

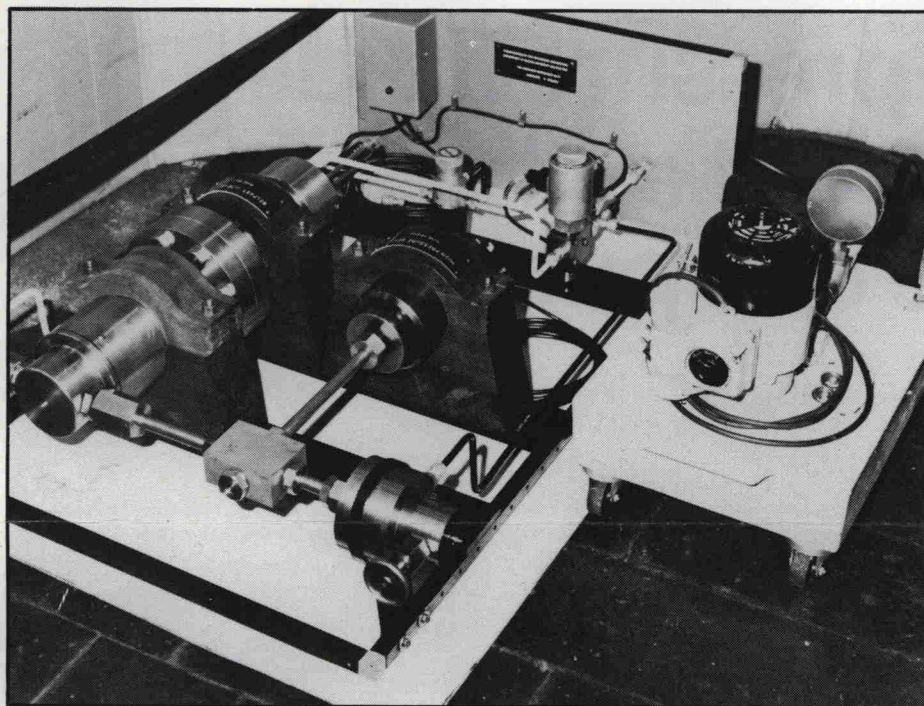
High-pressure fluids forced out at the stroke of a pump

B. Crossland & J. G. Logan

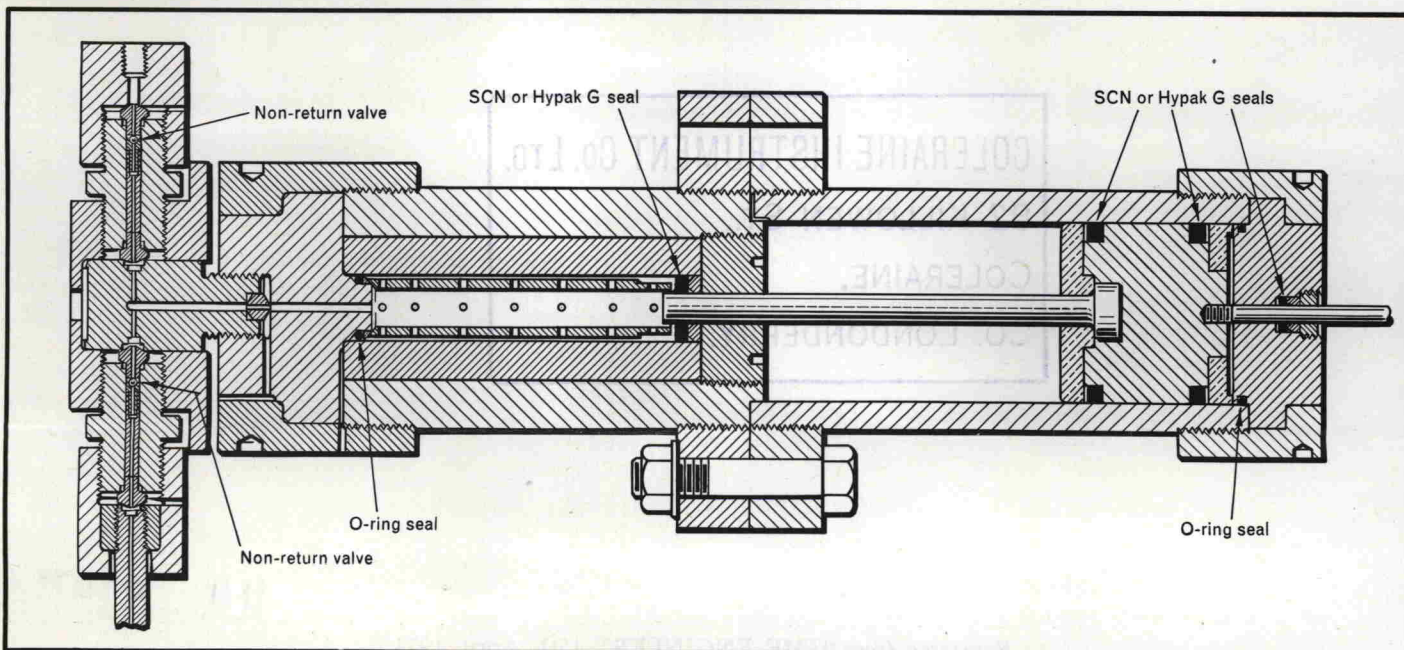
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High-pressure fluids forced out at the stroke of a pump

Modern industry is demanding high pressures for testing, extrusion and other purposes. An automatic hydraulic intensifier has been designed to do this



Above: Complete automatic intensifier unit. Below: Cross section of intensifier



There is an increasing demand from industry and research establishments for equipment to operate at up to 1.4 GN/m^2 ($200\,000 \text{ lbf/in}^2$). Industrially it is of interest in such fields as isostatic compaction of powders and for hydrostatic extrusion presses.

The use of high-velocity jets, produced by pressure differences of this sort of magnitude across an orifice, is being investigated for cutting rock, coal and metals.

High pressures can be used scientifically, for establishing viscosity of lubricants under simulated extreme pressure loading, or for the study of rocks under the pressure found in parts of the earth's mantle.

Extensive knowledge of high-pressure engineering has been gained by the Mechanical Engineering Department of Queen's University, Belfast. Agreement has been reached for this information to be made available to the Coleraine Instrument Company Ltd, 82 Killowen Street, Coleraine, Northern Ireland.

High-pressure fluid. The first fruit of this collaboration is an automatic intensifier system which is essentially simple and relatively cheap. The equipment provides a source of high-pressure fluid for autofretting, proof testing, and for development and research.

The essential component of the system is the Belfast intensifier (below) which has been tested exhaustively. Basically it consists of a low-pressure piston which drives a small diameter ram into a high-pressure cylinder.

The intensification ratio, ignoring an allowance for seal friction, is given by the ratio of the area of the low-