

(No Model.)

3 Sheets—Sheet 1.

L. H. WOLFE.
MATCH MAKING MACHINE.

No. 535,041.

Patented Mar. 5, 1895.

FIG. 8.

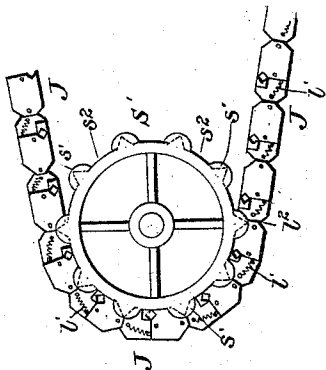


FIG. 9.

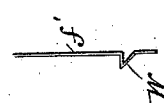


FIG. 1.

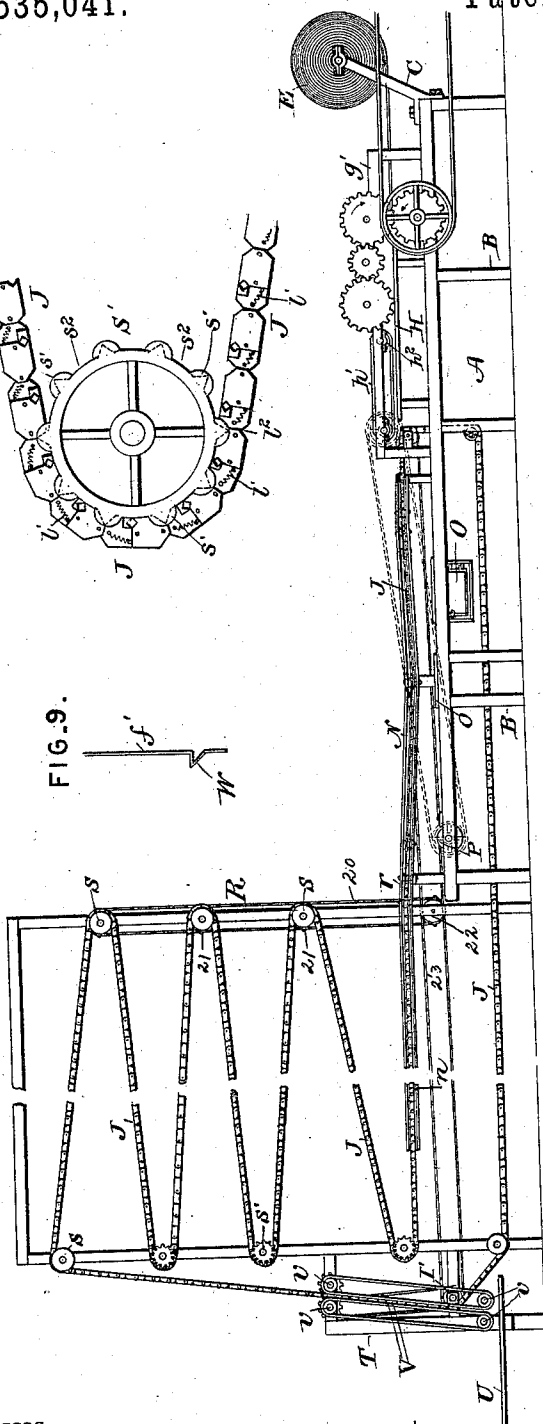


FIG. 7.

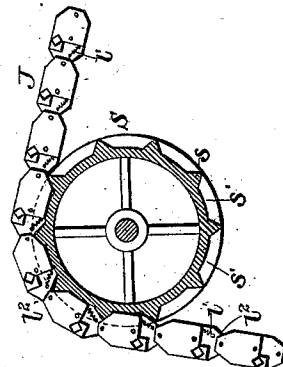
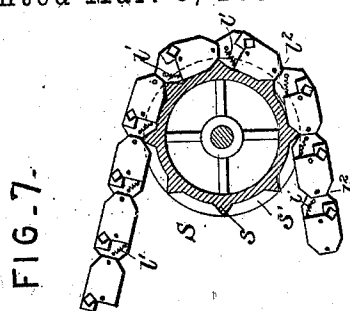
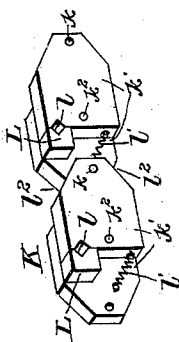


FIG. 6.



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(No Model.)

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FIG. 2.

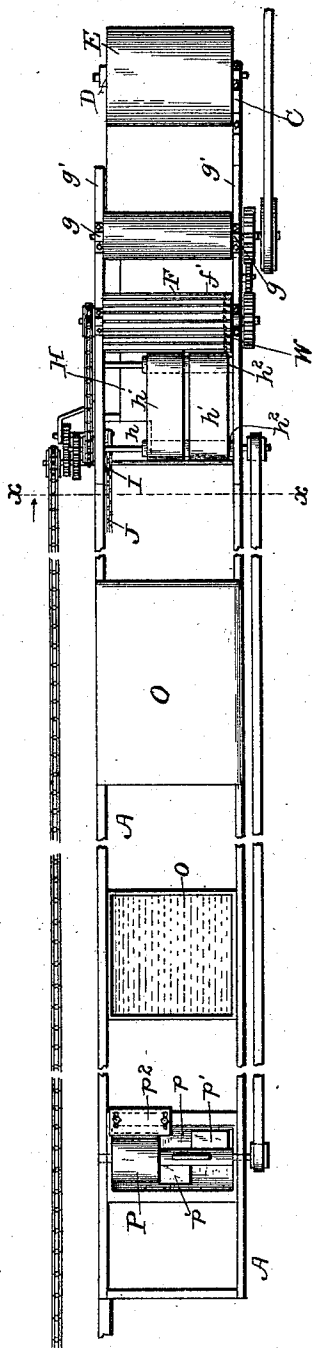


FIG. 4.

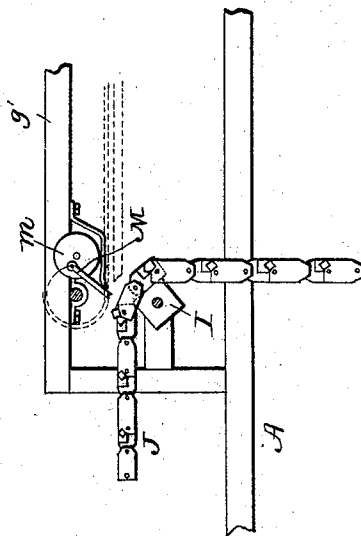


FIG. 10.

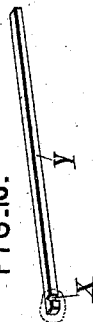
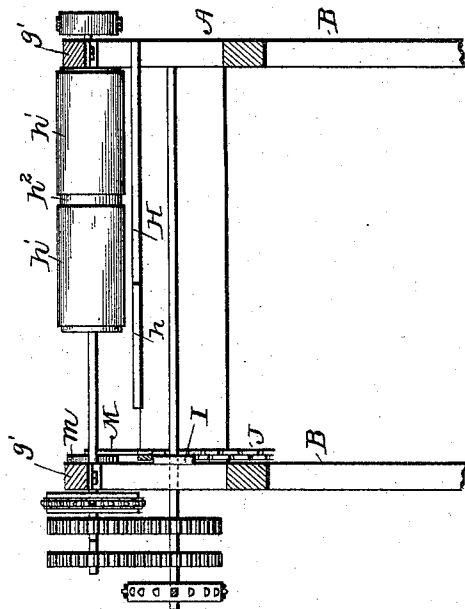


FIG. 5.



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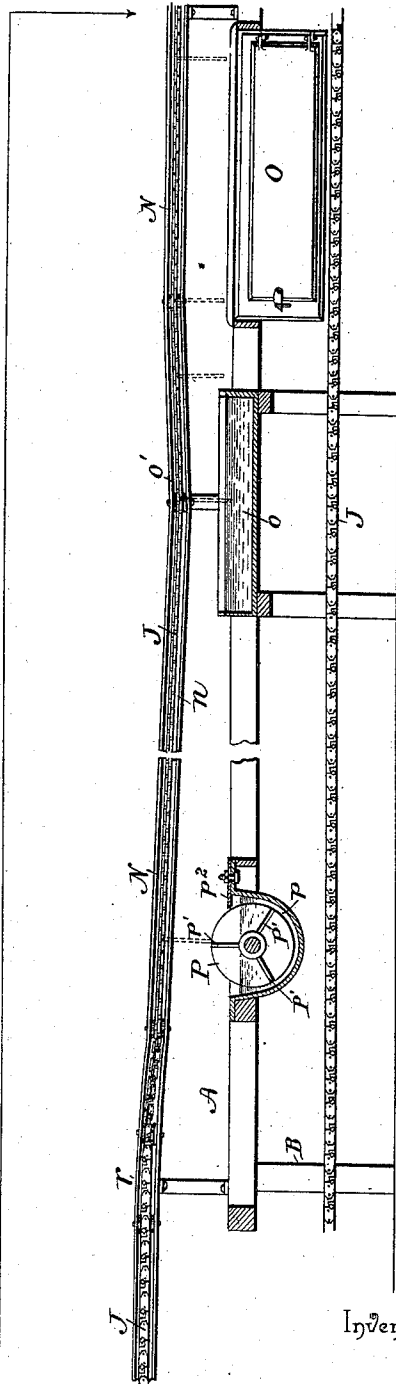
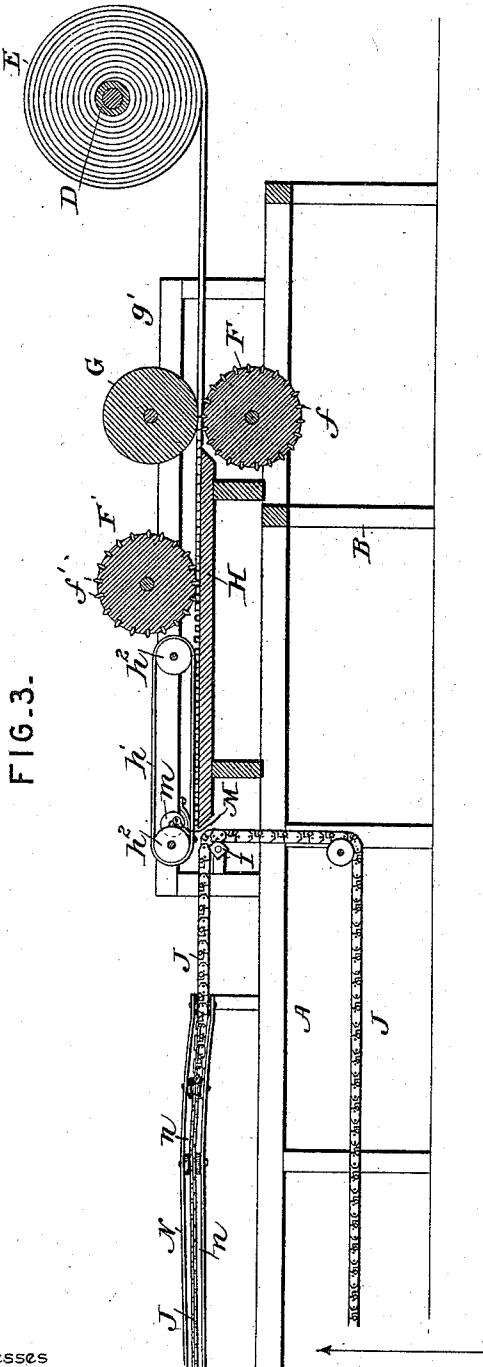
(No Model.)

3 Sheets—Sheet 3.

L. H. WOLFE.
MATCH MAKING MACHINE.

No. 535,041.

Patented Mar. 5, 1895.



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By his Attorneys, Levi H. Wolfe

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UNITED STATES PATENT OFFICE.

LEVI H. WOLFE, OF LEBANON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
A. J. RIEGEL, OF SAME PLACE.

MATCH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,041, dated March 5, 1895.

Application filed February 24, 1894. Serial No. 501,418. (No model.)

To all whom it may concern:

Be it known that I, LEVI H. WOLFE, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented a new and useful Match-Making Machine, of which the following is a specification.

This invention relates to match making machines; and it has for its object to provide a new and useful machine of this character, which shall possess simple and efficient means for completing the manufacture of a match at one single operation.

To this end the main and primary object of the invention is to provide a match making machine which shall comprise a series of mechanisms of a simple and effective type for cutting the match splints from the veneer strips, conveying the splint over the proper devices for heating and coating the same with the usual preparations, and finally drying the fulminate head which has been placed on the splint and delivering the thus completed match to a convenient point for boxing.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of a complete match making machine constructed in accordance with this invention. Fig. 2 is a top plan view thereof. Fig. 3 is a central vertical longitudinal sectional view of the machine. Fig. 4 is an enlarged detail sectional view at one side of the feeding end of the endless splint carrying chain. Fig. 5 is a vertical transverse sectional view on the line $x-x$ of Fig. 2. Fig. 6 is an enlarged detail in perspective of a section of the endless splint carrying chain. Fig. 7 is an enlarged detail elevation of a section of the chain showing the same as it passes around the uppermost chain wheels on the drying frame. Fig. 8 is a similar view showing the chain as it passes around one of the wheels on the drying frame. Fig. 9 is a detail plan view of one of the knife-blades of the cutter rollers. Figure 10 is a detail in

perspective of a completed match splint showing the fulminate-notch.

Referring to the accompanying drawings, A represents a horizontal machine frame suitably supported at the proper plane on the legs or standards B, and at one end of said frame are arranged the devices for cutting the veneer strip into match splints of the usual size, and at this end of the frame is arranged an off-standing bracket C disposed at an upward angle and carrying at its upper outer end the drum or roller D, on which is mounted a roll of veneer E. The roll of veneer E, is formed of a veneer strip of the width that match sticks or splints are usually cut from, whereby uniform lengths of splints may be cut, and the veneer strip from the roll E, in the present machine is first passed over the lower cutter roller F, journaled in suitable bearings on top of the frame A, near one end thereof and adapted to be driven by suitable belting from any suitable motive power.

The lower cutter roller F, is provided upon the periphery thereof with a series of longitudinal cutter blades or knives f , spaced apart the proper distance to cut the proper width of splint, and projected from the periphery of the roller so as to not cut entirely through the veneer strip which is passed thereover, and the strip of veneer is held onto the knives of the lower cutter roller F, by means of the upper combined pressure and feed roller G, arranged directly above the roller F, and having its spindle extremities mounted in suitable bearings g , arranged on top of the opposite side frames g' , projected above opposite sides of the main machine frame A. As the veneer strip passes between the rollers F and G, the same is cut from its under side to a depth not equaling the thickness of the strip, and these incisions are made at regularly spaced distances apart which are the widths of the splints to be formed, and in this condition the strip is fed along to a second upper cutter roller F'.

The second cutter roller F', is journaled in suitable bearings on top of the opposite side frames g' , directly in advance of the upper pressure roller G, and is adapted to work di-

rectly over the flat feed table H, supported in a horizontal position between the opposite side frames g' , and leading from a point from where the veneer strip issues from between the rollers F and G, and the said roller F', is also provided upon its periphery with a series of longitudinal cutter blades or knives f' , which are spaced apart the same distance as the blades or knives on the roller F, and are adapted to cut into the veneer strip from the top thereof, and directly in line with the incisions made by the lower cutter rollers so as to entirely separate the splints from the strip.

The several rollers are properly geared together in any suitable manner so that the cut of the blades or knives on the upper cutter roller will be coincident with the under cuts of the lower roller, and thereby provide means whereby the upper cutter roller will complete the cut made by the blades or knives of the lower cutter roller and will complete the match sticks or splints.

The horizontal flat feed table H, which is disposed directly under the upper cutter roller F', extends beyond said upper cutter roller to a point near one end of the side frames g' , and is provided at one side and end beyond the said upper cutter roller with a cut-away portion h , at the side of which cut-away portion is located a pair of endless feed belts h' . The pair of endless feed belts h' , are arranged to move side by side over the opposite belt rollers h^2 , journaled in the opposite side frames g' , and one of which is suitably geared to the other gear devices of the machine to impart motion to such belts to serve to hold the completed match splints flat on the horizontal feed table H, and to assist in moving the same out toward one end of said feed table to bring one end of the splints directly over the cut-away end portion h , of the said feed table.

At a point slightly below the plane of the feed table H, and included in the space of the cut-away portion h , is journaled an angular chain wheel I, which is preferably square with four corners, and is designed to accommodate for movement thereover the endless splint carrying chain J, which is adapted to grip each separate splint fed along the feed table and to carry such splint through the several stages of completion to the delivering end of the machine as will be more fully described. The said angular chain wheel I, is of course journaled at one side of and within the main frame of the machine and receives edgewise thereon the endless splint carrying chain J, which consists of the jointed links K, pivotally joined or connected with each other at their ends as at k . The jointed links K, of the endless chain comprise the separate jaws or link plates k' , overlapping each other at their adjacent ends and pivotally connected at the center of such ends as at k^2 , so that the links will have an open and shut movement for gripping the match splints.

One of the link jaws or plates k' , is provided at one side and near one edge with the notched grip lug L, which is disposed in the same circle of movement as and directly opposite to the angular splint notch l , formed in the inner end of the other link jaw or plate pivoted thereto, and when these two link jaws or plates are in alignment, the space between the lug L, and the notch l , will be closed sufficiently to hold therein, by one end, a match splint, so that such match splint may be carried from one end of the machine to the other, and these link jaws or plates are normally held in their closed position by means of the small closing springs l' , connected respectively at their ends to each of said jaws or plates. The jointed links K, completed by the link jaws or plates just described, are further provided at their ends with the inclined or beveled corners l^2 , which complete with the corresponding incline or bevel of the adjacent links, V-shaped notches or depressions which fit the teeth of the chain wheels over which the chain passes and which will be more particularly referred to, but as illustrated in the drawings, when the chain passes over the wheel I, the angles or points of such wheel bear directly under or against the then inner edge of the chain links at a central point directly in line with the pivot k^2 , so as to spread or open the link jaws at their then upper edges and separate the notch l , from the lugs L, sufficiently to admit one end of a match splint. As the endless chain passes around the chain wheel I, with the jaws thereof open at their gripping edges as just described, the match splints are successively and separately engaged by the lower notched edge of the kicker or feed lever M. The kicker or feed lever M, is arranged at an angle and is adapted to be given a vibratory or reciprocating movement by the crank wheel m , suitably journaled on one of the side frames g' , and geared with the other feeding devices of the machine. The lower notched edge of the kicker or feed lever M, is adapted to move against one end of the first match splint disposed over the cut-away portion h , of the feed table, and forces the end of said match splint in between the gripping ends of the link jaws or plates of that link which has passed into a position for the reception of a splint, and at about the moment the kicker or feed lever has receded from the match splint, that portion of the chain including the link just fed will straighten out above the chain wheel I, and close onto the match splint, which is then held in the link until released in the manner to be presently described, and every link of the chain is fed in the same manner. The gearing devices are so timed as to insure an uninterrupted operation such as described.

Between the inner end of the side frames g' , to a point at a distance beyond one end of the main frame A, the jointed links of the endless chain J, are guided to move in the

grooved chain track N. The track N, is suitably supported at one side of the machine frame A, at a plane above the same and is provided with a longitudinal groove *n*, agreeing with the width of the overlapped link members of the endless splint carrying chain J, so as to carry and guide the said chain at the proper angle and said track end is further provided in the groove thereof with a series of anti-friction rollers, as illustrated in the drawings. At a point just beyond the inner chain wheel I, where the endless chain is fed with the match splints, the grooved track is turned to or disposed in substantially a horizontal position, so as to dispose the match splints in a substantially upright position with their ungripped ends downward, and in this position the lower ends of the match splints are carried over a flat-top heating stove O, arranged within the machine frame and providing means for heating the lower ends of the match splints sufficiently to insure the proper adhesion of the substances in which the same are dipped, and the said match splints are arranged to pass over the top of the stove O, in slight contact therewith. After passing over the flat top stove O, the heated ends of the match splints are carried through or dipped into a pan or vessel *o*, containing a bath of paraffine, with which the strike end of a match is first coated in all ordinary processes of making matches, and the ends of the splints are dipped into and lifted out of the paraffine bath by reason of a downward curve or sweep *o'* being given to the track N, at a point directly over the pan or vessel containing the paraffine. The splint carrying chain continues to carry the match splints in a vertical position beyond the paraffine bath and directly onto and over the fulminate roller P. The fulminate roller P, is mounted on a suitable shaft journaled in the tub *p*, arranged within the frame A, near one end thereof, and this shaft is geared with other parts of the machine in any suitable manner so as to carry the fulminate roller at substantially the same speed as the chain J. The tub *p*, is adapted to contain the usual fulminate mixture, which is continually agitated or stirred up by the winged or bladed stirrer *p'*, arranged on the shaft of the roller at one side of the latter and also turning in the tub.

The fulminate roller P, is made of any suitable material suited for the purpose, and as it passes through the fulminate mixture necessarily accumulates a coating of the fulminate, which the paraffine coated match splints pick up as the same pass over the roller in contact therewith, and the thickness of the fulminate coating on the roller P, may be regulated by means of a suitable gage or scraper blade *p''*, arranged within the fulminate tub at one side of said roller.

The endless splint carrying chain carries the splints in such a position directly over the fulminate roller as to allow such splints to collect a sufficient quantity of fulminate

on their lower ends, and after leaving the fulminate roller the chain and splints are carried over the drying frame R.

The drying frame R, may be of any desired width according to the length of time which it is necessary to have the splints on the drying frame to allow the fulminate to dry, and the track N, extends nearly to the side of the drying frame beyond one end of the frame A, and before reaching such side of the drying frame is turned to an upward disposition as at *r*, to dispose the match splints in substantially an upright position which is most favorable for the even settling of the fulminate around the splint end, and to prevent the fulminate from running out into long heads.

The completed matches are carried a number of times transversely back and forth across the drying frame from the lower portion to the top thereof, and at opposite sides of the drying frame are journaled the opposite sets of chain wheels or pulleys S and S', which are provided with the pointed teeth or cogs *s*, to register in the V-shaped notches or depressions formed at the beveled corners $\frac{1}{2}$ of the chain links, and by reason of engaging between the ends of the links in these notches or depressions, the link jaws or plates are prevented from opening and dropping their matches. Both of the wheels or pulleys S and S', are provided with peripheral flanges *s'*, to hold the chain thereon, while the latter set of wheels S', are provided with match notches *s''*, in their flanges to admit the matches which are disposed next to the peripheries of these wheels as the splint chain passes thereover.

From the upper part of the drying frame the chain J, passes over an angular or squared chain wheel I', similar to the chain wheel I, located at the feeding end of the chain. The chain wheel I', is journaled at one side of a frame extension T, disposed at one end of the drying frame R, and is adapted to have the points or corners thereof engage the chain at a central point of its jointed links so as to cause the link jaws or plates to open and release the matches from their grip, and at the moment the matches are thus released the same are carried downward onto the delivery table U, by means of the parallel contacting delivery aprons or belts V.

The delivery aprons or belts V, are arranged to work at an angle over suitably arranged belt rollers *v*, which are given motion in any suitable manner. The said delivery aprons or belts extend above the plane of the releasing wheel I' and are arranged with their inner portions traveling in contact with each other so that the said belts secure a purchase or grip on the matches before the chain releases its grip on the same, and by this means the completed matches are fed or delivered onto the table U, in convenient shape for gathering and boxing.

Changes in the form, proportion and the

minor details of construction may be resorted to without departing from the principle, or sacrificing any of the advantages of this invention, and at this point more particular attention is directed to the specific construction of the cutter blades or knives of both the upper and lower cutter rollers, and by reference to Fig. 9 of the drawings, it will be seen that the cutter blades or knives are provided at or near one end with an angular knife off-set W, the projection of which is not so long as the width of the match splint, and as the veneer strip passes between the cutter rollers, the off-sets W, necessarily make an incision conforming to the configuration thereof and thereby cut an angular fulminate notch X, in one edge of the match splint Y, as shown in Fig. 10, of the drawings. By reason of cutting a fulminate notch in one end of the match splint, the fulminate which is placed on that end of the splint is caused to be held more firmly to the splint and is prevented from flying off when the match is struck, which is very common in most matches.

The gearing for the several working parts of the machine is clearly illustrated in the drawings and needs no other reference, but in regard to the gearing for the endless splint carrying chain, I preferably communicate motion thereto by means of a supplemental drive chain 20, passing over chain wheels 21, mounted at one end of the shafts carrying the chain wheels S, on the drying frame, and this chain 20, is driven from a wheel 22 which is suitably geared with a drive chain 23, which is employed to communicate motion to certain parts of the machine, but it will of course be understood that this particular gearing forms no part of the present invention but may be changed at will.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a machine of the class described, the combination of the machine frame having a holder at one end for the support of a veneer strip; and a horizontal feed table provided with a cut away portion at one end a lower cutter roller journaled on the frame near one end and provided with a series of longitudinal cutter blades or knives, a combined pressure and feed roller arranged directly over the lower cutter roller, a second upper cutter roller arranged in rear of the upper pressure roller over said feed table and also provided with a series of longitudinal cutter blades or knives adapted to cut into the veneer strips from the top to make incisions coincident and meeting with those formed by the blades or knives of the lower roller in the under side of said strip, and an endless splint carrying chain arranged to have one end located at a point included in the space of said cut away portion of the feed table substantially as set forth.

2. In a match making machine, the combination with the machine frame having a

holder at one end for the support of a veneer roll; of a lower splint cutting roller journaled on the frame, a pressure roller arranged directly over the lower cutter roller, a horizontal feed table arranged at one side of these two rollers, a second upper cutter roller arranged over said table, and an endless splint carrying chain working from the outer end of said feed table, substantially as set forth.

3. In a match making machine, the frame, a horizontal feed table arranged on said frame near one end, upper and lower cutter rollers journaled on said frame and one of which works over said table, a feed belt arranged to work over said table beyond one side of the upper cutter roller, an endless splint carrying chain arranged to work beyond said table, and a chain feeding device for feeding the splints to said chain, substantially as set forth.

4. In a machine of the class described, the combination with a horizontal feed table having a cut away portion at one end, splint cutting devices arranged to deliver on said feed table, a pair of endless feed belts arranged horizontally over the table in advance of the cutting devices and adapted to move the splints over said cut away portion, a jointed splint carrying chain arranged to have its feeding end located at a point included in the space of said cut away portion, and a vibrating kicker or feed lever adapted to move the splint ends from over said cut away portion into engagement with said chain, substantially as set forth.

5. In a machine of the class described, the combination with the suitably arranged baths and cutting devices; of the horizontal feed table adapted to receive the splints from the cutting devices and provided with a cut away portion at one end, a pair of horizontal endless feed belts moving over said table at one side of said cut away portion, oppositely arranged angular chain wheels one of which is located in the space of the cut away portion of said feed table, a jointed splint carrying chain arranged to move over said chain wheels and to be opened thereby, and a vibrating kicker or feed lever arranged to engage the match splints at the cut away portion of the feed table and to move the same in engagement with the jointed chain as the same is opened by the angular chain wheel adjacent thereto, substantially as set forth.

6. In a match making machine, the combination with the suitably arranged baths and cutting devices; of an endless splint carrying chain consisting of pivotally jointed two-part links each comprising two pivoted overlapping link jaws or plates having single angular opposing gripping notches in their connected ends, one edge of said links being adapted to be engaged at a central point directly in line with their pivots by the points or angles of suitably arranged angular or squared chain wheels located at the feeding and delivering ends of said chain, substantially as set forth.

7. In a match making machine, the combination with the splint cutting devices and suitable baths; of the endless splint carrying chain consisting of two-part links pivotally
 5 connected at their ends and each comprising two overlapping link jaws or plates centrally pivoted together at their overlapped ends, and one of which is provided with a laterally off-standing notched grip lug and the overlapping
 10 ends of the other of which is provided with a splint notch opposed to said laterally off-standing lug, closing springs connected at their ends to the overlapping ends of the jaws or plates of each link to normally close the
 15 same, and link opening wheels located at the feeding and delivering ends of said chain to open the jaws thereof, substantially as set forth.

8. In a match making machine, the combination with the splint cutting devices, suitable baths and a drying frame; of opposite
 20 sets of chain wheels or pulleys journaled at opposite sides of said drying frame and provided with pointed teeth or cogs and peripheral side flanges, one set of said wheels being
 25 further provided with match notches in their flanges, an endless splint carrying chain having jointed gripping links leading from the cutting devices over said baths, the links
 30 of said chain being provided at their ends with inclined or beveled corners completing with the adjacent links V-shaped notches or depressions to fit over the pointed teeth or cogs
 35 of the wheels on the drying frame, and link opening wheels located at the feeding and delivery ends of said chain, substantially as set forth.

9. In a match making machine, the combination with the frame; of a flat top heating
 40 stove arranged on the frame, an adjacent pan or vessel containing a bath of paraffine, a suitably arranged fulminate tub located beyond

the paraffine bath, a fulminate roller mounted to turn in said tub and carrying at one side a stirrer or agitator, and an endless splint carrying chain guided to move in a substantially
 45 horizontal position over the stove, the pan, and tub, to dispose the match splints vertically, substantially as set forth.

10. In a match making machine, the combination with the cutting and bath devices; of
 50 a suitably arranged drying frame having opposite sets of chain wheels or pulleys, parallel contacting delivery aprons or belts mounted at one end of the drying frame and arranged
 55 above a suitable delivering table, the endless splint carrying chain arranged transversely on the drying frame over the chain wheels or pulleys thereon and having a portion thereof
 60 disposed parallel with and at one edge of the meeting portions of said aprons or belts, and a chain opener suitably arranged to release the matches from said chain, substantially as set forth.

11. In a machine of the class described the
 65 splint cutter consisting of a roller provided with a series of longitudinal cutter blades or knives having knife off-sets at or near one end adapted to form a fulminate notch at
 70 one edge of the match splint, substantially as set forth.

12. In a match making machine, the splint cutter consisting of a roller provided with a
 75 series of longitudinal cutter blades or knives having angular knife off-sets located at or near one end, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LEVI H. WOLFE.

Witnesses:

JOHN A. FOX,
 A. H. RIEGEL.