June 6, 1950 W. J. PINE 2,510,252

DRIP VALVE

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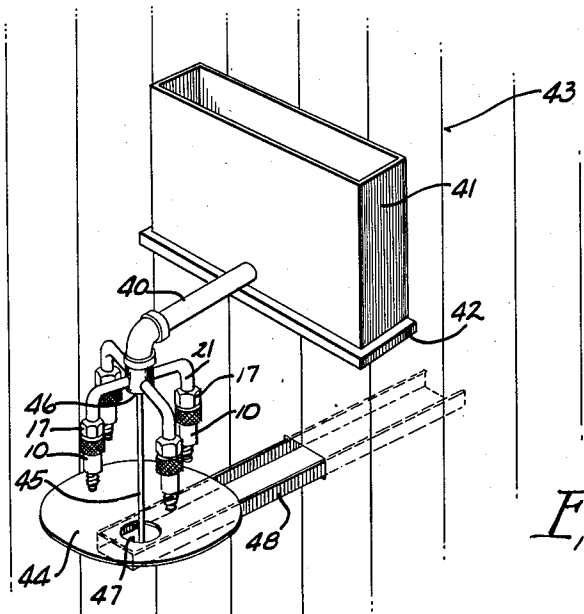

Fig. 1.

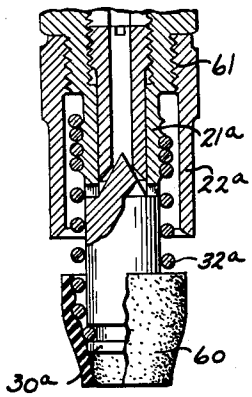

Fig. 5.

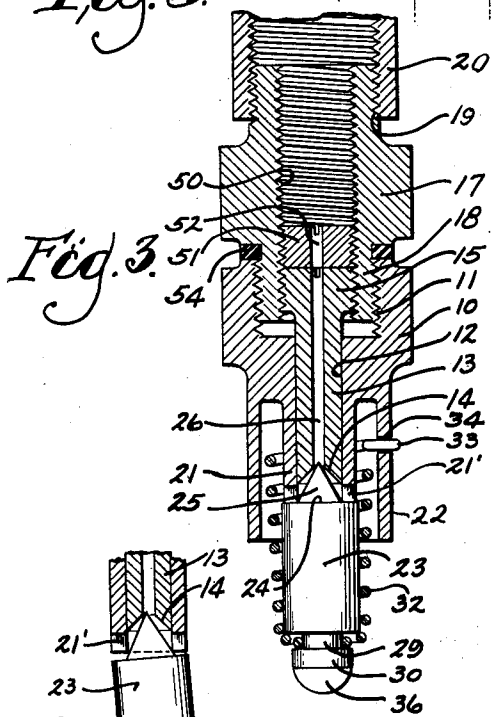

Fig. 3.

Fig. 4.

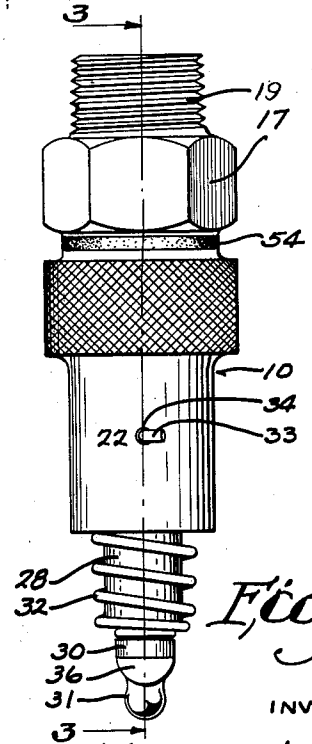

Fig. 2.

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DRIP VALVE

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21 Claims. (Cl. 119—72.5)

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My invention relates to improvements in drip valves.

The object of my invention is to provide means for enabling fowls to supply themselves with pure water from a protected reservoir or other source of supply.

A further object is to prevent the withdrawal of excess water, while enabling the fowls to pick it in individual drops from positions of suspension, and to withdraw it from the reservoir substantially in proportion to their needs and not materially in excess of needs, whereby waste of water and the wetting of the surrounding premises may be avoided.

In the following description, reference is had to the accompanying drawings, in which:

Fig 1 is a perspective view of a poultry drinking fountain containing a plural set of drip valves embodying my invention.

Fig. 2 is an elevation of one of the drip valves, drawn to an enlarged scale.

Fig. 3 is a sectional view drawn to line 3—3 of Fig. 2.

Fig. 4 is a detail view of the male valve member in tilted position, fragments of the body and valve seat member being shown in vertical section.

Fig. 5 is a detail, partly in elevation and partly in vertical section, showing a modification.

Like parts are identified by the same reference characters throughout the several views.

My improved drip valve has a body 10 provided with a threaded socket 11 at its upper end, and a central vertical bore 12 leading downwardly through the body from the bottom of the socket. A tubular member 13 is fitted to the bore and provided with a conical valve seat 14 at its lower end. The upper end of the member 13 extends into the socket 11 and is provided with a head 15, exteriorly threaded, as shown in Fig. 3.

The body is supported from a water supply pipe by means of a coupling member 17 which has a stem-like extension 18 at its lower end. It it exteriorly threaded for engagement in the socket 11, and interiorly threaded for engagement with a thread on the headed end 15 of the member 13. The upper end of this coupling member is provided with an exterior thread 19 for engagement with the supply pipe 20.

The body 10 has a sleeve-like depending portion 21 through which the bore 12 extends, and annularly spaced therefrom is a depending skirt 22 of greater length. A spring supported valve member 23 has an annular shoulder 24 which seats against the lower end of the sleeve-like ex-

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tension 21, the latter having its lower end notched as shown at 21'. The valve member 23 has its upper end provided with a needle-like extension 25 which loosely enters conical valve seat 14, but is more sharply tapered and, therefore, adapted to be tilted as shown in Fig. 4. Near its point it is in close proximity to the seat 14 along a circular line and a water seal tends to form along this line, although the parts are out of actual contact. They are held out of contact by the lower end of the sleeve-like extension 21.

The valve member 23 has a supporting stem 28 provided with a neck 29 and a head 30 at its lower end, upon which a drop of water may collect, as indicated at 31 in Fig. 2. A spring 32 is coiled around the neck 29 and connected with the skirt 22 at 33, the upper end of the spring being preferably received in the annular socket 34 between the skirt 22 and the sleeve-like extension 21. The skirt 22 protects the upper end of the spring and limits tilting movement of the valve.

Normally the spring holds the valve 23 with its annular shoulder 24 in contact with the lower end of the sleeve-like extension 21, with the needle-like projection 25 slightly retracted from the valve seat 14. The needle valve contact is so close that a film of water tends to form a seal along the line of closest approach and prevents dripping if the pressure of the water is insufficient to overcome the upward urge of the spring. If the film is dislodged, a drop of water will escape and pass downwardly over the valve to the head 30 where it will tend to collect in the form of a suspended drop. If the water does not so escape, a light lateral pressure applied to the head 30 will cause the valve to tilt, or fulcrum on the lower end of member 21, thereby slightly withdrawing the needle-like extension 25 from the seat 14 and permitting the escape of additional water from the passage 26 in the member 13. Sufficient lateral pressure for this purpose will be exerted whenever one of the fowls picks at the head 30. The latter preferably will be provided with a semi-spherical glass knob 36, sufficiently suggestive of a drop of water suspended from the head 30 to induce the fowls to pick it.

My improved drip valve may be connected with any suitable source of water supply under light pressure. It Fig. 1 I have illustrated a set of four of these drip valves, each connected by a pipe 21 with a supply main 40, leading from a reservoir 41, supported by a shelf 42 from the interior surface of the wall 43 of a building or chicken coop.

Also, in Fig. 1 I have illustrated a disk 44 suspended by a rod 45 from an end cap 46 on the supply main 40. The disk 44 has its upper surface dished toward an opening 47 communicating with a drain trough 48 leading to any suitable point of discharge, preferably through the wall 43 of the building, whereby excess water dripping from any one of the four drip valves will be delivered through the opening 47 of the trough 48 and discharged beyond the building wall.

The valve seat member 13 may be adjusted vertically in the coupling member 17 by screwing its head 15 upwardly or downwardly in the threaded central bore 50 of the coupling member 17. A lock nut 51 may be employed to prevent accidental changes in the adjustment, this lock nut having a central bore 52 in registry with the passage 26. Thus the pressure of the valve 23 upon its annular seat 24 may be nicely adjusted with reference to the pressure of the water in the main 40, and this adjustment may be made at the factory where the valves are produced. This factory-predetermined adjustment will ordinarily be unknown to the user.

However, it will be desirable to allow the user to make a slight additional adjustment, and for this purpose I provide a resilient gasket 54 between the upper end of the body 10 and the lower end of the coupling member 17. By rotating the body 10 upon its threaded connection with the coupling member 17, it may be moved upwardly or downwardly to regulate the drip during the night or at other times when the fowls do not have access to the valve. When the valve is properly adjusted the film of water will then tend to collect between the valve seat and the valve and form a seal which will prevent dripping except for a short period after a lateral displacement of the valve has occurred.

The conical valve seat 14 allows the valve 25 to be tilted laterally as shown in Fig. 4, the normal tilt under impact of a fowl's bill being somewhat exaggerated in that view.

It will be observed that the valve 23 is in reality a double valve, the portion 24 serving as a check valve with its flat annular face 24 seating against the lower end of the sleeve-like member 21 and the portion 25 serving as a needle valve to regulate the drip without moving to full closing position. But in fact, neither the annular face 24 or the needle 25 is ever fully closed, the notches 21' allowing water to escape to the drop-collecting knob whenever the film seal of the needle valve is broken by a tilting movement or by the pressure of the supply water.

Spring actuated needle valves which completely close are not sufficiently delicate in their operation to satisfy the requirements of a poultry waterer, and those which conform in taper to that of the seat are apt to stick and remain closed despite the effort of the fowls to open them. But I have discovered that by giving the needle a sharper taper than that of the seat and preventing it from closing farther than necessary to prevent a flow of water under very light pressure, such a valve may easily be vibrated laterally by the pick of a fowl, and when so vibrated it will allow the escape of at least one drop of water, and it can be easily restored to its normal position by a light spring with just sufficient tension to overcome the water pressure and prevent the escape of more than a few drops of water after each vibratory movement of the valve.

In Fig. 5 I have shown a modification in which a rubber sleeve or collar 60 protects the lower end of the spring 32a and covers the head 30a. The upper end of the spring 32a is in screw connection with the threaded outer surface of the sleeve-like body member 21a and the protecting outer skirting 22a is separately formed and screwed to the body at 61. The drop of water is trapped by the convergent walls of the rubber collar 60, but is partially exposed and accessible to the fowls. Also the rubber presents a softer surface for them to pick at.

I claim:

1. A drip valve for enabling fowls to supply themselves with water, comprising the combination with a source of water supply having a downwardly opening outlet provided with a valve seat, of a valve closing upwardly into proximity to said seat, a spring urging the valve toward closing position, means for preventing a closure of the valve beyond film forming proximity, and a depending stem exposed in a position to be picked by the fowls and vibrated laterally, whereby to allow at least one drop of water to pass the valve and collect on the end of the stem.

2. The combination with a reservoir adapted to contain drinking water for fowls and having a downwardly opening outlet tube provided with a valve seat at its lower end, of a valve provided with a valve supporting spring and a stop for normally holding it yieldingly in closely spaced relation to said seat and in such proximity thereto as to normally allow a static film of water to form between it and the valve seat, whereby to allow the valve to vibrate laterally under extremely light pressure such as that exerted by the pick of a fowl, said valve having a depending stem accessible to fowls and provided with a water collecting knob to be picked at by them.

3. A drip valve for enabling fowls to supply themselves with water, comprising the combination of a hollow valve body provided with a coupling member for connecting it with a source of water supply and a depending sleeve-like portion, a downwardly extending tubular outlet member provided with a flaring valve seat at its lower end within said sleeve-like portion, a valve loosely fitted to the lower end of the sleeve-like portion and movable into a nearly closed relation to said seat against the pressure of water tending to escape from the outlet member, and a coiled spring for urging the valve toward closing position on said valve seat, said valve being formed to permit a slow escape of water from the body, when tilted, and having a depending stem portion accessible to fowls and provided with a water-collecting rubber collar.

4. A drip valve as set forth in claim 3, in which the sleeve-like portion has an exterior screw thread with which the upper coils of the spring are engaged.

5. A drip valve for enabling fowls to supply themselves with water, comprising the combination with a valve body connectible with a source of water supply and provided with a downwardly extending port for the escape of water and having a conical valve seat at its lower end, a valve having a different conical pitch than and movable toward said seat in opposition to the pressure of the water and provided with a depending stem, and means for resiliently supporting the valve in film forming proximity to said seat, with its depending stem accessible to fowls and laterally movable by impact of the fowls.

6. A drip valve for enabling fowls to supply themselves with water, comprising the combination with a source of water supply under predetermined pressure, of a vertically adjustable valve body provided with a tubular bore and means for connecting it with said source of supply, a tubular seat member adjustably mounted in said bore and provided with a conical annular valve seat at its lower end, a valve having a cylindrical portion provided with a flat annular shoulder adapted for contact with the body at the lower end of said bore, and a spring adapted to urge said valve toward seating position against the pressure of the supply water, said valve having a needle-shaped extension normally in close proximity to said conical valve seat in drip regulating relation thereto, and a stem depending from the valve and provided with a water-collecting knob in a position accessible to the fowls.

7. A drip valve as set forth in claim 6, in which the water-collecting knob is composed of transparent material suggestive of a suspended drop of water.

8. A drip valve as set forth in claim 6, in which the tubular seat member is adjustable in threaded engagement with a coupling member for varying the position of the seat relative to the end of the body bore portion.

9. In a drip valve mechanism, the combination with a valve body having a water passage and vertically spaced seats, of a spring-supported check valve held in contact with a portion of the lower seat and normally seating thereon, and a needle-shaped extension in normal flow regulating proximity to the upper seat.

10. In a drip valve mechanism, the combination with a valve body having a water passage and vertically spaced seats, of a spring-supported check valve in normal contact with the lower seat, and said check valve having a pointed extension in normal flow regulating proximity to the upper seat and held by the check valve out of actual contact therewith, said lower seat being notched below said extension to allow escape of water past the lower seat while the valve is in closed position.

11. A drip valve for enabling fowls to supply themselves with water, comprising the combination of a hollow valve body provided with a coupling member for connecting it with a source of water supply, a vertically adjustable, downwardly extending tubular outlet member fitted to said body and provided with a flaring valve seat at its lower end, a check valve loosely fitted to an opening in the bottom of the body and normally seated against the body, a spring for urging the valve to such position, a needle-shaped upwardly projecting member on said valve normally in flow regulating proximity to said flaring valve seat, and means whereby fowls may exert lateral pressure against said valve to tilt it from its normal seating position on the body and retract its needle-shaped extension from said flaring valve seat.

12. The combination of a water supply reservoir having an outlet duct provided with a downwardly flaring valve seat, a sleeve-like skirting encircling the valve seat and having a notched lower end below the seat adapted to serve as a valve stop, a valve member having its upper surface provided with an axially disposed needle valve and a shoulder for contact with the skirting to prevent the needle valve from contacting said seat, and means for yieldingly supporting said shoulder in contact with the lower end of the sleeve, with the needle valve in such proximity to the seat as to limit the escape of water from said duct in quantities of more than a drop at a time.

13. The combination set forth in claim 12, in which the valve is provided with a depending stem having a water collecting knob to be picked at by fowls, and in which the needle valve is in such proximity to its seat as to normally prevent the delivery of water except in drops for short periods following a vibratory movement of the valve.

14. A drip valve for supplying water to fowls and comprising a valve body having a bore portion, a tubular member in the bore portion and having a conical valve seat formed therein adjacent an end of the body bore portion, a valve having a shoulder engageable with an end of the bore portion and a needle-like extension projecting into proximity with the seat, and resilient means for urging the valve shoulder into contact with the end of the body bore portion and for returning the valve extension to a predetermined position relative to and out of contact with the seat in the tubular member.

15. A drip valve for supplying water to fowls and comprising a valve body having a bore portion, a tubular member in the bore portion and having a conical valve seat formed therein adjacent an end of the body bore portion, a valve having a shoulder engageable with an end of the bore portion and a conical pointed extension projecting into proximity with the seat, the angle of the valve seat being greater than the angle of the valve point, and resilient means for urging the valve shoulder into contact with the end of the body bore portion and for returning the valve extension to a predetermined position relative to and out of contact with the seat in the tubular member.

16. A drip valve for supplying water to fowls and comprising a valve body having a bore portion and a skirt portion surrounding the bore portion, a tubular member in the bore portion and having a conical valve seat formed therein adjacent an end of the body bore portion, a valve having a shoulder engageable with an end of the bore portion and a pointed extension projecting into proximity with the seat, and a spring connecting the body skirt portion and the valve for urging the valve shoulder into contact with the end of the body bore portion and for returning the pointed valve extension to a predetermined position within and out of contact with the seat in the tubular member.

17. A drip valve for supplying water to fowls and comprising a valve body having a bore portion notched at one end thereof, a tubular member in the bore portion and having a conical valve seat formed therein adjacent an end of the body bore portion, a valve having a shoulder engageable with an end of the bore portion and a conical point extending into proximity with the seat, the valve being formed with a neck and a head for collecting water into drops, and a spring connecting the valve body and the valve for retaining the valve shoulder in contact with the end of the body bore portion and for returning the valve point to proximity with the valve seat upon movemen of the valve by picking a drop of water from the valve head by a fowl.

18. In a drip valve for supplying water to fowls, a coupling member in substantially tubular form and having one end thereof exteriorly threaded, a valve body threaded on the coupling member for

adjustment relative thereto, the valve body having a bore portion, a tubular member having a valve seat formed therein adjacent an end of the bore portion, a valve seating on the end of the body bore portion and having an extension therefrom into proximity with the tubular member valve seat, and resilient means retaining the valve in contact with the body bore portion while permitting movement of the valve extension relative to the seat in the tubular member.

19. In a drip valve for supplying water to fowls, a coupling member in substantially tubular form and having an end thereof exteriorly threaded, a valve body threaded on the coupling member and having a bore portion, a tubular member positioned in the coupling member and extending into the body bore portion, the tubular member having a valve seat formed therein adjacent one end of the bore portion, a valve seated on the end of the body bore portion and having an extension therefrom into proximity with the tubular member valve seat, adjustment of the valve body relative to the coupling member varying the position of the body bore portion and relative to the seat in the tubular member for varying the spacing between the seat and the valve extension, and resilient means retaining the valve in contact with the body bore portion while permitting movement of the valve extension relative to the seat in the tubular member.

20. In a drip valve for supplying water to fowls, a coupling member in substantially tubular form and having one end thereof exteriorly threaded and being interiorly threaded throughout its length, a valve body threaded on the coupling member for adjustment relative thereto, the valve body having a bore portion, a tubular member threaded into the coupling member and extending into the body bore portion, the tubular member having a valve seat formed therein adjacent

an end of the bore portion, a valve seating on the end of the body bore portion and having a pointed extension therefrom into proximity with the tubular member valve seat, adjustment of the tubular member in the coupling member varying the relation of the valve seat relative to the end of the body bore portion and varying the rate of water flow through the valve, and resilient means retaining the valve in contact with the body bore portion while permitting movement of the valve extension relative to the seat in the tubular member.

21. The combination with a reservoir adapted to contain drinking water for fowls and having a downwardly opening outlet tube provided with a valve seat at its lower end, of a valve provided with a valve support, a spring and a stop for normally holding it yieldingly in closely spaced relation to said seat and in such proximity thereto as to normally allow a static film of water to form between it and the valve seat and allowing the valve to vibrate laterally under extremely light pressure such as that exerted by the pick-up of fowl, said valve having a depending stem accessible to fowls and provided with a water collecting knob to be picked at by them.

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