3 Sheets--Sheet 1.

M. SMITH & J. C. JORDAN.

Improvement in Machines for Slitting Match Cards.

No. 125,149. Patented April 2, 1872.

Fig. 1.

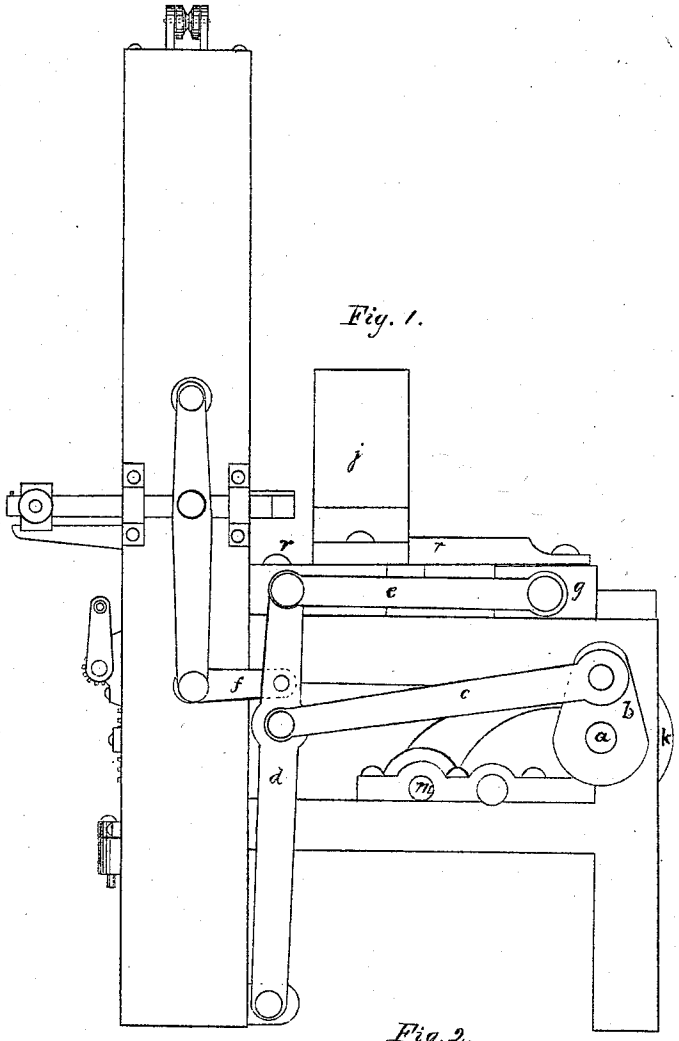
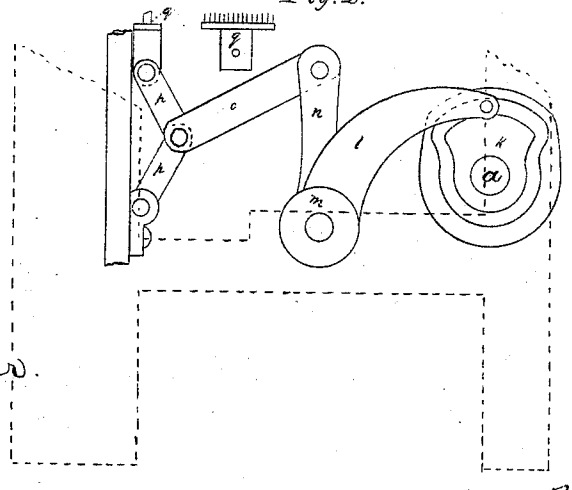


Fig. 2.



Witnesses:

D. W. Scribner.

E. C. Jordan.

Inventors:

Manasseh Smith

James C. Jordan

Per Wm. H. Clifford

atty

3 Sheets--Sheet 2.

M. SMITH & J. C. JORDAN.

Improvement in Machines for Slitting Match Cards.

No. 125,149. Patented April 2, 1872.

Fig. 1.

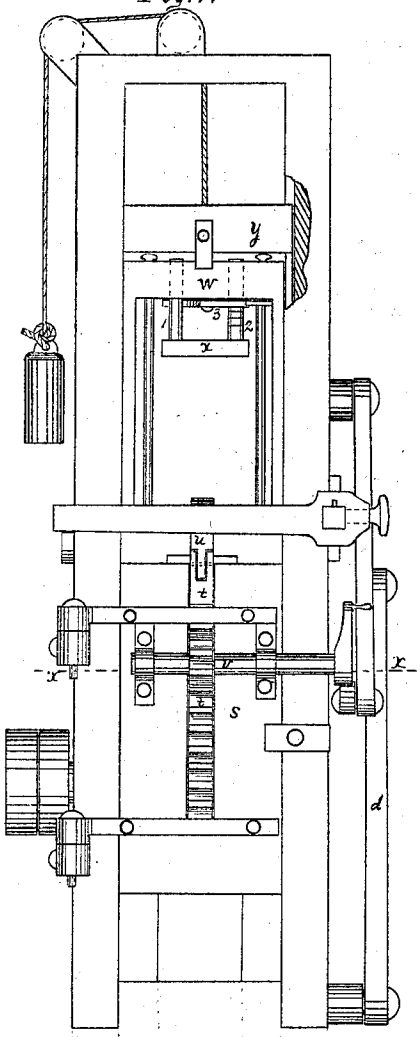


Fig. 2.

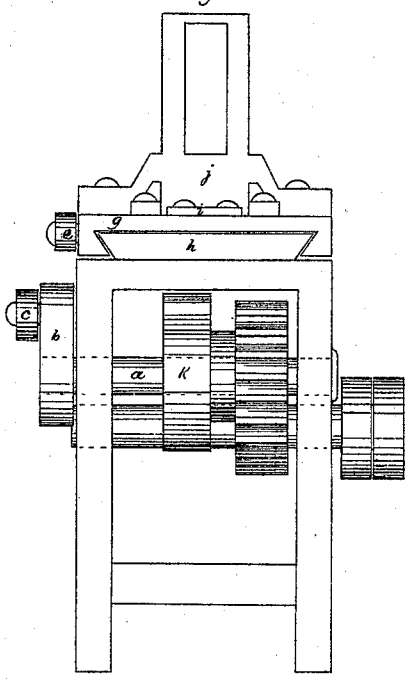


Fig 4

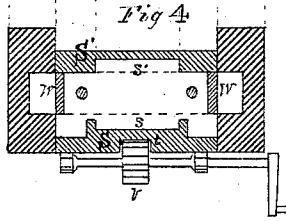
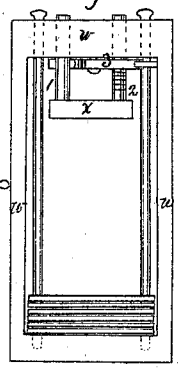


Fig. 3.



Witnesses:

D. W. Scribner.

F. C. Jordan

Inventors:

Manasseh Smith

James C. Jordan

Per Wm H. Clifford
atty.

3 Sheets--Sheet 3.

M. SMITH & J. C. JORDAN.

Improvement in Machines for Slitting Match Cards.

No. 125,149. Patented April 2, 1872.

Fig. 1.

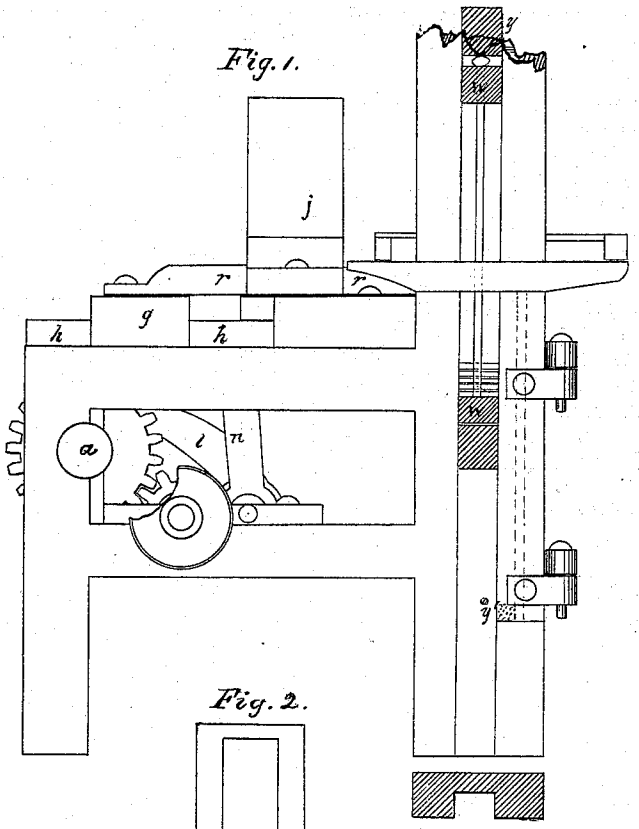
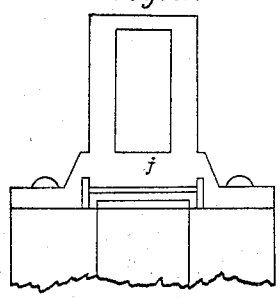


Fig. 2.



Witnesses:

D. W. Scribner.

F. E. Jordan

Inventors:

Mannasseh Smith

James C. Jordan

Per Wm. H. Clifford

Atty.

UNITED STATES PATENT OFFICE.

MANASSEH SMITH AND JAMES C. JORDAN, OF PORTLAND, MAINE.

IMPROVEMENT IN MACHINES FOR SLITTING MATCHES.

Specification forming part of Letters Patent No. 125,149, dated April 2, 1872.

To whom it may concern:

Be it known that we, MANASSEH SMITH and JAMES C. JORDAN, both of Portland, in the county of Cumberland and State of Maine, have invented a new and useful Machine for Slitting Match-Cards; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing which is made a part of this specification, in which—

Figure 1, Plate 1, is a side elevation. Fig. 2, Plate 1, is a sectional longitudinal elevation of the devices that operate the knives. Fig. 1, Plate 2, is an end elevation. Fig. 2, Plate 2, is an elevation of the opposite end from Fig. 1. Fig. 3, Plate 2, is a view of the rack. Fig. 4, Plate 2, is a section on *x x* of Fig. 1. Fig. 1, Plate 3, is a side elevation, partly in section. Fig. 2, Plate 3, is a front end view of the hopper.

Our invention consists of a combination of devices for so slitting match-cards that the card shall be divided into matches for nearly the entire length of said card, but for a small space near the butt of the card or matches there shall be left a portion which is not slit, which said portion is intended to hold the matches together in the form of a card until desired to be broken off for use. Our machine effects this operation automatically. The slitters or devices by which the cutting is effected, or the division of a card into matches is produced, receives the cards upon their edges, upon which it is pushed by a plunger until the knives or slitters have traversed nearly the length of the card, at which time the knives or slitters are made to drop below the face of the bed or plate upon which the card is placed when pressed upon the knives, and so leaves a portion of the card uncut or unslit.

The devices by which the cards are impelled onto the knives or slitters, and those by which the knives are withdrawn at the proper moment, are operated by the revolution of the same shaft. *a* shows the shaft. On one end of this is set the crank *b*, to which is pivoted the connecting-rod *c*, operating the upright pivoted arm *d*, to which are connected the horizontal arms *e* and *f*. The arm *e* is pivoted to the rear end of the reciprocating carriage *g*, which carries the feed-plate *i*. This carriage slides on the bed *h* as it is impelled by the rotation of the shaft *a*, hereinbefore described. Over the bed *h*, and over the feed-plate *i* as it moves, is fixed the hopper *j*, into which the cards are placed preparatory to cutting. At each forward motion of the carriage *g* the feed-plate *i* presses forward the bottom card in the hopper onto the knives, and at each reversed motion of the carriage *g*, and after the feed-plate *i* is drawn back entirely out of the bottom of the hopper *j*, the next card in order above, drops into the place from which the feed-plate had just previously forced the one below it. We neither claim these devices, nor their above-described operation. Neither do we claim the stationary knives for slitting the cards. Upon the shaft *a* is rigidly set the cam or eccentric *k*, with a path of the desired form to produce the necessary motion of the curved arm *l*, rigidly set upon the shaft *m*, and having a stud or finger to play in the path of the cam *k*. Upon the shaft *m* is also fixed the arm *n*, to the upper end of which is pivoted the horizontal arm *o*. This arm operates the toggle-joint *p*. One arm of this joint is immovably pivoted to the frame of the machine. Upon the end of the other arm of this toggle-joint is affixed the plate or block to which the knives or slitters are fastened, so that as the toggle *p* is straightened the knives are raised and pushed upward, and as it is crooked the same are drawn downward. When the stud or finger of the curved arm *l* is in that portion of the path or groove of the cam *k* that straightens the toggle *p* and pushes upward the knives *q*, the feed-plate *i* is pushing the card forward on the knives *q* until they have traversed nearly the length of the card. When the card is thus slit nearly its whole length, the stud or fingers of the curved arm *l* suddenly drops into that portion of the path of the cam *k*, which draws downward the knives *q* below the surface of the plate upon which the card lies, and this portion of the path of the cam *k* retains the knives below the surface of the plate, upon which the card lies until such time as the feed-plate *i* has pressed the slit card forward into certain devices prepared for its reception, (not herein claimed,) and until the feed-plate is drawn backward by the carriage *g*, preparatory to presenting another unslit card to the knives.

The operations are effected by the cam *k*, curved arm *l*, arm *n*, arm *o*, and toggle *p*, as

follows: When the arm *l* is slightly raised, by the form or shape of the cam *k*, it slightly rotates the shaft *m*, to which it is attached. This motion moves forward slightly the arm *n*, which, pressing forward the arm *o*, straightens the toggle *p*, and so pushes up above the upper surface of the plate, upon which the card rests, the knives *q*. This takes place while the feed-plate *i* is making its backward movement, and is there held while it is making its forward movement, until such time as the knives have traversed nearly the length of the card, when the stud or finger of the curved arm *l* dropping into the other part of the path of the cam *k*, the shaft *m* is slightly rotated in the other direction, the arms *n* and *o* drawn back thereby, the toggle *p* crooked, and the knives drawn down. It will be understood that the knives, except as to the slight upward and downward motion, are fixed, and that the cards, as before described, are moved onto them.

Our invention further consists of a device for leveling the cards preparatory to dipping, and for fastening them in the racks before being removed from the machine where the slitting is done. As fast as the racks are filled with the cards the rack is slowly fed or pushed down, by the operation of the plungers *r r*, until the rack is filled. We neither claim the rack, the plungers, nor the operation of filling and feeding down the rack. As the rack descends below the level of the table, upon which the card lies, it passes into a box or compartment, formed on three sides by the frame of the machine and a back-plate, and on the front and remaining side by a door, the operation and peculiar structure of which, together with the groove or recess in the back-plate forms the subject of the second part of our invention. The inner face of the door S is formed into a groove, *s*, as illustrated in the drawing, Fig. 4. This, in connection with the groove *s'* on the face of the back-plate S', constitutes the guides for the cards as the rack descends. By this means, when the door S is closed the ends of the cards are forced into a perfectly even and regular position relative to each other, so that the points shall, to the same extent, project through the rack in proper position for dipping. Upon the outer face of the door S is seen vertical toothed rack *t*, sliding in grooves or guides on the said door. Upon the upper end of the rack *t* is pivoted a clamp, *u*. The rack is raised or lowered by the shaft and gear *v*. The card-rack shown in the drawing at *w* is furnished at the upper end with a top piece, *x*, supported by two notched rods, 1 2, passing through holes in the top of the frame of the rack. When the rack is filled with cards, the clamp *u* is then thrown over the top of the top piece *x*. By then revolving the shaft and gear *v*, the clamp *u* is drawn down so as to force downward said top piece *x*, so as to press tightly together the cards held between the slats of the card-rack *w*. The top piece *x* is so constructed that when forced down by the clamp *u* it will be there held by the catch 3 until released by the operator. Thus, when forced down by the clamp *u*, the match-cards are held compressed by the top piece or follower *x* in the rack with sufficient firmness for dipping and handling. The clamp is then raised, the door opened, and the rack removed. The lower part of the rack, when this operation is going on, rests on a lip-pin or projection, *y'*, on the lower part of the inner face of the door, or on the back-plate. As before specified, the cards while being slit rest upon a plate, and this plate of course has slots, through which the knives penetrate when they are raised. This is likely to become covered with the dust and filaments of wood from the cards and the slitting thereof. This settling upon the knife-plate prevents the proper rising of the knives through the slotted plate. To prevent this accumulation of wood dust we either direct a current of air upon the said bed-plate, or else scrape the spaces between the said knives, at each operation, by a set of fingers. Both the air current and the fingers are operated by the movement of the carriage.

It is obvious that a variety of equivalent methods may be employed for dropping the knives below the face of the bed-plate at any required moment during the operation of slitting the cards, or the card itself may be dropped or raised, and the knife remain stationary; or the knives may be placed above the card and raised instead of lowered; or a revolving knife, constituting a portion of a periphery of a circle, may be used, the said knives to be rotated by power derived from the machine, or by the passage of the card over them. Either single or double sets of rotary knives may also be used to perform the slitting operation, and when the cutting-edge extends the entire periphery of the circle the rotary knives can then be withdrawn in any of the ways herein specified.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The knives *q*, by which the slit is made in the card, combined with toggle-joint *p*, levers *o n l*, and cam *k*, substantially as and for the purpose described.

2. The combination of the toothed rack *t*, clamp *u*, shaft and gear *v*, top piece or follower *x*, with the door, card-rack, and back piece, substantially as herein described.

MANASSEH SMITH.
JAMES C. JORDAN.

Witnesses:
D. W. SCRIBNER,
WILLIAM HENRY CLIFFORD.