2 Sheets—Sheet 1.

T. M. HEALEY.

MACHINES FOR MAKING BARRELS.

No. 180,815. Patented Aug. 8, 1876.

Fig. 1.

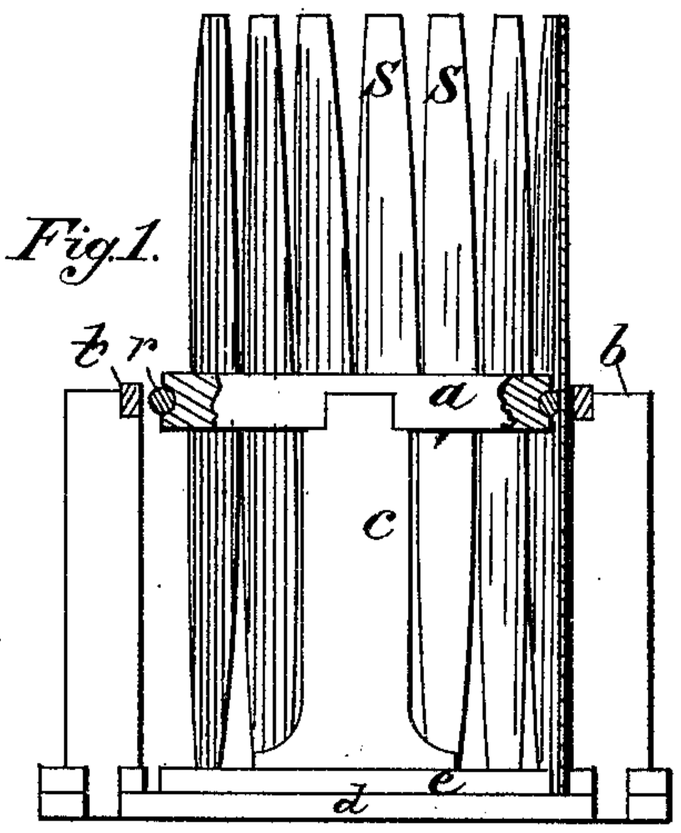


Fig. 5.

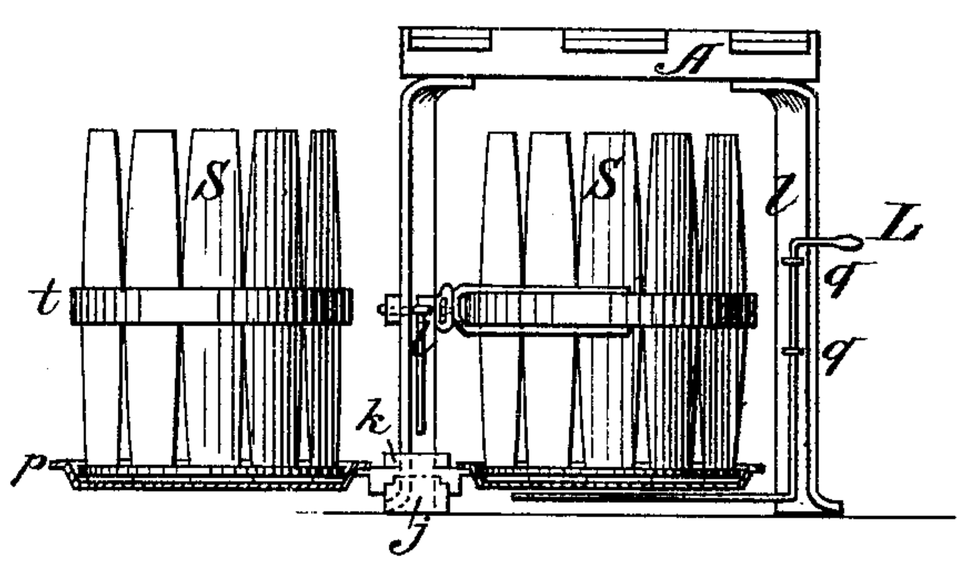


Fig. 2.

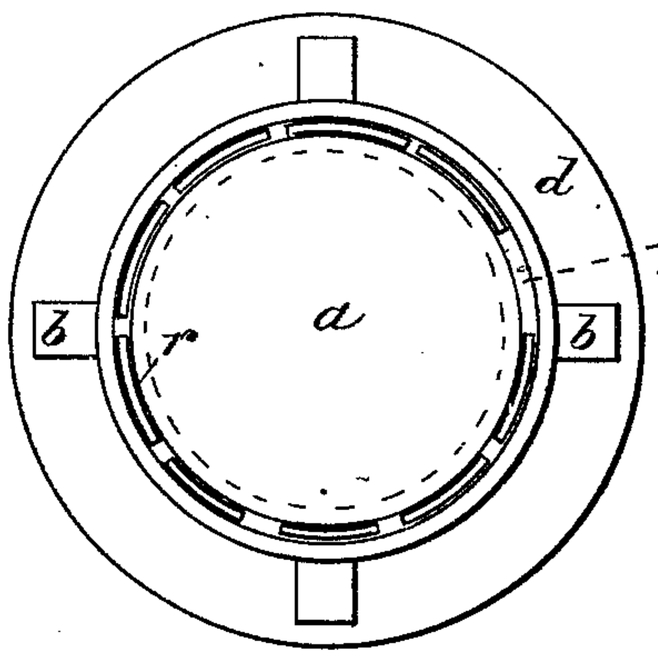


Fig. 4.

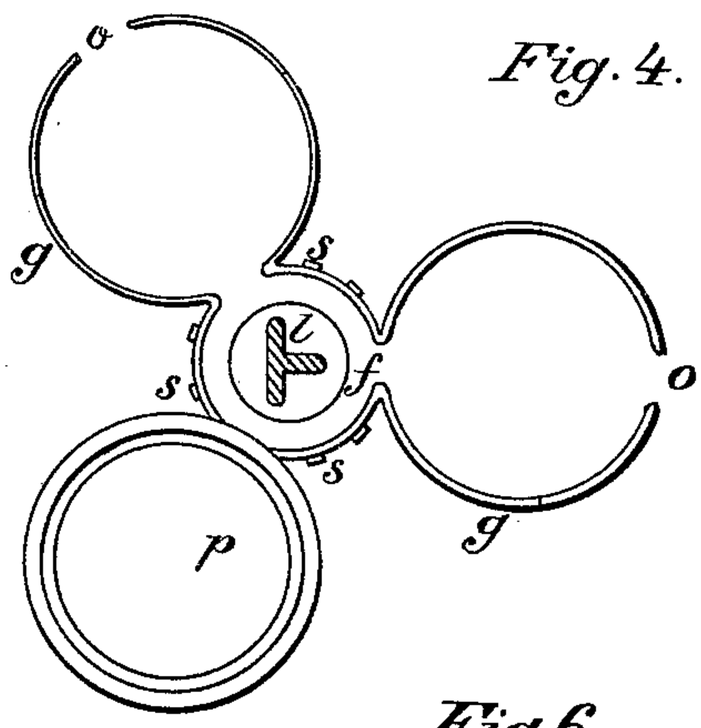


Fig. 3.

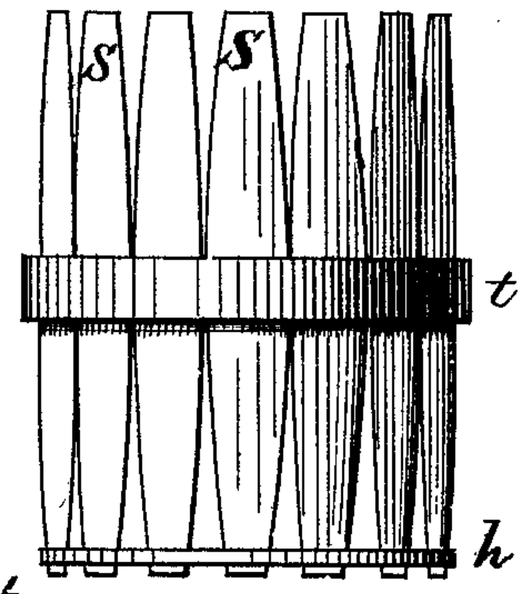
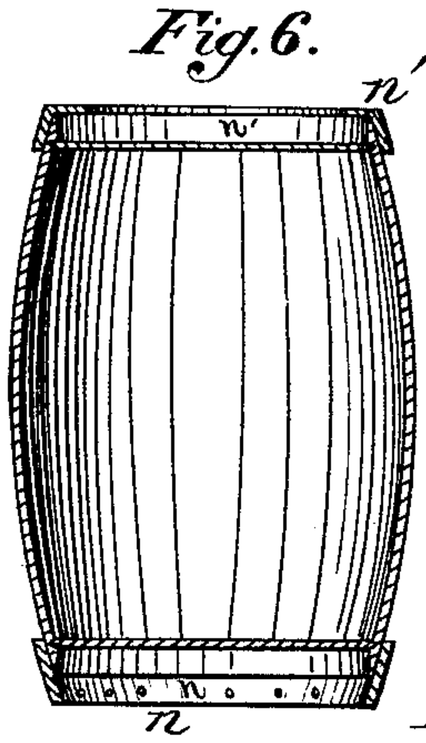


Fig. 6.



Attest:

Jno. D. Patten

H. J. England

Inventor.

Thos. M. Healey

2 Sheets—Sheet 2.

T. M. HEALEY.

MACHINES FOR MAKING BARRELS.

No. 180,815. Patented Aug. 8, 1876

Fig. 7.

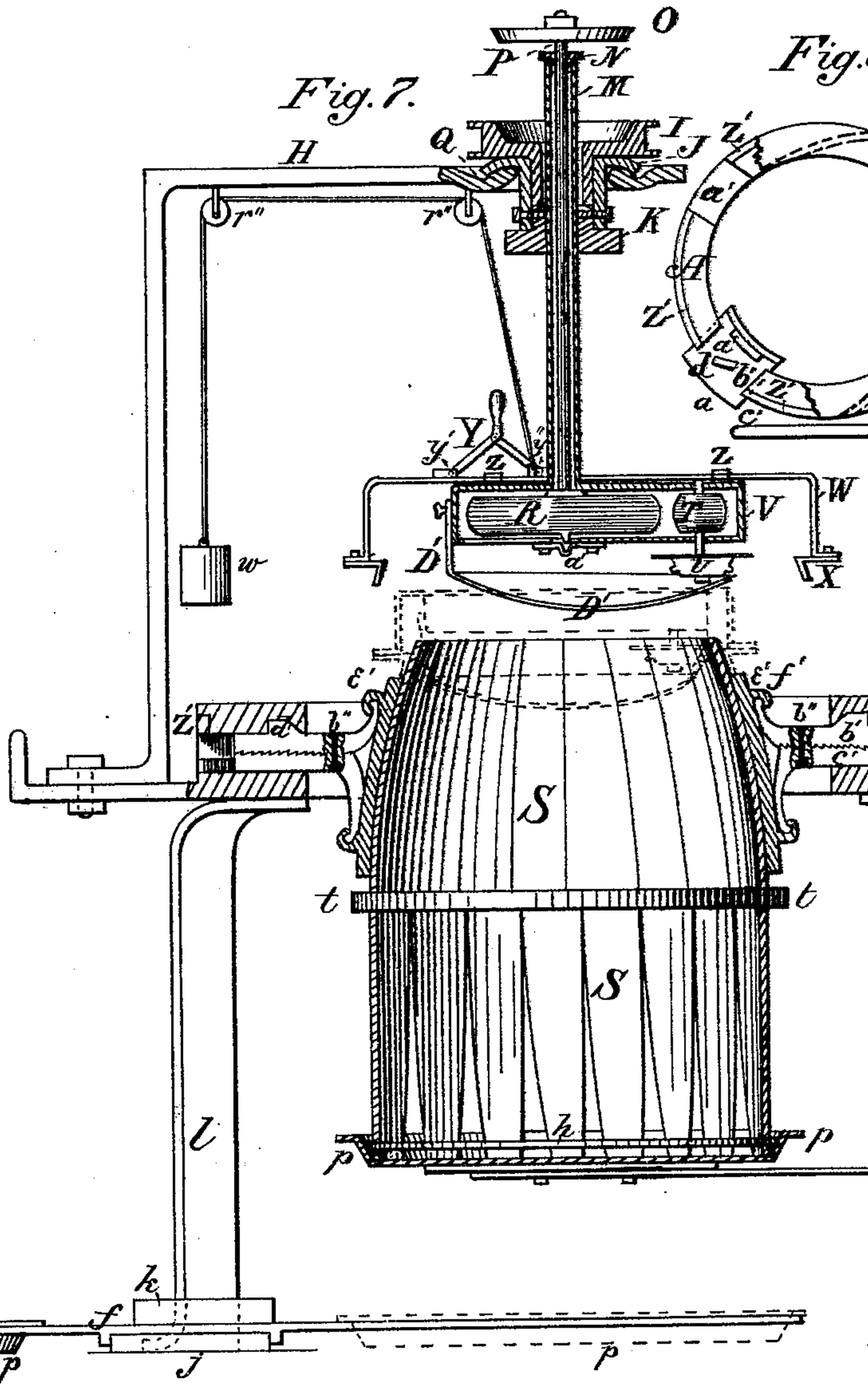


Fig. 8.

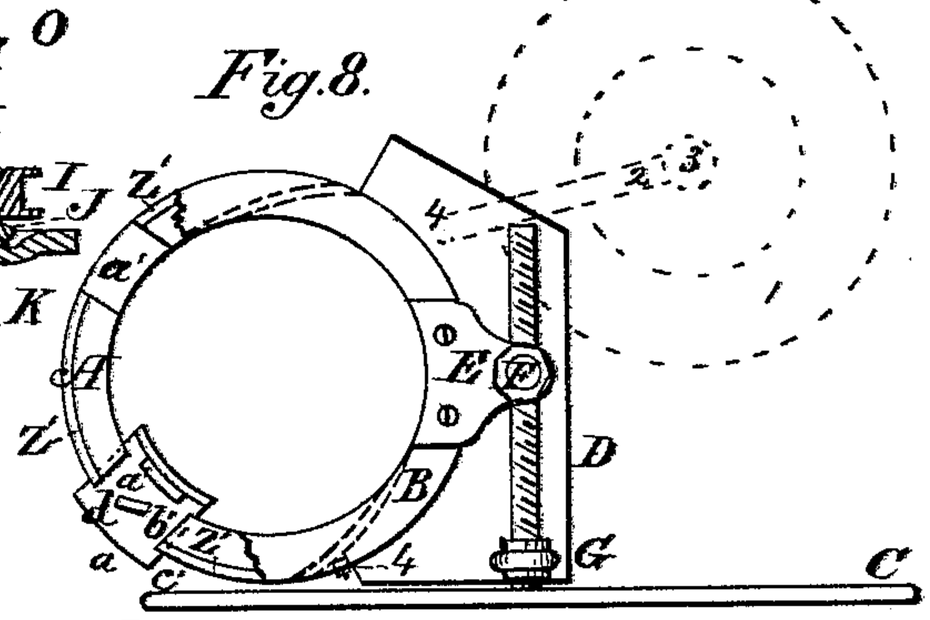


Fig. 9.

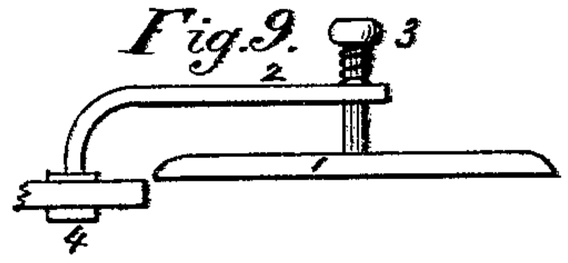
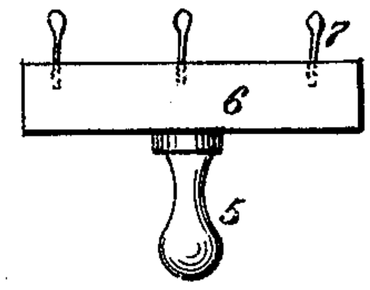


Fig. 10.



Attest:
Jno. D. Pytten,
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Inventor:
Thos. M. Healey

UNITED STATES PATENT OFFICE.

THOMAS M. HEALEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN MACHINES FOR MAKING BARRELS.

Specification forming part of Letters Patent No. **180,815,** dated August 8, 1876; application filed May 24, 1876.

To all whom it may concern:

Be it known that I, THOMAS M. HEALEY, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Machines for Making Barrels; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains 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.

Figure 1 is a section of device in which the cask-cylinders are set up and trussed on the bilge. Fig. 2 is a plan of the above, showing the position of the staves. Fig. 3 is a cask-cylinder or "blank" in central truss and end hoop. Fig. 4 is a plan view of cask-carrier or "feed-table," showing section of trusser-leg within the central body of the same. Fig. 5 is the same in position on trusser, filled with cask "blanks." Fig. 6 is the cask as it leaves the trusser. Fig. 7 is a section of trusser and crozer. Fig. 8 is a plan of trusser, showing top and lower rings of same, dog in place, driving-screw, and dotted lines representing plan of hoop-driver, and elevator-gage. Fig. 9 is a section of hoop-driver. Fig. 10 is a section of head-holding device.

The same letters and numbers represent like parts in all the figures.

The object of this invention is to cheapen and perfect the manufacture of casks and similar articles made from ordinary staves, as contradistinguished from seamless casks. It was formerly found to be practically impossible to produce casks from ordinary commercial staves, or staves made by ordinary stave-making machinery, that would be uniform in size and shape, one with another, so that hoops can be made for them in sets by measurement, with a certainty of properly hooping off any cask of a given size with any of the sets of hoops.

The ordinary cut or sawed stave is cut or sawed as near as may be with the grain of the wood, and its edges are tapered and beveled with the intention and upon the theory that, when the same number of staves of any given size and taper are set up into casks and snugly fitted together, and onto a uniform-sized head, by trussing, the resulting casks will be uniform in size and shape. Any deviation from the elements entering into the above formula vitiates the product, as far as regards its size and shape. Commercial staves do so deviate. They vary, owing to wear and tear in the machinery making them; in their shape, as component elements of the periphery of the cask; and they vary more notably with regard to the elements that are contributed to the shape of the cask by the bending of the stave, which bending is modified and made a varying quantity by the varying thickness, stiffness, and hardness of the wood composing the stave. Any variation in the length of the stave will give, when the cask-cylinder is leveled, a big end, owing to the fact that one end of the long stave is cut off nearer to the bilge than its neighbor, as the casks are all set up, as near as may be, level on one end in setting up the cask.

The process and machinery herein described overcome all of these defects, and while it cheapens the cost of the production of casks, so far as the raising, trussing, and working off are concerned, the resulting casks are always uniform in size and shape. The operation is always under the eye, and controlled by the hand, of the operator, who can see that the staves come together properly, and when the trussing shows defects in the staves (that appear only in trussing) that will interfere beyond his control with the production of a good cask, he can stop the operation of the machine at once, drop the cask-cylinder out, remove the defective stave or staves, and substitute good ones, and thus the percentage of unmerchantable casks or "culls" is reduced.

In the accompanying drawing my invention is shown as applied to the manufacture of casks from staves, either tight or slack.

The taper of the staves and the size of the head to be used being ascertained, a hoop, which I call the "central or bilge truss hoop," is made of such a size that the greatest number of small staves that are likely to be put in the hoop, in the ordinary handling and selection of the staves, shall give sufficient wood at the chime to make a good and merchantable cask. This hoop is then put in its place

in the following device, Figs. 1 and 2, Sheet 1, which I call the "setting-up device," to be filled with staves. This setting-up device consists of a circular disk or ring, *a*, of a diameter a little less than that of the interior of the cask at the bilge. It may be grooved around its edges, to contain the elastic pressure-roller *r*, as shown, and is supported upon a base, *d*, by an upright, *c*, of such length that it shall reach the middle of the height of the cask. The center truss-hoop before mentioned is supported around and concentric with this disk or ring upon suitable uprights *b b*, as shown. A second or lower disk or ring, *e*, can also be used, as shown, for the steadying of the staves which are to be placed in the open space between the disk and the central truss-hoop. The last stave to fill the space S′ is to be selected of such a size that when driven home to its place it will truss the cask upon the center or bilge within the bilge-hoop. A thin hoop, *h*, of a diameter a little less than the truss-hoop, is placed around the end of the set-up cask, which is then ready to be removed from the setting-up device.

In the manufacture of tight casks, the set-up staves are heated or steamed. Slack casks do not need steaming or firing, but are immediately placed upon the feed-table or movable support, one method of constructing which is shown in Fig. 4, Sheet 1. This movable support is so arranged with regard to the trusser that any of the casks it carries can, at will, be made to come centrally opposite the opening of the same.

The movable feed-table, Figs. 4 and 5, Sheet 1, consists of a central revolving body, *f*, with arms *g*, so arranged as to form a support for the casks it carries, either in movable pans or platforms *p*, as shown, or by supporting the the cask just beneath, or beneath and above the central or bilge hoop *t*. In this latter case the arms are attached to a vertical bolt, which moves in suitable ways up and down with the cask, and has a swivel-joint in it, so as to allow of rotating the cask end for end, as shown at *l*, Fig. 5. The arms *g* are open at *o*, to allow the bent lever L to raise the cask-cylinder into the trusser, or, as shown by dotted lines, to permit the insertion of the cask. The support or feed-table is kept horizontal or in its proper plane by the upper and lower plates *j* and *k*.

The lifting of the cask is effected either by a bent lever, as shown at L, running in loops *q q*, counterpoised by means of a weight-cord and pulley, *r′*, or by a plunger coming up from below, actuated by suitable levers; or the bent lever L may be arranged so as to rotate upon its vertical part, and carry in or bring out the cask-blank at will. The cask-blank is then lifted into the trusser, which is an eccentric chuck, so constructed that the segmental circle formed by the interior of its compressing dogs or plates shall be the contour of the exterior of so much of the cask, when finished, as is within their grasp, when the same are thrown in toward the center far enough to make the cask of the shape and size required.

The compressing-chuck, Figs. 7 and 8, Sheet 2, is composed of upper and lower rings containing within them suitable dogs for trussing the staves. The lower ring A, mounted on suitable supports *l l*, has upon its upper surface a greater or less number of equidistant radial grooves *a*, Fig. 8, whose sides are parallel and grooved out to receive the tongues of the dogs, as shown by dotted line at *e′*, Fig. 8. These dogs are made of one or more pieces, as shown at Figs. 7 and 8; a lower and broader plate, *c′*, whose edges fit in the grooves of the lower ring of the chuck, as shown by the dotted line at b^1, Fig. 8, serrated or finely grooved upon its upper surface, as shown in Fig. 7; an upper narrower plate, *e′*, Figs. 7 and 8, serrated on its lower surface to match *c′*. The two plates of the dogs are bolted together by the bolts b^2, at Fig. 7, sliding in slots, in such a manner as to allow of motion upon one another, in a radial direction when mounted in the chuck, when the bolts are loosened, and to be rigid in regard to one another when the same are tightened. Attached to the inner ends of the upper and lower plates of the dogs, by suitable hinges or catches *f′*, Fig. 7, are the inner plates *e′ e′*, shaped as above described. The sliding of the upper upon the lower plate will accommodate different-sized casks at the bilge, made so by a different curvature of the edges of the staves. The face-plates of these dogs are made long enough to reach from a point sufficiently near the bilge of the cask to insure its proper trussing near the bilge to within a short distance of the chime of the cask, leaving room enough to put on the necessary hoops.

The lower ring A of the chuck is provided with suitable bearings or projections, as shown in Figs. 7 and 8, to support the crozer and the swivel-bearing G of the driving-screw. The upper ring of the chuck has its lower face and outer edge rabbeted out to ride easily on the flange Z′, Figs. 7 and 8, and has upon its lower surface eccentric grooves, shown by the dotted lines in A, Fig. 8, traversing its breadth, made to receive the lugs *d′ d′*, Figs. 7 and 8, of the dogs, and a projecting support, E, Fig. 8, for the swivel-nut F of the driving-screw D.

The motion of the upper upon the lower plate is effected by means of the screw D running in the swivel-bearing G attached to the lower ring, and the swivel-nut F attached to the upper ring of the chuck. This screw is driven either by hand-wheel C or by suitable belting or gearing. The whole chuck is so constructed that the motion of the upper upon the lower ring will increase or lessen the diameter of the circle formed by the plates *e* of the dogs. The chuck being open the cask-blank, Fig. 3, Sheet 1, is lifted into the chuck to the desired height, which can be measured by the hoop-driver and gage, (shown by the dotted lines 1 2 3 4, Fig. 8,) and again at Fig. 9, which revolves on the stem, (shown at 4, Fig. 9,) over

the opening of the chuck. The cask-blank is held by the counterpoised lever L. The chuck is then closed upon the cask until it is trussed into the proper shape and size. It is then "worked off" or leveled, crozed, and champfered by the cutter-head U, constructed and operated as follows:

A bracket, or other support, carries, suspended over the center of the chuck, the hollow spindled horizontal pulley I, running in a collar, J. The lower surface of this collar, and the upper surface of the support, are, respectively, hollowed out and rounded off in the manner shown at Q, so that the pulley I and collar J can be moved out of the horizontal without interfering with the motion of the pulley around its own axis.

The upper surface of the pulley I is hollow, and its inner edge is turned out with a regular flare, as shown. Passing through the hollow spindle of the pulley I is the vertical shaft P, with its sleeve M, which carries at its upper end the bearing N, to keep the shaft P axially with the sleeve M. The sleeve M has an outer bearing, K, attached to the collar J by suitable fastenings. This bearing keeps the sleeve clear of the pulley I, and yet allows free vertical motion of the sleeve. The shaft P carries on and firmly attached to its upper end, just above and clear of the sleeve-bearing N, a friction-plate, O, which has its edges turned off to match the upper surface of the pulley I. Attached to the lower end of the shaft P is a pulley, R. The sleeve M is attached to and carries the box or casing V, as shown. The extreme point of the shaft P is turned off to run in the adjustable step a^2, attached to the casing V, as shown. There is a collar upon pulley R, on which the box or casing V rests. The small pulley T, driven by the pulley R, has its bearings in the box V. The shaft of this pulley T extends down below the casing, and carries the cutter-head U, whose cutting-blades are shaped to level, chamfer, croze, and howel the staves of one end of the cask.

The bearing of the small pulley T is arranged at such a distance from the shaft P that, when said shaft is vertical, the cutter-head will operate on the cylinder of the cask, of the size made in the chuck.

A guide-hoop, X, of a size to fit loosely on the end of a trussed cask, is attached to the box V by the bars W running through the loop Z. The cam or compound lever Y is fastened at one end to the box V, at y', and by the other end to the bar W, by a screw working in a slot to allow of adjustment for different size casks, and by its operation makes the cutter-head U approach or recede from the hoop X, the hoop and attachments are counterpoised by a weight, cord, and pulley, as shown, or raised and lowered by a lever or other suitable device.

The cask having been trussed into shape—which operation is superintended by the operator, who, with his hammer, keeps the staves straight and to their places—as the pressure increases, the hoop X is brought down. The plate O, engaging in the pulley I, starts the pulleys R and T, carrying the cutter-head U, which is engaged in the cask-cylinder by the cam Y, and then the guide-hoop X is rotated by hand around the cask as fast as possible, without choking or stopping the cutter-head U. The cam Y then withdraws or disengages the cutter-head U, and the hoop X is lifted up and out of the way. The chuck is then opened sufficiently to allow the head of the cask, held by the hand, or by a device like that shown in Fig. 10, to be introduced into the croze of the cask.

The chuck or trusser is then tightened again with the head in place, and permanent or temporary hoops are placed or driven upon the cask by the hoop-driver—whose action can be easily understood from the drawing—or with an ordinary hammer. Two kinds of temporary hoops are shown at Fig. 6, on a cask whereon only end hoops have been placed. The chuck or trusser is then opened, the cask is lowered down upon the feed-table, and another brought under the chuck and lifted up; or the same one can be reversed, and the operation above described be repeated on the other end.

In trussing the second end of a cask, the thin hoop *h*, whose use has been to prevent the flaring out of the staves, is removed as soon as the closing of the chuck renders it loose.

In working off the second end of a cask, a dust-pan, D′, or a similar device, is used to catch the dust, which, when full, is emptied through an open cask-blank onto the pan, and removed.

In making tight work of considerable size, the first end of the steamed blank can be trussed, and a hoop of the proper size put on. It is then released from the chuck, reversed, and the second end is trussed and worked off first, to save reheating.

The casks made in the manner above described are of uniform size and shape. Irregularities in the width of the staves are crushed out, and in tight work the lateral and concentric pressure forces the fibers of the wood of the edge of each stave into that of its neighbor, thus insuring a tight and stiff joint. The distortion at the bilge that results from hard trussing, done in the old manner of driving on truss hoops, whereby the bilge of the cask is actually opened, is avoided.

The cheapness of the machinery, and the few hands that are required to work it, in comparison with other cask machinery, places it in the reach of even the smallest coopering establishments.

I do not claim as of my invention the production of bilged casks by compression of the fibers of the wood, for the bilge of the casks, the manufacture of which has just been described, is made and intended to be made by the taper of the staves, and the trusser acts as a compressor only when irregularities ex-

ist in the end of the staves; nor do I claim the securing of heads in casks by compressing the shells thereof onto heads cut of a less diameter than the inner diameter of the shells of the casks in the croze, for I finish or work off the cask-cylinders of the exact size of the head in the croze, and loosen the chuck just as I would loosen a truss-hoop to open a cask-shell made to fit a head by the method long in practice; but

What I do claim is—

1. In a machine for setting up staves in a cask, the combination of the base *d e*, center disk *a*, and elastic pressure-band *r*, and rigid outer bilge-hoop *t*, as and for the purpose substantially as described.

2. In a machine for making casks from staves, the combination of an eccentric compressing-chuck, A B, movable cask-support *f g*, and chamfering and crozing device, constructed and operating substantially as described.

3. In a machine for making casks from staves, the combination of the lifting device L and the compressing-chuck, above described, to overcome the irregularities in the width of the staves, to form casks of a uniform size and shape at the chime, substantially as described.

4. In a chuck for compressing casks, such as above described, the combination of the plate *c'*, plate *b'*, bolts *b''*, with the plates *e'*, as and for the purposes described.

5. In a machine for making casks and similar articles from staves, the combination of the rings A and B, dogs *e'*, swivel-bearing G, swivel-nut F, and screw D, constructed and operating substantially as described.

6. In a machine for making casks from staves, the device for leveling, chamfering, and crozing, composed of the combination of the vertical shaft P, sleeve M, collar J, pulley I, support Q, frictional plate O, pulleys R and T, cutter-head U, guide-bar W, guide-hoop X, and cam Y, constructed and operating substantially as described.

7. The process herein described for setting up casks from staves, in a rigid central truss-hoop, so as to be of uniform diameter at the bilge, and then compressing the outer ends of the staves to form a regular curve from near the bilge to the chime, crozing, leveling, and chamfering or working off the staves to an even thickness, and putting on permanent or temporary end hoops, either with or without the head in place, whereby hoops made in sets will fit upon the cask and hold the staves upon uniform-sized heads, substantially as set forth.

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

THOS. M. HEALEY.

Witnesses:

JNO. D. PATTEN,

J. L. CONDRON.