TABLE 4. Variation of Diametrical Shrinkage, Density, Transverse Rupture Strength, and Electrical Resistivity of Specimens with Volume Concentration of Plasticizer in Starting Blanks

<table>
<thead>
<tr>
<th>Amt. of plasticizer, vol.%</th>
<th>Diametrical shrinkage, %</th>
<th>Density, %</th>
<th>Transv. rupture str., MN/m²</th>
<th>Elec. resistivity, µΩ cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.0</td>
<td>12.3</td>
<td>97.0</td>
<td>450</td>
<td>58.0</td>
</tr>
<tr>
<td>37.5</td>
<td>12.8</td>
<td>98.0</td>
<td>500</td>
<td>58.0</td>
</tr>
<tr>
<td>40.0</td>
<td>15.0</td>
<td>93.5</td>
<td>130</td>
<td>67.0</td>
</tr>
<tr>
<td>42.0</td>
<td>16.0</td>
<td>93.5</td>
<td>170</td>
<td>67.0</td>
</tr>
<tr>
<td>45.0</td>
<td>19.0</td>
<td>96.0</td>
<td>480</td>
<td>56.0</td>
</tr>
</tbody>
</table>

Note: All the values in the table are averages.

LITERATURE CITED


PRESSING OF PARTS OF VARYING CROSS SECTION

G. S. Baryshnikov and A. G. Gryazev

In the manufacture of parts from powdered materials it is always necessary to bear in mind the need to reduce labor to a minimum, achieve a good surface finish and high dimensional accuracy, impart the necessary mechanical properties to blanks, and ensure that the shape of blanks approximates as closely as possible to that of starting parts. The majority of parts have cross sections varying along the axis of pressing. The extent to which the standard K-8130, K-0628, and K-0624 automatic presses can be employed for their manufacture is very limited, because with these machines it is difficult to attain an even density in such compacts and provide for their ejection. Recourse to additional machining increases costs and labor and decreases the coefficient of utilization of metal.

In this article a description is given of a method of producing powder blanks in the standard K-8130, K-0628, and K-0624 automatic presses, which have one lower punch, involving the addition of a second, moving punch for the purpose of obtaining considerable changes in compact cross section in the direction of pressing (Figs. 1 and 2). The method is particularly suitable for large-series and mass production. Different variants of this method can be employed for pressing parts with and without holes.

The pressing of parts of varying cross section without holes is shown diagrammatically in Fig. 1. During the filling of the die cavity with powder (Fig. 1a) the punch 1 is raised through a transition piece linked to a connecting rod and the piston of the central rod of the press, and controls the fill in the thin portion of the part. The fill height is regulated by an upper stop of the central rod. A second punch 2 is attached to the ejector of the press. The fill height above the punch 2 is regulated as is normally done with these presses.
Fig. 1. Pressing of part of varying cross sections without hole: a) filling; b) pressing; c) ejection.

Fig. 2. Pressing of part of varying cross section with hole. Designations as for Fig. 1.

In the course of pressing (Fig. 1b) the upper punch 3, which is mounted on the pressing head of the press, exerts pressure on the powder above the punch 1 and the punch 1 itself. The pressure is transmitted to the air in the cylinder of the central rod of the press. The downward movement of the punch 1 compresses the air. At the same time the powder above the punch 2 fills the free volume in the upper punch 3. At the end of pressing the punch 1 comes into contact with the ejector of the press. Ejection is performed simultaneously by two punches. After the compact has been pushed aside, the ejector of the press together with the punch 2 is lowered to its starting position, while the punch 1 is raised to its starting position for filling with powder.

This method is being successfully employed in large-series production, in K-8130 automatic mechanical presses, of parts characterized by considerable changes in cross section in the direction of pressing.

For pressing parts of varying cross section with holes (Fig. 2a) a rod 4 with a moving hole-shaping punch 1 is provided. During filling the punch 1 rests on compensating disks 5.