Dec. 8, 1925. 1,565,052

N. K. BOWMAN

METHOD OF PRODUCING MINING MACHINE BITS

Filed March 12, 1924

Fig. 1.

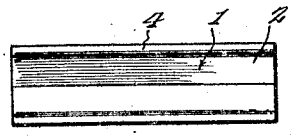


Fig. 2.

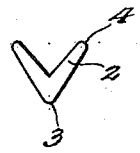


Fig. 3.

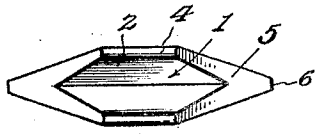


Fig. 4.

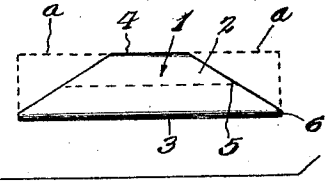


Fig. 5.

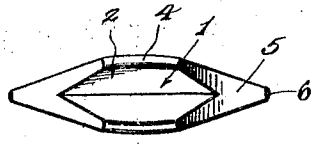
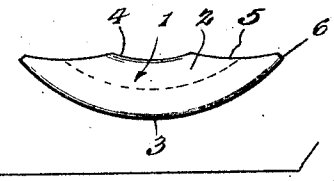


Fig. 6.



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By

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UNITED STATES PATENT OFFICE.

NEWTON K. BOWMAN, OF BOWDIL, OHIO.

METHOD OF PRODUCING MINING-MACHINE BITS.

Application filed March 12, 1924. Serial No. 698,695.

To all whom it may concern:

Be it known that I, NEWTON K. BOWMAN, a citizen of the United States, residing at Bowdil, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Methods of Producing Mining-Machine Bits, of which the following is a specification.

This invention relates to an improved method of producing mining machine bits of substantially the type disclosed in my Patent No. 1,462,681, issued July 24, 1923. Bits of this type are substantially V-shaped in cross section and comprise an arcuate back, a more or less arcuate intermediate base portion, and terminal portions which constitute the cutting teeth and the faces of which are more or less concave, the points of the teeth being relatively blunt. In producing such bits the original method of procedure was to diagonally shear the corner portions of the wings of a substantially V-shaped blank and then shape the partially formed bit by subjecting it to the action of a die press. The bit being then of proper form, was tempered and thus made ready for use. Before the tempering operation it was always found necessary to file or otherwise dress the faces of the teeth of the bit owing to the fact that because of the shear cutting of the corner portions of the wings of the original blank, the edges of the wings at the faces of the teeth were found to occupy planes diverging in the direction of the back of the respective tooth, whereas it is necessary that the faces of the teeth be so formed as to present a common curvilinear surface. Therefore, it is the primary object of the present invention to evolve a method by which such bits may be produced without the necessity of resorting to the filing step, thus effecting a saving equal practically to the cost of performance of all of the other steps combined as well as the cost of the material. In this connection the invention further contemplates a method of producing the teeth which method will eliminate the time and labor involved in shearing off the corners of the wings of the initial blank.

Another object of the invention is to evolve a method of producing such bits by which method the extremities of the teeth will be formed more or less blunt, without resorting to any individual step to produce this result, the formation of a somewhat blunt terminal being desirable inasmuch as it has been found in actual practice that a sharp terminal will be broken off upon contact with the coal being cut.

In the accompanying drawings:

Figure 1 is a plan view of the initial blank employed;

Figure 2 is an end elevation thereof;

Figure 3 is a view similar to Figure 1 illustrating the first step in the method of producing the bit;

Figure 4 is a view in side elevation illustrating the manner in which this step is carried out and the partially formed bit shown in Figure 3 is produced and likewise illustrating the manner in which the blunt extremities of the teeth of the bit are produced;

Figure 5 is a view similar to Figure 3 illustrating the completed bit;

Figure 6 is a side elevation of the completed bit and illustrating the same in the form which it will assume following the second step of the method.

The first step in the method of embodying the invention comprises producing blanks of the form shown in Figures 1 and 2 of the drawings from which the bits are to be formed by the succeeding steps of the method. The blanks are produced by cutting off predetermined lengths of a bar or strip of angle iron material and by reference to said Figures 1 and 2 it will be observed that the blank, which is indicated in general by the numeral 1, comprises two angularly disposed wings indicated by the numeral 2, the back of the blank at the juncture of the wings being somewhat rounded, as indicated by the numeral 3, and the longitudinal edges of the wings being likewise rounded transversely as indicated by the numeral 4. It will further be observed by reference to Figure 2 that each wing is of gradually decreasing thickness from its juncture with the other wing to its rounded longitudinal edge 4, so that the blank is of maximum thickness at the juncture of its two wings, thereby locating the greater mass of material at the point which is to receive the greatest strain. The blanks are cut from the length of material on lines at right angles to the line of extent of the said length of material so that each blank has both of its ends blunt and straight or flat.

As previously explained, it was the original practice, in forming up the bit from the blank such as shown in Figures 1 and 2, to diagonally shear the corners of the wings 2, but for the reason previously given, this was found to be an unsatisfactory method of procedure inasmuch as it necessitated a step of filing or similar dressing the faces of the teeth which was an expensive step in the manufacture of the article. In order to avoid this step of filing and incidentally save the time and labor incident to its carrying out, the invention contemplates, as the next step in the method, diagonally scoring or otherwise cutting the blank at the valley side thereof. The dotted lines indicated by the reference letter *a* in Figure 4 of the drawings illustrate, in conjunction with the diagonal faces 5, the outline or contour of that portion of the blank which is removed by the cutting step. This cutting step may be performed in various ways, as, for example, by a jig saw to which the blanks shown in Figures 1 and 2 may be fed, first one end foremost and then the other end foremost, and at such angle as to effect a a severance of the corner portions of the wings of the blank along a line to produce the inclined end faces 5. By reference to Figure 4 of the drawings it will be observed that the relatively adjacent ends of the cuts made in the blank are located at points equidistantly spaced from the longitudinal middle of the edge 4 of each wing of the blank and extend to a point, at their other ends, spaced a short distance from the ridge or back 3 of the blank with the result that the extremities of the partially finished article are, during this cutting step, rendered more or less blunt as indicated by the numeral 6, this having been found preferable to the formation of a sharp point owing to the fact that through experience it has developed that a sharp edge will break off thus rendering the bit unfit for use whereas a dull point will offer greater resistance and will not be liable to breakage and will, on the other hand, after a short period of use, become sharpened to an extent to adapt it to most effectually perform its function without any liability of breakage.

The next step in the method resides in placing the partially finished bit shown in Figures 3 and 4 in a die press, the cooperating die members of which are so formed as to impart to the article the form shown in Figures 5 and 6 of the drawings. More specifically the press is so designed that when operated the blank shown in Figures 3 and 4 will be given the arcuate form shown in Figure 6, the ridge or back 3 being curved continuously from end to end on the arc of a circle, and the intermediate portions of the edges 4 of the wings 2 being likewise longitudinally curved and on an arc concentric to the arc of curvature of the said back or ridge 3. The face portions 5 are, during this operation, given a concave form as shown clearly in Figure 6 and it will be evident by reference to this figure and Figure 5, that all portions of the area of each face portion 5 lie in a common curvilinear surface and that no dressing of the faces either by filing or otherwise is required. That this is true is due to the fact that the ends of the blank shown in Figure 1 are cut diagonally and the surfaces thus formed each occupy a common plane or, in other words, each surface is flat and disposed in a plane diagonal to the back 3 of the blank and the edges 4 of the wings 2 thereof, and, when the partially finished article is formed up in the die press, the flat character of these faces will be altered and they will assume a curvilinear form of uniform character throughout.

The final step in the method comprises tempering the bits thus produced and in carrying out this operation, the bits, at a temperature of approximately 1700° F., are plunged into an oil bath and, after removal from the bath, are next plunged into a lead bath at a temperature of approximately 450° F., and after removal from this bath are permitted to cool and are ready for use.

It will be understood that the initially produced blank shown in Figures 1 and 2 of the drawings is of untempered iron and that therefore the steps of cutting off the ends of the blank to provide the diagonal faces 5, and the die press forming of the blank, may be carried on with facility.

Having thus described the invention, what is claimed as new is:

1. The method of producing a mining machine bit from a blank having relatively angularly disposed wings, which comprises diagonally cutting off an end of the blank to produce a flat face diagonal to the back of the blank and the longitudinal edges of the wings, and forming the blank, including the said face thereof, to longitudinally curvilinear form.

2. The method of producing a mining machine bit from a blank having relatively angularly disposed wings, which comprises diagonally cutting off an end of the blank to produce a flat face extending on a line from a point in the length of the edges of the wings of the blank to a point at the said end of the blank spaced a relatively short distance from the back of the blank, and forming the blank, including the said face thereof, to longitudinally curvilinear form.

3. The method of producing a mining machine bit from a blank of untempered material having relatively angularly disposed wings, which comprises diagonally cutting off the ends of the blank to produce flat faces oppositely inclined and diagonal to

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the back of the blank and the longitudinal edges of the wings, forming the blank, including the said faces thereof, to longitudinally curvilinear form, and tempering the completed blank.

4. The method of producing a mining machine bit from a blank having relatively angularly disposed wings, and a longitudinally ridged back, which comprises diagonally cutting off the ends of the blank along lines extending from points equi-distantly spaced from the opposite ends of the longitudinal edges of the wings and extending to the respective ends of the blank at points spaced inwardly from the said ridged back thereof a relatively short distance, whereby to produce flat faces diagonal to the ridged back of the blank and the longitudinal edges of the wings, and forming the blank, including the said faces thereof, to longitudinal curvilinear form.

5. The method of producing a reversible mining machine bit from a blank having a ridged back, which comprises diagonally cutting off the ends of the blank to produce flat working faces diagonal to the said ridged back, and forming the blank to longitudinally curvilinear form.

6. The method of producing a mining machine bit from an open-sided blank, which comprises diagonally cutting off an end of the blank to produce a flat working face extending diagonally between the said open side of the blank and the opposite side thereof, and forming the blank to longitudinally curvilinear form.

7. The method of producing a mining machine bit from a blank which comprises diagonally sawing off an end of the blank to produce a flat working face extending diagonal to one side of the blank, and forming the blank, including the said face thereof, to longitudinally curvilinear form.

8. The method of producing a mining machine bit from a blank which comprises diagonally cutting off an end of the blank to produce a flat working face extending diagonal to one side of the blank, and forming the blank to longitudinally curvilinear form.

In testimony whereof I affix my signature.

NEWTON K. BOWMAN.