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AIR PUMP

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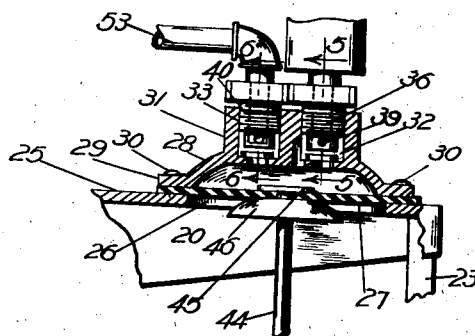
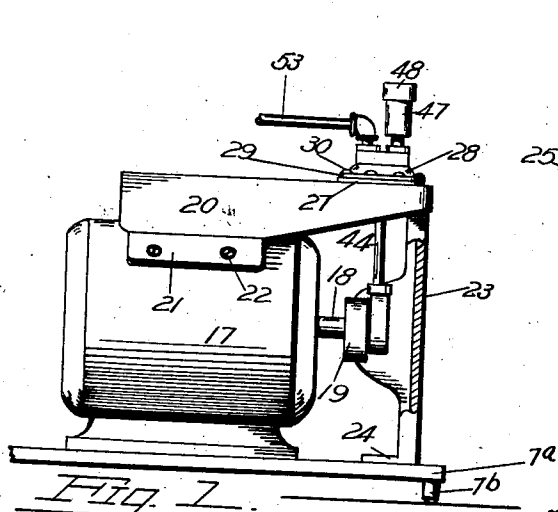


Fig. 2.

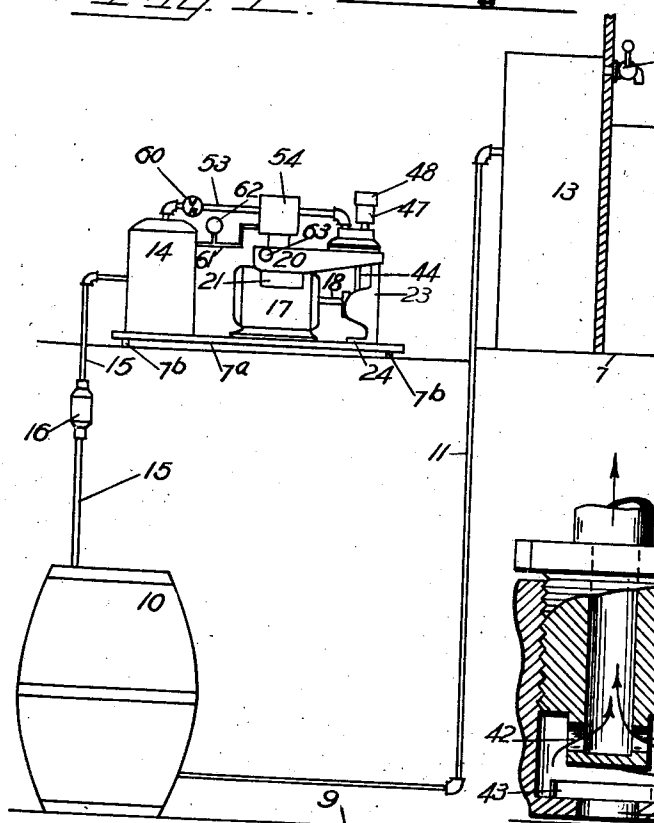


Fig. 3.

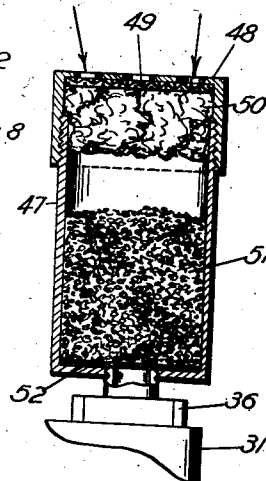


Fig. 4.

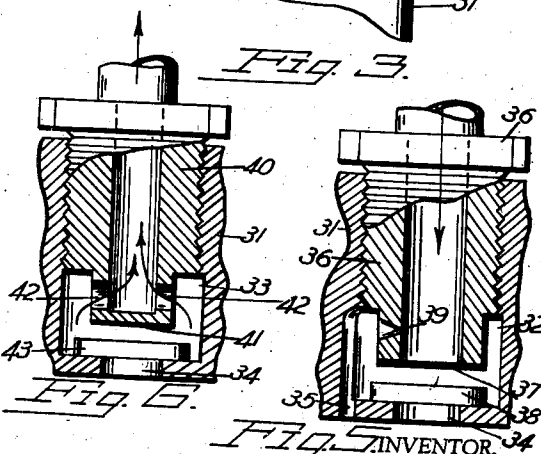


Fig. 5.

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AIR PUMP

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8 Claims. (Cl. 230—58)

This invention relates to improvements in air delivery systems for any purpose where a volume of clean, filtered air under pressure, is wanted at a low cost, such as for beverage dispensers, doctors' and dentists' offices, engravers, dry cleaners and the like. To illustrate an application of the improved system, it is shown in connection with a beverage dispenser.

In places where beverages are dispensed in large quantities, as for example in beer parlors, the beer is usually contained in kegs or barrels located in the basement and connected by suitable pipes to the taps located at the bar. To produce a strong flow of beer from the keg to the tap, at all times, and regardless of the amount of beer in the keg, the surface of the beer is subjected to air under pressure.

In large establishments the air is compressed by motor driven pumps which automatically maintain the air at a given pressure.

It is the object of this invention to produce an air delivery system that shall be automatic in its operation.

Another object of this invention is to produce a compressor mechanism of a simple and substantial construction that can be attached directly to an electric motor, and maintain a constant predetermined pressure.

A still further object is to produce a simple diaphragm pump, including valve mechanism therefor, that shall be of such construction that the air will not come in contact with any oil or lubricant-covered parts.

The above and other objects that may become apparent as the description proceeds, are attained by means of an arrangement of elements and a construction of parts that will now be described in detail, and for this purpose, reference will be had to the accompanying drawing in which the invention has been illustrated and in which

Figure 1 is a side elevation of a motor and pump assembly showing the latter attached to the motor;

Figure 2 is a vertical section through the pump;

Figure 3 is a section through the air filter and purifier;

Figure 4 is a diagram showing a beverage dispensing system and the relative location of the several elements thereof;

Figure 5 is a vertical section of the air intake valve; and

Figure 6 is a vertical section of the air outlet valve.

In the drawing numeral 7 designates the floor on which the bar 8 is located, and numeral 9 designates a floor at a lower level, preferably the basement floor. The beer or other beverage is contained in the cask or barrel 10 which is con-

nected by a pipe 11 with a tap 12 located near the bar. Pipe 11 passes through a cooler 13.

Located on a base plate or platform 14a, having rubber tipped legs 17b, is an air storage tank 14, which is connected with the top of the barrel by means of a pipe 15 in which is connected an air purifier 16. The air is compressed by power developed by a motor 17, provided with the usual shaft 18 to which is attached a crank disk 19.

Secured to the motor is a saddle or support having parallel sides 20 provided at one end with wings 21 that are attached to the motor by screws 22. The saddle extends beyond the end of the motor and is provided at its outer end with a guard 23, whose lower end terminates in a foot 24. The top 25 of the saddle has an opening 26 and supports a diaphragm 27 which may be of any suitable material such as rubber, rubberized fabric, leather, etc. A pump housing 28 has a flange 29 that rests on the diaphragm near its outer edge, and is secured to the top by screws 30. The pump housing has an upwardly extending portion 31 having two threaded openings 32 and 33.

The bottoms of openings 32 and 33 are each provided with a hole 34 and the bottom of opening 32 is also provided with one or more additional holes 35. A hollow plug 36 is positioned in opening 32, and terminates at 37, a short distance above the bottom. A valve 38, of considerably larger diameter than the hole 34, rests loosely on the bottom, and operates to close the opening at 37 on the compression stroke of the pump. The lower end of plug 36 has a bleed opening 39 to which reference will be made hereinafter.

A hollow plug 40 is threaded in opening 33, and terminates in a closed bottom 41. Openings 42 are provided above the bottom. A valve disk 43 rests on the bottom of opening 33, as shown in Figure 6.

A connecting rod 44 has its lower end connected with a crank pin on the crank disk 19 and has its upper end provided with a head 45 that rests on the upper surface of the diaphragm 27. A member 46, having an upper spherical surface, is secured to the connecting rod directly below the diaphragm. When the motor runs, the connecting rod 44 will be reciprocated so as to flex the diaphragm, and vary the capacity of the pump chamber directly above it. When the diaphragm moves downwardly, air will enter through the tubular plug 36 and when it moves upwardly, it will leave through plug 40.

Attached to the upper end of the inlet plug 36 is an air filter and purifier comprising a cylinder 47 whose upper end is closed by a perforated cap 48. A screen 49 is positioned adjacent the inner surface of the perforated cap 48 and a quantity of fibrous material 50, such as cotton, is positioned in the cap adjacent the screen.

The lower end of cylinder 47 contains a quantity of chemicals 51 suitable for air purification, such as activated carbon and others usually employed for this purpose. A screen 52 rests on the bottom of the cylinder and keeps the chemicals in place.

Plug 40 is connected by means of a pipe 53 with the storage tank 14.

The switch mechanism for starting and stopping the motor in accordance with the pressure of the air in the storage tank 14 is located in a housing 54.

The purpose of the bleed opening 39 is to relieve all pressure in the compression head when the pump stops. The air purifier 16, in pipe 15, is similar in construction and function to that shown in Figure 3, and merely subjects the air to a second filter and purifying action, and either purifier may be used without the other one.

With this apparatus a predetermined air pressure can be maintained at all times within the storage tank 14, and as a result the beer or other beverage will always flow when the tap 12 is opened.

The motor, compressor and tank are preferably mounted on the base plate 1a for convenience in handling and installing. The rubber tipped legs 7b, absorb any vibration and noise from the machine and silence its operation. A reducing valve 60 may be adjusted to put air at a predetermined pressure, into the tank 14 and the air line from the tank to the place of delivery is connected to the tank at a point remote from the air inlet to permit the absorption of the pump impulses and to insure an even, smooth flow of compressed air at the delivery point. The automatic switch 54 controls the starting and stopping of the motor and is connected by pipe 61 with the tank 14.

Gauge 62 registers the air pressure in the tank and the switch 54 will operate on a one and one-half pound change of pressure in the tank. Fuse 63 protects the motor from overload. The whole assembly is compact, automatic and economical in its operation and can be readily installed for any of the purposes mentioned.

Having described the invention, what is claimed as new is:—

1. An air compressor comprising in combination, a motor having a shaft, a pump frame having one end secured to the motor, the other end overhanging one end of the motor, a base for the motor, a leg projecting downwardly from the overhanging end and bearing on the base, the frame member having a wall of extended area provided with an opening, a diaphragm covering the opening, a pump housing having one side open and provided with a flange engaging the diaphragm near its edge, the diaphragm forming a flexible wall for the housing, the wall of the housing having an inlet and an outlet opening, a tubular check valve assembly in each opening, the check valves being oppositely arranged, an air purifying device connected in series with the air inlet valve, and means operated by the rotation of the motor shaft for flexing the diaphragm alternately in opposite directions.

2. An air compressor comprising in combination, a motor, a pump frame having one end fixed to the motor, the other end overhanging the motor, a base supporting the motor, a leg projecting downwardly from the overhanging end, and

bearing on the base, a pump mounted on the overhanging end, and means for operating the pump by means of power from the motor.

3. An air compressor comprising in combination, a motor, a base supporting the motor, a pump frame having one end fixed to the motor, the other end overhanging the motor, a leg projecting downwardly from the overhanging end, and bearing on the base, a pump mounted on the overhanging end, means for operating the pump by means of power from the motor, and an air purifier in series with the pump.

4. An air compressor comprising in combination, a motor, a base supporting the motor, a pump frame having one end fixed to the motor, the other end overhanging the motor, a leg projecting downwardly from the overhanging end, and bearing on the base, a pump mounted on the overhanging end, the motor having a drive shaft, and means comprising an eccentric device for operating the pump when the motor shaft turns.

5. An air pump of the diaphragm type comprising in combination, a frame having a member of extended area provided with an opening, a flexible diaphragm overlying the opening, a housing having a concave recess on one side and provided with a flange for engaging one surface of the diaphragm, the housing wall having two openings, the bottoms of the openings having each a hole of smaller diameter than the opening, a valve member supported on each perforated bottom, a tubular plug open at its inner end, positioned in one opening with its open end adjacent the valve member, the bottom of this opening having a hole positioned beyond the valve, a tubular plug in the other opening, the end of the last mentioned plug being closed, the sides of the plug having openings, the two plugs serving respectively as inlets and outlets and means for flexing the diaphragm alternately in opposite directions.

6. An air pump comprising a motor, an overhanging saddle member on the motor, a diaphragm on the member, a housing above the diaphragm, one-way air-valves in the housing for admitting and discharging air respectively, an eccentric pin on the motor shaft, a rod connecting the eccentric with the diaphragm for reciprocation thereof, a base plate supporting the motor, a leg connecting the saddle member with the base, legs on the base, and vibration absorbing tips on the legs.

7. An air-compressor unit comprising a pump-driving motor, an overhanging saddle on the motor, an air-pump carried on the saddle, an air-storage tank connected with the air-pump, automatic means for controlling the motor in response to predetermined pressure variations in the tank, a supporting base for the tank and motor, a leg supporting the saddle from the base, and vibration absorbing legs on the base.

8. An air-compressor unit comprising a pump-driving motor, an overhanging saddle on the motor, an air-pump carried on the saddle, an air filter on the pump, an air-storage tank connected with the air-pump, automatic means for controlling the motor in response to predetermined pressure variations in the tank, a supporting base for the tank and motor, a leg supporting the saddle from the base, and vibration absorbing legs on the base.

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