McC. YOUNG.

MACHINES FOR CUTTING AND STICKING MATCH-STICKS.

No. 194,319. Patented Aug. 21, 1877.

Fig. 1.

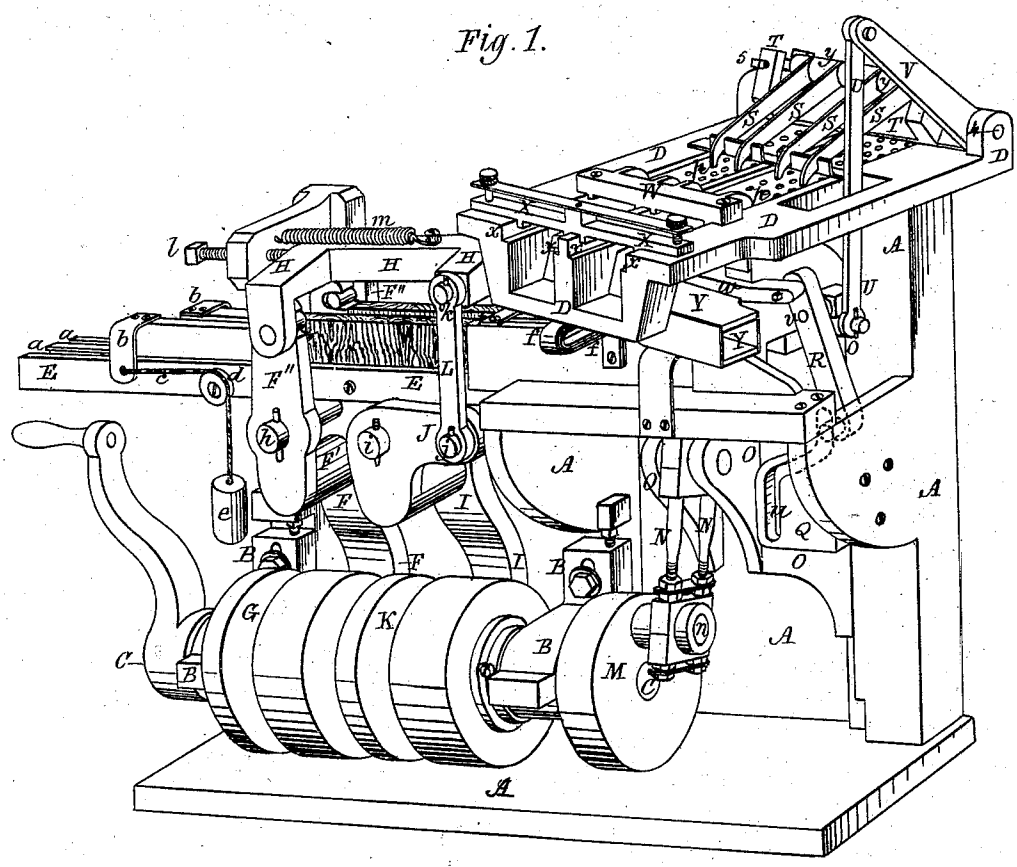


Fig. 2.

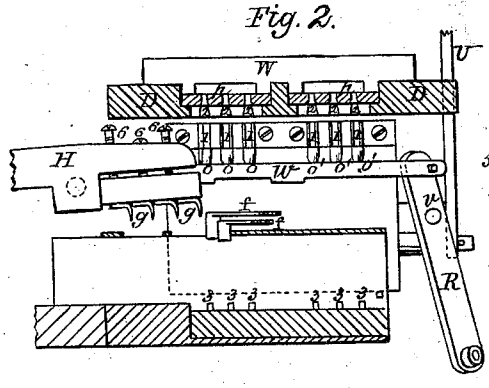
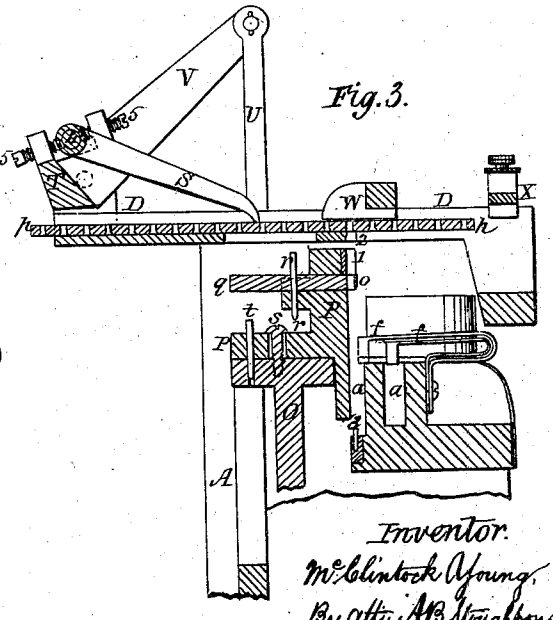


Fig. 3.



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McCLINTOCK YOUNG, OF FREDERICK, MARYLAND.

IMPROVEMENT IN MACHINES FOR CUTTING AND STICKING MATCH-STICKS.

Specification forming part of Letters Patent No. **194,319**, dated August 21, 1877; application filed March 1, 1875.

To all whom it may concern:

Be it known that I, McCLINTOCK YOUNG, of Frederick, in the county of Frederick and State of Maryland, have invented certain new and useful improvements in machines for cutting a series of match-splints from a series of blocks, and sticking them in a series of plates ready for being dipped in the igniting composition; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a perspective of the machine. Fig. 2 represents a vertical transverse section through the carriage-frame, and the more immediate parts of the machine co-operating in conjunction therewith. Fig. 3 represents a vertical longitudinal section through the carriage-frame and its coactive or adjacent parts.

My invention relates to an automatic machine in which blocks of wood in series and side by side are controllably fed into and through said machine, from which blocks a series of match-splints are cut, carried up, and stuck into a series of plates that are arranged side by side, and progressively fed through and out of the machine; and my invention consists in the several combinations of devices hereinafter described by which I accomplish the desired results.

The main frame A, to withstand the rapid motions of the machine, is made of cast-iron, and very strong. In adjustable bearings B on this frame is hung the shaft C, on which are arranged the series of cams and cranks through which motion is imparted to the several parts of the machine. On top of the main frame A is secured the secondary or carriage frame D, which is set oblique to the main frame for a purpose that will be hereinafter described.

To the main frame there is attached a feeding trough or arm, E, in which are made two guideways, *a a*, each capable of containing a series of blocks or bolts of wood, from which the match-splints are to be cut. Behind the series of blocks there is a feeder, *b*, to which a cord, *c*, is attached, said cord passing over a pulley, *d*, and having upon its end a falling weight, *e*, by which the blocks are fed up to the splint-cutters. A spring, *f*, is arranged so as to press upon the foremost of the series of blocks, to prevent them from slipping back when the positive toothed feeder *g* is out of the wood, and recedes to take a new hold thereon. The falling weights *e*, it will be understood, move the blocks up to where they come within the influence of the real feeder *g*, and the latter force the blocks along to the cutters.

The toothed feeders *g*, of which there are two, are arranged side by side, so that each one feeds up its own line of blocks or bolts, and a four-motion feed is imparted to each as follows: A lever, F, is pivoted to the main frame at *h*, and upon its lower end there is a friction-roller that runs in an under-cut cam-groove, G, on the cam-shaft C, so that said lever shall have a positive motion in both directions. To this lever F is attached, by a cross-arm, F′, arms F″, to which the rear of the frame H, that carries the feeding-points *g*, is pivoted, and by this arrangement two of the feed-motions, viz., the forward and backward ones, are obtained. Another lever, I, pivoted to the main frame at *i*, has upon its lower end a friction-roller that runs in an under-cut cam-groove, K, on the cam-shaft C, by which it also receives a positive vibratory motion. On the lever I there is a crank-arm, J, on pivot-pins *j*, in which the lower ends of connecting-straps L are attached, the upper ends of said straps being pivoted at *k* to the frame H, which carries the feeding-points *g*, and by this mechanism said feeding-points receive their other two motions, viz., upward and downward, all these motions being positive, and not depending upon the reaction of any spring movement. An adjusting-screw at *l* regulates the backward movement of the frame H, and, consequently, the length of the feed. The spring *m* is merely to hold the frame H to its bearings; but it in no-wise influences its motions in feeding.

On the end of the shaft C there is a crank-wheel, M, to a wrist, *n*, in which are connected the adjustable pitmen N, the upper ends of which pitmen are, by suitable bearings, connected to the vertically-reciprocating frame or gate O, which carries the series of knives *o o o* and *o′ o′ o′*, and by which the splints are cut off from the blocks, those *o* cutting from one block, and

those *o'* from the other, said blocks, as before stated, being fed along under the cutters, side by side. And these cutters may be round, square, or of diamond form, so as to cut splints of similar form, as may be desired. The cutters or knives and the knife frame are set oblique to the line in which the blocks are fed through, so that, as above mentioned, one set of knives will cut from one block, and the other set from the other block, both sets, however, moving at the same time.

Above the cutters or knives *o o'* are guides 1 1 1, partially open, so as to allow small slivers or pieces of wood that are severed from the blocks to pass out, and thus prevent clogging, and above these guides 1 there is a guide-plate with conical or countersunk openings 2 through it, by which the match-splints are guided into the holes of the moving plates *p*, by which they are carried out of the machine. At 3 are shown the points which hold the wood that is to form the splints, and allow the cutters to go clear through and entirely sever the splints from the blocks, these points entering up into the cutters a short distance for that purpose.

The cutters or knives *o o'* are made upon the end of a small bar of steel, *q*, and each of these bars has a seat in the knife stock or frame P, into which they are slipped from the rear of the machine, and they are held in their exact position, in relation to each other and to the blocks of wood they are to act upon, by pins *r*, passing through them into the stock, and by which arrangement they can be at any time drawn out or replaced with great accuracy. The stock or frame P carrying the series of knives is made adjustable on the gate O by a slot and set-screw, (or two or more of them,) as at *s*, and to hold it in its exactly-adjusted position, when adjusted, steel pins *t* pass through the stock and into the gate.

At times it may be necessary to redrill and enlarge the holes and the pins *t* when the stock, by wear, has to be moved up any material distance; and for this purpose these parts are so made as to be readily reached, removed, replaced, or readjusted.

In a plate, Q, attached to the main frame, there is a cam-slot, *u*, in which a roller on the end of the lever R runs, said lever being pivoted to the gate at *v*, and by which slot said lever is vibrated. To the upper end of the lever R there is pivoted the sliding keeper-plate *w*, which, when the match-sticks are in the cutters, guides, or carriers, and are being carried up to be stuck in the plates *p*, moves underneath said knives or carriers and forms a support for the splints, and forces them into the plates *p*.

In ways *x x*, in the carriage-frame D, the two plates *p p* are moved by the reciprocating feeding-fingers S S, which take into the holes in said plates, and so push them along in exact time to receive the match-splints as they are brought up to it. These fingers S are separately and loosely arranged upon a shaft, 4, with washers *y* between them, and this shaft 4 is hung in a rocking-box, T, by screw-points 5, diametrically opposite to each other and at each end of said shaft, so that said shaft and the fingers may be adjusted with the greatest precision, as the holes in the plates *p* must be exactly over the splints, and at the exact time to receive them, the machine being run at a very high speed.

The box T is rocked from the gate O by means of the connecting-rod U and arm V.

The plates P are connected one to the other, and so fed along in endless series, and are separated after they come out filled with match-splints, for convenient handling.

On the frame D there is placed first a rigid presser-bar, W, bearing upon the plates *p* at or near the points where they are receiving the match-sticks, and near the end of the frame D there is a yielding presser-bar, X, for holding the plates to the ways, and against accidental movement.

All the motions of the machine are positive, and they all move at a very high velocity.

The set-screws 6 are for defining the distance which the feeding-points *g* shall enter the wood, and to compensate for their wearing away.

There are many other adjustments and mechanical contrivances on the machine which I do not deem it essential to now describe or refer to, but which add much to the simplification and accurate operation of the several parts of the machine.

A wind-trunk is arranged at Y, through which an exhaust-current of air is drawn by a fan arranged in any convenient position, so as to catch and carry away out of the machine all small slivers of wood, or other clogging material, that would tend to interfere with the operation.

The pins 3 are made separate from the plate that holds them, being inserted in holes made in said plate, and thus are easily replaced if broken.

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

1. The combination of the frame H, carrying the feeding-spurs *g*, with the arms F″ J, straps L, and levers F I, and their cam-grooves, for effecting a positive four-motion feed to the spurs, as described.

2. In combination with the double feed-troughs *a a* and their forwarders *b b* the spurs *g*, having the positive four-motion feed, as described.

3. In combination with the feeding-spurs *g* the springs *f* for holding the blocks when the spurs are out of the blocks, substantially as described.

4. In combination with the feeding-spurs and weight to advance the blocks side by side, the double series of cutters *o o'* on the gate O, one set for cutting splints from one set of blocks, and the other set for cutting from the other series of blocks, substantially as described.

5. In combination with the adjustable knife-stock P, the cutters *o o'*, wrought upon the shank or bar *q*, and held to said stock by seats and pins, substantially as and for the purpose described.

6. In combination with the double series of plates *p p*, for receiving the cut splints, the double sets of feeding-fingers, adjusted by screws 5, and worked from the single rocking box T, substantially as described.

7. In combination with the rocking box T and shaft 4 for holding the feeding-fingers, the diametrically-opposite screws or screw-points at each end of said shaft, as and for the purpose described.

8. In combination with the cutters *o o'*, the open guides 1 and conical holes 2 for directing the splints into the carrying-plates *p*, substantially as described.

9. In combination with the cutters *o o'*, the slide or cut-off *w*, moved by a positive motion in both directions, as and for the purpose described and represented.

10. In combination with the cam-shaft, hung in adjustable bearings B, the adjustable pitman N, for the purpose of timing the action of the cutters to and with the feeding up of the blocks, substantially as described.

11. In combination with the vertically-reciprocating cutters *o o'*, the wind-trunk Y, for taking up and carrying off the small slivers of wood to prevent clogging, substantially as described.

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