

(No Model.)

3 Sheets—Sheet 1.

A. M. BENSON.  
MACHINE FOR JOINTING STAVES.

No. 401,874.

Patented Apr. 23, 1889.

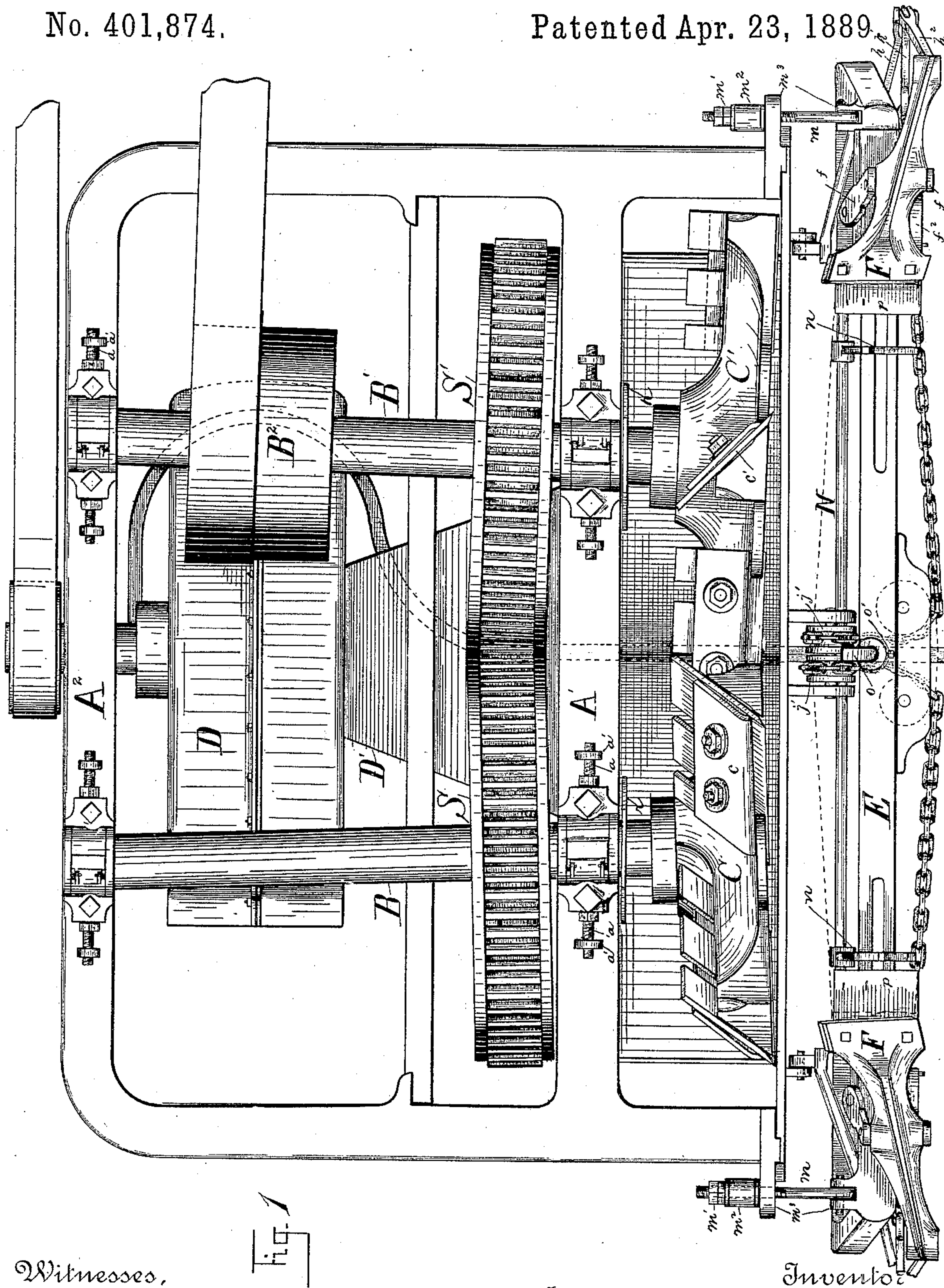


Fig. 1

Witnesses,

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By his Attorney  
Thos. D. Hall

Inventor



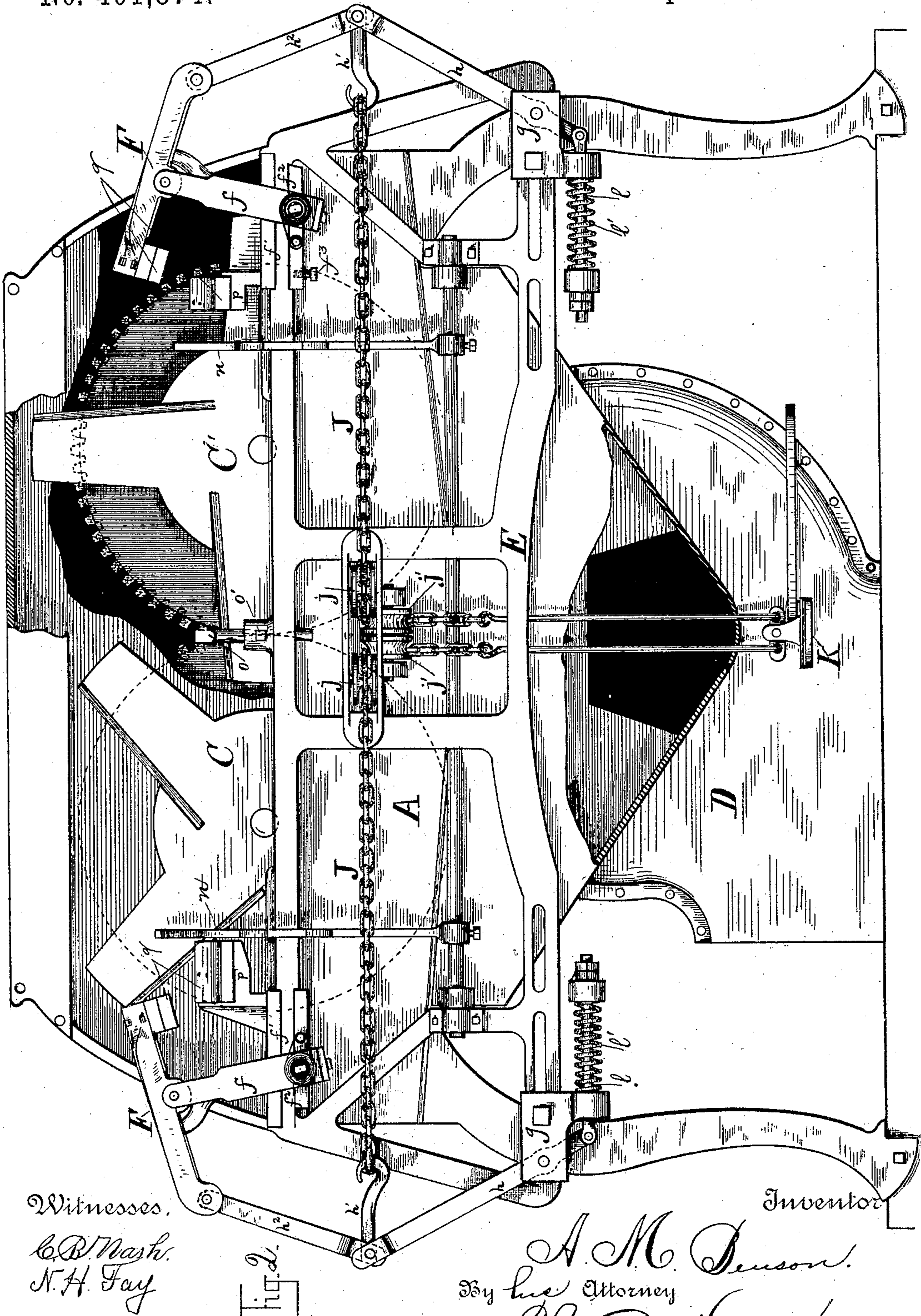
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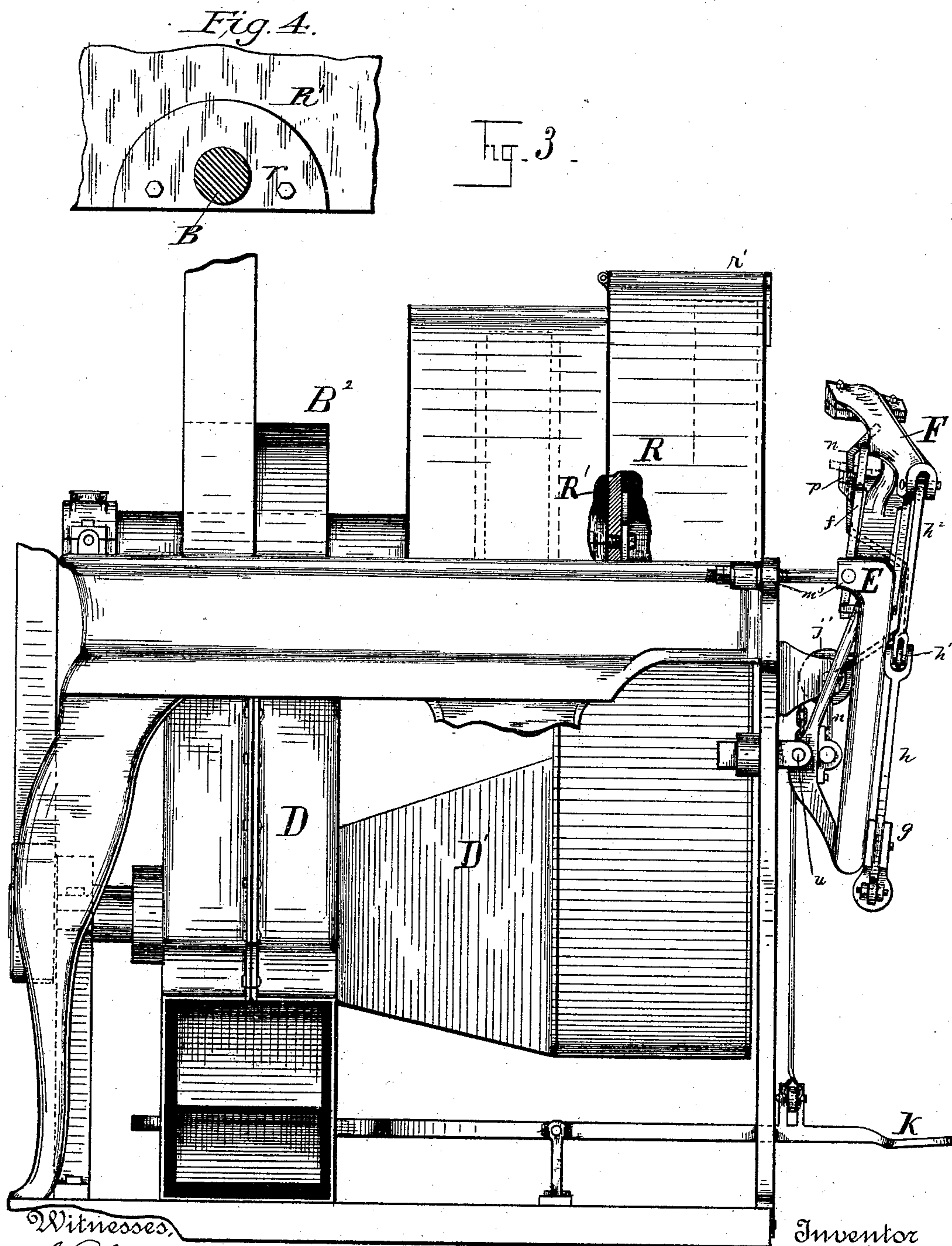
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A. M. Benson  
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# UNITED STATES PATENT OFFICE.

ARZA M. BENSON, OF CLEVELAND, OHIO.

## MACHINE FOR JOINTING STAVES.

SPECIFICATION forming part of Letters Patent No. 401,874, dated April 23, 1889.

Application filed June 28, 1888. Serial No. 278,420. (No model.)

*To all whom it may concern:*

Be it known that I, ARZA M. BENSON, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Machines for Jointing Staves, of which the following is a specification, the principle of the invention being herein explained, and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention consists of the improvements hereinafter described and claimed.

Referring to the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation view of the same, certain parts being broken away. Fig. 3 is an end elevation view, certain parts being broken away. Fig. 4 is a detail view of one of the semi-disks *r*, showing it fitted over one of the shafts and bolted to partition *R'*.

A is the frame of the machine, supported by the customary legs. Journaled in the longitudinal portions *A'* *A*<sup>2</sup> transversely of the machine are the shafts *B B'*, each adjustable longitudinally of the machine at both points of journaling by means of bolts *a*, threaded through lugs *a'*, the latter respectively integral with said longitudinal portions. Secured respectively to cutter-heads *C C'*, in any suitable manner, are the knives *c c'*, said cutter-heads being secured respectively to shafts *B B'*, said shafts being inclined toward each other, the distance between them being somewhat less at their cutter-head extremities than at their opposite ends, as is customary in this class of machinery. The usual band-pulleys, *B*<sup>2</sup>, are secured to shaft *B'*, and connected up in the usual manner to driving-power.

Below shafts *B B'*, I locate exhaust-fan *D*, provided with the usual driving-power and connected with hopper *D'*, that incloses the lower portions of the cutter heads and knives. To the front of the machine is hinged the swinging table *E*, provided at its opposite ends with the clamps *F*, that are each pivoted in the upper portion of the spring-pressed lever *f*, pivoted to slide *f'*, that is in turn adjustably secured to the table. Said slides are secured in position by means of set-screws *f*<sup>3</sup>,

that may be loosened, whereupon the slide may be moved either way on the table and adjusted as desired. Spring *f*<sup>2</sup> operates to rock said lever *f*. At either end of the lower portion of said table are secured bearing-blocks *g*, adjustable longitudinally of the table. Pivoted to said bearing-blocks are the levers *h*, and respectively pivoted to the opposite extremity of said levers are hook *h'* and lever *h*<sup>2</sup>, the latter having its opposite extremity pivotally engaging with the outer extremity of clamps *F*. Chains *J* are secured to hooks *h'*, and pass respectively over sheaves *j j'*, and are connected at their lower extremities by means of rods to the treadle *K*, that is pivoted near its central portion, and provided with a backwardly-extending curved extremity that passes around the fan-cover and acts as a balance to the forward portion, so that there will be no weight on the treadle when the foot of the operator is removed. Rods *l*, provided with spiral springs *l'*, pass through openings in blocks *g*, and are pivotally connected with lever *h*.

Rods *m*, movably secured at one end to table *E*, fit loosely in openings at each end of the machine-bed, and are provided on their extremities with nuts *m'* and rubber bearing-washers *m*<sup>2</sup>, which limit the outward movement of the table, as the lugs *m*<sup>3</sup> limit its inward movement and prevent it from striking the cutter-knives. Spring-pressed rod *N* is journaled longitudinally of the table, and adjustably keyed to said shaft are the lever-arms *n*, that serve to gage of equal width the two ends of the stave to be operated upon. I secure center rest, *o*, to the upper central face portion of the table, said rest being adjustable vertically by means of a set-screw, *o'*. End rests, *p*, for the staves are also secured to the table and adjustable horizontally. Said rests and the extremities of clamps *F* are provided with beveled gripping-lugs *q*, that may be removed and others substituted to suit the varying requirements of the particular staves to be operated upon. Semi-disks *r* closely fit over the shaft *B B'*, and to these are secured the cover *R* by bolts passing through middle partition, *R'*, of the same, whereby a tight joint is formed and all dust and shavings caused by the knives are



prevented from passing into the gear-wheels. Said box is provided with a hinged lid,  $r'$ , at its front portion. Said box  $R$ , thus tightly fitted to prevent the escape of all dust and shavings caused by the cutter-knives, incloses the upper portions of said cutter heads and knives, while the V-shaped hopper  $D'$  incloses the lower portion of the same, said hopper and box being connected together and opening into each other. Said fan  $D$  and hopper  $D'$  are located substantially in the same horizontal plane, and the location of the fan is in a plane below that of the journaling of the stave-jointing mechanism, whereby the shavings are easily moved, partly by their own gravity, toward the fan, and thence are transferred in any direction without waste of power. The location of the fan beneath the supporting-frame of the machine also economizes space and renders the machine more compact. Gear-wheels  $S S'$  are respectively keyed onto shafts  $B B'$ , and are each provided with double-housing friction-bands  $s s'$ . The wheels are also slightly beveled, the periphery of band  $s$  being slightly smaller than the periphery of band  $s'$ ; but it is important that the peripheries of bands  $s s$  should equal one another, and also that peripheries of bands  $s' s'$  should be exactly the same.

I have found that to use plain gears without housing is impractical in this machine, running at the high rate of speed that is required, as the backlash very quickly snaps one or more of the gear-teeth; but by double housing the wheels and providing a friction-band on each side of the same all backlash is prevented and the machine runs very quietly and easily and needs few repairs.

I have found that to secure sufficient strength the swinging table must be rather heavy, and I utilize this needed weight to effect a result never heretofore accomplished—namely, to firmly clamp the stave before the table is swung forward, and after the stave is jointed to retain said grip of the clamps upon the stave until the table is swung back from the knives. I accomplish this result as follows: The table is hinged at  $u$  and the sheaves  $j j'$  are journaled closely above the same, so as to give but little leverage. Thus, as the treadle  $K$  is depressed, the weight of the table is so great that the clamps  $F$  are brought down into firm contact with the stave before the table begins to swing forward, and again when the table is once swung forward its pivotal point is so low relatively to the height of the table, and the weight of the latter is so great that as soon as the operator's foot is lightened on the treadle the table immediately swings outward before the stave is relieved from the grip of the clamps. This is of especial importance in twisted or winding staves that have a tendency to lift the clamps by reason of their twist, and hence are liable to be unevenly jointed. By my improvement

all this danger is overcome, as the staves are held rigid and firm until quite clear from the knives.

The operation of the machine is as follows: It is understood that the machine is geared up to any suitable power and is in motion. The stave to be jointed is placed so that its two ends rest on the rests  $p$  and the center rest,  $o$ . The operator then presses down with his foot on the treadle  $K$ , causing the toggle-joint, through the medium of chains  $J$ , to be straightened. As the levers of the toggle-joint begin to assume a right-line position, the lever  $l$  on each end of the table is forced outwardly by the movement of the lever  $h$ , and the spring  $f^2$ , secured to the lever  $f$ , causes said lever pivotally to move forward, thus shifting the pivotal bearing-point of the levers  $F$  so that its clamp is vertically over the rest  $p$ . The lever  $K$  is pressed down still further, causing the levers  $F$  to clamp the stave securely against rest  $p$ . Meanwhile, as the chains  $J$  have bearing over the sheaves  $j j'$ , the swinging table is caused to swing forward, carrying with it the stave and crowding the same against the rapidly-rotating knives on the cutter-heads. Levers  $n$  closely have bearing against the side of the stave.

An important feature of my invention is the pivotal bearing of the supporting-lever  $f$  and the pressure exerted on said lever by spring  $f^2$ , whereby said lever is caused to move forward as soon as the tension of the spring  $l'$  is overcome by the straightening of the toggle-joint  $h$ . As soon as the foot is lifted from the treadle  $K$ , said spring  $l'$  overcomes the forward tension of spring  $f^2$ , and clamps  $F$  are not only vertically withdrawn from contact with the ends of the stave, but are also withdrawn outwardly by reason of the shifting of the pivotal point by said clamps  $F$ . The stave may then be removed from position and another one placed on the rests, the clamps being withdrawn endwise to such an extent as to permit the stave to be readily placed in position. While the stave is being jointed the exhaust-fan is of course revolving and withdraws all shavings, dust, &c., away from the cutter-head through the hopper, and may be discharged in any suitable place.

The foregoing description and accompanying drawings set forth in detail mechanism in embodiment of my invention. Change may therefore be made therein, provided the principles of construction respectively recited in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a stave-jointing machine, the combination, with a stave-rest and a clamping-arm, of a pivotal spring-pressed support in which said clamping-arm is pivotally supported, substantially as set forth.

2. In a stave-jointing machine, the combination, with a stave-rest and a movable support, of a spring-pressed clamping-arm pivot-



ally engaging with said movable support, substantially as set forth.

3. In a stave-jointing machine, the combination of a stave-rest, a swinging spring-pressed support, a clamping-arm pivotally engaging with said support, and toggle-joint-actuating mechanism connected with said clamping-arm, substantially as set forth.

4. In a stave-jointing machine, the combination of a stave-rest, a movable support, a clamping-arm connected with said support, a toggle-joint to one arm of which said clamping-arm is pivotally secured, and a spring-pressed rod pivotally engaging with the opposite arm of said toggle-joint, substantially as set forth.

5. In a stave-jointing machine, the combination of a bearing-block adjustable longitudinally of the machine, a clamping-arm, toggle-joint mechanism pivotally engaging with said clamping-arm, and having pivotal supporting engagement with said bearing-block, actuating mechanism engaging with said toggle-joint mechanism and adapted to straighten the same, and automatic spring mechanism engaging with said toggle-joint, whereby the latter is thrown out of right-line position, substantially as set forth.

6. In a stave-jointing machine, the combination of a swinging table provided at its upper portion with a pivotal clamping-arm support and at its lower portion with a bearing-block, said support and bearing-block each adjustable longitudinally of the machine, a clamping-lever pivoted to said pivotal support, a spring-pressed bar having sliding engagement in said bearing-block, and a toggle-joint pivotally connected with said clamping-arm, said bearing-block, and said spring-pressed rod, substantially as set forth.

7. In a stave-jointing machine, the combination, with a frame provided with openings and a swinging table, E, of rods *m*, movably secured at one extremity to said table and loosely fitting in the openings in said frame, said rods provided on their opposite extremities with nuts, substantially as set forth.

8. In a stave-jointing machine, the combination, with frame A, provided with lugs *m*<sup>3</sup>, said lugs provided with openings, and a swinging table, E, of rods *m*, movably secured at one extremity to said table and loosely fitting in said openings in the lugs, the opposite extremity of said rods being provided with nuts *m*<sup>1</sup>, and with flexible washers *m*<sup>2</sup> intermediate of said lugs and nuts, substantially as set forth.

9. In a stave-jointing machine, the combination, with stave-jointing mechanism, and a hopper inclosing the lower portion of the same, of an exhaust-fan connected with said hopper and located substantially in the same horizontal plane therewith, substantially as set forth.

10. In a stave-jointing machine, the combination of cutter heads and knives, a tight-box inclosing the upper portion of said cutter heads and knives, a hopper inclosing the lower portion of the same, and an exhaust-fan connected with said hopper, substantially as set forth.

11. In a stave-jointing machine, the combination of cutter heads and knives, a box and a V-shaped hopper connected together and respectively inclosing the upper and lower portions of said cutter heads and knives, and an exhaust-fan connected with said hopper, substantially as set forth.

12. In a stave-jointing machine, the combination, with stave-jointing mechanism journaled in the machine-frame, and a hopper inclosing a portion of said jointing mechanism, of an exhaust-fan connected with said hopper and located in a plane below the journaling-point of said jointing mechanism, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 22d day of June, A. D. 1888.

ARZA M. BENSON.

Witnesses:

J. B. FAY,

E. J. CLIMO.