Sept. 2, 1941. W. H. COLES ET AL 2,254,270

SPRINKLING APPARATUS

Filed April 22, 1938

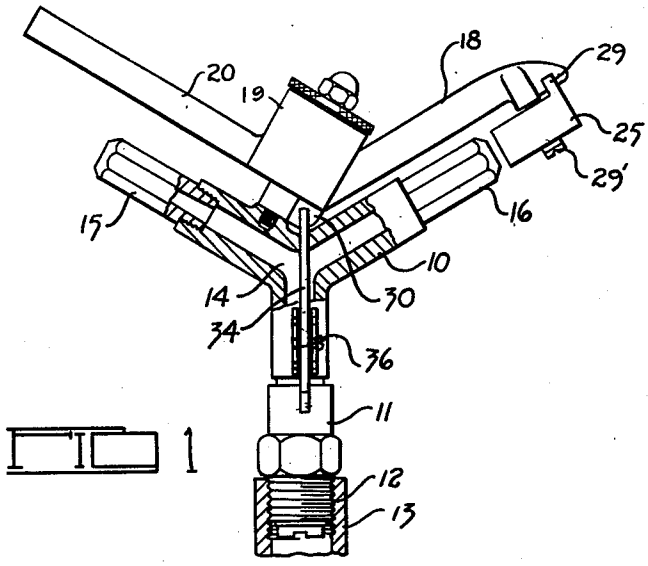


FIG 1

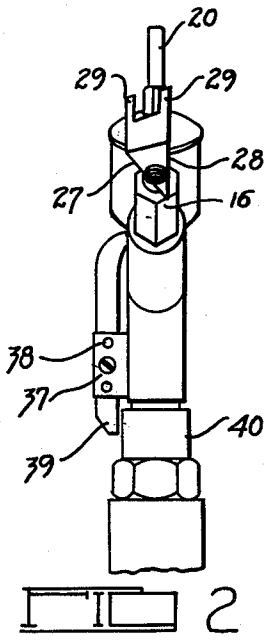


FIG 2

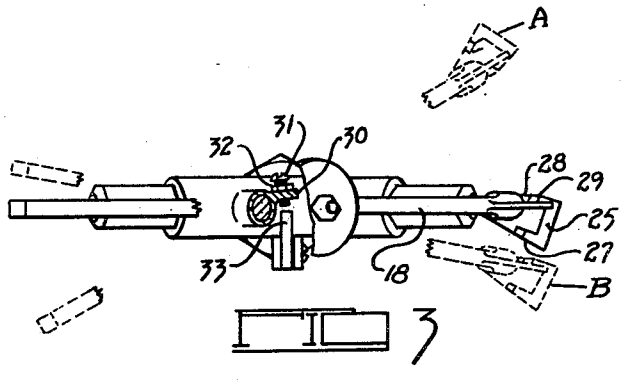


FIG 3

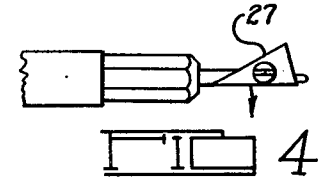


FIG 4

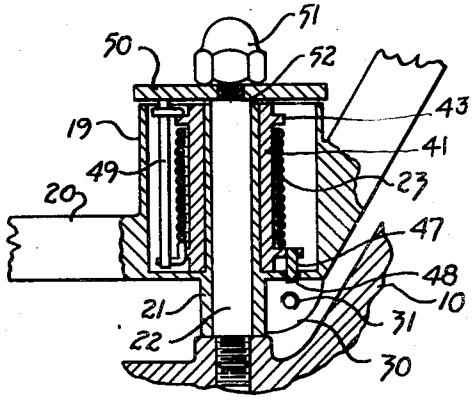


FIG 6

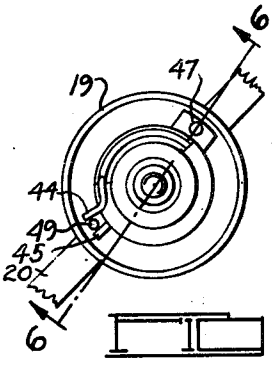


FIG 5

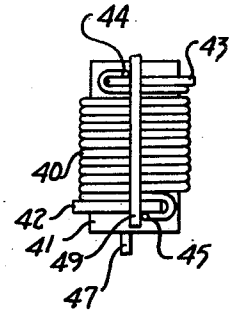


FIG 7

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SPRINKLING APPARATUS

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Application April 22, 1938, Serial No. 203,564

7 Claims. (Cl. 299—69)

This invention relates to water distributing or sprinkling devices, and more particularly to sprinklers having a step by step rotary movement.

One object of the invention is the provision of a sprinkling device having means for rotating the sprinkling member step by step, and including a brake device affording a substantially constant speed of rotation regardless of the pressure of the water supplied to the sprinkler.

Another object of the invention is the provision of a sprinkling device having impact means operated by the water flowing through the sprinkling member and incorporating a brake device operated by the impact means for frictionally engaging the support on which the sprinkling member is mounted.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawing, in which

Fig. 1 is a side elevation, partly in section, showing a sprinkling device embodying the present invention;

Fig. 2 is a front elevation of the sprinkling device;

Fig. 3 is a top plan view of the same with a portion of the spring and spring housing removed;

Fig. 4 is a bottom plan view showing the relationship between the vane and the associated nozzle;

Fig. 5 is a top plan view of the spring and spring housing, with the cover of the housing removed;

Fig. 6 is a vertical section taken on the line 6—6 of Fig. 5; and

Fig. 7 is a side elevation of the spring unit.

Referring more particularly to the drawing by reference numerals, 10 designates a sprinkling member, rotatably supported for movement about a vertical axis on a supporting member 11 which forms a bearing for the lower end of the sprinkling member. The support 11, as shown, is provided with screw threads 12 adapted to be engaged by the threads on a washer pipe 13 of any suitable character.

The body of the sprinkling member has a central passage 14 in free communication with the end of the water supply pipe 13, and communicating with water distributing nozzles 15 and 16, herein shown as two in number and positioned 180° apart. The nozzles are directed in radial vertical planes at a suitable upward inclination so that the stream of water will be thrown a large distance over the ground.

The sprinkling member 10 is adapted to be moved step by step and at a comparatively slow rate of speed so that the streams of water issuing from the nozzles 15 and 16 will be moved slowly over different portions of the ground, and as herein shown the means by which the sprinkling member is moved is one operated by the water flowing through the sprinkling member and preferably operated by the stream of water after it issues from one of the nozzles. This means, as herein shown, comprises a rigid arm 18 pivotally supported on the sprinkling member 10 for movement about an axis that is preferably inclined at a substantial angle to the horizontal and to the vertical. The arm 18 is integral with or rigidly connected to a shell or housing 19 and with an extension portion 20, and is provided with a bearing sleeve 21 rotatably supported on a fixed pivot pin 22 which extends upwardly from the top of the body member. The shell 19 forms an enclosing housing for a spring 23 which acts to yieldingly hold the arm 18 in the position shown in full lines in Fig. 3.

Pivotally supported on the outer end of the arm 18 is a vane 25 which, in the normal position of the arm 18 assumed when the device is not in use, is positioned in front of the nozzle 16. It is thus in the path of the stream of water issuing from that nozzle. The vane is of triangular formation having diverging faces 27 and 28. A pin 29' extends through a hole in the vane and is removably secured by suitable screw threads or the like in the arm 18, thus providing a pivot support for the vane, which is arranged so that either one of the diverging surfaces 27 or 28 may be struck by the stream issuing from the nozzle. Ears 29 project toward the end of the arm 18 and form limiting stops determining the angular movement of the vane on the arm.

With the vane 25 arranged as shown in full lines in Fig. 3, the stream issuing from the nozzle 16 acts against the surface 27 and the force of the stream rapidly swings the arm 18 counterclockwise as viewed in Fig. 3 against the action of the spring 23 and into the position shown in dotted lines at A, the spring yieldingly absorbing the momentum of the arm and its associated moving parts and stopping the same gradually after they move about a quarter of a revolution. Just before the vane 25 moves out of the stream of water, the outer end of the surface 27 is struck by the water and the vane is tilted over so that

the point is positioned as shown in dotted lines at A. As the arm 18 is returned by the spring, the point of the vane is so positioned that the surface 28 will be struck by the stream and the arm will then be forced against the action of the spring into the position shown in dotted lines at B in Fig. 3. Just before the vane leaves the stream as it moves clockwise from the normal position in front of the stream, the vane will be again tilted by the force of the water on the outer end of the vane. Thus each time the vane passes the stream it is struck by the stream and propelled along in the same direction it moves as it enters the stream, and the vane is tilted on the arm automatically by the stream itself.

The position of the arm 18 indicated in dotted lines at B in Fig. 3 is determined by suitable stop provided on the sprinkling member 10 and impacted or struck by a portion of the oscillatable arm before the spring overcomes the inertia of the arm, so as to produce rotary step by step movements of the sprinkling member about its vertical axis of rotation. The impacting portion of the arm is preferably a projection 30 having an adjustable threaded stud 31 normally fixed in position on the projection 30 by means of a lock nut 32. The end of the stud 31 is preferably located closely adjacent the axis about which the sprinkling member moves, and is adapted to strike the end 33 of an impacted device herein shown as a lever 34 so as to transfer the rotational momentum of the lever arm and its associated moving parts to the sprinkling member and thus move the sprinkling member through a small arc. The lever 34 is pivotally supported on a fulcrum stud 36 which is removably carried in brackets 37 fixed to and projecting from the body portion of the sprinkling member. The brackets 37 are provided with a series of holes, 38, herein shown as three in number, and the lever 34 is similarly provided with correspondingly spaced holes so that the fulcrum stud 36 may be engaged in any of the holes to locate the fulcrum point at the desired distance from the upper end of the lever. The lower end 39 of the lever bears against the cylindrical surface 40 of the support 11 so as to provide a braking effect restraining or controlling the angular movements of the sprinkling member on the support. As the upper end of the lever 34 is struck by the end of the stud 31, the fulcrum stud 36 transfers the momentum of the moving arm 18 to the sprinkling member and at the same time the lower end of the lever 34 is pressed against the surface 40. Thus the time required for given angular movement of the sprinkling member may be made substantially constant even though the water pressure supplied to the sprinkler may vary through extremely wide limits, for the braking effect increases as the force of the impact blow increases. With high water pressures the arm 18 is forced rather violently into the position B of Fig. 3 and would tend to rotate the sprinkler through a rather wide angle, but the restraining effect of the brake is proportionately increased at the very time of impact so that the speed may remain substantially constant.

The speed of operation may be controlled, however, by shifting the pin 36 into a different hole and thus change the braking effect to either increase or decrease the same. The speed may also be controlled by moving the screw 31 so as to increase or decrease the arc of movement between the normal position of the arm 18 and the limiting position indicated at B.

The spring, which is concealed and protected within the shell 16, is preferably a spiral spring wire 40 wound on a sleeve 41 which is provided with flanged portions 42 and 43 around which the ends 44 and 45 of the spring are turned. In the normal position of the spring on the sleeve, as shown in Fig. 7, the ends of the spring press firmly against the ends of the flanges 42 and 43. The sleeve 41 is provided with a pin 47, fixed thereto and projecting into a hole 48 provided at the bottom of the shell 16 as shown in Fig. 6, thus definitely positioning the sleeve 41 against relative turning but permitting the spring and sleeve unit to be readily withdrawn from the housing 16. The two ends 44 and 45 of the spring project outwardly and are relatively displaced in a lateral direction so as to afford space between them for a pin 49 which is fixed to the cap or cover 50 of the shell 16. The cap 50 is held by nut 51 against the flanged portion 52 of pin 22, thus holding the cap 50 and the pin 49 fixed with respect to the sprinkling member 16. In the normal position of the arm 18 no spring pressure is exerted against the pin 49 by either end of the spring, but as soon as the arm turns in one direction or the other from its normal position, it pushes either the upper or lower end of the spring, depending on the direction of movement of the arm, so as to increase the spring tension and apply the spring pressure directly to the pin and thus yieldingly urge the arm 18 back to its normal position. The spring has a number of turns so that the arm can be swung through a wide angle in either direction without subjecting it to positive or sudden restraining force, and thus permitting the gradual absorption of the inertia of the moving arm without imparting rotational movements to the sprinkler.

In accordance with the construction as herein set forth, the means which produces the periodic impacts on the sprinkling member and governs the speed of rotation at different water pressures is of comparatively simple construction and may operate effectively with water containing mud or other substances without effect on the apparatus, and since the spring is concealed and protected it will be apparent that the device may remain in service over long periods of time and may operate effectively to produce the desired rotational movements of the sprinkling member at a controlled rate.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A sprinkling device comprising a support, a sprinkling member mounted for rotational movement on said support and having a distributing nozzle, an arm pivoted on said member, a vane pivoted on said arm and adapted to be actuated by the stream of water issuing from said nozzle to swing said arm in opposite directions from a normal position, spring means yieldingly holding said arm in normal position with said vane in front of the nozzle and means on said member adapted to be impacted by said arm to rotate said member and actuated by such impact to brake the rotation of said member.

2. A sprinkling device comprising a support, a sprinkling member mounted for rotational movement on said support and having a distributing nozzle, impact means operated by the water that

flows through said member for moving said member step by step on said support, and a lever pivoted on said sprinkling member having a portion positioned to be struck by said impact means and another portion positioned to be frictionally pressed against said support when said first portion is struck.

3. A sprinkling device comprising a support, a sprinkling member mounted for rotational movement on said support and having a distributing nozzle, an arm pivotally mounted on said member for oscillatory movement about an inclined axis, a triangular vane pivotally supported between diverging water actuated surfaces thereof and actuated by the stream of water issuing from said nozzle for swinging said arm alternately towards opposite sides of said stream, a coil spring normally urging said arm to position said vane in front of said nozzle, means carried by said member and engaged by said arm at a predetermined position of said arm at one side of said stream for imparting step by step movement to said member on said support and means for adjusting said predetermined position to vary the turning movement produced by such engagement.

4. A sprinkling device comprising a supporting member, a sprinkling member mounted for rotational movement on said supporting member and having a distributing nozzle, impacting means operably carried by one of said members and operated by the water that flows through such member, an impacted part impacted by said impacting means for moving the sprinkling member step by step on said supporting member, and means operated by said impacted part for applying a frictional restraining force on the sprinkling member each time the impacted part is engaged by the impacting means.

5. A sprinkling device comprising a supporting member, a sprinkling member mounted for rotational movement on said supporting member and having a distributing nozzle, impact means carried by said sprinkling member and operated by the water flowing therethrough for moving the sprinkling member step by step on said supporting member, and a friction member movably carried by said supporting member and adapted for pressure engagement with said support to frcitionally restrain the rotational movement of said sprinkling member and having a portion operated by said impact means for variation of the frictional restraint in accordance with the force of the impact.

6. A sprinkling device comprising a supporting member, a sprinkling member mounted for rotational movement on said supporting member and having a distributing nozzle, impacting means operably carried by one of said members and operated by the water that flows through such member, an impact part impacted by said impacting means for moving the sprinkling member step by step on said supporting member, means operated by said impacted part for applying a frictional restraining force on the sprinkling member each time the impacted part is engaged by the impacting means, and adjustment means operable to adjust the amount of frictional restraint applied by said impacted part for each impact.

7. A sprinkling device comprising a supporting member, a sprinkling member mounted for rotational movement on said supporting member and having a distributing nozzle, impacting means operably carried by one of said members and operated by the water flowing through such member, an impacted part operably carried on one of said members and engaged by said impacting means to move the sprinkling member step by step on said supporting member, a brake device operably carried by one of said members and engaging the other member to apply a brake force on the sprinkling member, and a connection between said brake device and said impacted part providing for application of braking forces which are proportional to the amount of the impact blow.

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