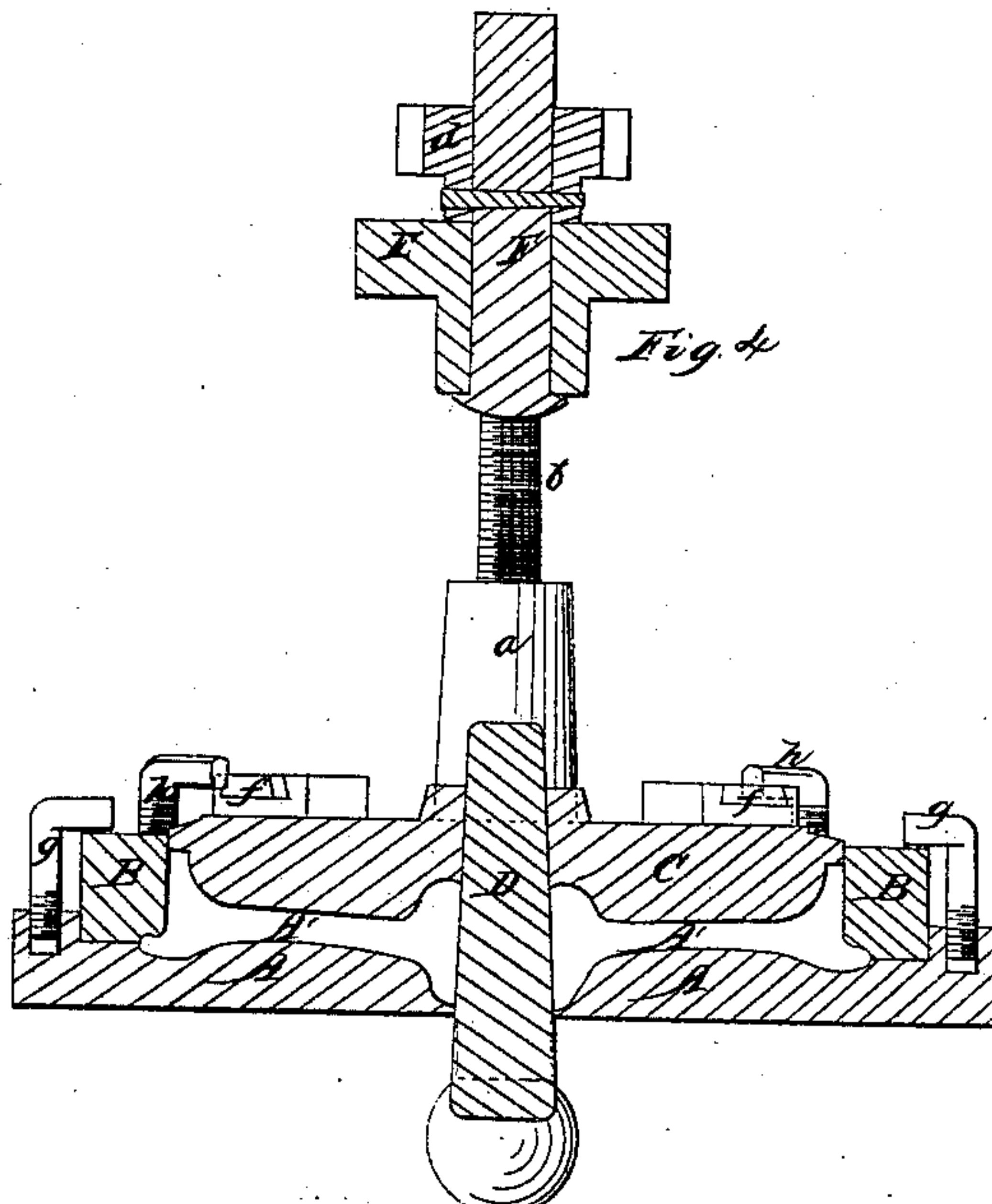
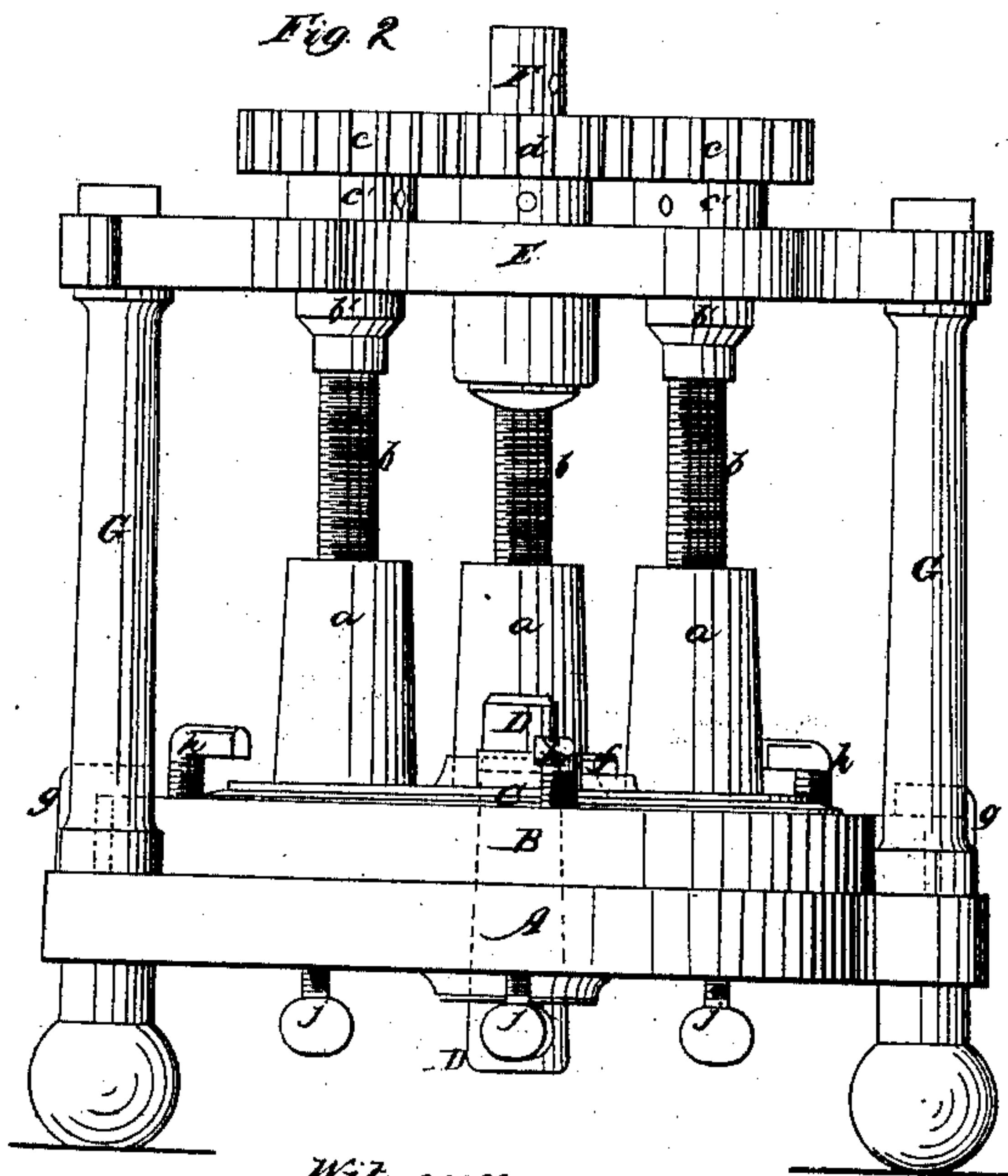
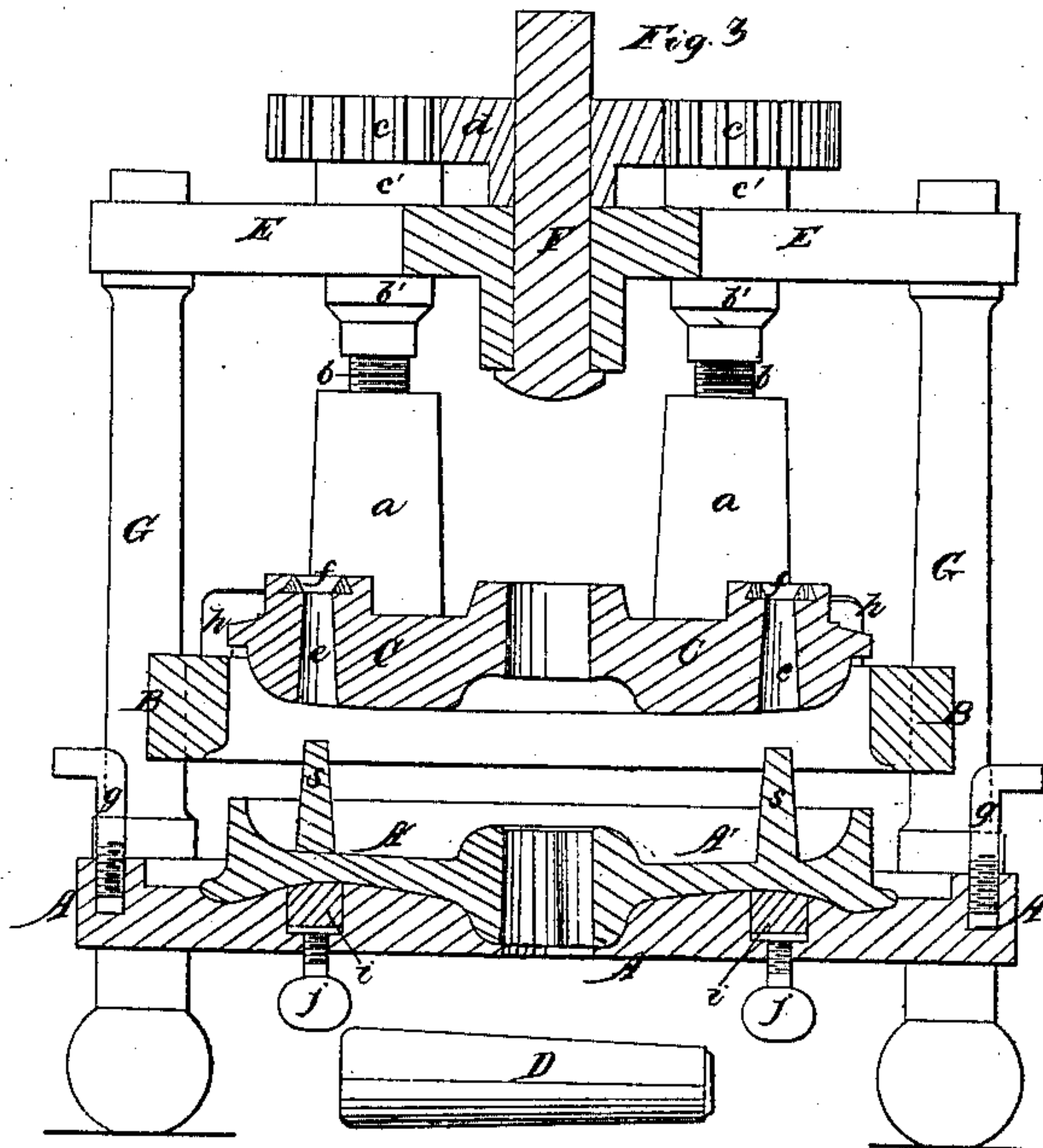
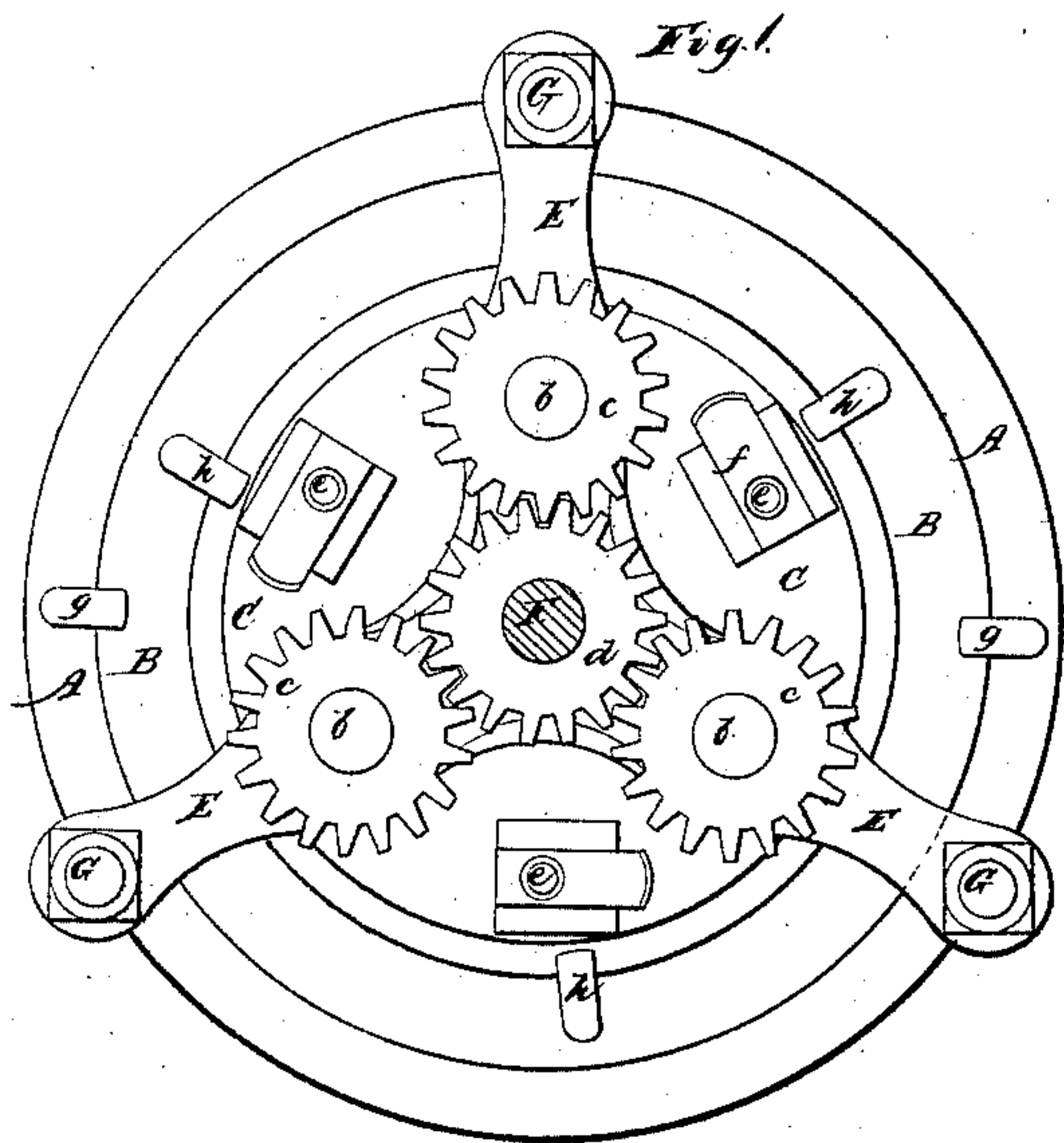


# J. B. Tarr

## Casting Car Wheels.

N<sup>o</sup> 57,644.

Patented Aug. 28, 1866.



Witnesses.  
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Schwabacher

Inventor  
J. B. Tarr  
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Mason, Kimball & Lawrence



# UNITED STATES PATENT OFFICE

JOHN BLAKE TARR, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND  
P. E. MERRIHEW, OF SAME PLACE.

## IMPROVED MACHINE FOR MAKING CAST-STEEL CASTINGS.

Specification forming part of Letters Patent No. 57,644, dated August 28, 1866.

*To all whom it may concern:*

Be it known that I, JOHN BLAKE TARR, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Machine for Making Castings of Cast-Steel; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan view of the machine adapted for casting car-wheels. Fig. 2 is an elevation of the machine. Fig. 3 is a vertical section through the machine, showing the three parts of the mold in positions for allowing the cast wheel to be removed from the machine. Fig. 4 is a vertical section, showing the three parts of the machine in position for receiving the metal.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to produce articles of cast-steel by casting this metal in molds and subjecting it to considerable pressure while in a melted state, for the purpose of expelling the air and rendering the metal more dense than it would otherwise be, and free from blisters or other imperfections, as will be hereinafter described.

The machine which I shall describe is constructed and adapted for producing railroad-car wheels of cast-steel; but it is not contemplated to confine the invention to the casting of wheels, or parts of wheels, as other articles or objects can be produced by changing the form of the molds and without altering the principle of the invention.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, A represents the base-plate of the machine, which forms the lower section of the mold within which the wheel A' is cast.

B represents a ring, which produces the circumference or tread of the wheel and a portion of the flange thereof. This ring forms the vertical section of the mold, and it is fitted within a recess which is formed in the upper face of the horizontal section or bed-plate A, as shown in Figs. 3 and 4.

C represents the upper section of the mold,

which produces the contour of the outer surface of the wheel, and forms, in conjunction with the ring B and base-plate A, a chamber or mold within which the wheel is cast.

The hole which is through the center of the wheel A' is produced by means of a conical core, D, which is driven through the central holes, which are made through the two plates A and C, the largest end of said core being down, as shown in Figs. 2, 3, and 4.

The horizontal section C of the mold is cast with three or more elevations, *a a a*, projecting perpendicularly from its upper surface, which portions have female screw-threads formed in them for receiving the vertical screw-rods *b b*, which rods have spur-wheels *c c c* keyed on their upper ends, as shown in the drawings.

Circular enlargements or shoulders *b' b' b'* are formed on the rods *b* near their upper ends, so as to press against a horizontal cross-head, E, and resist any upward movement of said screw-rods.

The spur-wheels *c c c* have hubs or collars *c' c' c'* formed on them, which afford a bearing upon the cross-head E for each screw-shaft.

There is a central shaft, F, which has its bearing in the cross-head E, and which is the driving-shaft for turning the screw-rods *b*. The spur-wheel D on this shaft F engages with the three spur-wheels *c c c*, and thus the said screws are all rotated simultaneously when it is desired to move the mold-section C up or down.

The cross-head or head-piece is supported and held down by means of three upright posts, G G G, which are firmly secured to the bed-plate A and said cross-head F, as shown in the drawings.

Two or more hooked screws, *g g*, which are tapped into the base-plate A at suitable points, are used for holding down the ring-section B, and similar hooks, *h h*, are tapped into the ring-section B, for the purpose of allowing this ring B to be lifted up by means of the section C, as shown in Fig. 3. This section B is thus elevated for the purpose of allowing of the removal of the wheel A'.

Three or more ingates, *eee*, are made through the upper section, C, and at the upper and smallest ends of these ingates flaring holes are made through dovetail slides *fff*, which lat-



ter are used, after the metal has been poured into the mold, for cutting off the upper ends of the sprues.

The ingates *e* are made flaring, for the purpose of allowing the wheel *A'* to be freed from the section *C* after casting this wheel, as will be hereinafter described.

Directly beneath each one of the ingates *e* a hole is made through the base-plate *A*, for the reception of a block, *i*, of plumbago, beneath which is a thumb-screw, *j*, for adjusting said block and keeping its exposed surface always flush with the surface of the mold-section *A*, as shown in Fig. 3. Any other refractory substance may be used instead of the plumbago which will answer as well to prevent the liquid steel from melting the surface of the section *A* and adhering to it at the points below the ingates.

Before commencing the operation of casting it is desirable to cover the entire surfaces of the sections of the molds inside with soot, to prevent the metal from burning and adhering to the mold.

The sections of the mold are adjusted in their proper positions, as shown in Figs. 2 and 4, and the central core, *D*, inserted from beneath the base-plate *A*, through this plate and the upper plate, *C*. The liquid steel is then poured into the mold through the three ingates, and when the mold is full the slides *f f f* are immediately moved over the ingates, so as to cut off the upper ends of the sprues *s s* and to close the openings. The main shaft *F* is now rotated so as to turn all the screw-rods *b b b* and depress the plate *C* with a steady and powerful pressure upon the liquid metal in the mold. This pressing operation will expel the air and gaseous carbon from the steel through suitable apertures, which are made in the mold-sections for the purpose, and at the same time compress the steel so as to render it more dense. After the pressure has been removed, which is done after the casting has set, the plate *C* is elevated a sufficient distance to free it from the wheel. This plate *C* is then depressed

again and the hooks *h h* turned over it, the hooks *g g* being now turned outward, so as to release the ring-section *B*. This done, the shaft *F* is again rotated, so as to elevate the plate *C*, and with it the ring *B*, as shown in Fig. 3, thus allowing the core *D* to be driven down and the cast-steel car-wheel to be removed from the mold-section *A*.

It will be seen that the upper section, *C*, of the mold in which the casting is made forms the follower of a press for condensing the steel and expelling gas and air from it while it is in a liquid or semi-liquid state. Wheels or other articles thus produced will possess great strength. They will be tough, and not so liable to crack under heavy blows or concussions as cast-steel commonly used.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Subjecting the cast-steel, while in a liquid state and within the mold which is to give it the desired form, to such a degree of pressure as will cause the expulsion of air and gas from it and render it more solid, by means substantially as described.

2. Constructing the bottom of the mold, at those points only which are directly under the ingates, of adjustable blocks of plumbago or other analogous refractory substance, substantially in the manner and for the purpose described.

3. The manner, substantially as herein described, of constructing the ingates with cutters on them, when said ingates are applied and operated as described, for the purpose set forth.

4. The use of adjusting-screws in conjunction with mold-sections *A B C* and the hooks *g h*, or their equivalents, substantially as described.

JOHN BLAKE TARR.

Witnesses:

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