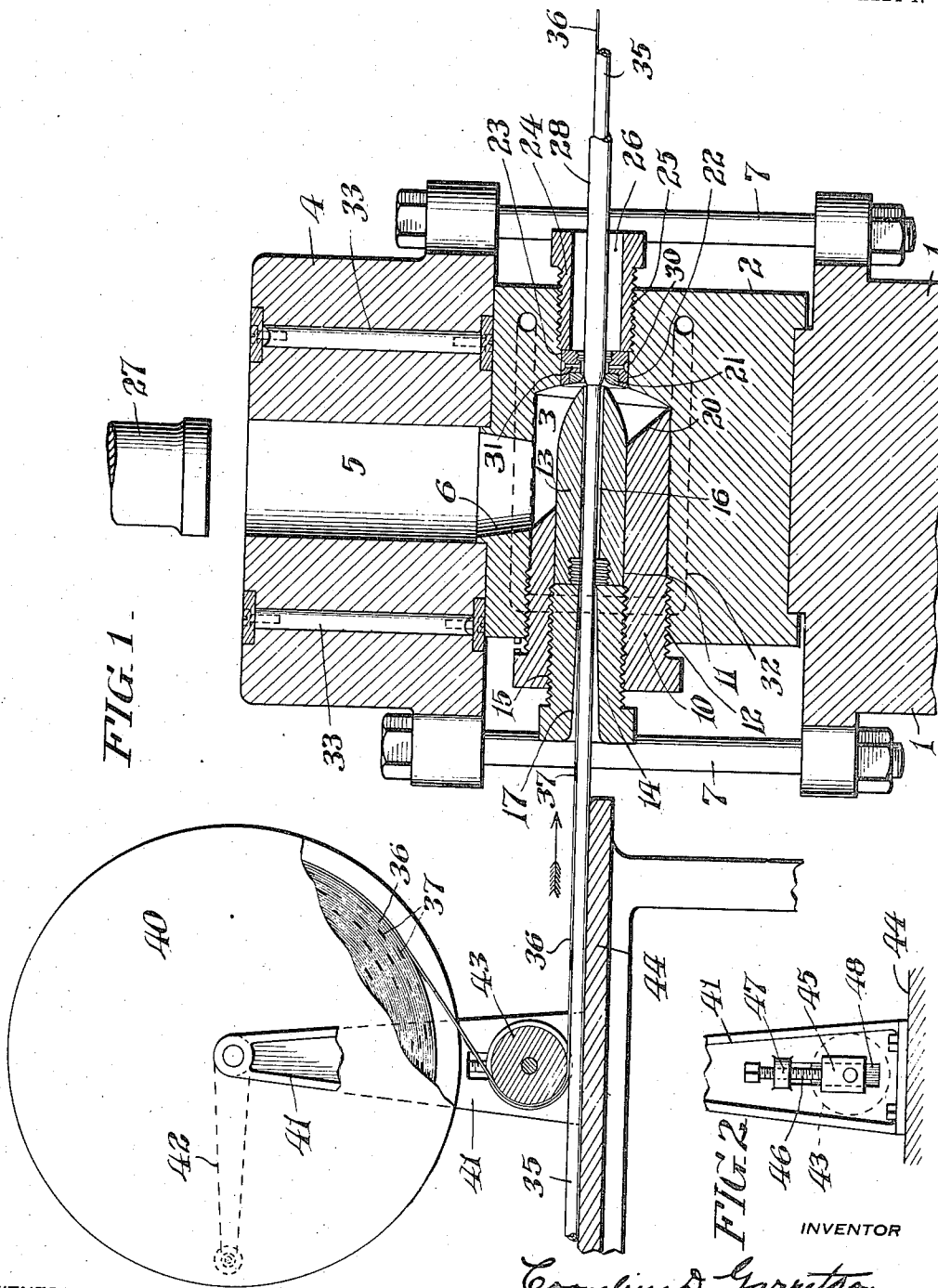


C. D. GARRETSON.
METHOD OF MARKING RUBBER HOSE.
APPLICATION FILED AUG. 20, 1910.

995,782.

Patented June 20, 1911.

2 SHEETS-SHEET 1.



WITNESSES

Daniel Webster, Jr.
William Conway

Cornelius D. Garrettson

BY Cyrus N. Anderson

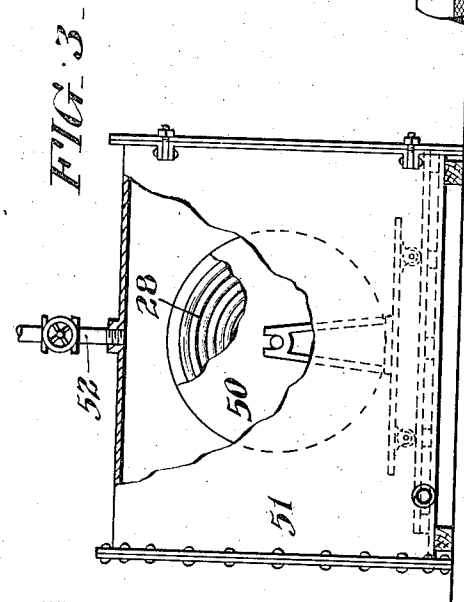
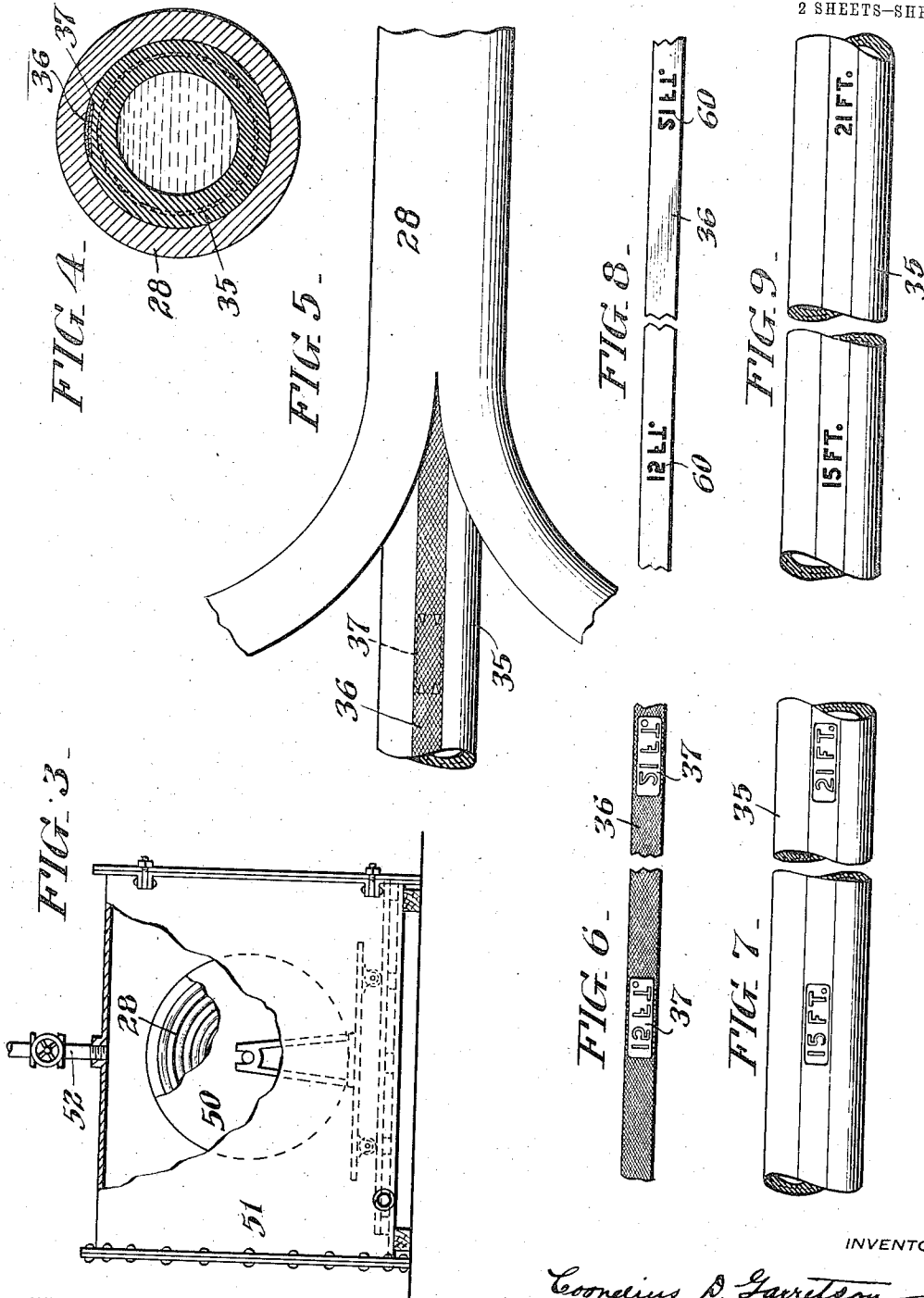
ATTORNEY

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William Conway

INVENTOR

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BY Cyrus W. Anderson

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UNITED STATES PATENT OFFICE.

CORNELIUS D. GARRETSON, OF WILMINGTON, DELAWARE, ASSIGNOR TO ELECTRIC HOSE AND RUBBER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

METHOD OF MARKING RUBBER HOSE.

995,782.

Specification of Letters Patent. Patented June 20, 1911.

Application filed August 20, 1910. Serial No. 578,143.

To all whom it may concern:

Be it known that I, CORNELIUS D. GARRETSON, a citizen of the United States, residing at Wilmington, in the county of Newcastle, State of Delaware, have invented a new and useful Method of Marking Rubber Hose, of which the following is a specification.

My invention relates to a method of marking rubber hose during the course of its manufacture without increasing to a substantial degree the cost of the manufacturing of the hose.

The specific object of my invention is to cause the marking of the rubber hose during its manufacture to indicate the length in feet or other denominations of the hose manufactured. Such lengths may vary from a few feet to several hundred feet.

In order that the principles of my invention may be comprehended and the manner of practicing the same understood by those skilled in the art to which it relates, I have illustrated and will describe hereinafter the means employed by me for the practicing of and carrying out the method which I have invented for marking hose during the process of its manufacture.

In the drawings I have indicated two ways or means by which the marking of hose, in accordance with my invention, may be effected, but it is to be understood that my invention is capable of being practiced by other means than that disclosed and that my invention is not limited to the specific means illustrated by me for the purpose of explaining my invention.

In the drawings,—Figure 1 is a longitudinal vertical section of a portion of the apparatus employed in the practice of my invention; Fig. 2 is a view showing a detail of construction of the apparatus shown in Fig. 1; Fig. 3 is a side elevation, with a portion broken away, of a vulcanizing chamber showing hose inclosed in its casing in position to be vulcanized; Fig. 4 is a transverse section of hose, a marking means in contact with the hose and a casing surrounding the hose and marking means,—water being indi-

cated within the hose; Fig. 5 is a view of a portion of hose showing the casing in the act of being removed and also showing the marking means in contact with the hose; Fig. 6 is a plan view of a portion of tape having a marking die secured thereto; Fig. 7 is a view of a portion of finished hose showing the number thereon indicating the length of the hose; Fig. 8 is a view of a modified construction of means for marking the hose; and Fig. 9 is a view of a portion of hose showing the marking thereon by the means shown in Fig. 8 to indicate the length of the hose.

Before proceeding with a discussion in detail of the method constituting my invention and the mechanism employed by me for the practicing of the same, I desire to call attention to the fact that, except for the addition of the means for marking hose, the machine illustrated in Fig. 1 is substantially the same as the machine illustrated in United States Letters Patent to Henry B. Cobb, No. 558,257, dated April 14, 1896. For a full and complete description of the said machine reference may be had to the drawings and the specifications of said patent. It will be noted, however, that there are some variations in details of construction, but such variations are not of such difference as to render a description in full of the machine necessary.

Referring now to the drawings, 1 designates the support for the block 2 having the die chamber 3 therein. Supported upon the block 2 is a block 4 having a molten metal (preferably lead) receiving chamber 5.

6 designates an opening or passage way from the molten lead receiving chamber 5 into the die chamber 3. The molten lead is poured from a melting furnace, not shown, into the top of the chamber 5.

The blocks 2 and 4 are secured together and to the base 1 by means of bolts 7.

10 designates a sleeve having an eccentrically located opening 11 therein,—the thicker side of the said sleeve being located at the lower side of the die chamber 3. The

sleeve is secured in the die chamber by means of a screw-threaded connection at 12 therewith as is clearly shown.

13 designates the male member of a die 5 which is located in the opening 11 in the sleeve 10. The die member 13 is held in position by means of a plug or block 14 having a screw-threaded connection with the interior of the sleeve 10 as indicated at 15. 10 The die member 13 is provided with an axial opening 16 in alinement with the opening 17 in the block 14.

The inner end of the sleeve 10 is beveled or inclined at an angle of about 45 degrees 15 as indicated at 20 and forms substantially a continuation, at a different angle of inclination, of one side or portion of the inclined wall of the opening or passage way 6. The inclined end 20 of the sleeve 10 forms a 20 shoulder surrounding the die member 13. It will be observed that the inner reduced end portion of the die member 13 is surrounded by a portion of the die chamber 3 and that it projects centrally of and in 25 proximity to the surrounding walls of the opening of the female die member 21 which is mounted in a sleeve 22 supported in an opening 23 in the block 2. The sleeve 22 and the die member 21 are secured and held 30 in position by means of the plug 24 which has screw-threaded connection with the opening 25 in the block 2. The plug 24 is provided with an opening 26, the diameter of which is considerably greater than that 35 of the female die member 21.

The molten lead is forced from the lead receiving chamber 5 by means of a hydraulic piston 27 (the means for operating said piston not being shown) and as it is forced 40 between the adjacent portions of the die members 13 and 21 is formed into a tube 28 as is fully described in the Letters Patent to Cobb, mentioned above.

Owing to the provision of the inclined 45 wall 20, the discharge of lead from the lead chamber under the pressure of the hydraulic piston to which it is subjected meets with such comparatively little impediment or resistance that it forms and ejects the tubing 50 with a speed so great as to preclude the cooling of the lead sufficiently to cause it to set as it is formed into the tube. To overcome this difficulty, means, such as is shown in the Letters Patent to Cobb, No. 558,257, is 55 provided for cooling the female die to cause it to chill the lead as the tube is formed, and which may be described as follows: A groove 30 around annular sleeve 22 is provided to which is supplied, from a source 60 not shown, cold water or other fluid cooling means which passes from the said groove through the passage ways 31 into contact not only with the female die member 21 but also into direct contact with the lead tube as 65 it leaves the said die member. Also it will

be understood that the contact of the cold water with the annular sleeve 22 causes a cooling of the said sleeve which cooling effect is, by conduction, transferred to the female die member 21. Any other suitable 70 means may be employed for cooling the tube. The formation of the tubing in the manner stated causes a progressive forward movement of the same.

For the purpose of maintaining the lead 75 in the die chamber 3 in a molten condition, I have provided passage ways 32 through the block 2 to which is supplied steam or other heated fluid. I have also provided means for maintaining the lead in the cham- 80 ber 5 in molten condition which consists of passage ways 33, two only of which are shown in the drawings, to which is supplied steam or other heated fluid. The arrangement of the passage ways 32 and 33 is not 85 shown in detail because a description of the same is to be found in the Letters Patent to Cobb aforesaid.

In Fig. 1 of the drawings I have illustrated a portion of soft rubber hose 35 and 90 a tape or other form of carrier 36 of suitable material, preferably asbestos fabric, which extends through the openings 16 and 17, through the die member 21 and through the enlarged opening in the plug 24,—said hose 95 and tape extending inside of the leaden tube 28. Although I prefer to use a carrier consisting of a tape of asbestos fabric such carrier may consist of cotton thread fabric or of any other material which it may be found 100 practicable to use and need not necessarily be in the form of a flat tape but may consist of a metal wire or a metal band.

The tape in the construction shown in Figs. 1 to 7 is provided at intervals, preferably 105 of one foot, with thin plates of metal or other suitable material 37 having depressed figures and letters formed therein in reverse as is indicated in Fig. 6. The plates 37 and their carrying tape are placed 110 in contact with the hose as it enters the tube forming machine illustrated in Fig. 1. The tape or other form of carrier is mounted upon a drum or spool 40 revolvably mounted 115 upon uprights or standards 41. Its supporting axle or pivot is provided with a crank 42 by means of which it may be revolved if desired. The tape, as is indicated, is wound upon the spool 40 and after leaving the same extends partially around and 120 under a guide roller 43 which is located in position above the hose as it is directed to the pipe forming machine shown in Fig. 1. The hose and the uprights and standards 41 are supported upon a platform or table 44. 125 In order that hose of different sizes may be passed underneath the guide roller 43, the latter is adjustably supported in the manner indicated in Fig. 2 of the drawings in which, 45 designates a bearing in which the axle or 130

pivot of the roller 43 is journaled. The bearings are supported upon bolts 46 which have screw threaded connection with lugs 47 formed upon the uprights or standards 41. The axle of the roller 43 is moved vertically in slots 48 in the uprights or standards 41 by turning the bolts 46.

It will be understood that the sizes of the openings 16 and 17 and also the openings through the female die member 21 may be increased or diminished for the purpose of operating upon and forming a solid metallic casing around hose of different sizes or cross sectional areas.

In the manufacture of the hose alternate layers of rubber and woven fabric are employed in the usual manner, after which the hose of whatever length it may be is filled with water or other fluid such as air under pressure sufficient to maintain the hose in circular shape in cross section. The opposite ends of the hose being closed, the hose is supported in a suitable manner and one end portion thereof is placed under the roller 43; and the said end portion together with the end portion of the tape carrying and the marking means which means is carried at intervals upon the said tape is inserted into the die members 15 and 21, after which the hydraulic piston 27 is operated to force the molten lead from the chamber 5 through the die chamber 3 and outwardly around the die member 13 and through the female die member 21 to form the tube 28 around the hose and around the tape and the marking means which is in contact therewith. The formation of and the presence of the casing around the hose and the tape in contact therewith holds the tape in definite relation to the hose; and the pressure of the casing is sufficient also to cause progressive forward movement of the hose and the tape with the said casing.

From the machine illustrated in Fig. 1 the hose and its casing are carried to and wound upon a drum, the water or other fluid pressure therein being in a known manner maintained, one of said drums being shown in Fig. 3. It is also to be noted here that when a tape 36 of woven fabric is employed the weave thereof preferably though not necessarily should be the same as that of the fabric comprised in the hose structure, for the reason that it is desirable that in the vulcanization process when the leaden casing and the inclosed hose and tape are subjected to heat and pressure and tape and the fabric entering into the hose structure should expand and contract in the same ratio or degree.

As already stated, after passing from the machine illustrated in Fig. 1, the leaden casing together with the inclosed hose and tape are wound upon a drum. Afterward the pressure upon the water or other fluid

within the hose, and hose and the tape remaining within the casing, is increased as may be desired, say two hundred to three hundred pounds; the ends of the hose being thereafter securely closed so as to maintain such pressure.

In the process of vulcanization the hose and the tape within the leaden casing, preferably upon a drum 50 as indicated in Fig. 3, are placed within the vulcanizing chamber 51. Steam is supplied to the chamber through a pipe 52 at such temperature as may be necessary to cause a complete vulcanization of the hose. After the vulcanization is complete the steam is allowed to escape from the vulcanization chamber through a port or opening in a known manner located preferably at the bottom of the said chamber. My invention does not involve a change in the method of vulcanization and, therefore, I shall not enter into a further description of the same.

The conversion of the water in the hose into steam due to the high temperature of the steam admitted to the vulcanizing chamber 51 is prevented by reason of the fact that it is surrounded by the metal casing or tube 28 which resists the expansion of the water and maintains it in a liquid state. The tendency of the water to expand exerts great pressure upon the hose from within against the interior of the casing or tubing 28 and against the tape 36 and plates 37 and causes the tape and said plates to become embedded in the surface of the hose and also causes the material of the hose to project into the depressions formed in the metallic plates with the result that in the completed hose the letters and figures which are in reverse upon the marking plate or other means are reproduced in upright or positive position upon the hose as shown in Fig. 7. If air instead of water is used in the hose the application of heat during the process of vulcanization causes a greatly increased internal pressure with the same result as in the case where water is used.

If the letters upon the plate are formed by the depressions of the material thereof, the letters upon the hose will project above the surrounding surface of the hose. On the other hand, if the letters and figures upon the marking plate or other means are raised, the letters and figures upon the hose will be depressed. After the vulcanization of the hose the lead casing is split by any suitable mechanism upon opposite sides and is removed in the manner indicated in Fig. 5; after which the tape 36 carrying the marking means 37 may be separated from the hose. After separation of the tape from the hose, the markings to indicate the number of feet or other denominations of length in the hose will be indicated in the manner shown in Fig. 7 in which the letters and

figures 15 Ft. and 21 Ft. will consist of portions of the material of the hose extended above the surrounding surface. It should be stated that the surface surrounding the letters is depressed below the remaining portion of the surface of the hose a distance equal to the combined thickness of a plate 37 and the tape 36.

In Figs. 8 and 9 I have shown a modification of the method of producing the markings upon the hose which consists of a tape of suitable material such as paper or other fabric which is provided at intervals with figures and letters as indicated at 60 in reverse, which letters consist of a substance which is adapted to be transferred from the tape of paper or other suitable material to the hose under the influence of the heat and pressure to which the hose is subjected during vulcanization. The letters and numerals thus placed upon hose to indicate its length are shown in Fig. 9. When the letters are so placed upon the hose, the surface of the hose is not interrupted by the letters, but is continuous, the coloring matter constituting the letters being combined with and entering into the substance of the hose.

Having thus described my invention, I claim:—

1. The method of marking rubber hose with insignia thereon in feet or other denominations, during its manufacture, to indicate the length of the same, which consists in placing a device carrying marking means at required intervals thereon in contact with the hose, placing a casing around the hose to hold the latter and the said device and the marking means thereon in contact with each other, exerting pressure upon the said hose from within and simultaneously applying heat to said hose to cause vulcanization.

2. The method of marking rubber hose which consists in placing against the hose prior to its vulcanization marking means at intervals, the said marking means being carried upon a continuous member, confining the hose and the marking means within an inclosure, placing an expansible fluid within the hose under pressure and subjecting the whole to the action of heat whereby the pressure within the hose is increased.

3. The method of continuously marking a rubber hose, which consists in supplying the soft rubber hose with a fluid core, in applying to its surface a series of connected marking means, in surrounding the hose and marking means by a fluid, in placing the fluid under pressure to cause progressive feeding of the hose and marking means together, in chilling the fluid to form a solid casing about the marking means and core and in impressing the marking means upon the hose by the action of heat.

4. The method of continuously marking a

rubber hose, which consists in supplying the soft rubber hose with a fluid core, in applying to its surface a series of connected marking means, in surrounding the hose and marking means by a fluid, in placing the fluid under pressure to cause progressive feeding of the hose and marking means together, in chilling the fluid to form a solid casing about the marking means and core and thereafter in applying heat to the hose, marking means and casing to vulcanize the rubber at the same time that the marking means is impressed upon the rubber by the combined action of heat and pressure.

5. The method of continuously marking a rubber hose which consists in supplying the soft rubber hose with a fluid core, in applying to its surface a series of connected marking means, in surrounding the hose and marking means by a fluid, in placing the fluid under pressure to cause progressive feeding of the hose and marking means together, in chilling the fluid to form a solid casing about the marking means and core and in pressing the rubber hose outwardly against the marking means and solid casing by means of the fluid core of the hose to impress the marking means upon the hose.

6. The method of continuously marking a rubber hose which consists in supplying the soft rubber hose with a fluid core, in applying to its surface a series of connected marking means, in surrounding the hose and marking means with fluid, in placing the fluid under pressure to cause progressive feeding of the hose and marking means together, in chilling the fluid to form a solid casing about the marking means and core and in heating the fluid core to impress the marking means upon the hose.

7. The method of marking a rubber hose during its manufacture with marks to indicate its length which consists in forming the hose in a soft state, in providing it with a fluid core, in placing the said hose in a casing with marking means at intervals therein for forming marks upon the hose to indicate its length, and in causing the formation on said hose of the said marks on said marking means by the action of pressure and rendering the marks on the hose permanent by the application of heat.

8. The method of marking hose during its manufacture which consists in placing a casing about the hose at the same time that a device carrying marking means located at intervals thereon is placed between the hose and the casing and in impressing the marking means upon the hose by pressure from within against the casing.

9. The method of marking hose during its manufacture which consists in placing a connected series of marking means against the surface of the same and in surrounding the hose and marking means before vulcaniza-

tion of the former with a casing and in compressing the hose upon the marking means against the casing by pressure from within.

10. The method of marking rubber hose during its manufacture which consists in filling the hose with water before its vulcanization, in supplying marking means continuously exteriorly of and in contact with the hose, in surrounding the hose and marking means by a metallic casing and in impressing the marking means upon the hose by the action of heat.

11. The method of marking rubber hose during its manufacture which consists in filling the hose with a fluid before its vulcanization, in supplying the marking means continuously exteriorly of and in contact with the hose, in surrounding the hose and marking means with a molten metallic casing, in solidifying the casing thereon and in impressing the marking means upon the hose by the action of heat and pressure.

12. The method of marking hose during its manufacture which consists in forming the hose, in filling it with a fluid, in placing a series of marking means against its surface mounted upon a continuous carrier which carrier has the same degree of expansibility and contraction as the fabric comprised in the hose structure, in forming a metallic casing around the said hose and said carrier and in subsequently impressing the marking means upon the hose by means of pressure exerted from within by said fluid.

13. The method of marking hose during its manufacture which consists in forming the hose, in filling it with a fluid, in placing a series of marking means against its surface mounted upon a continuous carrier which carrier has the same degree of expansibility and contraction as the fabric comprised in the structure of the hose, in feeding the hose and carrier continuously forward by the action of molten metal under pressure, in solidifying the molten metal around the hose and carrier in the form of a casing and in subsequently impressing the marking means upon the hose by the action of pressure from within exerted by the said fluid.

14. The method of manufacturing hose which consists in placing marking means upon a support at intervals, placing the support and marking means in proximity to the hose before vulcanization, surrounding the hose and support with a casing and causing distension of the hose to press the marking means against the casing by pressure from within.

15. The method of marking hose at intervals to indicate its length which consists in forming a metal casing around the said hose and simultaneously placing within the said casing and between the said hose marking

means separate and independent from the said casing, in applying pressure to the said hose from within to cause it to press against the said marking means and the interior surface of the said casing and applying heat to the said hose, marking means and casing whereby a permanent impression from the marking means upon the hose is effected.

16. The method of marking rubber hose simultaneously with its manufacture which consists in supplying the unvulcanized hose and a tape with a marking means thereon at intervals in contact with said hose to a lead pipe forming machine, forming the pipe about the hose and tape at the same time that they are fed or moved forward by said pipe and held in fixed relative position with respect to each other thereby and in transferring the markings from the tape to the hose while the lead pipe surrounds them and while they are retained in fixed relation to each other by the said pipe.

17. A step in the method of forming hose which consists in applying to the surface thereof a tape of fabric having the same ratio or degree of expansion and contraction under tension as the hose structure, mounting on the said tape at intervals marking means and surrounding the hose, tape and marking means with a casing at the same time that the hose and tape are fed forward.

18. A step in the method of making hose which consists in the continuous application thereto of a support for marking means and the marking means on said support and at the same time surrounding the said hose, support and marking means by a rigid casing.

19. A step in the method of making hose which consists in selecting a tape having the same ratio or degree of expansion and contraction under tension when subjected to heat as the hose structure, applying marking means at intervals thereon, placing the tape in contact with the exterior of the hose before vulcanization and surrounding the hose and tape with a rigid casing.

20. The method of marking rubber hose during its manufacture which consists in placing a tape of suitable material in contact with the said hose before vulcanization, the said tape having thereon at intervals marking indicia of a substance capable of being transferred from the tape to the hose by the action of heat and pressure, in placing a metallic casing about the said hose and tape, applying pressure interiorly of the said hose to cause expansion thereof against the said tape and against the interior of the said casing and in subjecting the said casing to the action of heat.

21. The method of marking a rubber hose during its manufacture to indicate its length which consists in forming the hose in a soft

state and providing it with a core, in plac-
ing said hose and core in a casing with means
at intervals therein for marking the said
hose at corresponding intervals with char-
5 acters indicating its length, and in render-
ing the marks on the hose permanent by the
application of heat.

In testimony that I claim the foregoing as
my invention, I have hereunto signed my
name this 19th day of August, A. D. 1910. 10

CORNELIUS D. GARRETSON.

In the presence of—

CYRUS N. ANDERSON,
IRVIN SHUPP, Jr.
