April 30, 1935. A. E. PAIGE 1,999,663

LIQUID DISPENSING APPARATUS

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FIG. I.

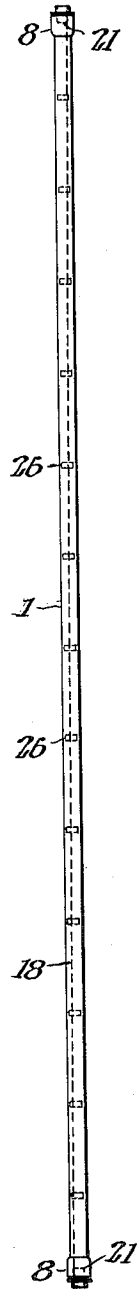


FIG. II.

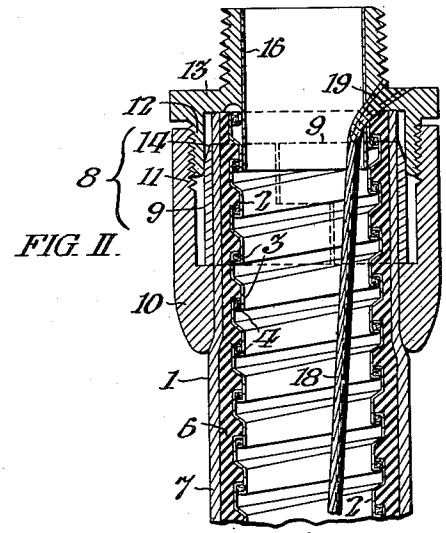
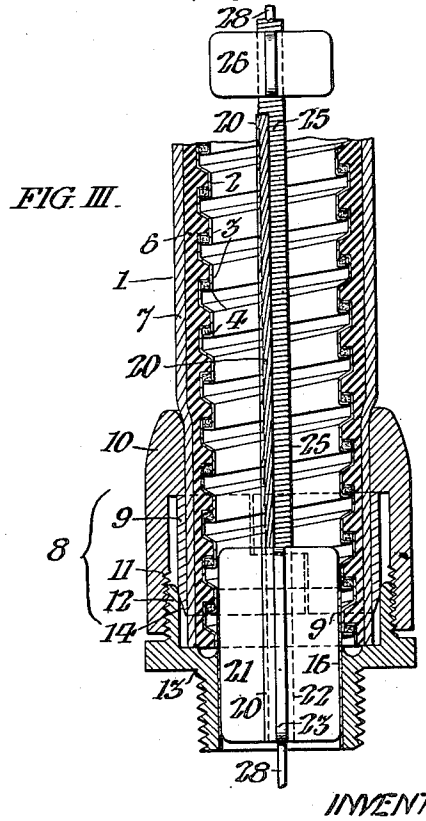


FIG. III.



INVENTOR:

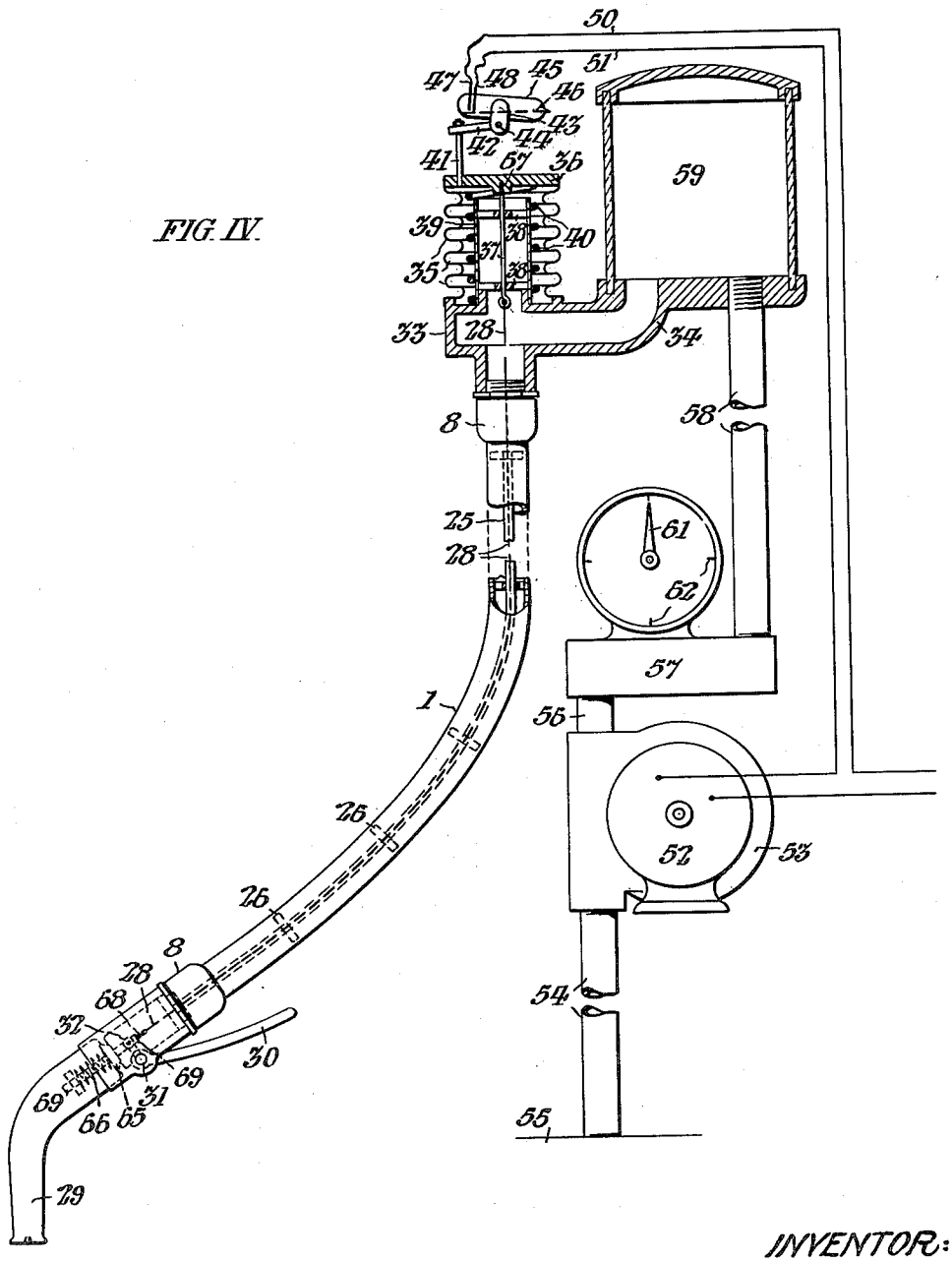
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LIQUID DISPENSING APPARATUS

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FIG. IV.



INVENTOR:

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Patented Apr. 30, 1935 1,999,663

UNITED STATES PATENT OFFICE

1,999,663

LIQUID DISPENSING APPARATUS

Arthur E. Paige, Philadelphia, Pa.

Application January 30, 1931, Serial No. 512,318

4 Claims. (Cl. 137—90)

My invention may be advantageously employed in apparatus for dispensing gasolene from curb stands, and particularly such apparatus wherein the discharge of liquid is effected by an electrically driven pump, in the stand, controlled by a switch, in the stand, operated by means of a flexible mechanical connector, such as a push or pull wire or pull cable extending along a flexible liquid dispensing hose to manually operative means for moving said wire or cable at a dispensing nozzle at the discharge end of said hose.

Such a flexible dispensing hose preferably includes a metallic lining tube, formed of a helically wound strip of metal having its edges interlocked; that tube being covered by a tubular plastic composition, and the latter by a tubular textile fabric. As the interlocked edges of said lining are separated by a compressible packing filament, to render liquid-tight the joint between them; such a hose is susceptible of considerable elongation under such normal stresses as are incident to the ordinary use thereof, and such a hose ten feet long and one and one-half inches in outside diameter has been stretched as much as eight inches before being ruptured.

As hereinafter described, my invention includes means for reinforcing such a flexible liquid dispensing hose so that there is no such variation to interfere with the operation of the flexible connector and its appurtenances for operating the switch. As hereinafter described, such reinforcing means may be a constant length cable fixed at its opposite ends with respect to the ends of the hose.

Ordinarily, such flexible connecting means are carried by the hose in eccentric relation to the latter, for instance, in a tube extending along the outer circumference of the hose, and such location creates a factor of variation in the length of the connector accordingly as the hose is straight or more or less bent. Therefore, a further object and effect of my invention is to also eliminate that variable factor by means supporting the flexible connector in coaxial position in the hose.

My invention also includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings, Fig. I is an elevation of a length of flexible liquid dispensing hose provided with reinforcing means maintaining it of constant length.

Fig. II is a fragmentary longitudinal sectional view of the hose indicated in Fig. I, but on a larger scale, showing a reinforcing cable directly connected at its end with the end coupling of the hose. As indicated in Fig. I, the opposite end of said cable is similarly connected to the opposite end coupling of the hose, but in diametrically opposite position.

Fig. III is a longitudinal sectional view of one of the end couplings on the hose indicated in Fig. I, but showing a modified form of reinforcing means including a cable which is fixed at its ends to spacing elements in the hose which support, in coaxial relation with the hose, a flexible tube, supported by spacing elements throughout its length and through which the flexible connector leading to the switch may be reciprocated.

Fig. IV shows such a hose included in liquid dispensing apparatus of the automatically operative type above contemplated.

Referring to Figs. I to III inclusive, the flexible dispensing hose 1 includes the metallic lining tube 2 formed of a helically wound strip of metal having its edges 3 interlocked with a compressible packing filament 4 interposed between said edges. Said tube 2 is covered by the tube of plastic composition 6, conveniently a rubber compound, and the latter is covered by the tubular textile fabric 7, conveniently formed of braided cotton threads.

The couplings 8 indicated at opposite ends of the hose in Fig. I may be conveniently formed alike, each including a split tubular spring band 9 encircling and compressing the textile fabric covering 7 and the composition covering 6 tightly upon the metallic lining 2 within the tubular sleeve 10 which is internally screw threaded at 11 for engagement with the annular flange 12 on the adapter 13, which flange rides over the outer conical edge 14 of said band 9 and compresses the latter as said adapter 13 is screwed into said sleeve 10 to the position shown. Said adapter preferably includes the inner cylindrical bushing 16 overlapping the outer end of said lining 2 so as to prevent displacement thereof in the coupling.

The hose structure as thus above described is susceptible of elongation when subjected to even slight tensile stress in the direction of its length. However, I provide means to maintain such hose of constant length, which means, in Fig. II, include the wire cable 18 conveniently formed of a central wire with six wires twisted uniformly spirally around it. Each end of said cable 18 is extended through a hole 19 conveniently drilled in the adapter element 13 of the coupling 8 in conical form so that the cable may be untwisted therein and soldered or brazed to the couplings;

forming joints affording the maximum resistance to tensile stress because the cable ends are thus enlarged in engagement with the couplings, so that it is impossible to pull them through the holes 19.

Said constant length cable 18 is thus inserted in the hose under tension, so as to slightly longitudinally compress the hose, and, as indicated in Fig. I, the opposite ends of the cable 18 are connected with the respective end couplings 8 at diametrically opposite sides of the hose. Such construction and arrangement permit the maximum degree of flexibility of the hose without elongation thereof as to its axial length.

However, I do not desire to limit myself to the specific form or arrangement of the reinforcing means above described, as a constant length cable may be otherwise disposed in and connected with such a flexible hose. For instance, in the form of my invention shown in Fig. III, such a hose 1 is reinforced by the constant length cable 20 which is soldered or brazed at its opposite ends upon spacing elements 21, which are soldered or brazed in the respective end couplings 8. Each of said spacing elements 21 conveniently comprises an axial tube 22 having radial flanges 23 of equal extent from the axis thereof, thus holding the tube in coaxial position in the hose. Said tubes 22 hold the opposite ends of the flexible tubular sheath 25, which is conveniently formed of a close helically wound wire, soldered or brazed at its opposite ends to said elements 21 and supported intermediate of its length by other spacing elements 26 which may be similar to the elements 21 but shorter. Said elements 26 may be soldered or brazed to the cable 20 so as to be retained in proper longitudinally spaced relation with respect to the hose, but the tubular sheath 25 is preferably loosely slipfitted through said intermediate spacing elements 26 to afford the maximum degree of flexibility of the structure without bending or twisting said sheath 25 beyond its elastic limit.

Said sheath 25 thus affords a continuous passageway for the flexible connector 28 to extend therethrough in coaxial relation with the hose 1. As above contemplated, said connector 28 may be a single flexible wire or may be rendered more flexible by being formed of a large number of extremely small wires twisted together. For instance, forty-two fine phosphor bronze wires may be grouped in six strands of seven each and twisted around a cotton cord center to provide a cable one-sixteenth of an inch in diameter having the maximum degree of flexibility with the maximum degree of resistance to elongation under tensile stress.

Referring to Fig. IV; such a hose 1 with appurtenances constructed and arranged as in Fig. III may be provided at its discharge end with the nozzle 29, connected with its end coupling 8, carrying the lever 30 fulcrumed at 31 and having its arm 32 connected with said flexible connector 28 so that the latter may be stressed longitudinally toward said nozzle 29 by the operator grasping said nozzle and lever during the act of inserting the nozzle in an automobile tank to be charged with gasolene.

The opposite end coupling 8 of said hose 1 may be rigidly connected with the pipe fitting T 33 on the conduit frame 34 carrying the metal bellows 35 which is supported at its lower end upon said fitting 33 and has its upper head 36 attached to the opposite end of said flexible connector 28 by the plunger 37 mounted in the guides 38 in the tube 39 on said frame 34 which tube limits the movement of said bellows 35, by said lever 30.

Stress upon said connector by movement of said lever 30 toward the hose collapses said bellows 35 toward the end of the hose, against the stress of the bellows-distending spring 40. Such motion is transmitted by the rod 41 on said head 36 to the lever arm 42 on the switch cradle 43 which is fulcrumed at 44. The evacuated glass switch tube 45 which is held in and tilted by said cradle 43, contains the body of mercury 46 which, in the open position shown, is separated from the terminals 47 and 48 of the electric circuit 50 and 51, but electrically connects them when said bellows is collapsed as aforesaid. Said circuit includes the electric motor 52 which is adapted to operate the pump 53 to lift liquid through the conduit 54 from the subjacent tank 55 and discharge it through the conduit 56, meter 57 and conduit 58 into the glass cylinder 59, and thence through said T fitting 33 into the hose 1. Said meter is adapted to turn the index hand 61 to traverse a circular series of graduations 62 and thus indicate the volume of liquid dispensed through said meter.

The construction and arrangement indicated in Fig. IV are such that when the operator inserts the nozzle 29 in any liquid receptacle, and presses the lever 30, said switch is closed by longitudinal stress on the flexible connector 28, and the electric motor 52 is energized to operate the pump 53 and dispense liquid through said nozzle 29 until said lever 30 is released by the operator; when the meter indicates that the desired quantity has been dispensed.

Said lever 30 may be operatively connected with the valve 65 in said nozzle 29 which is normally shut by the spring 66, so that the flow of liquid through the nozzle is stopped contemporaneously with the cessation of the pumping operation, or if such valve be omitted, the hose 1 may be permitted to drain itself dry at each dispensing operation.

Of course, said spring 40 cooperates with the plunger 37 and the other elements of the motion-transmitting device connecting the spaced switch and valve, to afford automatically compensated adjustment therefor in relation to said switch and valve. However, in any embodiment of my invention, it is preferable to also include means at both ends of the connector 28 whereby it may be axially adjusted to vary its effective length with respect to said hose 1; for instance, the opposite ends of said connector 28 may be provided with respective screws 67 and 68, respectively in axially adjustable threaded engagement with said head 36 and with the stem 69 of said valve 65.

Of course, such a constant length liquid dispensing hose as above described may be embodied in apparatus different from that indicated in Fig. IV, for instance, in that shown in my copending application Serial No. 505,751 filed December 31, 1930, for Letters Patent of the United States 1,914,817 granted June 20, 1933, and in my copending application Serial No. 513,567 filed February 5, 1931, for Letters Patent of the United States.

Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. Liquid dispensing apparatus including a flexible hose having couplings at each end thereof and a flexible connector extending along the hose through the liquid passageway in the hose; means supporting said connector with its axis in coaxial relation with said hose, throughout its length, including a flexible tubular sheath and spacing elements between said hose and sheath at intervals throughout their length, the opposite end spacing members being respectively rigidly connected with said couplings and with said sheath, and the intermediate spacing members being rigidly connected with said sheath but loose from said hose.

2. A structure as in claim 1, including means continually compressively stressing the hose longitudinally, but permitting said hose to be flexed laterally without variation in its length, comprising a single stranded cable having its opposite ends respectively secured to said hose couplings; said cable being tensilely stressed.

3. A structure as in claim 1, including means continually compressively stressing the hose longitudinally, but permitting said hose to be flexed laterally without variation in its length, comprising a single stranded cable having its opposite ends respectively secured to said hose couplings, the ends of said cable being secured in outwardly flared holes extending laterally to the exterior of said couplings; whereby tensile stress may be applied to said cable to compress said hose longitudinally before the ends of said cable are secured to said couplings.

4. In liquid dispensing apparatus, the combination with a flexible hose having couplings at its opposite ends and normally capable of being stretched axially by stresses incident to its normal use; of means for preventing such stretching, while permitting said hose to be bent laterally without changing its axial length, including a single stranded cable extending along said hose in a diametrical plane with its ends respectively extending laterally to the exterior of said couplings, through outwardly flared holes; whereby tensile stress may be applied to said cable to compress said hose longitudinally before the ends of said cable are secured to said couplings and said hose is thereby continually compressively stressed longitudinally and maintained of constant length as to its axis, regardless of any bending to which it may be subjected in dispensing liquid therethrough; the strands at the opposite ends of said cable being spread apart to conical wedge shape in said couplings and held in such spread relation by metal between them; whereby obstruction of the liquid passageway through said hose by the fastening means of said cable is obviated.

ARTHUR E. PAIGE.