May 10, 1932. J. W. JOHANSSON 1,857,723

MANUFACTURE OF STRIP MATCHES

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Fig. 1.

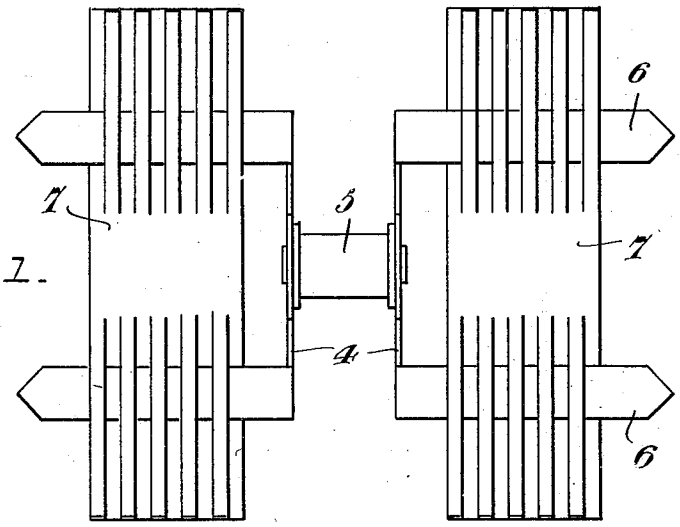

Fig. 2.

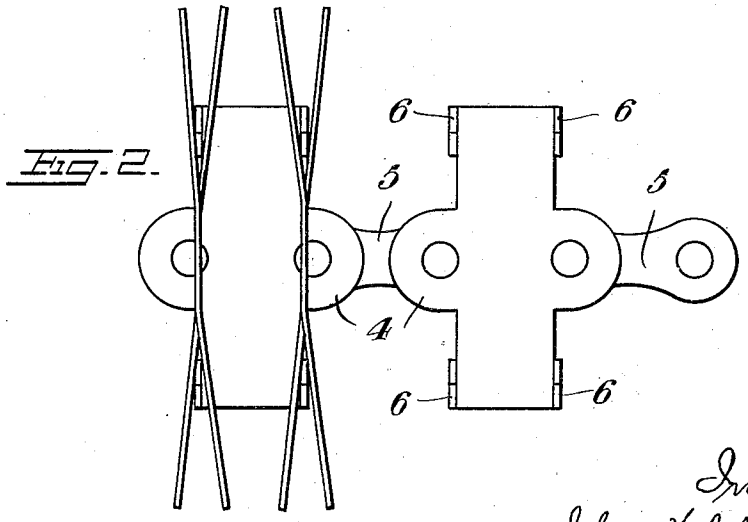

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Fig. 3.

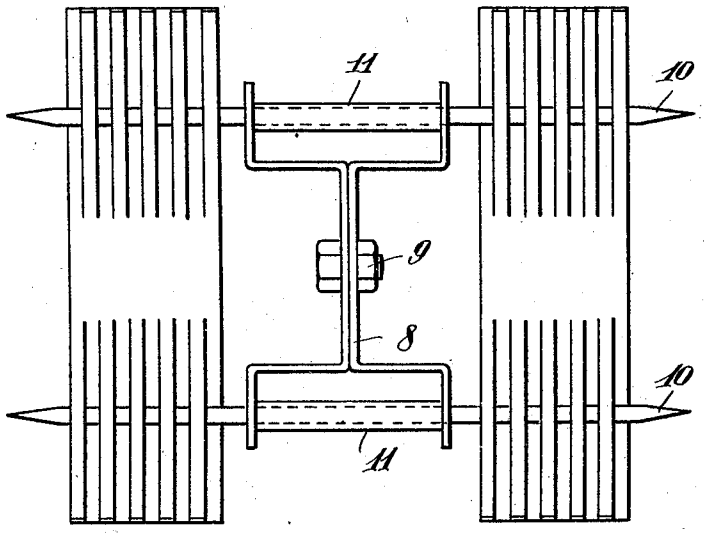
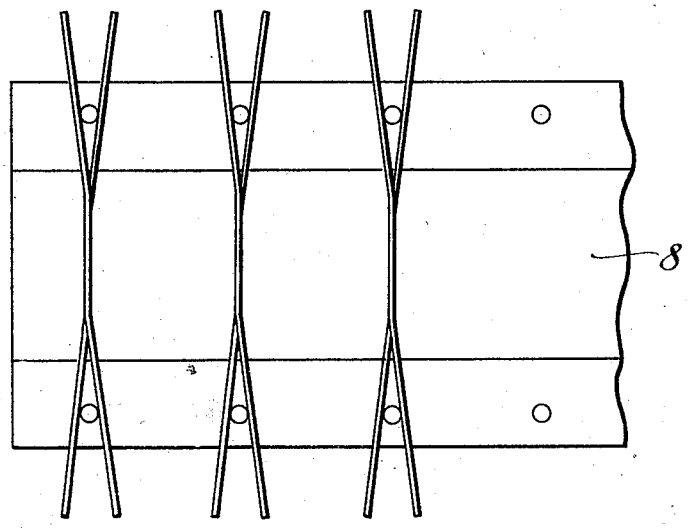


Fig. 4.



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UNITED STATES PATENT OFFICE

JOHAN WERNER JOHANSSON, OF BANKERYD, SWEDEN

MANUFACTURE OF STRIP MATCHES

Application filed May 12, 1930, Serial No. 451,658, and in Sweden April 9, 1930.

The present invention relates to the manufacture of matches of the kind which are formed by splitting the material to be made into matches, such as strips or sheets of wood, cardboard, or the like, into a plurality of matches lying side by side and integrally connected to a common base. Matches of the above kind may either be provided with a separate envelope and are in such case termed match books, or they may be loosely inserted into special etuis or into cigarette-cases. Match strips of this kind may be manufactured either with a single row of matches only or with two rows in which last-mentioned case the middle portion of the strip is left undivided, the material being split from this undivided portion towards opposite edges of the strip. By dividing or folding such a strip along its middle line two single match strips may be obtained.

In order to prevent the formation of coherent match heads, either in the heading or drying operation, it has been proposed to set the stamped splints so as to cause them thereafter to keep themselves sufficiently apart. In case of certain kinds of cardboard it has proved difficult, however, to obtain a sufficiently great permanent setting, or the base of the matches has been damaged as result of too great a setting. In case of wooden matches it has proved impossible to obtain the necessary permanent setting so that when using such material it has been necessary to make the matches unusually wide in order to allow heading of the matches without setting after pointing the ends thereof. In this case, however, the match heads cannot be made as large as desirable and, moreover, the heads will have a greater tendency to drop off from such a pointed end than from an end of uniform thickness.

This invention has for its object to overcome the above said difficulties and consists in a method and means whereby the matches after setting are caused to maintain their relative position by means of a member which accompanies the matches and keeps them apart during their conveyance for further operation, as impregnation, paraffination, heading or drying.

In the accompanying drawings some embodiments of the invention are shown. Fig. 1 is an end view and Fig. 2 is a side elevation of a supporting device forming part of a chain. Fig. 3 is an end view and Fig. 4 a side elevation of a supporting device constructed as a conveying bar.

Figs. 1 and 2 show part of a conveying mechanism constructed so as to form a conveying chain for double match strips in which the individual supporting elements 4 are hingedly connected together by means of links 5. The elements 4 are stamped from sheet metal, and those parts 6 of the elements which are intended to serve as supporting means for the double match strips are bent at right angles. In placing the match strips 7 upon the parts 6 the chain may be passed between two setting mechanisms of well known design so that the match strips may be pushed from the setting mechanisms on both sides of the chain and delivered to the members 6 adapted thereafter to maintain the setting. In the embodiment shown the length of the members 6 corresponds to one match strip only; it is evident, however, that by increasing the length of said members two or more match strips may be placed side by side upon the same supporting member.

As is usual practice in universal match machines the conveying chain 4, 5 may be passed in the shape of a loop through the machine to enable impregnating or heading of one end of the match strips along the first horizontal part of this loop. After having passed one or, generally, an odd number of turning points the other ends of the loop are directed downwards during the succeeding horizontal part of the loop, thereby allowing heading of these ends too.

It is to be noted that in substitution of a conveying chain I may also use individual conveying bars having similar supporting members. An example of such a structure is shown in Figs. 3 and 4, where 8 indicates such a conveying bar comprising two sheet metal plates which are bent so as to form a fork on each side of a central web and are connected by bolts 9 through said web. Inserted through corresponding apertures

formed in the fork ends are two rows of pins or rods 10 the parts of which located between the fork ends carry sleeves 11 attached to the pins 10 in any appropriate way. As the length of the sleeves corresponds to the distance between the fork ends a reliable attaching of the pins 10 will result. The sleeves 11 may also be used in effecting the feeding of the supporting bars in their longitudinal direction past the necessary setting mechanisms, the sleeves being to this end operated by toothed wheels or other feeding means. As the length of the bars as well as the number of pins may be varied within very wide limits the above described conveying bars are especially suitable for machines of great output and if said bars are fed through the drying device at right angles to the longitudinal direction of the bars, then a comparatively wide and short drying path may be obtained which enables a very favourable construction of the entire machine.

The devices shown for separating the matches are of great value as far as the obtainment of a uniform product is concerned. After completed stamping of the matches any setting at the match base proper is not required and, consequently, the matches cannot be damaged in any way due to the setting operation. The matches are bent from each other to such an extent as is necessary to permit the insertion of the separating members in their places. As there will thus be obtained a very slight permanent setting after removal of the separators the setting will practically be eliminated at the packing of the matches, especially if the match ends are stamped on one side or both in such a way as not to render the heads wider than the matches proper. In dyeing of the match strips which is common in case of wooden matches all four sides of the matches will be available to the dyeing liquid to equal degree and in the impregnating operation the paraffine will, as a result, not be drawn up between the matches as would be the case if the matches were not set, and in the heading operation any tendency to form double heads will be eliminated. In all the figures the loose attachment of the match strips will also present the advantage that in the heading operation the match strip, when depressed agains the bottom of the heading table, will be automatically brought to such a corrected position as to cause all of the match ends to touch the bottom with the result that all heads will be of uniform length. The invention further permits the manufacture of matches of reduced width and increased thickness which will, in turn, permit the manufacture of match books of a more suitable shape than hitherto possible.

What I claim is:—

1. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to opposite sides so as to form two spaced rows of splints, for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements each provided with two separating members for each match strip, one for each group of splints, each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

2. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to opposite sides so as to form two spaced rows of splints, for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements each provided with two bar-shaped separating members for each match strip, one for each group of splints, each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

3. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to opposite sides so as to form two spaced rows of splints, for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements each provided with two laterally projecting separating members for each match strip, one for each group of splints, each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

4. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to oppo-

site sides so as to form two spaced rows of splints, for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements each provided with two bar-shaped separating members for each match strip, one for each group of splints, laterally projecting from said elements and each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

5. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to opposite sides so as to form two spaced rows of splints, for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements hingedly connected so as to form a conveying chain, each of said elements being provided with two separating members for each match strip, one for each group of splints, each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

6. A conveying device to be used in connection with the manufacture of match strips of the type, which are split on opposite edges of an undivided central portion so as to form two groups of match splints connected by said central portion and in which the splints of each such group are bent alternately to opposite sides so as to form two spaced rows of splints for supporting the strips during their conveyance for further operation, as impregnation, paraffination, dipping and drying, comprising a plurality of conveyor elements hingedly connected so as to form a conveying chain, each of said elements being provided with two bar-shaped separating members for each match strip, laterally projecting from said elements and each adapted to engage the space between the two rows of splints of the respective group so as thereby to carry the match strip and maintain its rows of splints in their relative position during said conveyance.

7. A conveying device as defined by claim 2 in which the bar-shaped separating members are in the form of needles.

8. A conveying device as defined by claim 4 in which the bar-shaped separating members are in the form of needles.

9. A conveying device as defined by claim 6 in which the bar-shaped separating members are in the form of needles.

In testimony whereof I have signed my name.

JOHAN WERNER JOHANSSON.