United States Patent

Lindell

[15] **3,650,869**

[45] **Mar. 21, 1972**

[54] PROTECTIVE PAD AND METHOD OF USING

[72] Inventor: **Stanley M. Lindell,** Richfield, Minn.

[73] Assignee: **Minnesota Mining and Manufacturing Company,** St. Paul, Minn.

[22] Filed: **July 7, 1969**

[21] Appl. No.: **839,323**

[52] **U.S. Cl.** **156/212,** 156/213, 161/109, 161/112

[51] **Int. Cl.** **B32b 3/04,** B32b 3/10

[58] **Field of Search** 156/211, 212, 213, 214; 29/157; 285/156; 117/80; 161/109, 112

[56] **References Cited**

UNITED STATES PATENTS

2,390,632	12/1945	Abrams et al.	156/214 X
2,899,765	8/1959	Fuller	156/211 X
3,129,816	4/1964	Bond et al.	117/80 X

Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—G. E. Montone
Attorney—Kinney, Alexander, Sell, Steldt & Delahunt

[57] **ABSTRACT**

Service connections to gas mains are protected against external corrosive influences by covering with a protective mastic sheet material which is slit in a pattern permitting complete void-free coverage by simple and rapid hand application.

5 Claims, 7 Drawing Figures

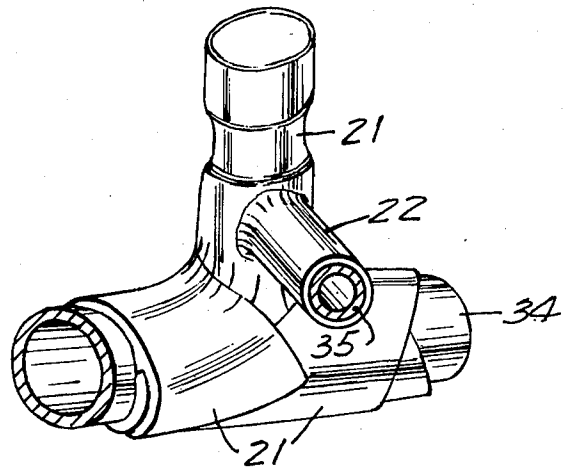


FIG. 1

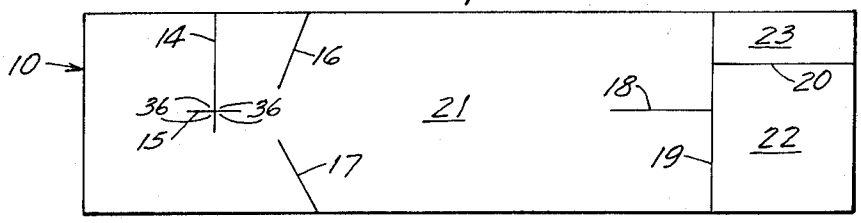


FIG. 2

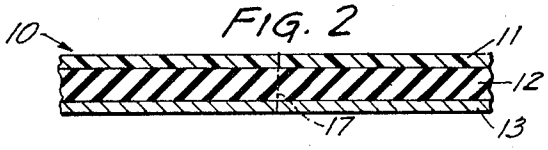


FIG. 3

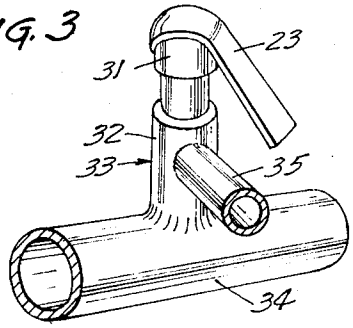


FIG. 4

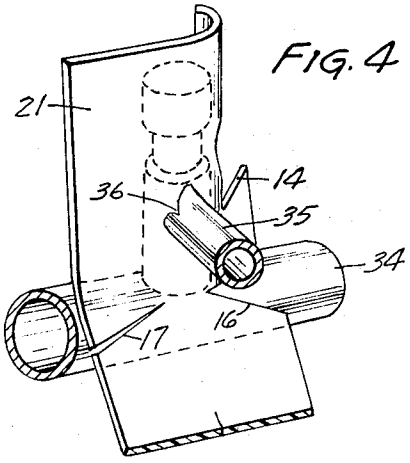


FIG. 6

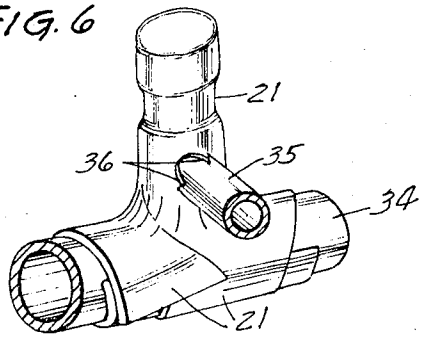


FIG. 5

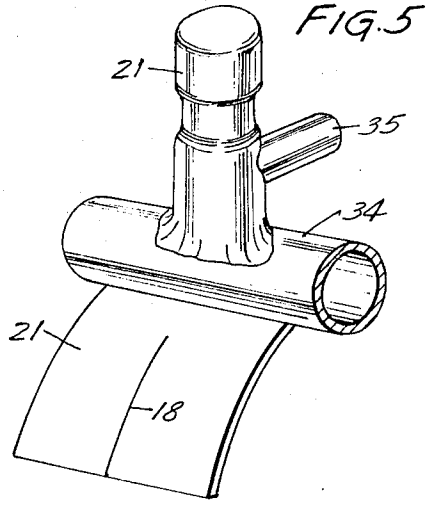
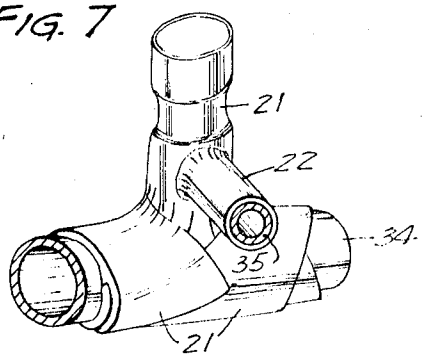


FIG. 7



INVENTOR.
STANLEY M. LINDELL
BY Kinney, Alexander
Sell, Steldt & DeLa Hunt
ATTORNEYS

PROTECTIVE PAD AND METHOD OF USING

This invention relates to the protective covering of underground pipe lines or the like. An example is in the protection of iron pipe used for supplying natural gas to domestic users. In one specific aspect, the invention contemplates the protective covering of welded tee joints serving as gas main service connections.

A typical method of making connections to a gas main involves welding a series of T-shaped couplings along the main at desired intervals. One end of the crossmember of the T is welded to the main, and connection to the user's meter is made through the extended stem of the T. After all connections are completed, service is initiated by puncturing the main with a probe inserted through the crossmember, withdrawing the probe, and capping the open end.

Since the entire connection is subsequently to be covered with earth or is otherwise subject to corrosion, some form of protection is required. The application of molten asphalt or asphalt paints is slow and untidy. Wrapping with protective tapes has been suggested but the contour of the connection makes such applications slow and difficult and the results uncertain.

The present invention overcomes these and other deficiencies and difficulties by providing a precut plastic adherent protective patch with which the entire tee connection is easily and quickly provided with a close-fitting water-repelling protective covering.

In the drawing, FIG. 1 is a plan view, and FIG. 2 a partial edge elevation on an expanded scale, of a preferred and exemplary precut patch, and

FIGS. 3–7 show in perspective some significant stages in the application of the patch of FIGS. 1 and 2 to a completed tee connection on a gas main.

The patch **10** of FIGS. **1** and **2** consists of a rectangular segment of a thin tough plastic film **11** having bonded to one surface a thick layer of soft mastic **12** which is protected with a removable slipsheet **13**. The patch is provided with a number of linear cuts **14–20** which sever the film and slipsheet, but do not permanently separate the adjacent edges of the soft tacky mastic which therefore serves to retain the cut edges in their initial alignment.

The dimensions of the patch will vary depending on the particular tee and main to be covered. Typically, for a standard connection to a two-inch main the overall patch dimensions will be 6½ inches × 25 inches. The distance from the near end to the 4¼ inch cut **14** is 4½ inches and to the outer ends of the cuts **16,17** is 7¼ inches. The central cut **15** is two inches in length. The distance between cut **14** and cuts **16** and **17**, about two inches for the present example, is approximately one-half the length of the crossmember of the tee on which the covering is to be applied. The inner ends of cuts **16,17** are two inches apart, and these two cuts are at an angle of about 70–75 degrees with the long edge of the patch. Central cut **18** is four inches long. Cut **19**, serving as an end line and separating the main body **21** from the extensions **22** and **23**, is at five inches from the end of the sheet. The width of the narrow segment **23** defined by cut **20** is 1-¾ inches, or about one-fourth the total width of the sheet.

A preferred patch structure employs a plasticized vinyl resin film **11**. Age-resistant synthetic rubber, and polyethylene or polypropylene films, are also useful. Preferably the film is seven to eight mils in thickness. In narrow strips, e.g., one inch in width, the vinyl film may be stretched to at least twice its length at normal room temperature under hand-applied tension without breaking, and, when stretched to a 50 percent increase in length and then released, will slowly return to substantially its initial length. Suitable compositions and films are described in U.S. Pat. No. 3,129,816, wherein are further disclosed various adhesive primer compositions useful in providing improved bond between the film and the mastic coating **12**. Films which cannot be effectively conformed under hand manipulation, or which are too weak or too easily broken to provide for effective hand application of the patch, are to be avoided. Thus, the vinyl films are preferably from about seven

to about 20 mils in thickness, whereas vulcanized rubber films are preferably within the range of about 15 to 50 mils.

A suitable mastic may contain the following components, the proportions being indicated in parts by weight.

butyl rubber (Butyl 365)	11.0
ethylene-propylene rubbery polymer (Nordel 1040)	10.0
polybutylene (m.w. 900–1500)	38.0
asphalt (softening point 190° F.)	11.0
powdered talc	26.8
carbon black	3.2

The well-mixed mass is sheeted out on an extruder to a thickness of about 0.1–0.2 inch, preferably about 0.12 inch, on a removable polypropylene film liner and is then bonded to the seven mil vinyl film under moderate pressure. The vinyl film may be pre-coated with an adhesive primer if desired although this refinement is not ordinarily necessary and of course adds to the cost of the product. The coating is tacky to the touch, strongly coherent when two surfaces are pressed together, and is soft and pliable under moderate finger pressure, but has sufficient internal strength or resistance to flow to retain its original thickness when the coated sheet is wound into a loose roll or cut into segments and stacked to a height of 10 or 12 thicknesses as in storage and shipment of the patch material. From the exemplary formulation it will be apparent that the mastic layer is age-resistant, water-resistant, and noncorrosive as well as having the plastic flow and bonding properties indicated.

An alternative mastic composition may consist of

butyl rubber (GRI–165)	105
zinc oxide	4
bentonite clay (Bentone 34)	41
asphalt (190° F. softening point)	55
polybutylene	190
carbon black	15
asbestos shorts	20
coarse silica powder	60
fine silica powder	10

which in this instance is applied to a 10-mil vinyl film, again at a preferred thickness of 120 mils, and is protected with a removable liner. The mastic layer may be as thin as about 20 mils or as thick as about 200 mils.

The sheet material will ordinarily be produced in continuous wide strips from which the individual patches **10** are removed either before or at the time of use. Thus the patches may be supplied either separately, e.g., packaged in individual envelopes, or in continuous roll form. The former procedure is presently preferred, the protective envelopes obviating any possibility of the mastic oozing from the exposed edges and adhering to various surfaces during storage or prior to use. Silicone-coated paper or parchment envelopes are particularly suitable for enclosing the individual patches.

The use of appropriate dies and presses makes it possible to isolate the individual patch and to form the several cuts therein in a single operation. The die may be designed to sever the entire thickness, including the removable liner, around the periphery while cutting only to the surface of the liner along the several cut lines. It is preferred, however, to cut entirely through the liner as well as the film and mastic, and then carefully to withdraw the cutting edge so as to permit resealing of the mastic along those areas. Such sealing takes place along less than the full edge area so that the pieces may be easily separated when desired but normally remain bonded together. The juncture thereby obtained is of sufficient strength so that the patch continues to present a continuous surface, even the completely severed segments **22** and **23** remaining attached to the main body **21**.

The application of the patch to a T-connection at a gas main will now be described. It will be understood that gas flow has previously been established by perforation of the main through the member **32** and that the entire area has been competently cleaned, e.g., by wire-brushing.

The segment **23** is first detached and, after removal of the liner, is pressed firmly over the cap **31** and down along one side of the crossmember **32** of the tee **33** which has previously been welded to the gas main **34**. The mastic adheres well to the metal and, under the slight continuous tension imparted by the contracting slightly stretched film, flows into and conforms with all irregularities in the metal surface. The segment **23** covers the entire end of the cap **31** and reaches part way down its sides.

The segment **22** is next removed and retained for subsequent use. The segment **21**, with liner removed, is opened along cuts **14** and **15** by being drawn against the crossmember **32** and around the stem **35**, as shown in FIG. **4**. The upper portion, above the cut **14** as shown in the figure, is first pulled around the crossmember and adhered thereto and over the segment **23**. The lower portion, between the cuts **14** and **16**, is then pulled around the crossmember beneath the stem **35**. The tips **36** formed at the juncture of cuts **14** and **15** remain extended along the base of the stem.

The left-hand portion above the cut **17** is next drawn around the back of the crossmember **32** and over the edges of the right-hand portion, and the top is smoothly folded together and pressed over the previously partly covered cap **31**, to form a generally uniform covering over the entire crossmember as shown from the reverse side of the connection in FIG. **5**. The bifurcate end of the segment **21**, containing the cut **18**, is then brought around beneath the main **34** and the two ends drawn snugly around the covered crossmember and crossed beneath the stem **35** as shown in FIG. **6**, thereby covering the exposed edges of slits **16** and **17**.

Finally, the segment **22**, with liner removed, is wrapped under tension around the stem **35**, over the tips **36** and snugly against the previous wrapping, to complete the installation as shown in FIG. **7**. Additional coverings may be applied in conventional manner to the main **34** and to the service pipe as needed.

The same patch is useful also in the protective covering of connections employing a simple ell connection, as is typically used in water-pipe connections. For such applications the slits **14** and **15** are not required and may be omitted; or, if present, may be covered with the segment **22**. The slanted slits **16, 17** permit the end portion of the patch to be folded around the L in much the same manner as described for the lower portion of the T in connection with FIGS. **4** and **5**, and the bifurcate end formed by slit **18** permits the exposed edges of the slits **16,17** to be effectively covered in the manner described in connection with FIG. **6**.

Under the hand pressure used in applying the patch, and the additional moderate tension supplied by the stretched film backing, the soft mastic flows into substantially all crevices and voids within the area and provides an effective barrier to subsequent entry of water or other corrosive influences. In effect, the connection is hermetically sealed or encapsulated. Protection is maintained even under stresses induced by changes in temperature or under normal earth movements, due to the elastic resiliency, adhesion, and plastic flow properties of the patch. These results are attained in a simple manner without waste of materials. The application of the protective covering is accomplished in a minimum of time, with no delay for heating, cooling, drying, curing or other pre- or post-treatment of the installation.

What is claimed is as follows:

1. A resiliently elastic, adherent, plastically conformable protective patch adapted to be formed into a close-fitting protective covering over a service line connection to a gas main, said patch being a rectangularly shaped sheet consisting essentially of a resiliently stretchable thin polymeric film, a thick soft plastic tacky mastic coating bonded thereto, and a protective removable slipsheet over said mastic coating, said sheet being cut through at least the polymeric film component to provide the following straight slits: a first slit (**16**) extending from one side edge toward one end of said sheet at an angle of about 70–75 degrees with said edge and across about one-third the width of said sheet; a corresponding second slit (**17**) extending from the other side edge and opposite said first slit; and a third slit (**18**) extending from the other end line of said sheet along the centerline a distance equal to about two-thirds of said width.

2. A protective patch as defined in claim **1** adapted to fit a gas line T-connection as herein described, and being further provided with a fourth slit (**14**) extending transversely from said one edge about two-thirds across the width of said sheet, and a fifth slit extending along the centerline of said sheet and bisected by said fourth slit, the length of said patch between said fourth and fifth slits and said first and second slits being just sufficient to extend from a gas main to the stem of a said T-connection affixed thereto.

3. A protective patch assembly as defined in claim **2** wherein said sheet is extended beyond said other end line and is provided with a transverse sixth slit (**19**) at said end line, and wherein the extended portion is cut to provide a longitudinal seventh slit (**20**) extending from said end line to the outer end of said extended portion and at about one-fourth the width of said patch.

4. A protective patch assembly as defined in claim **3** wherein said slits extend through both said film and said slipsheet and wherein said mastic is cohered at adjacent cut edges over less than all of the cut edge area.

5. Method of protecting a gas main service line T-connection by covering said connection with a protective patch assembly comprising a rectangularly shaped sheet being cut to provide the following straight slits: a first slit (**19**) extending transversely from one side edge of said sheet across the width thereof to define a main body and an extended portion of said sheet; a second slit (**16**) extending from said edge toward one end of said main body at an angle of about 70–75 degrees with said edge and across about one-third the width of said sheet; a corresponding third slit (**17**) extending from the other side edge and opposite said first slit; a fourth slit (**18**) on said main body extending from said first slit along the centerline a distance equal to about two-thirds of said width; a fifth slit (**14**) between said second slit and said one end extending transversely from said one edge about two-thirds across the width of said main body; a sixth slit (**15**) extending along the centerline of said main body and bisected by said fifth slit, the length of said main body between said fifth and sixth slits and said second and third slits being just sufficient to extend from a gas main to the stem of a said T-connection affixed thereto; a seventh slit (**20**) extending across said extended portion and at about one-fourth the width thereof, said method comprising the steps of: pressing the narrower segment of the extended portion over and along the crossmember of said T; pressing and wrapping the main body of said patch around said crossmember, with the stem of said T protruding between the opposing edges of said fifth and sixth slits, and around said gas main with the ends as defined by said first and fourth slits overlapping and covering the exposed edges of said second and third slits; and pressing and wrapping the wider segment of the extended portion around the stem of said T and covering the exposed edges of said fifth and sixth slits.

* * * * *