(No Model.) 2 Sheets—Sheet 1.

A. DODDS.

DOVETAILING MACHINE.

No. 364,635. Patented June 14, 1887.

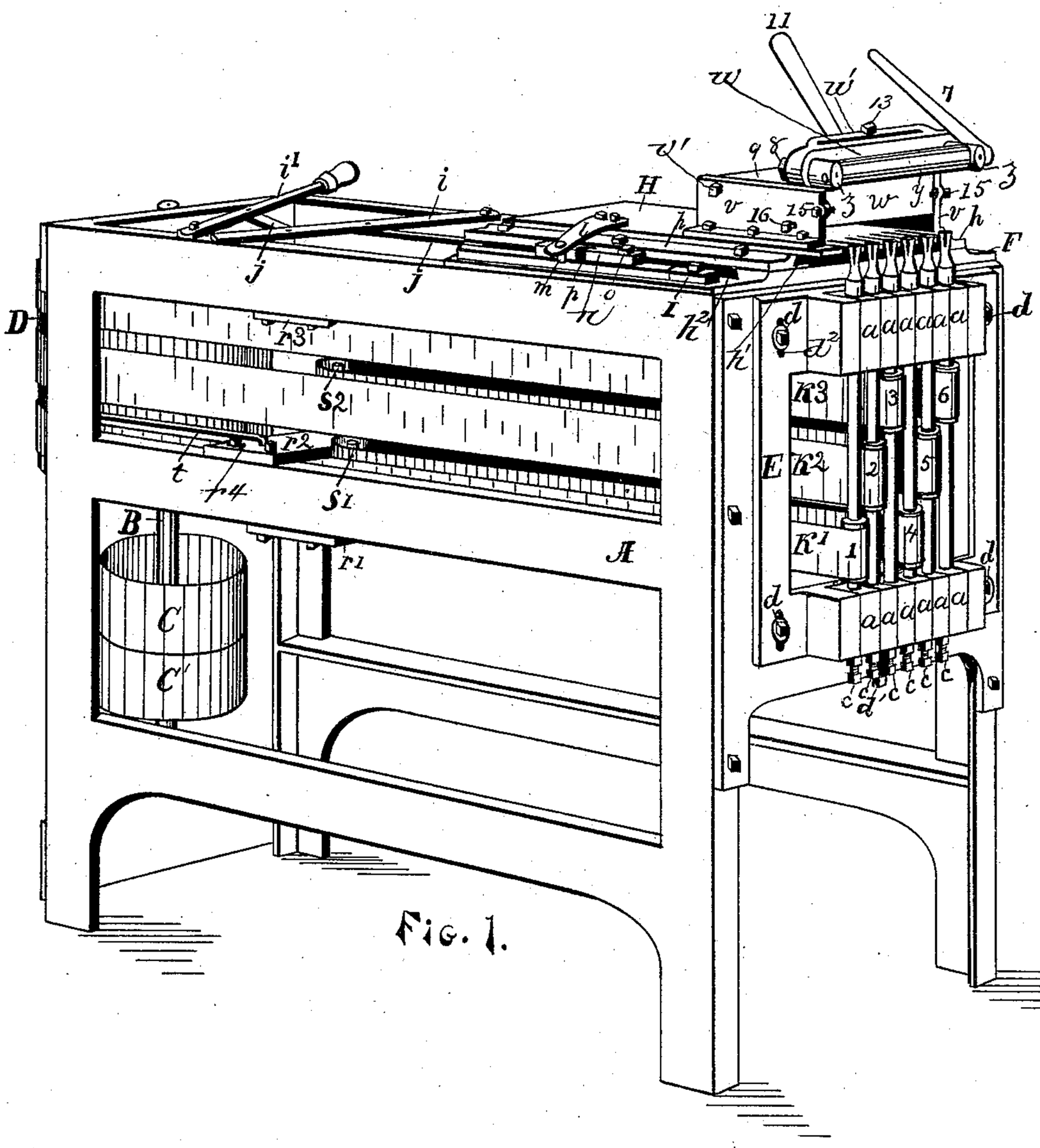

Fig. 1.

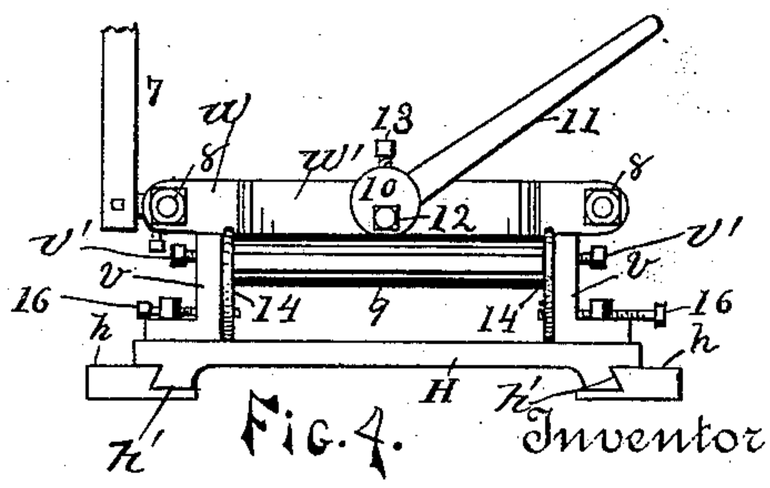

Fig. 4.

Witnesses
Henry Town
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Inventor
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By his Attorney
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(No Model.) 2 Sheets—Sheet 2.

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DOVETAILING MACHINE.

No. 364,635. Patented June 14, 1887.

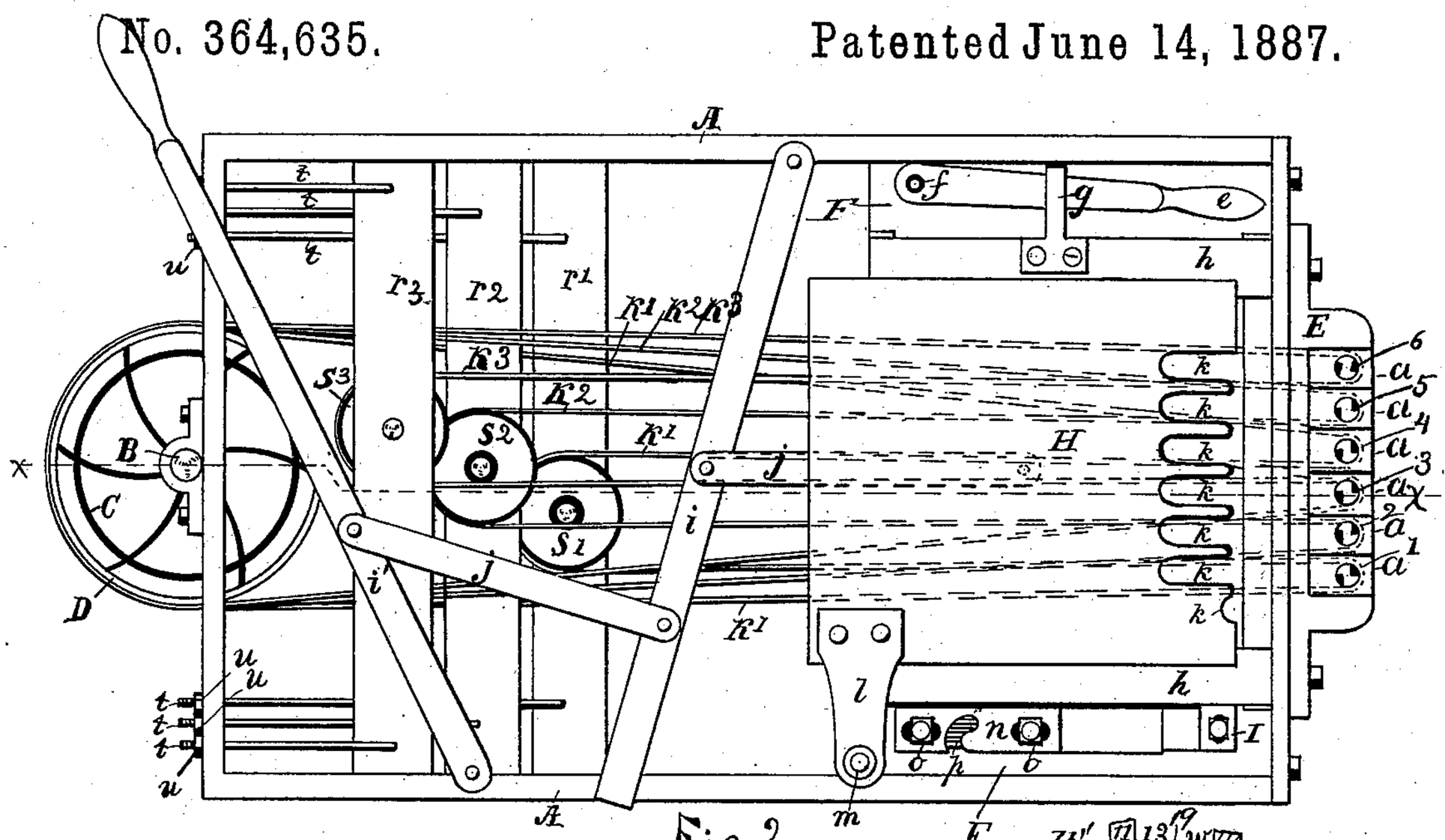

Fig. 2.

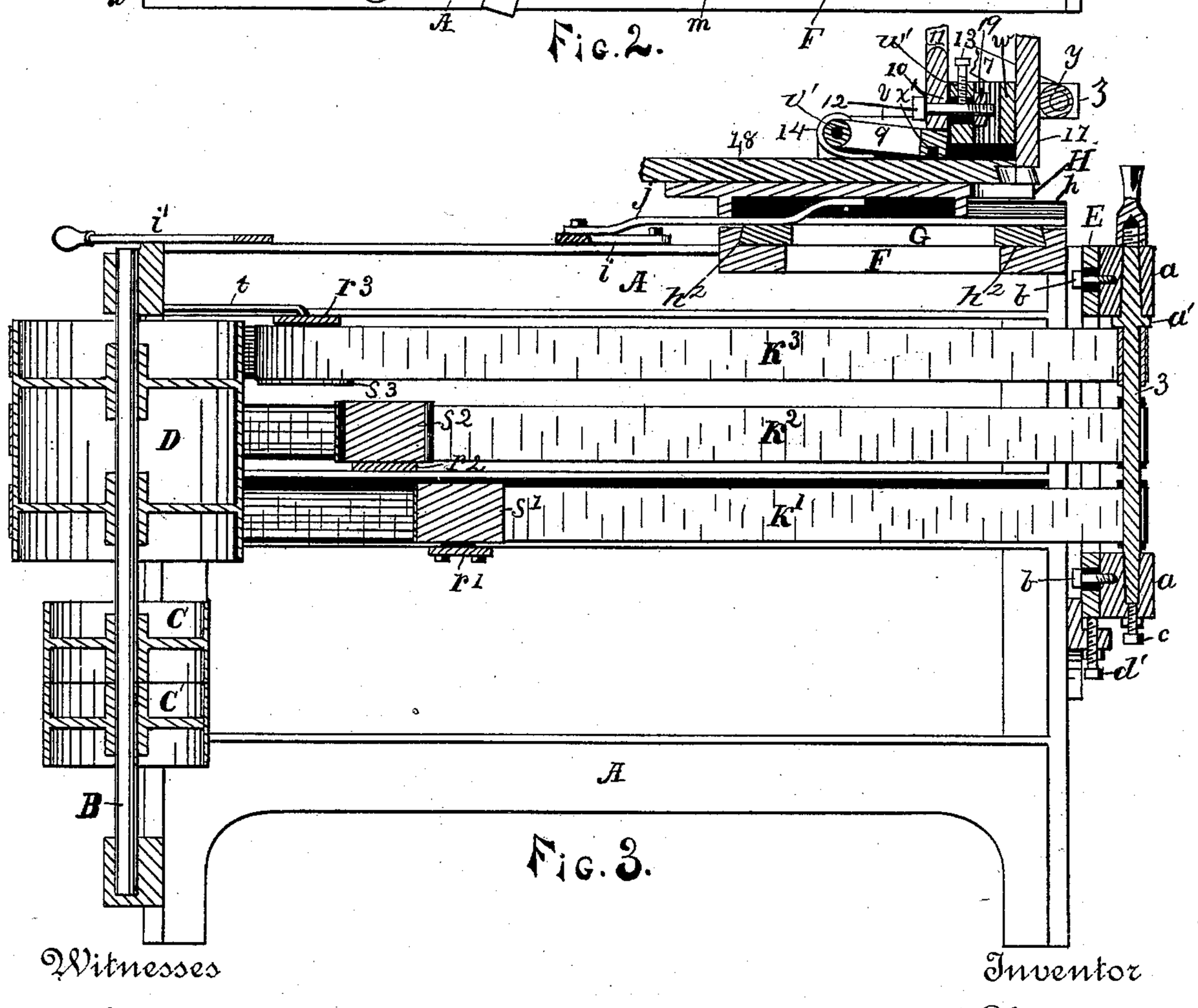

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER DODDS, OF GRAND RAPIDS, MICHIGAN.

DOVETAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 364,635, dated June 14, 1887.

Application filed July 28, 1886. Serial No. 209,333. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER DODDS, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented a new and useful Improvement in Dovetailing-Machines, of which the following is a specification.

My invention relates to improvements in dovetailing-machines having conical cutters adapted to form tenons, the sides of which consist of three plane and one convex surface, and also adapted at the same time to form mortises to fit said tenons, and more particularly to those machines having a sufficient number of cutters to form the entire corner at one operation. Machines having a sufficient number of cutters to do so have been made; but no means of adjusting or keeping said cutters in line, of tightening the journals when worn, and of rounding one side of said tenons, have been provided.

Machines adapted to form a single tenon and mortise, as described, at one movement, repeating such movement as often as necessary to complete the corner, have been made. These are slow of operation, and the guiding mechanism for the table has been unreliable or complicated.

The objects of my invention are, first, to provide mechanism for adjusting and keeping in line a series of spindles sufficient in number to form an entire corner at one operation; second, to provide a clamping mechanism that shall be easily constructed and more quickly adjusted for different thicknesses of boards; third, to provide a simpler and reliable guiding mechanism for the table carrying the boards. These objects I accomplish by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective of a machine embodying my invention; Fig. 2, a plan of the same with the clamping device omitted to show the construction of the table; Fig. 3, a vertical section of the complete machine on the line *x x* of Fig. 2; Fig. 4, a rear view of the table and the clamps for holding the boards.

A is a rectangular frame to which the various parts are attached; B, the shaft, provided with a driving-pulley, C, and loose pulley C′, which drives the spindles 1 2 3 4 5 6 by means of the belts K′ K² K³, which receive motion from the drum D on the shaft B. Said belts are tightened by the idlers s' s^2 s^3, journaled upon plates r' r^2 r^3, which are adjusted by means of the rods *t*, having nuts *u* upon their outer ends, and secured to the frame by bolts passing through slots r^4 in said plates.

The spindles 1 2 3 4 5 6 are provided with suitable cutters at their upper ends and journaled in movable blocks *a*, which are separately attached to the frame E by means of screws *b*, passing through vertical slots in said frame, to permit of separate vertical adjustment of said blocks. The journals of said spindles are tapered, their smaller ends being toward the ends of the spindles. A screw, *c*, supports each spindle, and a collar, *a′*, on each engages with the under side of the upper bearing to keep the spindle from rising. The frame E rests upon a screw, *d′*, and is secured to the frame A by bolts *d*, passing through vertical slots d^2.

H is a table to carry the boards, which slides to and from the spindles in grooves *h′* in the strips *h h*, which are attached to a frame, G, having a transverse movement in grooves h^2 in the upper surface of the bed-plate F.

The frame G is moved by means of the lever *e*, pivoted at *f* to the bed-plate F, and passing through a loop, *g*, attached to said frame. The table H is moved toward and from the cutters by means of the levers *i i′* and bars *j j*, pivoted and connected as shown.

The notches *k* in the edge of the table are of suitable width, and extend into the table a sufficient distance to admit the cutters as the table advances, the points between said notches serving to support the boards, the shallower notch *k* being provided to accommodate the cutter at that end of the series when the table is moved laterally to round the inner sides of the tenons. A suitable arm, *l*, is attached to the table, having a guide-pin, *m*, which operates in conjunction with the block *n* and the stop I to determine the movement of said table, as hereinafter more fully described. The block *n* is secured to the bed-plate F by screws *o o*, which pass through slots to permit of adjusting said block to accommodate various thicknesses of boards upon which tenons are cut. The opening *p* is of suitable width to admit the pin *m*, and the sides of said opening serve to guide the pin and are concentric

curved surfaces of such radii that the pin will be caused to traverse a semicircular path the radius of which is equal to one-half the distance between the centers of the spindles.

I is a stop against which the frame G strikes, so adjusted that the pin *m* will pass closely along the side of the block *n*, thus preventing lateral movement of the table, except when the pin *m* enters the opening *p*. Said stop I is made adjustable to take up any lost motion due to wear of the guide-pin and guide-block.

The angle-plates *v v* are secured at either side of the table H, and are connected at their ends by the plate *w*, the surface of which is vertical to said table and parallel to the line of cutters. Eccentrically journaled in studs *z z*, which pass through said plate *w* near its upper corners, is the roll *y*, which is operated by the lever 7. Said studs are made adjustable in length by means of the nuts 8 8, to accommodate the various thicknesses of boards upon which tenons are cut.

The clamp 9 is pivoted at *v'* (near the rear corners) to the angle-plates *v v* and provided with springs 14 14, which tend to lift the free end of the clamp away from the board. Said free end of the clamp is provided with a strip of rubber, *x'*, upon its under side, and is depressed by an eccentric, 10, actuated by a lever, 11, and pivoted upon a bolt, 12, passing through a slot in the loop *w'* at the back of the plate *w*, said bolt being vertically adjustable by means of the screw 13, and secured by a nut, 19, within the loop *w'*.

15 15 and 16 16 are adjustable stops to adjust the boards in the clamps, which are represented at 17 and 18.

By the mechanism described for adjusting the roll and clamp and for guiding the table I reduce the cost and simplify the mechanism. By filing off the lower side of the upper bearings I can lower and thus tighten the same upon the spindle. By lowering the screw *c* the lower bearing can in like manner be tightened, and by loosening both bearing-blocks upon the frame E, I can vertically adjust the spindle and its bearings. I can thus tighten all the bearings and bring all the cutters in line. I can also by lowering or raising the frame E adjust the entire line of cutters to secure perfect-fitting joints, lowering the frame decreasing, and raising the frame increasing the size of the tenons relative to the mortises.

During the process of cutting the dovetails the table moves in a right line toward the cutters, which pass through the lower end of the vertical board, forming rectangular tenons thereon, thence entering the end of the horizontal board form mortises with rounded inner sides corresponding to the shape of the conical cutters. During this movement the frame E is pressed against the stop I by the lever *c*, and the table pressed toward the cutters by the lever *i*, the pin *m* traversing the side of the guide-block *n*. Pressure upon both of said levers being now reversed, the table recedes, the pin *m* returning along the side of the block *n* until it reaches the opening *p*, which it enters, and by a proper manipulation of the said levers is caused to traverse the same, the sides of the opening guiding said pin in a semicircular path, which causes a similar movement of the table, which causes the cutters to cut away the inner side of the adjacent tenons, leaving them rounded to correspond with the inner sides of the mortises.

I am aware that a series of spindles having cutters and driven by belts passing over adjustable idlers are not new; also, that a single spindle having a cutter adapted to make a dovetail mortise and tenon, operating in conjunction with a table freely movable in all directions, and guided by a pin operating in conjunction with a convex surface, a connecting-arm, and a pivot-pin to which said arm is attached, is not new; also, that a table freely movable in all directions, having attached clamps to hold the boards, guided as aforesaid, and operated in conjunction with a single cutter, is not new. I do not claim these broadly.

What I claim, and wish to secure, is as follows:

1. In a dovetail-machine, a series of spindles having conical journals, in combination with separately-adjustable conical bearings attached to an adjustable frame, said spindles having adjusting-screws at their lower ends, and collars engaging with the ends of the upper bearings, substantially as described.

2. In a dovetail-machine, the combination of a vertical plate and an eccentrically-journaled roll, with studs connecting said plate and roll, and provided with adjusting-nuts, substantially as described.

3. In a dovetail-machine, the combination of angle-plates, a clamp pivoted to said plates and provided with springs, with an eccentric pivoted upon an adjustable bolt, substantially as described.

4. In a dovetail-machine, the combination of angle-plates and vertical plate, with an eccentrically-journaled roll supported by studs having adjusting-nuts, and a clamp pivoted to said plates and provided with springs and operated by an eccentric pivoted upon an adjustable bolt, substantially as described.

5. In a dovetail-machine, a table adapted to support the boards to be operated upon, in combination with a frame adapted to move in a right line, having attached grooved strips in which said table moves at right angles to the movement of said frame, and a guide-pin attached to said table, said pin engaging with an adjustable block having concentric curved guiding-surfaces engaging with opposite sides of said pin, substantially as described.

6. In a dovetail-machine, a table arranged to move horizontally in all directions, having attached a guide-pin, in combination with a guide-block having concentric guiding-surfaces engaging with said pin, and an adjustable stop-block engaging with said table, substantially as described.

7. In a dovetail-machine, in combination

with a series of spindles having cutters attached and provided with separately-adjustable tapered bearings and attached to an adjustable frame, a table adapted to move horizontally in all directions, having attached clamps for holding the boards, and a guide-pin operating in conjunction with a guide-block and stop-block, substantially as described.

ALEXANDER DODDS.

Witnesses:
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