July 25, 1950 D. C. MANSUR 2,516,711

FIELD SPRINKLING APPARATUS

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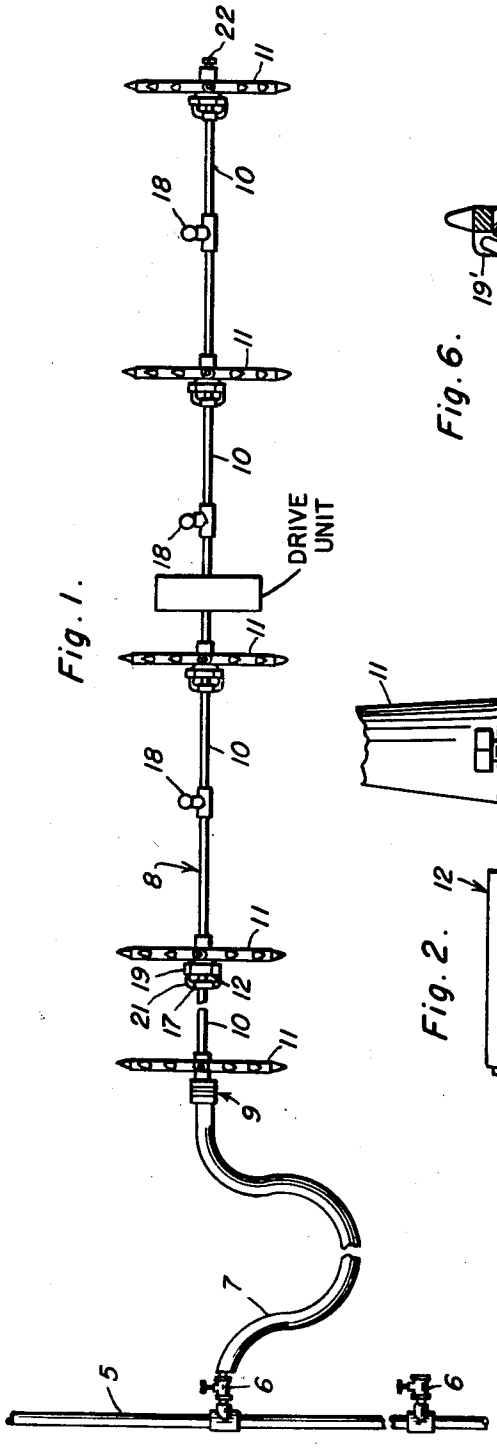


Fig. 1.

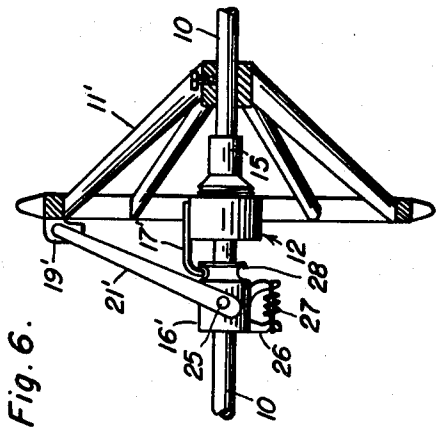


Fig. 6.

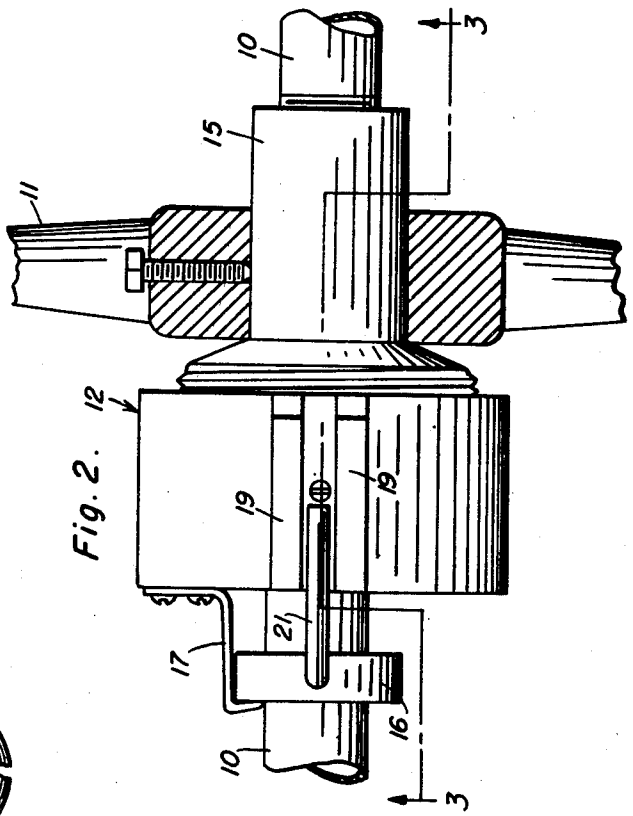


Fig. 2.

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Fig. 3.

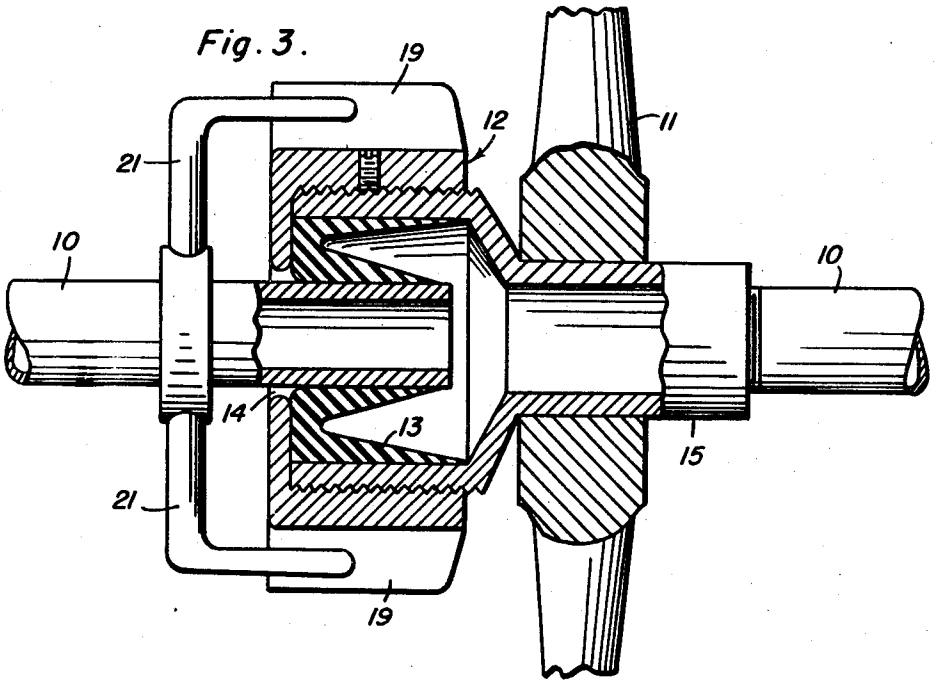


Fig. 4.

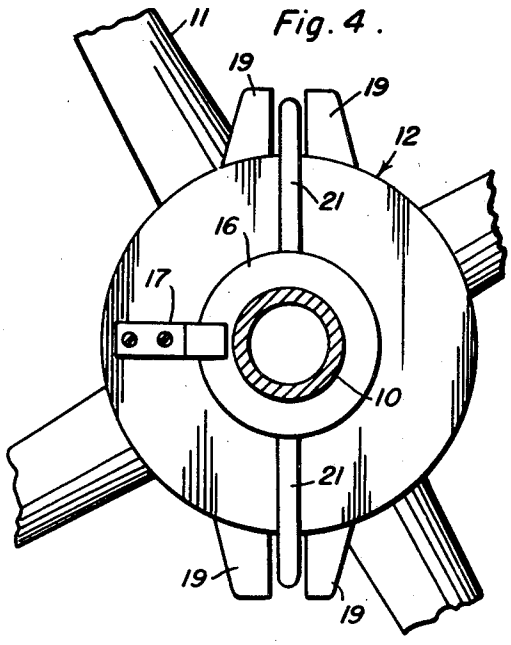
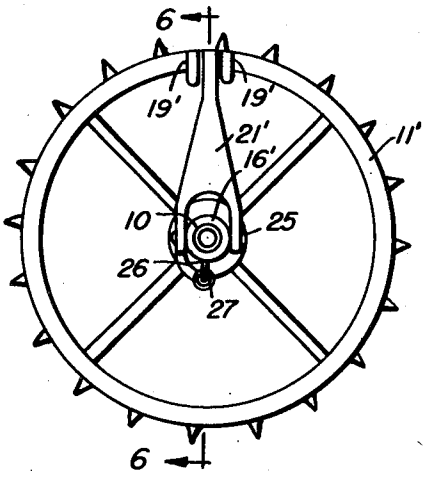


Fig. 5.



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FIELD SPRINKLING APPARATUS

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Application December 8, 1947, Serial No. 790,331

3 Claims. (Cl. 299—47)

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This invention relates to improvements in irrigation apparatus of the type including a delivery pipe supported on wheels and adapted to be rolled over the field to be irrigated, said delivery pipe being so connected with its wheels that rotation of the pipe will cause rotation of the wheels.

The primary object of the present invention is to provide an irrigating apparatus of the above kind including a delivery pipe composed of a plurality of pipe sections arranged in end to end relation and each provided with a supporting wheel, and means separably and flexibly coupling the adjacent ends of said pipe sections so as to provide water-tight joints therebetween and to permit them to assume different angular positions relative to each other, as required when the delivery pipe is rolled over uneven ground.

A further object of the invention is to provide an apparatus of the above kind including means to provide a driving connection between the adjacent ends of said pipe sections so that rotation of one of the latter will cause rotation of the rest of the same for rolling the delivery pipe over the ground.

A further object of the invention is to provide, in an irrigating apparatus for the above kind, an improved wheeled delivery pipe which is extremely simple in construction and efficient in use.

The exact nature of the present invention, as well as other objects and features thereof, will become apparent from the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary plan view, partly broken away, showing an irrigating apparatus embodying the present invention;

Figure 2 is an enlarged fragmentary view, partly in elevation and partly in section, showing the coupling between the adjacent ends of adjacent sections of the delivery pipe and a portion of one of the supporting wheels;

Figure 3 is a section taken on line 3—3 of Figure 2;

Figure 4 is a view looking toward the right of Figure 2;

Figure 5 is a view somewhat similar to Figure 2 drawn on a smaller scale and showing a modification of the invention, the complete supporting wheel being shown;

Figure 6 is a section taken on line 6—6 of Figure 5.

Referring in detail to the drawings, 5 designates a supply pipe which is laid along one side of the field to be irrigated and may be connected with a suitable source of water supply under pressure.

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The pipe 5 is provided at predetermined intervals with valve controlled outlets 6 having suitable connections for one end of a flexible hose 7 whose opposite end is connected to one end of the delivery pipe 8 by a swivel coupling 9.

The delivery pipe 8 is composed of a plurality of pipe sections 10 arranged in end to end relation and each provided with a supporting wheel 11 which may be provided with peripheral traction lugs as shown. Means is provided for separably and flexibly coupling the adjacent ends of the pipe sections 10 so as to provide water-tight joints therebetween and permit them to assume different angular positions relative to each other, as required when the delivery pipe is rolled over uneven ground. For this purpose, each pipe section 10 is provided at one end with a female coupling member 12 of a well known type which includes a flexible liquid seal member 13 through which is inserted the adjacent end of the next adjacent pipe section 10 as shown clearly in Figure 3. The liquid seal member 13 is adapted to be expanded by the water under pressure into snug contact with the end of the inserted pipe section and with the coupling member 12 so as to provide a water-tight joint between the adjacent ends of the adjacent pipes 10. The coupling member 12 has an opening at one end as at 14 which is of larger diameter than the end of the pipe sections 10 inserted therethrough, thereby allowing the pipe sections to assume different angular positions relative to each other by reason of flexing of the liquid seal member 13 as generally disclosed in the U. S. patent to C. Wyss, No. 2,355,407, dated August 8, 1944. At its other end, the coupling member 12 has an attaching neck 15 on which the hub of the associated wheel 11 may be fitted and suitably secured. In order to prevent the end of the pipe section 10 from being unintentionally withdrawn from the associated liquid seal member 13, a collar 16 is secured on said pipe section 10 adjacent the coupling member 12, and a spring catch 17 is secured to the coupling member 12 and engaged over this collar as best shown in Figure 2. It will be seen, however, that the sections 10 may be readily uncoupled by merely springing the catches 17 from behind the collars 16 and then withdrawing an end of each pipe section 10 from the associated liquid seal 13. Each pipe section 10 may be provided with one or more sprinkler heads 18 through which the water is discharged onto the ground.

The apparatus includes means to provide a driving connection between the adjacent ends of

adjacent pipe sections so that rotation of one of said pipe sections will cause rotation of the rest of the same for rolling the delivery pipe over the ground. For this purpose, in the construction of Figures 1 to 4 inclusive, each coupling member 12 is provided at diametrically opposite points with a pair of spaced longitudinal ribs 19, and the collar 16 is provided at diametrically opposite points with outwardly projecting angular arms whose outer ends loosely project into the spaces between the pairs of ribs 19. This not only provides the driving connection between the adjacent ends of adjacent pipe sections 10, but it provides a driving connection which does not interfere with free flexing of the pipe sections to different angular positions relative to each other, because the arms 21 are narrower than the spaces between the lugs 19 of each pair and they are spaced from the coupling member 12 proper. The coupling member 12 at the end of the delivery pipe opposite that end to which the hose 7 is coupled, may be closed by a suitable plug 22.

From the foregoing description, it will be seen that I have provided an irrigation apparatus in which the delivery pipe can be rolled over the field and stopped at any desired point with the spray nozzles 18 positioned to cause the water to flow in the desired direction. The end pipe section 10 adjacent the swivel coupling 9 may be manually turned by actuation of its supporting wheel 11 or through the use of any other suitable means.

In the modified construction of Figures 5 and 6, the wheel 11' has its rim offset laterally with respect to its hub so that the wheel can be secured directly on the associated pipe section 10 instead of being mounted upon the attaching neck 15 of the adjacent coupling member 12. Also, a conventional coupling member 12 may be employed which is not provided with the ribs 19 of the form shown in Figures 1 to 4 inclusive. For this purpose, the collar 16' which is secured on the adjacent pipe section 10 is elongated and has a driving arm 21' pivoted thereto near one end as at 25, the pivoted end portion being bifurcated to straddle the collar 16' as shown clearly in Figure 5. The driving arm 21' projects outwardly to a point adjacent one side of the rim of wheel 11' and between elongated lugs or ribs 19' provided on the adjacent side of said wheel rim. The collar 16' is provided with a hook 26 having one end of a helical tension spring 27 anchored thereto, the other end of spring 27 being connected to the adjacent end of arm 21' and acting to swing the latter toward the wheel 11' for engaging the outer end of said arm 21 between the pair of lugs or ribs 19'. This provides a constant driving connection between the adjacent shaft sections 10 and allows angular movement of the pipe sections relative to each other. To prevent each pipe section 10 from being withdrawn from the associated liquid seal member 13 of the coupling member 12, the latter may have a spring catch 17' attached thereto which engages over a flange 28 provided on the adjacent end of the collar 16'. It will be seen that the coupling member 12 is disposed between the hub of wheel 11' and the collar 16', the driving connection being provided between the collar 16' and the rim of wheel 11'. Thus, the catch 17' may be welded to the coupling member 12 of conventional form so that said coupling member need not be provided with ribs as at 19 in the form of Figures 1 to 4.

It will be understood that, while I have described my invention as an irrigation apparatus, it is equally applicable to a spraying apparatus, or any apparatus in which it is desirable that a delivery pipe be moved from place to place. Also, while I have described the embodiments herein illustrated in detail, it will be understood that changes and modifications may be made therein without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

1. Irrigation apparatus comprising an elongated rotatable fluid-delivery pipe formed of a plurality of sections arranged in end-to-end relationship and substantially abutting one another, a flexible-type coupling unit connecting each of the individual substantially abutting pipe sections to form the elongated fluid-delivery pipe, each of said coupling units comprising a pair of joined fluid-tight tubular pipe receiving members, said coupling receiving one of the abutting type sections tightly at one end and having at its other end an enlarged opening for receiving the other of the abutting pipe sections, a driving connection between each two abutting pipe sections linked by the coupling unit, said coupling and said driving means permitting the thereby-supported pipe sections to be movable out of axial alinement with respect to other pipe sections supported by other coupling units; a support wheel for carrying each coupling unit and located with respect to the coupling unit so that the coupling unit is substantially axially positioned thereon, a connection between the support wheel and at least one section of each coupling unit for transferring rotational motion between the wheel and the pipe section through the coupling units; fluid release means carried by the pipe sections; a flexible connector attached at one end to the combined pipe sections and arranged for attachment at the other end to a source of fluid supply, and means for rolling the wheels with respect to ground so that during wheel rotation the couplings and the thereby coupled pipe sections likewise rotate and as all components are transported from one to another location as a unit the supported pipe is capable of being moved out of axial alinement with respect to abutting pipe sections when moved over uneven terrain.

2. An irrigation apparatus comprising a plurality of spaced pipe supporting wheels and a section of fluid-delivery pipe connecting each pair of supporting wheels; a flexible-type coupling unit rigidly secured to and located axially upon each of the support wheels, each of said coupling units comprising a pair of fluid-tight complementarily formed tubular members into which the pipe sections located between the separate wheels are secured and in which the said pipe sections terminate, one of the sections of said coupling unit having an opening therein for receiving the pipe which opening is of a diameter greater than that of the supported pipe section to permit a shift in the location of the supported pipe section out of axial alinement with respect to the next adjacent pipe section while maintaining the fluid-tight coupling connection, a driving connection between each pipe section and the wheels through the therewith associated coupling unit so that rotation of one of the wheel and pipe components serves to transfer rotation to the other, sprinkling heads attached to the pipe sections for releasing fluid, a connecting terminal for coupling one end of the plurality of coupling-

joined pipe sections to a source of fluid supply, and means for rotating the pipe sections and the wheel elements through the therewith associated coupling units for causing the combined coupled pipe unit array to roll over the terrain regardless of irregularity of ground formation.

3. Irrigation apparatus including an elongated rotatable fluid-delivery pipe comprising a plurality of individual pipe sections arranged in end-to-end substantially abutting relationship, a multi-part flexible type fluid coupling unit joining each of the individual substantially abutting pipe sections to form a continuous pipe array, means to connect the substantially abutting ends of the individual pipe sections to different parts of the flexible coupling so that the axes of the coupled pipe sections may be angularly displaced relative to each other, a plurality of pipe and coupling unit support wheels having the elongated pipe supported substantially axially thereon, a driving connection between each wheel and its supported pipe section, rotational driving means between adjacent pipe sections, sprinkling heads attached to the pipe sections, a connecting terminal for providing a fluid supply coupling

at one end of the plurality of coupling-joined pipe sections, and means for rotating the pipe sections and the support wheels as a unit for causing the coupled elongated fluid-delivery pipe array to roll over the terrain irrespective of ground unevenness.

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