Apparatus with Sliding Anvils for the Production of High Pressures

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It is well known that in multianvil devices a distribution of stress can be realized which is particularly favourable for achieving very high pressures. However if one attemps to increase the useful volume of these devices, a decrease in the maximum pressure attainable is known to occur, resulting from partial gasket extrusion. The purpose of this communication is to describe a prototype operating without gaskets and therefore without the limitations due to their extrusion and still having the advantages of the previous devices. This prototype includes four anvils sliding against each other between two parallel flat anvils. As two of the anvils, with large end area, come closer to each other, the remaining two, with small end area move away from each other. The resulting reduction of the volume enclosed by the anvils yields the pressure increase. A calculation based on the assumption of plane strains suggests that pressures of 160 to 180 kbars could be reached with the tungsten carbides now available. Recent tests with the apparatus yielded very distinct transitions in bismuth at 25.4 and 27 kbars.