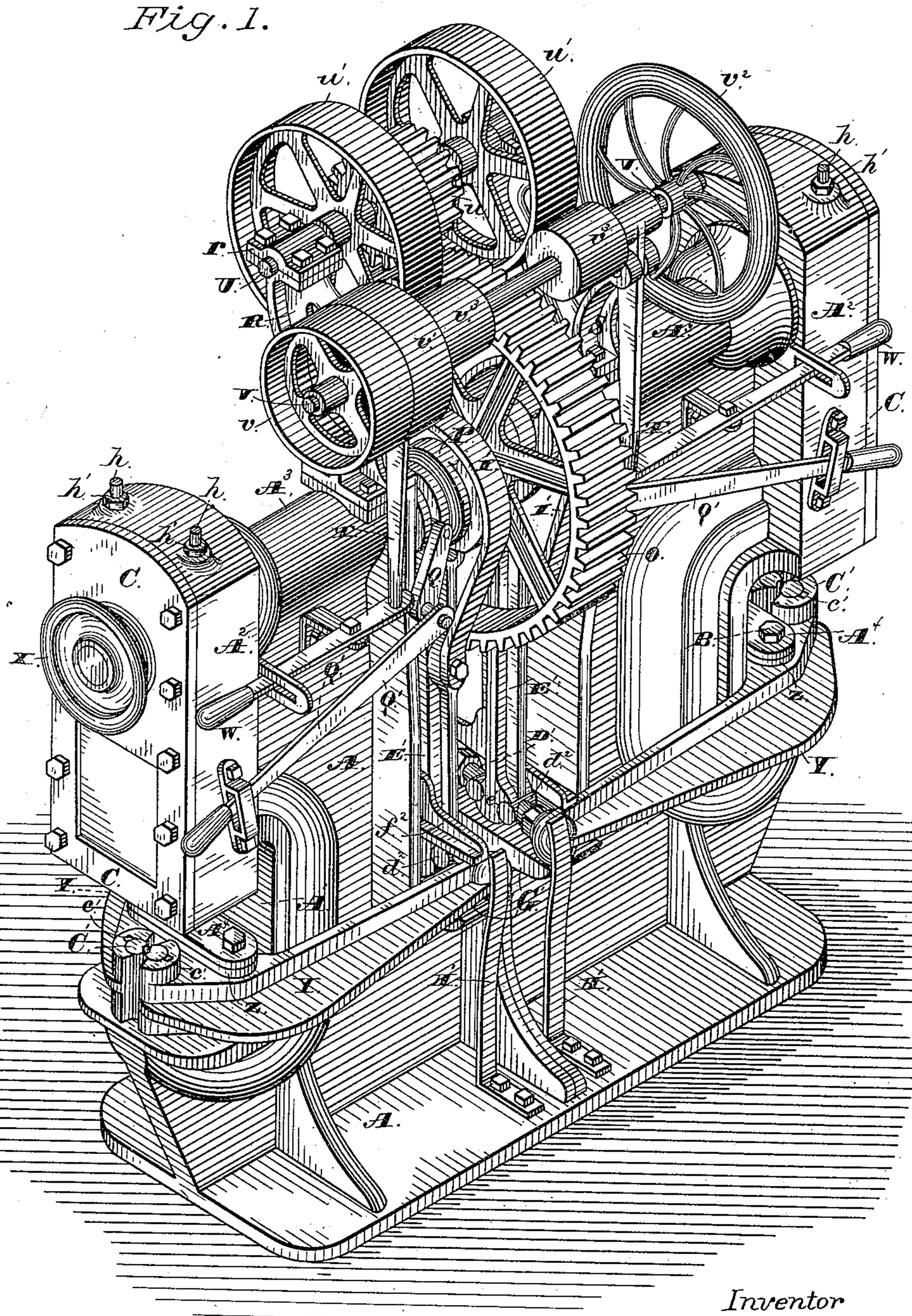
(No Model.) 10 Sheets—Sheet 1.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 1.*




Witnesses

Ed. A. Newman.

Ed. C. Newman.

Inventor

Jas. R. Little, by

Prindle & Russell, his Attys

(No Model.)

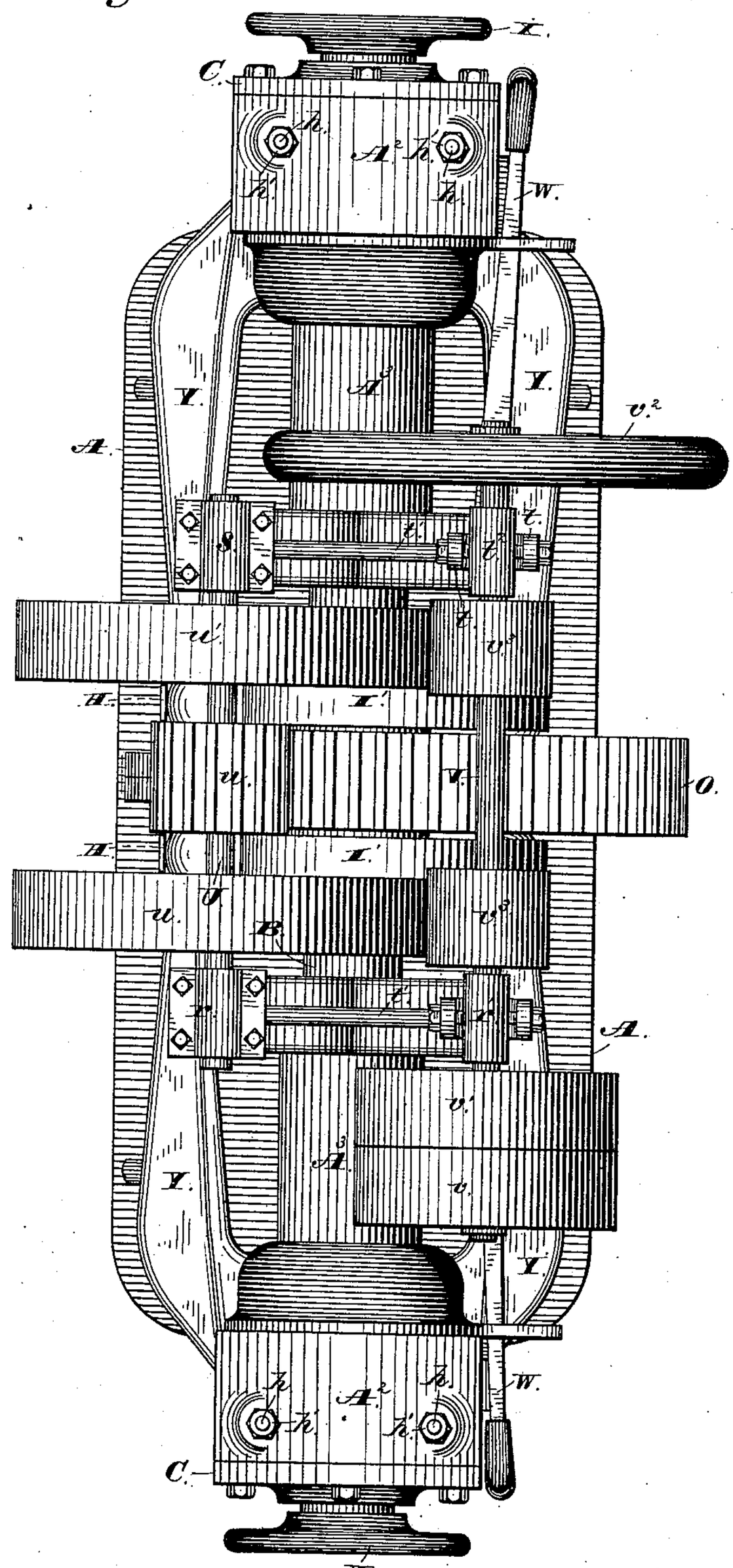
10 Sheets—Sheet 2.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 2.*




Witnesses

Ed. A. Newman.

Cal. C. Newman.

Inventor

Jas. R. Little, by

Brindle and Russell, his Attys.

(No Model.) 10 Sheets—Sheet 3.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

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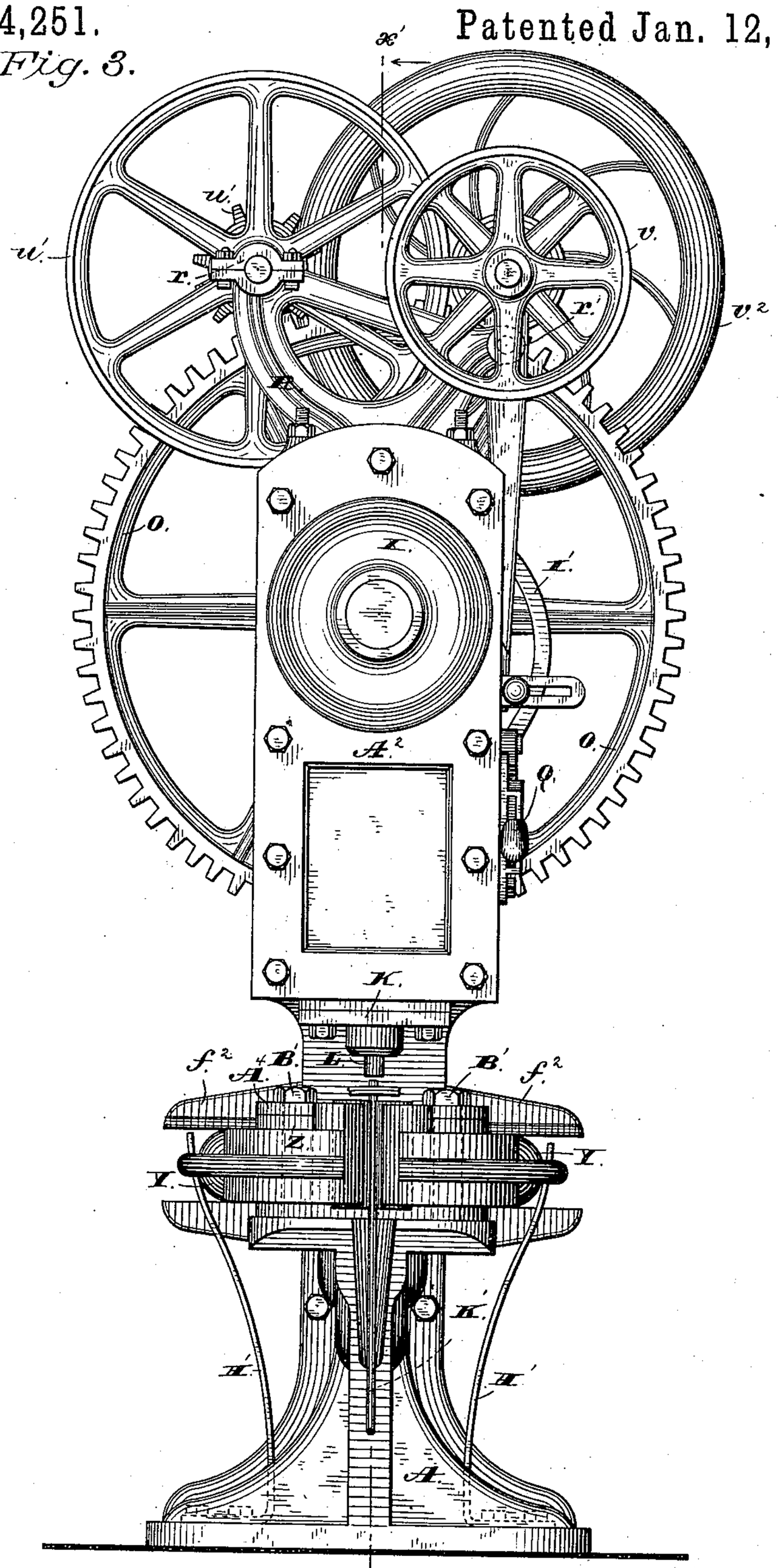
*Fig. 3.*




Witnesses

Ed. A. Newman,

Chl. C. Newman.

Inventor

Jas. R. Little, by

Prindle and Russell, his Attys

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

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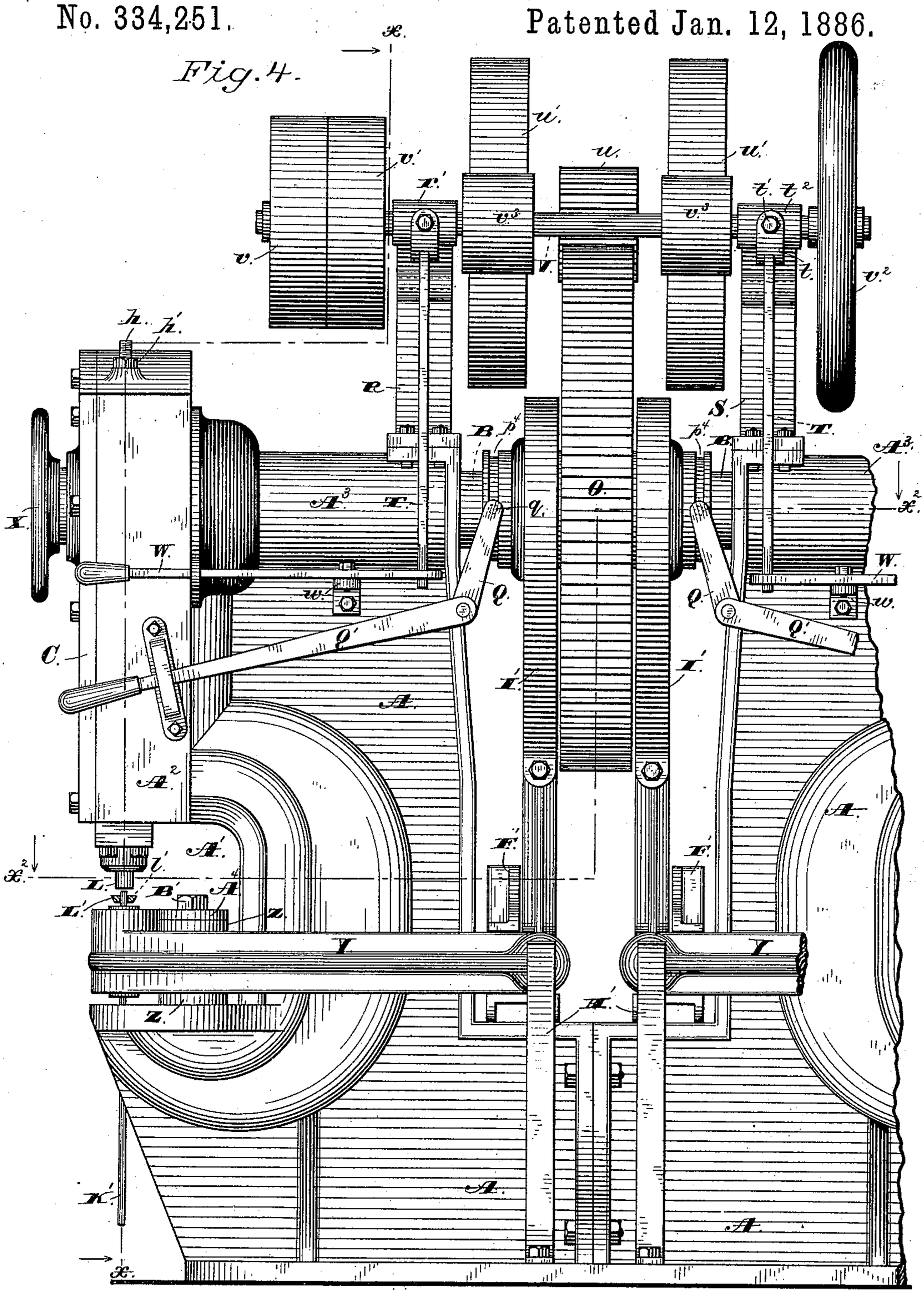
# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

Fig. 4.




Witnesses

Ed. A. Newman.

Al. C. Newman.

Inventor

Jas. R. Little, by

Brindle & Russell, his Attys

(No Model.) 10 Sheets—Sheet 5.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 5.*

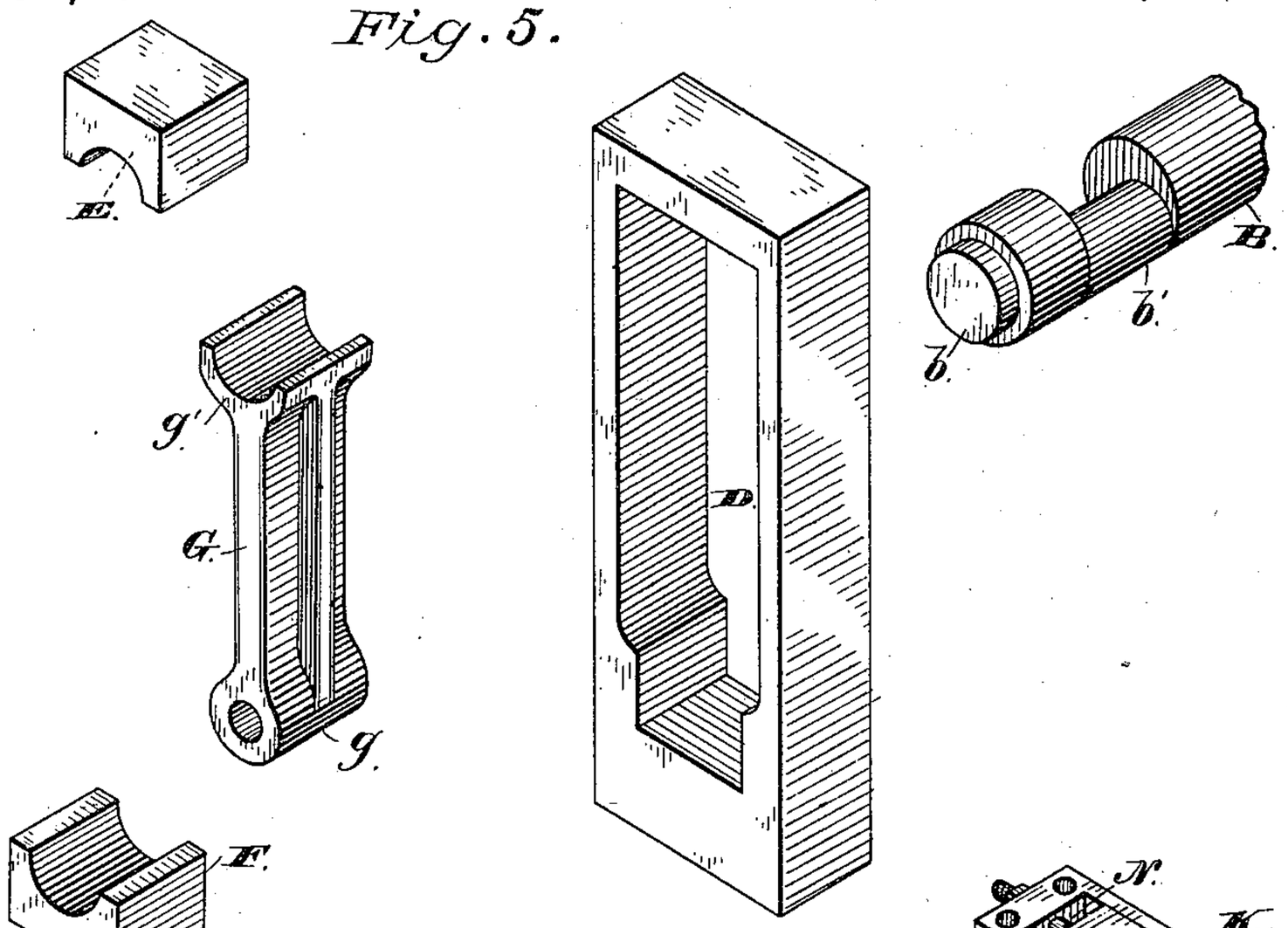



*Fig. 6.*

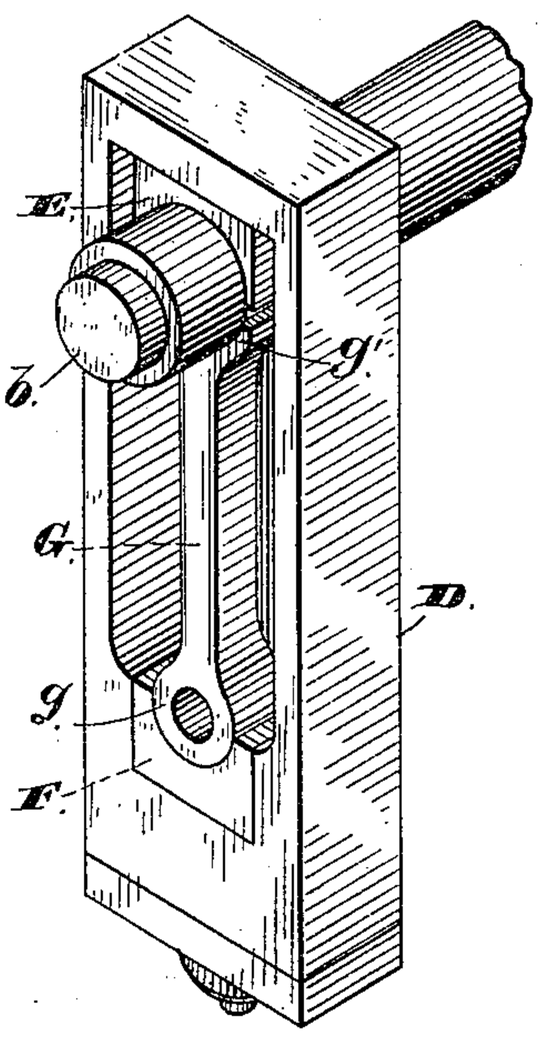
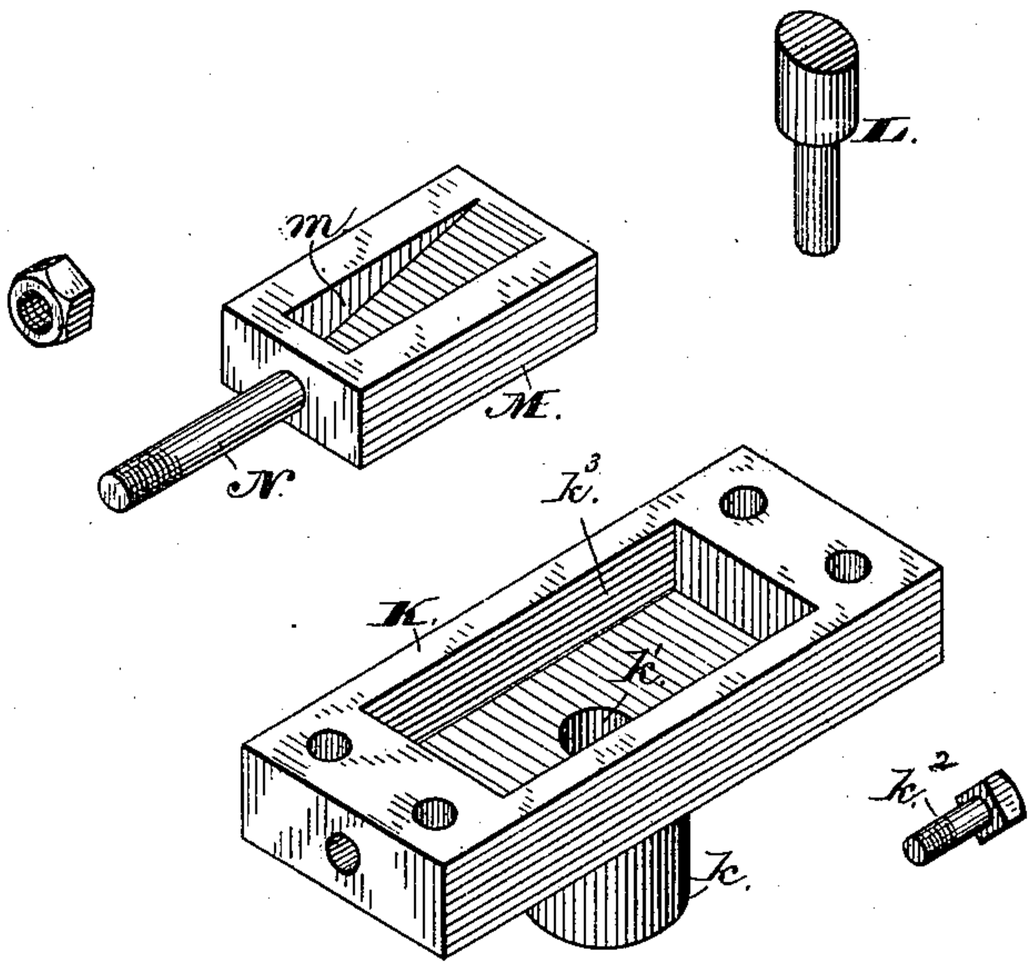



*Fig. 7.*




Witnesses

Ed. A. Newman

Chl. C. Newman.

Inventor

Jas. R. Little, by

Brindle & Russell, his Attys

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# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

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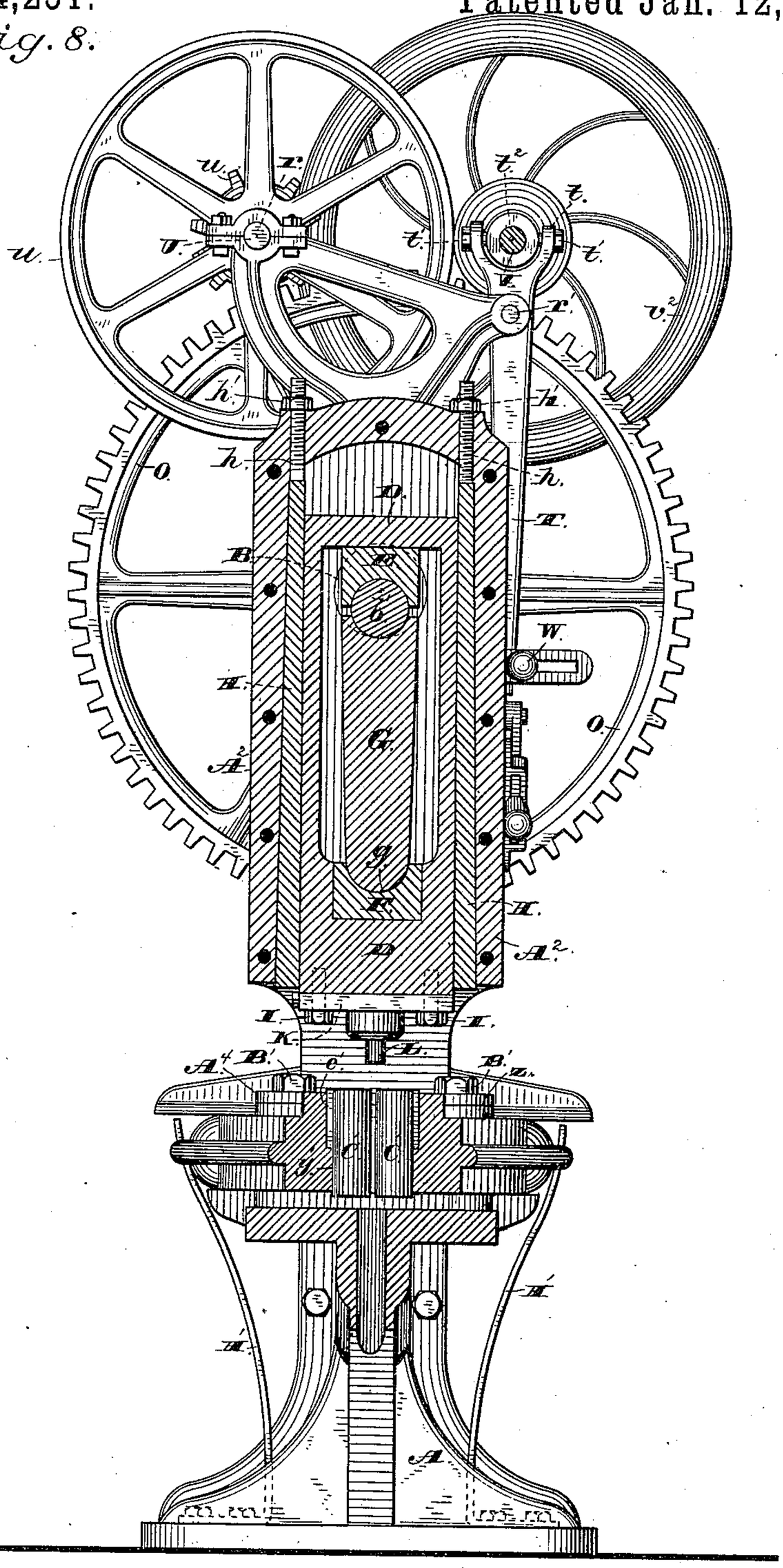
*Fig. 8.*




Witnesses

Ed. A. Newman,

Chl. C. Newman

Inventor

Jas. R. Little, by

Pindle and Pindle his Attys

(No Model.)

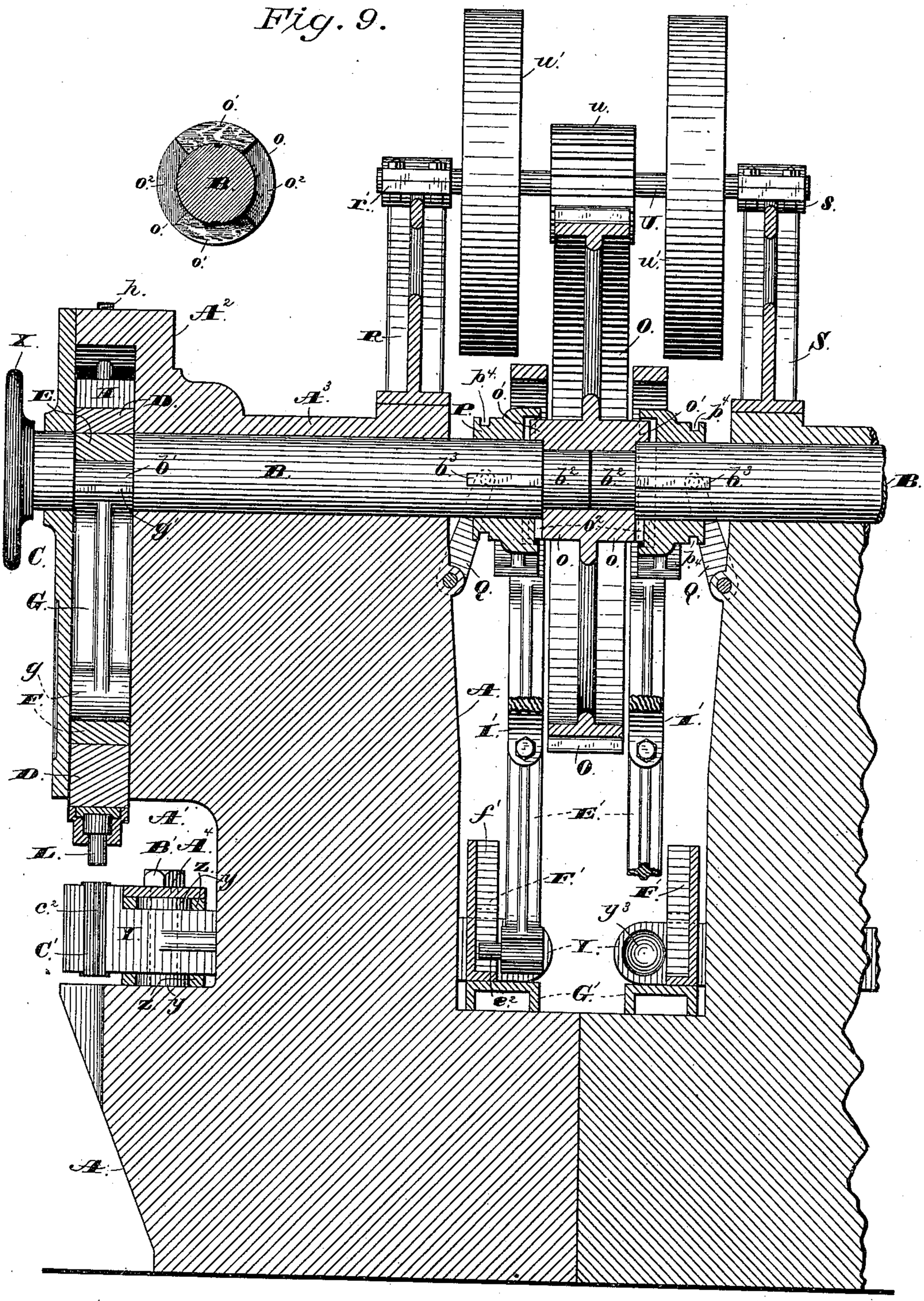
10 Sheets—Sheet 7.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 9.*




Witnesses

Ed. A. Newman,

Ed. C. Newman.

Inventor

Jas. R. Little, by

Crindle & Russell, his Attys

(No Model.) 10 Sheets—Sheet 8.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 10.*

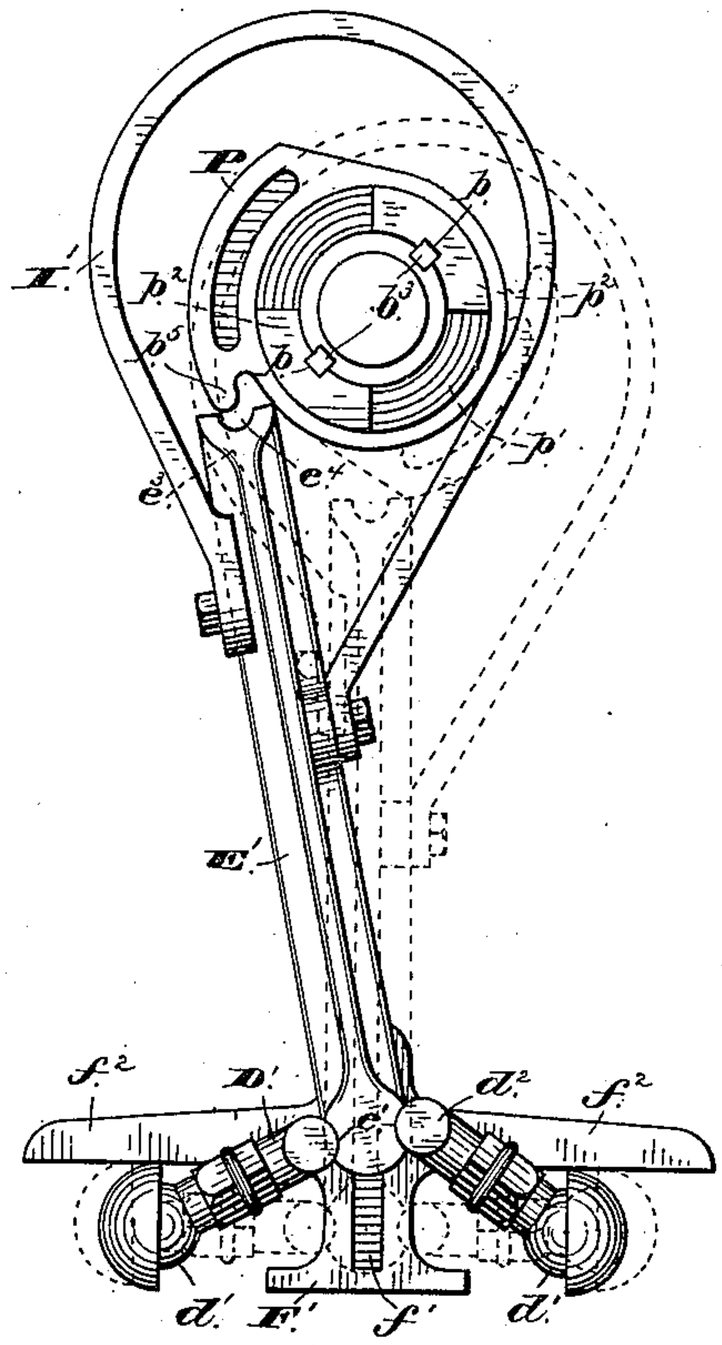
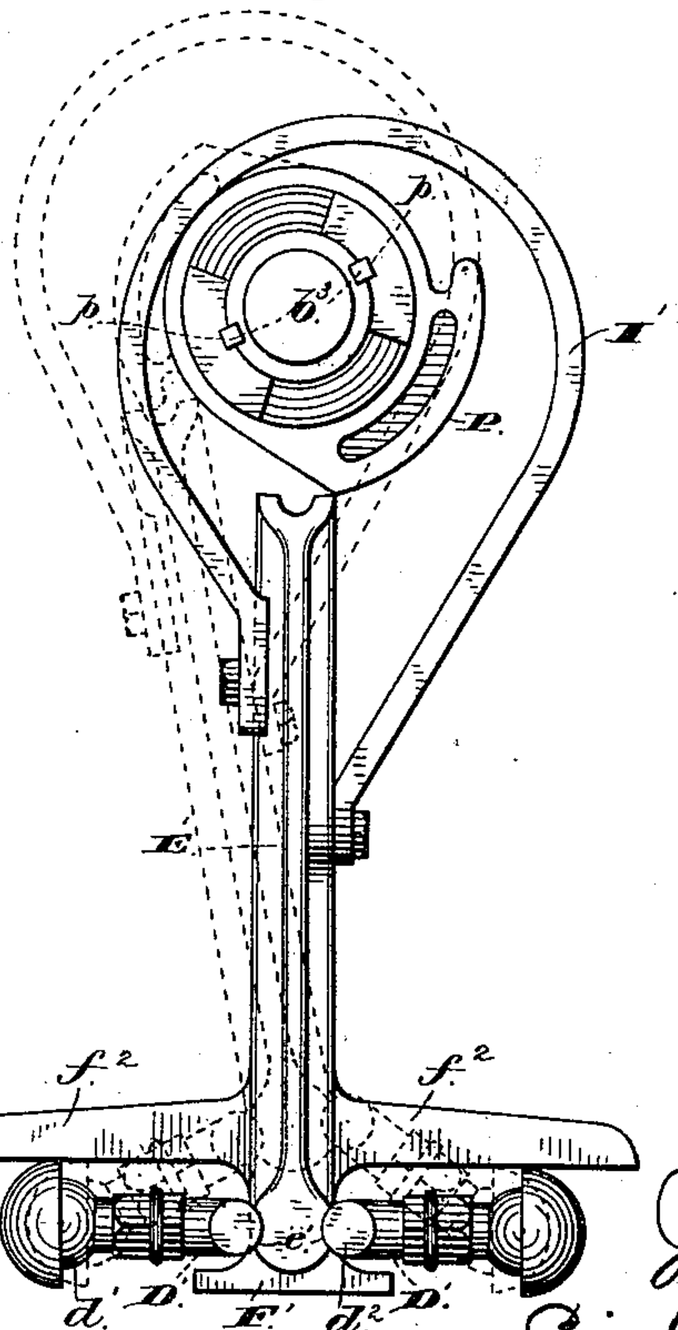



*Fig. 11.*




Witnesses

Ed. A. Newman.

Ed. C. Newman.

Inventor

Jas. R. Little, by

Brindle and Russell, his

attorneys

(No Model.) 10 Sheets—Sheet 9.

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## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 12.*

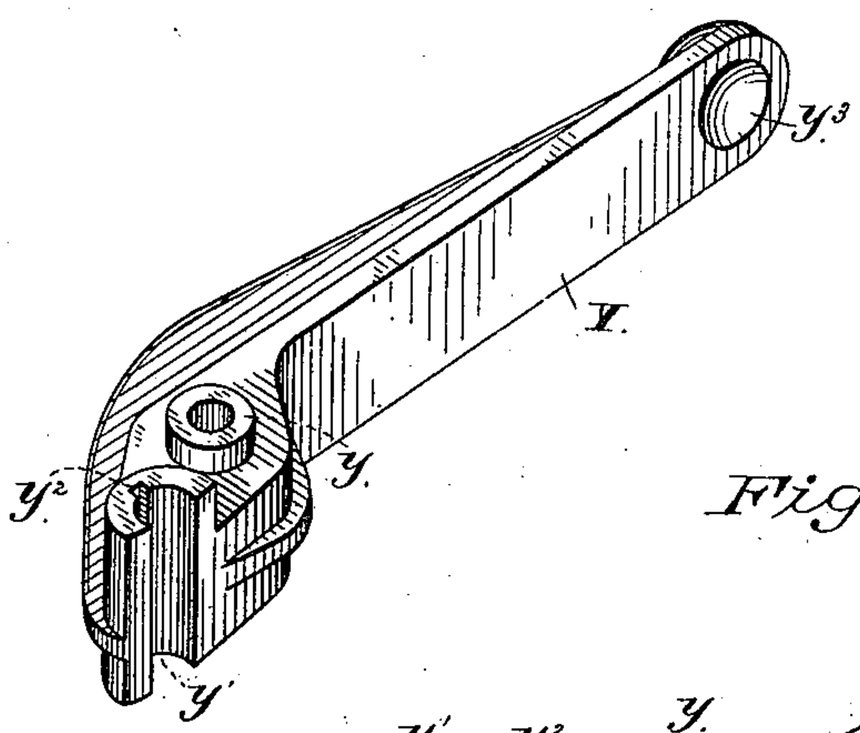



*Fig. 13.*

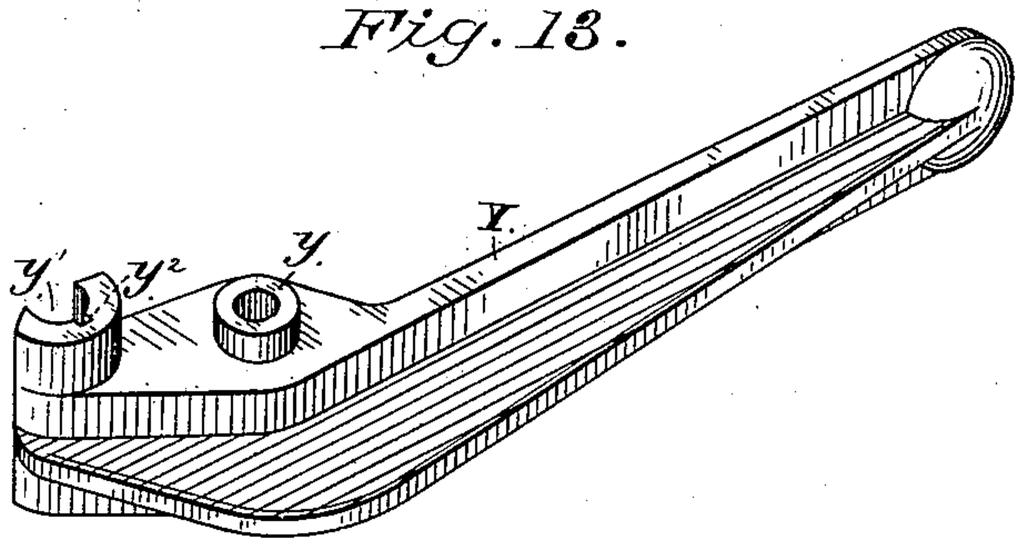
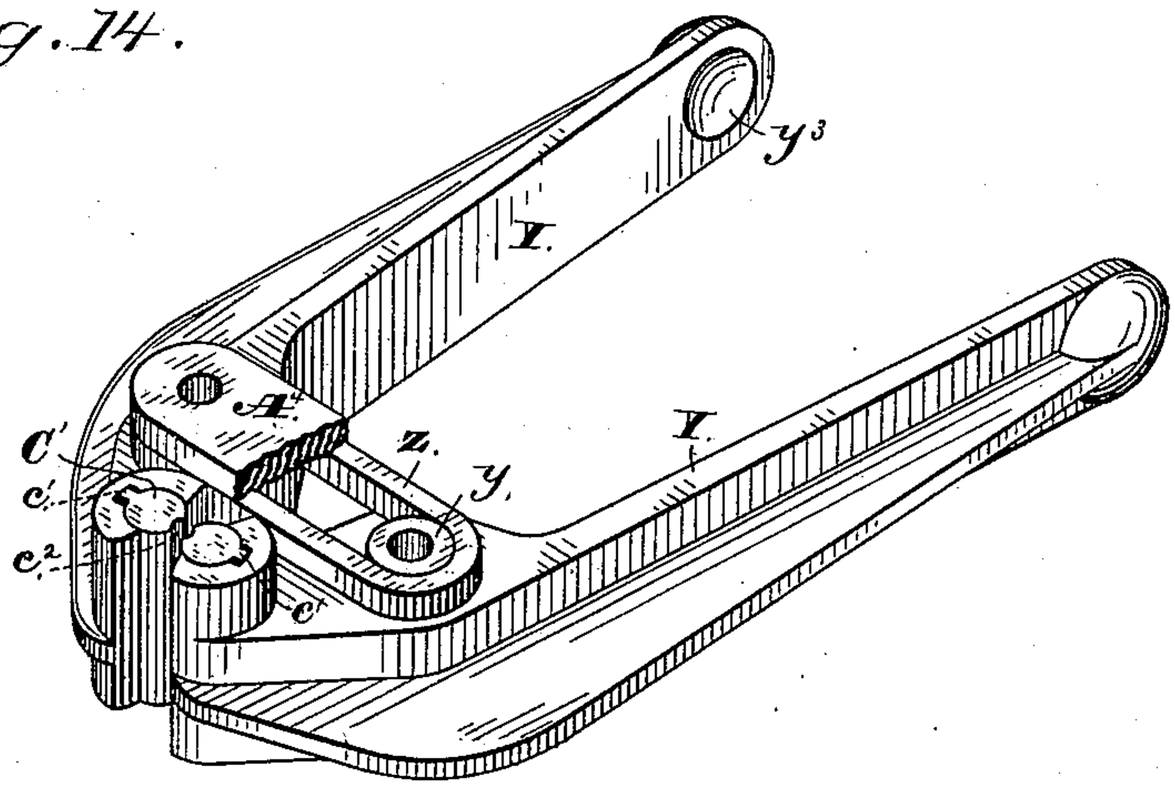



*Fig. 14.*




Witnesses

Ed. A. Newman.

Cal. C. Newman.

Inventor

Jas. R. Little, by

Brindle & Russell, his Attys

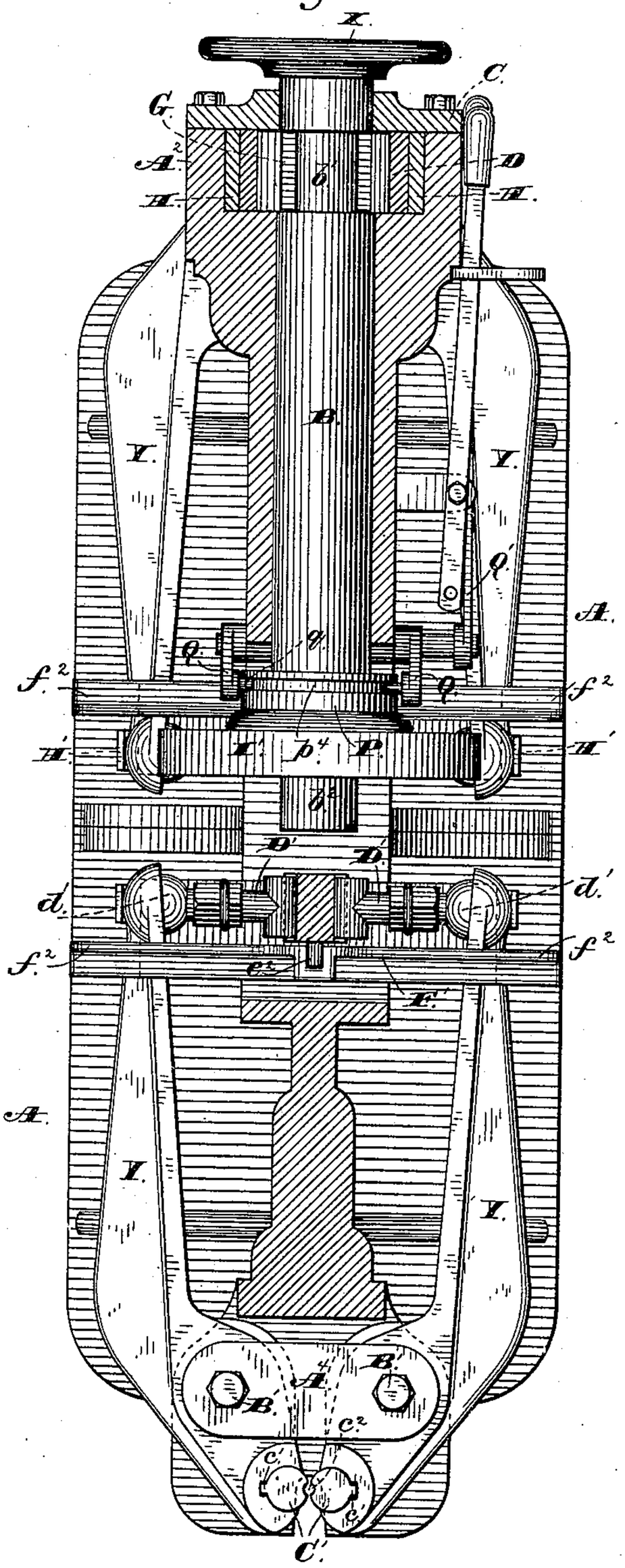
(No Model.) 10 Sheets—Sheet 10.

# J. R. LITTLE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

No. 334,251. Patented Jan. 12, 1886.

*Fig. 15.*




Witnesses

Ed. A. Newman.

Cel. C. Newman.

Inventor

Jas. R. Little, by

Prindle & Russell, his Attys

# UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE QUINCY METAL WHEEL COMPANY, OF SAME PLACE.

## MECHANISM FOR MANUFACTURING METAL WHEELS.

SPECIFICATION forming part of Letters Patent No. 334,251, dated January 12, 1886.

Application filed June 2, 1884. Serial No. 133,602. (No model.)

*To all whom it may concern:*

Be it known that I, JAS. R. LITTLE, of Quincy, in the county of Adams, and in the State of Illinois, have invented certain new and useful Improvements in Mechanisms 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 as arranged for use. Fig. 2 is a plan view of the upper side of the same. Fig. 3 is a front elevation of said machine. Fig. 4 is a side elevation of the same. Fig. 5 is a perspective view of the parts employed for connecting the operating-shaft with the plunger, said parts being separated from each other and from the head. Fig. 6 is a like view of the same combined with said shaft. Fig. 7 is an enlarged perspective view of the parts employed for adjusting said plunger to vertical position. Fig. 8 is a vertical section of the machine upon line *x x* of Fig. 4. Fig. 9 is a like view of the same upon line *x' x'* of Fig. 3. Figs. 10 and 11 are rear elevations of the parts employed for operating the clamping-jaws. Figs. 12 and 13 are perspective views, respectively, of the outer and inner sides of the clamping-levers separated from each other. Fig. 14 is a like view of the same as combined, and Fig. 15 is a horizontal section upon line $x^2$ $x^2$ of Fig. 4.

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

My invention is designed for use in the construction of metal wheels, pulleys, &c.; and it consists, principally, in the construction and operation of the clamping-jaws, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for operating the clamping-jaws, substantially as hereinafter shown.

It consists, further, in the means employed for operating the plunger, substantially as hereinafter set forth.

It consists, further, in the means employed for adjusting the plunger vertically, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the means employed for connecting the operative mechanism with and disconnecting the same from the driving-shaft, substantially as hereinafter specified.

It consists, further, in the construction, arrangement, and combination of parts, as hereinafter described, and more specifically pointed out in the claims.

In the annexed drawings, A represents the frame of my machine, which has the general form shown in Figs. 1, 3, and 4, and is for convenience constructed in duplicate and the parts united at their rear lower ends. Each section of said frame is provided with a horizontal recess, A', above which is a head, $A^2$, that contains the plunger and its operating mechanism, while at the upper end of said frame is a sleeve or journal bearing, $A^3$, that extends horizontally rearward from said head, and is adapted to receive and contain a shaft, B, which shaft is journaled mainly within said bearing and partly within the plate C, that forms the front of said head. The front end of the shaft B is provided with a reduced portion or journal, *b*, which is contained within a corresponding bearing in the plate C, and operates to limit the outward longitudinal motion of said shaft, while its motion in a rearward direction is limited by the end of the corresponding shaft B of the opposite machine, against which it abuts.

Upon the portion of the shaft B which is contained within the head $A^2$ is formed an eccentric, *b'*, that has sufficient throw to give the desired motion to a plunger, and around the same is placed a yoke, D, which is fitted to the interior of said head and adapted to be moved vertically within the same.

Within the upper end of the yoke D is a half-box, E, which at its lower side is fitted to the periphery of the eccentric *b'*, and at its upper side bears against the upper end of the opening within said yoke, and has such length with reference to the lateral dimensions of said opening as to permit it to move as far as required in either direction to enable said eccentric to revolve.

Within the lower end of the yoke D is closely fitted a second half-box, F, which furnishes a pivotal bearing for the correspondingly-shaped lower end, *g*, of a pitman, G, and per-

mits the upper portion of said pitman to be swung laterally within the limits of the open center of said yoke. The pitman G, at its upper end, $g'$, is adapted to embrace the lower periphery of the eccentric $b'$, while its length is such as to cause it to loosely fill the space between said box F and eccentric $b'$ when said yoke is suspended from said box E and the latter is in contact with the upper side of said eccentric. In consequence of the construction shown said yoke is caused to move vertically within the head $A^2$ whenever the shaft B is revolved.

In order that the yoke D may be readily fitted within the head $A^2$ and lateral motion therein prevented, the interior of said head is made somewhat wider than said yoke, and the lower end of the space is slightly wider than its upper end. Between one or each side of said yoke and the contiguous side of said space is placed a gib, H, which is tapered lengthwise to correspond to the taper of said opening, and by being moved lengthwise increases or diminishes the space within which said yoke moves. For the purpose of enabling said gibs to be readily adjusted to and secured in position, each is provided at its upper end with a reduced threaded portion, $h$, that projects through the upper end of the head $A^2$, and receives at such point a nut, $h'$.

Secured by bolts I to the lower end of the yoke D is a block, K, which in horizontal shape and size corresponds to the like features of said yoke end, and upon its lower side is provided with a round centrally-located boss, $k$, that projects downward a distance substantially equal to the thickness of said block.

Within the block K, at the axial center of the boss $k$, is a round vertical opening, $k'$, which from a point near the upper end of said boss to its upper end has substantially twice the diameter of its lower portion. Said opening $k'$ is for the reception of a plunger, L, which is fitted to and adapted to be moved vertically within the same, and when adjusted to place is secured therein by means of a set-screw, $k^2$, that passes radially inward through the side of said boss and impinges upon the periphery of said plunger.

In order that the plunger L may be readily adjusted downward to place and firmly supported from above, its upper end is cut away upon a laterally-inclined line. The block K is provided within its upper side, around said end, with a right-angled recess, $k^3$, that corresponds in horizontal shape to the like features of said block, and within such recess is placed a wedge-block, M, which is loosely fitted thereto vertically, and from front to rear has a length considerably less than the length of said recess.

Within the lower face of the block M is provided a longitudinally-arranged recess, $m$, which has a width slightly greater than the diameter of the upper end of the plunger L, and from one end of said block nearly to its opposite end has a laterally-upward inclination that corresponds to the inclination of the said upper end of said plunger. A screw, N, journaled within the end of the block K, adjacent to the deepest end of the recess $m$, passes through a correspondingly-threaded opening in the end of said wedge-block M, and enables the latter to be moved longitudinally, so as to force said plunger downward, when desired.

In practice, when the plunger L is placed within the block K, it is set at a point slightly higher than desired for good work, and is then, by the movement of the wedge-block M, adjusted downward to the exact point required. Should said plunger, from wear, require to have its lower end dressed off, it may afterward be easily and certainly adjusted downward to place by the means described, and when thus adjusted is held with all necessary firmness, as said wedge-block solidly fills the space between its upper end and the lower end of the yoke D.

The shafts B are driven by means of the following-described mechanism, viz: The rear abutting ends of the shafts are each provided with a reduced portion or journal, $b^2$, and upon the same is loosely journaled a gear-wheel, O, which has upon each side a projecting hub, $o$, that has its face cut away upon radial lines, so as to leave two oppositely-located segments, $o'$, which are separated by spaces or recesses $o^2$, that correspond therewith in size and shape.

Fitted loosely upon the shaft B is a collar, P, which, by means of two feathers or keys, $b^3$, that are secured longitudinally within the periphery of said shaft, and two corresponding splines or keyways, $p$, which are cut within the interior of said collar, are adapted to be moved toward or from the hub $o$, but are prevented from rotating independently of said shaft. The end of the collar P adjacent to the wheel-hub $o$ is recessed to enable it to pass over and loosely embrace the same, while within the bottom of such recess $p'$ are provided segments $p^2$, which are adapted to fit into the recesses $o^2$ of said hub, and are separated by recesses $p^3$, that are adapted to receive the segments $o'$ of the same. As thus arranged, it will be seen that if said collar or clutch section is moved into engagement with said hub the shaft B and wheel O will be combined and compelled to rotate together.

The clutch-section P is moved into or out of engagement by means of a forked lever, Q, which is pivoted upon the rear side of the frame A, beneath the shaft B, with its arms $q$ engaging with a circumferential groove, $p^4$, in said section, and a bar, Q', that is secured to said lever or to its pivotal bearing, and from thence extends forward and downward to a convenient point at the front side of said frame. By moving said bar upward said clutch-section is thrown into engagement, while an opposite motion of said bar will release the latter from engagement.

Secured to and extending upward from the inner end of one of the frame-sections A is a U-shaped frame, R, which at the end of each of its forks is provided with a journal-bearing, *r* or *r'*, while to the opposite section is correspondingly secured a frame, S, that has but one journal-bearing, *s*, and at its opposite side, at a lower point, has pivoted a lever, T, which is vertically arranged, and within its upper forked end, *t*, has hung upon pivots *t'* a journal-box, $t^2$. Said box $t^2$ is in line horizontally and laterally with the corresponding journal-box *r'*, of the frame R.

Within the journal-boxes *r* and *s* is journaled a shaft, U, which is provided with a toothed pinion, *u*, that meshes with the wheel O, and has secured, at one side of said pinion a wheel, *u'*, which has a plain or otherwise formed periphery, that is adapted for engagement by a friction-pulley.

Within the boxes *r'* and $t^2$ is journaled a second shaft, V, which at one end is provided with a fast and a loose pulley, *v* and *v'*, respectively, at its opposite end has a balance-wheel, $v^2$, and between said boxes is provided with a friction-pulley, $v^3$, that is adapted to engage with the friction-wheel *u'* by an inward movement of the upper end of the lever T. The lower end of the lever T engages with a lever, W, which from thence extends horizontally to the front end of the machine, and is pivoted upon a suitable vertical bearing, *w*, at a point near its longitudinal center. As thus arranged, a laterally-outward movement of the front end of said lever W will cause the friction-pulley $v^3$ to be thrown into engagement with the wheel *u'*, and the motion of the shaft V to be communicated to the shaft U, and through the same to the plunger-operating mechanism, while an opposite movement of said lever will release said friction pulley and wheel from engagement and arrest the motion of said operative mechanism.

For convenience in rotating the shaft B by hand, when necessary to set and adjust a plunger, a hand-wheel, X, secured to the front end of said shaft, furnishes the required means.

The compressing mechanism shown is intended for use in connection with clamping mechanism, which latter is constructed and operated as follows, viz: Resting upon the bottom of the recess A' are two levers, Y, each of which has the form shown in Figs. 12 and 13, and extends in a curve from a point beneath the plunger rearward and outward, and thence rearward alongside the frame A. Each lever Y is provided upon its upper and lower sides, near its front end, with a cylindrical boss, *y*, around which passes a link, Z, that spans the space between said lever and the opposite lever Y and encircles the corresponding boss *y* of the same. Said bosses *y* have dimensions slightly greater than the thickness of the link Z which is to encircle the same, so that when said lower bosses rest upon the bottom of the recess A' said lower link loosely fills the space between the bottom of said recess and the lower faces of said levers, while above said upper link is placed a plate, $A^4$, that extends horizontally in all directions over the same, and is secured in place by means of two bolts, B', one of which passes downward through each end of said plate and through the axis of the boss beneath. As arranged, the said levers are, by the operation of said links and covering-plate, pivoted together, and may have their front ends moved toward or from each other by a reverse movement of their rear ends.

Within the front portion, at the inner side of each lever Y, in a line laterally with the axis of the plunger, is formed a cylindrical vertical recess, *y'*, which is cut sufficiently near the edge of said lever to cause about one-third of the side of said recess to be open, as seen in Fig. 11. Said recess extends downward about one-half the distance between the upper and lower faces of said lever, and receives a correspondingly-shaped block of steel, C', that loosely fills the space, and upon its outer side is provided with a stud, *c'*, which extends radially into a vertical groove, $y^2$, that is formed within the outer side of said recess. Said groove is considerably wider than said stud, so that while said parts operate to prevent said steel block C' from being turned in either direction any considerable distance, they give to the same a certain liberty of motion for purposes hereinafter set forth. Each of said blocks C' is provided within its inner side with a longitudinal half-round groove, $c^2$, and is hardened to prevent wear or other injury. Within the inner face, at the rear end of each lever Y, is formed a semi-spherical recess, $y^3$, that receives and forms a bearing for the spherical end *d'* of a toggle-bar, D', which bar extends inward, and has its opposite spherical end, $d^2$, contained within a semi-spherical recess or bearing, *e'*, that is provided in the end at one side of a pitman, E'. Said pitman has a pin, $e^2$, passing through its said lower end into a vertical groove, *f'*, that is provided in a plate, F', which is placed immediately in front, by means of which construction said pitman is permitted to move vertically within certain limits and to vibrate laterally upon said pin, which thus constitutes a movable pivotal bearing.

The rear ends of the clamping-levers Y are supported upon a horizontal plate, G', that is secured transversely upon the rear portion of the frame A, and constitutes a bearing upon which said levers slide, while the plate F', which is secured to the upper face at the longitudinal center of said plate G', is provided with lateral arms $f^2$, that extend out over said levers, and operate as top bearings to prevent the latter from being accidentally raised from off said plate G'. The clamping-levers are, by the operation of springs H', which are arranged to exert an inward pressure upon their rear

ends, held normally in the position shown by the full lines of Fig. 10, their rear ends closed inward, and their outer ends or jaws separated, in which position the toggle-bars D′ have their inner ends forced upward, and the pitman E′ is moved in the same direction and its upper end turned to one side, as shown in Fig. 11. The upper end, $e^3$, of the pitman E′ is extended laterally in a slight curve to each side, and at the longitudinal center of such part is formed a half-round notch, $e^4$, which is engaged by a cam projection, $p^5$, that is secured upon or forms part of the clutch-section P. Said cam projection has its front end rounded and undercut, as shown in Fig. 10, and when the shaft B is rotated engages with said notch $e^4$ and moves said pitman downward and toward the opposite side until, when said parts occupy the relative positions shown by the dotted lines of said Fig. 10, said part $p^5$ slips out of engagement with said notch and the curved end engages with the periphery of said cam, which is concentric with said shaft B. During the passage of the periphery of the cam $p^5$ over the end $e^3$ of the pitman E′ the clamping mechanism has a period of rest, and holds in its embrace whatever has been placed between its jaws, and by lengthening or decreasing circumferentially the said cam such period of rest will be correspondingly changed. When the cam $p^5$ has passed out of engagement with the pitman E′, the operations of the springs H′ will cause the clamping mechanism to automatically resume its normal position and release whatever was held between its jaws.

While the arrangement of springs shown is preferably employed, it will be obvious that different forms of spring and different arrangements may be used without change in the principle of operation.

In order that the pressure of the clamping-jaws may be regulated, each toggle-bar D′ is made in two sections, and the same united by a screw-connection, which permits of the shortening or lengthening of said bar, as desired.

In order that the pitman E′ may be prevented from being carried too far by the movement of the cam $p^5$, and may be returned, when released, to position for re-engagement with said cam, a strap, I′, is secured to said pitman, and extends in an irregular curve around the collar P and said cam $p^5$. Said strap has such dimensions and shape as to cause it to have a bearing upon said collar or cam at a point opposite to that at which the upper end of said pitman engages, by which means the latter is prevented from being moved outward in either direction. After the cam $p^5$ has performed its office in moving the pitman E′ to its lowest point, and has passed out of engagement with the laterally-extended curved end $e^3$ of the same, it engages with the upper portion of the strap I′ and swings the same and the upper end of said pitman back to position for re-engagement with the front end of said cam.

The machine is now complete, and is used as follows for the special purpose intended: The spoke K′ of a wheel is placed between the clamping-jaws with the rim or felly L′, through which the outer end of said spoke is loosely passed, a short distance above said jaws, after which, by the starting of the mechanism, said jaws are closed firmly around said spoke and hold the same while the plunger descends and compresses the projecting portion of the spoke, and causes it to fill the opening or mortise $l'$ within said rim and to be enlarged at each side of the same. The operative mechanism is timed so that the clamping-jaws close together and clasp the wheel-spoke in advance of the downward movement of the plunger, and remain closed until after the latter has performed its work and moved upward, such relative operations being automatic and entirely independent of the operator. The clutch is only used for the purpose of disconnecting the machine from the driving mechanism when it is desired to use but one machine, the starting and stopping of the machine when in use being effected by means of the friction pulley and wheel. There is so little momentum of the moving parts beyond said friction-pulley that when the latter is removed from contact with said friction-wheel the latter and all parts driven thereby stop almost instantly.

Having thus fully set forth the nature and merits of my invention, what I claim is—

1. In combination with the levers Y, provided with the cylindrical bosses $y$, the links Z, fitted around and extending between said bosses and operating as pivotal connections for said levers, substantially as set forth.

2. In combination with the levers Y, having the bosses $y$, and with the links Z, the plate $A^4$ and bolts B′, substantially as and for the purpose shown and described.

3. In combination with the lever Y, provided within its front end with the cylindrical recess $y'$, having the radial groove $y^2$, the block C′, fitted loosely into said recess, and provided with the radial stud $c'$ and longitudinal peripheral groove $c^2$, substantially as and for the purpose specified.

4. In combination with the levers Y, provided within their rear ends with the semi-spherical recesses $y^3$, the toggle-bars D′, having spherical ends $d'$ and $d^2$, the pitman E′, provided within its lower end with semi-spherical recesses $e'$, and means whereby the lower end of said pitman may be moved vertically, substantially as and for the purpose shown.

5. In combination with the levers Y, and with mechanism, substantially as shown, whereby the rear ends of the same may be moved apart, the springs H′, arranged to exert an inward pressure upon the rear ends of said levers, substantially as and for the purpose set forth.

6. In combination with the rear ends of the levers Y, the plate F′, provided with the lateral guard-arms $f^2$, and the plate G′, placed

beneath and operating as a bearing for said levers, substantially as and for the purpose specified.

7. The pitman E′, provided with the laterally-extended notched upper end, $e^4$, and the cam $p^5$, adapted to be rotated by the shaft B and to engage with and move said pitman downward, substantially as and for the purpose shown.

8. In combination with the upper portion of the pitman E′ and with the cam $p^5$, the strap I′, secured to said pitman and encircling said cam, substantially as and for the purpose set forth.

9. As a means for operating the plunger L, the shaft B, provided with the eccentric $b'$, the yoke D, adapted to be moved vertically within the head $A^2$, the laterally-movable half-box E, the fixed half-box F, and the pitman G, having its upper end adapted to embrace the lower periphery of said eccentric and its lower end, $g$, to fit within said half-box F, said parts being combined to operate substantially as and for the purpose shown and described.

10. In combination with the yoke D and plunger L, the block K, provided with the vertical opening $k'$ and recessed upper side, $k^3$, the block M, fitted within and adapted to be moved lengthwise of said recess, and provided with the longitudinal inclined recess $m$, which is adapted to receive the upper inclined end of said plunger, and means, substantially as shown, whereby said block M may be adjusted to and secured in longitudinal position, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of April, A. D. 1884.

JAMES R. LITTLE.

Witnesses:
F. M. McCann,
John W. Rickart.