B. BURGESS.

Machine for Making Molds for Car-Wheels.

No. 199,259. Patented Jan. 15, 1878.

FIG. I.

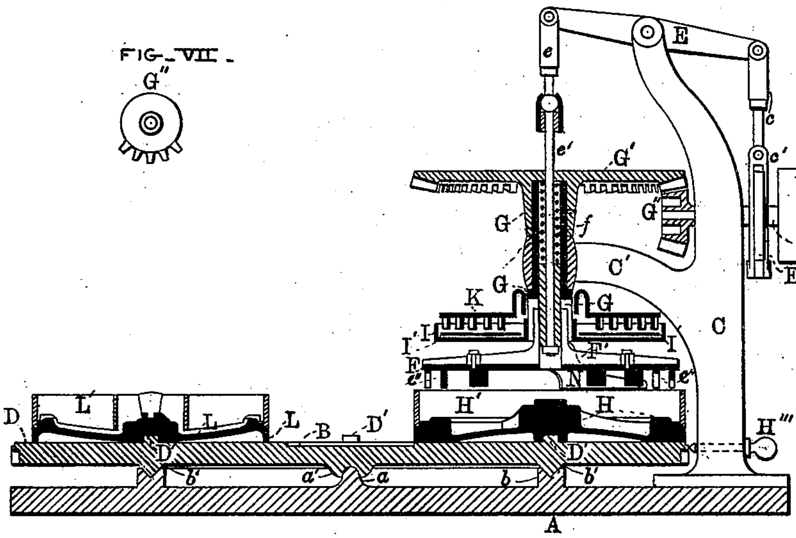


FIG. II.

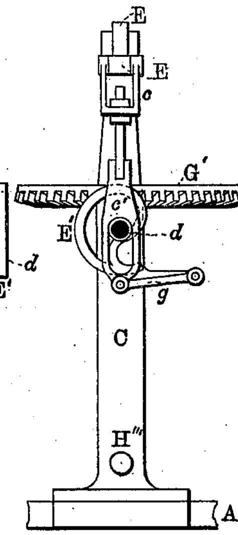


FIG. VII.

FIG. III.

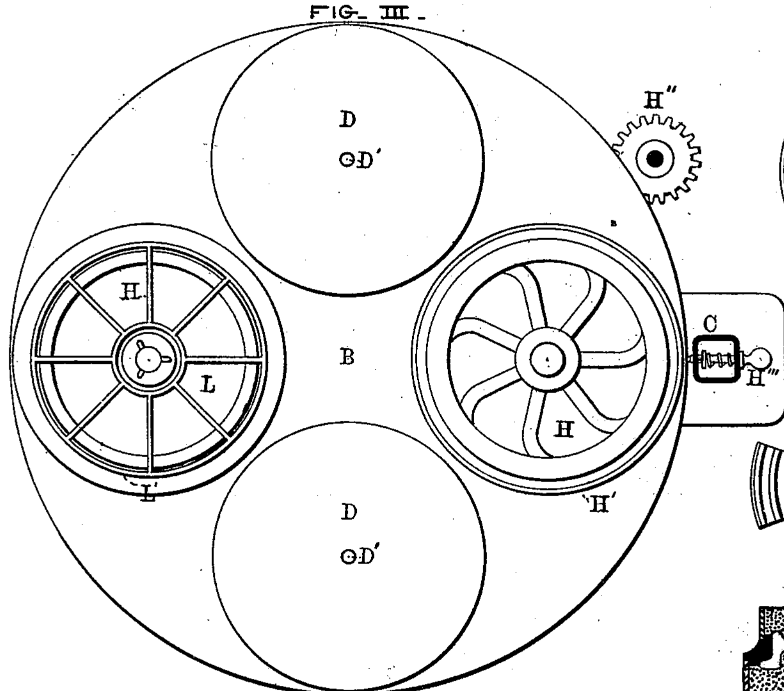


FIG. VI.

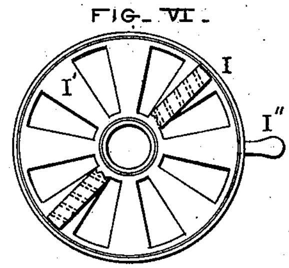
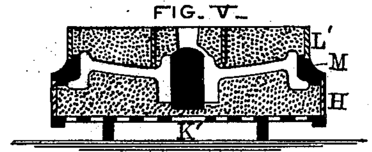


FIG. IV.

FIG. V.



WITNESSES.

W. W. Evans.

Jas. W. Graham.

INVENTOR.

Benjamin Burgess

by G. H. W. T. Howard

Atty.

B. BURGESS.

Machine for Making Molds for Car-Wheels.

No. 199,259. Patented Jan. 15, 1878.

FIG. VIII.

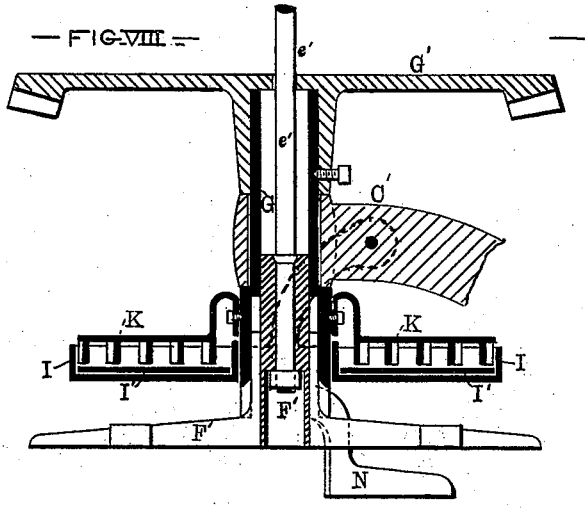


FIG. IX.

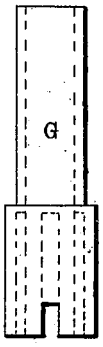


FIG. X.

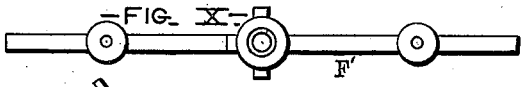


FIG. XI.

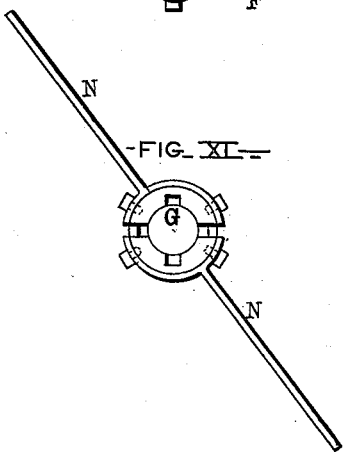


FIG. XII.

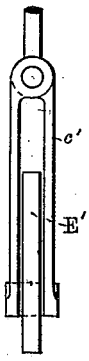
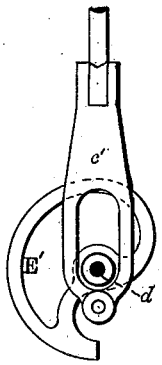


FIG. XIII.



WITNESSES.

F. B. Groff

A. Scott

INVENTOR.

Benjamin Burgess

by Munn & Co

Attorneys.

UNITED STATES PATENT OFFICE.

BENJAMIN BURGESS, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN MACHINES FOR MAKING MOLDS FOR CAR-WHEELS.

Specification forming part of Letters Patent No. **199,259**, dated January 15, 1878; application filed November 21, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN BURGESS, of the city of Baltimore and State of Maryland, have invented certain Improvements in Machinery for Molding Car-Wheels, of which invention the following is a specification; and I do hereby declare that in the same is contained, a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The invention relates, first, to certain improvements in a machine for molding car-wheels, wherein that part of the molding operation consisting of ramming the molding-sand into the flasks, and in contact with the pattern contained therein, is effected by a rammer having a complex movement obtained from a revolving driving-shaft through the medium of suitable mechanical devices, and in which the flasks and sections of pattern to be operated upon are placed upon a revoluble bed-plate at a regular distance from the center thereof, and in such positions with reference to the center of the rammer as to admit of the said flasks containing the sections of the wheel-pattern being brought directly underneath the rammer, and secured in the proper position during the ramming operation, as will hereinafter fully appear. The said invention relates, secondly, to certain improvements in the car-wheel pattern, as hereinafter described.

In the description of the said invention which follows reference is made to the accompanying drawing, forming a part hereof, and in which—

Figure 1 is a partly-sectional side view of the machine. Fig. 2 is an end view of portions of the same. Fig. 3 is a sectional plan of the invention. Fig. 4 is a view of the under side of the rammer. Fig. 5 is a section of the complete mold. Fig. 6 is a plan of a part of the invention; and Fig. 7, an end view of a segmentally-toothed wheel, hereinafter referred to. Fig. 8 is an enlarged view, partly in section, of a portion of the machine. Figs. 9, 10, 11, 12, and 13 are exterior views, on enlarged scale, of certain detached portions of the machine, as hereinafter particularly described.

Similar letters of reference indicate similar parts in all the views.

A is the foundation-plate of the machine, supporting the revoluble bed-plate B and the frame C. The said foundation-plate is provided with a central gudgeon, *a*, which enters the central recess *a'* of the bed-plate B. The foundation-plate A further supports the bed-plate B by means of the V-grooved ring *b*, within which the similarly-shaped projection *b'* of the bed-plate rests.

By means of the supporting devices forming the connection between the stationary foundation-plate and the revoluble bed-plate described, an accurate movement of the said bed-plate is at all times preserved, and the wear consequent upon the movement of the said bed-plate distributed over a large surface. The V-shaped projection and ring also serve to give rigidity to the bed-plate, and fit the same to receive heavy weights near the circumference thereof without sustaining injury therefrom.

The upper surface of the bed-plate B is furnished with a series of raised circular seats, D, upon which the sections of pattern are placed, and each seat is provided with a pin, D', located centrally thereof, adapted to fit into a cavity in either section of the wheel-pattern.

The frame C, before referred to, is bolted to the foundation-plate A, and at its upper end is forked to allow of the attachment thereto of the vibratory lever E, the outer end of which is fitted with a link, *c*, pivoted to a cam-yoke, *c'*. A downward movement is imparted to the outer end of the vibratory lever E through the medium of a cam, E', fastened to the driving-shaft *d*, and confined within the yoke *c'*. The inner end also of the vibratory lever E is provided with a link, *e*, connecting the said lever with the central shaft *e'*, to the lower extremity of which is indirectly attached the rammer before alluded to. The said rammer, which is represented in the drawing by F, consists of a plate having irregularly-located projections *e''* on the under side thereof, and it is bolted or otherwise secured to a carrier, F', rigidly connected to the central shaft *e'*.

The projections *e''* on the rammer are irregularly placed, in order to prevent the projections of one side or wing of the rammer from entering the depressions in the sand produced by the projections of the opposite or corresponding side or wing, when the rammer is revolved.

The means of connection between the cen-

tral shaft e' and the link e is a socket, which admits of the free revolution of the central shaft independently of the said link, in the operation of the machine, hereinafter described.

A portion of the carrier F′ slides within a sleeve, G, supported by an arm, C′, extending from and forming a part of the frame C, the said carrier, together with its attached rammer, having an intermittent rotary movement in common with the sleeve, obtained from the beveled wheel G′ driven by the segmentally-toothed pinion G″ on the driving-shaft *d*. The downward motion of the rammer and its connections is obtained independently of the cam E′, it being effected by the weight of the said parts assisted by the resilient reaction of a spiral spring, *f*, situated in the sleeve G, the said spiral spring being compressed between a portion of the beveled wheel G′ and the upper end of the carrier F′ in the upward motion of the carrier.

By reference to Fig. 2 of the drawing, it will be seen that lateral movement of the lower end of the cam-yoke c' is prevented by connecting the same to the frame C by means of an arm, *g*.

Parts of the invention not yet alluded to, or only briefly mentioned, will be described and their uses fully set forth in the description of the operation of molding wheels by means of the present improvements which follows. The section of pattern represented by H, and which is to be embedded in that portion of the mold technically known as the "drag," is placed over a pin, D′, projecting from one of the raised circular seats D, and the flask H′ fitted thereupon.

By reference to Fig. 1 of the drawing, it will be seen that the flask H′ rests upon a shoulder formed on the pattern-section H, and that a clean and sharp angle is formed at the inner point of union for the sand to enter.

The said flask is then filled with molding-sand, and the bed-plate revolved through the medium of a pinion, H″, located exteriorly thereof, until the said flask and section of pattern are brought directly underneath the rammer, which has been previously elevated to its greatest height by partially turning the driving-shaft. The correct position of the bed-plate at this stage of the molding process is maintained by means of a spring-stop, H‴, the pointed end of which enters a depression in the edge of the plate. The driving-shaft is now put in revolution, which causes the rammer to deliver strokes in rapid succession upon practically the entire surface of the sand within the flask, the position of the rammer at each stroke being altered by its intermittent rotary movement.

By reference to Fig. 7, which represents an end view of the pinion G″, it will be seen that a portion only of its periphery is toothed. Consequently the beveled wheel G′ remains stationary, except when the teeth of the pinion are engaged therewith. During this ramming process the sand in the flask is compressed uniformly upon the pattern; and to supply the space caused by the compression of the sand, additional sand is fed to the flask from a sand-tray, I, suspended from the frame C and directly over the said flask. This sand-tray has a radially-slotted bottom and an inner slotted plate, I′, having a handle, I″, extending therefrom. By adjusting the size of the effective openings in the bottom of the sand-tray by means of the slotted plate, the amount of sand fed to the flask at each revolution of the rammer may be regulated, a rake, K, revolving within the said tray, conducting the sand to the radial slots therein.

Scrapers N, attached to the carrier F′, revolve in close contact with the upper edge of the flask, thereby preventing an accumulation of sand above the same, the superfluous sand being conducted to the bed-plate, from which it may be removed. Upon the sand being rammed in the flask H′ to the proper density, the spring-stop H‴ is withdrawn from the depression in the edge of the bed-plate, and the bed-plate revolved sufficiently to bring the flask H′ clear of the rammer, and one of the adjoining circular seats having therein the other section of pattern and its flask under the ramming. The flask H′, with its contained pattern, is then covered by a perforated plate, K′, which is clamped thereto, after which the whole is moved to the floor of the foundry and turned over. The clamps are next removed and the pattern lifted from the drag, and the surface of the sand prepared in the usual manner for the reception of the molten metal.

During the ramming of the drag portion of the mold, as described, the remaining section L of the pattern is adjusted upon a seat, D, adjoining the one occupied by the said drag, and covered by the cope-flask L′, which is then filled with sand. The pattern-section L is also provided with a shoulder, upon which the cope-flask L′ rests, it in this respect being the same as the pattern-section H.

In the movement of the bed-plate carrying the drag-mold clear of the rammer the pattern L and its flask L′ are conducted beneath the rammer, as aforesaid, and the ramming process hereinbefore described repeated.

Upon the removal of the cope from the bed-plate and the preparation of the surface of the mold after the withdrawal of the pattern therefrom, the chill-ring M, which forms the tread and a part of the flange of the wheel, is placed over the drag and the central core inserted in the mold. The cope is next placed upon the chill and the sections of the mold clamped together, as shown in Fig. 5, after which the mold is ready to receive the molten metal in the casting operation. The upper and lower edges of the chill-ring M are constructed to enter and seat the said parts of the flask, and the firmness and solidity of the mold are thereby increased.

The usual method of molding wheels, requiring the periphery or a portion of the periphery of the same to be chilled by the contact

of the molten iron with a metallic surface, consists in placing the pattern within the chill and ramming sand upon and around the whole, the pattern afterward being withdrawn and the chill left in the mold. By means of the present invention, however, it will be understood that the chill is not used until the flasks are rammed, and then it forms a section of the flask, as well as a part of the mold. This improved method greatly facilitates the molding of wheels, and it is specially applicable to the molding-machine herein described.

The operation of molding car-wheels by hand is one requiring great skill and experience on the part of the operator, as any variation in the density of the mold produces defects in the casting. Care has also to be taken to prevent the sand from being uniformly too dense or too loose, the former defect causing the molten metal coming in contact with the sand to be repelled, thereby causing such agitation of the metal as to produce what are technically termed "scabs" on the surface of the casting, and the latter the enlargement or straining of the mold, and the consequent distortion of the wheel.

By means of the improved machine forming the present invention the molds are rammed uniformly to the desired density, which insures a perfect casting.

The primary object of the movable bed-plate B being to conduct the molds and flasks underneath the ramming device, a plate having a reciprocating or any other movement adapted to secure this end may be employed; but the revoluble plate herein described and shown is preferred, as no reversal of the direction of its movement is necessary to bring any one of the seats for the molds to a position with reference to the ramming device necessary to admit of the ramming operation.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. In a machine for molding car-wheels, a bed-plate provided with a series of pattern-receiving seats, each having a pin for centering the pattern or section of the same, combined with a rammer and its operating devices, the said bed-plate being adapted to be moved and its seats brought under said rammer by suitable mechanism, substantially as and for the purposes specified.

2. In a machine for molding car-wheels, a revolving bed-plate provided with a series of seats having central pins to receive the pattern or section of the same, combined with a ramming appliance and its operating mechanism, and a stop or locking device, whereby, when one of the said seats containing the pattern centered thereon is brought under the rammer, the bed-plate is held stationary, substantially as specified.

3. In a machine for molding car-wheels, the following elements in combination, viz: a moving bed-plate having a series of seats provided with pins or centering devices, whereby the pattern or section of same is seated and centered, a rammer and mechanism imparting thereto an intermittent-rotary and a vertically-reciprocating movement, and a locking device, whereby the plate, when any one of its several seats is brought under the rammer, is held stationary, substantially as described.

4. In a machine for molding car-wheels, the combination of a ramming device, a sand-tray, having openings in the bottom thereof adjustable in size, and adapted to feed the flask with sand as the said sand is compressed by the said ramming device, and a rake or series of rakes constructed to revolve within the sand-tray, to conduct the sand contained therein to the openings in the bottom thereof, substantially as herein described and shown.

5. In a machine for molding car-wheels, the rammer F, having projections e'' on its under side, combined with mechanism whereby an intermittent rotary and a vertically-reciprocatory movement is imparted to it, as specified.

6. As means for communicating an intermittent rotary movement to the central shaft e', carrying the rammer F, the beveled wheel G′ and segmentally-toothed pinion G″, secured to the driving-shaft d, substantially as herein shown.

7. As means for elevating the central shaft e', carrying the rammer F, independently of the intermittent rotary motion of the same, as described, the combination of the revolving cam E′, cam-yoke c', links c and e, and vibratory lever E, substantially as herein set forth.

8. The vertically-reciprocating rammer F, having a spiral spring placed about its axis, which spring, by resistance to compression, assists the force of gravity in impelling the descent of the rammer from its raised position, as specified.

9. A car-wheel pattern, each of the half-sections of which is provided with a shoulder or rest to receive one of the two parts of the flask, substantially as specified.

In testimony whereof I have hereunto subscribed my name this 15th day of November, in the year of our Lord 1877.

BENJAMIN BURGESS.

Witnesses:
WM. T. HOWARD,
HENRY TAYLOR.