(No Model.) 6 Sheets—Sheet 1.

J. HENDERSON.

MACHINE FOR SPINNING CAR WHEELS.

No. 581,284. Patented Apr. 27, 1897.

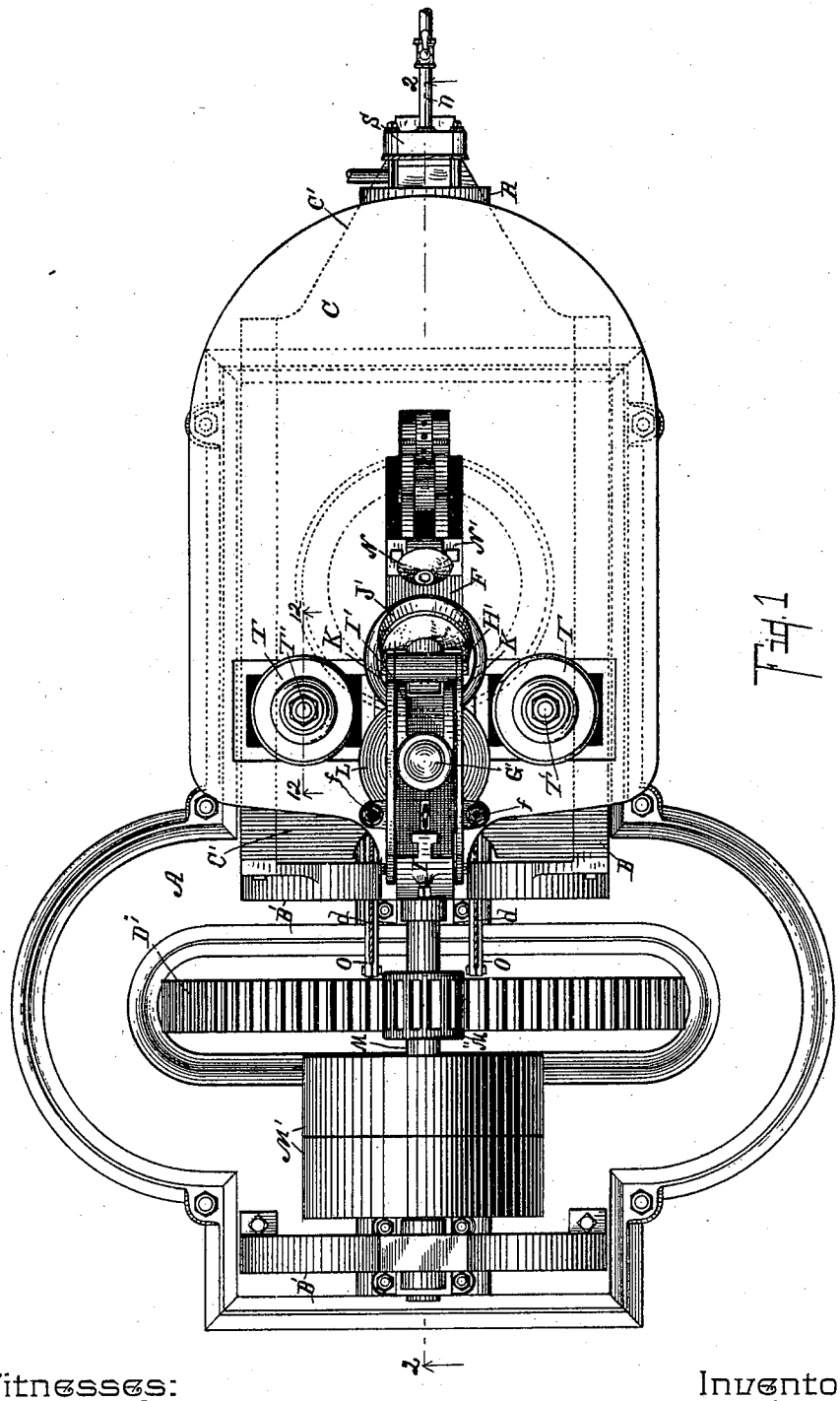

Fig. 1

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(No Model.) 6 Sheets—Sheet 2.

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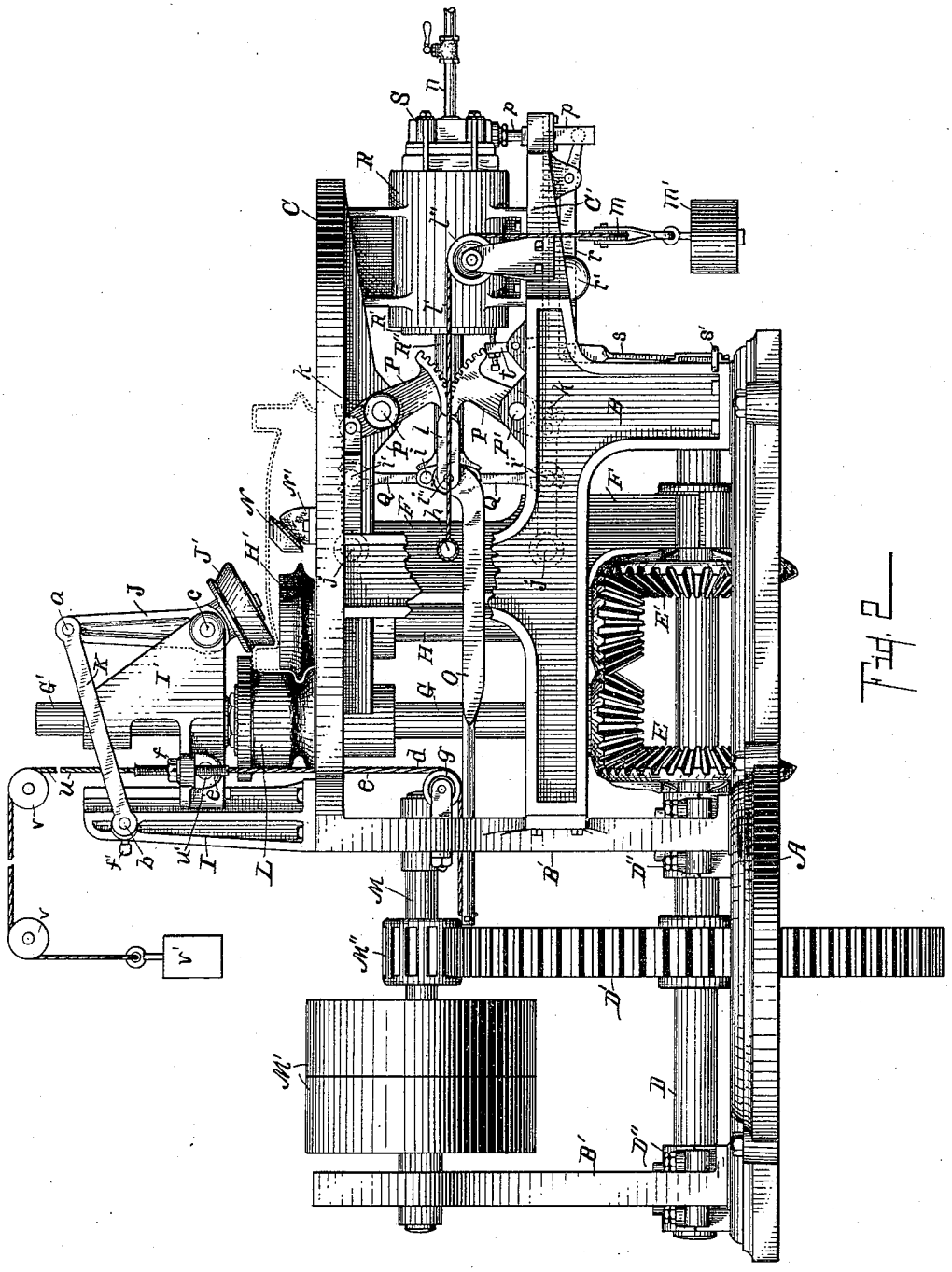

Fig. 2.

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(No Model.) 6 Sheets—Sheet 3.

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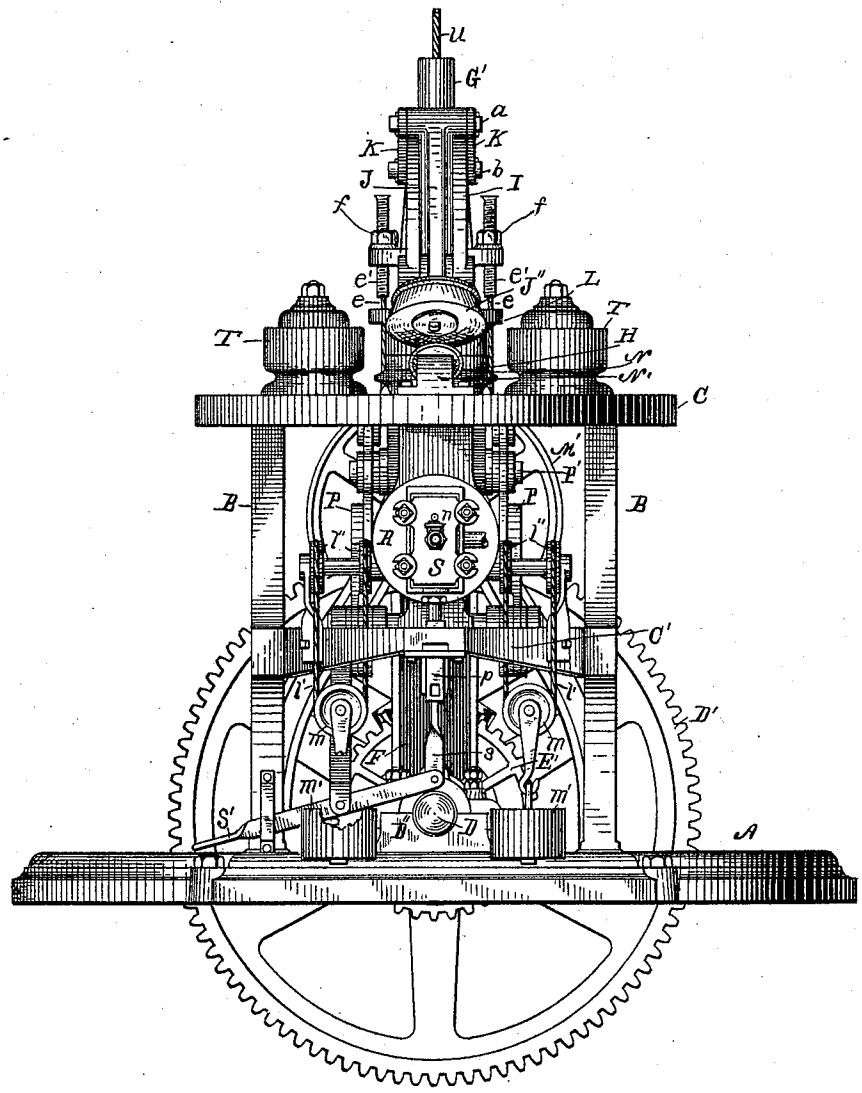

Fig. 3

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(No Model.) 6 Sheets—Sheet 4.

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MACHINE FOR SPINNING CAR WHEELS.

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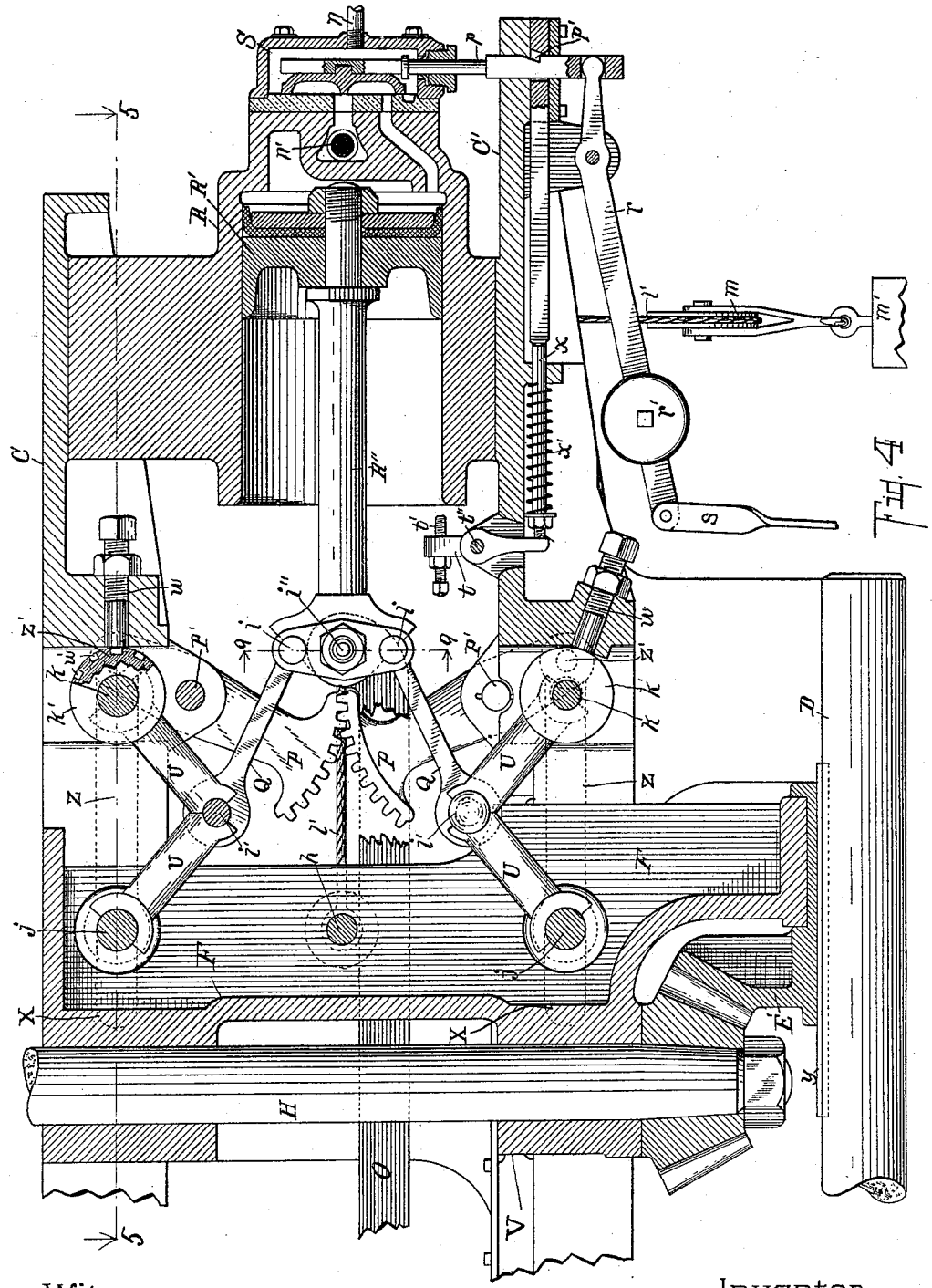

Witnesses:
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(No Model.) 6 Sheets—Sheet 5.

J. HENDERSON.

MACHINE FOR SPINNING CAR WHEELS.

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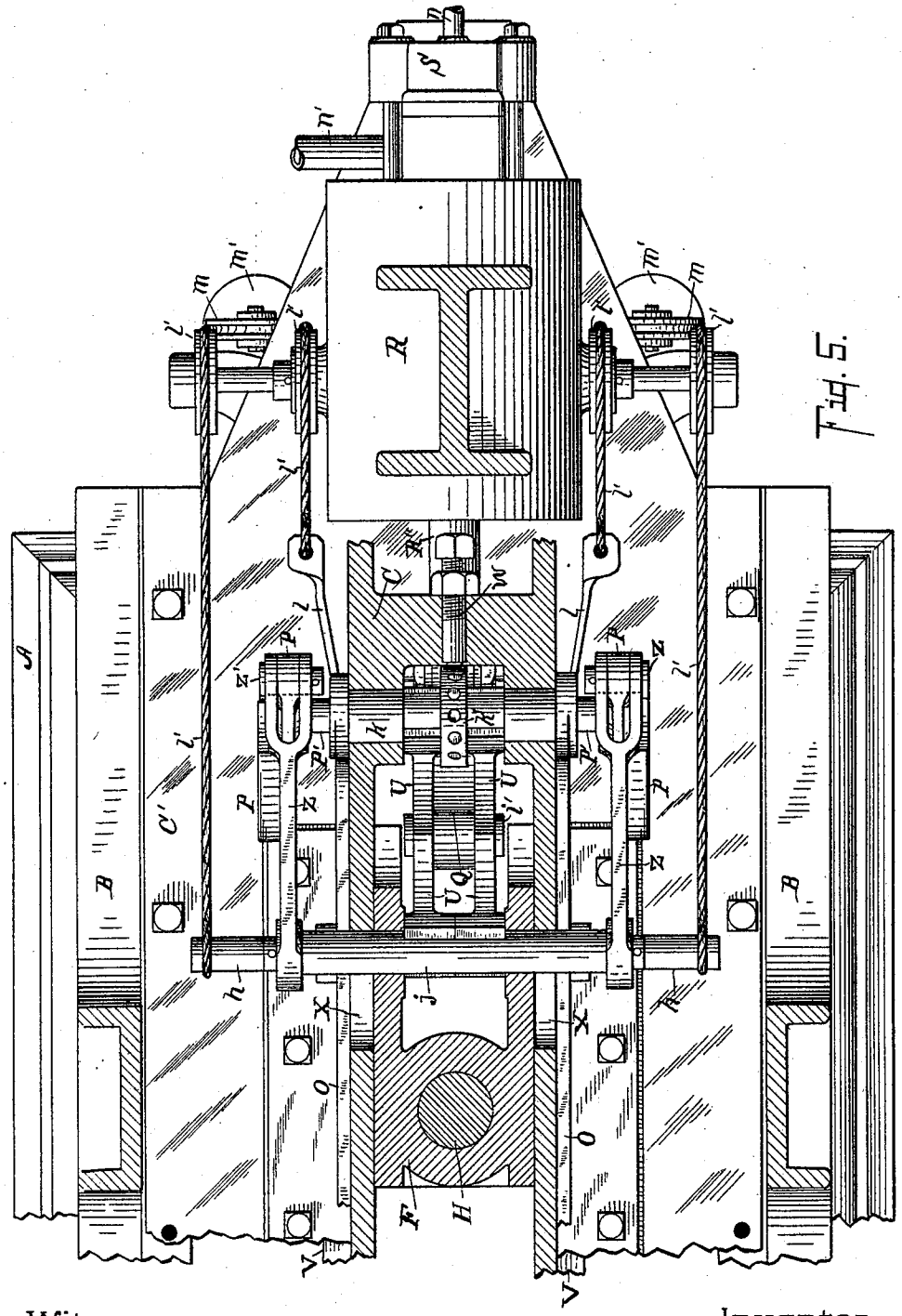

Fig. 5.

Witnesses:
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(No Model.) 6 Sheets—Sheet 6.

J. HENDERSON.

MACHINE FOR SPINNING CAR WHEELS.

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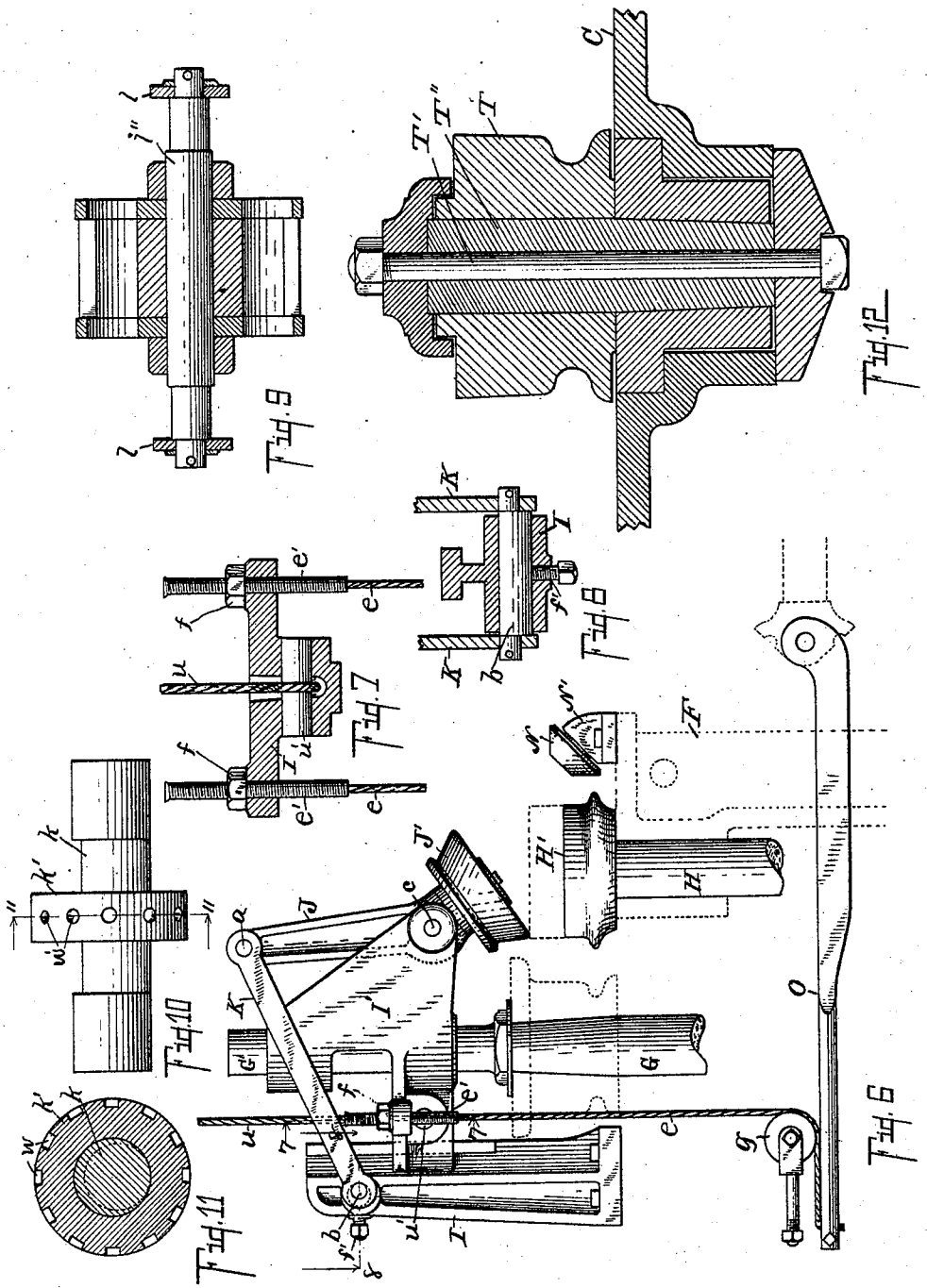

Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES HENDERSON, OF THREE RIVERS, MICHIGAN, ASSIGNOR TO THE SHEFFIELD CAR COMPANY, OF SAME PLACE.

MACHINE FOR SPINNING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 581,284, dated April 27, 1897.

Application filed September 6, 1895. Serial No. 561,650. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENDERSON, a citizen of the United States, residing at the city of Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Machines for Spinning Car-Wheels, of which the following is a specification.

My invention relates to improvements in metal-spinning machines, and more particularly to a spinning-machine for spinning car-wheels of thick sheet metal or plates.

As heretofore constructed machines of this class have been difficult of adjustment. It has been difficult to control the same to secure the desired results, and the shaft of the spinning-wheel has been more or less likely to become inclined, which prevents its doing good work.

The objects of my invention, therefore, are, first, to provide a machine which is positive and powerful in its action; second, to provide means of adjusting and carrying the spinning-wheel so that it shall move to exactly the desired position; third, to provide improved means of controlling the movement of the spinning-wheel, so that it shall be entirely automatic in its action or can be controlled by the operative at will; fourth, to provide an improved spinning-machine for spinning car-wheels of sheet metal where the rims are of irregular form.

Other objects and improvements in the machine will appear clearly in the detailed description of the same.

I accomplish the objects of my invention by the machine and mechanism shown in the accompanying drawings, in which—

Figure 1 is a top plan view of a spinning-machine embodying all of the features of my invention. Fig. 2 is a front elevation of the machine shown in Fig. 1 with a portion of its frame broken away and the guide-wheels removed. Fig. 3 is an elevation of the machine taken from the left hand of Figs. 1 and 2, being an end elevation of the machine. Fig. 4 is an enlarged detail sectional view of the hydraulic cylinder and its connections for actuating the spinning-roll, taken on line 2 2 of Fig. 1. Fig. 5 is a sectional view taken on line 5 5 of Fig. 4, looking down. Fig. 6 is an enlarged detail view of the parts essential to the spinning of irregular-formed car-wheels, taken from Fig. 2. Fig. 7 is an enlarged detail sectional view on line 7 7 of Fig. 6, looking in the direction of the little arrows at the end of the section-line. Fig. 8 is a transverse sectional view taken on line 8 8 of Fig. 6, looking down. Fig. 9 is a sectional view of the cross-head and its connections to the piston-rod of the hydraulic cylinder, taken on line 9 9 of Fig. 4, looking in the direction of the little arrows at the ends of the section-line. Fig. 10 is an enlarged detail sectional view of the adjustable eccentric *k*, appearing clearly in Figs. 4 and 5. Fig. 11 is a sectional view on line 11 11 of Fig. 10, looking in the direction of the little arrows at the ends of the section-line. Fig. 12 is a vertical sectional view of one of the guiding-rollers of the spinning-machine, taken on line 12 12 of Fig. 1, looking in the direction of the little arrows at the ends of the section-line.

Similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A is the base which supports the remaining parts of my improved machine. B B are side pieces projecting up therefrom, which support the top or table-like portion C, which is adapted and formed to answer its peculiar purpose. To the rear of the machine are upwardly-projecting brackets B′ B′, which afford bearings to carry the driving-shafts of the machine. The inner bracket B′ is also secured by suitable bolts to the rear end of the table portion C and serves as a support for that part of the machine. Between the side pieces B is supported a central lower table or plate C′, which is parallel with the top plate C.

The counter-shaft M is supported in suitable boxes on the bearings B′ B′ to the rear of the machine and bears the usual tight and loose pulleys M′ for operating the machine from suitable belt connections. Extending longitudinal of the base and supported in suitable boxes D″ D″ therein is the driving-shaft of the machine D, which bears a large gear-wheel D′, which meshes with the pinion M″ above and serves to actuate the entire ma-

chine. A vertical shaft G extends up through the rear portion of the tables C and C′ and bears a suitable bevel-pinion at the bottom, which meshes at that point with a bevel-gear E on the shaft G. This shaft G is permanently held in position and bears the female spinning-roll L, which is supported above the top of the table C. In a suitable housing or frame F is supported a movable vertical shaft H, which bears at its upper end a male spinning-roll H′, the housing F being movable back and forth over a space of about three inches in suitable guideways, which permits the roll to be moved out and in for the purpose of spinning the car-wheels between the two rolls L and H′.

From the top plate C to each side of the spinning-rolls are guiding-rolls T, which are supported in suitable slots and are adjustable to and from the spinning-rolls to properly guide the rim of the car-wheel of any size to the same, so that it shall be spun true by being guided in this way. The guiding-rolls are adjusted close to the spinning-rolls when a small car-wheel is being spun and moved farther away when a larger wheel is being spun, the points of contact with the two guide-rolls and the point of contact between the two spinning-rolls determining the circle of the periphery of the wheel.

On the driving-shaft D below is a suitable bevel-gear E′, which meshes with the bevel-pinion on the lower end of the shaft H. A bracket from the housing or frame F extends downwardly and a journal-bearing box is formed thereon to hold a suitable sleeve which is integral with the bevel-gear E′. The bevel-gear E′ is movable along the shaft D, along a suitable key *y*, which fits into a key-seat in the gear E′ and its sleeve, which permits of the required motion and holds the gear E′ in mesh with its follower on the lower end of the shaft H, which appears clearly in Fig. 4.

Between the plates C and C′ is supported a hydraulic cylinder R by suitable bracket projections therefrom. In the cylinder R is a suitable hydraulic piston R′, from which extends a piston-stem R″, which is connected by a suitable cross-head with the housing or frame F by a suitable mechanism for actuating the same. This connection from the cross-head of the piston R to the housing or frame F is specially constructed to secure even and powerful motion of the vertical shaft H, carrying its spinning-roll H′ above.

The housing F is supported in suitable guideways V in the intermediate plate C′ at the bottom and is guided at its upper end between downwardly-projecting plates from the top plate C. Horizontal shafts *k* are supported in suitable bearings in the top plate C above and in suitable bearings on the intermediate plate C′ below, parallel with each other in substantially the same vertical plane.

Suitable shafts *j j* project transversely with the machine through the upper and lower part of the housing F, and the upper shaft *j* is connected to the upper shaft *k* by a suitable toggle-joint U U, and the lower shafts *k* and *j* are similarly connected by a similar joint, the joints being adapted to fold toward each other between the top plate C and the intermediate plate C′, the toggle-joints being equal and the shafts *j* and *k* above and below being the same distance apart and in planes parallel to each other.

On the forward end of the piston-stem R″ is a suitable cross-head, standing in the vertical position, which is connected by links Q Q to the central joint of the toggle-joints U U above, and below by pins *i*, which are suitably secured to the cross-head.

To the ends of shafts P′, which are supported by suitable hangers from the top plate C and by suitable brackets from the intermediate plate C′, are secured levers P, bearing segments of gear which project up from the lever below and down from the lever above and mesh in a line opposite the outer end of the piston-stem R′. The outer ends of the upper levers are connected by suitable links Z to the shaft *j*, and the outer ends of the lower levers are connected, also, by similar links Z to the lower shaft *j*. The levers P P and link Z are exactly symmetrical to each other and equal.

By examining Fig. 4 it will be seen that when the water is admitted to the hydraulic cylinder R it will carry the piston-head R′ forward, which will actuate, through the links Q Q, the toggle-joints U U U U, which will carry forward very powerfully the frame or housing F, which will carry its spinning-roll H′ forward against the spinning-roll L, the spinning-rolls being actuated from the driving-shaft, as heretofore described. As the joints which actuate this spinning-roll H′ are toggle-joints, the force with which the spinning-roll is carried forward is very great. The connections from the shaft *j* through the levers P, which mesh with each other, prevent any unequal motion of the top and bottom of the shaft H and serve to actuate the same in exactly the vertical position after the vertical shaft H has been once adjusted to that position.

The adjustment of the connection to the housing F for adjusting the shaft is accomplished by a disk *k′*, supported on the shafts *k* above and below, and by rotating the same it will be noticed that as the bearings are eccentric the bearings of the rear ends of the links U will be carried backward and forward to any required extent for securing a proper adjustment, and when the set-screw is turned into the aperture *w′* on the periphery of the disk *k′* (see Figs. 10 and 11) the same will be held very securely and with very little strain at that point, owing to the fact that the bearing-support is eccentric, and consequently does not yield easily to the pressure. A shaft *h* extends through the central portion of the housing or frame F, and to the outer ends of this shaft *h* are secured cables *l′*, which pass

rearwardly over suitable sheaves and around to suitable arms *l*, which are connected with the cross-head of the hydraulic cylinder. A suitable weight *m'* is supported from a pulley *m*, which hangs in the loop of the cable *l'* and returns, by its weight, the cross-head and housing to the normal position after the machine has been actuated. On the bottom of the cylinder R is secured a suitable hydraulic valve S for delivery of water under pressure to the hydraulic cylinder from the supply-pipe *n*, and it also allows water to exhaust from the cylinder through the exhaust-port *n'*. The valve-stem *p* projects downwardly through a suitable guide in the intermediate plate C'. In the lower part of the stem is contained a notch *p'*, which is engaged by a suitable slide *x*, which is carried to place by a coil-spring *x'*. On the intermediate plate C' is supported a small lever *t* on pivot *t''*, the lower end of which is adapted to engage the inner end of the slide *x*. The upper end bears a suitable adjustable set-screw *t'*, which projects inwardly toward the inside of the cylinder R and at such a point as to be engaged by the piston-head at the outer end of its stroke. A suitable lever *r* is pivoted to the under side of the intermediate plate C' and engages at its outer end in a mortise in the stem *p* to the slide-valve. At its inner end it bears a weight *r'* and is connected by a link *s* to a foot-lever *s'*, by which it may be actuated. By stepping on the foot-lever *s'* the link *s* will be raised, which will raise the inner end of the lever *r*, carrying the outer end down, which will depress the valve-stem *p* and allow it to be engaged by the slide *x* in the notch *p'*. This will operate the valve and the machine.

It will be noted when the piston R' moves forward to actuate the housing which carries the spinning-roll that at the inner end of its stroke it will come in contact with the set-screw *t'*, which will actuate the lever *t*, which actuates the slide *x*, and release the valve-stem *p'* and allow the weight *r'* to carry up the valve and allow the water to exhaust from the cylinder. Then the weights *m'* will carry the entire apparatus back to the normal position. When the operative desires to again actuate the machine, he merely steps on the lever *s'*, more water is admitted to the hydraulic cylinder, and the same process is again repeated.

If the car-wheels are very hot and roll very easily, which may cause irregularities in the rim of the same, or if for any other reason irregularities occur in the rim which it is desired to roll or spin further, the operative continues to hold his foot upon the trip-lever *s'*, which will not permit the water to exhaust from the hydraulic cylinder, and the wheel can be spun as long as desired or until the foot of the operative releases the trip and allows the machine to return. This makes the machine automatic or under the control of the operative, as desired.

A suitable guiding-bracket I is secured to the upper rear end of the plate C, and to the front of the same are formed suitable guides. A vertical shaft G' is secured to the upper end of the shaft G. Supported on said shaft and guideway is a suitable frame or housing I', which is adapted to reciprocate up and down the shaft G' and guide on the bracket I. To the forward lower corner of the housing I' is secured a lever J, which operates on a pivot or fulcrum *c*. Projecting downwardly and outwardly on the lower end of lever J is a spinning-roll J', which is rounded at the lower side and has a shoulder-like formation at the top. Extending from the upper end of the lever J back to the upper part of the bracket I are links K, which are pivoted at *b* to the bracket I and at *a* to the upper end of lever J. The connection at *b* has an eccentric adjustment like the eccentric adjustment of the shaft *k*, (seen in Figs. 4, 10, and 11,) the adjustment being effected by the set-screw *f'*. Secured to the housing I' is a cable *u*, which passes over suitable pulleys *v v* at the top and is weighted to counterbalance the housing and carry the same upwardly to keep tension upon the same. This cable is secured at its lower end to the housing by the pin *u'*. To each side of the housing are cables *e*, which extend downwardly, and these are secured to bolts controlled by nuts *f*, which have a connection to the housing for adjusting the tension upon the cables. Between the upper plate C and intermediate plate C' are supported pulleys or sheaves *g*, around which these cables pass. Secured to the ends of the shaft *i''*, which passes through the cross-head of the engine, are straight thrust-bars O, which pass through suitable guideways to each side under the pulleys *g*. To the rear end of these thrust-bars O are secured the lower ends of the cables *e*.

The portion of this improved spinning-machine bearing wheel J' is designed for use in spinning-wheels irregularly formed, as indicated by dotted lines in Fig. 2, and the operation of the machine is such that when the rolls are returned to their normal position the roll J' will be lifted by the weight *v'* lifting the housing I'.

When the car-wheel is placed in position to be spun and the machine is put in operation, as the housing F is carried forward to carry the male spinning-roll H up to the female spinning-roll L, it will, by forcing the thrust-bars O, put stress upon the cables *e*, which carry down the housings I', and in so doing, by the action of the links *k* on the lever J, move the spinning-wheel J' to place and roll or spin the inwardly-projecting portion, as indicated.

After a wheel is properly spun and the machine is returned to the normal position, as will be readily seen, the weight *v'* will raise the upper housing I', moving the spinning-roll J' out of the way, so that the car-wheel can be easily removed and another inserted. The motion here secured is that required to properly adjust and bring down the spinning-

roll J′ to secure the best formation of the metal in this position. The central part of the wheel, while it is being spun, is supported on a little idle-roll N, which is a beveled wheel supported on a little bracket N′ at the top of the housing or frame F.

Having thus described my improved spinning-machine and its various parts, I desire to state that the same can be considerably varied in its details without departing from my invention. For spinning the flanges on ordinary car-wheels the upper portion carried by the housings I′, along with the shaft G′ and bracket I, can be entirely removed. In this instance the male spinning-roll H′ should be full and extend upwardly to correspond with the formation of the female roll L, as indicated by dotted lines in Fig. 6. The roll J′ and its connections can be used in connection with rolls L and H′, if they are actuated by other means than those indicated, and answer its purpose very well. The little idle-roll N, while it serves a very useful purpose, might be dispensed with.

Other means of guiding the wheel to place could be substituted and used for the idle-rolls T T, but these will be found very effective and convenient for the purpose. Other variations will, no doubt, readily suggest themselves to those skilled in the art to which this invention pertains.

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

1. In a machine for spinning car-wheels, the combination of the base, A, supporting suitable framework; the top plate, C, and the intermediate plate, C′, supported in said framework on the base, A; a counter-shaft, M, supported in brackets, B′, B′, to the rear of the machine to actuate, through the pinion, M″, the driving-wheel, D′, to actuate the driving-shaft, D; the driving-shaft, D, supported on said base; a vertical, revolving shaft, G, in stationary bearings driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and the intermediate plate, C′; a vertical shaft, H, supported in said housing and revoluble therein with a beveled gear at the bottom; a beveled gear movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket from the housing, F, to actuate the vertical shaft, H; a suitable spinning-roll, L, above the top plate, C, on a shaft, G in stationary bearings; a suitable spinning-roll, H′, to correspond with the spinning-roll, L, on the shaft, H, above the top plate, C; a suitable extension, G′, to the shaft, G, above; a suitable bracket, I, with a guide to the front thereof supported above the top plate, C, and parallel with the shaft, G′; a suitable housing or frame, I′, adapted to reciprocate up and down the shaft, G′, and guide in the bracket, I; a suitable cable, u, with weight, v', connected to said housing or frame to carry the same normally upward; a lever, J, pivoted to the lower front corner of the housing, I′, at pivot, c; a link, K, connecting the upper end of the lever, J, at a, to the bracket, I, at the adjustable pivot or shaft, b; a beveled spinning-roll, J′, on the lower end of the lever, J; cables, e, adjustable by hexagonal nuts, f, connected to the housing, I′, extending downwardly therefrom; pulleys, g, by which said cables pass; thrust-bars, O, connected to the cross-head, and extending forwardly under the guiding-pulleys, g, and connected at their outer ends to the lower ends of the cables, e; hydraulic cylinder, R, to the front of said machine containing piston, R′, with the piston-stem, R″, bearing a suitable vertical cross-head; toggles, U, U, above and below connected by shafts, j, j, to the housing, F, and by eccentric shafts, k, k, to the top plate, C, and intermediate plate, C′; links, Q, Q, connected to the central joint, i', i', on said toggles, U, U, and to the cross-head at i, i; disks, k', with set-screws, W, for adjusting the eccentric shafts, k, to adjust the position of the housing, F; equal symmetrical levers, P, pivoted at P′ to the top plate, C, and intermediate plate, C′, the said levers bearing segment-gears adapted to mesh with each other between the said plates; links, Z, Z, connected to housing, F, and to the upper and lower end of said levers, P; a suitable valve for admitting and exhausting water under pressure from the hydraulic cylinder, R; a valve-stem, p, connected to said valve and projecting downwardly containing the catch, p'; a slide-bar, x, supported on intermediate plate, C′, and actuated by spring, x', for engaging the catch, p', on the valve-stem; a lever, t, adapted to engage and actuate the bar, x, supported on the pivot, t''; the set-screw, t', projecting inwardly toward the piston-head, r', in said hydraulic cylinder; a lever, r, supported from a suitable hanger from the plate, C′, and engaging in a suitable mortise in the lower end of the vertical valve-stem, p; a weight, p', on the inner end of said lever to depress the same to raise the valve-stem, p; a foot-lever, s', pivoted near the base, A, of the machine; a link, s, connecting the inner end of the foot-lever, s', with the inner end of the lever, r', all coacting together substantially as described.

2. In a machine for spinning car-wheels, the combination of the base, A, supporting suitable framework; the top plate, C, and the intermediate plate, C′, supported in said framework on the base, A; a counter-shaft, M, supported in brackets, B′, B′, to the rear of the machine to actuate, through the pinion, M″, the driving-wheel, D′, to actuate the driving-shaft, D; the driving-shaft, D, supported on said base; a vertical, stationary shaft, G, driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and the intermediate plate, C′; a vertical shaft, H, supported in

said housing and revoluble therein with a beveled gear at the bottom; a beveled gear movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket from the housing, F, to actuate the vertical shaft, H; a suitable spinning-roll, L, above the top plate, C, on a shaft, G in stationary bearings; a suitable spinning-roll, H′, to correspond with the spinning-roll, L, on the shaft, H, above the top plate, C; a hydraulic cylinder, R, to the front of said machine containing piston, R′, with the piston-stem, R″, bearing a suitable vertical cross-head; toggles, U, U, above and below connected by shafts, *j*, *j*, to the housing, F, and by eccentric shafts, *k*, *k*, to the top plate, C, and intermediate plate, C′; links, Q, Q, connected to the central joint, *i*′, *i*′, on said toggles, U, U, and to the cross-head at *i*, *i*; disks, *k*′, with set-screws, W, for adjusting the eccentric shafts, *k*, to adjust the position of the housing, F; equal symmetrical levers, P, pivoted at P′ to the top plate, C, and intermediate plate, C′, the said levers bearing segment-gears adapted to mesh with each other between the said plates; links, Z, Z, connected to housing, F, and to the upper and lower end of said levers, P; a suitable valve for admitting and exhausting water under pressure from the hydraulic cylinder, R; a valve-stem, *p*, connected to said valve and projecting downwardly containing the catch, *p*′; a slide-bar, *x*, supported on intermediate plate, C′, and actuated by spring, *x*′, for engaging the catch, *p*′, on the valve-stem; a lever, *t*, adapted to engage and actuate the bar, *x*, supported on the pivot, *t*″; the set-screw, *t*′, projecting inwardly toward the piston-head, *r*′, in said hydraulic cylinder; a lever, *r*, supported from a suitable hanger from the plate, C′, and engaging in a suitable mortise in the lower end of the vertical valve-stem, *p*; a weight, *r*′, on the inner end of said lever to depress the same to raise the valve-stem, *p*; a foot-lever, *s*′, pivoted near the base, A, of the machine; a link, *s*, connecting the inner end of the foot-lever, *s*′, with the inner end of the lever, *r*′, all coacting together substantially as described.

3. In a machine for spinning car-wheels, the combination of the base, A, supporting suitable framework; the top plate, C, and the intermediate plate, C′, supported in said framework on the base, A; the driving-shaft, D, supported on said base; a vertical shaft, G in stationary bearings, driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and the intermediate plate, C′; a vertical shaft, H, supported in said housing and revoluble therein with a beveled gear at the bottom; a beveled gear movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket from the housing, F, to actuate the vertical shaft, H; a suitable spinning-roll, L, above the top plate, C, on a shaft, G in stationary bearings; a suitable roll, H′, to correspond with the spinning-roll, L, on the shaft, H, above the top plate, C; hydraulic cylinder, R, to the front of said machine containing piston, R′, with the piston-stem, R″ bearing a suitable vertical cross-head; toggles, U, U, above and below connected by shafts, *j*, *i*, to the housing, F, and by eccentric shafts, *k*, *k*, to the top plate, C, and intermediate plate, C′; links, Q, Q, connected to the central joint, *i*′, *i*′, on said toggles, U, U, and to the cross-head at *i*, *i*; disks, *k*′, with set-screws, W, for adjusting the eccentric shafts, *k*, to adjust the position of the housing, F; equal symmetrical levers, P, pivoted at P′, to the top plate, C, and intermediate plate, C′, the said levers bearing segment-gears adapted to mesh with each other between the said plates; links, Z, Z, connected to housing, F, and to the upper and lower end of said levers, P; a suitable valve for admitting and exhausting water under pressure from the hydraulic cylinder, R; a valve-stem, *p*, connected to said valve and projecting downwardly containing the catch, *p*′; a slide-bar, *x*, supported on intermediate plate, C′, and actuated by spring, *x*′, for engaging the catch, *p*′, on the valve-stem; a lever, *t*, adapted to engage and actuate the bar, *x*, supported on the pivot, *t*″; the set-screw, *t*′, projecting inwardly toward the piston-head, *r*′, in said hydraulic cylinder; a lever, *r*, supported from a suitable hanger from the plate, C′, and engaging in a suitable mortise in the lower end of the vertical valve-stem, *p*; a weight, *r*′, on the inner end of said lever to depress the same to raise the valve-stem, *p*; a foot-lever, *s*′, pivoted near the base, A, of the machine; a link, *s*, connecting the inner end of the foot-lever, *s*′, with the inner end of the lever, *r*′, all coacting together substantially as described.

4. In a machine for spinning car-wheels, the combination of the base, A, with suitable framework thereon; the top plate, C, and intermediate plate, C′, supported in said framework on the base, A; the driving-shaft, D, supported on said base; a vertical shaft, G, in stationary bearings, driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and intermediate plate, C′; a vertical shaft, H, supported in said housing and revoluble therein with a beveled gear at the bottom; a beveled gear movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket on the housing, F, to actuate the vertical shaft, H; a suitable spinning-roll, L, above the top plate, C, on the shaft, G in stationary bearings; a suitable spinning-roll, H′, to correspond with the spinning-roll, L, on the shaft, H, above the top plate, C; and suitable means of reciprocating the housing, F, backward and forward to spin the rim of a car-wheel between the rollers, L and H′, as specified.

5. In a machine for spinning car-wheels, a

suitable frame and base; a vertical shaft in said frame; a spinning-roll at the upper end of said shaft; a suitable movable housing or frame; a vertical shaft in said housing bearing a suitable spinning-roll to correspond with the spinning-roll on the shaft in said frame; a suitable driving-shaft for actuating both of said vertical shafts; a hydraulic cylinder, R, to the front of said machine; a piston, R′, with a piston-stem, R″; a valve to said cylinder; a valve-stem, *p*, connected to said valve and projecting downwardly containing the catch, *p′*; a slide-bar, *x*, supported on intermediate plate, C′, and actuated by spring, *x′*, for engaging the catch, *p′*, on the valve-stem; a lever, *t*, adapted to engage and actuate the bar, *x*, supported on the pivot, *t″*; the set-screw, *t′*, projecting inwardly toward the piston-head, R′, in said hydraulic cylinder; a lever, *r*, supported from a suitable hanger from the plate, C′, and engaging in a suitable mortise in the lower end of the vertical valve-stem, *p*; a weight, *r′*, on the inner end of said lever to depress the same to raise the valve-stem, *p*; a foot-lever, *s′*, pivoted near the base, A, of the machine; a link, *s*, connecting the inner end of the foot-lever, *s′*, with the inner end of the lever, *r*, all coacting for the purpose specified.

6. In a machine for spinning car-wheels, the combination of the base, A, supporting suitable framework; the top plate, C, and intermediate plate, C′, supported in said framework; a driving-shaft, D, supported in suitable boxes on the base to drive the machine; a vertical shaft, G in stationary bearings, driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and the intermediate plate, C′; a vertical shaft, H, supported in said housing and revoluble therein with a beveled gear at the bottom movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket from the housing, F; a suitable hydraulic cylinder, R, connected by intermediate connections to the housing, F, to carry the same back and forth; a spinning-roll, L, above the top plate, C′, on the shaft, G in stationary bearings, and a spinning-roll, H′, above the top plate, C, on the shaft, H, movable therewith to coact with the roll, L, all coacting substantially as described.

7. In a machine for spinning car-wheels, a suitable frame and base; a vertical shaft in said frame; a spinning-roll at the upper end of said shaft; a suitable movable housing or frame; a vertical shaft in said housing bearing a suitable spinning-roll to correspond with the spinning-roll on the shaft in said frame; a suitable driving-shaft for actuating both of said vertical shafts; a hydraulic cylinder, R, to the front of said machine; a piston, R′, with a piston-stem, R″; a valve to said cylinder, and a valve-stem, *p*, connected to said valve and projecting downwardly containing the catch, *p′* a slide-bar, *x*, supported on intermediate plate, C′, and actuated by spring, *x′*, for engaging the catch, *p′*, on the valve-stem; a lever, *t*, adapted to engage and actuate the bar, *x*, supported on the pivot, *t″*; the set-screw, *t′*, projecting inwardly toward the piston-head, R′, in said hydraulic cylinder; suitable means of opening said valve to be retained by the bar, *x*, as specified.

8. In a machine for spinning car-wheels, a suitable frame and base; a vertical shaft in said frame; a spinning-roll at the upper end of said shaft; a suitable movable housing or frame; a vertical shaft in said housing bearing a suitable spinning-roll to correspond with the spinning-roll on the shaft in said frame; a suitable driving-shaft for actuating both of said vertical shafts; a hydraulic cylinder, R, to the front of said machine; a piston, R′, with a piston-stem, R″; a valve to said cylinder; a valve-stem on said valve; a catch for retaining said valve in the open position; a stop actuated by a moving part of the machine to release said catch; a lever, *r*, supported from a suitable hanger from the plate, C′, and engaging in a suitable mortise in the valve-stem; a weight, *r*, on the inner end of said lever to depress the same to raise the valve-stem; a foot-lever, *s′*, pivoted near the base, A, of the machine; a link, *s*, connecting the inner end of the foot-lever, *s′*, with the inner end of the lever, *r*, all coacting for the purpose specified.

9. In a machine for spinning car-wheels, the combination of a main frame with top plate, C, and intermediate plate, C′; a vertical shaft therein; a spinning-roll on said shaft; a movable frame or housing in said main frame; a vertical shaft in said housing which is movable therewith; a spinning-roll on said shaft in the movable housing corresponding to the roll on the shaft in the stationary part; a hydraulic cylinder, R, to actuate said movable housing; piston, R′, in said cylinder with a piston-stem, R″, bearing a vertical cross-head; toggles, U, U, above and below connected by shafts, *j*, *j*, to the housing, F, and by eccentric shafts, *k*, *k*, to the top plate, C, and intermediate plate, C′; links, Q, Q, connected to the central joints, *i′*, *i′*, on said toggles, U, U, and to the cross-head at *i*, *i*; disks, *k′*, with set-screws, *w*, for adjusting the eccentric shafts, *k*, to adjust the position of the housing, F; equal symmetrical levers, P, pivoted at P′ to the top plate, C, and intermediate plate, C′, the said levers bearing segment-gears adapted to mesh with each other between the said plates; links, Z, Z, connected to housing, F, and to the upper and lower end of said levers, P; a suitable valve for admitting and exhausting water under pressure from the hydraulic cylinder, R, all coacting as specified.

10. In a machine for spinning car-wheels, the combination of a main frame, with top plate, C, and intermediate plate, C′; a vertical shaft therein; a spinning-roll on said shaft; a movable frame or housing in said main frame; a vertical shaft in said housing

which is movable therewith; a spinning-roll on said shaft in the movable housing corresponding to the roll on the shaft in the main frame; a hydraulic cylinder, R, to actuate said movable housing; piston, R′, in said cylinder with a piston-stem, R″, bearing a vertical cross-head; toggles, U, U, above and below connected by shafts, *j*, *j*, to the housing, F, and by eccentric shafts, *k*, *k*, to the top plate, C, and intermediate plate, C′; links, Q, Q, connected to the central joints, *i′*, *i′*, on said toggles, U, U, and to the cross-head at *i*, *i*; disks, *k′*, with set-screws, *w*, for adjusting the eccentric shafts, *k*, to adjust the position of the housing, F; a suitable valve for admitting and exhausting water under pressure from the hydraulic cylinder, all coacting as specified.

11. In a machine for spinning car-wheels, the combination of a main frame with a top plate, C, and intermediate plate, C′; a vertical shaft in said main frame; a spinning-roll on said shaft; a movable frame or housing in said main frame; a vertical shaft in said housing which is movable therewith; a spinning-roll on said shaft in the movable housing corresponding to the roll on the shaft in the main frame; a hydraulic cylinder, R, to actuate said movable housing; piston, R′; suitable connections from said piston to said movable housing to actuate the same; equal, symmetrical levers, P, pivoted at P′, to the top plate, C, and intermediate plate, C′, the said levers bearing segment-gears adapted to mesh with each other between the said plates; links, Z, Z, connected to housing, F, and to the upper and lower end of said levers, P, all coacting as specified.

12. In a machine for spinning car-wheels, the combination of a main frame with top plate, C, and intermediate plate C′; a vertical shaft in said main frame; a spinning-roll on said shaft; a movable frame or housing in said main frame; a vertical shaft in said housing which is movable therewith; a spinning-roll on said shaft in the movable housing corresponding to the roll on the shaft in the main frame; a hydraulic cylinder, R, to actuate said movable housing; piston, R′, in said cylinder with a piston-stem, R″, bearing a vertical cross-head; toggles, U, U, above and below connected to said housing and to the main frame and adapted to fold toward each other to actuate the movable frame; links, Q, Q, connected to the central joints of said toggles, U, U, and to the cross-head to form a toggle between said toggles to greatly increase the power, coacting as specified.

13. In a machine for spinning car-wheels, the combination of a main frame; a shaft in said main frame bearing a suitable spinning-roll; a movable housing in said main frame; a suitable shaft in said housing bearing a roll corresponding to said spinning-roll on the shaft in the main frame, and means for actuating said shaft; double, oppositely-situated toggles connecting said movable housing to the main frame which are adapted to fold toward each other; links connecting the central joints of said toggles pivotally at the center to form a toggle between the double toggles; and suitable means of actuating the central toggle, all coacting as specified.

14. In a machine for spinning car-wheels, the combination of a main frame; a shaft in said main frame bearing a suitable spinning-roll; a movable housing in said main frame; a suitable shaft in said housing bearing a roll corresponding to said spinning-roll on the shaft in said main frame; and means for actuating said shafts; oppositely-facing, equal, symmetrical levers pivoted to said main frame and bearing segment-gears adapted to mesh between the same; links connecting the outer ends of said levers to the movable housing to cause the same to move forward at an even rate throughout; and suitable means of moving the housing, as specified.

15. In a machine for spinning car-wheels, the combination of a main frame; a shaft in said frame bearing a suitable spinning-roll; a movable housing in said frame; a suitable shaft in said housing bearing a spinning-roll corresponding to said spinning-roll on said shaft in the main frame; means for operating said shafts; connections from said main frame to said housing for actuating the same; a shaft, *k*, with eccentric bearings for attaching said connections; and an adjusting-disk, *k′*, on said shaft, *k*, with its center in line with said eccentric bearings, with perforations in its periphery; and set-screw, *w*, for retaining the same in position, for the purpose specified.

16. In a machine for spinning car-wheels, the combination of a main frame; a shaft in said frame, bearing a suitable spinning-roll; a movable housing in said main frame; a suitable shaft in said housing bearing a spinning-roll corresponding to said spinning-roll on said shaft in the main frame; means of operating said shafts; connections from said main frame to said housing for actuating the same; a shaft with eccentric bearings for attaching said connections; and suitable means of adjusting said shaft in its bearings to adjust the relation of the housing and main frame, as specified.

17. In a machine for spinning car-wheels, the combination of the base, A, supporting suitable framework; the top plate, C, and the intermediate plate, C′, supported in said framework on the base, A; a counter-shaft, M, supported in brackets, B′, B′, to the rear of the machine to actuate, through the pinion, M″, the driving-wheel, D′, to actuate the driving-shaft, D; the driving-shaft, D, supported in said base; a vertical shaft, G in stationary bearings, driven by a suitable beveled gear on the shaft, D; a suitable frame or housing, F, guided between the top plate, C, and the intermediate plate, C′; a vertical shaft, H, supported in said housing and revoluble therein with a beveled gear at the bottom; a beveled

gear movable along the driving-shaft, D, and actuated by a suitable feather or key and carried by a suitable sleeve in a bracket from the housing, F, to actuate the vertical shaft, H; a suitable spinning-roll, L, above the top plate, C, on a shaft, G in stationary bearings; a suitable spinning-roll, H′, to correspond with the spinning-roll, L, above the top plate, C, on shaft, G; a suitable extension, G′, to the shaft, G, above; a suitable bracket, I, with a guide to the front thereof supported above the top plate, C, and parallel with the shaft, G′; a suitable housing or frame, I′, adapted to reciprocate up and down the shaft, G′, and guide in the bracket, I; a suitable cable, *u*, with weight, *v*′, connected to said housing or frame to carry the same normally upward; a lever, J, pivoted to the lower front corner of the housing, I′, at pivot, *c;* a link, K, connecting the upper end of the lever, J, at *a* to the bracket, I, at the adjustable pivot or shaft, *b;* a beveled spinning-roll, J′, on the lower end of the lever, J; cables, *e*, adjustable by screw-nuts, *f*, connected to the housing, I′, extending downwardly therefrom; pulleys, *g*, by which said cables pass; thrust-bars, O, connected to a moving part below and extending forwardly under the guiding-pulleys, *g*, and connected at their outer ends to the lower ends of the cables, *e;* suitable means for carrying said housing back and forth, for the purpose specified.

18. In a machine for spinning car-wheels, the combination of a main frame; a shaft in said frame bearing a suitable spinning-roll; a movable housing in said main frame; a suitable shaft in said housing bearing a roll corresponding to said spinning-roll on the shaft in the main frame; and means of actuating said shafts; a suitable extension, G′, to the shaft, G, above; a suitable bracket, I, with a guide to the front thereof supported above the top plate, C, and parallel with the shaft, G′; a suitable housing or frame, I′, adapted to reciprocate up and down the shaft, G′, and guide in the bracket, I; a suitable cable, *u*, with weight, *v*′, connected to said housing or frame to carry the same normally upward; a lever, J, pivoted to the lower front corner of the housing, I′, at pivot, *c;* a link, K, connecting the upper end of the lever, J, at *a* to the bracket, I, at the adjustable pivot or shaft, *b;* a beveled spinning-roll, J′, on the lower end of the lever, J; cables, *e*, adjustable by screw-nuts, *f*, connected to the housing, I′, extending downwardly therefrom; pulleys, *g*, by which said cables pass; thrust-bars, O, connected to a movable part below and extending forwardly under the guiding-pulleys, *g*, and connected at their outer ends to the lower ends of the cables, *e;* suitable means of actuating said housing, for the purpose specified.

19. In a machine for spinning car-wheels, the combination of the stationary main spinning-rolls; a movable main spinning-roll parallel with and corresponding to said stationary roll and adapted to coact therewith; an auxiliary roll above said main roll; and a lever connected to said auxiliary roll to force it into the face of the wheel to a point where its spinning-surface is substantially parallel with the spinning-surface of the main roll to form an auxiliary strengthening-flange on the wheel as specified.

20. In a machine for spinning car-wheels, the combination of a stationary main spinning-roll; a movable main spinning-roll parallel with and corresponding to said stationary roll, and adapted to coact therewith; a shaft, G′, extending above said stationary roll; a guide to one side thereof; a housing, I′, adapted to reciprocate on said shaft, G′, and guide; a lever, J, pivoted to the outer, lower corner of said housing, I′; a link, K, connecting the upper end of said lever, J, to the guide; and suitable means of actuating the said housing, I′, to actuate the roll, J′, as specified.

21. In a machine for spinning car-wheels, the combination of a stationary main spinning-roll; a movable main spinning-roll parallel with and corresponding to said stationary roll and adapted to coact therewith; a shaft, G′, extending above said stationary roll; a guide to one side thereof; a housing, I′, adapted to reciprocate on said shaft, G′, and guide; a lever, J, pivoted to the outer, lower corner of said housing, I′; a link, K, connecting the upper end of said lever, J, to the guide; an adjustable connection for said link, K, to adjust the position of roll, J′, and suitable means of actuating the said housing, I′, to actuate the roll, J′, as specified.

22. In a machine for spinning car-wheels, the combination of a stationary, main spinning-roll; a movable main spinning-roll parallel with and corresponding to said stationary roll and adapted to coact therewith; a shaft above said stationary roll; a guide to one side thereof parallel therewith; a suitable housing movable on said shaft and guide; a lever pivoted to said housing; a spinning-roll on the lower end of said lever to coact with the rolls below; a link connecting the upper end of said lever to the guide; and suitable means of actuating said housing to actuate the spinning-roll thereon, as specified.

23. In a machine for spinning car-wheels, the combination of a plate, C; stationary spinning-roll, L; movable spinning-roll, H′, to correspond therewith; a beveled support-roll, N, supported on bracket, N′, to support and guide the central part of the car-wheel; guide-rolls, T, T, to each side of said spinning-rolls to guide the car-wheels between the spinning-rolls to spin them true, as specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

JAMES HENDERSON. [L. S.]

Witnesses:
W. J. WILLITS,
L. B. PLACE.