Application for a Patent
67528/81

PHILIP FRANK TEMPLE, of 17 Myilly Terrace,
Darwin, 5794, Northern Territory, Australia,

hereby apply for the grant of a Patent for an invention entitled:

"APPLICATOR FOR WATERING SYSTEMS"

which is described in the accompanying specification.

My address for service is:

Care: SPRUSON & FERGUSON
PATENT ATTORNEYS
ESSO HOUSE, 127 KENT STREET
SYDNEY, NEW SOUTH WALES,
AUSTRALIA

Dated this TWENTY-FIRST day of FEBRUARY, 1980

Signature of Applicant.

To:
The Commissioner of Patents
Commonwealth of Australia

"MIXING DEVICE FOR WATERING SYSTEMS"
DECLARATION IN SUPPORT OF AN APPLICATION
FOR A PATENT OR PATENT OF ADDITION.

In support of the application made by PHILIP FRANK TEMPLE

for a patent or patent of addition for an invention entitled: -

"APPLICATOR FOR WATERING SYSTEMS"

1. Philip Frank Temple of 17 Myilly Terrace, Darwin, 5794, Northern Territory, Australia, do solemnly and sincerely declare as follows: -

1. I am the applicant for the patent or patent of addition.

(or, in the case of an application by a body corporate)

I am authorized by

the applicant for the patent or patent of addition to make this declaration on its behalf.

2. I am the actual inventor of the invention.

(or, where a person other than the inventor is the applicant)

Full name and address of inventor(s). 2.

is the actual inventor of the invention and the facts upon which the applicant is or are entitled to make the application are as follows:

Declared at SYDNEY this 21ST day of FEBRUARY 1980

To: The Commissioner of Patents,

Signature of Declarant.

SPRUSON & FERGUSON
Claim

1. A device for distributing soluble additives in a pressure watering system, said device having an inlet and outlet for connection in series with the watering system, characterised by an outer pressure chamber and an inner permeable chamber for holding the additives, two paths for water flow between the inlet and outlet, one path being a direct main flow path and the other path being into and through the inner chamber and out of the outer chamber, the path through the inner chamber comprises an inlet hole between the upstream end of the main flow path and the inside of the inner chamber and an outlet hole between the inside of the pressure chamber and the downstream end of the main flow path, and a single regulating valve for adjusting the flow simultaneously through both of the paths.
The following statement is a full description of this invention, including the best method of performing it known to me:—

"MIXING DEVICE FOR WATERING SYSTEMS"
"MIXING DEVICE FOR WATERING SYSTEMS"

BACKGROUND ART

Soluble solid additives and concentrated liquid additives can be applied through devices which allow an additive solution to be distributed through a hose or sprinkler system.

Mixing devices presently available are based on the use of especially made fertilizer tablets which dissolve slowly as the water flows around them or on a venturi action for additive solutions. The disadvantages of these devices are:

(i) They are only capable of holding comparatively small quantities of fertilizer (about 200 grams);
(ii) They require the use of specially manufactured tablets of fertilizer;
(iii) Some devices are dependent for their operation on moving parts and these devices are prone to break down;
(iv) Some devices use a plurality of valves and these lead to eventual malfunction;
(v) Other devices are not self-draining or they do not have provision to prevent particulate matter blocking the outlet nozzles etc.

DISCLOSURE OF INVENTION

The device of the invention is capable of overcoming the foregoing disadvantages. It is also capable of operating while attached to a tap or while in line on a hose. When not in use it may be left in situ attached to a tap or hose without affecting the water flow. Access to the device for recharging does not require disconnection of the device from the tap or hose. The device may have a non-return
valve to prevent back flow and contamination of the water supply.

In one broad form, the invention comprises a device for distributing soluble additives in a pressure watering system, said device having an inlet and outlet for connection in series with the watering system, characterised by an outer pressure chamber and an inner permeable chamber for holding the additives, two paths for water flow between the inlet and outlet, one path being a direct main flow path and the other path being into and through the inner chamber and out of the outer chamber, the path through the inner chamber comprises an inlet hole between the upstream end of the main flow path and the inside of the inner chamber and an outlet hole between the inside of the pressure chamber and the downstream end of the main flow path, and a single regulating valve for adjusting the flow simultaneously through both of the paths.

**BRIEF DESCRIPTION OF DRAWINGS**

Fig. 1 is a cross-sectional view of the view A-A in Fig. 2,

Fig. 2 is a plan view of the device, and

Fig. 3 shows several views of a mixing valve.

**BEST MODE OF CARRYING OUT THE INVENTION**

The mixing device consists of a pressure chamber 12 within which there is mounted a gauze or the like permeable container or chamber 7 having a smaller mesh size than outlet hole 8 and outlet holes of dripper nozzles etc. generally in use. The term permeable includes both membrane and gauzes and implies the inner chamber may be completely or partly permeable. The gauze container or inner chamber 7
holds the fertilizer and access to it for inserting additives may be gained through an opening 13 in or near the top of the chamber 12, which is sealed by a screw-on cap 6 or the like. The cap 6 may be fitted with a water-tight gasket. In the smaller version of the device, the chamber 12 has its water inlet 1 which is near the top of the chamber mounted directly to the water tap by means of a threaded collar. In the larger version, the device is free standing and has its inlet 1 connected to the water supply by a short length of hose pipe or the like. In both versions the water outlet 9 may be at or near the bottom of the chamber.

The inlet 1 and outlet 9 are directly connected together by the main flow path 4. As shown in Figure 1 the path 4 runs round the outside of chamber 12 but it is not restricted to this configuration. The path 4 may run through the chamber 12 or be formed by a channel between the inner wall of the chamber 12 and an impermeable part of the wall of the inner chamber 7. The channel could be formed by flanges on the outer wall of the inner chamber.

In another embodiment the main flow path 4 is between the inner surface of the pressure chamber 12 and an impermeable part of the inner chamber 7, which path connects the inlet 1 to the outlets 8 and 9. The other path is
through the inner chamber 7 and out through the permeable part of this chamber to mix with the water in the main flow path 4 along its length.

The inside cross-sectional area of this path 4 is about the same as the connecting hose or water pipe. However, about 2 or 3 cm from its beginning or upstream end, the inside cross-sectional area of the path is reduced and this reduction continues until about 2 or 3 cm from the end, at which point the inside cross-sectional area returns to normal.

On the upstream side of the point of reduction of inside cross-sectional area there is a hole 5, the cross-sectional area of which is the same as the reduction in area of the path. The hole passes from the path directly into the inner chamber 7 which holds the fertilizer. The hole can be so positioned so that incoming water causes a circular current in the spherical chamber. This helps solids to dissolve.

On the downstream side of the point where the inside cross-sectional area of the path returns to normal there is another hole 8 the same cross-sectional area as the first which provides access directly into the bottom of the pressure chamber 12 (but not into the gauze container). The position of this hole ensures complete draining of fertilizer etc from the chamber after each use and obviates the need for flushing.

Adjustment means may be incorporated to control the relative amount of water travelling through the container 12 to that travelling round the path 4 and hence regulating the strength of the fertilizer solution leaving the device. While the flow rate can be adjusted by the tap to which the device is connected, a further flow rate regulator may be incorporated in the device, and this may be combined with the adjustment means.

One such regulator will now be described. A valve 14 is located where the outlet hole 8 from the chamber 12 meets the path 4. It has a tapered conical shape and has a hole 21 drilled up the centre from the narrow end, the same diameter as the path 4. The hole 21 is drilled at an angle so as to emerge from the side of the valve. Thus, water exits through the inner chamber 7 and out through the permeable part of this chamber to mix with the water in the main flow path 4 along its length.

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passing down the path 4 enters the side 16 of the valve and exits from the narrow end 17.

The narrow end of the valve 17 has a raised collar 20 extending approximately 2/3 of the way around. When the valve 14 is in one position the collar 20 blocks the outlet hole 8. When the valve 14 is turned to another position the outlet hole 8 is opened.

The opening 16 at the side of the valve and the collar 20 are so positioned with respect to one another that when the valve is turned to its extreme in one direction the full flow of water through the path 4 passes through the valve, while the outlet hole 8 is completely blocked. This position is used to retain liquid additives in the chambers. When turned to its extreme in the other direction the flow of water through the path 4 is completely blocked while the outlet hole 8 is fully open. At intermediate positions the flow through the path 4 and the flow through the outlet hole 8 can be varied with respect to each other, thus achieving varying mixing rates.

The valve 14 is secured by a locking plate 19 and sealed by a washer 15. A knob 18 on the outside enables the valve to be turned to different positions.

By sealing the outlet hole 8 (when turned to a certain position) the valve 14 enables the chamber 12 to be filled with liquid fertilizer, detergent, concentrated weedicide or pesticide, etc., without the concentrated liquid escaping through the outlet hole 8 and into the hose. When the inner chamber 7 is filled and the screw-on cap 6 replaced, the water tap is turned on and the mixing valve 14 turned to the desired position. Only then does the concentrated liquid begin to mix with the water passing through the path 4.

In operation, the main flow of water passes through the path 4, but because of the restricted cross-section near the top (or because of the setting of the regulator), there is a flow of water through the hole 5 in the path into the inner chamber 7. As the pressure chamber fills a strong solution of fertilizer is created. When the pressure chamber is full, the solution begins to be steadily forced out through the hole 8 in the bottom of the chamber where it
mixes with the water passing through the path 4.

At the water inlet 1 there is a spring-loaded valve 3 which opens under the pressure of the incoming water and closes when the flow stops. This is intended to prevent the return of fertilizer solution into the tap and contamination of the water supply, e.g. in situations where the flow is stopped at the hose nozzle and the tap remains open.

The chamber 12 may be fitted with a floating ball valve or the like for the emission of air.

When attached directly to a tap the device may incorporate a flexible collar to prevent the device being damaged if accidentally knocked.

**INDUSTRIAL APPLICABILITY**

Dispensing fertilizers, weedicides, pesticides, etc., through high pressure watering system.
The

1. A pressure with an outlet for characterizing permeable water flow through the direct main path through the inside of the inside of main flow the flow

2. cross-sectional the downstream downstream

3. regulating

4. can shut off

5. the regulator reference

6. substantial

1 and 2.
The claims defining the invention are as follows:

1. A device for distributing soluble additives in a pressure watering system, said device having an inlet and outlet for connection in series with the watering system, characterised by an outer pressure chamber and an inner permeable chamber for holding the additives, two paths for water flow between the inlet and outlet, one path being a direct main flow path and the other path being into and through the inner chamber and out of the outer chamber, the path through the inner chamber comprises an inlet hole between the upstream end of the main flow path and the inside of the inner chamber and an outlet hole between the inside of the pressure chamber and the downstream end of the main flow path, and a single regulating valve for adjusting the flow simultaneously through both of the paths.

2. A device as claimed in claim 1 wherein the cross-sectional area of the main flow path is restricted on the downstream side of the inlet hole and is enlarged on the downstream side of the outlet hole.

3. A device as claimed in claim 1 or 2 wherein the regulating valve is manually operable.

4. A device as claimed in claim 3 wherein the valve can shut off the flow through both chambers.

5. A device as claimed in claims 1, 2, 3 or 4 wherein the regulating valve is substantially as described with reference to Figure 3.

6. A device as claimed in any preceding claim substantially as herein described with reference to Figures 1 and 2.

7. A device as claimed in claim 1 wherein the main...
flow path is between the inside of the pressure chamber and 
an impermeable part of the inner chamber and the other path 
is through the inner chamber and out through the permeable 
part thereof to entrain with the water flowing in the main 
flow path.

DATED this SEVENTH day of MAY 1984

PHILIP FRANK TEMPLE

Patent Attorneys for the Applicant
SPRUSON & FERGUSON
DRAWINGS