(No Model.)

L. R. FAUGHT.

CHILLED CAST IRON CAR WHEEL.

No. 477,524. Patented June 21, 1892.

FIG. 12.

FIG. 13.

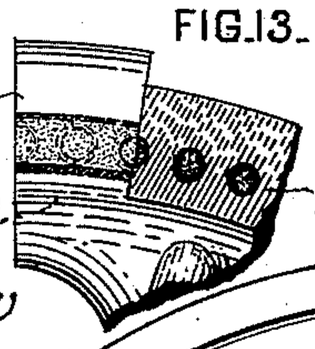

FIG. 1.

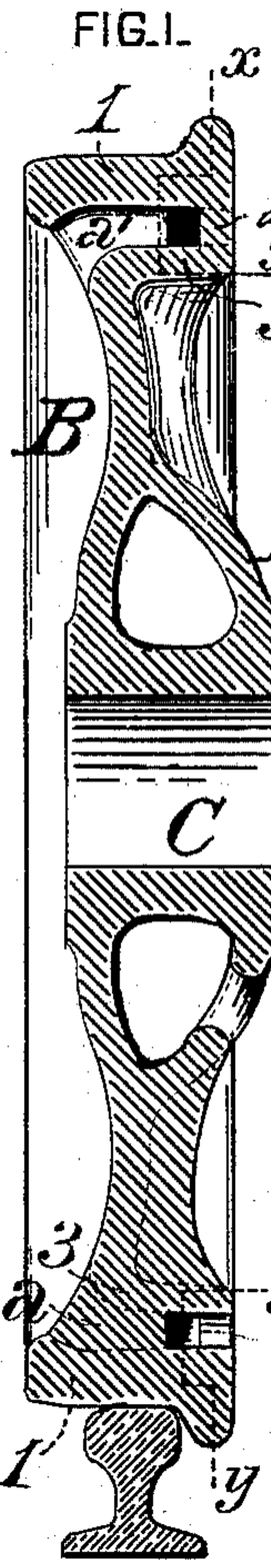

FIG. 16.

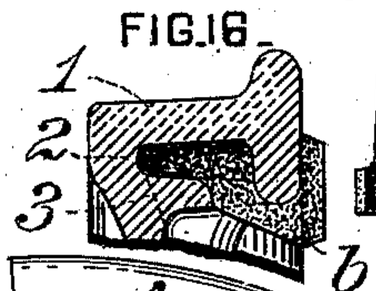

FIG. 14.

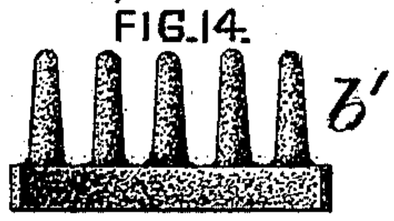

FIG. 18.

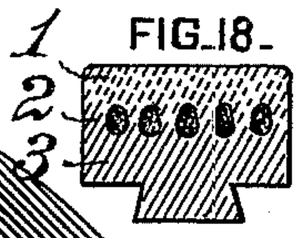

FIG. 2.

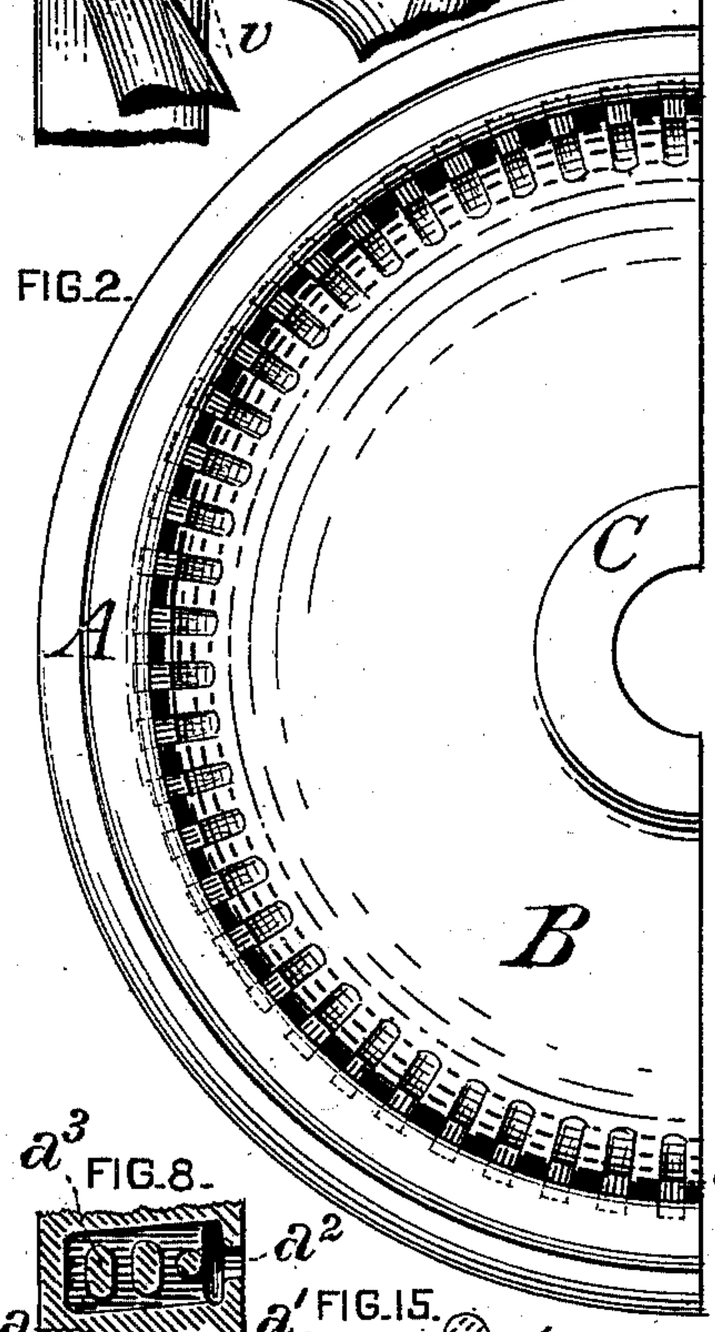

FIG. 3.

FIG. 8.

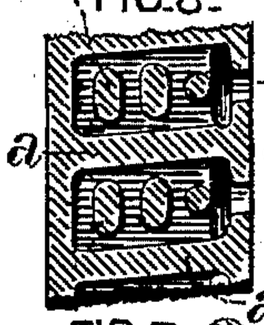

FIG. 15.

FIG. 11.

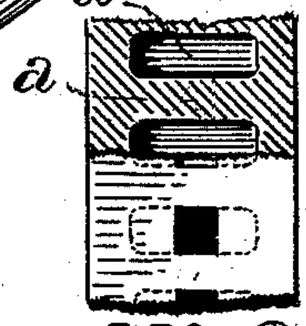

FIG. 7.

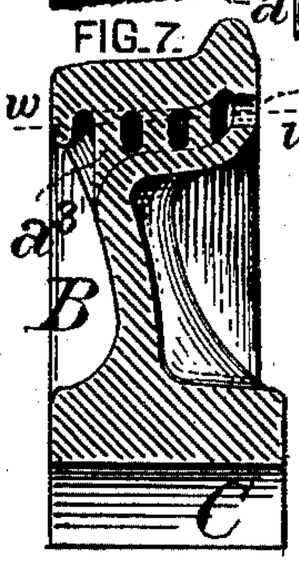

FIG. 6.

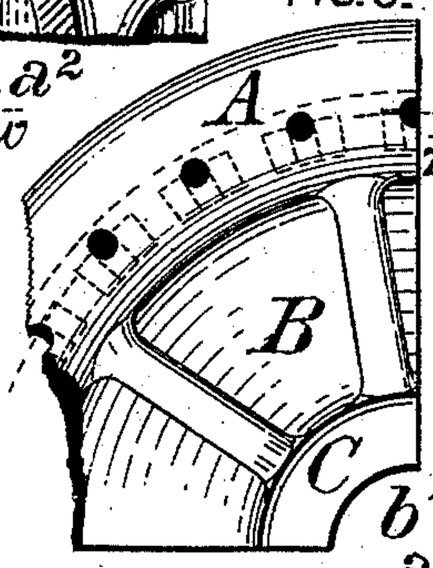

FIG. 4.

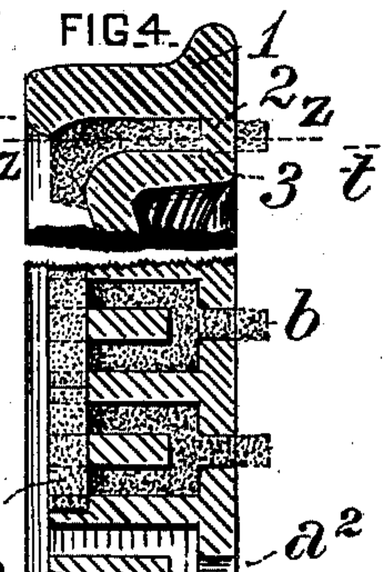

FIG. 5.

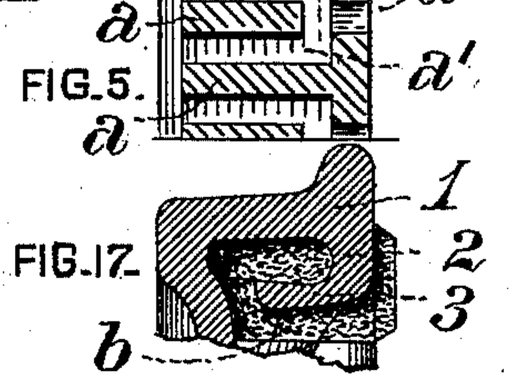

FIG. 10.

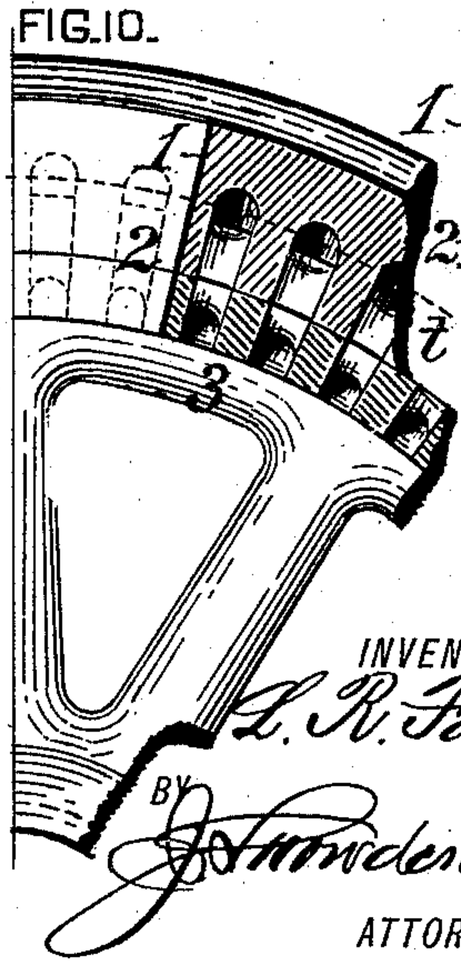

FIG. 9.

WITNESSES:

T. J. Hogan.

F. E. Gaither.

INVENTOR

L. R. Faught.

BY

J. Warden Bell.

ATTORNEY

UNITED STATES PATENT OFFICE.

LUTHER R. FAUGHT, OF PHILADELPHIA, PENNSYLVANIA.

CHILLED CAST-IRON CAR-WHEEL.

SPECIFICATION forming part of Letters Patent No. 477,524, dated June 21, 1892.

Application filed February 13, 1892. Serial No. 421,410. (No model.)

To all whom it may concern:

Be it known that I, LUTHER R. FAUGHT, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Chilled Cast-Iron Car-Wheels, of which improvement the following is a specification.

My invention, while relating more particularly to chilled cast-iron wheels for railroad service, is likewise applicable to other chilled castings, and, generally stated, is designed to attain therein a better and more uniform quality and depth of chill than heretofore in a casting of great structural strength and durability.

Its objects are, specifically, first, to overcome the difficulties ordinarily attending the chilling of the treads of comparatively heavy wheels and the wearing-surfaces of other castings of thick and heavy section; second, to render the parts more elastic under the strains and concussions to which they are subject in practical service, and, third, to insure the molten metal being run more solidly into the sections to be chilled and to prevent the formation of blow-holes and shrinkage cavities.

To these ends my invention, generally stated, consists in the combination, in an integral casting, of an outer solid section, having a chilled rim or face, an intermediate cellular section formed of a series of webs or ribs with interposed open spaces, and an inner or base section. The improvement claimed is hereinafter fully set forth.

In forming a chilled surface upon an iron casting the iron portion of the mold is, as is well known to those skilled in the art, the only one which is effective in the production of the desired result, and its capability to this end is limited and is uniform, whether the section to be chilled is thick or thin. Consequently a chill of sufficient depth might be produced on a comparatively thin section while it would not be on a thick one, the relative depth of chill varying in inverse proportion to the thickness of the section. It will therefore be seen that in the heavier and more important class of railroad-wheels the chill-depth would ordinarily be the least and the quality of the product would be correspondingly deficient in excellence. Expansion and shrinkage result from the contact of a heavy body of molten metal with a chill, and the perfect roundness of contour which a properly-constructed and serviceable railroad-wheel should possess is impaired to a greater or less degree by variations from uniform close contact between the cast metal and the chill. Such variations have been minimized and the quality of chilled wheels substantially improved by the introduction of what is known as the "contracting chill," which was devised by me for the purpose of maintaining the uniform close contact above referred to and in which, by reason of the inner portion of the chill (or that adjoining the surface of metal to be chilled) being divided circumferentially into a series of independent but connected sections, the expansion of said sections by being heated is in correspondence with the contraction of the metal in cooling, and the inner surface of the chill contracts in diameter, so as to accompany the contraction of the cast metal, a close and uniform contact throughout of the chill and the wheel being thereby effected and maintained.

My present invention is an improvement in the form and construction of a chilled wheel or other casting between which and that of an effective and desirable chill there is designed to be a mutual co-operation or contributionship in the formation of the casting, as will presently be seen.

The essential principle of my invention is the formation of the circumferential portion of a chilled wheel in three sections, which, while cast integral, have distinctly separate functions. The first or outer section is the rim or tread portion proper, and is solid and comparatively thin; the second or intermediate section is a cellular structure formed of a series of ribs or webs with interposed open spaces or cavities, and the third or inner section is the base from which project in radial planes the ribs or webs of the intermediate section by which the inner and outer sections are connected. In the formation of the casting the cores which are introduced to form the intermediate cellular section serve as a line of barriers or separating members which tend to more evenly distribute the molten iron in its progress toward the surface of the chill, so that a more uniform and equal chill-

ing effect will be produced throughout the tread, and also serve to prevent the access of scum and foreign matter to the chilling-surface. The structure of the circumferential portion of the wheel is one which combines strength with lightness, and in operation the circulation of air with more or less activity through the cells or spaces of the intermediate section tends to conduct away heat that may be imparted to the tread by the application of excessive braking force.

In the accompanying drawings, Figure 1 is an axial section through a double-plate car-wheel illustrating an application of my invention; Fig. 2, a half front view of the same; Fig. 3, a half rear view of the same, the upper and the lower portions being shown partly in section at the lines *x x* and *y y*, respectively, of Fig. 1; Fig. 4 an axial section through the rim or outer portion of the same, showing one of the cores of the cellular section in position; Fig. 5, a circumferential section through the same at the line *z z* of Fig. 4; Fig. 6, a partial rear view of a single-plate wheel embodying my invention; Fig. 7, an axial section through the same; Fig. 8, a circumferential section through the same at the line *w w* of Fig. 7; Fig. 9, an axial section through a portion of a spoke-wheel illustrating the application of my invention in a modified form; Fig. 10, a partial front view of the same, a portion being shown in section at the line *s s* of Fig. 9; Fig. 11, a view of a portion of the tire-section of the wheel shown in Figs. 9 and 10, the same being in elevation as seen from the inside, and partly in circumferential section at the line *t t* of Fig. 10; Fig. 12, an axial section through the rim portion of a wheel, showing another form of the cellular section; Fig. 13, a partial rear view of the same, a portion being shown in section at the line *v v* of Fig. 12; Fig. 14, a view in elevation of a core for forming the cavities or cells in the intermediate section of the rim portion of the wheel shown in Figs. 12 and 13; Figs. 15, 16, and 17, axial sections showing minor structural variations in the form of the rim portion of wheels, and Fig. 18, a section through an anvil-block in accordance with my invention.

As illustrated in Figs. 1 to 5, inclusive, my invention is applied in a chilled cast-iron car-wheel of the well-known double-plate type, having its outer or rim portion A connected by curved or dished plates B B′ with a central hub C. Except as to the construction of the rim portion, these parts, as well as the flange and the adjoining tread or face of the wheel, are of the ordinary or standard form. As heretofore constructed, the portions of chilled wheels on which the tread and flange are formed have ordinarily been cast solid and of greater or less thickness, in accordance with the diameter of the wheel and the nature of the surface for which it is designed. Chilled wheels having hollow rims, among early examples of which may be cited the "Bourshett wheel," are also well known in the art, their rims being a continuously-hollow annulus, and differing essentially from my invention in the particular that no cellular structure whatever was designed to be or constitutes a part of them.

In the practice of my invention I form the rim, outer, or circumferential portion A of the wheel of three separate but connected sections 1 2 3, which are preferably all cast integral. The outer or tread section proper 1, upon which the flange is formed and which is chilled on its outer portion, is of solid section, and is of proper thickness to sustain strain and wear in service, but thinner than the ordinary solid rims are usually made. A second or intermediate section 2 immediately adjoins the outer section 1 and is connected thereto and to an inner or base section 3 by being cast integral with each of said sections 2 and 3, when it is itself integral, as in all the forms shown except that of Figs. 9, 10, and 11, in which it is circumferentially divided, its outer part being integral with the outer section 1 and forming with the same a chilled tire, and its inner part being integral with the inner or base section 3. The inner section 3 is cast solid, except in so far as it may be perforated by openings to the cells or spaces of the section 2, as in Figs. 16 and 17, and constitutes the base, from which project radially the ribs or webs of the cellular section 2, and which is connected directly by a plate or plates or by spokes or arms, as the case may be, with the hub C of the wheel.

The intermediate section 2 is composed of a series of webs, ribs, or division-plates *a*, which extend in radial planes between the sections 1 and 3, and may be in length either equal to the full width of the rim portion A or shorter than such distance, or, as in the construction of Figs. 1 to 5, longer and shorter ribs may be alternately located. The webs *a* are separated by interposed cells or open spaces *a′*, which are formed by the insertion of suitable cores *b* in the mold, said cells having openings a^2 at one or both ends. The presence of the cores *b* serves to distribute the molten metal in its passage toward the chill and to form a barrier to scum and foreign matter, and the cells *a′* lighten the rim-section and permit a circulation of air through the same which tends to prevent undue heating of the wheel in service by the brake-shoe. The portions of the wheel shown in section in Fig. 3 above and below its center, are taken at the lines *x x* and *y y*, respectively, of Fig. 1.

It will be obvious that various modifications may be made in the form and structural detail of the intermediate section 2 without departure from the governing principle of my invention, among others the following, which are illustrated in the drawings: Thus in the wheel shown in Figs. 6, 7, and 8, the webs *a* are set obliquely to the front and rear surfaces of the rim instead of being at right angles thereto, as in the instance first described. The main or principal webs are also set at a

greater distance apart, and supplemental webs a^3, in the form of posts or columns, are located between them.

Figs. 9, 10, and 11 show the cells a', as formed in substantially **I**-section, and separated one from another by webs extending entirely across the rim. The cells are not in this case open at their ends, and the outer, intermediate, and inner sections are, further, not cast integral, as in the previous instances. The outer portion of the intermediate section 2 is integral with the outer section 1, thus forming a separate tire, and the inner portion of the section 2 is integral with the inner or base section 3, forming the rim of the wheel proper, or wheel "center" as it is termed. It will be seen, however, that when the tire and center are fitted together the same essential construction and relation of the three sections are presented as in the prior cases.

In Figs. 12, 13, and 15 the cells a' are of conical or tapering form, and do not extend entirely through the section, being open at one end only. The semicircular-sided bodies of metal between the cells from the webs of the section 2 and the wheel is preferably cast flange downward, so as to allow the molten metal to flow around the cores b', Fig. 14, and hold them firmly in place, which will be found to greatly facilitate their introduction and handling.

Fig. 15 shows a cell of similar form, and also shows a rib or projection on the inside of the section 3, and Figs. 16 and 17 show the openings from the cells for the withdrawal of the cores as formed in the inner section 3, instead of in the front or rear of the intermediate section 2.

An instance of the application of my invention to chilled castings other than railroad-wheels is shown in Fig. 18, which is a vertical transverse section through a trip-hammer die or anvil block composed of an outer section 1, having a chilled face, an intermediate cellular section 2, and a base-section 3, these three sections being formed in an integral casting. Other instances in which the same essential principle of construction may be similarly applied in chilled castings of different forms and functions will naturally suggest themselves to those familar with the art.

I claim as my invention and desire to secure by Letters Patent—

1. In a chilled-iron casting, the combination of an outer section having a chilled rim or face, an intermediate cellular section formed of a series of webs or ribs with interposed cells or open spaces, and an inner or base section, substantially as set forth.

2. In a chilled cast-iron railroad-wheel, the combination, with a hub and a connected body-plate or equivalent series of arms, of a rim composed of an outer section having a chilled rim or face, an intermediate cellular section formed of a series of webs or ribs with interposed cells or open spaces, and an inner or base section, substantially as set forth.

3. In a chilled cast-iron railroad-wheel, the combination of an outer section having a chilled rim or face, an inner or base section integral with the main body of the wheel, and a series of webs or ribs projecting in substantially radial planes from the inner section and separated one from another by cored cells or spaces which are interposed between the inner and outer sections, substantially as set forth.

4. In a chilled cast-iron railroad-wheel, the combination of an outer section having a chilled rim or face, an inner or base section integral with the body of the wheel, and a series of webs or ribs projecting in substantially radial planes from the inner section and extending alternately, entirely, and partially across the section, said webs being separated one from another by open-ended cored cells or open spaces which are interposed between the inner and outer sections, substantially as set forth.

LUTHER R. FAUGHT.

Witnesses:
CHAS. E. PANCOAST,
SAMUEL COLLINS.