July 31, 1934. L. I. YEOMANS 1,968,792

PROCESS OF MANUFACTURING FLANGED BODIES

Filed July 25, 1930

Fig. 1.

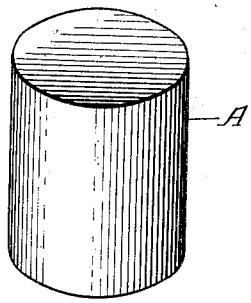


Fig. 2.

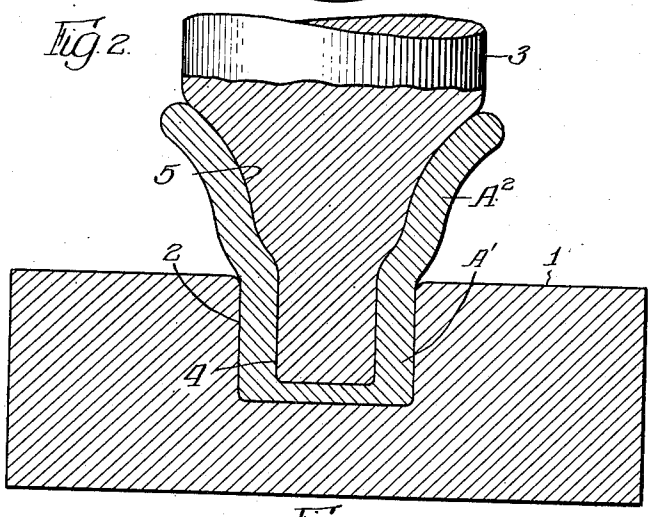
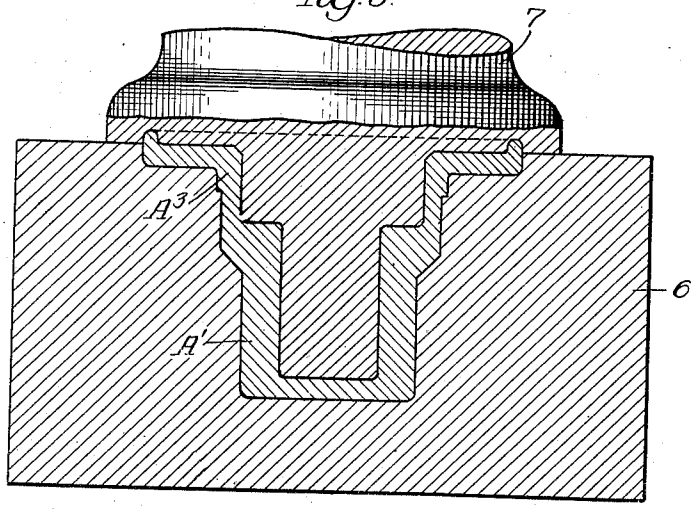


Fig. 3.



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PROCESS OF MANUFACTURING FLANGED BODIES

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Application July 25, 1930, Serial No. 470,548

2 Claims. (Cl. 29—148.2)

This invention relates to the manufacture of flanged bodies such as shaft flanges, pipe flanges, bodies for couplings and universal joints and the like, and its object is to provide a method of making such bodies which economizes in material and labor and which may be carried out with relatively inexpensive appliances.

The invention is primarily intended to utilize the known fact that metals when raised to high temperature become relatively plastic and are susceptible of deformation and extrusion as pressure is applied under certain favorable conditions.

In the accompanying drawing:

Figure 1 is a perspective view of a blank which is to be formed into a flanged body.

Fig. 2 is a sectional view showing the blank as having been forged between a die and a plunger.

Fig. 3 shows the intermediate body illustrated in Fig. 2 as having been formed into the desired flanged body by means of two dies.

In practicing the invention in the most desirable manner, a solid metal rod, billet or bar of any desired cross-sectional form is cut to lengths which provide a weight of metal sufficient to produce the finished part with some slight surplus, as, for example, the cylindrical blank A shown in Fig. 1. After having been heated to a temperature at which it becomes plastic, it is placed in a die 1. Preferably, although not necessarily, the die 1 is of such interior form as to impart to the blank a portion of the form which is desired in the finished product. Herein I have shown the die 1 as consisting of a simple block of metal having a plain cylindrical recess 2 therein which is the counterpart of a portion of the exterior of the completed forging. The blank A is of suitable diameter to fit within the recess 2 and is of such length as to project out of the recess. 3 is a punch the lower or operating end 4 of which is preferably of such size and form as to impart to the blank in part the interior form which the finished forging is to possess. The portion of the punch above the part 4 may be of any desired shape adapted to flare the metal of the blank outwardly and so that, in the final or advanced position of the punch, it is spaced away from the die 1 so that the metal thus flared out shall not be confined by the die. When the punch 3 is driven into the die 1 the metal of the blank flows into conformation with the recess 2 and outwardly along the punch, thus producing an intermediate or semi-finished flanged body A' which has in part a final form and which comprises an extruded portion A^2 which is not in contact with the die 1 and hence is not robbed of heat through contact with the die.

In the manufacture of some flanged bodies the operation of the punch and die does not cool the intermediate body sufficiently to reduce its plasticity below the point where it can be properly subjected to subsequent forming operations, but in those instances where the intermediate body has lost plasticity it is reheated.

The intermediate body A', A^2 is then subjected to another forming operation between dies 6 and 7 whereby the extruded portion A^2 is forged into a flanged portion A^3 of the finished portion. Any excess metal extruded between the dies 6 and 7 in the form of a fin or flash is removed in the usual or any desired manner.

It will be understood that in some instances the flanged body to be produced is of such formation that the intermediate body A', A^2 must be subjected to a plurality of forming operations between dies.

In whatever manner the final form is produced, the invention contemplates that in one or more of the steps the plastic metal shall flow freely and out of contact with one or the other of the forming members so that true extrusion rather than forging in a confined die space occurs.

In many instances it will be necessary to pierce, blank or trim the final product.

It will be noted that the die members 1 and 3 are of comparatively simple form and therefore are relatively inexpensive to produce and more durable than die members of complex form.

It will also be seen that by extruding the metal into an unconfined space the metal does not cool as rapidly as it otherwise would and that the die member 1 is not subjected to the destructive action of the hot extruded metal.

There are numerous advantages in starting with a plain cylindrical blank as compared with a flat blank or one punched from sheet metal, as there is a saving in the cost of dies for producing the blank, avoidance of waste in cutting the blank from the sheet, and saving of labor in the various preliminary operations.

I claim as my invention:

1. The process of forming a flanged body such as shaft flanges, pipe flanges and bodies for couplings and universal joints from a blank which consists in heating the blank, placing the heated blank in a die having a recess from which the blank projects, subjecting the blank to the action of a punch having an outwardly flared upper portion which imparts the final form to the portion of the blank within the recess and which

extrudes metal from said recess outwardly along the outwardly flared portion of the punch beyond the influence of the die, and subjecting the intermediate body thus produced to pressure between other forming members to impart the desired form to said extruded portion.

2. The process of forming a flanged body such as shaft flanges, pipe flanges and bodies for couplings and universal joints from a billet-like blank which consists in heating the blank, placing the heated blank in a die having a recess from which the blank projects, forcing a punch into said blank and into said recess, whereby some of the metal of the blank is flared outwardly along the punch and beyond the influence of the die, and subjecting the intermediate body thus produced to pressure between other forming members to impart the desired form to said flared portion.

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