In our laboratories, pressures between 5 and 10 kb may be developed in the top chamber of the cylinder, in a liquid medium by directly and gradually thrusting the piston upwards into the cylinder either by means of a motor or by means of a piston of a bigger diameter, thrusted itself by a low pressure liquid. The sample, which is to be tested, is placed in the top chamber.

So long as the working pressure does not exceed 10 kb, it is advantageous to generate this pressure in a separate generator and to convey the fluid under pressure into vessels by means of pipes. The generator consists in an oil pump and a pressure intensifier. Owing to the fact that the latter's working is rather fierce, it is usually made use of a screw injector for fine adjustment (fig. 1bis).

A pipe can be connected to the generator or to the vessel by simply crushing steel on steel so that a very small ring-shaped surface of contact acting as a seal is given rise to. The steel is crushed because it has been tightened and the seal will remain tight, so long as the pressure does not exceed a limit which is determined by the tightening forces. This kind of connection is usually used with us and gives satisfaction up to 5 kb. It is obvious, that the hardness numbers of the pieces to be assembled must show not negligible differences.

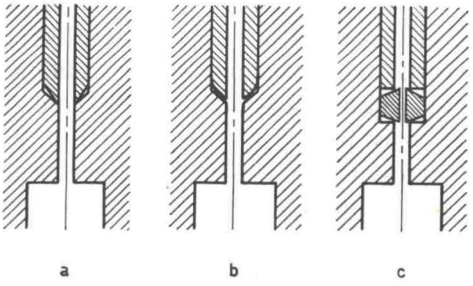

Fig. 2.

Figs. 2a–c show some executions of such a junction, the tightening means being omitted. The joint called "cone on cone" and shown by fig. 2a is a joint, which can most easily be executed by using hard steel grades which are very suitable to this purpose. If the pipe is made of stainless, steel, it may happen that it narrows by pinching. The pinching effect however, disappears when the pipe's end is rounded off (fig. 2b) or a lens-ring joint is inserted (fig. 2c).

In more difficult cases, self-sealing packings as the O-ring shown on fig. 3a, or the Bridgman's type of packing shown on fig. 3b, can always be used. In that case, the higher the pressure the tighter the seal. The O-ring, shown on fig. 3a and usually made of rubber can also be made of a metal particularly when it is used for working at a low or a high temperature. Its shape, usually circular, may be replaced by a triangular one so that said seal may be put into a housing, the shape of which is also a triangular one

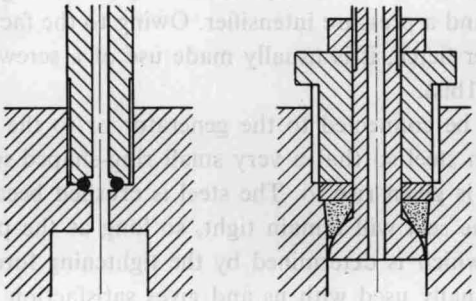

Fig. 3.

Such a seal is called a delta-ring. The wave-ring devised by MANNING [1933] may also be used. The great advantage, which can be taken of using it is that the assembly parts are not submitted to an additional axial thrust but only to lateral thrusts which are easily counterbalanced. The sole objection to using it is that it must be very precisely machined. Failing to do so, it would leak at a low pressure. We almost exclusively use the joint shown on fig. 3b when high temperatures are concerned.

One normally works with vessels as large-bored as possible into which one inserts small apparatuses. If electric signals must be detected or observations taken, the vessel must be provided with suitable electrical connections driven through it or with optical windows. Holes should not be made in the very wall of the cylinder and plugs should normally be provided with connections and windows, which are made tight by applying the same principles. The window shown on fig. 4a and the connector shown on fig. 4b have been made tight by means of a conical shape devised by Amagat. The conical block is not much used now, at least as far as windows are concerned, because it runs the risk of cracking, when the pressure is released. In fact, the steel plug returns to its initial shape and severely presses the