No. 688,241. Patented Dec. 3, 1901.

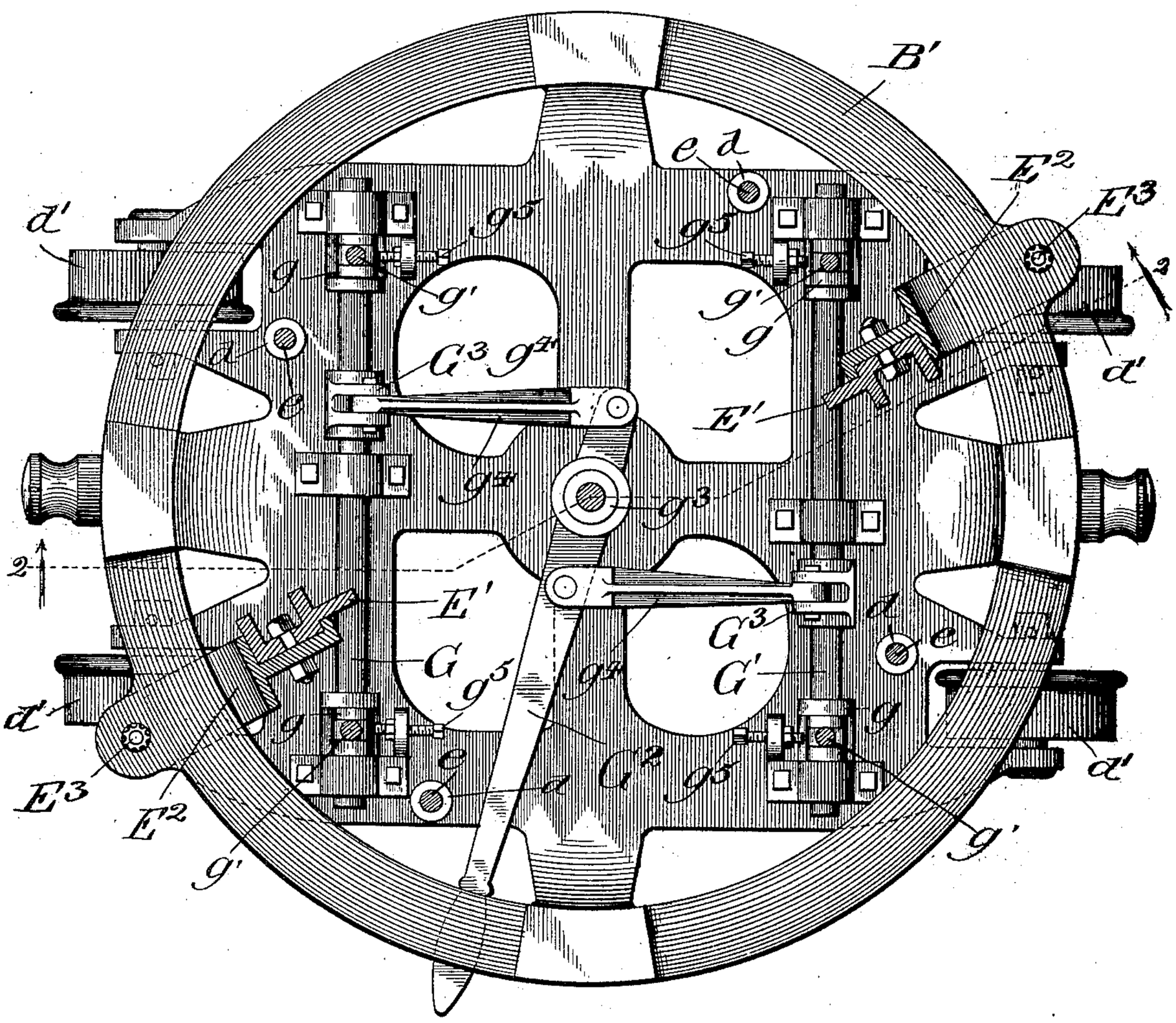
T. A. FRASER.

MECHANISM FOR FORMING CAR WHEELS.

(Application filed Jan. 7, 1898.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 5 Sheets—Sheet 2.

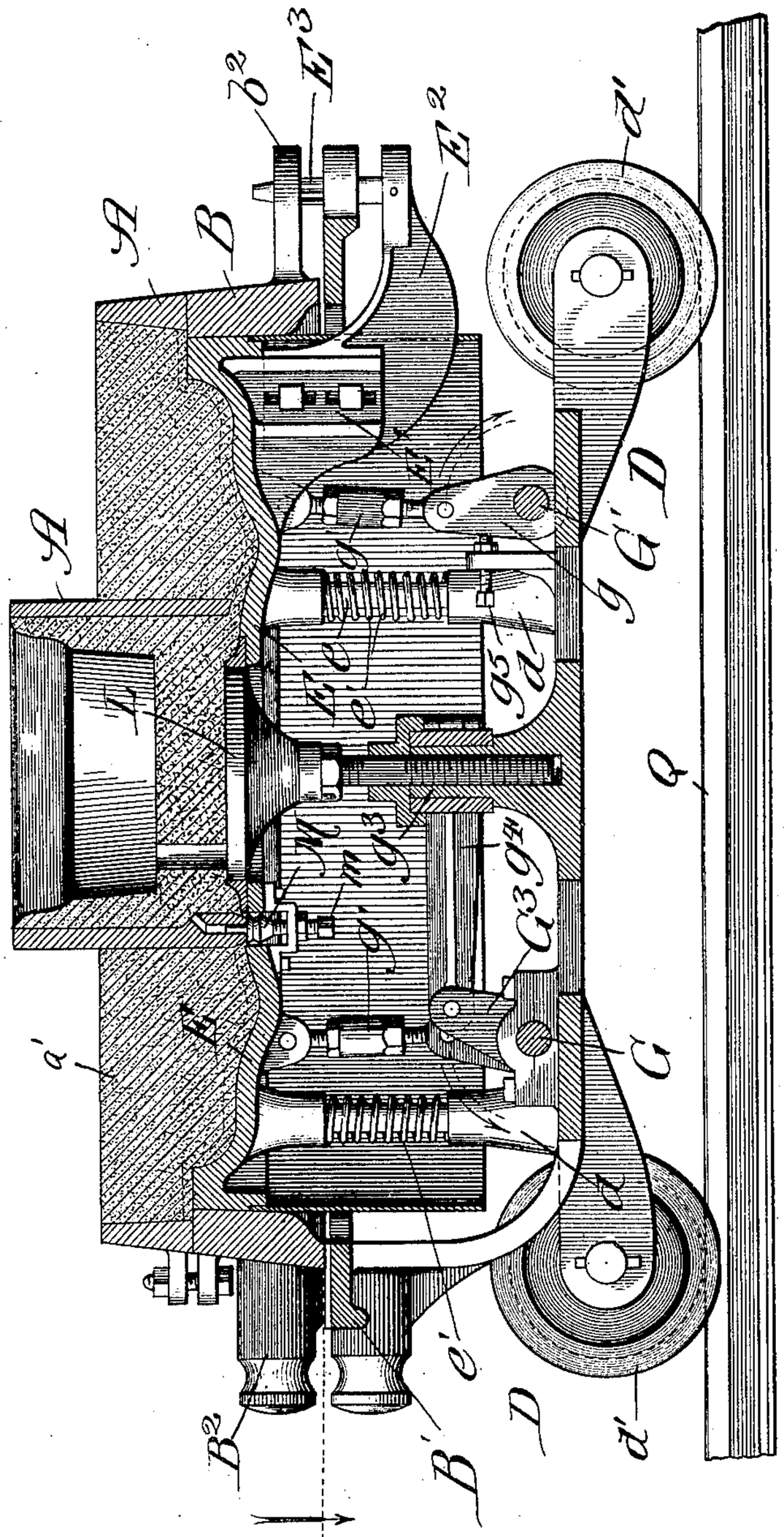

Fig. 2.

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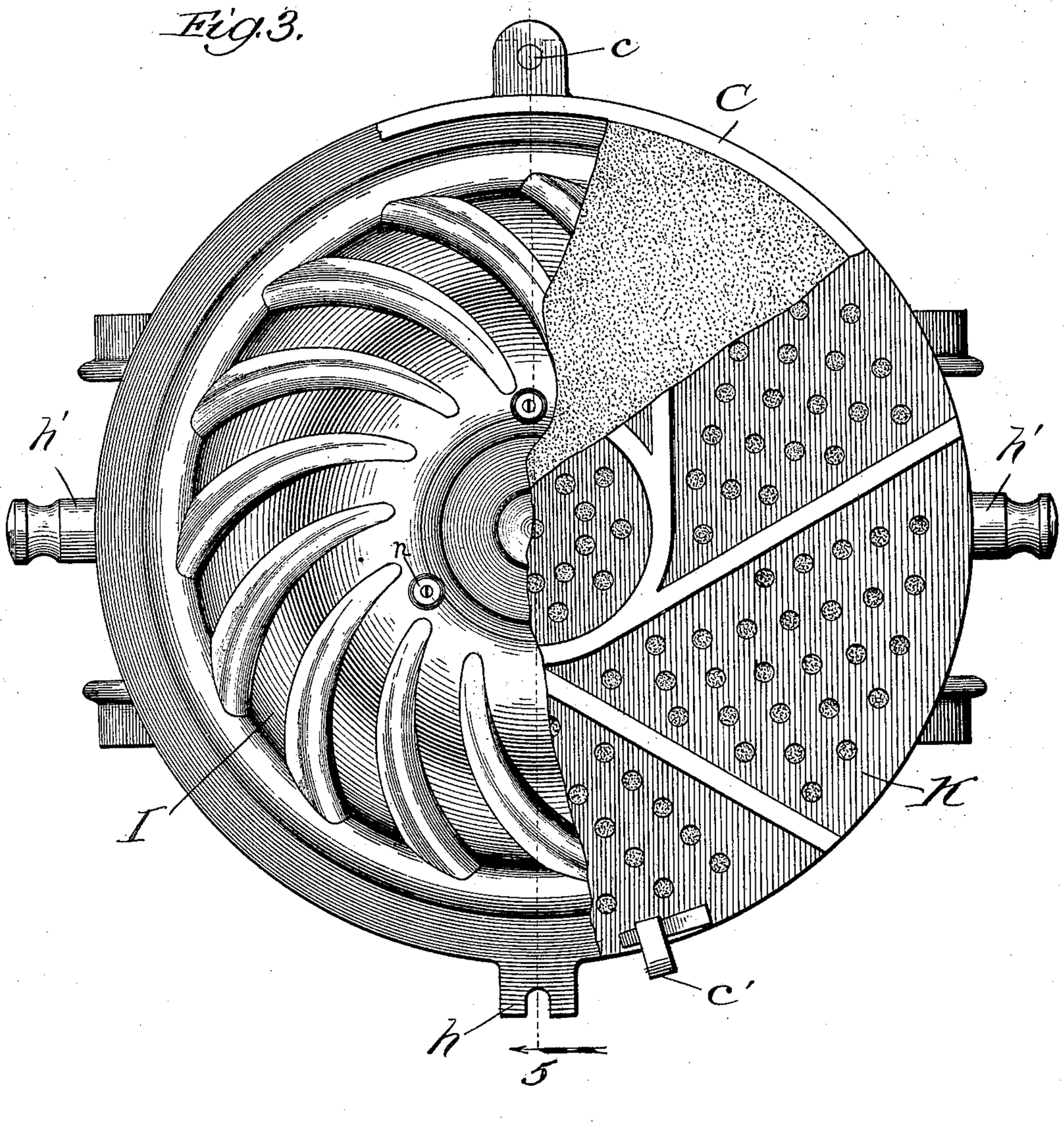
(No Model.) 5 Sheets—Sheet 3.

Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

Fig. 4.

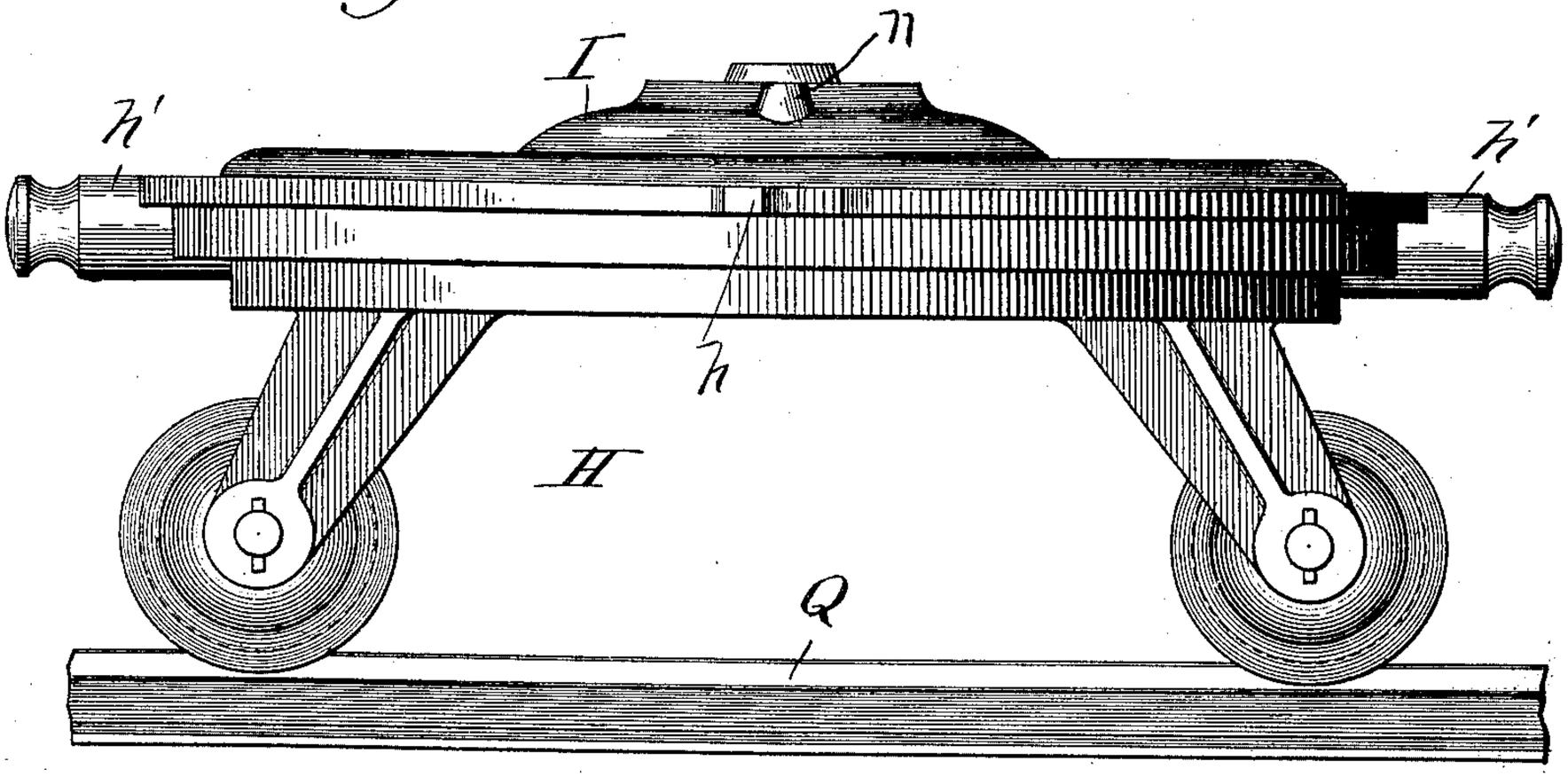
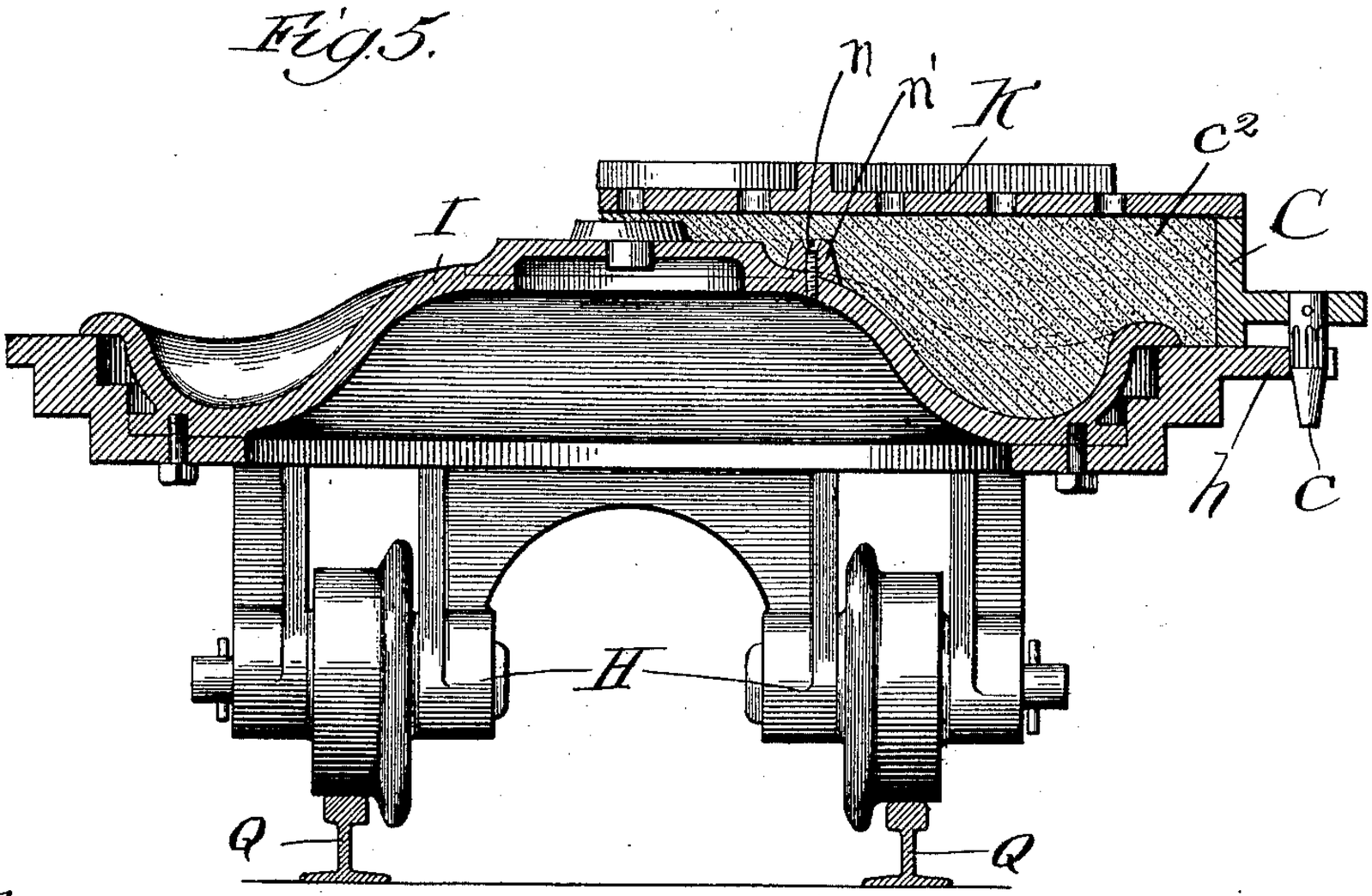


Fig. 5.



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(No Model.) 5 Sheets—Sheet 5.

Fig. 6.

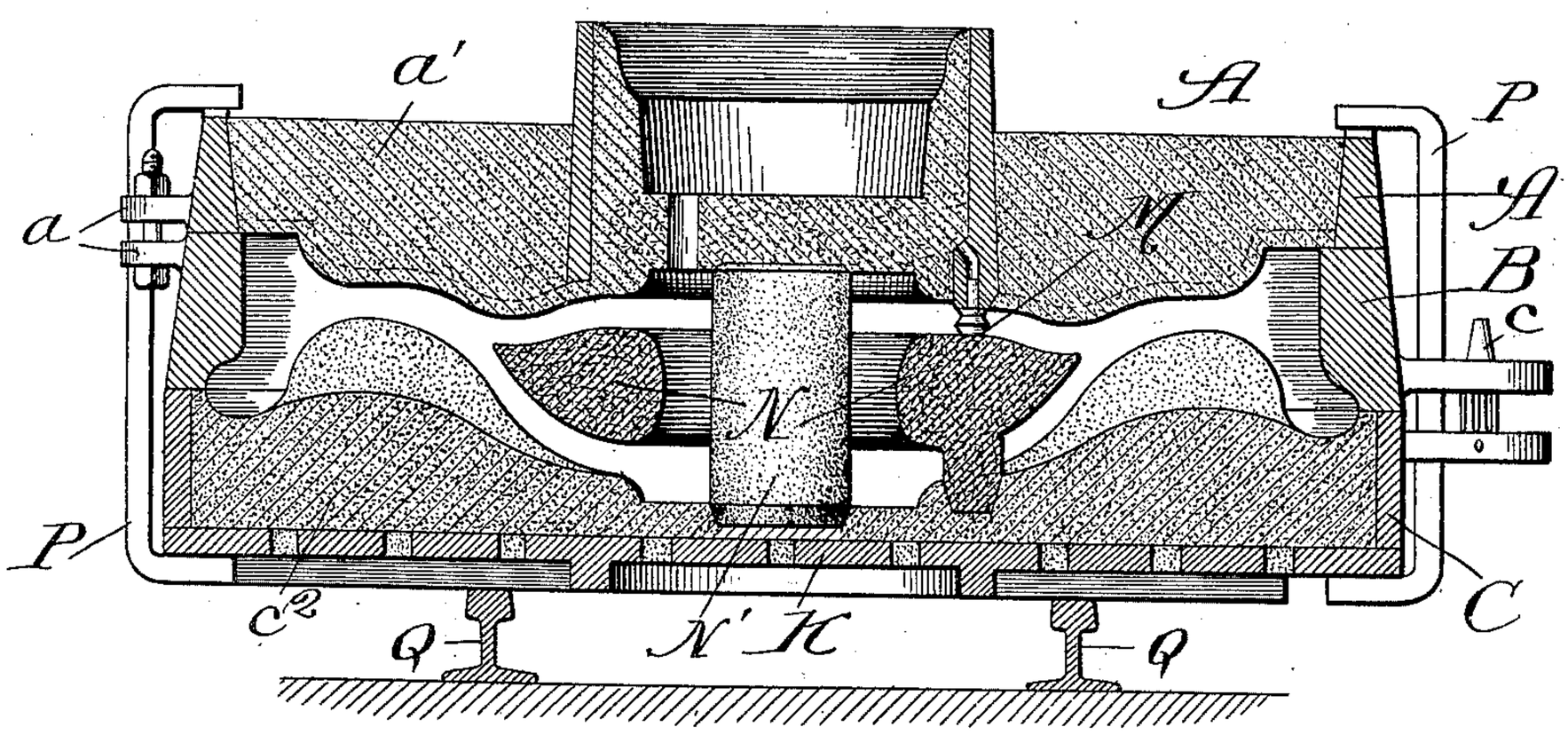
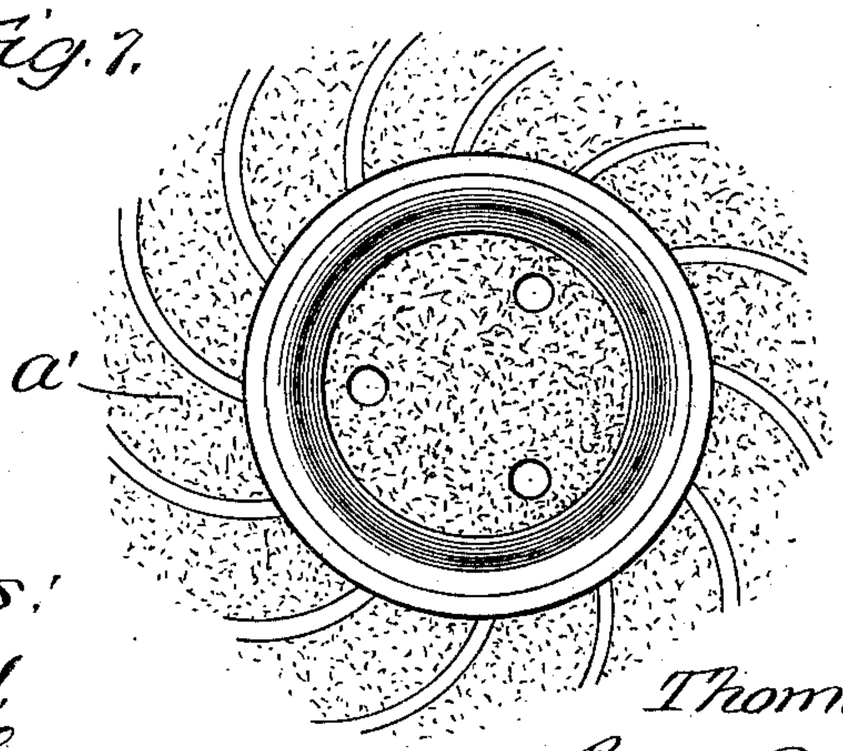


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR FORMING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 688,241, dated December 3, 1901.

Application filed January 7, 1898. Serial No. 665,906. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. FRASER, a citizen of the United States, residing in Chicago, Illinois, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention relates particularly to machines or mechanisms for the forming of car-wheel molds, and has for its object the providing of a simple, economical, and efficient mechanism for forming the mold for the casting of car and similar wheels.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan sectional view of the lower portion of the mechanism shown in Fig. 2, taken on line 1 of Fig. 2 looking in the direction of the arrow; Fig. 2, a vertical sectional elevation taken on line 2 of Fig. 1; Fig. 3, a broken plan view of part of the mechanism shown in Fig. 5, known as the "drag," and looking at it from the top; Fig. 4, an elevation of the drag; Fig. 5, a broken sectional elevation taken on the line 5 of Fig. 3 looking in the direction of the arrow, and Fig. 6 a vertical central sectional elevation of the completed mold.

In the art to which this invention relates it is well known that the forming of the mold for and the casting of car-wheels requires the use of a high grade of skilled manual labor and that even when such labor or help is employed there is a material loss in the resultant products.

My invention therefore has for its principal object the providing of simple and efficient mechanisms for forming car-wheel molds, so that relatively unskilled labor may be used. Further, the mechanisms are so constructed and arranged that an increased daily product can be turned out and with a very small percentage of loss and with greater uniformity as to product, all of which will more fully hereinafter appear.

In constructing what I prefer to term a "machine for the forming of car-wheel molds" I make a mold in three portions, consisting of a cope A, a chill-ring B, and a drag C. The cope A and the chill-ring B, while made in two parts, as shown particularly in Fig. 2, are bolted together at *a* and kept in such engagement until one or the other of the parts becomes broken or injured, so that they have to be renewed or repaired.

In forming a mold for a car-wheel and using it in connection with my improvements I provide a base D, adapted to be provided with wheels *d'* to form a truck, though these wheels may be dispensed with. This base portion carries one portion E of the pattern for the car-wheel and forms one side of the car-wheel mold. This pattern is vertically movable and is provided with several pins *e*, adapted to enter recesses or perforations in the guides *d* on the base, and between such pattern and these guides and surrounding the pins are helically-coiled springs *e*, acting to counterbalance the weight of the pattern. In order to move the pattern downwardly or upwardly whenever desired and release the cope and its molding material, two rock-shafts G and G' are provided and mounted in suitable bearings on the base portion and provided with toggle-lever arms *g*, rigidly secured thereto. Intermediate these lever-arms and the pattern and pivotally secured to each is the second portion of the toggle-levers *g'*, made, preferably, in the shape of adjustable turnbuckles, so that as the rock-shafts are rotated in the direction indicated by the arrows in Fig. 2 the pattern is pulled down and away from the molding-sand. To move these rock-shafts, I prefer to provide a horizontal operating-lever G^2, preferably pivotally-mounted at the center of the base on a stud g^3, which lever is provided with two links g^4, connecting it with the rock-shafts by means of the lever-arms G^3. The movement of the toggle-levers should be limited, and in order to accomplish such result and lock them set-screws g^5 (shown particularly in Figs. 1 and 2) are provided and arranged to be contacted by the levers when they pass the line of centers. This portion E of the pattern is provided with depending lugs E' and adjustable brackets E^2, carrying fluted tapered pins

E^3, arranged to pass through projecting ears on the ring B′, which forms a portion of the base or truck, and continuing are adapted to enter into projecting ears b^2 on the chill-ring and position the same on the base. It will be understood that the cope-ring A carries the molding-sand a', which forms one half of the mold, while the chill-ring B forms the periphery of the car-wheel mold. The brackets E^2 can be made adjustable by providing slots either in the lugs E′ or the heads of the brackets in line with the attaching-bolts.

The drag C (shown in Fig. 5) carries the molding material or sand c^2 to form the other half of the car-wheel mold and is preferably mounted upon a truck H. This truck has bolted or otherwise secured to it a pattern I, by which one surface of the car-wheel mold is formed. The pattern I has secured thereto blocks or heads n by screws n', as shown in Fig. 5, which blocks or heads are for the purpose of forming a hole through the inside plate of the wheel, through which the core-sand may be taken out after the wheel is cast, as is usual in casting double plate-iron wheels. The truck is provided with projecting lugs h, having recesses, so that when the drag is placed thereon the flask-pins c will enter the recesses and position the flask upon the pattern. A bottom board K is used and preferably formed of metal, so that when the sand is tamped in place it may be laid on the drag and moved around, acting as a scraper to remove the surplus sand and as a support for the entire mold when the same is turned over and in position, as shown in Fig. 6.

In operation the cope, with the base-truck (shown in Fig. 2) and its attached parts, is arranged with the pattern at its upper limit of movement. The truck is placed on a track Q in position for making the mold. The chill-ring and cope are next placed in position, so as to surround a platen or circular table L, which forms the hub, in such manner as to enable the central core to be inserted and the metal poured. Before the cope is placed in position three chaplets M are inserted in perforations on the under side of the cope-ring, the functions of these chaplets being to position the interior core, as will be more fully described. These chaplets when the cope is placed in position, as shown in Fig. 2, are forced up and against the metal portion of the cope-ring by means of set-screws m, which are secured to the pattern. The molding-sand is next carefully tamped into position and leveled off on the upper part of the cope by means of a scraper or otherwise. The operating-lever is then moved in the direction to depress the pattern away from the molding-sand. The chill-ring and cope are provided with trunnions B^2, so that they may be raised by means of a crane to permit of the truck being drawn from under. The drag is next placed in position on the truck carrying the other portion of the pattern, as shown in Fig. 5, and the sand carefully tamped in place. The molding-sand is then leveled off by means of a straight-edge or scraper and flush with the bottom portion. The bottom board is then placed in position thereon and rubbed around to make a firm seat and is clamped to the track by means of a temporary clamp c', as shown in Fig. 3. A crane is then used to lift the drag with its truck by means of the trunnion h' from the track and turned, so that a bottom plate is placed on the tracks, as shown in Fig. 6. The temporary clamp is then removed and the truck and pattern lifted off the drag. The interior and central cores N and N′ are next placed in position and the cope with the chill-ring brought over by means of the crane and lowered onto and into engagement with the flask-pin c, so as to bring the parts into the desired relation. Clamps P are then provided and arranged to firmly clamp the mold and the bottom plate together. In Fig. 6 the mold is shown in its completed form, with one of the chaplets contacting with the central core to position the same and hold it from floating. These chaplets, preferably formed of metal, are forced rigidly into engagement with the cope-ring, and they will always keep the same position and hold the interior core at the same point in all of the molds.

I claim—

1. In a mechanism for forming car-wheel molds, the combination of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by peripheral standards, guides on the depressed bottom within the diameter of the circular opening in the rim, a pattern for forming one side of a car-wheel mounted within the diameter of the circular opening in and above the plane of the rim and serving as its own pattern-plate, downwardly-projecting guide-rods on the pattern within the diameter of the circular opening in the rim to enter the guides on the depressed bottom, means carried by the depressed bottom of the base and connected directly with the pattern for moving the pattern vertically, means on the annular rim for supporting a chill-ring and cope in position to have the ring receive the pattern and surround and engage the periphery thereof, and a chill-ring and cope, substantially as described.

2. In a mechanism for forming car-wheel molds, the combination of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by peripheral standards, guides on the depressed bottom within the diameter of the circular opening in the rim, a pattern to form one side of a car-wheel mounted within the diameter of the circular opening in and above the plane of the rim and serving as its own pattern-plate, downwardly-projecting guide-rods on the pattern to enter the guides of the depressed bottom, supporting-springs one around each guide-

rod to counterbalance the weight of the pattern, and a toggle-lever mechanism carried by the depressed bottom of the base and connected directly with the pattern for raising and lowering the pattern, substantially as described.

3. In a mechanism for forming car-wheel molds, the combination of a base having an upper annular rim and a depressed bottom connected with the rim by peripheral standards and mounted on wheels, a pattern to form one side of a car-wheel vertically movably mounted within the diameter of and above the plane of the rim of the base, upwardly-projecting guides on the depressed bottom of the base within the diameter of the rim, downwardly-projecting guide-rods on the pattern to enter the guides of the depressed bottom, downwardly and outwardly extending radial brackets from the under face of the pattern, upwardly-projecting tapered pins from the brackets outside of the annular rim, a chill-ring and a cope connected together, perforated lugs on the chill-ring receiving the tapered pins of the pattern-brackets to retain the chill-ring and cope in position and have the ring receive the pattern and surround and engage the periphery thereof, supporting-springs, one around each guide-rod to counterbalance the weight of the pattern, and toggle-lever mechanism carried by the depressed bottom of the base and connected with the pattern for raising and lowering the pattern vertically and in a straight line, substantially as described.

4. In mechanisms for forming car-wheel molds, the combination of a base portion mounted on wheels, a pattern to form one side of the car-wheel mold vertically movably mounted on the base and provided with downwardly-projecting lugs, radially-extending brackets secured to such lugs and provided with vertically fluted and chamfered pins adapted to enter perforated lugs on the chill-ring and hold the chill-ring and cope in position to surround the periphery and upper portion of the pattern, vertical guide-studs on the pattern, guides on the base to receive the guide-studs, helical coiled springs surrounding the guide-studs to counterbalance the pattern, toggle mechanism for raising and lowering the pattern, and set-screws secured to the base portion constructed and arranged to limit the motion and to lock the toggle-lever, substantially as described.

5. In mechanisms for forming car-wheel molds, a fixed base portion provided with wheels to form a truck, a pattern vertically movable independent of the base portion, means for holding a chill-ring and cope with its ring in a fixed position to surround the periphery and upper portion of the pattern, a chill-ring and a cope-ring, two or more perforations in the cope-ring adapted to receive metallic chaplets to position the core, set-screw mechanism on the pattern to force the chaplets into positive and uniform engagement with the cope-ring, and toggle-lever mechanism for raising and lowering the pattern on the base, substantially as described.

6. The combination, in a mold-forming mechanism for car-wheels, of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by peripheral standards, vertical guides on the depressed bottom within the diameter of the circular opening in the rim, a pattern to form one side of a car-wheel mounted within the diameter of the circular opening in and above the plane of the rim and serving as its own pattern-plate, downwardly-projecting pins from the pattern to enter the vertical guides of the depressed bottom of the base, a horizontally-movable lever pivotally mounted on the depressed bottom centrally thereof, a rock-shaft on each side of the lever, each rock-shaft mounted in bearings on the depressed bottom, means connecting the lever with each rock-shaft, and means connecting the rock-shafts and car-wheel pattern, for the movements of the lever to raise and lower the pattern, substantially as described.

7. The combination, in a mold-forming mechanism for car-wheels, of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by a peripheral standard, vertical guides on the depressed bottom within the diameter of the circular opening in the rim, a pattern to form one side of a car-wheel mounted within the diameter of the circular opening in and above the plane of the rim and serving as its own pattern-plate, downwardly-projecting pins from the pattern to enter the vertical guides of the depressed bottom of the base, supporting-springs, one around each downwardly-projecting pin, to counterbalance the weight of the pattern by the upward pressure of the springs, a horizontally-movable lever pivotally mounted on the depressed bottom centrally thereof, a rock-shaft on each side of the lever, each rock-shaft mounted in bearings on the depressed bottom, means connecting the horizontal lever with each rock-shaft, and means connecting the rock-shafts and car-wheel pattern, for the movements of the lever to raise and lower the pattern, substantially as described.

8. The combination in a mold-forming mechanism for car-wheels, of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by peripheral standards, vertical guides on the depressed bottom within the diameter of the circular opening in the rim, a pattern mounted within the diameter of the circular opening in and above the plane of the rim of the base and serving as its own pattern-plate, downwardly-projecting pins from the pattern to enter the vertical guides of the depressed bottom, a horizontally-movable lever pivotally mounted

on the depressed bottom centrally thereof, a rock-shaft on each side of the lever, each rock-shaft mounted in bearings on the depressed bottom, an arm on each rock-shaft, a link connecting each arm of each rock-shaft with the horizontal lever, lifting-arms, two on each rock-shaft, each lifting-arm connected with the car-wheel pattern, and an adjustable support between the lifting-arms and the pattern, substantially as described.

9. The combination, in a mold-forming mechanism for car-wheels, of a base having an upper annular rim and a depressed bottom connected with the rim by peripheral standards, a pattern to form one side of a car-wheel mounted within the diameter of and above the plane of the rim of the base, guiding means between the pattern and the depressed bottom of the base within the diameter of the rim, a horizontally-movable lever centrally pivoted on the depressed bottom of the base, a rock-shaft on each side of the lever, each shaft mounted in bearings on the depressed bottom of the base, means connecting the lever, the rock-shaft and the car-wheel pattern for the movements of the lever to raise and lower the pattern vertically, and a chill-ring and cope united together and carried by the pattern to have the ring receive the pattern and surround and engage the periphery thereof, substantially as described.

10. The combination in a mold-forming mechanism for car-wheels, of a hollow base having its top open and in the shape of an upper annular rim and having a depressed bottom connected with the rim by peripheral standards, ears projecting from the depressed bottom, wheels journaled in the ears for mounting the base on carrying-wheels, a pattern vertically movably mounted on the depressed bottom of the base within the diameter of the circular opening in and above the plane of the rim of the base and serving as its own pattern-plate, and a chill-ring and cope supported from the pattern and guided by the annular rim of the base and held in position to have the chill-ring receive the pattern and surround and engage the periphery thereof, substantially as described.

11. The combination in a mold-forming mechanism for car-wheels, of a base having an upper annular rim and a depressed bottom connected with the rim by peripheral standards, projecting ears on the rim, a pattern to form one side of a car-wheel mounted within the diameter of and above the plane of the rim and adjustably supported and carried on the depressed bottom, brackets extending downwardly and outwardly from the under side of the pattern to have their extreme ends aline with the ears of the annular rim, a cope and a chill-ring united one to the other, projecting ears on the chill-ring to aline with the ears of the annular rim and upwardly-projecting pins from the ends of the brackets passing through the ears of the annular rim and the ears of the chill-ring for positioning the cope and ring to have the ring receive the pattern and surround and engage the periphery thereof, substantially as described.

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