these double partitions 25, 26; small passages 29 may be provided in the partitions to permit the flow of air from one compartment to another with a sufficient throttling effect.

A longitudinal partition may also be provided, if desired, this longitudinal partition consisting similarly of two sheets 30 and 31, with a top face 32 level with the other top faces 28 of the aforesaid transverse partitions and also with the flange 27 of the sock; this longitudinal partition may also comprise small throttling passages

3

4

33 interconnecting a pair of transversely aligned compartments.

The assembly is closed and sealed by simply superposing thereto a thin sheet 34 of flexible and air-tight material welded along the flanges 27 of the sock and also to the top faces 28 and 32 of the transverse partitions and possibly of the longitudinal partition.

Of course, the specific forms of embodiment of the invention illustrated in the drawing and described in detail hereinabove should not be construed as limiting the scope of the invention since various modifications may be brought thereto without departing from the basic principles thereof as set forth in the appended claims.

Thus, notably, it may be advantageous to use a sock of the type set forth by completing same with another inner sole adapted on the one hand to isolate the wearer's foot from the flexible and air-tight material constituting said sock, an on the other hand to ensure a better

distribution of the foot pressure over the entire surface of the sock; thus, an inner sole of the type described and illustrated in the French Pat. No. 1.426.837 of its Certificate of Addition No. 91.180 may advantageously be used, this second sole being cemented to, or simply laid on the first one.

What is claimed is:

1. A sock comprising a thin envelope of flexible, air-impervious material, divided longitudinally into a plurality of internal fluid-tight compartments of relatively large dimensions, each compartment containing air and forming an air cushion, said envelope being sized to extend beneath the full length of a foot with each compartment producing an individual damping action when a load is applied thereto, a different air pressure being obtained in each one of said compartments in order better to adapt each of them to the load to be applied thereto.

* * * * *

20

25

30

35

40

45

50

55

60

65