

No. 716,342.

Patented Dec. 16, 1902.

W. LIVINGSTONE.

WHEEL OR ROLLER FOR CASTERS, &c.

(Application filed Mar. 28, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig.1.

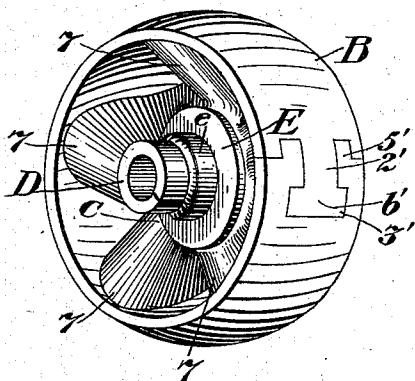


Fig.2.

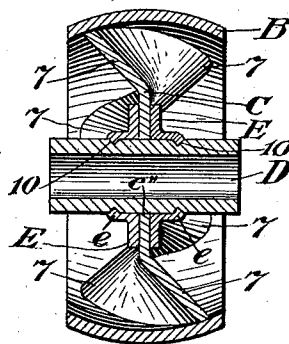


Fig.3.

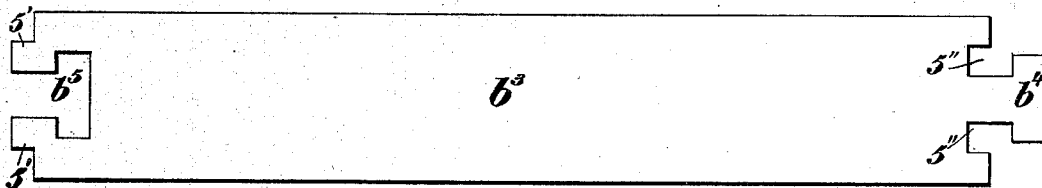


Fig.9.

Fig.11.

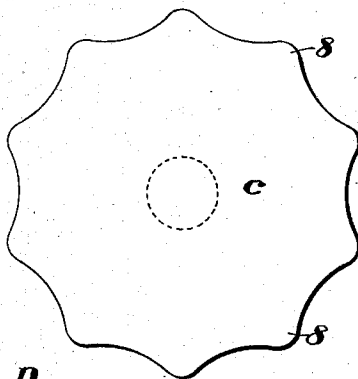
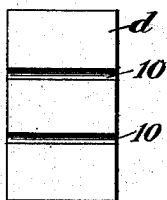


Fig.10.

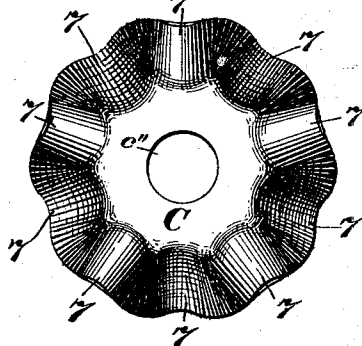


Fig.12.

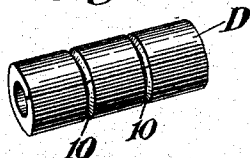


Fig.13.



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2 Sheets—Sheet 2.

Fig. 4.

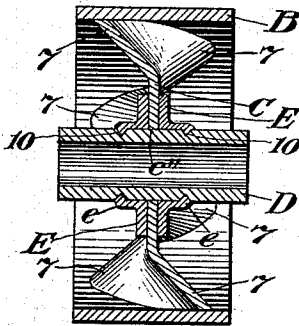


Fig. 6.

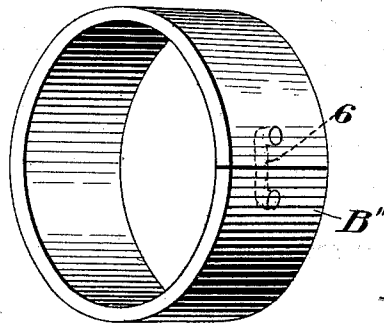


Fig. 5.

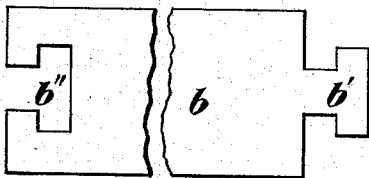


Fig. 7.

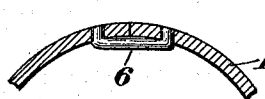


Fig. 14.

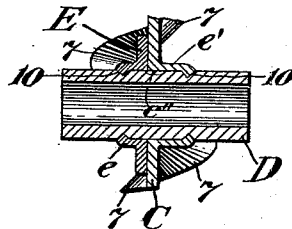


Fig. 15.

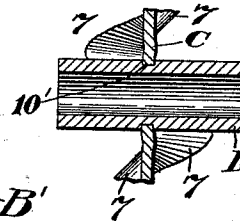
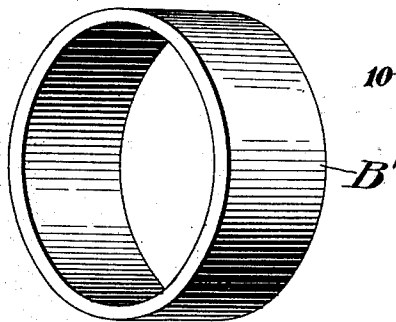


Fig. 8.



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UNITED STATES PATENT OFFICE.

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WHEEL OR ROLLER FOR CASTERS, &c.

SPECIFICATION forming part of Letters Patent No. 716,342, dated December 16, 1902.

Application filed March 28, 1902. Serial No. 100,458. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LIVINGSTONE, a citizen of the United States, residing in Flushing, in the county of Queens and State of New York, have invented certain new and useful Improvements in Wheel or Roller Construction, of which the following is a specification.

My present invention relates to improvements in wheels or rollers which may be used in furniture-casters or applied to other purposes; and it relates more especially to that class of wheels or rollers which are now made or designed to be made of sheet metal.

It has been the practice heretofore in some sheet-metal-wheel constructions to make the wheels from two half shells or cups, the bottoms of which form two end webs of the wheel and the rims of which constitute the rim or tread of the hollow wheel. Such constructions also generally embody the employment of various devices within the hollow wheel for the purpose of supporting and strengthening the rim and preventing its collapse. It is evident that in wheels so constructed there necessarily results a seam between the two halves of the tread, which seam extends around the periphery of the latter, and however well jointed and fitted together the two halves of the wheel may be there is always present a tendency to open at the joint and to accumulate rust along the seam, which gradually spreads out around the whole rim or tread. The various devices within the wheel for strengthening purposes, moreover, necessitates an expenditure of material and labor which materially increases the cost of production.

It is an object of my present invention to cheapen the cost of producing such wheels or rollers by providing a construction therefor necessitating the least possible expenditure of material and a minimum cost for making and assembling.

It is another object of my present invention to obtain in such wheels or rollers the greatest possible strength and resistance to crushing.

It is a further object of my present invention to provide a wheel which shall have a single-piece rim without a circumferential seam and supported by a central web having

a sinuous line of contact with the inner surface of the rim.

In the drawings attached to the present specification I have illustrated a wheel or roller embodying my present invention, and in the drawings Figure 1 is a perspective view of a complete wheel, showing one method of constructing the tread or rim from a blank whose ends are secured together by what may be designated as a "double interlocking joint." Fig. 2 is a central longitudinal section of such wheel. Fig. 3 is a plan view of a blank suitable for forming a wheel-tread, and the ends of which are so formed as to cause their double interlocking when the blank is bent around to a circular shape, as in Fig. 1. Fig. 4, Sheet 2, is a section similar to Fig. 2, but illustrates the wheel in that stage of its construction in which the web has been inserted in the tread or rim prior to the operation of crowning the rim or giving thereto a convex formation to bring the inner surface of the rim in close contact with the sinuous periphery of the web. Fig. 5, Sheet 2, is a plan view of the end portions of a blank such as indicated in Fig. 3, but in this figure the ends of the blank are so formed as to cause their simple interlocking when the blank is bent to circular form. Fig. 6 is a perspective view of a wheel tread or rim prior to the insertion of the web and in which the ends of the rim-forming blank merely abut, other means as distinguished from an interlocking construction being employed to firmly hold the abutting ends together. Fig. 7 is a sectional view illustrating the means shown in Fig. 6 for securing the abutting ends together. Fig. 8 is a view similar to Fig. 6, but in this instance the tread or rim is formed by the section of a tube. Fig. 9 is a plan view of a blank suitable for forming the web of the wheel. Fig. 10 is a view similar to Fig. 9, but illustrates the blank after the circumferential or edge portions thereof have been corrugated for the purpose of strengthening the web and extending axially of the wheel the eventual sinuous line of contact between the outer edge of the web and the inner surface of the wheel-tread. Fig. 11 is a plan view of a blank suitable for forming the wheel-hub. Fig. 12 is a perspective view showing such blank after it has been rounded to circular form prior to its in-

section through the central opening in the web. Fig. 13 is a central section on the axial line of a flanged washer or thimble, which is designed for use in permanently and rigidly securing the hub of the wheel to the web thereof. Fig. 14 is a sectional view corresponding to Fig. 2, but shows the hub portion only and illustrates a construction in which the edge of the central opening in the web is bent laterally, this construction necessitating only one flanged washer for the proper securing of the web to the hub. Fig. 15 illustrates a modified construction in which the edge of the opening in the web enters a groove in the hub.

Similar characters of reference designate corresponding parts in all figures.

In constructing the tread or rim of the wheel a section of a tube of the proper width and length may be used, such as indicated at Fig. 8 and designated by B'. Instead of a tube-section, however, a sheet-metal blank may be employed whose length is substantially equal to that of the circumference of the wheel of the desired diameter and whose width corresponds substantially to that of the axial measurement of the wheel-rim. If a sheet-metal blank is employed for the purpose of forming the rim or tread of the wheel, the opposite ends thereof will be suitably formed to make a tight joint or seam when the blank is bent to cylindrical form and the two ends brought together and fastened. For this purpose any suitable construction may be employed, that indicated more especially in Fig. 5 comprising an interlocking tongue or tenon (designated by b') extending from one end of the blank marked b and a counterpart recess or mortise b'' , formed in the other end. When the blank is bent to circular form, the mortise and tenon are adapted to engage with each other and by their interlocking prevent the pulling apart of the ends of the blank.

Although by no means deemed necessary that the same shall be used in all instances, I have shown in Fig. 3 a contour of the blank ends which is designed to effect a double interlocking engagement between such ends when the blank is shaped to circular form. As there illustrated, that end of the blank in which the mortise b'' is formed is provided with tenon members $5'$ on opposite sides of the mortise. These tenon members are adapted to fit within appropriate mortises $5''$ $5'''$ in the opposite end of the blank—that is, the end having the main tenon b' —when the blank is bent around to form the wheel-tread B. (See Fig. 1.)

Instead of so forming the blank ends that they shall either singly or doubly interlock one with the other the abutting ends of the tread or rim B'' in Figs. 6 and 7 are joined by a connecting round or flat wire or rod 6, whose ends are secured in openings adjacent to the cross-seam. It is, moreover, obviously not essential that the mortises and tenons, whether

the ends of the blank be merely interlocked or doubly interlocked with each other, shall be of the particular form shown nor that the sides of a tenon or of a mortise intersect to form sharp corners, since such corners may be rounded off to a more or less extent.

The wheel-web and its construction constitutes one of the most important features of the present invention. The central portion of the tread—that is, the portions thereof lying midway between the edges of the tread—being manifestly that portion subjected to the greatest stress under the load which the wheel supports, means for adequately supporting the tread along this portion should exist in order that the structure should possess a maximum of strength. In forming such web according to my present invention I employ in castor-wheels and others of similar proportions a single sheet-metal member, which for the purpose of increasing its strength and resistance to buckling and collapse and for the purpose, furthermore, of extending the line of contact between the web and the rim axially of the wheel is radially corrugated at its outer or rim portion—that is to say, the sheet-metal blank of which such web is formed is provided with alternate radially-extending ridges and furrows disposed circumferentially of the blank. The number of these corrugations may of course be varied, depending to some extent upon the size of the wheel; but preferably they do not extend inward to an amount such that the means for mounting the wheel in the horn, &c., cannot be firmly secured to the web. The present improvements are not limited to any particular width of the corrugations measured circumferentially of the wheel or web nor, on the other hand, is the maximum height from the base of any furrow of the corrugation to the peak of the adjacent ridge restricted to any particular amount, although I prefer to make this latter sufficient to extend the line of contact between the web and the inner surface of the wheel-tread a substantial distance on each side of the central cross-plane of the wheel when a single-web construction is used. In a wheel having a single web I prefer, furthermore, that such corrugations shall be made to extend substantially the same distance on each side of such plane in order that a symmetrically-formed wheel may be produced and the stress uniformly distributed.

A blank such as that indicated in a general way in the drawings by c may be employed for making the web C of the wheel, and in order that the general outline of the web after its edge or peripheral portion shall have been provided with corrugations, such as 7, shall, as seen in plan view, be comprised within the circumscribing circle corresponding to the greatest internal diameter of the wheel-tread the edge of the blank may have a sinuous outline, those portions of greatest radial width, such as 8, forming those parts

of the corrugations which lie at the greatest distance from the aforesaid central cross-plane.

In the construction illustrated the hub of the wheel is also formed from a sheet-metal blank, such as *d*, the same being in the form here shown of substantially rectangular outline. This blank is rounded by any suitable means to a cylindrical form yielding the hub *D*, having an internal bore for the reception of the journal (not shown) upon which the wheel is mounted to revolve. In securing the web within the wheel-tread the former is first inserted and properly positioned in the wheel-tread. Both the web and the wheel-tread are then rigidly fastened together by the crowning of the rim—that is, by contracting its diameter at and adjacent to the edges of the wheel. To this end the corrugated web is in the preferred construction of such a shape as to cause the outer edge of the web along the edge of the corrugations to contact with an inclosing rim, curved in the line of its axis rather than a cylindrical rim—that is to say, the outline of the web, as seen in edge view, is somewhat curved.

The hub may be secured to the web by assembling on each side of the web a disk *E*, which after being brought close up against the metal of the web has the edge of its laterally-projecting annular flange *e* swaged or in some other manner forced into engagement with the walls of a groove 10, provided on the hub for the purpose. To the end of further reducing the cost of manufacture, I may bend the edge of the central opening *c'* in the web laterally to form an annular laterally-extending flange *e'*, whose outer edge is likewise swaged or otherwise forced into one of the annular grooves 10 in the wheel-hub, (see Fig. 14,) while on the opposite side of the web a washer *E* may be used, as in the construction shown in Fig. 4.

In the method set forth in Fig. 15 of fastening the web to the wheel-hub no securing-washer is shown, although, if found desirable, such washer or washers may be additionally employed. As indicated in that figure, the hub *D'* is provided with an annular channel or groove 10', with the walls of which the edge of the central opening in the web may be engaged after the latter has been slipped over the hub. For this purpose the edge of such opening will ordinarily be bent, corrugated, or otherwise formed to provide metal which by swaging or other means may afterward be forced inward to engage the web with the hub. It is manifest also that I may use a section of a tube in manufacturing the wheel-hub instead of employing sheet metal therefor. By thus providing a sinuous line of contact between the web and the wheel-tread and carrying the actual metal-to-metal contact some distance on each side of the central plane—in other words, by employing a radially corrugated web—I am enabled to

greatly increase the resistance of the structure to crushing or collapse under heavy loads, and since there is required a comparatively few number of parts and these are of such a character as to greatly cheapen the cost of manufacture I am enabled to make a highly-efficient wheel at a minimum cost.

Having described my invention, I claim—

1. A built-up wheel in which there is combined with a wheel-tread, a single supporting sheet-metal web centrally located with respect to the tread and secured thereto, and having struck-up radially-extending corrugations embodying ridges alternating first on one side of the web and then on the other, each ridge increasing in height radially outward of the web and terminating close to the adjacent edge of the tread, whereby the line of contact between the tread and the web extends across substantially the entire width of the tread.

2. A built-up wheel in which there is combined with a wheel-tread, a single supporting sheet-metal web centrally located with respect to the tread and secured thereto, and having a flat, perforated central portion and a corrugated edge portion, the corrugations embodying substantially like-proportioned ridges alternating first on one side of the web and then on the other and each ridge increasing in height radially outward of the web.

3. A built-up sheet-metal wheel in which there is combined, a sheet-metal wheel-tread, a rolled-up sheet-metal hub, and a single supporting sheet-metal web centrally located with respect to the tread and secured thereto, and having a flat, perforated central portion and a corrugated edge portion, the corrugations embodying substantially like-proportioned ridges alternating first on one side of the web and then on the other, and each ridge increasing in height radially outward of the web and terminating close the adjacent edge of the tread, whereby the line of contact between the tread and the web extends across substantially the entire width of the tread.

4. A built-up wheel in which there is combined with a sheet-metal wheel-tread having its abutting edges locked together, a single supporting sheet-metal web centrally located with respect to the tread and secured thereto and having a substantially flat central portion and a corrugated edge portion, the corrugations embodying substantially like-proportioned edges alternating first on one side of the web and then on the other and each ridge increasing in height radially outward of the web.

5. A built-up wheel in which there is combined with a crowned wheel-tread, a single supporting sheet-metal web centrally located with respect to the tread and secured within the latter by the crowning thereof, and having a substantially flat central portion and a corrugated edge portion, the corrugations

embodying substantially like - proportioned ridges alternating first on one side of the web and then on the other, and each ridge increasing in height radially outward of the web and terminating close to the adjacent edge of the tread, whereby the line of contact between the tread and the web extends across substantially the entire width of the tread.

6. A built-up wheel in which there is combined with a crowned wheel-tread, a hub, a sheet-metal web secured within the tread by the crowning of the latter, and a retaining-collar on the hub, said web having a substantially flat central portion and a corrugated edge portion, and said corrugations embodying substantially like-proportioned ridges alternating first on one side of the web and then

on the other, each ridge increasing in height radially outward of the web.

7. A built-up wheel in which there is combined with a crowned wheel - tread, a web made from a blank having a sinuous outline, and secured within the tread by the crowning of the latter and having a flat central portion and a corrugated edge portion, said corrugations embodying substantially like-proportioned ridges alternating first on one side of the web and then on the other and each ridge increasing in height radially outward of the web.

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