made by sewing such material in the shape of tidies, like Exhibit A, for example, or as a border around a plain center, are laces and articles made of lace, but contends that the commercial designations "laces" and "lace" are confined to those forms of the fabrics commonly known as laces which are sold by the yard. The strength of this contention lies in the fact that, when purchasers ask for such articles other than lace by the yard, they designate them as "lace tidies." I do not understand that this fact takes the article out of the class of laces. It is conceded that a person who wished to buy lace for edges or insertions or flouncings would ask for lace edgings or insertions or flouncings, as one witness says, to indicate somewhat its width or purpose. In the same way, the purchaser would designate what kind of laces he wished when he called for lace collars, cuffs, or handkerchiefs. It appears that even lace 36 or 63 inches in width, one width of which would be sufficient to make a whole dress, would be included under the commercial term "lace." The importer, however, contends that, if these tapes, rings, and thread are put together in a certain pattern, it is lace when it is made straight to be sold by the yard, but it is not lace when it is made in a curved form or in a square. In view of the fact that these articles are commonly included under the term "laces," and in view of the fact that nearly all of the witnesses testify they are commercially known as "lace tidies," and in view, further, of the testimony of several witnesses that lace collars, cuffs, and other articles not made to be sold by the yard are known commercially as "laces," I find that the importer has failed to prove his contention that there is such a universal trade term or designation "laces" as would include an article made by the yard, and exclude the same pattern when made in other forms. The decision of the board of general appraisers is reversed.

RUBBER TIRE WHEEL CO. v. COLUMBIA PNEUMATIC WAGON WHEEL CO.

(Circuit Court, S. D. New York. December 27, 1898.)

1. PATENTS—INVENTION—NEW COMBINATIONS OF OLD PARTS.
   The combination of old parts which had been used in other combinations, but not together, in a manner to obtain the combined and harmonious action of all such parts, and the full benefit of the peculiar advantages of each, producing a successful result which had not previously been achieved, constitutes patentable invention.

2. SAME—EVIDENCE OF INVENTION—SUCCESSFUL OPERATION.
   The commercial success and wide use of a patented device is entitled to consideration where the question of invention is in doubt; as is also the fact that prior devices, alleged to have been anticipations, were not successful.

3. SAME—RUBBER-TIRED WHEEL.
   The Grant patent, No. 554,675, for a rubber-tired wheel, discloses patentable invention, and was not anticipated by anything in prior patents, either English or American, though the several parts which constitute the essential features of the invention were each used in different combinations in previous inventions.

This is a suit in equity by the Rubber Tire Wheel Company against the Columbia Pneumatic Wagon Wheel Company for infringement of a patent.

Paul A. Staley, F. P. Fish, and Kerr, Page & Cooper, for complainant.
C. W. Stapleton and Frederic H. Betts, for defendant.

THOMAS, District Judge. The complainant is the owner of letters patent of the United States, No. 554,675, issued February 18, 1896, to A. W. Grant, for a rubber-tired wheel. The tire manufactured pursuant to this patent, commonly known as the "American" tire, in distinction from the "English" tire, proved so acceptable that it came into general use, and practically excluded all other solid rubber-tired wheels from the American market. It is not necessary to describe at length its complete success. It is sufficient that it commands the trade in its peculiar field. The defendant desired to manufacture a solid rubber tire, and with that view carefully examined all styles of rubber tire, and thereupon adopted, and has since been making and selling, the precise tire made by the complainant pursuant to its patent; or, if there is any deviation in form, it is so slight as to be observable only upon the nicest scrutiny. The defendant excuses this appropriation upon the ground that the complainant's combination had been so thoroughly anticipated by prior patents as to present in function or result no patentable invention. The complainant correctly states that its tire is composed of three principal parts: (1) A "channel, or retaining seat of iron or steel, fitted into the wheel-rim; (2) a strip of solid rubber, seated in the channel; and (3) two independent retaining wires, passing entirely through this rubber, so as to encircle the wheel, the ends of the respective wires being united, so as to form two independent rings."

These essential parts have each peculiarities of form, and relation one to the other. The under side of the rubber is covered with a strip of fibrous material, usually canvas, which (1) strengthens the base, and tends to reinforce the rubber under the action of the wires passing through it, when strains are brought upon such wires, and (2) tends to prevent wear on the bottom of the rubber. The sides or flanges of the channel incline outwardly, forming with its base a tapered or flaring groove or channel. The inner or unexposed sides of the rubber are fitted into and conformed in shape to the channel, to a point obviously inferior to the upper edges of the flanges, at which point the exposed sides, making an obtuse angle with the unexposed sides, incline inwardly and upwardly and away from the flanges, and gradually round and diminish into the tread of the tire, which is formed on the arc of a circle of much smaller diameter than the width of the rim. The result of the flaring flanges is that the rubber, in moving or springing laterally, is not pressed sharply against the edges of the flanges, and thereby injured, as would be the case if the flanges inclined inwardly. The two wires pass through the rubber longitudinally, in openings which are below the edges of the flanges, and on a line with the vertices of the angles made by the unexposed and exposed sides of the tire; and the ends of each wire are fastened to-

Fig 1

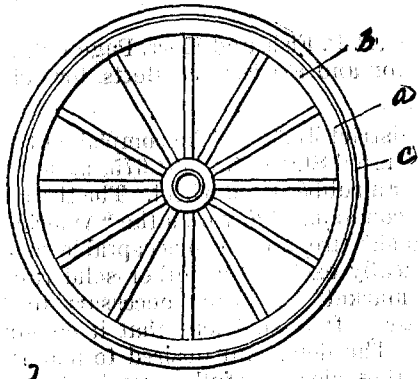


Fig 2

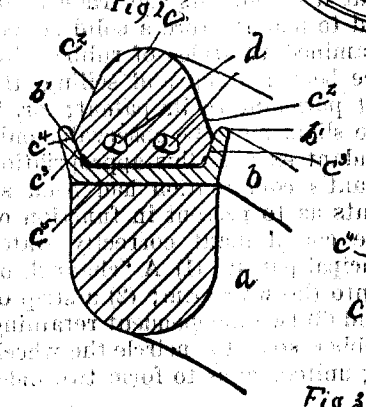


Fig 4

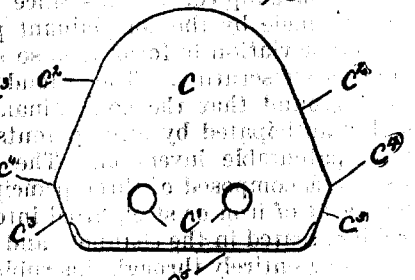
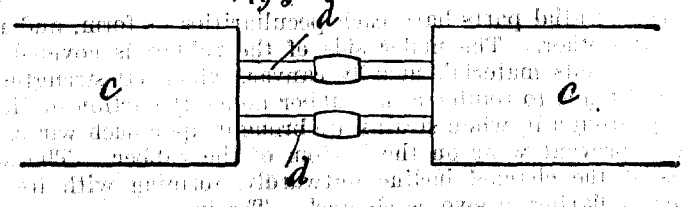


Fig 3



gether, after having been drawn sufficiently tight to hold the rubber within the channel, but not so rigidly as to prevent the rubber moving slightly in its seat, and thereby to a degree yielding to any force opposing the progress of the wheel. This latitude of movement, together with the elasticity of the rubber, permits the tire to accommodate itself to the obstacles with which it comes in contact when the wheel is in motion. This lateral movement allowed to the rubber, whether arising from its permissible turning on the wires, or from its own elasticity, or both, and the adaptations which, notwithstanding such movement, tend to preserve the tire from abrasion by the rim, are essential features of the tire.

Is this combination novel? Does it produce a result not previously known in the art? Mr. Stapleton, the defendant's president, testified:

"I don't mean to say that I find the exact form shown in the Grant patent in any one prior patent, but I find all the features and advantages claimed to be obtained in the Grant construction in more than one prior patent, and the slight changes of construction in the Grant patent from the prior patents are exactly shown and described in other prior patents."

Mr. Benjamin, the expert for the defendant, states:

"All the elements of both claims of the patent in suit are disclosed in the patents and publications adduced in the prior art, operating in like manner to produce a like result. * * * No one structure in the prior art as here shown is a fac simile in every detail of the structure of the patent in suit."

It is understood from these statements that the defendant claims that all the features and functions specified or existing in the Grant patent are not disclosed in any one patent, but that every feature and function disclosed by the Grant patent is to be found in prior structures and patents. Upon the argument the complainant's counsel was understood to state to the court that the complainant's patent must be sustained, if at all, as a patentable combination of parts. Hence it may be considered in what tires the chief parts forming the present combination existed previously, in conjunction with what other elements, and for the performance of what offices.

First, as to the tapered channel with flaring flanges. Willoughby patent (British), No. 5,924, also No. 18,030, of 1892 (Fig. 30); Myers patent, No. 468,971, of 1892 (Fig. 3); Rodgers patent, No. 589,826, of 1895 (Fig. 1); Elliott patent, No. 440,702, of 1890 (Fig. 3); Owen patent (United States), No. 365,091, of 1887,—all show channels with flanges more or less flaring, or inclined inwardly from the base of the channel or rim. Certainly it is not new to set solid rubber within such channels, with flaring flanges. In the Willoughby patent, No. 18,030, several figures show a channel with flaring flanges, secured to the felly, into which is fitted a rubber rising somewhat above the flanges, "having annular recesses or projections therein," on which is superimposed "a metallic tyre in sections, having recesses or projections corresponding to or engaging with those in the rubber bed." See, also, Willoughby patent, No. 5,924, Meyers, Elliott, and Rodgers patents, which show rubber set into a channel with flaring flanges. This is true also of the Walker (British) patent of 1877. Therefore, without noticing for the moment some substantial differences between these rubbers and those of the complainant, it may be concluded that applying rubbers to channels with flaring flanges was anticipated by the patents mentioned, as appears from the figures accompanying such patents.

The purpose of inventors respecting rubber set in rims with flaring flanges may be ascertained by reference to the specifications in several patents. In the Owen letters patent, No. 365,091, of June 21, 1887, for tire for velocipede, attention is called to the inclination of the tire to expand laterally under pressure, "so that it projects beyond the edges of the rim, and is sheared or cut off thereby," and the patentee states:

"To avoid this difficulty, I reduce the width of the tire outside of the rim or felly, making its sides either of a flat or concave form, or of other form falling within the semicircle, so that, when subjected to pressure, the lateral

expansion or enlargement will not cause the tire to project beyond the rim. This construction is plainly shown in Figures 5, 6, and 7."

An examination of such figures does show a channel, with flaring flanges, and within it a "tough refractory" rubber, which is not fitted to, and does not rest directly upon, the base of the channel; but does rest on a supporting inner layer of soft elastic rubber, but the unexposed sides do partially rest upon the flaring flanges. The sides of the exposed part of the tire make an angle with the unexposed sides of the rubber, the angle as shown in Figs. 6 and 7 being slightly below the upper edge of the flange. Figs. 6 and 7 show the rubber in its exposed part in form similar, but not identical, especially in the shape of the tread, with the form of complainant's tire in its exposed part, such exposed sides being flat in Fig. 6, and concave in Fig. 7. Other figures accompanying the letters to Owen show the exposed portion of the rubber in concave and convex forms, fitted in connection with an underlying rubber in channels with flanges, which in some instances incline inwardly, and in other cases incline outwardly. This tire is similar to complainant's tire in these respects: Flaring flanges are shown in Figs. 5, 6, and 7; the unexposed sides in part rest against such flaring flange; the exposed sides make an angle with the unexposed sides at a point slightly below the upper edge of the flanges; the sides of the exposed portion are flat in Fig. 6; the tread is formed on the arc of a circle of smaller diameter than the width of the rim.

Letters patent (United States) No. 424,452, of April 1, 1890, issued to Biersmith, show (Fig. 1) a channel with corrugated flanges with flaring edges, although the unexposed sides of the rubber are concave. Respecting this figure it is stated in the specification:

"By reference to Fig. 1, it will be seen that the act of corrugating the rim circumferentially tends to flare the upper or outer edges, E, of the sides, C, to cause the same to extend slightly from the rubber tire, thereby preventing an abrasion of the same, and allowing the tire to cushion upon the smooth flare of the rim when compressed by contact with the ground or pavement."

In this patent the exposed portion of the rubber is formed on the arc of a circle. The essential resemblance to the complainant's tire is in the fact that the corrugated sides flare at their upper edges, and that it is suggested in the specification that this is done to allow the tire to cushion upon the flare, and thereby avoid abrasion of the rubber when compressed.

The British letters patent, No. 14,812, of July 4, 1891, issued to Lenton, provide:

"The rim in cross section is a segment of two circles united together also, to receive the upper part of the tire (and secured in any manner), and may be termed 'duplex' or 'double' rim, the edges of which are brought outward, and in some cases rolled over, so that the cutting action of tire of the ordinary air cushioned or pneumatic is prevented."

The specification further states:

"According to the construction of my tire as above set forth, there is no tendency to overlap the rim, the action of the superincumbent weight being rather to press the rubber well into the hollows of the rim, and to prevent it from springing off, as might happen with a tire and rim of spherical section."

That patent shows a tire adjusted to the "segment of two circles united," without space between the sides and upper edge of the flange,

and (Fig. 5) an angle at the upper edge of the channel; but the tire in outline cross section resembles the "heart" or "pip" shape.

The Elliott letters patent, No. 440,701, state:

"In accordance with this invention, a metallic strip is drawn or passed through suitable dies or rolls to present a trough-shaped band or tire having outwardly flaring or divergent sides, the upper edges of which are rolled over. The rubber tire is placed in this trough-shaped band, and fastened by pins or rivets passing through it." Again: "By making the metallic tire in this manner, the rubber tire, when compressed by a direct or lateral pressure, and thereby overlying the metallic edges, b', will not be cut or injured by said edges, while said edges are made sufficiently high to properly re-enforce the rubber tire."

The first claim states:

"(1) The metallic band, b, made of trough shape, and having the sides, b', extending from the bottom plate, and diverging from one another from the plane of the bottom plate, and having their outer edges rolled over, substantially as shown and described, and adapted to receive a rubber tire, which is secured in said band by transverse fastenings," etc.

Letters patent (United States) No. 539,826, of May 28, 1895, issued to Rodgers, on which defendant relies to show anticipation, and of whose priority over complainant's actual invention there is some doubt, state:

"My invention relates to that class of tires made of rubber, and held within a flanged or concave rim, and consists in making the rubber tire in two parts, extending peripherally around the rim, the inner part conforming to the shape of the flanged rim, in cross section, fitting snugly therein, and having a peripheral groove to receive the outer part of the rubber tire fitting therein, in terminating the inner part of the rubber tire, fitting within the rim, in shoulders at the outer edges of the rim flanges, and making the outer wearing part of the tire of less diameter than the inner part and than the distance between said flange edges, so that it cannot be pressed outward over said flanges to be cut thereby." Again: "In Figs. 6, 7, and 8 the tire is shown made in one piece, the inner part, indicated by B', terminating in shoulders, B^3, at the outer edges of the rim flanges, and the semicylindrical or semielliptical part C' (corresponding to the part C), rising centrally from the periphery of the part B', with its sides sufficiently removed from the rim flanges to prevent the part C' from being crowded over upon and cut by said flanges."

Although the figure and specification show a channel or rim with flaring flanges, and that the part of the rubber without the flanges is of less diameter than the inner part thereof, so as to prevent cutting the rubber, yet the rubber in form, and the fitting of the same in the rim, is essentially different from the complainant's tire.

The patents above enumerated will be compared or contrasted hereafter with the Grant tire.

The third essential part of the complainant's tire relates to the manner of fastening the rubber within the channel. For the purpose of showing anticipation, the defendant calls attention to several earlier patents for rubber tires. It will be recalled that the complainant's rubber contains two independent and continuous retaining wires, passing through longitudinal openings in the rubber, the tops of said openings being substantially on a line with the angle made by the exposed and unexposed sides, and below the outer peripheries or upper edges of the flanges. The Claypool patent (United States) No. 431,223, of July 1, 1890, presents some similarity. The specification states:

"Fig. 5 is a transverse section of the rim and tire, showing two strands of tightening band employed in holding the tire in place." Again: "G represents a tightening band, preferably of wire, which is passed through the slit or opening, F, and into the channel, E, of the tire." Again: "Instead of using but one tightening band, G, it is evident that I may use a plurality of such bands, as seen in Fig. 5."

This patent shows a rubber held in a channel, the sides of which are at right angles to its base, or converge inwardly, by one wire or two wires near together, passing through openings placed slightly above, below, or on a line with, the upper edges of the flanges. The specification states:

"In practice I prefer to turn the flanges of the rim inward slightly to form a dovetail channel for the reception of the expanded side of the base portion of the tire; but it will be apparent that I may employ a rim with a rectangular channel, and form the tire with an arched base, to normally rest thereon, and secure the same in place by means of the band, G, as shown in Figs. 7 and 8."

The letters (British) No. 5,924, of 1892, issued to Willoughby, show in Figs. 5a and 5c a rubber with a single opening near the base of the channel, and in Fig. 8a two openings near the base of the channel, and each nearer to the adjacent side or flange than to the other opening; and Willoughby patent, No. 18,030, of 1892, Fig. 30, shows two openings in the exterior metal tire. Through the opening a metallic rod or wire, which is coiled in parts, is passed, of which the specification (letters No. 5,924) speaks as follows:

"I unite the ends of the coil or coils, which will also bring together the two ends of the attached rubber; so I form the combination into a hoop, or I may leave the ends disconnected until the combination is laid around the periphery of the wheel it is to occupy, and, forcibly drawing the ends together, I unite them in place in a manner described in patent No. 406,490, or in some other convenient way, so I avoid the stretching over the sides of the wheel rim. This, in some of the applications of my invention, is an advantage. * * * Once on, and the circle complete, lateral displacement is prevented by the sides or flanges of the channel, and the tension of the coil keeps the tire tightly in place."

It is evident that the Willoughby patents show duplicate openings for holding a rubber tire in a channel with flanges and metal wire, coiled in portions thereof, passing through the same, although not a simple wire in channels with flaring flanges, supporting a rubber in the form employed by the complainant, and described in his letters patent.

The Elliott patent (United States), No. 440,701, of November 18, 1890 (Fig. 2), shows a channel with flaring flanges, in which is seated a rubber adjusted to the channel, with an opening whose superior boundary is substantially in a line with the upper edge of the flanges, fashioned in shape to receive a flat strip of metal, whose ends pass out through an opening in the tire and felly, and made fast to the inner periphery of the felly. This mode of holding the tire within the channel seems to the court to be so remote in function to the complainant's wire attachment as to preclude further comment thereon. In the letters (No. 440,702) to Elliott it is said:

"I do not desire to limit my invention to the formation of the slot at any particular point of the felly, nor to any particular shape of the opening in the rubber tire to receive the same. * * * While I consider a flat strip the

best to use, as it prevents a wider bearing surface on the tire to hold down the edges, and prevent it from rolling, yet the metallic block may be formed to accommodate a strip other than flat."

This statement is too indefinite to foreshadow the complainant's device. The same immediate disposition may be made of the Beale (British) patent, No. 11,329, of 1883, and other similar devices. The letters (United States) No. 539,826, of May 28, 1895, issued to Rodgers, illustrate an attachment of the rubber within the channel by means of one or two circular openings in the rubber. The specification states:

"The tire may be perforated for one wire, as in Fig. 6, for two, as in Fig. 7, or for a flat metal core, as in Fig. 8." Again: "The outer portion, C, of the rubber tire, or tread, is provided with a central base and perforation; and through this a wire, e, or other suitable form of metal core, is drawn, and, the rubber being compressed therein, to give it the desired power of resistance, the ends of the core are joined in any suitable manner to prevent its stretching, the recoil of the compressed rubber serving to hold the ends of the rubber tire in snug contact, without the aid of cement, though the latter may be used if desired."

The figures indicate clearly openings according with this description, but located so that about one-half of the opening is above the outer periphery of the flanges. The Hoffman (British) patent, No. 1,901, of 1890, also, it is claimed, shows a similar means of attaching the rubber to the rim; but, as it does not seem to have received more than passing notice in the briefs of counsel, it need not be considered in detail.

These patents show that the employment of wire or wires passed through openings made longitudinally in the rubber, and the binding of the ends of these wires together, to hold the rubber in the rim, had been used before the Grant tire was invented.

The remaining element of the Grant tire is the canvas or fibrous strip placed at the base of the tire, to prevent the breaking of the rubber below that portion of the tire which is between the retaining wires and the rim. A similar use of canvas is common in rubber appliances, and is found and clearly described in connection with rubber tires in the British patent of Timberlake, of December 18, 1890, British patent of Crowther, No. 9,006, of 1892, and in the United States patent of Lyon, No. 418,982, issued in 1890. The function attributed to it in the Grant patent seems to have been anticipated. To this point an attempt has been made to present with slight discussion all patents to which attention is called in the defendant's printed brief, save the Du Bois tire, alleged to have been made in Philadelphia, in the years 1891–1893. In January, 1890, letters patent (United States) No. 419,005 were issued to Du Bois for tire for vehicle wheels. The claim is:

"(1) A vehicle wheel having a tire with side flanges, a tread having shoulders thereon, and an upset annulus surrounding said tread and within said tire, said parts being combined substantially as described."

The specification states:

"I am aware that it is old to secure a tread within a tire by means of wires passed circumferentially around the said tread, but I am not aware that it is common to secure the tread by upsetting an annulus thereon, as herein described and claimed."

Complainant's Exhibit No. 7 is said to be a Du Bois tire. It shows a rim with inwardly inclining flanges, holding an oval-shaped rubber, through which passes longitudinally a band, similar to that employed by Elliott and Beale. This adds nothing to the knowledge of the patents already discussed. There is, however, oral evidence of a tire of different shape, which Du Bois claims to have made, which he thus described:

"A rubber tire having a strap passing through the tire a certain distance from the bottom, the channels from the stock shape, rolled by Jones & Laughlin, of Pittsburgh, Pa., and shown in their list of shapes. These channels were beveled on the inside. The rubber from the molds which we had made came to us perfectly at right angles to the base, the channels being beveled or flared. The rubber was ground and filed off to fit the channel. The edges were rounded up on the radius mentioned before. That is about the full description of the tire. * * * I tried nearly every shape by which I could procure the least weight of rubber, at the same time securing enough substance to insure wear. The upper portion of the rubber was— I can hardly describe the shape in words— It was meeting of two circles, where it joined the bevel entering the channel. There was enough play given to allow the rubber to fill the channel without pressing hard against the edges of the flange. * * * The rubber was so constructed that it sloped away from the side of the channel, meeting at the apex or point without forming a round. * * * The curves of the upper portion of the tire were brought down, so that they joined the channel at the joint where the edges of the channel were rounded,—where the end of the inner side of the semicircle came."

The witness thereupon made several sketches of this alleged structure, of which No. 2 bears very close resemblance to the complainant's tire, save as to the manner of fastening, for which the strap arrangement passing through the rubber is employed, but the location of the angle differs essentially from the oral description of the witness. Howard, foreman for Du Bois, states that the rubber was ground to fit the channel, producing a chamfered tire, and that the angle or widest part of rubber tire came a little bit below the top of the steel channel, wherein, as to the location of the angle, he differs from the oral evidence of Du Bois. Evidence similar to that of Howard is given by MacNeal, Davis, Watson, and Haynes, workmen in the Du Bois factory, who put the angle in the rubber from one-eighth to three-sixteenths of an inch below the top of the channel. Du Bois and Howard testified to sales to several persons of the tire in the form described, but there is other evidence of persons to whom the tire was said to have been sold, which diminishes seriously the credit of these statements. The tire described is essentially unlike that described in the Du Bois patent, and seems to have escaped both fame and market; and the Du Bois tire, whatever it was, was apparently a failure. It does not seem just to found an anticipation of the complainant's tire upon oral evidence whose accuracy must be doubted seriously in reading the statement of Du Bois himself.

All the patents to which the attention of the court has been called by defendant's argument have been reviewed, and it remains to summarize the parts and functions of such parts, and consider whether complainant's tire presents a patentable combination. This inquiry may be premised by the following statement: It is considered that one general result is demanded in a rubber tire, viz. such arrangement

of parts as will permit its profitable use; in other words the tire must be such that it will wear sufficiently long to be reasonably economical. Hence it must be capable of withstanding strains. To do this, it must have capacity for lateral movement, whereby it may yield rather than persist in overcoming forces brought to bear against it; otherwise, it will be worn or wounded in its tread, or torn from its channel. The wire through the rubber holds it in its place, and gives it the opportunity for lateral play. But that wire alone is not sufficient, but must be re-enforced, lest it tear or strain the rubber; hence arises the necessity of the unexposed sides and base of the rubber fitting the channel up to the point of the angle, which receives a share of the force, and tends, in connection with the rubber's elasticity, to send the rubber back to its seat. This angle must be below the upper end of the flange, so that the inferior side of the rubber may impinge against the same; and the flange should flare, to give the rubber opportunity for lateral play, and also lest the rubber be pressed against it and cut thereby. Hence only such tires could anticipate the Grant tire as have the following characteristics: (1) A rubber held in the channel by a longitudinal wire, so firmly that it may not escape, yet so freely that it may have the same lateral play through its whole extent; (2) a rubber fitting a channel at the base and sides, whose unexposed sides form an interior obtuse angle with the exposed sides; (3) the location of the vertex of such angle below the upper edges of the rim; (4) flaring flanges. Parts in combination cannot produce the result effected by the Grant tire unless they be such parts, or the equivalents of such parts, and be adjusted as above stated. Is such a tire described previous to the alleged invention of Grant?

The patents considered contain the following elements found in the Grant tire, irrespective of form, adjustment, and presence of other parts:

Tire.	Flaring Channel.	Wire Connection.	Angle.
Beale			
Claypool		"	
Biersmith	"		
Elliott	"		
Myers	"		
Rodgers	"	"	
Owen	"		"
Walker	"	"	"
Lenton	"		
Willoughby (No. 5,924)	"	"	"
Willoughby (No. 18,030)	"	"	"

From the above it will be seen that Biersmith has a flaring rim, and no other resembling parts; but such rim and the rubber are totally different in shape. The same is true of Lenton; and, while the rim in Elliott has a flare, the remaining parts are essentially different in shape and attachment. The same is true of the Myers tire. Beale is no nearer to the Grant tire than a strap connection is to a wire connection. Claypool only resembles the Grant tire in its wire connection, which is shown above, below, and on a line with the upper edges of the flanges. Rodgers shows a rim slightly flaring, in which is fitted a rubber, whose sides are coterminous with the edges of the

rim, and in this is fastened an oval rubber, in which is an opening or openings about opposite the edges of the rim, through which wires are passed to hold it in place. The arrangement, form, and parts are substantially different from those employed in the Grant tire. It is considered that none of these patents could perform the function or produce the result found in the Grant tire, although some parts appear that are essential to the full success of the Grant tire. In the Walker (British) tire there is found either described in the specification or illustrated in the figures a V-shaped rim, an angle, and retaining wire. The angle is slightly within the edges of the flange, and is made by flat inner and spherical outer sides. This patent relates to "improvement in velocipedes." The specifications state:

"My improvements further consist of making the tires of India rubber having segments of metal, metal wire, metal wire rope, or any strong cord or core imbedded in its substance near the inner surface of its circumference, and at given intervals wires or staples embracing the core, and having their shanks projecting from the India rubber tire towards the center of its circle. These shanks are tapped with a screw thread, and have screw nuts fitted. Corresponding holes are to be made in the metal rim of the wheel, and the shanks passed through, and fastened by screwing on the nuts with washers, riveting, bending, or otherwise; thus rendering the coming off of the tire simply impossible."

It is obvious that the attachment forbids the freedom of play that belongs to the Grant tire. The channel is V-shaped, and hence the sides are flaring, but it has very little similarity in shape or function to the rim used by Grant.

The Willoughby patent, No. 5,924, Fig. 8a, shows in combination wire connections, also described in the specification, very similar, save in location, to those used by Grant, and the figure shows also a very slight angle located slightly within the flanges. The rim, however, is of the clinger variety; that is, the flanges incline inwardly, and bind the rubber on each side. Such a tire thwarts the lateral play otherwise permitted to the rubber by the wires, and, although almost imperceptible angles appear, made by the sides of the rubber, they are not sufficient to give the immunity resulting from a well-defined angle whose vertex is within the flaring rim. Figures 5a and 5c show rims shaped like the segment of a circle, in which are seated spherical rubbers held in place by a single wire. The rim is described in the specifications as U or V shaped. A V-shaped rim must have flaring flanges, but the rim is quite unlike that employed by Grant, and in the entire absence of the angle the functions attributed to the Grant tire seem to be absent. Indeed, the freedom of action permitted by the wire in the rim used by Grant seems to be denied the tire, for the reason that the rubber is confined by the V-shaped channel.

The Willoughby patent, No. 18,030, shows wire connection, flaring flanges, and angle (see Figs. 26, 30, 31), and in mere coincidence of parts seems to be the nearest approach to the Grant tire. But look at these figures, and all possible conception of coincidence of function is dissipated at once. There is the flaring rim, in which is seated a rubber upon which is placed a steel outer tire, through which pass the openings and wires. The angle is far without the upper edges of the rim, and it appears that neither function ascribed to the Grant tire is obtained.

The last to be considered is the Owen tire. Here are shown (Figs. 5, 6, 7) flaring flanges, and an obtuse angle, whose vertex is slightly within the flanges. Hence it embodies two of the essential elements of the Grant tire. The third essential—the connection wire—is absent, and hence the function that depends so much upon it is absent.

The result of this examination is: (1) That no previous tire embodied the parts essential to the Grant tire. (2) That no previous tire performed both the functions ascribed to the Grant tire. (3) No tire ever had the lateral play ascribed to the Grant, because such action depends, not only upon the wire connection, but also upon the flaring rim and angle situated within the flanges, and no previous tire ever combined the three in any relation that made the function possible. (4) Previous tires have been made with the expressed intention of flaring the sides, so that the rubber could not project beyond the rim; but the successful operation of such a tire depends upon a marked obtuse angle located within the edges of the flanges, and the shape of the rim and of the rubber have much influence. No previous tire in form and adjustment of parts has equaled the Grant tire in effecting desired results.

It may be observed, further, that, while all parts in the Grant patent, as well as parts not contained in it, existed before, yet no one tire had all the parts now present, and, when any of such parts were used, it bore a different relation to its associated parts. It was just for that reason that the earlier tires failed. The mechanism was imperfect, because the parts were in some respects faulty themselves, or misassociated, or both, and impaired the proper action of the correct part or parts. Not a single tire can be selected that did not have one or more features that so disturbed the harmonious working of the whole as to make the structure undesirable. In the Grant patent not a single element can be deducted without disturbing the perfect functional action of the whole, as well as of the several parts. In the Grant tire there is an harmonious and beneficial co-operation of all the parts; in other tires there is an inharmonious action of one or more parts with the others. If Grant has selected old parts,—as he certainly has,—he has selected those not before associated, and has given them a new relation each to the other; and where any two parts have been used before in a similar relation he has so modified such relation as to supply a lacking harmony of action. This, in a sense, is selection, and in the adjustment of parts used there is variance in the form and location of such parts. But a careful and painstaking study of the Grant patent increases the conviction that the skill and method employed in the selection and the new adjustment was not only intelligent, but that it resulted in something more than a contrivance of which any skilled mechanic would be capable. Grant studied the correct principle, and he fashioned and adjusted the parts to allow the principle to operate to the best advantage. A person may assemble certain parts in a watch, and these parts may act one upon another so imperfectly as to impair or destroy correct action. Another may eliminate from the works the parts that are not only useless, but destructive of proper action, and select and add from other watches parts which, in connection with those already used, under

modification of adjustment, result in a perfect timepiece. Such last person gives a new association and relation to the parts. The result is that one watch presents a mechanism resulting in perfect action. Is there no inventive skill in this, no new result, no new harmonious function? It is apparent that the same end has been in the view of previous patentees, viz. to prevent a cutting of the rubber on the flanges, and to avoid a straining or breaking of the rubber by contact with obstructions and inequalities in the road. The same parts in separation may have been used to effect that result; but previous tires have not been profitably durable, and no particular part now used was able then to effect the desired result, because the right parts making up the whole were not selected, and properly adjusted one to the other. But the present parts do effect such result, because they are correct in form and relation, and because such parts modify and assist each other's action precisely as they should. It is illogical to assert that there is no new result when old parts are so related that they accomplish what in perfection has long been sought in vain. A device that effects a valuable function should not be declared unpatentable or lacking in novelty, because some one had used one of the parts here and another there, to secure the same result, but has used them so awkwardly and illy associated with other parts that the result was not obtainable.

Referring now to the cases cited by the learned counsel for the defendant, it may be considered whether such new combination of parts in modified relations, resulting in the accomplishment of what had before been sought, but had not been obtained in equal degree, is patentable. In Stephenson v. Railroad Co., 114 U. S. 149, 5 Sup. Ct. 777, Id., 14 Fed. 457, the patent was condemned because "no one of the three elements of the alleged combination performs any new office, or imparts any new powers to the others, and combined they do not produce any new result more cheaply or otherwise more advantageously." Can it be seriously said that in the Grant patent no new power is given by the location of the angle, and that there is no result, new in advantage, in the use of the wires allowing lateral motion to the entire rubber; the destructive tendency, however, being limited by such angle? In Busell Trimmer Co. v. Stevens, 137 U. S. 423, 11 Sup. Ct. 150, the combination was condemned, because there was shown in it only "great industry" in acquiring a thorough knowledge of what others had done in an attempt to trim soles in a rapid and improved mode by the various devices perfected by patents for that purpose, good judgment in selecting and combining the best of them, with no little mechanical skill in their application. It was said in that case that the new product "necessarily retained all the beneficial features of all those earlier patents, and to a certain extent improved upon them. Such improvement, however, was an improvement in degree, and was, therefore, not patentable. But in that case it was found that there was no substantial difference between the improved cutter and one previously issued, "except in the configuration of their molded surfaces, and this is not a patentable difference." In the present case the parts, although old, had existed in connection with other parts entirely dissimilar to those here used, and the result or function is accom-

plished in the harmonious and profitable action of all the parts, and in respect to the scope for lateral play, while it may have been in view of previous patentees, the previous parts simply precluded it, while the present parts invite and assist it. In Pickering v. McCullough, 104 U. S. 310, 318, Mr. Justice Matthews said:

"In a patentable combination of old elements all the constituents must so center into it as that each qualifies every other. To draw illustration from another branch of the law: they must be joint tenants of the domain of the invention, seised each of every part, 'per my et per tout,' and not mere tenants in common, with separate interests and estates. It must form either a new machine of a distinct character and function, or produce a result due to the joint and co-operating action of all the elements, and which is not the mere adding together of separate contributions; otherwise, it is only a mechanical juxtaposition, and not a vital union."

He was writing concerning a patent, of which he says:

"It is perfectly clear that all the elements of the combination are old, and that each operates only in the old way. Beyond the separate and well-known results produced by them severally, no one of them contributes to the combined result any new feature; no one of them adds to the combination anything more than its separate, independent effect; no one of them gives any additional efficiency to the other, or changes in any way the mode or result of its action."

And he quotes from Reckendorfer v. Faber, 92 U. S. 347, 357, where it is said:

"The combination, to be patentable, must produce a different force or effect, or result, in the combined forces or processes, to that given by the separate parts. There must be a new result produced by their union. If not so, it is only an aggregation of separate elements."

Now, apply whatever is found in these holdings to the case at bar. The present combination is made up of several elements. Each one of them has been used before, but in combinations where the parts were warring one upon another, and their action, and the reaction upon each other, instead of distributing strain, so that each part received its due proportion, and in co-operation with the other parts sustained the tire, cast upon one or more of the parts a force that it was not suited to bear, resulting in the tearing or wearing of the tire to an unprofitable degree. Will it be claimed that the same force, or effect, or result is obtained in the use of the angle and flaring rim in the Owen, or Walker, or Willoughby patents as in the Grant tire? No, because (1) some of the parts were incorrect in shape, (2) some were incorrectly located, (3) some parts were absent that should have been present, (4) some were present that should have been absent. And so with other patents. Is the effect produced by each element in the Grant patent confined to its separate, independent effect? Obviously that is not the fact. Do not these elements all enter into the new combination, so that each part qualifies every other? Obviously such is the case. Admitting that each part in its former relation tended or was intended to perform the same function, the fact remains that it was associated with parts that rendered the exercise of the function impossible. In what previous patent can it be said justly that any part employed by Grant qualified correctly every other part in the manner in which it does in its present association? There was, of course, qualification, but it was hurtful. If it may be

said that each part separately, or possibly in combination with one other part, had in former patents a tendency to perform the same office, yet the execution of the function was destroyed or neutralized by incongruous parts, or by adjustment that caused conflict. The Grant tire, as compared with any previous tire, shows decided functional characteristics, and when any one or more similar parts are used they are used in such changed connection with other parts that they effect a different result, although it is the same result the previous patentees in some cases had in view, and which they attained only in such limited degree that the tire failed. It is true that in certain particulars there is a close similarity, as in the angle and its location in the Owen tire. But place the two tires side by side, and study the effect of lateral or direct pressure upon the rubber, and observe the differences in the result. The same contrasting examination of any of the other tires with the Grant tire will lead to the conviction that the former failed in obtaining the result desired. It may be that the differences in form or adjustment in some respects are slight, but it is sufficient to make the Grant tire successful, and the magnitude of that success aids the court in resolving doubtful considerations in favor of the patent in suit. Such employment of the fact of commercial success and wide use to aid the solution of doubtful questions is justified (Barbed Wire Patent Cases, 143 U. S. 275, 12 Sup. Ct. 443, 450; Magowan v. Packing Co., 141 U. S. 332, 12 Sup. Ct. 71; Id., 27 Fed. 362–364; Kreamitz v. Cottle Co., 13 Sup. Ct. 719; Consolidated Brake-Shoe Co. v. Detroit Steel & Spring Co., 47 Fed. 894; Topliff v. Topliff, 145 U. S. 156, 12 Sup. Ct. 825; Seabury & Johnson v. Am Ende, 152 U. S. 561, 14 Sup. Ct. 683; Manufacturing Co. v. Adams, 151 U. S. 139, 14 Sup. Ct. 295); and the fact of failure in whole or part of previously patented tires is available (Gandy v. Belting Co., 143 U. S. 587, 12 Sup. Ct. 598).

Thus, after prolonged examination, study, and discussion, in which doubtless appears much unnecessary repetition, and in which much has been left unsaid, the result is reached that the decree should be in favor of the complainant. The consideration of the questions may have involved incorrect appreciation of the parts and functions of the parts of the tires considered, and may have overlooked features in the patent in suit as well as of others with which it has been compared or contrasted, but an effort has been made to portray faithfully the previous state of the art, so far as the printed arguments and accompanying evidence presented call attention to the same, and to state plainly the grounds of the conclusion reached.

SHREI et al. v. MORRIS et al.

(Circuit Court of Appeals, Seventh Circuit. February 16, 1899.)

No. 532.

PATENTS—INVENTION—IMPROVEMENT IN REFRIGERATOR CRATES.

The Shrei patent, No. 547,185, for an improvement in refrigerator crates, describes a cheap box, to hold perishable products to be shipped, above which is a rack for ice; the two being separated by a diaphragm of sheet metal, having its edges turned down to prevent the water from entering