

June 22, 1937.

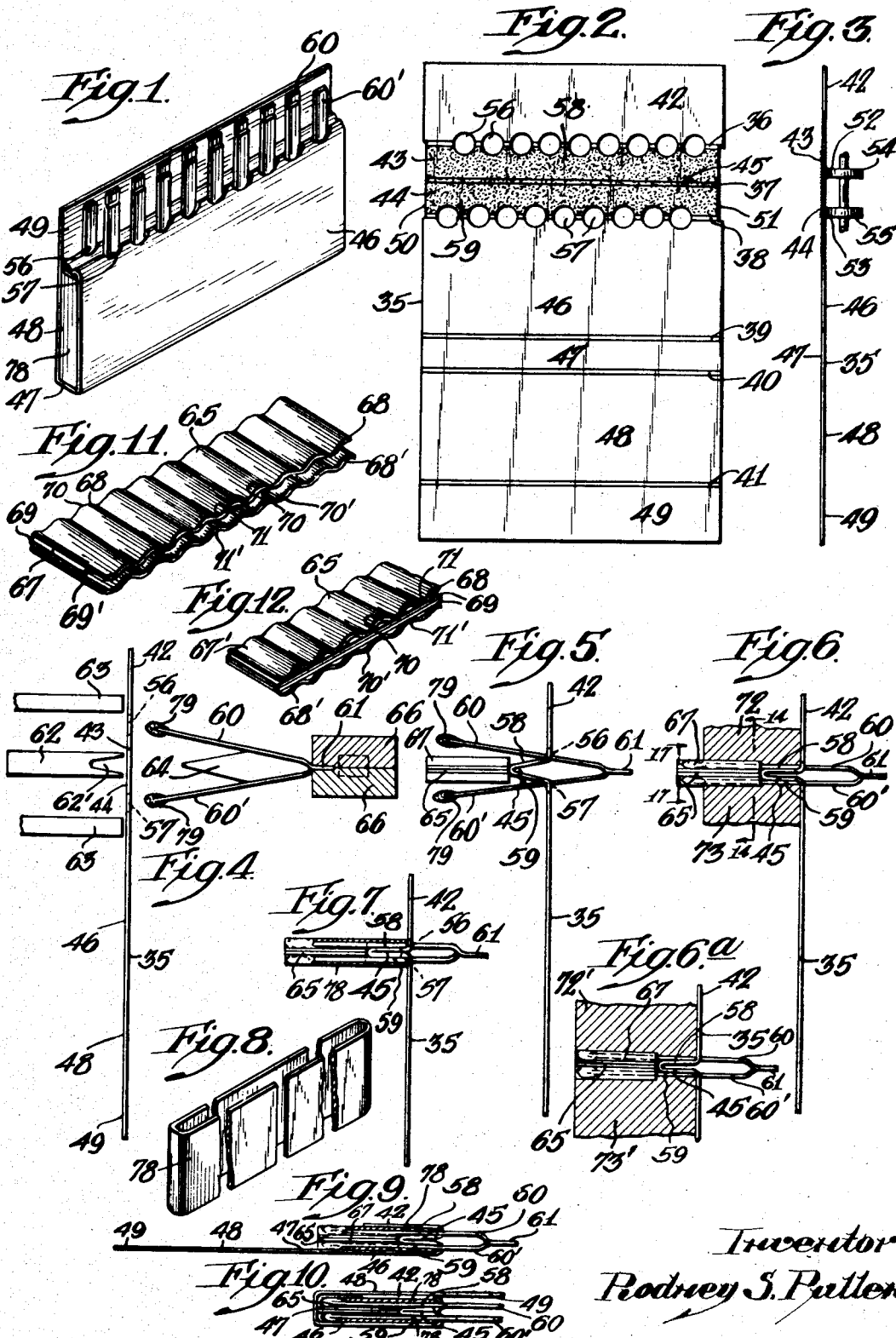
R. S. PULLEN

2,084,706

METHOD OF MAKING MATCH PACKETS

Filed June 6, 1936

3 Sheets-Sheet 1



Inventor
Rodney S. Pullen

by *Wm. Still Johnson and Son*
Attorneys.

June 22, 1937.

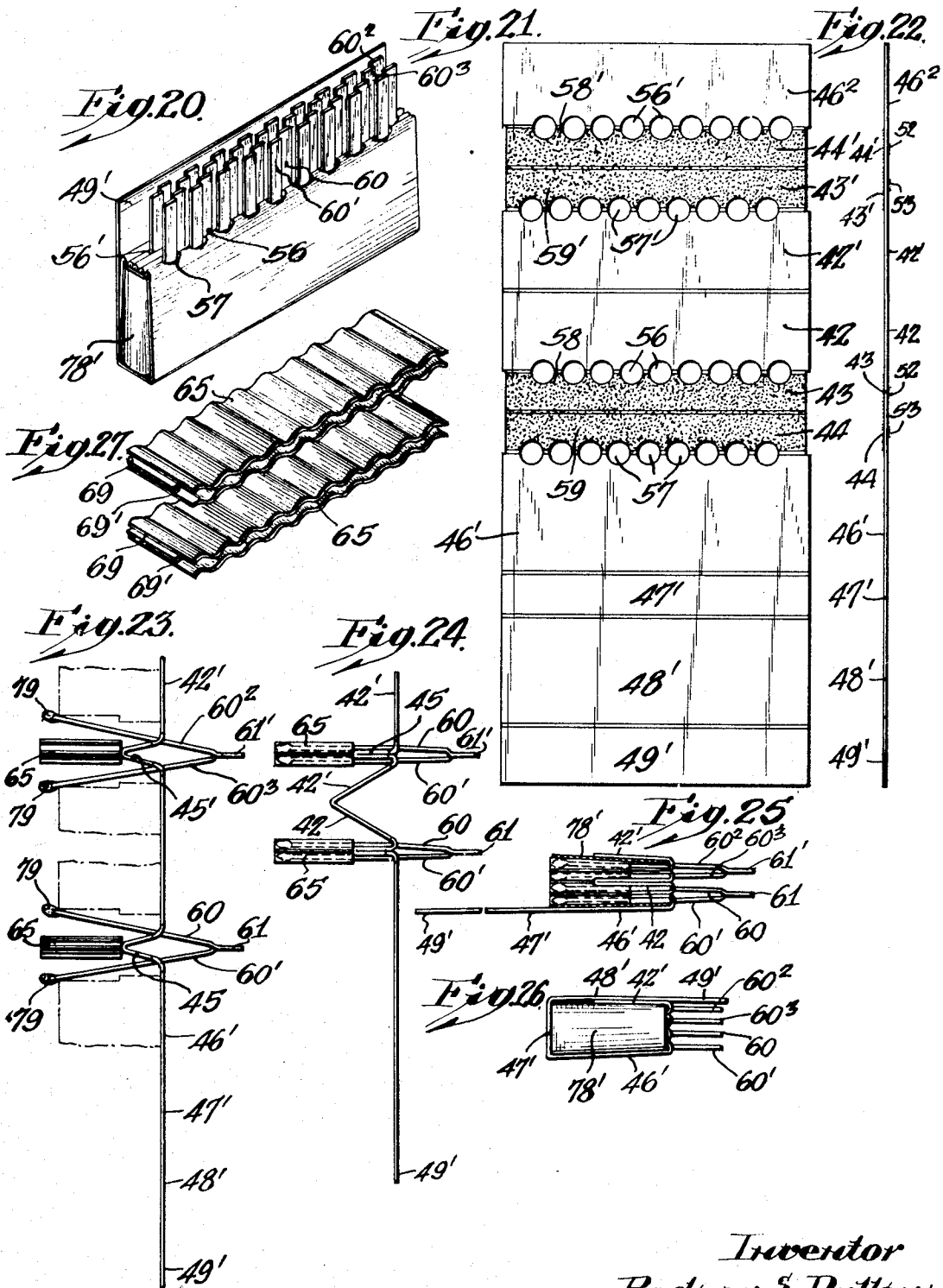
R. S. PULLEN

2,084,706

METHOD OF MAKING MATCH PACKETS

Filed June 6, 1936

3 Sheets-Sheet 3



Inventor
Rodney S. Pullen

by *W. S. Pullen and Son*
Attorneys.

UNITED STATES PATENT OFFICE

2,084,706

METHOD OF MAKING MATCH PACKETS

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

Application June 6, 1936, Serial No. 83,891

10 Claims. (Cl. 93—2)

My invention relates to methods of manufacture of packet matches of the pull and light type available for paper matches and also for wooden stick matches.

5 My invention relates to methods of manufacture as distinguished from the finished packet and is a continuation in part for the purpose of taking care of the method inventions of an application filed by me November 26, 1935, for
10 Match packet, Serial No. 51,595.

One purpose of the invention is to use the sticks and/or heads of the matches as dies to reform the contour of a corrugated insert to fit the matches or more nearly fit them than did
15 the original corrugations.

A further purpose is to provide corrugations that are deeper than the thickness of the match stick and/or match head parts and to form the corrugations to match shape by using the matches
20 as dies and pressing them transversely in the direction of the depth of the corrugations and into the grooves of the corrugations, preferably pressing the ribs of the corrugations also in the same direction to spread the corrugations into
25 closely matching contact with the match sticks and/or match heads.

A further purpose of the invention is to provide a dampened corrugated insert between two adjacent staggered rows of matches and subsequently to reshape the insert.

A further purpose is to provide a corrugated insert between adjoining rows of relatively staggered matches in which the corrugations are higher than the match sticks and/or heads and
35 in which the corrugations are pressed in the direction of their depth to flatten the ribs and outline the grooves for the match sticks and/or match heads by the spread of the ribs and intermediate corrugation walls against the matches.

40 A further purpose is to provide a spacing and striker-carrying stub or strip between the staggered matches of adjacent rows of match sticks which is initially plane but which is corrugated after the matches are in position, preferably by
45 pressure of the matches laterally after the matches have been inserted.

A further purpose is to provide a spacing stub or strip between the staggered matches of adjacent rows of match sticks in which corrugated material separates adjoining rows of alternating matches and in which casing material preferably integral with the blank for the previous part of the casing is reversely bent—or attached to a
50 like sheet—to form the beginning of a second set

of adjoining rows of staggered matches of like kind.

A further purpose is to pass the matches through holes in the case which are altered in shape by bending the packet walls at the holes
5 to give retardation to the stick as the stick is withdrawn and further altering the shape of these holes in the bent condition of the packet wall by laterally deforming the wall of the packet on one side at least to slightly oval the openings at the same time rounding the surface of the
10 packet wall adjoining the opening.

A further purpose is to provide a reentrant packet stub between adjoining rows of relatively staggered matches having match openings at the points of reentrant bending and to enlarge one wall of the opening at least to lead into the enlargement of the opening by corrugating the reentrant portion of the packet, preferably after the matches have been inserted.

20 A further purpose is to use separate corrugated material for the staggered matches of two rows and to maintain the pitches of the corrugations.

A further purpose is to provide holders for matches of separate rows for staggered match packet insertion and to handle the holders with their matches, in the same manner as a match strip with divided matches is handled, in the paper match manufacture of pull-and-light packets.

I have preferred to illustrate a few forms only in which the invention may appear, selecting the views from constructions which are practical, effective and commercially desirable, but particularly with a view to their clear illustration of the principles involved.

Figure 1 is a perspective view of a match packet containing two rows of paper matches, staggered and having the ends of the packet protected by a bale.

40 Figure 2 is a plan view of the blank forming the wrap of Figure 1.

Figure 3 is a side elevation of the structure of Figure 2.

Figure 4 is a side elevation of the blank with the rows of a paper match strip spread and in position for insertion on one side and an insert on the opposite side of the wrap blank. Holding clamps for manipulation of the strip are shown here which are omitted in the other figures.

50 Figure 5 is a side elevation of the parts of Figure 4 in a second position in the process of forming the packet.

Figures 6 and 6a are side elevations of the same parts as are shown in Figures 4 and 5 in a third
55

position and with forming dies in place with the corrugated inserts of Figures 11 and 12, respectively.

Figure 7 is a fragmentary side elevation of the packet of Figure 6 with a bale about the parts, intended to close the ends of the packet against excessive flash from match ignition.

Figure 8 is a broken perspective of a bale seen in Figure 7.

Figure 9 is an end elevation of the parts of Figures 4-6 with the flaps turned up over the front and back of the packet.

Figure 10 is an end elevation of the structure of Figure 9 except that the wrap has been turned about to position.

Figures 11 and 12 are perspectives of inserted corrugated material. Figure 11 is in reverse position to give greater clearness.

Figures 13 and 14 are cross sections of the packet of Figure 6 before and after pressing, respectively, taken upon line 14-14.

Figure 15 is a section corresponding to Figure 14 but showing a modified insert.

Figures 16, 17 are sections corresponding generally to that upon line 17-17 of Figure 6 but taken before and after pressing, respectively and Figure 17 including the bale.

Figure 18 is a fragmentary perspective of the corrugated insert and a match, after pressing, showing one possible result of the pressing.

Figure 19 is a fragmentary perspective of the stub of the figures, after pressing and with several matches in place.

Figure 20 is a perspective view of a packet using the matches from two "strips".

Figure 21 is a plan view of the blank used in Figure 20.

Figure 22 is a side elevation of the structure of Figure 21.

Figures 23 and 24 are side elevations of the wrap of Figure 21, with associated inserts, at different stages in the process of making the packet.

Figure 25 is a side elevation corresponding generally to Figure 9 but with the packet of Figure 20. It is true also of the double packet having the single packet characteristics of Figure 30.

Figure 26 is an end elevation of the packet of Figure 20, including the bale of Figure 20 which is omitted in Figure 23.

Figure 27 is a perspective of a modified form of corrugated insert with the corrugated strips shown in spaced relation to each other.

Figure 28 is a transverse section similar to Figure 5 but illustrating a modification in which a holder for wooden stick matches is shown for insertion of the matches through the openings in a wrap for formation of a packet of light-on-withdrawal packet.

Figure 29 is a perspective view of a modified form of packet in which the shanks of individual match sticks of strip material have not been severed from the match strip.

Figure 30 is a fragmentary perspective view of a packet partly folded using separated individual matches corresponding in part with the other packets but fitting the matches into the spaces inside the corrugated material of an insert as distinguished from outside the corrugations.

Figure 31 is a side elevation of a corrugated strip match-holding insert such as is used in Figure 30.

Figure 32 is an end elevation of the completed packet of which figure shows partial completion.

In the drawings similar numerals indicate like parts.

The present packet has many characteristics in common with the packet of my Patent No. 1,921,372, issued August 8, 1933, but differs from it in a number of particulars which will later appear.

Packet matches of the pull-and-light type depend for their commercial success upon various factors in addition to the actual capability of operating in that manner. It is not possible of course to control the ways in which the packets are held. Sometimes they are held by the ends, in which case the protection from holding pressure and the use of holding pressure to give added friction to the matches alike fail. However, where they are held by the flat parts of the packets as intended, pressure by the thumb and fingers of the user upon the flat sides can be used to increase friction in withdrawal or the matches can be protected from such increase; and such conditions bear quite appreciably upon the success of the packet.

In the form shown in Figures 1-19 the blank is quite comparable with the blank of Figure 2 of said patent. The blank 35 is formed of pulp board, straw board or the like and is scored, preferably double scored, at 36, 37, 38, 39, 40 and 41 for the purpose of providing an inner rear packet flap 42, scratch portions 43 and 44 together forming a re-entrant igniting spacer 45, a front flap 46, an end flap 47, a rear flap 48 and a terminal protective projecting rear flap 49.

The sides of the wrap are cut away as at 50, 51 at the "ends" of the spacer 45. The faces of the re-entrant portions 43 and 44 back of the scratch material may be "painted" with glue, at 52, 53 as by rollers 54, 55 before creasing the "spacer", if desired, in order to hold the two portions together, as an addition to or as alternative to holding them together by corrugating the spacer at the bend, hereinafter described.

At the rear ends of the packet on opposite sides of the score lines 37 and desirably central with respect to the bends by which the re-entrant spacer 45 is formed, two rows of openings or holes 56, 57 are cut, large enough to pass the heads of the matches when the sheet is flat and preferably large enough also to offer little or no retardation against the sides of the match sticks.

The retardation to withdrawal can be applied largely to the sticks at this point or largely to the heads to require appropriate tension before the matches begin to move or largely to the sticks at intermediate points by seating them between close walls or can be made up of any appropriate proportions of these resistances, with the purpose and result that the match is retarded in starting and, permissibly also during movement. This retardation requires a real pull for withdrawal and the match therefore acquires sufficient impetus to be withdrawn continuously at an igniting speed where it passes the scratch material 58 and 59.

The corrugated inserts between the matches in the present case may be used to protect against pressure upon the heads of the matches in place and to permit pressure by the users against the packages in position so that the retarding action upon the heads of the matches will not become effective until the matches have started out.

When the packet is to be a "paper match book" as distinguished from a wooden match book, paper or wood matches of the ordinary strip type may be used, comprising rows 60, 60' of staggered matches united at the rear ends by an un-

severed rear stub 61 and spread at some such angle as that shown in Figure 4.

The unsevered rear stub 61 affords a handle by which the staggered matches of the two rows 60 and 60' may be manipulated. It does not matter whether the matches are passed through the blank or the blank is passed over the matches except that it is more convenient to shift the blank. Pushers 62, 63 shift the blank to the right so as to cause the walls of the holes 56, 57 to pass over the heads of the matches.

The pusher 62 is recessed at 62' to allow the panels 43 and 44 to re-entrantly bend within the recess about the scoring 37 and over the wedge-shape projection 64, thereby forming the ignition spacer. However, at this stage, the panel walls of the ignition spacer have not been flattened against each other and these walls are plane. The insert 65 is next supplied, the parts assuming approximately the position seen in Figure 5. However, the clamps 66 by which the stub is held in Figure 4 are omitted in the remaining figures.

The panels 43 and 44 of the spacer 45 may or may not be glued along their inside faces, as seen in Figure 4, according to whether it is desired to secure these panels tightly against each other or not. The corrugation of these plane faces, subsequently to be described, will hold them rather closely together. A corrugated insert 67 is next placed in position just forward of the ignition spacer.

The insert may be wide enough in the direction of the lengths of the matches to extend beyond the heads of the matches as in Figure 11 or may stop short of the heads of the matches as in the insert 67' in Figure 12.

The corrugated insert is shown in Figures 11 and 12 as made up of two separate corrugated strips 68, 68' fastened back to back and each comprising a corrugated facing on one side and a plane backing strip 69, at the back fastened to the corrugations and thus maintaining the corrugations in their initial and intended respective pitch positions. The backing strip of Figure 11 preferably stops short of the heads of the matches, as at 69' so as to give additional room for the heads of the matches. The restraint against spreading is especially important here where the matches are to be crowded laterally into the corrugations.

These two strips 68, 68' are secured together with a spacing such that the crests 70, 70' and gutters 71, 71' of the oppositely facing corrugated strips are staggered and matches placed in the respective gutters will likewise be staggered, those of one row with respect to those of the second row.

With the parts in some such position as shown in Figure 5 the matches are next pressed laterally between pressure heads 72 and 73 so that the alternately placed matches of the two rows will fit, those of one row between those of another, within the gutters of the respective corrugations and each match will be pressed laterally as a die.

By the lateral impression of the matches upon the corrugated material as in Figures 13 and 14, several advantages are secured. Because the depths of the gutters between crests are initially greater than the thicknesses of the match stems, the corrugations are relatively flattened adjacent the crests and squared at the bottoms of the gutters and the material thus forced down and out into the spaces between the matches spreads out

at both sides against the match sticks, reforming the gutters from their rounded permissibly curved contours to relatively squared corrugations which may be made to fit with such snugness as may be sought against the side faces of the match sticks.

In designing the match packets any degree of side contact or approach to full contact with the matches may be provided from closely pressing contact against the sides of the matches to merely greater restrictions of the grooves or gutters of the corrugations along which the match head must pass in withdrawal. Not only can the extent of distortion of the cross sections of the gutters and crests be determined to a nicety but the contour when pressed may be allowed to spring back somewhat when released from the pressure of the dies if the pressing be effected upon a dry corrugated material (and dry ignition spacer) or any degree of maintenance of the shape when pressed may be secured by different degrees of steaming or other moistening of the corrugated material and/or spacer at the time of pressing, always within such moisture limits that the materials of the heads and scratch surfaces will not be injured.

In Figure 13 the matches are shown as resting initially within the corrugations with the crests as extending laterally beyond the match sticks to such an extent only that when pressed between dies which engage both the sticks and the crests the latter will be flattened down to the flats of the match sticks, increasing the friction against the sides of the match sticks and forming new grooves for the sticks.

The sides 74, 75 of the grooves as formed may thus be made to give initial retardation to withdrawal of the matches by reason of friction against the sides of the matches, with subsequent retardation of the larger heads to travel along the lengths of the grooves formed or, with less pressure on the matches as dies or less spare crest projection to be pressed down, to alter the extent of retardation to travel of the heads without initially affecting the starting movement of the match sticks.

It will be evident that the shape of the grooves formed in the lateral pressing operation will depend upon the shape of the match sticks and that the grooves will thus form rounded semi-cylindrical seats for rounded sticks as in the case of rounded wooden matches, relatively squared seats or sockets for paper or squared wooden match sticks, etc.

When the lateral pressing of the matches of the several rows takes place it will ordinarily not be necessary to press the heads of the matches separately because the pressing of sticks adjacent to the heads causes some lateral pressing of the heads themselves and this sockets the heads slightly within the corrugated material. Where it is desired to form closer and more intimate conformation of the socket formed to the head, the pressure heads or blocks 72', 73' can be extended as shown in Figure 6a to bring any desired amount of pressure to bear directly upon the heads and to attain any degree of socketing which may be sought.

In selecting the heights of crests and contours of the corrugations for the corrugated insert, an advantage is to be gained from the standpoint of avoidance of "holding" of the matches by the user by having the crests of the corrugations in the completed packet laterally higher

than the match heads, as seen at 76 in Figures 16 and 17, whether this height of corrugations be maintained at the heads only or throughout the lengths of the crests of corrugated material. The advantages from the higher crests arises from the fact that the user, if he holds the packet by pressure against its flat sides during match withdrawal, will then not be holding against the heads of the matches since the holding pressure transmitted through the wrap and bale will be taken upon the crests of the corrugations at the head ends and the heads will thus be relieved from pressure. Similarly the amount of fullness provided by the corrugations along the stick portions of the matches, permitting the material of the crests and grooves to be crowded laterally against the match sticks, may be selected so as to leave a little fullness after the pressing as seen at 77 in Figure 15, where it is desired to avoid the pressure from the "hold" of the user clamping the sticks of the matches and excessively restricting withdrawal of the heads of the matches.

If the crests of the corrugations are left "high" as seen in Figures 15, 16, 17 after the pressing operation the retardation to withdrawal of the match will be nearly uniform because nearly independent of the holding by the user.

Several variations are shown in the corrugated material, depending upon whether or not it is to extend beneath the heads, and upon the contour and particularly the height of crest in the corrugations themselves. In Figure 27 also a special corrugated board is shown which is made by fastening flat or plane sheet, instead of fastening together two corrugated strips each complete with its own plane backing or support.

Preferably the corrugated insert material will not carry any scratching or igniting composition though it will evidently be possible to load any part of the length of the several corrugation gutters with such material if desired. In the preferred form the scratcher material is placed wholly upon the re-entrant ignition spacer 45 where it will be reached by the moving head of the match after the match has acquired a considerable speed of withdrawal and just before the match emerges from the packet.

As will be seen in Figure 6, the ignition spacer 45, initially plane and formed of a re-entrant fold, lies within the pressure heads 72, 73. These heads press the match sticks alternating on opposite sides of the spacer, laterally into the spacer so as to corrugate the spacer material as seen in Figure 19. This operation is preferably performed before the flap 42 is turned up to position, leaving it free from corrugation.

The corrugation of the spacer has many advantages. It provides gutters within the spacer which may be made more or less to correspond with the gutters resulting after pressing within the corrugated insert, giving smooth withdrawal. The gutters, on the other hand, may be made to fit the contours of the heads of the matches so as to engage the matches for igniting purposes concurrently upon as large a surface of one side of each head as possible. The corrugations in the spacer lead to the openings or holes 56, 57, curving the inner walls about these holes and permitting the use of smaller holes or permitting the edge of the bale to come up into the outer edges of these holes as would not otherwise be feasible.

The corrugation tends to stiffen the previously plane walls of the spacer, which stiffening is in-

tensified by the fact that the outer oppositely facing spacer walls are covered with scratcher or ignition material. The corrugation also stiffens the reverse bend against opening (needed when glue is not used to hold the parts together). It does this by waving the planes of the bend so as to make the laterally waved bend comparable to a plane hinge in which the pintle is offset at corresponding intervals, with a resultant interference with opening movement of the hinge. The corrugation, whether it conforms to the contour of the adjoining corrugated insert material or not, reduces if it does not eliminate the abruptness of passage of the heads from the corrugated material to the spacer during withdrawal movement of the matches.

The contouring and nesting of the match heads into the insert is facilitated greatly by shortening the backing material as seen in Figure 11. In Figure 12 the insert stops short of the match head position.

The packet is completed by folding the flaps successively from their positions in Figure 7 to those in Figures 9 and 10 with or without bale insertion. Where the bale is not used it is desirable to hold the ends of the packet together at the same time that the flaps are held in place. In the patent above this is done by staples. Where the bale is used this is unnecessary and the packet can be sealed by gluing the inner rear flap 42 to the outer rear flap 48, with or without gluing of the bale to the inside of the inner flap 42 or to the inside of the flap 46. This gluing of the bale is ordinarily not necessary as the bale will hold its position without gluing.

The uncut match stub 61, which has afforded a convenient holding edge for manipulating the matches in the first place and for holding the packet as the packet has advanced toward completion, continues to be used for this purpose up to the point where the flaps are bent from the position of Figure 9 to the position of Figure 10 to close the end flap 47 across the ends of the matches, to bring the rear flap 48 up to engagement with the inner rear flap 42 and to place the upper rear flap in protective position in back of the adjoining match heads. It is then cut off, or the uncut match stub may be slitted longitudinally with the match stick.

The method and apparatus shown in Figures 1 to 19 may conveniently be used in the formation of a double packet in which a second flap 42', which may correspond in all particulars with inner flap 42, is secured to the inner flap 42, with adjoining sections 43', 44' and 46' in reverse order from the order seen in Figure 21, connected to the section 42'. Though the additional part of the packet can be constructed from a separate flap 42', glued to the blank 42 and with contiguous blanks 43', 44' and 46', it is much more desirable to use an additional blank integral with the first as seen in Figures 21 and 22.

It will be noted that the additional blank material 42', 43', 44' and 46' terminates in a blank 47', corresponding generally in flap width lengthwise of the blank to the flap width of the blank 42. The additional blank is perforated at 56', 57' in general correspondence with the perforation of the blank in Figure 2. The openings 57' are staggered with respect to the openings 56'.

It will be seen that the additional thickness of the packet requires for this form a wider flap 47' to form the end of the thicker packet and that the bale for the wider packet must be wider than the bale seen in Figure 8. In manufacture,

as indicated in Figures 23-27, the flaps 43', 44', are covered with scratcher material on one side and glued, if desired, on the other and are collapsed re-entrantly as in the case of flaps 43 and 44. Also inserts are provided for the spaces 45 and 45' thus formed, and the parts are pressed by presser heads 72 and 73 as in the case of spacers 45. At any suitable stage in the manufacture the flaps 42, 42' are collapsed, reentrantly, as seen in Figure 24 and the packet is completed generally as in the packet of Figures 1-19. The end flap 47', of course, must be wider (longer in the blank) than the end flaps 42.

With the duplex packet of Figures 20-27 some slight changes are made in the method of feeding the match rows in for the packet and closing the packet in that the second pair of rows 60², 60³ of matches cannot merely be passed through the apertures 56', 57' with collapse formation of the re-entrant spacer but during the collapse of the two pairs of sides 43, 44 and 43', 44', respectively of the two spacers formed, the holding mechanism must move relatively, one with respect to the other, since the two uncut stubs 61, 61' must move nearer with respect to each other as the length of the blank is taken up by the collapse of the flaps 43, 44, 43', 44' to form the two spacers. Furthermore, when the two flaps 42, 42' are collapsed similarly to the collapse of the flaps 43, 44 and 43', 44' to form a connecting web spacing the match sticks of one match strip from the match sticks of the next, there is a further shortening of the blank.

From the description above it will be evident that the bale 78 may be used or omitted as desired according to whether exposure of the matches at the ends would otherwise be objectionable or can be disregarded. It is the intention to protect against the flare due to accidental ignition of a number of match heads 79 in case a match be not withdrawn promptly after ignition; and when the danger from this is reduced by whatever other means, the use of the bale becomes unnecessary.

In Figure 28 rows 80, 81 of individual stick matches are indicated, with holders 82, 83, pivoted at 84, by which holders the matches are individually supported in the same positions as from the strip in Figure 4. The holders are spring-controlled by a spring 85 so as to tend to separate and are controlled against the action of the spring by any suitable cams 86, 87 operative either by separate movements of the cams or by movement by the cams by reason of the lateral position of the holders. By this is meant that the progress of the elements of the packet in a direction perpendicular to the paper in Figure 28 may cause the rows of holders with their matches to engage either more restricted or less restricted portions of the cams. The rows of matches of Figure 28 are capable therefore of being handled in all particulars the same as those shown in the previous figures, with the exception that when the operations are completed the holders and matches are relatively separated to detach instead of separation of a stub as in the other figures.

In Figure 29 the stub 45' has been slitted longitudinally of the match sticks so as to leave a small detachment section only at 88 by which the matches are held together.

Not only are the sticks nearly severed to correspond with the stick portions in the lower part of the figure, but the severed ends 89 of the sticks are spaced alternately in two rows so as to

permit of easy access by the user. This packet of Figure 29 is intended to secure the stiffening effect of sufficient attachment for that purpose, while leaving little of subsequent detachment to permit the matches readily to be separated one at a time for use. The packet in other respects may be identical with Figure 1 or may have the individual characteristics of any pull-and-light strip packet.

In Figure 30 a wrap is shown of the general character of that in Figure 2 having an inner rear flap 42' and a V re-entrantly-collapsed spacer 45 of the general character of that appearing in Figures 5-10. An adjoining front flap 46 is also shown. So far as these parts are concerned the construction could be identical with that of the first ten figures. It should be noted that the spacer 45 may be initially plane and in that event is preferably subsequently corrugated by lateral pressure upon the match sticks at this point, using the match sticks as dies alternately to press the spacer in opposite directions. There are features in this packet which are independent of the question of corrugation of the spacer 45, whether this corrugation be done at all, or be done initially or after insertion of the matches.

The primal differences between the packet of Figure 30 and that of the previous figures, lie in the facts that in the packet of Figure 30 the matches are placed in the gutters 90 between the corrugated facings 91 and the backing material 92, that is, instead of being located within the outer gutters 93 as in the other forms the matches 60⁴ and 60⁵ are placed within the gutters 90 which form the insides of the crests 94. This makes the inserts 95 self-contained to the extent that the corrugated material itself supports the matches and the matches can be protected, carried and manipulated by the corrugated facings and the backing forming the insert. A continued strip of composite corrugated material containing the matches intended for a series of match packets is shown in Figure 31 and a completed packet containing matches so located within the composite corrugated material is shown in Figure 32.

As a result the composite corrugated insert can be supplied to the match packets with or without the matches shown in Figure 31, giving alternative methods of construction of the packet. In either event the matches are inserted stick first from the end of the composite corrugated material farthest from the insert, i. e. downwardly in the construction of Figure 31. This can be done in the composite corrugated material before it is applied within the packet, or the insert can be supplied to the packet and the matches can subsequently be inserted through the spaces of the composite material and through the openings 56, 57. This may be done after the corrugation of the spacer 45 (if it be preliminarily corrugated) or prior to the corrugation of this spacer 45 with subsequent corrugation of the spacer by lateral pressure upon the sticks of the matches. In either event there is no necessity for using presser heads against the composite corrugated material but against the exposed match sticks only.

With the form of Figure 30 it is permissible but not essential that the backing of the corrugated strips shall stop short of the heads of the matches, as in Figure 11, in order to provide additional room for the match heads and use the edge of the backing strip as special retardation to be overcome by the heads before the matches can

start on their passages along the enclosed grooves of the corrugations.

This form of packet is capable of being made into a double packet, by the use of the same type of blank as seen in Figure 21 with the difference however from the packet shown in Figure 32 that no bale need be used, such as is seen in Figure 20.

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 invention.

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

1. The method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consists in relatively shifting the wrap and matches to pass the heads of the matches through the apertures in the wrap, collapsing the wrap re-entrantly between the apertures to form a spacer, placing the insert in position between the rows of matches and beyond the spacer, laterally pressing the matches to cause them to press as dies against the corrugated material of the insert to mold the corrugations into correspondence with the shapes of the match sticks to an extent determined by the pressure used and folding the wrap about the matches, spacer and corrugated insert to form a packet in the usual way.

2. The method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consists in relatively shifting the wrap for matches to pass the heads of the matches through the apertures in the wrap, collapsing the wrap re-entrantly between the apertures to form a spacer, placing the insert in position between the rows of matches and beyond the spacer, laterally pressing the matches to cause them to press as dies against sides of the spacer to corrugate it by the alternating pressures of the matches on opposite sides and folding the wrap about the matches, spacer and corrugated insert to form a packet in the usual way.

3. The method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consists in relatively shifting the wrap for matches to pass the heads of the matches through the apertures in the wrap, collapsing the wrap re-entrantly between the apertures to form a spacer, placing the insert in position between the rows of matches and beyond the spacer, laterally pressing the matches to cause them to press as dies against the corrugated material of the insert and against the sides of the spacer to alter the corrugations by the pressure of the match sticks and to corrugate the spacer, and folding the wrap about the matches, spacer and corrugated insert to form a packet in the usual way.

4. The method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consists in shifting the matches and

wrap relatively to pass the match heads through the apertures, re-entrantly bending the wrap between the apertures to form a spacer, moistening the corrugated insert to an extent depending upon the extent of deformation of the corrugations intended, placing the insert between the rows of matches, pressing the matches laterally against the corrugated insert to act as dies in deformation of the corrugations and folding the wrap about the matches, spacer and corrugations to form a packet.

5. Steps in the method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consist in passing the matches through staggered and spaced apertures to form a spacer, and in folding the spacer, inserting the insert and corrugating the spacer after the matches have been put in place.

6. Steps in the method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consist in passing the matches through staggered and spaced apertures in rows in the wrap, re-entrantly bending the wrap between the apertures to form a spacer, putting the insert in place and corrugating the spacer after the matches have been inserted by lateral pressure of the matches against the spacer.

7. The method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consists in relatively shifting the wrap and matches to pass the heads of the matches through the apertures in the wrap, collapsing the wrap re-entrantly between the apertures to form a spacer, placing the insert in position between the rows of matches and beyond the spacer, pressing the heads of the matches into the gutters of the corrugations by pressing sticks against the insert and pressing the sticks against the spacer and folding the wrap about the matches, spacer and corrugated insert to form a packet in the usual way.

8. Steps in the method of forming a packet from a wrap having rows of staggered apertures, matches staggered in two rows and a corrugated insert adapted to be placed between the rows of matches, which consist in relatively shifting the wrap for matches to pass the heads of the matches through the apertures in the wrap, collapsing the wrap re-entrantly between the apertures to form a spacer, moistening the insert, placing the insert in position between the rows of matches and beyond the spacer, and laterally pressing the matches to cause them to press as dies against the corrugated material of the insert while retaining the corrugated material against spreading to mold the corrugations by the match sticks.

9. In the manufacture of match packets from matches arranged in two rows, separating material between the rows and a packet wrapper, the method which consists in providing a portion of the wrapper with an ignition surface, in re-entrantly bending this ignition part of the wrapper to form an insert having the ignition material on the outsides of the bend, in corrugating the insert to give passage ways for the matches and at the same time retain the insert in re-entrantly bent position, in placing the separating material in position between the rows of matches

and folding the wrap about the insert separator and matches to form the packet.

10. Steps in the method of forming a match packet, including matches staggered into rows and a corrugated insert adapted to be placed between the rows, which consist in separating the
5 two rows of matches, in moistening the corru-

gated insert, in placing it between the rows of match sticks and in laterally forcing the matches into the gutters of the corrugated material while retaining the corrugated material against spreading.

RODNEY S. PULLEN.