P. H. WATSON.

Improvement in Car-Wheels.

No. 114,628. Patented May 9, 1871.

Fig. I.

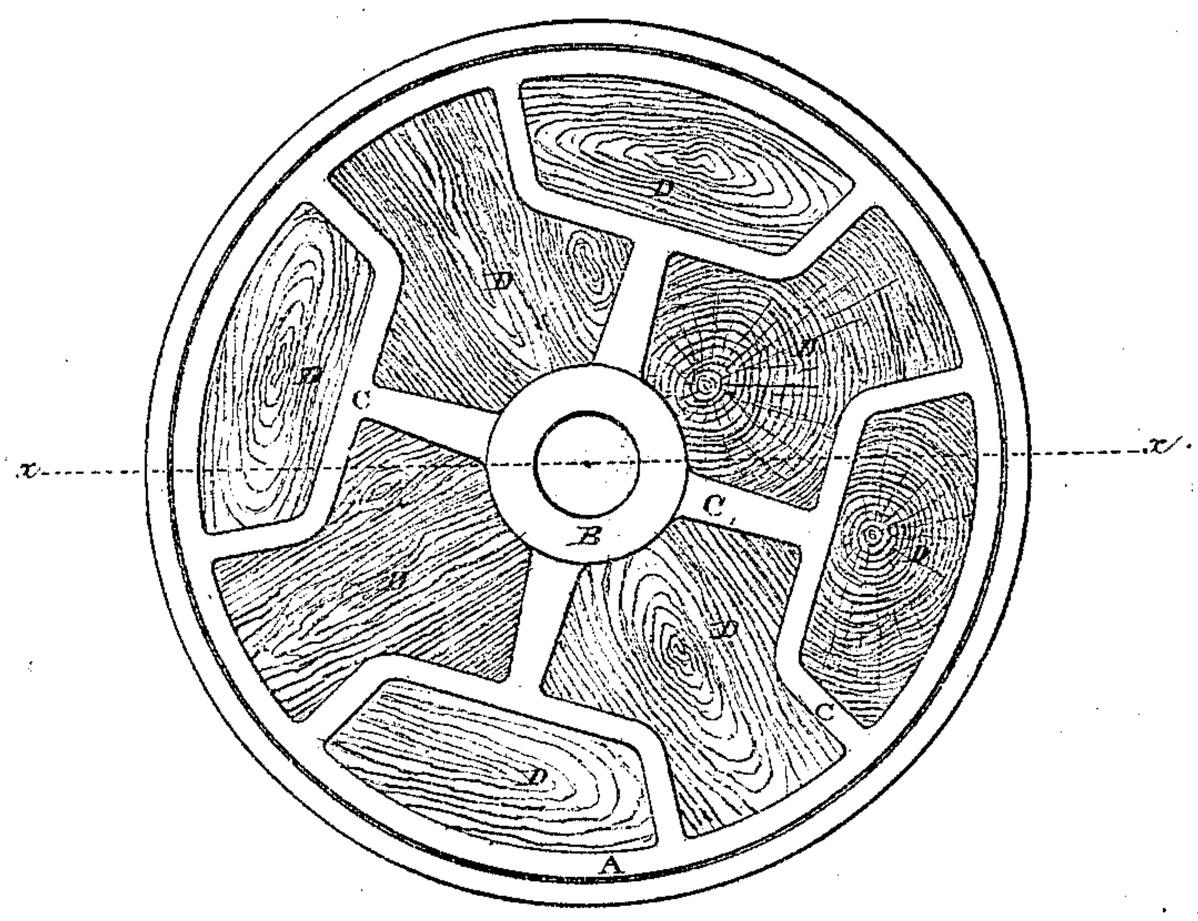


Fig. II.

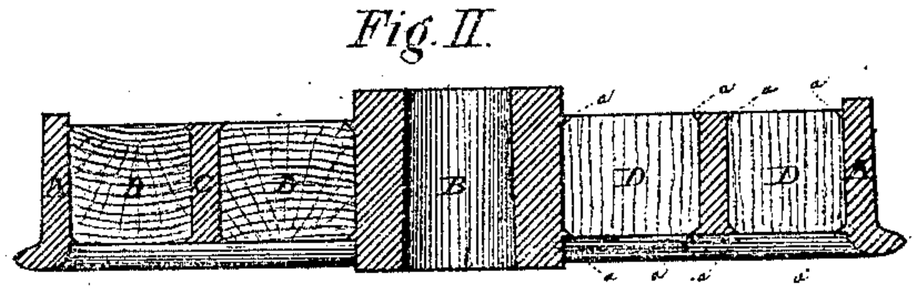
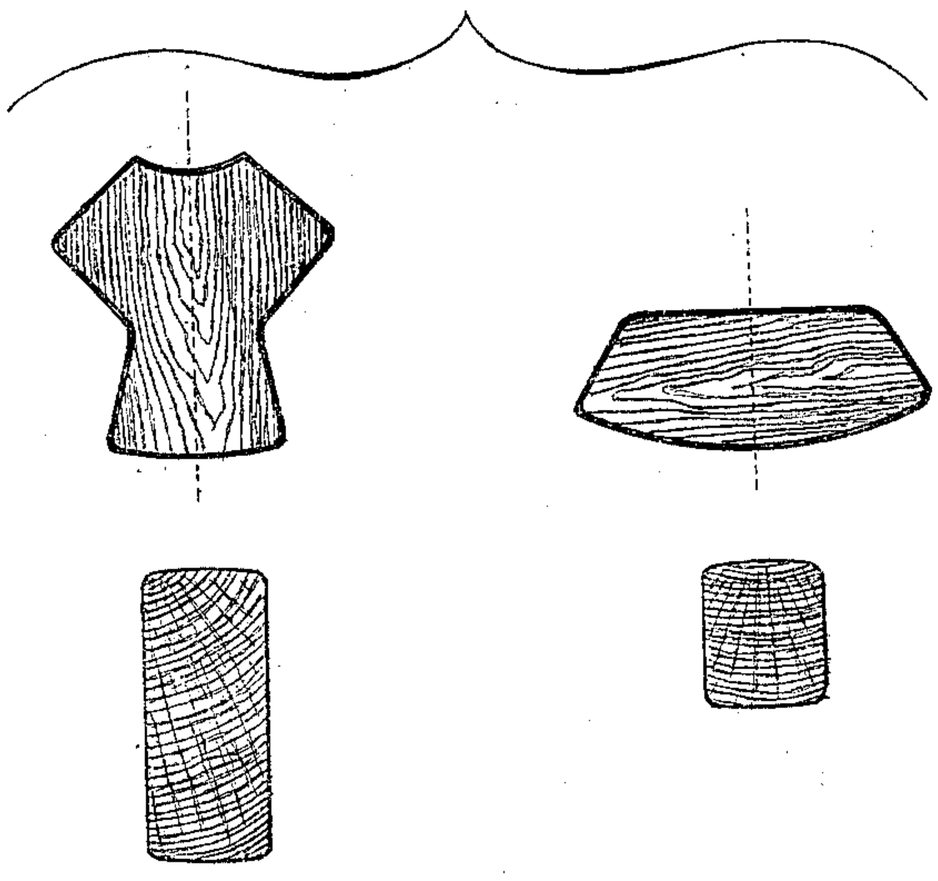


Fig. III.



Witnesses.

J. M. Goodwin

L. A. Watson

Inventor.

P. H. Watson

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

PETER H. WATSON, OF ASHTABULA, OHIO.

IMPROVEMENT IN CAR-WHEELS.

Specification forming part of Letters Patent No. **114,628**, dated May 9, 1871.

To all whom it may concern:

Be it known that I, PETER H. WATSON, of Ashtabula, in the county of Ashtabula and State of Ohio, have invented a new and useful Improvement in Car-Wheels, of which the following is a specification, reference being had to the accompanying drawing, which makes part of the specification, and in which—

Figure I represents a side elevation of one of my elastic car-wheels. Fig. II represents a section of the same in the plane of the dotted line *x x*, crossing Fig. I. Fig. III represents plans of the two forms of elastic panel required to fill the spaces in the wheel, each panel being shown in section below the plan in the plane of the dotted line crossing the plan.

The ordinary cast-iron car-wheel with a chilled tread is durable in use, simple and cheap in construction, with no parts to work loose, but is heavy, rigid, and sonorous, striking the rails where it meets with inequalities solid destructive blows, and transmits the reacting shocks, jars, and ringing sounds of such blows to the axles and parts carried thereon, such action being destructive to the roadway and cars, and the noise being unpleasant to passengers.

To avoid such difficulties elastic wheels of many kinds have been constructed, one of the most approved of which has a solid plank disk to connect a metal tread with a metal hub, which disk is secured to both hub and tread by metal plates and bolts. The wood in this wheel, by virtue of its elasticity, muffles the jars and noise produced by the blow of the tread of the wheel upon inequalities of the rail.

Among the objections to such a composite wheel are multiplicity of parts and fastenings and the great cost of construction. The other elastic car-wheels are all liable to these or greater objections.

The object of my invention is to combine the simplicity and cheapness of construction and the durability of the chilled-tread cast-iron wheel with the freedom from jarring and noise of the wooden-disk wheel without complication of parts or numerous fastenings; and this I accomplish by casting the wheel of iron, with the hub and tread of the usual forms, and connected by flexible arms, so arranged as to yield to relieve the hub, axle, truck-frame, and other parts from the effects of blows upon the tread.

The spaces between the arms and between the tread and hub I fill with elastic panels in a state of compression, so that by their great tension or tendency to expand to their original dimensions they will hold themselves firmly in place and press toward the hub and tread and toward each other, so that each arm will be embraced between them as between two elastic cushions, which permit it to yield freely to absorb shocks and jars, but restrain its flexure within the limit at which it would break or set, and also muffle all ringing or jarring sounds.

The cast-iron portion of the wheel is of the material and is molded and cast in the manner commonly approved for the ordinary chilled-tread cast-iron wheel.

The inner sides of the tread A of the hub B and of the arms C are fitted with retaining-flanges *a*, Fig. II, projecting into the spaces among the arms. The purpose of these flanges is to form a shallow groove, to retain the panels D in place after they have been inserted.

The tread of the wheel is less in thickness than would be required in a wheel having rigid spokes or arms. The hub is about the same as in such a wheel, in order that it may have the required strength to hold itself by its own elasticity in position upon the axle.

Each arm C of the wheel radiates from the hub to a point about half-way between the hub and the tread. Then it branches tangentially to the right and to the left, when both branches turn in a radial direction, and extend in that direction until they meet the tread. The tangential portions of the arm, it is obvious, must operate as a spring-bar to receive any shock impressed upon the wheel in a radial direction, whether on the tread or on the axle.

A material suitable for the panels D should be elastic, firm, light, and not liable to shrink or swell from the atmospheric changes of temperature and moisture to which car-wheels are ordinarily subject.

Well-seasoned elm-wood suitable for carriage-wheel hubs, well varnished, is a very good material for this purpose. Before being

placed in the wheel it would be compressed edgewise of the panel by a force about equal to that impressed upon the corresponding portion of the wheel by the momentum of the shocks to which it will be subjected in running with its load. This compression reduces the wood to such dimensions that it may be inserted into the spaces in the wheel, where it will quickly expand, filling the spaces and pressing firmly against every side, so as to not only hold itself securely in place, but to present a strong support to the parts against which it thus bears.

The corners of the panels should be beveled or otherwise shaped to fit the hollow sides of the spaces, and to come out flush with the outer sides of the arms, to render the sides of the wheel smooth, and prevent it from operating as a fan to blow up dust and uselessly consume power.

The wooden panels should in form be the counterparts of the spaces to be filled, but before compression must be as much larger as will be needed to allow the quantity of material necessary for consolidation to the required degree of density and elasticity, which will in some measure depend upon the quality of the wood, firm hard wood requiring less and soft wood more compression.

A margin all around the shaped panel, of varying width correspondent to the varying breadth of the panel, will afford the requisite material for compression, provided the panel be made of sections cut crosswise from the log, or made of plank sawed in the usual manner from very spongy wood; but if the wood of planks for panels be of a firm, close grain, the margins at the ends of the grain should be but little longer than the space to be filled, while the margins at the sides of the grain would have to overlap the corresponding sides of the space to be filled very considerably to furnish sufficient material for condensation to produce the expansive force necessary in the panel.

If the wood be placed with its grain parallel, as nearly as practicable, with the radiuses of the wheel, it need not be compressed across the grain as much as if the grain of the wood were placed as nearly as practicable at right angles to the radiuses of the wheel, nor as much as if the grain of the wood in the panels were to be arranged parallel with the axis of the wheel.

Any ordinary press for compacting substances in sectional molds, as a brick-press, for example, could readily be adapted by any competent machinist to the compression of these panels, and, therefore, a particular description of such a press is deemed unnecessary. I will, however, suggest that a convenient press for the purpose would be a strong metallic pyramidal tube, with a hard polished interior surface, the cross-section of the tube being of the same shape as that of the space to be filled by the panel, but at its smaller end less than the panel-space by at least the width of the flanges, so that by placing the space to be filled against the smaller end of the tube, and inserting the panel-plank into the wider end of the same and forcing it through by a plunger, the panel would be duly compressed and forced into its place by a single operation.

The compression of the wood might be facilitated by softening the panels by steeping in fluids or vapors, cold or hot, if advisable; and in order to use some kinds of very hard or uneven-grained woods some such preparation would be necessary.

In all cases the panels, after insertion, should be thoroughly protected from the action of the weather by some penetrating paint or varnish, which will both close the pores of the wood and the joints between the wood and the metal. The arms of the wheel may be shaped in various ways, so as to yield in a greater or lesser degree to relieve shocks; but as such variations readily suggest themselves, and would, obviously, all act upon the same general principle, it would render this specification needlessly long to describe or represent them. So, also, the panels might be held in place by any one of many well-known modes of fastening; but the form of arm I have shown, and the manner of holding the panel in place which I represent, I deem preferable to any of the others which hitherto I have essayed.

What I claim is—

A car-wheel fitted with elastic panels under tension, constructed, arranged, and operating substantially as described.

P. H. WATSON.

Witnesses:
J. M. GOODWIN,
CHARLES BURKHART.