

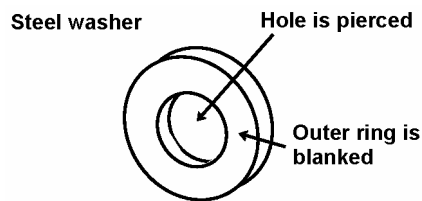
COMMERCIAL PRODUCTION

Blanking and Piercing

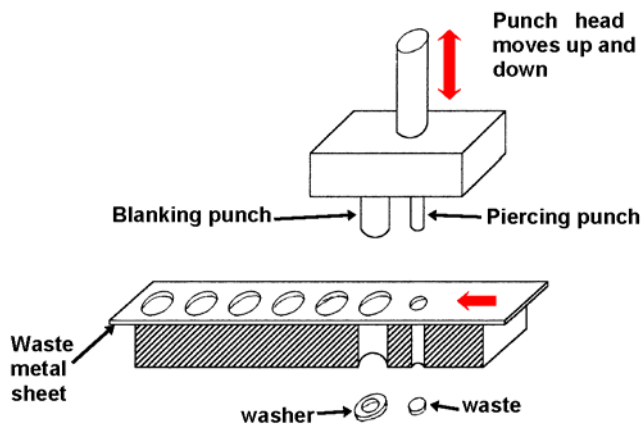
Blanking and piercing are useful processes for producing identical small metal parts such as washers, for use with nuts and bolts. The processes are normally automated and one machine can turn out more than 1,000 washers per hour.

Piercing is when a press is used to cut holes of any shape out of a sheet of metal. The part cut out is waste.

Blanking is when a press is used to cut out a shape that is to be kept and used. The sheet of metal that it has been cut from is the waste.

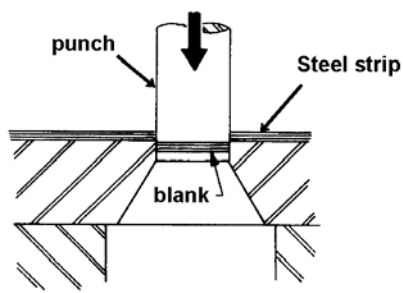


A Blanking and Piercing Press



The steel strip is moved forward one position each time the punch head moves up. Each downward stroke of the punch produces one washer and one piece of waste.

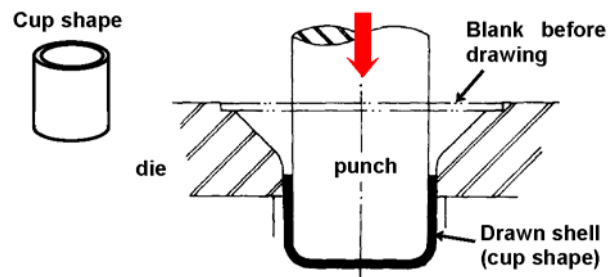
A section view of the Blanking process



Presswork

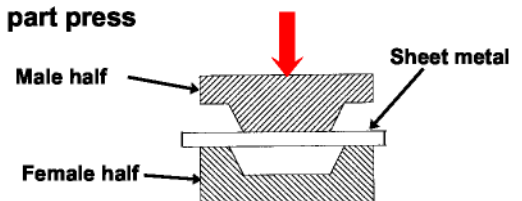
Shaping sheet metal by pressing it gives a rigid and tough shell structure. Pressure can be applied by a hydraulic ram.

Drawing a metal cup shape

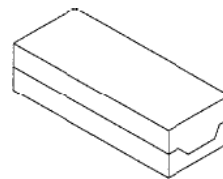


Pressing a channel shape

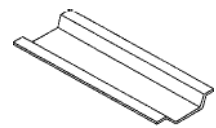
Two part press



3D view of press

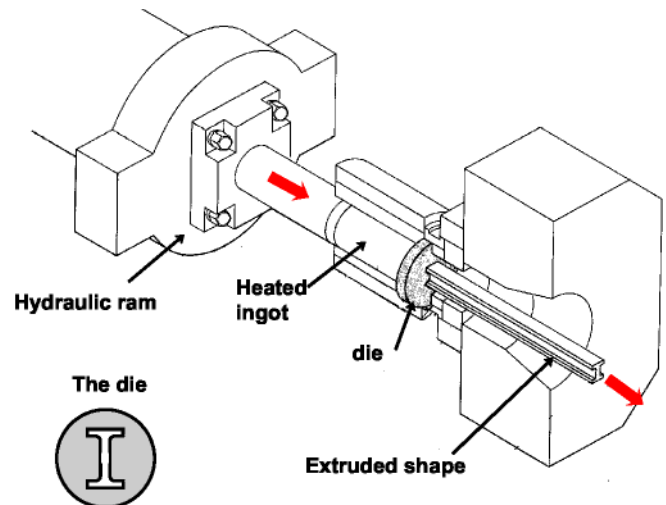


Finished channel shape



Extrusion

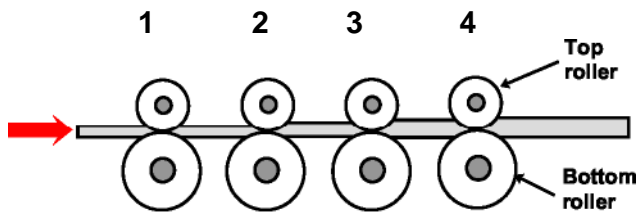
An ingot of metal is heated until it is soft. A hydraulic ram then forces the metal through a shaped hole in a die. This process can produce long lengths of the same shape, e.g. aluminium roof guttering can be produced to the length required (no leaky joints).



Rolling

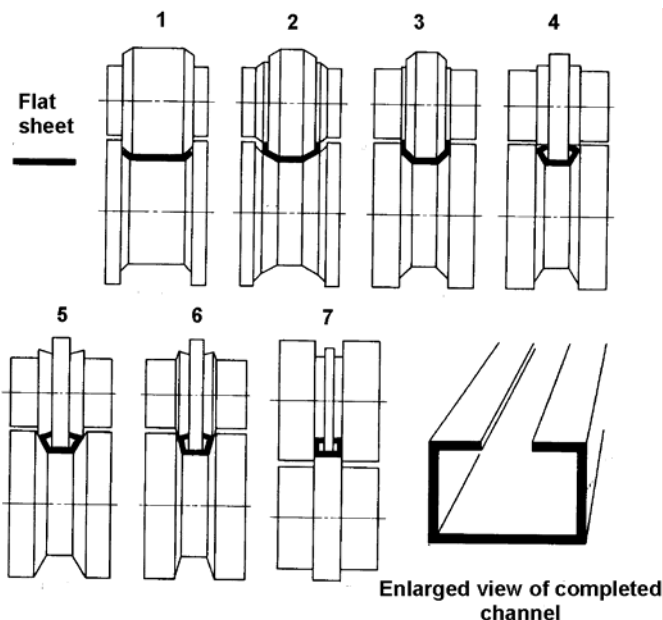
Cold rolling is a process in which a flat strip of metal is passed through a series of rollers that progressively change it into its final shape. Each set of rollers alters the shape a little bit.

The first four of the seven sets of rollers used for making the channel shape are shown below.



Enlarged view of completed channel

A view of each roller in the series, showing how the shape is progressively changed, in seven stages, from a flat sheet to the channel shape.



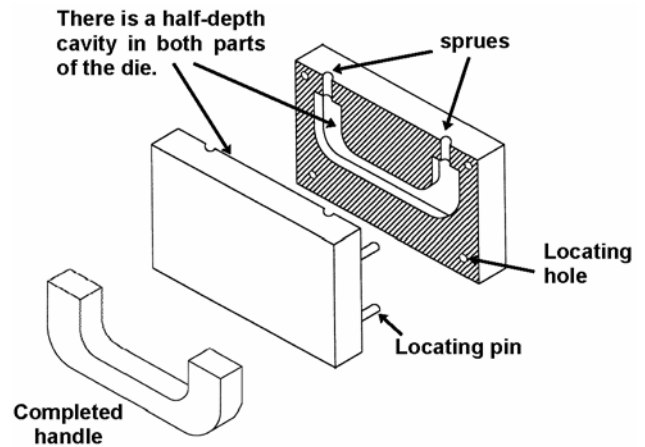
Die Casting

Where large numbers of identical components are required, sand casting is not appropriate because the mould has to be broken up each time. Die casting is a method using a permanent mould (called a die). The moulds are made of tough alloy steel and are split into two or more parts to allow the casting to be removed.

The holes to allow the molten metal into the die (the sprues) are normally too small for metal to fall through under gravity. A ram system is normally used to force the metal in under pressure, so the system is often known as **Pressure Die Casting**.

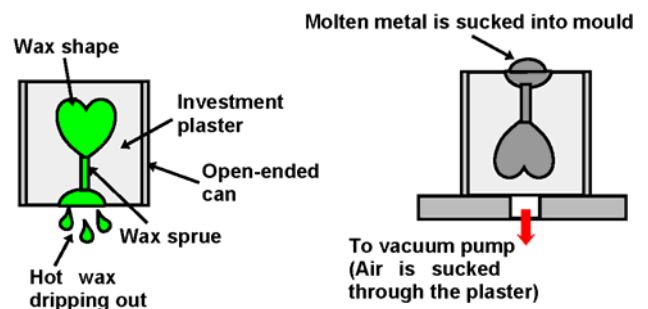
This method is normally automated and can produce over 100 castings per hour.

A two piece die for casting an aluminium handle

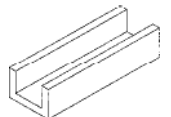


Lost Wax Casting (Investment Casting)

This is a very accurate method of casting small items from jewellery to aircraft engine parts. **1.** The shape required is formed in wax. **2.** The shape is then covered in plaster (called investment). **3.** When the plaster is set it is placed in an oven so that the wax can melt and drip out, leaving a cavity of the same shape (the wax is lost). **4.** Molten metal is then forced in and sets. **5.** Finally the plaster is broken off leaving a very accurate casting behind.



1. What is the difference between Blanking and Piercing in presswork?
2. Illustrate an example of blanking.
3. Show how a metal cup shape can be made without a seam.
4. Illustrate **two** different ways of making a flat steel strip into the shape shown below.
5. The diagram below shows the cross-section of a length of aluminium roof guttering, 8 metres long. Explain how the guttering can be manufactured.
6. Which casting system is most suited for making a large number of identical components and why?
7. Which is the most accurate method of casting?



KEY WORDS Blanking: Piercing: Punch: Press: Extrusion: Rolling: Die casting: Lost Wax:

Worksheet 32b