(No Model.)

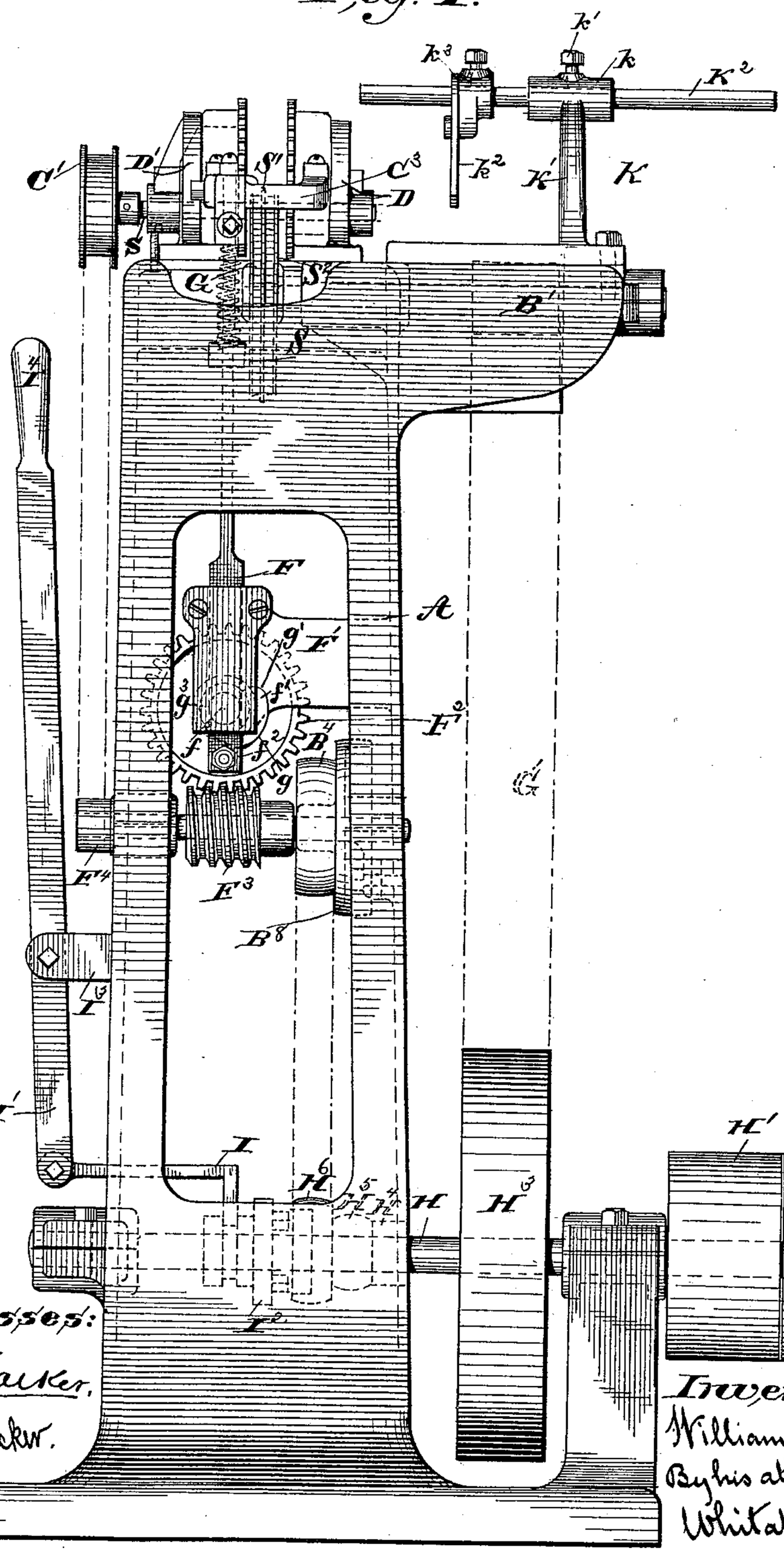
3 Sheets—Sheet 1.

# W. H. DOANE.

## BLIND SLAT TENONING MACHINE.

No. 391,231. Patented Oct. 16, 1888.

Fig. 1.




Witnesses:
E. M. Walker.
L. B. Whitaker.

Inventor.
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(No Model.) 3 Sheets—Sheet 2.

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## BLIND SLAT TENONING MACHINE.

No. 391,231. Patented Oct. 16, 1888.

*Fig. 2.*

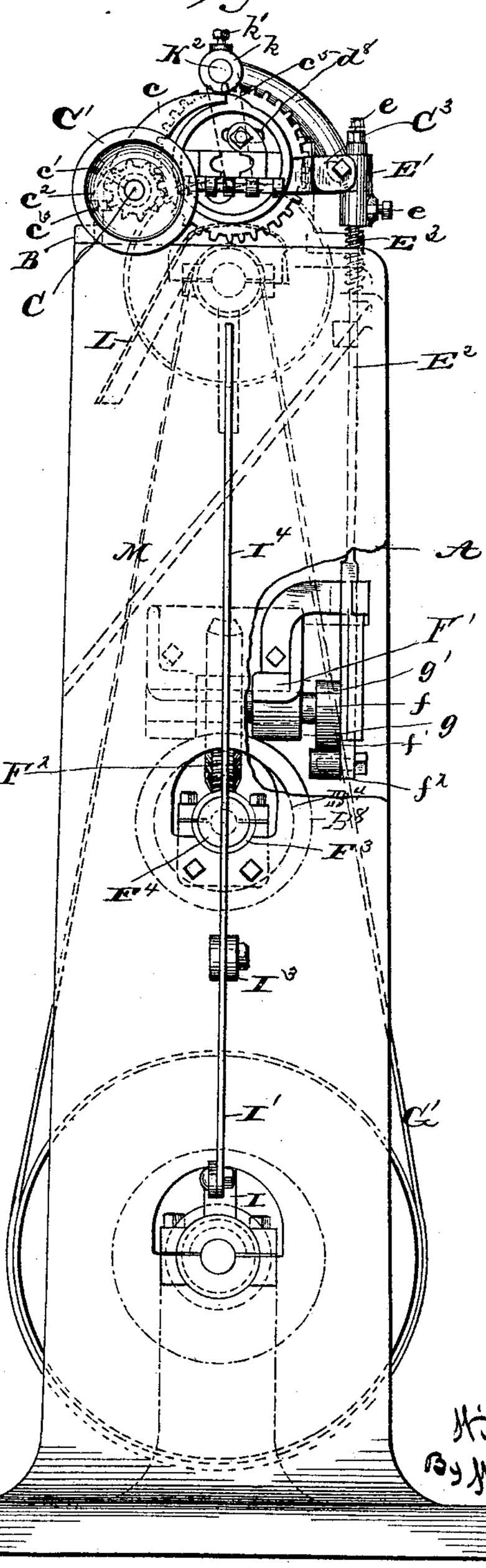



*Fig. 6.*

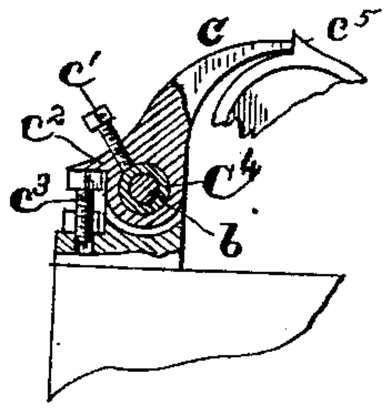
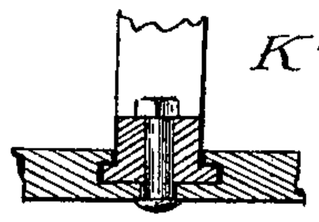



*Fig. 7.*



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(No Model.) 3 Sheets—Sheet 3.

# W. H. DOANE.

## BLIND SLAT TENONING MACHINE.

No. 391,231. Patented Oct. 16, 1888.

Fig. 3.

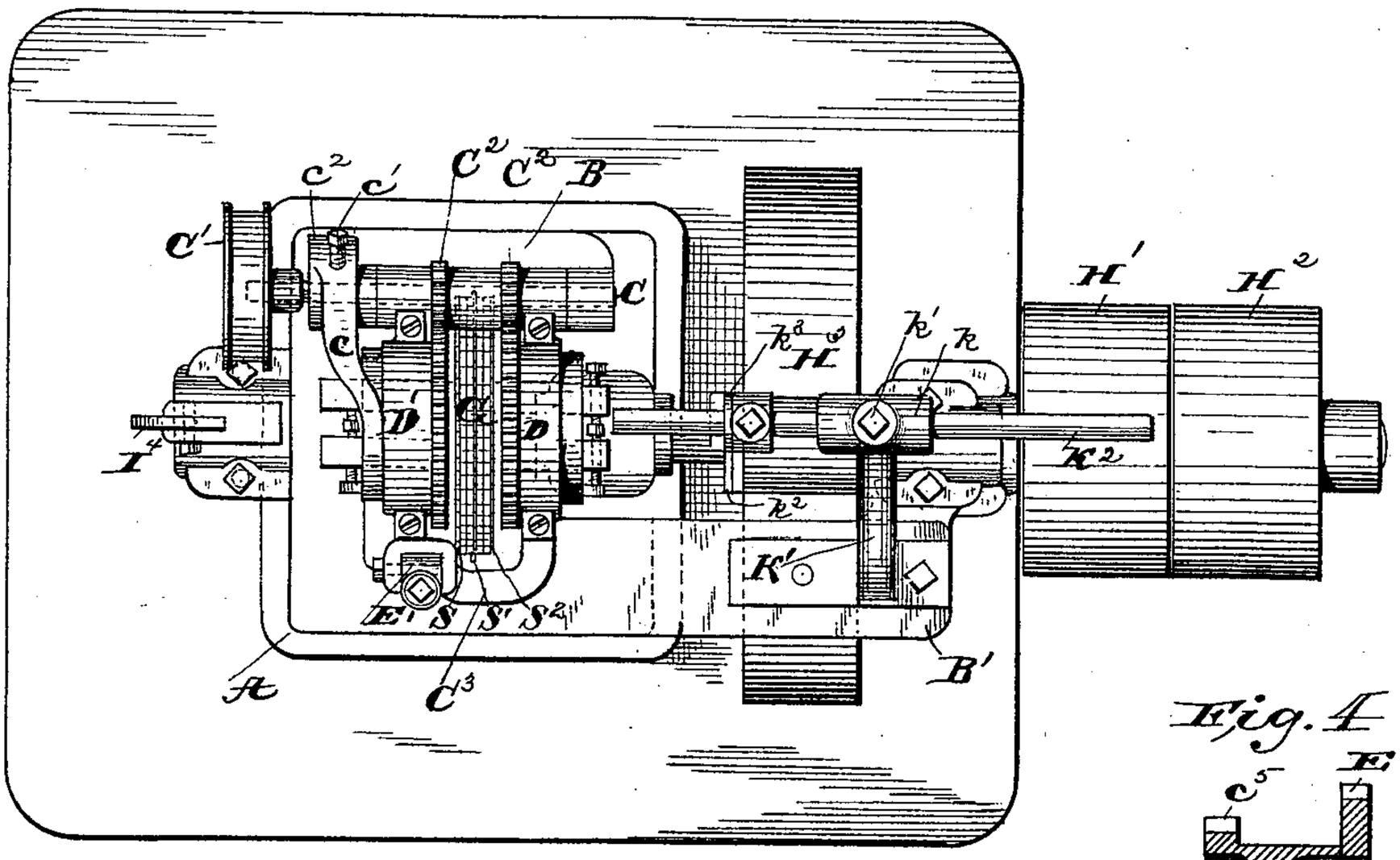



Fig. 4.

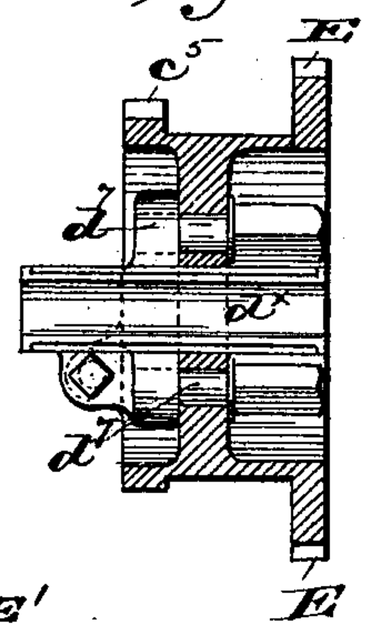
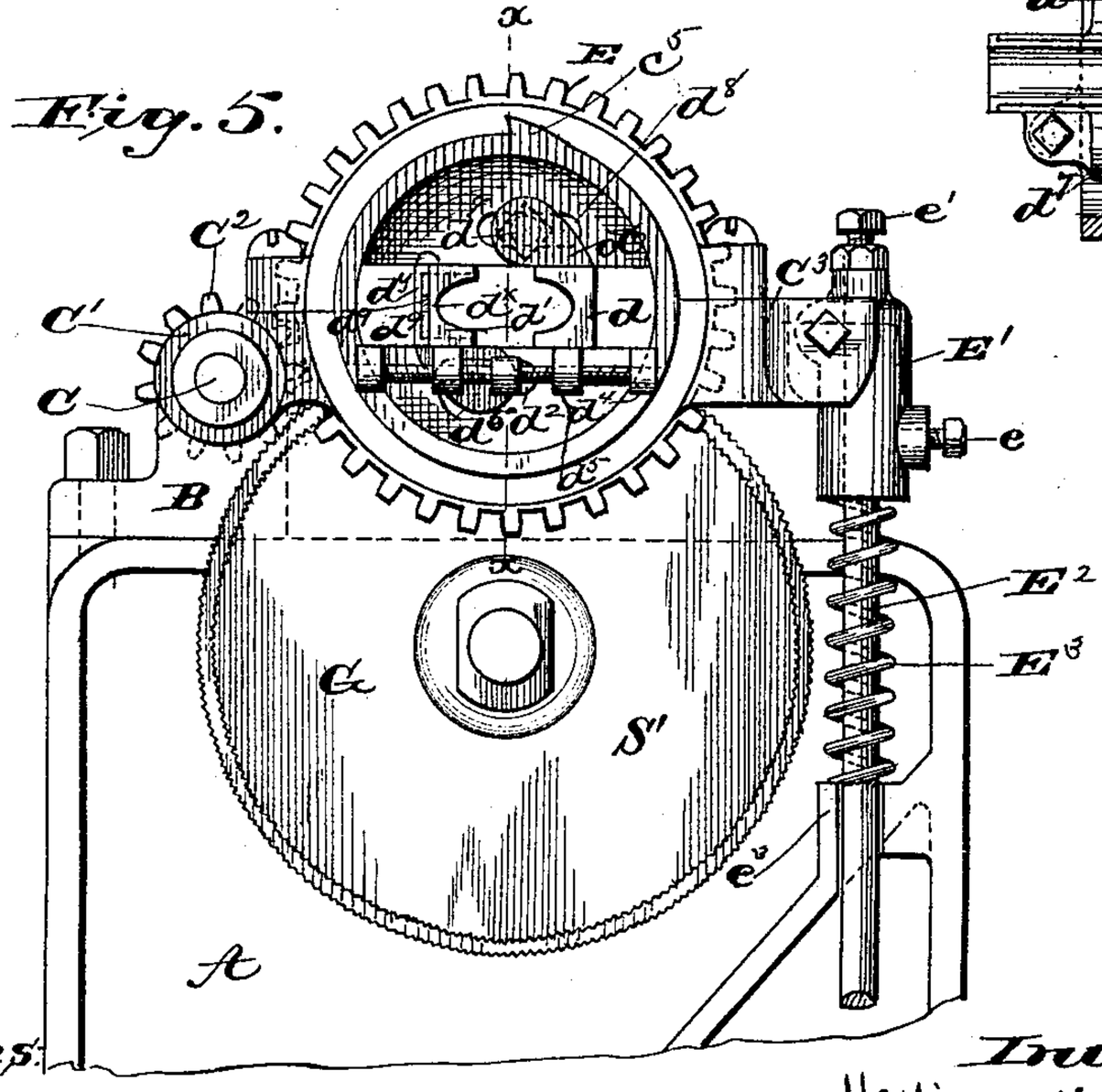



Fig. 5.




Witnesses:
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Inventor:
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# UNITED STATES PATENT OFFICE.

WILLIAM H. DOANE, OF CINCINNATI, OHIO.

## BLIND-SLAT-TENONING MACHINE.

SPECIFICATION forming part of Letters Patent No. 391,231, dated October 16, 1888.

Application filed September 27, 1887. Serial No. 250,793. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. DOANE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Blind-Slat-Tenoning Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines for tenoning blind-slats; and it consists of certain improvements in the construction and arrangement of parts of the same, which render the machine substantially automatic in its operation.

One of the principal objects of my invention is to provide a means of automatically presenting a slat-strip to a cutting and tenoning device, holding it there long enough for the strip to be severed and a tenon formed on each of the severed ends, then returning the slat-strip to its starting-point and holding the strip-carrying devices from movement long enough to permit the advance of the strip for the formation of another slat, when the strip will be again moved forward without any action on the part of the operator.

In order that my device may be clearly understood, I have illustrated it in the several views of the annexed drawings, and will describe it in the following specification.

The same reference-letters have been used to identify similar parts throughout the several drawings.

Figure 1 is a front elevation. Fig. 2 is an end view. Fig. 3 is a plan view. Fig. 5 is an enlarged view of parts of the machine, chuck, chuck-frame, and pitman. Fig. 4 is a sectional view of chuck, taken on line *x x* of Fig. 5. Fig. 6 is a detail view, partly in section, of the pawl and chuck-frame, a portion of the latter being broken away. Fig. 7 is a detail sectional view of the adjustable stop-rod stand.

The main column A of my improved machine is provided with a bracket, B, firmly secured to it in any desired manner, and also has a lateral extension, B′, near its upper end. Mounted in the bracket B in suitable bearings is the shaft C, which carries the pulley C′, the driving-pinion $C^2$, and the chuck-frame $C^3$. The bearing of the shaft C nearest the pulley C′ is provided with a sleeve-extension, $C^4$, Fig. 6, on which is mounted the pawl *c*. This pawl is secured from longitudinal movement on the sleeve by the set-screw *c′*. The lower or rear extremity of the pawl is provided with a slight projection, $c^2$, which, when the chuck-frame springs up, rests upon the head of the set-screw $c^3$, thus relieving the set-screw *c′* of any strain.

The cutter-head consists substantially of two cutters, S and $S^2$, of the construction ordinarily employed in this class of machine, and a saw, S′, centrally located between them.

D D′ are chucks, within which the slats are inserted. These chucks rotate in complete journal-boxes in the frame $C^3$, and are provided with jaws *d d′*, which are adjustable by means of the screw $d^2$, which is oppositely threaded from a point midway its extremities. This screw has a bearing in the projecting lugs $d^4$ of the chucks and operatively engages the oppositely-screw-threaded projections, $d^5$, of the jaws. The jaw *d* has an upwardly-extending flange, $d^6$, provided with a pin, $d^7$, which works in the slot $d^8$. This pin is capable of receiving a nut at its outer extremity, by which the jaw *d* is secured at a desired point.

The jaw *d′* consists of two parts, $d^x$ and $d^y$. $d^x$ is substantially of the same shape and construction as the jaw *d*, and has a downward projection corresponding to $d^6$, secured in the same manner. Adjustably connected to the part $d^x$ is the part $d^y$, forming the jaw proper. In the rear of the jaw $d^y$ and between it and its frame is a spring, $d^9$, for the purpose of allowing for any slight variation in the width of slats. The spring $d^9$ is shown in this instance as composed of a piece of rubber; but any other form of spring may be employed. Both jaws may be constructed in like manner, if desired.

The entire frame $C^3$ swings on the shaft C, in order that the work may be brought to and from the cutter-head. The chucks are driven simultaneously by means of wheels E, operated by the pinions $C^2$.

Between the two forwardly-extending arms of the frame $C^3$ is pivoted the sleeve E′, in which the pitman $E^2$ is inserted and secured by means of the set-screw *e*.

*e′* is a set-screw, with jam-nut engaging top of pitman to compensate for any wear of the

saws or other cause necessitating a change in the length of the pitman. The pitman is steadied by means of the projection $e^3$ from the main frame, through which it passes. Between this projection and the sleeve E is a coiled spring, $E^3$, passing round the pitman. This spring may be interposed between the standard and frame, or, applied to an extension of the pitman or the chuck-frame, may be extended on the opposite side of its pivot and a contractile spring employed connecting such extension with standard.

F is a cap secured to the bracket or projection F′ from the main column to hold the pitman in its seat in the said bracket or projection.

The bracket F′ carries the worm-wheel $F^2$, mounted on a shaft, *f*, and near the end of this shaft is rigidly secured the cam *f′*. The pitman is provided near its lower extremity with a friction-roller, $f^2$, engaging cam *f′*. This cam is provided with a slow or gradual inclined surface, *g*, which ends in an abrupt shoulder, *g′*, and the beginning of the incline is a concentric portion, $g^3$. This construction of the cam gives a slow progressive movement to the chuck-frame when carrying the slat toward the cutter-head, and when this has done its work permits the spring to retract the chuck-frame by a quick movement. The concentric portion $g^3$ gives a sufficient interval of rest between the return and the succeeding advance movement of the chuck-frame to enable the operator to advance new material for the action of the cutter-head. The slow progressive movement of the chuck-frame toward the cutter-head is an important feature, as it renders the work of the machine smooth and even and avoids the disagreeable jumping which is common to the machines as heretofore constructed.

The mechanism operating the chuck-frame gives it a continuous intermittent feeding motion, consisting of a slow advance toward the cutting devices and a quick return movement away therefrom, with a period of rest after the return movement to permit the slat-strip to be advanced in the chucks. This feeding movement is regular and continuous as long as the chucks are in operation without requiring any labor or attention on the part of the operator. As it has this regular and continuous movement and operates at the proper times at different determined rates of speed without manual direction or control, it is termed an "automatic feed."

The worm-wheel $F^2$ is operatively connected with the worm $F^3$, which is journaled in bracket-bearings secured to the inner side of the main column and is driven by the pulley $B^4$ and belt gearing. The outer end of the shaft of the worm $F^3$ is provided with a pulley, $F^4$, which is connected by a belt with the pulley C′.

The power-shaft H is provided with a working and idler pulley, H′ and $H^2$ also with the spindle-driving pulley-wheel $H^3$ and the collar $H^4$ to hold the small cone $H^5$, forming a part of the main pulley $H^6$.

I is a yoke connected at one extremity with the lever I′ and at the other with the clutch $I^2$. The lever I′ is pivoted to the projection $I^3$ from the main frame, and is provided at its upper extremity with a handle, $I^4$. This lever is for the purpose of starting and stopping the motion of the chuck-frame by means of the yoke I, operating the clutch $I^2$. The cone $H^5$ runs idle on shaft when the parts are in the position shown in the drawings, and is for the purpose of changing the speed of the machine by connecting it with the pulley $B^8$ on worm-shaft.

Adjustably secured to the top of the main column is the stop-rod stand K, consisting of two parts, the upright K′ provided with the sleeve *k* and the horizontal portion $K^2$, which passes through the sleeve *k*, and held in any desired position by the set-screw *k′*. The stop proper, $k^2$, is attached to the stop-rod stand by means of the shoe $k^3$ in a well-known manner. The stop being mounted on an adjustable standard in the manner indicated, it may be placed on either end of $K^2$, and so be used for long or short slats.

The pawl *c* is for the purpose of stopping the movement of the chucks by engaging the projection $c^5$ on the chuck-frame until another slat-strip can be moved forward into position to be operated upon, the driving-belt meanwhile running idle on the pulley C′. The lowering of the chuck-frame releases the projection $c^5$ from operative engagement with the pawl.

L is the cover for the spindle and pulley.

The shavings and dust are removed by the web M, located upon the inside of the column.

The operation of the machine is as follows: The slat-strip is inserted between the jaws *d d′* until one end comes in contact with the stop $k^2$, which has been adjusted to provide for the desired length of slat. The chuck-frame-operating mechanism is then started by means of the lever $I^4$. The chucks at first are locked from motion by the pawl *c* engaging the projection $c^5$; but the worm $F^3$, engaging the worm-wheel $F^2$, forces the eccentric portion of the cam *f′* against the friction-roller $f^2$ of the pitman, which is attached to the swinging ends of the chuck-frame, thereby forcing the chuck-frame, and consequently the chucks and slat-stop, slowly toward the cutter-head, and at the same time disengaging the pawl *c* from the projection $c^5$. The chucks at once begin to rotate, and the cutter-head is so located and arranged that at a single rotation of the chucks the tenons on the adjacent ends of two slats are formed and the central saw severs the finished slat from the strip. The eccentric portion of the cam acting on the friction-roll attached to the pitman forces the pitman slowly downward, carrying with it the swinging chuck-frame and contracting the spring $E^3$. As soon as the friction-roller reaches the end

of the eccentric portion of the cam, the pitman is released and the spring carries it and the chuck-frame into their original position, the pawl *c* re-engaging the projection $c^5$. The friction-roll $f^2$ being now opposite the eccentric portion of the cam, the chuck-frame and chuck remain at rest, affording an opportunity for the operator to advance the slat-strip for a repetition of the operation. The advancement of the slat-strip generally expels the finished slat. Should, however, the same be held by its contact with the stop $k^2$, it can be readily removed by the operator.

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

1. A blind-slat-tenoning machine provided with a tenoning and slat-severing cutter-head mounted in suitable bearings, and a movable slat-chuck having a slow automatic feed forward and a quick return movement from the cutter-head, substantially as described.

2. A blind-slat-tenoning machine having a stationary cutter-head and stationary slat-severing device, whose axes are located in substantially the same plane, a swinging chuck-frame, and an automatic feeding device connected with the chuck-frame and moving it to and from the tenoning and severing devices, whereby a single reciprocation of the swinging chuck-frame forms a tenon and severs the slat, substantially as described.

3. In a blind-slat-tenoning machine, the combination, with a supporting-standard having a lateral extension near its upper end, of a cutter head and shaft, the said shaft being mounted in a bearing on said lateral extension and having a pulley between said bearing and the standard, and the slat-stop mounted on said extension, substantially as described.

4. In a blind slat-tenoning machine, the combination, with hollow supporting-column, of a swinging chuck-frame mounted on said column and chuck-frame-operating mechanism located within said column and supported thereby, substantially as described.

5. In a blind-slat-tenoning machine, the combination, with a swinging chuck-frame, of chuck-frame-operating mechanism and an adjustable connection between said mechanism and said chuck-frame, whereby the movement of the swinging chuck-frame can be varied or adjusted, substantially as described.

6. In a blind-slat-tenoning machine, the combination, with an adjustable standard, of an adjustable slat-stop adjustably mounted in said standard, substantially as described.

7. In a blind-slat-tenoning machine, the combination, with an adjustable standard, of a slat-stop adjustably and reversibly mounted in said standard, substantially as described.

8. In a blind-slat-tenoning machine, the combination, with an adjustable standard, of a rod adjustably mounted in said standard and a slat-stop adjustably mounted on said rod, substantially as described.

9. In a blind-slat-tenoning machine, the combination, with a main supporting standard or frame and a swinging chuck-frame, of a pitman connected to said chuck-frame, a cam acting on said pitman for moving it in one direction, and a spring interposed between the standard and the chuck-frame or its connection, substantially as described.

10. In a blind-slat-tenoning machine, a slat-chuck having an adjustable jaw, said jaw consisting of two parts, one movable upon the other, and a spring interposed between the parts, substantially as described.

11. A slat-chuck having movable jaws provided with flanges and each having a projection extending from one of its sides, a right-and-left screw journaled on said chuck and passing through and operatively engaging the said projection, and chuck-bolts operatively engaging the flanges for rigidly securing the jaws in their adjusted position, substantially as described.

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

WILLIAM H. DOANE.

Witnesses:
L. K. BYRNS,
A. M. SPENCER.