

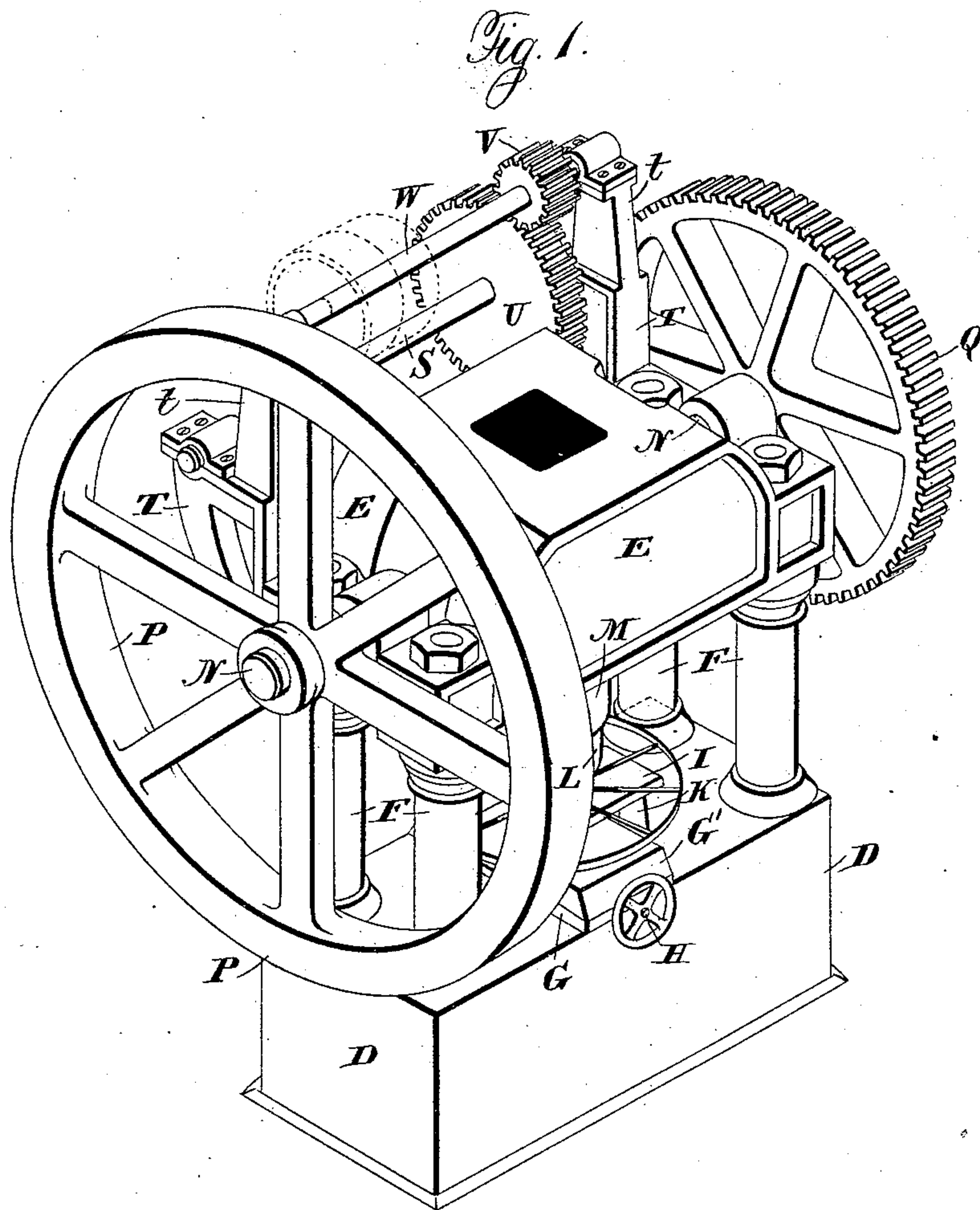
(No Model.)

5 Sheets—Sheet 1.

J. R. LITTLE.
MANUFACTURE OF METAL WHEELS.

No. 472,893.

Patented Apr. 12, 1892.



Witnesses.

James Hutchinson.
Henry C. Hazard

Inventor.

James R. Little, by
Kindle and Russell, his Attys

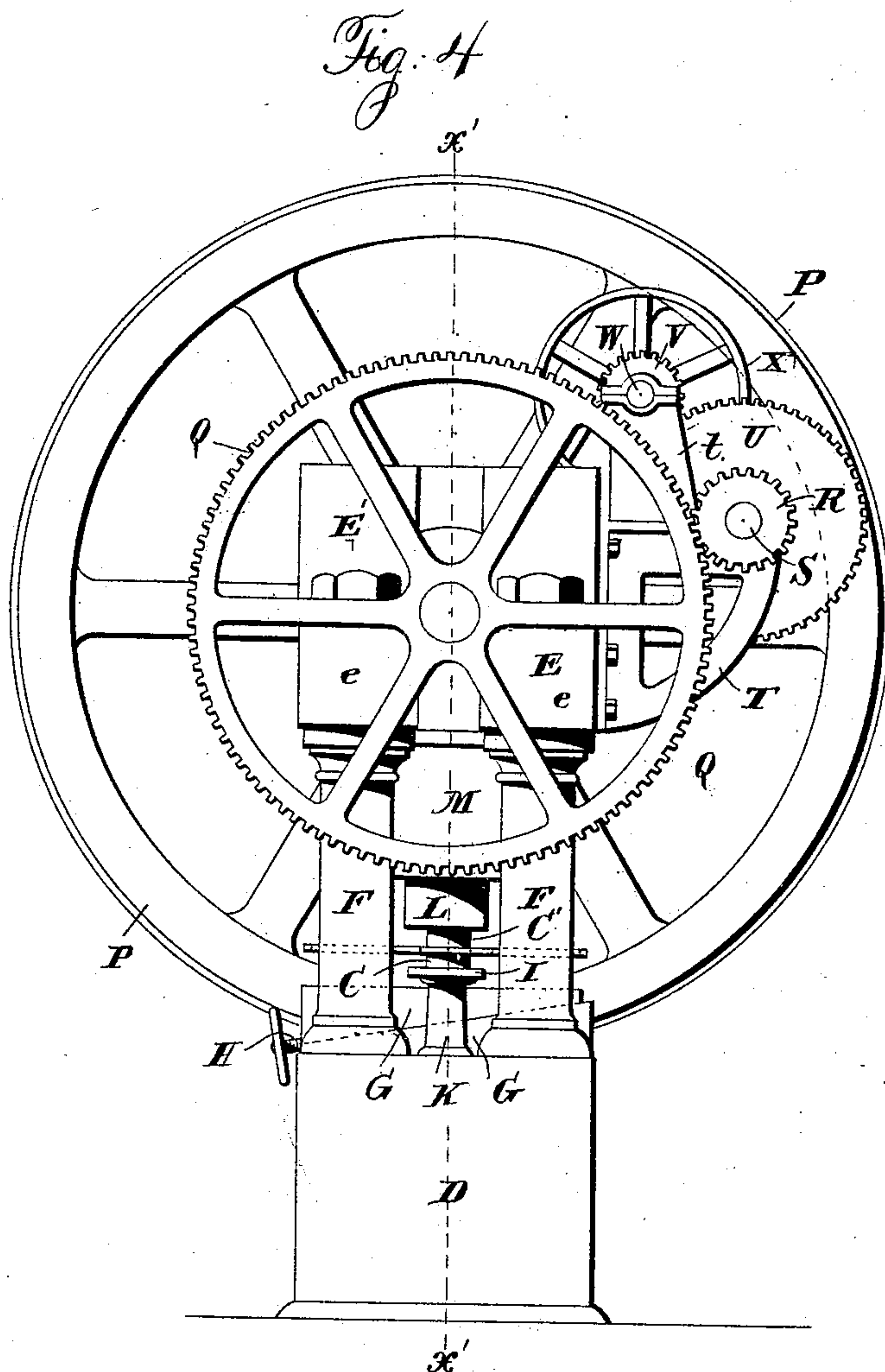
(No Model.)

5 Sheets—Sheet 3.

J. R. LITTLE.
MANUFACTURE OF METAL WHEELS.

No. 472,893.

Patented Apr. 12, 1892.



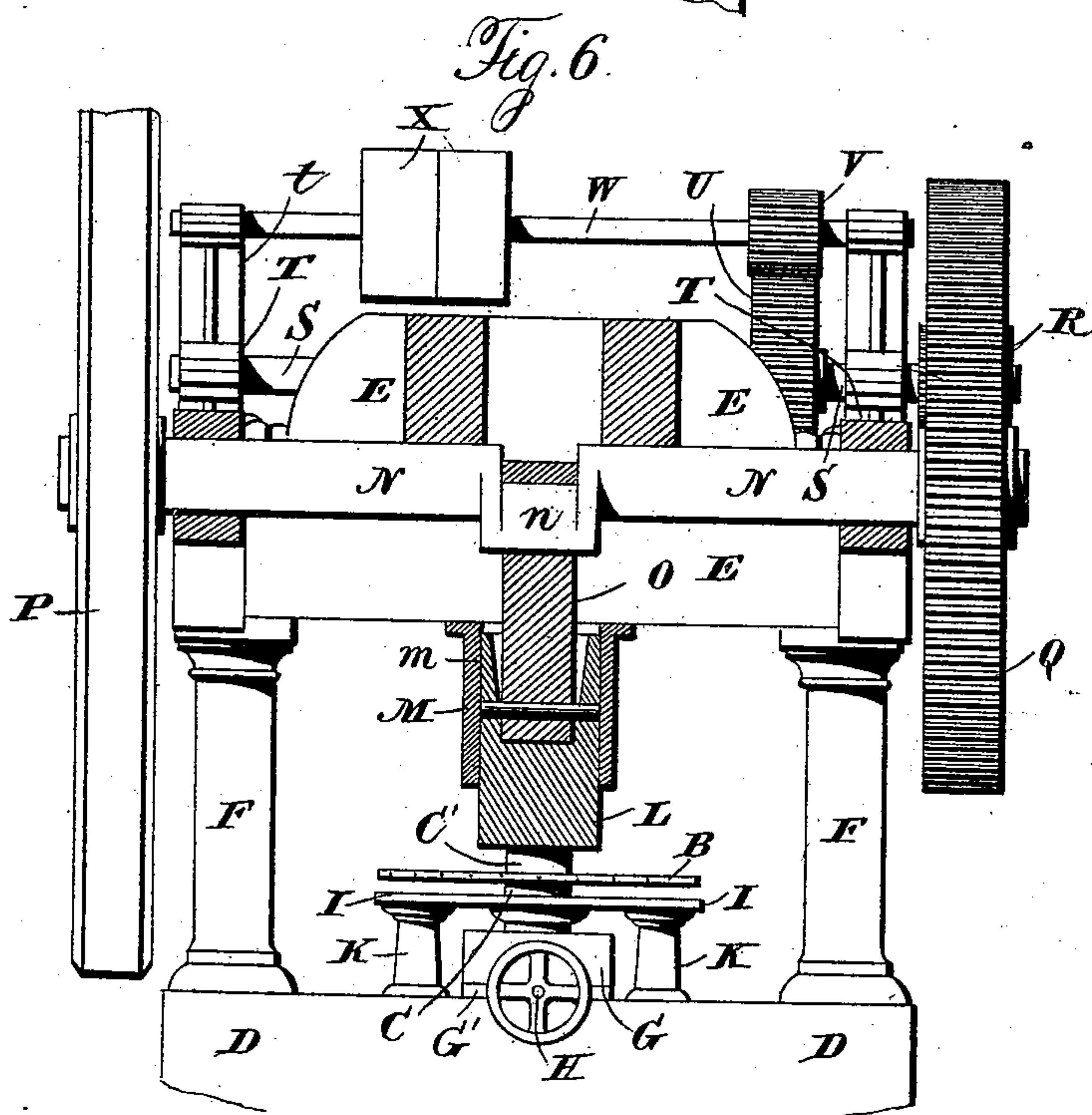
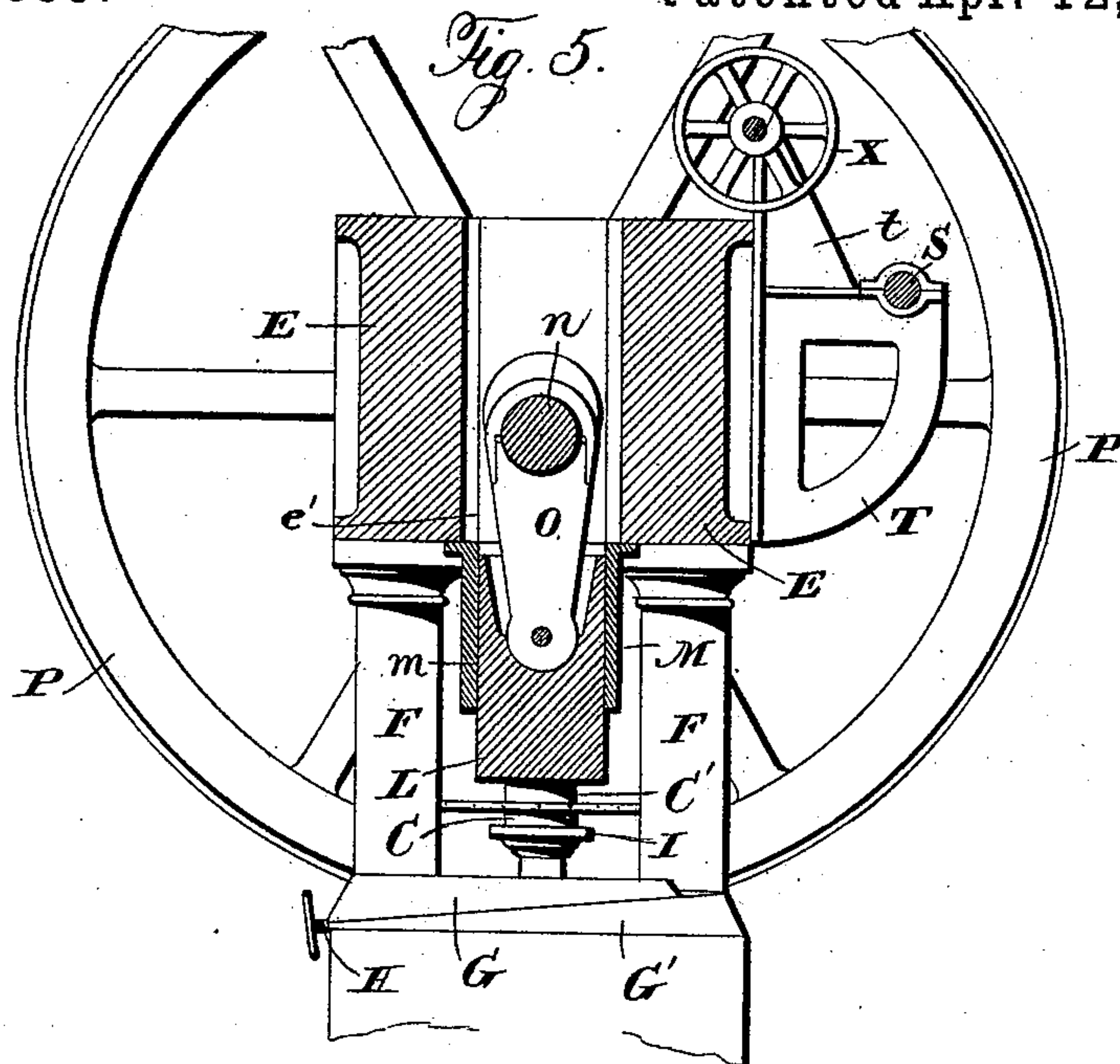
Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
James R. Little, by
Crimm and Russell, his Attys.

J. R. LITTLE.
MANUFACTURE OF METAL WHEELS.

No. 472,893.

Patented Apr. 12, 1892.



Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
James R. Little, by
Kimble and Russell, his Attys.

(No Model.)

5 Sheets—Sheet 5.

J. R. LITTLE.
MANUFACTURE OF METAL WHEELS.

No. 472,893.

Patented Apr. 12, 1892.

Fig. 7.

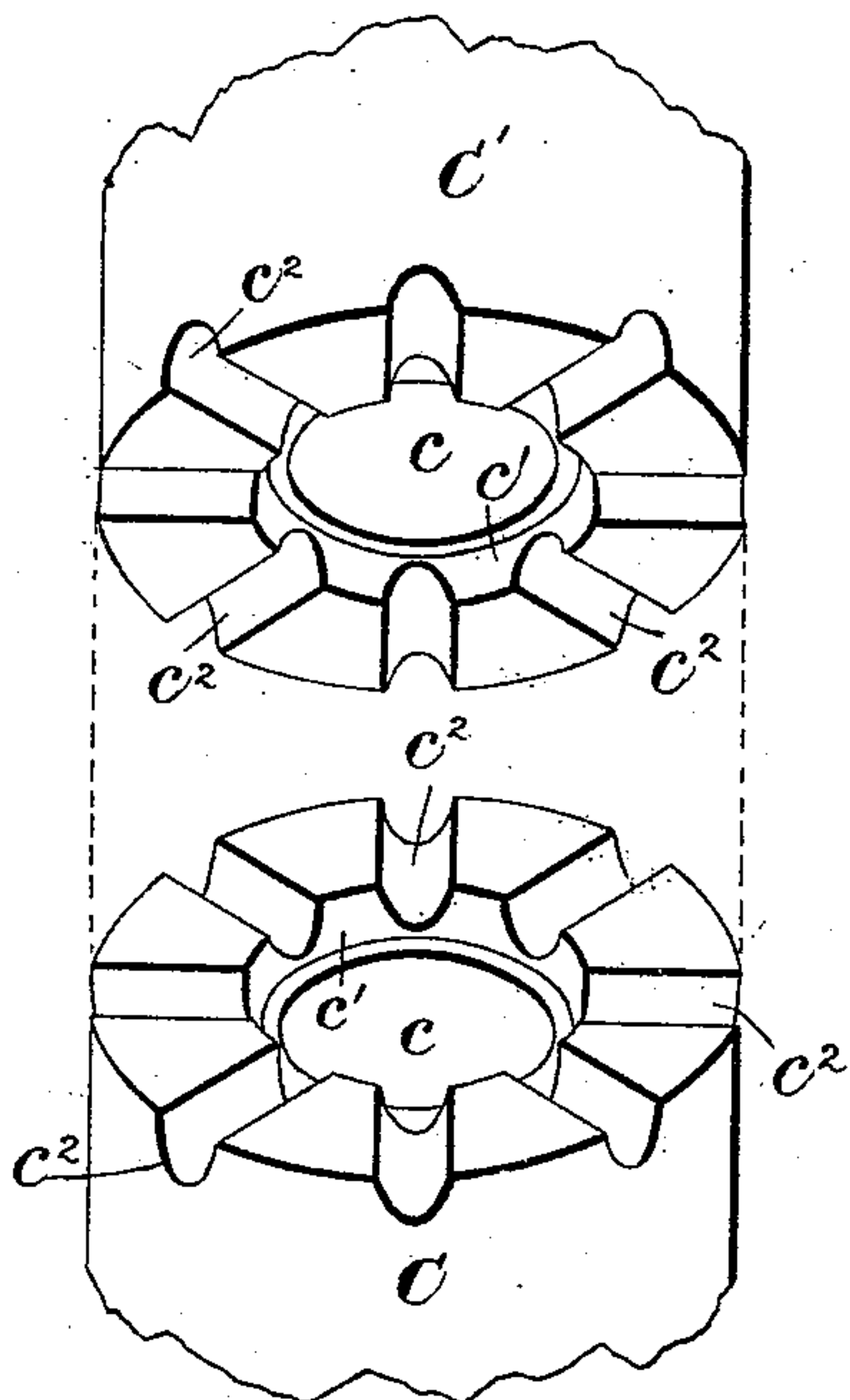


Fig. 9.

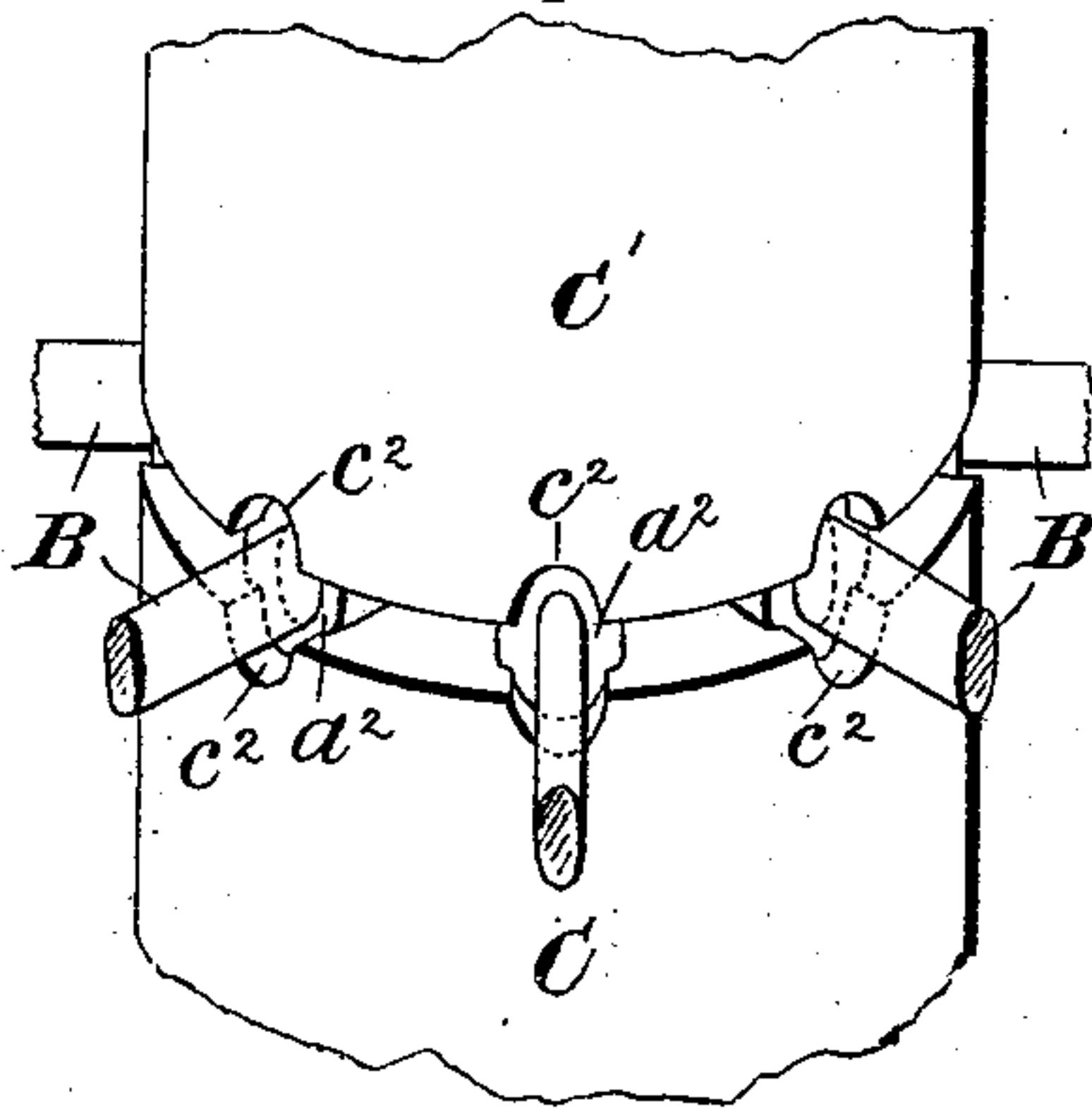


Fig. 8.

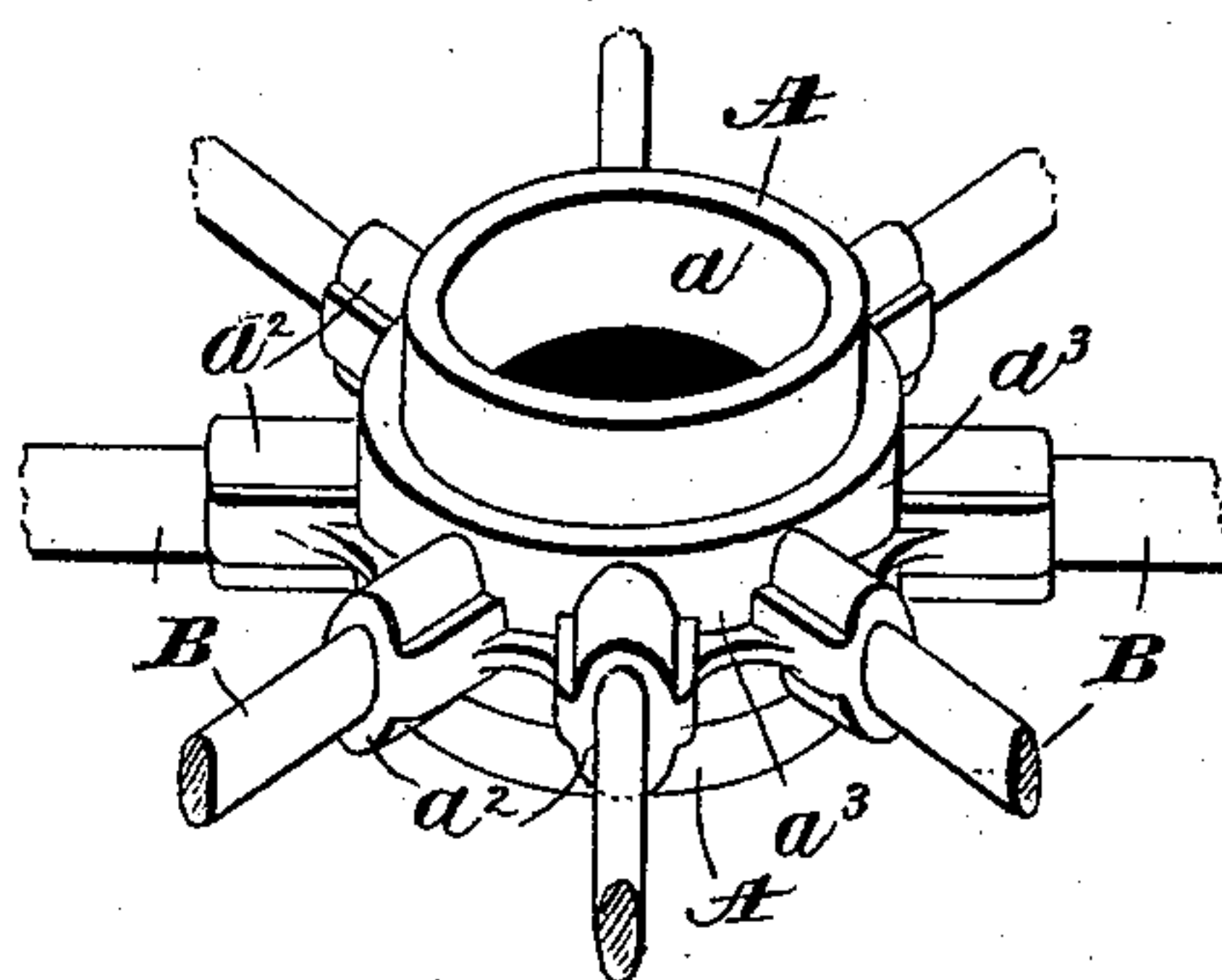
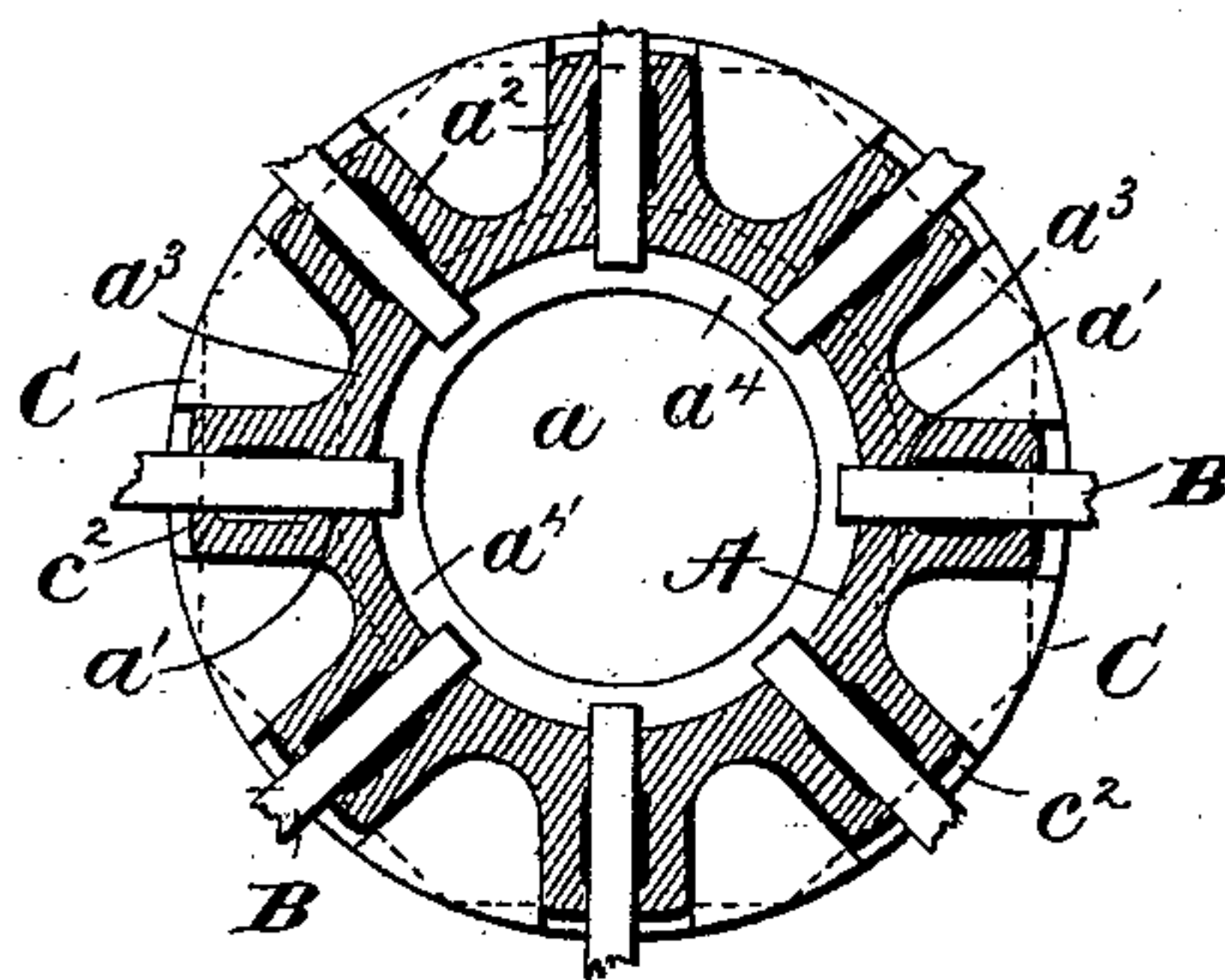


Fig. 10.



Witnesses:

Jas. C. Hutchinson.
Henry C. Hazard.

Inventor.

James R. Little, by
Prindle and Russell, his Attys.

UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS.

MANUFACTURE OF METAL WHEELS.

SPECIFICATION forming part of Letters Patent No. 472,893, dated April 12, 1892.

Application filed August 20, 1891. Serial No. 403,207. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. LITTLE, of Quincy, in the county of Adams, and in the State of Illinois, have invented certain new and useful Improvements in Mechanism for Manufacturing Metal Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my machine from the front and left-hand sides. Fig. 2 is a plan view of the same, from the upper side. Fig. 3 is a front elevation of said machine. Fig. 4 is a side elevation of the same. Fig. 5 is an enlarged section upon line $x x$ of Fig. 3. Fig. 6 is a like view upon line $x' x'$ of Fig. 4. Fig. 7 is an enlarged perspective view of the dies employed in said machine. Fig. 8 is a like view of one of my wheel-hubs with spokes in place. Fig. 9 is a perspective view of said dies and hub in position for compression, and Fig. 10 is a section of said hub on a line with the axes of the spoke-openings.

Letters of like name and kind refer to like parts in each of the figures.

My invention has for its object the ready construction of a metal wheel, which is shown in two applications that have heretofore been filed in the United States Patent Office, Serial Nos. 390,944 and 393,208; and such invention consists in the dies used for compressing the metal of the hub around the spokes and in the mechanism employed for operating such dies, substantially as and for the purpose hereinafter specified.

The wheel which is to be manufactured by my mechanism under consideration has a hub A, which is preferably constructed from malleable iron, and, as shown in Figs. 8 and 10, consists, essentially, of a cylindrical or substantially cylindrical body that is provided with the usual axial opening a and has a suitable number of spoke-receiving openings or mortises a' and a'' , which latter are preferably elliptical in cross-section and arranged with their longest diameters in a line with the axis of said hub. Said spoke-mortises are formed principally in bosses a^2 and a^3 , that project radially from a centrally-located circumferential or annular enlargement a^3 upon the hub and exteriorly conform in transverse

shape to the like feature of the interior of said mortises. Within such enlargement is provided an annular recess a^4 , which has a width equal to about three-fourths the width of the same and a depth sufficient to cause its circumferential wall to occupy a plane outside of the plane of the external surface or periphery of said hub. Into each of the openings a' is now inserted one end of a spoke B, that corresponds thereto in shape and has such dimensions as to cause it to loosely fill said opening, after which the metal forming the enlargement a^3 and the bosses a^2 and a^3 is compressed in a line with the axis of the hub A until each spoke contained therein is firmly grasped and a practical union is produced between the surfaces having contact. The compression of the spoke-engaging portions of the hub A is directly secured by means of two steel dies C and C', which are counterparts one of the other, and, as shown in Fig. 7, consist each of a cylindrical body provided with an axial opening c , that corresponds in diameter to and is adapted to receive one end of said hub, a recess c' within one end that corresponds to and is capable of receiving one end of the enlargement a^3 , and equidistant radial notches c^2 and c^3 , which correspond in number to the number of spoke-bosses a^2 and a^3 and are each adapted to fit over and to embrace nearly one-half of one of said bosses. A hub containing spokes being placed between the dies thus constructed and sufficient pressure applied to the ends of said dies the metal contained within the bosses a^2 and a^3 and enlargement a^3 will be compressed in a line with the axis of the hub, so as to cause said spokes to be firmly grasped without in any manner distorting or changing the shape of the body of said hub.

For the purpose of holding and manipulating the dies C and C', I employ a press (shown in Fig. 1) which has a frame that is composed of a rectangular base D, a head E, and four columns F and F, that extend vertically between and are secured to the corners of said parts. Said head may have any desired general shape, but preferably is composed of a central web-shaped body E', provided at its ends with cross-arms e and e , so that in plan view it has the form of the letter H.

Upon the base D is a centrally-located mov-

able table G, which has a longitudinally-inclined lower face that rests upon a corresponding oppositely-inclined stationary guide G', the arrangement being such as to permit
 5 said table to be moved longitudinally across said base and its upper side to maintain a horizontal position. A screw H, journaled within one of said parts and engaging with a nut which is secured to the other part and
 10 provided upon its outer front end with a hand-wheel *h*, enables said table to be adjusted to and held in longitudinal position, so as to cause the face of the latter to occupy any desired height within the limits of its mo-
 15 tion. The lower die C is placed centrally upon and supported by the table G and is held in lateral position thereon; while free to be moved vertically within certain limits by means of a guide-plate I, which extends trans-
 20 versely across said table with its ends secured to two columns K and K, and at its center is provided with an opening that corresponds to the size and shape of said die. Said die C may be held in circumferential position by
 25 means of dowel-pins that extend between its lower end and longitudinal grooves in said table, or by giving to its exterior a many-sided form and depending upon said guide-plate to maintain its position; or, if desired, both
 30 means may be simultaneously used for such purpose. The upper or movable die C' is secured upon the lower end of a plunger L, which is contained partly within a centrally-located vertical opening *e'* in the head E, and
 35 in part within a cylinder M, that is secured upon the lower side of said head, and is provided with an opening *m*, which corresponds to and constitutes a prolongation of said opening *e'*. A shaft N is journaled horizontally
 40 and longitudinally within said head and provided within the said opening *e'* with a crank *n*, and upon such crank is journaled one end of pitman O, that has its opposite end piv-
 45 oted to or upon the upper end of said plunger, by which arrangement the rotation of said shaft will cause a vertically-reciprocating motion of said plunger and operate to move said upper die toward and from said lower die.

Upon one end of the shaft N is secured a
 50 fly-wheel P and upon its opposite end a gear-wheel Q, which meshes with and receives motion from a pinion R, that is secured upon one end of a second shaft S. Said shaft S is journaled within suitable brackets T and T at
 55 the rear side of the frame and carries a gear-wheel U, that meshes with a pinion V upon a third shaft W, which last-named shaft is in turn journaled within and upon arms *t* and *t*, that extend upward from said brackets T and
 60 T. A band-wheel X, secured upon said shaft W, enables the latter to be driven from any convenient shaft, and through its rotation causes said shafts S and N to rotate and the plunger L and die C' to be reciprocated ver-
 65 tically. The mechanism is now complete, and is employed by placing within the lower stationary die C a hub A, having spokes B

and B within its mortises, and then causing the die C' to move downward upon the upper end of said hub and to compress its bosses 70 and peripheral enlargement. By a longitudinal movement of the supporting-table inward or outward the lower die will be correspond- 75 ingly raised or lowered and any desired increase or decrease of pressure upon the hub will be effected.

Having thus described my invention, what I claim is—

1. As a means for compressing the spoke-containing boss of a metal hub, a die formed 80 in sections or parts, each of which has a cavity to inclose a portion of the boss, substantially as and for the purpose specified.

2. As a means for compressing the spoke-containing boss of a metal hub, a die formed 85 in sections or parts, having cavities which inclose a portion but not all of the boss, substantially as and for the purpose shown.

3. As a means for compressing the spoke-containing boss of a metal hub, a die com- 90 posed of two parts having each a cavity to inclose less than half of the boss, substantially as and for the purpose described.

4. As a means for compressing the spoke-containing boss of a metal hub, a die com- 95 posed of two parts having each cavities corresponding in number to the number of bosses, each cavity being adapted to inclose a portion only of a boss, substantially as and for the purpose shown and described. 100

5. As a means for uniting spokes to a metal hub having a peripheral offset from which extend spoke-containing bosses, a die com- 105 posed of two parts, each of which has a number of cavities corresponding in number to the bosses, each cavity being adapted to inclose a portion of a boss and each of said die parts having a portion to abut against the peripheral offset on the hub, substantially as and for the purpose set forth. 110

6. As a means for uniting spokes to a metal hub having a circumferential offset from which radiate spoke-containing bosses, a die composed of two parts, each of which has a number of cavities corresponding in number 115 to the bosses, each cavity being adapted to inclose a portion of a boss and each of said die parts having an opening to contain a portion of the body of the hub and a part to abut against the circumferential offset on the 120 hub, substantially as and for the purpose specified.

7. As a means for compressing the spoke-containing bosses of a hub, a lower die part adapted to hold the hub and having a num- 125 ber of cavities corresponding to the number of the bosses, each cavity adapted to inclose a portion of a boss, and an upper die part having similar cavities, one of said parts being movable with relation to the other, sub- 130 stantially as and for the purpose shown.

8. As a means for compressing the spoke-containing bosses of a hub, a lower fixed die having a number of cavities corresponding to

the number of the bosses, each cavity being adapted to inclose a portion of a boss, an upper die having similar cavities, and means for moving the same relative to the lower die, substantially as and for the purpose set forth.

5 9. In combination, a lower fixed die, a crank-shaft, a pitman connecting the latter to the movable die, a main driving-shaft, and gearing between it and said crank-shaft, substantially as and for the purpose specified.

10 10. In combination, a lower fixed die adapted to receive and support a hub having radial spoke-containing bosses, an upper movable die adapted to impinge upon the latter, a crank-shaft, a pitman connecting the latter to the movable die, and means to rotate said crank-shaft, substantially as and for the purpose shown.

20 11. In a die-press, in combination with a bed having an inclined face, a die-supporting block upon the latter, and means for moving one of said parts relative to the other to change the plane of its die-supporting surface, substantially as and for the purpose described.

12. In a die-press, in combination with a bed having an inclined face, a die-supporting block having a correspondingly-inclined lower face and a horizontal upper face and means for moving said block upon said bed, substantially as and for the purpose specified.

13. In combination, a bed having an inclined face, a die-supporting block having a correspondingly-inclined lower face, the one being laterally movable with reference to the other to vary the plane of the die-supporting surface, a die upon said block, a holding device for said die to prevent lateral displacement thereof, and a suitable part to co-operate with said die, substantially as and for the purpose shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of July, 1891.

JAMES R. LITTLE.

Witnesses:

S. DEIDESHEIMER,
S. M. WALLACE.