

March 7, 1939.

W. S. BRINK

2,149,757

STEEL SECTION

Filed Jan. 16, 1935

2 Sheets-Sheet 1

Fig-1

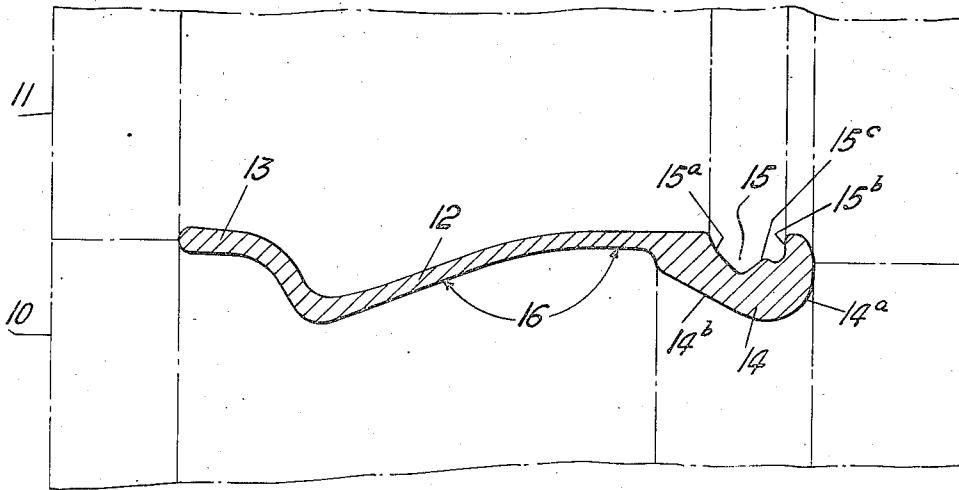
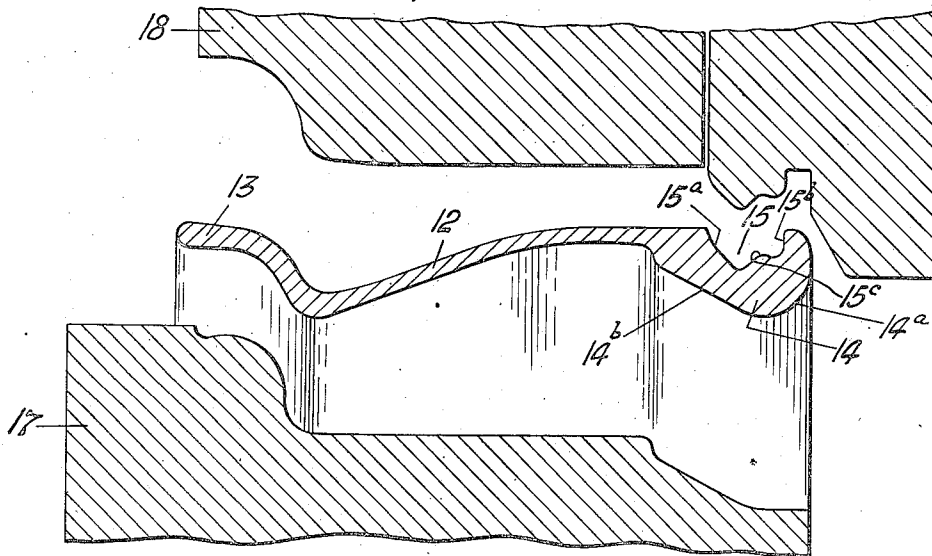


Fig-2



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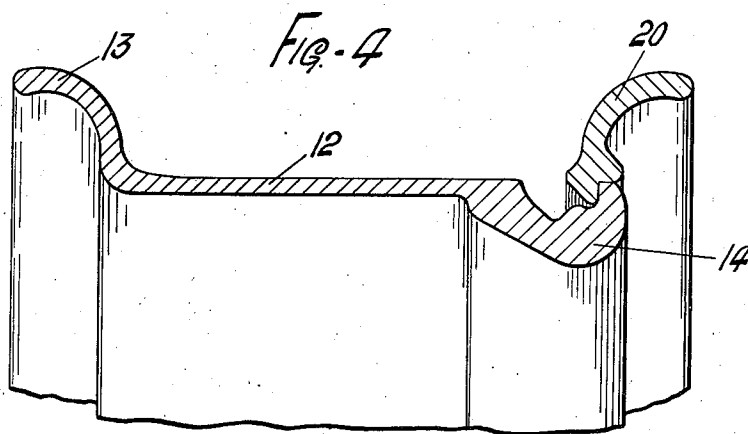
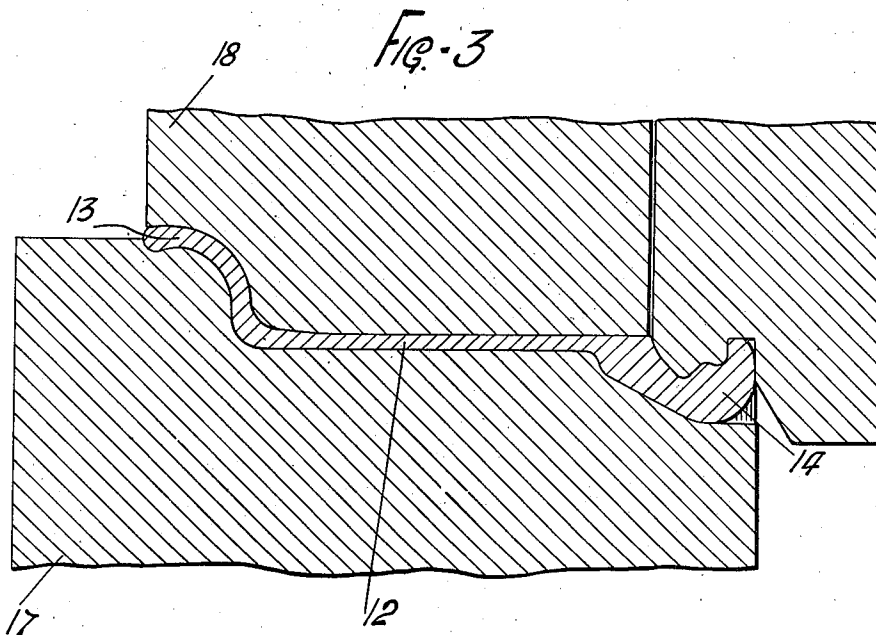
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STEEL SECTION

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5 Claims. (Cl. 29—159.1)

This invention relates to steel sections and methods of making the same, and more especially it relates to steel rims such as pneumatic tire rims and to procedure for rolling them.

In the manufacture of tire rims of the character mentioned, the steel blank or metal bar is heated and then hot rolled to a channel form that is as near the desired cross sectional form of the finished rim as possible. In this hot rolling operation, however, it is impossible to form on the channel lateral flanges which define a greater angle than approximately 80° with the axis of the forming rolls. Because of this fact it is necessary, in the production of rims having an overhanging side gutter, that the side flange of the gutter be formed during the hot rolling operation at an angle of approximately 70° to the axis of the forming rolls. The channel thus formed subsequently is cut to the desired length, rolled to circular shape, and the ends welded together. Thereafter it is necessary by a plurality of cold rolling operations to turn the gutter up to an angle of 90° with medial or base portion of the rim, and then over to approximately an angle of 70° with the base, which will be an approximate angle of 110° with the axis of the rolls.

The side flange formed integral with the base of the rim, on the opposite margin from the gutter, also is perpendicular in part to the rim base in the finished rim and therefore is required to be formed in a manner similar to that above described with relation to the gutter. Thus the combination of gutter and side flange in a single rim necessitated a hot rolled channel form in which the side flange and gutter made angles of not more than approximately 80° with the axis of the rolls, which fact in turn necessitated a plurality of cold rolling operations to produce the perpendicular side flange and the overhanging gutter.

The chief objects of the invention are to provide an improved steel rim section wherein the overhanging feature of the gutter is eliminated and a construction provided in lieu thereof that is capable of being shaped to finished form by the hot rolling operation; and to provide an improved method of making rims whereby after the steel is hot rolled to channel form and is bent and welded into circular form, a single cold rolling operation will suffice to shape the rim into the proper cross section in which portions of the side flange are perpendicular to the rim base. Other objects will be manifest as the specification proceeds.

Of the accompanying drawings:

Figure 1 is a cross sectional view of the hot-

rolled channel, the forming rolls being shown in broken lines;

Figure 2 is a cross sectional view of the channel after its ends have been welded to give it endless form, and the cold rollers, before the latter have altered the shape of the channel;

Figure 3 is a cross sectional view of the channel and the cold rollers during the cold rolling operation; and

Figure 4 is a cross sectional view of the finished rim including a removable ring or side flange in place in the gutter.

Referring to Figure 1 of the drawings, 10 and 11 denote a pair of cooperating forming rolls which serve to hot-roll a channel 12 into the cross sectional form shown, which includes an upwardly extending flange 13 along on longitudinal margin of the web and a second, downwardly extending thickened flange or channel 14 along the other longitudinal margin of the web, the latter flange comprising a gutter 15. It will be seen that the base or web portion of the channel is formed with a dihedral angle 16 located substantially along the longitudinal center line of the web, said angle being approximately 160° on that face of the web that eventually becomes the inner periphery of the tire rim. As is clearly shown in Figure 1, that portion of the web that includes gutter flange 14 is rolled substantially in parallelism with the axes of the rolls 10, 11, and may be considered the normal plane of the web, so that the angle 16 is formed entirely by reason of that portion of the web which includes flange 13 extending obliquely downward from the normal plane of the web. It will be seen that in the structure described, the flange 13 may have a portion that is substantially perpendicular to the adjacent web portion, yet said flange portion will be disposed at an angle of 70° or less with relation to the axis of roll 10.

The gutter 15 is a longitudinally extending groove of irregular profile, having a transversely arcuate rear face 15a extending from its top to its bottom, a straight front wall 15b of shallow depth and disposed perpendicular to the axis of roll 10, and a ledge 15c disposed intermediate the top and bottom of the gutter, there being a sloping wall of uniform gradient extending from the top of the ledge to the bottom of the gutter, the junctures of said walls and ledge being suitably rounded. The utility of said sloping wall resides in the fact that lateral pressure of a tire against a tire-retaining side ring resting in the bottom of said gutter will force said ring up said slope and onto the ring-seat, thus avoiding the possi-

bility of blowing the ring from the rim. The flange 14 in which the gutter 15 is formed is substantially thicker than any other portion of the web, and its marginal portion has a substantially semi-circular profile 14a, said semi-circular surface merging, on the under side of the flange, with an oblique or tapered surface 14b that extends upwardly toward the web 12.

Because the gutter 15 comprises no overhanging or undercut surfaces, and because the perpendicular gutter face 15b is comparatively shallow or narrow, it is possible to hot-roll the gutter side of the web to finished shape without inclining it at an angle to the axis of the rolls 10, 11. After cooling the channel 12 is cut into shorter strips of desired length, which strips are then coiled to circular form and the ends of the respective coils welded together as is well understood in the art. The channels are so cut and welded that in the resultant rings the web portion thereof that includes the gutter flange 14 is parallel to the axis of the ring, the web portion that includes flange 13 being disposed at an angle thereto and constituting a generally frusto-conical structure, as is most clearly shown in Figure 2.

The endless channel is next subjected to a single cold rolling operation whereby it is given its finished cross sectional shape. As is most clearly shown in Figure 3, the cold rolling operation is affected by the use of forming rolls 17, 18, which rolls flatten the web of the channel by drawing or forcing the frusto-conical portion thereof outwardly into alignment with the normally disposed, cylindrical portion of the web, whereby portions of the side flange 13 are brought into perpendicular relation to the base or web. In Figure 4 is shown the finished tire rim complete with a removable retaining ring or flange 20 mounted upon the gutter flange 14.

By the process described, a tire rim having a partly perpendicular side flange may be formed by a single cold rolling operation. The process has the further advantage that the deforming of the rim in the cold rolling thereof occurs solely in portions thereof where the metal is of least weight or thickness, whereby the operation is facilitated and excessive strains on the metal avoided. Obviously the various angles specifically set out may be varied as conditions necessitate.

As many other changes could be made, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative only and not in a limiting sense; accordingly, various modifications of the invention may be resorted to without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A steel section for the manufacture of tire rims, said section consisting of a web, one margin of said web being formed with an upstanding tire retaining flange, the other margin of said web being formed with a downwardly extending rim mounting and side ring retaining channel, the lateral profile of which comprises a semi-circular marginal face that merges, on the under side of the channel, with a bevel mounting face extending toward the bottom face of the web, the top face

of said channel being formed with a side ring retaining gutter that is relatively shallow with respect to the depth of said channel, said gutter having a vertical front wall that merges with a ledge intermediate the top and bottom of said gutter.

2. A steel section for the manufacture of tire rims, said section consisting of a base portion, one margin of said base portion being formed with an upstanding flange, the other margin of the base portion being formed with a reversely extending channel, the external profile of which comprises a semi-circular marginal face that merges, on the under side of the channel, with an oblique face extending toward the bottom face of the base portion, the top face of said channel being formed with a gutter having a vertical front wall that merges with a ledge intermediate the top and bottom of said gutter, there being a sloping wall of uniform gradient extending from the top of the ledge to the bottom of the gutter.

3. A steel section for the manufacture of tire rims, said section consisting of a web forming a dihedral angle substantially along its longitudinal center line, one margin of said web being formed with an upstanding flange disposed substantially at right angles to the adjacent web portion for a portion of its height, the other margin of said web being formed with a downwardly extending channel the inner profile of which is formed with a gutter that is non-parallel to the outer profile of said channel, the channel being relatively stiff and thick as compared to other parts of the web structure.

4. A steel blank for the manufacture of a tire rim having a removable endless side ring, said blank comprising an annulus having a cylindrical section and a section integral therewith that gradually bends inwardly to form a dihedral angle with said cylindrical section, said second section terminating in a tire-retaining flange extending substantially at right angles thereto, a relatively heavier and stiffer portion on the side of said cylindrical section remote from said second section and having an endless side-ring-retaining gutter in its top face, said gutter having a continuous wall sloping inwardly and away from said cylindrical section to the bottom of said gutter, and an opposite wall inclined to the bottom of said gutter outwardly to an offset ledge intermediate the bottom of said gutter and the top of said latter wall and terminating in a section that is substantially at right angles to said cylindrical section to form retaining means for said endless tire-retaining side ring.

5. A steel blank for the manufacture of a tire rim having a removable endless side ring, said blank comprising an annulus having a cylindrical section and a section integral therewith that gradually bends inwardly to form a dihedral angle with said cylindrical section, said second section terminating in a tire-retaining flange extending at an angle thereto, and a relatively heavier and stiffer portion on the side of said cylindrical section remote from said second section having an endless side-ring-retaining gutter in its top face.

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