C. A. WITTER.

PROCESS OF MANUFACTURING METALLIC SHAPES.

APPLICATION FILED MAY 24, 1920.

1,408,330. Patented Feb. 28, 1922.

Fig. 1.

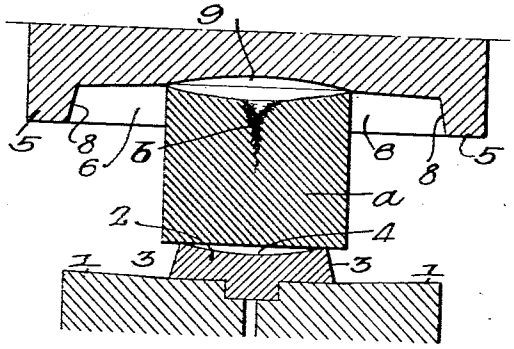


Fig. 2.

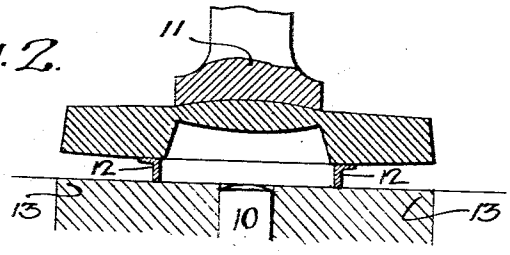


Fig. 3.

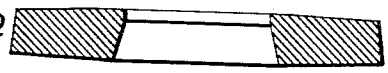


Fig. 4.

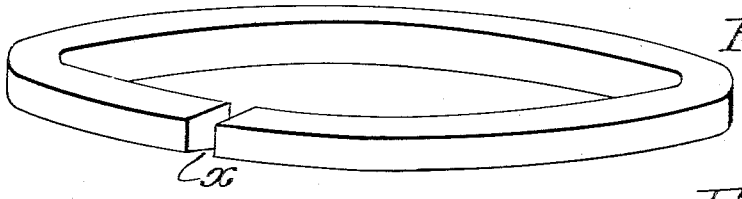


Fig. 5.

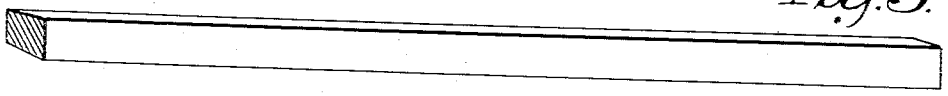


Fig. 7.

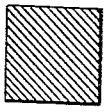


Fig. 6.

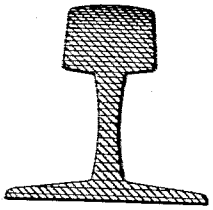


Fig. 9.



Fig. 8.

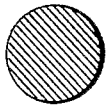


Fig. 11.



Fig. 10.



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PROCESS OF MANUFACTURING METALLIC SHAPES.

1,408,330. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed May 24, 1920. Serial No. 383,778.

To all whom it may concern:

Be it known that I, CLAUDE A. WITTER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in a Process of Manufacturing Metallic Shapes, of which the following is a specification.

My invention relates to certain improvements in the process of manufacturing rails and other shapes of iron and steel.

This application is a continuation in part of the application filed by me on the fourth day of October, 1919, under Serial No. 328,454, which was issued as a patent on the third day of August, 1920, No. 1,348,677.

One object of the present invention is to manufacture a rail, or like shape, from an ingot free of piping, or other defects usually due to piping or segregations.

A further object of the invention is to produce a blank from which different shapes can be rolled, the blank being free of piping and segregations.

In the accompanying drawings:

Fig. 1 is a sectional view showing an ingot located between the dies of a press;

Fig. 2 is a view showing the pressed bloom with the center partly punched therefrom and located between the dies;

Fig. 3 is a view of the bloom with the center entirely removed therefrom;

Fig. 4 is a perspective view of a ring enlarged from the bloom and cut;

Fig. 5 is a view of the blank made by straightening the cut ring illustrated in Fig. 4;

Fig. 6 is a sectional view of a railroad rail made from the blank illustrated in Fig. 5; and

Figs. 7 to 11, inclusive, are sectional views of other shapes that can be made from the blank.

In the manufacture of railroad rails, bars and other shapes, the universal practice has been to roll the rail, or other shape, directly from an ingot. The steel ingot from which a bloom is made has been cut to remove that portion of the ingot containing the piping formed when pouring the ingot. This materially reduces the size of the ingot and, consequently, the size of the finished product. In many cases the piping, or defects due to piping, is not entirely removed when the end of the ingot has been cut and a flaw often occurs at the most critical portion of the rail, or other shape.

By my invention, I entirely remove the piping and segregations by punching so that the material left in the bloom formed from the ingot is of a homogeneous metal and any defects, due to piping and segregations are entirely overcome and eliminated.

a is an ingot. *b* is the piping, which is usually formed in the ingot. 1 is the lower die of a press. 2 is an insert in the lower die, which shapes the bottom portion of the ingot. This insert has tapered side walls 3 and is concaved at 4. The ingot is placed on this insert, as clearly shown in Fig. 1. 5 is the upper die of a press, which is recessed at 6. The recess has an annular tapered surface 8 and is concaved at the center.

By forming the dies, as shown, the ingot will be reduced to the form illustrated in Fig. 2 and the center portion, containing the piping and segregations will be confined by the concave portions 4 and 9 of the dies.

Fig. 2 illustrates the bloom in a cutting die in which 11 is the punch. This punch removes the central portion of the bloom, leaving it in the form illustrated in Fig. 3. The bloom, which is in the form of a ring, is then enlarged by any of the ordinary processes on a becking hammer or roughing mill to any diameter desired, according to the finished article to be produced. Then the ring is cut, as shown at *x*, Fig. 4, and the blank is straightened, as shown in Fig. 5. The blank can be shaped in any of the forms illustrated in Figs. 6 to 11, inclusive, by the ordinary process of rolling.

I preferably taper the ring in cross section, as shown, in order that the inner portion of the ring will have a greater cubical content than the outer portion so that when the ring is cut and straightened the inner portion, when the bloom is reduced, will produce a shape having a substantial, uniform section and length of surfaces, and avoiding unnecessary lengths of crops or discards.

In manufacturing rails, such as railroad rails, Fig. 6, the head of the rail is formed from the outside of the ring section, as this portion of the metal, when the ring is straightened, is compressed during the straightening process and, consequently, is denser than the metal of the inner side.

The press, as illustrated in Fig. 2, is equipped with a push up cylinder, which has a ram 10 that extends through the center of the platen 13 of the lower die. After the bloom has been forged, the ram is raised,

which allows the sliding die 12 to be placed under the bloom and gives it the necessary support, while the cutting punch 11 broaches the bore. It will be noted that this eliminates the necessity of turning the bloom and punching from both sides.

I claim:—

1. The process herein described of manufacturing metallic shapes, said process consisting in making an ingot, flattening the same and punching it to remove the piping and segregations and to form a hole therein, then enlarging the bloom thus formed, reducing it in cross section, then cutting the bloom and straightening it, and finally rolling it to the shape of the article to be produced.

2. The process herein described of manufacturing metallic shapes, said process consisting in making an ingot, reducing the same in thickness in dies having concaved centers so as to retain the center portion of the ingot having the defects therein at the center of the bloom, then removing the center and straightening the ring thus produced to form a blank, and finally reducing the blank to the shape desired.

3. The process herein described of manufacturing metallic shapes, said process consisting in first making an ingot, flattening the same and confining the piping to the center of the flattened bloom, removing the center of the bloom to form a ring, enlarging the ring and reducing its cross section, cutting the ring, straightening it to form a blank, and finally reducing the blank to the desired shape.

4. The process herein described of manufacturing metallic shapes, said process consisting in making an ingot, flattening the same, and punching it to remove the piping and segregations and to form a hole therein, and shaping the ring so that its inner portion will have a greater cubical content than the outer portion, then enlarging the bloom thus formed, reducing it in cross section, cutting the bloom and straightening it.

CLAUDE A. WITTER.