

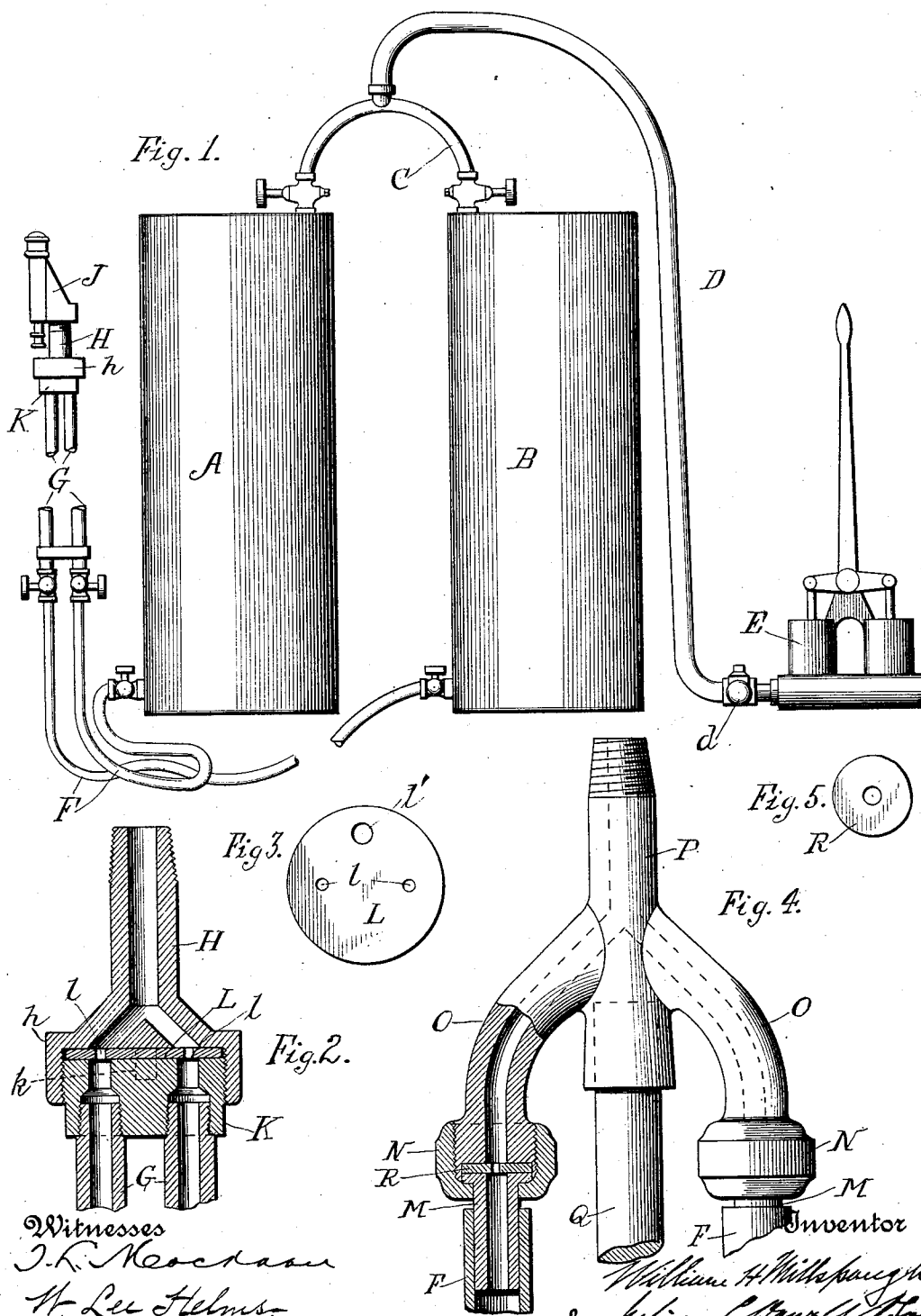
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W. H. MILLSPAUGH.
LIQUID MIXING AND SPRAYING APPARATUS.

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NO MODEL.



Witnesses
J. K. Neocham
W. Lee Helms

Inventor
William H. Millspaugh
by Julian C. Brown
his Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM HULSE MILLSPAUGH, OF SANDUSKY, OHIO, ASSIGNOR TO THE
SANDUSKY FOUNDRY AND MACHINE COMPANY, OF SANDUSKY, OHIO,
A CORPORATION OF WEST VIRGINIA.

LIQUID MIXING AND SPRAYING APPARATUS.

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To all whom it may concern:

Be it known that I, WILLIAM HULSE MILLSPAUGH, a citizen of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented certain new and useful Improvements in Liquid Mixing and Spraying Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for mixing and spraying different liquids; and its principal object is to provide a simple and highly-efficient apparatus for such purpose in which the admixture or commingling of the different fluids will be effected thoroughly and in precisely the desired proportions. Such an apparatus is particularly useful in oil-spraying outfits in which kerosene or other oil is mixed and sprayed with water or other liquid for insecticide, disinfectant, or other purposes where it is essential that the liquids be commingled uniformly and in the desired proportions for the purpose intended; but the invention is of course not limited to any specific application.

The invention will hereinafter be first fully described with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims following the description.

In said drawings, wherein corresponding parts in the different figures are indicated by like reference-symbols, Figure 1 represents in elevation a liquid mixing and spraying apparatus embodying my invention. Fig. 2 is a detail longitudinal sectional view of the connection or junction of the discharge or outlet hose or pipes from the liquid-tanks of said apparatus. Fig. 3 is a detail plan view of the apertured plate in said junction through which the liquids pass and by means of which the proportions of the different liquids in the discharged admixture are regulated. Fig. 4 is an enlarged detail elevation, partly in section, of a different form of connection or

junction for said discharge hose or pipes; and Fig. 5 is a detail plan view of one of the apertured plates in said latter junction.

The apparatus herein illustrated comprises, in the main, a pair of air-tight tanks or receptacles for the different liquids, an air-pump having free connection with both tanks at their upper parts, so as to exert equal pressures on the two liquids, outlet hose or pipes from said tanks having a junction or connection to a common discharge-pipe, means for regulating the flow of each liquid through said junction, and a spray-nozzle connected to said outlet pipe and through which the mixed liquids discharge.

Referring to Fig. 1, the letters A and B designate said tanks, the former of which may contain oil and the latter water. These tanks are connected at their upper parts by a pipe C, which is joined intermediate said tanks to a hose or pipe D, leading from the air-pump E. The pipe C may be provided with controlling-valves, one at each side of its junction with the pipe D, so as to cut off the air-pressure from either tank when desired. The hose or pipe D may be provided with a suitable check-valve *d* to permit the flow of air from the air-pump, but to prevent backward pressure thereof. The letter F refers to the outlet hose or pipes, each of which may also be provided with a controlling valve or valves for cutting off the flow of liquid at will. Any suitable strainers may be placed within the tanks for straining and freeing the liquids of foreign substances before they flow into said hose or pipes. The hose F are shown connected to pipes G, which have a junction or union with a discharge-pipe H, which latter may be provided with a spray-nozzle J. The junction of said pipes G may be effected by any suitable means. As shown in Figs. 1 and 2, said pipes G are screwed into a plug K, having bores therethrough registering with the bores of said pipes, and said plug is screwed into an enlarged or flaring or funnel-shaped part *h* of the pipe H, the bore of said pipe being bibranching in said enlarged part

plate L fits within the recess of the enlarged part *h* of pipe *II* and is clamped between the inner flat face of the latter and the plug *K*. Said plate has liquid-apertures *l* therein registering with the liquid passages or bores in the plug and of suitable sizes to allow the passage of the desired proportion of each liquid. The sizes of the apertures may be determined by tests or by any of the ordinary scientific methods. The plate *L*, as shown in Fig. 3, has three apertures therein. The smaller ones, *l*, register with the bores in the plug *K*, while the larger one, *l'*, fits over a pin or stud *k*, set in said plug, as indicated by dotted lines in Fig. 2, so as to insure registration of the apertures *l* with said bores. Different plates with suitably-sized apertures are used for obtaining different proportions of the liquids in the admixture. For example, assuming that the tanks *A* and *B* contain liquids having substantially the same fluidity or flow properties, if fifty per cent. of each liquid be desired in the admixture the holes in the plate should be of the same size. If a mixture of twenty per cent. of oil and eighty per cent. of water be desired, a plate should be employed having apertures approximately one-sixteenth and one-eighth inches. For other proportions other plates should be substituted having apertures of proper sizes to allow the desired flow of liquids under the same pressure. Where the tanks contain liquids one of which is more or less viscous or less fluid than the other, special plates are required having apertures adapted to allow the passage of the desired proportions of said liquids, the sizes of said apertures being of course determined by proper tests or calculations. For any desired admixture, the proper plate being used, it is obvious that precisely the required proportions of the liquids will be obtained, since the pressures on both liquids in the tanks are equal, and the rate of flow depends only on the sizes of the openings. Whatever pressure may be exerted on the liquids in the tanks, or however such pressure may vary, the proportional rate of flow will remain constant, since the pressures in both tanks are always equal. By reason of the junction of the outlet-pipes the different liquids coming oppositely together under pressure are thoroughly commingled and a perfect mechanical mixture in desired proportions is thus obtained.

In Fig. 4 a different form of junction or connection for the outlet-pipes is illustrated. In this figure the hose *F* are shown connected to short flanged thimbles or pipe-sections *M*, which are joined by suitable unions *N* to the branches *O* of a discharge-pipe *P*, which latter is shown having a socket between its branches, in which fits a handle *Q*. This han-

dle may be of any suitable length, and by means thereof the discharge-pipe or spray-nozzle thereon can be pushed up into the foliage or trees to be sprayed. Between the flanged end of each thimble *M* and end of each branch *O* is clamped a suitable plate *R*, having an aperture of proper size to allow the desired rate or proportion of flow.

The invention is susceptible of various modifications in details of construction and arrangement and is not limited to the particular embodiment herein illustrated. It may also be embodied in an apparatus having any suitable number of tanks containing different liquids desired to be commingled. Where such a plurality of tanks are employed, any one or more may be cut off from operation by closing the valves of the air-inlet and liquid-outlet pipes thereof.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for mixing liquids, a plurality of liquid-tanks, an air-pump having a common connection therewith, outlet-pipes therefrom having a common discharge, and a removable plate in the path of each liquid having an aperture of predetermined size to permit the desired relative rate of flow, substantially as described.

2. In an apparatus for mixing liquids, a plurality of liquid-tanks, an air-pump having a common connection therewith, outlet-pipes from said tanks, the ends of which are coupled to a connecting-piece having a discharge branch, and a removable plate clamped between said connecting-piece and each outlet-pipe having an aperture of proper size to permit the desired proportionate flow, substantially as described.

3. In an apparatus for mixing liquids, a plurality of liquid-tanks, an air-pump having a common connection therewith, controlling-valves for cutting off each of said tanks from said air-pump, outlet-pipes from said tanks having a common discharge, controlling-valves for preventing discharge from each of said pipes, and a removable plate in the path of each liquid having an aperture of proper size to permit the desired proportionate flow, substantially as described.

4. In a liquid mixing and spraying apparatus, a plurality of liquid-tanks, an air-pump having a common connection therewith, outlet-hose leading from said tanks, a discharge pipe or nozzle having a union or junction with said hose, and means in said junction for regulating the flow of each liquid therethrough in predetermined proportions, substantially as described.

5. In a liquid mixing and spraying apparatus, a plurality of liquid-tanks, an air-pump having a common connection therewith, liquid-outlet hose or pipes leading from said

5 tanks, a circular exteriorly-threaded plug into which said pipes are inserted, a discharge-pipe having an interiorly-threaded enlargement screwing on said plug, and a plate or dish clamped between said plug and inner face of said enlargement having apertures of predetermined sizes registering with the bores in said plug to regulate discharge of the dif-

ferent liquids in desired proportions, substantially as described. 10

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HULSE MILLSAUGH.

Witnesses:

MINNIE ZIMMERMAN,

SIDNEY FROHMAN.