
100B Semi-auto Filling, Closing, Aerating and Splitting Unit

I. Features

This unit can be used to fill containers with aerosol, water, such mid-viscosity substances as fat liquor solvent, and propellants, e.g. LPG, F12, DME, CO2 and N2, etc. Enjoying excellent safety, reliability, metering and automation, it applies to aerosol can made of tin or aluminum, with a universal 1-inch inlet. As an AIO, this unit leaves filling, closing and aeration in three benches, so three operators are needed when it works through linear transfer. The Semi-auto Filling, Closing, Aerating and Splitting Unit is designed by following the European philosophy of filling machine. It is a good choice for medium and small-sized aerosol manufacturers.

II. Composition and parameters

1. Composition:

This unit consists of filling machine, closing machine, aerating machine, booster pump, work benches, racks and pneumatic components, etc. The filling, closing and aerating machines are distributed in three work benches, operated by three people.

2. Parameters

Outline of host (L*W*H) (mm)	970*510*1500
Outline of booster pump (L*W*H) (mm)	800*220*700
Height of aerosol can (mm)	120~320
Diameter of aerosol can (mm)	Customizable
Closing diameter (mm)	27.5
Closing contact height (mm)	0~10 adjustable
Max. liquid fill each time (ml)	530
Max. gas fill each time (ml)	350
Capacity (cans/hr)	500-1000
Max. gas consumption (L/min)	900

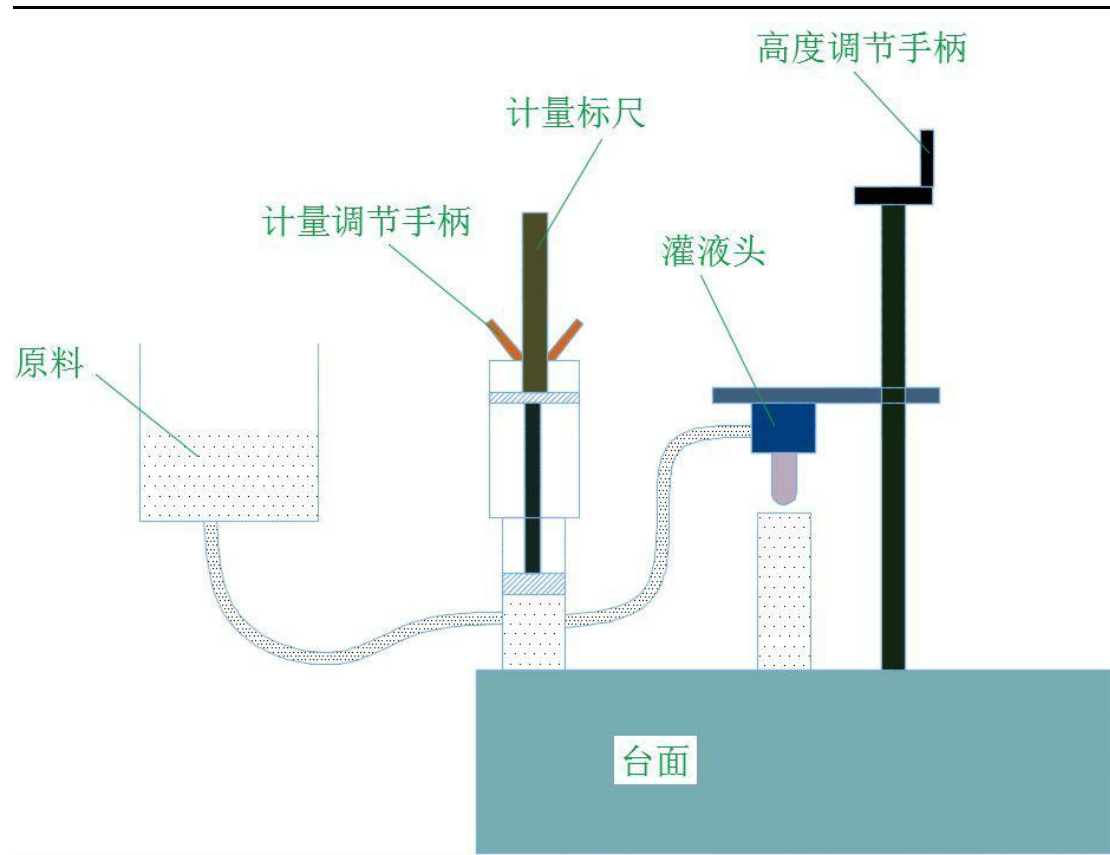
III. Basic structure and working principle

Many kinds of aerosol are inflammable or explosive when filling containers with them. Therefore, this unit employs a mechanical structure under full gas-pressure transmission, which can avoid electric spark caused when using electricity.

This equipment consists of filling machine, closing machine, aerating machine, booster pump, work benches, racks and pneumatic components. The filling machine is composed of a liquid metering cylinder and a liquid filler. The aerating machine is composed of a gas metering cylinder and a gas filler. The liquid metering cylinder and gas metering cylinder are fixed onto the bench, slightly in the back. The liquid filler,

closing machine and gas filler are mounted to the bed-plate of the lifting column. They are vertically adjustable depending on the height of the can. The booster pump works on a double-in double-out basis and the diameter of the inlet and outlet tubes is enlarged.

Liquid filling: Turn on the liquid filling switch, press the foot valve slightly, the double pneumatic operated directional valve of the liquid metering cylinder changes direction and the liquid filler valve turns on with the help of the micro cylinder. Meanwhile, the upper chamber in the power cylinder of the liquid metering cylinder takes gas in and the lower chamber exhausts. The piston in the power cylinder pushes down the piston in the liquid cylinder, so that the liquid in the liquid cylinder is transferred via the filler into the aerosol can. Then the signal valve is triggered by the piston of the power cylinder that has been pushed down, the gas pressure output from the signal valve acts on the double pneumatic operated directional valve of the liquid metering cylinder to make it change direction, so that the micro cylinder of the liquid filler moves opposite to the direction of incoming and outgoing gas of the power cylinder to turn off the valve of the liquid filler. Meanwhile, the metering cylinder returns home, takes in liquid of the same amount and waits for the next filling. The height of the locating piston of the metering cylinder can be adjusted by rotating the knob on the top of the metering cylinder in order to change the size of fill by changing the travel of the metering cylinder piston.



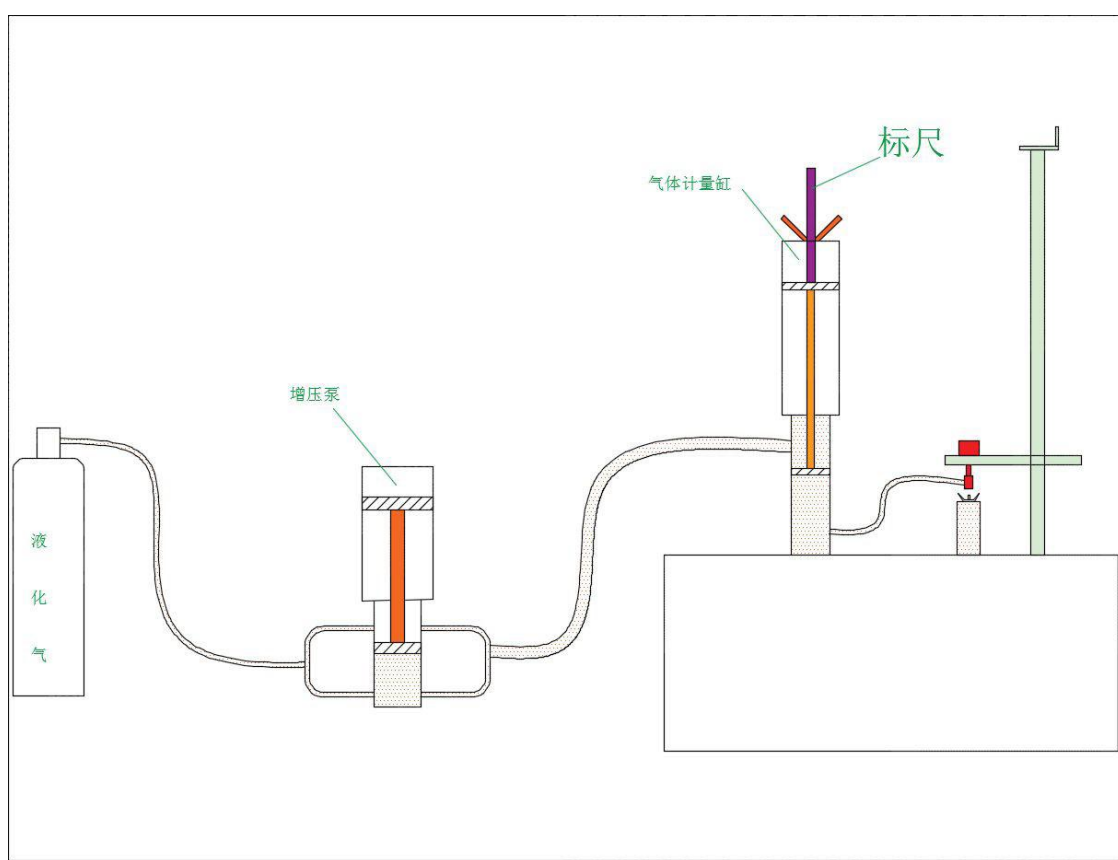
原料: Material 计量调节手柄: Meteringadjustor 计量标尺: Scale
 灌液头: Filler 高度调节手柄: Heightadjustor 台面: Work bench

As shown in the figure, the liquid metering cylinder pumps the material from the bucket into the filler and then into containers. There is a scale and an adjusting handle on the liquid metering cylinder. The volume of liquid can be measured accurately by the scale and adjusted by the handle.

Closing: Switch on the closing knob, press the foot valve slightly, the double pneumatic operated directional valve of the closing machine changes direction, the upper chamber in the lifting cylinder of the closing machine takes gas in and the lower chamber exhausts, so that the piston in the lifting cylinder is made to move downwards. The can valve is compressed by the closing end. Meanwhile, the closing signal valve is triggered by the bottom of the closing cylinder that has moved downwards, the gas pressure output from the signal valve acts on the single pneumatic operated directional valve to make the upper chamber in the closing cylinder take gas in and the lower chamber exhaust. The piston moves downwards so that the closing claw is released to close the cylinder mouth. Meanwhile, the stopper

on the top of the closing machine triggers the reset signal valve to output gas pressure, which acts on the double pneumatic operated directional valve to make it change direction. The piston of the lifting cylinder ascends home. Meanwhile, the single pneumatic operated directional valve changes direction to move the piston of the closing cylinder upwards and the closing claw retreats home.

Aeration: Controlled by the compressed air and pneumatic element, the booster pump inhales propellant automatically from the steel cylinder or gas container, raises pressure to make it become liquid, and sends it to the gas metering cylinder for filling. The pressure of liquid propellant may be controlled by adjusting the pressure of gas supply to the booster pump. Turn on the aeration knob, press the foot valve slightly, the double pneumatic operated directional valve of the gas metering cylinder changes direction, the gas filler pushes down the aerosol can with the help of the micro cylinder and the nozzle opens automatically. Meanwhile, the upper chamber in the power cylinder of the gas metering cylinder takes gas in, the lower chamber exhausts, and the piston in the power cylinder moves the propellant piston downwards, so that the liquid propellant in the propellant cylinder of the metering cylinder is injected via the gas filler into the closed aerosol can. At this moment, the piston of the power cylinder is pushed down to trigger the signal valve, the gas pressure output from it acts on the double pneumatic operated directional valve of the gas metering cylinder to make it change direction, so that the micro cylinder of the gas filler moves opposite to the direction of incoming and outgoing gas of the power cylinder, so that the gas filler and metering cylinder return home, takes in gas of the same amount from the cylinder and waits for the next filling. The height of the locating piston of the metering cylinder can be adjusted by rotating the knob on the top of the metering cylinder in order to change the size of fill by changing the travel of the metering cylinder piston.



液化气: Liquefied gas 增压泵: Booster pump
 气体计量缸: Gas metering pump 标尺: Scale

The gas in the liquefied gas bottle goes into and is pressurized by the booster pump. With bubbles removed, the gas is pressed into the gas metering cylinder, which can measure and adjust its volume. Then the gas is transferred from the filler into containers.

Diagram of Liquid Filling Machine

Fig. 1: Side view

1. Can locating screw; 2. Liquid filler; 3. Micro cylinder of liquid filler; 4. Bed-plate; 5. Cylinder; 6. Descending gas inlet of power cylinder; 7. Metering and adjusting handle; 8. Liquid metering cylinder; 9. Ascending gas inlet of power cylinder; 10. Signal valve; 11. Fastening screw of column and bed-plate; 12. Outlet of metering cylinder (to liquid filler); 13. Inlet of metering cylinder (connecting storage hopper)

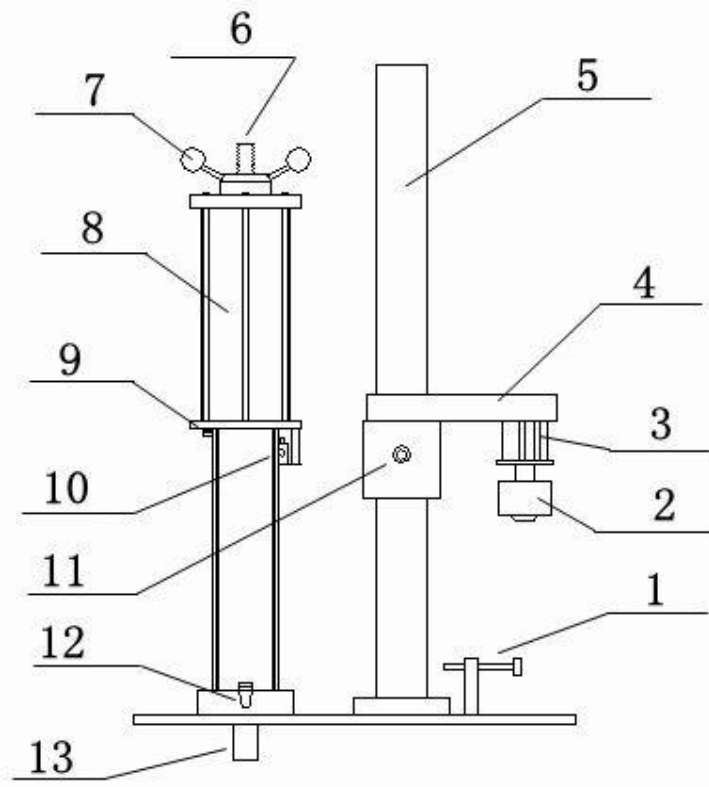


Figure 1

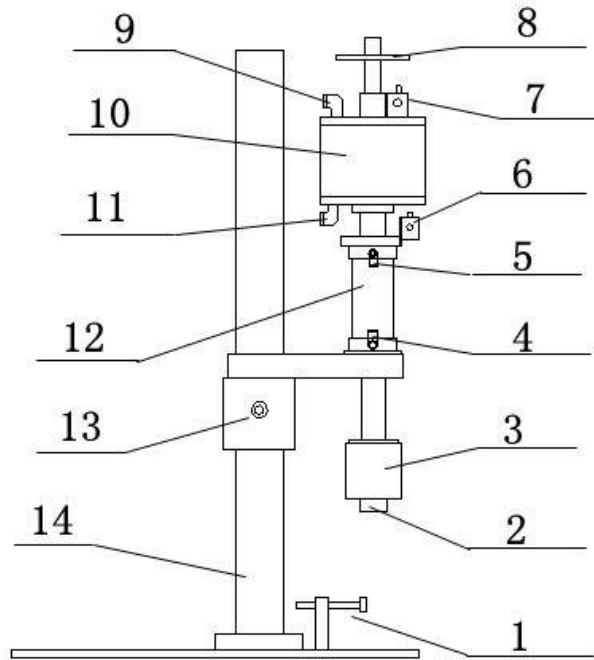


Fig. 2: Diagram of closing machine

1. Can locating screw; 2. Regulating ring for closing contact height of closing machine; 3. Closing end; 4. Controlling and adjusting elbow for ascending gas of lifting cylinder; 5. Controlling and adjusting elbow for descending gas of lifting cylinder; 6. Closing signal valve; 7. Reset signal valve; 8. Closing diameter adjuster; 9. Descending gas inlet of closing cylinder; 10. Closing cylinder; 11. Ascending gas inlet of closing cylinder; 12. Lifting cylinder; 13. Fastening screw of bed-plate and column; 14. Column

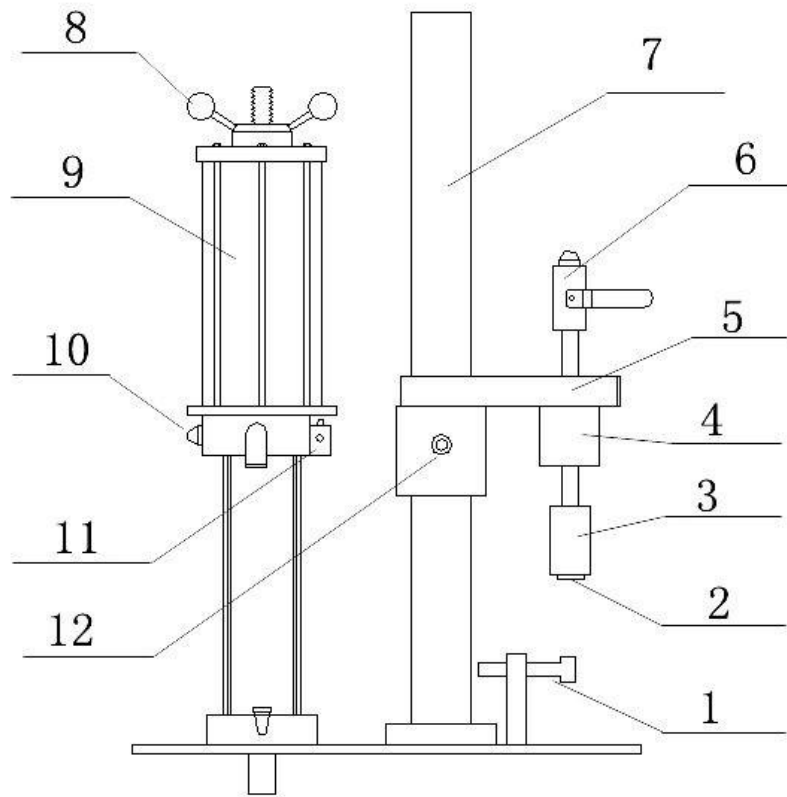


Fig. 3: Side view of aerating machine

1. Can locating screw; 2. Aerating nozzle; 3. Gas filler; 4. Micro cylinder of gas filler; 5. Bed-plate; 6. Ball valve; 7. Column; 8. Metering adjuster; 9. Gas metering cylinder; 10. Inlet of metering cylinder (connecting gas cylinder); 11. Signal valve; 12. Fastening screw of bed-plate and column

Fig. 4: Diagram of booster pump

1. Anchor bolt; 2. High-pressure oil pipe; 3. Check valve at gas inlet; 4. Propellant inlet; 5. Lower signal valve; 6. Gas triple; 7. Hand slide valve; 8. Upper signal valve; 9. Single pneumatic operated directional valve; 10. Connector of descending gas inlet; 11. Power cylinder; 12. Connector of ascending gas inlet; 13. Propellant cylinder; 14. Propellant outlet; 15. Propellant outlet

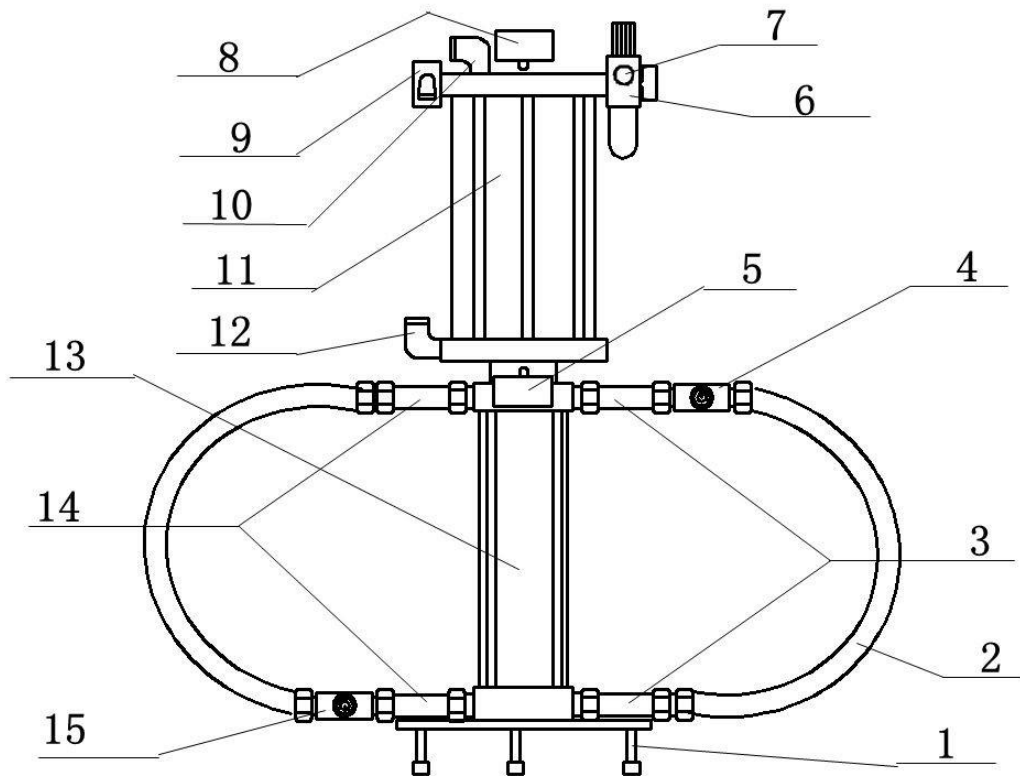


Fig. 4: Diagram of booster pump

List of accessories

Name	Size	Q'ty
Flat ring	125*110*5.6	2
Flat ring	100*85*6	2
Skeleton ring	16*20.5*3.6	1
Skeleton ring	50*40.6*7.1	1
Y-ring	16*24*5	4
Y-ring	32*40*5.5	1
Y-ring	40*50*6	1
O-ring	10*1.9	3
O-ring	9*1.9	2
O-ring	12*1.9	2
O-ring	14*1.9	2
O-ring	16*2.4	2
O-ring	16*1.9	1
O-ring	18*2.4	2
O-ring	20*2.4	2
O-ring	30*3.1	1
O-ring	32*2.4	2
O-ring	41*1.8	1

O-ring	45*3.1	2
O-ring	50*3.1	2
O-ring	60*2.4	1
O-ring	80*2.4	2
O-ring	90*3.1	2
O-ring	125*3.1	2
Pressure-proof gas pipe		2
Gas ball valve		1
Anchor bolt		4
Allen wrench		1
Silencer	2"	2
Piston slice of booster pump		2
Piston slice of gas metering cylinder		1
PTFE gasket of gas filler		2
PTFE stopper of liquid filler		1
Quick-connect elbow	G1/4φ10	2
Quick-connect elbow	G1/8φ6	1
Quick connector	G3/8φ10	1
Quick-connect elbow	G3/8φ10	1
Quick-connect tee	φ10	1
Quick-connect tee	Φ6	1