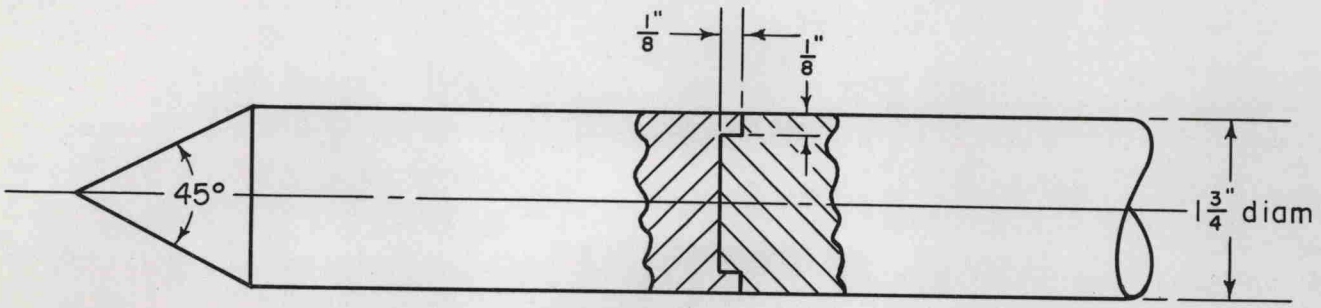
In a later attempt (No. 537) to HYDRAW a 1/4-inch-thick T-section to a 1/16-inch-thick T-section (a ratio of 4:1) the tab failed at the grip under a draw load of 500 lb before sufficient fluid pressure to cause extrusion-drawing was attained. The high draw load was intended to provide as high a draw stress (about 10,000 psi) as was reasonably possible with this arrangement, so that the fluid pressure requirements would be minimized. In the arrangement suggested previously, however, draw stresses even higher than 10,000 psi would be possible without point breakage. It is worthwhile noting that the tensile failure of the tab or point in Trial 537, occurred well away from the welded joint. Therefore, the technique of welding a lead or tab to the billet for HYDRAW seems to be sound.

XVIII

TANDEM EXTRUSION

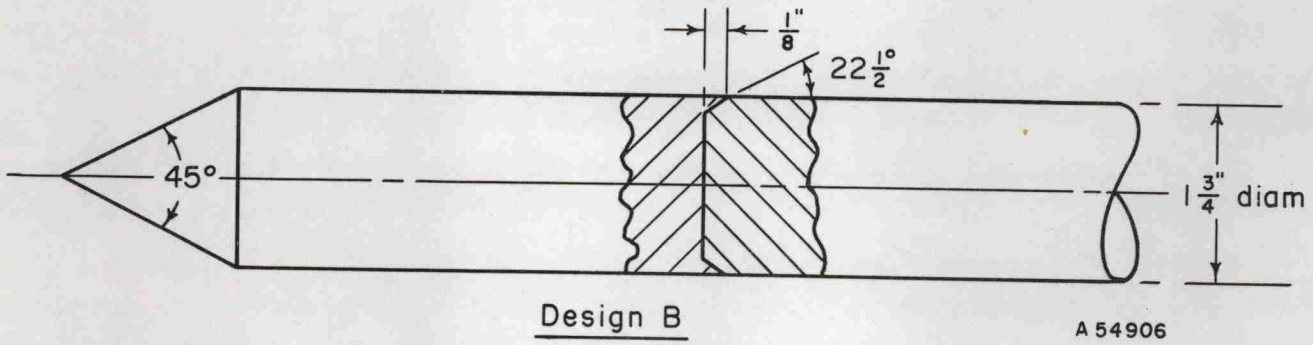
Tandem hydrostatic extrusion was carried out to determine the feasibility of stopping an extrusion, placing another billet on the back end of the first, and extruding them in sequence. This technique would be one of the possible means of achieving a high production rate of operation with the minimum of waste. It might result in cost savings by eliminating the need for machining a nose on every billet; only the starting billet would require this. The 7075-0 aluminum was chosen to evalute two tandem joint designs, Trials 453 and 454, respectively. Table XXXV gives the experimental data obtained with the designs.

The two methods of seating the second billet evaluated are shown in Figures 37 and 38. Design A is a counterbore fit and Design B is a taper connection. The extrusions were conducted at an extrusion ratio of 20:1 and stem speed of 20 ipm. Lubricant 53 and castor oil comprised the lubrication system, but the joint faces were not lubricated.



Design A

FIGURE 37. COUNTERBORED TANDEM BILLET JOINT DESIGN EVALUATED IN HYDROSTATIC EXTRUSION



Design B

A 54906

FIGURE 38. TAPERED TANDEM BILLET JOINT DESIGN EVALUATED IN HYDROSTATIC EXTRUSION

With Design A, Trial 453, the tandem joint extruded through the die satisfactorily without any discontinuity in the extrusion pressure curve. The shoulder in the female portion of Design A apparently gripped tightly around the mating surface and prevented the billets from separating. In contrast, with Design B, Trial 454, the second billet failed to extrude because of seizure in the die due to a lack of lubrication on the joint.