2 Sheets—Sheet 1.

J. H. GOWAN.

Machine for Grinding Car Wheel.

No. 217,365. Patented July 8, 1879.

Fig. 1

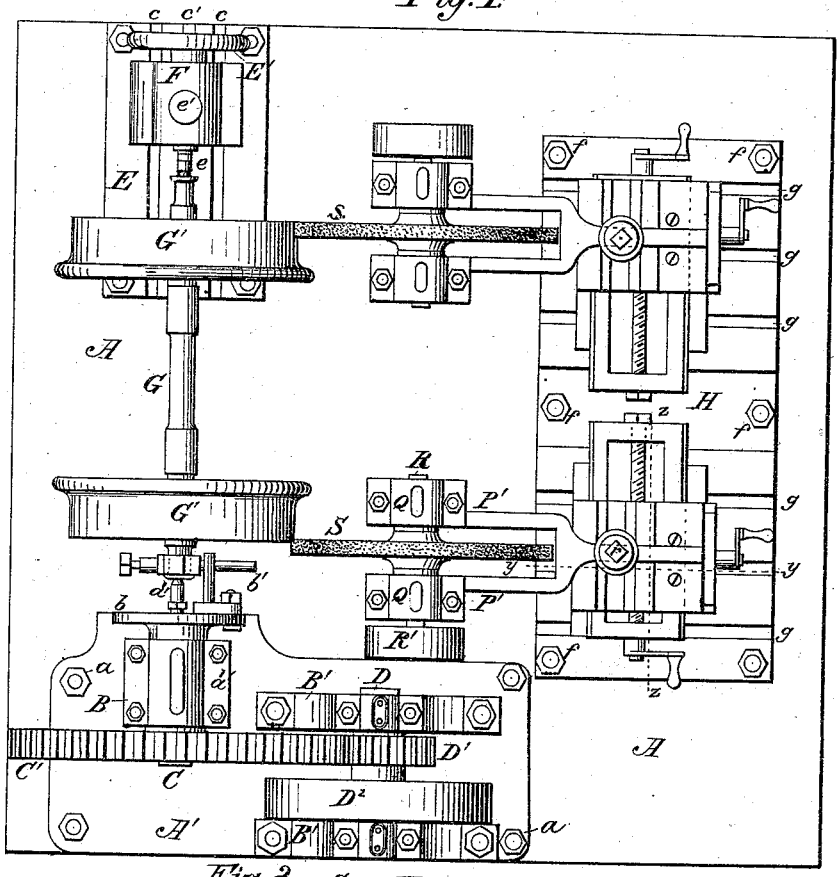
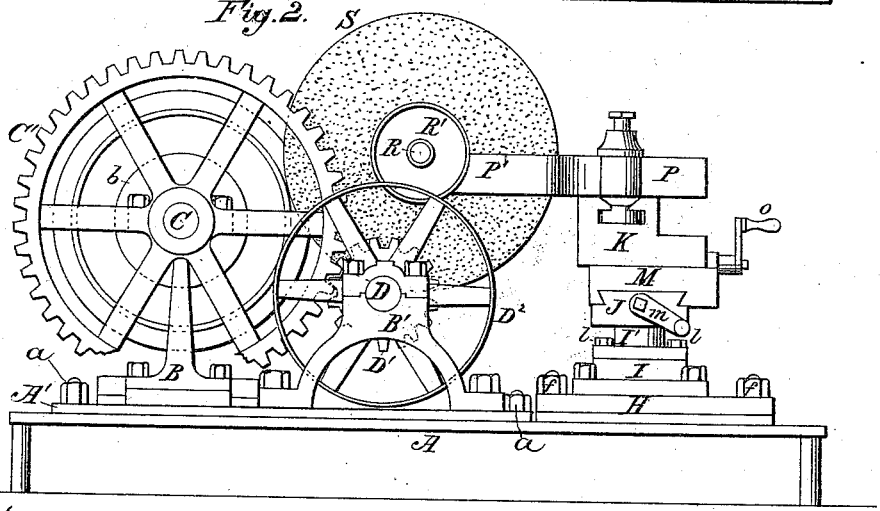


Fig. 2.



Attest:
H. H. Schott
D. P. Lowe

Inventor:
James H. Gowan
per J. B. Taskers & Co attys.

J. H. GOWAN.

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Fig. 3.

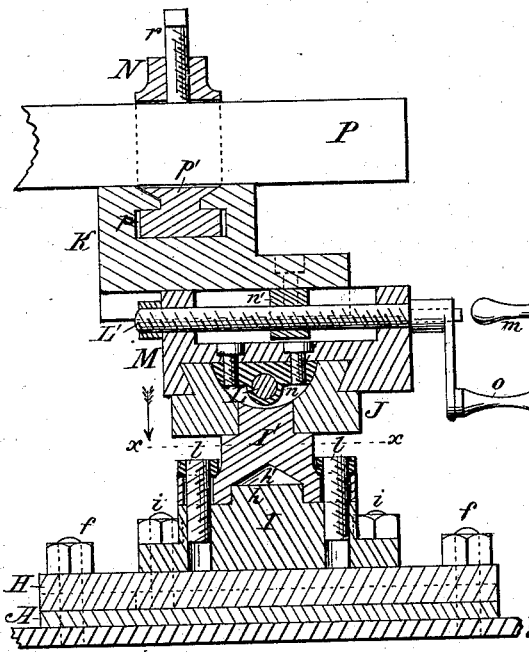


Fig. 4.

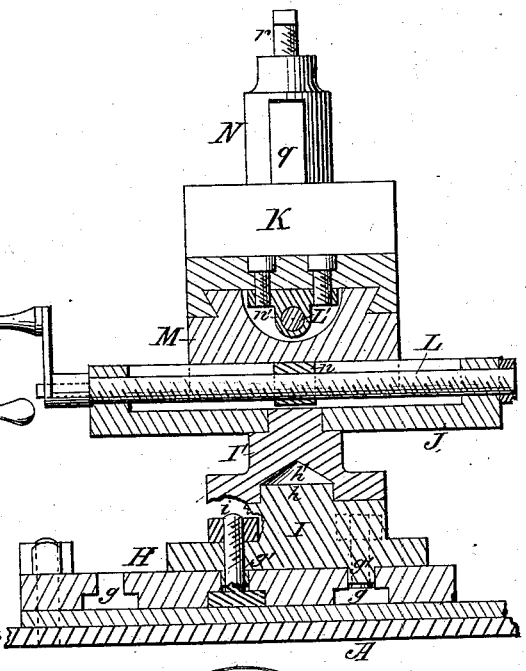
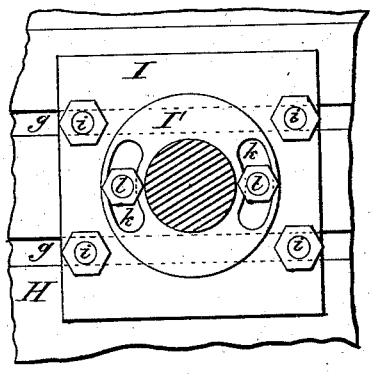


Fig. 5.



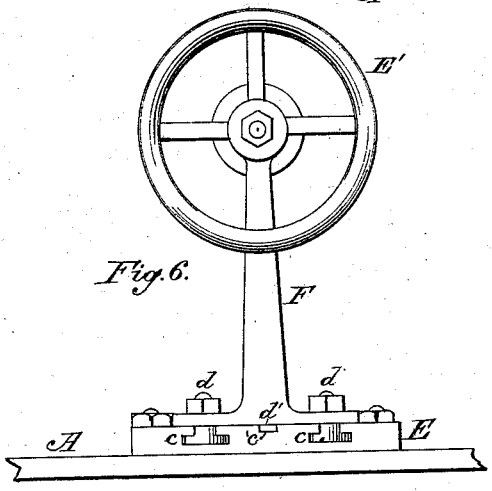


Fig. 6.

Attest:
F. H. Schutt.
A. P. Cowl

Inventor:
James H. Gowan
per J. H. Taskier & Co attys

UNITED STATES PATENT OFFICE.

JAMES H. GOWAN, OF CARSON CITY, NEVADA.

IMPROVEMENT IN MACHINES FOR GRINDING CAR-WHEELS.

Specification forming part of Letters Patent No. **217,365**, dated July 8, 1879; application filed October 25, 1878.

To all whom it may concern:

Be it known that I, JAMES H. GOWAN, of Carson City, in the county of Ormsby and State of Nevada, have invented certain new and useful Improvements in the Manufacture of Car-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in the manufacture of that class of cast-iron car-wheels used generally in this and foreign countries, consisting of a solid or hollow web uniting the hub and tread, the latter, in order to increase its durability, being hardened by the process of chilling—that is, allowing the molten metal as it fills the mold to come in contact with an iron band or "chill" at those points which it is desired to harden. Wheels cast in this way always have more or less defects in the surface of the tread, caused by blisters, inequality of shrinkage, or deviations from truth in the chills employed.

Under light loads these wheels will retain their integrity for a considerable time, owing to the excessive hardness of the chilled surface; but the continual wear increases the defects in a ratio corresponding with the weight of load, flat spots becoming larger, thus increasing the force of the concussions upon the rail, soon rendering it necessary, in order to save the rails, to place new wheels under the car-trucks. In order to avoid these expensive evils it is necessary that the wheels should have their peripheries turned perfectly true, a sufficient amount of metal being cut from the tread and flange to remove all defects, thus causing the wheel to wear evenly and obviate its destructive action upon itself, the rails, and rolling-stock generally.

The great hardness of the chilled tread and flange has hitherto rendered the operation of turning them impracticable, owing to its expensiveness, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process by furnishing a machine capable of turning the wheels perfectly at small expense is the principal object of this invention, which consists, essentially, in the combination and arrangement of mechanism by which the chilled tread or flanges of car-wheels may be turned or trued to any desired gage or shape, as will be hereinafter fully described and specifically claimed.

In the accompanying drawings, Figure 1 is a plan of the machine, showing the relative position of the different parts when acting upon a pair of car-wheels secured to and revolving with their axle. Fig. 2 is an end elevation, showing the system of gearing by which the axle with its attached wheels is rotated and the abrading apparatus by which the removal of the superfluous metal is accomplished. Fig. 3 represents a vertical section of one of the grinding-wheel supports on the line *y y* of Fig. 1. Fig. 4 is a transverse vertical section of the support on the line *z z* of Fig. 1. Fig. 5 shows a horizontal section of the grinding-wheel support on the line *x x* of Fig. 3, looking downward. Fig. 6 is an end view of the machine, showing the adjustable tai-stock and its grooved supporting-bed.

As has been heretofore stated, the great desideratum which would allow of the general introduction of chilled car-wheels with turned or trued peripheries has been the want of a machine which would reduce the great expense attending the operation of turning them as heretofore attempted; and I will now proceed to fully describe my invention, which accomplishes this much-desired result.

Referring to the drawings, A represents the bed-plate of the machine, upon which the whole superstructure is supported. It may be cast in one or more pieces, but a single piece of metal is preferable, as giving greater rigidity with the same amount of metal. The supplementary bed A′ is placed upon the bed-plate A, near one end, and securely fastened thereto by the bolts *a*. Upon this supplementary bed A′ is secured by suitable bolts the head-stock B, which carries the mandrel C in a long bearing, made adjustable to the mandrel by the cap *a′*, so that it may always be without shake or looseness. Secured upon the outer end of the mandrel is the spur-gear C′, which engages with a pinion, D¹, upon the shaft D. This shaft

revolves in journal-boxes on the standards B′, which are secured by bolts to the supplementary bed A′. A belt-pulley, D², is also secured upon the shaft D, and receives the belt from any suitable motor for the purpose of imparting rotation to the mandrel C. This mandrel is provided with a face-plate, *b*, and center *a″*, similar to those used on ordinary lathes.

At the opposite end of the bed-plate from the head-stock is placed the grooved plate or ways E, firmly secured by bolts to the bed-plate, and provided upon its upper surface with the two T-shaped bolt-grooves *c c* and a central guide-groove, *c′*. Upon this plate is placed the tail-stock F, secured in any desired position with relation to the head-stock by the bolts *d*, the heads of which slide in the grooves *c*. A tongue, *d′*, upon the bottom of the tail-stock enters the groove *c′* in the ways E and preserves the parallelism of the tail-center *e* with the line-center *a″*. The devices for moving forward the tail-center with relation to the tail-stock consist of a rotating nut, forming the hub of the hand-wheel E′, within which a screw-thread upon the spindle which receives the center *e* works. A set-screw, *e′*, passes downward through the top of the tail-stock, its lower end bearing against the spindle, so that the latter, together with the center *e*, may be alternately fixed or released when desired, these parts being substantially the same as those used upon ordinary lathes for moving and retaining the tail-screw in position. Between the two centers is placed an axle, G, carrying the wheels G′, which are to be turned, a dog, *b′*, secured to the axle being the means of conveying motion from the face-plate *b* to the axle, and, consequently, to the car-wheels secured upon it.

Secured to the bed-plate A by the bolts *f* is a transversely-grooved plate, H. The grooves *g* in this plate are also T-shaped and arranged at equal distances from each other, so that the tongues *g′* upon the base I of the tool-carrier K shall enter any two of them, thus allowing the tool-carrier and its adjuncts to be shifted from one pair of grooves to another to suit the work, as when wheels belonging to roads having different gages are to be trued up, as a change of gage causes a corresponding change in the length of the axles.

These bases are retained in position by T-headed bolts *i*, the heads of which move in the grooves *g*, and they are further provided with a circular projection, *h*, on their upper side, which enters a corresponding cavity in the downward projection I′ of the traverse-plate J.

Two segmental slots, *k*, are formed in the expanded flange of this part I′, through which pass the stud-bolts *l*, nuts upon which serve to hold the flange, and with it the traverse-plate J, parallel to the axial line of the centers, or at any angle thereto corresponding to the bevel of the tread of the car-wheels to be turned.

The traverse-plate J has a concavity of semi-circular section in its top, in which is placed the traversing screw L, rotating freely in journal-boxes at each end of the plate, and provided with the hand-crank *m*, by which it is turned to carry forward or back in line with the screw the traversing plate M, which is provided with a dovetail groove upon its under side fitting onto corresponding ways on the plate J, and it is also furnished with a nut, *n*, on its under side, upon which the screw L acts to move the plate back and forth.

The traversing plate M is likewise provided with a screw, L′, journaled in the ends of the plate M, as the screw L is in the plate J. It is also provided with the handle *o*, by means of which the screw is turned, and the tool-carrier, which is furnished on its under side with the nut *n′*, made to move at right angles to the axial line of the traverse-plate J.

This tool-carrier K has a T-shaped groove, *p*, in its upper part to receive a similarly-shaped part, *p′*, of the tool-post N, which may be moved to any point desired in the length of the carrier. The upper inner edges of the groove in the carrier are beveled, and the corresponding part of the tool-post likewise, thus avoiding sharp corners and giving greater strength to the post. Through the upper part of this tool-post is formed a mortise, *q*, through which and resting on the top of carrier K passes the bifurcated arm P. This arm may be firmly secured in any desired position to which it may be turned horizontally by the set-screw *r*, which passes down through the top of the tool-post into contact with the upper side of the arm.

Each prong P′ of the arm P is provided with a journal-box, Q, in which the shaft R rotates. This shaft is provided on one end with a driving-pulley, R′, through which it is driven at considerable speed by a belt from any suitable motor.

An emery or other grinding-wheel, S, is secured upon the shaft R between the journals Q by means of a washer and nut, which hold it firmly against a collar on the shaft.

The operation of the machine is as follows: An axle with the wheels secured thereon is placed between the centers. The traversing plates J of the tool-carriers are then brought parallel to the tread of the wheel—that is, they are given the same inclination from the center line of the axle as it is intended to give the tread, and secured in that position, motion being imparted to both the wheels and the grinding or abrading tools. The latter are moved forward by the cranks *o* until the abrading-tools have ground away the edges of the car-wheels to such a depth as may be needed to remove the defects from the tread.

When the cut is carried across their faces by means of the screw L and crank *m*, should the first cut not remove all that is necessary, a second may be taken. It is evident that the rotation of the screws L and L′ may be made automatic, if desired, by suitable gearing connected with some part of the revolving

mechanism of the machine or with the prime motor.

It will be evident that this machine may be employed in turning up old wheels, the peripheries of which have become so much out of truth as to make it dangerous and unprofitable to retain them longer in use, although after turning they become nearly or quite as good as new wheels, and the operation may be repeated as often as necessary until the chilled part of the wheel is used up.

These car-wheels will run much longer without becoming untrue than those which have not been turned, and the wear of the track is also greatly reduced.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The rotating abrading wheel or wheels, provided with means for operating the same, as hereinbefore described, in combination with mechanism for centering and rotating the chilled car-wheels and axles when firmly united together, for the purpose of rendering the peripheries of said wheels accurately concentric with the axle-bearings, all substantially as set forth.

2. The ways E, bolted to the bed-plate A, and provided with the T-shaped grooves *c c* and central guide-groove *c'* in the top of the ways E, between the T-grooves, in combination with the tail-stock F, having tongue *d'* and T-headed securing-bolts *d*, substantially as and for the purpose specified.

3. The plate H, bolted to the bed-plate A, provided with a plurality of transverse T-shaped grooves, *g*, placed at equal distances from each other, for the purpose of giving a variable adjustment to suit axles of different lengths, in combination with the abrading-wheel carriers and their supporting and adjusting mechanism, as set forth.

In testimony that I claim the foregoing as my own I hereunto affix my signature in presence of two witnesses.

JAMES H. GOWAN.

Witnesses:
HARRY HUNTER,
CURTIS P. MASON.