

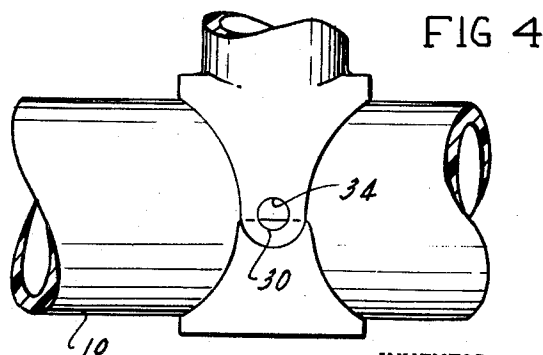
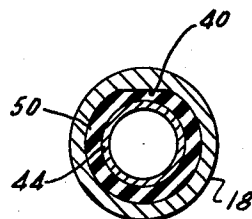
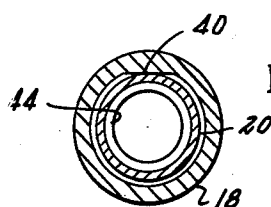
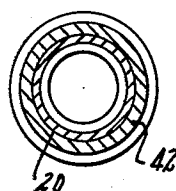
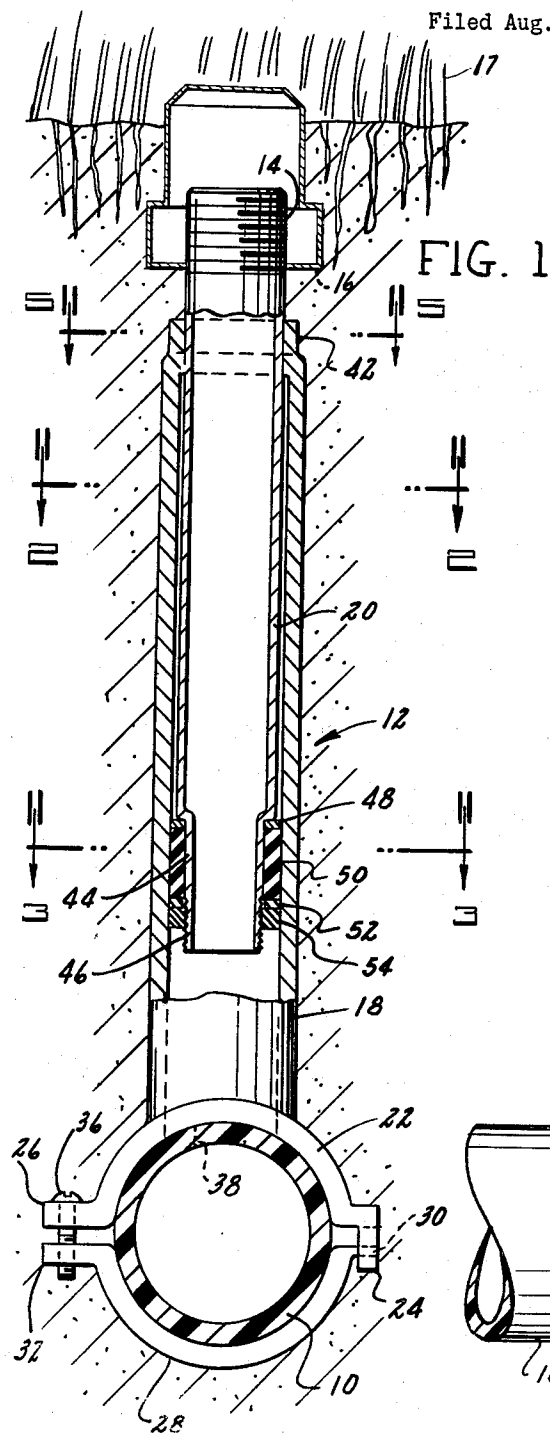
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F. A. HUTTY ETAL

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ADJUSTABLE SPRINKLER PIPE ASSEMBLIES

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INVENTOR.
FRED A. HUTTY
BY WILLIAM J. TRICKEY

WILSON, SETTLE, McRAE & CRAIG
ATTORNEYS

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ADJUSTABLE SPRINKLER PIPE ASSEMBLIES

Fred A. Huffy, Wayne, and William J. Trickey, East Lansing, Mich., assignors of thirty-three and one-third percent to Thomas F. Needham, Wayne, Mich.

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This invention relates to extensible-retractible pipe assemblies, as for example pipe assemblies utilized to form the riser between an underground water supply conduit and a sprinkler head.

In sprinkler systems the various water supply conduits are located a variable distance below the earth surface, as for example from about seven inches below the earth surface to about fourteen inches below the earth surface. In order to supply the sprinkler heads with water there are provided vertical riser pipes between selected points on the underground supply conduits and the sprinkler heads. Conventionally these risers are formed to a particular length, as during manufacture at the factory or by the assembling together of conventional pipe sections at the installation site. During the installation procedure the water supply conduits are extended within trenches dug into the earth, and it is very difficult to obtain a satisfactory level of every portion of each water supply pipe such as to dispose the sprinkler heads at the desired elevations with respect to ground level. In actual conventional practice many cut and try operations are required to obtain satisfactory results as regards correct positionment of the sprinkler heads.

After each installation has been in service for a period various changes occur in the earth strata and in the earth's surface contour, as by reason of earth sinkage and grass cutting accumulation, etc., consequently vertical adjustment of the individual sprinkler heads is very often necessary. Under conventional practice and installation such adjustments are very difficult if not impossible except by complete replacement of the riser with one of the required length.

One object of the present invention is to provide an adjustable length conduit mechanism which can be readily employed as an adjustable length riser between an underground water supply pipe and sprinkler head, the arrangement being characterized by the fact that the riser can be readily adjusted to position its sprinkler head at any desired level.

A further object of the invention is to provide an adjustable length riser construction and pipe assembly wherein adjustments may be made without cutting, deforming or otherwise disturbing the riser position in the earth.

A further object of the invention is to provide an adjustable length pipe and riser assembly wherein the adjustments can be performed after the riser is located within the earth, thereby enabling the riser length to be adjusted at any time subsequent to installation of the sprinkling system in which it is used.

An additional object is to provide an adjustable length riser construction wherein the adjustment operations can be performed without separating or removing the sprinkler head from the riser.

A further object is to provide an adjustable length riser construction wherein the adjusting operations can be performed readily from above ground by the average home owner without digging out the earth around the riser.

A further object of the invention is to provide an adjustable length riser which may be economically formed, and which may be manufactured to have a relative small number of component parts.

Another object is to provide an adjustable length riser which can be adjusted for length without extending tools down into the riser interior.

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A still further object of the invention is to provide an adjustable length riser construction which may be adjusted into an infinite number of riser positions without the requirement for a fixed or predetermined spacing between positions.

A still further object of the invention is to provide an adjustable length riser wherein a novel seal is provided between the adjusted sections for preventing loss of water through the riser section joint.

An additional object of the invention is to provide an adjustable length riser which can be utilized with conventional plastic pipe commonly employed for underground water supply conduits.

A major object of the invention is to provide an adjustable length riser which can be manufactured as a relatively low cost item in competition with inferior non-adjustable constructions.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIG. 1 is a sectional view taken through one embodiment of the invention,

FIG. 2 is a sectional view taken on line 2-2 in FIG. 1,

FIG. 3 is a sectional view taken on line 3-3 in FIG. 1,

FIG. 4 is a side elevational view of a portion of the FIG. 1 embodiment,

FIG. 5 is a sectional view taken on line 5-5 in FIG. 1.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practised or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring to the drawings, and particularly the FIG. 1, there is disclosed a portion of an underground automatic sprinkler system, including a generally horizontal plastic pipe 10 for supplying water to a generally vertical upstanding riser indicated generally by the numeral 12. The upper end of the riser is threaded, as at 14 to connect the riser with any suitable sprinkler head, herein designated by numeral 16. Insofar as the present invention is concerned any suitable sprinkler head construction can be utilized as for example a fixed adjustable orifice head or the conventional pop up type head. If desired the head could be formed as an integral part of riser section 20.

Referring further to the construction of riser 12, it will be seen from FIG. 1 that the riser includes a lower generally tubular pipe section 18 and an upper generally tubular pipe section 20 telescoped within the lower pipe section for axial and rotatable movement relative thereto.

The lower pipe section 18 is formed integrally with a clamp portion 22, herein shown as an arcuate generally semi-circular section having a lug 24 and a flange 26. Portion 22 seats on the upper cylindrical surface of the plastic conduit 10, and a second clamp portion 28 seats on the lower surface of plastic conduit 10. As will be seen from FIGS. 1 and 4, clamp portion 28 is provided with a lug 30 and a flange 32. The aforementioned lug 24 extends downwardly from the clamp portion 22 and is provided with an opening 34 for removably receiving the lug 30. The opposed flanges 26 and 32 are suitably apertured to receive a screw 36, with the opening in flange 32 being suitably threaded so that screw 36 can function to apply a clamping pressure through portions 22 and 28 onto the surface of plastic pipe 10. The primary purpose

of this clamping pressure is to provide a seal on the outer surface of the plastic pipe 10, so as to prevent escape of water from hole 38 around the joint between portion 22 and the outer surface of pipe 10.

Hole 38 may be formed in pipe 10 by drilling procedures at any appropriate point along the pipe length, either before installation of riser 12 or after installation thereof. When hole 38 is to be formed after stationment of the riser on pipe 10 the hole-forming operation may be accomplished by extending a tool (such as a drill or hot iron) down through the riser. It will be understood that within the broader aspects of the invention the water supply pipe can be connected with the riser by other means than that shown herein. For example metal nipples and upstanding T's can be employed for connection to pipe section 18.

By reference to the drawings it will be seen that riser section 18 extends vertically upwardly from clamp portion 22 for a substantial distance, and that vertically extending wall portion 40 thereof is flattened as shown in FIGS. 2 and 3. This flattened portion gives section 18 a non-circular inner surface contour which allows the pipe section to act as a key means for preventing rotation of certain of the components to be described hereinafter. The key action could be achieved by other configurations such as by the formation of ribs or grooves on section 18, or by forming section 18 with a rectangular cross section, hexagonal cross section, etc.

In the illustrated embodiment the extreme upper end portion of section 18 is reduced in diameter as at 42, and it will be seen from FIG. 5 that reduced portion 42 is of cylindrical internal configuration so as to conform with the cylindrical contour of the upper riser pipe section 20. Portion 42 could be formed separately from the main portion of section 18, as by constructing it as a separate internally threaded cap for meshed engagement on a threaded area formed as part of section 18. Portion 42 acts as a guide for section 20 and as a dirt-excluder.

Riser pipe section 20 is of cylindrical configuration for its entire vertical extent, and is provided with a reduced diameter cylindrical tubular section 44 at its lower end. The extreme lower end portion of extension 44 is threaded as at 46. If desired the entire length of extension 46 could be formed with external threads, although as will be seen from the drawings this is not necessary.

The juncture between extension 44 and the main length of pipe 20 defines a shoulder on which is seated a washer 48. Preferably the outer peripheral surface of washer 48 conforms to the contour of the inner surface of tubular riser section 18 so that washer 48 is prevented from rotary movement relative to section 18.

In the space immediately below washer 48 there is disposed an annular rubber-like compressible sealing element 50 which, as shown in FIG. 3 has its outer peripheral surface conforming to the configuration of riser section 18 so that element 50 is prevented from rotary movement relative to section 18. In the space immediately below sealing element 50 there is disposed a second washer 52 which is also configured to conform with the surface of pipe section 18. Some variation in the gasket-washer arrangement is possible while still obtaining satisfactory results. For example washer 48 could be eliminated and the aforementioned juncture formed as a sloping surface, in which case the gasket would have a wedging or camming relationship on the sloping surface. The gasket could be formed with a rounded "doughnut" shape with satisfactory results.

In the illustrated embodiment immediately below washer 52 there is disposed an internally threaded nut 54 which has its peripheral surface configured to conform with the inner surface of pipe section 18. It will be understood that in the illustrated embodiment each of the elements 48, 50, 52 and 54 are slidably keyed to the tubular section 18 so that while each of these elements can move axially of the pipe section 18 yet none of them

can move rotatably relative to pipe section 18. As previously indicated, the pipe section 20 is free to rotate within section 18.

In the FIG. 1 position sealing element 50 is in an axially compressed condition so that its outer peripheral surface is expanded radially outwardly into tight surface engagement with the inner surface of riser section 18. By this construction, when water is pumped through supply pipe 10 a portion thereof is directed upwardly into riser section 18, then into the interior of riser section 20, then into sprinkler head 16, and then outwardly therefrom as a fine spray onto the area to be irrigated, shown in the drawings by the numeral 17. The tight surface engagement between element 50 and the inner surface of section 18 is very important in that it prevents any undesired escape of water into the earth.

As previously noted, at various times it is necessary to adjust the length of the riser assembly, as for example during initial installation of the sprinkling system and after the ground has settled or earth accumulations have formed at the earth surface. In the illustrated embodiment the axial adjustment of the riser assembly can be very readily accomplished by a mere turning of head 16—riser section 20 assembly; in this connection these components are in practice very tight on one another because of the high tightening torque and dope application.

In the riser adjustment operation, as a manual rotary force is applied to pipe section 20 the nut 54 threads down on the threads 46 (because the nut 54 is keyed to section 18). As nut 54 threads down on threads 46 the sealing element 50 is permitted to elongate in an axial direction such that its outer peripheral surface draws radially inwardly away from the surface of riser section 18.

After section 20 has been manually rotated for a suitable distance, as for example one complete revolution, the sealing element 50 is sufficiently loose on section 18 as to permit axial adjustment of section 20 vertically in section 18. When section 20 has been axially adjusted to a desired position the upper end of section 20 may again be rotated (but in a reverse direction) so as to cause nut 54 to be drawn upwardly on extension 44 in a manner to axially compress sealing element 50. By this action the sealing element is caused to expand radially outwardly into tight sealing engagement with the inner surface of riser section 18.

A major feature of importance in connection with the illustrated embodiment is the fact that anyone can make the axial adjustment of the riser assembly from above ground and in a minimum time period. This feature enables the average home owner to make the adjustment at any time after the initial installation of the sprinkler system. Conventionally a major problem is encountered by reason of the fact that after an underground system has been installed a second trip to the installation is required in order for the installer to adjust the height of the sprinkler heads. By using the present invention the home owner can by himself make the adjustment, thereby eliminating an expensive service call by the installer. It will be understood that in making the adjustment the sprinkler head 16 need not be removed from riser section 20 since the actual rotary and axial forces can be applied by manually gripping the sprinkler head. The adjustment can be performed without digging away any of the earth adjacent the riser.

A feature of interest in connection with the illustrated embodiment is the fact that the riser assembly can be adjusted to give an infinite number of sprinkler head levels, i.e., there is no fixed pre-determined spacing between the various positions of adjustment. The adjustable riser assembly is of course slightly more expensive than the conventional non-adjustable construction. However, the riser section 18 as shown in the drawings can be built integrally with the clamp portion 22, as by making the clamp portion 22 and the riser portion 18 as an integral

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one piece casting. Such a construction lowers the total price of the complete installation and additionally makes for greater versatility in that portions 22 and 28 allow the riser assembly to be installed at any desired point along supply pipe 10.

The drawings illustrate the riser assembly as having the upper riser section 20 telescoped within the lower riser section 18. It is contemplated however that these parts can be reversed from their illustrated positions, i.e., portion 20 can be formed to extend integrally from clamp portion 22, and portion 18 can be utilized as the upper element for connection with sprinkler head 16. Stated in another way, the structures between clamp portion 22 and head 16 can be turned end for end, in which case portion 20 would extend upwardly from clamp portion 22 and riser portion 18 would extend downwardly from head 16.

The illustrated arrangement is preferred to that described immediately above because the adjustment of the upper riser section can be carried out with less interference from dirt accumulations around the outer surface of the pipe. Thus, as the illustrated riser section 20 is slid up and down in section 18 its lower end is located within section 18 so as to be free from contact with the surrounding earth. If element 18 were employed as the upper element its lower end would have to drive through earth accumulations surrounding the lower riser section on its descending movement.

The drawings necessarily show a particular embodiment of the invention, but it will be appreciated that various modifications and changes may be resorted to without departing from the spirit of the invention as set forth in the appended claims.

We claim:

1. The combination comprising an adjustable sprinkler head riser assembly including two telescoping elongated sections slidable axially on one another and rotatable relative to one another; a compressible sealing element carried by one of said sections and having a surface engageable with the other section to seal the joint between sections; means keying the sealing element against rotation relative to the other section; and means for effecting radial expansion and contraction of the sealing element, including thread means carried on a portion of the first section, nut means meshed with the thread means, and means slidably keying the nut means against rotation relative to the other section.

2. In an underground sprinkler installation the combination comprising a generally horizontally extending water supply pipe; a riser assembly extending upwardly from said supply pipe, including a first riser section affixed to the supply pipe and a second riser section telescoped on the first riser section for axial and rotational movement relative thereto; a sealing element rotatably carried by one of said sections and engageable with a circumferential surface of the other section to provide a seal between the sections; means keying the sealing element against rotation relative to the other riser section; and means carried by said one section for expanding and contracting the sealing element between a loose condition and a tightly sealed condition upon relative rotation of said sections.

3. The combination comprising an outer tubular pipe section having at least a portion of its length configured to form a keyed inner surface; a second pipe section telescoped within the first pipe section for axial and rotary movement relative thereto; an extension on one end of said second pipe section, at least a portion of said extension having external threads formed thereon; an annular rubber-like sealing element of substantial axial dimension encircling the extension, and having its outer pe-

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ripheral surface conforming generally to the inner surface contour of the first pipe section so as to be keyed therewith against relative rotary movement; and a nut threaded on the extension threads and having its outer peripheral surface keyed to the first pipe section so as to apply an axial force onto the sealing element when the two pipe sections are rotated relative to one another.

4. In a sprinkler installation the combination comprising a lower tubular riser section having at least a portion of its length formed with a keyed inner surface configuration; an upper tubular riser slidably telescoped into the lower section so that the upper section may be rotated and slid axially up and down in the lower section; a tubular extension formed on the lower end portion of the upper riser section; the outer surface of said extension being threaded for at least a portion of its length; an annular rubber-like sealing element encircling the extension and conforming to the inner surface configuration of the lower tubular section so as to be prevented from rotation when the upper pipe section is rotated; and nut means threaded onto the extension threads in keyed relationship to the lower riser section; whereby manual rotation of the upper riser section is effective to move the nut means vertically for causing same to apply an axial distorting force to the compressible sealing element such that it is radially expanded into sealing engagement with the inner surface of the lower tubular section.

5. In a telescoping pipe lock, first and second telescoping pipes slidable axially and rotatable relative to one another, a compressible sealing element rotatably carried by one of said pipes and having a surface engageable with the other pipe to provide a fluid seal between the pipes, a key element on said other pipe engageable with said seal to prevent relative rotation between said seal and said other pipe, and means between said pipes and contacting said sealing element and engageable with said key element to prevent relative rotation between said means and said other pipe for effecting radial expansion and contraction of said sealing element upon relative rotation of said pipes.

6. In a telescoping sprinkler and riser, first and second telescoping pipes slidable axially and rotatable relative to one another, said pipes being separated by an annular gap, a compressible sealing element rotatably carried by one of said pipes and having a surface engageable with the other pipe to provide a fluid seal between the pipes, a key element on said other pipe in said annular gap and engageable with said seal to prevent relative rotation between the sealing element and said other pipe, and means rotatable relative to said one pipe and engageable with said seal and said key element for effecting radial expansion and contraction of said sealing element upon relative rotation of said pipes.

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