(No Model.) 5 Sheets—Sheet 1.

M. E. BEASLEY & E. M. HUGENTOBLER

BARREL STAVE SHAPING MACHINE.

No. 300,194. Patented June 10, 1884.

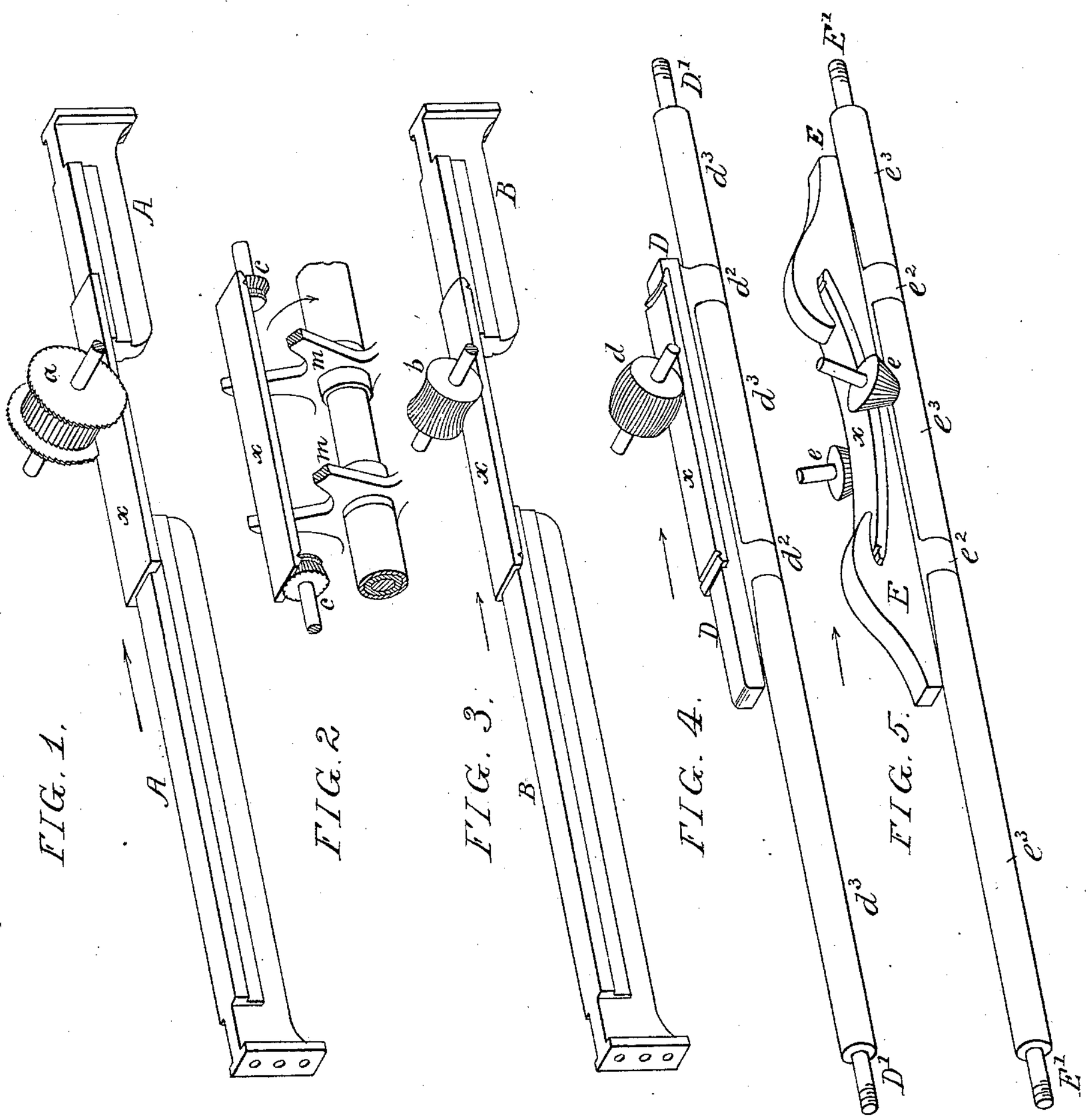

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

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M. E. BEASLEY & E. M. HUGENTOBLER

BARREL STAVE SHAPING MACHINE.

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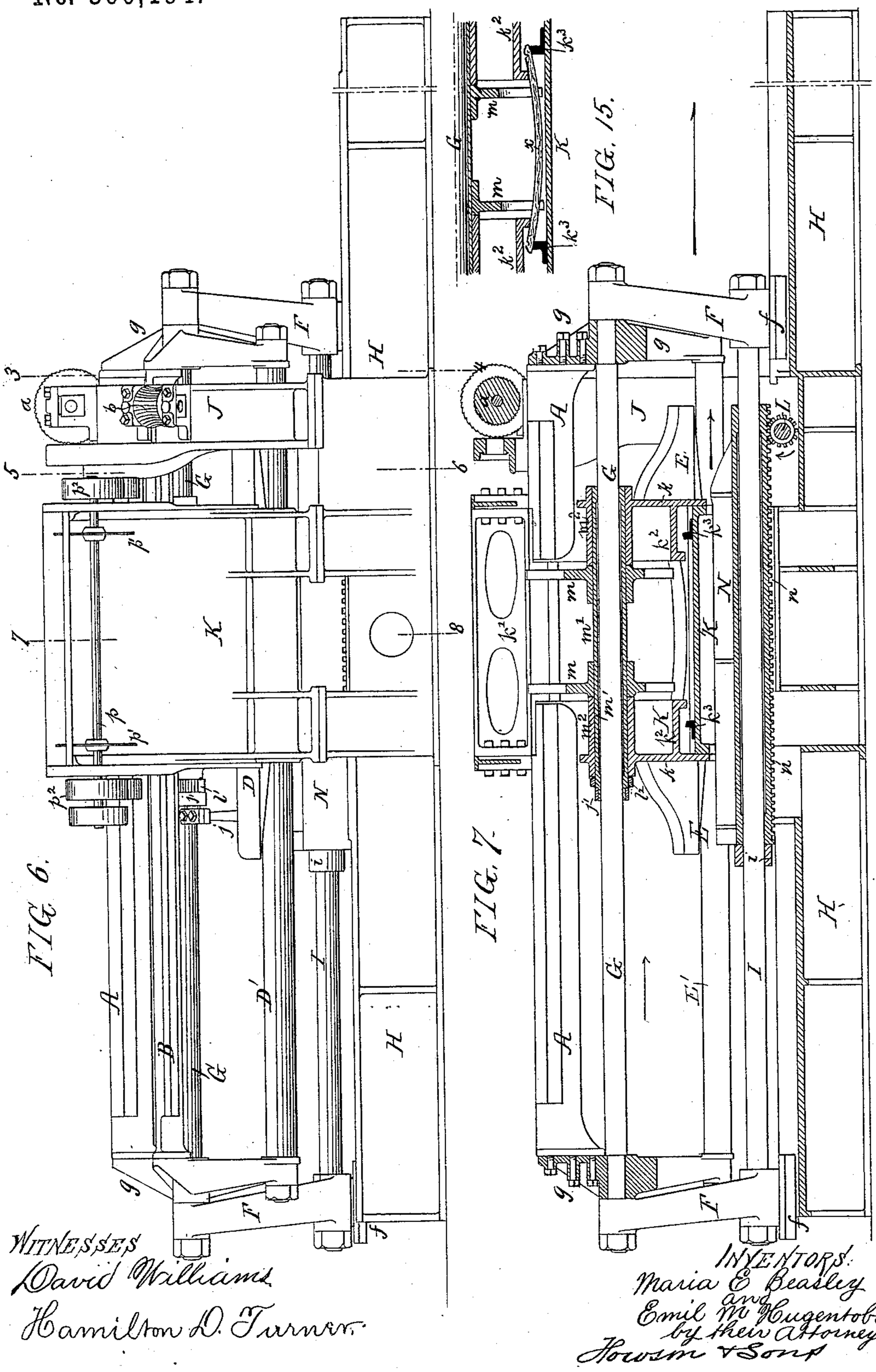

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M. E. BEASLEY & E. M. HUGENTOBLER

BARREL STAVE SHAPING MACHINE.

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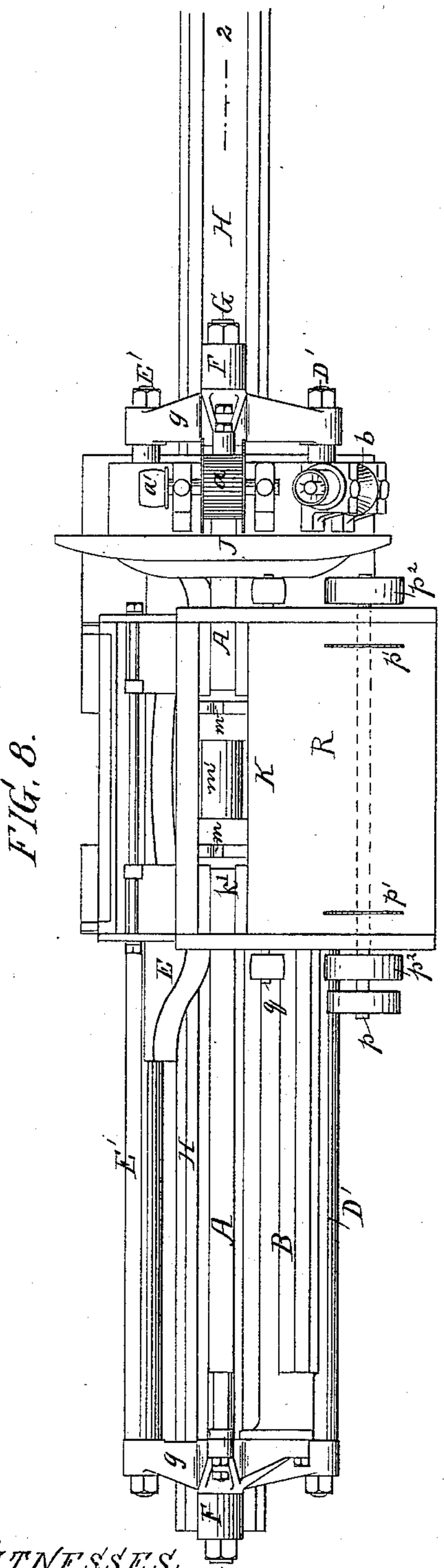

FIG. 8.

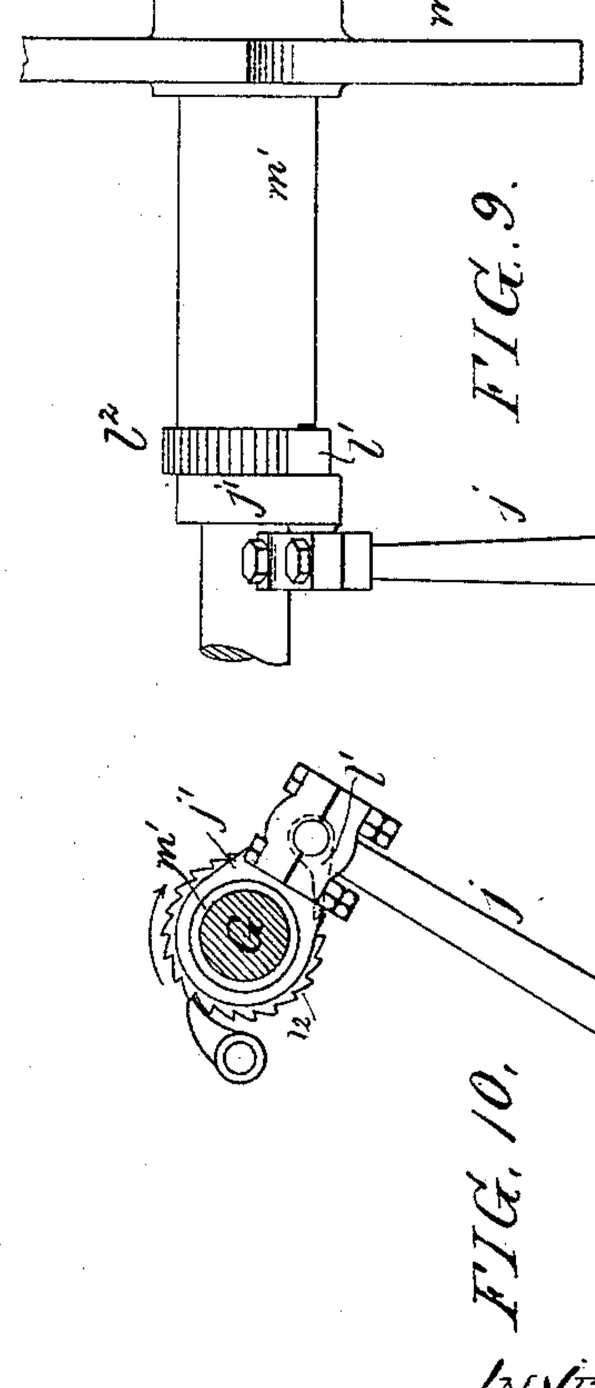

FIG. 9.

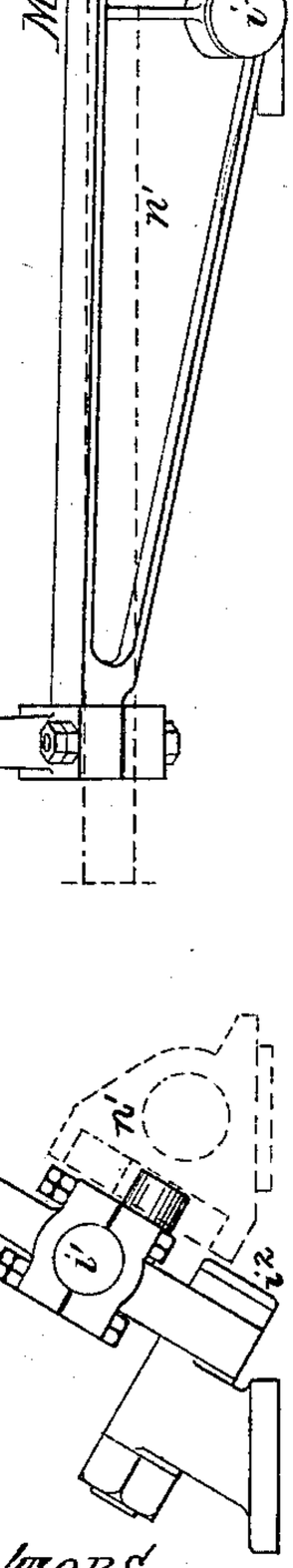

FIG. 11.

FIG. 10.

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BARREL STAVE SHAPING MACHINE.

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FIG. 12.

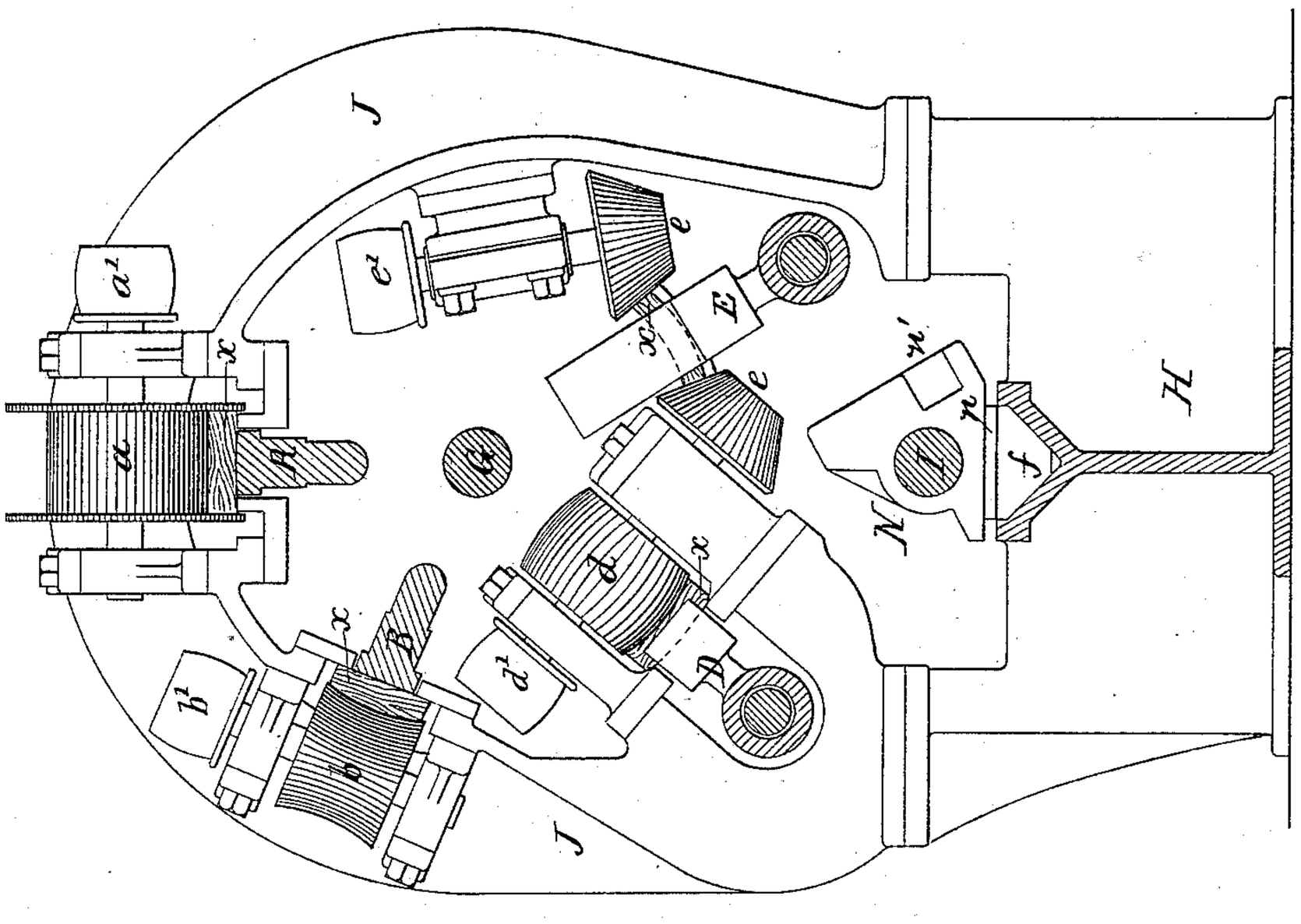
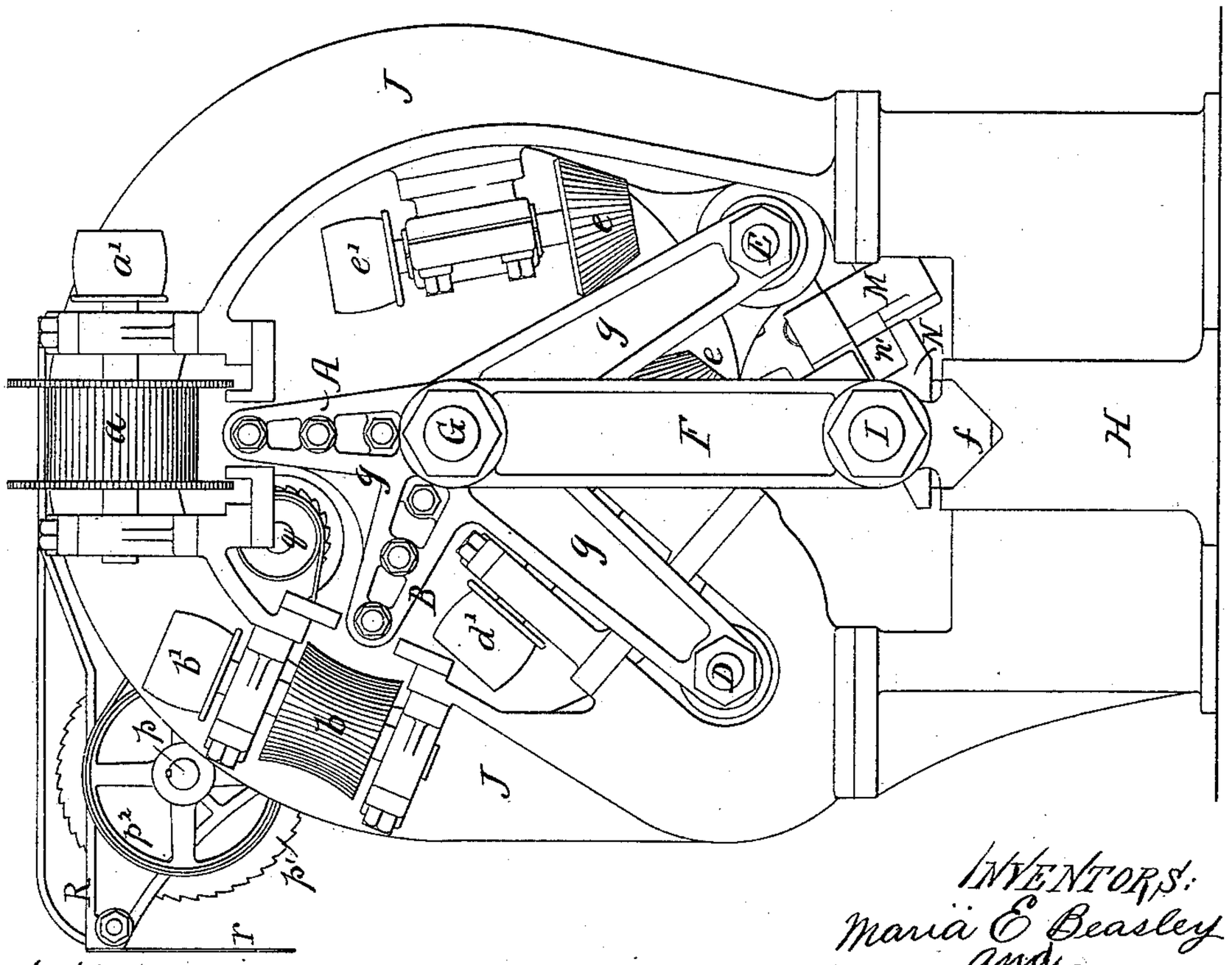


FIG. 11.



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M. E. BEASLEY & E. M. HUGENTOBLER

BARREL STAVE SHAPING MACHINE.

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FIG. 14.

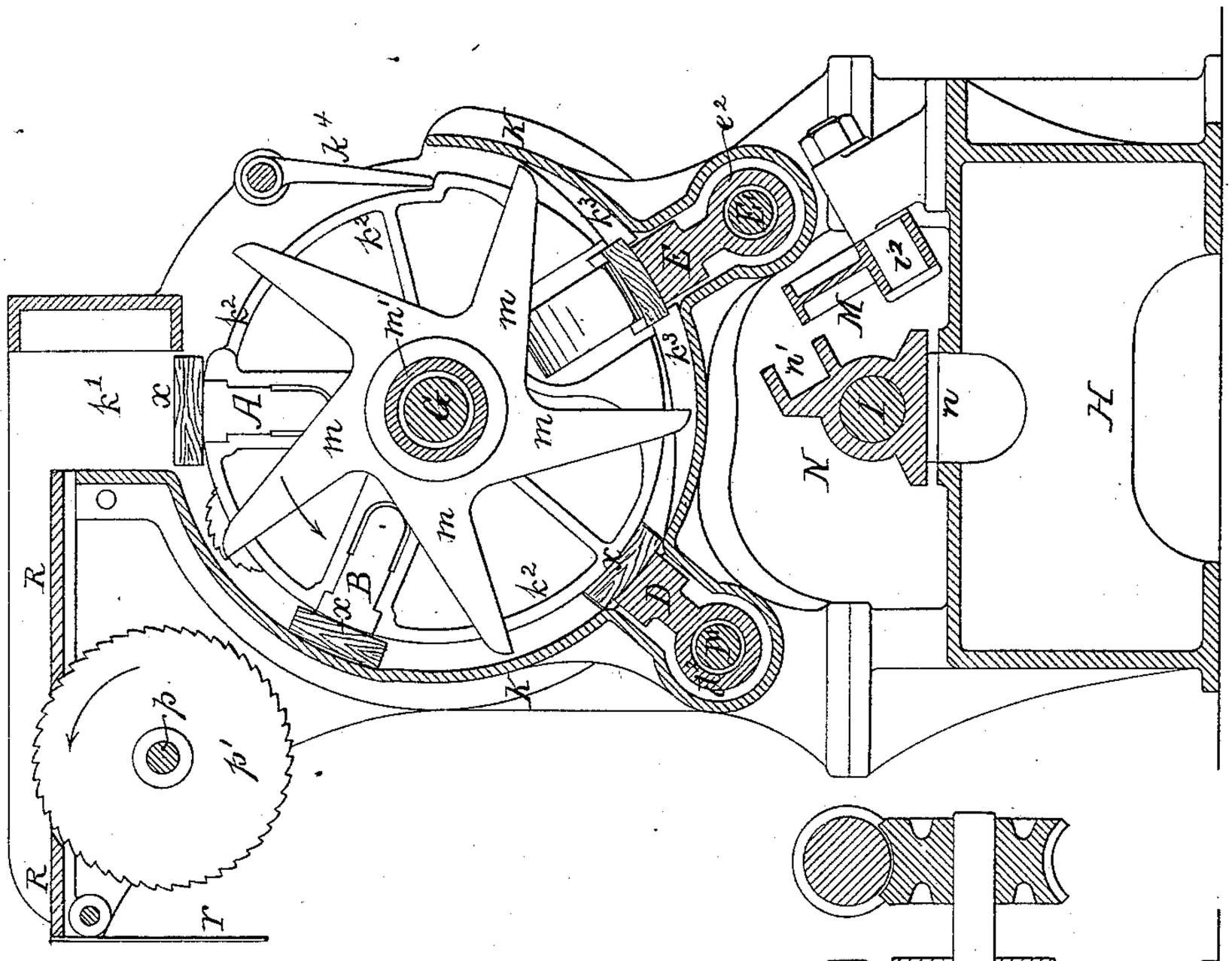
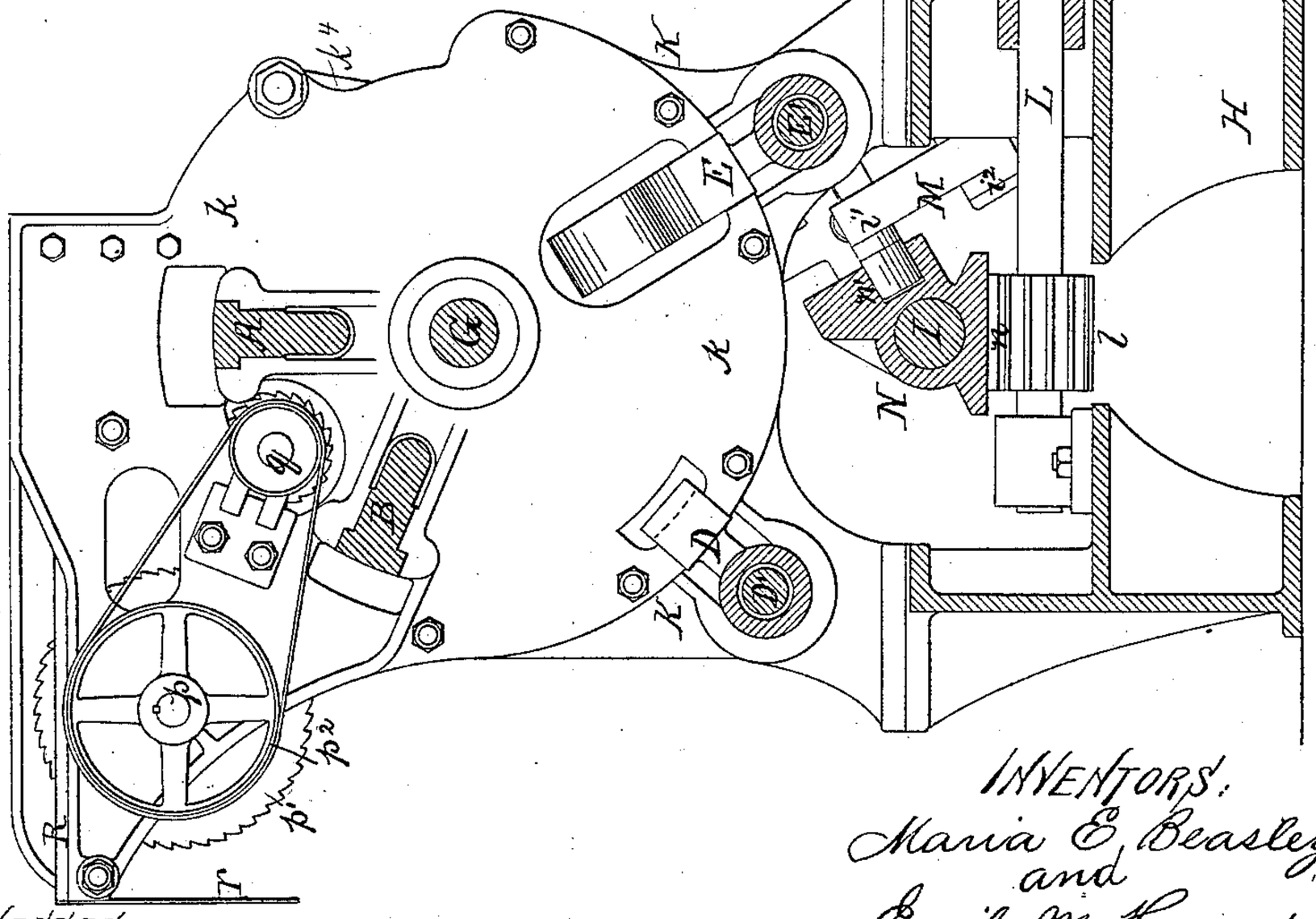


FIG. 13.



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UNITED STATES PATENT OFFICE.

MARIA E. BEASLEY, OF PHILADELPHIA, PENNSYLVANIA, AND EMIL M. HUGENTOBLER, OF NEW YORK, N. Y.; SAID HUGENTOBLER ASSIGNOR TO SAID BEASLEY.

BARREL-STAVE-SHAPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,194, dated June 10, 1884.

Application filed May 14, 1883. (No model.)

To all whom it may concern:

Be it known that we, MARIA E. BEASLEY, a citizen of the United States, residing in Philadelphia, Pennsylvania, and EMIL M. HUGENTOBLER, also a citizen of the United States, residing in New York city, New York, have invented an Improved Barrel-Stave-Shaping Machine, of which the following is a specification.

Our invention relates to certain improvements in the manufacture of staves for barrels, casks, &c.; and our invention consists of an improved machine for automatically cutting, planing, chamfering, crozing, and dressing stave-blanks in a succession of steps, as more fully described hereinafter.

In the accompanying drawings, Figures 1, 2, 3, 4, and 5, Sheet 1, are diagrams showing the different stages of progress in the manufacture of staves by our machine. Fig. 6, Sheet 2, is a front elevation of the machine. Fig. 7 is a longitudinal section on the line 1 2, Fig. 8. Fig. 8, Sheet 3, is a plan view. Figs. 9 and 10 are detached views of the feeding mechanism. Fig. 11, Sheet 4, is an end view of the machine. Fig. 12 is a transverse section on the line 3 4, Fig. 6. Fig. 13, Sheet 5, is a transverse section on the line 5 6, Fig. 6. Fig. 14 is a transverse section on the line 7 8, Fig. 6. Fig. 15, Sheet 2, is a view illustrating the temporary bending of the stave.

The successive operations in the manufacture of the staves accomplished by our machine will be best understood by reference to the perspective diagrams, Figs. 1 to 5, inclusive. A stave-blank, *x*, having been cutting to the proper length for the stave to be produced, is placed in a holder, A, as shown in Fig. 1, and this holder is then traversed longitudinally beneath the rotary cutter *a*, which planes the surface of the blank and at the same time cuts it to its proper width. Then the blank is transferred by the intermittent-feed mechanism to a second holder, B, Fig. 3, and as it passes to this second holder its opposite ends are subjected to the action of a pair of rotary cutters, *c c*, which croze the groove in the blank for the subsequent reception of the barrel-heads, and at the same time chamfer or bevel the ends of the blank. The latter having been then transferred to the second holder, B, is by the latter traversed longitudinally beneath a concave rotary cutter, *b*, which rounds the outer surface of the stave to the required curve for the diameter of the barrel. The partially-finished blank is now transferred by the feed mechanism to a third holder, D, Fig. 4, where the reverse side of the stave is subjected to the action of a rotary convex cutter, *d*, in a similar manner to form the inside curve on the stave. The blank is now finally passed to a fourth holder, E, Fig. 5, and on its way to the latter it is passed between devices which temporarily impart to it the longitudinal bend it will have to assume when it forms a part of the barrel. While in this bent condition it is inserted in the holder E, and by the longitudinal movement of this holder the bent blank is passed between a pair of rotary cutters, *e*, whose cutting-faces are at such an angle to each other as to dress the opposite edges of the stave to the bevel or angle necessary for the accurate fitting together of the staves when the barrel is formed. The feeding apparatus ejects the stave thus produced from the holder E and from the machine, whence it may be transferred to the steaming-box. It will be understood that in the machine the successive operations above described are all carried on at the same time on successive blanks.

We will now proceed to describe in detail the construction of the machine, referring to Figs. 6 to 15, inclusive, of the drawings.

On the bed-plate H of the machine is mounted a fixed frame or arch, J, which carries the rotary cutters *a*, *b*, *d*, and *e*, having their spindles mounted in suitable bearings, and provided with belt-pulleys *a'*, *b'*, *d'*, and *e'*, or other driving-gear, as illustrated in Figs. 11 and 12. For convenience, the cutter *d* and one of the cutters, *e*, are mounted on the same spindle.

The cutter *a* consists of a rotary planing-cutter of the width of the stave, and two circular saws on the sides of this planing-tool, to cut the blank to the required width.

The holders A, B, D, and E for the blanks are mounted on or form part of a traversing carriage, consisting, principally, of two heads,

g, united by a central rod, G, and by the rods D′ E′, carrying the holders D and E. This carrier is mounted on legs F F, bolted at their upper ends to the heads *g*, through the medium of the central rod, G, and at their lower ends united by a tie-rod, I, Fig. 7, the lower ends of the legs having V-shaped slides *f*, Figs. 7 and 11, adapted to corresponding ways on opposite ends of the bed-plate. While we do not confine ourselves to any special holders for the blanks, it will be observed that we have shown two holders, A and B, bolted directly to the heads, each of these holders being in two parts to permit the free passage of the feed-wheels between them, and having their adjacent ends recessed for the reception of the opposite ends of the stave-blank.

The holders D and E, as shown in Figs. 4 and 5, have collars d^2 d^2, fitting over their tie-rods D′ E′, respectively, and securely clamped in position between the heads *g* by means of intermediate sleeves, d^3 e^3. The holder D is recessed for the reception of the blank *x* in a straight condition, while the face of the holder E is curved and its ends provided with fingers to hold the blank in precisely the curved form it should afterward assume in the barrel.

The box for receiving the blanks and containing the feeding devices is composed of a casing, *k*, of a substantially cylindrical form, having end pieces, *k k*, slotted for the free passage of the holders and blanks, Fig. 13, when the traversing carriage passes the blanks beneath the rotary cutters, as hereinafter described. The top of the casing is slotted to form a longitudinal hopper, *k′*, Figs. 8 and 14, for the passage of the blanks to the holders, and at one side of this hopper is a table, R, over which the blanks are first passed, and which is carried by extensions on the end plates, *k k*. Suitable circular saws, *p′ p′*, mounted on a shaft, *p*, having its bearings in these extensions, project through slots in this table at a distance apart equal to the length of the stave.

Within the cylindrical portion of the casing are the chamfering and crozing cutters *c c*, Figs. 2, 13, and 14, whose spindles are mounted in bearings carried by the end plates, *k k*. These spindles are provided with belt-pulleys *q*, outside the end plates, in line with pulleys p^2 on the saw-spindle *p*, so that one can be driven from the other, Fig. 13.

A shield, *r*, is secured to the outer edge of the table R, to protect the operator, who stands on that side of the machine, from the portions of the circular saws *p′* below the table.

The end plates, *k k*, of the casing carry cylindrical ribbed flanges k^2, Figs. 7, 14, and 15, which project inward, so as to support the ends of the stave-blanks in their transfer from one holder to the next. These flanges are recessed, Fig. 14, for the passage and guidance of the holders A B, and also for the passage of the holder E, as are the end plates, *k k*, Fig. 13.

The feeding device consists of a pair of five-armed wheels, *m*, Figs. 7 and 14, mounted on a sleeve, *m′*, which is adapted to bearings m^2, formed on the end plates, *k k*, Fig. 7. Through the center of this sleeve *m′* passes the central tie-rod, G, of the traveling carriage, which is thus guided, as well as by the V-shaped ways on the bed-plate. An intermittent rotary motion is imparted to this sleeve *m′* and the feed-wheels *m*, to transfer the blanks at the proper time from one holder to the next by means of the devices hereinafter referred to.

In the bottom of the casing K are two inclined ribs or cams, k^3, Figs. 7, 14, and 15, on each side of the holder E and beyond the ribbed portion of the flanges k^2, Figs. 7 and 15, but not quite as far apart as the length of the stave, so that when the latter is pushed by the arms of the wheel *m*, Fig. 14, from the holder D to the holder E the ends of the staves will travel up these cams k^3, and will be bent by the ribbed ends of the flanges k^2, Fig. 15, to the curve which it should assume in the barrel, and in that form is pushed into and held in the holder E.

The intermittent longitudinal motion is imparted to the traveling carriage from a shaft, L, carrying a pinion, *l*, which gears into a rack, *n*, forming part of the sleeve N on the tie-rod I. This sleeve may have a limited motion on the tie-rod, the extent of which is determined at one end by one of the legs F, and at the other by an adjustable collar, *i*, so that when rotary motion is applied to the shaft L the sleeve will, for a certain distance, move independently of the carriage, and will then traverse the latter with it. This lost motion, as we will proceed to explain, is for the purpose of insuring the movement of the feed mechanism for transferring the blanks from one holder to the other while the carriage is at rest.

On the side of the sleeve N is formed a cam-groove, *n′*, Figs. 12, 13, and 14, the shape of which is illustrated by dotted lines in Fig. 9, the inclined portion of the groove being equal to or less in length than the extent of lost motion between the sleeve N and the carriage. To this cam-groove is adapted a pin, *i′*, in the end of a rocking lever, M, mounted on a pivot, i^2, on the bed-plate of the machine. The opposite end of this lever has a universal-joint connection with a link, *j*, pivoted to a pawl-carrier, *j′*, mounted loosely on the end of the sleeve *m′*. This carrier has a spring-pawl, *l′*, adapted to the teeth of a ratchet, l^2, secured to or forming part of the sleeve *m′*. Thus with every longitudinal movement of the rack N there will be a corresponding vibration of the lever M. Owing to the cam *n′* through the link *j*, a backward or forward movement will be imparted to the pawl-carrier, and consequently there will be a feed motion of the sleeve *m′* and star-wheels *m* at the beginning of the forward movement of the rack N in the direction of the arrow, Fig. 7; and as the length of the cam portion of the groove *n′* is equal to or less than the lost motion between the side rack and the carriage, this feed motion of the star-wheels

m will be completed before the rack comes into contact with the leg F, to cause the traversing of the carriage.

The operation of the machine is as follows: The operator feeds a strip of wood of the proper size over the table R between the two saws, *p'*, which cut the strip to the length of the stave, and the blank then passes through the hopper *k'* onto the holder A immediately beneath, Figs. 1, 7, and 14. Meanwhile, motion having been imparted to the several rotary cutters and to the driving-shaft L in the direction of its arrow, Fig. 7, and the independent movement of the rack N having just been completed to operate the feed-wheels *m* before the blank *x* falls onto the holder, the carriage will be traversed in the direction of the arrow, Fig. 7, and the blank will thus be brought under the action of the cutter *a*, which surfaces the blank, and by means of its saws at the same time cuts the blank to the proper width. When the carriage reaches the end of its movement, and the blank *x* has passed the cutter, the motion of the shaft I will have been reversed by automatic reversing mechanism such as is used on metal planing and other machines, and which is too well known to need illustration. The rack N then returns, the lost motion at the beginning of the return movement accomplishing no special purpose, but being simply incidental to the lost motion of the forward movement. The carriage is then traversed back to its first position, Fig. 7, when the movement of the shaft L and rack N will be again reversed, and while the latter is making its forward movement independently of the carriage the feed-operating devices will turn the wheels *m* the fifth of a revolution and transfer the blank *x* from the holder A to the holder B, subjecting it in its passage to the action of the chamfering and crozing cutters *c*. At the same time a new blank is introduced onto the holder A, and the carriage then moves forward and subjects the first and second blanks to the actions of the cutters *b* and *a*, respectively. The carriage then retuns, and while it is stationary at the beginning of the forward movement of the rack the first blank is transferred from the holder B to the holder D, the second from A to B over the cutter *c*, and a new one introduced onto A. The carriage is then moved forward again and the three blanks are dressed in their different stages by the cutters *d b a*, and the carriage then returns, the feed-wheel *m* turns the fifth of a revolution again, the first blank is transferred from D to E, the second from B to D, the third from A to B, over the cutters *c*, and a new blank applied to A. The carriage then moves forward again and the four blanks are passed under the cutters *e*, *e*, *d*, *b*, and *a*, and when the carriage has returned to its first position again the partial revolution of the wheels *m* causes the transfers of the blanks above referred to and removes the first blank from the holder E, and owing to the guidance of the fingers or arms *k*⁴, Fig. 14, resting on the ribbed flanges *k*², the finished blank is lifted out through the discharge-opening in the side of the casing K, whence it may be transferred to the steaming-box. As the blank is transferred to the holder E it is bent, as above set forth, by the combined action of the cams *k*³ and the ribs on the flanges *k*², Fig. 15, and is introduced into and held by the holder E in the bent form it should occupy in the complete barrel.

The two cutters *e e*, it will be seen on reference to Fig. 12, have their efficient cutting-faces on lines radiating from a central point, (in this instance about the center of the rod G,) which bears the relation to the stave-blank that the center of the barrel should bear to each stave. By this means, and owing to the fact that the stave-blank is in the curved form it must ultimately assume, the edges of each stave are cut or dressed to the exact bevel and to the taper and width toward each end necessary for a perfect fit in setting up the finished barrel. In other words, each stave-blank is thus cut into a perfect segmental section of the barrel-body, and the sections are all alike, so that an accurate fit is insured.

We claim as our invention—

1. The combination of the frame of a barrel-stave machine and cutters mounted in fixed bearings with an intermittently-reciprocating carriage having a series of holders for the stave-blanks, to be subjected to the action of said cutters successively for the dressing of the staves during the movement of the carriage, and automatic feed mechanism, substantially as described, for intermittently transferring the blanks from one holder to another at right angles to the movement of the carriage.

2. The combination of the frame of a barrel-stave machine, cutters, and a reciprocating carriage having holders for traversing the blanks longitudinally under said cutters, with chamfering and crozing cutters, and automatic feed mechanism, substantially as described, for intermittently transferring the blanks from one holder to another and subjecting them to the action of the chamfering and crozing cutters in the transfer.

3. The combination of the frame of a barrel-stave machine and a reciprocating carriage carrying a series of blank-holders, with intermittently-operated feeding-arms, for transferring the blanks from one holder to another at right angles to the movement of the carriage, and a series of cutters, beneath which the blanks are successively traversed as follows: a planer, chamfering and crozing cutters, concave and convex cutters, and edge-dressing cutters, all substantially as set forth.

4. In a barrel-stave machine, the combination of a holder constructed to hold the blank in a curved form, a holder for holding the blank straight, and cutters for dressing the blank, with feed mechanism for transferring the blank from the straight to the curved holder, and bending devices, substantially as

described, for imparting the required curve to the blank in the transfer.

5. The combination of a fixed casing or box having guide-flanges for supporting the staves, and an intermittently-traversing carriage having holders for the staves, with a series of rotary cutters and intermittent feeding-arms for transferring the staves at right angles to the movement of the carriage from one holder to the next on the said flanges, substantially as described.

6. The combination of the frame of a barrel-machine and the casing K, having supply and discharge openings for the blanks and guide-flanges, with an intermittently-reciprocating carriage having holders for the blanks, and intermittently-rotated feed-wheels for transferring the blanks on said flanges from one holder to another at right angles to the direction of motion of the carriage and while the latter is at rest.

7. The combination of a casing, K, having cams k^3 thereon, and ribbed flanges k^2 over the said cams, with a holder, E, and feeding-wheels for moving the stave-blank between the ribs and flanges onto the holder, substantially as described.

8. The combination of the frame of a barrel-stave machine and a series of cutters on a fixed portion of the frame with a reciprocating carriage having holders for the blanks, a casing for receiving and guiding the blanks, and an intermittent-feed mechanism for transferring the blanks from one holder to the next within the casing, substantially as set forth.

9. The combination of a traversing carriage provided with a series of holders, and having a central rod, G, and the casing K, having bearings, with a series of cutters and a sleeve, m', mounted to turn in said bearings, and carrying feed-wheels m, for transferring the blanks from one holder to another, the said rod passing through said sleeve, substantially as set forth.

10. The combination of a carriage having a series of holders for the stave-blanks, and intermittent-feed mechanism for transferring the blanks from one holder to another, with a rack connected to said carriage to impart motion thereto, but having a limited motion independent thereof, and devices, substantially as described, connecting the said rack with the feed mechanism.

11. The combination of a fixed frame carrying cutters, and an intermittently-reciprocating carriage having holders for the stave-blanks, with an intermittent-feed mechanism for transferring the blanks from one holder to another, and devices, substantially as described, connecting the carriage with feed-operating mechanism, whereby the blanks are transferred while the carriage is at rest.

12. The combination of a traversing carriage having holders for the stave-blanks, and feed devices for transferring the blanks, with an operating-rack, N, connected to the carriage, but having a limited motion independently thereof, and provided with a cam-groove, n', and a lever controlled by said cam, and connected to said feeding devices, substantially as set forth.

13. The combination of a carriage having a series of holders for the stave-blanks, and having feed-wheels for transferring the blanks from one holder to another, with pawl-and-ratchet operating devices, a driving-pinion, L, and a sleeve, N, provided with a rack and cam-groove, and mounted to have a limited motion on said carriage, and a lever, M, connected to the pawl and controlled by said cam-groove, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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EMIL M. HUGENTOBLER.

Witnesses:
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HENRY HOWSON, Jr.