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C. A. WITTER

PROCESS OF MAKING TIRE MOLDS

Filed Feb. 27, 1920

Fig. 1.

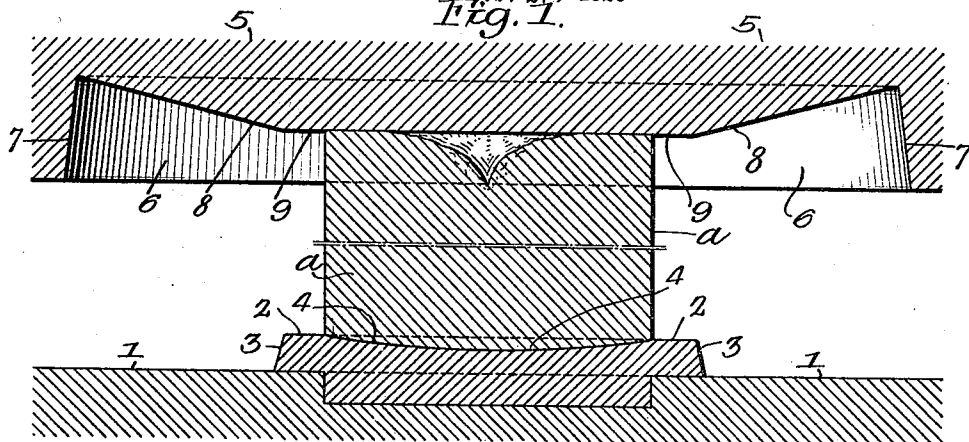


Fig. 2.

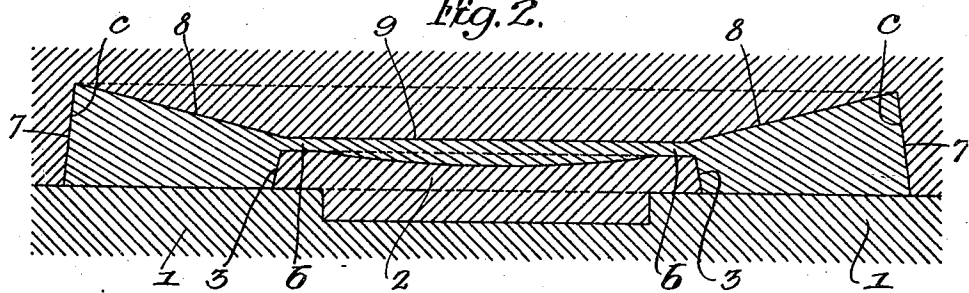


Fig. 3.

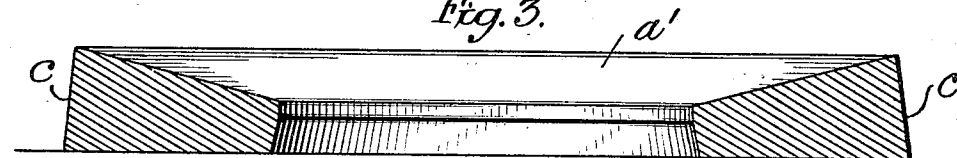


Fig. 4.

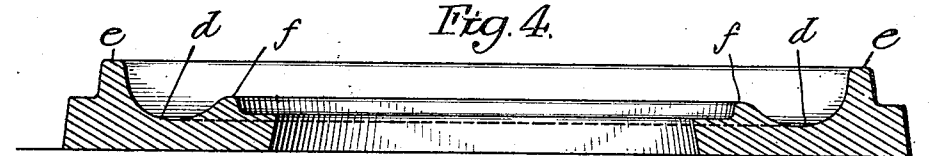


Fig. 5.

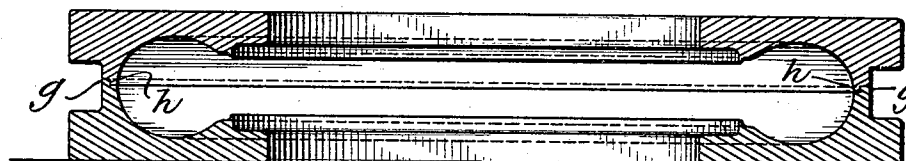
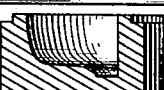


Fig. 6.



Fig. 7.



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PROCESS OF MAKING TIRE MOLDS.

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One object of my invention is to make a mold, in which automobile tires and like articles are vulcanized, of wrought metal in order to increase the strength materially so that they will withstand the heat to which they are subjected.

A further object of the invention is to reduce the thickness of the molds so that a greater number can be assembled in the vulcanizers than heretofore; to reduce the finish allowance to a minimum, and to reduce weight.

These objects I attain in the following manner, reference being had to the accompanying drawings, in which:

Fig. 1 is a sectional view illustrating the upper and lower dies with an ingot between the dies;

Fig. 2 is a sectional view, showing the reduced ingot between the dies;

Fig. 3 is a sectional view of the blank after the center has been removed;

Fig. 4 is a sectional view of the blank after being forged into shape;

Fig. 5 is a sectional view, showing two sections of the machined and finished mold assembled;

Fig. 6 is a view illustrating a modification of the blank; and

Fig. 7 is a view of a mold made from the blank illustrated in Fig. 6.

Referring to Fig. 1, *a* is an ingot of steel or iron. 1 is the lower die of a press. 2 is the insert in the lower die, which shapes the bottom portion of the ingot. This insert has a tapered projection 3 and is dished at 4. The ingot is placed on this insert, as clearly shown in Fig. 1. 5 is the upper die of a press, recessed at 6. This recess is tapered as at 7, and has an annular tapered surface 8 and a flat surface 9 at the center, so that when the ingot is reduced between these two dies 1 and 5, as in Fig. 2, it will be of a greater thickness at the periphery than at a point near the center. A web *b* will be formed, which is cut out, leaving the blank *a*¹. The periphery of this blank is slightly tapered, as at *c*, and is of the peculiar shape shown so that, when it is introduced into a forging press having a flat bottom die and a shaped upper die, an annular recess *d* is produced in the blank with a high flange *e* near the periphery and a low flange *f*. The forging operation reduces the finish allowance to a minimum.

The blank is then machined so as to pro-

duce either of the rings illustrated in Fig. 5. The only difference between these rings is that one has a narrow annular rib *g*, which interlocks with an annular rib *h* in order to make a tight joint where the two rings come in contact.

While I have described a blank in the form of a ring, of a greater width at the periphery than at the inner side, in some instances, the blank may be rectangular, as in Fig. 6, or other shape, according to the finished article to be produced. If, for instance, the inner flange of the mold is the same height as the outer flange, as in Fig. 7, then I preferably use a blank rectangular in cross section. This blank is placed in a forging press so that it will somewhat resemble the finished article, and is then machined to the shape required.

By this process, I am enabled to remove any piping that may form in the ingot, as this piping remains at the center of the blank, Fig. 2, and when the center is removed by punching this defective portion is cut out and the metal of the blank ring, Fig. 3, is perfect.

By making the mold in the manner above described from wrought metal as a substitute for the cast metal molds which have heretofore been employed for this use practically since the inception of the rubber tire, I am enabled to reduce the thickness of the mold materially, as a wrought metal mold is considerably stronger than one of cast metal, consequently a greater number of molds can be assembled in a vulcanizer. As the walls of the mold are much thinner than usual, the vulcanization is more rapid. In addition, the conductivity of the wrought metal itself is greater than that of cast metal and this also conduces to more rapid vulcanization.

Furthermore, as the mold is made of a forging, all blow holes and sand holes, which are present in cast metal, are eliminated, and the finish allowance is materially reduced by the forging operation. Finally, the wrought metal withstands expansion and contraction so that the cracking incident to the cast molds is eliminated, and it maintains its original dimension whereas the cast molds "grow" under repeated heating and cooling, so that in a short while the diameter of the mold cavity increases.

In some instances, after reducing the ingot and punching it to form a ring, the ring

may be increased in diameter by hammering and then forged into the desired shape, as in Fig. 4, and afterwards machined to finish.

5 I claim:

1. The process herein described of making a vulcanizing mold member in which rubber tires and like articles are formed, said process consisting in first forging an ingot
10 to a solid blank having a greater height at the periphery than at a point near the center, removing the relatively thin central portion of the blank, forging the blank into approximately the shape of the finished
15 mold member, and then machining the blank.

2. The process herein described of making a mold member in which rubber tires and like articles are vulcanized, said process
20 consisting in first forging an ingot by pressure so as to make a solid blank having a tapered periphery and of a greater height

at the periphery than at the center and having a relatively thin central portion, recessing the center of the blank, then punching
25 out this center so as to remove the piped section of the blank, which is at the center, reducing the blank by forging so as to form a high annular flange near the periphery and a low flange some distance within the
30 high flange, there being an annular groove between the two flanges, and machining the blank to finish.

3. The process herein described of making a vulcanizing mold member in which rubber tires and like articles are vulcanized,
35 said process consisting in first forging an ingot to the form of a ring which has a greater cross sectional width than cross sectional height, then in forging such ring to
40 approximately the shape of the finished mold member, and then in final machining such mold member to the desired shape.

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