(No Model.) 6 Sheets—Sheet 1.

R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

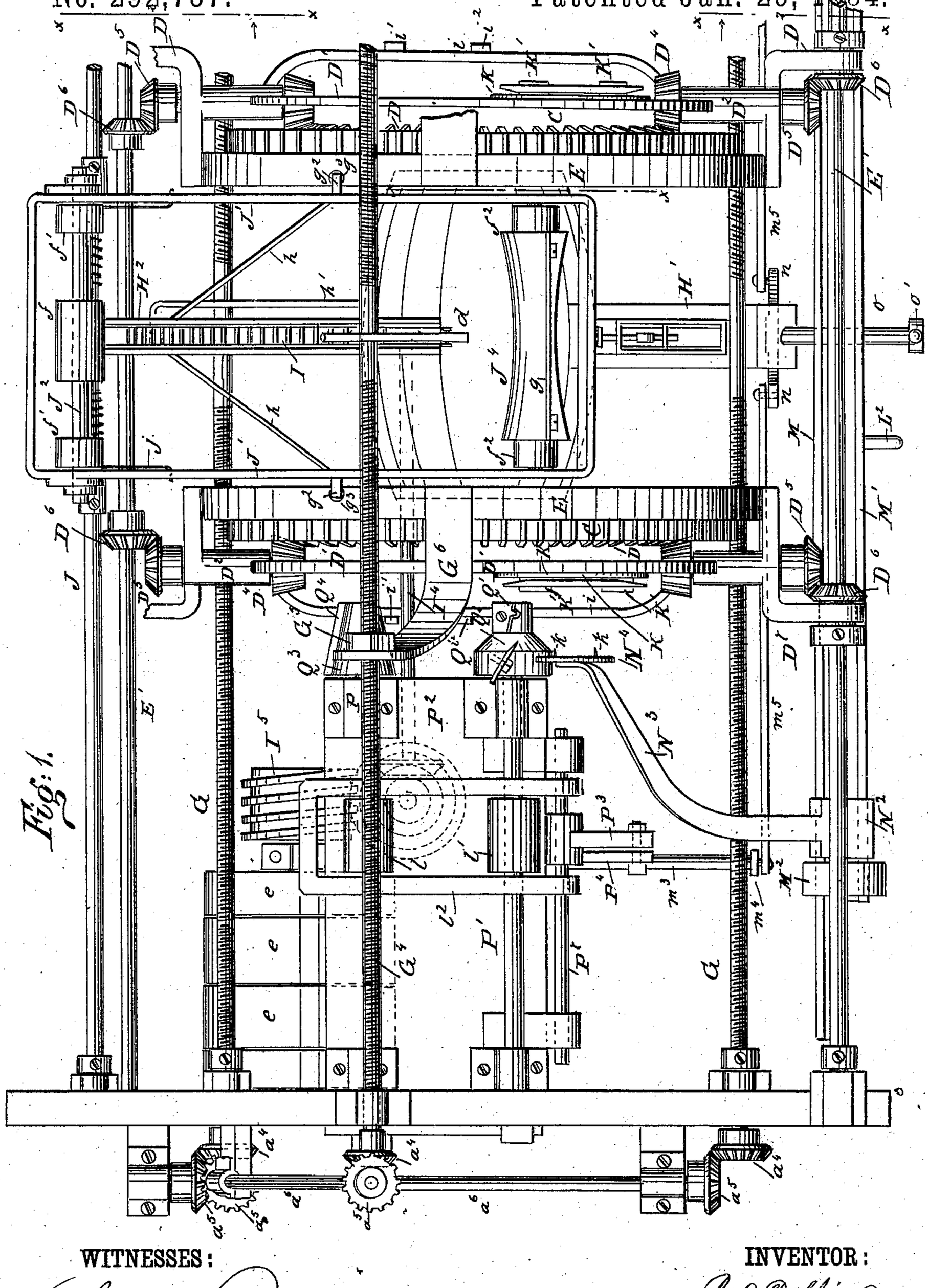

Fig: 1.

WITNESSES:

Chas. Nida.

C. Sedgwick.

INVENTOR:

R. O. Dobbin

BY Munn & Co

ATTORNEYS.

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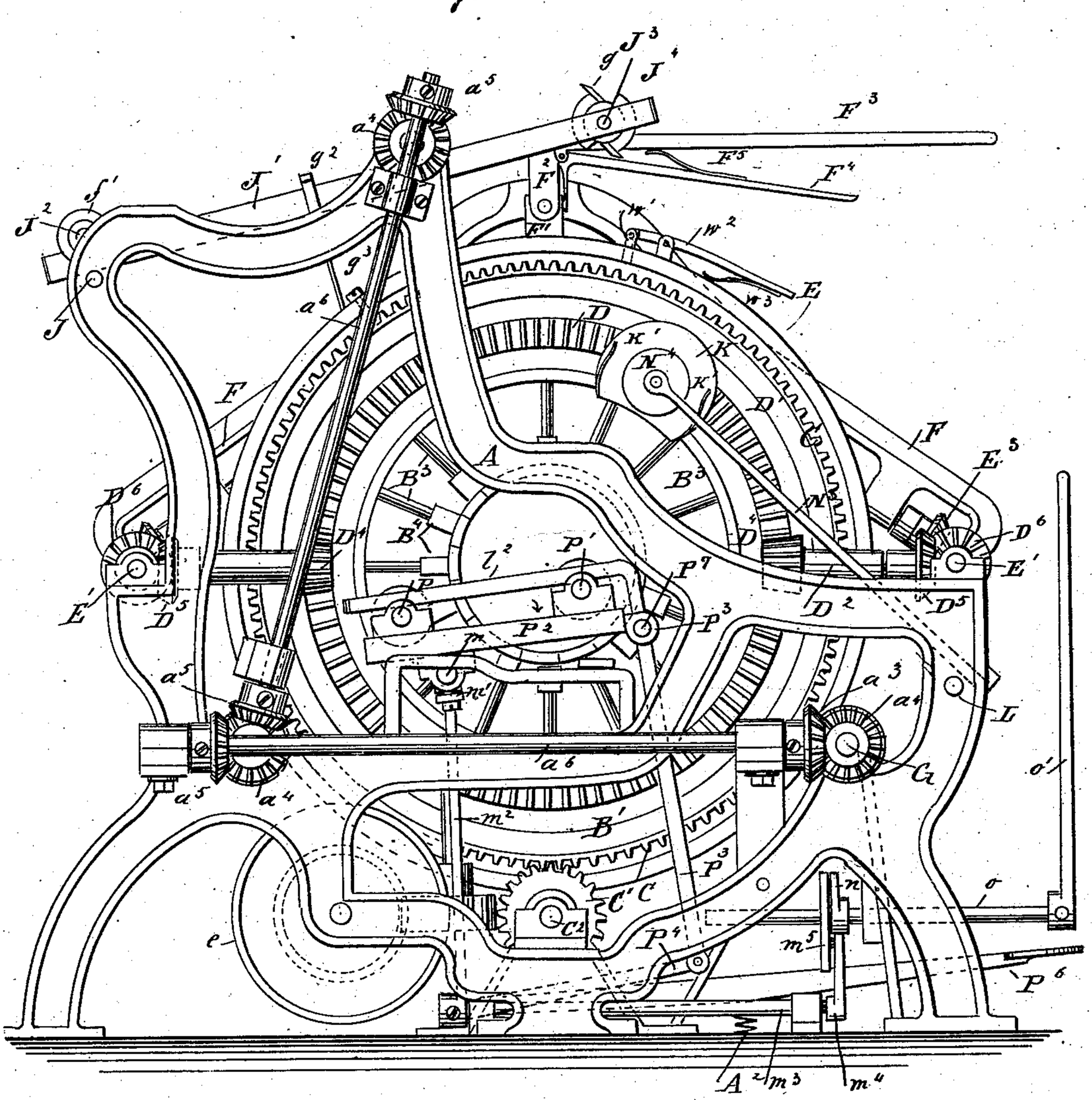
R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

Fig: 2.



WITNESSES:

Chas. Nide

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INVENTOR:

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(No Model.)

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R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

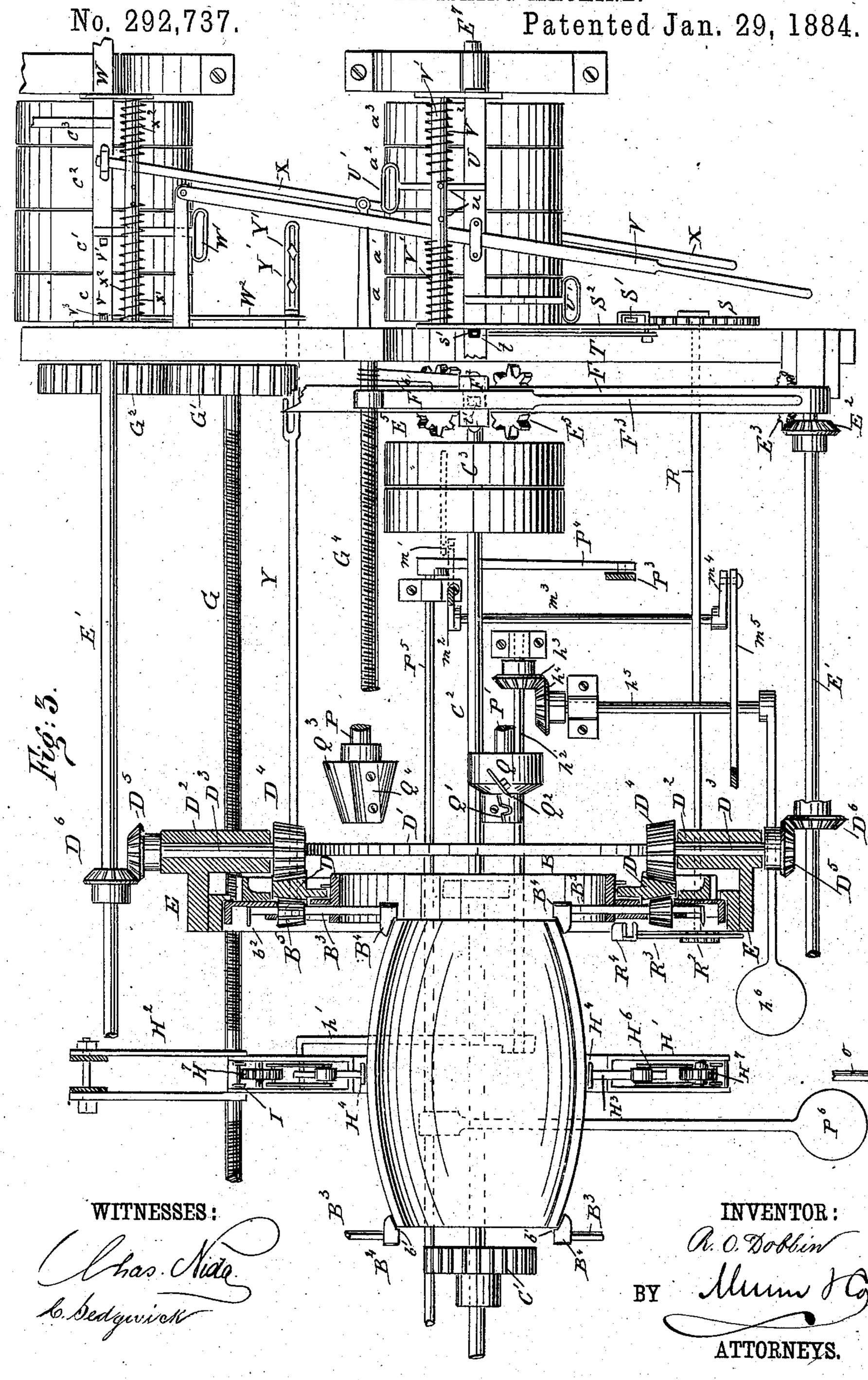

Fig: 3.

WITNESSES:

Chas. Nida.

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ATTORNEYS.

(No Model.) 6 Sheets—Sheet 4.

R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

Fig: 4.

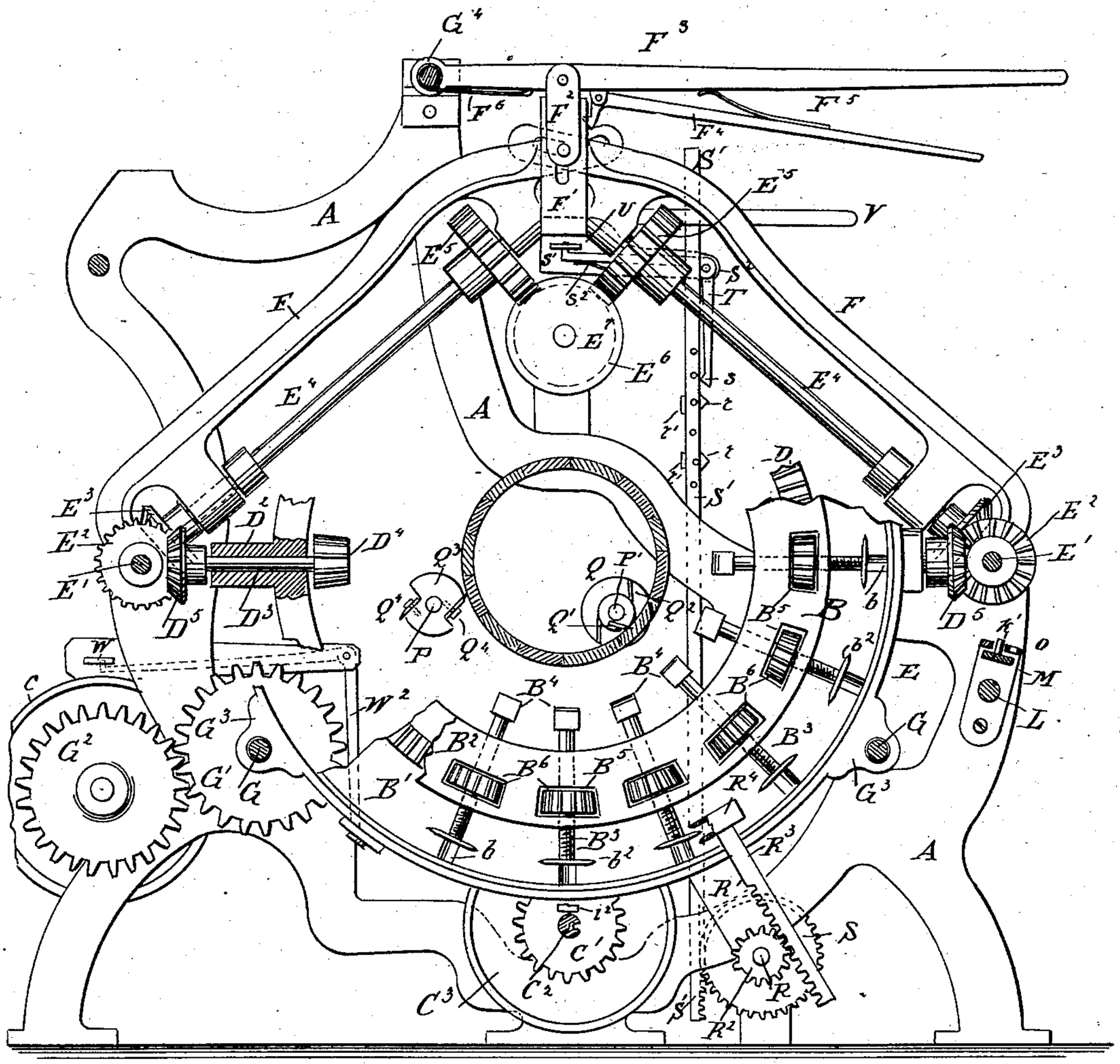


Fig: 5

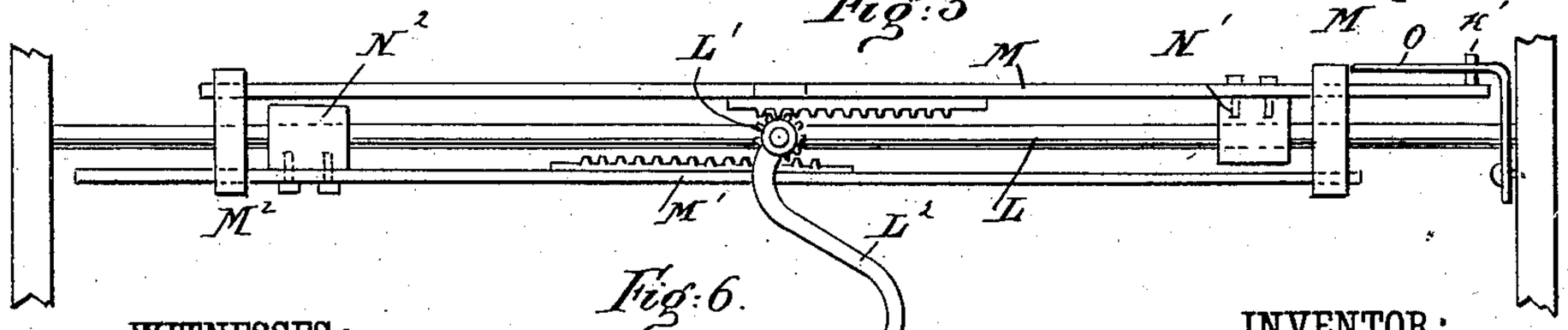
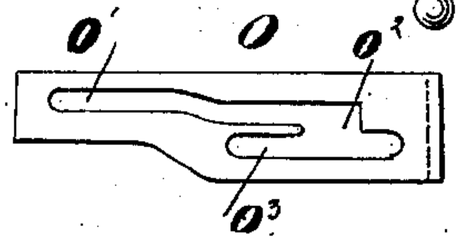


Fig: 6.



WITNESSES:

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ATTORNEYS.

(No Model.) 6 Sheets—Sheet 5.

R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

Fig: 7.

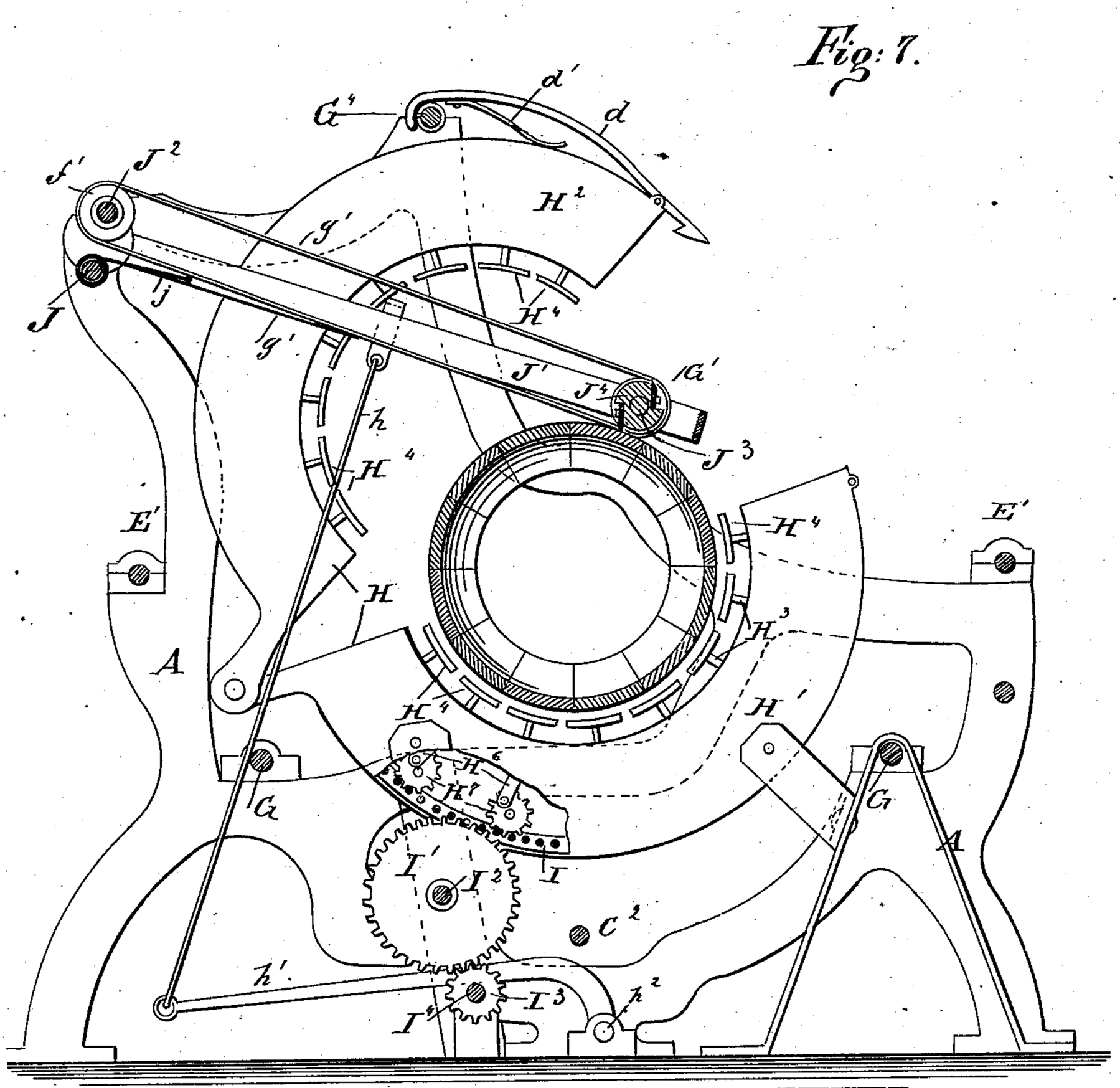


Fig: 8.

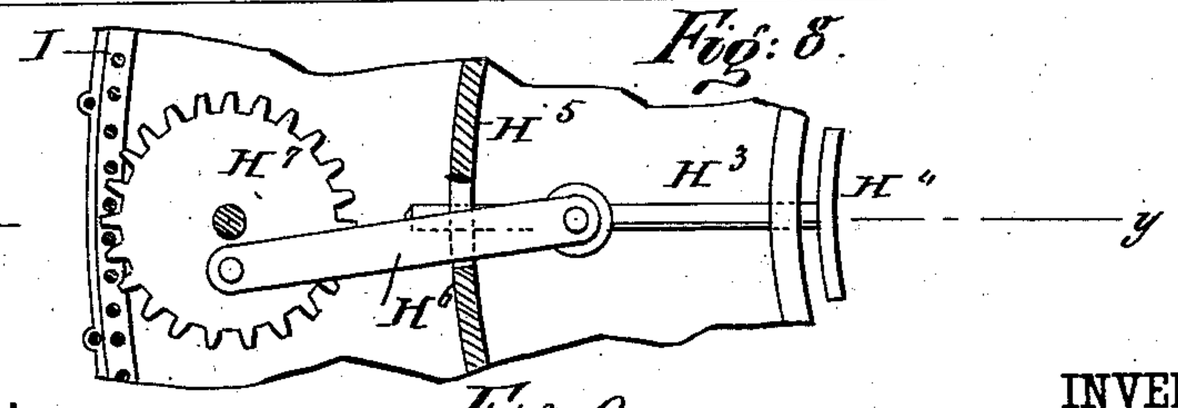
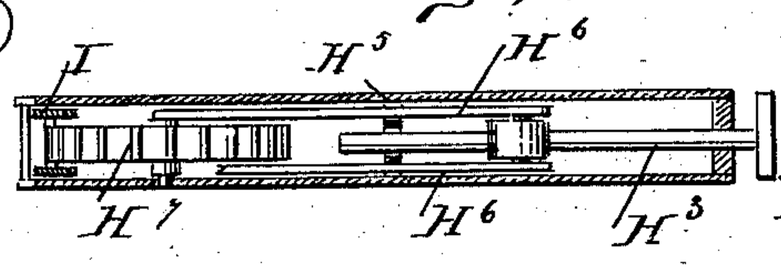


Fig: 9.



WITNESSES:

Chas. Nichols

L. Sedgwick

INVENTOR:

R. O. Dobbin

BY Munn

ATTORNEYS.

(No Model.)

6 Sheets—Sheet 6.

R. O. DOBBIN.

BARREL FINISHING MACHINE.

No. 292,737. Patented Jan. 29, 1884.

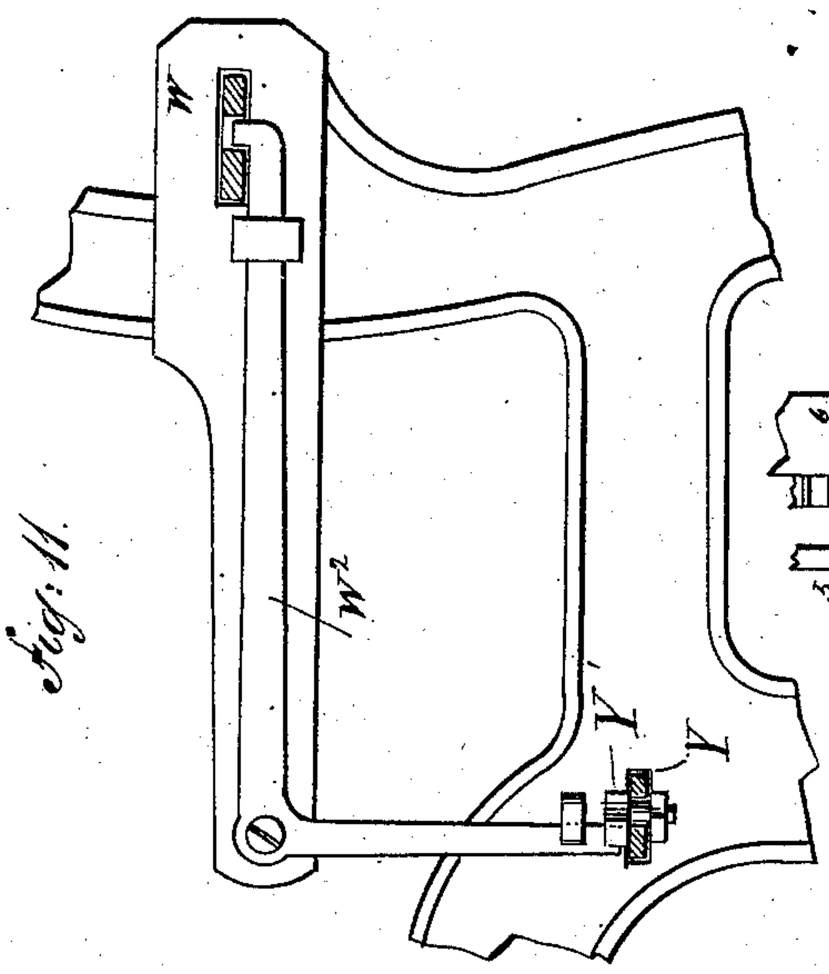


Fig. 11.

Fig. 10.

WITNESSES:

Chas. Nida.

C. Sedgwick

INVENTOR:

R. O. Dobbin

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT O. DOBBIN, OF WATERLOO, ONTARIO, CANADA.

BARREL-FINISHING MACHINE.

SPECIFICATION forming part of **Letters Patent No. 292,737**, dated January 29, 1884.

Application filed September 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT O. DOBBIN, of Waterloo, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Barrel-Finishing Machine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved machine for finishing barrels after they have been set up in truss-hoops.

The invention consists in the construction and combination of parts forming a barrel-finishing machine, hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of part of my improved barrel-finishing machine, showing the central chuck open and the barrel-planer lowered on a barrel held in the said chuck. Fig. 2 is an end elevation of the same, showing the barrel-planer raised. Fig. 3 is a plan view of part of the machine, parts being broken out and others shown in horizontal section. Fig. 4 is a cross-sectional elevation of the machine on the line *x x*, Fig. 1. Fig. 5 is a longitudinal elevation of the header. Fig. 6 is a detail plan view of the slotted guide-plate of the same. Fig. 7 is a central cross-sectional elevation of the machine, showing the central chuck opened, and showing the planer lowered upon a barrel resting in the lower part of the chuck. Fig. 8 is a longitudinal sectional elevation of a part of the middle chuck. Fig. 9 is a sectional plan view of the same on the line *y y*, Fig. 8. Fig. 10 is a longitudinal elevation of the rear of one-half of the machine, some parts being broken out and others shown in section. Fig. 11 is a cross-sectional elevation of the same on the line x^2 x^2, Fig. 10.

The several parts of the machine are supported in a frame, A, and on a base-plate upon which the machine rests.

The large revolving chucks B, which form the lathe for holding the barrel while the same is being turned, are formed of two annular plates, B′ and B^2, which are provided with radial grooves *b*, and which plates are placed against each other in such a manner that the grooves face each other and form radial tracks for the screw-spindles B^3, which are provided at the ends with dogs B^4, adapted to hold the ends of the staves. The said dogs are provided with shoulders or offsets *b′*, against which the outer edges of the ends of the barrel-staves rest, as shown in Fig. 3, which offsets are principally designed to force the hoops on the barrels. On the outer ends—that is, on the ends toward the periphery—the spindles B^3 are provided with plates b^2, which have their ends tapered, and which project from the inner surfaces of the chucks, and which, if united, would form one continuous circle concentric with the outer circle of the chuck. The united plates B′ and B^2 are provided with a series of slots, B^5, at right angles to the spindles B^3, and within these slots cog-wheels B^6 are contained, which are provided with central threaded apertures, through which the screw-spindles B^3 pass, whereby when the cog-wheels B^6 are rotated the screw-spindles B^3 will be moved radially to and from the center of the chuck.

On the outer surface of each annular plate B′ a circular rack, C, is riveted in such a manner that the teeth of the said circular rack will be at right angles to the outer surface of the annular plate B′, the teeth of the said circular rack C engaging with the teeth of a pinion, C′, mounted loosely to slide on a shaft, C^2, which is provided with a driving-pulley, C^3. By means of a longitudinal groove on the shaft C^2 and a stud or key projecting from the hub of the pinion C′ into the said groove, the said pinion can be caused to rotate with the shaft C^2, but can slide longitudinally on the same with the chucks. Each chuck is provided with a circular rack, C, which engages with its corresponding pinion, C′. A flat ring, D, which is provided with radial cogs on both flat sides, rests against the outer surface of a plate, B′, in such a manner that the teeth on one side of the said ring can engage with the teeth of the cog-wheels B^6, through which the spindles B^3 pass. A circular frame, D′, is attached by suitable arms to a ring, E, which surrounds the outer edge of the plate B′, which plate B′ and the plate B^2, attached thereto, can rotate in the vertical plane and in the ring E.

In the horizontal arms D^2, connecting the rings D′ and E, shafts D^3 are journaled, which are provided at the inner ends with beveled cog-wheels D^4, which engage with the outer teeth of the cogged ring or rack D. On the outer ends of shafts D^3 beveled cog-wheels D^5

are mounted, which engage with beveled cog-wheels D^6, which are mounted on horizontal shafts E′ on the front and rear of the frame A, the said wheels D^6 being adapted to rotate with the shafts E′, and also adapted to slide longitudinally on the same. The hook-arms D^7, in which the beveled cog-wheel D^6 can rotate, move the said cog-wheel with the chucks. At the end, at the right hand of a person standing in front of the machine, the shafts E′ are provided with beveled cog-wheels E^2, which engage with beveled cog-wheels E^3, mounted on inclined shafts E^4, which are provided at the upper ends with worm-wheels E^5, which are adapted to engage with a worm, E^6, mounted on a shaft, E^7, on which are mounted the fixed and loose pulleys *a*, *a′*, a^2, and a^3. The inclined shafts E^4 are journaled in projections of arms F, which arms have their lower ends mounted on the ends of the opposite shafts, E′, and which have their upper ends slotted and united by a transverse pin, which passes through a vertical slot in a frame, F′, and through a stirrup, F^2, surrounding the said frame F′, and pivoted to a lever, F^3, which is pivoted to the frame A, which lever F^3 is provided with an angle locking-lever, F^4, acted upon by a spring, F^5, which angle locking-lever F^4 is adapted to catch on the upper cross-piece of the frame F′. A spring, F^6, clutched around the screw-shaft G^1, presses the outer end of the lever F^3 upward. By means of the lever F^3 the worm-wheels E^5 can be raised or lowered at will to be disengaged from or engaged with a worm, E^6.

Horizontal screw-shafts G are journaled in the frame A longitudinally in the front and rear, and a screw-shaft, G^1, is journaled in the top of the frame A. One half of each screw-shaft is threaded right-handed and the other half left-handed. At the left hand of the machine the shafts G and G^1 are provided with beveled cog-wheels a^4, engaging with beveled cog-wheels a^5 on the transverse shafts a^6 at the end of the machine-frame, so that if one screw-shaft is rotated the others will also be rotated. The rear screw-shaft, G, is provided at the right-hand end of the machine with a cog-wheel, G′, which engages with the cog-wheel G^2, mounted on the shaft on which are mounted the loose and fixed belt-pulleys *c*, *c′*, c^2, and c^3. The screw-shafts G pass through nuts G^3, made integral with the rings E, and the screw-shaft G^4 passes through nuts G^5 at the upper ends of arms G^6, connected with the rings E, whereby when the screw-shafts are rotated the chucks B will be moved toward or from each other. The central chuck, H, consists of two flat, hollow, semi-annular boxes, H′ and H^2, of which the lower one, H′, is fixed, and the other, H^2, is hinged at the rear end to the lower section, H′. The two sections can be locked together by means of a latch, *d*, which is provided with a hook at its lower end, which hook is pressed against the outer edge of the lower section, H′, by a spring, *d′*. When the section H^2 is to be held open, the end of the latch-arm *d* is passed over the screw-shaft G^1, as shown in Fig. 7. The sections H′ and H^2 contain a series of radial rods, H^3, which are provided at the inner circular edges of the sections with segmental dogs H^4, against which the barrel that is to be held rests. The rods H^3 are guided by the inner circular edges of the sections and by apertures in a central circular partition, H^5, in the sections H′ and H^2. The rods H^3 are connected by means of connecting bars or rods H^6 with cog-wheels H^7, which are pivoted within the sections H′ and H^2 in such a manner that the teeth of these cog-wheels H^7 will almost project from the outer edges of the sections H′ and H^2. The outer circular edges of the sections H′ and H^2 are formed by semicircular racks I, with which the teeth of the wheels H^7 are adapted to engage. The semicircular rack I (see Fig. 7) of the lower section, H′, engages with the teeth of the cog-wheel I′, which is rigidly mounted on a short shaft, I^2, with which cog-wheel I′ the pinion I^3 engages, which is mounted on the shaft I^4, which is rotated (see Fig. 1) by means of a worm-wheel, I^5, and suitable intermediate gearing, (see dotted lines, Fig. 1, showing gears connecting shaft I^4 with worm I^5,) which worm is rotated by belts passing over the pulleys *e* on the same shaft as the worm-wheel. If the two sections H′ and H^2 are locked together, the two semicircular racks I will form one continuous circular rack, and if one rack-section is moved on a circular line the other will also be moved on a circular line. The racks I will act on the cog-wheels H^7, which in turn act on the connecting-rods H^6 and the rods H^3, and thereby the dogs H^4 will be moved outward from or toward the inner circular edges of the sections H′ and H^2.

On the longitudinal shaft J on the upper rear part of the frame A a U-shaped frame, J′, is journaled in such a manner that the said frame can swing in the vertical plane and in between the large chucks B B. On the inner end of the said frame J′ a shaft, J^2, is journaled, on which are mounted a central belt-pulley, *f*, and two side pulleys, *f′*. In the swinging end of the frame J′ is mounted a shaft, J^3, on the ends of which are loosely mounted belt-pulleys f^2, and between the said pulleys a concave cutter-head, J^4, connected with the pulleys f^2, is loosely mounted, to which the planing-knives *g* are attached. The contour of the cutter-head J^4 and of the cutting-edges of the knife *g* must be the same as the desired contour of the barrel. The knives *g* should be provided with slots, so that they can easily be adjusted on the cutter-head to project more or less, as may be necessary, and according as they wear off. Belts *g′* pass over pulleys *f′* and f^2, and a driving-belt passes over the pulley *f*, so that if the shaft J^2 is rotated the cutter-head will be rotated. The frame J′ is provided on the outer surfaces of its sides with stop-lugs g^2, which are adapted to strike on screws g^3 in the rings E, to prevent the cutter-frame J′ from being lowered too far. The

screws g^3 can be adjusted to project a greater or less distance from the rings E, according as the movement of the cutter-frame J′ is to be adjusted. Rods *h* extend from the swinging frame J′ down to the rear end of a lever-arm, *h′*, of a shaft, h^2, which is provided with a beveled cog-wheel, h^3, engaging with a beveled cog-wheel, h^4, and a horizontal shaft, h^5, at right angles to the shaft h^2 and parallel with the arm *h′*, which shaft h^5 is provided at the end with a treadle, h^6, whereby when the treadle is depressed the cutter-frame will swing downward. Springs *j*, coiled around the shaft J, act on the under edge of the swinging frame J′ and throw the same upward.

To the outer surface of the rings D′ circular plates K are attached, which are provided with curved side springs, K′, which are adapted to rest against the edges of the barrel-heads, which are placed against the plates K, and thus hold the said barrel-heads against the said plates. A shaft, L, adapted to rock on its longitudinal axis, is journaled in the front of the frame A, and in the middle of the said shaft a pinion, L′, is journaled in such a manner that its axis will be at right angles to the axis of the shaft L, and the shaft of the said pinion is provided at its outer end with a crank-handle, L^2. The pinion L′ engages with racks attached to bars M and M′, respectively, above and below the shaft L and parallel with the same, which bars are guided to move longitudinally by transversely-slotted guide-block M^2, held rigidly on the shaft L. The two ends of the upper bar, M, pass through the upper slots of the guide-blocks M^2, and the ends of the lower rack-bar, M′, pass through the lower slots of the guide-blocks M^2.

A sliding block, N′, is mounted on the shaft L to the right of the pinion L′, and the said block N′ is connected with the upper rack-bar, M. A like sliding block, N^2, is mounted on the shaft L to the left of the pinion L′, and is connected with the lower rack-bar, M′, each of which sliding blocks N′ N^2 is provided with an arm, N^3, which is provided at its end with a disk, N^4, having a series of studs, *k*, which project toward the plates K. The outer end of the rack-bar M is provided with a stud, *k′*, which passes through a slotted plate, O. The plate O is provided along its inner edge—that is, along the edge toward the interior of the frame A—with a longitudinal slot, O′, which is provided at its middle with a slight curve. At the right-hand end of the slot O′ a small transverse slot, O^2, leads to a slot, O^3, parallel with the slot O′, which slot O^3 is so located that one part is a short distance to the right of the outer end of the slot O^2, and the other part is to the left of the slot O^2, as is clearly shown in Fig. 6. The pintle *k′*, which passes through the slots O′, O^2, and O^3, guides the arms N^3 during their movements, as will be fully described hereinafter. Two horizontal shafts, P and P′, are journaled parallel with each other and parallel with the longitudinal axis of the machine on a plate, P^2, which is adapted to rock in a vertical plane and transversely to the longitudinal axis of the machine. The said plate P^2 has at its outer or front edge a rod, P^7, which is connected by a connecting-rod, P^3 with an arm, P^4, of a horizontal rocking shaft, P^5, provided with a treadle, P^6, which is pressed upward by a spring, A^2. By depressing the treadle P^6 the plate P^2 will be swung in the direction of the arrow, as shown in Fig. 2. On the shafts P and P′ pulleys *l* and *l′* are loosely mounted in such a manner that they can slide longitudinally on the said shafts P and P′, but rotate with the same. A stirrup-frame, l^2, pivoted on the rod P^7, is swung over the pulleys *l* and *l′*, and holds them in place, the ends of the stirrup being held stationary on the rod P^7 by the end of the connecting-rod P^3 when the plate P^2 is moved. The rocking plate P^2 is mounted on a shaft, *m*, on which it can rock and slide, and is connected by a bar, *m′*, with a vertical arm, m^2, of a transverse rocking shaft, m^3, the other end, m^4, of which is connected by a lever, m^5, with one end of a cross-arm, *n*, mounted on a horizontal transverse cross-shaft, *o*, provided with a handle-lever, *o′*. The rocking plates P^2 are provided in each half of the machine, and by means of the handle-lever *o′* of the shaft *o* both rocking plates can be moved toward or from the middle of the machine at the same time.

A cutter-head, Q, on the inner end of the shaft P′ is provided with a cutter, Q′, for crozing and howeling the barrel, and with a beveled cutter, Q^2, for beveling the ends of the staves. A cutter-head, Q^3, mounted on the inner end of the shaft P, is provided with a cutter, Q^4, which planes the outer surfaces of the ends of the staves—that is, those surfaces which are not acted upon by the planer J^4 or the parts below the pulleys f^2. The tension must be removed from the belts rotating the shafts P and P′ when the plates P^2 are being shifted. The cutting-blades in the heads Q and Q^3 can be adjusted by means of screws passing through slots in the said cutters. The plates P^2, carrying the shafts P and P′, are adapted to oscillate to admit the crozing-cutters Q′ to pass into the thickness of the staves without cutting entirely through the chiming.

All the above-described cutting-tools of the machine operate at the same time.

A horizontal shaft, R, is journaled in the frame A and in an arm, R′, of one of the rings E, in such a manner that the said shaft can slide longitudinally in its bearing in the frame A.

On the inner end of the shaft R is mounted a pinion, R^2, which engages with a rack, R^3, which slides diagonally on the inner surface of one of the chucks B. The said rack is provided at its upper end with a fork, R^4, having its open end facing the plate B′, between the shanks of which fork the beveled plates b^2 at the ends of the screw rods or spindles B^3 are adapted to pass.

On the outer end of the shaft R a cog-wheel,

S, is mounted in such a manner that it will turn with the shaft R, which, however, can slide within the same. A vertically-moving rack, S′, engages with the cog-wheel S, and its upper end is mounted in an arm, S^2, projecting from the frame A. The said rack-bar S′ is provided with a series of beveled projections, *r*, which can be adjusted and locked in the desired position on the bar by means of nuts *r*′. An angle-lever, T, pivoted on the end of the arm S^2, is provided at its lower end with a beveled spur, *s*, which faces the beveled projections *r* of the bar S′, and at its upper end it is provided with a finger, *s*′, which is adapted to pass into the apertures *t* and *t*′ in a flat longitudinally-sliding bar, U, above the belt-pulleys *a*, *a*′, a^2, and a^3, into which apertures the finger *s*′ is pressed by a spring, s^2.

To the sliding bar U elongated loops U′, through which the driving-belts pass, are attached. A horizontal lever, V, passes through a clip on the bar U, and is used to shift the same. Spiral springs V′ surround a slotted shaft, V^2, through which the lever V passes. Both springs act to press the lever V toward the middle of the bar U. Cheek-studs *u* are provided on the slotted shaft V^2, to prevent the springs from pressing the lever V too far in one direction or the other. A flat longitudinally-sliding bar, W, is held above the pulleys *c*, *c*′, c^2, and c^3, and is provided with elongated loops W′, through which the belts pass, and with apertures *v* and *v*′, into which a finger at the upper end of an angle-lever, W^2, is adapted to pass, and into which it is pressed by a spring. The lower end of the said lever W^2 rests on a longitudinally-sliding bar, Y, connected with one of the movable chucks B, and at its outer end it is provided with a series of adjustable beveled projections, Y′, against which the beveled side edge of the lower end of the lever W^2 is adapted to rest. A pivoted horizontal swinging lever, X, passes through a clip in the bar W and through a slotted shaft, X′, which is surrounded by springs X^2, both of which press the lever X toward the middle of the shaft X′. A locking-pin, *w*′, which passes through one of the rings E, is adapted to pass into a notch or recess in the corresponding plate, B′, and is attached to a lever, w^2, pivoted on the ring E, which lever is pressed upward at its outer end by a spring, w^3, so that the pin *w*′ will always be pressed inward.

To each ring D′ a cross-piece, *i*, is attached, which is provided with a check-lug, *i*′, against which the end of the sliding plate P^2 strikes, to prevent it from injuring the chuck. On the lower part of the cross-piece *i* a finger, i^2, is provided, between which and the side surface of the ring E the pinions C′ are located, so that the said pinions will move longitudinally on the shaft C^2 with their respective chucks.

The operation is as follows: The staves are first set up in truss-hoops, and when a barrel is placed in the center chuck, H, the staves are held together by two hinged truss-hoops near the ends of the barrel. The center chuck is then closed upon the center of the barrel, and is locked by means of the latch *d*. By means of the belts passing over the pulleys *e* *e*, the shaft I^1 and the pinion I^3 are rotated, and they in turn rotate the cog-wheel I′ on the shaft I^2, which cog-wheel I′ rotates the racks I of the center chuck. According as the racks I are rotated in one direction or the other, the cog-wheels H′ within the chuck H will be rotated in one direction or the other, and the rods H^3, on the inner ends of which the segmental dogs H^4 are secured, will be moved toward or from the center of the chuck. If the above-mentioned shafts and cog-wheels are turned in such a direction that the dogs H^4 move toward the center of the chuck, they will press against the barrel, and will thus firmly hold the same in place. Then the barrel is to be grasped by the revolving chucks B. By means of the belts acting on the fixed pulleys *a* or a^3, the dogs B^4 can be moved toward or from the centers of the revolving chucks B. The motion of the shaft on which the belt-pulleys are mounted is transmitted, by means of the worm E^6, the worm-wheels E^5, the shafts E^4, the beveled cog-wheels E^3 and E^2, the shafts E′, the beveled cog-wheels D^5 and D^6, the shafts D^3, the beveled cog-wheels D^4, the beveled cog-ring D, and the cog-wheels B^6, to the screw-spindle B^3, to which the dogs are attached. All the dogs move simultaneously, and are so adjusted that when the chucks B B are moved toward each other the shoulders *b*′ of the dogs will rest against the outer edges of the ends of the staves, as shown in Fig. 3. To move the chucks B toward or from each other, the pulleys *e* and e^3 are rotated, whereby the cog-wheels G^2 and G′ will be rotated, and the latter will rotate the shaft G on the rear of the machine, which, by means of the transverse shafts a^6 and the beveled pinions a^4 and a^5, rotates the top screw-shaft, G^1, and the front screw-shaft, G. As the screw-shafts above mentioned pass through nuts connected with the rings E, the chucks will be moved toward or from each other by turning the said screw-shafts. If the dogs B^4 have been previously adjusted according to the diameter of the end of the barrel, and the chucks B are moved toward each other, the staves will be clamped between the grasping-dogs of the opposite chucks, which dogs must be firmly set thereon. The upper section of the center chuck, H, is then swung upward, and is held raised by hooking the free end of the latch-lever *d* over the middle of the screw-shaft G^1, as shown in Fig. 7. The planer J^1 is then lowered to be in contact with the barrel by pressing down the treadle h^6, whereby the shaft h^5 and the beveled cog-wheel h^4 at the end of the same will be rotated, and will rotate the beveled cog-wheel h^3 and the shaft h^2, on which it is mounted. Thereby the arm h' of the shaft h^2 will be swung downward, and will swing the frame J′ downward, which is connected by means of

the rods or wires *h* with the said arm *h'*. The screws g^3 are so adjusted that the check-studs g^2, attached to the sides of the frame J', will rest on the same when the cutter J^4, is in contact with the barrel. As the cutter is continually rotated it will plane off the barrel, which must be rotated one revolution at the same time, so that all the parts of the outer surface of the barrel will be planed. To rotate the chucks B B, the locking-lever F^4 is disengaged from the upper cross-piece of the box F', and by means of the lever F^3 the stirrup F^2 is raised, whereby the upper ends of the hinged frames F will be raised, and the worm-wheels E^5 will be disengaged from the worm E^6, so that when the shafts E' are rotated by the rotation of the circular rack D, which rotates with the chucks B, they will not offer any resistance, as otherwise, if resistance were offered, or if the shaft E' could not be freely rotated by the cog-wheels B^6, as the rack D was rotated, the said cog-wheels B^6 would rotate, and would cause the dogs B^4 to be pressed against or moved from the barrel, which, by the disengagement of the worm-wheels E^5, is obviated. After the wheels E^5 have been disengaged from the worm E^6, the shaft C^2 is rotated by means of the belts passed around the pulleys C^3, whereby the pinions C' will be rotated, which engage with the circular racks C, attached to the plates B' of the chucks, whereby the said plates will be rotated and the barrel held by the two chucks will also be rotated. Before the chucks can be rotated the outer end of the lever w^2 must be depressed to release the plate B' from the ring E. As soon as the plate B' has made one revolution, the pin *w'* automatically snaps into the notch or aperture in the edge of the said plate and locks the same in position. The barrel is then again grasped by the center chuck, the truss-hoops are taken off, and then the dogs of the revolving chucks are separated a greater distance, and the revolving chucks are moved more toward each other, so as to permit those parts of the staves at the ends which have not been planed by the planer J^4 to project from the revolving chucks sufficiently to be acted upon by the knives Q^4 on the revolving cutter-head Q^3. Those parts of the staves below the pulleys f^2 of the planer J^4 are not acted upon by the said planer, and must be planed by the rotary cutter-head Q^3, and the sliding plates P^2 are then so adjusted that the knives on the cutter-head Q^3 plane off the above-mentioned ends of the outer surfaces of the staves, and the knives Q' and Q^2 on the cutter-head Q croze and howel the barrel and chamfer the ends of the same, the barrel being rotated once by means of the chucks B during the time that the above-mentioned cutters act on it. By raising the free end of the handle *o'* the shaft *o* will be rotated, the cross-arm *n* will be rocked, the connecting-arms m^5 will be turned toward the shaft *o*, and this will cause the arms m^4 and m^2 of the shaft m^3 to move in the same direction. As the arms m^2 are connected with the under sides of the plates P^2, the said plates and the cutter-shafts thereon will be moved toward the chucks B. As soon as the barrel has been planed, crozed, howeled, and chamfered, the handle *o'* is swung downward, whereby the plates P^2 and the cutters thereon will be moved back. The barrel is now ready to receive the heads, which are placed against the plates K, attached to the rings D', against which plates the heads are held by the clamping-springs K'. The stud *k'* at the outer end of the bar M of the header rests at the right-hand end of the outer slot, O^3, and the studded plates N^4 at the ends of the arms N^3 will be a short distance from the heads held on the plates K. By turning the crank L^2 the stud *k'* is moved toward the left hand of the slot O^3, and thereby the studs *k* on the disk N^4 will be forced into the barrel-head. Then by reversing the movement of the crank-arm L^2 the stud *k'* is moved to the transverse slot O^2, and by allowing the crank-axle to move upward the shaft L will rock on its longitudinal axis, and the arms N^3 will swing downward, so that the disks N^4, holding the barrel-heads, will be opposite the middle of the ends of the barrel. Then by turning the crank L^2 the stud *k'* will be moved toward the left-hand end of the slot O', and the arms N^3, carrying the heads, will be moved toward the ends of the barrel until the said heads are within the ends of the barrel. The portion o^3 of slot O is in position to so guide pin *k'* that the studs *k* will enter the barrel-head while held on plate K, and the length of slot O^3 is sufficient to allow motion to crank L^2 to force said studs into the head. The cross portion O^2 of the slot is to allow pin *k'* to rock therein, carrying arm N^3 and the barrel-head on its studs *k* in front of the open barrel. The long slot O' permits pin *k'* to play far enough for the barrel-head to be thrust into the barrel. During the time that the heads are being inserted the ends of the staves must be held by the dogs B^4; but as soon as the heads have entered the barrel the chucks B are moved from each other, and all the dogs are moved toward the periphery of the chucks, so that the ends of the staves will be released to allow them to receive the head; but the exact manipulation of the chucks B and dogs B^4 in entering the head will be dependent upon the nature and condition of the staves or of the stock from which the staves are made. The barrel is now ready to receive the hoops, which are placed on the opposite ends, while the barrel is being held at the middle by the central chuck, H, only. The hoops are forced on by means of the chucks B. The dogs are to be adjusted for each hoop, the shoulders *b'* of the dogs resting against the outer edges of the hoops, and then by moving the chucks B toward each other the hoops will be forced firmly on the barrel. Each pair of hoops is forced on successively in this manner. The above chucks may also be used to hold the barrel for sandpapering, polishing, or painting it. If a hoop is to be secured on the barrel, the said hoop must

be held by the dogs B^4, which must be brought together, so that each dog rests on the outer surface of the hoop; and when the hoop is held the movement of the dogs must be stopped, which is accomplished by throwing the belt from the fixed pulleys *a* or a^3 upon the loose pulleys a' or a^2. If the bar S′ is moved upward and one of its projections *r* strikes the spur *s* at the lower end of the angle-lever T, the projection *s′* at the upper end of the said angle-lever T moves downward and out of the aperture *t* or *t′* of the sliding bar U, and thus throw it in one direction or the other. The releases the same, permitting the springs V′ to bar S′ is moved by the cog-wheel S on the shaft R, which is rotated by the pinion R^2, which is acted upon by the bar R^3, provided at the upper or inner end with the fork R^4. As the beveled plates b^2 at the outer ends of the spindles B^3 pass through between the shanks of the fork R^4, they gradually move the said fork toward or from the center of the chuck, according as the plates b^2 are successively a greater or less distance from the center of the chuck. For instance, if the belt is to be shifted at a certain time, the bar S′ is so adjusted that at the right time it will be moved downward, and one of its projections *r* will strike against the lower beveled spurs of the lever T, thus releasing the bar U and throwing the belt upon a loose pulley, whereby the movement of the dogs B^4 will be stopped. The belt must be shifted upon the fixed pulleys by hand by moving the lever V.

The object of providing the automatic releasing mechanism is to avoid the trouble of watching the dogs until they are in a proper position, whereby considerable time and labor are saved.

If the hoops are to be forced upon the barrel, the chucks must be moved toward each other, the hoops being held by the dogs B^4. When the chucks have moved toward each other the desired distance, the belt must be shifted from the fixed pulleys *c* or c^3 upon the loose pulleys c' or c^2. The rod Y moves with one of the chucks B, and is provided with the beveled projections Y′, and when one of the same strikes the lower beveled end of the lever W^2 the projection at the upper end of the same will be drawn out of the apertures *v* or *v′* of the box W, which is thus released, and can be thrown in one direction or the other by the springs X^2, whereby the belts will be shifted. All that is necessary is to adjust the beveled projections Y′ on the bar or rod Y in such a manner that the bar W is released at the proper time. The belt must be shifted on the fixed pulleys *c* and c^3 by means of a hand-lever, X, and are shifted from the said pulleys automatically. The above-described machine can be adjusted to make barrels of different sizes; but separate machines will be required to make hogsheads or for making small kegs.

It is designed that the machine shall produce barrels of one size only, and that is most economical. All the hoops, heads, staves, &c., of one barrel will fit any other barrel of the same kind, and the cost of manufacturing or repairing barrels is thus materially reduced.

I am aware that radial dogs moved by a rotating cog-ring and gearing engaging said ring on both sides in a non-rotating chuck are not new, and that right and left screws have before been employed to close chucks upon a barrel, as in Patent No. 205,923, and that other devices somewhat similar to mine are shown in Patents Nos. 88,579, 144,618, and 220,349, and I do not claim the same as my invention.

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

1. Two chucks having radially-adjustable jaws, means for rotating said chucks, and means for setting said jaws, substantially as described, in combination with a stationary chuck and radially-adjustable jaws therein, whereby a barrel may be centrally compressed and held until the end chucks are secured, and then the jaws of the central chuck radially withdrawn, so that the barrel may revolve within said central chuck, as described.

2. A stationary chuck having radially-adjustable dogs to hold a barrel by its center, and mechanical means for advancing and withdrawing said dogs, in combination with two end chucks having radially-adjustable dogs, substantially as described, for holding the barrel by the circumference of its ends, and means, substantially as described, for advancing the end chucks upon the barrel while the same is held in the stationary chuck, as specified.

3. In a barrel-machine, a head-holding plate and means, substantially as described, for moving the same longitudinally to engage a barrel-head out of line of the axis of the barrel, in combination with means, substantially as described, for moving said holder into said axial line and along the same to thrust the head into the barrel, as specified.

4. The combination of a chuck adapted to compress and hold a barrel at its middle with two revoluble end chucks concentric with the axis of the middle chuck, and means, substantially as specified, for removing the middle chuck, whereby the barrel will be compressed and held by the middle chuck while closing the end chucks on it, and may then be freed from the middle chuck, to revolve concentric with the line which was the axis of the middle chuck when closed for turning or planing the barrel, as set forth.

5. The combination, with the fixed chuck-section H′, the section H^2, hinged thereto, and the shaft G, located above section H^2, of the hook *d*, pivoted to section H^2, and adapted to hook over shaft G when said section H^2 is raised to hold the same suspended, as shown and described.

6. In a barrel-machine, the combination, with the chucks for holding barrels, of rocking frames carrying cutter-heads for acting on

the inner surfaces of the ends of the staves, and cutter-heads for acting on the outer surfaces of the ends of the staves, substantially as herein shown and described, and for the purpose set forth.

7. The combination, with the revoluble barrel-holding chucks B, the planer described, pivoted to swing between said chucks, and adapted to plane the body of a barrel held and revolved thereby, of the planer raising and lowering device, consisting of the foot-treadle h^6, the shaft h^5, rocked thereby, the beveled-gear wheel h^4 on said shaft, engaging a similar wheel, h^3, the shaft h^2, carrying said wheel h^3, the arm h' on shaft h^2, and the connecting-rod h, communicating motion from arm h' to the planer, as shown and described.

8. The arms N^3, provided with means, substantially as described, for holding barrel-heads, the rock-shaft L, supporting said arms, the bars M and M′, provided with toothed racks, the pinion L′, mounted on a stud projecting from shaft L and engaging said racks, the crank L^2 on pinion L′, and the blocks N′ and N^2, connecting the arms N^3 with the rack-bars, as shown and described.

9. In combination with the barrel-rotating chucks described, the rocking plate P^2, the shafts P and P′, journaled therein, and carrying cutters adapted, respectively, to shape the outer and inner faces of the ends of the staves at the same time, the rocking of the plate bringing both sets of cutters into action at once, as shown and described.

10. The combination, with the barrel-rotating chucks described and the rocking plate P^2, carrying cutters for crozing and planing the barrel, of the foot-treadle P^6, the shaft P^5, supporting the same and rocked thereby, the arm P^4 on said shaft, and the rod P^3, connecting said arms with plate P^2, whereby said plate may be rocked by the foot of the operator to bring said cutters into action, and to so hold them as long as may be required, for the purpose specified.

11. The combination, with chucks for holding and revolving barrels, of means for revolving said chucks, dogs in said chucks moved radially upon the barrel, a toothed ring to move said dogs, gearing to rotate said ring, and means, substantially as described, for disconnecting said gearing when the chucks are to be revolved, for the purpose specified.

12. The combination, with the stationary ring E, of the radially-grooved plates B′ and B^2, the screw-threaded non-rotating spindles B^3 in said radial grooves, the internally-threaded cog-wheels B^6, mounted to rotate thereon, the ring D, provided with teeth on both its flat faces and engaging the cog-wheels B^6, and the cog-wheels D^4, engaging the ring D, as shown and described.

13. The combination, with the main frame A, the rings E, the chucks B, revolving therein, and the planer-frame J′, pivoted to frame A to swing vertically between chucks B, of the spring j, secured on shaft J, and engaging the planer-frame to lift it, substantially as specified.

14. In a barrel-machine, the combination, with the chucks for holding barrels, of frames adapted to be moved toward and from the chucks, and carrying separate shafts provided with cutter-heads for acting on the inner surfaces of the ends of the staves, and cutter-heads for acting on the outer surfaces of the ends of the staves, substantially as herein shown and described, and for the purpose set forth.

15. In a chuck for holding barrels, the combination, with a fixed outer ring, of rotating inner plates, radial screw-spindles held in the said plates and provided with cog-wheels, and of a loose cog-ring acting on the said cog-wheels on the screw-spindles, substantially as herein shown and described, and for the purpose set forth.

16. In a barrel-machine, the combination, with an outer ring, of rotating plates within the same, radial screw-spindles in the said plates, cog-wheels mounted on the said spindles, dogs on the inner ends of the said spindles, a cog-ring engaging with the cog-wheels on the spindles, and of devices for rotating the said cog-ring, substantially as herein shown and described, and for the purpose set forth.

17. In a chuck for holding barrels, the combination, with the outer ring, E, of the plates B′ and B^2, provided with radial grooves b and apertures B^5, of the screw-spindles B^3, the cog-wheels B^6 thereon, the dogs B^4, and devices for rotating the cog-wheels B^6, whereby the dogs and the spindles on which they are mounted will be moved toward and from the middle of the chuck, substantially as herein shown and described, and for the purpose set forth.

18. In a chuck for holding barrels, the combination, with the ring E, of the plates B′ B^2, the screw-spindles B^3, the cog-wheels B^6, mounted thereon, the ring D, provided with teeth on both the inner and outer flat surfaces, and engaging with the cog-wheels B^6, the cog-wheels D^4, engaging with the ring D, of longitudinal shafts on the front and rear of the machine-frame, of longitudinally-movable cog-wheels on the said shafts and engaging with the cog-wheels D^5, and of devices for rotating the said shafts, substantially as herein shown and described, and for the purpose of permitting the movement of the dogs B^4 in all the positions of the chuck, as set forth.

19. In a chuck for holding barrels, the combination, with the ring E, of the plates B′ B^2, the screw-spindles B^3, the cog-wheels B^6, mounted thereon, the ring D, provided with teeth on both the inner and outer flat surfaces and engaging with the cog-wheels B^6, the cog-wheels D^4 and D^5, the shafts E′, on which the sliding cog-wheels D^6 are mounted, the cog-wheels E^2 on the shafts E′, the cog-wheels E^3, the inclined shafts E^4, the worm-wheel E^5, and the worm E^6, mounted on the same shaft with

the driving-pulleys, substantially as herein shown and described, and for the purpose set forth.

20. In a barrel-machine, the combination, with the worm E^6, mounted on the same shaft with the belt-pulleys, of the worm-wheels E^5, engaging therewith, and mounted on shafts which are connected in such a manner as to operate the barrel-holding dogs, the pivoted arms F, in which the shafts E^4 are journaled, and of devices for raising the upper ends of the arms F to disengage the worm-wheels E^5 from the worm E^6, substantially as herein shown and described, and for the purpose set forth.

21. In a barrel-machine, the combination, with the worm E^6, mounted on the same shaft with the belt-pulleys, of the worm-wheels E^5, engaging therewith, and mounted on shafts which are connected in such a manner as to operate the barrel-holding dogs, the pivoted arms F, in which the shafts E^4 are journaled, the box F′, in which the upper ends of the arms F are held, the lever F^3, connected with the box F′ by the stirrup F^2, and the locking-lever F^1, substantially as herein shown and described, and for the purpose set forth.

22. In a barrel-machine, the combination, with the separable chuck-sections H′ and H^2, of the circular rack I, extending along the periphery, of the cog-wheels within the chuck, engaging with the rack, and of dogs connected with the said cog-wheels, substantially as herein shown and described, and for the purpose set forth.

23. In a barrel-machine, the combination, with the chuck-sections H′ and H^2, of the rack I along the periphery of the same, the cog-wheels H^7, the connecting-bars H^6, the radially-movable rods H^3, and the dogs H^4 on the said rods, substantially as herein shown and described, and for the purpose set forth.

24. In a barrel-machine, the combination, with the separable chuck-sections H′ and H^2, of the circumferential rack I, acting upon the dogs of the chucks, the cog-wheel I′, engaging with the rack I, and of devices for rotating the said cog-wheel, substantially as herein shown and described, and for the purpose set forth.

25. In a barrel-machine, the combination, with the rocking shaft L, of the rack-bars M and M′, the head-holding arms N^3, attached to the said rack-bars, the guide-stud k' on the bar M, and the plate O, provided with slots for guiding the stud k', substantially as herein shown and described, and for the purpose set forth.

26. In a barrel-machine, the combination, with the rocking shaft L, of the rack-bars M and M′, the pinion L′, the head-holding arms N^3, the plates K, attached to the rings D′, and the clamping-springs K′ on the plates K, substantially as herein shown and described, and for the purpose set forth.

27. In a barrel-machine, the combination, with the chuck B, having radially-movable screw-spindles B^3, on the outer ends of which beveled plates b^2 are secured, the rack R^3, provided with a fork, R^4, and the pinion R^2 on the same shaft, R, with the cog-wheel S, which acts on a rack for releasing the automatic belt-shifting device, substantially as herein shown and described, and for the purpose set forth.

28. In a barrel-machine, the combination, with a series of pulleys and a sliding box carrying elongated loops, through which the belts pass, of springs for moving the bar in such a manner that the belts will be on the loose pulleys, of a latch for holding the bar in such a manner that the belts will be on the fixed pulleys, of a vertically-movable bar provided with a series of beveled projections for acting on the lower end of the angle-lever which locks the bar carrying the belt-shifters in the desired position, and of a cog-wheel acting on the said bar and mounted on the same shaft with a pinion which is acted upon by a rack, which in turn is acted upon by the radially-movable spindles of a barrel-holding chuck, substantially as herein shown and described, and for the purpose set forth.

29. In a barrel-machine, the combination, with the rod S′, of devices for automatically shifting the belts, the beveled projections r on the rod S′, the nuts r', for locking the projections r in the desired positions, and of devices for transmitting motion to the rod S′ from the barrel-holding chuck, substantially as herein shown and described, and for the purpose set forth.

30. In a barrel-machine, the combination, with a series of pulleys, of the sliding bar U, provided with the apertures t and t', the beveled angle-lever T, provided at its upper end with a projection, s', and at its lower end with a spur, s, the vertically-movable rod S′, provided with beveled projections r, and of devices for transmitting motion to the said rod S′ from the barrel-holding chuck, substantially as herein shown and described, and for the purpose set forth.

31. In a barrel-machine, the combination, with the pulleys c c' c^2 c^3, of a sliding bar provided with belt-shifters, an angle-lever adapted to catch in apertures in the said bar, and of a sliding bar connected with one of the laterally-movable barrel-holding chucks, and provided with beveled projections which act on the lower end of the lever for holding the said sliding bar in position, substantially as herein shown and described, and for the purpose set forth.

32. In a barrel-machine, the combination, with a chuck, B, of a cross-piece, i, having a chuck-lug, i', against which the end of the sliding plate P^2 strikes, substantially as herein shown and described, and for the purpose set forth.

ROBT. O. DOBBIN.

Witnesses:
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OTTO HYMMEN.