Aug. 13, 1929. H. G. STODDARD 1,724,323

METHOD OF PREPARING STEEL BILLETS FOR FORGING

Filed Dec. 21, 1927

Fig. 1.

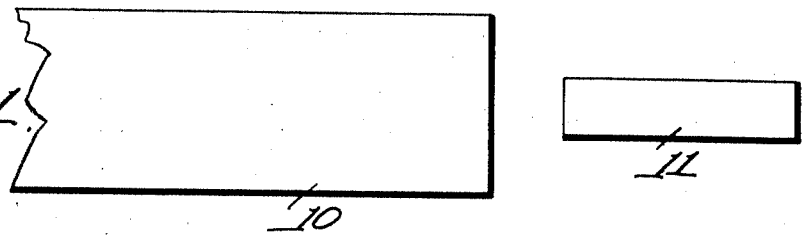


Fig. 2.

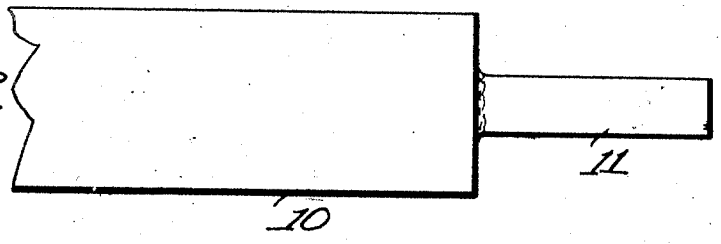


Fig. 3.

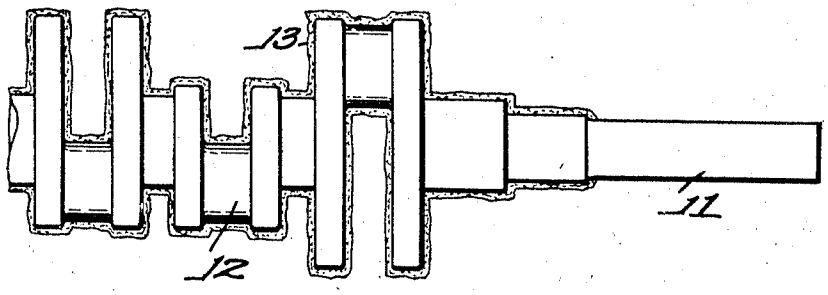


Fig. 4.

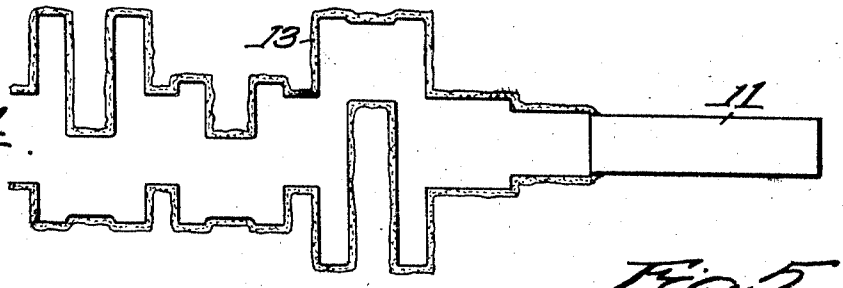


Fig. 5.

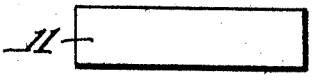
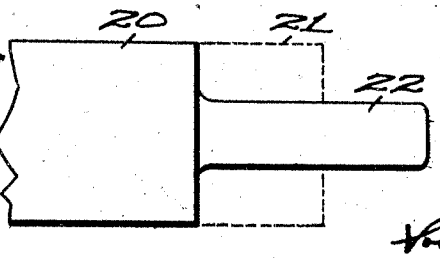


Fig. 6.



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UNITED STATES PATENT OFFICE.

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METHOD OF PREPARING STEEL BILLETS FOR FORGING.

Application filed December 21, 1927. Serial No. 241,660.

This invention relates to a method of procedure pertaining to the manufacture of crankshafts or other similar products direct from steel billets. The object of the invention is to provide a new and improved method of preparing a steel billet for forging operations under a drop hammer or other mechanism.

In such forging operations as heretofore practiced, it has been necessary to provide a billet of substantially greater length than the finished article, to pre-heat one end of the billet, and to subject the heated end to the operation of a drop hammer by which the end of the billet would be drawn out and reduced to a size convenient for use as a "tong piece" during subsequent operations. This preliminary heating accomplished no other useful purpose and a substantial amount of high grade forging stock was wasted in providing a temporary tong piece by this old method.

My invention consists primarily in providing an improved method of preparing a billet for forging, by which method the waste of expensive material is avoided and by which the special preheating operation is rendered unnecessary.

The preferred steps of carrying out my improved method are shown in the drawings in which

Fig. 1 shows a portion of a billet and a tong piece as separate elements;

Fig. 2 shows the same parts united, as by a butt-welding operation;

Fig. 3 is a plan view of a portion of a crank shaft forged from the billet;

Fig. 4 is a plan view showing the tong piece and a portion of the "flash" trimmed from the crankshaft;

Fig. 5 shows the tong piece recovered from the flash; and

Fig. 6 is a diagrammatic view showing the advantages of my procedure.

Referring to the drawings, I have indicated in Fig. 1 a portion of a steel billet 10 and a tong piece 11. The billet 10 is of high grade forging stock, usually square in section, and the tong piece 11 may be of any grade of steel stock, such as a piece of low grade cold rolled bar or rod, and is usually of much less diameter.

In the usual practice, the tong piece will be an inch and a quarter or an inch and a half in diameter, while the billet will run from three and a half to five inches square, or larger. The billet 10 is cut of substantially the length required to produce a finished forging, and the tong piece is of any desired length, commonly about eight inches.

Having provided the billet 10 and tong piece 11 as above described, these parts are firmly secured together, preferably by a butt-welding operation which may be conveniently performed in an electric welder.

The exact method of uniting the parts is not essential, provided the tong piece is secured to the end of the billet in such a manner that it will not be loosened or displaced during the heating of the billet for forging. It is not necessary, either, that the securing or welding be performed with any great care, as the tong piece is used only temporarily and no great damage is incurred if an occasional tong piece should become loosened or displaced.

After the billet has been heated to the forging temperature, the operator manipulates the billet by means of tongs which grip the tong piece, and is thus able to guide the billet from the furnace to the press or hammer, and to turn and otherwise manipulate the billet under the hammer during the forging operation.

After being forged, the parts assume somewhat the appearance indicated in Fig. 3, with the tong piece 11 still attached and with the billet transformed into a partially finished crankshaft 12, surrounded by a thin fin or web of metal 13 which is extruded between the dies and is commonly known as the "flash".

The partially formed shaft is then placed in a trimming press where the flash 13 and tong piece 11 are removed as indicated in Fig. 4. The flash is then trimmed from the tong piece 11, leaving the tong piece substantially in its original condition and adapted for repeated use on successive billets.

By this simple procedure, I have substantially reduced the expense of forging billets and in particular I have avoided the loss of expensive high grade forging stock which took place under the previous procedure, the saving in stock being indicated diagrammatically in Fig. 6. The billet 20 previously used was necessarily prolonged to pro-

longed to provide an end portion, indicated in dotted lines at 21, from which an integral tong piece 22 could be forged. All of the high grade stock in the portion 21 was entirely wasted, as it formed no part of the finished article, whereas by my improved method the billet is shortened by the amount of the end portion 21. The tong piece 11 may be of relatively cheap low grade material which is not only substituted for the high grade stock, but may itself be used repeatedly.

It will be understood that my improved method is also applicable to the production of forgings from bars of steel, as well as from billets direct.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed otherwise than as set forth in the claims, but what I claim is:—

1. The method of preparing a billet or bar for forging which consists in providing a billet or bar of substantially the length required for a finished forging, providing a separate tong piece of relatively low grade stock and of much less diameter than said billet or bar, and securing said tong piece to said billet or bar before forging operations are performed on said billet or bar, said tong piece being secured in such manner that it will not be loosened from the billet or bar by application of a forging heat thereto.

2. The method of preparing a billet or bar for forging which consists in providing a billet or bar of substantially the length required for a finished forging, providing a separate tong piece of relatively low grade stock and of much less diameter than said billet or bar, and butt-welding said tong piece tc said billet or bar before forging operations are performed on said billet or bar.

3. The method of preparing a billet or bar for forging which consists in providing a billet or bar of substantially the length required for a finished forging, providing a separate tong piece of relatively low grade stock and of much less diameter than said billet or bar, butt-welding said tong piece to said billet or bar before forging operations are performed on said billet or bar, thereafter removing said tong piece with the flash of the forging, and trimming the flash therefrom, thus conserving the tong piece for repeated use.

4. The method of preparing a billet or bar for forging which consists in providing a billet or bar of substantially the length for a finished forging, providing a separate tong piece of suitable dimensions for a tong hold, and securing said tong piece to said billet or bar before forging operations are performed on said billet or bar.

In testimony whereof I have hereunto affixed my signature.

HARRY G. STODDARD.