(No Model.) 7 Sheets—Sheet 1.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.

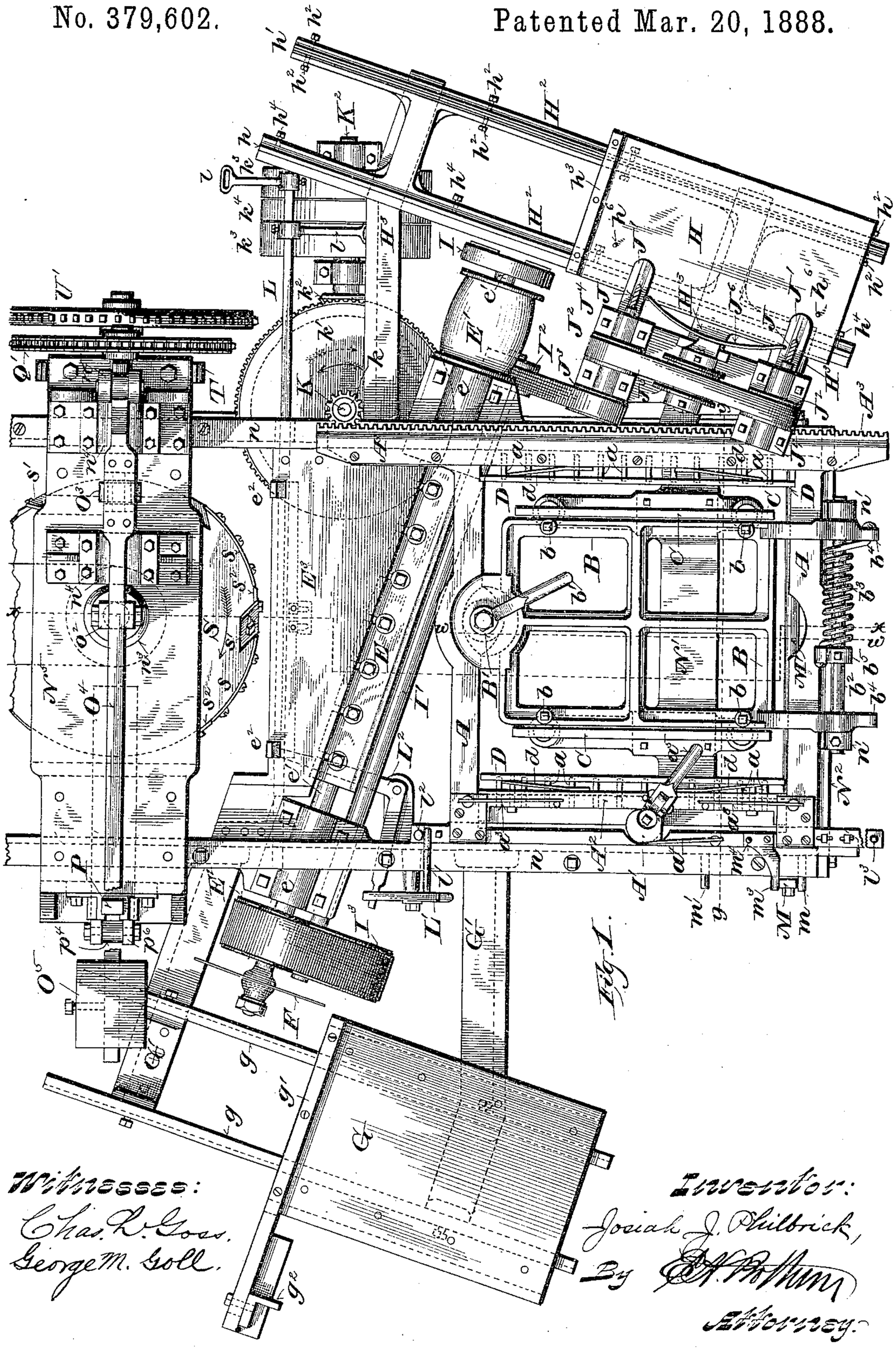

Fig. 1.

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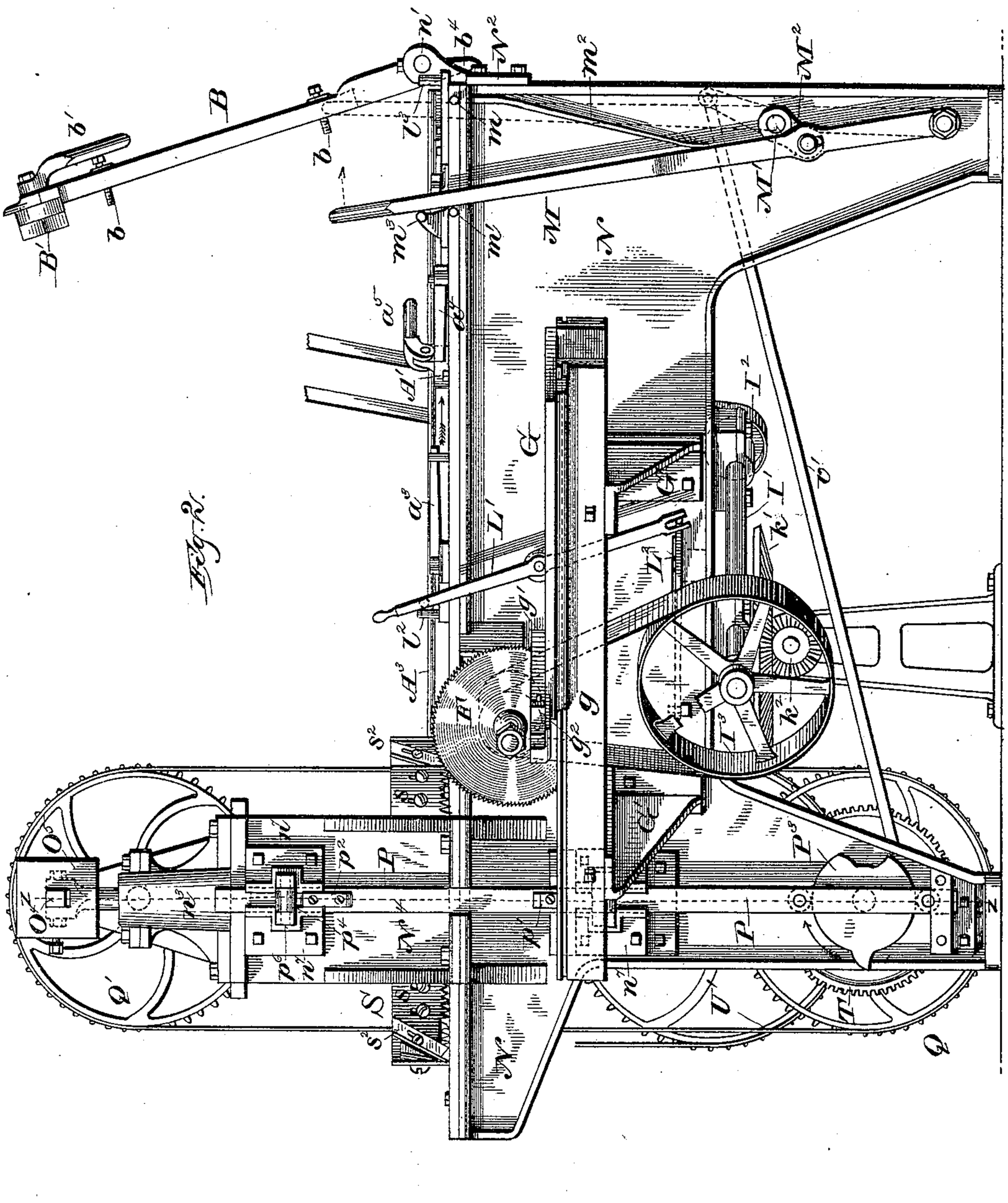
(No Model.) 7 Sheets—Sheet 2.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.



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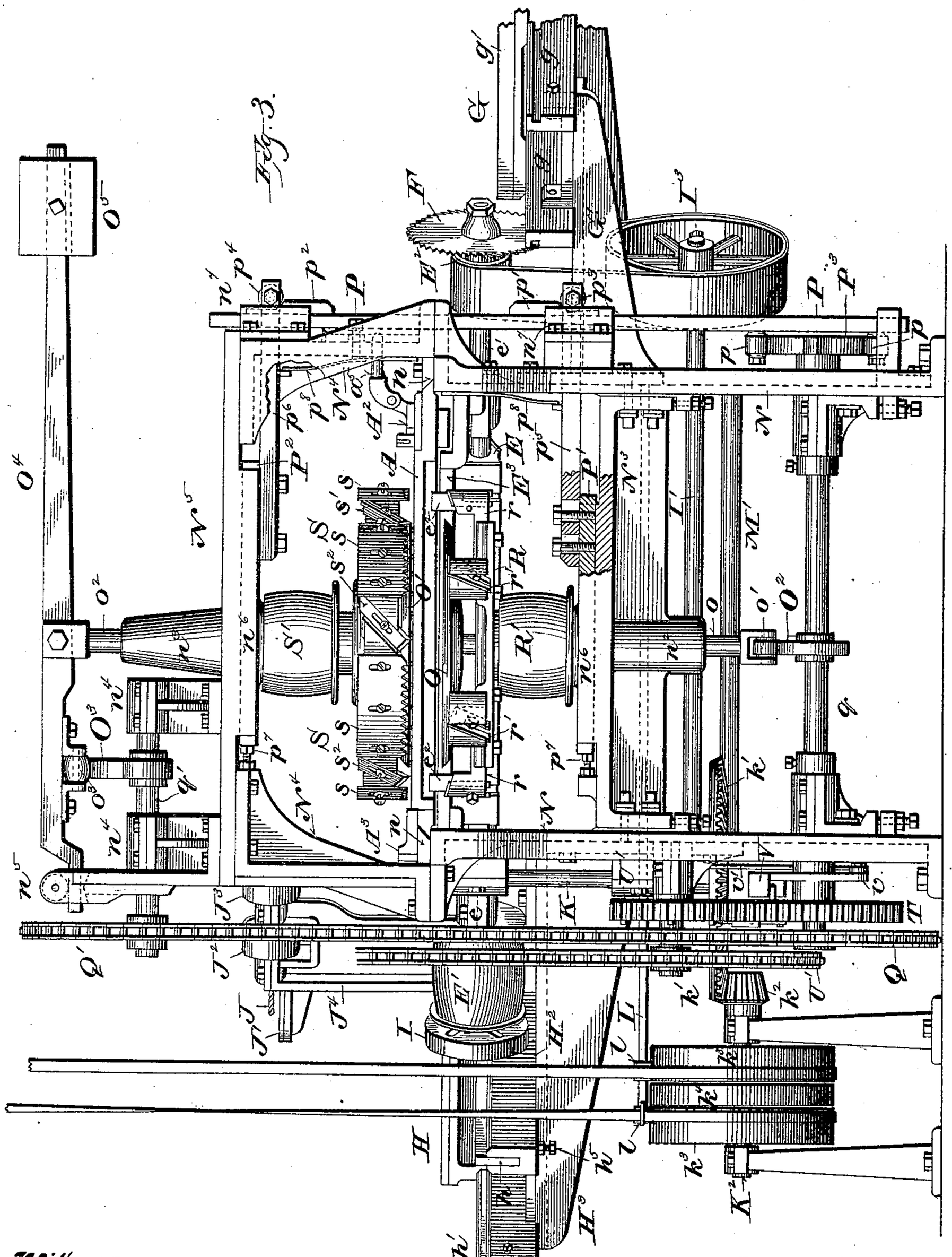
(No Model.) 7 Sheets—Sheet 3.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.



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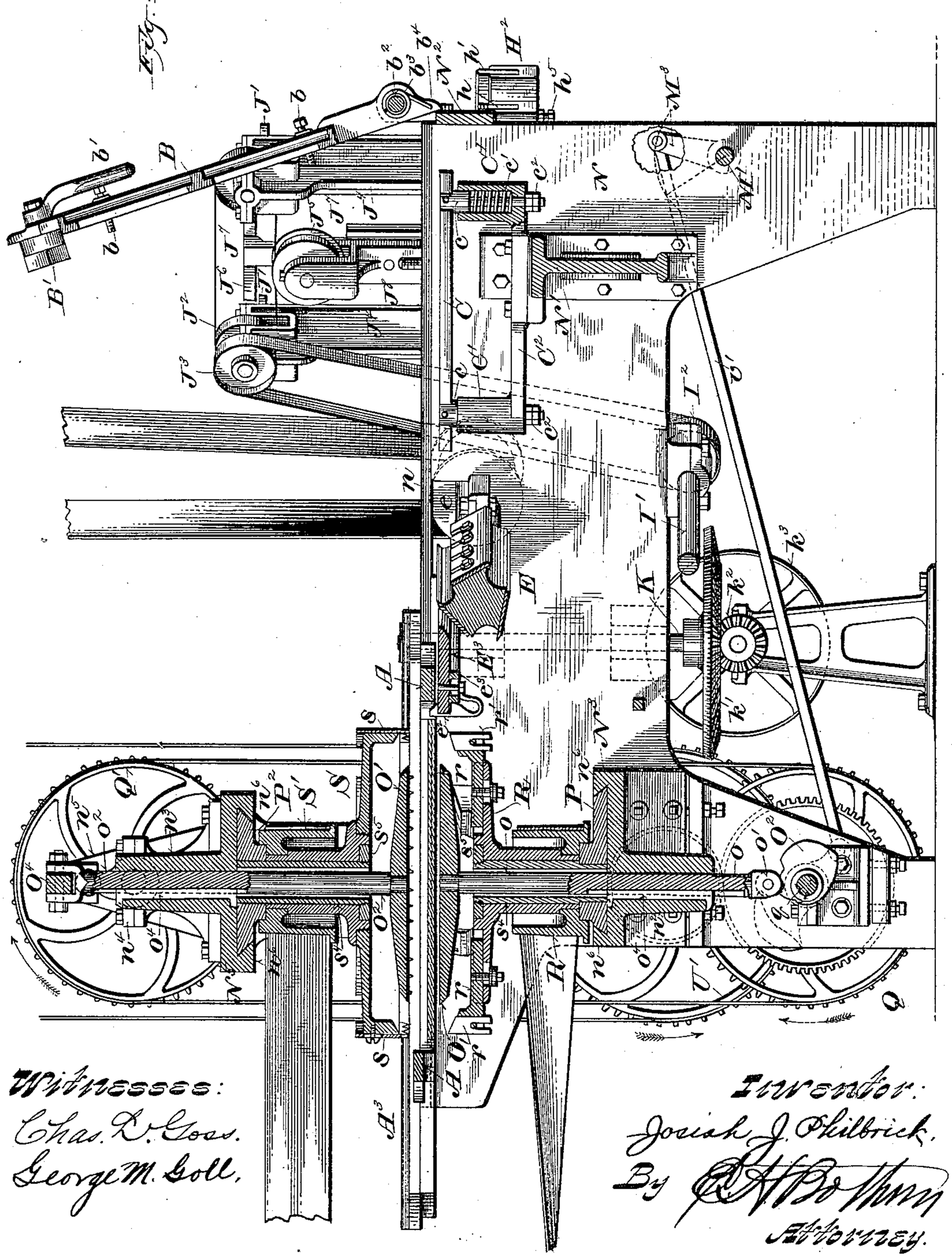
(No Model.) 7 Sheets—Sheet 4.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.

Fig. 4.



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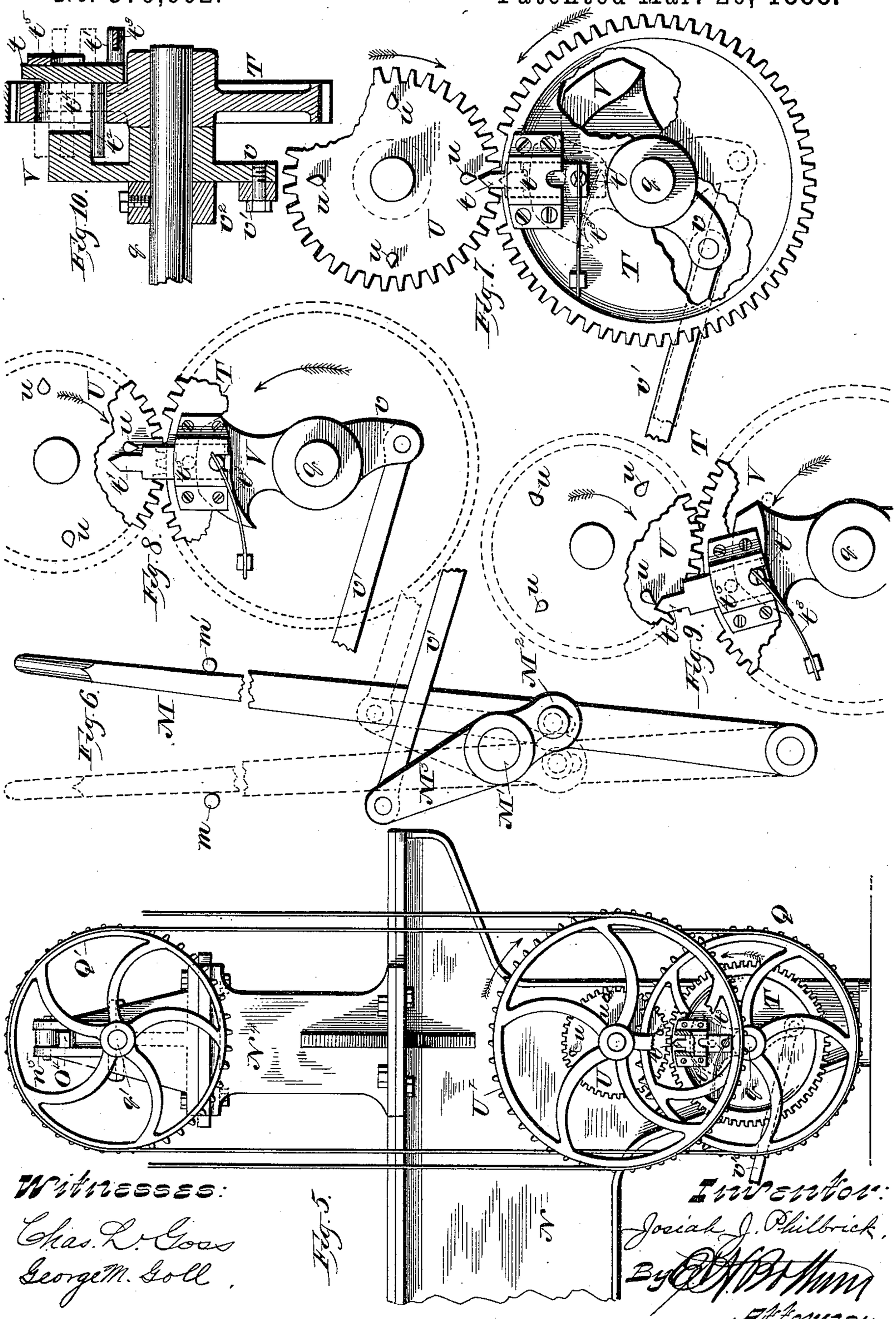
(No Model.) 7 Sheets—Sheet 5.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.



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(No Model.) 7 Sheets—Sheet 6.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

No. 379,602. Patented Mar. 20, 1888.

Fig. 11.

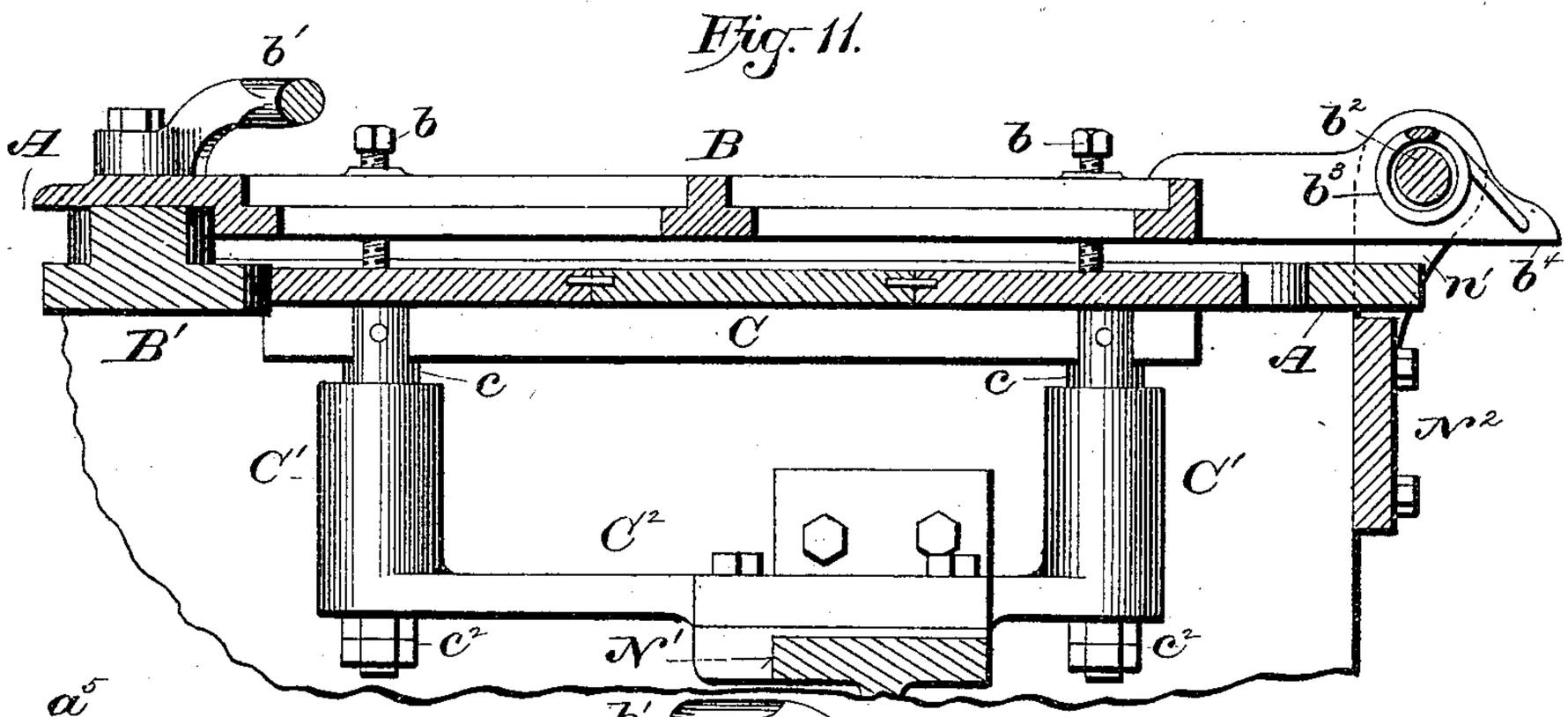

Fig. 12.

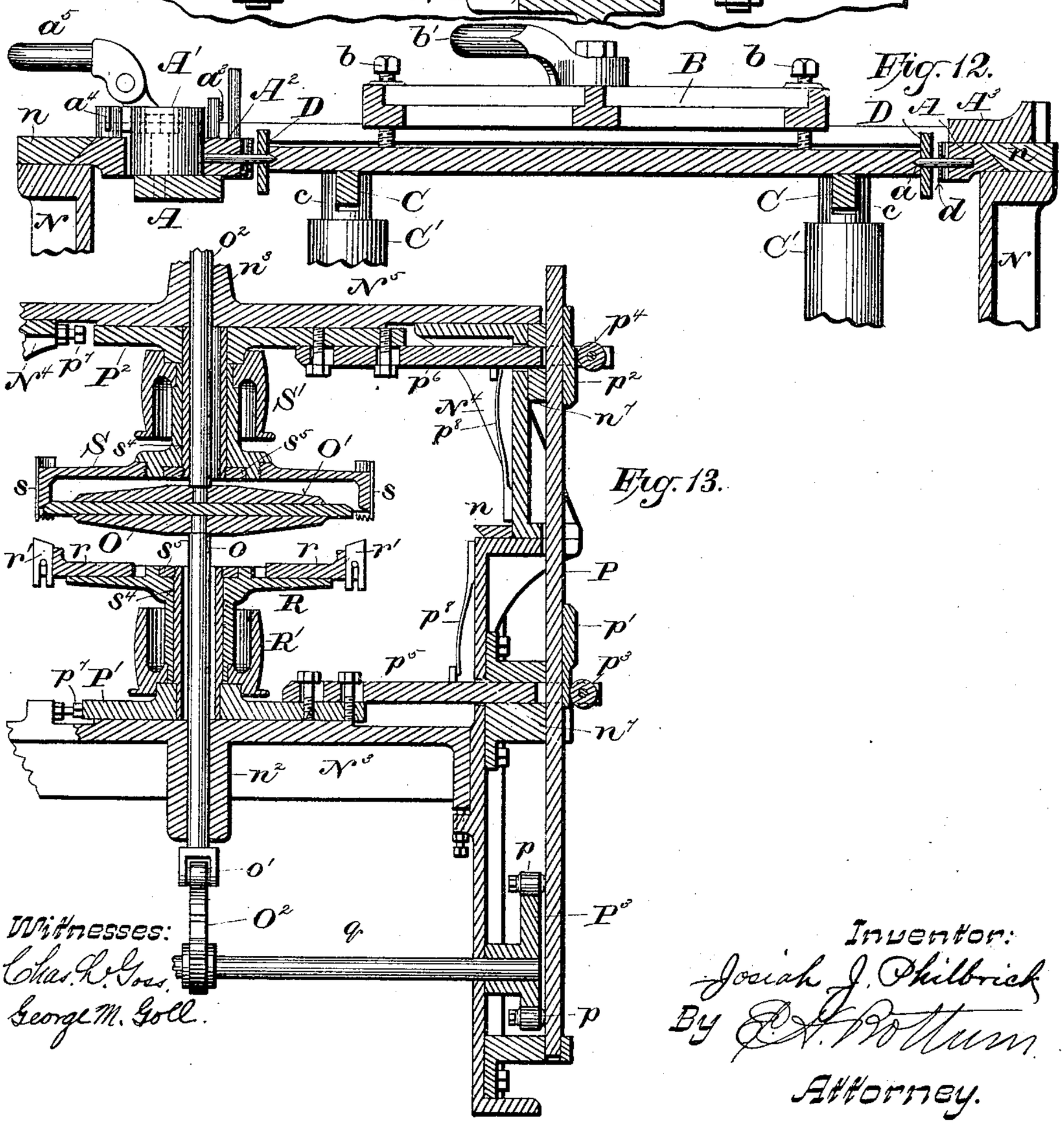

Fig. 13.

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(No Model.) 7 Sheets—Sheet 7.

J. J. PHILBRICK.

BARREL HEAD MAKING MACHINE.

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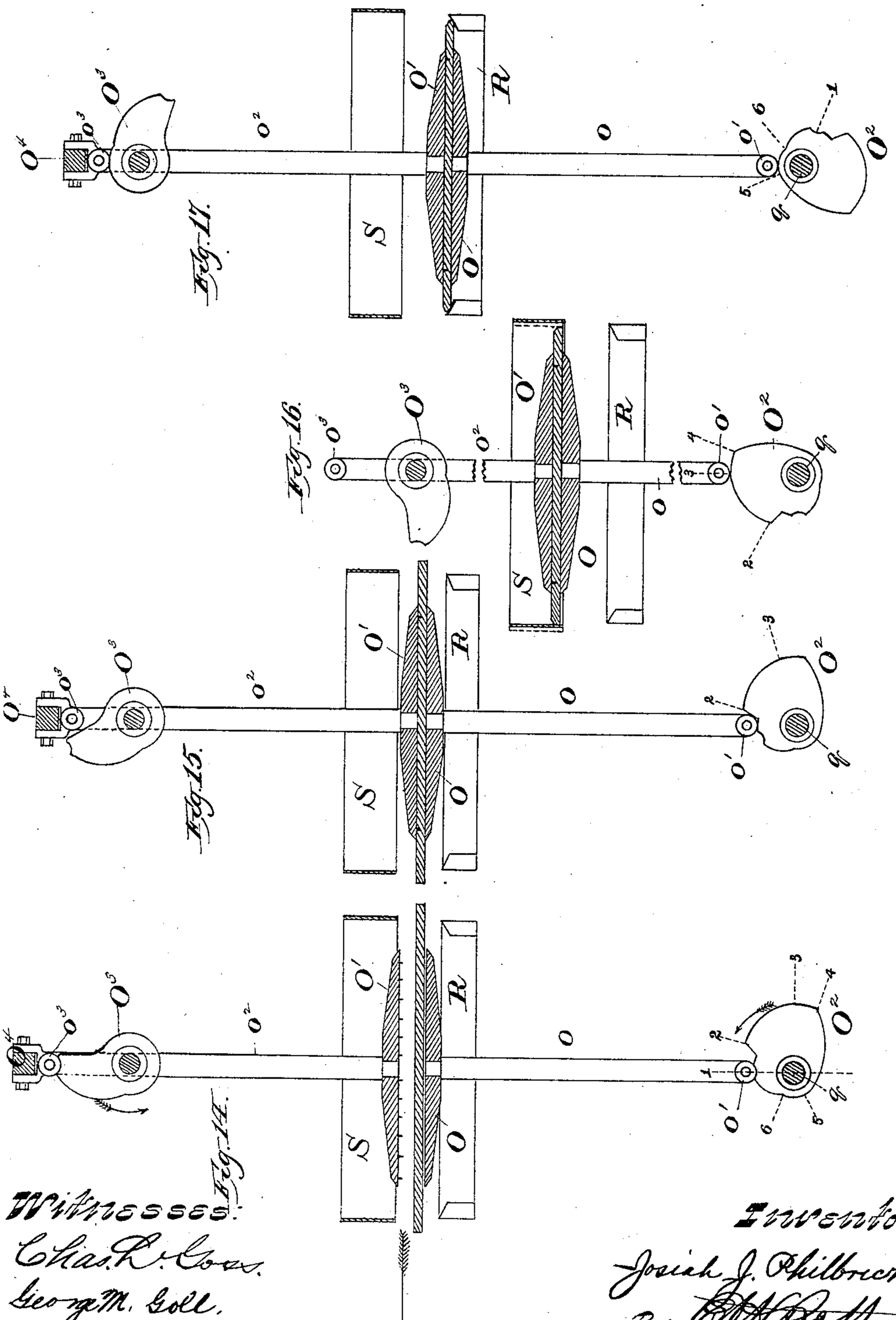

Fig. 17.

Fig. 16.

Fig. 15.

Fig. 14.

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UNITED STATES PATENT OFFICE.

JOSIAH J. PHILBRICK, OF OMRO, WISCONSIN, ASSIGNOR OF ONE-THIRD TO GEORGE CHALLONER'S SONS, OF SAME PLACE.

BARREL-HEAD-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,602, dated March 20, 1888.

Application filed March 10, 1887. Serial No. 230,363. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH J. PHILBRICK, of Omro, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Barrel-Head-Making Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is to produce finished barrel-heading and the like.

It consists, essentially, of jointing and doweling mechanism, blank-trimming mechanism, a planer, and rounding and chamfering mech anism and their connections.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a plan view of the machine. Fig. 2 is a side elevation of the same, viewed upon the side carrying the blank-trimming mechanism. Fig. 3 is a rear end elevation, showing particularly the rounding and chamfering mechanism. Fig. 4 is a vertical longitudinal section of the machine on the line *x x*, Fig. 1. Fig. 5 is a side elevation of a portion of the machine, showing the gearing by which the clamping-heads are operated. Fig. 6 is a detached detail view of the lever by which the gearing shown in Fig. 5 is set in motion. Figs. 7, 8, 9, and 10 are details, on an enlarged scale, of the mutilated gear, cam, &c., through which an intermitting rotation is imparted to the cams operating the clamping-heads. Fig. 11 is a longitudinal section on the line *w w*, Fig. 1, of the gage plate or frame. Fig. 12 is a cross section of the same and of the carriage on the line *y y*, Fig. 1. Fig. 13 is a medial vertical section on the lines *z z*, Fig. 2, of the clamping and cutter heads and the mechanism for shifting the cutter-heads laterally and making the heading oval; and Figs. 14, 15, 16, and 17 are details showing the operation of the clamping-heads and their actuating-cams.

Referring to Figs. 1, 3, and 4 of the drawings, E represents an ordinary planer-cylinder supported obliquely across the machine in bearings *e e*, provided therefor in the frame N of the machine. On the right-hand side of the machine, with reference to the operator and as seen in Fig. 1, is mounted upon the extended arbor *e'* of the planer E a driving-pulley, E', and just outside, upon the end of said arbor, the jointer-head I, which is furnished in its outer face with knives.

H is the jointer-carriage, provided with spurs h^6 h^6 and a transverse guard, h^3, to hold the sections of which the heading is composed in place when operated upon by the jointer I. Upon brackets H^3 H^3, secured to and projecting from the frame N of the machine, are supported and secured, parallel with each other and with the jointer-head I, grooved supports H^2 H^2, in which are inserted the steelways *h h'*, upon which the carriage H is supported and adapted to slide. The inner way, *h*, secured in its support H by set-bolts h^4 h^4, has its upper working-edge plane or flat, and rests upon adjusting-bolts h^5 h^5, as seen in Figs. 3 and 4, by means of which it may be adjusted vertically. The outer way, *h'*, has its upper working-edge V-shaped, to fit and work in a similar but slightly broader groove in the carriage H. The groove in the support H^2 being made a little wider than the way *h'* inserted therein allows the latter to be slightly curved laterally by means of the adjusting-bolts h^2 h^2, tapped into the sides of said support and bearing at their tips against opposite sides of said way *h'*.

The guard h^3 (shown, for convenience of illustration, at the forward end of the carriage H) will in practice be more conveniently attached to the rear end of the carriage, or the end toward the front of the machine, as seen in Fig. 1.

In suitable bearings provided therefor in the upright brackets or standards J^4 J^4 on the same side of the machine with the jointer are mounted the horizontal mandrels of the doweling-bits J J. To said standards J^4 J^4 are attached the horizontal rests J' J', upon which the blank-sections are supported in the proper position to be operated upon by the bits J J. Upon the bit-mandrels are fixed pulleys J^2 J^2, connected by a belt which runs over a tightening-

pulley, J^5, bearing in a slide, J^8, which is supported and vertically adjustable in a bracket or standard, J^7. To the standard J^7 is secured a spring, J^6, for forcing the blank-sections off from the bits J. At the opposite side of the machine, upon the extended planer-arbor e', are secured the pulley E^2 and trimming-saw F, hereinafter described. The pulley E^2 is connected by a belt, as shown in Figs. 1 and 3, with a pulley, I^3, on a parallel shaft, I', extending across the machine below, and provided at the opposite end with a pulley, I^2, which is connected by a belt with a pulley, J^3, on the nearest mandrel of the doweling-bits J J, which are thus driven from the planer-arbor e'.

Passing to the opposite side of the machine, G represents the trimming-saw carriage, supported and arranged to be moved parallel with the plane of the saw F upon ways g g, resting on and secured to brackets G' G', extending laterally from the frame N of the machine. Across one end of said carriage is secured the guard g', to the extended end of which, at the outer side of said carriage, is adjustably attached the gage g^2, by means of which the blanks are trimmed to a uniform standard size to be received into the carriage A and operated upon by the cam B' of the gage plate or frame B. The guard g' (shown, for convenience of illustration, at the front or advancing end of the carriage G) will in practice be attached to the rear end of said carriage, or to the end thereof nearest the front of the machine, as shown in Fig. 1.

A is the carriage by which the blanks are carried over the planer-cylinder E and deposited between the clamping-heads O O', to be operated upon by the rounding-heads. The sides of the carriage A are tongued or beveled, and work in similarly-grooved ways formed by the top of the frame N and by the beveled cap-plates n n, as shown most clearly in Figs. 3 and 12.

a a are dogs secured at one side of the machine in the side rail of the carriage and at the other in a laterally-adjustable bar, A^2. On each side of the carriage said dogs a a pass through perforated plates D D, which are held by springs d d in their normal position in advance of the points of the dogs a a, and force the heading-blanks off from said dogs when the sliding bar A^2 is released. A' is a cam provided with a jointed handle, a^5, and mounted upon the adjacent side rail of said carriage in position to engage and move the dog-bar A^2 inward, while springs a^3 a^3 (shown in Fig. 1) move said bar A^2 outwardly and retain it in contact with said cam. a^4 is a spring secured to said carriage and arranged to engage an angular projection on said cam A'. A^3 is a rack formed upon or secured to opposite side of said carriage.

B is a gage plate or frame hinged at the front of the machine upon a rod, b^2, fixed in ears n' n' upon a cross-girt, N^2. A spiral spring, b^3, wound around the rod b^2 and secured at one end in the collar b^5, fixed on said rod b^2, and at the other end in a projection, b^4, of said gage-frame B, lifts the latter when released into the position shown in Figs. 2 and 4, thus exposing the carriage to receive another blank.

b b are set screws passing through the gage-frame B at or near its four corners and bearing against the upper face of the blank, which is adjusted thereby, as desired, with reference to the cutting-line of the planer-cylinder E, as shown in Fig. 11.

B' is a cam connected with the free end of the gage-frame B and furnished with a handle, by means of which the sections of a blank-head are snugly pressed together and the gage-frame secured to the front end of the carriage A and held in place during the foregoing operation.

C C are supporting-bars upon which the blank-heads rest when placed in the carriage A underneath the gage-frame B. Said bars are hinged at or near each end in the forked heads of vertical stems c c, which in turn rest upon spiral springs c' c', inserted in cylinders C' C', formed upon plates C^2 C^2, secured to a cross-girt, N', of the frame N of the machine. The stems c c are retained in the cylinders C' C', and the upward movement of the bars C C is limited by lock-nuts c^2 c^2 on the ends of said stems projecting below said cylinders, as shown in Figs. 4 and 11.

E^3 is the planer-bed, set with its upper face at the same level with the cutting-line of the planer E, so as to support the blank-head and relieve the dogs from the strain caused by planing. The planer-cylinder E, being set obliquely across the machine, not only secures the advantage of a shear cut, but by carrying the saw-carriage G out from the machine gives room for the operator without unnecessarily extending the planer-arbor e'.

e^2 e^2 are dogs formed upon or attached to the ends of a spring, which is adjustably secured at the center by means of a slotted plate, e^3, to the under side of the bed E^3, as shown in Figs. 1 and 4, for making headings of different sizes. They project above the rear edge of the bed E^3 and are beveled on their front edges, so as to be forced down by an advancing head and allow the same to pass between the clamping-heads O O', as seen in Fig. 4.

The mechanism for feeding and reversing the blank-head carriage will be described by reference to Figs. 1, 2, 3, and 4.

K is a vertical shaft, provided at the upper end with a pinion, k, working with the rack A^3 of the blank-carriage A, and at the lower end with a bevel-gear, k', which works with a gear, k^2, upon the short horizontal driving-shaft K^2. k^4 is the driving-pulley, fixed upon said shaft K^2 between two loose pulleys, k^3 k^3.

L is a sliding bar or rod supported in suitable bearings in frame N transversely to the machine and carrying the belt-shifters l l. Upon the opposite side of the machine, accessible to the operator, is fulcrumed the belt-shifting lever L', engaging at its lower end one

limb of the bell-crank lever L^2, the other limb of which connects with the shifter-rod L.

l' is a rod secured to the lever L′ and projecting horizontally over the adjacent side rail of the blank-carriage A, to which are adjustably attached the stops l^2 and l^3.

Referring to Figs. 3 and 13, N^3 is a cross-tie of the frame N, formed with a central vertically-bored hub, n^2, on its under side.

N^5 is a cross-tie supported directly above it upon brackets or standards N^4 N^4, bolted to said frame N, and formed upon its upper side with the hub n^3, vertically bored in the same axial line with the hub n^2.

O is the lower clamping-head or rounding-table, secured to the upper end of the shaft o, which passes through the hub n^2, and is prevented from turning therein by a key, o^4. (Shown in Fig. 4.) The shaft o is provided with a friction-roller, o', which bears upon the periphery of the cam O^2 on the shaft q.

O′ is the upper clamping-head, secured to the lower end of the shaft o^2, which passes through the hub n^3, and is connected at its upper end with the lever O^4, fulcrumed at one end under a friction-roller in the bracket n^5, rising from the cross tie N^5, and provided at the opposite free end with a weight, O^5, adjustable thereon. A key, o^4, in the hub n^3 engages a longitudinal seat or groove in the shaft o^2 and prevents it from turning. The lever O^4 is provided on the under side, between the bracket n^5 and shaft o^2, with a friction-roller, o^3, which rests, when the rounding mechanism is not in operation, upon the cam O^3 and the shaft q', bearing in boxes n^4 n^4 on the cross-tie N^5.

Q Q′ are similar sprocket-wheels mounted upon the adjacent ends of shafts q q' and connected by a chain belt.

P′ and P^2 are dovetailed slides held between similar guides, n^6 n^6, formed, respectively, on the upper side of the cross-tie N^3 and the under side of the cross-tie N^5, and movable transversely to the machine.

s^4 s^4 are sleeves secured at one end in the slides P′ P^2, and having a larger bore than the shafts o o^2, which pass through them and said slides, as shown in Figs. 4 and 13, to allow the cutter heads to be moved sidewise.

S is the upper rounding-head, journaled upon the sleeve s^4 of the upper slide, P^2, and retained thereon by the nut s^5. It is formed with a depending peripheral flange beveled on its lower edge to correspond as nearly as practicable with the bevel to be given to the adjacent side of the barrel-head, and is furnished with three or more sets of knives or cutters, segments of a cylinder-saw or rounding-cutters s s, secured in a vertical position to the periphery of the rounding-head, chamfering-knives s' s', set at an inclination and with their cutting-edges oblique to intersecting radii of said rounding-head, so as to produce a shear cut and give the proper bevel to one side of the heading, and trimming-knives s^2 s^2, set with their cutting-edges in planes perpendicular to the heading. The head S is made separate from the hub upon which it is screwed, as shown in Figs. 4 and 13, and may be readily replaced by heads of different sizes for the various sizes of heading to be made.

S′ is a driving-pulley mounted upon the hub of the rounding-head S.

R is the lower rounding-head, formed with radial grooves in which are adjustably secured slides r r, furnished with chamfering-knives r' r'. It is journaled, like the upper head, S, upon the sleeve s^4, secured in the lower slide, P′, and upon its hub is mounted the pulley R′. The pulleys R′ and S′ are driven in opposite directions, and may be connected one by a straight and the other by a cross belt, as shown in Fig. 4, with a pulley or pulleys upon the same driving-shaft, (Not shown.)

P is a vertically-sliding bar provided on the outside with wedge or cam plates p' p^2 and working in guides n^7 n^7, secured to the frame of the machine.

p^5 and p^6 are draw-bars adjustably attached, as seen in Figs. 3 and 13, to the slides P′ P^2 and forked at their outer ends, which pass through the frame of the machine and the guide-blocks n^7 n^7 to receive the sliding bar P and friction-rollers p^3 p^4, journaled therein and working with the wedge or cam plates p' p^2.

p^7 p^7 are stop bolts tapped into lugs formed therefor—one on the cross-tie N^3 and the other on one of the brackets N^4. The slides P′ P^2 are brought to and retained in their normal position against the stops p^7 p^7 by springs p^8 p^8, secured to the frame of the machine and engaging pins or lugs on the draw-bars p^5 p^6. At its lower end the bar P is furnished on the inside with friction-rollers p p, which work on diametrically-opposite sides thereof with the periphery of the cam P^3, fixed upon the adjacent end of the cam shaft q, as seen in Figs. 2 and 3.

Referring to Figs. 5, 6, 7, 8, 9, and 10, illustrating the tripping and actuating mechanism for operating the clamping-heads, T is a spur-gear having a small part of its periphery without teeth.

U is a spur-gear working with the gear T and mounted upon a shaft journaled above the shaft q in suitable bearings provided therefor. Upon the same shaft with said gear U is mounted the driving pulley or wheel U′, which is connected by a belt with a suitable counter-shaft and pulley. (Not shown.)

t is a sliding tooth secured to the gear T, adjacent to that portion of its periphery without teeth, by a cap-box, t^5, in which it is movable radially with reference to said gear. The shank of said tooth t is provided on the outside with a right angled projection, t', split to receive one end of the spring t^3, which is secured at its other end to said gear T. A pin, t^2, formed on the opposite side of said sliding tooth t, at right angles thereto, passes through a radial slot, t^4, in gear T, as seen in Fig. 10, in position to be engaged by the cam V, which is loosely mounted upon the shaft q just in-

side of said gear and held in contact therewith by the collar v^2.

Upon the outer side of the gear U are formed or attached at intervals spurs *u u*, to engage the tooth *t*, beveled at the end to readily slip off from them at the proper time. The cam V is formed with an arm, *v*, which is connected by a rod, *v'*, with the upturned crank M^3 on the rock-shaft M', passing transversely across the front of the machine and provided at the opposite end with the depending crank M^2, as seen in Figs. 1, 2, 4, and 6.

M is a lever fulcrumed to the frame N of the machine and connected with the crank M^2, as seen in Fig. 2.

m m' are stops secured in the adjacent side of the frame or cap-plate *n*.

m^3 is a dog pivotally secured to the adjacent side rail of carriage A, and arranged to engage said lever M when the carriage approaches the front of the machine on its return from the rounding mechanism.

My improved machine operates as follows: The sections of which the heads are to be made, having been first cut approximately to the required length, are placed, preferably, one at a time in the proper position on the jointer-carriage H snugly against the guard h^3 and forced down upon the spurs h^6 h^6, which hold them firmly in place. The carriage is then run past the revolving cutter-head I, which accurately joints the adjacent edge of the section. The sections may be jointed, hollowing when desired, by adjusting the V-way *h'* by means of the bolts h^2 h^2, to curve outwardly at the center and thus produce a corresponding movement of the carriage. The joints may also be made open on the inner or under side of the head, thus insuring close joints outside by means of the adjusting-bolts h^5 h^5, Figs. 3 and 4, which elevate the way *h* and incline the carriage H with reference to the face of the jointer-head I. The sections are next placed upon the rests J' J' and forced edgewise against the doweling-bits J J, which bore the holes for the dowel-pins. The spring h^6, compressed by advancing the sections upon the bits, forces them off when the holes have been bored. The dowel-pins are now inserted, the sections glued and put together by the operator into blank heads, which are then placed upon the saw-carriage G snugly against the rack *g'*, and gage g^2 properly set for the required size and run past the saw F, which trims them to a uniform size, determined by the position of said gage g^2. The blanks are now placed one at a time on the rest-bars C C, and the gage-frame swung down upon them and secured to the forward end of the carriage A by turning the handle *b'*, which forces one part of the cam B' under the front rail of said carriage and the other part against the blank-head bearing at the opposite side at the front of the machine against the rear cross-rail of carriage A, as seen in Fig. 11, thus crowding the sections composing the blank snugly together and closing the joints between them. The bolts *b b*, adjusted to bear the blank-head down to the desired level with reference to the cutting-line of the planer E, bring it into and hold the blank in the proper position while the operator forces the dogs *a a* into its edges, as seen in Fig. 12, by means of the handle a^5 and cam A' operated thereby. The cam B' is then turned to release the blank-head and gage-frame B, which is automatically swung back by the spring b^3 into the position shown in Figs. 2 and 4, where its backward movement is arrested by the projections b^4 b^4 striking the cross-girt N^2. The lever L' is then drawn back by the operator toward the front of the machine, and, operating through the bell-crank lever L^2, carries the sliding rod L and belt-shifters *l l* to the right, as seen in Fig. 1, shifting the straight belt shown in Fig. 3 from the loose pulley k^3 to the tight pulley k^4, and through the bevel-gears k^2 k', upright shaft K, pinion *k*, and rack A^3, operating to feed the carriage forward. As it is carried over the cylinder E, the blank head is planed on its under side, and passing over the planer-bed E^3 it engages and forces the dogs e^2 e^2 down, and when it arrives over the lower clamping-head or rounding-table O, as seen in Fig. 4, the handle a^5 of the cam A' (thrown out over the side of the machine in dogging the blank-head in the carriage) strikes the adjacent bracket N^4, as seen in Fig. 4, and allows the dogs *a a* to be withdrawn by springs a^3 a^3 from the blank-head, which is forced off therefrom by the perforated plates D D and springs *d d* and deposited upon the rounding-table O. As soon as the blank-head clears the dogs e^2 e^2, they are forced up by the spring to which they are forged or attached and prevent the blank-head from being withdrawn by the returning carriage A, the front of which is raised, as shown in Figs. 3 and 4, to pass over the blank-head. The stop l^3, striking the rod *l'*, projecting from the belt-shifting lever L', shifts the cross-belt from the loose to the tight pulley k^4, and thus reverses the movement of the carriage A, which returns to the front of the machine, where its movement is arrested by the stop l^2 engaging the rod *l'*, projecting from the belt-shifting lever L', as shown in Fig. 2, and carrying both the straight and cross belts into their normal positions upon the loose pulleys k^3 k^3, as seen in Fig. 3. The carriage remains quiescent at the front of the machine until set in motion again by the operator in the manner described. As the carriage on its return approaches the front of the machine, the dog m^3 engages the lever M, as shown in Fig. 2, swings it forward into the position shown by dotted lines in the same figure against the stop *m*, and turning the rock-shaft M' and its crank M^3 back into the position shown by dotted lines, Fig. 6, and, acting through the connecting-rod *v'* and arm *v*, swings the cam V forward into the position shown in Fig. 8. The front edge of the cam V, passing under the pin t^2, raises the tooth *t* into position to be engaged by a spur, *u*, on the side of the driving-gear U, as seen in Fig.

8. The mutilated gear T is thus turned sufficiently to bring its teeth into engagement with those of the driving-gear U, as seen in Fig. 9. The cam V standing quiescent while the blank, carriage remains at the front of the machine, the pin t^2 slides off from the outer face of said cam and the tooth t is returned by the spring t^3 to its middle or normal position, as seen in Fig. 7. The cam O^3, driven by the gear T through the sprocket-wheels Q Q' simultaneously with the cam O^2 in the direction indicated by the arrow, Fig. 14, clears the friction-wheel o^3 and lever O^4, and the weight O^5 carries the upper clamping-head down upon the blank, as seen in Fig. 15. The points or spurs in the face of said clamping-head engaging the blank prevent the same from being turned or displaced by the rounding-heads. Both the clamping-heads O O', with the lever O^4 and weight O^5, are now sustained by the cam O^2, which rotates simultaneously and in the same direction with cam O^3, lifts the clamping-heads as the friction-roller o' traverses that portion of its periphery from 1 to 2, and elevates the blank into engagement with the upper rounding-head, S, as shown in Fig. 16, the saws s s rounding the head, and the knives s' s' chamfering it on the upper side or edge as the roller o' traverses that part of said cam from 2 to 3. While the roller o' traverses that part of the periphery of cam O^2 from 3 to 4, which is concentric with shaft q, the barrel-head is held in the same vertical position, and the cam P^3, acting upon the upper roller, p, lifts the bar P, carrying the wedge or cam-plate p^2 under the roller p^4 in draw-bar p^6, moving the slide P^2 and the upper rounding-head secured thereto laterally to the right, as seen in Fig. 13, thus causing the chamfering-knives s' s' and the vertical cutters s^2 s^2 to trim the head off on one side and make the same slightly oval, with its greatest diameter across the grain of the wood. This becomes necessary for tight barrels particularly, as in trussing and hooping the barrel the heads are considerably compressed across the grain of the wood, and if made perfectly round at the outset would be compressed to an oval form by trussing and hooping. As soon as the elevated portion of cam P^3 passes the upper roller, p, the bar P is withdrawn to its middle position, the wedge-plate p^2 releases the roller p^4, and the slide P^2, with the rounding-head S, is forced back to its normal position against the stop p^7 by the spring p^8. The friction-roller o', passing the point 4 and traversing that portion of the periphery of cam O^2 between 4 and 5, allows the clamping-heads, actuated by their own weight and the weighted lever O^4, to descend and carry the partially-formed barrel-head into engagement with the lower rounding-head, R, as shown in Fig. 17, the cutters r r chamfering the barrel-head on the lower side or edge. While the roller o' traverses that part of the periphery of the cam O^2 between the points 5 and 6, concentric with the axis of rotation, the barrel-head is sustained in the same vertical position, while the cam P^3 forces the wedge-plate p' down against the friction-roller p^3 and moves the slide P' and lower rounding-head sidewise, thus chamfering the lower side or edge of the barrel-head slightly oval to correspond with the upper chamfered edge, formed as previously described.

The arms r r of the lower rounding-head, R, may be adjusted radially, so as to leave a square or vertical edge between the chamfered or beveled faces, or so as to produce a sharp V-shaped edge. As the elevated portion of the cam P^3 clears the lower friction-roller, p, the bar P returns to its middle position, and the slide P' is forced by the adjacent spring p^8 back against its stop p^7, as seen in Fig. 13. The cam O^2, working with the friction-roller o' from 6 to 1, raises the rounding-table O to a level a little below the planer-bed E^3, as seen in Fig. 3. Said friction-roller o' then drops into a depression at 1 in said cam, as shown in Figs. 4 and 14. At the same time the elevated portion of cam O^3 raises the clamping-head O' sufficiently to allow the carriage A to pass under it with the next head, and the friction-roller o^3 drops into a depression in the periphery of said cam, thereby arresting the movement of the clamping-heads and their actuating-cams, that part of the mutilated gear T free from teeth having returned to the starting-point adjacent to the gear U, as shown by dotted lines, Figs. 5 and 7. The pin t^2 of the sliding tooth t, arriving at the rear edge of cam V, as shown by dotted lines, Fig. 9, passes under the shoulder thereof, as seen in Fig. 10, forcing said tooth down and straining the spring t^3, as shown by full lines, Fig. 5, and by dotted lines, Fig. 7. Another blank-head having been placed and dogged in the carriage A, as previously described, the straight belt is shifted by the operator upon the tight pulley k^1 by means of the lever L'. As the carriage moves forward, the lever M is forced to follow it by the spring m^2 (shown in Fig. 2) till it strikes the stop m', thus operating, through the rock-shaft M, crank M^3, and connecting-rod v', to throw the cam V back and release the pin t^2, which is moved by the spring t^3 into its middle position, (shown in Fig. 7,) to be raised by the next advance movement of said cam, as previously described.

The attachment of the draw-bars p^5 p^6 to the slides P' P^2 may be so adjusted as to produce a greater or less sidewise movement to the rounding-heads and to make the heading more or less oval, as required, according to the material, it being necessary to make them more oval of soft material and less oval of hard wood. Whenever it is desired to run the blank-head back with the carriage A and plane both sides, or make two cuts on a single side before depositing it upon the rounding-head O, the handle a^5 of the dogging-cam A^2 is turned upon its joint (without turning the cam) so as to clear the standard N^4, and thus prevent releasing the blank at that point. The pin m^4 being removed, the dog m^3, Fig. 1, may

be turned in, so as not to engage the lever M on the return of the carriage and set the clamping-head and their cams in motion.

Various changes may be made in the details of construction, and the arrangement of the parts of my improved machine may be variously modified without departure from the spirit of my invention. To give the oval shape to the heading, a lateral movement may be given to the clamping-heads instead of the rotary cutters, and the rotary cutters may be moved vertically instead of the work.

I claim—

1. The combination, in a barrel-head-making machine, of a jointer, a reciprocating carriage movable past said jointer, a grooved rail-support, a flexible rail inserted in said grooved support and engaging with and guiding said carriage, and adjusting-screws bearing against the sides of said rail and arranged to bend the same laterally to the desired curvature, substantially as and for the purposes set forth.

2. The combination, in a barrel-head-making machine, of a jointer, a carriage movable past said jointer, and carriage-ways supporting and guiding said carriage, one of said ways being adjustable vertically and one adjustable laterally to the desired curvature, substantially as and for the purposes set forth.

3. The combination, in a barrel-head-making machine, with the supporting-frame, of rounding mechanism, a rotary planer and carriage-ways mounted upon said frame, and a reciprocating carriage movable upon said ways and arranged to convey a blank past and in contact with said planer to said rounding mechanism, substantially as and for the purposes set forth.

4. The combination, in a barrel-head-making machine, with the rounding mechanism, of a rotary planer, a reciprocating carriage arranged to carry a blank past said planer in position to be operated upon thereby and to deliver said blank to said rounding mechanism, a jointer mounted upon the planer-arbor, a carriage movable upon ways past said jointer, and doweling-bits supported in bearings adjacent to said jointer and connected with each other and to said planer-arbor by suitable driving mechanism, substantially as and for the purposes set forth.

5. In a barrel-head-making machine, the combination of a planer-cylinder, a jointer mounted upon one end of the planer-arbor, a saw mounted upon the other end of said arbor, a carriage movable past said jointer upon ways transverse to the planer-arbor and arranged to support the blank-sections in proper position to be operated upon by said jointer, a blank-carriage provided with a gage and movable on ways past and parallel with the plane of said saw, and a blank-carriage movable on ways oblique to the planer-cylinder and arranged to carry a blank past said cylinder in position to be planed thereby on one side, substantially as and for the purposes set forth.

6. The combination, in a barrel-head-making machine, of a rotary planer, a blank-carriage movable past the same on ways oblique thereto, a jointer mounted upon one end of the planer-arbor, a saw mounted upon the end of said arbor, a blank-section carriage movable past said jointer on ways transverse to said arbor, a blank-carriage provided with a laterally-adjustable gage and movable on ways past said saw parallel with the plane thereof, and doweling-bits located adjacent to said jointer and driven by suitable mechanism from said planer-arbor, substantially as and for the purposes set forth.

7. The combination, in a barrel-head-making machine, of the planer, a carriage for carrying the blanks over said planer, a trimming-saw mounted upon the planer-arbor, and a carriage provided with an adjustable gage and arranged to support a blank and carry the same past said saw in position to be trimmed to the proper size for the planer-carriage, substantially as and for the purposes set forth.

8. The combination, in a barrel-head-making machine, with the rounding mechanism, of a yielding bed or rest, a planer located between said rounding mechanism and said bed or rest, a reciprocating carriage movable past said planer and arranged to receive a blank from said bed or rest and carry the same past said planer in position to be operated upon thereby to said rounding mechanism, and a gage plate or frame arranged to fold over said bed or rest and bring the blank thereon to the required level in said carriage, substantially as and for the purposes set forth.

9. The combination, in a barrel-head-making machine, of a blank-carriage provided with dogs arranged to engage and hold a blank therein, a plate or frame hinged to the machine and arranged to fold over a blank in said carriage, and a clamp connected with said plate or frame and arranged to press and hold the sections of a blank together until it is dogged in said carriage, substantially as and for the purposes set forth.

10. The combination, in a barrel-head-making machine, of a blank-carriage, rest-bars supported on vertical stems resting in turn upon springs, a gage plate or frame hinged to the machine and provided with adjusting-bolts for straightening and holding the blank in the proper position to be secured in said carriage, a cam connected with the free end of said gage frame or plate and arranged to lock the same to said carriage and at the same time to force the joints of the blank together, and a spring arranged to throw said gage plate or frame back when released, substantially as and for the purposes set forth.

11. The combination, in a barrel-head-making machine, of rounding mechanism, a blank-carriage provided with dogs secured on one side of said carriage in a laterally-sliding bar, a cam provided with a handle arranged to move said dog-bar laterally, and a trip arranged to engage the handle of said cam and release the

blank in position to be operated upon by said rounding mechanism, substantially as and for the purposes set forth.

12. The combination, in a barrel-head-making machine, of rounding mechanism, a carriage arranged to receive and convey a blank to said rounding mechanism, dogs for securing the blank in said carriage, and an arm arranged to operate one or more of said dogs and to be turned by a projection upon the machine-frame, and thereby release said blank when it has been carried by said carriage into position to be received by the rounding mechanism, substantially as and for the purposes set forth.

13. The combination, in a barrel-head-making machine, of rounding mechanism, a reciprocating carriage arranged to receive and convey a blank to said rounding mechanism, dogs located in the path of said carriage adjacent to said rounding mechanism and arranged to engage the rear edge of said blank as it is brought by said carriage into position to be operated upon by said rounding mechanism and to prevent its withdrawal therefrom by the return movement of said carriage, substantially as and for the purposes set forth.

14. The combination, in a barrel-head-making machine, of rounding mechanism, a rotary planer, a reciprocating carriage provided with dogs for holding a blank therein and arranged to convey the blank past said planer to said rounding mechanism, an arm arranged to operate one or more of said dogs and to be turned by a fixed stop and thereby release the blank in position to be operated upon by said rounding mechanism, and dogs located in the path of said carriage and arranged to engage the rear edge of said blank and prevent its withdrawal by the carriage from said rounding mechanism, substantially as and for the purposes set forth.

15. The combination, in a barrel-head-making machine, of rounding mechanism, a reciprocating carriage provided with a movable dog arranged to engage a blank therein, a stop located adjacent to the path of said carriage, and a jointed arm pivoted to said carriage and connected with said dog and arranged to be turned to engage said stop or to clear the same, as desired, substantially as and for the purposes set forth.

16. The combination, in a barrel-head-making machine, of rounding mechanism, a carriage arranged to convey the blanks thereto, dogs for holding the blanks in said carriage, a cam arranged to work a dog or dogs on one side of said carriage and provided with an arm, a stop located adjacent to the path of said carriage so as to engage said arm, and a spring working with and arranged to further turn said cam so as to permit the complete withdrawal of said dog or dogs from the blanks, substantially as and for the purposes set forth.

17. The combination, in a barrel-head-making machine, of rounding mechanism, a carriage arranged to convey the blanks thereto, dogs secured in one side of said carriage and in a laterally-sliding bar on the other side thereof, a cam or eccentric working with said sliding bar, and a spring or springs holding said sliding bar in contact with said cam or eccentric and withdrawing the dogs when released from said blank, substantially as and for the purposes set forth.

18. The combination, in a barrel-head-making machine, of rounding mechanism, a carriage arranged to convey the blanks thereto, dogs secured in one side of said carriage, a laterally-sliding bar provided with dogs on the other side of said carriage, and a spring-actuated plate arranged to force the blank off from said dogs when released, substantially as and for the purposes set forth.

19. The combination, in a barrel-head-making machine, of a pair of cutter-heads, a pair of clamping-heads set between and parallel with said cutter-heads and movable in the line of their axes toward and from each other, the heads of one of said pairs being laterally movable transversely to their axes, mechanism arranged to move said heads laterally, and mechanism connected with and arranged to rotate the heads of one of said pairs, substantially as and for the purposes set forth.

20. The combination, in a barrel-head-making machine, of a pair of rotary cutter-heads movable transversely to their axes, a pair of clamping-heads movable in the direction of their axes and located between said cutter-heads, mechanism arranged to move said clamping-heads axially and carry the blank into contact with the knives of the cutter-heads, and mechanism arranged to move said cutter-heads transversely to their axes, so as to cut the heading oval, substantially as and for the purposes set forth.

21. The combination, in a barrel-head-making machine, of rotary cutter-heads mounted upon slides movable transversely to their axes, a support for holding the blank in position to be operated upon by said cutter-heads, and a vertically-sliding bar provided with cam plates or faces engaging the slides of the cutter-heads and arranged to move said slides and cutter-heads laterally, so as to cut the heading oval, substantially as and for the purposes set forth.

22. The combination, in a barrel-head-making machine, of the rounding-heads, a support for holding a blank in position to be operated upon thereby, slides carrying said cutter-heads and movable transversely to their axes, draw-bars adjustably attached to said slides, and a sliding bar provided with inclined faces working with said draw-bars and arranged to move said rounding-heads laterally, substantially as and for the purposes set forth.

23. In a barrel-head-making machine, the combination of rounding-heads, clamping-heads supported upon the adjacent ends of vertically-sliding shafts, a cam working with the shaft of the lower clamping-head, a weighted lever connected with the shaft of the upper

clamping-head, and a cam working with said lever, substantially as and for the purpose set forth.

24. In a barrel-head-making machine, the combination of the rotary rounding-heads, clamping-heads upon the adjacent ends of vertically-sliding shafts passing through said rounding-heads, a weighted lever connected with the shaft of the upper clamping-head, a cam supporting the lower clamping-head and arranged to move the blank into position to be operated upon by said rounding-heads, and a cam sustaining the weighted lever and upper clamping-head when the rounding mechanism is not in operation, substantially as and for the purposes set forth.

25. In a barrel-head-making machine, the combination of the rounding-heads, clamping-heads located between said rounding-heads and movable axially with reference thereto, a carriage arranged to deliver the blanks between said clamping-heads, a cam working with said clamping-heads and arranged to move the blank into position to be operated upon by said rounding-heads, cam-actuating gear, and a trip-lever arranged to set said cam in motion, substantially as and for the purposes set forth.

26. In a barrel-head-making machine, the combination of the rounding-heads, clamping-heads located between said rounding-heads and arranged to support the blanks in proper position to be operated upon by said rounding-heads, a carriage arranged to deliver a blank between said clamping-heads, a cam arranged to raise and lower said clamping-heads, a mutilated gear upon the cam-shaft working with a driving-gear and provided with a sliding tooth, and a cam connected with a tripping-lever and arranged to force said sliding tooth into engagement with a tooth on the driving-gear, and thereby turn the mutilated gear into engagement therewith, substantially as and for the purposes set forth.

27. The combination, in a barrel-head-making machine, of a blank-carriage, rotary rounding-heads, vertically-movable clamping-heads, a cam supporting the lower clamping-head and arranged to move the blank into contact with the cutters on the rounding-heads, a mutilated gear mounted upon the cam-shaft and provided with a sliding tooth, and a driving-gear working with said mutilated gear, a cam, V, arranged to force said sliding tooth into engagement with a spur on the driving-gear, and a lever connected with said cam V and arranged to be operated by projections on the blank-carriage, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSIAH J. PHILBRICK.

Witnesses:

LEWIS M. OGDEN,

CHAS. L. GOSS.