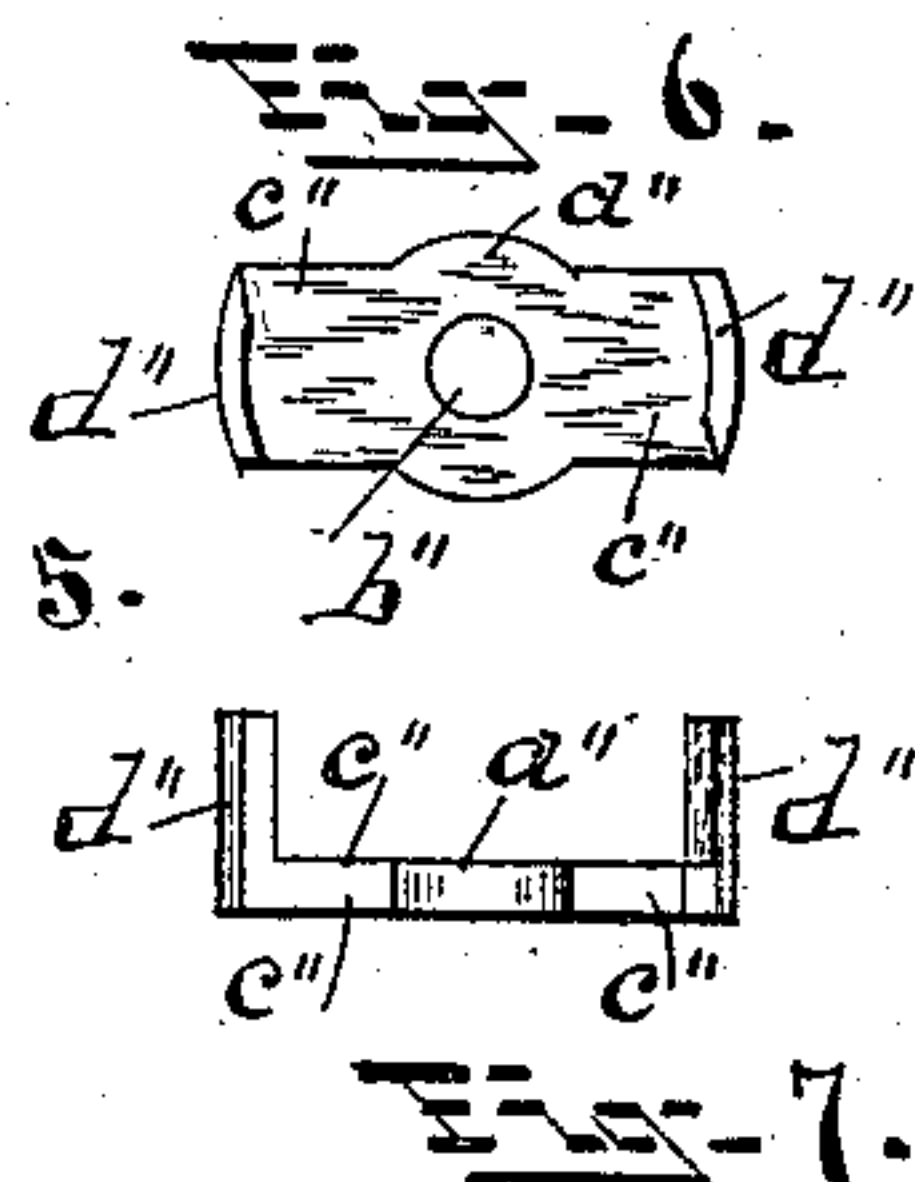
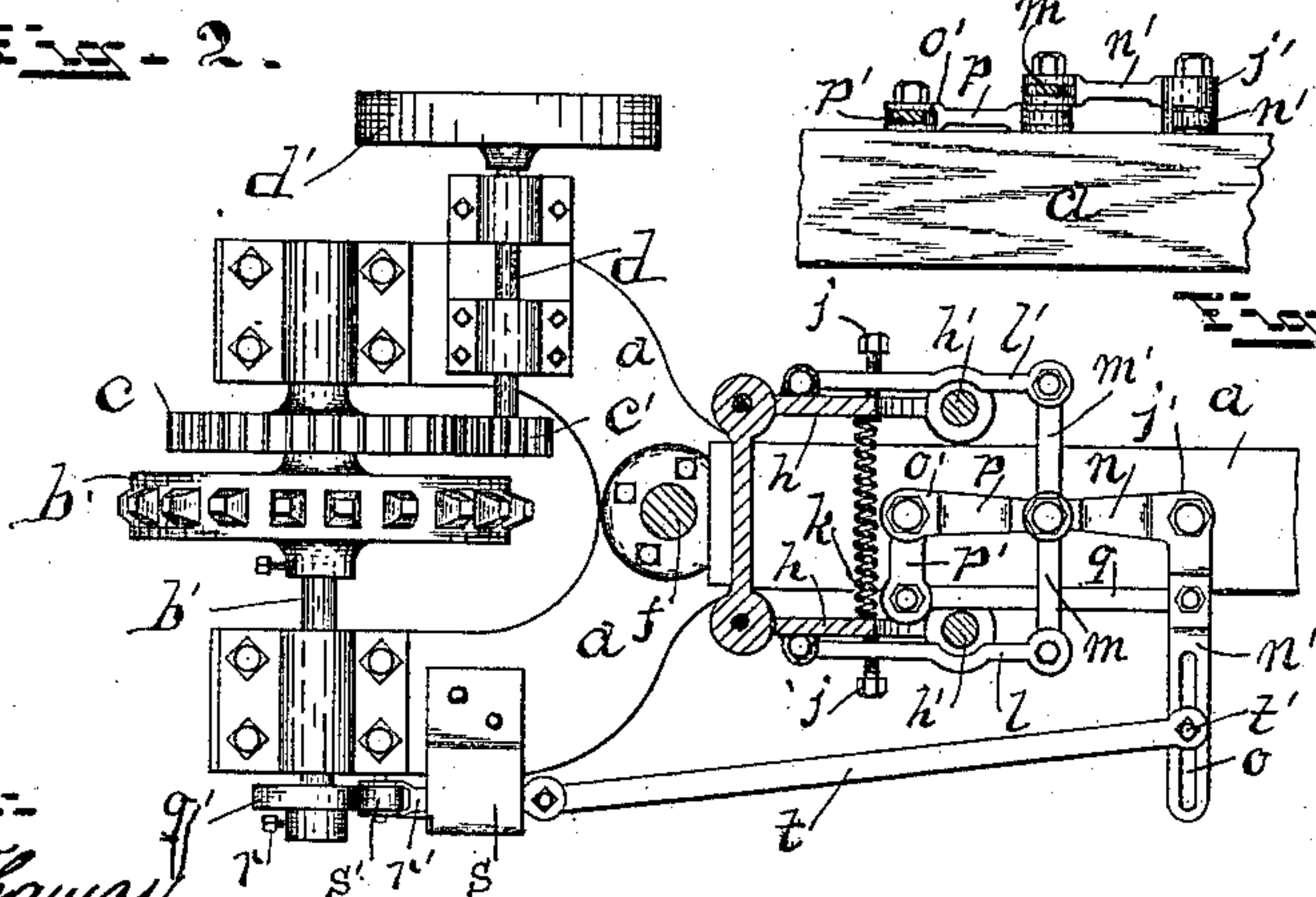
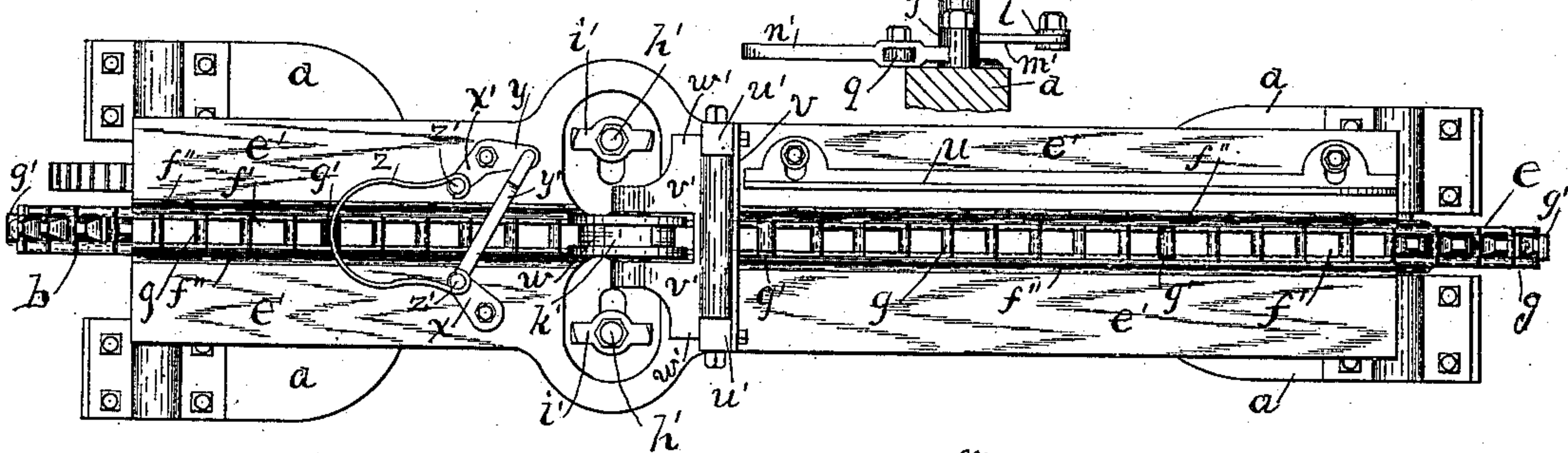
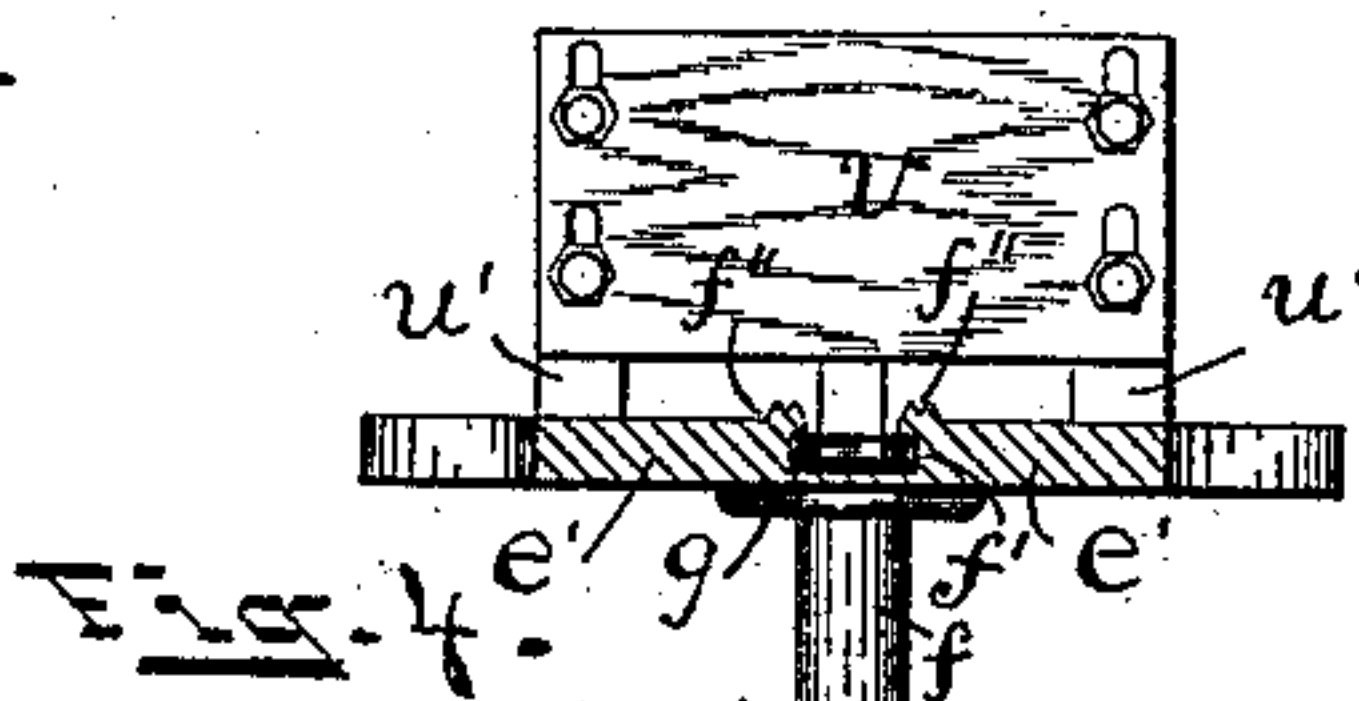
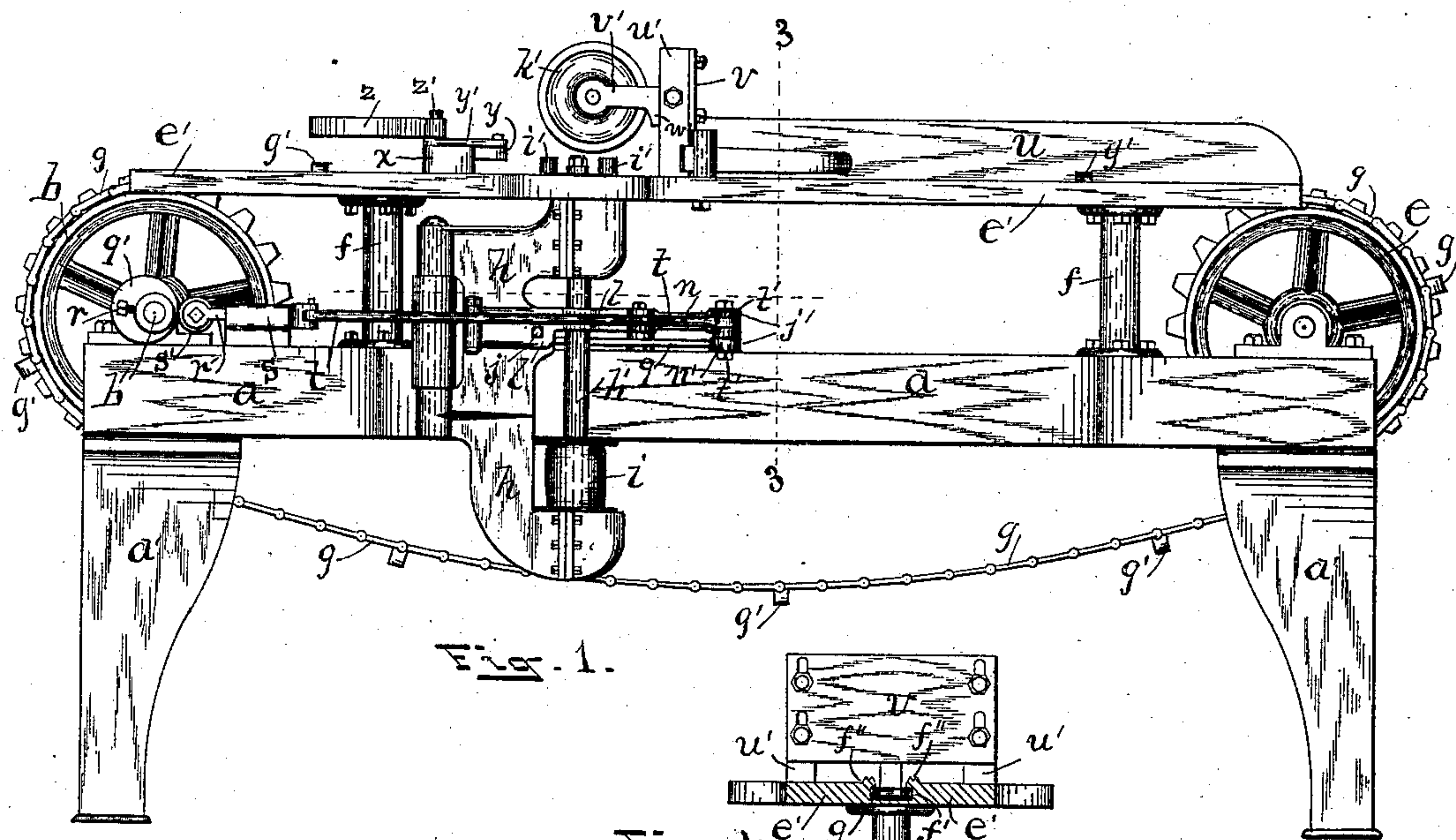


(No Model.)

A. D. CATLIN.  
STAVE JOINTING MACHINE.

No. 376,139.

Patented Jan. 10, 1888.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

ABEL D. CATLIN, OF BAY CITY, MICHIGAN.

## STAVE-JOINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 376,139, dated January 10, 1888.

Application filed February 17, 1887. Serial No. 227,896. (No model.)

*To all whom it may concern:*

Be it known that I, ABEL D. CATLIN, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Stave-Jointing Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in that class of stave-jointing machines in which rotary cutters are employed to perform the operation; and it consists in devices for holding the stave in proper position in relation to the cutters, in devices for operating and adjusting the cutters to produce staves of different desired forms, in devices for adjusting the cutters to operate upon staves of different lengths, and in the combination, arrangement, and construction of the parts of the machine, as I hereinafter more fully describe and claim; and the objects of my invention are to provide a machine which will accomplish a greater range of work, that will operate more accurately and economically, and that may be easily adjusted to form staves of different widths and different forms. The devices I employ to attain these objects are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved stave-jointing machine. Fig. 2 is a top or plan view of the same. Fig. 3 is a plan view of the rear lower portion of the machine, partly sectional. Fig. 4 is a section at 3 3. Fig. 5 is a side view of the levers moving the cutters. Fig. 6 is a plan view of the cutter. Fig. 7 is a side view of Fig. 6.

*a* represents the bed-piece of the machine, and *a'* are the legs secured to and supporting the bed-piece.

*b* is a sprocket-wheel mounted upon a shaft, *b'*, which is journaled to the rear portion of the bed-piece, and also carried by this shaft *b'* is a gear-wheel, *c*, and engaged with the wheel *c* is a pinion, *c'*, which is carried by the inner end of a shaft, *d*, the outer end of the shaft being provided with a driving-pulley, *d'*.

*e* is a sprocket-wheel suitably mounted upon a shaft which is journaled to the front end of the bed-piece *a*. A table, *e'*, is supported above the bed-piece *a* by the standards *f*, and at a height to be just above the upper portions of the sprockets *b* and *e*, and is provided in its center with a longitudinal groove, *f'*, which extends the entire length of the table, and an endless drive-chain, *g*, provided at proper intervals with projecting lugs *g'*, is passed over the sprockets *b* and *e*, and with its upper portion between the sprockets resting within the groove *f'*.

*h* are vertical frames hinged by their rear ends to the opposite sides of the rear portion of the bed-piece *a*, and, extending forward beside the bed-piece, are provided on their outer free ends with suitable boxes carrying the vertical shafts *h'*. These shafts *h'* are provided on their lower portions with the pulleys *i*, and their upper ends pass upward through curved openings in the table and are provided above the table with the rotary cutters *i'*, and a spring, *k*, connected by its ends to the free ends of the frames, draws the frames at all times toward each other or toward the bed-piece. The openings in the table *e'*, through which the shafts *h'* pass, may be considerably larger than the shaft and suitably formed to allow the shaft to move outwardly when the frames *h* are swung on their pivoted or hinged ends.

Hinged by one end to the outside of the rear portions of the frames *h* are the arms *l* and *l'*, the outer free end of the arms extending beyond the body portion of the frames, and *j* are screw-bolts, which adjust the arms in position in relation to the frames. Upon the upper surface of the bed-piece *a* is pivoted an elbow-lever, *j'*, its short arm *n* extending rearward along the bed-piece, and its long arm *n'* extends outward at right angles with the arm *n* and is provided with a slot, *o*.

*m* is a piece pivoted by one end to the free end of the arm *n*, and pivoted by its opposite end to the outer free end of the arm *l*.

*o'* is an elbow-lever pivoted to the surface of the bed-piece *a* in rear of the lever *j'*, and has an arm, *p*, of a length equal to the arm *n*, extending forward to the end of the arm *n*, and is pivoted by its free end to the one end of the piece *m'*, the opposite end of the piece *m'* being pivoted to the free end of the arm *l'*.



Extending outward at right angles with the arm  $p$  is an arm,  $p'$ , considerably shorter than the arms  $p$  and  $n$ , and to the outer end of this arm  $p'$  is pivoted one end of the rod  $q$ , the opposite end of the rod being pivoted to the arm  $n'$  at a distance from the central pivot thereof equal to the length of the arm  $p'$ . This form of connecting the levers  $j'$  and  $o'$  and the arms  $l$  and  $l'$  has the effect of operating them all in conjunction, so that when the arm  $n$  is moved the arms  $l$  and  $l'$  are moved in opposite directions to an equal distance.

Upon the outer end of the shaft  $b'$  is mounted a cam-wheel,  $q'$ , and is held in position by a set-screw,  $i$ , which allows the cam-wheel to be properly adjusted in relation to the lugs  $g'$  upon the chain  $g$ .

$r'$  is a piece passing through a support,  $s$ , which is bolted to the bed-piece, and is provided on one end with a roller,  $s'$ , which bears against the periphery of the cam-wheel  $q'$ , and the opposite end of the piece  $r'$  is pivoted to a connecting-rod,  $t$ , the opposite end of which is pivoted to the arm  $n'$  by a bolt,  $t'$ , passing through the slot  $o$ .

$u$  is a gage-piece which is adjustably secured upon the front portion of the table and parallel with the chain-groove  $f'$ , and  $u'$  are standards secured to and extending above the table in front of the cutters  $i'$ , and adjustably secured to the front side of these standards and across the table is the stop  $v$ , with a space between the stop and table to allow the material to be operated upon to pass beneath the stop, which may be raised or lowered to allow pieces of different thicknesses to pass.

$v'$  are rearward-extending arms, the front ends of which are pivoted to the upper ends of the standards  $u'$ , and to their outer free ends are journaled a shaft carrying a roller,  $k'$ , which is located between the cutters  $i'$ . The pivoted ends of the arms are provided with stops  $w'$ , which engage with the standards and prevent the roller from dropping upon the table, and in the periphery of the roller is formed a groove,  $w$ , which allows the lugs  $g'$  to pass without catching upon or lifting the roller.

Pivoted by one end to the surface of the table, and at a suitable distance in rear of the cutters  $i'$ , and at a proper distance from the chain  $g$ , is a short lever,  $x$ , the free end of the lever being rounded and extending inward and rearward; and on the opposite side of the table and at an equal distance from the chain is a similar lever,  $x'$ , pivoted in a like manner to the lever  $x$ , and is provided with an arm,  $y$ , extending forward diagonally, and to the outer free end of this arm  $y$  is pivoted one end of a connecting-piece,  $y'$ , the opposite end of the piece  $y'$  being pivoted to the free end of the lever  $x$ , and the free ends of the levers are also provided with an upward-projecting stud,  $z'$ , upon which are caught the ends of a curved spring,  $z$ . This spring  $z$  operates to crowd the free ends of the levers together, and the connecting-piece  $y'$  obtains for the free ends of

the levers an equal movement in relation to each other. A counter-shaft is properly supported in rear of the machine and provided with suitable pulleys, to which are belted the pulleys  $i$ , which drive the cutters, and also a pulley which is belted to the pulley  $d'$ , which operates through the pinion  $c'$  and gear  $c$  to rotate the shaft  $b'$  and sprocket  $b$  in a direction to move the chain  $g$  from the front to the rear of the machine in the groove  $f'$ .

As the shaft  $b'$  is revolved the cam  $q'$  revolves against the roller  $s'$  and imparts a reciprocating movement to the piece  $r'$ , which, by means of the rod  $t$ , moves the arm  $n'$  back and forth and oscillates the lever  $j'$ , the short arm of which, being connected by the piece  $m$  to the arm  $l$ , moves outward the arm and left frame  $h$ , which carries the cutter  $i'$ . The movement of the arm  $n'$  by means of the piece  $q$  causes the lever  $o'$  to oscillate and move outward the lever  $l'$  and right-hand frame  $h$ , which also moves outward the right-hand cutter,  $i'$ . The spring  $k$ , acting to pull the frames  $h$  toward each other, operates upon the connecting-rods and levers to bear the roller  $s'$  against the cam-wheel, so that the piece  $r'$  is pushed forward by the cam-wheel and rearward by the action of the spring  $k$  on the frames  $h$ .

In order to obtain a proper coaction of the feeding chain with the cutters, the number of links in the chain is a multiple of the number of teeth in the driving sprocket-wheel  $b$ , and the number of links between the lugs  $g'$  equals the number of teeth in the sprocket, so that the cutters will be extended and receded at each revolution of the sprocket, which also brings forward a new lug. This action allows staves of different lengths to be jointed to a proper form and equal curvature by adjusting the cam-wheel upon the shaft  $b'$  so that the cutters will be fully extended in the middle of the length of the stave. In practice staves are placed in a pile upon the front portion of the table with their front ends against the stop-piece  $v$ , which is arranged to allow one or more pieces, as desired, to pass beneath and retains the remainder, and the lugs  $g'$ , which are of a proper height to catch one or more staves, as desired, carry the staves toward the rear of the table beneath the roller  $k$  and between the cutters  $i'$ , which, as the stave passes rearward, recede outwardly until the central portion of the stave is reached, when they gradually return to their former position as the stave passes, and the cutters, as the stave passes, trim off the extra material from the edges thereof and give the stave a proper curved form and bevel with which to construct a barrel having a desired form and with a proper bilge, and the stave, after passing the cutters, passes between the rearward-extending ends of the levers  $x$  and  $x'$ , which recede equally, and by the action of the spring  $z$  retain the stave in a true and rigid position upon the center of the table and in relation to the cutters, the levers moving outward as the wider



central portion of the stave passes and moving inward as the narrower end portions pass. The form of the curve on the staves is adjusted by moving the screw-bolt  $t'$  and the end of the rod  $t$  outward in the slot  $o$  for reducing the curve and by moving the bolt and rod inward for enlarging the curve, and the curve is adjusted to staves of different lengths by slightly rolling in the required direction the cam-wheel  $q'$  upon the shaft  $b'$ . The cutters are independently adjusted in relation to the chain by turning the screw  $j$ , which is passed through the arm and tapped into the frame  $h$ , so that when the screw is turned in one direction the frame is drawn inward by the spring  $k$ , and when turned in the opposite direction the frame is drawn outward by the screw.

The cutters  $i'$  are formed of a circular plate,  $a''$ , having a central opening,  $b''$ , passed upon the shaft  $h'$  and held in position by a nut, and provided with the portions  $c''$ , projecting horizontally from its outer edge and opposite each other, and with the portions  $d''$ , extending upward from the outer ends of the portions  $c''$ .

The outer sides of the portions  $d''$  are turned off to form a surface curved from the center of the shaft, and the vertical front edges of the portion are beveled from its inner side outward to form a cutting-edge upon its outside edge, and the parts  $d''$  are given a proper incline to form the required bevel upon the stave. This forms a cheap and easily-constructed cutter and allows the edges to be sharpened without reducing the diameter of the cutters, which avoids any necessity for adjusting knives, &c., after sharpening.

Upon each side of the groove  $f'$ , and extending upward from the surface of the table, are the longitudinal ribs  $f''$ , the upper edges of which are provided with one or more angular edges. These angular edges support the stave and prevent any side movement of the stave as it is being operated upon by the cutters, the roller  $k'$  pressing the staves firmly upon the ribs, and also allows a stave of a concave form transversely and having irregular edges to be firmly and rigidly supported in its central portion.

I do not confine my invention entirely to the precise form and location, as herein described, of the levers  $x$  and  $x'$ , or to the form and location of the levers  $j'$  and  $o'$  and their connecting-pieces, as other forms and other locations may be used and produce a similar result, and other devices may be used for imparting an oscillating movement to the arm  $n'$ ; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a stave-jointing machine, the combination, with the rotary cutters, the table, and feeding devices, of the lever  $x$ , pivoted by one end to the surface of the table on one side, and the lever  $x'$ , pivoted to the table on the opposite side and provided with the arm  $y$ , the piece  $y'$ , pivoted to the free end of the arm  $y$  by one end and to the free end of the lever  $x$

by its opposite end, and the spring  $z$ , with its ends connected to and bearing inward upon the free ends of the levers, substantially as set forth.

2. In a stave-jointing machine, the combination, with the bed-piece  $a$ , the vertical frames  $h$ , hinged by their rear ends to the opposite sides of the bed-piece and carrying on their outer free ends the shaft  $h'$  and cutters  $i'$ , and a spring,  $k$ , placed between and with its ends secured to the outer portions of the frames, of the arms  $l$  and  $l'$ , having one end hinged to the rear portion of the frames and the opposite end extending beyond the shaft  $h'$ , the bolts  $j''$ , passing through the central portion of the arms and tapped into the frames, and devices imparting an outward movement to the free ends of the levers, substantially as and for the purpose set forth.

3. In a stave-jointing machine, the combination of the bed-piece  $a$ , the frames  $h$ , hinged to opposite sides of the bed-piece and carrying on their free ends the shafts  $h'$  and cutters  $i'$ , the spring  $k$ , with its opposite ends secured to the opposite frames, the elbow-lever  $o'$ , pivoted to the bed-piece and provided with a side arm,  $p'$ , and a forward-extending arm,  $p$ , a piece,  $m'$ , with one end pivoted to the free end of the arm  $p$  and its opposite end pivoted to the outer portion of one of the frames  $h$ , the elbow-lever  $j'$ , pivoted to the bed-piece and provided with the rearward-extending arm  $n$  and an outwardly-projecting arm,  $n'$ , a piece,  $m$ , with one end connected to the free end of the arm  $n$  and its opposite end pivoted to the other frame  $h$ , the rod  $q$ , with one end connected with the arm  $n'$  and its opposite end connected with the arm  $p'$ , and devices imparting an oscillating movement to the lever  $j'$ , substantially as and for the purpose set forth.

4. The combination, in a stave-jointing machine, of the bed  $a$ , the frames  $h$ , hinged to opposite sides of the bed, and the spring  $k$ , secured by its ends to the frames, the lever  $o'$ , pivoted to the bed-piece and having its forward-extending arm connected with one of the frames, the lever  $j'$ , having an outward-extending arm,  $n'$ , provided with the slot  $o$ , and a rearward-extending arm connected with the other of the frames, a rod,  $q$ , with one end pivoted to the arm  $n'$  and its opposite end pivoted to the arm  $p'$ , with a cam-wheel,  $q'$ , having a rotary movement, a piece,  $r'$ , provided with a roller,  $s'$ , bearing against the cam-wheel, and a rod,  $t$ , with one end connected with the piece  $r'$  and its opposite end connected with the arm  $n'$  by the bolt  $t'$ , substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ABEL D. CATLIN.

Witnesses:

JAS. E. THOMAS,  
LANE LYLE.