

J. H. TAYLOR.
PROCESS OF MAKING CAR WHEELS.
APPLICATION FILED APR. 1, 1907. RENEWED MAR. 28, 1910.

981,034.

Patented Jan. 10, 1911.

2 SHEETS—SHEET 1.

Fig. 4.

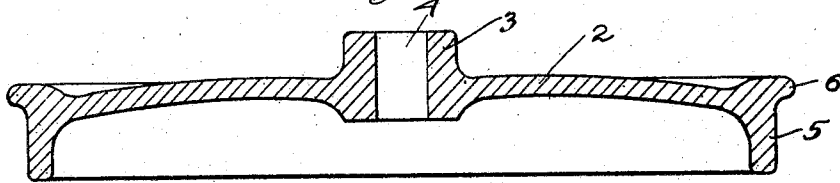


Fig. 5.

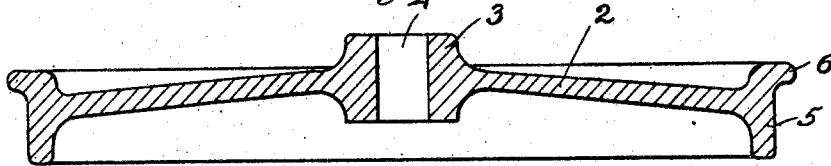
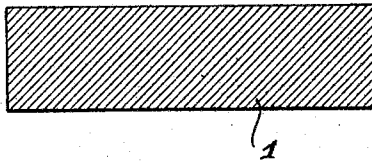


Fig. 1.



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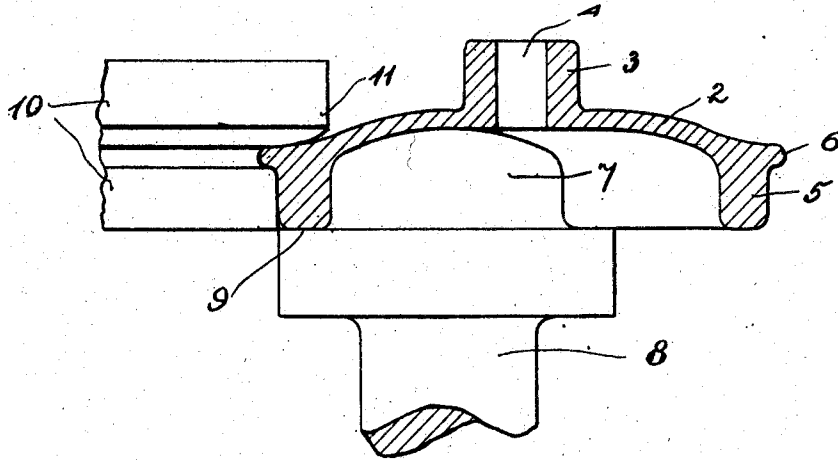


Fig. 2.

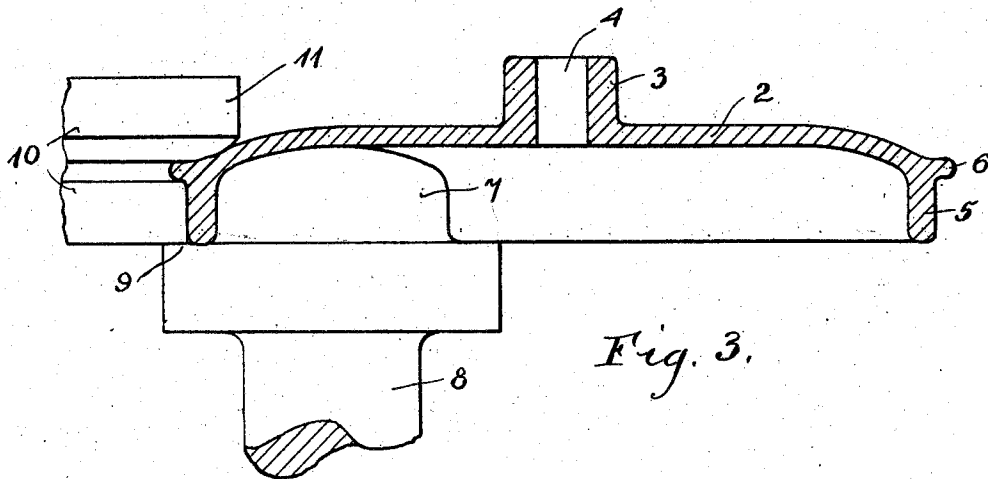


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES HALL TAYLOR, OF CHICAGO, ILLINOIS.

PROCESS OF MAKING CAR-WHEELS.

981,034.

Specification of Letters Patent.

Patented Jan. 10, 1911.

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To all whom it may concern:

Be it known that I, JAMES HALL TAYLOR, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Processes of Making Car-Wheels, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved process for making car wheels, its object being to produce integral car wheels from a steel blank by forging and rolling in such manner that the material will be properly worked and toughness and strength produced in the right places. The wheel should have its greatest toughness in the rim and particularly along the tread and should have its greatest strength in the flange. The rim should be tough to resist the wear and tear resulting from rolling, while the flange should be strong to resist derailment and strains resulting as the wheel passes over special work, such as frogs, switches, curves and so on. In prior art processes an embryo wheel is first drop-forged and this wheel then subjected to the action of rollers which engage the web, the inner side of the rim at each side of the web, and the outside of the rim and flange. The part of the tread area adjacent the flange, of course, is the part which most of the time is in engagement with the rail and consequently the metal at this point should be as tough, if not tougher than the rest of the wheel, and the material in the flange and about the flange should also be tough and strong. This normal tread area appears opposite the web, and in the processes of the prior art as referred to, there is no rigid abutment or roller provided opposite this normal tread area and consequently the metal cannot be worked properly. The rollers of course, engage the web and the rim at the sides of the web, but the metal cannot be worked thoroughly into the rim as it merely shifts and is never inclosed between absolutely rigid abutments or rollers and thus squeezed and worked into suitable form in the rim, the result being that where the metal should be the toughest, namely, along the normal tread area and at the base of the flange, it is fibrous and consequently weak. In my process provision is made for rolling or

compressing the entire rim part between solid and rigid rolls, thus working the material of the rim in the same fashion that it is worked in steel rims or tires for locomotive drive wheels.

I shall describe my process in detail with reference to the accompanying drawing in which—

Figure 1 illustrates in cross section a blank of steel or other suitable material; Fig. 2 shows the embryo wheel after having passed through a drop-forging stage and also showing rolls applied thereto for rolling out and working the rim; Fig. 3 shows the next form of the wheel after the rim and flange parts have been worked and rolled out to the proper form; Fig. 4 shows the shape of the wheel after a drop-forging treatment, and Fig. 5 shows the final form of the wheel after emerging from the final drop-forging treatment.

A blank 1 after being suitably heated is placed in the dies and drop-forged to form the section shown in Fig. 2, which section has the web 2, the hub 3 with its axle opening 4, and the embryo rim 5 and flange 6. The hub axle opening and web are in final form so far as thickness is concerned, but not in so far as their position with reference to the rim and flange is concerned. The hub is entirely on one side of the web, and the embryo rim is all on the other side of the web as shown. This shape of the wheel allows the head 7 of a roll 8 to engage along the entire width of the inner face of the rim, while the flange 9 of the roll engages the outside of the rim. The head 7 also engages part of the web 2. The roll 10 receives the flange of the wheel and engages along the entire width of the outer surface of the rim, a flange 11 on the roller engaging and backing up the other side of the rim part. As the rolls are driven, they are gradually brought closer together so that the rim is worked and compressed and the diameter of the wheel increased until the wheel assumes a shape approximately like that shown in Fig. 3 in which all the parts of the wheel are complete so far as dimensions are concerned but not in proper relative positions. After the rim and flange have thus been rolled out and worked to final dimensions, the wheel is placed between other dies and drop-forged by gradual stages until the final form shown in Fig. 5 is produced. Fig. 4 shows one of the intermediary forms while

the wheel passes through the final drop-forging stages. In Fig. 3 the wheel is dish-shaped, the hub being still all on one side and the web and the rim drawn out at the other side. During subsequent drop-forging treatment, the web is forced into the rim and the hub forced first to the intermediary position, as shown in Fig. 4, and then to the final position, as shown in Fig. 5. In the latter position the hub extends equal distances at both sides of the web. The web is conical and joins the rim approximately at the middle thereof.

When the wheel is first placed in the rolls, the entire rim part is rigidly backed up, and when the rolls are driven, the material in the rim is worked and compressed and is toughened and strengthened, particularly at the normal tread area and at the flange. The metal is not merely pushed from one position to another, but is confined between the rolls which are gradually brought together and thoroughly worked and compressed into final tough consistency, and if there were any weak or fibrous parts resulting from the first drop-forging treatment, these parts will be thoroughly worked back again to a uniform and tough consistency. During the final drop-forging process also the metal near the junction of the web and rim is thoroughly worked and further compressed into that part of the rim where it is most needed.

With my improved process of forming car wheels, I am, therefore, enabled to produce a car wheel in which the material, particularly in the rim, is toughened and strengthened and made all uniform and homogeneous. Of course, the arrangement of the rolls can readily be changed without interfering with my invention, as, for instance, instead of having one set of rolls which are gradually brought together, the wheel could be passed through successive sets of rolls.

I do not wish to be limited to the exact evolution shapes shown nor to the number of evolutionary stages or steps, the main feature of the invention being the production of an embryo wheel form which allows the entire rim part to be surrounded, backed up, and worked between rigid and solid abutments.

Having thus described my invention, I desire to secure by Letters Patent the following claims:

1. The process of forming car wheels which consists in first forging from a blank an embryo wheel having its rim material all at one side of the web, then rolling the rim part to the desired cross-section and at the same time bringing the wheel to the proper diameter, and then forcing the web and hub portions to their usual position within the rim.

2. The process of forming car wheels which consists in first forming an embryo wheel having the web at one side of the tread portion of the rim, then rolling the tread portion of the rim to the desired cross-section by applying pressure to the entire width of the inner and outer surfaces thereof, and then forcing the web to a position within the rim.

3. The process of forming car wheels which consists in first forming an embryo wheel having the web at one side of the tread portion of the rim, then rolling the tread portion of the rim to the desired cross-section by applying pressure to the inner and outer surfaces thereof, and then forcing the web to the proper position within the rim.

In witness whereof, I hereunto subscribe my name this 26th day of March A. D., 1907.

JAMES HALL TAYLOR.

Witnesses:

CHARLES J. SCHMIDT,
FRED W. KOEHN.