Oct. 30, 1945. R. S. PULLEN 2,388,012

METHOD OF MAKING MATCH PACKETS

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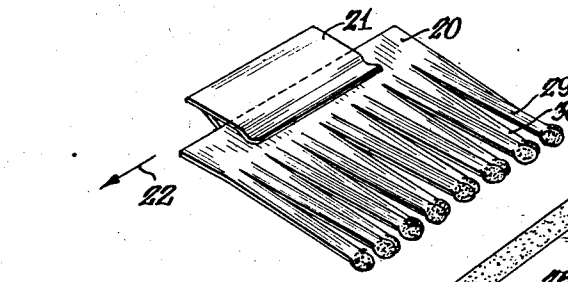


Fig. 1.

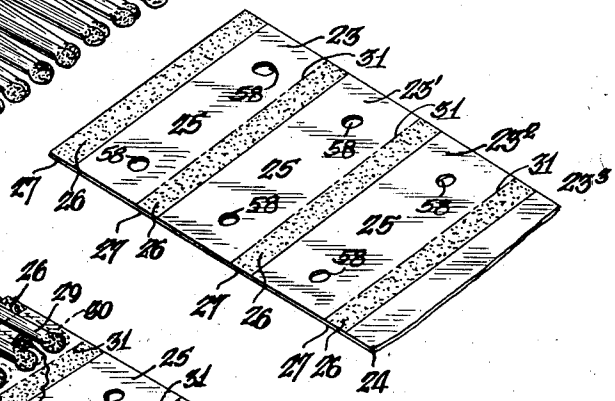


Fig. 2.

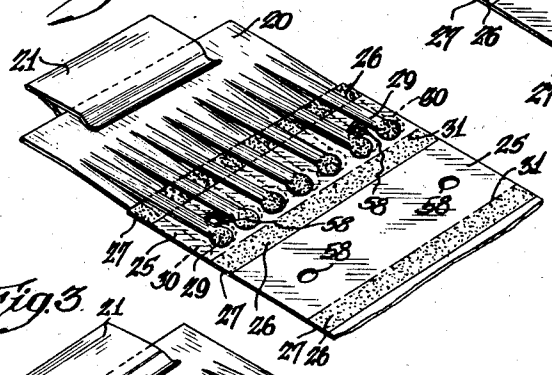


Fig. 3.

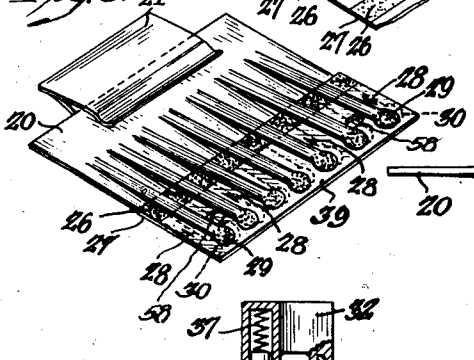


Fig. 3b.

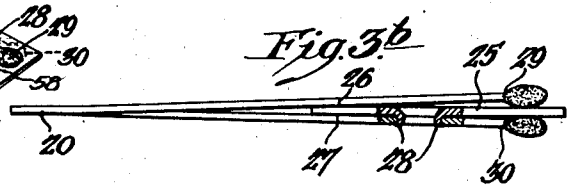
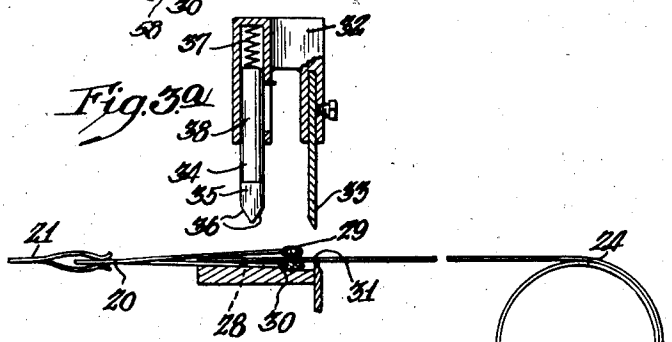


Fig. 3a.



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Fig. 4.

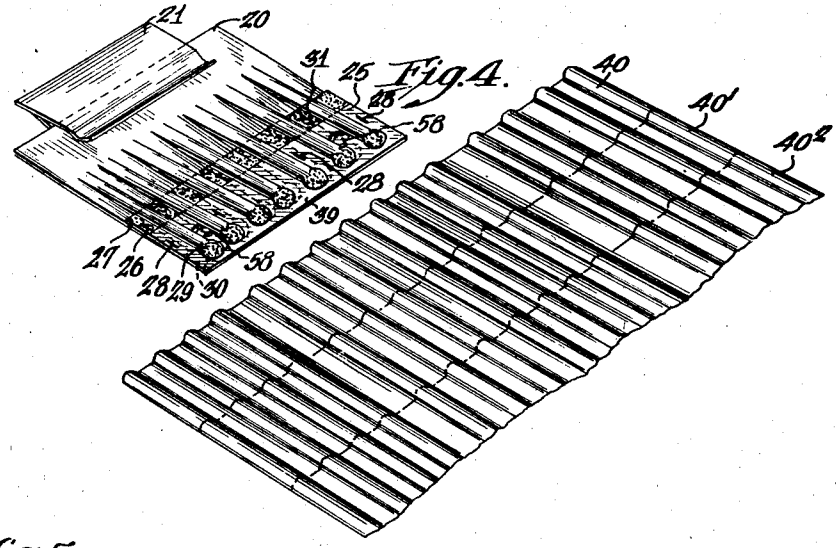


Fig. 5.

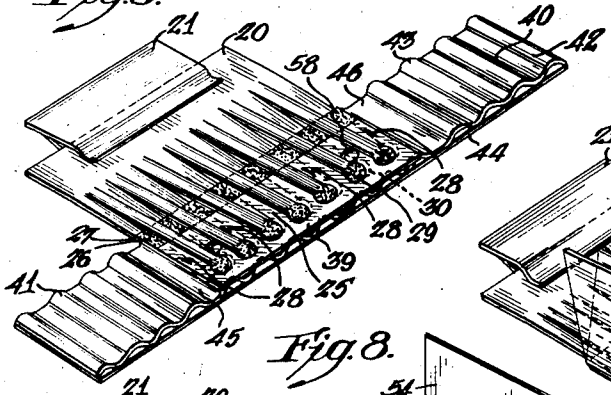


Fig. 6.

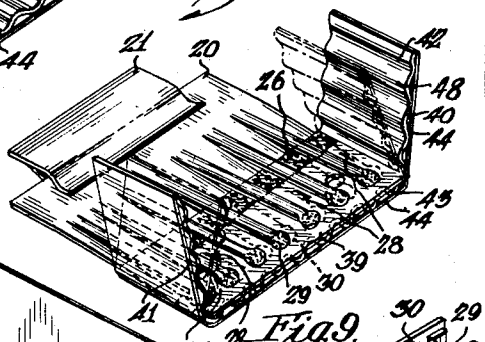


Fig. 8.

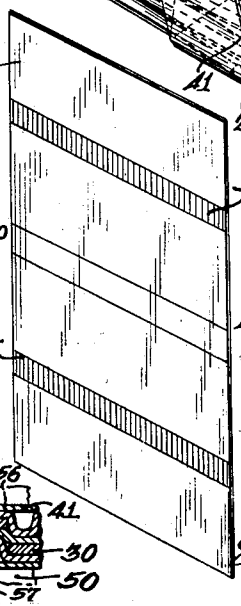


Fig. 7.

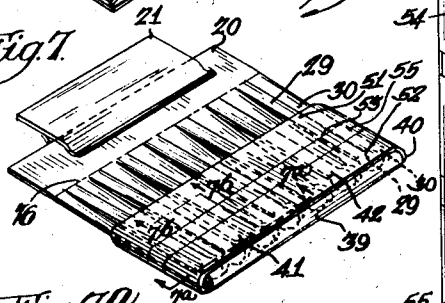


Fig. 9.

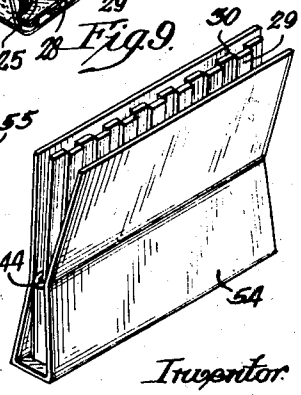


Fig. 7a.

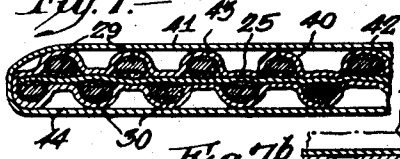
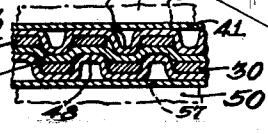


Fig. 7b.



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Patented Oct. 30, 1945

2,388,012

UNITED STATES PATENT OFFICE

2,388,012

METHOD OF MAKING MATCH PACKETS

Rodney S. Pullen, Akron, Ohio, assignor to Pullenlite Company, Philadelphia, Pa., a corporation of Pennsylvania

Application June 26, 1943, Serial No. 492,346

10 Claims. (Cl. 93—2)

My invention relates to match packets made of paper matches or wooden matches and to mechanism and methods by which match packets may be constructed.

The main purpose of my invention is to simplify and cheapen the manufacture of the packet.

A further purpose is to hold the parts together simply and effectively during handling so as to avoid the necessity for separate holding mechanism.

A further purpose is to use a separate strip between the staggered matches of two rows of matches in a packet section of match comb and temporarily to fasten the strip to some of the matches as an intermediate means of holding the parts together during manufacture.

A further purpose is to provide a floating intermediate strip between adjacent rows of staggered matches, to place scratcher material upon this strip and to retain the strip against withdrawal in the direction of match movement by turning the edge of the strip across one row of match heads.

A further purpose is preliminarily to print or paint heat sealing material upon the inside of a match packet cover or on the outside of a bale in juxtaposition therewith, which can be handled freely without any objectionable tackiness during the intermediate steps of manufacture and which can finally be sealed, the cover to the bale, to hold the packet together.

The invention relates to the method involved.

Further purposes will appear in the specification and in the claims.

The present application is a continuation in part of application 407,541 for Match packet and method of making it, filed August 20, 1941.

I have preferred to illustrate a few only of structures and methods by which the operation can be carried out, applying the invention to paper strip matches. The invention is applicable also to wood strip matches using strips of proper thickness similar to veneers.

The front has been considered as set by the head ends of the match, and the side has been taken as the side of the match.

Figure 1 is a perspective view showing in separated position a section of a match comb along with a roll-carried spacing insert carrying scratcher material and intended to be fed between the rows of the staggered matches.

Figure 2 is a perspective view corresponding with Figure 1 except that the parts have been fed into union.

Figure 3 is a perspective corresponding with Figure 2 except that the scratcher insert between the rows of staggered matches has been cut from the roll of which it formed a part.

Figure 3^a is a vertical side elevational section of a composite tool by which the scratcher insert may be impacted into temporary union with some of the matches and the spacing insert is cut off.

Figure 3^b is a fragmentary sectional side elevation of the matches of Figure 3^a taken lengthwise of one of the matches and through a clinching cut uniting the match and insert.

Figure 4 is a perspective view showing a match comb section and scratcher insert before they are enclosed by the front bale of a roll of bales.

Figure 5 is a view corresponding with Figure 4 except that one bale has been fed beneath a comb section and has been cut from the roll of bale material of which it formed a part. It is ready to be folded about the comb section and insert.

Figure 6 is a perspective view showing intermediate steps in the operation of folding the bale about the section of comb and about the insert.

Figure 7 is a perspective view corresponding to Figure 6 except that the bale has been folded into closed position.

Figure 7^a is a transverse section taken through the comb material, insert and bale upon a line shown generally at 7^a—7^a of Figure 7.

Figure 7^b is a section corresponding generally to Figure 7^a except that it has been taken upon line 7^b—7^b.

Figure 8 is a perspective view of a cover which is to be used about the wrapper section of Figure 7.

Figure 9 is a perspective view of a finished packet made by the process or method involved.

In the drawings similar numerals indicate like parts.

In the manufacture of match packets the tendency in the recent past has been toward performing all of the operations in a single machine in order that the match material may be fed in at one point and the various parts of the packet at other points and the packet may be completed from what might be considered raw materials, all in this same machine. This has been varied of course in paper book match manufacture because the combs of matches necessarily have been prepared outside and have been fed to the machine in comb sections, each sufficient for one packet, everything else entering into the book match being fed from rolls.

Book match manufacture, as now practiced,

involves the use of a long and very complicated mechanism and presents difficulties which are avoided in my invention by further splitting up the manufacture into parts which are prepared in separate machines and which are used as raw materials in the present invention.

I plan to prepare the comb as usual, to divide it into comb sections, to use an intermediate strip between the rows of staggered matches of the comb, preparing the strip by placing layers of scratch material upon opposite sides of the strip at one edge, and feeding the strip with striking material on it as raw material to the machine.

Corrugated bale material likewise is cut into strips so that individual bales can be fed from a roll to positions about the match sections and scratcher strips. The wrapper is then applied.

The views are intended to be largely diagrammatic and to show a succession of operations which may be performed by hand but which preferably are carried out by a machine. The successive positions of the operating parts are illustrated with little complication by mechanism for effecting the several movements of the parts. This is done for two reasons: to indicate that the method involved may be carried out by hand, and because there are many ways in which the movements can be effected.

In Figure 1, and for convenience in handling where a machine is used, a comb section **20** sufficient for one packet is held by a link **21** of a chain by which the section is advanced in the direction of the arrow **22** for successive operations at different stations. Considering Figure 1 as station 1 the match comb is in position to receive the end match scratcher insert **23** of a roll **24** of match scratcher inserts **23**, **23'**, **23²**, **23³** each comprising a spacing band or strip **25** and scratcher material **26**, **27** on opposite sides of the strip.

The match scratcher insert is fed between the rows of matches, as seen in Figure 2, after which the scratcher strip and some of the matches are pierced under such conditions that a part **28** of the strip is carried into each of the matches pierced and concurrently or separately therewith the strip is cut from the roll.

The scratcher insert lies between two rows **29** and **30** of staggered matches and the impaling is preferably effected by cutting through the striker strip and into selected matches of the lower row. The scratcher strip is also cut from the roll adjacent each successive second strip **23'** of scratcher material and along any such line as **31**.

For the purpose of effecting these impaling and cutting operations by machine a tool of the character of that in Figure 3ª may be used. This tool as shown comprises a holder **32** carrying a shearing knife **33** in position to cut along line **31** of the scratcher strip. The holder carries also an impaling punch **34**. The latter as shown is flattened on opposite sides at **35** and V pointed at **36** and is backed up by a spring **37** pressing the body **38** of the impaling punch downwardly to exert a holding function during the cutting and finally to punch the strip and matches.

By whatever means the impaling is effected it results in carrying portions **28** of the body of the strip into the matches so as slightly to retard movement of the strip of scratcher material with respect to the matches.

The next operation is the enclosure of the comb section and spring scratcher strip within a bale.

In Figure 4 the match section with the scratcher strip in position is shown spaced from the end of the roll carrying bales **40**, **40'**, **40²**, the end one **40** of which is to be used as a bale for the particular match comb section shown. In Figure 5 this end bale portion **40** underlies the match comb section and striker strip. Its ends project at **41** and **42** beyond the match section sides and the bale has been cut from the roll.

The bale comprises corrugated interior facing **43** and backing **44**, the corrugation channels preferably being of extra width at **45** and **46**, corresponding in spacing, one from the other, to the width of the comb section, so as to facilitate bending of the ends of the bale at these channel positions and through successive folding positions of which two are seen in Figure 6. The folding continues from the positions seen in Figure 6 until the ends **41** and **42** have been pushed down into the positions seen in Figure 7.

As will be seen the interiorly facing ribs **48** upon the ends of the bale lie in such position when closed upon the section of match comb that they fit within the spaces between the adjoining matches of one row of matches; and the ribs **48'** upon the body of the bale interfit with the matches of the other row. If now a presser head **49** be pressed down upon the outside surfaces of the folded ends **40** and **42** of the bale while the body of the bale is supported by a platen **50**, the ribs will be forced between the match sticks into side-stick gripping engagement much as seen in Figure 7ᵇ.

It is not the intention to engage the ribs with the match sticks throughout all of that part of the lengths of the matches which is covered by the width of the folded bale. Instead the ribs are forced into the spaces between the matches at spaced points only along the match lengths, at or near opposite edges **51** and **52** of the bale so as to leave the central part **53** of the width of the bale, both above and below the bale in Figure 7, relatively crowned and with but light pressure upon the surfaces of the matches.

The spaced frictional engagements (constrictions) of the walls of the corrugation ribs with the edges of the matches adjacent in the same row are effective to prevent movement of the bale along the match lengths, and, particularly as to the bale ends, to hold these ends in closed (folded) position.

The constrictions near to the heads of the matches are effective also to afford retardation to withdrawal of the match heads when the matches are pulled for use. Some retardation of the kind is essential in order that the pull upon the match may be stored as it were until it becomes great enough when the match is released to give the match the necessary rapid passage across the ignition material and out from the interior of the packet. If there were no retardation or if the match were pulled out slowly the head might not ignite with the friction material and if it did ignite, the match would not be pulled out with sufficient rapidity to protect against flash from the match head reaching the adjacent matches. For the above reasons the use of some retardation is not only desirable but is essential to reliable operation of the match packets.

The relatively crowned intermediate part of the bale width is located at a part of the packet at which the packet conveniently is held by one hand during withdrawal of the matches and pro-

tects against undue pressure of the fingers in holding bringing corresponding pressure upon the matches.

The relative crowning of the laterally middle part of the bale results in the match heads having comparatively free space for travel after the first constriction is passed before the head reaches the second constriction and the resultant pressure in the "free" space is but little affected by pressure from the holding hand.

The second constriction, easily passed by the head of the match after it has jumped free from the first constriction, is nevertheless a protection against flame from the igniting head flashing back and igniting other match heads.

I have found in practice that ample frictional resistance and proper retardation can be given by crimping the ribs of the corrugations into the spaces between the matches at the two points indicated, spaced along the lengths of the match sticks and both lying between the match heads and the friction material, the one point close to the match head and the other point comparatively close to the friction material.

The holding strength of rib engagement with the comb section not only holds the bale ends closed against the comb section but retains the parts during the subsequent handling of the baled comb section to form the match packet.

Preferably during the operation of piercing the striker insert material into some of the matches or the cutting of the striker strip from its roll, but permissibly during the pressing of the bale ribs into the spaces between the matches, the projection **39** is turned across the heads of one row of the matches, assisting in holding the strip carrying striker material against dislodgement when the matches are withdrawn.

Obviously here as in the other figures of my illustration the movements of the parts are relative and either part may move toward the other or both may be moved—except as convenience of placement and of providing the motions and handling of the packet parts may affect the construction of a machine to accomplish the results.

It is the intention to have heat sealed fastening between the bale and the cover to hold the cover fast and thus complete the package.

The heat sealing material may be applied by printing or painting it in strips upon either of the facing surfaces of the bale and cover **54**. Thus, the strips **55** of heat-set material may be placed upon the outside of the folded ends of the bale as shown and upon the back of the bale or upon the cover as shown or both.

Where other means of holding the cover to the packet are intended to be used within the heat set material, the parts of the wrap may be held closed by the use of heat set material upon the outside of the match comb section or upon the inside of the folded ends of the wrap.

Note that after the heat sealing material is rendered tacky the heat does not need to be withdrawn.

The imprint of heat sealed material is most desirably applied to the cover or bale before the cover or bale is supplied to the machine by which the parts are to be brought together.

The heat sealed material is very desirable for use in this connection because of the fact that when cold it is without adhesive character and the parts can be fed and handled freely without complication by the adhesiveness of the compound. When the parts are all together the packet is pressed between heated surfaces **56**, **57** and is held between them long enough for the heat sealed coatings to adhere to the adjacent parts. The heated surfaces **56** and **57** may be the platens **49** and **50** which have been heated to perform this further service.

As a final operation, the sticks are cut free from the margin along some such line as line **76** in Figure 7.

Feeding of the several strips comprising insert material, bales and cover may be effected in well known ways, differing somewhat according to whether the sections fed be delivered in separate sheets from a hopper, for example, or from a roll. Where the strips form parts of a roll it is convenient to facilitate both guiding and feeding and insure accurate extents of feed by use of sprocket wheels not shown engaging in strip holes **58** as in the feeding of film for projection purposes.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such in so far as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In the method of making a match packet, the intermediate steps which comprise inserting a spacing strip lengthwise from the head ends of a section of a match comb and in piercing the strip and matches in line therewith at intervals to force the material of one of the parts into the body of the other part so as temporarily to hold the strip against movement with respect to the match comb section.

2. In the method of making a match packet, the intermediate steps which comprise inserting a match striker spacing strip between the rows of matches of a section of match comb and in piercing the strip, and matches in line with the strip, at intervals to intermingle the material of the strip and matches, so as temporarily to hold the strip against movement with respect to the match comb section and in placing a bale about the packet while the parts are so intermingled.

3. The method of inserting a spacing strip between two rows of matches and holding the strip tentatively in position with respect to the matches of the two rows which consists in inserting a strip carrying scratcher material between the two rows of matches of a section of match comb with the scratcher material near the edge of the strip farthest from the match heads and in holding the strip against movement lengthwise of the matches during the further manufacture of the match packet by interengaging parts of the matches or strip, one in the other.

4. In the method of making a match packet, the steps which comprise feeding a spacer carrying striker material between two rows of matches of a match comb section, holding the spacer and matches together by resilient lateral pressure of an impaling tool while cutting one edge of the spacer and subsequently pressing the impaling tool through the spacer and into one of the matches to interlock the spacer and match section.

5. The method of inserting a spacing strip between two rows of matches and holding the strip tentatively in position with respect to the matches of the two rows which consists in inserting the

strip from the head ends of the matches to a position in which part of the side of the strip extends beyond the match heads and in holding the strip against movement toward the free stick ends of the matches by transversely turning the strip in a direction across the heads of the matches of one of the rows.

6. The method of inserting a spacing strip between two rows of match comb material and holding the strip tentatively in position with respect to the matches of the two rows which consists in inserting the strip from the head ends of the matches to a position in which part of the side of the strip extends beyond the match heads, piercing the strip and matches together to cause lateral intermingling of material one in the other and in turning on edge of the strip in a direction transverse to the heads of one row of matches across the match heads to prevent further movement of the strip toward the free stick ends of the matches.

7. In the method of making a match packet, the steps which comprise feeding a spacer carrying striker material between two rows of matches of a match comb section, covering the match section and spacer laterally by a corrugated bale whose ends terminate on one side of the section, pushing the ribs of bale corrugations into spaces between the matches adjacent the head ends of the matches and at a further spaced distance from the head ends and there spreading the ribs to hold the ends of the bale against the sides of the matches.

8. In the method of making a match packet, using a match comb, striking material, a bale and a cover, the intermediate steps which comprise cutting off a section of match comb suitable for a packet, applying the striking material for the matches of the comb and at the same time spacing the matches of the comb, folding the bale laterally about the section and folding the cover longitudinally about the section and holding the bale to the match section by friction and holding the cover and bale together by adhesion.

9. In the method of making a match packet, using a match comb, striking material, and corrugated bale having ribs and a cover the intermediate steps which comprise cutting off a section of match comb suitable for a packet, applying the striking material for the matches of the comb and at the same time spacing the matches of the comb, folding the bale laterally about the section and folding the cover longitudinally about the section holding the bale to the match section by friction and holding the cover and bale together by adhesion, and crowning the bale lengthwise of the matches at the sides of the match section and between points spaced along the ribs.

10. In the method of making a match packet, the steps which comprise feeding a spacer carrying striker material between two rows of matches of a match comb section, covering the match section and spacer laterally by a corrugated bale whose ends terminate on one side of the section, pushing the ribs of bale corrugations into spaces between the matches adjacent the head ends of the matches and at a further spaced distance from the head ends, there spreading the ribs to hold the ends of the bale against the sides of the matches and crowning the bale lengthwise of the matches at the sides of the match section and between the spread points upon the ribs.

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