

No. 679,504.

Patented July 30, 1901.

W. H. HEARD.
SPRAYING APPARATUS.

(Application filed Dec. 31, 1900.)

(No Model.)

2 Sheets—Sheet 1.

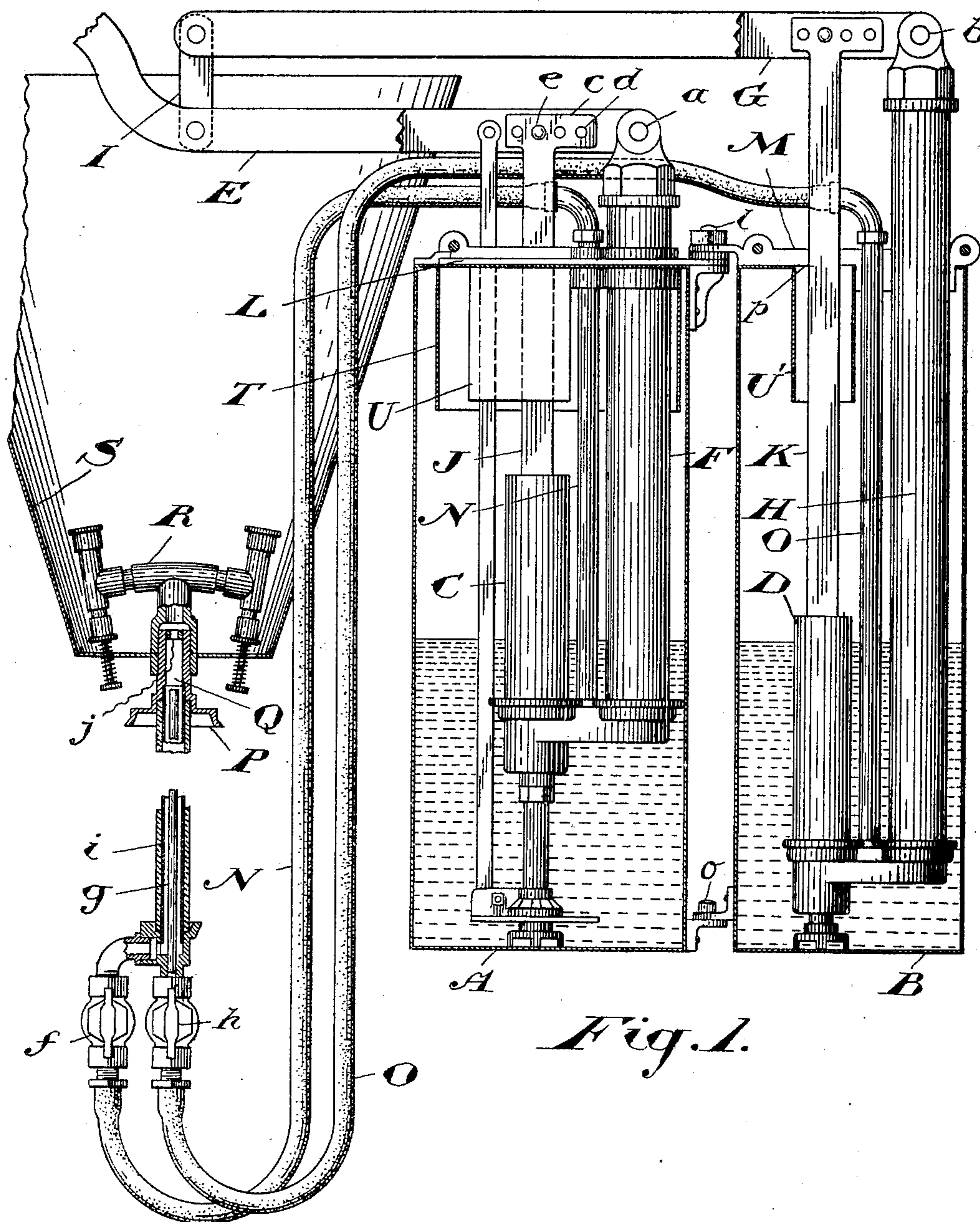


Fig. 1.

Witnesses

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J. W. Webster.

Inventor

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by Ridout & Maybee
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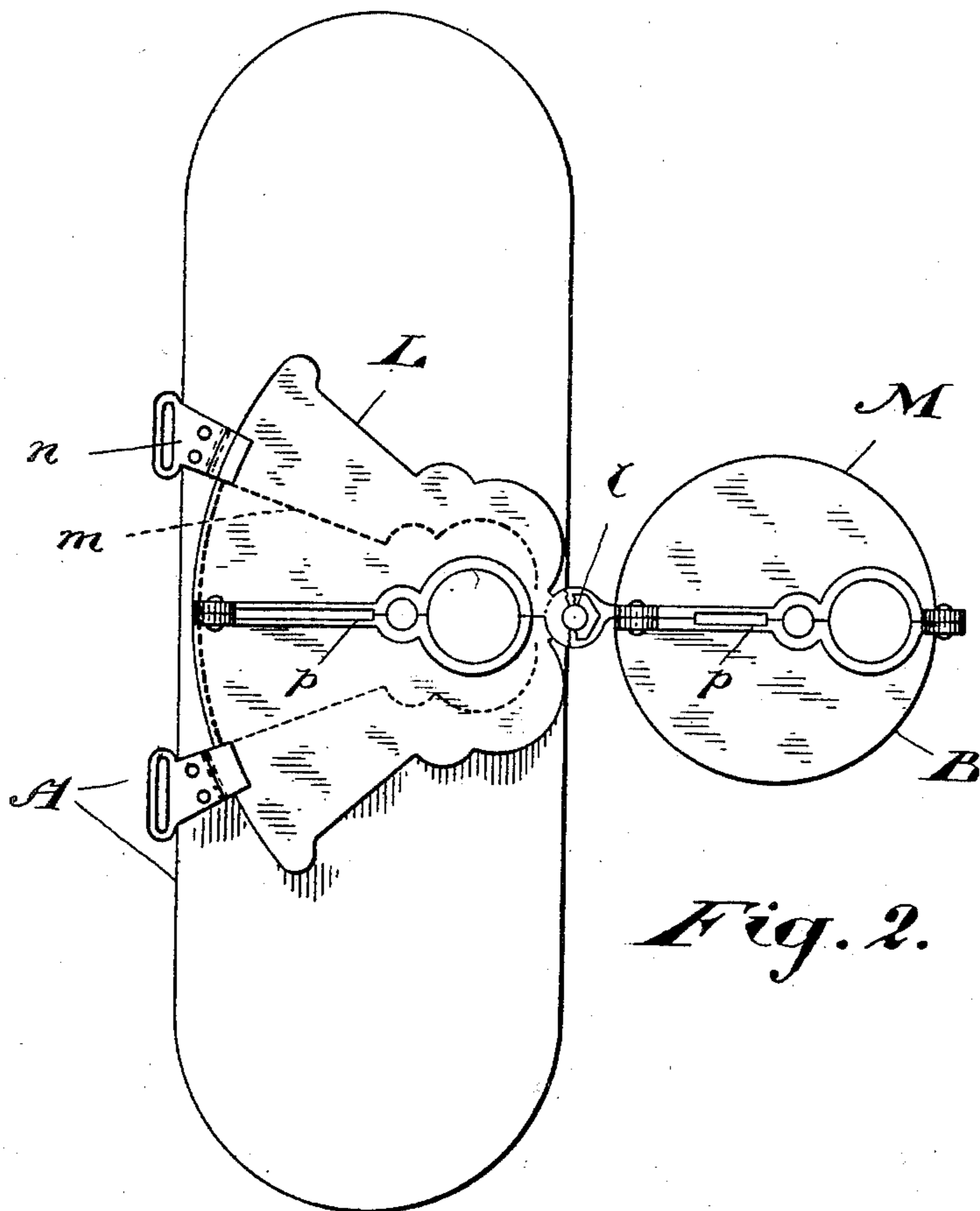


Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

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SPRAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 679,504, dated July 30, 1901.

Application filed December 31, 1900. Serial No. 41,601. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY HEARD, plumber, of the city of London, in the county of Middlesex, Province of Ontario, Canada, have invented certain new and useful Improvements in Spraying Apparatus, of which the following is a specification.

The object of my invention is to devise means for producing a spray of oil mixed with water in which a given proportion of oil to water is maintained with greater accuracy than is now possible and in which the percentage of oil may be easily regulated within a wide range. I achieve this object by employing separate pumps for the oil and the water so coupled that they may both be operated from the handle of one pump and by keeping the discharge-pipes for the oil and the water separate from one another till they reach a point in immediate proximity to the spray-nozzle, where the oil and water are mixed and discharged through the nozzle.

My invention further relates to a cone-shaped wind-shield connected to the nozzle, and to certain improvements in the construction of a knapsack form of the apparatus, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a sectional elevation of my improved apparatus. Fig. 2 is a plan view showing the arrangement of the tanks for the liquid and their covering-plates.

In the drawings like letters of reference indicate corresponding parts in both figures.

A is the main tank, and B a supplemental tank. The main tank is illustrated in the form of a knapsack-tank, with the supplemental tank secured in position behind it; but of course any other forms of tank may be employed. Located within the main tank A is the pump C, of substantially the same construction as that illustrated in my prior United States Patent No. 654,151. Within the tank B is located the pump D, substantially similar to the pump C, but without the agitator, which, as the pump is intended principally to work on oil or some other homogeneous liquid, is unnecessary.

E is the operating-handle of the pump C, suitably pivoted at *a* to the top of the air-chamber F. This handle is preferably formed

double or split, as indicated, and extends forwardly in a horizontal direction.

G is the operating-handle of the pump D, pivoted at *b* to the air-chamber H and extending forward over the handle E, to which it is connected by the pivoted link I.

The plunger-rods J and K of the pumps are preferably provided with T-heads *c*, provided with a series of small holes *d*. Corresponding holes are provided in the handles, so that by means of the pins *e*, passed through the holes in the handles and the T-heads, the pivot-points of the plungers on the handles may be shifted closer to or farther from the pivot-points *a* and *b* of the handles on the air-chambers. The advantage of this construction is that smaller slots are required in the plates L and M than for the mode of connection illustrated in the prior patent referred to, in which the plunger-rod must be swung backward or forward to find a fresh point of attachment to the handle.

N and O are the discharge-pipes of the pumps C and D, respectively. The pipe O communicates through the stop-cock *h* with the interior of the small pipe *g*. The discharge-pipe N communicates with the interior of the large pipe *i*, surrounding the pipe *g*, through the stop-cock *f*. These pipes extend up within the body of the drip-cap P, which is substantially of the construction shown in my prior patent.

Within the body of the drip-cap is formed the mixing-chamber Q. As the small pipe *g* stops short before entering this chamber, the oil or other liquid flowing through it is compelled to mix with the liquid coming up through the large pipe *i* within this mixing-chamber. In order to insure a thorough mixing of the two liquids, I prefer to insert the perforated diaphragm *j* in the mixing-chamber. The liquids in passing through this perforated diaphragm are very intimately mixed before passing to the spray-nozzle R, which is screwed into the upper end of the drip-cap. Below the nozzle I screw on the base of the shield S. This shield is sufficiently large to surround the spray-nozzle and the cone of spray issuing therefrom. Its proportions may vary; but it should be of sufficient length to reach from the nozzle almost to the point of

application of the spray, usually about eight-
 teen or twenty inches, and of sufficient diam-
 eter to avoid contact with the spray itself as
 much as possible. The ends of the disgorgers
 5 of the nozzle may pass through apertures in
 the base of the shield, as indicated in the
 drawings. I find that by the use of such a
 shield the waste of material caused by the
 action of wind is entirely obviated.

10 From the construction described it is evi-
 dent that as long as the handle E is operated
 an unvarying proportion of water and oil or
 other liquid will be supplied to the spray-noz-
 zle in a properly-mixed condition.

15 It is found that it is impossible to spray a
 mechanical mixture of crude petroleum and
 water if they are permitted to mix before
 reaching the point of formation of the spray,
 for the reason that if the motion of the pumps
 20 is stopped even for an instant the mixed oil
 and water will separate so that alternate doses
 of pure water and pure oil are discharged
 from the spray-nozzle instead of the mixture
 desired. It is for this reason that I keep the
 25 two liquids entirely separate till they come
 together in the mixing-chamber. I find this
 mixing-chamber of importance, as if the oil
 and water be led directly to the nozzle there
 is a danger of the two not always preserving
 30 an unvarying proportion in the spray. When
 they are forced through the mixing-chamber
 and then through its perforated diaphragm,
 they are forced into such intimate mixture
 that the spray is for all practical purposes of
 35 identical composition while the machine is
 in operation. If it be desired to vary the pro-
 portions of oil and water, the plunger-rods of
 one or both pumps may be adjusted on the
 handles, as already described. By this means
 40 I find that I can secure a mixture of oil and
 water in which the proportion of oil varies
 from about one to ninety per cent.

It is desirable in a knapsack apparatus
 that it shall be possible for the operator to
 45 use either hand for pumping. In order to ac-
 complish this, it is necessary that it be possi-
 ble to swing the pump-handle so that it will
 go over either shoulder. I accomplish this
 result by pivoting the plate L upon the tank
 50 A at the point *l*. This plate, as in my prior
 patent, is clamped about the air-chamber and
 discharge-pipe of the pump C. In the top
 of the tank I cut an opening *m* and make the
 plate L of sufficient width to cover the open-
 55 ing when the operating-handle is swung to
 the desired limit in either direction. In or-
 der to hold down in position the front edge
 of the plate L, I provide one or more clips *n*,
 which are secured to the top of the tank and
 60 extend over the upper surface of the plate.
 (See Fig. 2.) As the operating-handles of the
 two pumps must swing together and the
 pumps therefore always remain in line one
 behind the other, it is necessary to pivot the
 65 tank B upon the tank A, which is preferably
 done at the pivot-point *l* of the plate L, the
 plate M of the pump D being provided with

a suitable lug for the purpose. The two tanks
 are also pivoted together at *o* in line with the
 pivot-point *l*. 70

From the construction described it follows
 that the handles and pumps are always in
 line, no matter in what direction the handle
 E may be swung.

To prevent liquid being splashed up out of 75
 the opening in the tank A, I surround the
 said opening with the downwardly-depend-
 ing apron T, which effectually accomplishes
 the object. I also provide the slots *p* in the
 plates L and M with similar aprons U and U', 80
 which prevent the splash of liquid out through
 these slots.

What I claim as my invention is—

1. In spraying apparatus the combination
 of two separate tanks to contain liquids; a 85
 pump for each tank; means for operating the
 pumps simultaneously; a spray-nozzle; and
 separate discharge-pipes for the pumps com-
 municating with one another in immediate
 proximity to the spray-nozzle, substantially 90
 as and for the purpose specified.

2. In spraying apparatus the combination
 of two separate tanks to contain liquids; a
 pump for each tank; means for operating the
 pumps simultaneously; a spray-nozzle; sepa- 95
 rate discharge-pipes for the pumps commu-
 nicating with one another in immediate prox-
 imity to the spray-nozzle; and means for ad-
 justing the relative action of the said pumps,
 substantially as and for the purposes specified. 100

3. In spraying apparatus the combination
 of a spray-nozzle; two separate tanks for liq-
 uids; two independent conduits for liquid
 extending from the said tanks to the spray-
 nozzle and means for simultaneously forcing 105
 liquids from the said tanks independently
 through the said conduits, substantially as
 and for the purpose specified.

4. In spraying apparatus the combination
 of two separate tanks to contain liquids; a 110
 pump for each tank; means for operating the
 pumps simultaneously; a mixing-chamber;
 a nozzle communicating directly with the said
 chamber; and separate discharge-pipes for
 the pumps communicating with the interior 115
 of the said mixing-chamber, substantially as
 and for the purpose specified.

5. In spraying apparatus the combination
 of two separate tanks to contain liquids; a
 pump for each tank; means for operating the 120
 pumps simultaneously; a mixing-chamber; a
 nozzle communicating directly with the said
 chamber; a perforated diaphragm between
 the mixing-chamber and the nozzle; and sepa-
 rate discharge-pipes for the pumps communi- 125
 cating with the interior of the said mixing-
 chamber, substantially as and for the pur-
 pose specified.

6. In a spraying apparatus a tank for liq-
 uids having an opening in the top; in combi- 130
 nation with a plate covering the said opening
 and pivoted upon the tank behind it; a pump
 extending through the said plate and secured
 thereto and an operating-handle for the said

pump extending forward in a generally horizontal direction, substantially as and for the purpose specified.

5 7. In a spraying apparatus a tank for liquids having an opening in the top; in combination with a plate covering the said opening and pivoted upon the tank behind it; a pump extending through the said plate and secured thereto and an operating-handle for the said
10 pump extending forward in a generally horizontal direction; a supplemental tank pivoted upon the aforesaid tank substantially on the same line of centers as the aforesaid plate; a pump secured in position in the said supplemental tank; an operating-handle for the
15 pump extending forward over the handle of the first-mentioned pump; and a pivoted link connecting the said handles, substantially as and for the purpose specified.

20 8. In a spraying apparatus the combination of two separate tanks for liquids; a pump for each tank located one behind the other; an operating-handle for each pump each of said handles being pivoted at one end on a fixed
25 part; and a link pivotally connecting the two handles which are arranged to operate in the same vertical plane, substantially as and for the purpose specified.

30 9. In a spraying apparatus the combination of a tank having an opening in its top or cover; a downwardly-extending apron surrounding

the said opening; a plate movable over the said opening and a pump secured to the said plate, substantially as and for the purpose specified.

35 10. In a spraying apparatus the combination of a tank having an opening in its top or cover; a downwardly - extending sleeve or flange surrounding the said opening; a slotted plate covering the said opening; and a downwardly-extending apron or flange surrounding the slot in the said plate, substantially as
40 and for the purpose specified.

11. In a spraying apparatus a tank having an opening in its top or cover in combination
45 with a slotted plate covering the said opening; and a downwardly-extending apron or flange surrounding the slot in the said plate, substantially as and for the purpose specified.

12. In a spraying apparatus, the combination
50 of a liquid-tank, two pumps for discharging the liquid, a pivoted handle, the plunger-rod of one of said pumps having a T-head, a plurality of holes in said handle and head, and a pin for connecting said handle with
55 said T-head through any of said holes, substantially as described.

London, August 1, 1900.

WILLIAM HENRY HEARD.

Witnesses:

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