J. K. SAX.

MANUFACTURE OF CAR-WHEELS.

No. 186,500. Patented Jan. 23, 1877.

*Fig. 1.*

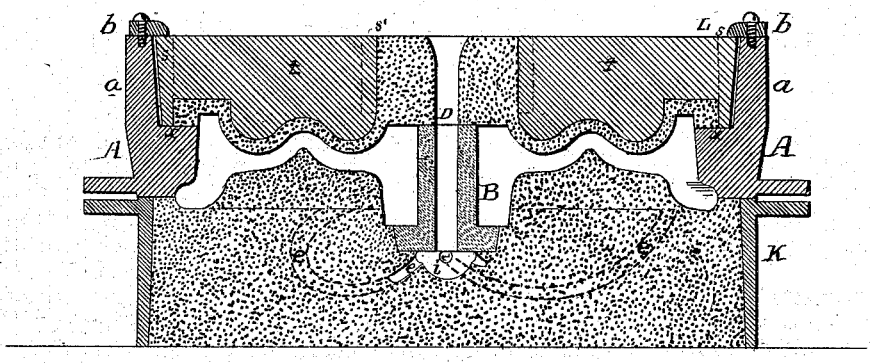
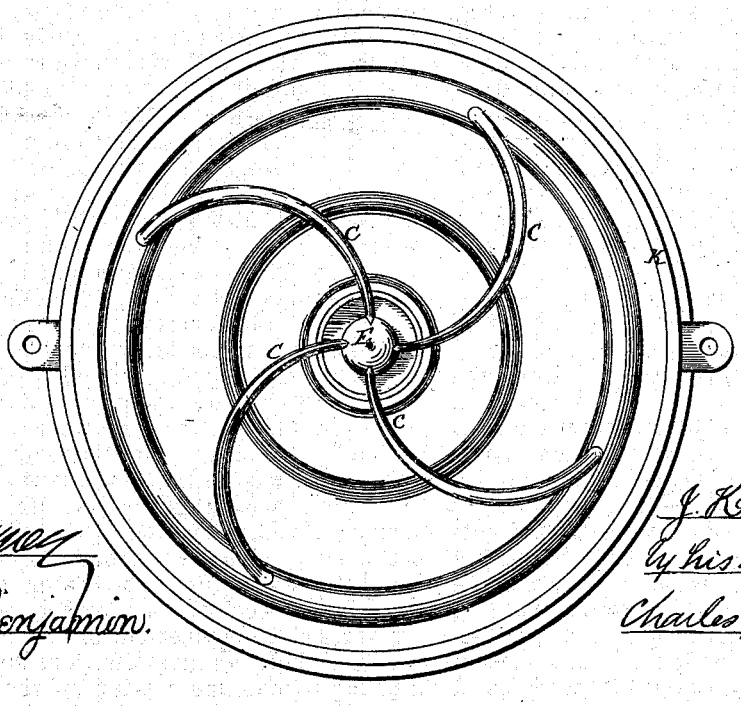



*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

JOHN K. SAX, OF PITTSTON, PENNSYLVANIA.

## IMPROVEMENT IN MANUFACTURE OF CAR-WHEELS.

Specification forming part of Letters Patent No. **186,500**, dated January 23, 1877; application filed December 19, 1876.

*To all whom it may concern:*

Be it known that I, JOHN K. SAX, of Pittston, Luzerne county, State of Pennsylvania, have invented Improvements in the Manufacture of Car-Wheels, of which the following is the specification:

My invention consists of an improved mode and an improved apparatus for casting car-wheels, especially chilled wheels, to produce perfectly-round wheels, sound at the treads, free from flaws, and from strains resulting from unequal contraction and expansion.

In the accompanying drawing, Figure 1 is a sectional elevation of my improved flask, containing the sand and core properly molded for casting a car-wheel; and Fig. 2 is an inverted plan view, showing the flask with the pattern and curved sprue-rods.

K represents the drag; A, the chill; and L, the cope, consisting of concentric rings *s s'* and radiating bars *t t*, (shown in section, Fig. 1,) which cope, instead of resting directly upon the chill, as usual, rests upon a shoulder, *x*, within an annular flange, *a*, projecting from, and forming part of, the chill, the latter being provided with the usual lugs and dowel-pins for securing the parts in their relative positions, and with buttons *b* pivoted to the flange *a*, serving to retain the cope in its place. In connection with the flask I use a series of curved sprue-rods, C, gradually increasing in their diameter from their inner to their outer ends, and a semi-spherical block, E, recessed to receive the inner ends of the rods. In preparing the mold for casting, the cope is secured in place in the chill, the two are reversed, and the pattern inserted in place, when the parts will be in a reversed position to that shown in Fig. 1. The pattern-block E is then applied to the center of the wheel-pattern, and the sprue-rods C are placed with their inner ends in the block, and their outer ends in contact with the flange at the bottom of the rim of the pattern, as shown in Fig. 2. The sand is then packed within the drag in the usual manner. The flask is now reversed, the cope is packed with sand and properly tamped, the chill and cope are separated from the drag, and the pattern then removed. The sprue-rods are now removed by seizing their outer and larger ends, and withdrawing them in a curved line, which can readily be done, as each rod forms part of a true circle, and is set at convenient angle to admit of easy removal. The block E is then removed, a hollow core, B, having an enlarged bottom portion, is placed in position, and the chill and cope are replaced, as shown in Fig. 1, when the parts will be in position for casting.

It will be seen, on reference to the drawing, that the channels *e*, formed by the sprue-rods, communicate with the basin *i* formed by the block E, and with the space forming the flange of the wheel; and, further, that these channels are not only curved, but extend spirally so as to each enter the rim-space at an angle very nearly parallel to the face of the chill. The metal is poured into the central sprue D and passes into the basin *i*, which, being larger than the inlet, forms a reservoir from which the metal passes evenly and uniformly into all the channels *e*, and is discharged into the mold in streams which flow nearly parallel to the face of the chill with a whirling motion that is maintained until the mold is filled. As the metal flows downward through the core B it heats the latter, so that the metal which flows inward from the rim is only partially cooled when it flows back from the chill to the center of the mold, and it will be seen that after the wheel is cast the cooling will commence at the hub and terminate at the rim, allowing the center and web to cool fast enough to accommodate themselves to the form taken by the outer rim-portion of the wheel, no portion of which, therefore, is under the tension invariably resulting when the outer portion cools first and shrinks upon the expanded inner part. By introducing the metal from below the flange at the rim, and in several streams flowing all in the same circular direction and nearly parallel to the face of the chill, the imperfections which result from conducting the metal to the chill from the center or hub direct, there to cool without further movement, are avoided, the movement of the metal rendering air-holes and imperfections impossible, insuring a thorough mixture of the different streams of metal, preventing the latter from setting and cooling in spots or unequally on the tread, and throwing the dirt or other impurities toward the center, while any damp-

ness or sweat that may arise on the chill before the metal fills the mold by my process is rendered harmless to the product.

The result of this process is to produce a wheel free from fissures or imperfections, having a sound uniform tread, not liable to warp in cooling, or from the chill becoming out of of round, and with no portion of the metal under strain from unequal contraction; moreover, the wheels will be perfectly round, owing to the re-enforcing of the chill by the flange *a*, which remains comparatively cool while the chill is heated—therefore retains its shape and prevents the chill from warping or expanding irregularly.

It will be apparent that any desired number of sprue holes or channels, *e*, may be formed, and that the shape of the flask may be altered without departing from the principle of my invention.

I claim—

1. The within-described mode of casting car-wheels—that is, by introducing the metal from below, near the periphery of the mold, in several streams flowing spirally from the center, and issuing upward nearly parallel to the periphery, substantially as set forth.

2. The mode of casting car-wheels by introducing the entire body of metal at the periphery in a series of streams at regular intervals each at such an angle as will impart a rotary motion to the entire body of metal until the mold is filled, as specified.

3. The regularly-curved sprue-rods C, constructed to form curved channels leading spirally from the center sprue to the rim of the mold, as set forth.

4. The pattern-block E, adapted to form below the sprue D an enlarged central receiving-basin communicating with the sprue-channels *e*, as set forth.

5. The combination of the central hollow core having an enlarged bottom portion with a mold having the basin *i* below the core and the sprue-holes C radiating spirally from the basin to the lowest part of the rim, substantially as and for the purpose set forth.

6. A chill, provided with a vertical re-enforcing-flange, *a*, permanently attached to, and forming part of, the chill, and extending upward to inclose the cope, substantially as described.

7. The combination of the said flanged chill and the cope L inclosed by the flange, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN K. SAX.

Witnesses:

GEORGE O'NEILL,

S. W. CHURCHFIELD.