G. A. RICHARDS.

DRAINAGE SYSTEM.

APPLICATION FILED AUG. 19, 1915.

1,298,258. Patented Mar. 25, 1919.

FIG. 1.

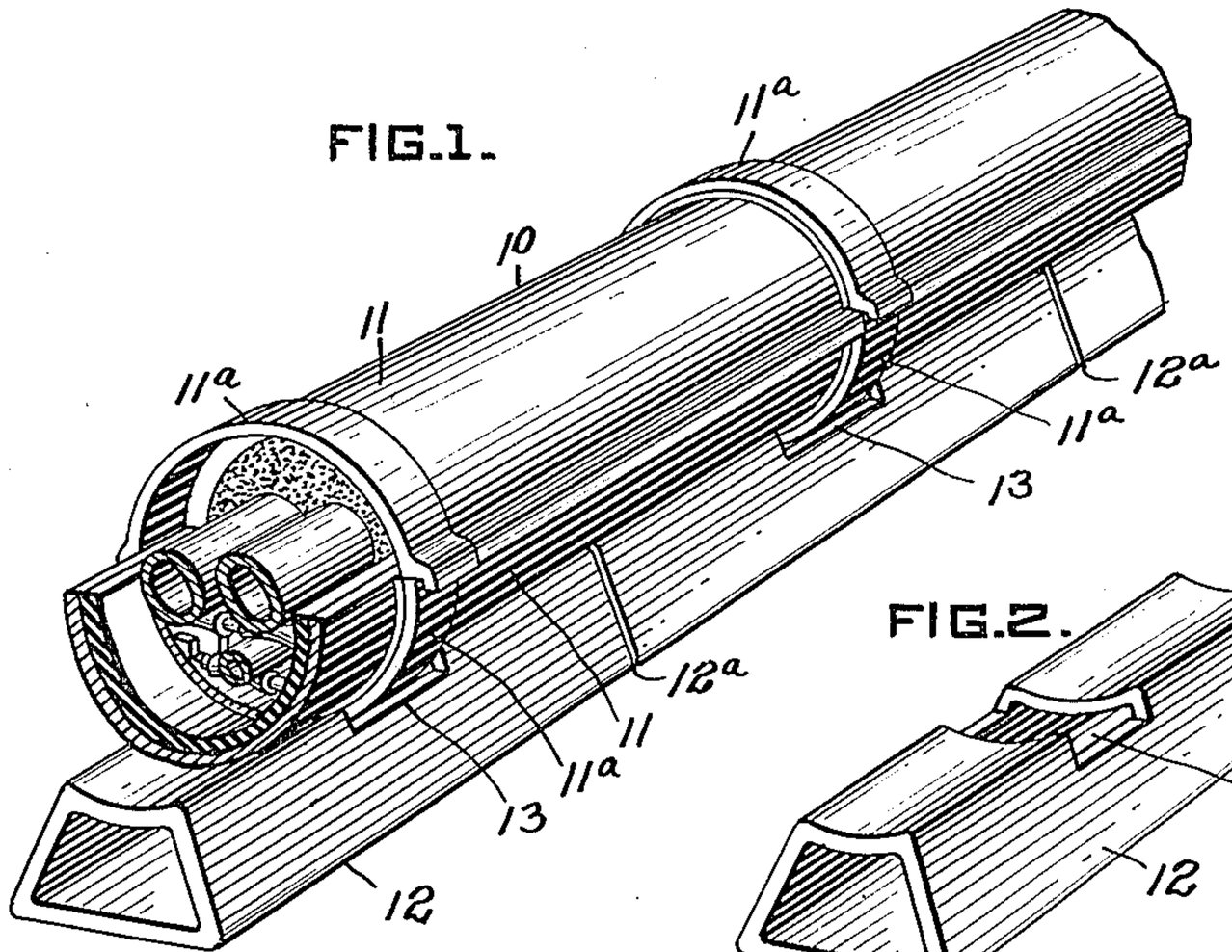


FIG. 2.

FIG. 3.

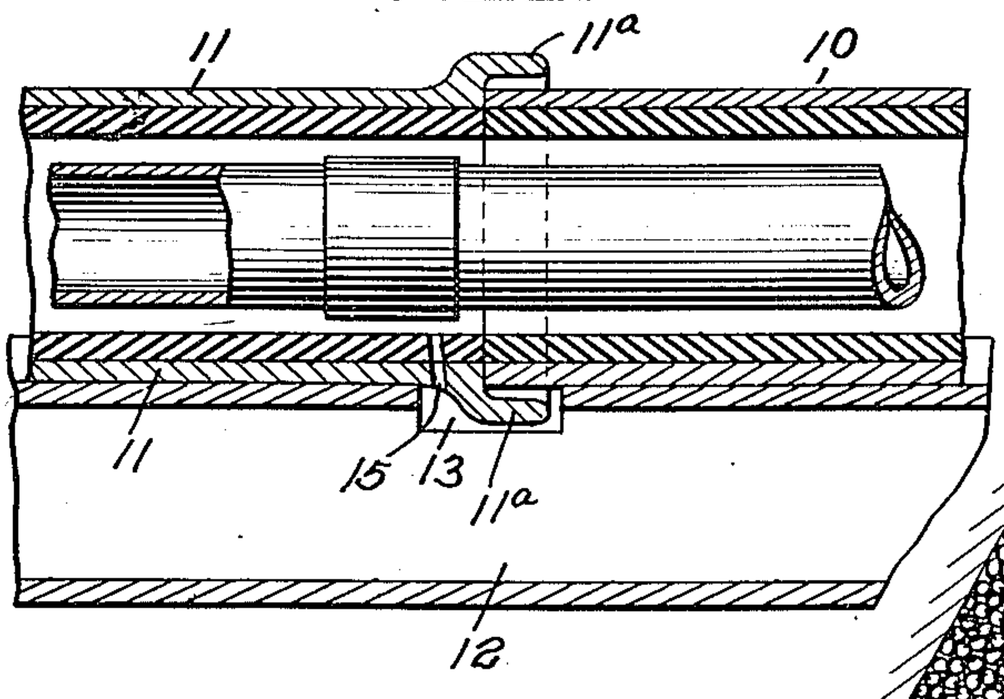
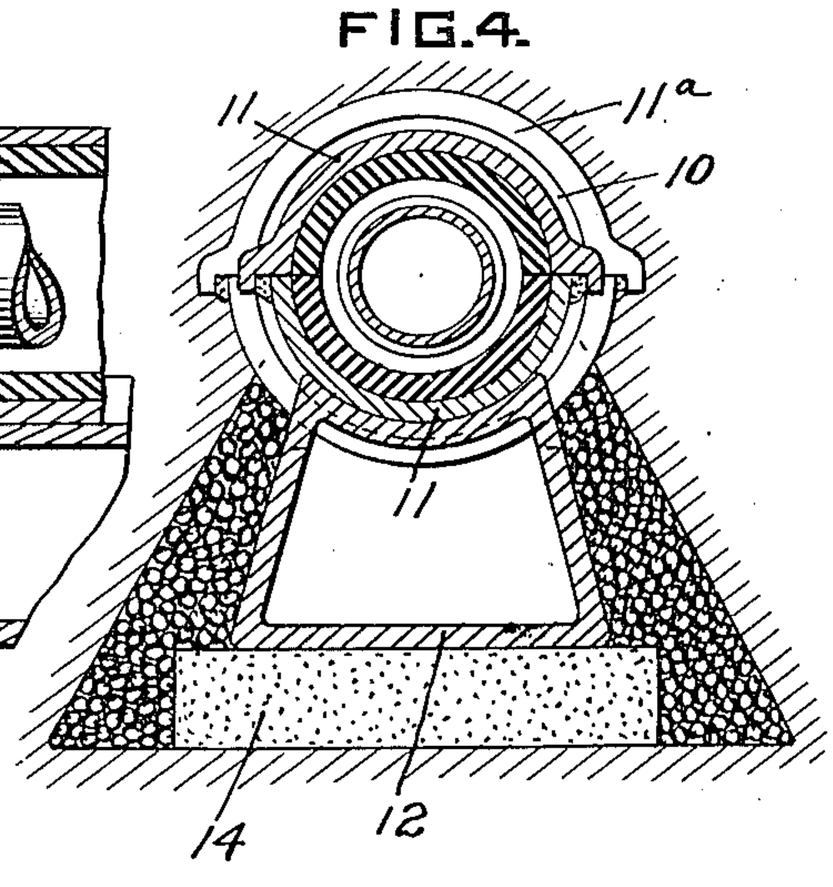


FIG. 4.



WITNESSES

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DRAINAGE SYSTEM.

1,298,258. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed August 19, 1915. Serial No. 46,250.

To all whom it may concern:

Be it known that I, GLENDON A. RICHARDS, a citizen of the United States, and resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Drainage Systems, of which the following is a specification.

This invention relates to improvements in drainage systems and more particularly to systems employed in connection with conduits which in themselves do not necessarily act as drains.

The invention is particularly adapted for use in connection with conduits adapted to carry a steam line or lines, the conduit being generally formed in sections of tile or other material, these sections, for assemblage purposes, being generally divided lengthwise of the section. An example of a conduit for this purpose is disclosed in the patent granted to me September 12, 1911, Number 1,002,932.

Conduits for this purpose are usually installed below the surface of the ground, being placed in suitable trenches which are then filled up. Consequently, the conduit sections are necessarily exposed to the moisture, drainage, etc., contained in the surrounding earth. And as the conduits generally have the bell and spigot type of connection, thus increasing the external diameter of the conduit at the junction points of the sections, the tendency of the moisture, drainage, etc., to collect adjacent the conduit periphery at these points is constantly present.

Sectional conduits have been employed for various purposes and to retain the alinement of the sections and prevent damage to the conduit, the sections have been supported either by a formed base at the bottom of the trench and on which the sections rest, or in some cases, by mounting the sections on another conduit, which latter may be used for the carrying of drainage, an example of which is shown in English Patent No. 3661 of 1878 to Brooke, in which at least two separate conduits are formed in superposed relation, the lower conduit acting as a drain. In one form, the patentee provides the drain conduit which acts as the support with cut-away portions at the top of the drain to receive the bell of the conduit section, the bell being in contact with the drain walls and forming the top wall for the drain at such points; another form has the drain free from cut-away or other openings, the conduit being supported on the drain by separate supporting members. In either case, however, the disadvantages resulting from the collection of moisture, drainage, etc., external of the conduit, are not met or eliminated, the form first mentioned closing the opening provided to receive the bell, with the result that moisture and drainage is shed from the bell on to the outer sides of the drain, while, in the second form, the moisture and drainage collect below the conduit sections.

In a prior patent granted to me February 16, 1915, No. 1,128,513, and employing conduit sections more particularly for the present purpose, this condition was partially met by forming the tops of the drain sections with depressions to receive the bells and in which moisture and drainage could collect, pass off into the surrounding earthy material, or filter through the walls of the drain, the drain being of porous material, but this construction, while an improvement on the earlier structures referred to, did not meet the desired condition of a practically dry material surrounding the conduit, since any collection or drainage in the depressions would be at the section joint, a point where the presence of such drainage is especially undesirable as it may ultimately enter into the joint through deterioration of the packing; while the porosity of the drain would permit of the passage of the collections into the drain by a filtering action, this function would be present only so long as the matter filtered out did not coat the outer surface of the drain; when such latter condition arises, this outlet for the drainage becomes closed; where the drainage passes away from the depressions, it passes into the earth in the immediate vicinity of the joint, so that the difficulty of disposing of the drainage effects is still present although to a reduced extent.

In the present invention, I aim to overcome these difficulties by causing the drain itself to act to carry off this moisture, thus leaving the joint and the material immediately surrounding the conduit as dry as possible. I provide this result by employ-

ing the supporting drain to carry off the moisture, etc., arranging the parts in such manner that the path of least resistance for such accumulations is into and through the drain, eliminating any necessity for a porous drain with its disadvantages. In producing this result, I retain the supporting effect which the drain is to produce, and at the same time form the drain in such manner as to cause it to efficiently act to carry off these accumulations. The general arrangement is such as will also permit the drain to take care of any moisture which might be provided within the conduit itself, the particular arrangement being such that when desired this result can be obtained.

To these and other ends, the nature of which will be readily understood as the invention is hereinafter disclosed, my invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claim.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views,

Figure 1 is a perspective view showing a sectional conduit adapted for the purpose indicated mounted on the supporting drain, parts being broken away for the purpose of illustrating the various features.

Fig. 2 is a perspective view showing one of the drain sections.

Fig. 3 is a longitudinal sectional view showing the joint of two conduit sections and the supporting drain therefor.

Fig. 4 is a cross sectional view also showing a preferred way in which the bottom of the trench is arranged.

As indicated in the drawing, the conduit, indicated generally at 10, is formed of sections 11 preferably divided longitudinally on practically diametrical lines, the sections being arranged with enlargements 11[a] at one end which, when the mates of a section are placed together, form the bell of a bell and spigot joint, the bell being adapted to receive the opposite or spigot end of the adjacent section. As shown in the drawing, the sections are lined and contain one or more pipes, the interior of the conduit being practically filled. No specific claim is made herein for this conduit structure, it being a well known type of construction for this purpose. One feature, presently referred to, is preferably employed in connection with the conduit and this particular feature is included within the present invention.

The supporting drain, indicated generally at 12, is also formed of sections, the length of the drain sections, as illustrated, substantially equaling the exposed length of the conduit sections, there being a slight variation in this respect in order that when the drain sections are laid end to end, a small space will be maintained between them, this space being indicated at 12[a] in the drawing. It is evident, however, that the drain sections may be of a greater length than the conduit sections.

The drain sections are generally formed with a flat base and converging sides, with the top substantially conforming to the configuration of the major portion of the conduit section which contacts with the drain section. As the conduit sections are generally of a circular configuration, the tops of the drain sections are generally concave. As shown more particularly in Figs. 2 and 3, the top of a drain section is cut away as at 13, this cut-away portion being provided in a suitable manner and being preferably located about midway of the length of the drain section. This cut away portion forms an opening into the interior of the drain from the top, and as it preferably extends downwardly some distance from the top plane of the drain, as more particularly shown in Fig. 3, this opening also extends into the side walls of the drain. This opening is adapted to receive that portion of the bell of the conduit section which extends below the top plane of this section; the length of the cut-away portion being greater than the length of the bell, as shown more particularly in Fig. 3, the result being that the bell itself is entirely out of contact with any wall of a drain section, the excess in area of the opening permitting free access therethrough of any drainage or moisture which may collect external of the bell or in the immediate vicinity of the bell.

By arranging this cut-away portion intermediate the ends of the drain section, the joints of the conduit are spaced from the spaced apart ends of adjacent drain sections, thereby eliminating difficulties which would arise if the opening 13 were at the ends of the drain sections.

As will be understood from Fig. 3, all moisture or drainage which would collect on the exterior of the conduit above the point of contact of conduit and drain sections would, in passing around the conduit, reach either the spaces 12[a] or the opening 13, while such collection on the bell would simply pass around the bell toward its lower point, and since the latter is free from an earth contact and is also out of contact with the drain walls, would simply drip into the drain.

This feature of the open passageways for drainage eliminates any necessity for the use of drains of porous material, and I, therefore, preferably so construct the drain sections as to render them impervious to the drainage, the latter passing into the drain through the passageways provided for this purpose.

If desired, the slight spaces between the drain sections may be closed by cement or otherwise along the bottom of the drain section and partially up the side walls, if it is desired to prevent any leakage of drainage from the drain. Such arrangement is not, however, absolutely essential, since the drain itself forms the freest path for the flow of the material, while any leakage that might occur would be at a point so far removed from the conduit as to have no material effect on the general purpose of retaining the earth surrounding the conduit as free as possible from moisture. This effect is increased where the trench is arranged as in Fig. 4, the latter indicating a preferred way in which the system is applied. As shown in this view, the bottom of the trench is provided with a base 14, preferably of concrete or other material and having a width greater than the width of the drain section, the drain sections being placed upon this base, and then placing a ballast of gravel or cinder about the base and the drain sections to a suitable thickness, the conduit being placed on top of the drain section, after which the earth is filled in about the parts, resulting in an arrangement of the type indicated in Fig. 4.

By this arrangement, the parts are firmly supported and any drainage which may pass out of the drain sections at the spaces 12ª, would pass to the bottom of the ballast, a point so far removed from the conduit as to be ineffective thereon. Should the accumulation increase to such an extent as to pass above the top plane of the bottom of the drain sections, it would flow directly through the drain without leakage, the drain acting to take off all accumulations above this point and thereby acting to safeguard the conduit. As will be readily understood, such accumulations within the ballast as would be provided from the surrounding earth would also be controlled in the same manner.

This general arrangement not only provides for rapidly taking care of moisture and drainage from the immediate vicinity of the conduit, but may also act to accumulate the drainage in a manner to prevent such accumulation from reaching the immediate vicinity of the conduit, it being clear that even should the spaces between the drain sections be insufficient to carry off accumulations, the presence of the opening in the side walls of the drain sections below the plane of the conduit sections provides additional means for carrying off such excess. Consequently, the arrangement is such as to take care of all conditions which would presumably be encountered in an installation of this character.

In addition to the above, the drain opening 13 may also receive the moisture, etc., which might collect within the conduit itself, it being only necessary to provide leakage ports, such for instance as indicated at 15 in Fig. 3, leading from the interior of the conduit through the conduit walls in proximity to the bell, an arrangement which may be desirable in some instances.

As heretofore pointed out, the drain sections are preferably impervious or nonporous, thereby providing for increased strength of the sections and the support provided thereby. This result is preferably obtained by the use of vitrified tile which may be glazed.

Another advantage in the use of this impervious material is the fact that the presence of the top opening, intermediate the ends of the section, tends to cause a slight buckling action on the section during the burning of the sections in the kiln, this action tending to form a pocket at the top from end to end of the section, this, however, being insufficient to affect the firm seating of the conduit sections, at the same time, however, providing a sufficient space for the passage of such moisture as may find its way between the drain and conduit sections. As the sections are impervious, this collection passes to the openings and into the drain sections, in an obvious manner.

I also prefer to employ the staggered relation between drain and conduit sections. This not only insures longitudinal alinement of the conduit sections and prevents lateral and longitudinal movements thereof, but also tends to produce an interlocking effect and an assurance of proper connections being maintained. This is an especially desirable result in the particular type of installations for which the invention is adapted. In installing the structure for such purpose, the drain sections are first placed in position, after which the steam or other pipes are connected up and properly tested; the conduit sections are then placed in position and secured in such positions. The drain sections thus coöperate in the positioning of the conduit sections.

As will be obvious, the moisture, etc., in the vicinity of the conduits is carried away out of direct contact with the conduits thereby materially reducing radiation losses, water and dampness offering a greatly increased percentage of loss through radiation over air, especially under conditions where the conduits are placed underground.

What I claim is:—

In conduit systems, the combination with a sectional conduit having bell and spigot connections, of a sectional supporting drain therefor, the drain sections having a seat for the major portions of the conduit sections and being cut away on the line of the seat to accommodate the conduit bells, said cut away portions having a length and depth

to intersect the interior of the drain and prevent surface contact of the conduit bells and drain sections, whereby said cut away portions will additionally act as passageways for drainage emanating externally of the conduit and in the vicinity of the bell and spigot connection, said conduit having a drainage opening leading through its walls, with the exit of said opening leading to a cut-away portion of a drain section.

In testimony whereof I affix my signature in presence of two witnesses.

GLENDON A. RICHARDS.

Witnesses:

W. H. GALLMEYER,

ARTHUR L. EVANS.