

960,525.

C. W. ELLIOTT.
WOOD BENDING MACHINE.
APPLICATION FILED MAR. 25, 1909.

Patented June 7, 1910.

2 SHEETS—SHEET 1.

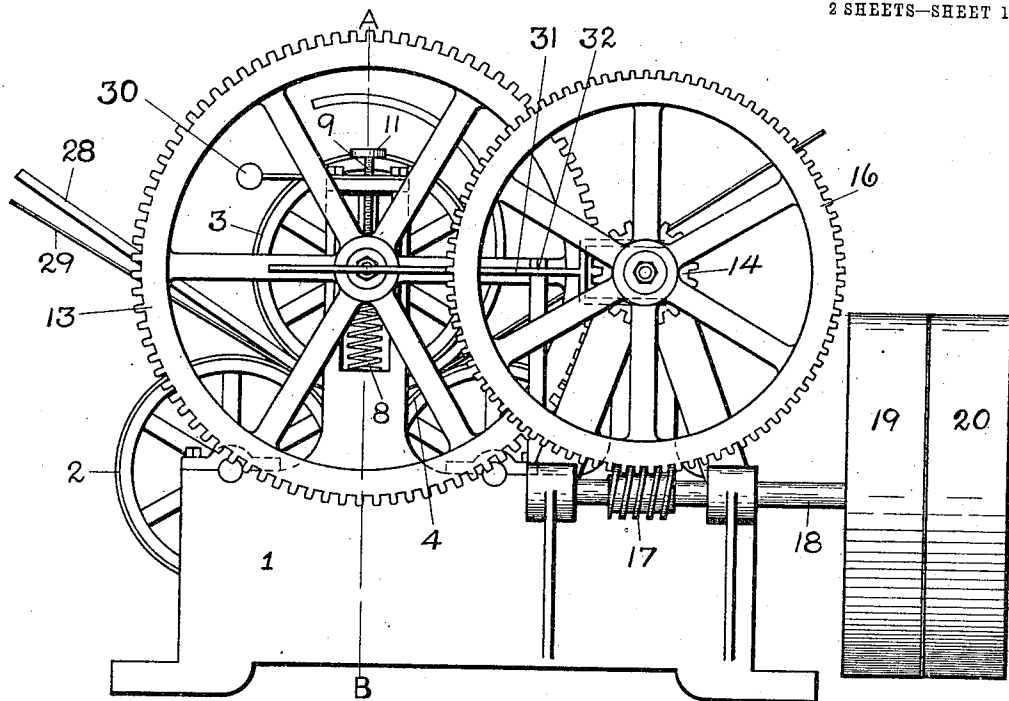


Fig. 1-

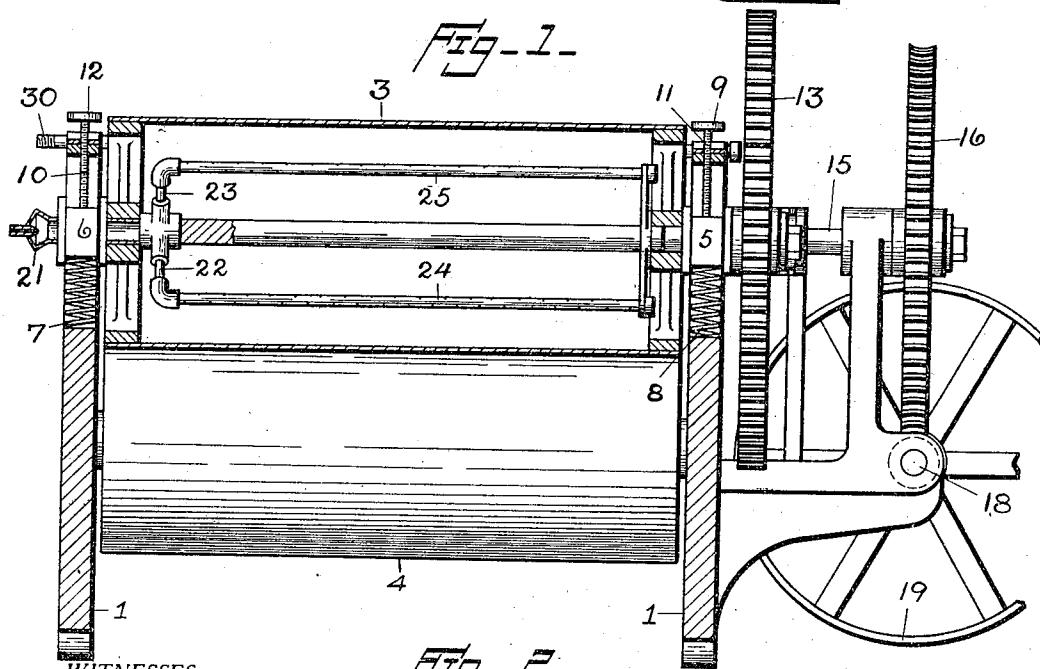


Fig. 2-

WITNESSES:

John E. Heller.
Maria H. Beynroth.

INVENTOR.

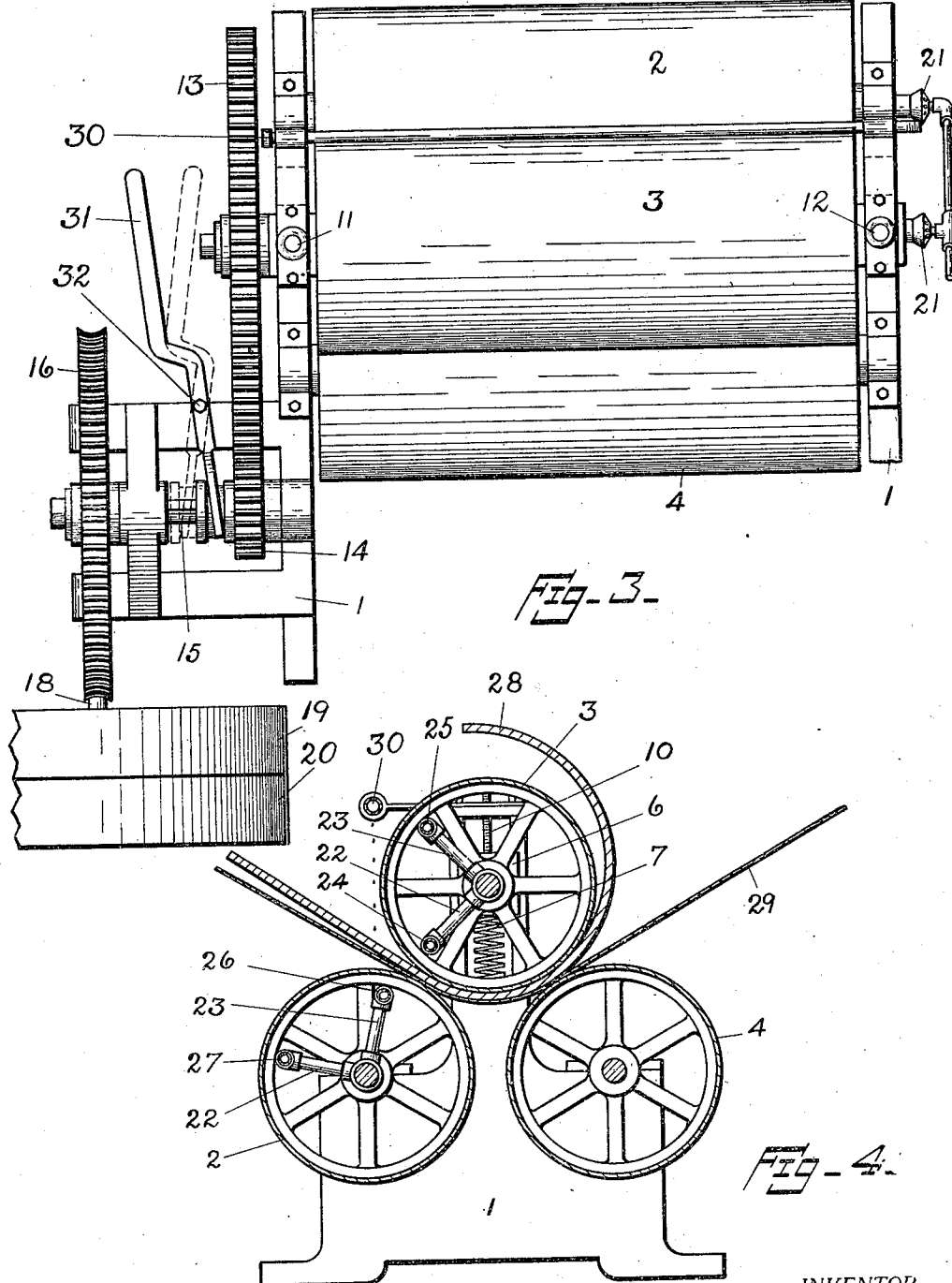
Charles W. Elliott.
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UNITED STATES PATENT OFFICE.

CHARLES W. ELLIOTT, OF NEW ALBANY, INDIANA.

WOOD-BENDING MACHINE.

960,525.

Specification of Letters Patent.

Patented June 7, 1910.

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To all whom it may concern:

Be it known that I, CHARLES W. ELLIOTT, a citizen of the United States, residing at New Albany, in the county of Floyd and State of Indiana, have invented a new and useful Improvement in Wood-Bending Machines, of which the following is a specification.

This invention relates to machines for bending wood, and especially for forming the shell and hoops of drums. Heretofore it has required a considerable period of time to steam, bend, and thoroughly season a one-piece drum shell, or a hoop, and then the result has been quite uncertain, inasmuch as the unequal strains due to variations in the grain of the wood produce irregularities in the curvature of the shell or hoop, so that by no means every piece of wood operated upon results in an approved finished piece. In present practice, if a piece of wood to be bent has not straight grain, so that the grain runs out at the surface in places, the piece is split in bending or bent in irregular curves, the weaker portions forming sharper curves than the stronger. Thus, in present practice, much wood must be discarded as unsuitable, and then much that has been selected is broken and wasted after passing through the bending and seasoning operation. This occasions a serious waste of material, labor, and time. I have overcome these difficulties by my improvement in a very simple, comparatively inexpensive, and efficient manner, so that I am enabled to save material, labor, and time, and attain uniformly excellent results. These benefits I attain by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation; Fig. 2, a front elevation; Fig. 3, a top plan view; and, Fig. 4, is a vertical transverse section.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

In a frame, 1, are journaled three rolls, 2, 3, and 4, in triangular relation. Rolls 2 and 4 are mounted in stationary boxes and the roll 3 in vertically adjustable boxes, 5 and 6. The boxes 5 and 6 are preferably supported underneath by springs, 7 and 8,

and are held down against the pressure of springs 7 and 8 by set-screws, 9 and 10, which are provided with hand-wheels, 11 and 12. By means of the hand-wheels 11 and 12, the roll 3 may be quickly and easily adjusted for bending wood to rings of different diameters. The rolls 2 and 4 are journaled to rotate freely, while the roll 3 is driven by a gear, 13, secured to the left hand end of the shaft upon which roll 3 is mounted. Gear 13, in turn, is driven by a pinion, 14. Pinion 14 is slidably mounted upon a counter-shaft, 15, which is driven by a worm-gear, 16, mounted thereon. The worm-gear 16 is driven by a worm, 17, mounted upon a worm-shaft, 18, upon the outer end of which are mounted a tight pulley, 19 and a loose pulley, 20. By this means roll 3 is driven slowly with uniform motion. The right hand end of the shaft of roll 3 is tubular and provided with a mixer, 21, by means of which a proper mixture of gas and air may be admitted to the inner surface of the roll. Branch pipes, 22 and 23, issue from the tubular part of the shaft to burners, 24 and 25, which extend in proximity to the roll throughout its length, toward the front of the machine and along lines approximately 90 degrees apart. By this means the wall of roll 3 may be suitably heated. The heat may be regulated by admitting more or less gas to the burners. A set of burners, 26 and 27, similar to burners 24 and 25, similarly located, are placed in roll 2. It will be understood that, with the rolls 2, 3, 4 mounted as described, when rotated by means of the gearing described, will draw in and bend a strip of wood, 28, as is commonly done in the case of similarly arranged rolls for bending iron.

In order to prevent the wood from cracking and splitting, or forming irregular curves on account of variations of strength, while it is being bent under roll 3, I place a strip, 29, of resilient material such as spring steel, under the wood on the outer side of the curve (Figs. 1 and 4). By reference to Fig. 2, it will be seen that the strip 29 hugs the wood closely and keeps it pressed firmly against the surface of roll 3, and thus any fibers of the wood that may have been severed on account of the grain

running diagonally across the strip, are prevented from tearing loose from the body of the strip, extending outward, and forming a rough surface upon the periphery.

5 It is not necessary to select wood of absolutely straight grain in order to make good drum-shells and hoops with my machine. The steel strip 29 prevents the breaking of the wood strip, which is frequently experienced on account of cross-grain and
10 brash and otherwise weak portions in the wood strip 28.

In the art of bending wood it is customary to steam the wood before clamping it in
15 forms. In the use of my machine it is also found necessary to steam the wood, to facilitate its bending and permanently setting in the form desired, but I do not steam the wood previous to putting it into the machine but provide for this purpose a source
20 of water supply, such as a perforated tube, 30, disposed along roll 3 just above the point where strip 28 enters between the rolls, so that water is allowed to trickle continuously upon the wood as it slowly passes
25 into the rolls. The strip 29 forms a pan under the wood strip, so as to hold the water in contact with the under surface of the wood at the same time that it flows on the
30 top thereof. The rolls 2 and 3, being heated by the burners 24, 25, 26, 27, cause the water to flash into steam and drive the steam into the wood at the beginning of the bending operation. As the bending proceeds, the
35 steam is held between the surface of roll 3 and of strip 29, and the wood is thoroughly steamed and heated by the hot rolls 2 and 3 and heated strip 29 at the same time that it is being bent; but before the wood leaves
40 roll 4, the steam has been evaporated and the wood thoroughly dried and seasoned, so that the uniform curvature imparted to it has become permanently established.

For the purpose of quickly removing
45 pieces from the rolls, provision is made for throwing roll 3 out of gear. This is accomplished by means of a lever, 31, which is fulcrumed at 32, and is forked at the rear end in order to engage the slotted hub of
50 pinion 14. By moving the handle of lever 31 to the left, or toward the rolls, pinion 14 is shifted upon its shaft 15 and slipped out of mesh with gear 13. The gear 13 may now be operated by hand in either direction.

55 It will be appreciated that the operation of steaming and seasoning is progressive, from the beginning of the strip to the end. By this process I am enabled to form a complete drum-shell or hoop in about ten minutes, which, by the old process of steaming and locking in forms, generally requires
60 from two to three months. The shells and hoops formed upon my machine do not exhibit the common tendency, of developing

irregularities in curvature in course of time 65 after they have been released from the machine. I am also enabled to use wood with fancy grain, so as to make drums of ornamental appearance, which is not practicable with the old method on account of the liability of the wood strip to cracking, breaking, and bending irregularly. I am enabled to use also some kinds of wood which have peculiarly excellent resonant qualities which have heretofore been regarded as impracticable for making drums. 75

I have been enabled to save labor, and expense with my machine because the results have been more uniformly successful and therefore less scrap has been produced and the strenuous care heretofore required in attending to the bending operation has been obviated. The work also can be done by persons less highly skilled in the art than is the case with previous machines and processes. The surface of the wood after bending is quite smooth, being thoroughly pressed during the process by the steel strip 29, so that less subsequent finishing is required than heretofore. 80 85 90

Having thus described my invention so that any one skilled in the art pertaining thereto may make it and understand its operation, I claim—

1. A machine for bending wood, comprising a series of bending-rolls arranged in triangular relation, and a spring strip which is normally substantially straight, said strip being fed against the face of the wood which forms the periphery of the curve and keeping the peripheral surface of the wood under pressure throughout the bending operation. 95 100

2. A machine for bending wood, comprising a series of bending-rolls adjustably arranged in triangular relation, and means for pressing that surface of the wood which forms the periphery of the curve intermediate the peripheral rolls by constant direct spring pressure. 105 110

3. A wood bending machine comprising a roll or former around which the wood is bent and means for feeding and bending the wood around said roll in combination with a strip interposed between the wood and such feeding means of a material which tends to maintain itself in a flat plane. 115

4. A wood bending machine comprising a roll or former around which the wood is bent and means for feeding and bending the wood around said roll, in combination with a metal strip interposed between the wood and such feeding means of such a quality that it tends to maintain itself in a flat plane, said feeding and bending means being heated and transmitting heat to said metal strip. 120 125

5. A wood bending machine comprising

a roll or former around which the wood is bent and means for feeding and bending the wood around said roll, in combination with a strip interposed between the wood and
5 such feeding means of a material which tends to maintain itself in a flat plane, means for heating said feeding and bending

means, and means for moistening the surface of the wood adjacent the roll or form around which it is bent.

CHARLES W. ELLIOTT.

Witnesses:

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ABRAHAM KNOBEL.