Aug. 28, 1956 E. UMBRICHT 2,760,825

SPRAYER

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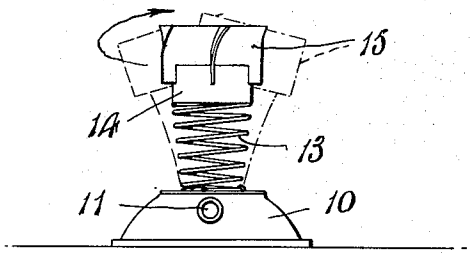


Fig. 4.

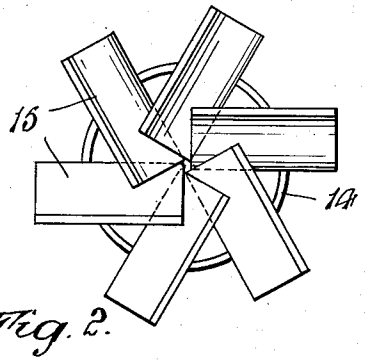


Fig. 2.

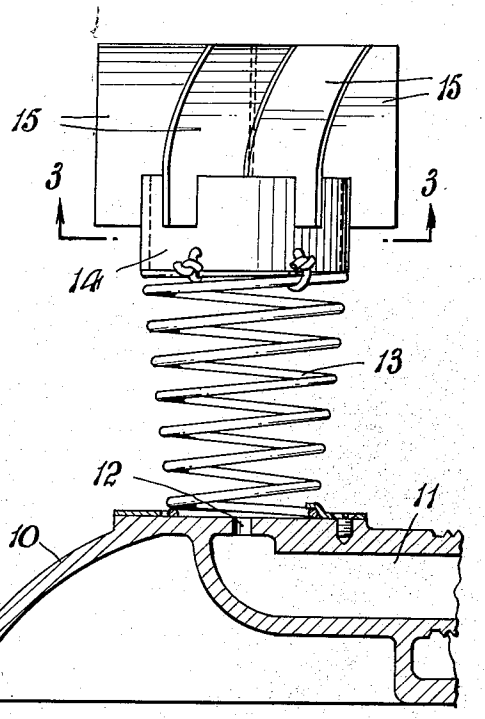


Fig. 1.

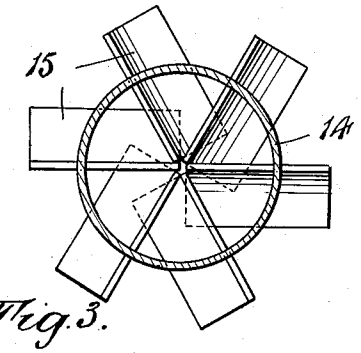


Fig. 3.

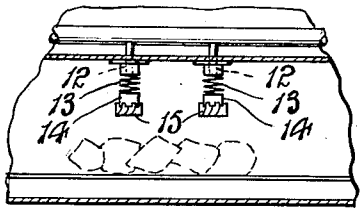


Fig. 5

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SPRAYER

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6 Claims. (Cl. 299—123)

This invention relates to devices for spraying water or other fluids, such as in the sprinkling of lawns or the spray treatment or cleansing of articles or material, and has for its object to provide a simple automatic device operable by the force of a jet of fluid to break up and divert said jet into a series of spray formations moving and combining to effectively spray a desired circular area.

An important object of the invention is to provide a gyratory but non-rotary spray head resiliently mounted in the path of a jet of water or fluid and vaned to rock in gyratory fashion under the impact of such a jet.

A still further object is to provide in such a device a resiliently mounted spray head capable of such gyratory but non-rotary motion wherein a plurality of off-set fan-like vanes radiate from a common center, with the inner end of at least one of the said vanes projecting into the normal path of the said water jet whereby the impact of the jet will cause each vane to reactively move out of said path and bring an adjacent vane into said path; the repetition of this action bringing all the vanes successively into the path of the jet and thereby promote a continuous gyratory motion of the sprayer head causing the said vanes to each divert and project spray formations therefrom.

Still further objects or advantages additional or subsidiary to the aforesaid objects, or resulting from the construction or operation of the invention as it may be carried into effect, will become apparent as the said invention is hereinafter further disclosed.

In carrying the said invention into effect, I may adopt the novel construction and arrangement of parts hereinafter described, by way of example, having reference to the accompanying drawing, wherein:

Figure 1 is an elevation, with the base shown in section, of a lawn sprayer embodying the said invention;

Figure 2 is a top plan view of the sprayer head;

Figure 3 is a cross-sectional view taken on a plane indicated by the line 3—3 in Figure 1;

Figure 4 is an elevation on a smaller scale of the lawn sprayer indicating, in dotted lines, a movement of the sprayer head under influence of a jet of water directed upwardly thereagainst; and

Figure 5 is a fragmentary sectional detail of an article cleaning or spraying compartment utilizing the improved sprayer for the cleaning or spray treatment of material passing through the compartment.

Similar characters of reference indicate similar parts of the several figures of the drawing.

Referring more particularly to the first four figures of the drawing; **10** indicates a sprayer base having water or fluid inlet **11** terminating in an upwardly directed jet opening **12**. **13** is a flexible column shown as being conveniently in the form of a somewhat tapered coil spring mounted on the said base **10** so that a jet of water from the nozzle **12** may be directed co-axially therethrough; **14** being a ring or tubular member secured to the upper end of the said spring **13** and open at the

center whereby the jet of water may impinge on blades **15** arranged to successively intercept such jet in the peculiar manner about to be described.

The said blades **15** are in any desirable number to meet the requirements of the spraying action desired, and are arranged in circular series on the ring or mounting **14** and extend radially from the axis thereof, as clearly seen in Figures 2 and 3, with the inner edges of the said blades substantially meeting at the axis of the said mounting whereby the inner end of at least one of said blades will intercept the jet of water from said nozzle when the water is first turned on.

Each of the said blades is bent or off-set throughout at least its upper portion, and all of them in a right or in a left-hand direction according to the desire of the designer. In other words, the said blades are arranged in the general form of a rotary fan although it is a feature of this device that these blades do not rotate in the manner of a fan, although the head of the device does have an otherwise gyrating motion about the axis defined by the jet of water emanating from the nozzle opening **12**.

The gyratory motion referred to results from the force of the water jet striking the under off-set surface of one or other of the blades **15**, which blade, reacting to the impact, attempts to move laterally away from the jet thus rocking the head of the device to one side (as indicated in dotted lines in Figure 4) against the yielding resistance of the spring support **13**. This initial movement merely brings the next blade of the head into opposition to the jet of water, whereupon the rocking is varied as to direction in accordance with the differing radial angularity of this second blade; the reaction being thus progressively transferred from one blade to the next, with consequent changing in the direction of rocking of the head, until all of the blades have been similarly subjected to the stream of water and a circular rocking gyration of the head brought about and continuously repeated as long as the jet of the water is maintained.

It will readily be understood that the described action causes each blade, in turn, to break up the jet of water into a spray and to project this spray upwardly and outwardly of the head throughout a circular area dependent upon the force of volume of the water jet, the individual surface area of the blades, and their number and extent to which they are off-set, as well as upon the resilience of the spring mounting **13**; all of which may be varied in relation to each other to control the force, density or type of spray required and the area to be sprayed.

As shown in Figure 5, the device may be utilized, such as in an inverted position if desired, in a spray booth or in a washer, and it has been found in actual practice that, by simple adjustment of the off-set of the blades and of the water pressure, the impact effect of the spray on the material being sprayed may be regulated to a degree whereby a gentle spraying may be obtained or a forceful spray provided, such as may be required for the removal of oil or foreign material from articles or material.

The device may be very simply and robustly constructed and, being free from bearings and relatively sliding or rotating elements, requires no lubricant or other servicing, and is not subject to sticking or similar interference with its continuous operation. As it need have only one outlet orifice for the water, which orifice may be relatively large, it is much less subject to clogging by sand or other small impurities in the water stream.

It is not intended, of course, that the device be limited in use to the spraying of water as it is obviously well adapted to the spraying or disseminating of other fluids.

This invention may be developed within the scope of the following claims without departing from the essential features of the said invention, and it is desired that

the specification and drawing be read as being merely illustrative of a practical embodiment of the same and not in strictly limiting sense.

What I claim is:

1. In a sprayer of the type described, a jet member adapted to project a column of fluid along an axis, a fan-like head comprising a plurality of vanes in circular series radiating from said axis, each of said vanes having an under off-set surface facing said jet member, the inner end of at least one of said vanes extending into said axis, and means supporting said head in spaced relation to said jet member comprising resilient means normally coaxial with the column of fluid and yieldably resisting tilting gyratory motion of said head under the impact of the column of fluid.

2. A gyratory non-rotary sprayer including a jet member adapted to project a column of fluid along an axis, a fan-like head comprising a plurality of vanes in circular series radiating from said axis, each of said vanes having a surface portion facing said jet member and inclined with respect to the direction of flow of the fluid in said column, the inner end of at least one of said vanes extending into said axis, and a resilient springy support spacing said head from said jet member normally coaxial with the fluid column whereby said head is capable of a non-rotary gyratory motion against the yielding resistance of said support under the impact of the column of fluid on said vanes to cause said vanes to successively rock into intercepting relation to the column of fluid.

3. In a sprayer of the type described, a jet member adapted to project a column of fluid along an axis, a fan-like head comprising a plurality of vanes in circular series radiating from said axis, each of said vanes having an under surface adapted to intercept the column of fluid at an inclination to the direction of flow of the fluid in said column the inner end of at least one of said vanes extending into said axis, and a resilient support in the form of a coiled spring normally coaxial with said fluid column spacing said head from said jet member whereby said head is capable of a non-rotary gyratory motion under the impact of the column of fluid to cause said vanes to successively rock into intercepting relation to the column of fluid.

4. A gyratory non-rotary sprayer comprising a jet member adapted to project a column of fluid along an axis, a fan-like spray head having a plurality of inclined vanes in circular series radiating from said axis, the inner end of at least one of said vanes projecting into said axis, a ring secured to said vanes and normally concentric with said axis, and a resilient support in the form of a tapered coiled spring supporting said head in spaced relation opposite said jet member, said coil spring having its smaller end secured concentric with said jet member and having its larger end secured to said ring, said coil spring and ring being adapted to have the column of fluid pass generally axially therethrough, thereby to strike said vanes, whereby the impingement of the column of fluid on said vanes is capable of oscillating the spray head with tilting non-rotary gyratory motion which successively presents said vanes in intercepting relation to the column of fluid.

5. A gyratory non-rotary sprayer comprising a jet member adapted to direct a column of fluid along an axis, a fan-like spray head having a plurality of vanes in circular series radiating from the said axis, said vanes having surface portions inclined to the direction of flow of the fluid in the column, inner end of at least one of said vanes projecting into said axis, and a resilient coil spring normally coaxial with said axis, one of its ends being secured concentric with said jet member and its other end being secured to said fan-like head and normally concentric with said axis, whereby the column of fluid is enabled to pass from said jet member through said coiled spring to strike said vanes with said head oscillating in a non-rotary gyratory motion under the impact of the column of fluid on said vanes, causing said head successively to present said vanes in intercepting relation to the column of fluid.

6. A gyratory non-rotary sprayer including a jet member adapted to project a column of fluid along an axis, a fan-like head including a plurality of vanes arranged in a circular series pattern and extending outwardly from positions near the axis of said head, each of said vanes having a surface portion facing said jet member and inclined with respect to the direction of flow of the fluid in said column, the inner end of at least one of said vanes normally extending into the fluid column, and a resilient helical spring spacing said head from said jet member and normally coaxial with said fluid column, whereby said head is capable of non-rotary gyratory motion against the yielding resistance of said resilient support under the impact of the fluid column on said vanes to cause said vanes to successively rock into intercepting relation to the fluid column.

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