A. D. MOSBY.

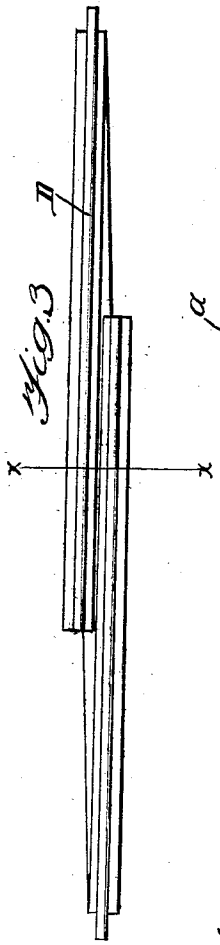
METHOD OF FORMING CIRCULAR T-SECTION TRACKS FROM STRAIGHT PIECES OF RAIL.

APPLICATION FILED MAY 31, 1911.

1,269,631.

Patented June 18, 1918.

2 SHEETS—SHEET 1.



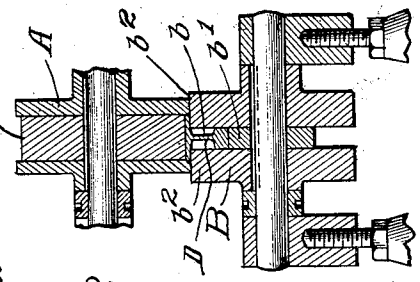
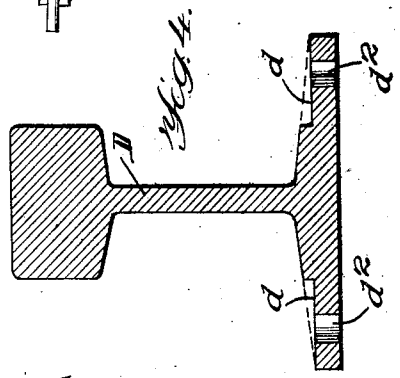
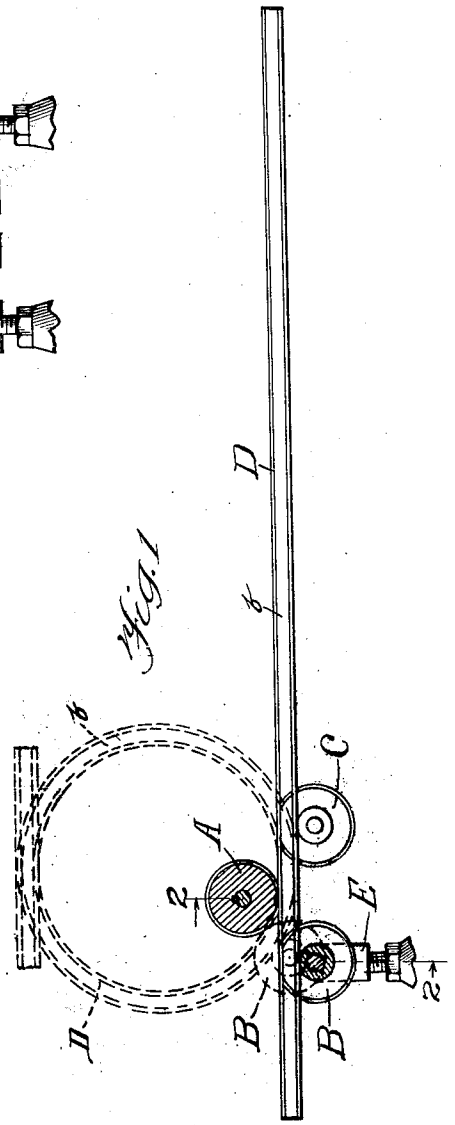


Fig. 2





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Fig. 5.

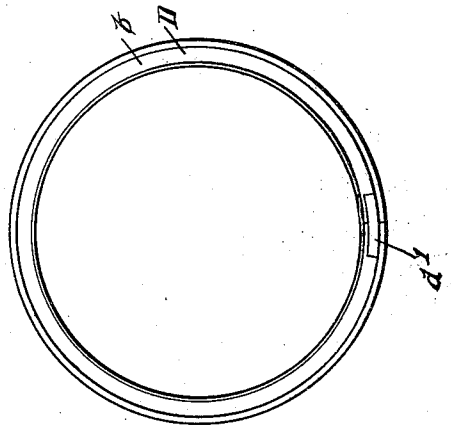
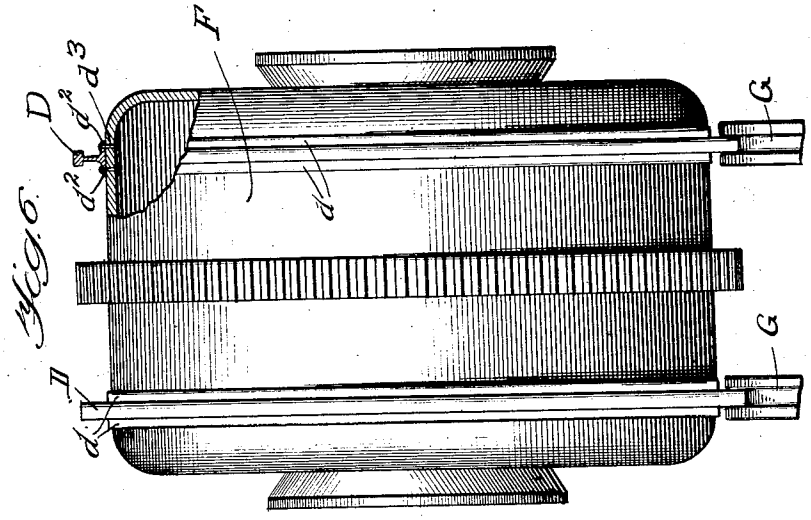


Fig. 6.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING CIRCULAR T-SECTION TRACKS FROM STRAIGHT PIECES OF RAIL.

1,269,631. Specification of Letters Patent. **Patented June 18, 1918.**

Application filed May 31, 1911. Serial No. 630,283.

To all whom it may concern:

Be it known that I, ALFRED D. MOSBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Forming Circular T-Section Tracks from Straight Pieces of Rail, of which the following is a specification.

My invention relates to an improvement in circular tracks or tires, suitable for use upon the revolving drums of concrete mixers, or upon other drums or revolving elements of apparatus of similar character; and the object of the invention is to provide an improved steel T-section track or tire together with a novel method of forming the same from a straight piece of T section railroad rail of the ordinary sort. The method consists in taking a piece of common T section rail and causing it, while cold, to be moved back and forth between three bearing or pressure exerting elements, for example, rollers, which are arranged to bear and exert pressure against the upper and lower surfaces of the rail, two on one side and the third between the other two on the opposite side of the rail, and gradually either by a constant movement or by a succession of movements repeated at suitable intervals, shifting one or more of said rolls in the direction of the opposed roller or rollers so as to continue or reëstablish the pressure as it is relieved by the bending of the rail. In this way, the web and ball of the rail are stretched, the base flange bent, and the whole rail gradually given a curved configuration. As the forming rollers are necessarily spaced apart so that it is impossible to give the end portions of the rail a curved configuration, the method preferably involves imparting to the rail a spiral bend which offsets its opposite ends and proceeding with the bending operation until the substantially straight portions at the extremities of the rail are overlapped, then cutting off these portions, springing the ends into alinement and securing them together.

The method is best illustrated by reference to the accompanying drawings, which show, in a diagrammatic manner, apparatus for carrying out the method and which further show the operation concerned at various different stages. In the drawings—

Figure 1 is a longitudinal sectional elevation of the forming rollers;

Fig. 2, a sectional view taken on line 2—2 of Fig. 1, looking in the direction of the arrows, and on a somewhat enlarged scale;

Fig. 3, an edge view of the circular track before the straight portions at its ends have been cut off;

Fig. 4, a cross-section of the track, the original shape of the rail being indicated approximately by the dotted lines;

Fig. 5, a side view of the finished track; and

Fig. 6, a view in elevation, with parts in section, of the drum of a concrete mixer, showing the application thereto of the circular track.

Like characters of reference indicate like parts in the several figures of the drawings.

A, B and C designate the three bearing elements or rollers. Roller A bears against the normally under side of the base flange of the rail, the rail being designated D. The roll is preferably formed with the shallow groove *a* for the purpose of preventing the rail from slipping on the roller. Rollers B and C are preferably alike. Referring particularly to Fig. 2, the roller B is shown as formed with a deep groove *b* which receives the web and the ball of the rail, the ball bearing against a core b'. The side members b^2, b^2, of the roller bear against the normally upper surfaces of the base flange of the rail and the perimeters instead of being beveled in conformity to the slope of the upper sides of the base flange are formed on lines parallel to the axis of the roller so that in the finished track the base flanges are flattened, as indicated at *d*, (Fig. 4). In order to accomplish this result the effective bearing of the rail on the lower rollers must necessarily be between the base flange and the elements b^2 and not between the tread or upper surface of the ball of the rail and the element b'. The ball of the rail, for example, may initially stand out of contact with the element b' or, even if it touches it in some cases, the stretching of the ball and

the web, which takes place when the rail is bent from the straight form to the circular form, will diminish the height of the web and ball sufficiently so that the effective bearing is still maintained at the base flange of the rail. This disposition of the rail with regard to the lower rollers is important apart from the fact that it allows the swaging or flattening of the base flange in that it permits the web and ball to stretch freely. This circumstance, taken with the fact that the ball is guided at the sides, as is preferably also the base flange, makes it possible to bend this difficult cross section by a cold process without distorting the relatively thin web and base flange. It will be understood that it is difficult to bend a straight piece of T section railroad rail into circular form with the ball outward because of the very considerable mass of metal in the ball, where the greatest amount of stretching has to take place, in comparison with the lightness of the base flange and of the connecting web. In fact, up to the time that my invention was perfected it had been generally considered impossible to perform this operation without getting a distortion of the rail which would make the finished article impractical for the purpose to which the tracks or tires turned out by my process are used.

This flattening of the base flanges facilitates the attachment of the track to the drum by providing a right angle surface instead of a sloping surface to drill against. The boxes E in which roller B is journaled are adjustably mounted so that the roller may be shifted, either by constant or intermittent movements, from the position shown in the full lines of Fig. 1 to that indicated by the dotted lines; that is, as the pressure exerted by the rollers against the rail is relieved by the bending of the rail it is reëstablished by shifting the position of roller B. Obviously, the same results might be obtained by shifting either of the other two rollers, or, if desired, more than one roller might be shifted. As above stated, the rollers b^2 by bearing against the upper inclined surfaces of the base flange cut into the same. This operation besides flattening the outer margins of the base flange has the further result of assisting in holding the rail against lateral displacement. The stresses tending to distort the rail are, of course, the greatest as the curvature of the rail approaches circularity. By this time shoulders have been formed by the flattening process which materially aid in checking the tendency of the rail to distort.

During this operation a lateral pressure is exerted upon the rail, either by hand or by suitable apparatus, which offsets the ends of the rail. In effect, the rail is given a spiral rather than a strictly circular curvature. This enables the straight portions at the ends of the rail to be overlapped as indicated in Fig. 3, the bending operation being carried on until this overlapping occurs and until a curvature of the desired radius is produced. The overlapping, straight portions at the extremities of the rail are then cut off, for example, on the line x—x of Fig. 3, and the ends of the circular structure which results sprung into alinement with each other and secured together by the fish-plate d', as shown in Fig. 5.

Fig. 6 shows the application of a pair of tracks so formed to the drum of a concrete mixer. F designates the drum and G, G the flanged wheels on which it is supported and revolved. The tracks D are slipped over the drum and rivet holes d^2 drilled through the base flanges of the track and at the same time through the drum. d^3 designates the rivets. The operation of drilling the rivet holes is facilitated by the fact that the base flanges have been flattened in the bending operation as above described.

A great deal of difficulty has been experienced in providing the revoluble drums of concrete mixers with tracks or tires which will not become soon worn out or damaged. Where such tracks or tires are formed integrally with the body of the drum it is necessary to throw away the drum when the tracks wear out. Ordinary cast rings secured to the drum are not satisfactory because they wear out quickly and because it is not always easy to get a good fit of the rings on the drum. The liability of rings or tracks of this sort to wear is enhanced by the fact that water and cement from the interior of the drum are apt to slop out of the charging and discharge openings, trickle around the edge of the drum and so get in between the track and the wheels or rollers on which it bears. My method makes it possible to provide the drums of concrete mixers with a very durable track made of hard steel which will under ordinary circumstances outlast the life of the drum itself. If, however, the track should become worn or damaged it may be easily removed and another put in its place. The T section configuration of the track is such as to intercept in the spaces under the ball of the rail any slop which may trickle around the end of the drum and so prevent it from coming between the bearing surfaces of the track and rollers on which it is supported.

The method above described provides a bearing ring which is superior to a cast metal ring in that it will not have any of the flaws or weaknesses that a casting of this diameter would be very likely to have. In the first place, the rail from which the ring is formed consists of rolled metal which for that reason is stronger than cast steel

would be, the rolling giving a grain or texture to the metal which adds to its strength. If the original rail should contain any flaw or weakness it will not be able to withstand the stresses developed during the cold bending process. The cold bending process gives an article much superior to one produced by a hot bending process in which the rail is reheated, if such process were possible with a section of this sort, because the reheating of the rail necessarily reduces its carbon. By my process the rail is stretched without changing the chemical character of the metal.

I claim:

1. The method of forming from a straight piece of T section railroad rail a circular bearing ring having the ball of the rail on the outside and the base flange on the inside which consists in causing the rail while cold to be moved back and forth between bearing elements which exert bending pressures only against the rail base while guiding the ball of the rail so as to hold it from lateral displacement.

2. The method of forming from a straight piece of T section railroad rail a circular bearing ring having the ball of the rail on the outside and the base flange on the inside which consists in causing the rail while cold to be moved back and forth between bearing elements which exert bending pressures only against the rail base while guiding the sides of the ball of the rail, and also the edges of the rail base, so as to hold them from lateral displacement.

3. The method of forming a circular track or tire of the character described from a straight piece of T-section railroad rail by a cold bending operation which consists in causing the rail to be moved back and forth between bearing elements arranged to exert bending pressures against opposite sides of the rail base while guiding the ball of the rail so as to hold the same from lateral displacement, exerting said bending pressures so as to give the rail a slight helical form, continuing the operation until the straight ends of the rail are overlapped and the track brought to the proper diameter, and then cutting off the overlapping portions.

4. The method of forming a circular track or tire of the character described from a straight piece of T-section railroad rail by a cold bending operation which consists in causing the rail to be moved back and forth between bearing elements which exert pressure against the bottom of the rail base and elements which exert pressure against the upper inclined surfaces of the rail base, the latter so formed as to cut into the same while guiding the ball of the rail so as to hold it from lateral displacement.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."