a fluid pressure apparatus, for instance, read as follows: "A cushioning plug 28 Fig. 1 (not shown) secured at an end of the rod 16 of a hydraulic or pneumatic actuated piston 20 and slidable into an axial bore 36 in the cylinder 11 as the piston approaches the end of its stroke comprises a sleeve 29 having a tapered free end 29a Fig. 2 (not shown) . . ." and so on. The combination of a telegraphic style and the absence of drawings makes abridgements like this almost useless as a source of information.

Fortunately there is some evidence that the Patent Office has relented, and is now trying to cut its losses by increasing circulation rather than by reducing production costs. After discussions between the Chartered Institute of Patent Agents and the Patent Office, patent searchers are hopeful that the situation is righting itself. As the Board of Trade itself points out, the patent abridgements are a vital source of information. Chemical and pharmaceutical firms already recognize this, although British engineering firms have been slower to take advantage of what often amounts to an ethical form of commercial espionage. It is therefore particularly important that the standard of abridgements be maintained, unless patent specifications are to become a graveyard for technical information rather than a source of it.

Water for Profit

FOUR thousand delegates from seventy countries are meeting in Washington this week for what is described as a forum for the discussion of water problems of all nations and all peoples. As participants in a conference organized by the Department of the Interior, under the uplifting title of "Water for Peace", they will hear 160 papers, and visit a large exhibition to see what can be done to solve the problems of water supply.

The Ministry of Technology seems fully to have entered into the spirit of the occasion. The delegation, led by the minister himself, consists of 25 academics, industrialists and government scientists, and the British part of the exhibition covers 1,700 sq. ft. Exhibitors include the National Engineering Laboratory, which is showing a scale model of the Reynolds Building, which includes a 4,000 horse-power test rig, the Water Resources Board, and a number of private companies including the largest manufacturer of desalination equipment, Weir Westgarth, Ltd., of Glasgow. Desalination is naturally one of the important themes of the conference, and to mark this the British delegation will be doling out copies of a book written by the Atomic Energy Authority. After a foreword by the minister and an introduction by Professor R. S. Silver of Edinburgh University, the book, *Desalination and its Role in Water Supply*, goes on to discuss the nature of the problem and both traditional and modern approaches to its solution. The opportunity to sing the praises of British industry, now an almost traditional part of all exhibitions overseas, is not allowed to pass unnoticed. Also included are design studies for desalination equipment linked to nuclear power stations; one, using an AGR, produces 400 MW of electricity and 273,000 m^3 of water per day, while the other uses an SGHWR and gives 200 MW of electricity and 364,000 m^3 of water a day.

British Water Reactor Design

THE steam generating heavy water reactor at Winfrith in Dorset will be completed some time this year. It is an unusual reactor by British standards, and something of a change for the AEA, which has for many years been associated with gas-cooled graphite moderated reactors. The reactor at Winfrith is a pressure tube design using light water as coolant and heavy water as moderator; it is rated at 100 MW. Some of the engineering aspects of the Winfrith design were discussed on May 18 at a symposium at the Institute of Mechanical Engineers.

The fuel for the SGHWR is slightly enriched uranium dioxide pellets contained in zircalloy cans 12 ft. long; 36 of these cans make up each fuel element. The fuel rods are mounted inside pressure tubes through which light water circulates at a pressure of 970 lb./sq. in. The water flowing up past the fuel extracts heat and boils; the resultant mixture of steam and water is separated in steam drums and the steam is used to drive a turbine. The light water flowing around the fuel carries out some 30 per cent of the moderation of the neutrons, the rest of which occurs in the heavy water moderator which is contained in a reactor calandria surrounding the fuel elements. The moderator is unpressurized, but is circulated through heat exchangers to extract the heat generated. Reactor power in the short term is controlled by varying the height of the moderator in the calandria, and in the longer term by controlling the moderating power of the heavy water by injecting boric acid.

Although it is not an experimental plant, the Winfrith reactor does have features that would not be found in a wholly commercial reactor. A separate flow system provides for experiments on nuclear superheating of steam, and there are loops for testing advanced fuel assemblies. The reactor can be fuelled either on- or off-load, which is interesting in view of the controversy about the importance to be attached to on-load refuelling—the Dungeness *B* contract was won by a British AGR design largely because it could be fuelled on-load —and one possibility here is the rapid refuelling of the reactor off-load at times of low demand for power. The implications are that by dispensing with complicated on-load fuel handling equipment, the SGHWR could be made much more cheaply.

Will the SGHWR prove competitive with other designs? Mr H. Cartwright, director of the Water Reactor group at the AEA, refused to be drawn by questioners at the symposium. Remarkably enough, he was "not very interested in comparisons", but with low capital and fuel costs, he thought that generating costs would be competitive. It is true that in the intermediate to large range, the SGHWR does have some attractive features: good neutron economy, low fuel cost, economies on heavy water because of the moderation supplied by the cooling water, and the possibility of extrapolating the pressure tube design immediately to larger sizes without needing to build another prototype design. Much of the fabrication work can be done in the shop, and not on-site, which is a big advantage. If capital costs can be cut to the bone, the SGHWR might prove to have better export prospects than the AGR has so far shown, although this is a backhanded compliment at best.