

The Beard Regulator.

3

THE growing demand for spare parts for renewal of the various models of Beard Regulators urges the desirability of a few words from the home of the compressed gas regulator. It is believed they will be appreciated by many, especially by those who have a workshop at hand. The Beard Regulators enjoy a reputation of over a quarter of a century, the first of their kind having been placed on the market in 1884. It was absolutely the original pioneer in those days when compressed gas was in its commercial infancy. Although at the outset rather large and weighty, the utility of the valve was abundantly appreciated. It was the thing wanted ! In 1886 it was superseded by the small Beard Regulator, which was more compact and equally efficient. This was similar to the presentday, Low-pressure, or A Model, but several patented improvements have been added to its internal mechanism, until to-day we have a valve and gear proved by practical experience to be superior to any regulator on the market.

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The care and supervision exercised during its manufacture, combined with the unparalleled experience and an untiring effort for perfect efficiency, have rendered these Regulators absolutely reliable and trustworthy. They are perfect Regulators. Originally used chiefly for lime light, the cheaper production of compressed gases has vastly enlarged the sphere of utility of the Beard apparatus. Models suitable for following purposes are always kept in stock :-

MODEL A, suitable for

Lime Light, Low Pressure, Medical and Dental Inhalation Purposes. Vehicle Illumination with Coal Gas or

Acetylene.

MODELS B and C, suitable for

Engineering and Building, Blowpipe Work, Iron and Steel Welding and Cutting, Lead Burning, etc., Beer and Mineral Water Aerating. In some instances special valves are constructed to suit particular requirements.

A special type of the Beard Regulator was finally adopted (after a long series of severe tests), in conjunction with the W.E.G. mine rescue outfit. In this connection human life depends on the Regulator's efficiency. It is gratifying to know that this production has given most satisfactory results whenever used.

The user of a Beard Regulator may still rest assured he has an article embodying every detail proved necessary during a quarter of a century's daily experience and usage.

We can be consulted at all times, and shall be pleased to continue to advise any user or report on any problem that may arise.

How the Regulator works.

A Regulator for attaching to cylinders of compressed gases is a requisite piece of apparatus for ensuring good results. Without this there will be a great waste in the gas. But it is not sufficient to attach a regulator to a cylinder and expect it to do its duty, unless the operator has a knowledge of its mode of use.

5

From the diagram (vide page 7) it will be seen that at the lower end there is a screw with a cone-shaped piece G. This screw, when tightened in the neck of the gas cylinder, enables the cone-shaped piece to become firmly seated in its counterpart, which forms part of the neck of the gas cylinder, and these, by reason of their close connection, form a gas-tight joint. The upper part contains a species of bellows C, and when the gas is admitted into this it distends upwards and rises against the pressure of a spiral spring B. To the inside part of this bellows arrangement are attached rods D, forming a lazy-tongs, so that the greater the pressure on the bellows the more tension is put on a cam at the foot of the lazy-tongs, which presses a small valve F tightly upon the face of the nipple or valve seat, thus stopping all further supply of gas from the cylinder into the bellows until some has been allowed to escape by means of the outlet tube H, seen at the side, and to which the connection is made to the jet. The improvements in this valve F are that both ends are made similar; it is capable of being reversed, so that should one end get worn and allow the gas to pass, it can be readily unscrewed from the cap and reversed; the new end taking the place of the old one.

Such is the arrangement of the internal parts of the regulator; for when once its mode of action is understood, it

6

ean easily be cleared if a speck of dirt gets in and prevents its working efficiently.

The gas regulator having been attached to the cylinder, and connection having been made to the jet, it is imperative to the proper working that the jet tap be closed before the cylinder valve is opened. Having opened the cylinder valve, the gas bellows become filled and distended, consequently bringing into play the valve, so that no more gas is admitted. We now turn on the jet tap and allow the gas to flow through. What happens? The pressure spring on top of the small bellows forces the gas to the jet, and, at the same time, the very fact of the bellows being slightly emptied closes the lazy-tongs, moves the cam, and opens the valve, so that no sooner is a small quantity of gas used than more gas is admitted into the bellows from the cylinder. This arrangement goes on quite automatically, as long as the gas is being used, requires no attention whatever, and the pressure always remains the same : any regulation that may be required must be made by means of the tap at the jet itself.

Description of Models.

9

The foregoing description of the Beard principle applies to all the Beard models. They differ in the following respects :--

A MODEL (cover diameter 2³/₂ in.) is constructed to give a set delivery outlet pressure of 2 lbs. per sq. in. This pressure is obtained from Spring B, which is, of course, constant. This model can be safely worked at 5 to 7 lbs. per sq. in. where necessary, for instance, in conjunction with the Beard Collimator (high power) lime-light jet.

Better results with other types of jets can, in some instances, be obtained at this pressure.

These springs are stocked.

C MODEL (cover diameter 2 in.) is also a set-pressure Regulator, adjusted to give a 15 lbs. per sq. in. delivery. Its internal mechanism is built stronger, and the bellows C is reinforced with vulcanized canvas. This particular model is extensively used for lime-light purposes also blow-pipes where the jet or burner is fitted with an injector or suction system. The principle of this device in brief is as follows:— Oxygen is supplied at a high pressure through a fine nipple.

8

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10

By arranging the position of this nipple in the passage of the coal gas, a suction is set up. Coal gas from the main is generally used under this system with most satisfactory results, and giving a near approach to a good mixed jet. The Beard Injector Jet embodies all that pertains and obtains to absolute safety—a point well worth bearing in mind.

"A" Model Regulators can be convented to this pressure.

The B MODEL is a variable pressured Regulator. This has been constructed to meet a demand for various uses. By referring to sectional diagram at end, one can follow the gas course into the chamber C, as in the previous model. This chamber is loaded with two springs; B spring gives the Regulator a minimum pressure of 2 lbs. per sq. in. In the top of the cover is fitted a screw J; this bears upon a second spring B', which in turn, by compression, further loads the Bellows Chamber C; any increase of pressure is recorded on the outlet pressure gauge L, which has been found the more preferable way of ascertaining the Regulator's working pressure.

This screw must not be adjusted while outlet is closed.

By following the gas passage along we come to H, which is a fine adjustment valve, fitted to the outlet to give a gradual delivery, which will be found most useful. Fig. 1 is a very necessary fitting, viz., a safety or relief valve set to relieve Chamber C at 30 lbs. to sq. in. This is adjustable, and can be set at any other pressure by the long-threaded portion, and locked by the thin hexagon nut.

Cylinder Gauge K is for indicating contents of cylinder, and can be fitted to all models.

Connections at Cylinder.

When about to connect Regulator, etc., to cylinder, carefully wipe out the seating first, as a mere speck of dirt has been known to prevent a proper seating of the connection, and hence allow a proportion of gas to escape. Should, in spite of all precautions, there still be a small escape, it is a good plan to insert a thin lead washer, which will be found to be very effective. A few of these washers, which can be quickly made when one has the materials at hand, should always be on hand, for one never knows when such may be required.

To Repair or Clean the Gas Regulator.

The Regulator should be held by the screwed stem G in a vice with lead or wood clamps to prevent injury to the threads.

Unscrew the Brass Cover A, which protects the bellows and holds the pressure spring.

Do not attempt to pull or twist in any way the rubber bellows, otherwise damage would be done to the internal mechanism.

Carefully cut and take off the threads that bind the bellows, removing the bellows from the metal cap.

With a pair of pliers grip firmly the metal piece which screws into metal cap, unscrew cap and take off, then remove rubber bellows from the base.

This leaves the levers and fulcrum E free to be got at.

With the handles of pliers, or preferably a forked wrench that will engage with the projecting ends of fulcrum pin upon which the levers work, the fulcrum and levers can be unscrewed and removed.

The valve can now be taken out and the coned orifice or valve seat examined.

Great care must be taken not to injure or scratch this, otherwise it will not make a sound joint when put together. The gas way is just under 1-16th in. dia., and should this be filled with dir1, a wire or drill must be used to clear the dirt out.

The valve F is reversible, ends being fitted with a ductile material, capable of seating itself, and making a gas-tight joint upon its fellow seating, the cone. The flange cap fitted is for use at either end.

Should the working end of valve be much worn or indented, the flanged cap should be taken off and screwed on the bad end, thus making it equal to a new valve.

The Spring under the flanged cap of valve keeps the valve against the eccentric ends of lever and off the valve seat.

The fulcrum face beds upon (usually) paper washers; these are used to determine the height of valve face from its seating, additional washer would take it the thickness higher from its seating, and give more gas-way, and care should be taken not to remove these when taking regulator apart.

When the fulcrum is screwed down tightly, the face of joint screwing against the bellows cap should move about 5-16th inch, that is, when levers are depressed and extended.

The test to know if valve would work correctly is by placing the nipple in the mouth, and sucking through when levers are depressed; if clear, so far all is in order. Now pull or distend lever; if valve closes sound, the vacuum would be 14

formed, and no air could be drawn through. All that now remains to be done is to put parts back again in some order as taken apart.

Pressure Gauge.

The pressure gauge is made on the Bourdon principle, *i.e.*, the straightening of curved oval section steel tube by the pressure of the gas in the interior, from the free end of tube a connecting rod to the segment of a toothed wheel gearing with a pinion upon which is fixed an index pointer.

This mechanism is fitted into a brass case carrying the dial, which is protected by a Bezel Ring holding a cover glass.

This mechanism is very delicate, and it is advisable not to tamper with it should the gauge be out of order, but send it to the maker for repairs.

However, sometimes the index pointer becomes loose and out of position, not returning to zero.

When this is so, remove the bezel and glass, and when gauge is empty put pointer in position by pressing on the spindle, tapping gently with the handle of a screwdriver or small hammer, and when at zero stop.

A spring door or safety valve is fitted to the back of case of gauge, and should never be touched or forced open, as it has no connection whatever with the working of the gauge.



