F. H. WAGNER.

LIQUID FEEDING APPARATUS.

APPLICATION FILED OCT. 2, 1916.

**1,377,994.** **Patented May 10, 1921.**

Fig. 1.

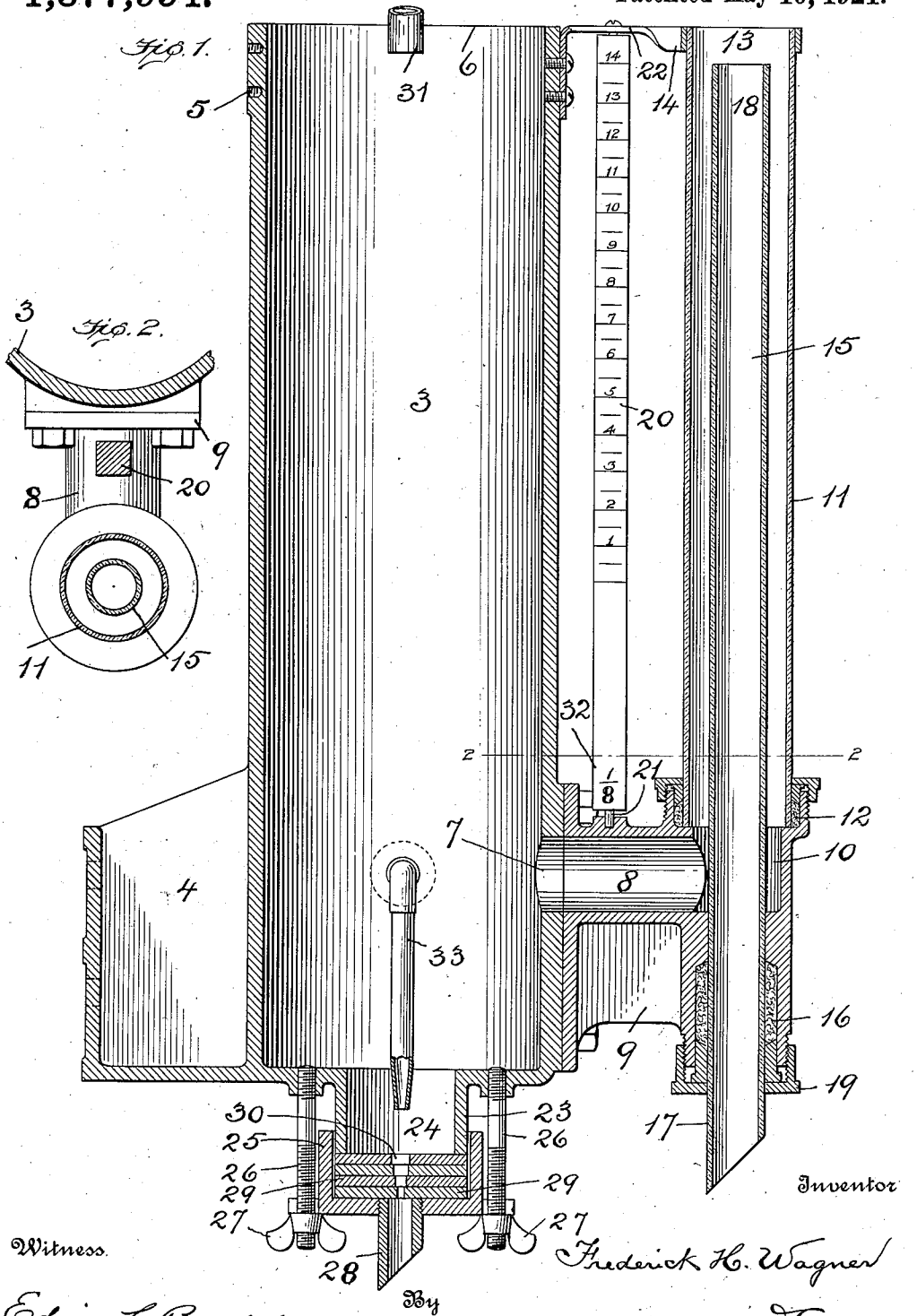



Fig. 2.




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## LIQUID-FEEDING APPARATUS.

1,377,994. Specification of Letters Patent. Patented May 10, 1921.

Application filed October 2, 1916. Serial No. 123,247.

*To all whom it may concern:*

Be it known that I, FREDERICK H. WAGNER, a citizen of the United States, residing at Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Liquid-Feeding Apparatus, of which the following is a specification.

This invention relates to an improved apparatus for feeding liquid continuously at a predetermined rate.

The apparatus may be employed to continuously feed or discharge a predetermined quantity of liquid in a predetermined time, such for example as a definite number of gallons per hour, and is not restricted in its use to any definite art or manufacture, but may be employed wherever it is desired or applicable.

One object therefore of the present invention is to provide an improved apparatus that will feed or discharge a predetermined quantity of liquid in a predetermined time; that will feed or discharge the liquid continuously: that may be adjusted to vary the quantity of liquid fed or discharged and in which the pressure on the discharge is uniform throughout its operation.

With these, and other objects in view, the invention is illustrated in the accompanying drawing, wherein,—

Figure 1 shows the improved apparatus in vertical longitudinal section, and

Fig. 2, a horizontal sectional detail through the overflow tubes; scale bar and one side of the liquid receptacle,—the section being taken in the line 2—2 of Fig. 1.

Referring to the drawing by numerals, 3, designates a cylindrical receptacle which is designed to be secured in a vertical position through the bracket, 4, and threaded sockets, 5, and which is preferably left open at the upper end, 6, so that the fluid or liquid to be fed may continuously flow into the said upper open end.

Near the bottom, the receptacle has a side port, 7, which communicates with a horizontal passage, 8, that is formed through a side bracket, 9, and the outer end of this passage opens into an annular chamber, 10, so that continuous communication is maintained between the receptacle and the annular chamber.

A glass tube, 11, extends vertically from the upper side of the annular chamber, and the interior of this tube has constant communication with the said chamber. This glass tube has its lower end seated in a recess formed on the upper side of the bracket, 9, and a tight joint is maintained about said lower end by means of a packing, 12, and a suitable packing box structure. The upper end, 13, of the glass tube, in the present instance, is supported by means of a bracket, 14, that projects from the side of the receptacle.

It will be understood, from the foregoing explanation, that the glass tube, 11, is always in communication with the receptacle through the passage, 8, and annular chamber 10.

An inner tube, 15, extends vertically through the glass tube, 11, and said inner tube has its lower end also extending down through the annular chamber, 10, and then through a stuffing box, 16, so that the extreme lower end, 17, of said inner tube projects below said stuffing box.

This inner tube, 15, by reason of the stuffing box, may be vertically adjusted in the outer or glass tube, 11, so that the height of its upper end, 18, which is left open, may be changed with respect to the outer tube. The inner tube, 15, is an overflow tube so that the liquid may rise in the outer glass tube until it reaches the upper open end of the inner tube, whereupon the liquid will overflow into, and pass down through, said inner overflow-tube and run off to any desired point. This overflow, however, is not the measured liquid, as will presently be seen.

The stuffing box, 16, has a screw cap, 19, through which the lower end of the over flow tube passes, so that by loosening said cap, and freeing the packing in said box, the overflow tube may be moved vertically with respect to the outer tube, and during such movement, the upper end of the overflow tube may be clearly seen through the glass outer tube, 11, and the height thereof definitely located during the adjustment.

At one side of the outer glass tube 11, I sustain a scale-bar, 20. In the present instance, the scale-bar extends vertically between the glass tube, 11, and the side of the cylindrical receptacle, 3, and the lower end thereof is provided with a pin, 21 that

enters a socket in the upper side of the bracket, 9, thereby forming a step-like bearing at said lower end. The upper end of the scale-bar is rotatably connected to the bracket, 14, by a screw or pin, 22. In the present instance, the scale-bar is square in cross-section whereby to provide a plurality of flat faces on which scale-lines may be located. The number of sides or faces which the scale-bar may have, however, may vary. and may be more or less than shown.— it being desirable to provide a plurality of faces, so that several scales may be accessible on the one bar.

The lower end of the cylindrical receptacle, 3, has an annular depending flange, 23, which forms a circular chamber, 24, which latter has unrestricted and continuous communication with the interior of the receptacle. A flanged cap, 25, telescopically fits the flange, 23, of the receptacle and is adjustably sustained about the same by means of bolts, 26, and wing-nuts, 27, and a discharge-nozzle or pipe, 28, is connected to the cap, 25, and provides an outlet from the inner to the outer side of said cap.

Between the cap and the circular chamber, 24, I interpose one or more disks, 29, each of which latter is provided with a central perforation, 30, for the escape of liquid from the chamber, 24, to the nozzle or pipe 28.

While I have shown, in the present instance, four disks 29, it will be noted that the perforations in the disks vary in diameter, and that the disk with the smallest perforation is lowermost. In some instances however, I may employ only one disk at a time, which disk will have the size of perforation desired to control the flow of measured liquid from the receptacle.

The size of the perforations; the scale-bar and the location of the upper overflow end, 18, of the inner tube, 11, are controlling in the practical operation of the invention as will now be explained.

As an example, let it be presumed that the lowermost disk, 29, is provided with a perforation one-eighth of an inch in diameter; that another disk has a perforation of three-sixteenths of an inch in diameter; another disk has a perforation of one-fourth of an inch in diameter and the other disk has a perforation of five-sixteenths of an inch in diameter.

Obviously, the disk employed having the smallest perforation, will control the discharge of liquid from the receptacle and such discharge will be uniform, only, provided, the height of the column of liquid in the receptacle, 3, and consequently the pressure of the liquid at the perforation in the controlling disk, is maintained uniform. To therefore maintain the column of liquid at a uniform height in the receptacle, 3, I provide the outer tube, 11, and the inner overflow tube, 15, it being understood that liquid is being fed by a pipe, 31, into the receptacle 3, faster than it will discharge through the perforation in the disk employed in the chamber, 24, and consequently the overflow tube will maintain the column of liquid at a uniform level and at a uniform pressure on the perforated disk.

If it were intended that a fixed and definite quantity of liquid per hour always be discharged from the apparatus, a change of disks, or a change in the height and the pressure of the liquid columns, would be unnecessary, and the single disk and a definite and fixed location of the upper end of the overflow tube would suffice. This, however, is not the case, for the reason that the apparatus could only be used for the discharge of a fixed quantity, at all times and if a different quantity be desired another apparatus would have to be used. To provide for varying the quantity, I employ the adjustable overflow and I make provision for a change of disks. When a change of disk is made however, it may be necessary to change the height of the overflow tube, and to determine exactly the proper height of the overflow tube, I provide the scale bar 20. Each side of the scale bar has a scale that differs from the scale on any other side of said bar and each scale is made to conform to the size of the perforation in a disk. For example, suppose the disk having the one-eighth inch hole is desired, and that it is desired to feed, say, fourteen gallons of liquid per hour. The scale designed to be employed with the disk having the one-eighth of an inch perforation, will bear characters indicating that it is the one-eighth scale, as shown, for example at, 32. If it is therefore desired to feed liquid through the one-eighth of an inch perforation at the rate of fourteen gallons per hour, the upper end, 18, of the overflow tube, 15, will be adjusted to register with that scale-line adjacent to the numeral fourteen on said one-eighth scale.

For twelve gallons per hour the tube, 15, will be lowered until its end, 18, is brought into alinement with the scale-line adjacent the numeral twelve on said scale.

If it is desired to feed a greater quantity of liquid per hour then the one-eighth inch perforated disk will be removed and a disk having a larger perforation will be employed and the overflow tube will then be adjusted to the scale for the particular disk employed.

For convenience in opening a perforation in case the latter should become clogged, I provide a steam pipe, 33, through which a jet of steam may be directed against the clogged disk.

Having described my invention, what I claim is,—

1. In a liquid-feed apparatus, the combi-

nation with a receptacle having two outlets one of a greater capacity than the other, of means for varying the size of the outlet of the lesser capacity to one of a plurality of predetermined sizes at a time; a tube having continuous communication with the outlet of the greater capacity; an adjustable overflow tube in said tube, and a scale for each size of outlet of the plurality of sizes whereby a predetermined quantity of liquid may be discharged in a given time by adjusting the overflow tube in accordance with the scale for the size of outlet employed.

2. In a liquid-feed apparatus, the combination with a receptacle having two outlets one of greater capacity than the other; means for definitely changing the size of the outlet of lesser capacity to one of a plurality of predetermined sizes; an overflow tube through which the liquid passing through the outlet of greater capacity may flow; means for permitting the overflow tube to be adjusted to vary the height of the column of liquid in the receptacle and to maintain a uniform predetermined pressure at the outlet of lesser capacity, and a scale for each predetermined size of outlet by which the overflow tube may be adjusted to produce the discharge of a predetermined quantity of liquid in a predetermined period of time.

3. In a liquid-feed apparatus, the combination with a receptacle to hold liquid,—said receptacle having an outlet, of a glass tube exterior to the receptacle and communicating with the latter; a scale-bar having a plurality of scales thereon and extending parallel with the glass tube; means for changing the size of the receptacle-outlet; an overflow tube extending vertically in the glass tube and means for vertically adjusting the overflow tube according to the said scale.

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

FREDERICK H. WAGNER.

Witnesses:
PAUL M. KUEHN,
R. B. HOOPER.