

Aug. 16, 1927.

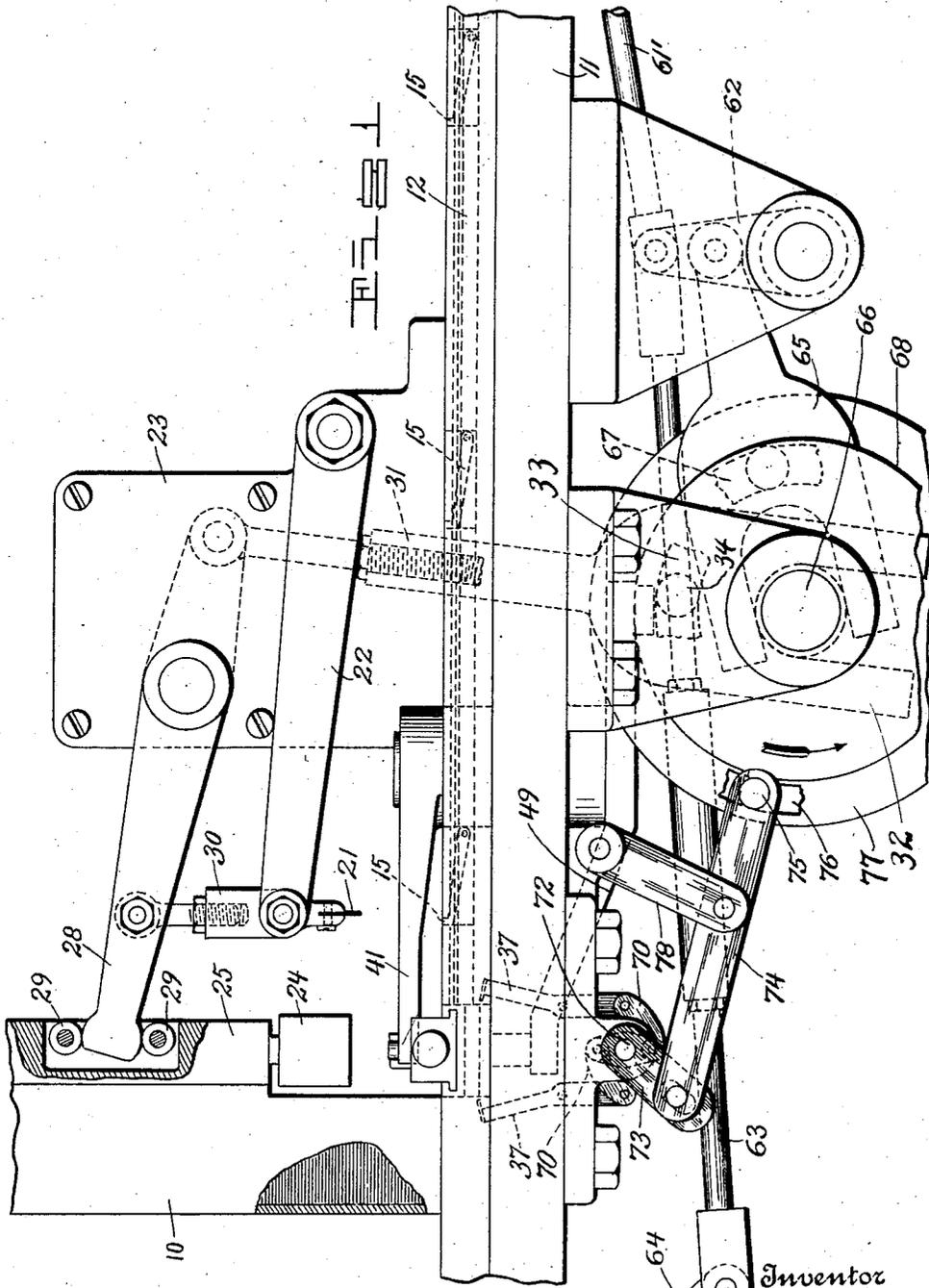
A. W. CHRISTIANSON ET AL

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MATCH PACKETTING MACHINE

Filed May 2, 1924

5 Sheets-Sheet 1



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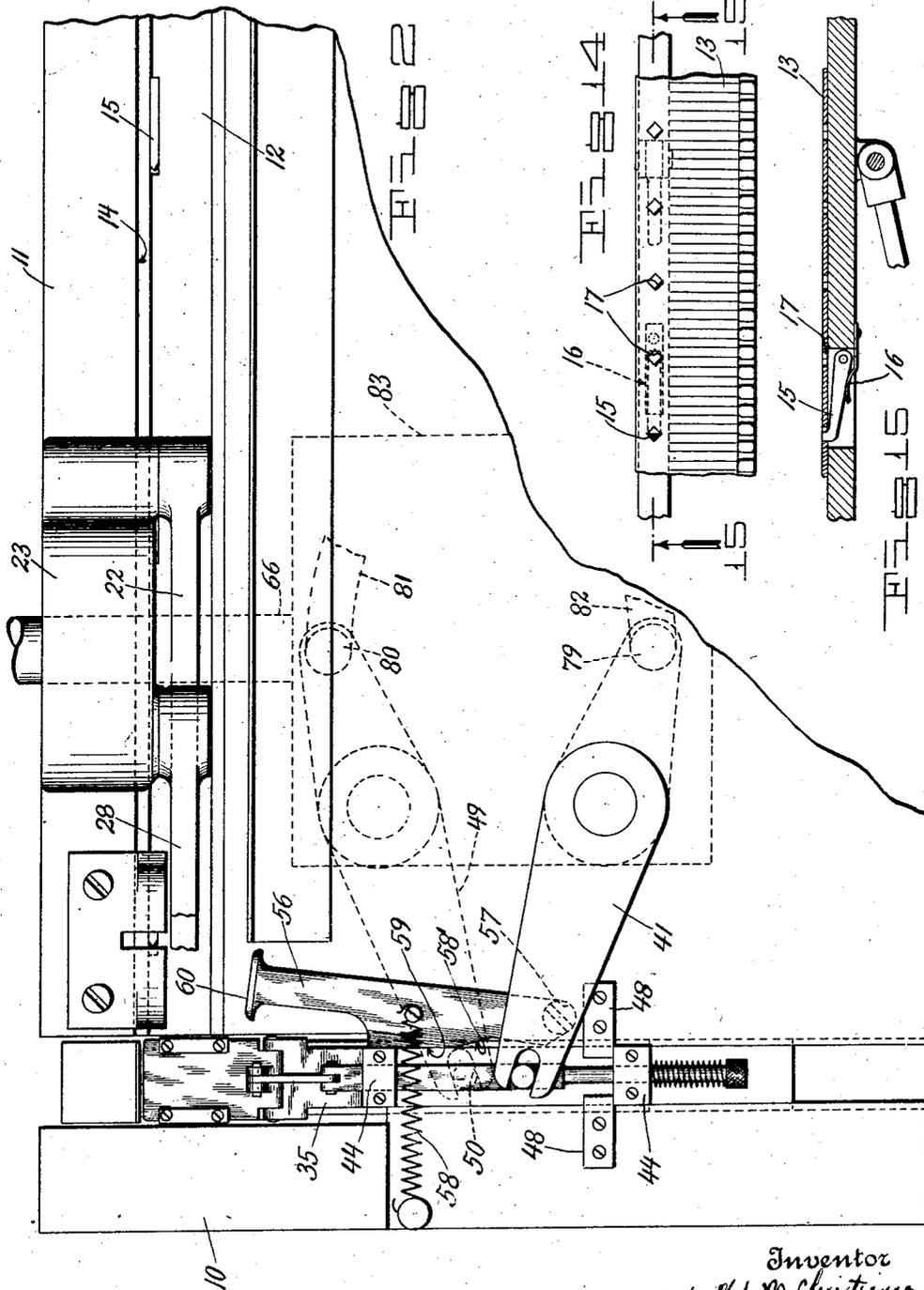
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5 Sheets-Sheet 2



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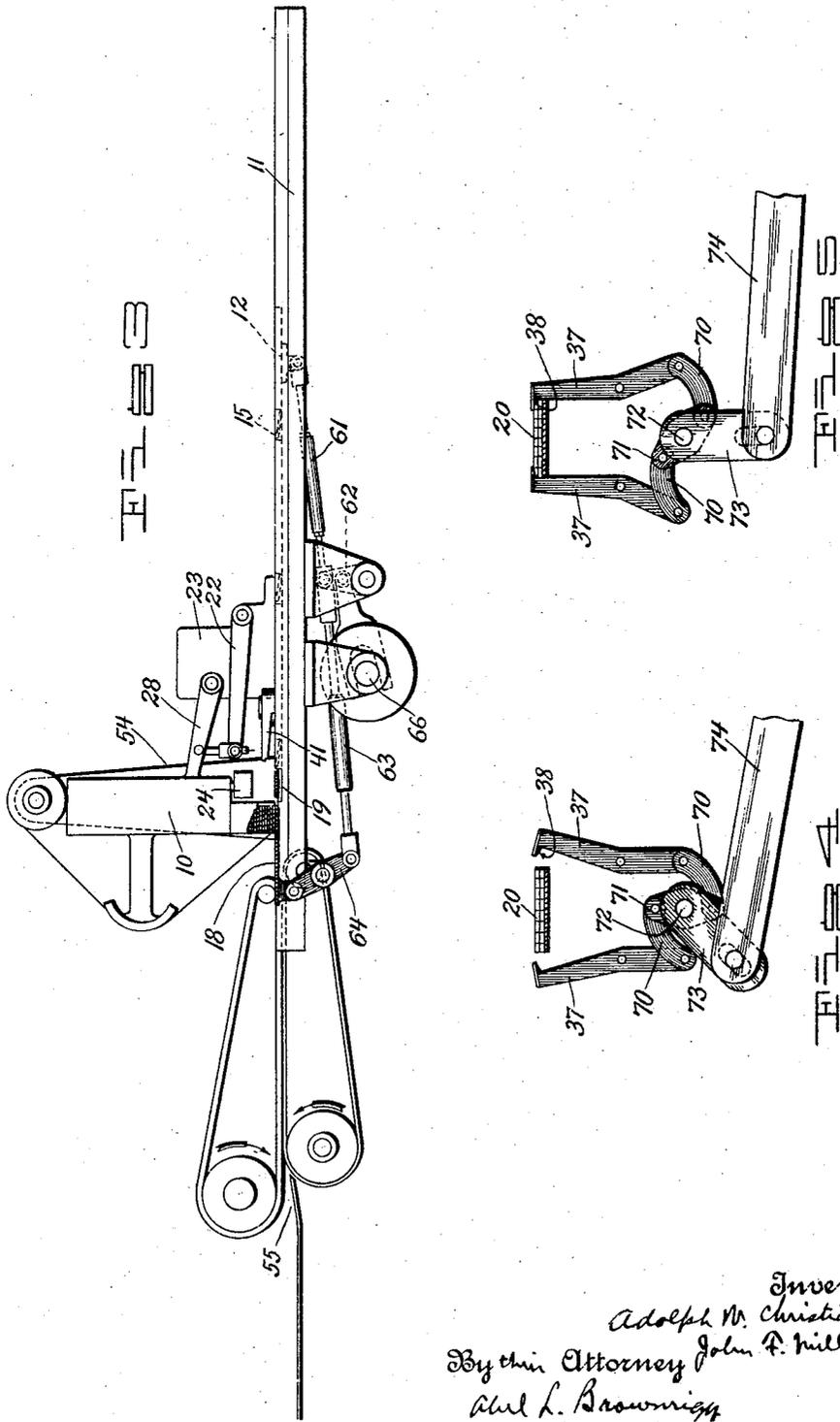
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5 Sheets-Sheet 3



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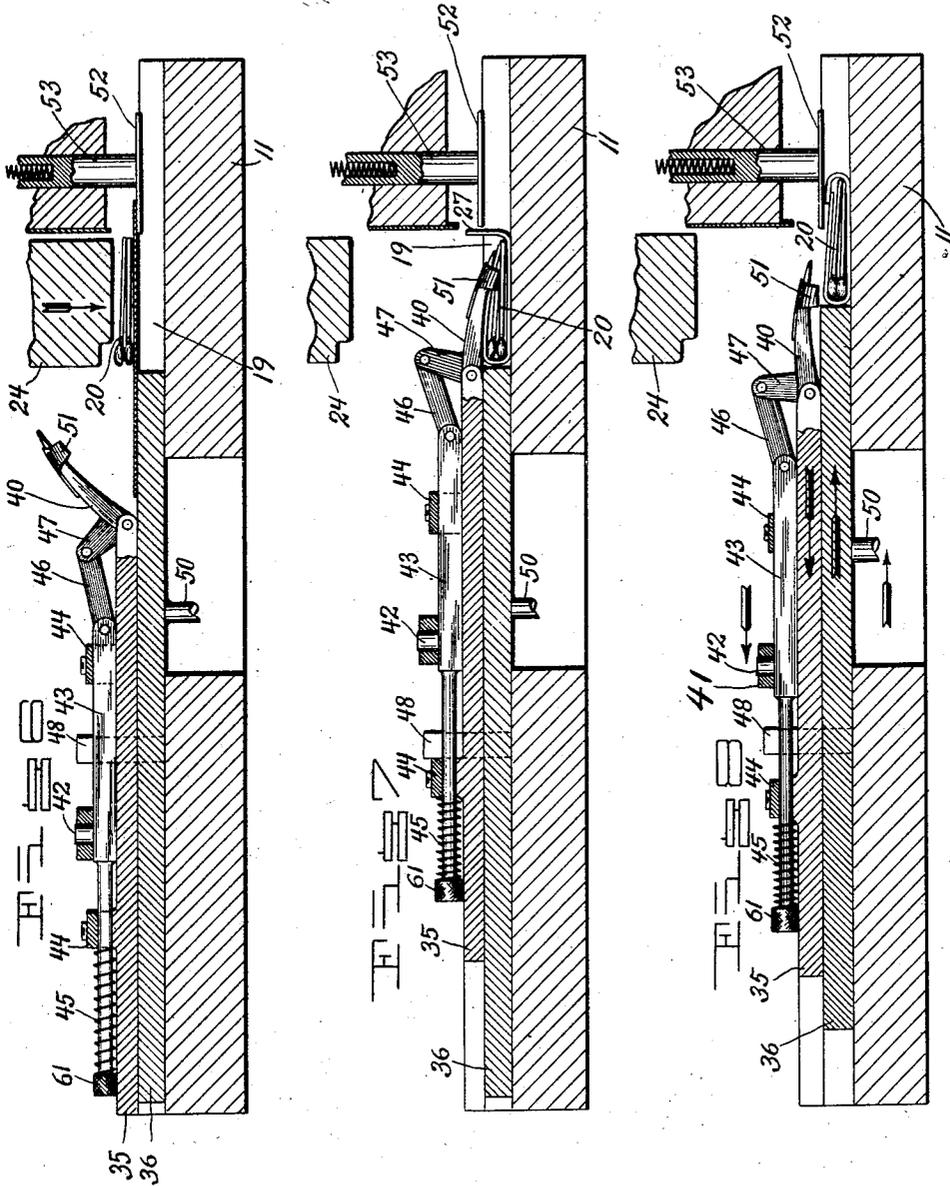
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MATCH PACKETTING MACHINE

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5 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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MATCH-PACKETING MACHINE.

Application filed May 2, 1924. Serial No. 710,575.

This invention relates generally to machines for forming match packets of the folding or book type.

A general object of the invention is to provide an improved machine of the general nature described in which match packets can be produced rapidly and efficiently and in a completely assembled and finished condition, with substantially no attention on the part of the attendant except the supplying of match strips to the machine.

The invention includes means for severing match strips into sections of suitable size and feeding a match strip section and a cover blank laterally toward each other and into superposed relation over a forming recess, and in providing means for forcing the parts into the recess to form initial bends in the extended ends of the cover blank. Another feature of the invention resides in the provision of a hinged folder plate carried by a reciprocating part and operating to fold the longer flap of the cover member onto the match strip section as the assembled parts lie in the recess in which they are centered and held by a pair of wedge-shaped jaw members which are movable toward and from each other into and out of operating position. An ejecting slide member mounted beneath the hinged folder plate operates to push the assembled and centered parts laterally out of the forming recess and beneath a resiliently-held folder plate which folds the shorter flap member into holding relation to the free end of the previously folded long flap member. In the position in which the assembled parts are left in the ejecting operation a stapling device acts to permanently attach the extended end of the parts together whereupon a coating device receives the packet and applies a strip of friction material thereto.

Other features of the invention will be hereinafter described.

In the drawings in which a preferred embodiment of the invention has been selected for illustration.

Figure 1 is a view in side elevation and partly in section of a portion of a match packeting machine embodying the invention.

Figure 2 is a plan view of the parts shown in Figure 1.

Figure 3 is a view in side elevation and largely diagrammatic of the packeting ma-

chine shown in Figure 1 together with a stapling and friction material applying device.

Figure 4 is a view in side elevation of a match strip centering device used in the invention and showing the jaws thereof in open position.

Figure 5 is a view similar to Figure 4 showing the jaw members in closed or operative position.

Figure 6 is a view in vertical section of folding and ejecting mechanism forming part of the machine.

Figure 7 is a view similar to Figure 6 showing the folding mechanism in operating position.

Figure 8 is a view similar to Figure 6 showing the ejecting means in operative position.

Figure 9 is a view in perspective showing the relation of the parts just previous to an assembly operation.

Figure 10 is a view in perspective showing the machine packet parts after having been forced into the forming recess.

Figure 11 is a view in perspective showing the cover folding device in operation.

Figure 12 is a view similar to Figure 11 showing the position of the cover folding device at the end of its cover folding operation.

Figure 13 is a view similar to Figure 12 showing the beginning of the operation of the ejecting device.

Figure 14 is a view in plan showing a portion of a match strip.

Figure 15 is a view in vertical section showing a portion of the match strip feeding device.

Referring to the drawings for a more detailed description of the invention a vertically extending storage receptacle for cover blanks is shown at 10 from the lower extremity of which extends the horizontal frame member 11 which is equipped with a feed device 12 for intermittently moving match strips 13 toward the base of the cover storage receptacle. The match strip feed device 12 is in the form of a bar mounted to reciprocate in a slideway 14 provided for the purpose in the horizontal frame member 11 and is equipped with hinged pawl members 15 which are normally projected upwardly from the surface of the slide bar by the action of spring members 16.

The pawl members 15 are adapted to engage holes or openings 17 formed for the purpose in the match strips 13 and to move the match strip when the direction of movement is toward the receptacle 10 and to depress the yielding spring members and slidingly engage the undermost surface of the strips without producing movement thereof, when movement of the slide bar is away from the receptacle 10.

At the same time that the match strip is being carried toward the receptacle 10 a cover blank feed slide 18 is so moved across the lower end of the receptacle as to push the lowermost blank in the pile laterally toward the advancing match strip and in covering relation to a forming recess 19 formed in the framework adjacent the lower end of the cover blank receptacle.

In order to sever the match strips 13 and to produce sections 20 having a suitable width to cooperate with the width of the cover blank, a knife member 21, carried at one end of an arm 22 pivoted on a post or standard 23, is vertically reciprocated to engage the strip at a point one section removed from the position of the extreme end section where it is pushed into place on a cover blank just above the forming recess 19.

In order to press the cover blank and the overlying match strip section downwardly into the forming recess 19, a plunger 24 which is mounted to reciprocate in a vertical slideway 25 formed on the face of the cover blank receptacle, is adapted to be pushed downwardly into the recess 19 thereby producing an initial folding operation on, and an upright disposition of the cover blank end tabs 26 and 27.

The plunger 24 is reciprocated by the engagement therewith of the end of an arm 28 pivoted on the standard 23 and extending between a pair of antifriction rollers 29 carried by the plunger. A link connection 30 between the arm 28 and the arm 22 serves to reciprocate the knife member 21 and maintain the knife constantly in the same vertical plane. A driving link 31 carried by the arm 28 is provided with a forked extremity 32 for engagement with the drive shaft of a cam wheel 33 while a pin 34 on the link travels in a cam groove in the cam wheel to give motion to the arm 28.

In addition to the described cover blank feed slide 18 and the match strip feed bar 12 which are reciprocated toward and from each other to place a pair of severed match strip sections 20 in superposed relation on a cover blank over the forming recess 19, and the vertically reciprocating knife member 21 and plunger 24, a pair of horizontally movable slide members 35 and 36 are mounted to move to and fro with relation to the position of the forming recess 19 and

to take part in the further folding and the ejection of the packet from the machine. Also a pair of jaw members 37 having inclined or wedge shaped under surfaces 38 are arranged to be moved toward each other to engage and center the match strip section on the cover blank as the plunger 24 begins its ascent, and to hold the parts in proper relation to each other during the folding and ejecting operations which immediately follow.

In the folding operations which take place following the rise of the plunger 24 the upper slide member 35 carrying a hinged folder plate 40 is moved forwardly toward the folder recess 19 through the engagement of the forked end of an operating arm 41 engaging a pin 42 on a slide bar 43 passing through guide members 44 on the slide member 35 and normally held in a retracted position by the spring 45. The forward end of the slide bar 43 has a link connection at 46 with the crank arms 47 projecting from the rearward face of the folder member 40. In the operation of the device the slide member 35 is moved forwardly to the position shown in Figure 7 in which position the member 35 is held from further movement by engagement of the rearward guide member 44 with a pair of stop members 48. During the forward movement of the slide member 35 and the slide rod 43 carried thereby the folder plate 40 is brought into engagement with the upstanding flap or tab 26 of the cover blank to fold the same inwardly as indicated in Figure 11 of the drawing.

When further movement of the slide member 35 is stopped at the point indicated in Figures 7 and 12 of the drawing, the forward movement of the slide rod 43 through the guide members 44 is continued against the action of the spring 45 with the result that the folder plate 40 is caused to swing downwardly into the folder recess as shown in Figures 7 and 12 of the drawing.

With the folder plate still in its lowered position the ejector slide plate 36 is pushed forwardly through the engagement of operating arm 49 with the downwardly projecting pin 50 so that, as is indicated in Figure 13 of the drawing, the shorter tab member 27 is bent inwardly over the forward end of the folder plate 40 which thus functions to hold the longer tab 26 in depressed position until the short tab 27 is folded over into locking relation thereto.

Preferably the folder plate 40 is equipped with wing members 51 on its opposite lateral edges, the wing members serving as guide members to direct the forward movement of the packet under the ejecting action of the slide member 36.

The folder plate 40 is swung back to its raised position immediately following the

folding of the short tab 27 under the folder plate 52 which is carried at the lower end of a spring pressed plunger 53. It will be seen that the packet is pushed outwardly to a point where the folded short tab member 27 can be engaged by a stapling or stitching device 54 to permanently attach the cover blank and the match strip sections 20 together in a known manner. Following the stapling operation the friction material applying device 55 operates on the packet and passes it along to drying means not herein shown.

In order to guide the match strip sections 20 into position over the cover blank following the severing operation, a guide arm 56 is shown in Figure 2 of the drawing. The arm is pivoted at 57 and is engaged by a spring 58 normally tending to swing the arm to the left toward the position where the packeting takes place. The position of the guide arm 56 is controlled by the position of the slide member 35 and for this purpose an off-set edge 59 on the guide arm is maintained in engagement with the forward guide member 44 on the slide member when the slide member and the parts carried thereby are in the advanced position. Before the withdrawal of the slide member 35 to permit of the placing of a new set of match strip sections and a cover blank in position for assembly, the guide member 44 on the slide member encounters a recessed or incurved portion 58 on the edge of the guide arm 56 which permits the guide arm to swing inwardly and follow the movement of the match strip sections passing from the position of the knife member to the assembly position. The head 60 of the guide arm thus guides the movement of the sections 20 and prevents displacement thereof from the normal path of travel.

In order to insure accuracy in the operation of folding the long tab of the cover member the spring driving connection 45 between the slide bar 43 and the folder-carrying slide member 35 is provided with adjustable tensioning means 61.

The operating means for the match strip feed device 12 and for the cover blank feed slide include link members 61' for connecting the slide bar 12 to a crank arm 62 and a link 63 for connecting the crank arm 62 to a rock arm 64 to the other end of which the cover feed slide 18 is connected. It will be seen that with this arrangement, swinging movement of the crank arm 62 operates to move the slide bar 12 and the slide plate 18 in opposite directions, that is, either toward or away from each other. Movement is communicated to the crank arm 62 through a forked member 65 which straddles the drive shaft 66 and is equipped with a pin which travels in a groove 67 on a cam wheel 68 thereon.

Operation of the centering jaw members 37 is effected through a pair of link members 70 connecting the lower ends of the jaw members to opposite extremities of a rock arm 71 carried on a shaft 72 to which a crank arm 73 is attached. A link 74 is pivoted to the crank and carries a pin 75 for engagement with a cam groove 76 in a cam wheel 77 on the shaft 66. A suspension link 78 supports the link 74 at a point intermediate its ends.

The arms 41 and 49 which operate the folder and ejector slide bars are supplied with pins 79 and 80 which cooperate with cam grooves 81 and 82 in the periphery of a drum 83 on the drive shaft 66.

What we claim is:—

1. In a match packeting machine, a framework provided with a forming recess and a vertically extending receptacle for cover blanks adjacent the recess, horizontally movable means for pushing the lowermost blank in the pile into covering relation to the recess, horizontally movable means for pushing a match strip section into superposed relation to the cover blank, a vertically reciprocating plunger for forcing the match strip section and the cover blank into the recess to initially fold the ends of the cover blank, a pair of jaw members movable into position to center the match strip section on the cover and to hold the parts in position during the ascent of the plunger, a horizontally movable member movable to and fro with relation to the forming recess to fold one end of the cover blank, a yieldable plate underneath which the packet may be forced to fold the other end of the cover, and an ejecting slide member operating beneath the horizontally movable folding member to eject the packet from the recess.

2. In a match packeting machine, a framework provided with a forming recess and a vertically extending receptacle for cover blanks adjacent the recess, horizontally movable means for pushing the lowermost blank in the pile into covering relation to the recess, horizontally movable means for pushing a match strip section into superposed relation to the cover blank, a vertically reciprocating plunger for forcing the match strip section and the cover blank into the recess to initially fold the ends of the cover blank, a pair of jaw members movable into position to center the match strip section on the cover and to hold the parts in position during the ascent of the plunger, a horizontally movable member movable to and fro with relation to the forming recess and provided with a hinged plate for engaging and folding one end of the cover, a yieldable plate underneath which the packet may be passed to fold the other end of the cover, and an ejecting slide

member operating beneath the horizontally movable folding member to eject the packet from the recess.

3. In a match packeting machine, a framework provided with a forming recess and a vertically extending receptacle for cover blanks adjacent the recess, horizontally movable means for pushing the lowermost blank in the pile into covering relation to the recess, horizontally movable means for pushing a match strip section into superposed relation to the cover blank, a vertically reciprocating plunger for forcing the match strip section and the cover blank into the recess to initially fold the ends of the cover blanks, a pair of jaw members movable into position to center the match strip section on the cover and to hold the parts in position during the ascent of the plunger, a horizontally movable member movable to and fro with relation to the forming recess and provided with a hinged plate for engaging and folding one end of the cover, a slide bar mounted on the slide member and having a link connection with said hinged plate, means for moving said slide bar to thereby move said slide member toward said forming recess, a stop member for checking the movement of said slide member but permitting the continued movement of said slide bar to thereby swing the hinged plate downwardly into the recess to fold the cover therein, and an ejecting slide member operating beneath said folder plate to push the packet from the recess.

4. In a match packeting machine provided with a forming recess into which a match packet assembly is forced by a plunger, folding and ejecting means for the packet comprising a slide member movable to and fro with relation to the recess and provided with a hinged plate for engaging and folding one end of the packet cover member, means for swinging the plate downwardly into the recess to complete the folding of the engaged cover member, an ejecting slide bar mounted beneath the slide member and movable into the recess to eject the packet laterally therefrom, a resiliently held plate for engaging the upper surface of the packet as it is ejected to fold the other end of the cover, and guiding wings on said hinged plate for directing the ejecting movement of the packet.

5. In a match packeting machine provided with a forming recess into which a match

packet assembly is forced by a plunger, centering means for the match strip sections including a pair of jaw members movable toward and from each other to engage the lateral edges of the match strip sections and center the same on the cover blank, said jaw members also acting to hold the match strip sections and cover blank in the recess during the withdrawing movement of the plunger.

6. In a match packeting machine provided with a forming recess into which a match packet assembly is forced by a plunger, centering means for the match strip sections including a pair of jaw members movable toward and from each other to engage the lateral edges of the match strip sections and center the same on the cover blank, and operating means for the jaw members including a rock arm, a link connection between one end of the rock arm and one of the jaw members, a link connection between the other end of the rock arm and the other jaw member, a crank arm attached to the rock arm, a cam, and a link connection between the cam and the crank arm.

7. In a match packeting machine for operating on match strips and provided with a forming recess, a vertically reciprocating plunger for forcing assembled match strip sections into the forming recess, means for feeding match strip sections toward the recess, an oscillatable arm engaging the plunger for operating the same, another arm provided with a cutter member for severing the match strip section at a distance from the forming recess equal to the width of a severed section, and a link connection between said arms for operating the cutter member.

8. In a match packeting machine provided with a forming recess, a horizontally movable folding member arranged to be moved to and fro with relation to one side of the recess, horizontally movable means for feeding match strips toward the recess at right angles to the direction of movement of the folding member, means for severing the match strip, a guide arm for the severed section, and spring means cooperating with the folding member for guiding the movement of the severed section toward the recess as the folding member is retracted.

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