March 26, 1968 V. F. MICHAEL 3,374,807

LABELED ARTICLE AND METHOD FOR FORMING SAME

Filed Nov. 25, 1964

Fig. 1

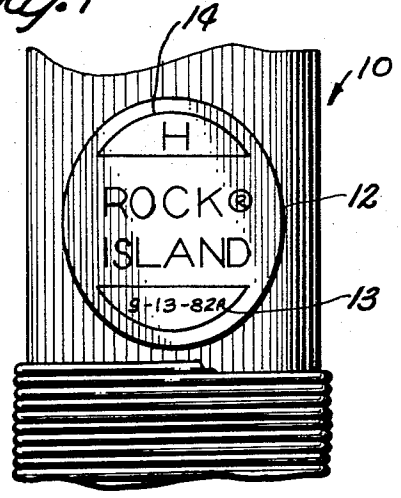



Fig. 2

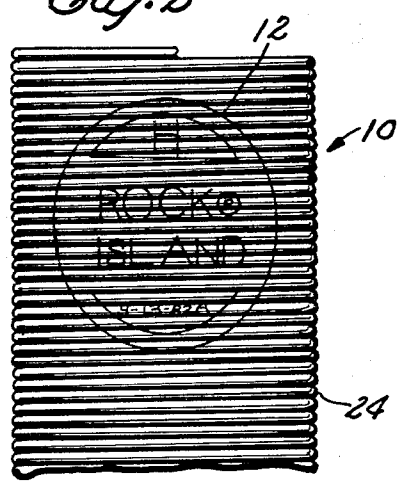



Fig. 3

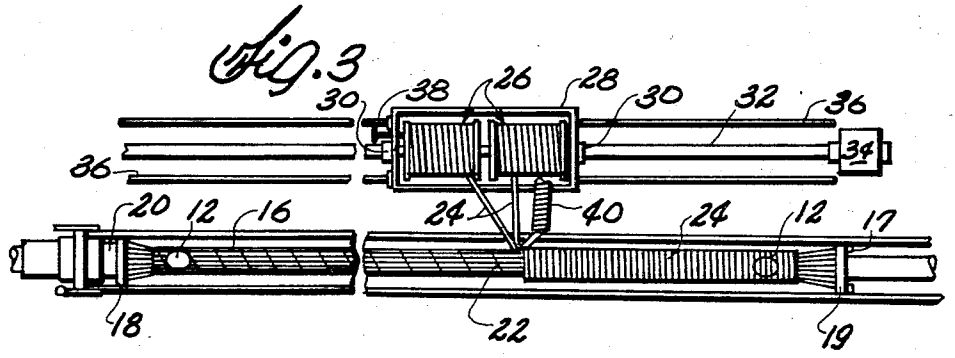
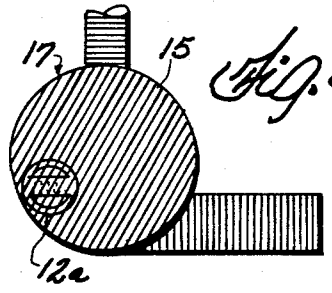



Fig. 4




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# LABELED ARTICLE AND METHOD FOR FORMING SAME

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This invention relates to novel labeled articles and a method for labeling plastic articles which are at least partially transparent at an outer surface portion, and more particularly relates to a plastic pipe having a label embedded therein and a method for forming the same.

Manufacturers are often confronted with the problem of labeling their goods without in any way creating problems for the purchasers of such goods as a result of such labeling. Manufacturers of plastic pipe, for example, may seek to label their pipe in order to identify the particular service for which the pipe is intended, as well as provide other manufacturing data and the identity of the manufacturer itself. However, quite often the label may be undesirable and constitute a definite detriment when the pipe is employed by the user.

By way of example, users of pipe employed in wells are oftentimes insistent that no labels, paint, chalk, or other removable material be disposed on the pipe. Such materials could eventually, if not promptly, work free of the pipe surface and contaminate the well contents. The pipe manufacturer in such instances is unable to employ labels affixed to the pipe exterior.

Labels, however, are normally most desirable on a product such as pipe since they not only immediately disclose the manufacturer, but in addition may also reveal the type of pipe, the date of manufacture, machine and operator employed in pipe manufacture, as well as other pertinent information. To etch or cast such information into the pipe itself would be prohibitively expensive, and in addition it may undesirably mar the pipe surface; in some instances it would be impossible to form such information on the pipe surface without affecting the pipe strength.

Increasingly popular materials of composition for pipes are hard plastics, such as cured epoxy resins, which may be reinforced with filamentous material, such as glass roving. Such a reinforced pipe and a method for forming the same is disclosed in my copending application Ser. No. 84,069, filed Jan. 23, 1961, now Patent No. 3,202,560, which issued Aug. 24, 1965.

It has been found that a label conveying desired information may be embedded in the pipe itself adjacent the outer surface thereof. The information on the label is clearly legible because of the transparency of the epoxy resin and because of its embedment the label can never deteriorate or be destroyed during normal pipe usage.

It is an object of this invention, therefore, to provide a novel, labeled, plastic article and a method for embedding the label in such plastic article.

It is another object of this invention to provide a method for readily embedding a label in plastic pipe as the pipe is being formed without altering the normal procedure for manufacturing such pipe.

It is a further object of this invention to provide a method for embedding a label in an article which is at least partially transparent. The resulting article may be subjected to severe handling and usage without in any way deleteriously affecting the label disposed therein.

It is an object of this invention to provide a labeled plastic pipe article in which the label is embedded in a desired position within the pipe in a liquid-impermeable reisn, thereby becoming an integral part of the pipe without danger of disengagement therefrom.



The above and other objects of this invention will become more apparent from the following detailed discussion when read in the light of the accompanying drawing and appended claims.

This invention may be readily incorporated in the method of pipe formation wherein alternate layers of longitudinal and helical glass roving layers impregnated with epoxy resin are placed under tension about a rotatable mandrel. The roving reinforcements are arranged parallel and transversely to the longitudinal axis of the mandrel to obtain maximum use of the glass strength. A label member having printed thereon desired information relating to manufacture of the pipe, type of service for which intended, etc., is affixed to the partially-formed pipe beneath the outermost helical glass wrap comprising the final reinforcement layer. This layer is impregnated with a tough, hardenable material, such as epoxy resin, and a hardener therefor, such as triethylene tetramine. After curing of the pipe, the label is clearly visible beneath the helical glass layer and epoxy coating; all information printed thereon is clearly legible.

The label may also be affixed in place over the outermost reinforcing layer by placing a coating of epoxy resin thereover and curing the coating. The previously-described method enables the label to be affixed in place while performing a method of pipe formation without departing from the usual steps carried out in practicing such method.

The principles of this invention, as will hereinafter be made apparent, may be applicable to articles other than pipe having outer layer portions composed of at least partially transparent materials of composition compatible with the label.

For a more complete understanding of this invention, reference will now be made to the drawing wherein:

FIGURE 1 is a fragmentary elevational view of a partially-completed pipe member having a label affixed thereto;

FIG. 2 is a fragmentary elevational view of a completed pipe member illustrating a label member embedded therein in accordance with the method of this invention;

FIG. 3 is a fragmentary, schematic top plan view of apparatus which may be employed in forming the pipe fragments of FIGS. 1 and 2; and

FIG. 4 is a front elevational view of a pump member having a label embedded therein in accordance with the teachings of this invention.

As above pointed out, the presence of a label member adhered to an exterior surface portion of an article is sometimes undesirable. For example, a pipe inserted in a well should obviously be free of any materials which when placed in normal operation would contaminate the well contents. It is apparent that in the raising or pumping of liquids, a submersible pump member having a label disposed on the exterior surface thereof could contaminate the liquid being pumped by working free of the pump surface.

Assuming that a label were adhesively secured to each length of a pipe line depending into a deep hole, it is apparent that the numerous labels which would eventually be worked free from the pipe surfaces could lead to a variety of difficulties. The paper could clog pump members, disintegrate in the fluid being pumped and contaminate the same, and in other ways obviously deleteriously affect the operations conducted in the well.

It is also evident that if a pipe member were disposed horizontally in the ground for conveying water for flooding operations or for other purposes, the handling generally afforded such pipe would soon abrade and destroy whatever desired information may appear on the label.

If pertinent information relating to the pipe or other article is not readily made available by examining the article which is already in use, it may be necessary to

have a sales representative of the original manufacturer investigate the job application for which a replacement article is sought. If, however, a label member could be securely affixed to the pipe so that the desired information thereon becomes a permanent part of the pipe, the desired information which the user of the pipe may need at infrequent intervals is readily available. New pipe, or other articles, may then be quickly ordered to satisfy an immediate need where time may be of the essence.

Therefore, the availability of certain information on items which are already in use greatly facilitates the ordering of replacement items and, in addition, provides the manufacturer with necessary manufacturing data in the event that certain articles of manufacture prove to be defective because of some flaw in the manufacturing machinery or process.

Referring now more particularly to FIG. 1, a fragment of a pipe member **10** is illustrated having a label **12** affixed thereto, preferably on an end portion. It is apparent from the label member that certain desired information may be printed thereon which will assist the user of the pipe, as well as the manufacturer of the pipe, in the event it becomes necessary to trace the origin of the pipe to a specific plant and machine of the manufacturer.

Thus, it will be noted that label **12** may contain a trademark or name of the manufacturer on the face thereof, together with certain code numbers and letters, as in label segment **13**, which may indicate the date of manufacture, place of manufacture, machine of manufacture, and shift during which manufactured. The label may also contain a segment, such as segment **14**, which may have a code marking to indicate a particular composition or which may bear an initial, such as illustrated initial H to indicate the type of service for which the pipe is intended, H by way of example standing for heavy duty or heavy service.

The particular pipe fragment illustrated is a glass-reinforced resin pipe, such as is disclosed in my copending application Ser. No. 84,069, now Patent No. 3,202,560, which issued Aug. 24, 1965. The illustrated pipe fragment **10** is composed of layers of glass roving embedded under tension in cured epoxy resin. It has been found that the combination of the roving and epoxy resin provides a pipe of excellent strength characteristics. The roving is arranged in the form of longitudinal socks in which the filaments are parallel to the longitudinal axis of the pipe, and in the form of helices in which the windings are arranged substantially at right angles to the longitudinal axis of the pipe. Such roving depositions provide superior strength characteristics when embedded in the cured epoxy resin. The strength inherent in such pipe enables it to perform a variety of functions in a manner which renders the same superior to metal pipe.

Referring now to FIG. 3, there is fragmentarily illustrated in top plan view a schematic representation of apparatus which may be employed in forming a glass-reinforced resin pipe about a rotatable mandrel. FIG. 3 illustrates a longitudinal assemblage of glass roving filaments **16** which are secured at opposed end limits to locking rings **18** and **19**. Filaments **16** are disposed about a mandrel member, not shown, which is adapted to be rotated by means of a rotatable collet **20** which is in turn driven by driving means of well-known construction.

Anchor ring **19**, to which one end of the sock **16** composed of glass roving filaments is secured, is attached to collar **17** by means of bolts or the like, the latter collar being rotatable with the collet **20** and mandrel, not shown, about which the pipe is formed. After the filaments **16** of the longitudinal assembly are locked in place and placed under tension by moving the rings **18** and **19** apart a desired interval, a loose spiral wrap **22** is wound about the filament **16** to maintain the same in desired, spaced relationship about the mandrel periphery as the latter element rotates.

After the longitudinal socks made up of filaments **16** are moved over the mandrel as a unit, helices of glass filaments are wound about the rotating assemblage of filaments **16**. The helices are formed from roving **24**, which is pulled from spools **26** rotatably mounted on platform **28**. Platform **28** has opposed, internally threaded members **30** which are adapted to threadedly engage screw member **32**, which is rotatably driven in either direction of rotation by reversible motor **34**. Platform **28** is assisted in maintaining a desired horizontal position by means of parallel, elongate guide rods **36** which slidably engage the interiors of receiving passageways in platform **28**.

A friction member **38** may be mounted in a platform wall portion to engage a side portion of the spools **26** so as to regulate the ease of rotation of the spools and thereby determine the tension under which the roving **24** is pulled from the spools **26** by means of the mandrel about the pipe which is being formed.

FIG. 3 illustrates the glass-reinforced pipe member in the course of formation. A resin dispenser **40** is fragmentarily illustrated which dispenses fluid, uncured resin and hardener at the point the roving is pulled onto the rotating mandrel. Thus, the roving is saturated with the liquid resin-hardener liquid as the same is applied to the rotating mandrel. A pipe member of the type above described may be formed of as many longitudinal and helical layers of fibrous reinforcements as may be desired, the number of layers being determined by the desired strength of the ultimate pipe.

FIG. 3 also illustrates a pipe member in the process of having the final helical layer of roving **24** applied thereto, after which the pipe may be cured and the mandrel removed from the interior thereof in the manner disclosed in my copending application Ser. No. 84,069, now Patent No. 3,202,560 which issued Aug. 24, 1965. It is at this stage that a label such as label **12** illustrated in FIG. 1, is affixed in place and locked in the pipe beneath the final spiral roving layer of the pipe. The final transparent filament layer is thus seen to desirably serve as a locking and positioning device which assures desired location of the label in the final pipe product.

It will be noted from FIG. 3 that at the right-hand end of the partially-formed pipe, label **12** is illustrated disposed beneath the final outermost layer of glass filaments and the epoxy resin saturating such glass. The left-hand portion of the partially-formed pipe **54** has a label **12** disposed on the longitudinal glass filaments **16** prior to wrapping of the same by means of the roving **24**.

It is seen from FIG. 2 that the label **12** and all of the information printed thereon is clearly legible beneath the outer layer of roving **24** and the hardened epoxy resin or other transparent resinous material in which the glass helices are embedded. The final label member cannot be disengaged from the pipe member regardless of the rough treatment afforded the pipe; the label is embedded in the pipe interior and locked in placed beneath a helical layer of transparent glass filaments and overlying cured resin.

Numerous resins may be employed as a material of composition for the pipe in carrying out this invention. The specific resin employed must permit the reading of the label information through the outermost thickness thereof interposed between the outer pipe surface and the label itself. In the event that a non-transparent, filamentous reinforcement is employed which prevents reading of the label when disposed thereunder, the label may be placed over the filamentous reinforcement and embedded in a surface layer of epoxy resin or other transparent resin which permits reading of the label information. Various filament reinforcements may be employed in forming shaped articles, such as nylon and various sisal fibers; also, various polyester and other resins may be employed as the pipe-forming material in which the filaments are embedded.

FIG. 4 illustrates a glass-filament reinforced pump casing **15**, which may be submerged in a well, having a label

12*a*, similar to label **12** of FIGS. 1, 2 and 4, embedded in an outer surface portion. The casing **15** of illustrated pump **17** may be formed in substantially the same manner as the above-discussed pipe, i.e., the filament reinforcements are under tension and the resin matrix cured with said filaments under tension.

It will be noted that the water-tight seal effected by the plastic in which the label **12***a* is disposed prevents deterioration of the label member so that the information appearing thereon may be readily apparent to individuals retrieving the pump even after the same has been in use for extended periods of time in a submerged condition.

The material in which the label is embedded or the layer of material overlying the label need not be entirely transparent. The material need only be sufficiently transparent so that the label may be read through a thin section, such as would normally be disposed between the label and the article outer surface. Such sections would normally be less than one inch in thickness. The labels, such as employed labels **12** and **12***a*, are not formed of unusual materials of composition but are of paper ordinarily used in the formation of labels.

The above-described pipe and pump casing are of course given by way of illustration only and the inventive principles disclosed may be utilized in many other applications apparent to those skilled in the art.

Without further elaboration, the foregoing will so fully explain the character of my invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, while retaining certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

**1.** An article of manufacture comprising a labeled, filament-reinforced cured resin pipe body; said body comprising layers of transparent filamentous reinforcements, said reinforcements comprising alternate layers of tensioned filaments arranged parallel and transversely to the longitudinal axis of said body embedded in cured transparent resin; label means locked in desired position and embedded beneath an outermost layer of helical filamentous reinforcements; the amount of glass-filaments and resin overlying said label means bein such that said label means may be clearly visible from the exterior of the pipe.

**2.** In the method of pipe formation wherein alternate layers of longitudinal and helical glass roving are placed under tension about a rotatable mandrel, said roving being arranged parallel and transversely to the mandrel longitudinal axis and impregnated with a tough hardenable resin which is transparent when viewed in thin sections, the improvement comprising applying a label to the outer surface of a partially-formed pipe, and locking said label in a desired position on said partially-formed pipe by means of an outermost layer of helical glass roving filaments which are applied under tension over said label in the normal course of pipe formation; said outer helical glass roving filaments being those necessary to effect completion of said partially formed pipe and forming a layer of sufficient thinness so that said label is readily legible therebeneath.

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