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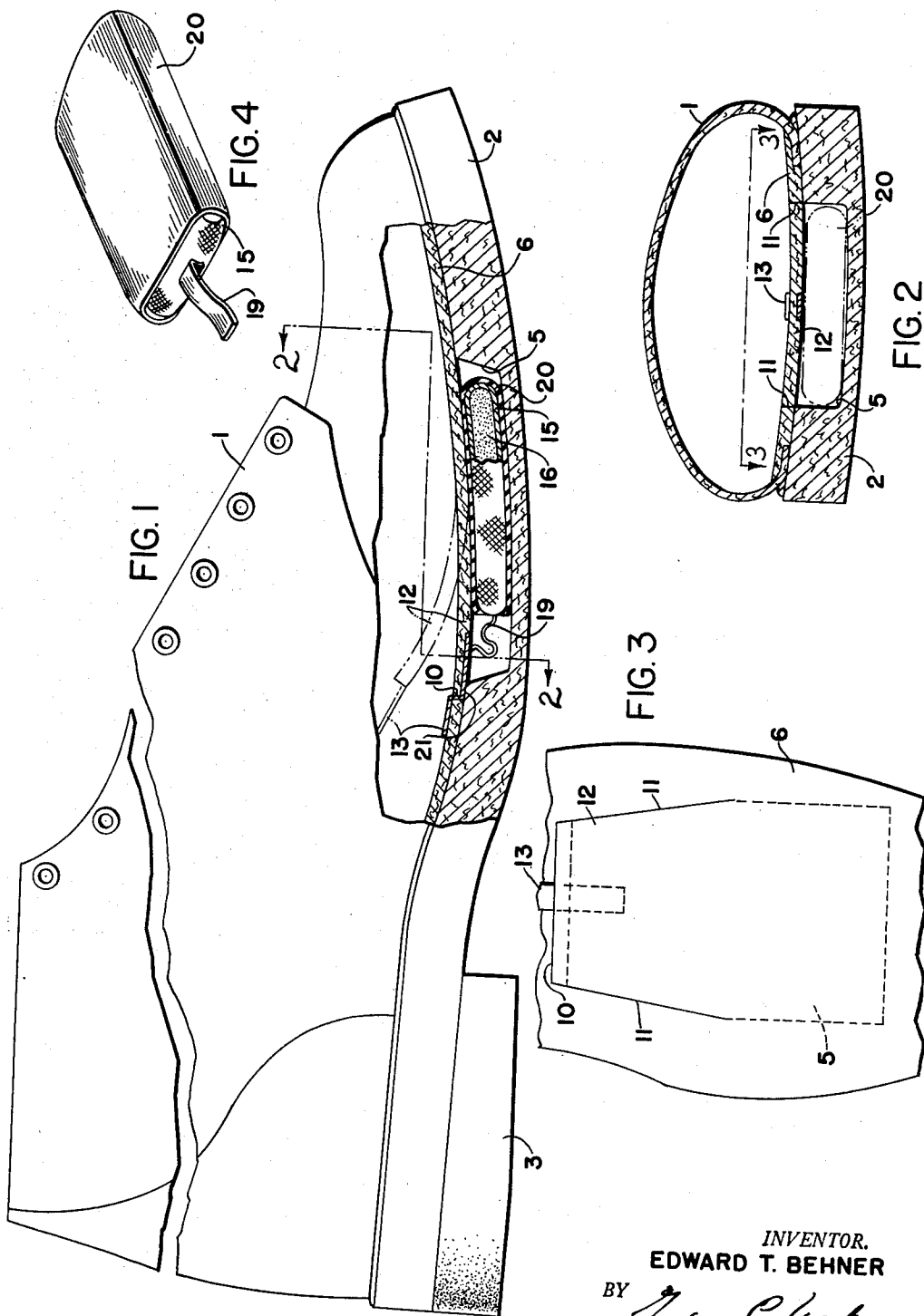
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FOOTWEAR WITH SELF-CONTAINED HEATING UNIT

Filed Aug. 14, 1952

2 Sheets-Sheet 1



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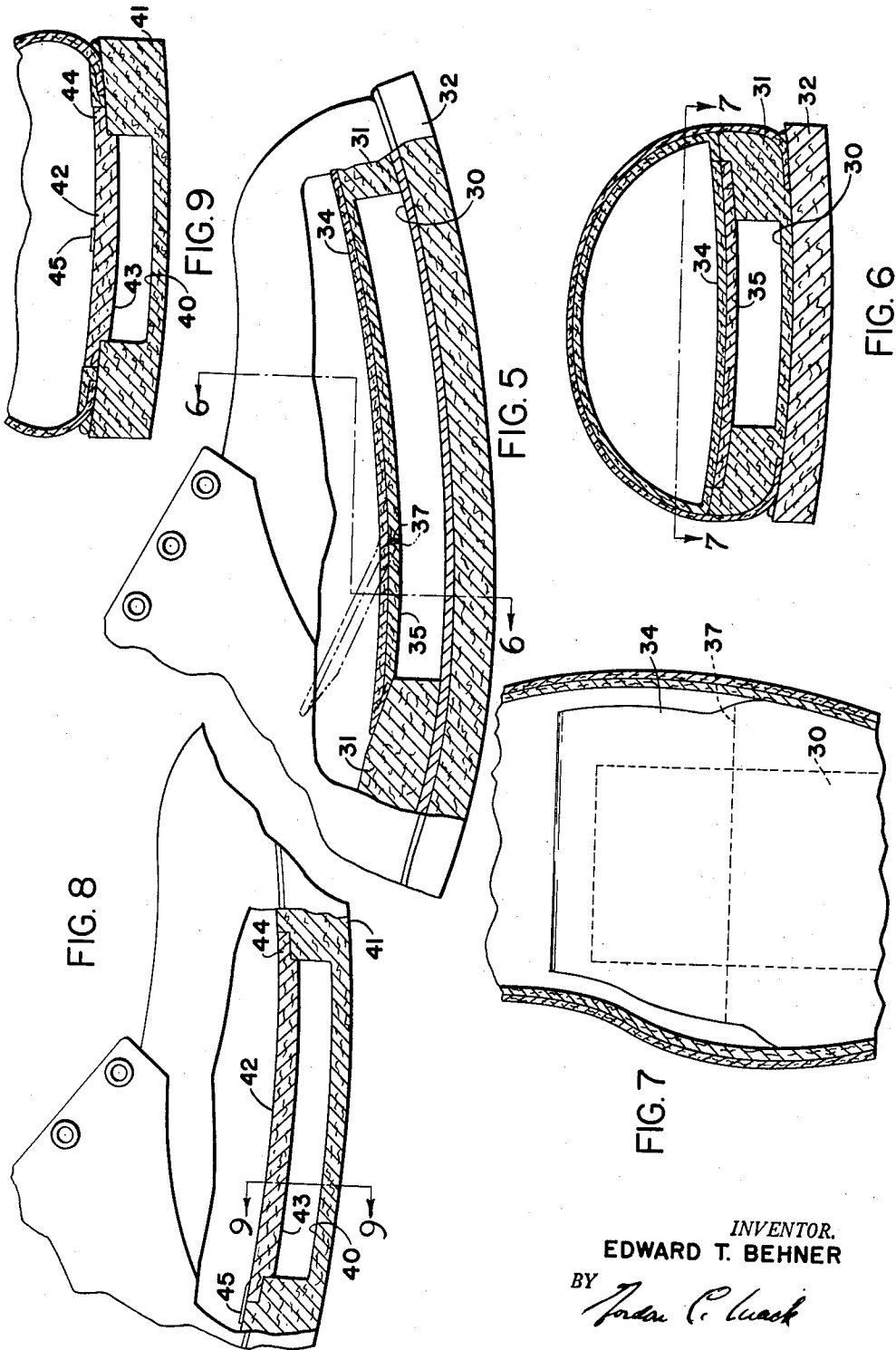
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FOOTWEAR WITH SELF-CONTAINED HEATING UNIT

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1 Claim. (Cl. 36—2.6)

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This invention relates to footwear, and particularly men's shoes and boots. A cavity is provided in the sole of the footwear, preferably forward of the shank, for insertion of a bag or other container of a chemical which when wet generates heat. The cavity is covered and the cover is strong enough to support that portion of the weight of the person wearing the footwear, which normally rests on the cover.

The invention will be described with particular reference to a shoe, but it is understood that it relates generally to boots, etc.

The shoe is intended primarily for use by sportsmen and men in the military service, etc. who are outside in the bitter cold where it is awkward or impossible to warm one's feet except by some self-contained means. The chemical employed is of the type which generates heat when it is wet. Several such chemicals are commercially available, as for instance the material marketed as Thermat by Bauer and Black. The chemical is used in granular form, contained in a bag. Just prior to inserting the bag in the cavity in the sole of a shoe a small amount of water is added to it. The water penetrates the bag, and ordinarily it will be desirable to work the contents of the bag somewhat to distribute the water more or less uniformly throughout it before inserting the bag in the cavity. It is not necessary to add at one time all of the water required to generate all of the heat from the chemical. Usually sufficient water will be added to cause the bag to generate heat for several hours, and then the bag will be removed from the cavity, additional water will be added, and the bag will be returned to the cavity. Several additions of water will ordinarily be used so that heat is generated over a prolonged interval of a day or two, depending upon the amount of chemical in a bag. After the chemical fails to generate heat when more water is added, it is discarded and a fresh bag of chemical is used.

The container for the chemical will ordinarily be made of cloth or other water-penetrable material. After adding the water to the container it may be put in a bag or sheath of rubber or the like, to prevent the cavity from becoming soiled, but this is not necessary.

As heat is generated by the chemical the water is vaporized as steam. This may be vented through vent holes provided in the cover of the cavity, or in any other suitable manner. If there is no other vent for the steam, it will be vented between the cover and the top edge of the cavity.

The cavity may be located in the ordinary sole,

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or a special sole may be provided above the ordinary sole and the cavity may be formed in it. The walls of the cavity will ordinarily be of leather, but may be made of plastic, wood, or even metal or the like.

The footwear may be of any design. It may be a boot, or a shoe or the like. The sole may be of leather, rubber or of a synthetic composition, etc. The shoe may be fur-lined and water-proofed, although this is not necessary. For simplicity, the drawings illustrate a shoe with a leather upper.

The invention will be further described in connection with the accompanying drawings, in which—

Fig. 1 is the side view of a shoe partly broken away to show the cavity and the container of chemical inside of it;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a view in perspective of a bag of the chemical in a rubber cover;

Fig. 5 is a view of an alternative arrangement with the cavity above the ordinary sole;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is an elevation of another construction, partly broken away; and

Fig. 9 is a section on the line 9—9 of Fig. 8.

For the purpose of illustration Fig. 1 shows an ordinary shoe such as may be worn by a workman. The upper 1 is stitched to the sole 2 in the usual way. The heel 3 is nailed to the sole. The invention is not dependent upon the manner in which the shoe is assembled, and the drawings are illustrative only.

The cavity 5 is cut down into the leather of the sole. The insole 6 covers the hole and binds the edges of the upper. It is formed in the usual way except that it is cut laterally along the line 10 and two side cuts 11 (Fig. 3) are made in it to form the cover 12 which can be lifted along the edge 10. The tab 13 of leather or cloth or the like facilitates lifting the cover to gain access to the cavity 5.

Inside the cavity is the cloth container 15 in which is the chemical 16. The size of this container and the amount of chemical which it contains may vary. It facilitates transfer of heat from the bag to the sole of the person wearing the shoe, if the bag is thick enough to form a tight fit so that the cover presses against it. This insures transfer of heat directly to the cover. The cavity is preferably located directly under the ball of the foot, so that the person's weight

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is pressing against the cover as he walks, and conductance of the heat from the chemical to the person is thereby facilitated. Ordinarily each bag will contain about one-quarter or one-half of a cubic inch of the chemical. The container is preferably formed from a relatively heavy cloth bag 15, approximately the size of a tea bag, which is sewn closed after the chemical has been put into it. To facilitate removal of the container from the cavity a tab 19 is fastened to it. The cavity can be kept free from traces of chemical solution by inserting the bag in the cover 20 of rubber or other water-impermeable material before putting it in the cavity.

When the owner of the shoe is going out into the bitter cold he puts a little water on the bag, less than a teaspoonful. He manipulates the bag in his fingers to distribute the water more or less uniformly in the chemical. The bag is then inserted in the rubber sheath. The cover 12 is lifted and the sheathed container is inserted in the cavity 5. The cover is then closed. The shoe is then worn as any other shoe.

The heat generated by wetting the chemical may raise the temperature of the bag and its contents to around 180° F. However, this is not harmful. The cover 12 prevents the wearer's foot from coming in direct contact with the hot bag. The cold of the ground or the snow or ice dissipates heat quite rapidly from the bottom of the sole of the shoe. The heat radiates out from the cavity so that although the greatest heat is more or less localized, there is a general warming of the sole of the foot, or at least the forward part of the sole. The sole of the wearer's foot never gets any hotter than a toasty warm.

When located just forward of the shank of the sole, as illustrated in Fig. 1, the cavity warms the blood circulating to the toes and is strategically located to prevent frostbite. If located at the heel the heat will be diffused to the sole of the foot, but the foot will not be warmed as effectively as when the heating bag is located immediately forward of the shank.

The shape of the cavity may vary and its size will in general depend upon the amount of chemical which is to be employed. If a shoe is to be worn by a sportsman who is to be out in the weather only a part of a day, it is not necessary to provide as large a cavity as in the shoe of a person who is to wear the shoe continuously for a period of eighteen hours or more. If the cavity is appreciably larger than the bag of chemical, heating is not as efficient as when the bag of chemical fits snugly in the cavity.

Figures 1-3 show a relatively narrow cavity, and the cover is no wider than the cavity. The cover is not separated from the forward part of the insole and the forward portion of it is supported by the insole. The ledge 21 at the rear edge of the cavity supports the rear edge of the cover. The cover is made of stiff insole material so that it does not sag when a person's weight is placed on it.

The cavity need not be built into the ordinary sole but may be built into a sole which is superimposed on the ordinary sole. Thus, in Figs. 5-7 the cavity 30 is provided in a secondary sole 31 which is supported by the ordinary sole 32. The cavity of Fig. 5 is shown as somewhat longer than the cavity of Fig. 1.

The cover of the cavity is made of two parts 34 and 35 which are suitably united. The part 34 is a leather covering which extends clear to the toe of the shoe. The part 35 is a stiff leather which is ordinarily the same composition as the secondary sole 31. It is severed from the secondary sole along its front edge 37 and is supported by the insole or part 34 which serves as a hinge. The rear edge of the cover is beveled and rests flat against the surface of that portion of the secondary sole 31 which is just to the rear of the cavity. As shown in Figs. 6 and 7, this cover is wider than the cavity and is supported at the sides as well as at the rear. This makes the cover very strong and it easily supports the weight of the wearer.

The structure shown in Figs. 8 and 9 provides a cavity 40 in the sole 41. The cover 42 is removable. The central portion 43 of the cover is thicker than the edges 44 and fits down into the cavity. It holds the cover in position. The tab 45 which is fastened to the cover in any usual manner facilitates its removal from the shoe. Instead of the cover being built with a thick center to fit down into the cavity, it may be provided around the edge of its under surface with a bead which fits down into a complementary groove in the sole of the shoe; or the under surface of the cover may be formed with a groove which fits over a bead on the sole of the shoe. Any means may be provided for holding the cover in place in the shoe.

The cavities 39 and 49 of the respective modifications shown in Figs. 5-7 and 8-9 are filled with a container of the moist chemical when the shoes are to be worn in the cold.

Although the cavity is shown as located forward of the instep, this is not necessary, although it is preferably and imparts heat to the most advantageous part of the sole of the wearer's foot. The size of the cavity will generally be limited to holding a bag containing the required amount of chemical, because a cavity larger than required to hold the desired amount of chemical will result in heat loss and will not make the shoe as serviceable or the heating as efficient as a cavity which just comfortably receives the bag of chemical.

What I claim is:

Footwear having in the sole and forward of the shank thereof a cavity, an openable cover between the cavity and the interior of the footwear, and in the cavity a water-penetrable container having therein a chemical which generates heat when wet and which snugly fills the cavity and presses against the cover thereof, the container being removable from the cavity with the chemical therein.

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