Dec. 9, 1930. F. F. VON WILMOWSKY 1,784,035

FOOTWEAR

Filed May 15, 1928 2 Sheets-Sheet 1

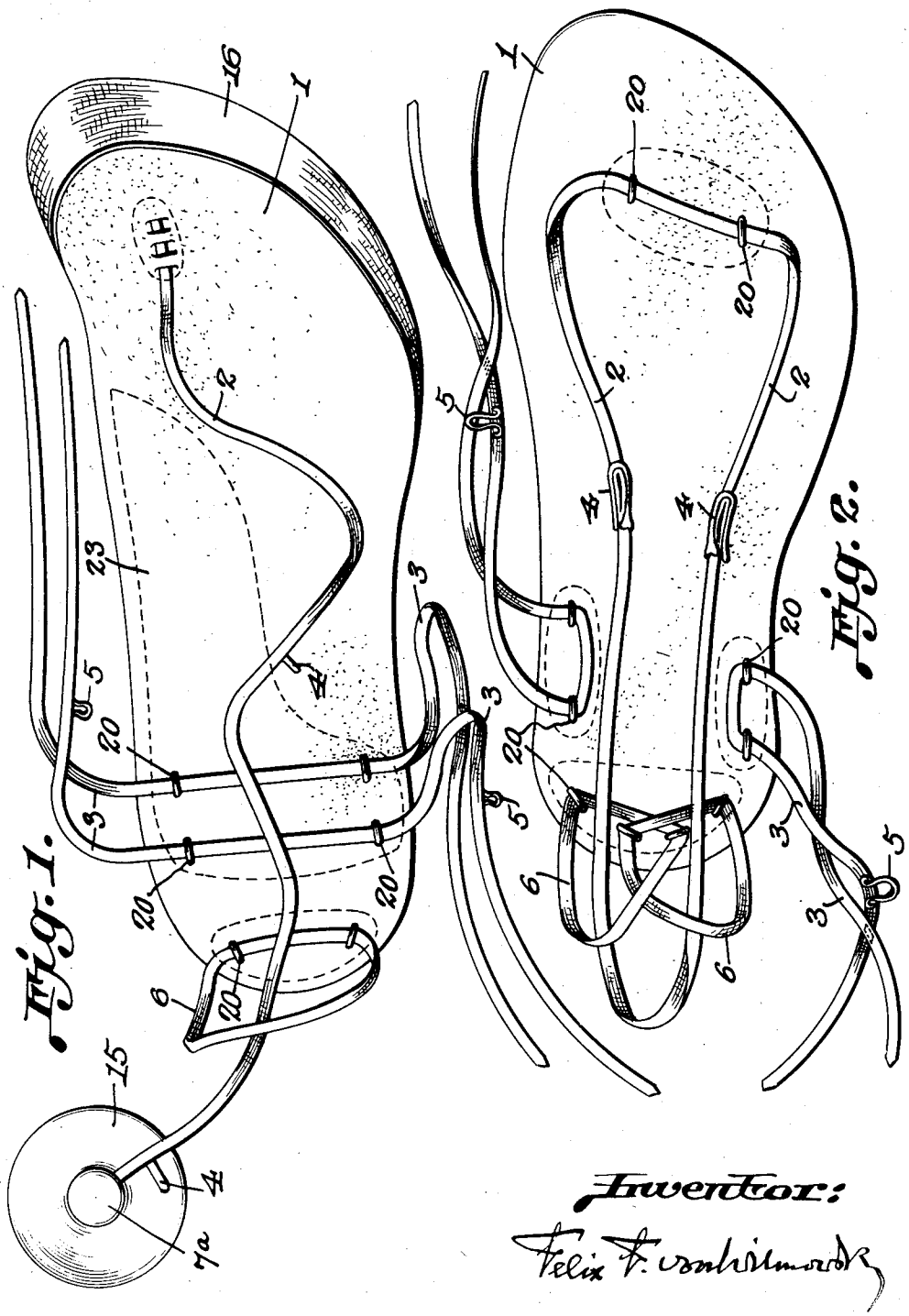



Fig. 1.



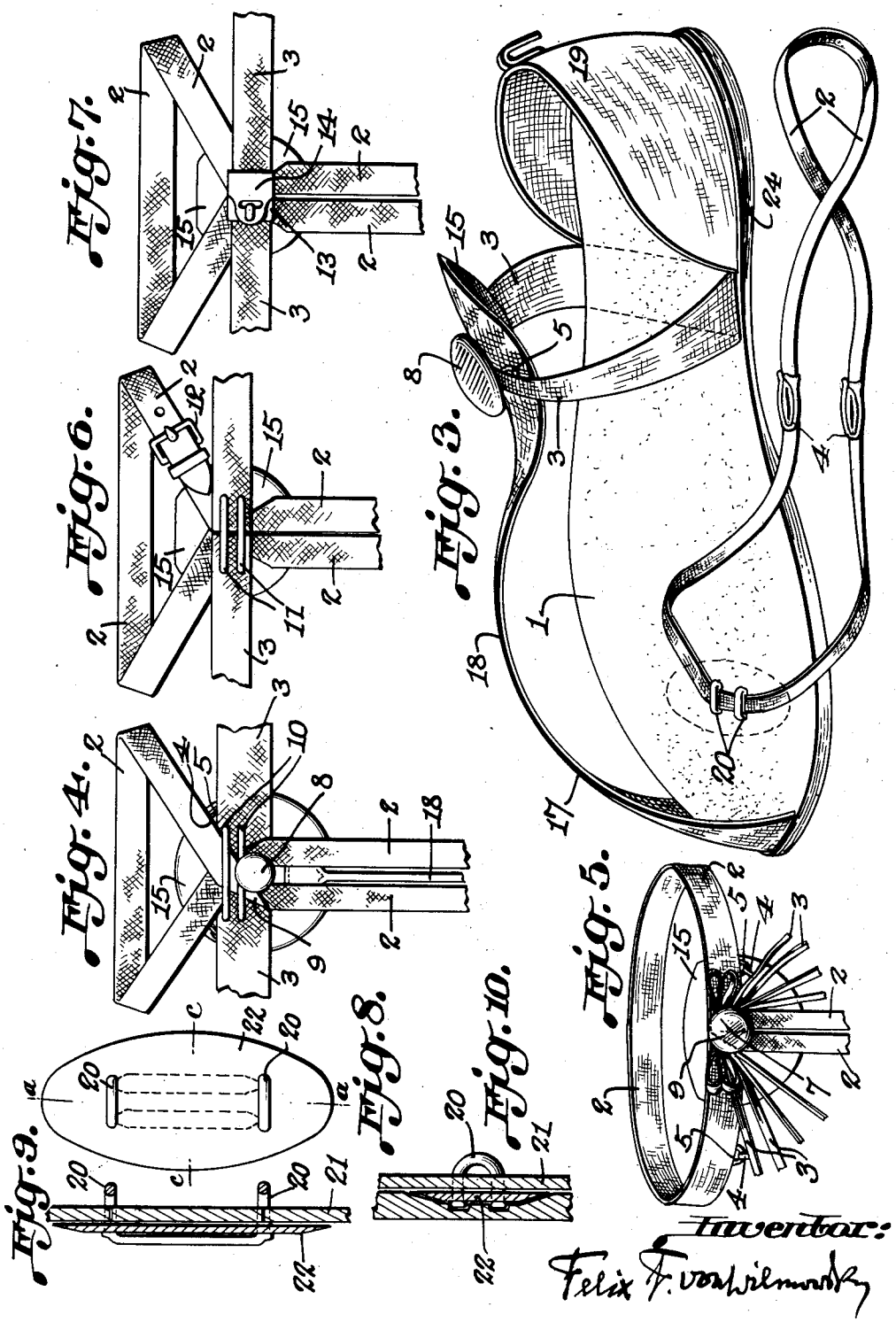

Fig. 2.

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# UNITED STATES PATENT OFFICE

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## FOOTWEAR

Application filed May 15, 1928. Serial No. 277,853.

The improvements relate to the ancient forms of sandals and have for a principal object to ensure free and easy walking barefoot, especially on pebbly and other rough ground, with exposure of the bare feet to the elements and with free play of the toes and the muscles of the foot, and to keep the sandal firmly and yet comfortably attached with its sole clinging to the sole of the foot, eliminating the gradual loosening of the sandal while the foot is moving about.

My improved sandal comprises the combination of a sole, single or composite—that is to say, composed or combined of several soles—and either in one piece or made up of sections hinged or otherwise joined together, and which may be of any suitable material such as leather, india rubber, fibers felted or otherwise intertwined, layers of canvas or paper, coiled rope sewn together, bark, wood, metal; and a longitudinal toe strap, single or composite and either in one piece or made up of sections—consisting, say, of a strap or straps and a ring or rings looped together. The toe strap is fastened or otherwise attached to the forepart of the sandal sole, either at its end or in its middle part; in the latter case, the two loose ends or branches of the toe strap are preferably sewn or otherwise joined or, e. g. by a buckle, to be joined together above the heel, preferably on the outer side of the foot. When the sandal has been put on the foot, the toe strap passes from the sandal sole between the toes of the foot and rearward over, preferably along, the instep and forms a substantially horizontal ring or loop tight around the ankle of the foot, preferably passing below the bony eminences (malleoli) of the ankle along a line similar to that of the present low shoe for men; it serves to make the forepart of the sandal sole and may serve to make also the middle and the rear parts of the sandal sole cling to the sole of the foot. If, when the sandal is put on, the toe strap is not to be attached to the sandal sole at any point except below the toes of the foot, the combination of the sandal comprises, besides, a cross band or instep strap, single or composite and either in one piece or made up of sections; preferably it is formed substantially of two half-sides or branches joined or to be joined together over the central line of the instep of the foot. The instep strap, either at its ends or in its middle part, is fastened or otherwise attached to substantially opposite points of the sides of the sandal sole. When the sandal has been put on the foot, the instep strap passes athwart the instep; it serves to make the middle and the rear parts of the sandal sole cling to the sole of the foot. The combination of the toe strap with an instep strap is in all cases my preferred form of making the sandal sole cling to the sole of the foot. The combination of my improved sandal comprises further a means by which, after the sandal has been put on the foot, it is kept firmly adjusted or continuously readjusted while the foot is moving about, so as to keep the sole of the sandal clinging firmly to the sole of the foot notwithstanding the constant tendency of the sandal sole to work itself loose while the foot is moving about. The means by which I have accomplished this consists in keeping the substantially horizontal ring or loop of the toe strap locked tight around the ankle of the foot; the ways and means of keeping the toe strap locked tight around the ankle may assume various forms. If the horizontal ring or loop of the toe strap around the ankle is formed by tying or joining the loose ends or branches of the instep strap together around the toe strap in front of the ankle, an inferior way of keeping the substantially horizontal ring tight consists in attaching the two rear branches or halves of the composite instep strap to the sides of the sandal sole way back, not far from the heel of the foot; however, in that arrangement the top knot of the instep strap (or, in case of a unitary instep strap, its top) presses hard and rather painfully upon the sinews of the instep when the wearer is running or climbing strenuously, since the sinews moving below the knot or crossing of the instep strap tend constantly to shift the latter forward. A more reliable way of keeping the horizontal ring or loop tight around the ankle is by fixing a knob on top

of the instep strap thus attached and crossing the double toe strap (or the two sides or branches of the toe strap) behind the knob over to the opposite side of the foot. My preferred means is a clasp or broach in front of the ankle by which the toe strap passing in form of a substantially horizontal ring tied or fastened or looped tight around the ankle and the instep strap (or the member or division of the composite instep strap) passing athwart the rear part of the instep are united or joined or fastened together in front of the ankle.

The improved sandal heretofore characterized has been further improved by combining with the aforesaid combinations a heel strap or heel straps, single or composite and either in one piece or made up of sections; preferably longitudinal, attached in its middle part to the sandal sole and its two branches looped together. The heel straps are attached to the rear part of the sandal sole, behind the heel of the foot; they are to be joined to or pass, looped, over the rear of the toe strap behind the heel; their function is not only to confine the portion of the toe strap which passes around the heel within a certain suitable distance from the rear of the sandal sole and to make the rear end of the sandal sole cling to the heel of the foot; I have found that a heel strap restraining the substantially horizontal ring or loop of the toe strap from passing above the ankle bones of the foot aids substantially in preventing the instep strap from slipping forward and in preventing the toe strap from working open around the ankle while the foot is moving about strenuously, and that the combination may serve as an efficient aid to means of keeping the horizontal ring or loop of the toe strap tight around the ankle of the foot. The heel strap may be in form of a heel cap to whose rim the toe strap is secured, say, by means of a hook or hooks.

With the foregoing I have combined another improvement of the sandal which protects the skin and in particular the principal sinews lying below the skin of the instep from the pressure of the straps during strenuous exercise of the foot as hereinabove indicated, and, beyond this, and more important, prevents the sinews from shifting the instep strap forward. My object is accomplished by means of a small preferably half rigid plate or shield of horn, leather, rubber, ivory, metal or other suitable material which is curved according to the lines of the instep and which is placed upon the instep below the strapping; the shield may be unattached and held in place simply by the strapping; preferably it is either attached permanently or is secured adjustably to the strapping. If the instep shield is provided with a ring or tube through which a toe strap, looped (as shown in the Figures II and III), is slipped so as to open and close the ring around the ankle adjustably by means of moving the plate along the joined two lines of the toe strap, it is preferably provided with hooks or eyes which fit into corresponding hooks or eyes fixed at suitable points of the toe strap, thereby keeping the toe strap locked approximately horizontally and tight around the ankle when the sandal is on the foot as will be described hereinafter.

A further improvement of the sandal consists in combining with the above said combination a toe guard; such toe guard consists of the raised front border of the sole, thereby shielding the toes; or of a cap; preferably it is in the form of a strong though not absolutely rigid guard in front of the two large toes sufficiently high and rigid to prevent, in walking or running, direct contact of the toes with a stone or other obstacle.

In the accompanying drawings,

Figure I gives a plan view of a sandal showing a single toe strap, one end fixed in the sole and carrying at its loose end a large knob and, beneath the knob, an instep shield; after the toe strap has been put between the two large toes of the foot, it is to be slung around the ankle and over the knob; the composite instep strap consists of two parallel straps whose middle parts are attached near the heel of the foot athwart the sandal sole by means of eyes or loops protruding from the sole; the four loose ends are to be tied or joined together athwart the instep of the foot in front of the ankle behind the knob of the toe strap; the toe strap at two points and the rear member of the composite instep strap are provided with hooks and eyes, which, joined together, prevent any gradual working loose of the strapping, and, in combination with the large knob of the toe strap, keep the substantially horizontal ring of the toe strap locked tight around the ankle; a looped heel strap, attached to the sandal sole by means of eyes protruding from the latter, aids in keeping the ring substantially horizontal and tight by restraining the rear of the toe strap; the sandal sole has a guard in front of the toes and is composite, with an arch support fixed between the sole members.

Figure II gives a plan view of a sandal with a toe strap whose middle part is attached to the sandal sole through eyes protruding from the latter and whose ends are joined together so that the strap forms a large ring or loop; the toe strap is to come up between the two large toes and between the third and the fourth toe of the foot and is to pass around the ankle; the composite instep strap consists of two parallel straps whose middle parts are attached near the heel of the foot along the sandal sole through eyes protruding from the sole; the four loose ends are sewn together on either side; they

are to be tied or joined together athwart the instep of the foot in front of the ankle, beneath and again over the looped toe strap, thereby forming a substantially horizontal ring of the toe strap tight around the ankle; hooks and eyes on the toe strap and the instep strap prevent, when joined, the instep strap from slipping forward and widening the toe strap ring; a double looped heel strap aids in keeping the ring in position. When the sandal is put on the foot, an unattached instep shield with knob (not shown here, but illustrated in the Figure V) is placed upon the instep in front of the ankle and the strapping is crossed behind the knob.

Figure III gives a side view of a sandal showing a composite (double) sole with heel lifter; a looped toe strap is attached to the sandal sole as in the Figure II; an instep strap, single and continuous, is united with a toe guard by means of a bridge carrying an instep shield; the instep strap carries a large knob; after the foot has slipped through the looped toe strap and through the instep strap and the toe strap has been adjusted between the two large toes, the two sides of the toe strap in front of the ankle are to be slung across the instep behind the knob, thereby closing the ring tight around the ankle; by joining together the hooks and eyes on the toe strap and the instep strap the toe strap is kept locked approximately horizontally tight around the ankle; a heel cap carrying a hook restrains the toe strap above the heel and aids in keeping the horizontal ring in position and tight.

Figure IV gives a front view of the substantially horizontal ring of a looped toe strap whose middle part (not shown) is attached to the sandal sole and of an instep strap or band with instep shield fixed below it as worn on the foot; with the two lines of the folded toe strap crossing behind the knob in the manner which has been planned in the Figure III; the strapping is fastened together by hooks and eyes after the sandal has been put on the foot; the toe strap and the instep strap are fastened further together in front of the ankle by means of clasps.

Figure V gives a front view of the substantially horizontal ring of a looped toe strap whose middle part (not shown) is attached to the sandal sole and of a composite (double) instep strap which is made up of halves or branches as shown in the Figure II and as they appear combined with an instep shield and a knob in front of the strapping after the sandal has been put on the foot; the toe strap is crossed behind the knob, and in front of the instep shield; the instep strap has been tied over the crossed toe strap; the front of the toe strap, running from the ankle to the toes, has been narrowed to half width; hooks and eyes on the toe strap and the instep strap keep the toe strap locked in substance horizontally tight around the ankle; other hooks and eyes (not shown) on the toe strap and the instep shield keep the instep shield in place.

Figure VI gives a front view of the substantially horizontal ring of a toe strap whose middle part (not shown) is attached to the sandal sole and of an instep strap passing over the toe strap, the toe strap and the instep strap being permanently united in front of the ankle by sewing and then cut through along the central front; when the sandal is put on, the severed two sides of the strapping are fastened together over an instep shield in front of the ankle by means of clasps; another manner of fastening the toe strap ring is carried out by the buckle of the toe strap with loose ends or branches whereby the two sides of the strapping are kept permanently united in front of the ankle and the sandal is put on and off the foot by the simple fastening and unfastening of the buckle.

Figure VII gives a front view of the substantially horizontal ring of a looped toe strap united with an instep strap and severed into halves in front of the ankle, each side forming a permanent unit as in the Figure VI; the strapping is to be fastened together in front of the ankle by a so-called clip-fastener over an instep shield which is fastened to one side of the united straps.

Figure VIII gives a plan view of a metal string protruding from a washer; the string is anchored by being flattened on the other side of the washer.

Figures IX and X give cross sections of the washer and the string shown in the Figure VIII along the lines *a*—*a* and *c*—*c*, and as combined with a composite sole in the manner which is shown in the Figures I, II, III.

Like numerals in the several drawings refer to like parts of the several combinations. 1, 1 mark the sandal soles; 2, 2 the toe straps; 3, 3 the instep straps; 4, 4 hooks on the toe straps 2, 2 and which, in combination with the eyes marked 5, 5 on the instep straps, serve to keep the toe strap locked tight around the ankle, keeping, after the hooks and eyes have been joined together, the instep straps from slipping forward and thereby loosening the tight ring around the ankle. 6, 6 mark heel straps; 7, a knob behind which the two sides of the toe strap are to be crossed and the instep straps 3, 3 are to be tied in the Figure V; 7*a*, in the Figure I, marks a knob behind which the toe strap 2 is to be slung and the instep straps 3, 3 are to be tied. 8, 8 mark knobs behind which the two sides of the looped toe strap are to be crossed in the Figures III and IV. 9, 9 mark the foldings of the crossed toe straps in the Figures IV and V. 10, 10 mark bar clasps fastening together the toe strap and the instep strap in the Figure IV; 11, 11 mark bar clasps fas-

tening together the two sides or halves of the strapping in the Figure VI; 12 marks a buckle joining the loose ends of the toe strap 2 in the Figure VI. In the Figure VII, 13 marks a metal plate, base of a clip-fastener, and 14 a plate with a slit; they serve to fasten the two sides of the strapping together. 15, 15 mark the instep shields. 16 marks a toe cap in the Figure I; 17 a toe guard, 18 a toe guard bridge, and 19 a heel cap in the Figure III. 20, 20 mark eyes or loops protruding from the sole in the Figures I, II, III; and in the Figures IX and X, from a piece of leather marked 21. 22, 22 mark a washer in which the strings forming the loops 20, 20 are anchored. 23 marks an arch support in the Figure I, and 24 a heel-lifter shown in the Figure III.

In putting the sandal on the foot, if the toe strap is single and fixed at one end in the sole as shown in the Figure I and the instep strap is in one piece as shown in the Figure III, the foot is slipped under the instep strap and the toe strap is adjusted between the toes; the end of the toe strap is then locked around the ankle; this may be done by buttoning, through a slit (not shown) in the strap, over the knob 7; if the end of the toe strap is looped, by tightening the loop; or the strap is simply slung over the knob 7. The hooks 4, 4 shown in the Figure I are then put into corresponding eyes 5, 5 on the instep strap, thereby keeping the instep strap from gradually slipping forward. If the toe-strap is double or the single toe-strap, with its middle part attached to the fore part of the sandal-sole, is open (see the Figures II and VI), its loose ends or branches passing around the ankle are crossed above the heel of the foot and are finally tied or joined together in front of the ankle in a similar manner as the ballet-dancers fasten their shoe-straps. If the toe-strap is double or the single toe-strap is fixed at its middle part in the sandal-sole and the ends are joined or looped (as shown in the Figures II and III), the first thing to do is to slip the toe-strap over the heel and between the toes, passing the foot through the one-piece instep-strap (in Figure III). The two lines of the toe-strap are then joined together in front of the ankle by some suitable means; (as is shown in the Figures IV and V) it may be done by crossing the two sides of the toe-strap each over to the other side behind a knob, which is fixed in front of the ankle. If the toe-strap is double or the single toe-strap is fixed at its middle part in the sandal-sole and the ends are joined or looped (as in the Figures II and III) and it has a ring (as in the Figure V) or tubular device shiftable along its looped or double length so that by shifting the same the loop or ring is narrowed and widened, the foot slips through the loop or ring and the latter is thereafter closed tight around the ankle.

In case the single instep strap is made up of two separate half-sides or loose ends, the sandal is put on by placing the foot upon the sole between the two lines of the looped toe strap after the two forward ends of the loop have been slipped between the toes; the two halves of the instep strap as shown in the Figure II are now tied together athwart the instep and in front of the ankle; the toe strap is then adjusted around the ankle so as to form a tight substantially horizontal ring above the heel and the two lines are held together over the tie of the instep strap; the latter is then tied once more, over the toe strap, and is knotted fast. The toe strap and the instep strap are then locked together so as to keep them in their mutual position, fitting tight around the ankle, by some suitable means; a simple and efficient way of fastening is by hooks and eyes as shown in the Figures IV and V; or by means of buttons and button holes; the instep strap may also be passed through a doubling of or a slit in the toe strap. The toe strap may be kept locked together with the single instep strap also, if the latter is made up of two halves, as is shown in the Figure VI, by a clasp pin in front of the ankle. If the instep strap is composite, the several strings which are tied over and around the toe strap may be either tied separately athwart the instep, or they or some of them may be united or bunched together as is shown in the Figure II. The fastening of the toe strap tight around the ankle may be done in various other ways and by various other designs; if the toe strap is locked tight around the ankle by means of the instep strap, it is essential that the instep strap is kept from slipping or working gradually forward along the toe strap. If the toe strap is a broad band looped around the ankle, I prefer to join the upper parts of the folded strap in front of the ankle together by some suitable means, say, a bar clasp as is shown in the Figure IV; this ensures the smooth folding of the toe strap in front of the ankle. The foldings of the toe strap may be stiffened by encasing them in rigid frames and be made permanent by encrusting them with metal. In order to expedite the putting on of the sandal, I have united each half of the instep strap permanently with the corresponding side of the toe strap looped around the ankle and have then severed the united straps along the middle line of the front. When putting a sandal thus fitted out on the foot, the foot is slipped into position between the two halves of the united strap, with the toe strap around the ankle and between the toes; the two halves of the strapping are then fastened together over the instep in front of the ankle by a single fasten-

ing movement. Such fastening and locking tight together may be done generally in any suitable manner, say, by tying knots or by means of hooks and eyes or of a fastener as is shown in the Figure VII. The putting of the sandal on the foot may be still further simplified by permanently uniting the two halves of the strapping as shown in the Figure VI and arming a break in the substantially horizontal ring of the toe strap with a buckle as is shown in the Figure VI; it reduces the task of putting the sandal on the foot to the slipping of the toe strap between the toes and buckling the strap around the ankle.

The straps are preferably made of soft-cured and unelastic goat leather; they may be of any other suitable material such as linen, canvas, strong silk ribbon (as is shown in the Figures IV to VII), pliant metal tissue; suitable portions, e. g., across the fore part of the instep, may be of elastic material. The straps are attached to the sandal sole either by sewing their ends to the sole or in some other suitable manner; say, by passing the strap through two holes in the upper layer of a composite sole, the strap passing through one hole and coming up again through the other hole; the sole around the holes may be reinforced by washers. Instead of stringing the straps through the sole, separate strings of leather or metal may be strung through the sole, looped sections of which protrude from the sole as is shown in the Figures I, II, III (marked 20, 20); the strings with washers are shown in the Figures VIII, IX, X. If the sole is thus equipped, the straps are attached to or strung through these loops or eyes.

The improved sandal may be modified and adapted to abnormal forms of feet; arch supports, heel-lifters and other orthopedic devices may be applied to or combined with it as is shown in the Figures I and III. The sandal may be adapted for various sports, for swimming by expanding the sole; also, by arming the sole with studs.

I claim:

1. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and which passes between the toes and is looped approximately horizontally around the ankle when the footwear has been put on the foot; and a means by which the toe strap is kept locked tightly around the ankle after the footwear has been put on the foot.

2. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and which passes between the toes and is looped approximately horizontally around the ankle when the footwear has been put on the foot; and a device shiftable along the toe strap and by which the loop of the toe strap is adjustably tightened and loosened around the ankle; and a means by which the toe strap is kept locked tightly around the ankle after the footwear has been put on the foot.

3. In a footwear, the combination of a sole; a toe strap which is attached to the fore part of the sole and which passes between the toes and around the ankle when the footwear has been put on the foot; strap means attached to the opposite sides of the sole and which pass athwart the instep when the footwear has been put on the foot; and a means by which the toe strap is kept locked around the ankle after the footwear has been put on the foot.

4. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and which passes between the toes and around the ankle when the footwear has been put on the foot; and strap means attached to the opposite sides of the sole and which pass athwart the instep when the footwear has been put on the foot; the instep strap consisting of two half-sides which when putting the footwear on the foot are joined together across the instep.

5. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and having two branches which pass between the toes and around the ankle when the footwear has been put on the foot; and strap means consisting of two halves whose bases are attached to the opposite sides of the sole and which, joined together, pass athwart the instep when the footwear has been put on the foot; the two halves of the instep strap means being united with the branches of the toe strap at the points, respectively, where the loop of the toe strap around the ankle commences and where it ends; the toe strap being locked around the ankle by fastening together the two branches of the toe strap and the instep strap means.

6. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and which passes between the toes and is looped approximately horizontally around the ankle when the footwear has been put on the foot; a means by which the toe strap is kept locked tightly around the ankle after the footwear has been put on the foot; and a means by which the tendon of the heel of the foot is prevented from widening the tight horizontal toe strap ring passing around the ankle and the toe strap ring is held tight in its substantially horizontal position and at a definite distance from the base of the heel after the footwear has been put on the foot.

7. In a footwear, the combination of a sole, a toe strap which is attached to the fore part of the sole and which passes between the toes and around the ankle when the foot-

wear has been put on the foot; a means by which the strap is kept locked around the ankle after the footwear has been put on the foot; and a means by which the toes are protected from contact with obstacles after the footwear has been put on the foot.

8. The combination of a sole, a toe strap which is attached to the fore part of the sole and which passes from the sole between the toes and around the ankle when the footwear has been put on the foot; and means behind which the looped toe strap is crossed in front of the ankle; thereby closing the loop of the toe strap so as to form a ring around the ankle.

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