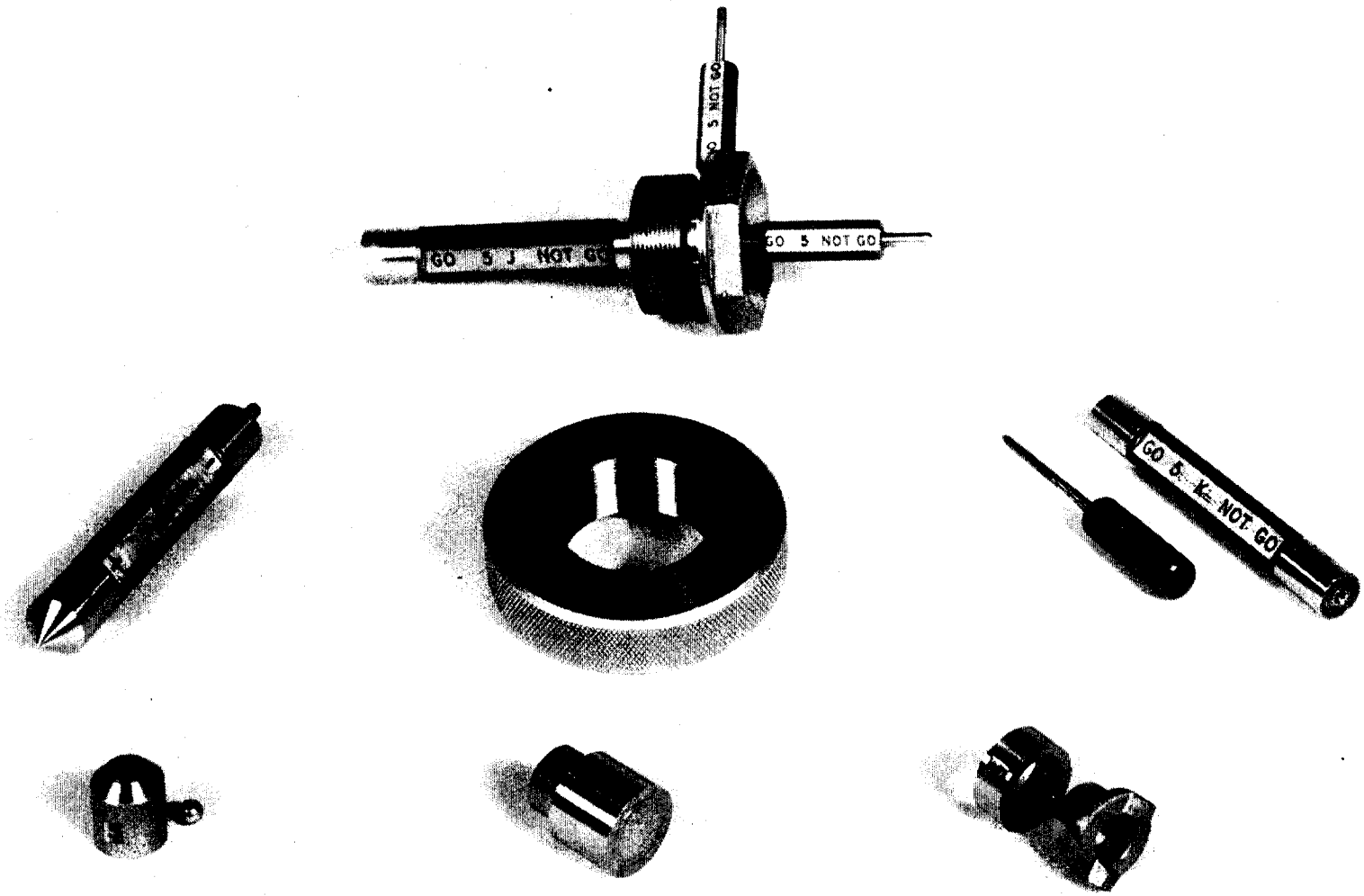

ONE SET OF GAUGES

TESTING AND CHECKING ADMIRALTY SPRAYER CAPS

BY

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One of the minor commitments of the Admiralty Fuel Experimental Station is the testing and checking of sprayer caps before they are given to S.N.S.O. for issue to the Fleet. The connection of this work with the ' fuel experimental ' purpose of the Station is perhaps not obvious, but as the turn-over is about 300 caps per week (we sometimes wonder where they all go) there is quite a lot of work involved. There is nothing at all spectacular about it, but we have decided to give it some publicity, since the fact that it is going on comes as a surprise to many engineer officers.

This testing has now been going on for some 25 years. It has always been fairly comprehensive, as back records show, but in recent years it has been refined so that it is a real test and check of parts which the makers themselves also check to fairly close tolerances. It should be mentioned here that the full checks are now actually only applied to caps from commercial firms, and then only to a limited percentage ; unsatisfactory batches are returned to the makers for correction. In the case of caps made in the Royal Dockyards, only the output and spray quality are checked, since the A.F.E.S. has the best rig for that.

The dimensional tests are based on sets of gauges specially produced, or rather evolved, for this purpose. One set is shown in the illustration, there being a separate set for each size of cap. As can be seen the majority are of the ' go ' and ' not go ' type, but in some cases considerable ingenuity was needed to design a gauge which would give a full check, be reliable in its accuracy, and yet be simple. The total number of dimensional checks is eleven. Dimensions affecting the output seriously are toleranced to $\pm$ 0·0005 in., those with only a minor effect to between $\pm$ 0·001 in. and 0·005 in.

The output and spray quality test has for many years been carried out on a rig, using water, which again was developed at the Station. When the limiting output figures were originally established, they were correlated with hot oil outputs on a similar rig, but the advantages of using water for the day to day tests are too obvious to need mentioning. A recent advance is that a 'synthetic fuel' has been produced which, at normal temperatures (about 60 degrees F), has the same characteristics as furnace fuel oil when it is at the best burning temperature. This, together with more accurate metering devices, will lead to a refinement in the checking processes. The output variations accepted for the different size caps are shown in the Table. These figures are the ones used in the water-spray output tests ; the outputs are therefore only correct for water, but the acceptable variation will be substantially the same with oil.

It is hoped that this information will give those concerned with the operation and maintenance of sprayers and caps a rather better idea of the sort of devices they are than is, or has been, usual in the Fleet. Economic, as well as strategic considerations, make it important that these sprayers, which, after all, still form the basis for the performance of most seagoing warships, should be on their

TABLE

Admiralty Sprayer Size ..	00	0	1	2
Acceptable Output (lb/hr) .. *Fluid : Water at 150 lb/sq in* ..	100–136	211–224	346–363	585–610
Tolerance on mean Output (per cent ±)	15·2	2·7	2·4	2·1

2A	3	3A	4	5	6	7
720–750	911–960	1035–1090	1230–1297	1582–1674	1870–1972	2215–2360
2·0	2·5	2·5	2·6	2·8	2·7	3·1

best behaviour at all times. This they can only be if they receive a treatment in use which is in accord with the care and attention they have received before reaching the hands of the user.

The ' maintenance ' of sprayer caps should really only involve routine cleaning, for which the drill is laid down ; the best treatment for damaged caps is replacement. Since this is not always possible, means of ' cleaning up ' sprayers, without affecting the output, have been evolved. They are, however, only emergency measures.

The outlet orifice is both the most crucial and the most exposed part of the cap. Nothing can be done to restore its shape after damage, but sometimes the outlet edge can be improved by lapping the face with fine carborundum on a $\frac{1}{2}$ in. diameter flat glass disc.

The swirl chamber is a zone of high oil velocity. Any scratches on the surfaces in contact with the oil—and these, of course, include the face of the plug—are bad for the spray and should be removed, if this is possible without removing the whole surface. The lugs on the plug should be used for taking it out of the cap ; driving it out from the other end usually produces damage to both plug and outlet orifice.

The thread and sealing flange are also frequently damaged. The thread can be cleaned up in the usual way of course, but cases have occurred where caps were so slack in the body that they came out when in use. The sealing flanges are tested to 300 lb/sq in at the A.F.E.S. ; damage to them is fairly easy to make good, but a test of some kind should be applied before the cap is put back into service.