

(No Model.)

2 Sheets—Sheet 1.

L. H. MONTROSS.
MATCH MAKING MACHINE.

No. 580,347.

Patented Apr. 6, 1897.

FIG. 1.

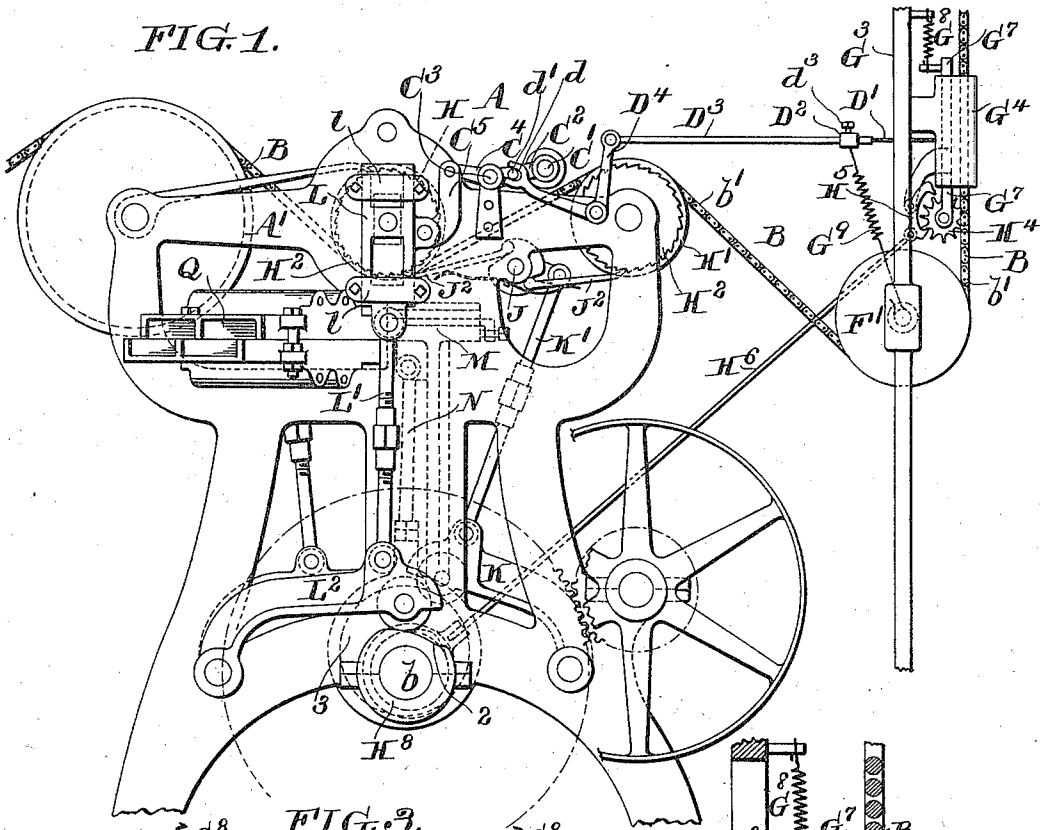
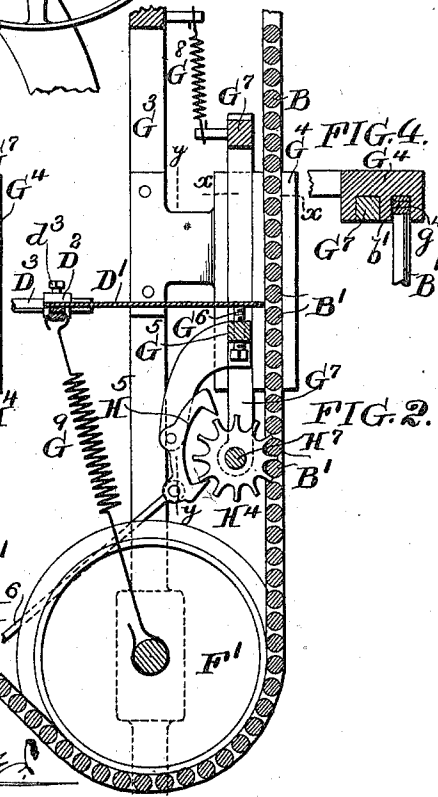
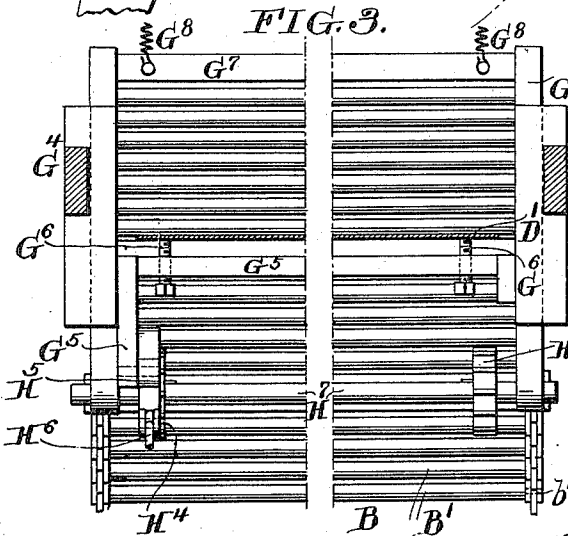


FIG. 3.



WITNESSES:

Henry D. Dwyer
Rose M. Kelly

INVENTOR:

L. H. Montross
By *[Signature]*

(No Model.)

2 Sheets—Sheet 2.

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FIG. 5.

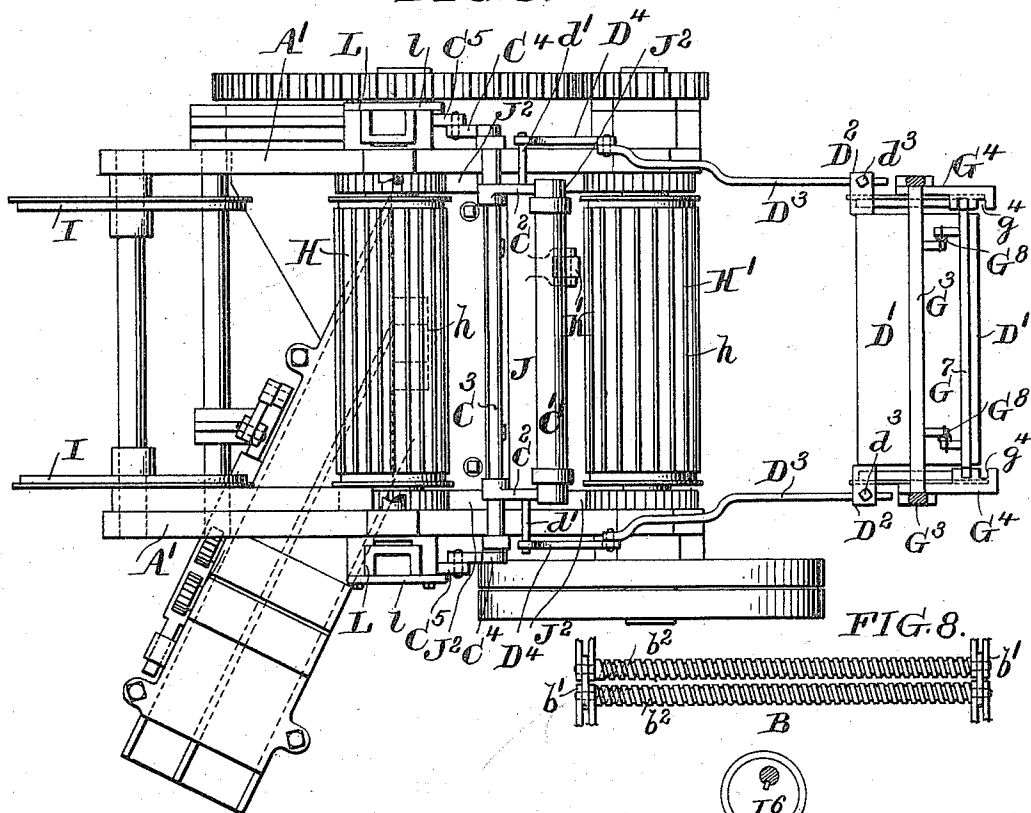


FIG. 8.

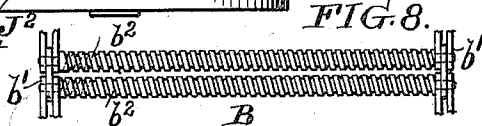


FIG. 6.

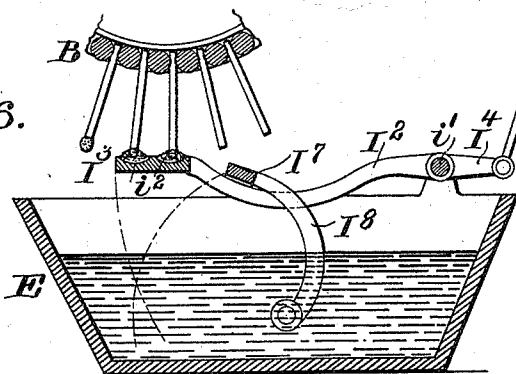
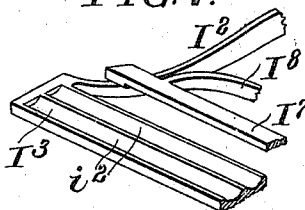


FIG. 7.



WITNESSES:

Chas. D. Dwyer
Ross M. Kelly

INVENTOR:

L. H. Montross
By *[Signature]*

UNITED STATES PATENT OFFICE.

LEVI H. MONTROSS, OF CAMDEN, NEW JERSEY, ASSIGNOR OF THREE-FOURTHS
TO ADOLPH SEGAL, OF PHILADELPHIA, PENNSYLVANIA.

MATCH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 580,347, dated April 6, 1897.

Application filed July 26, 1895. Serial No. 557,188. (No model.)

To all whom it may concern:

Be it known that I, LEVI H. MONTROSS, of the city and county of Camden, State of New Jersey, have invented an Improvement in Match-Making Machines, of which the following is a specification.

My invention relates to match-making machines; and it consists of certain improvements, which are fully set forth in the following specification and are shown in the accompanying drawings.

My improvements are particularly designed for use in connection with a machine adapted for the complete construction of matches, in which in an organized machine the splints are cut, introduced into a carrier, provided with heads, and discharged without the necessity of intermediate handling.

I have shown my improvements applied to a machine of the character shown and described in Letters Patent No. 541,564, dated June 25, 1895, and granted to me jointly with Adolph Segal. In that machine there is employed a traveling carrier consisting of transverse bars linked together, between which the splints are introduced by the reciprocating cutter, the carrier being depressed intermittently to receive the splints from the cutter. The splints are carried by the carrier over the pans containing the igniting compounds, &c., and after the heads have dried the matches are expelled by suitable ejecting devices.

A part of my present improvements relates to the ejecting devices, whereby the completed matches may be ejected from the carrier with great certainty and facility, and the operation of the ejecting mechanism may be properly timed with reference to the movement of the traveling carrier.

Another part of my improvements relates to devices for taking up the slack in the traveling carrier and holding it in contact with its cylinder or drum.

My invention also embraces improvements in the devices for applying the compound to the splint-heads, whereby greater uniformity in the formation of the heads is attained, and in the construction of the traveling carrier, and includes other combinations of parts and improvements in construction, which are fully set forth and claimed hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of the splint-cutting machine

and ejecting devices, showing a portion of the splint-carrier. Fig. 2 is a vertical sectional view, enlarged, of the match-ejecting devices. Fig. 3 is a vertical sectional view on the line *yy* of Fig. 2. Fig. 4 is a longitudinal sectional view on the line *xx* of Fig. 2. Fig. 5 is a plan view of the splint-cutting machine and ejecting devices with the carrier removed. Fig. 6 is a vertical sectional view of the compound-applying devices with part of the carrier. Fig. 7 is a perspective view of a portion of the compound-applying devices, and Fig. 8 is a perspective view of a portion of the carrier.

I shall first generally describe the machine of Letters Patent No. 541,564 so far as the same has been shown herein for the purpose of illustrating my improvements.

A is the splint-cutting machine.

B is the splint-carrier, which, as shown, consists of a series of transverse bars *B'*, linked together at their ends by links *b'* and having their adjacent faces of round or convex form.

H H' are the driving-drums of the splint-cutting machine, grooved longitudinally, so that the ribs *h* thus formed engage the spaces between the bars *B' B'* of the carrier and drive it on the principle of a sprocket-wheel. The carrier passes over the cylinder H' and under the cylinder H. I am guiding rollers or disks over which the carrier passes. The cylinders H H' are provided at each end with oppositely-arranged ratchets H², and between them is journaled a rock-shaft J, provided with pawls J² J² at each end located on opposite sides of the rock-shaft and each engaging one of the ratchets H². By these means intermittent motion is imparted to the cylinders H H' and the carrier is moved intermittently. The shaft J is operated by a connecting-rod K', lever K, and cam on the shaft *b*. The cylinder H is journaled at each end in a slide L, guided by guides *l* on the side frames A' A', and these slides are connected by rods L' L' with rocking levers L², operated by the cams 2 on the shaft *b*. By these means a reciprocating movement is imparted to the cylinder H and the apron is intermittently depressed toward the cutter. The reciprocating frame M, which carries the cutters, is shown in dotted lines in Fig. 1 and is reciprocated by a connecting-rod N from an eccentric 3 on the shaft *b*. The wood is carried in

the box Q and is fed forward intermittently by suitable rollers in the well-known manner.

As the cutter descends it cuts a series of splints from the edge of the block of wood, and as it rises with these splints the carrier B is depressed by the downward movement of the cylinder H and the bars B' B' are forced down upon the ends of the splints and engage them.

The wood-feeding devices are so operated that they will feed the block of wood forward while the cutter is raised, so that the edge of the block acts as a stop for the lower ends of the splints while they are being introduced into the carrier.

When the cutters descend, they cut another series of splints, which free those previously cut from the eyes of the cutters. The carrier moves forward, carrying the splints previously introduced with it and bringing the next pair of bars into position to receive the next series of splints delivered by the cutter. As the machine continues to operate the splints are carried forward to the vessel which contains the first bath, of material such as paraffin, into which the ends of the splints are dipped. They are then carried by the carrier to the vessel containing the igniting compound for forming the heads. After the heads are formed the carrier passes through the room or drying inclosure to permit the heads to dry. The carrier then passes to the ejecting apparatus and the finished matches are ejected. From the ejecting apparatus the carrier returns to the splint-cutting machine, and the operations are repeated.

I will now describe my improvements as applied to a machine of this general character.

As the carrier B must have sufficient slack to permit the rising- and -falling movement caused by the reciprocation of the cylinder H, I employ suitable tension or tightening devices to take up or compensate for the slack when the cylinder H rises, and thus to hold the carrier in contact with the cylinder with the bars B' B' in engagement with the ribs *h* and to prevent the weight of the carrier beyond the cylinder H pulling it taut and thus rotating the cylinder.

C' is the tightening or take-up device, which is shown as a roller or bar extending transversely across and above the carrier and carried by arms C² of a rock-shaft C³.

C⁴ are arms carried by the rock-shaft C³ and connected, as by links C⁵, with the slides L. When the slides L rise and lift the cylinder H, the shaft C³ is rocked through the links C⁵ and arms C⁴, and the roller C' is depressed upon the surface of the carrier B, so as to take up the slack therein and keep the apron in contact with the cylinder H. Without this take-up device the weight of the carrier beyond the cylinder H would tend to pull the carrier taut, and this would result in the rotation of the cylinder or in putting it under considerable strain. The take-up roller C' effectively prevents this.

I shall now describe the ejecting devices for ejecting the completed matches from the carrier.

D' is an ejecting-plate which is reciprocated back and forth, so that its front edge will pass between adjacent bars B' B' and expel the splints.

I have shown a portion of the carrier B descending in a vertical plane with the ejector D' located in the rear.

G³ is a stationary frame having extensions or brackets G⁴ G⁴, provided with ways or grooves *g*⁴, in which the ends of the carrier B are guided.

F' is a guide-wheel over which the carrier passes.

The ejector D' may be carried by the devices, which reciprocate it in any convenient manner. I have shown the ejector D' provided on its end with ears D², adapted to receive reciprocating rods D³, which may be clamped by screws *d*³. By these means the plate D' may be adjusted to and from the carrier B.

D⁴ are bell-cranks having their fulcrums on the side frames of the splint-cutting machine and each having one arm pivotally connected with the rear of the corresponding rod D³ and the other arm operatively connected with the corresponding arm C² of the rocking shaft C³, as by a pin *d*⁴ and jaw *d*. As the shaft C³ rocks the ejector-plate D' is reciprocated back and forth and its forward edge is projected between adjacent bars B' B' of the carrier B. The reciprocations of the plate D' are thus timed accurately with the operation of the splint-cutting machine. It is obvious that the ejector D' may be operated from any other part of the machine.

The outer edge of the plate D' is guided by a frame G⁵, preferably through the medium of set-screws G⁶, carried by the frame G⁵, upon which the plate rests. By adjusting the screws G⁶ the outer edge of the plate may be raised or lowered. The frame G⁵ is carried by a yielding frame G⁷, guided in ways in the extensions G⁴ of the frame G³ and normally retained in a raised or elevated position by a spring or springs G⁸ between the frame G⁷ and the frame G³ or other stationary part.

A spring or springs G⁹ between the ejector D' and the stationary frame G³ maintains the ejector in contact with the frame G⁵ or the set-screws G⁶ thereon during its reciprocations.

H⁴ are sprocket-wheels carried by a shaft H⁷ on the yielding frame G⁷. The wheels H⁴ engage the bars of the traveling carrier B and are rotated thereby.

H⁵ is a balance or escapement-lever pivoted at the middle to an extension of the frame G⁵ and alternately engaging and disengaging the teeth of one of the sprocket-wheels H⁴ in the manner similar to the operation of watch and clock escapements. The balance or lever H⁵ is connected by an eccentric-rod H⁶ with an eccentric H⁸ on any convenient driven part

of the machine, (shown, *e. g.*, on the cam-shaft *b* of the splint-cutting machine.) By these means the balance or lever *H*⁵ is rocked.

As the carrier *B* is moved intermittently by the operation of its driving devices, it acts to impart an intermittent rotation to the sprocket-wheel *K*⁴, but as the movement of the wheel *H*⁴ is controlled by the escapement-lever *H*⁵ it can rotate only during the movement of the rocking of the lever. If the lever *H*⁵ is in engagement with the wheel *H*⁴, instead of rotating the wheel it will move it down with its yielding frame *G*⁷ and the ejector *D*⁷ will correspondingly move down with the frame *G*⁷, so that its edge will remain in line with the space between the bars of the carrier and be in proper position to eject the matches when it is projected. Thus any tendency of the carrier at the place of ejection to lose its uniformity of movement with reference to the reciprocation of the ejector *D*⁷ will be counteracted by the automatic adjustment imparted to the ejector by the devices described. The instant the rocking of the lever *H*⁵ permits the turning of the wheel *H*⁴ the parts are restored to their normal position by the action of the springs *G*⁸. The edge of the ejector *D*⁷ is thus constantly maintained in perfect position with reference to the bars of the traveling carrier. It is apparent that any irregularity or lack of uniformity in the operation of the devices, without the employment of regulating mechanism, would be liable to cause the edge of the ejector at times to strike the bars *B*⁷ *B*⁷ instead of entering between them.

Heretofore it has been proposed to apply the compound to the ends of the splints for the purpose of forming the match-heads by means of a drum partially submerged in the compound and rotating therein, so that its surface would become coated with the compound and the splints' ends would graze the coating and take up sufficient matter to form the heads. My improvements are designed to accomplish the formation of the heads with greater uniformity, to avoid friction in the application of the compound, and to keep the mixture agitated or stirred.

The vessel *E*, which contains the igniting compound, is located in any convenient position and the traveling carrier *B* passes over it after it has been provided with splints by the splint-cutting machine. The splint-heads may be first dipped in paraffin, if desired.

Rocking levers *I*², having their fulcrum, as at *i*², on the vessel *E*, carry on their outer ends a table or plate *I*³, adapted to be dipped into and out of the compound when the levers *I*² are rocked. When the table or plate *I*³ is dipped into the compound, it takes up a quantity thereof, and when it rises it carries the compound up to the ends of the splints and applies it to them. On each movement of the compound is applied to one or more rows of splints in the carrier *B*.

The table or plate *I*³ may be grooved or

hollowed slightly, as shown at *i*², to retain the compound.

Any suitable mechanism may be employed for rocking the levers *I*² and operating the plate *I*³. For this purpose I have shown the arm *I*⁴ of one of the levers connected with an eccentric-rod *I*⁵, operated by an eccentric *I*⁶, which may be located on any driven shaft or counter-shaft of the machine.

To regulate the quantity of compound taken by the plate *I*³ and applied to the splints, I employ a gage *I*⁷, carried by rocking arms *I*⁸, having their fulcrum below the fulcrum of the arms *I*². The gage rests on the arms *I*², and as they rise and fall the gage slides over the face of the plate *I*³. When the plate *I*³ descends into the compound, the gage *I*⁷ passes beyond it, so that the plate is exposed to receive the compound. As the plate rises the arms *I*² cause the gage to move back, so that it passes over the plate *I*³ and removes the surplus compound, always leaving a uniform quantity, so that the heads formed will be of uniform size. The gage *I*⁷ makes contact with the plate *I*³ only at the ends, so as to leave a space between the opposed faces of the plate *I*³ and the gage and permit the desired depth of compound to remain on the plate when the gage passes over it.

The movements of the plate *I*³ and gage *I*⁷ keep the compound agitated and render manual stirring unnecessary.

As the carrier *B* is composed of bars linked together and movable with reference to one another, when the carrier is flexed as it passes about the guides and cylinders of the machine there is liability of the movements of the bars producing a movement of the splints and throwing them out of proper position to take the compounds. To overcome this liability, I provide the bars with grooved or roughened surfaces *b*², Fig. 8, which have the effect of firmly holding the ends of the splints and preventing them from becoming easily displaced.

The details of construction shown may be varied without departing from my invention.

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

1. The combination with splint-cutting devices, of a traveling carrier adapted to receive the splints from the cutting devices and having a slack portion by which it may be depressed toward the cutting devices to take the splints therefrom, means to intermittently depress the carrier at said slack portion, and a take-up acting on the carrier to take up the slack portion thereof when the means to depress it rise.

2. The combination with splint-cutting devices, of a traveling carrier adapted to receive the splints from the cutting devices and having a slack portion by which it may be depressed toward the cutting devices to take the splints therefrom, means to intermittently depress the carrier at said slack portion, and a take-up acting on the carrier to take up the

slack portion thereof when the means to depress it rise, and connections between the means for depressing the carrier and the take-up.

5 3. The combination with the splint-carrier adapted to be depressed intermittently and having a slack portion to permit such depression, splint-cutter, driving-cylinder for the carrier and means for intermittently operating the cylinder to move it toward the cutter to depress the slack portion thereof and cause the carrier to receive the splints therefrom, of the take-up C' located above the carrier, and means to press the take-up C' upon the carrier to take up the slack therein when the driving-cylinder moves away from the cutter.

4. The combination, with the splint-carrier, reciprocating splint-cutter, driving-cylinder and means for intermittently operating it to move the carrier toward the splint-cutter to receive the splints therefrom, of the rocking take-up C' located above the carrier, and operative connections between the rocking take-up C' and the means for intermittently moving the carrier toward the cutter for forcing the take-up upon the carrier and taking up the slack therein when the carrier moves away from the cutter.

5. The combination, with the splint-carrier, reciprocating splint-cutter, driving-cylinder, reciprocating slides carrying the driving-cylinder and operating to intermittently move the cylinder and carrier toward the splint-cutter, of the rock-shaft C³ located above the carrier, the take-up roller C' carried by the rock-shaft, and connections between the rock-shaft and the reciprocating slides, substantially as and for the purpose specified.

6. In a match-making machine, the combination of a traveling splint-carrier composed of transversely-arranged bars linked together at their ends and having adjacent convex or round surfaces between which the ends of the splints are received, and a reciprocating ejector consisting of a flat plate adapted to be projected between the pairs of splint-carrying bars from the rear to eject the matches therefrom and means controlled by the traveling splint-carrier for maintaining the edge of the ejector-plate in alinement with the space between a pair of bars when the plate is projected.

7. The combination with a traveling match-carrier, and a reciprocating ejector adapted to eject the matches from the carrier, of means controlled by the movement of the traveling match-carrier for raising or lowering the position of the operative end of the ejector so as to maintain it in proper position therewith, and intermittently-actuated controlling devices for controlling the operation of said means for adjusting the ejector by the carrier.

8. The combination with a traveling match-

carrier and a reciprocating ejector adapted to eject the matches from the carrier, of a yielding movable guide-frame for adjusting the position of the operative end of the ejector, means for moving said guide-frame controlled by the traveling carrier, and intermittently-actuated mechanism for controlling the operation of said means for moving the guide by the carrier.

9. The combination with a traveling match-carrier and a reciprocating ejector adapted to eject the matches from the carrier, of a yielding movable guide-frame for adjusting the position of the operative end of the ejector, a sprocket carried by the yielding movable frame and operated by the traveling carrier, and a rocking escapement-lever for controlling the movement of said sprocket-wheel, whereby when the rotation of the sprocket-wheel is prevented by the escapement-lever the guide-frame will yield and the end of the ejector will move with the carrier.

10. The combination with a traveling match-carrier and a reciprocating ejector adapted to eject the matches from the carrier, of a yielding movable guide-frame for adjusting the position of the operative end of the ejector, a sprocket H⁴ carried by the yielding movable frame and operated by the traveling carrier, the rocking escapement-lever H⁵ carried by the movable frame and engaging the sprocket H⁴, and the spring G⁹, substantially as and for the purpose described.

11. The combination of a traveling splint-carrier having an intermittent motion and carrying the splints in a depending position, a receptacle to contain composition over which the splint-carrier travels, a rocking compound-applying plate, means acting upon said plate to rock it and dip it into the receptacle and then raise it to splints during the period of intermission in the travel of splint-carrier, and a rocking gage within the vessel adapted to move over the compound-applying plate when it rises to scrape off the surplus compound.

12. The combination with a traveling splint-carrier having an intermittent motion and carrying the splints in a depending position, and a receptacle to contain composition over which the splint-carrier travels, of the composition-applying plate I³ carried by the rocking arms I² and adapted when rocked to be alternately dipped in the composition and raised to the splints, and the rocking gage I⁷ arranged to travel over the face of the plate I³ when it rises.

In testimony of which invention I hereunto set my hand.

L. H. MONTROSS.

Witnesses:

ERNEST HOWARD HUNTER,
WM. L. EVANS.