Dec. 9, 1941. F. NUSSBAUM 2,265,853

FOOTWEAR

Original Filed Nov. 9, 1939

Fig. 1

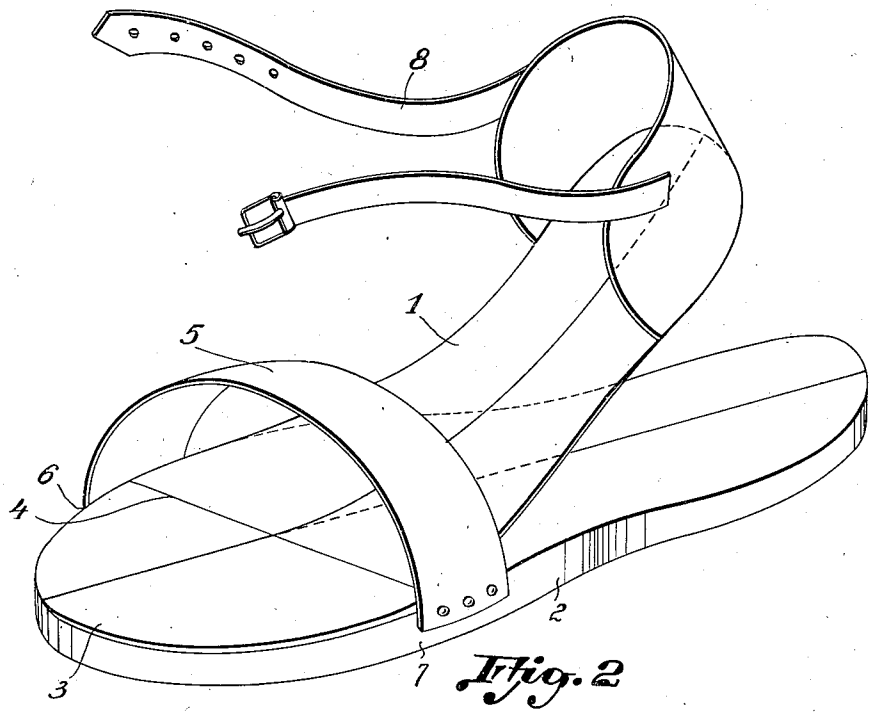
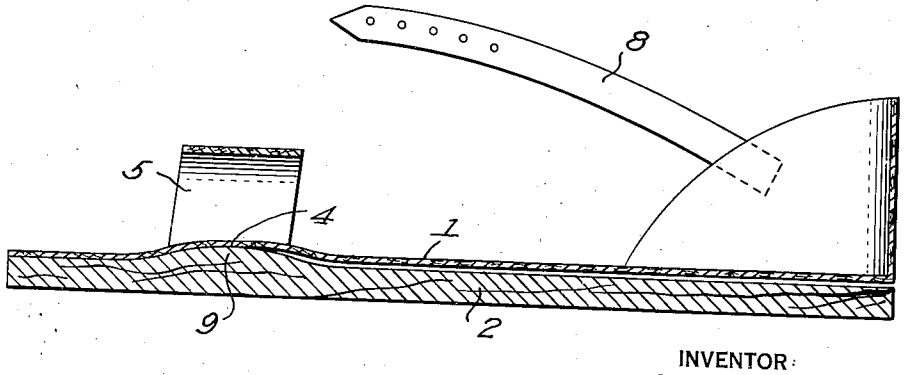


Fig. 2



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FOOTWEAR

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Original application November 9, 1939, Serial No. 303,498. Divided and this application May 18, 1940, Serial No. 335,908

6 Claims. (Cl. 36—8.5)

My invention relates to footwear especially to footwear for orthopedic purposes, and is a division of my copending application, Ser. No. 303,498, filed November 9, 1939, now Patent Number 2,217,990, granted Oct. 15, 1940.

Most known means designated for healing foot diseases as, for example, soles for orthopedic purposes, rely on the principle of supporting the arch of the foot. These means lift and keep the sunken and weakened arch lifted, thereby putting the muscles of the foot out of action with the effect of further weakening the foot. Thus insoles can be only of passive and never of activating influence on the muscles of the arch, and they can in no ways be regarded as correcting and healing means for the foot.

Correcting, and thereby healing. effect on the foot is only possible through activating it by functionally correctly rolling it on the sole, starting with the bones and muscles thereof in their anatomically correct position.

It is therefore the main object of my present invention to produce active flexing of the arch by activating its muscles.

It is a further object to activate these muscles of the arch by functionally correctly moving the foot on a sole formed in accordance with my present invention.

It is another object of my present invention to provide means adapted to give active flexing to the arch, especially means adapted to reactivate sunken arches, as only by these means can a real correction and healing of the foot be attained.

Still a further object of my invention is to achieve this correction by means adapted to force the foot to a functionally correct rolling during its motion, thereby healing it.

Another object of my invention consists in providing an article of footwear one part of which serves as a guiding means for the foot on a sole which is only partly connected with the foot but is an ideal support for the foot when this is placed on it.

A further object of my invention is to attain by this guiding means a correct placing of the foot on this free sole and to avoid the placing of the foot sole not fully on the sole itself but partly alongside of it.

In order to attain these objects I propose in my novel footwear an inner and an outer wear sole, means for holding substantially the entire foot facing surface of said inner sole in contact with the sole of the foot, and means connecting said outer wear sole to said inner sole in the front part of the sole only, thus leaving the other parts of the outer wear sole not connected with either the inner sole nor the foot. The means holding the inner sole in contact with the sole of the foot ensure secure attachment of the inner sole to the foot. The means connecting the outer wear sole to the inner sole ensure correct relative position between these soles and thus also between the foot and the outer wear sole, when walking as well as when standing. The fact that these soles are attached to each other only in their front parts ensures a certain activating effect on the muscles of the arch by compelling the toes to carry out a clutching movement with each step. This clutching movement of the toes is caused by the fact that when stepping, the wear sole tends to remain on the ground and in order to lift this sole, especially its heel part, the wearer automatically makes a clutching movement with the toes. Thus the wear sole acts as a "double lever" turning around the points at which it is secured to the attaching means, holding it in contact with the toe part of the foot sole. It is evident that only by this partial attachment of the wear sole to the foot is it possible to attain the above described lever action, to force the toes to a clutching movement and to activate thereby the muscles of the foot, especially those of the arch. If the wear sole were attached throughout, i. e., over the entire foot-facing surface, to the foot, it would act only as a heavy and rigid shoe sole, without having any effect on the muscles of the foot.

In accordance with a preferred embodiment of my invention the inner sole is made of a flexible material such as soft leather, textile, flexible rubber, flexible plastic materials or the like and the outer wear sole is made of a rigid material such as non-flexible leather, wood, hard rubber, and other solid plastic materials. Thus the inner sole serves only for attaching this sole to the foot thereby ensuring correct relative position between the outer wear sole secured to this inner sole and the sole of the foot. The inner sole being made of a thin flexible material does not interfere with the influence of the outer sole on the foot, i. e. elevations and depressions provided on the foot facing surface of the outer sole influence the sole of the foot practically in the same manner as if the foot would be placed directly on this outer sole.

In order to provide a practical, simple and handy construction for this novel footwear it is of advantage and importance to give the soles substantially the same size and shape i. e. to make their outlines correspond.

The degree of the activating flexing effect on the muscles of the arch attained by my novel footwear construction depends largely on the manner in which and the extent to which the inner and outer sole are connected: The influence of the lever action of the outer wear sole on the toes is stronger if the soles are connected only in the region of the toes and weaker if this connection extends farther back i. e. nearer to the heel region of the soles. I have found that an advantageous connection consists in connecting said soles in the front part of the soles from the toe end up to a line lying substantially beneath the joints between the phalanges and the metatarsals of the foot, thus leaving the other parts of the outer wear sole unconnected with either the inner sole, or the foot, thereby enabling these free parts of the outer sole to exert a lever-like action on the toes. This lever-like action compels the toes to carry out with each step a clutching movement, flexing and activating thereby the muscles of the arch.

I have further found that it is of advantage to provide in the front part of the footwear attaching means secured to the outer wear sole and crossing the width of the foot substantially in the region of the joints between the phalanges and the metatarsals. Thus when walking the toes are pressed against these attaching means while carrying out the clutching movement. The contacting points between the upper side of the toes and the attaching means crossing the width of the foot in the region of the main joints practically act as a centre of turning for the lever-like action of the outer wear sole. As a result of the clutching movement of the toes the outer sole is pressed downwards in the toe part of the sole, thus turning around these contacting points as a centre of turning, and the rear, unconnected part of the outer wear sole is thereby lifted and held in contact with the inner sole. In this way by clutching of the toes and lifting of the sole the required flexing of the arch will be attained.

The lifting of the outer sole can be facilitated by providing further resistance for the clutching movement of the toes in placing on the foot facing surface of the outer wear sole an additional elevation arranged in such a position that it lies substantially beneath the joints between the phalanges and the metatarsals of the first, second and third toes, serving as such resistance. This additional elevation serves as resistance for the toes when they are compelled to carry out the clutching movement, as explained above in detail. If no elevation were provided for, it would be much more difficult for the toes to lift by their clutching movement the heel part of the wear sole, as the toes would slide on the foot-facing surface of the sandal, without gripping it.

In the accompanying drawing, Fig. 1 is a perspective view of a sandal, in accordance with my present invention;

Fig. 2 is a cross-section of a specific embodiment of this sandal, with an elevation of the foot-facing surface of the outsole.

Fig. 1 shows a sandal made in accordance with my invention. As may be seen from the drawing this sandal comprises an inner sole 1 and an outer wear sole 2. These soles are secured together in the region 3 of the toes only up to a line 4 lying substantially beneath the joints between the phalanges and the metatarsals of the foot, strap 5 serving as attaching means and being fixed to both edges 6 and 7 of the outer wear sole 2 crosses the width of the sandal substantially above line 4. The inner flexible sole 1 is provided in the region of the heel with strap-like attaching means 8 for securing said inner sole to the heel part of the foot, thereby holding the entire foot-facing surface of the inner sole 1 in contact with the sole of the foot. The outer wear sole is with the exception of the region 3 of the toes, not connected with either the inner sole nor the foot.

The action of this novel orthopedic sandal is evident when the aforesaid objects and main features of my invention are considered. The inner sole 1 serves to ensure the correct relative position between the outer wear sole 2 and the foot itself, the strap 5 serves as an abutment for the toes during their clutching movement and the foot-facing surface of the outer sole serves as an ideal surface for the foot during walking as well as a lever for attaining flexing of the arch. The foot-facing surface of this outer wear sole 2 may be provided with different elevations and depressions, which are advantageous from the orthopedic point of view. Thus it is for instance possible to provide, as shown in Fig. 2, under strap 5 an elevation 9 substantially beneath the joints between the phalanges and metatarsals of the first, second and third toes; this elevation thus serves for improving the clutching effect of the toes.

I want to stress that I may make the foot-facing surface of the outer wear sole flat or provide it with different "support-like" means as usually used for insoles or the like. I may also provide the elevation described above on such a flat outer wear sole; certainly it is also possible to give this outer wear sole any form or shape required for different and specific orthopedic purposes, i. e. provide this sole with elevations and depressions in accordance with the individual or typical requirements of the specific case, this sole thus serving and being adapted for widely different orthopedic purposes. It is also possible to give the foot facing surface of the outer wear sole 2 a surface as proposed in my copending application Serial No. 303,498, now Patent Number 2,217,990, granted Oct. 15, 1940, i. e. to provide this sole with a longitudinal elevation having a high region, and regions laterally thereof tapering therefrom to the side edges of said sole, the highest points of said elevation forming a crest line extending substantially from the region intended to lie beneath the space between the third and fourth toes to the inner edge of the heel.

Summarizing the effects of my novel footwear on the foot from the orthopedic point of view, these are the following:

1. Correct placing of the heel of the foot on the sole,

2. Activating of the foot by functionally correctly rolling it on the sole starting with the bones and muscles thereof in their anatomically correct position,

3. Active flexing of the muscles of the arch caused by correct position of the heel and simultaneous strong action of the toes,

4. Relaxing of the extensors of the toes and stretching of their sinews,

5. Animation and strengthening of the flexers of the toes,

6. The entire muscular system of the foot and leg is animated, strengthened and induced to functionally correct action, and

7. The blood circulation in the foot is stimulated to a maximum.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features, that from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. An article of footwear comprising an inner flexible sole, a rigid outsole, an elevation on the foot facing surface of said outsole, said elevation being arranged in such a position that it lies substantially beneath the joints between the phalanges and the metatarsals of the first, second, and third toes, means connecting said outsole to said inner sole in the front part of the sole only, means holding substantially the entire foot-facing surface of said inner sole in contact with the sole of the foot, and attaching means in the front part of said footwear being secured to said outsole, said attaching means crossing the width of the footwear substantially in the region of and above said additional elevation.

2. A shoe comprising an inner flexible sole, a relatively heavy rigid outsole secured to said flexible inner sole in the front part of the foot only, attaching means secured only to the front part of said outsole and at least to the heel part of said inner sole for attaching only the front part of said outsole and at least the front and the heel parts of said inner sole to the foot, said attaching means thus holding substantially the entire foot-facing surface of said inner sole and the front part of said outsole in contact with the footsole, leaving thereby the other parts of said outsole not connected with either the inner sole or the foot.

3. An orthopedic shoe comprising a relatively light flexible inner sole, a relatively heavy rigid outsole secured to said inner sole in the front part of said soles only, attaching means secured to said inner sole for attaching at least the heel part of said inner sole to the foot, and attaching means secured to the front part of said shoe for attaching only the front part of said outsole and that part of said inner sole which is secured to said outsole to the front part of the foot, said attaching means thus holding substantially the entire foot-facing surface of said inner sole and the front part of said outsole in contact with the foot sole, leaving thereby the other parts of said outsole not connected with either the inner sole or the foot.

4. An orthopedic sandal comprising an inner flexible sole, a thick rigid outsole, said inner sole being secured to said outsole in the region of the toes only, attaching means secured only to said inner sole in the region of the heel for attaching said inner sole to the heel part of the foot, and strap-like attaching means secured to said sandal only in the region of the joints between the phalanges and the metatarsals of the toes for attaching said outsole and said inner sole to the toe part of the foot.

5. An orthopedic sandal comprising an inner flexible sole, a thick rigid outsole, said inner sole being secured to said outsole in the region of the toes only, attaching means secured only to said inner sole in the region of the heel for attaching said inner sole to the heel part of the foot, and attaching means secured to said sandal only in the region of the joints between the phalanges and the metatarsals of the toes for attaching said outsole and said inner sole to the toe part of the foot.

6. An orthopedic sole comprising an inner flexible sole, a rigid outsole, said inner sole being secured to said outsole in the front part of the sole from the toe end only up to a line lying substantially beneath the joints between the phalanges and the metatarsals of said toes, attaching means secured only to said inner sole for attaching the heel part of the inner sole to the foot, and attaching means secured to said sole and crossing the width of the foot substantially above the line up to which said outsole and said inner sole are connected in the front part of the sole.

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