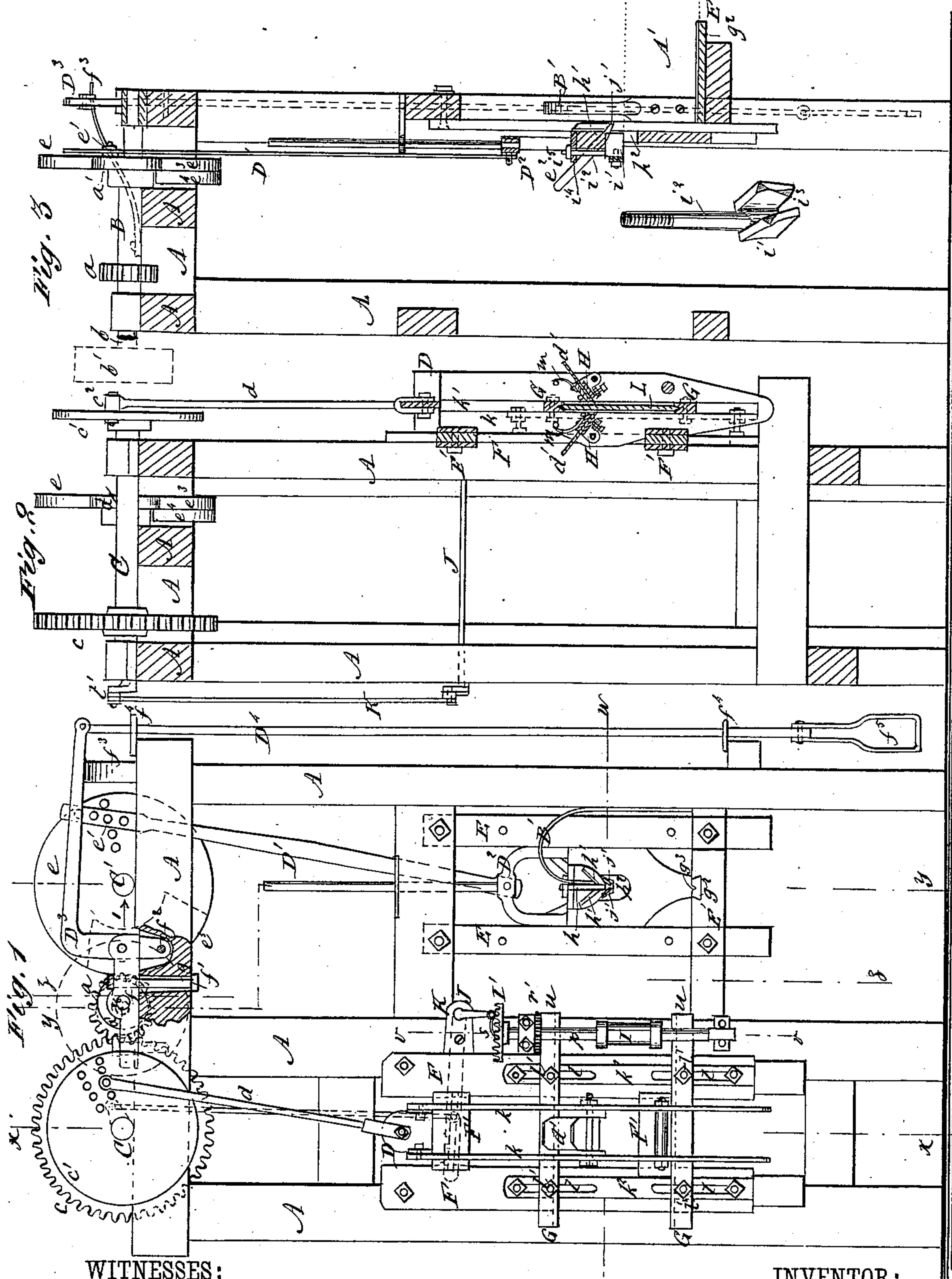


F. SHENTON.  
Slate-Dressing Machine.

No. 226,795.

Patented April 20, 1880.



WITNESSES:  
*C. Newell*  
*C. Sedgwick*

INVENTOR:  
*F. Shenton*  
BY *Munn & Co*  
ATTORNEYS.





# UNITED STATES PATENT OFFICE.

FRANCIS SHENTON, OF SLATINGTON, PENNSYLVANIA.

## SLATE-DRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 226,795, dated April 20, 1880.

Application filed October 9, 1879.

*To all whom it may concern:*

Be it known that I, FRANCIS SHENTON, of Slatington, in the county of Lehigh and State of Pennsylvania, have invented a new and Improved Slate-Machine, of which the following is a specification.

The object of my invention is to facilitate the beveling of the ends and the trimming of the sides of school-slates.

The invention consists, first, of angularly-set vertically-moving knives for beveling and trimming the end edges of the slates, and, in connection therewith, grooves and ways and other devices for holding the slate in its proper position for the action of the knives, and an arrangement for holding the knives in position to act upon the edges at the proper moment.

Secondly, the invention consists of self-adjusting vertically-moving knives for trimming the sides of the slate, and, in connection therewith, adjustable ways for holding the slate for the action of the knives, and a feeding mechanism adapted to feed the slate to the knives when they move up out of the way.

In the accompanying drawings, Figure 1 is a front elevation of my improved machine. Fig. 2 is a vertical section of the machine, taken on line *x x* of Fig. 1. Fig. 3 is a vertical section of the same, taken on line *y y* of Fig. 1. Fig. 4 is a vertical section thereof, taken on line *z z* of Fig. 1. Fig. 5 is a horizontal section on line *w w* of Fig. 1. Fig. 6 is a vertical cross-section of the side-trimming knives, taken on line *x' x'* of Fig. 5. Fig. 7 is a rear view of the edge trimming and squaring knives and the frame in which they are held; and Fig. 8 is a sectional detail, taken on line *v v* of Fig. 1, of the bearings of the feeding-roll shafts.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is the framework of the machine, supporting at the top a transversely-journaled shaft, B, carrying on one side a pinion, *a*, and on the opposite side a friction-wheel, *a'*, and on its outer end, *b*, it is designed to have a belt-pulley, *b'*, for the belt by which motion is communicated to the machine.

Parallel to the shaft B, on either side, are

shafts C C'. Shaft C carries a spur-wheel, *c*, meshing with pinion *a*, and a crank-wheel, *c'*, to the crank *c'* whereof is pivoted the upper end of pitman *d*, the lower end of said pitman being pivoted to the vertically-moving frame D, which carries the side-trimming knives *d' d'*.

Shaft C' carries a large friction crank-wheel, *e*, in line with friction-wheel *a'*. To the crank *e'* of wheel *e* is pivoted the upper end of pitman D', the lower end whereof is pivoted to the frame D<sup>2</sup>, carrying the edge-trimming knives *e<sup>2</sup> e<sup>2</sup>*.

The bearing *f* of shaft B is attached to frame A by a bolt, *f'*, passed up through a slot, *g*, in the frame and through the said bearing. This arrangement allows a slight sliding movement to the bearing *f*, sufficient to carry the friction-wheel *a'* to and from friction-wheel *e*, for the purpose of throwing wheel *e* in and out of gear with wheel *a'*. The bearing *f* is pivoted to the bent lever D<sup>3</sup>, fulcrumed at *f<sup>2</sup>*, and having its power end supported on a spring, *f<sup>3</sup>*, and pivoted to a rod, D<sup>4</sup>, which passes down through guides *f<sup>4</sup>*, and terminates near the floor in a stirrup, *f<sup>5</sup>*. By pressing with the foot on stirrup *f<sup>5</sup>* the lever is caused to draw bearing *f* in the direction of the arrow 1, and this movement carries friction-wheel *a'* in contact with friction-wheel *e*, thus giving motion to wheel *e*, and, through pitman D', giving a reciprocating motion to edging-knife frame D<sup>2</sup>. On relieving the stirrup *f<sup>5</sup>* of pressure the spring *f<sup>3</sup>* throws the lever up and the bearing *f* back, carrying wheel *a'* from wheel *e* and stopping the motion of wheel *e* and frame D<sup>2</sup>. The side *e<sup>3</sup>* of wheel *e* opposite crank-pin *e'* is provided with a weight, *e<sup>4</sup>*, the purpose of which is to bring the wheel *e* to a stop with the crank-pin *e'* up, so that the edging-knives frame D<sup>2</sup> will be held in an elevated position, and thus enable the slate to be inserted under the edging-knives without the trouble and delay of raising frame D<sup>2</sup>.

The edges of frame D<sup>2</sup> are held in grooves *g'* in vertical guides E E attached to cross-pieces, so that the said frame D<sup>2</sup> will move accurately in a vertical plane at right angles to and just behind a table, E', in which is set a plate, *g<sup>2</sup>*, provided with a horizontal groove, *g<sup>3</sup>*.



In the face of frame  $D^2$  is a vertical groove,  $h$ , which aligns exactly with the horizontal groove  $g^3$ . On either side of groove  $h$  are lugs  $h'$ . Just under lugs  $h'$  an opening,  $h^2$ , is made through frame  $D^2$ , and on the back of the frame  $D^2$  a bar,  $h^3$ , is placed crosswise of opening  $h^2$  on studs  $i$ , to which said studs bar  $h^3$  is fastened by burrs, so that a space is left between said bar and frame  $D^2$ . Under bar  $h^3$  and in opening  $h^2$  is placed a piece,  $i'$ , provided with a bolt,  $i^2$ , and a V-shaped slot,  $i^3$ . The bolt  $i^2$  is passed through ear  $i^4$  and held in place by a burr,  $i^5$ .

The edge-trimming knives  $e^2 e^2$  are passed through the opening  $h^2$  from the rear side of frame  $D^2$ , between the piece  $i'$  and the upper edge  $j$  of opening  $h^2$ . By means of the fastening-bolt  $i^2$  the piece  $i'$  is drawn up against knives  $e^2$ , which are thus held securely between said piece  $i'$  and the edge  $j$  of opening  $h^2$ , while the cutting-edges  $j' j'$  project downward through opening  $h^2$  immediately under the ends of lugs  $h'$ , one edge  $j'$  being on each side of groove  $h$ , so as to trim and bevel both sides of the edges of the slate at the same time. The extreme points of the cutting-edges  $j'$  are projected downward, so that the said edges will cut the slate with a shear cut, and at the same time have a tendency to draw the slate inward toward the knives instead of pushing it away.

The operation of this part of my invention is as follows: In Fig. 3 a slate (represented by dotted lines  $A'$ ) is shown in the act of being fed to the edging-knives  $e^2 e^2$ . The lower edge of said slate is placed in groove  $g^3$ , while its upper edge is placed against the end of bent spring  $B'$ , which serves as a guide to the knives, said spring-guide yielding sufficiently to allow for any inequalities in the surface of the slate against which it presses. The slate is now pushed in until its end next to frame  $D^2$  is immediately under the slot  $h$ . The stirrup  $f^5$  is now pressed by the foot to move friction-wheel  $a'$  to wheel  $e$ , thus giving motion to frame  $D^2$ , which descends, and the edges of knives  $e^2 e^2$ , coming in contact with the adjacent end of the slate, trim and bevel off the edges on both sides at one stroke, and as the knives descend the beveled edge passes up through slot  $h$ . By releasing the stirrup the connection between wheel  $a'$  and  $e$  is broken, and the weighted side  $e^3$  causes wheel  $e$  to come to a stop with the crank  $e'$  up and the frame  $D^2$  at its highest point. The slate  $A$  is now reversed and the opposite end shoved under the knives  $e^2 e^2$ , which are again caused to descend and trim and bevel this end of the slate, which is now ready to be subjected to the second operation of trimming its sides by the mechanism which I will now describe.

$F F$  are two vertically-placed guide-plates, and  $F' F'$  are cross-heads placed between plates  $F F$ , so as to slide freely up and down. The frame  $D$  is fixed to cross-heads  $F' F'$ . Said frame is composed of two parallel side bars,  $k k$ , provided with longitudinal slots  $k' k'$ .

On each side of frame  $D$  vertical bars  $k^2 k^2$ , provided with slots  $l l$ , are attached to plates  $F F$  by bolts.

$G G$  are guide-bars passed horizontally through slots  $k' k'$  in frame  $D$ . The ends of these bars are connected with bars  $k^2 k^2$  by means of set-bolts  $l' l'$  passed through slots  $l l$ . The guide-bars  $G G$  are parallel to each other, and are vertically adjustable, so as to give a greater or less vertical space between them, and thus accommodate them to receive different sizes of slates.

In the inside adjacent edges of bars  $G G$  are longitudinal V-shaped grooves  $l^2 l^2$  for the reception of the beveled edges of the slates. Midway of the length of frame  $D$ , between the side bars,  $k k$ , and on either side of vertical slots  $k' k'$  are pivoted heads  $H H$ . These heads are provided with springs  $m m$ , the free ends whereof bear against lugs  $m' m'$ . To the heads  $H$  are secured, by set-screws  $m^2 m^2$ , the side-trimming knives  $d' d'$ , the edges  $n n$  whereof are arranged to project part way toward each other at an acute angle across slots  $k' k'$ . Lugs  $o o$  attached to bars  $k k$  on each side of slots  $k' k'$ , serve as stops to limit the upward movement of heads  $H H$  in the direction of arrows 2. Consequently the edges of knives  $d'$  are held apart on the downward movement of frame  $D$  when they are cutting or trimming the sides of the slate; but on the upward movement of the frame  $D$  the springs  $m m$  yield sufficiently to allow the knives to move up the sides of the slate without undue friction.

$I I$  are vertical feed-rolls fixed to parallel shafts  $p p$ , which are journaled in blocks  $q q$  attached to bolts  $q' q'$  projecting from the frame of the machine. The blocks  $q q$  bear against springs  $r r$ . (Spiral springs, as in Fig. 4, or rubber springs, as in Fig. 8.) These springs are for the purpose of enabling the bearing-blocks to yield slightly, so that the feed-rolls  $I I$  can receive slates of varying thickness.

Shafts  $p p$  are geared together by gear-wheels  $r' r'$ , and on the end  $r^2$  of one of said shafts, which projects through its bearing-block, is fixed a crown-wheel,  $I'$ . Just over the teeth of the crown-wheel is a pawl,  $s$ , pivoted to a crank on the adjacent end of rock-shaft  $J$ . On the opposite end,  $s'$ , of shaft  $J$  is a crank,  $t$ , which is connected by a pitman,  $K$ , with a crank,  $t'$ , on the end of shaft  $C$ , which carries the crank-wheel  $e'$  that gives the vertical motion to the frame  $D$ .

The adjustment of rock-shaft  $J$  and pawl  $s$  is such that the pawl  $s$  is caused to engage the teeth of crown-wheel  $I'$  only when the frame  $D$  is raised. Thus when the frame  $D$  is moving up the rock-shaft is operated so as to cause the pawl  $s$  to engage crown-wheel  $I'$ , and through it turn the feed-rolls  $I$ ; but as the frame descends the pawl is drawn back to engage other teeth of wheel  $I'$ , the feed-rolls remaining stationary while the frame  $D$  descends and the knives  $d'$  plane off the surfaces of the slate.



The ends *u u* of guide-bars *G* project between feed-roll shafts *p*, so that the V-shaped grooves *l<sup>2</sup>* are in line with the space between feed-rolls *I*.

5 The operation of this part of the invention is as follows: The slate *L*, after it has had its end edges beveled and trimmed in the manner before described, is placed between feed-rolls *I* with its beveled edges in grooves *l<sup>2</sup> l<sup>2</sup>* of  
10 guide-bars *G*, in the manner shown in Figs. 5 and 6. The feed-rolls, by the intermittent motion above described, carry the slate between the edges of knives *d'*, at the downward stroke whereof (when the slate remains stationary)  
15 the knives shave off the two sides in the manner shown in Fig. 6. The stopping of the feeding gives opportunity to the knives to shave down the whole length of the slate in a vertical line, and as the feeding is adjusted to the  
20 motion of the machine the whole surface of both sides of the slates is exposed to the action of the knives.

The operator sits on a bench, *M*, in front of the edging-knives *e<sup>2</sup>* and table *E'*, in easy reach  
25 of the stirrup *f<sup>5</sup>* and feed-rolls *I*, so that he can edge the slate, and then, without changing his position, put the slate between the feed-rolls *I*, so that it can be fed to the side-trimming knives *d'*.

30 Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. As an improvement in slate-machines, in combination with grooved plate *g<sup>2</sup>* and spring  
35 *B'* to serve as guides for the slate *A*, the edging-knives *e<sup>2</sup> e<sup>2</sup>*, adapted to move vertically, for the purpose of trimming and beveling the edges of the slate, in the manner substantially as described.

2. In combination with the vertically-moving frame *D<sup>2</sup>*, provided with the groove *h*, lugs *h'*, opening *h<sup>2</sup>*, and bar *h<sup>3</sup>*, the angularly-set knives *e<sup>2</sup> e<sup>2</sup>*, piece *i'*, and bolt *i<sup>2</sup>*, constructed, arranged, and operating in the manner and for the purpose described. 40

3. In combination with the vertically-moving frame *D<sup>2</sup>* and knives *e<sup>2</sup>*, the pitman *D'*, friction-wheels *a' e*, movable bearing *f*, and suitable mechanism for throwing wheels *a' e* in and out of gear, substantially as and for  
45 the purpose described. 50

4. In combination with the friction-wheel *e* and frame *D<sup>2</sup>*, the weight *e<sup>4</sup>* on side *e<sup>3</sup>* of wheel *e* opposite crank *e'*, as and for the purpose substantially as described. 55

5. The knives *d' d'*, pivoted in vertically-moving frame *D*, in combination with suitable mechanism for holding and guiding the slates, substantially as described. 55

6. The adjustable guide-bars *G G*, provided with grooves *l<sup>2</sup>*, in combination with suitable knives for trimming and shaving the two sides of the slate, substantially as described. 60

7. In combination with the vertically-moving knives *d' d'*, the feed-rolls *I I*, constructed and operated in the manner substantially as described. 65

8. The combination and arrangement of feed-rolls *I I*, guide-bars *G G*, and vertically-moving knives *d' d'*, as and for the purpose  
70 substantially as described.

FRANCIS SHENTON.

Witnesses:

LEWIS H. ROTH,  
GEO. C. SHENTON.