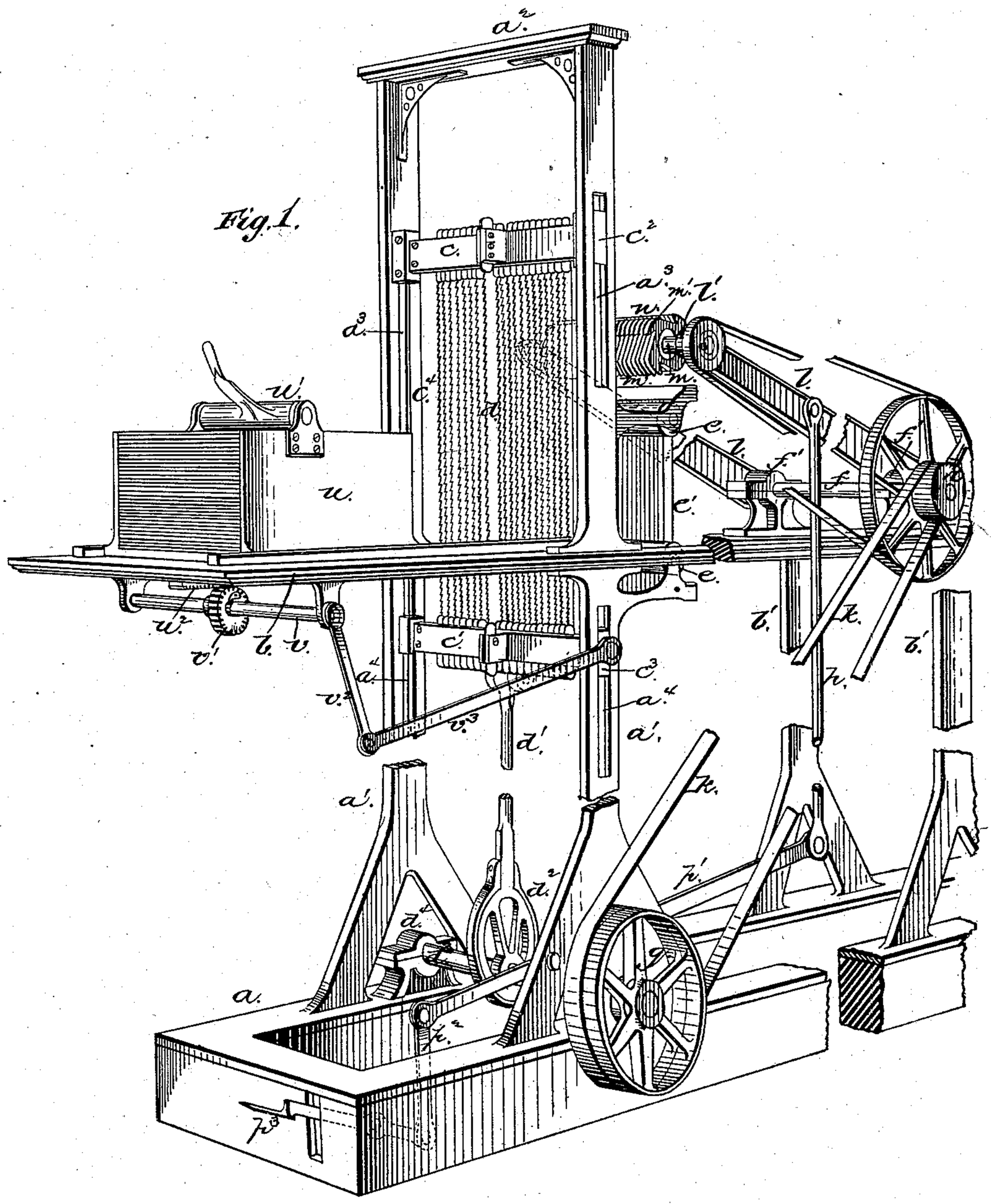
(No Model.) 2 Sheets—Sheet 1.

G. HARGREAVES.

MATCH CARD MACHINE.

No. 255,621. Patented Mar. 28, 1882.

Fig. 1.



WITNESSES

E. F. Bates

Philip C. Wallace.

INVENTOR

Geo. Hargreaves

by Anderson & Smith

his ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

G. HARGREAVES.

MATCH CARD MACHINE.

No. 255,621. Patented Mar. 28, 1882.

Fig. 2.

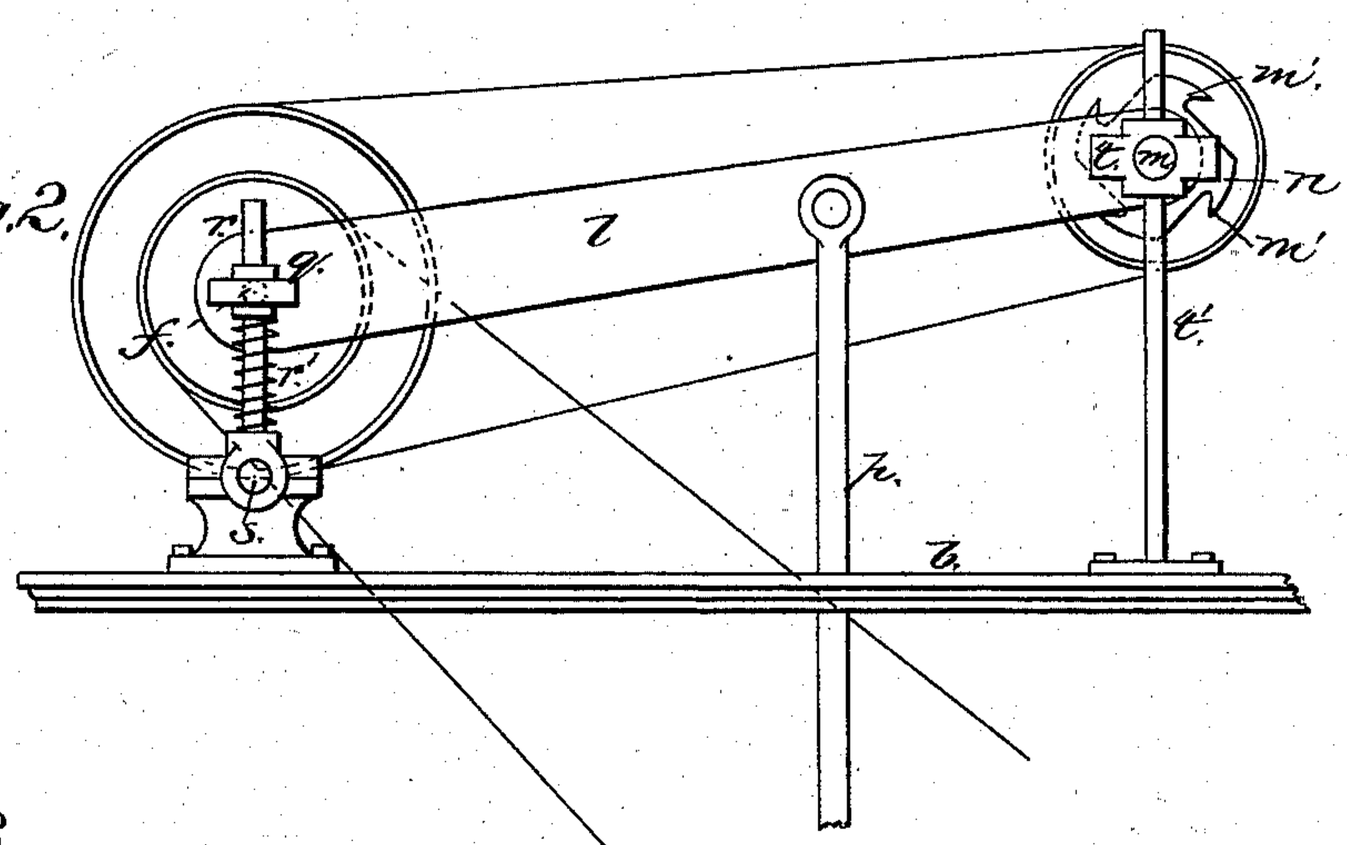


Fig. 3.

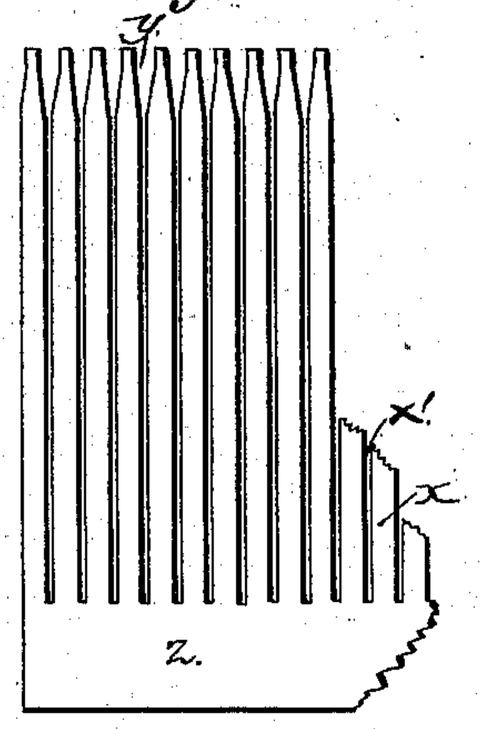


Fig. 4.

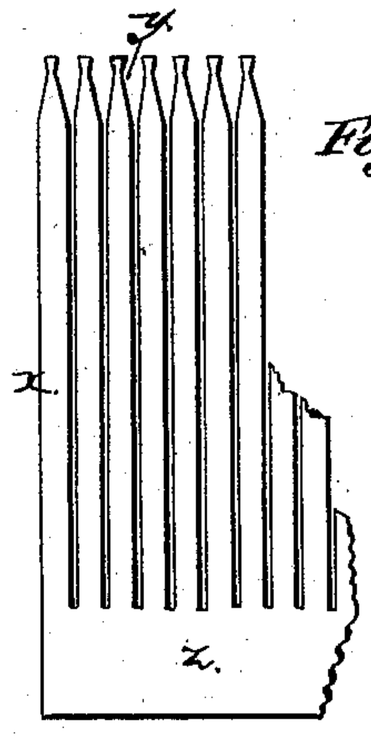
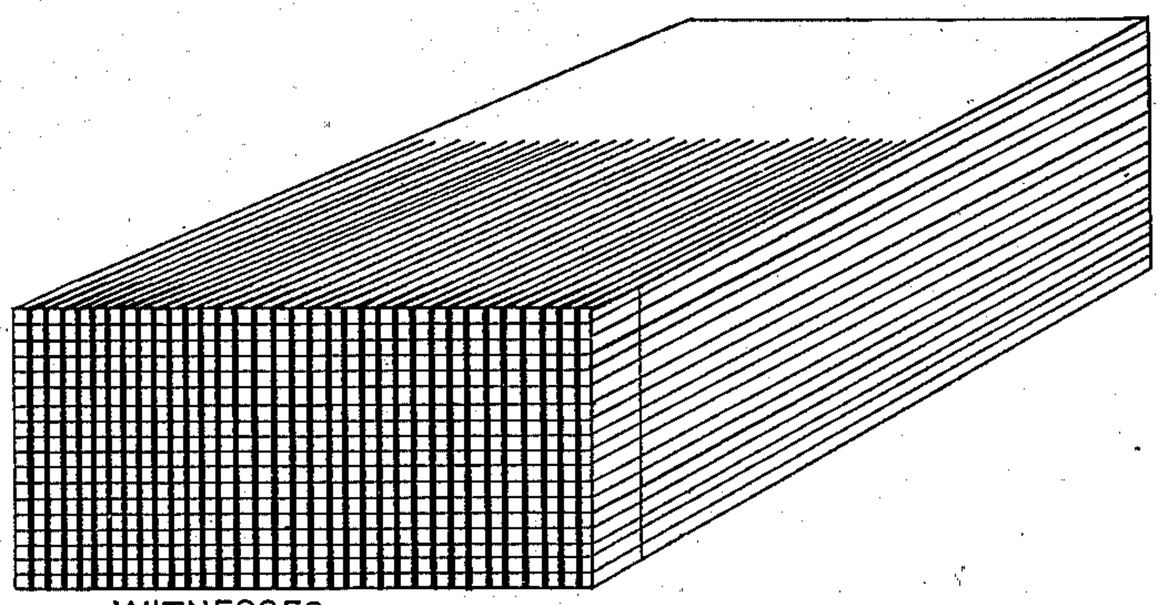


Fig. 5.



WITNESSES
E. H. Bates
Philip Lemasi.

INVENTOR
Geo. Hargreaves
by Anderson & Smith
his ATTORNEYS

UNITED STATES PATENT OFFICE.

GEORGE HARGREAVES, OF DETROIT, MICHIGAN.

MATCH-CARD MACHINE.

SPECIFICATION forming part of Letters Patent No. 255,621, dated March 28, 1882.

Application filed July 30, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HARGREAVES, a citizen of the United States, resident at Detroit, in the county of Wayne and State of Michigan, have invented a new and valuable Improvement in Match-Card Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a perspective view of my invention. Fig. 2 is a modification. Figs. 3, 4, and 5 show the article made by the machine in different conditions.

This invention relates to improvements in machines for making match-cards; and the invention consists in the construction and novel arrangement hereinafter set forth, and pointed out in the claims.

In the annexed drawings, the letter *a* designates a bed-plate or frame, from which rise the standards *a'*, supporting about mid-length a table, *b*, and, rising above the latter, they are braced by a top cross-bar, a^2. Above and below the table these standards have slots a^3 a^4, in which slide the ends c^2 c^3 of the upper and lower cross-bars, *c c'*, of the jig-saw frame c^4. The jig-saws are arranged side by side across the table and held at their ends securely to the cross-bars, the edge of the middle saw, *d*, being somewhat in advance of those of the others. The saw-frame c^4 has a pitman-connection, *d'*, with an eccentric, d^2, on a shaft, d^3, which is arranged below across the bed-plate *a* in bearings d^4. To this shaft d^3 power is applied in any suitable way, and by it the saws are made to reciprocate by means of the eccentric and pitman.

To the rear of the saws there are journaled in the table the presser-rolls *e*, back of which are the separators *e'*, equal in number to the saws, and arranged in order behind the latter. The rear end of the table *b* rests on legs *b'*, and above these, in bearings *f'*, is journaled a transverse shaft, *f*, to which power is communicated from shaft d^3 by means of pulleys *g* and *h* and belt *k*.

Hung loosely upon the upper shaft, *f*, at each side of the table *b*, is a swinging arm, *l*, which extends upwardly to the front. In the upper ends, *l'*, of these arms *l* is journaled a shaft, *m*, having keyed to it a series of rotary cutters, *n*. These cutters are arranged back of the separators *e'*, and are of the same number. They are designed, when in position, to work in line behind the separators, so that a saw, a separator, and a cutter shall be aligned.

The swinging arms *l* are operated and their position varied by connecting-rods *p p'* and lever p^2, which connects them with a treadle, p^3, at the front. Power is communicated to the cutter-shaft *m* from shaft *f* by pulleys and belt.

By the construction described the cutter-shaft is driven from shaft d^3, so that the cutters and saws are operated together, and at the same time, by the treadle, the cutters are forced down to their work. These cutters are in the form of circular saws having wedge-shaped teeth *m'*. In Fig. 2 are shown modifications of the device for operating the cutters, whereby the latter can be brought down perpendicularly. In this case the shaft *f* is journaled in bearing-blocks *q*, which are adapted to slide on arms *r*, keyed to a rock-shaft, *s*, arranged parallel to shaft *f*. The blocks *q* are supported on the arms *r* by springs *r'*, which allows shaft *f* a vertically-yielding motion.

On shaft *f* are loosely hung the swinging arms *l*, carrying the cutter-shaft *m* at their upper ends. This shaft extends beyond the arms and turns freely in bearing-blocks *t*, which have a free sliding movement on vertical guide-posts *t'*, secured to the table *b*. Power is applied and the position of the cutters varied, as already described. As the treadle is operated the arms *l* descend, bringing the cutters with them, the blocks *t* sliding on posts *t'*, keeping the cutters in a vertical line. The necessary thrust of arms *l* is permitted by the yielding of the springs *r'* and the rocking of the shaft *s*.

On the front end of the table *b* is placed the carriage *u*, carrying at the top the cam *u'* and under its bottom the rack u^2.

Journaled under the front of the table is a shaft, *v*, having at its middle portion a gear-wheel, *v'*, intermeshing with the rack u^2. This

wheel is locked by a pawl to the shaft v when turning forward, but runs loose when the shaft turns backward. A crank-arm, v^2, of the shaft is connected by a jointed rod, v^3, with the jig-saw frame, so that the vertical reciprocation of the frame rocks the shaft v, and through the wheel v' drives the carriage u up to the saws with an intermittent action.

The forward part of the bottom of the carriage u is recessed, so that the sides of the carriage may pass the frame of the saws and allow the latter to work up in the carriage. In this carriage are placed in a vertical pile the match-card blanks, held firmly by the cam u' above. As the machine is operated the feed-shaft and wheel drive the carriage up to the saw-frame, forcing the blanks against the saws, which, being in operation, make parallel kerfs in the blanks, forming their front ends into splints. As the blanks are thus cut they extend back of the jig-saws and are caught and held down firmly by the presser-rolls e, their ends projecting beyond in line with the cutters above. At this point, the rack having progressed beyond the gear-wheel, the feed-motion ceases, and the cutters are brought down into contact with the ends of the splints by pressure on the treadle p^3. These cutters strike the edges of the splints on each side of a kerf at the ends, making wedge-shaped openings between the ends of the splints. When one end of the pile of blanks is finished the carriage is drawn back and the other end of the blanks presented to the saws. The middle saw, d, being wider than the others, cuts a longer kerf, and hence when the blanks are reversed runs the second kerf into its first and separates the blanks into two parts. The blanks are finished into cards by making a transverse cut through the solid portion at the bases of the splints, forming cards containing a series of splints connected by a ribbon.

Fig. 5 represents the blanks as they appear after having one end worked by the machine, and Figs. 3 and 4 represent the completed card. In these figures, x is the splints, separated by the kerfs x' and having the wedge-shaped openings y at the ends, the bases of the splints being connected by the ribbon z.

The card thus made effects a great saving in material. Only a narrow kerf is required to form the splints, and ample space is provided at the ends by means of the enlargement of the kerfs for the fulminate to adhere.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a match-card machine, the combination, with the table b, of the saw-frame carrying the jig-saws and working in the slotted standards a', the sliding carriage u, having clamp u' and rack u^2, the shaft v, carrying pinion v', arms v^2 v^3, the latter connected to the saw-frame, and the loosely-pivoted arms l, carrying the rotary cutters n and the rods p p' p^2 and treadle p^3, substantially as specified.

2. In a match-card machine, a saw-frame carrying jig-saws placed side by side, the central saw, d, being arranged to project slightly in advance of the others, substantially as and for the purposes specified.

3. In a match-card machine, the combination, with the jig-saws supported in a saw-frame working in the slotted standards a', of the aligned separators e' and the aligned rotary cutters n, supported in bearings in the arms l, loosely pivoted on the shaft f and operated by rods p p' p^2 and treadle p^3, substantially as specified.

4. In a match-card machine, the combination, with the jig-saws, the aligned separators e' in rear thereof, and the aligned rotary cutters n, supported in bearings in the pivoted arms l, working on the shaft f and operated by rods p p' p^2 and treadle p^3, of the presser-rolls e e, substantially as specified.

5. In a match-card machine, the combination of the cutter-shaft m, the arms l, and the vertically-sliding bearings t on the guides t' with the blocks q, supported on the arms r by springs r', whereby a vertical motion is given to the shaft f when the arms l are operated, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEORGE HARGREAVES.

Witnesses:

ROBERT H. BROWN,

J. S. HUFF.