3 Sheets—Sheet 1.

A. C. BLOUNT.

MACHINE FOR MAKING STAVES.

No. 184,751. Patented Nov. 28, 1876.

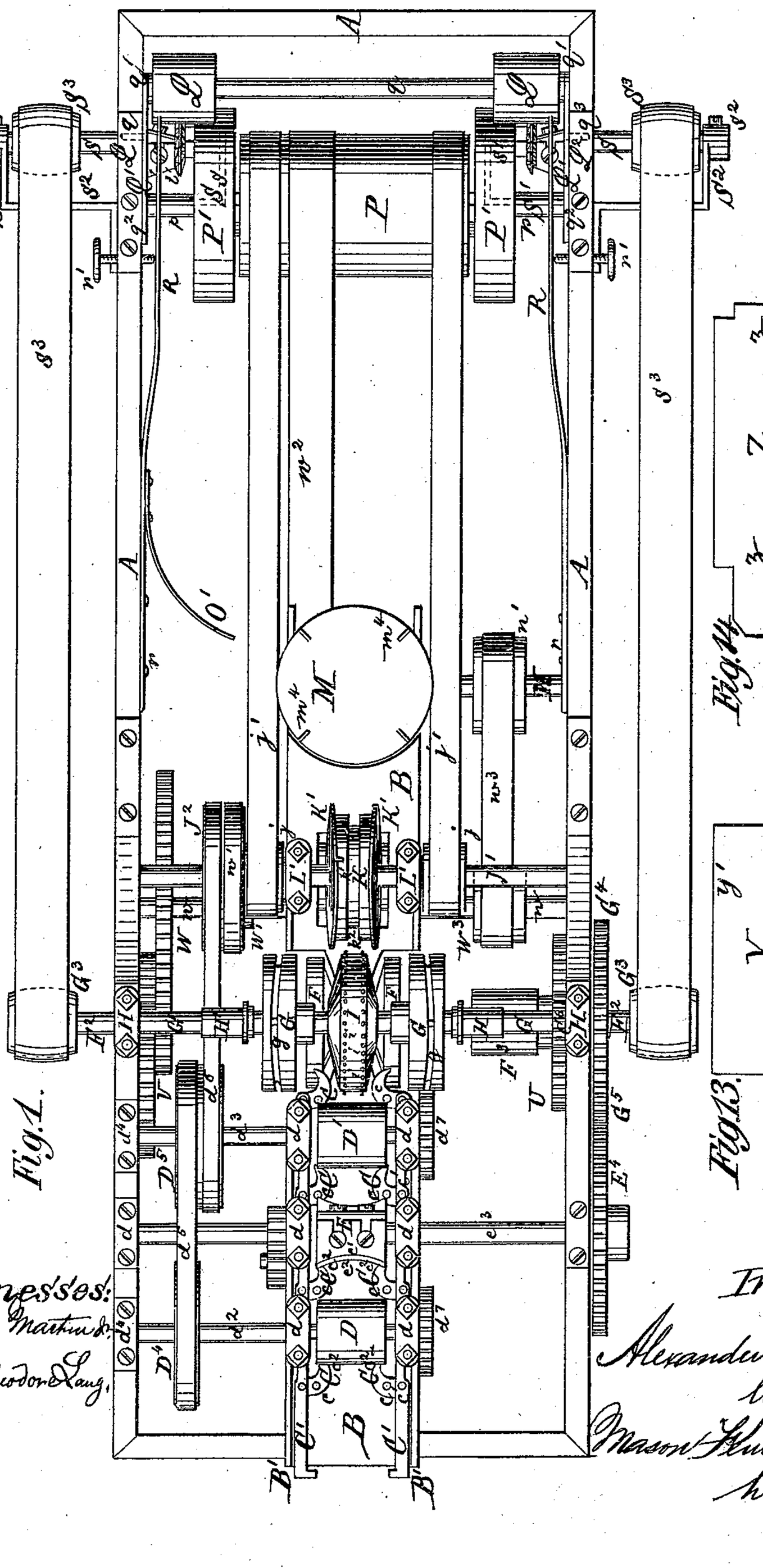

Fig. 1.

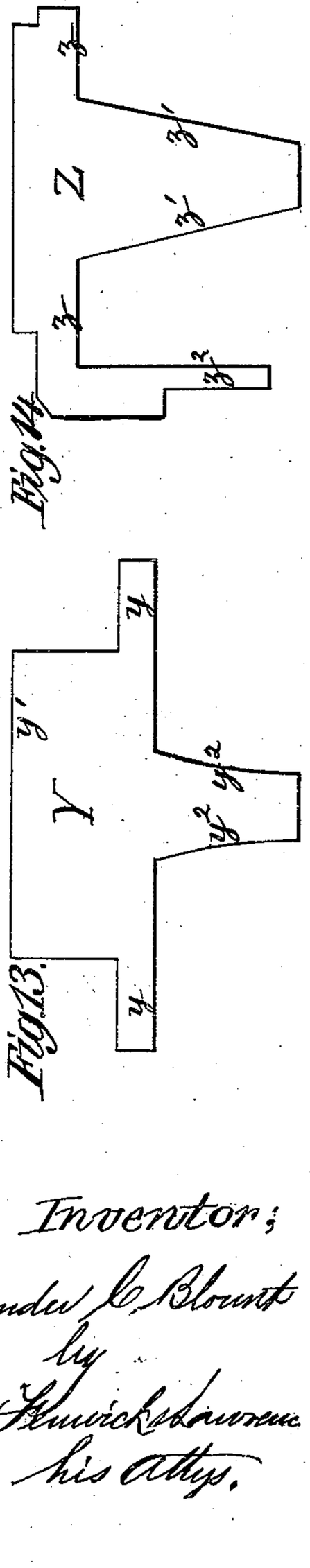

Fig. 2.

Fig. 3.

Witnesses:
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J. P. Theodore Lang,

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3 Sheets—Sheet 2.

A. C. BLOUNT.

MACHINE FOR MAKING STAVES.

No. 184,751. Patented Nov. 28, 1876.

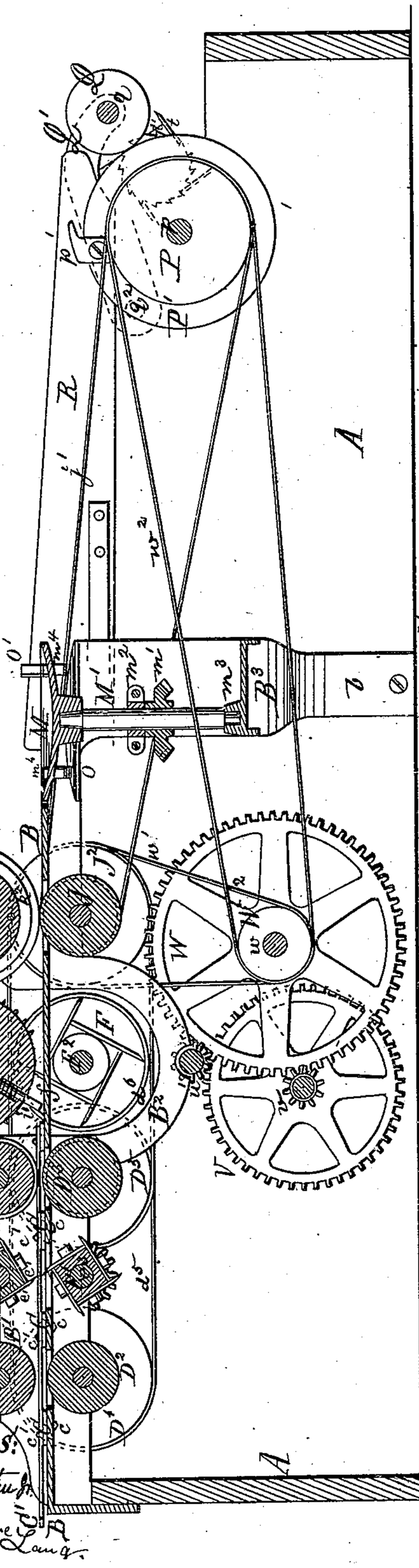

Fig. 2.

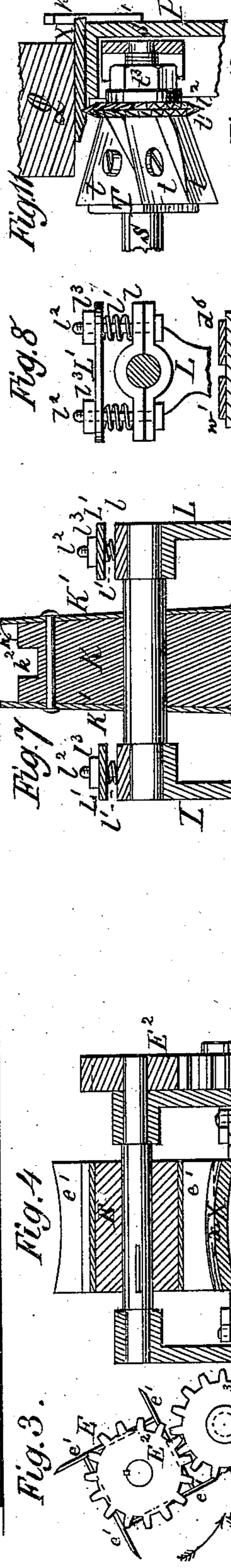

Fig. 8.

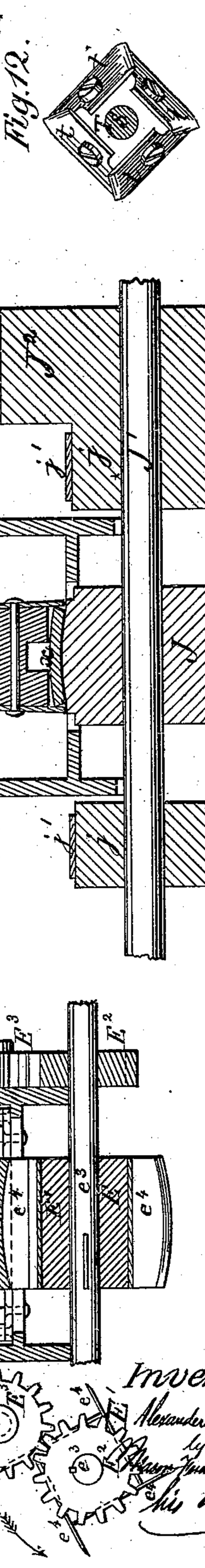

Fig. 7.

Fig. 12.

Fig. 4.

Fig. 3.

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3 Sheets—Sheet 3.

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Fig. 5.

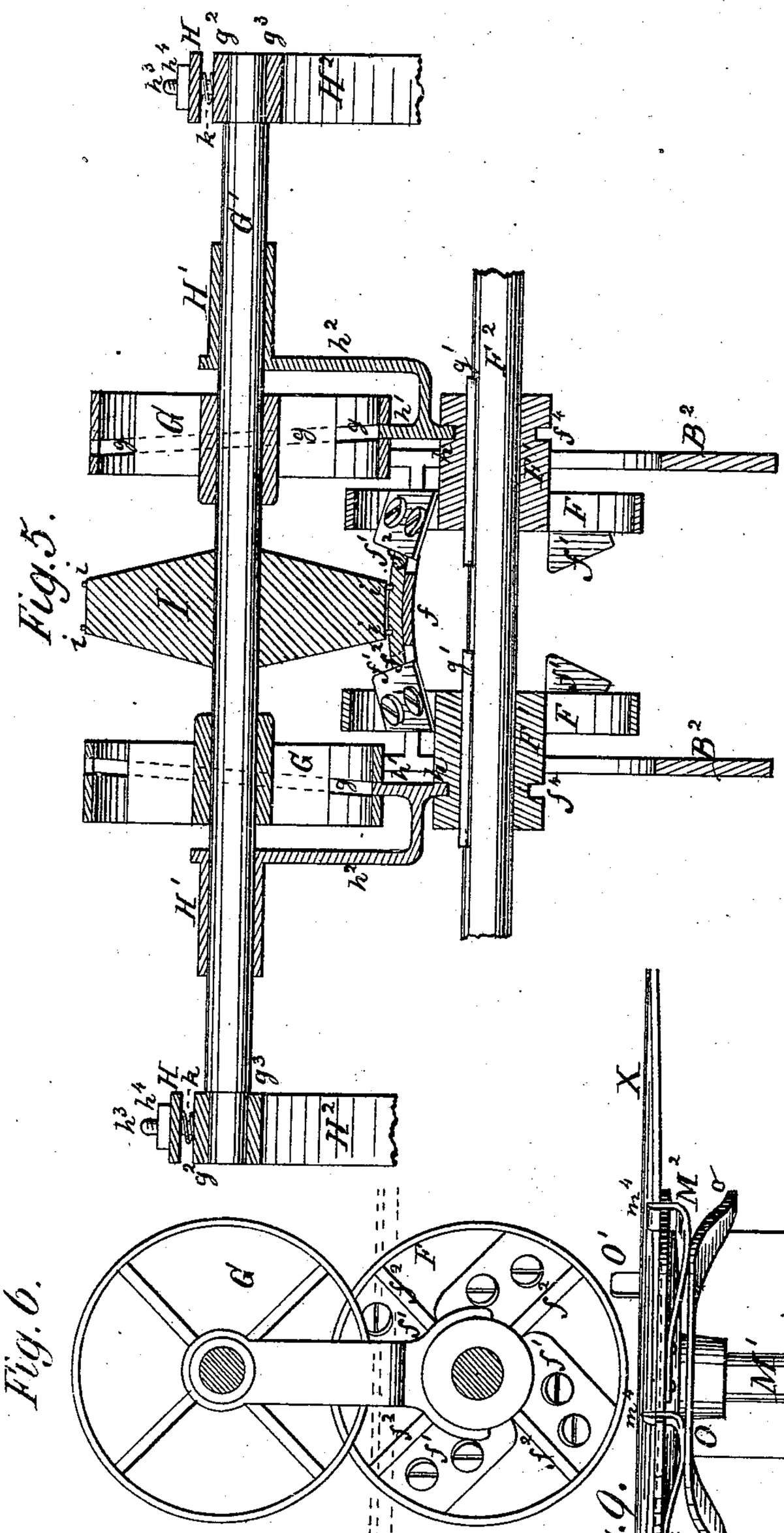

Fig. 10.

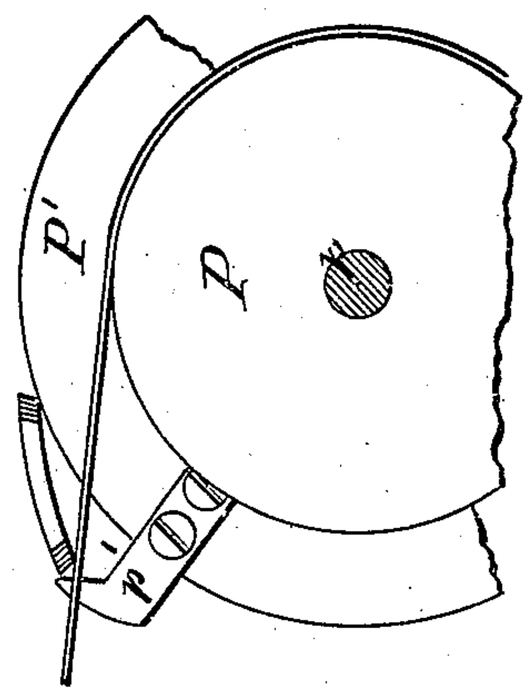

Fig. 6.

Fig. 9.

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UNITED STATES PATENT OFFICE.

ALEXANDER C. BLOUNT, OF PASCAGOULA, MISSISSIPPI.

IMPROVEMENT IN MACHINES FOR MAKING STAVES.

Specification forming part of Letters Patent No. **184,751**, dated November 28, 1876; application filed September 14, 1876.

To all whom it may concern:

Be it known that I, ALEXANDER C. BLOUNT, of Pascagoula, in the county of Jackson and State of Mississippi, have invented a new and useful Improvement in Stave-Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved stave-cutting machine. Fig. 2 is a vertical longitudinal central section of the same. Figs. 3 and 4 are detailed views, illustrating the shaping of the convex and concave surfaces of the stave. Figs. 5 and 6 are detailed views, illustrating the forming of the joints of the stave. Figs. 7 and 8 are detailed views, illustrating the continuation of the feed-motion after the formation of the joints. Figs. 9 and 10 are detailed views, illustrating the mode of delivering the staves to an endless apron in the proper position, for the purpose of having them crozed and chamfered at the ends. Figs. 11 and 12 are detailed views of the crozing and chamfering tools, and Figs. 13 and 14 are top views of two gages used for adjusting the cutters of the joint-forming machinery.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, hereinafter described and specifically claimed, by the operation of which upon a board or plank a complete barrel-stave is produced.

The object of my invention is to make barrel-staves in less time, and with less expense with regard to first cost, and the expense connected with the wear and tear of the machinery necessary for the production of such staves, than has heretofore been accomplished by machinery, so far as I am aware.

In the drawings, A represents a frame of simple construction, to which a table, B, for the support of a stave-blank is fastened. The said table B has at either side a number of curved guide-levers, C, pivoted at c to the table, and pivoted at c^1 to an operating connecting-rod, C′, so arranged that, by forward or backward movement of such connecting-rod, all the guide-levers C connected therewith have their curved ends c^2 brought closer to or moved farther from the center of the table B. To the sides B^1 of the table B the upper feed-rollers D D^1 of the machine and a cutter-head, E, between them are attached by means of journal-bearings d. The lower feed-rollers D^2 D^3 are at one side of the table B, supported by suitable journal-bearings, while at their other side the shafts d^2 d^3 extend to the frame of the machine, to which they are secured by means of journal-bearings d^4. The said shafts d^2 d^3 have, between the table B and the bearings d^4, two pulleys, D^4 and D^5, the latter having a sufficiently broad surface, so that, beside a belt, d^5, for driving the pulley d^4, another belt, d^6, for driving the feed-motion may be applied to it. The upper and lower feed-rollers are connected by geared wheels d^7. The cutter-head E is of ordinary construction, and its cutters e^1 are provided with inwardly-curved cutting-edges e^2, whereby the convex back x of the blank stave is shaped. Below the said cutter-head E another cutter-head, E^1, is placed upon a shaft, e^3, which cutter-head has cutters e^4, with outwardly-curved cutting-edges e^5, whereby the inner concave side x^1 of the stave is formed. The cutter-head E is, by means of gear-wheels E^2 and an intermediate gear, E^3, as shown in Fig. 3, connected with the cutter-head E^1 in such manner that one of them cuts against and the other one with the feed-motion, thus reducing the strain upon the feed-rollers to a trifle, and so that the upper feed-rollers D D^1 need not be weighted, as is generally done. Behind the last pair of feed-rollers, of which the lower one D^3 has a convex surface fitting the hollow side of the stave, the table B is reduced in width, as at f, to less than the actual width of the finished stave. At the described place two cutter-heads, F, are placed opposite each other upon a shaft, F^2, which is driven by means of a belt and a pulley, F^3, from the line-shaft of the shop. The cutter-heads F have the shape of pulleys, and they have inclined cutters f^1 fastened to their arms f^2. The cutting-edges f^3 of the said cutters form an acute angle with the axis of the cutter-head, and thereby effect the forming of an oblique joint, x^2, at either side of the unfinished stave X.

In order to reduce the width of the stave gradually toward both ends the cutter-heads F are moved longitudinally on the shaft F^2, either toward or from each other, by means of

cam grooves g in two cam-pulleys, G, fastened to a shaft, G^1. By means of a tongue-and-groove connection, g^1, the cutter-heads F are revolved by the shaft F^2. The hubs of the said cutter-heads are each provided with an annular groove, f^4, into which a forked head, h is inserted. The shank h^1 of the said head h fits into the groove g of the pulley G, and is thereby operated. A steady motion in an axial line is insured to the head h and its shank by an arm, h^2, which connects the said head with a sleeve, H^1, on the shaft G^1. Between the cam-pulleys G is a guide-roller, I, fastened to the shaft G^1. The cylindrical surface of the said roller I is either roughened, or by preference provided with two rows of pointed or sharpened teeth i, arranged equidistant from the center line of the table B, so that the said teeth will keep the stave in a central position while passing under the roller I. At a point where the cam-grooves g are nearest to each other the roller I is provided with a spring-bolt, i', which is struck by the end of the stave and pushed along by it until the teeth i insert themselves into the back of the stave, and thereby continue the revolution of the roller I, I, and, consequently, the revolution of the grooved pulleys G. As the spring-bolt gets near the reduced part f of the table, it is pushed into the said roller I. The circumference of this roller I is made equal to the length of a stave, so that each stave passing under the said roller causes it to make a complete revolution. As the cutters f^1 begin to operate upon the stave before it is under the roller I, and as it is necessary that the wheel must begin its revolution at the same time, the spring-bolt i' is so constructed that it is struck and operated just at the proper moment, so that the operation of the cutters f^1, and the axial movement of the cutter-heads F upon the shaft F^2 begin together at the proper time. In order to protect the inner edges of the stave, I give the reduced part f of the table B a convex surface, which fits the hollow part of the stave, as shown in Fig. 5. The table is also strengthened by two side arches, B^2, connecting the front part of the table A with the back part, which is made as strong as the front part, and between which the described reduction f takes place. The two rows of teeth i extend to within some distance of the spring-bolt i', so that the last two teeth will leave the stave, and thereby cause the roller I to stop just when the spring-bolt is at the proper position. The upper bearings g^2 of the shaft G^1 are weighted by springs k on the elongated bolts h^3, the nuts h^4 of which bear upon an abutting-plate, H, of the said springs. The lower bearings g^3 of the shaft G^1 are, by means of arms H^2, fastened to the frame of the machine. Directly behind the roller I a take-up feed roller, J, and a pressure-roller, K, are placed so that the stave enters the same before it has left the rollers D^1 D^3. The feed-roller J has a convex surface of the same diameter as the feed-roller D^3, and performs the same function. The roller K serves as a pressure-wheel and central guide of the stave, while the joints of the stave are being finished. For that purpose the said roller K is provided with an inclined disk, K^1, on each side, whereby two flanges are formed on the said wheel or roller, between which the stave may pass with a continuous lateral fit, and in a central direction. The circumference of the main body of the roller is made equal to the length of a stave, and a lip, k^1, at the narrowest part of the wheel, serves, by coming in contact with the advancing end of the stave, to start the wheel or roller K, until the stave is upon the lower feed-roller J, which causes the completion of the revolution.

To insure friction between the stave and the roller K, the latter is provided with a central groove, k^2, the edges of which bear upon the back of the stave. Behind the lip k^1 the disks K^1, and a part of the wheel or roller K, are cut away, thereby forming a depressed surface, K^2, which permits of lateral movement of the stave after it has left the feed-roller J. The journal-bearings L of the roller K are susceptible of vertical play by means of a movable top bearing, l, springs l^1 on the bolts l^2, and abutment-plates L', below the nuts l^3 of the said bolts. When the whole of the stave has passed out of the wheels or rollers K and J it rests on a turn-table, M, in a central position. The face m of the said turn-table is dishing, so that the curved inner edges of the joints of the stave rest on the rim of the said turn-table, thereby preventing the stave from rocking or slipping.

The turn-table M is supported by an upright shaft, M^1, with a bevel-gear, m^1, and bearings m^2 and m^3 on a vertical extension, B^3, of the table B, which, by means of braces b, is fastened to the frame A of the machine. A bevel-gear, n, on a shaft, N, with a pulley, n', serves to revolve the turn-table M, which is provided with spring-catches M^2 for carrying the stave. The said spring-catches M^2 are fastened at four equidistant points to the lower side of the turn-table M, and their upright heads m^4 are made to play in four equidistant slots, m^5, near the edge of the said turn-table. A stationary disk, O, with cam-surfaces o, is fastened to the extension B^3 below the said turn-table, upon which the spring-catches M^2 are made to bear. The cam-surfaces o cause the heads m^4 of the said spring-catches to dive into the slots m^5, but the surface of the disk O causes them to be elevated above the surface of the turn-table, and to push the stave off, with the aid of a spring-hook, O', which may be fastened to the frame A. The shaft J^1 of the feed-roller J is provided with a pulley, j, of the same diameter as the said feed-roller, at each side of the table B. Each of the said pulleys j has a belt, j', which is passed around the tension pulley or drum P, upon a shaft, p. The said belts j' carry the stave, as it leaves the turn-table toward the two pulleys P' on the shaft p, which

pulleys are of the same diameter as the inner diameter of the intended barrel at the ends, and the extreme distance of which is less than the distance of the grooves for the insertion of the barrel-heads. The pulleys P′ are at opposite points provided with projecting arms p', whereby the stave is caught, adjusted in a position parallel to the shaft p, guided upon the pulleys P′, and forced under a pair of pressure-rollers, Q, on a shaft, q. On the way to the rollers Q the stave is adjusted lengthwise in a central position with the pulleys P′ by means of two springs, R, which are fastened to the opposite inner sides of the frame A at r, and the free ends of which may be adjusted to the required distance near the pulleys P′ by set-screws r' in the frame A. The shaft q has its journal-bearings q^1 at the ends of two swinging arms, Q^1, which are pivoted at q^2 to the frame A, and are provided with pins or lugs q^3, upon each of which a spring, Q^2, bears. At the outer side of the pulleys P′ two shafts, S, are firmly supported by bearings s^1 s^2, and brackets S^1 S^2, fastened to the frame A. The said shafts S are provided with pulleys S^3 and cutter-heads T. The cutter-heads T are provided with inclined cutters t, for the purpose of chamfering the ends of the stave, and with serrated disk-cutters t^1 t^2, fastened to the inner faces of the said cutter-heads by means of nuts t^3 for the purpose of crozing the stave.

The pulleys S^3 are driven by belts s^3 from two pulleys, G^3, on the main shaft F^2. The said shaft F^2 has a gear-wheel, G^4, attached to it, which, by means of an intermediate gear, G^5, drives a gear-wheel, E^4, on the shaft e^3 of the cutter-head E^1. A pinion, G^6, fastened to the shaft G^1, drives a wheel, U, of an intermediate shaft, u, upon which a pinion, u', engages with a wheel, V, which has a pinion, v, attached to it. The pinion v drives a wheel, W, on a shaft, w, which is provided with three pulleys, W^1 W^2 W^3, of the same diameter as the pulleys j. The pulley W^1 drives the pulley J^2 on the shaft J^1 of the feed-roller J by a belt, w^1. The pulley W^2 drives the drum P by a belt, w^2, and the pulley W^3 drives the pulley n' by a belt, w^3. The pulley J^2 drives the pulley D^5 by the belt d^6. The pulleys D^4 D^5 J^2 being of the same diameter, the feed-motion of the table D is uniform. The gages Y and Z serve the purpose of setting the cutters f^1. The gage Z consists of a plate with two straight shoulders, z, and two equally tapered sides, z^1, and connected with one of the shoulders z, and an arm, z^2, made to fit the grooves f^4 of the cutter-heads F^1. When the cutter-heads F^1 are moved as far apart as the grooves g permit, and the arm z^2 is inserted into the groove f^4, and the shoulders z held against the said cutter-heads, the sides z^1 are in a central position and ready for use. The cutting-edges of the cutters f^1 are then made to touch the said sides z^1, and they are adjusted. The gage Y has two shoulders, y, which are placed against the ends of the sides B^1, and a flange, y^1, which fits between the said sides and two curved sides. The gage Y is laid on the reduction f, and the cutters f^1, being slowly revolved, must just graze the sides y^2 with their cutting-edges.

Operation: The machine being set in motion, a blank, X, of proper dimensions is put upon the table B, and centrally adjusted by means of the curved guides C, in the manner above described, and then pushed between the feed-rollers D D^2, which propel it between the cutter-heads E E^1, where it receives a convex surface above and a concave surface below; thence the said blank enters between the feed-rollers D^1 D^3, and is pushed by them against the spring-bolt i'. The wheel I revolves and the cutter-heads F are moved apart until half of the stave has passed under the said wheel, when they are moved toward each other again. Thus the blank receives its oblique joints x^2, and becomes tapered at both ends. The stave X, before leaving the last pair of teeth i of the wheel or roller I, enters between the wheel or roller K and the curved feed-roller J, starting the wheel K by means of the lip k^1. The formation of the joints x^2 is finished by the cutters f^1, and the stave leaves the wheel K. Arrived upon the turn-table M the stave commences to turn with it, swinging from the wheel K and leaving it by means of the depression K^2. As the other end of the stave meets the spring-check o', one of the catches m^4 rises above the surface of the table M, and moves the other end of the stave toward the rim of the said turn-table. This causes the stave to drop upon the feed-belts j', and it is now going toward the feed-rollers P′. Upon nearing the rollers, the stave is caught by the arms p' and carried in the proper position under the pressure-rollers Q, while the springs R adjust it lengthwise. While passing under the rollers Q the inner side of the stave is crozed by the cutters t^2, and chamfered by the cutters t.

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

1. In a stave-machine, the centering-guides C, attached to the table B and rods C′, in combination with the cutters e^1 e^4 and f^1 f^1, substantially as described.

2. In a stave-machine, the combination of the centering-guides C and the guide-wheel K, substantially as described.

3. The cutter-heads E and E^1, having cutters e^1 and e^4, connected and driven positively by toothed wheels E^2, E^2, and E^3, substantially as described.

4. The combination of the revolving cutters e^1 e^4, feed-rollers D^1 and D^3, wheel I, and revolving and sliding cutters f^1 f^1, substantially as described.

5. The combination of the feed-rollers D^1 D^3, wheel I, jointing-cutters f^1 f^1, wheel K, and roller j, substantially as and for the purpose set forth.

6. The feed-wheel I, provided with the sliding bolt i', substantially as and for the purpose described.

7. The combination of the vertically-yielding shaft G^1, wheel I, the cam-grooved pulleys G, the feed rollers D^1 D^3, and the cutter-heads F F, having cutters f^1 f^1, substantially as and for the purpose described.

8. The guide-wheel K, having a stave-shaped channel between its flanges K^1 K^1, a depression, k^2, and a lip, k^1, substantially as described.

9. The combination of the guide-wheel K and the jointing mechanism, consisting of the cutter-heads F F, and their cutters f^1 f^1, and the cam-grooved pulleys G G, substantially as described.

10. The combination of the pulleys G G, having the cam-grooves g, the shaft G^1. the forked head h, having shanks h^1, arms h^2, and sleeves H^1 H^1, and the cutter-heads F F, having cutters f^1 f^1, and grooves f^4 f^4, and the shaft F^2, substantially as and for the purpose described.

11. The turn-table M, made of a dished form, substantially as and for the purpose described.

12. The spring-catches M^2 of the turn-table M, in combination with the cam-disk O, substantially as described.

13. The combination of the guide O′ and turn-table M, substantially as described.

14. The combination of the guide O′, turn-table M, feed-belts j', feed-pulleys P′, having arms p', pulleys Q, and the crozing and chamfering cutters, substantially as described.

15. The combination of the adjustable side spring-guides R, and the feed-belts j' j', substantially as described.

16. The feed-pulleys P′, having arms p' attached directly to them, in combination with the pressure-pulleys Q Q, feed-belts j' j', and with chamfering and crozing cutters, or with either the chamfering or crozing cutter, substantially as described.

17. The combination of the mechanism for effecting the cutting of the concave and convex surfaces upon the stave, the mechanism for effecting the jointing of the stave, and the mechanism for effecting the crozing and chamfering of the stave, the combination being such that the said operations are performed successively in one machine without handling the piece of stave-lumber after it is introduced into the machine, substantially as set forth.

Witness my hand in the matter of my application for a patent for an improved stave-machine for dressing, convexing, and concaving, jointing, crozing, and chamfering staves.

ALEX. C. BLOUNT.

Witnesses:
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