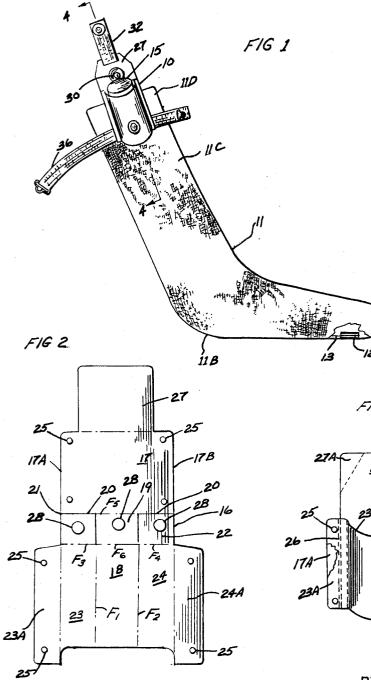
ELECTRICALLY HEATED SOCK WITH BATTERY SUPPORTING POUCH

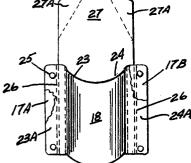
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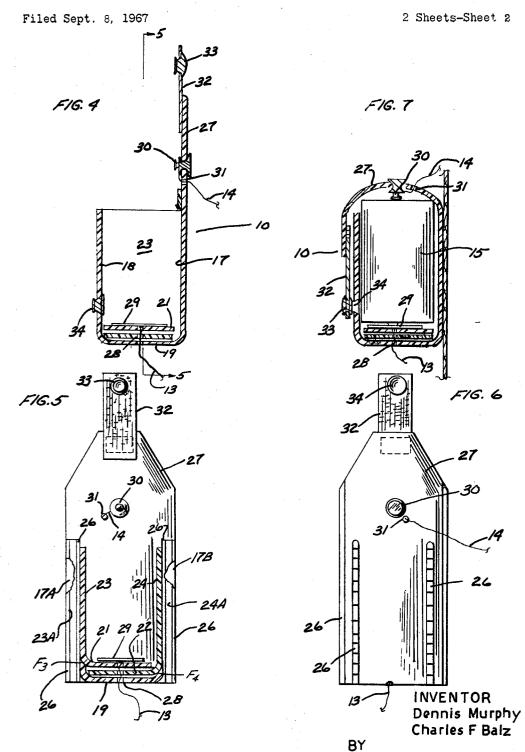


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ELECTRICALLY HEATED SOCK WITH BATTERY SUPPORTING POUCH



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3,396,264 ELECTRICALLY HEATED SOCK WITH BATTERY SUPPORTING POUCH Dennis J. Murphy, Fishkill, and Charles F. Balz, Beacon, N.Y., assignors to Timely Products Corporation, a corporation of Connecticut Filed Sept. 8, 1967, Ser. No. 666,412 13 Claims, (Cl. 219–211)

## ABSTRACT OF THE DISCLOSURE

An electrically heated sock having a pouch generally integrally formed of a sheet of blank material which is specifically die cut and folded to define a pocket having a flap for encasing a battery therein and having contacts arranged to provide positive contact with the electrodes of the battery disposed within the pouch when the flap is closed.

### THE PROBLEM IN THE ART

In the construction of low voltage, battery-energized electrically heated socks of the wholly self-contained type wherein the battery was supported by and/or adjacent 25 the upper end portion of the sock, considerable difficulty has been heretofore encountered providing a proper support or attachment for the battery. In the early development of this type of self-contained battery-operated sock, a pocket was knitted or woven into the hem portion of 30 the sock to define an integrally formed pouch for receiving the battery. However, the knitting and/or forming of a pouch or pocket as an integral part of the sock during the manufacture of the sock introduced severe manufacturing problems into the construction of the sock 35 which greatly increased the cost thereof and which would have necessitated substantial changes in the knitting machines. Also it has been discovered in practice that relatively complex battery-holding brackets were necessitated to connect the battery into circuit with the heater portion 40 of the sock when the battery was placed in the knitted pocket of the sock. Accordingly, the integrally woven pocket in the hem portion of the sock has proven to be an entirely unsatisfactory manner for supporting the bat-45 tery on the sock.

Other known efforts to support the battery for energizing such electrical socks comprised the complete separation of the battery support from the sock. This means included the construction of a separate knitted pocket or 50pouch which was strapped to the leg by a connected garter band and the battery for energizing the heater of the sock carried therein. However, this construction has not proven satisfactory for the reason that such construction detracted from the desirably wholly self-contained feature of the electric sock as such construction required the 55sock to be constructed in two separate and distinct parts which required interconnecting extended wire conductors and detachable contacts for creating the circuit between the battery carried in the remotely positioned pouch and the electric heater carried in the toe portion of the sock. With this type of two-piece construction, experience has shown much difficulty to be encountered in maintaining proper and positive electrical contact between the battery and the heater of the sock. This two-piece construction also necessitated a relatively complex auxiliary battery holder or bracket to support the battery within the remotely disposed knitted pocket or pouch in electrical contact with the heater of the sock. Thus the structure and cost of such auxiliary battery holder or bracket greatly 70 increased the cost and manufacturing effort of such electric socks.

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## OBJECTS OF INVENTION

An object of this invention is to provide an improved pocket or pouch construction in which the need for an auxiliary holder or bracket for the battery is completely eliminated.

Another object of this invention is to provide an improved pouch construction which can be readily secured adjacent the upper end portion of the sock so as to enable one to wear the sock in comfort in a manner so as to 10 render the presence of the battery unnoticeable.

Another object of this invention is to provide a battery pouch for an electrical sock having built-in contacts which can be formed from a single sheet of foldable blank material, which when folded snugly receives and supports the battery in electrical contact with the heater.

Another object of this invention is to provide a battery pouch construction having electrical contacts incorporated therein which can be readily manufactured with a minimum of cost and/or difficulty.

Another object of this invention is to provide an improved pouch construction wherein its construction is such that positive electrical contact is insured between the battery and the heater of the sock.

Another object of this invention is to provide a blank construction which when folded forms an integral pouch construction having a closure flap which is adapted to be utilized as a switching means for making and breaking the circuit between the battery and the electric heater portion of the sock.

Another object of this invention is to provide an improved pouch construction which can be directly secured to the upper end portion of the sock in a manner so that the weight of the battery is supported on the leg of the wearer.

## SUMMARY OF INVENTION

The foregoing objects and other features and advantages of this invention are attained by a pouch construction formed of a single blank of foldable material which is die cut and formed to define an integrally connected back wall forming portion terminating in outer marginal portions and a front wall portion, the respective front and back wall forming portions being interconnected by an intermediate connecting web portion. The front wall portion has laterally extending connected side wall forming portions which are rendered foldable relative to the front wall portion about opposed fold lines so that in the folded position of the blang a pocket is defined thereby. The side wall portions in turn are each provided with outer marginal portions arranged, when folded, to be disposed into contiguous overlying relationship to the outer marginal portions of the back wall portion of the pouch. Means are provided for securing the overlying marginal portions of the back wall forming part of the blank with the outer marginal portions connected to the side wall portions of the blank to maintain the blank in pouchforming position. The blank construction further includes an integral flap portion connected about a fold line to the upper end portion of the blank back wall portion, and a 60 fastening means in the form of a stretchable tongue, and complementary fasteners carried on the tongue and on the front wall of the form pouch is provided for maintaining the flap in a closed position. If desired, an elastic band or garter is suitably connected to the pouch so that the same may be strapped about the leg of the wearer of 65 such socks to assist in supporting the weight of the battery to one's leg.

Contact means are provided in the pouch to maintain the battery in circuit with the heater of the sock. One contact is disposed on the bottom of the pouch, and a second or complementary contact carried on the flap portion of the pouch, the arrangement being such that when the closure flap is secured in its closed position, the electrodes of the battery is positively sandwiched and in contact between the opposed contacts of the pouch. In operation the flap functions as a switch for making and breaking the circuit to the heater of the sock.

A feature of this invention resides in the provision of a battery pouch formed of a single sheet of foldable material in which the adjacent marginal portions of the folded may be suitably sealed or secured to define an integral pouch.

Another feature of this invention resides in the provision of a battery pouch for an electric sock which is relatively simple in construction, which can be easily fabricated, and which is relatively inexpensive to manufacture.

Another feature of this invention resides in a single blank construction which can be readily formed and secured into a pouch-forming pocket for snugly receiving the battery therein wherein the need or use of an auxiliary battery holding means is completely obviated.

Another feature of this invention resides in a battery pouch construction wherein the closure flap thereof functions as a switching means for making and breaking the circuit to the heater.

Another feature of this invention resides in the provi- 25 sion of means for positively sandwiching the battery in electrical contact between the electrical contacts of the battery pouch.

Other features and advantages will become more readily apparent when considered in view of the drawings 30 and specification in which:

FIG. 1 illustrates a perspective view of the battery pouch construction of this invention as applied to an electrically heated sock, portions of which are broken away

FIG. 2 illustrates a plan view of the blank construction from which the battery pouch of FIG. 1 is fabricated.

FIG. 3 illustrates the blank construction of FIG. 1 in an intermediate folded position.

FIG. 4 illustrates a detail sectional side view of the 40 battery pouch construction taken along line 4-4 on FIG. 1 with the battery removed.

FIG. 5 is a sectional front view taken along line 5-5 on FIG. 4.

FIG. 6 illustrates a back view of the pouch construc- 45tion of FIGS. 4 and 5.

FIG. 7 illustrates a cross-sectional view of the pouch construction of FIGS. 4 through 6 in which the closure flap of the pouch is illustrated in the closed position thereof.

Referring to the drawings, there is shown in FIG. 1, the improved pouch construction 10 embodying the invention herein as applied to a heated sock 11. The sock 11 is illustrated as a conventionall formed sock, for example, a woven or knitted sock that comprises generally a toe 55portion 11A, a heel portion 11B and a connected leg portion 11C, the upper end of which may be provided with suitable elastic hem or cuff 11D. The construction and manufacture of the illustrated sock is conventional, with the exception that an electrical heater 12 is disposed in 60 the toe portion 11A of the sock as disclosed in U.S. Patent No. 3,293,405. As described, in U.S. Patent No. 3,293,405, the electrical heater 12 is suitably connected to electrical conductors 13, 14 which extend up the leg portion of the sock, and which electrical conductors terminate at electrical contacts carried on the pouch as will 65be hereinafter described. Accordingly, it will be noted that the sock 11 is electrically heated by means of an electrical resistance material which is energized by a low voltage battery 15, as for example a battery of six volts  $_{70}$ or less such as a flashlight battery.

In accordance with this invention the battery 15 is suitably carried in an improved pouch construction 10 which is preferably secured to the sock 11 adjacent the upper end 11D thereof by any suitable means, e.g., sewing. The 75 improved pouch construction 10 for supporting the battery 15 adjacent the upper end of the sock to form a wholly self-contained electrically heated sock comprises essentially a single blank of sheet material 16 which is shaped and die cut as illustrated in FIG. 2. The blank 16 may be formed of any suitable foldable sheet material. However, it is preferred that the blank 16 be formed of a suitable, heat-sealable plastic material.

As shown in FIG. 2 the blank construction 16 comprises a sheet material having laterally extending step 10portions as indicated. The blank 16 includes a back wallforming portion 17 and a front wall portion 18 interconnected by an intermediate bottom web portion 19. The bottom web portion 19, as indicated, is provided with opposed L-shaped die cuts 20, which in the folded posi-15tion of the blank, as will be hereinafter described, define side wall bottom flaps 21.

As shown, the front wall portion 18 has connected along the opposed longitudinal edges thereof about fold lines  $F_1$  and  $F_2$  opposed side wall-forming portions 23, 2024 which are adapted to be folded relative to the front wall portion 18 about respective fold lines  $F_1$  and  $F_2$ . Each of the respective side wall portions 23, 24 terminates in a laterally extending marginal portion 23A, 24A which in the folded position of the blank, as illustrated in FIG. 3, are arranged to overlie the marginal end portions 17A, 17B of the back wall portion of the blank. Connected to each side wall portion is a side wall bottom flap 21, 22 foldable about fold lines F<sub>3</sub> and F<sub>4</sub>. In the illustrated form of the blank, FIG. 2, it will be noted that the outer marginal portions 17A, 17B of the back wall-forming portion and the marginal portions 23A, 24A connected to the side wall-forming portions are each provided with relatively small apertures 25 which function as means to effect alignment for maintaining the respective portions 35of the blank in a pre-assembled intermediate step to facilitate the manufacture and assembly thereof. Accordingly, the pouch is constructed by first forming and die-cutting the blank 16 as illustrated in FIG. 2, and the blank 16 thus formed is then reversely folded about fold lines F5 and  $F_6$  to dispose the front portion 18 of the blank in spaced relationship to the back portion 17 of the blank as best seen in FIG. 2. In this position the side portions 23, 24 of the pouch are formed about their respective fold lines with the side marginal portions 23A, 24A laterally folded to overlie the marginal portions 17A, 17B of the back wall-forming portion, as in FIG. 2. In this intermediate folded position it will be noted that the bottom side wall-forming flaps 21, 22 are folded inwardly about their respective fold lines  $F_3$ ,  $F_4$ , as best seen in FIGS. 4 and 5. This allows the bottom side wall flaps 21, 22 to be folded in overlying relationship above the bottom webforming portion 19 of the blank. Accordingly, as seen in FIGS. 4 and 5, the bottom of the pouch is defined by a triple layer of material which includes the bottom web portion 19 and the opposed side bottom flaps 21, 22.

To secure the overlying marginal portions 17A, 17B and 23A, 24A to form the integral pouch construction, it will be noted that a heat-seal seam 26 is formed by suitable means which integrally fuse the marginal portions together. In the sealing operation the marginal portions extending beyond the outermost seam (FIG. 3) may sever, thus forming the pouch construction as seen in FIGS. 1 and 5.

In accordance with this invention a closure flap 27 is integrally formed to the back wall 17 of the pouch to form an extension thereof. The flap 27 is sufficiently long so that when folded it forms a closure for the open end of the pocket or pouch defined by the folded blank, as best seen in FIG. 7. If desired, the corner portion 27A of the flap 27 may be cut along the dotted lines as shown on FIG. 3 to shape the flap as shown in FIGS. 5 and 6. It will be noted that the size of the blank construction is specifically prescribed so that in the folded position thereof a pocket is defined which will snugly receive the battery 15 by which the electrical heater of the sock is energized.

In accordance with this invention it will be noted that the bottom forming web portion 19, and each of the respective bottom side forming flaps 21, 22 are provided 5 with an aperture 28 which in the folded position of the blank is disposed in alignment, as best seen in FIGS. 4 and 5.

In the illustrated form of the invention the battery 15 comprises a conventional flashlight battery which may 10 generate a voltage of 11/2 volts.

The battery pouch is provided with suitable contacts by which the battery supported or carried therein is connected into electrical circuit with the heater of the sock construction. As shown, a plate 29 formed of suitably con- 15 ducting material is disposed in the bottom of the pocket and it is arranged to rest upon the uppermost of the bottom-forming side wall flaps, as is best illustrated in FIGS. 4 and 5. Preferably the contact plate 29 comprises a disc which rests on the bottom of the pouch. The electrical 20 conductor 13, which connects the disc contact 29 into circuit with the heater 12, is threaded through the aligned openings 28 provided in the respective bottom flaps and bottom wall portion of the pouch. Thus when the battery is disposed in the pouch, one electrode engages the con-25tact disc as seen in FIG. 7. The complementary contact for connecting the other electrode of the battery into circuit with the heater comprises a button-type contact 30 which is carried on the closure flap portion of the pouch. As best seen in FIG. 7, it will be noted that when the 30 closure flap 27 is secured in the closed position, the button contact 30 is disposed against the end or other electrode of the battery. Accordingly, as best seen in FIG. 7, with the closure flap 27 drawn to its closed position, the battery 15 is positively sandwiched between the contact disc 35 29 and button contact 30 to place the battery in circuit to the heater 12. The conductor 13, 14 connecting the button contact 30 in circuit to the heater is threaded through an opening 31.

In order to insure that the battery is secured between 40 the respective contacts 29 and 30 so as to insure positive electrical contact with the terminals or electrodes of the battery a stretchable tongue 32 of elastic material is connected to the free end of the flap 27 and suitable fastening means are provided for securing the stretchable 45 tongue 32 to the wall of the pouch to maintain the flap in the operative closed position as in FIG. 7.

In the illustrated form of the invention the fastening means comprise complementary male and female snaptype fasteners 33, 34, one of which is carried adjacent the 50 free end of the stretchable elastic tongue and the other complementary fastening means being carried on the front wall portion of the pouch adjacent the lower end thereof. As best seen in FIG. 7 it will be noted that in order to align the complementary fasteners 33, 34 to effect the 55 engagement thereof, the tongue 32 must be slightly stretched so that the tension thus provided assures that a sufficient force is maintained by the closure flap 27 against the end of the battery to insure positive electrical contact between the opposed contacts 29, 30, and the 60 respective battery electrodes.

Because the dimensions of the blank sheet are specifically predetermined to define in the folded position thereof a pouch construction for snugly receiving the bat-65tery, it will be noted that the need for any auxiliary battery holding bracket is completely obviated.

As best seen in FIG. 1, it is preferred that the battery pouch 10 construction defined be suitably secured to the upper end portion of the sock by any suitable means, for  $_{70}$ example, by a sewn seam or the like. If desired, an elastic band or garter 36 may be secured to the pouch construction 10 whereby the weight of the battery can be further supported on the leg of the wearer by strapping the pouch about the leg of the wearer. The band or garter 75 tion of said flap, whereby said top contact is adapted to

36 thus connected to the pouch construction may also function as a garter for the sock.

While the instant invention has been described with respect to a particular embodiment thereof, it will be readily appreciated and understood that variations and modifications may be made without departing from the spirit or scope of the invention. For example, in addition for use with electric socks as herein described, the battery pouch may be used with other battery-operated heated garments or other battery-operated devices. For example, the pouch may be satisfactorily used with battery heated gloves,

sweaters, shirts, pants and various articles of clothing. What is claimed is:

1. An improved pouch construction adapted for securing a low-voltage battery to the hem portion of a battery-actuated, electrically heated sock comprising:

- a sheet of blank material adapted to be folded to form an integrally constructed pouch.
- said sheet including an integrally connected back wall having outer marginal portions and front wall portion.
- a web portion interconnecting said front and back wall portion,
- and said front wall portion having laterally extending connected side wall forming portions which in the folded portion of the blank define the side walls of the pouch construction,
- said side wall portions having outer marginal portions arranged when folded to be disposed in contiguous overlying relationship to the outer marginal portions of said back wall portion,
- and means securing said overlying marginal portions of said back wall forming portion and said outer marginal portions connected to said side wall forming portions to maintain said blank in pouch-forming position.
- a flap portion connected about a folding to the upper end of said back wall portion,
- and fastening means for detachably securing said flap portion to said front wall portion in the operable position of said pouch.
- 2. The pouch construction as defined in claim 1 wherein said blank is formed of a plastic heat fusible material.

3. The invention as defined in claim 2 wherein said means for securing the overlying marginal portions of said back forming portion and said outer marginal portions connected to said side wall portions include a heat fusible seam.

4. The pouch construction as defined in claim 1 wherein:

- said web portion is die cut to define a bottom web portion interconnected between said back portion and front portion,
- and a pair of opposed bottom side wall flaps hingedly connected about a foldline to said side portions, whereby in the folded position of said blank, the side wall bottom flaps are folded in overlying relationship continuous to said bottom web portion to define a reinforced triple layer bottom wall for said pouch.

5. The pouch construction of claim 1 wherein each of said bottom web portions and side wall bottom flaps are provided with an aperture position therein so that in the folded position of the blank, said apertures are disposed in alignment.

6. The invention as defined in claim 5 and including an electrical conducting contact located in the bottom of said pouch, and a

wire conductor electrically connected to said contact, said conductor being threaded through said aligned apertures in the assembled position of said pouch.

7. The invention as defined in claim 6, and including an electrical top contact secured to an intermediate por-

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make contact with an electrode of a battery adapted to be supported in said pouch.

8. The invention as defined in claim 1 wherein said fastening means includes:

a stretchable tongue connected to said flap,

and complementary mating fasteners connected adjacent the free end of said tongue and the front wall portion whereby the flap is disposed in snug relationship to the end of the battery adapted to be disposed within said pouch.

9. The invention as defined in claim 8 and including complementary electrical contacts for connecting a battery within said pouch in electrical contact when said flap is secured.

10. The invention as defined in claim 9 wherein a 15 contact is connected to said flap portion to engage an electrode of a battery disposed in said pouch and another contact disposed in the bottom of said pouch to electrically contact the other electrode of said battery.

11 The invention as defined in claim 1 and including 20 an elastic band connected to said pouch for securing the same about the leg of a wearer.

**12.** A low voltage, battery-operated, electrically heated sock, comprising in combination:

- a sock having a toe portion, a heel portion, and a con- 25 nected leg portion,
- a heater disposed in the toe portion of said sock, said heater including a strip of electrical resistance material,
- and a battery pouch disposed adjacent the upper end 30 of said sock adapted for supporting the battery for energizing said heater.
- said battery pouch including a blank of heat fusible plastic material,
- said blank including integrally connected back wall 35 portion and a front wall portion, said back wall portion having outer marginal portions,
- a bottom forming web interconnecting said back wall portion to said front wall portion,
- a side wall portion connected to each side of said front 40 wall portion about a foldline,

each of said side wall portions having a connected laterally extending outer marginal portion,

- said blank being reversely folded so that the marginal portion of said side walls contiguously overlies the 45 marginal portions of said back wall portions,
- a heat fusible seam securing said side wall marginal portions to the back wall marginal portion,

side wall bottom flaps connected to each of said side wall portions, 50

- said side wall bottom flaps in the folded portion of said blank being disposed in contiguous overlying relationship to said bottom forming web in the folded position of said blank,
- each of said bottom flaps and bottom web portions having aligned apertures formed therein,

a closure flap hingedly connected to said back portion about a foldline,

an elastic tongue connected to said closure flap,

- complementary fastening means on said tongue and said front wall portion for detachably securing said closure flap in the closed position,
- an electrical contact disposed in the bottom of said pouch,
- and a second electrical contact connected to said flap, said contacts being adapted to sandwich said battery therebetween when said closure flap is secured,
- and electrical conductors connecting each of said contacts in circuit with said heater whereby said heater is energized only when said closure flap is secured to said front wall portion,
- means securing said pouch adjacent the upper end of the connected leg portion of said sock, ,
- and an elastic band connected to said pouch for supporting the weight of the battery therein on the wearer's leg.
- 13. A battery pouch construction comprising:
- a blank of readily foldable material including a back panel and a front panel, and a web portion interconnecting said back and front panels,
- said front panel having connected side wall forming portions in the folded position of the blank,
- each of said side wall forming portions having an outer laterally extending marginal portion adapted in the folded position of said blank to be disposed in contiguous overlying relationship to the marginal portions of said back panel,
- means securing said overlying marginal portions together to define a battery receiving pocket,
- a flap connected to the upper end of said back panel, said flap being adapted to fold over the open end of the pocket defined in the folded position of said blank,
- fastening means for securing said flap to the front panel,
- an electrical contact secured to the said flap so that in the folded and fastened position, said contact is disposed in contact with an electrode of a battery disposed in the pouch,
- and a second contact positioned in the bottom of said pocket to engage the other electrode of said battery.

#### References Cited

#### UNITED STATES PATENTS

2,584,302	2/1952	Stein 219-527
2,692,326	10/1954	Crowell 219-211
3,079,486	2/1963	Winchell 219-528
3,084,241	4/1963	Carrona 219-211
3,293,405	12/1966	Costanzo 219—211

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