(Model.)

# J. R. MANN.

## EDGE TOOL.

No. 561,409. Patented June 2, 1896.

Fig. IV.

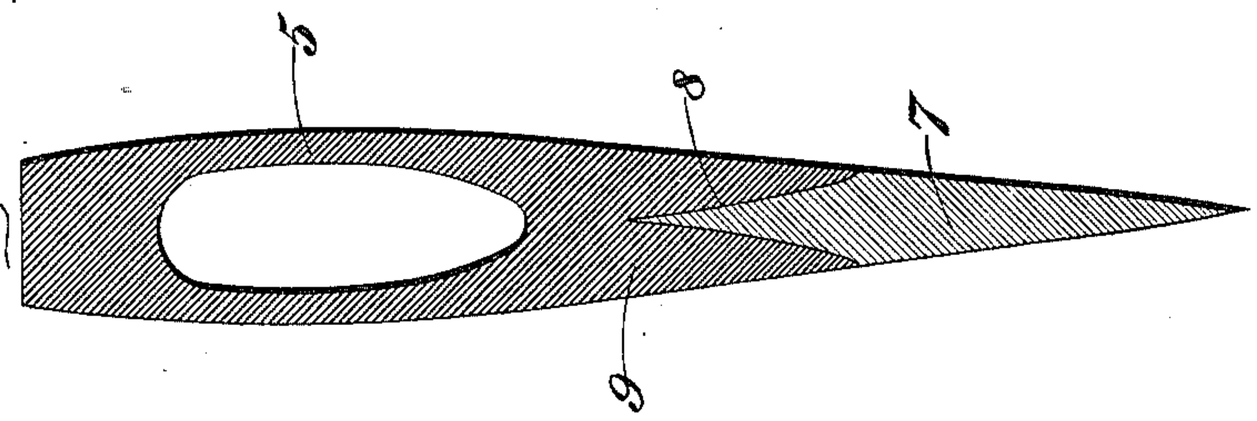



Fig. III.

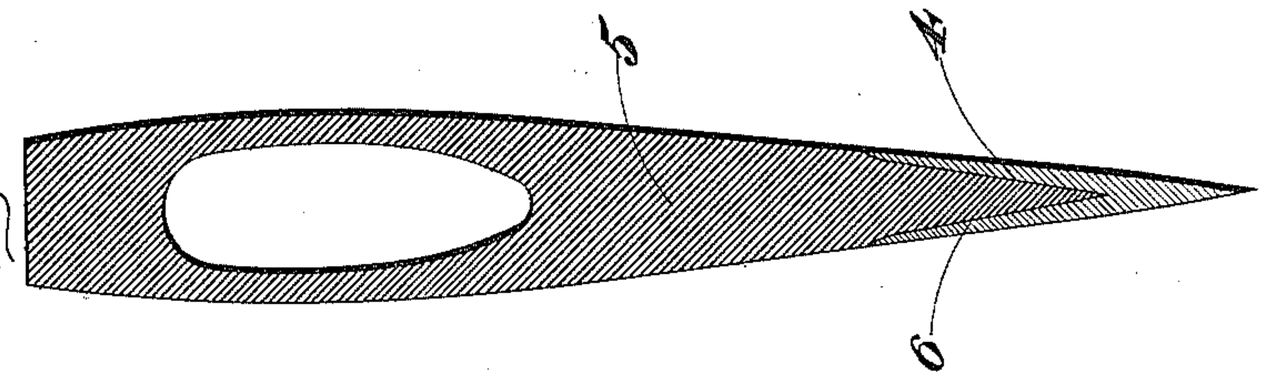



Fig. II.

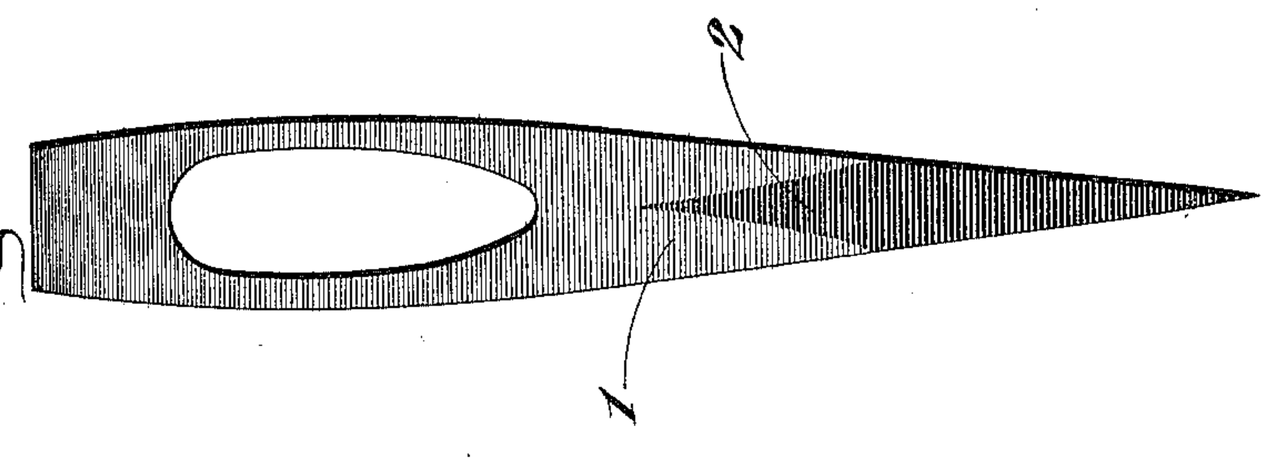
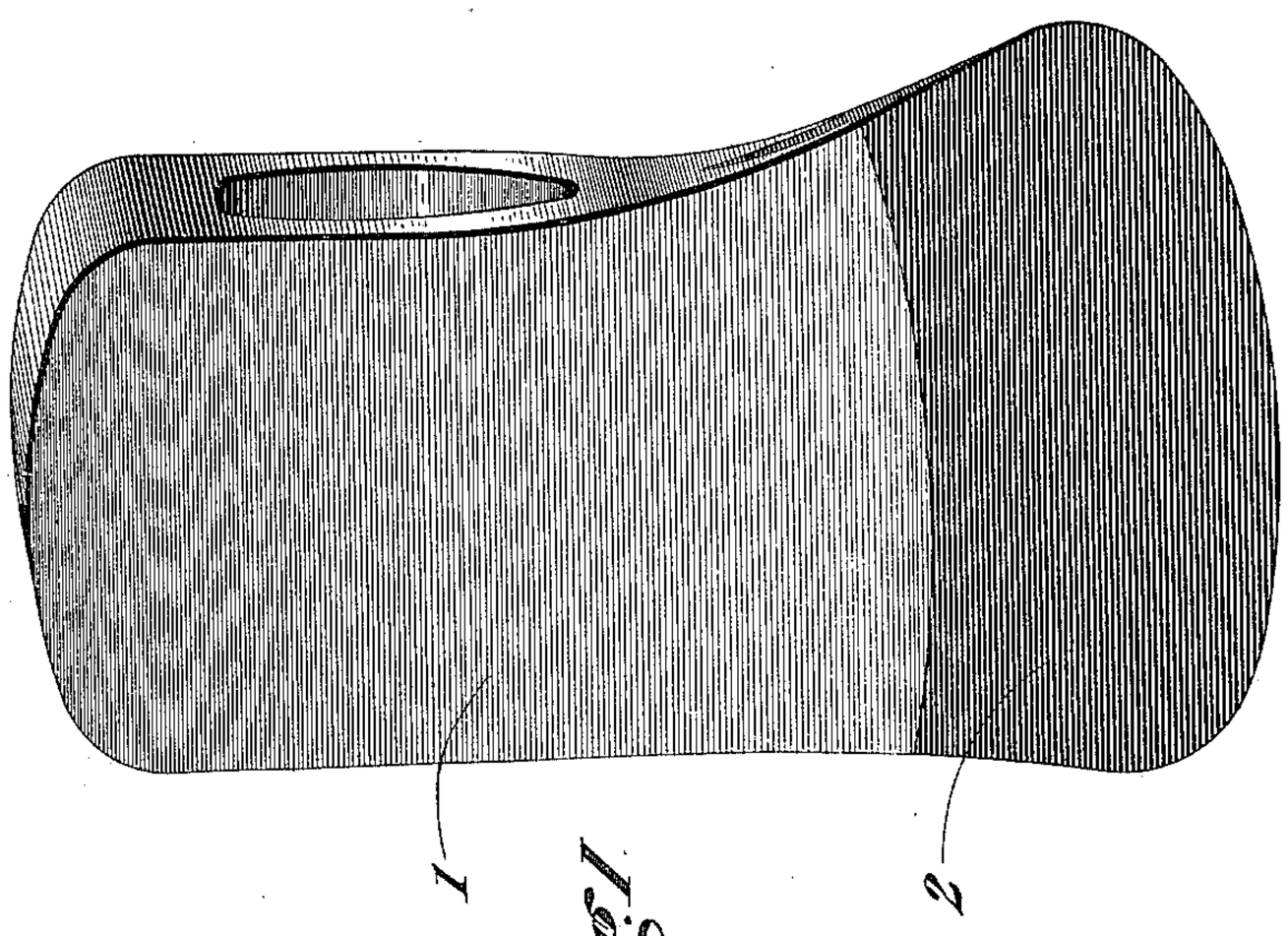



Fig. I

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# UNITED STATES PATENT OFFICE.

JOSEPH R. MANN, OF LEWISTOWN, PENNSYLVANIA.

## EDGE-TOOL.

SPECIFICATION forming part of Letters Patent No. 561,409, dated June 2, 1896.

Application filed February 20, 1896. Serial No. 580,076. (Model.)

*To all whom it may concern:*

Be it known that I, JOSEPH R. MANN, of Lewistown, county of Mifflin, State of Pennsylvania, have invented certain new and useful Improvements in Edge-Tools, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce an improvement in edge-tools, such as axes, hatchets, chisels, or the like, in which the characteristic temper-colors of the respective metals of which the tool is composed are displayed and preserved in an even and uniform manner upon the surface of the tool, so as to constitute at the same time an attractive commercial finish in the article and a clear and unmistakable indication of the structural formation and quality of the tool.

My invention, while applicable to any composite edge-tool or edge-tool made of different metals, is, owing to the manner in which they are prepared for employment in commerce, especially applicable to axes, hatchets, chisels, or the like.

In the manufacture of axes two kinds or grades of metal are employed. For example, the body of the ax may be made of low-grade steel and the bit of high-grade steel, the latter adapted to receive the requisite temper to hold a sharp cutting edge. The differences in cost between the low and high grade steels is considerable, and therefore, while it is necessary to the production of a thoroughly serviceable tool to employ a certain proportion of the high-grade steel, it is nevertheless practicable for an unscrupulous manufacturer to derive a considerable profit by omitting to use such a proportion of high-grade steel as may be necessary to produce a first-class article. To realize profit in this way it is necessary, of course, to practice imposition upon the purchaser of the tool, so as to persuade the purchaser of the inferior article that he is securing a good article at a lower price than that which is charged for similar articles made by another manufacturer. Moreover, as between different manufacturers, without consideration of any element of fraud in the manufacture, there exists, of course, different grades of excellence in their respective products, resulting from differences between the knowledge of the art and skill bestowed by each upon the manufacture.

My invention is designed to facilitate the detection of attempts to practice fraudulent imposition and to afford means for readily discriminating between an inferior and a superior article.

When placed upon the market, axes are usually provided with a certain finish calculated to attract the eye or please the fancy, and thereby render the article salable. A great variety of finishes have been heretofore employed. For example, axes have been finished with a rough body part and a polished edge, or with the body part painted down to the line of the weld so as to exhibit only a bright bit. Sometimes they are bronzed or gilded and sometimes they are finished with a high polish extending over their entire surfaces. A uniform blue color has also been imparted to the entire body of the ax as a finish, such color being imparted to the metal as by means of heating it in a bed of powdered lime or the like, as in the usual method of bluing metals. As above suggested, however, these various finishes are employed merely for the purpose of rendering an article attractive to the trade. All of the finishes tend to obscure the line of the weld or demarkation between the high-grade and the low-grade metal of which the tool is composed. In some of the finishes this line is completely obscured. In others—as, for example, in a high-polish finish—the weld-line on the side of the tool may be indistinctly and with difficulty traced by a close observer; but even in tools finished in that way, which is the most favorable for the detection of the weld-line, it is practically impossible to trace with certainty the line in the front and rear edges of the tool, where, as will hereinafter more clearly appear, it is most important to trace it. Moreover, in none of the finishes heretofore employed is the comparative quality of the two metals in any wise indicated.

By my invention I impart to the tool a finish not only commercially attractive, but one which indicates at a glance, even to the most casual observer, the proportionate quantity of the respective metals employed, and to one acquainted with the metal employed, the quality of the temper of the metals.

The accompanying drawings are designed to illustrate in such diagrammatical manner as it is possible to illustrate in black and white the nature of my invention, and also to illustrate certain differences in the manufacture of tools, which my invention enables one readily to detect in the completed article.

Thus, Figure I represents one of my finished axes in side elevation, and Fig. II, a similar view in end elevation. Fig. III is a cross-section of an overlaid steel ax. Fig. IV is a similar view of an inserted steel ax.

Referring to the figures on the drawings, 1 represents the body part of an ax, and 2 the bit. In the drawings the body part is represented as lighter in color and the bit as dark, to correspond with the relative differences which exist between the temper-colors of those parts in practice, the colors in practice being, respectively, straw or copper, and dark or purplish blue.

I deem it sufficient for the purposes of this specification to define in broad general terms a method of producing my article without specifying in detail each of the steps of the process. By way of such explanation the method of producing the ax may be defined as follows: First, an ax having a body part made of open-hearth, Bessemer, or low-grade steel, semigrade steel, or iron, and a bit of crucible cast-steel welded thereto is by any of the usual processes now employed reduced to a smooth surface. Afterward the ax is thoroughly cleansed and is suspended in an oven. The temperature of the oven is then raised to about 550° Fahrenheit, or to such a temperature as is required to produce the desired temper in the crucible or high-grade steel. At such a temperature and under proper conditions not only will the requisite temper be developed in the metal, but the entire surfaces of the two metals will have become oxidized or colored by the heat, so that when withdrawn from the oven the ax will present a surface having a color uniform and regular in appearance, as if it had been painted. As is well understood in the art, however, steel of different grades when raised to the same temperature present different colors of oxidation. Thus the crucible steel of the ax, when properly tempered, will present a deep blue color, while the low-grade steel heated to the same temper assumes a straw or copper color.

It is possible to bring up the low-grade steel to the blue color by sufficiently raising the temperature; but such a rise in the temperature to which the ax is subjected will change the color of the crucible steel, so that it is impracticable to develop one color in one of the metals without developing a different color in the other metal. Not only will the appropriate color of each metal be developed upon the side of the ax, as shown in Fig. I, but its proper color will appear upon each metal wherever a surface of it is exposed. Consequently the clean line of the weld marked by the juncture of the blue and straw colors will show in clear and strong contrast both upon the side of the ax and its edge, thereby indicating how much of each metal is employed in the manufacture of the ax and in what manner the two metals are united. Moreover, as above explained, the relative colors will indicate to an observer skilled in the art the comparative qualities of the temper produced in each of the metals. Thus if the bit has been overtempered the color of it will show that fact, as well as the color of the low-grade steel of the body part, and an insufficient temper will in like manner be indicated by relative deficiencies in the color.

Another valuable feature of my invention resides in the fact that the tool can be tempered and finished by the same treatment, which affords not only a saving in cost, but reduces the liability of damaging the tempered tool in polishing.

In producing a bright polish upon the bit there is always liability of heating the metal and drawing the temper.

By my invention, as above explained, a highly-polished surface is not produced upon the tool, but only a smooth surface. Not only is there less liability of burning the steel in producing such a surface, but the ax is smoothed before it is tempered. After it is smoothed it is heated and the temper and finish are by the same identical process produced. When withdrawn from the oven and cooled, the ax is ready for the market. I prefer, however, to add to the colored surface a final coating of transparent varnish or similar substance, which protects the surface of the metal from rust and renders it less liable to accidental defacement by abrasion.

As above explained, the proper temper-colors of the metals present themselves upon the entire surface of each metal wherever it is exposed. It is by reason of this fact that my invention enables one to judge of the amount of the two kinds of steel employed in the manufacture.

In the manufacture of axes or edge-tools the two kinds of steel are united together in two ways. One way is to insert the low-grade steel into the high-grade steel, as illustrated in Fig. III of the drawings. An ax so produced is called an "overlaid-steel" ax, because the high-grade steel 4 is welded upon a surface of low-grade steel 5, as indicated by the line 6 in Fig. III. In this class of axes the line of the weld upon the flat side of the ax extends high up upon its body part, indicating that a large proportion of high-grade steel is employed, whereas the amount of effective steel is very small and the ax soon wears out in use.

In Fig. IV of the drawings the high-grade steel 7 is inserted into a V-shaped cleft 8 in the body 9 of the low-grade steel. In this form the line of the weld upon the side of the ax does not extend nearly so high as in the other form of ax shown in Fig. III. An examination of the sides of the blades of an

inserted-steel ax and of an overlaid-steel ax would suggest that the latter contained much more steel than the former, whereas in two axes of the same size the inserted-steel ax may contain several times as much effective steel as the overlaid-steel ax contains. When it is considered that the high-grade or cast steel costs about five to ten times as much per pound as soft steel, the profit derivable from the employment of overlaid steel instead of inserted steel will be readily perceived to be sufficiently considerable to tempt an unscrupulous manufacturer to take advantage of it. By the employment of my invention, however, it is impossible to conceal the imposture from a purchaser exercising the most ordinary care, because the temper-color of the two metals follows its appropriate metal wherever it is exposed, clearly indicating upon the edge of the ax or that part shown in Fig. II of the drawings just how much of each metal is employed and how the two metals are united. In other words, if an overlaid-steel ax were placed upon the market with my finish the inferior metal would expose a narrow tongue of straw color running into the blue color of the high-grade steel, as shown in Fig. III. On the other hand, an inserted-steel ax would instantly upon mere inspection exhibit a tongue of blue color extending into the straw color of the inferior metal, as shown in Fig. IV, declaring its true quality.

What I claim is—

1. As a new article of manufacture, an edge-tool composed of a plurality of metals or grades of metal, reduced to a smooth surface, and in which the true temper-color of each metal, having been developed by heat, is exhibited in regular uniformity upon the entire surface of each metal wherever exposed.

2. As a new article of manufacture, an edge-tool composed of a plurality of metals, or grades of metal, reduced to a smooth surface, and in which the true temper-color of each metal, having been developed by heat, is exhibited in regular uniformity upon the entire surface of each metal wherever exposed, the smooth and colored article being provided with a coat of transparent varnish.

In testimony of all which I have hereunto subscribed my name.

JOSEPH R. MANN.

Witnesses:
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