UNITED STATES PATENT OFFICE

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METHOD OF AND MEANS FOR HANDLING STOCK


This invention relates to a method of and means for handling bar stock such as is fed to forging machines. These machines include gripper dies which clamp on the stock and hold it while the heading or forging die upsets or otherwise shapes the stock.

As is known to those skilled in the art it is essential, when producing forgings from bar stock, that the stock be gripped along a length thereof approximately equal to three or more diameters of the stock. Therefore, it will be obvious that when the end of the used bar is grasped by the grippers during the formation of the last forging produced from the bar, there remains in the machine a length of unused metal approximately equal to or greater than three diameters of the stock. This metal has been discarded.

It is an object of the present invention to provide a means whereby practically the entire length of the bar stock can be used in the production of forgings while, at the same time, the stock can be properly gripped and held in accordance with the rule hereinbefore stated.

Another object of the invention is to provide tongs of novel construction adapted to grip one end of a bar of stock and to be fed between the grippers with the engaged end portion of the stock so that said portion of stock will be held properly positioned for correct shaping by the dies of the machine.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in certain novel steps in the method of handling bar stock and in the novel construction and arrangement of parts hereinafter more fully described and pointed out in the claims, it being understood that modifications of the method and of the structure of the apparatus used can be made within the scope of the present invention as claimed.

In the accompanying drawings the means for handling the bar stock and the several steps of the method have been illustrated.

In said drawings,

Figure 1 is an elevation of a gripper and a header cooperating therewith for completely forging an article in four passes, the end portion of a bar of stock being shown held in the first step of the gripper by a tong forming a part of the present invention.

Figure 2 shows the stock and the tongs in engagement therewith positioned in the first step of the gripper following the action of the first header tool.

Figure 3 is a similar view showing the parts positioned following the second shaping of the stock at the second step.

Figure 4 is a view showing the stock following the shaping thereof at the third step.

Figure 5 shows the stock held in the fourth step preparatory to being pierced and sheared by the piercing tool of the header.

Figure 6 shows the stock after the shaping thereof has been completed by piercing and shearing.

Figure 7 is a transverse section through the two grippers showing the relative positions of the parts following the completion of the forging, this section being taken on the line 7—7, Figure 6.

Figure 8 is a plan view showing the tongs in engagement with the end of a piece of bar stock.

Referring to the figures by characters of reference, 1 and 2 designate opposed gripping dies having rear stock receiving cavities or depressions 3 opening at one end into front cavities or pockets indicated generally at 4, 5, 6, and 7. Heading tools indicated at 8, 9, 10, and 11 are adapted to work within the respective pockets for the purpose of upsetting and shaping the end portion of a bar of stock indicated at A. This bar is adapted to be placed successively in the different pockets so that after passing through the several steps of the forging operation a com-
pleted article will be delivered from the machine. The method of producing the article does not constitute any part of the present invention.

Therefore it has been necessary to discard as scrap a considerable length of stock on the end of a bar from which forgings have been made. This has been due to the fact that it has been necessary to grasp the end of the bar with tongs, and between the tongs and the point at which the forging is made there must be a length of gripper die approximately equal to three or more diameters of the stock. This is essential in order that the stock may be properly held during the forging operation.

It is one of the objects of the present invention to reduce the amount of stock which must be scrapped. To effect this saving it is essential that one end of the stock be reduced in diameter so as to form a projection or stud B. This stud can be formed by placing one end of the stock between the dies 1 and 2 where suitably shaped pockets 12 have been provided or by shaping the end of the stock with a hammer or other means.

For the purpose of handling the stock specially constructed tongs are used. Each pair of tongs has the usual pivotally connected arms 13 and from each arm is extended a semi-cylindrical elongated jaw 14. These jaws, when pressed together, provide a structure the external diameter of which is equal to the external diameter of the stock A.

The jaws have registering recesses 15 and the reduced end of the stock is adapted to be gripped tightly by these recessed portions. Thus when the tongs and stock are assembled, the outer surface of the gripping portion of the tongs will constitute, substantially, a continuation of the outer surface of the bar of stock.

After the hot bar of stock has been initially shaped by reducing one end thereof, said end is grasped by the tongs and the stock is then positioned between the gripping dies 1 and 2, it being placed successively in the different steps where the stock will be successively acted on and shaped by forging.

After one article has been produced in this way the bar is fed forwardly and moved through the successive steps of the forging operation until another article is completed. This operation is continued until slightly more than enough metal is left to produce one object by the forging operations. At this time, when the stock is placed between the dies 1 and 2, the tongs will also be positioned between the dies and when the dies are brought together, they will grip both the stock and the tongs. The stock may be carried by means of the tongs from one step to the other following the respective forging operations and when the stock is finally brought to the last stage where the pocket 7 is provided, the small amount of surplus stock is sheared off as shown in Figures 5 and 7 by means of a shear indicated generally at 16 and, if desired, the stock may be pierced to complete the formation of the forged article as shown in Figure 7. When the surplus metal is sheared from the last forged article it will remain gripped between the jaws of the tongs as shown in Figures 7 and 8 and can be removed readily from the machine. It will be apparent that by providing tongs such as described the amount of waste is reduced to the minimum because the jaws of the tongs take the place of the length of stock that would otherwise be required to prevent the stock from slipping through the grippers while the stock is being forged.

While the tongs described may be used advantageously in connection with forgings that are sheared from the bar, it is particularly useful in connection with forgings that are punched from the bar, the wad removed by the punching operation being retained as a part of the bar for use in the formation of the next succeeding forging.

What is claimed is:

1. The combination with a forging machine including dies having recessed portions for receiving and gripping a bar of stock, of tongs including jaws forming a gripping structure for engaging a reduced end of said bar of stock, said structure being equal in diameter to that portion of the stock projecting therefrom, said tongs being movable into and adapted to be gripped by the said recessed portions of the dies to prevent the gripped stock from slipping during a forging operation.

2. The combination with a forging machine including dies having recessed portions for receiving and gripping a bar of stock, of tongs including jaws forming a gripping structure for engaging a reduced end of said bar of stock, said tongs being movable into and adapted to be gripped by the said recessed portions of the dies to prevent the gripped stock from slipping during a forging operation.

3. A machine for shaping short metal blanks including opposed gripping dies having separate groups of communicating front and back cavities, a tongs including jaws for gripping the back end of a blank to be shaped, said jaws being removably seated in the back cavity of any one of said groups and gripped by the dies, thereby to hold a gripped blank with one end within the front cavity of said group, and means cooperating with the gripping dies for shaping the held blank in the front cavity in which it is located.

4. The method of forging a short blank which includes the steps of reducing the back end of the blank, housing said end in a separate extension of the blank, then gripping the extension to hold it against movement, and
finally shaping the front end of the blank within the gripping means.

5. The method of forging a short blank which includes the step of gripping the back end of the blank in a tongs, clamping the tongs successively in separate shaping cavities, and shaping the front end of the blank in said cavities one stage nearer completion every time the tongs is seated in one of the cavities.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

JOHN HENRY FRIEDMAN.