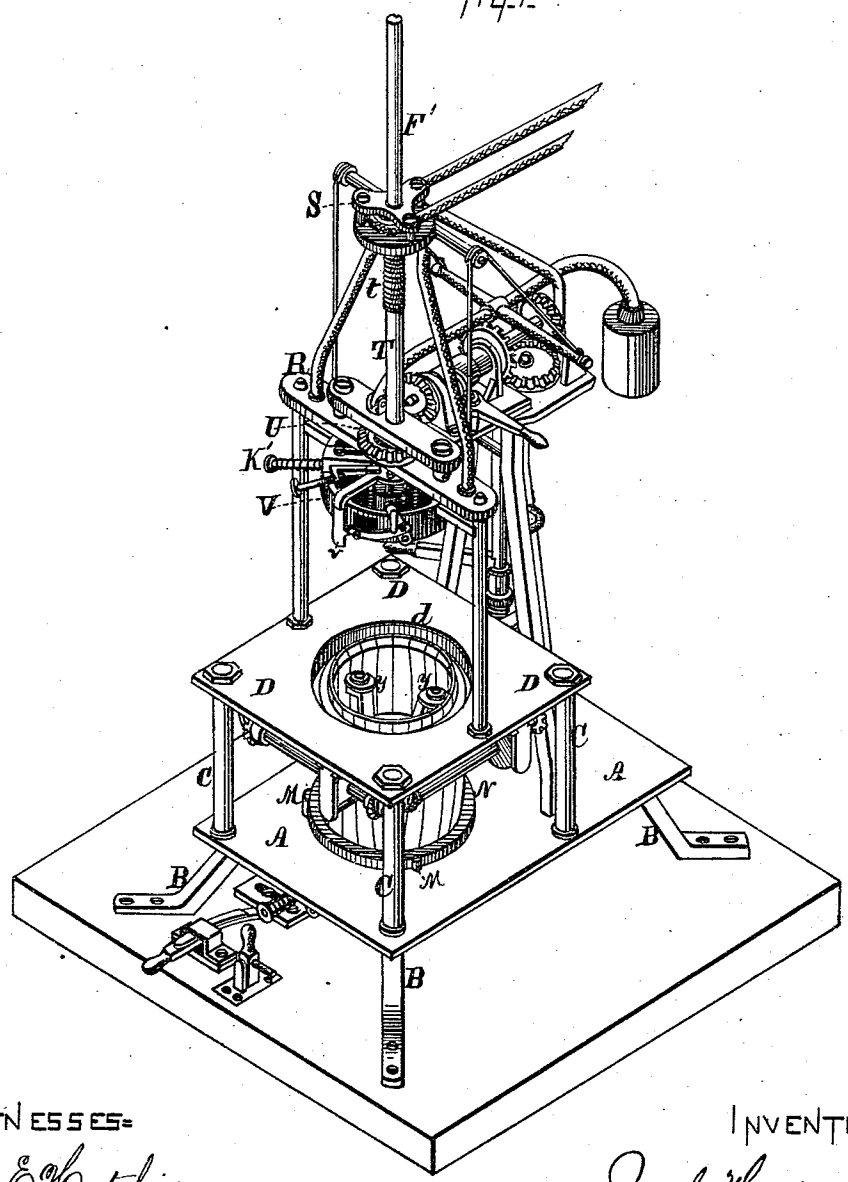
6 Sheets--Sheet 1.

J. MARTIN.

Machine for Making Barrels.

No. 161,251. Patented March 23, 1875.

Fig. 1.



WITNESSES:

Jas. E. Hutchinson

John R. Young

INVENTOR.

Jacob Martin, by

Prindle and Lovejoy Attys

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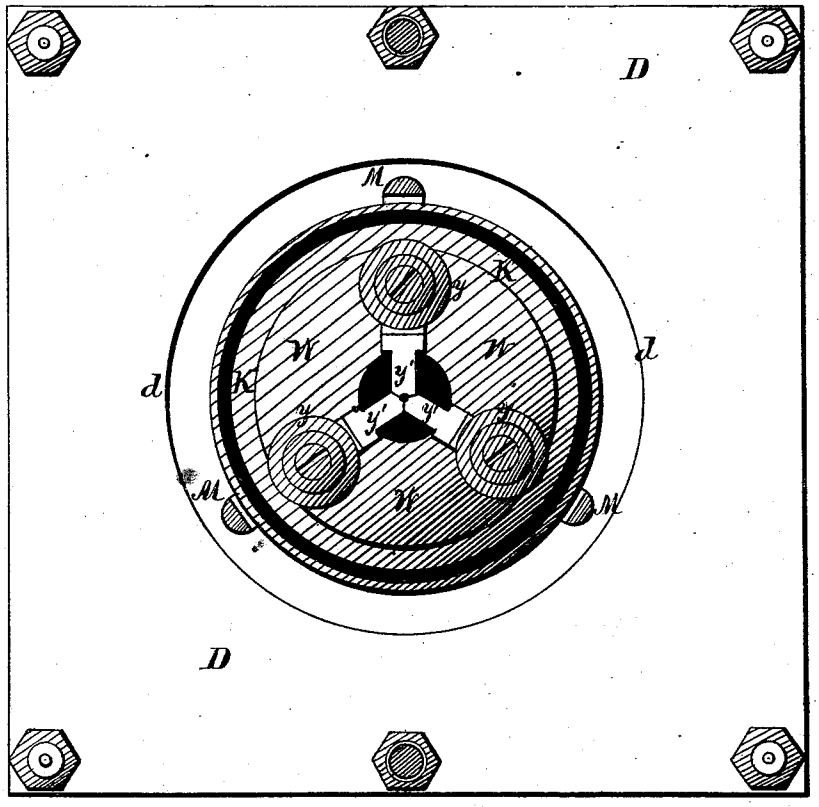
Fig. 2.



WITNESSES:

Jas. E. Hutchinson

John R. Young

INVENTOR.

Jacob Martin, by

Prindle and Co. his Attys

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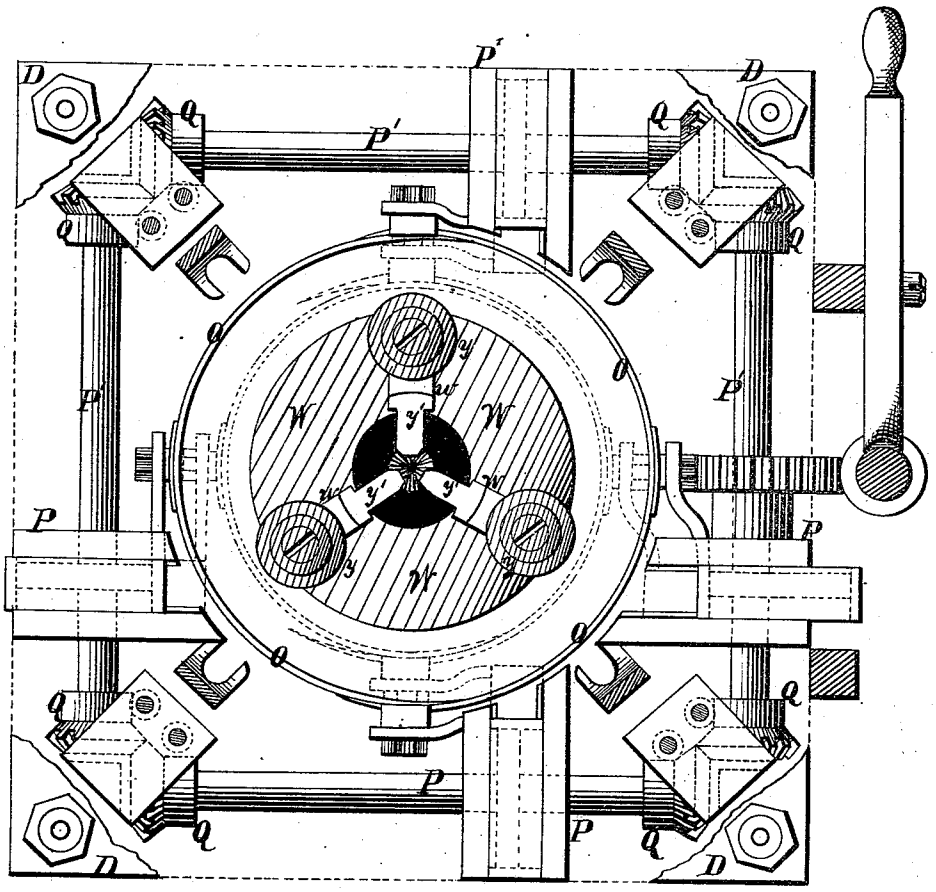
Fig. 3.



WITNESSES:
Jas. E. Hutchinson
John R. Young

INVENTOR.
Jacob Martin, by
Prindle and Co., his Attys

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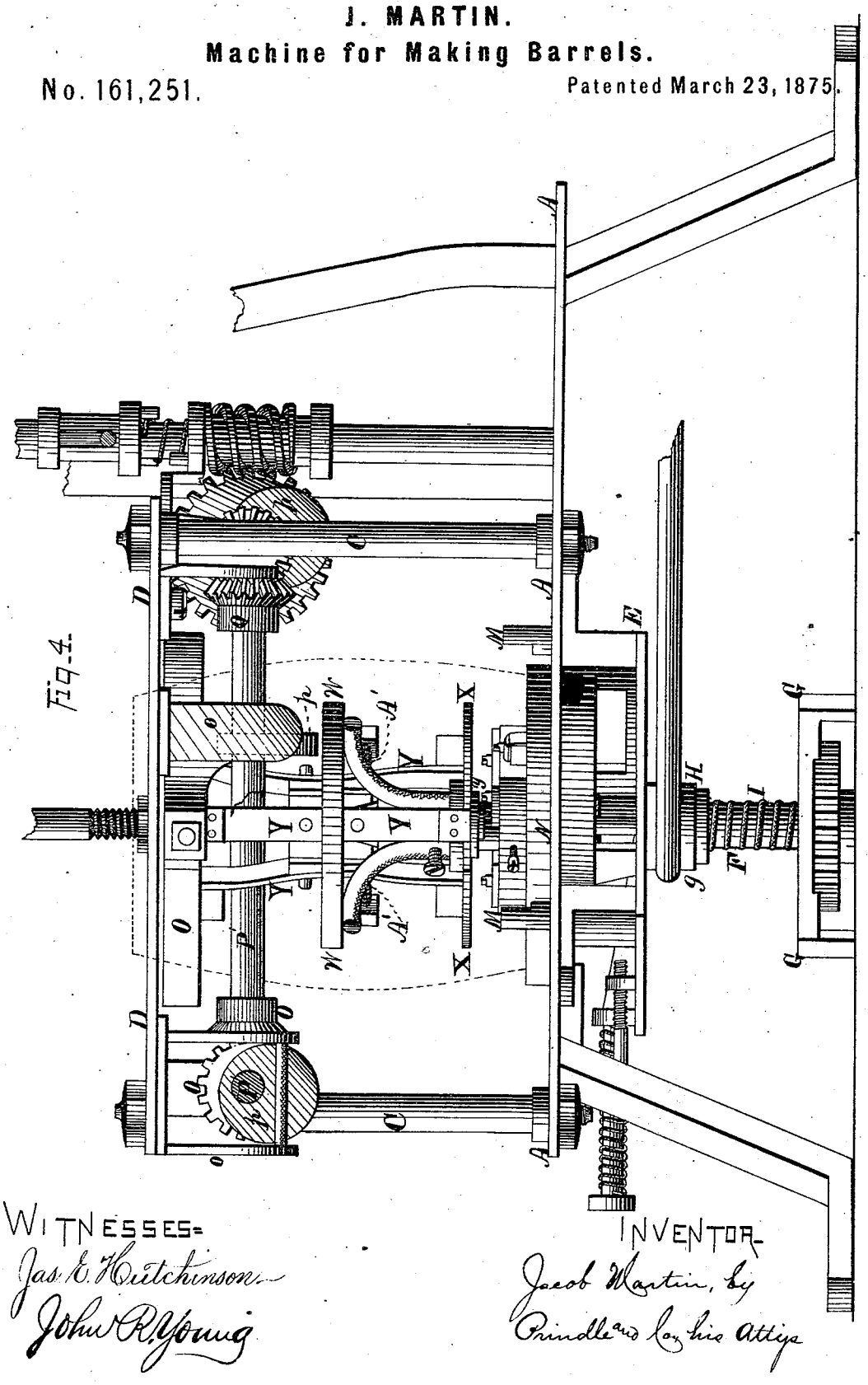

Fig. 4.

WITNESSES:
Jas. E. Hutchinson
John R. Young

INVENTOR:
Jacob Martin, by
Prindle and Lay his Attys

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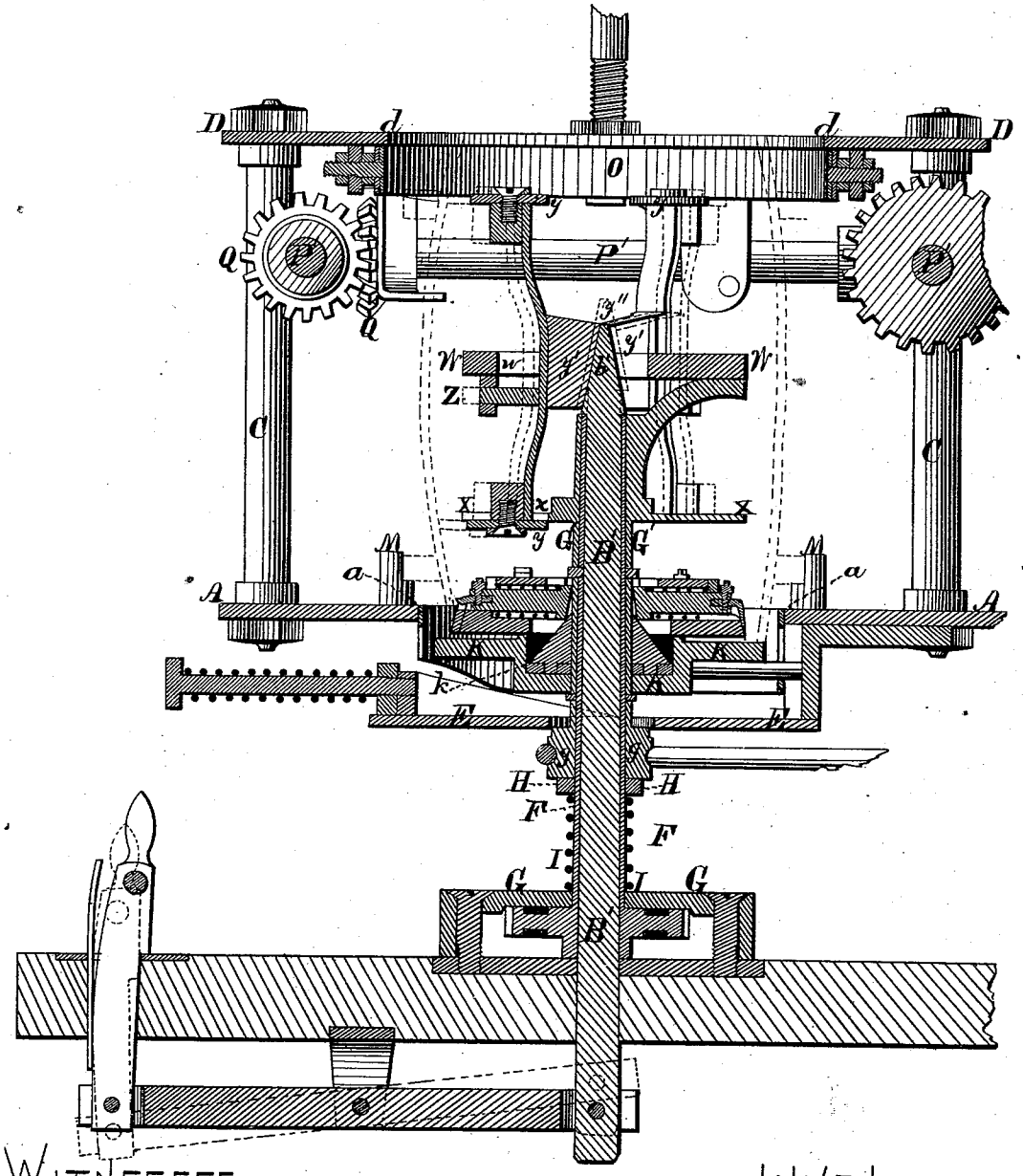
Fig. 5.



WITNESSES=
Jas. C. Hutchinson
John R. Young

INVENTOR.
Jacob Martin, by
Prindle and Co., his Attys.

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Fig. 6.

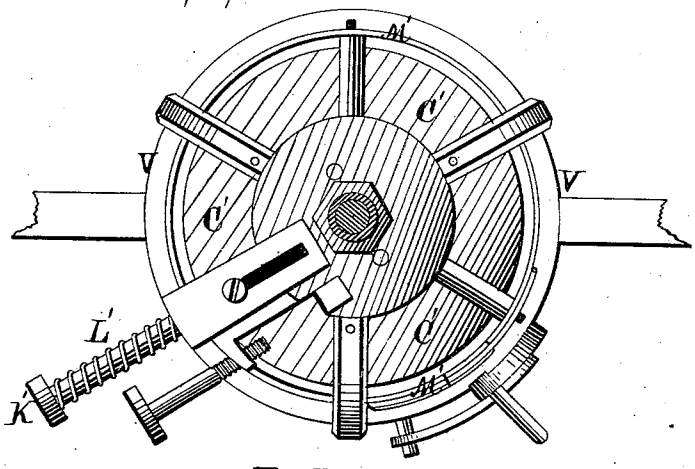


Fig. 7.

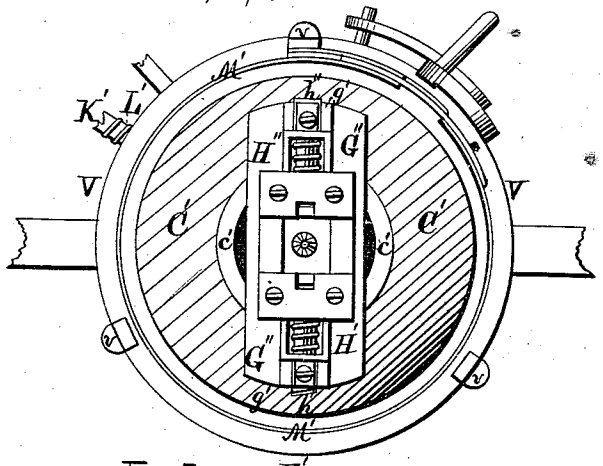
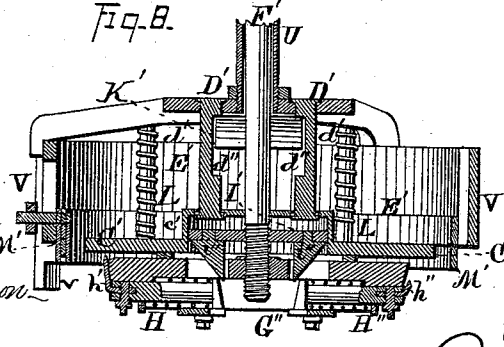


Fig. 8.



WITNESSES:

Jas. E. Hutchinson

John R. Young

INVENTOR.

Jacob Martin, by

Prindle and Lochie Attys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

JACOB MARTIN, OF CAIRO, ILLINOIS.

IMPROVEMENT IN MACHINES FOR MAKING BARRELS.

Specification forming part of Letters Patent No. **161,251**, dated March 23, 1875; application filed January 28, 1875.

To all whom it may concern:

Be it known that I, JACOB MARTIN, of Cairo, in the county of Alexander and in the State of Illinois, have invented certain new and useful Improvements in Machines for Making Barrels; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a perspective view of my improved machine as arranged for use. Fig. 2 is a plan view of the upper side of the stand for receiving the staves, and for confining the same in position. Fig. 3 is a like view of the same, the upper plate being removed, so as to show the operative mechanism. Fig. 4 is a side elevation of said parts, the dotted lines showing the position of the barrel. Fig. 5 is a vertical central section upon line *x x* of Fig. 3. Figs. 6 and 7 are plan views of the upper and lower sides, respectively, of one of the heads employed for confining the staves in position, and for crozing and chamfering the same; and Fig. 8 is a vertical central section of the same.

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

The design of this invention is to enable barrels to be trussed, chamfered, and crozed with ease, uniformity, dispatch, and thoroughness; and to this end it consists, principally, in the means employed for compressing the upper ends of the staves, and for holding the same in position to receive the truss-hoop, substantially as is hereinafter specified. It consists, further, in the means employed for placing the truss-hoops in position upon the staves, substantially as is hereinafter shown. It consists, further, in the means employed for bringing the outer faces of the staves into line circumferentially, substantially as and for the purpose hereinafter set forth. It consists, further, in the means employed for cutting the chamfer and croze within the ends of the barrel, substantially as is hereinafter shown and described. It consists, finally, in the means employed for confining the ends of the staves during the operation of cutting the chamfer and croze, substantially as is hereinafter specified.

In the annexed drawings, A represents a metal plate that forms the base of my machine, and is supported in a horizontal position by means of suitable feet B and B. Secured within the outer portions of the plate A are four standards, C C, &c., which extend vertically upward therefrom, and, at a height somewhat less than that of a barrel, are secured to and support a second plate, D, said latter plate being also horizontal.

A round opening, *a*, slightly larger than the exterior dimensions of a barrel end, is provided at the center of the lower plate A, while a similar but larger opening, *d*, is formed in and through the upper plate D.

At a short distance below the lower plate A is rigidly secured a plate, E, which is somewhat larger than the opening *a*, and furnishes a bearing for the upper portion of a hollow vertical shaft, F, the lower end of which is sustained within a step or second bearing, G, such arrangement enabling said shaft to be rotated freely when desired.

Journaled loosely upon the shaft F is a sleeve, G′, which, at its lower end, rests upon a collar or bearing, H, that in turn rests upon, and is supported by, a spiral spring, I, which spring is coiled around said shaft, and extends between said collar and the step G. Fitted loosely around the sleeve G′, and within the opening *a* of the plate A, is a circular disk, K, which, at its center, is depressed, so as to form a recess, *k*, that has a cylindrical form. The lower side of said disk bears at its center upon a collar or enlargement, *g*, upon said sleeve G′, which collar prevents the depression of said disk without at the same time depressing said sleeve, while the upward motion of both parts is limited by two rods, L and L, that pass loosely through corresponding openings in said disk and the plate E, and have their ends enlarged or headed.

The disk K has substantially the same horizontal dimensions as the end of a barrel, and forms a bearing or support for the lower ends of the staves preparatory to the trussing of the same into the form of a barrel, said staves being permitted to incline outward and rest against the edges of the openings *a* and *d*.

Three or more studs, M M, &c., are placed

vertically within the plate A, near the edge of the opening *a*, and are recessed out at their inner sides, so as to permit the lower truss-hoop N to rest loosely therein, but at a point so near the lower ends of the staves as to offer no obstacle to their free arrangement, as described.

When the staves are in the position described, it becomes necessary that their upper ends should be drawn inward sufficiently to enable the upper truss-hoop N to be passed over the same, which said operation is effected by the following-described mechanism: A circular metal band, O, divided at two or more points, and having its ends overlapping, is arranged within suitable guides P P, &c., upon the lower side of the plate D, and immediately outside of the opening *d*. To each side of the band O is attached a yoke, *o*, (shown in Fig. 4,) which yoke is capable of a radial horizontal motion within suitable guides, that are also attached to or upon the lower face of the plate D. Four shafts, P′ P′, &c., are journaled upon the lower face, and near the outer edge, at each side of the plate D, and are connected at their ends by means of beveled pinions Q and Q, so that motion imparted to one shaft will be communicated to each of the other shafts. Upon each shaft P′, where it passes through the yoke *o*, is secured an eccentric, *p*, that closely fills said yoke radially, and, when rotated with its shaft, causes said yoke, and the portion of the band O attached thereto, to be moved toward or from the center of the machine.

If, now, the staves are placed in position and said shafts caused to revolve, it will be found that the sides of the sectional band will simultaneously move toward the center and compress the staves to any desired degree.

It is intended that the throw of the eccentrics shall be just sufficient to compress the staves until they will receive the truss-hoop, and that said eccentrics shall, by moving continuously in one direction, expand said band to its normal size.

The next operation consists in placing the upper truss-hoop in position, and forcing the same upon the staves, and at the same time forcing the latter downward through the lower truss-hoop, which operation is effected in the following manner: Journaled within suitable bearings R and S, above the plate D, is a vertical hollow shaft, T, which has such length as to permit its lower end to be brought to or below said plate, and to be raised above the same to a height somewhat greater than that of a barrel. The upper portion of said shaft is threaded, and passes through a nut, which, by suitable gearing, may be caused to revolve, so as to force said shaft downward or draw it upward within the limits of said thread.

Upon the lower end of the shaft T is secured a head, V, which corresponds in size and shape to the exterior of a truss-hoop, N, and at three or more points upon its periphery is provided with vertical pins *v v*, &c., which extend below said head, and are recessed upon their inner sides, so as to enable said hoop to be placed between said pins, with its upper side against the lower face of said head.

The shaft T and its head are preferably so counterbalanced as to enable a slight force to move them in either direction vertically, so that when the nut U has lifted said parts until the threaded portion *t* has passed beyond said nut they may, by the hand of the operator, be moved to their highest limit, or, when at the latter point, may be moved downward until said threaded portion engages with said nut.

The upper truss-hoop N is now placed within the recessed studs or pins *v v*, &c., (where it is held in place by springs,) the head and shaft moved downward until the threaded portion of the latter engages with the nut U, and the latter caused to rotate, so as to continue the downward motion of said parts. The upper ends of the barrel-staves having been previously compressed by the sectional band O, the truss-hoop N is pressed downward over said staves until the friction becomes greater than the strength of the spring I, which supports the lower head or disk K, after which the barrel and said head are moved downward through the lower truss-hoop until the resistance of the latter equals the friction of the upper hoop. When both hoops N and N are driven to place the motion of the nut U is reversed, the upper head is raised until the threaded portion of the shaft has passed beyond said nut, after which said parts are moved upward out of the way of the removal of the trussed barrel. The lower head, when released from pressure, is raised to place by the spring I, and with it the barrel, which releases the lower truss-hoop from the supporting-studs M M, &c., and leaves the same upon the staves, while the upper hoop is, in a like manner, left by the withdrawal of the upper head.

In order that the outer surfaces of the staves may be brought into a line circumferentially, and the surface of the barrel caused to present a smooth appearance, it becomes necessary that each stave should be pressed firmly outward against the truss-hoops before the latter are forced entirely to position, to accomplish which result the following-described mechanism is employed: Two circular disks, W and X, are connected together, as shown in Figs. 3 and 5, and are secured upon the hollow shaft F in such position as to bring the upper disk W midway between the ends of a barrel that is placed within the machine. Within each disk W and X are provided three radial slots, *u* and *x*, respectively, and within said slots are placed three half-elliptical spring-bars, Y Y, &c., which latter have pivoted to each of their ends rollers *y y*, that rotate in horizontal planes. The central portion of each bar is attached to or upon a rod, Z, that is capable of radial horizontal motion only, and serves as a guide for and with which said bar moves. A spiral or other spring, A′, is arranged so as

to press each bar Y inward to its farthest limit, so as to prevent the rollers *y y*, &c., from coming into contact with the barrel-staves, except when it is desired to true up the latter, in which event said bars and rollers are moved radially outward by the following-described means: A solid shaft, B′, provided at its upper end with a conical point, *b′*, is placed within the hollow shaft F, and rendered vertically adjustable by suitable mechanism. The conical end *b′* comes opposite the centers of the roller-bars Y Y, &c., and at such points said bars are each provided with a lug, *y′*, that at its inner side corresponds to and bears upon said conical end.

If, now, the shaft B′ be moved upward, its conical end will force radially outward the roller-arms Y Y, and cause their rollers *y y*, &c., to bear against the staves of the barrel; and if, at the same time, said parts are caused to revolve, said rollers will be caused to travel successively over and press said staves outward.

By means of the spring given to the roller-bars a yielding pressure is given to each roller, which enables it to move over any inequalities of the inner surface of the barrel, and exert the desired pressure upon each stave.

The croze and chamfer within each end of the barrel are cut by similar mechanism, the only points of difference being such as are necessary to adapt the same to position, so that a description of the devices employed for operating within one end of said barrel will sufficiently illustrate the principle involved. For convenience the upper mechanism is selected for illustration. Within the head V is placed a disk, C′, which is exactly the reverse of the lower recessed disk K*k*, and is connected with said head by means of two vertical rods, D′ and D′, which pass loosely through suitable openings in said parts near their centers, and are headed at their ends, so as to limit the degree of motion apart without interfering with the freedom of motion toward each other of said head and disk. Suitable springs E′ and E′ are arranged to keep the disk C′ at the lower side of the head V, except when the former is arrested by contact with the upper end of a barrel, and the latter continues to move downward around said barrel end.

Journaled within the hollow shaft T is a solid shaft, F′, which, at its lower end, is provided with a bar, G″, that carries within a central longitudinal groove, *g′*, two heads, H′ and H″, which latter may be moved radially and horizontally outward, and when not thus moved are drawn inward by suitable springs. Within the outer end of one sliding head, H′, is secured a chamfer-cutter, *h′*, while the second head, H″, carries a croze-cutter, *h″*, of usual form. A circular disk, I′, is fitted loosely within the recess *c′* of the disk C′, and upon its lower side is provided with two radial lugs, *i″* and *i″*, which project downward upon opposite sides of the center, and, at their outer sides, incline upward and outward from their lower ends to the outer edge of said disk I′. The disk I′ is arranged so as to bring the inclined edges of its lugs *i″* and *i″* against the rear ends of the cutter-heads H′ and H″, when, by depressing the former, it will be seen that said lugs will operate as a wedge, and force said heads outward. To effect such result when the machine is in operation, a recess, *d′*, is formed within the inner face of each rod D′, and within the space thus formed is fitted a bar, K′, that, upon its inner end and lower side, has an inward and upward inclination. The bar K′ is forked at its inner end, so as to enable it to clear the shaft F′, and is so arranged as to be capable of longitudinal motion, a suitable spring, L′, being provided for the purpose of causing it to remain at its outward limit, except when intentionally moved inward. If, now, the bar K′ is pressed inward, its inclined or wedge-shaped end will pass over the shoulders *d″*, formed by the lower ends of the recess *d′*, and force the rods D′ downward, and with them the disk I′, by which means the cutter-heads will be moved outward, so as to bring their cutters into contact with the barrel-staves.

As the crozing and chamfering devices are only used when the head V has reached its lowest point, it will be seen that said devices and the disk C′ will be pressed upward within their head, so as to give to the rods D′ and D′ all necessary freedom of longitudinal motion.

A suitable adjustable stop should be provided for limiting and varying the motion of the bar K′, and, consequently, of the cutters. In order that the ends of the staves may be prevented from springing away from the cutters, a thin metal band, M′, is placed at and around each end of the barrel, and one end permanently attached to or upon some convenient portion of the machine, while the opposite or free end of said band is connected with some suitable device, by means of which the same may be drawn longitudinally, so as to lessen the space inclosed by said band. Before the cutting-tools are thrown outward into contact with the staves, the bands M′ and M′ are drawn closely around the ends of the latter, which are thus compressed to and confined closely in the position they are designed to occupy when the barrel is completed, and are prevented from springing outward during the operation of cutting the croze and chamfer.

The device is now complete, and is operated as follows: The truss-hoops being placed in position within their supports, the staves are arranged within the lower hoop and the opening in the upper plate, after which the sectional compressing-ring is caused to move inward, and confine in place the upper ends of the staves. The upper head, with its truss-hoop, is now moved downward until said hoop is in position, and the lower end of the barrel has been forced downward to a sufficient distance through the lower hoop, during which operation the outer surfaces of the staves are

brought into line by the rotation of the aligning-rollers. The confining-bands are now caused to embrace the ends of the staves, and the croze and chamfer cut in each end of the barrel, after which the upper head is raised and said barrel removed.

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

1. As a means for compressing the upper portion of a barrel, the circular sectional band O, arranged to expand and contract radially, and operated by means of the connected shafts P′ P′, &c., eccentrics *p p*, and yokes *o o*, substantially as specified.

2. In combination with the studs M M, for supporting the lower truss-hoop N, and with suitable mechanism for forcing the barrel-staves downward, the disk K, for supporting the ends of the staves, arranged to move vertically, and sustained in position by the yielding pressure of a spring, I, substantially as and for the purpose shown.

3. In combination with the upper truss-hoop N, the vertically-moving head V and studs *v v*, substantially as and for the purpose set forth.

4. In combination with the truss-hoops N and N, which operate as guides for limiting the radial motion of the staves, the rollers *y y*, journaled upon and rotating in horizontal planes with the spring-bars Y Y, caused to travel over the inner faces of barrel-staves, and forced outward with a yielding pressure against the same, substantially as and for the purpose shown and described.

5. The means employed for cutting a croze and chamfer within each end of a barrel, consisting of the cutters *h′* and *h″*, fixed within and moving radially with the sliding heads H′ and H″, and thrown outward by the wedge-bar K′, recessed rods D′ D′, disk I′, and inclined lugs *i″* and *i″*, said parts being combined to operate in the manner and for the purpose substantially as specified.

6. The metal band M′, made contractible, so as to be capable of closely embracing the ends of the staves, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of November, 1874.

JACOB MARTIN.

Witnesses:
GEO. S. PRINDLE,
WILLIAM FITCH.