June 26, 1956 K. R. LUNG 2,752,077

GASOLINE HOSE AND NOZZLE FOR DISPENSING GASOLINE

Filed Nov. 14, 1952 2 Sheets-Sheet 1

FIG-1

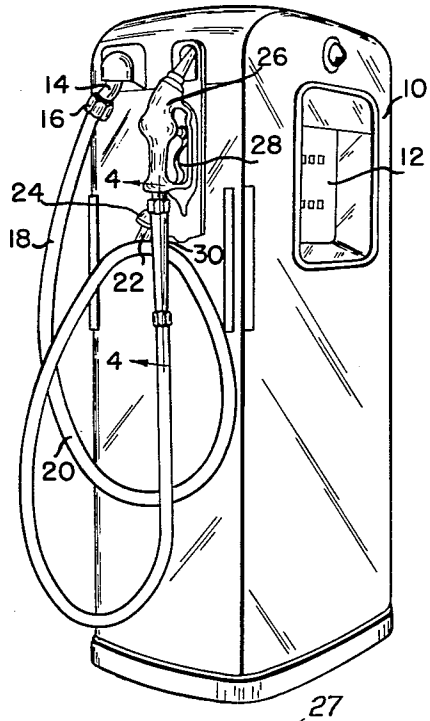


FIG-5

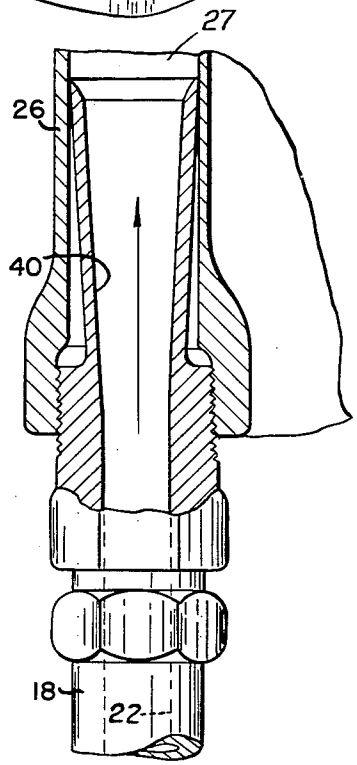
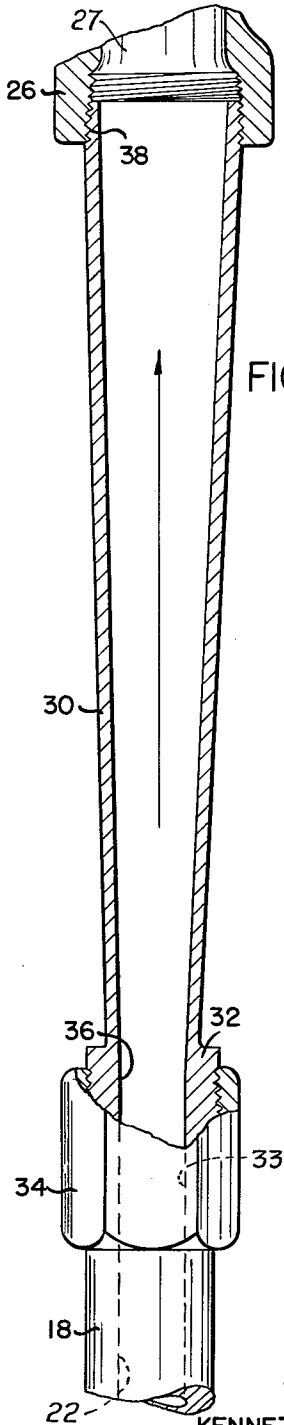


FIG-4



INVENTOR.
KENNETH R. LUNG
BY Toulmin & Toulmin
ATTORNEYS

June 26, 1956 K. R. LUNG 2,752,077

GASOLINE HOSE AND NOZZLE FOR DISPENSING GASOLINE

Filed Nov. 14, 1952 2 Sheets-Sheet 2

FIG-2

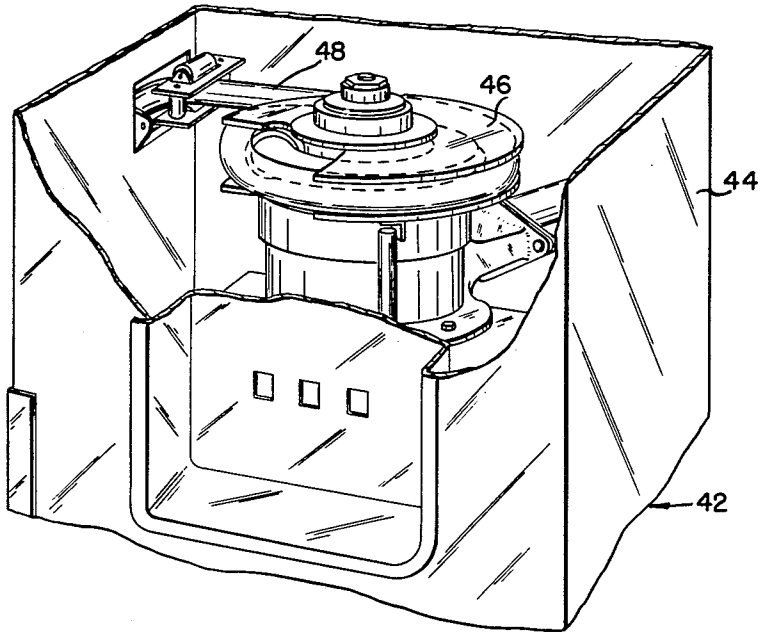


FIG-6

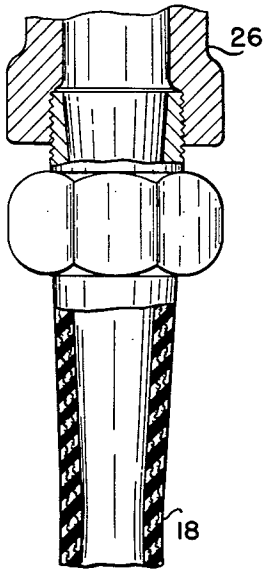


FIG-3



INVENTOR.
KENNETH R. LUNG
BY Faulmann & Faulmann
ATTORNEYS

United States Patent Office 2,752,077 Patented June 26, 1956

2,752,077

GASOLINE HOSE AND NOZZLE FOR DISPENSING GASOLINE

Kenneth R. Lung, Dayton, Ohio, assignor to The Tait Manufacturing Company, a corporation of Ohio

Application November 14, 1952, Serial No. 320,393

4 Claims. (Cl. 222—527)

This invention relates to dispensing pumps, particularly dispensing pumps for dispensing gasoline as in the usual type of filling station and to a method of dispensing gasoline.

Modern gasoline pumps such as are found in filling stations have tended to become relatively short not only for reasons of appearance but also because of improved components within the pump and methods of constructing the pump which enable it to be made more compact.

While the shortening of the gasoline pump embodies the advantages of a much more attractive appearance and economy, certain drawbacks are to be found particularly in connection with the hose. On account of the short height of the pumps, together with the increase in size of modern automobiles, it has become necessary to provide in connection with the pumps and the dispensing hose, an arrangement for supporting an extra loop of the hose either inside or outside of the pump or a reel within the pump on which the hose can be wrapped so that sufficient length of hose is available at all times for servicing all types of vehicles.

The conventional hose that is employed with dispensing pumps is relatively large, heavy and stiff and considerable rather heavy labor is involved in servicing automobiles.

The large heavy hoses are also quite expensive and due to their weight oftentimes tend to be dragged on the ground so that they chafe and become badly worn.

Having the foregoing in mind, the primary object of the present invention is to provide an improved gasoline dispensing hose and a method of dispensing gasoline in which the drawbacks referred to above with present day and conventional systems are avoided.

Still another object is the provision of a gasoline dispensing hose for dispensing gasoline pumps which is much smaller and lighter than conventional hoses thereby making it a simpler and less laborious matter to service an automobile.

A still further object is the provision of an arrangement whereby a much smaller hose can be employed in connection with a dispensing pump but in which the rate of dispensing from the pump can be maintained the same as with conventional devices.

The foregoing objects and advantages of this invention become more apparent from the following description of the drawings in which:

Figure 1 is a view typical of a dispensing pump having a hose according to this invention thereon with an outside loop.

Figure 2 is a view similar to Figure 1 partly in section showing a pump arrangement in which the hose is wound on a reel within the pump.

Figure 3 is a cross-sectional view indicating a typical hose construction.

Figure 4 is a sectional view indicated by line 4—4 on Figure 1 showing a venturi device that is connected between the hose and nozzle at the discharge end thereof.

Figure 5 is a view similar to Figure 4 but showing the use of a much shorter venturi at the end of the hose and with the bulk of the venturi mounted within the nozzle.

Figure 6 is a fragmentary sectional view through the discharge end of the hose showing the manner in which the venturi portion of the dispensing channel can be formed integrally with the hose.

Referring to the drawings somewhat more in detail, in Figure 1 there is illustrated a substantially conventional gasoline dispensing apparatus at 10 having therein the usual components consisting of a pump (not shown) which delivers fluid through a meter that actuates the quantity and price registering dial mechanism 12. The fluid that is pumped through the meter leaves the dispenser 10 through a fitting 14 and a dispensing hose which is attached to the fitting by a nut 16. Dispensing hose 18 in Figure 1 hangs in a loop 20 outside the dispenser for providing the additional length of hose required over what would hang in a single loop. Loop 20 has a connector at 22 leading through a fitting 24 into the inside of the dispenser where there is provided a spring and counterweight so that the loop 20 is normally urged to the position indicated in Figure 1.

At the end of dispensing hose 18 opposite its connection with fitting 14 there is the usual dispensing nozzle 26 having an inlet 27 and an operating lever 28 and employed in a conventional manner for delivering the fluid being dispensed such as gasoline into the tank of an automobile.

According to the present invention the hose 18 is made much lighter and much more flexible than previous conventional hose constructions by making such hose of much smaller diameter. For example, a conventional hose may be three-quarters of an inch inside diameter or greater whereas the hose according to the present invention can be one-half of an inch diameter or even smaller. This difference in sizes of the inside diameters of the hoses makes a hose according to this invention much lighter and much more flexible and therefore considerably easier to handle than the conventional hose. A further advantage obtains from the reduced inside diameter of the hose in that the projected area of the hose is much smaller and under the same working pressure the wall thickness of the hose can be substantially reduced while still maintaining the same factor of safety. This thinning of the hose wall further contributes to the lightness and flexibility and therefore serves to ease the use of the hose.

Inasmuch as the hose diameter is reduced it follows that under the same discharge pressure from the pump, the rate of dispensing will be considerably reduced. For this reason, the discharge pressure of the pump is somewhat increased so that the velocity of the fluid through the hose is also increased thereby maintaining the same volume of discharge per unit of time.

This increase in pressure necessary to obtain the increased rate of flow of fluid through the hose so as to maintain the same delivery rate however, is not so great as to offset the reduction in wall thickness of the hose. For example, in a conventional pump a pressure of about twenty-two pounds to the square inch is developed on the fluid being pumped and when a hose according to the present invention is employed, this pressure is increased to about twenty-seven pounds per square inch.

Due to the increased velocity of the fluid in the hose

it becomes desirable to provide means for eliminating the possibility of splashing of the liquid where it emerges from the dispensing nozzle. More particularly, since the nozzle 26 is of the conventional type and is therefore constructed for operation with hose of conventional inner diameter delivering the liquid to its inlet 27 at the usual velocity and volumetric rate, if such nozzle were directly connected to the smaller hose of the invention delivering the liquid at a substantially higher velocity, splashing and like effects of undesirable turbulence would be likely to occur unless special provision is made for converting this high velocity flow to a lower velocity at an increased pressure.

According to the present invention a preferred means of accomplishing this desirable result consists of the diffuser fitting 30 disposed between the discharge end of the hose and the inlet 27 of nozzle 26.

Figure 4 shows a sectional view through the diffuser and it will be seen to comprise the smaller inlet end 32 hanging a bore 33 substantially matching the inner diameter 22 of the hose 18 and connected with the hose 18 by means of nut 34. Means are provided at 36 in the form of an insert, or a shaped section of the hose, or a portion on nut 34 to provide for a smooth flow passage connecting the hose with the diffuser. The diffuser 30 then tapers outwardly to a threaded upper end 38 which is received in the threaded inlet opening of nozzle 26 and which is of an inner diameter substantially equal to the inner diameter of the nozzle inlet 27 as shown.

The diffuser 30 provides means for gradually reducing the velocity at which the liquid is flowing so that even though an extremely high velocity of fluid exists in hose 18, this fluid is slowed down to the conventional rate when it reaches the nozzle inlet 27 and therefore when it emerges from nozzle 26. At the same time, this reduction in velocity is effected through the diffuser at a controlled rate such that some of the velocity is converted into a corresponding increase in discharge pressure as compared with the pressure existing in the interior of the hose 18 at the higher velocity with which the liquid flows therethrough.

The diffuser 30 may obviously be formed of metal but could also consist of a plastic element if desired, or could be made of any material having the requisite strength. The diffuser could be either rigid or at least semi-flexible and substantially equivalent results would obtain.

As will be seen in Figure 5, a diffuser 40 could be provided that actually extended into the inlet passage in nozzle 26 and which diffuser would be connected to hose 18 in substantially the same manner as illustrated and described in connection with Figure 4. The Figure 5 construction is particularly advantageous because the diffuser is at all times completely enclosed within nozzle 26 whereby it is not subjected to any physical abuse and can be made relatively lighter and more flexible than would be employed for the diffuser of Figure 4.

Turning now to Figure 2, there is illustrated a housing 44 containing a reel 46 on which the hose 48 is wrapped. The reel is rotatable so that the hose can be drawn outwardly from the housing when liquid is dispensed. The reel is preferably spring biased to return the hose to within the housing or if desired, a motor could be used for this purpose.

The advantage of the combination of the hose and dispensing method according to my invention in connection with the pump construction of Figure 2 is that the reel, necessarily a rather large bulky item, can be made considerably smaller for receiving the same length of hose than would be the case with a conventional hose. Since the hose is smaller than the conventional size, a greater length of hose could be wrapped around a conventional reel.

Referring again to the diffuser section of the dispensing channel, as will be seen in Figure 6, this section could be formed integrally with the hose by the use of a suitably shaped mandrel or the like employed at the time of manufacturing the hose. By utilizing the Figure 6 construction, an absolutely smooth walled flow passage is provided for the gasoline or whatever fluid is being dispensed and no additional diffuser would be necessary to avoid turbulence in the stream of fluid being dispensed.

From the foregoing it will be evident that I have provided an improved dispensing hose and a method of dispensing liquids which has the advantages of economy in the construction of the hose, greater lightness and flexibility. A desirable high rate of dispensing is maintained but without introducing any splashing or turbulence in the fluid stream.

My invention is particularly useful with the modern low height pumps in which additional length of the dispensing hose over what will hang in a single loop between the outlet fitting and the nozzle hook thereof is required but it will be apparent that advantages also exist in connection with the lightness and flexibility of the hose when it is employed with the older style of dispensers.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. In a liquid dispensing device of the character described, a hose for delivering said liquid from said device and having an inlet and outlet end, a dispensing nozzle at the outlet end of said hose, said hose having a reduced internal diameter substantially throughout the length thereof effecting delivery of liquid to said outlet end of said hose at a flow velocity substantially greater than desired, and a diffuser member disposed in the line of flow of said liquid through said hose between said outlet end and said nozzle and having an internal flow passage of gradually increasing diameter effecting retardation of said flow rate at said outlet end of said hose and prior to discharge of said liquid from said nozzle.

2. In a liquid dispensing device of the character described, a hose for delivering liquid from said device to a remote discharge point, a dispensing nozzle at the end of said hose remote from said device, said hose having a continuous flow passage therethrough from said device to said nozzle, the internal diameter of said flow passage substantially throughout the length of said hose being smaller than will deliver said liquid at a desirably low velocity of flow, and a diffuser section in said flow passage immediately upstream from said nozzle and having a gradually and substantially increasing diameter effecting retardation of said flow velocity.

3. In a liquid dispensing device of the character described, a flexible hose for delivering said liquid from said device to a remote point, said hose having an inlet and outlet end and a reduced internal diameter substantially throughout the length thereof effecting delivery of said fluid to said outlet end at a flow rate greater than desired, a dispensing nozzle at said outlet end of said hose, and a diffuser section at the juncture of said hose with said nozzle having an internal diameter which gradually and substantially increases in the direction of flow of said liquid from said hose into said nozzle effecting retardation of said flow velocity of said liquid.

4. In a gasoline dispensing system of the character described including apparatus for delivering gasoline at a predetermined output pressure and volumetric rate to a dispensing nozzle having an inlet of predetermined inner diameter, the combination of a flexible hose connected at the inlet end thereof to said apparatus and of predetermined substantially lesser inner diameter than said nozzle inlet providing a substantially higher velocity flow therethrough than through a hose of substantially the same inner diameter of said nozzle inlet at said output pressure, and means forming a diffuser directly connecting the outlet end of said hose and said nozzle inlet,

said diffuser having an internal flow passage substantially matching the inner diameter of said hose at the upstream end thereof and gradually increasing to substantially the same inner diameter as said nozzle inlet at the downstream end thereof to effect delivery of gasoline to said nozzle inlet at increased pressure with respect to the pressure within said hose and at substantially the same volumetric rate as a hose of the same inner diameter as said nozzle inlet directly connecting said apparatus with said nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

1,744,842	Suverkrip et al.	Jan. 28, 1930
1,831,586	Barr	Nov. 10, 1931
1,883,656	Estock	Oct. 18, 1932
2,130,687	Lochmund	Sept. 20, 1938
2,343,903	Hammand	Mar. 14, 1944
2,456,626	Dahnke	Dec. 21, 1948
2,561,578	Koester	July 24, 1951