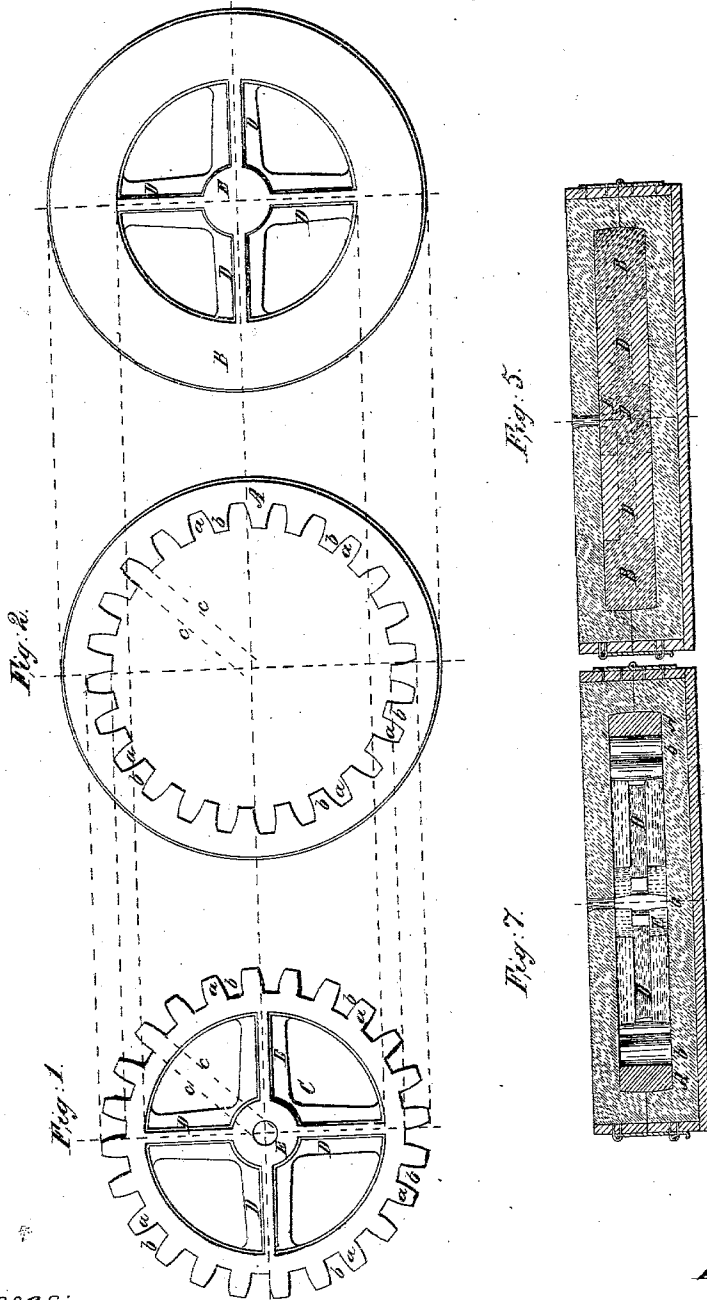


R. T. Davis.

Chill for Casting Toothed Gear.

No. 102,781.

Patented May 10, 1870.



Witnesses:

E. N. Bebout
W. H. Williams

Inventor:

R. T. Davis
By J. Abbott
Atty.

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Fig. 4.

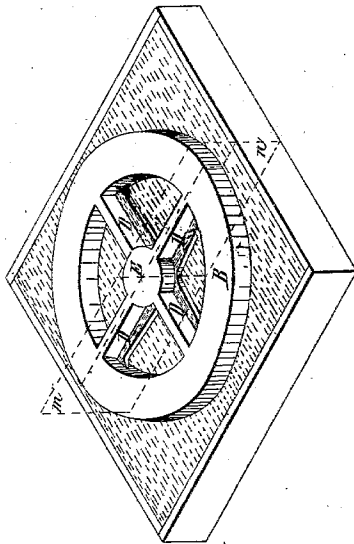
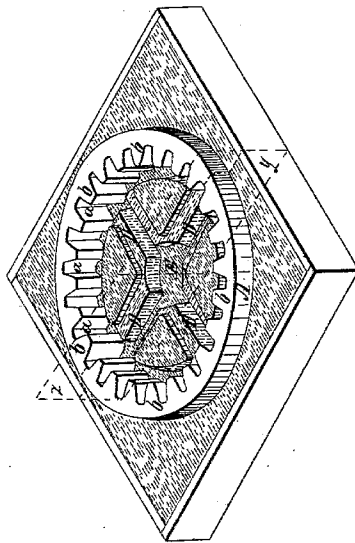


Fig. 6.



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United States Patent Office.

R. T. DAVIS, OF CANTON, OHIO.

Letters Patent No. 102,781, dated May 10, 1870.

IMPROVEMENT IN CHILLS FOR CASTING TOOTHED-GEAR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, R. T. DAVIS, of Canton, in the county of Stark and State of Ohio, have invented a new and improved Mode of Casting Chill Tooth-Gear, of which the following is a specification.

The nature and objects of my invention are the use of a chill-die, composed of metal, in casting tooth-gears, in combination with the ordinary molding-flask, and a wheel-pattern in the casting of a toothed, cogged, and other wheels for gearing for the purpose of chilling and hardening the wearing-surfaces of such teeth and cogs, and of rendering such surfaces smoother than they would be if cast in sand, as heretofore done.

In the accompanying drawings—

Figure 1 presents a view of a toothed wheel, to which reference will be made in illustrating my method of casting.

Figure 2 is a top view of my chill-die.

Figure 3 is a like view of a wheel-pattern, such as may be used in my method of casting.

Figure 4 is a perspective view of the wheel-pattern lying in the bottom part of the molding-flask.

Figure 5 is a vertical sectional view of the top and bottom parts, together, inclosing the wheel-pattern as in the act of molding, the section being cut by the plane indicated by the red lines *m n*, fig. 4.

Figure 6 is a perspective view of the impression made by the wheel-pattern B in the sand in the lower half of the flask, and of the chill-die A placed in position for use after the removal of the wheel-pattern.

Figure 7 shows a vertical section made by the plane indicated by the red lines *x y*, fig. 6, through the flask, chill-die A, and the wheel, after the cast has been made.

As the ordinary flask is used, no further description of that is necessary.

The wheel-pattern B is made with the hub and arms of the wheel of the forms and dimensions desired, but the depth through the rim should be made in proper proportions to that of the chill-die A, yet to be described, and should have a sufficient draft on its outer circumference to insure its easy removal without marring its impression in the sand.

The chill-die, as shown in fig. 2, is the web or rim of a wheel without hub or arms, having exactly the same thickness as the rim of the wheel-pattern B, and the same circumference and draft, so that when the wheel-pattern B is removed this die A may take its place in the mold, but its inner circumference is so formed as to be the exact counterpart of the wheel that is to be cast, except that a due allowance should be made for the shrinkage of the metal of the wheel in cooling, the

indentations *a* in the chill-die corresponding to the teeth *a* of the wheel C, and the teeth *b* of the die corresponding to indentations *b* between the teeth of the wheel C.

Care should be taken to have the rim of the chill-die deep enough to have sufficient strength and stiffness, so as not to be sprung out of shape, and care, also should be taken that the teeth of the wheel should be as wide at their bases as at their pitch-line, and that the plane of their flanks shall not pass through the axis of the wheel, but at such a distance therefrom as to secure their proper form and their proper radial-direction with reference to the axis, so that, when the metal of the chill-die shall chill the metal of the wheel cast, the latter shall shrink from the former equably at all points. The die, in such case, will not be strained or injured.

The red lines *c c*, in figs. 1 and 2, indicate what is here meant.

The process of casting according to my improved method is easily understood from what has been shown.

After the wheel-pattern B has been cast in the mold so as to leave its impression, it is removed from the flask, and if the melted metal were then poured in, we would have a cast of that pattern; but, in order to have teeth of the desired form cast to the wheel, the die A, with teeth of any form or dimensions desired, is placed in the mold after the wheel-pattern has left its impression, and, of course, it fills the mold so made from the outer circumference of the chill-die to its inner circumference, and then the melted metal is poured into the mold and the toothed-wheel, of the form and dimensions desired, is cast.

The surfaces of the teeth are chilled and hardened by the metal of the chill-die, and are perfectly smooth if the surface of the die is so, instead of being soft and rough, as they would be if cast in the sand.

It is scarcely necessary for me to assert how much more durable such hardened teeth will be, nor how much such smoothness will conduce to their durability, besides making much less noise while in use.

I am aware that plain chilled rims or tires for wheels have heretofore been cast in revolving metallic molds by the aid of centrifugal force, and I am also aware that plain chilled rims have been heretofore used in the casting of car-wheels, and so formed as merely to aid in forming one or two flanges upon such wheels; but no such chill-die to form, harden, and render smooth the teeth or cogs upon wheels has heretofore been in use, and, more especially, has no such chill-die as mine ever been used in connection with a wheel-pattern and common flask as I have done it.

Having fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The described chill-die, when detached and removable into and out of molding-flasks at pleasure, and so constructed as to give the desired form to teeth or cogs upon and as parts of wheels, and at the same time to chill, harden, and render smooth the surfaces of such teeth or cogs, substantially as above set forth.
2. Chilled tooth-gear, when cast by the above-de-

scribed process, substantially as set forth, as a new article of manufacture.

As evidence that I claim the foregoing, I have hereunto set my hand in presence of two witnesses.

R. T. DAVIS.

Witnesses:

JOB ABBOTT,

E. W. BEEBOUT.