

In his continuing series on regulators, Bob Campbell examines a true original.



SIEBE GORMAN'S 'TADPOLE' SET

Produced around 1948 these 'Tadpole' sets featured Siebe Gorman's first design of a twin-hose demand valve (what is nowadays called a 'regulator'). In starting let me say that Tadpole is a generic term used in the UK some fifty years ago to describe any diving set that used the small WWII aircraft oxygen cylinders. These cylinders were 13 inches long by 7 inches diameter (330 mm x 178 mm) and weighed 16 lbs (7½ kg). They were readily available on the surplus market and eagerly pressed into service by divers generally to produce a compact diving set. Working at 1800 psi they contained 26 cu ft. (In modern parlance an approx 6 litre cylinder at 125 bar.). It was their dumpy appearance that gave rise to the appellation Tadpole, even Tads. Twin Tads formed a very comfortable back pack and were in extensive use in those early days. Siebe Gorman may well have been the first to employ this configuration.

When Siebe Gorman designed their set they had not yet recognised the imminent onset of the amateur sport diving interest and so their eyes were on its application as a lightweight commercial diving set. Consequently, these sets were not offered for retail sale, could only be obtained directly from the factory and, I suspect, were only available to approved customers. No doubt a training course was also required..

The set to be described is in the care of the Michael Field at Waltham and is believed to have been used by Cdr. Jimmy Hodges RN, a pioneering underwater photographer who sadly lost his life when diving using an oxygen set in the Caribbean with Hans Hass.

Siebe Gorman's catalogue depicts the set being worn by a diver dressed in a military style one-piece Sladen suit, weight belt and leaden boots. A lighter version was also shown with a full-face mask, two-piece suit, weight belt and shallow water diver boots. There was no hint of a free swimming diver with fins!

Set Configuration

This set was designed as an integral unit and it was not intended that it should be dismantled between dives. It comprised a pair of inverted Tadpole cylinders with the original cylinder valves still in place. (the move to the later universal pillar valve with a yoke connection on the demand valve had yet to materialise). This placed the cylinder valves around hip level and well within a diver's reach.

A short screwed manifold connected the two cylinders and led into another piped assembly which formed a secondary manifold. This was mounted on the horizontal portion of the back plate assembly, which supported the whole set on the

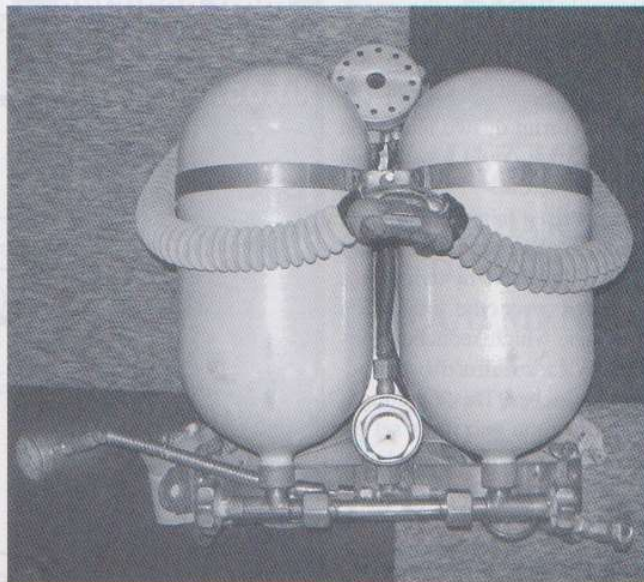
diver's back. From the centre of the secondary manifold a high pressure connection led upward to a 1st stage reducing valve resting between the two cylinders. The secondary manifold also split horizontally, the left-hand branch leading to a submersible pressure gauge via a flexible HP tube reinforced externally with a spiral brass strip. The right-hand branch leading to a purge valve (details later) in reach of the diver's hand.

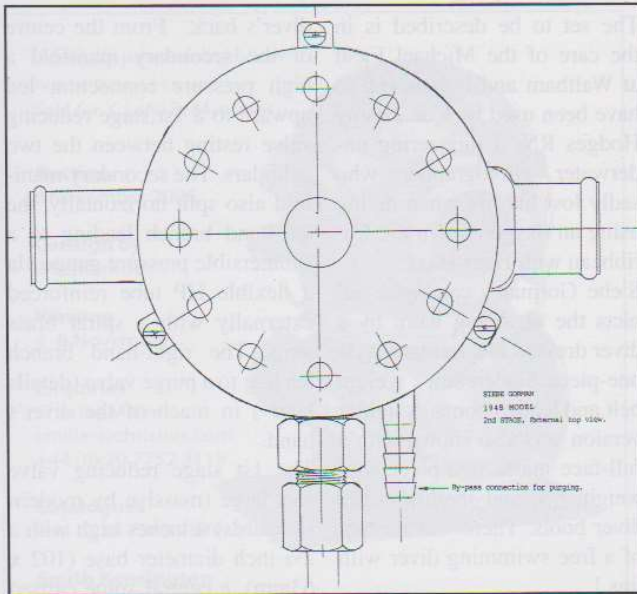
The 1st stage reducing valve was large (massive by modern standards) 4 inches high with a 2½ inch diameter base (102 x 63mm), a central spine carried the 1st stage valve and extended upward to also support the 2nd stage demand valve, which was an independent unit linked to the 1st stage by an interstage pressure pipe.

The harness was attached to the back plate assembly, which itself resembled an inverted 'T' and comprised four straps, two at the shoulders and two at the waist. These straps were of the aircraft 'Sutton' pattern i.e. there was a series of eyelets in three of the straps which were stacked over a centre pillar on the fourth and locked in place by a single quick-release pin

Continued on next page

*Top left: Bob Campbell
Below: The Siebe Gorman Tadpole Set*





External top view

Continued From previous page

through the central pillar. Fine adjustment of the harnessing was achieved by using buckles.

The Demand Valve

The demand valve or 2nd stage comprised a substantial brass casting with upper and lower covers held together by 3 brass screws in external lugs. The overall diameter was 3½ inches, and it was 4½ inches deep (~90 x 115mm); a much smaller diameter but much deeper than later twin hose demand valves. A unique feature was the separate exhaust chamber, the cover of which provided the mounting spigot for the whole demand valve assembly. Internally the upper, inhalation, chamber featured a pivoting 'L' shaped lever holding the metering valve in place with a stirrup of two tensioned springs, that could be adjusted by a fine screw.

A rubberised fabric diaphragm, bound in place around the outer body of the valve by twine, was stretched over the inhalation chamber, which reduced it internally to an effective diameter of 3 inches. This diaphragm bore down on two discs set either side of the demand lever, which in turn pivoted about its toe. Over the top of the diaphragm was a top protective cover, which formed an

external water chamber.

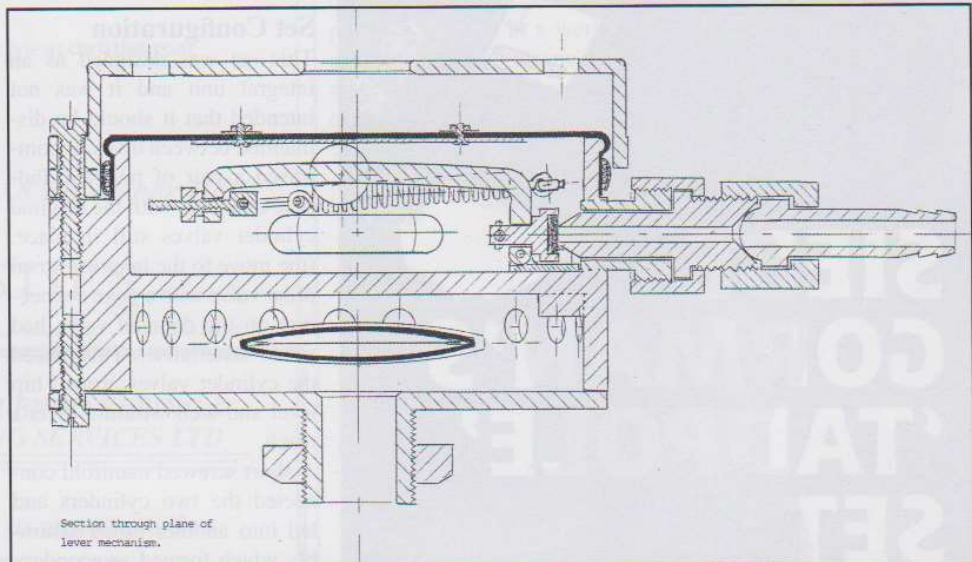
A screwed coupling connected the inhalation chamber to the first stage, while a spigot connection lead down to the purge valve previously mentioned. This allowed the diver to bypass the first stage valve entirely and inject air directly into the inhalation chamber and breathing hoses to clear flooded water and to boost the breathing air supply if necessary.

The breathing hose connections were diametrically opposed, with the inhalation hose leading over the right shoulder to a metal 'T' mouth-piece without non-return valves. Originally the connection was

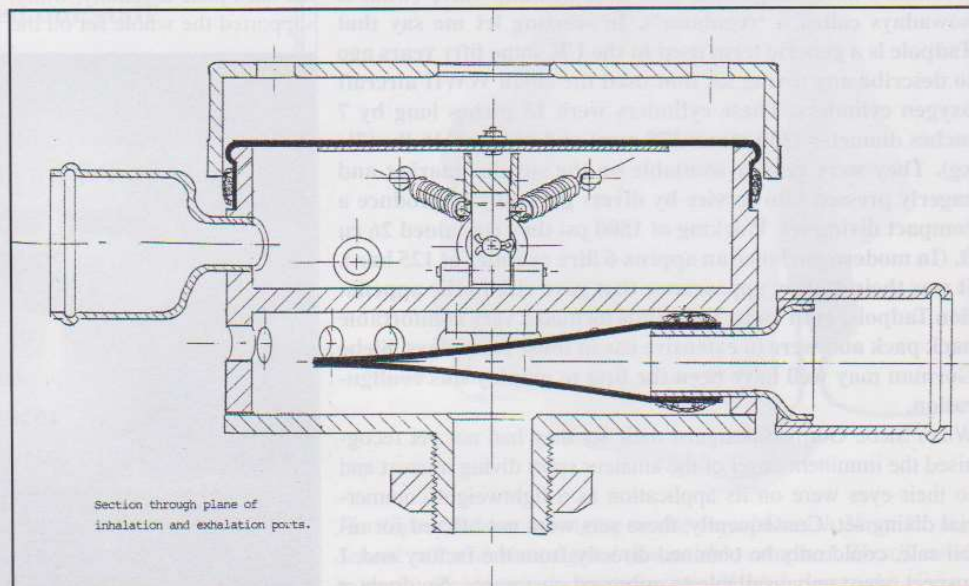
to a full-face mask, but latterly a separate mouthpiece and half-mask were used. The exhaust hose returned over the left shoulder to the demand valve. These hoses were of a fabric covered military pattern.

Surface Demand Configuration

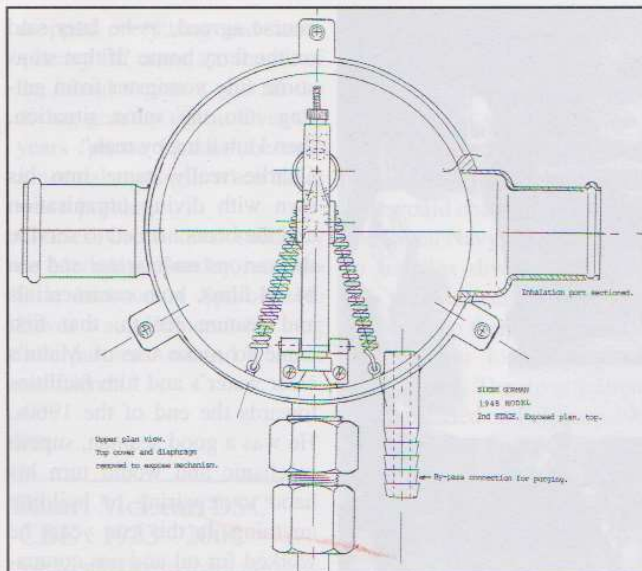
The design of the 2nd stage valve was such that it was also used in a surface demand configuration with the 2nd stage demand valve alone being worn in a simple webbing harness. In this mode it did not incorporate the purge valve connection. This was a specifically dedicated demand valve - it was not



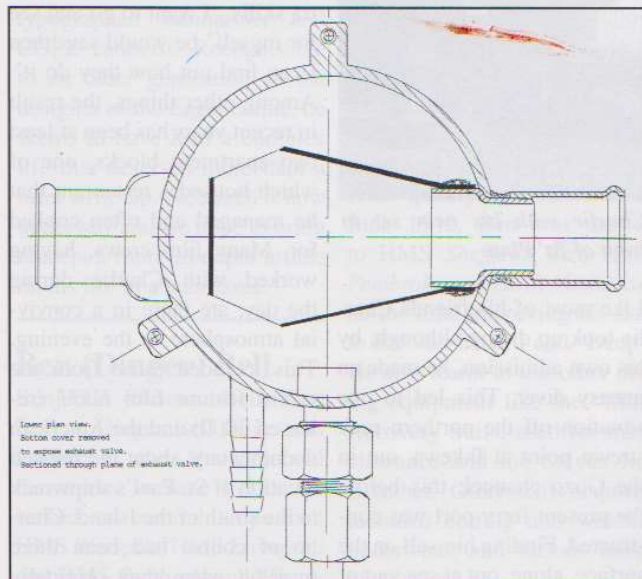
Section through valve - showing diaphragm, lever mechanism and exhaust valve.



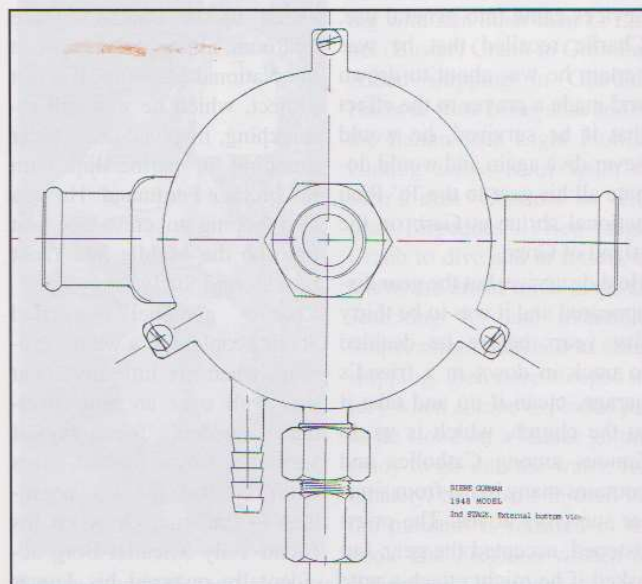
Section - showing inhalation (left) and exhalation ports



Top cover and diaphragm removed



Bottom cover removed – showing 'Ducksbill' exhaust valve.



External bottom view

intended that the integral diving set should be dismantled to provide this service:

Surviving Sets

In the UK one complete set survives. This is in the care of Mike Field and displayed at the Waltham Windmill Museum (really) near Grimsby. It was restored by John Salisbury to a display, but not functioning, condition. A spare pair of first and second stage valves are in the hands of the HDS and provided the source material for the drawings shown here.

An Australian copy, built by Bill Young, is displayed in Queensville Maritime Museum, Victoria, Australia. There have been references to other copies and an original existing in Australia in the 1950s but whether or not these still exist I do not know.

Recently a surface demand unit has been unearthed in New Zealand. Originally used by Reece Discombe, a commercial diver, it is now in the hands of Keith Gordon. Also in New Zealand

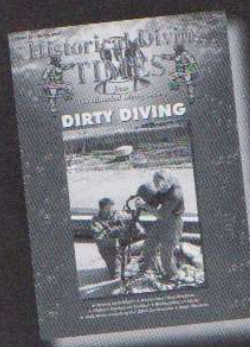
is Ivor Howitt who imported that original Siebe Gorman set into Australia. He is soon publishing his memoirs which should tell us more about these sets and perhaps, their fate in the Pacific area.

Whilst beachcombing close to Swanage Pier in Dorset, I discovered an eroded casing buried in the sand, unfortunately none of the mechanism had survived.

References

Historical Diving Times, No 35, Winter 2005, pp 15 -17; No.34, Summer 2005, pp. 30 - 31; No 36, Summer 2005, p. 22; Vol 9, Issue 3, Summer 2001, p13; Historical Diver (HDSUS). No. 44, Summer 2005, pp. 36 - 37; Siebe Gorman Catalogue D, pp 74 - 75; Deep Diving, 5th Edition, pp 84, 338, 339.

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