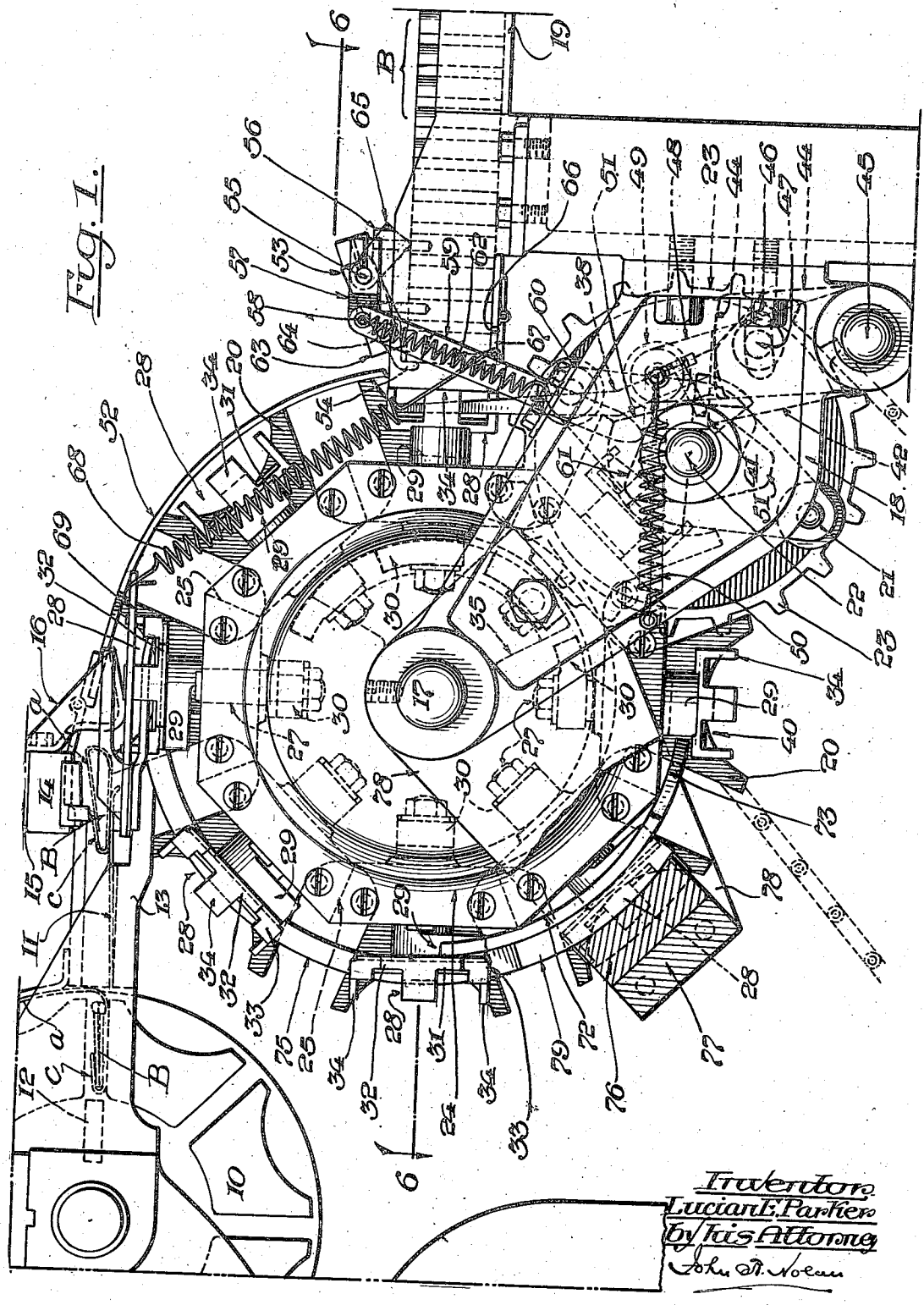
Dec. 27, 1938. L. E. PARKER 2,141,483

MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

Filed Oct. 9, 1937 5 Sheets-Sheet 1

Fig. 1.



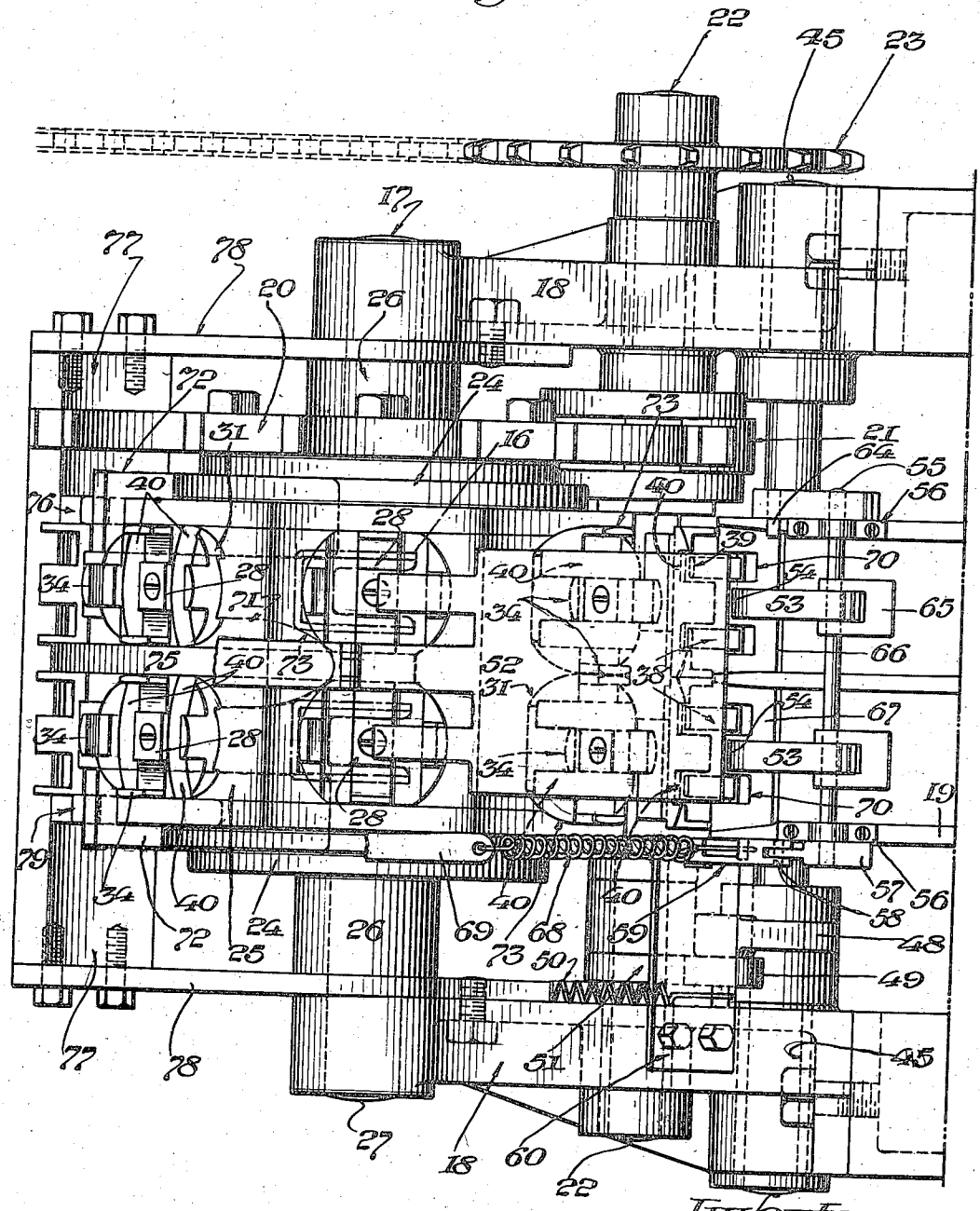
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MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

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Fig. 2.



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MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

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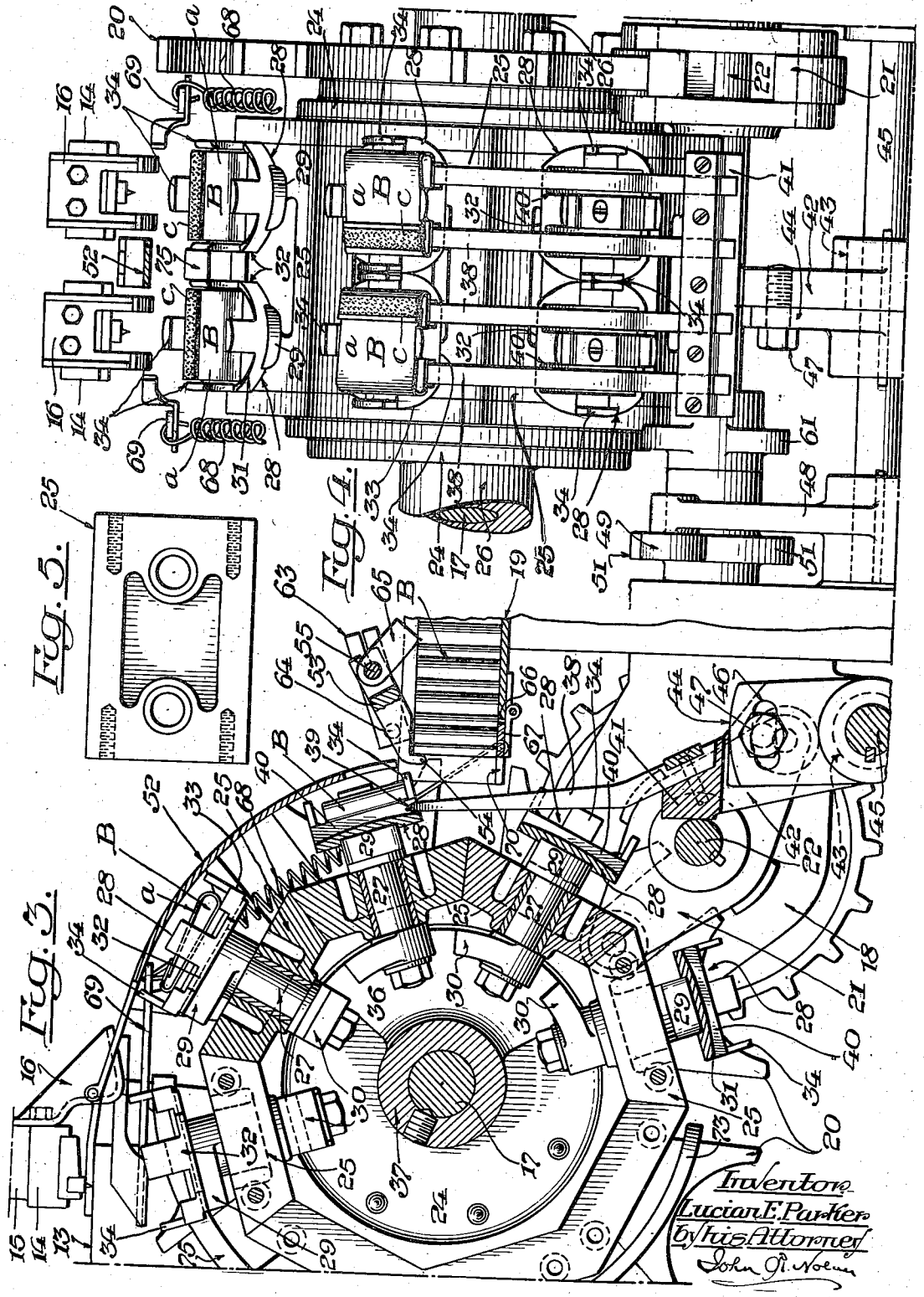


Fig. 4.

Fig. 5.

Fig. 3.

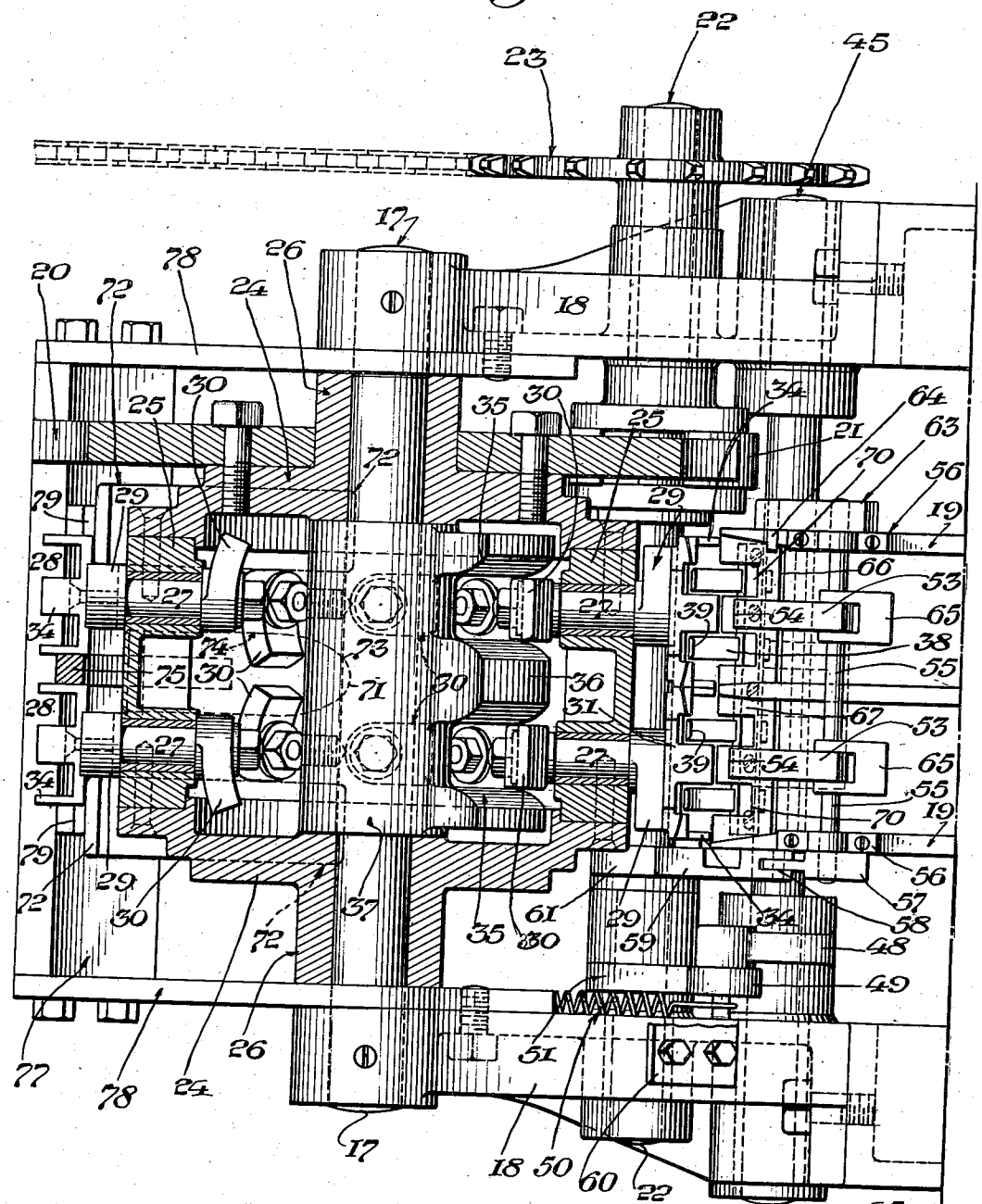
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MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

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Fig. 6.



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MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

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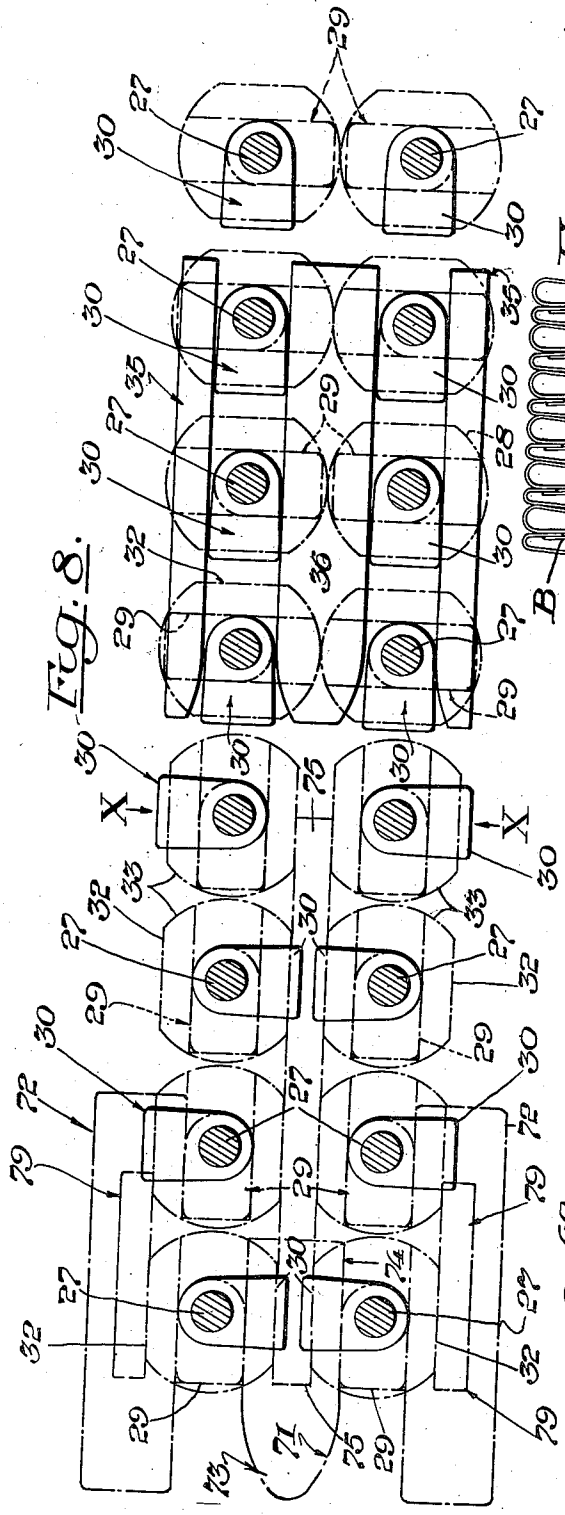


Fig. 8.

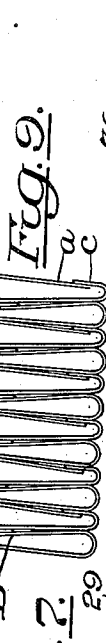


Fig. 9.

Fig. 7.

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Patented Dec. 27, 1938

2,141,483

UNITED STATES PATENT OFFICE

2,141,483

MECHANISM FOR ASSEMBLING MATCH PACKETS AND THE LIKE

Lucian E. Parker, Wadsworth, Ohio, assignor to The Diamond Match Company, New York, N. Y., a corporation of Delaware

Application October 9, 1937, Serial No. 168,143

8 Claims. (Cl. 226—4)

This invention relates to mechanism for assembling match packets and the like, and especially book matches of the type wherein each book comprises one or more cards of matches enclosed in a flexible cover having a long front flap which when closed is adapted to be tucked under the free edge of a short front retaining fold to which and the back of the cover are fastened the base or bases of the match card or cards. The mechanism herein illustrated as an embodiment of my invention has been designed for use more especially in connection with a continuous match booking machine from which the complete match books are delivered flatwise in succeeding pairs, all in similar endwise and face arrangement, that is, the larger or headed ends of the matches point in one direction and the folded faces of the books are upward, as for example, in United States Patent No. 1,042,472, dated October 29, 1912.

The principal object of my invention is to provide novel and efficient mechanism which is arranged and adapted to receive the match books pair by pair as they are discharged from the booking machine, and which mechanism thereupon partially turns the books in successive order in opposite directions, and in planes parallel to the faces of the respective books, preparatory to their delivery in succession to a packing trough, thus endwise reversing the books in a manner to ensure their uniform and compact assemblage within the trough with the smooth back of each book in contact with the folded front of the adjacent book. Such disposition of the books obviates any liability of the interlocking of the opposing folds of adjacent books (as where the folded fronts of the books are in contact) during the removal of a book from a container in which they may be subsequently stacked, as for example, the supply hopper of a machine for vending book matches.

With this object in view (and others) my invention comprises novel features of construction and combinations of parts, which in a preferred form will be hereinafter described, the scope of the invention then being expressed in the appended claims.

In the drawings—

Figure 1 is a side elevation, partly in section, of match book assembling mechanism embodying my invention, showing the same in its co-operative relation to the cover-tucking devices of the booking machine.

Fig. 2 is a plan of the said mechanism.

Fig. 3 is a partial vertical section of the intermittently rotatable book reversing element and adjuncts of the assembling mechanism, several of the book holder heads being removed, and the parts being shown in their relative positions before the completion of a step of said element.

Fig. 4 is an end elevation of the mechanism shown in Fig. 3, the packing trough being omitted.

Fig. 5 is a plan of one of the peripheral face plates of the book reversing element.

Fig. 6 is a horizontal section of the mechanism, as on the line 6—6 of Fig. 1.

Fig. 7 is a development of a series of pairs of intermittently rotatable book holder heads which are arranged and adapted to receive the match books in successive pairs as they are discharged from the booking machine, and transfer them thence in endwise reversed relation to the receiving end of the packing trough, such holder heads and the books therein being shown in the relative positions which they are caused to assume during their intermittent travel.

Fig. 8 is a similar development of the holder heads in broken lines, showing the axial studs and toes of the respective holder heads and the relation of the toes to each other and to the stationary controlling cams therefor.

Fig. 9 illustrates a succession of match books in the relative positions which they occupy when assembled in the packing trough.

Referring to the drawings, 10 designates the usual intermittently rotatable flap folding wheel of a typical match booking machine, from which wheel the match books, in pairs, are delivered horizontally in similar endwise and face arrangement upon yielding supporting plates 11 by the action of a reciprocating ejector frame 12, the larger or headed ends of the matches leading and the folded faces of the covers being upward. The plates 11 are secured to the floor of a bed 13 having parallel channels into which the books are ejected. The booking machine also includes two tucker members 14 which are carried by reciprocating arms 15 and are operative to insert the free ends of the cover flaps *a* of each successive pair of books B under the stapled short folds *c* of the covers at the narrow ends of the respective books. Each pair of closed books are pushed onward by the next succeeding pair of books presented to the tuckers, and are thereby entered in the adjacent peripheral book holder heads of an intermittently movable book reversing element embodying the principle of my invention. The tucker arms 15 have secured thereto adjacent the members 14 shoe-like members 16 which by virtue of the motion of the arms 15

push down and hold the books immediately following the delivery of the books in the holder heads. (See Fig. 1.)

The book reversing element herein illustrated is in the form of an octagonal wheel which is mounted for intermittent rotation on a stationary central shaft 17 having its ends fixed in brackets 18 conveniently supported by the frame structure for the packing trough 19 in which the books are assembled in two parallel rows.

Any suitable means for intermittently rotating the reversing wheel in timed relation to the booking machine may be employed. In the present instance I have illustrated for this purpose a double-acting Geneva stop motion, whereof the driven member 20 is fastened to one end of the wheel, and the complementary double driver 21 is fast on a shaft 22 which is connected by suitable sprocket gearing (indicated in part at 23) with and driven from the usual tucker-actuating shaft of the booking machine. The gear ratio between the tucker-actuating shaft and the shaft 22 is one to two because of the double driver.

The reversing wheel in the form shown comprises two spaced end heads 24 with interposed peripheral face plates 25 bolted thereto, the end heads having central hubs 26 through which the shaft 17 extends. In each of the plates 25 are journaled two spaced radial studs 27 which extend beyond the respective faces of the plate, the distance between the centers of the two studs corresponding to that between the center lines of the two tuckers of the booking machine. Fast on the outer ends of the companion studs 27 are open heads 28, whereof each provides a holder of suitable shape and size for the flatwise reception and retention of a match book B when the head is positioned adjacent to and in alignment with one of the tuckers during a dwell of the reversing wheel in its intermittent rotation. Also fast on each pair of studs close to the heads 28 are arms 29 which extend at right angles to the toes 30 that are fixed to the inner ends of the studs.

Each of the heads 28 comprises a base 31 having parallel straight sides 32 and rounded or arcuate ends 33, the inner face of the base having therein a radial recess which opens at one flat side of the head and tightly receives the arm 29 adjacent the outer end of the associated stud. The opposite face of the base is provided at its sides and ends with outwardly projecting lugs 34, which in conjunction with the base afford a holder in which a match book can be flatwise deposited with its center co-axial with the stud. The spaced relation of the adjacent holder heads 28 is such that each head can be independently turned about its central axis a predetermined extent during the intermittent rotation of the reversing wheel.

When in each dwell of the reversing wheel a pair of holder heads are located adjacent the tuckers 14 the toes 30 of such heads extend either outwardly or inwardly; that is to say, the toes of the alternate pairs of studs extend outwardly and inwardly as they approach and reach the book receiving position adjacent the tuckers. In Fig. 8 the receiving position of a pair of heads is indicated at X, it being noted that the actuating toes 30 for such heads extend outwardly, that is, toward the respective sides of the reversing wheel, and that the actuating toes for the next succeeding pair of heads extend inwardly, that is, toward the mid-portion of the wheel, and so on in alternation.

When the match books have been delivered to the pair of holder heads 28 adjacent the tuckers the loaded holder heads in the next succeeding step of the reversing wheel are advanced, and the next succeeding pair of empty holder heads are brought to loading position. Hence the succeeding pairs of heads with their toes alternately pointing in opposite directions progress to and from the book receiving or loading station.

In the intermittent travel of each pair of loaded holder heads the actuating toes 30 of such heads abut suitably-disposed stationary cams 35 or 36 located within the reversing wheel, which cams effect the partial turning of the toes through opposite paths of 90° each, thus correspondingly swinging the supported books in planes parallel to the faces of the respective books and with such books in end reversed relation; that is, with either the narrow or the larger ends of the books of a pair adjacent each other, as indicated at the right of Fig. 7.

In the present instance two similar laterally disposed single-face sector cams 35 and an intermediate corresponding double-face cam 36 are formed on a sleeve 37 which is fixed to and constitutes, in effect, a part of the stationary shaft 17. These cams are so constructed and are so arranged in relation to the paths of the toes 30 that in the clockwise movement of the reversing wheel the outwardly extending pairs of actuating toes abut the outer cams 35 and the inwardly extending pairs of the alternate toes abut the intermediate cam 36, thus partially turning the studs and their loaded heads a quarter turn in alternation in a manner to position the adjacent match books of the two rows with their larger ends pointing in opposite directions to each other and the larger heads of the adjacent books of each row also pointing in opposite directions, as indicated in Fig. 7. In this movement of the reversing wheel the respective pairs of toes 30 enter and extend longitudinally of the spaces between the sector cams, thus being efficiently guided in their continued travel to the book-discharging position, it being noted that the arms 29 of the respective holders extend outwardly and inwardly in alternation in the travel of the toes 30 between the cams, as indicated at Fig. 8.

When any pair of holder heads 28 have received their books and been advanced two steps, the partially turned books contained in such heads are ejected facewise (front or back), by means, for example, of two pairs of upstanding oscillating fingers 38 having upper bevelled ends 39 which, entering suitably-disposed recesses 40 in the floor of the holder heads and behind the books just before the completion of the second step movement, push the opposing books bodily from the holder heads and place them vertically face to face in the adjacent receiving end of the packing trough 19. In this way the books are assembled in the trough in parallel rows with the adjacent books of each row in end reversed relation and the smooth back of each book in contact with the folded front of the adjacent book. Moreover the books of each row are positioned on their edges in the trough, thus facilitating the manual removal of determined quantities of books for packing in the usual cartons.

In the present instance four corresponding ejecting fingers 38 are provided, two for each book of a pair. The lower ends of the fingers are affixed by means of a clamp bar to a transverse bar 41 having a centrally depending leg 42 which is loose on a sleeve 43 of an adjacent arm 44 fast on a rock shaft 45. This arm has an arcuate

slot 46 through which passes a connecting bolt 47 for the associated leg and arm, thus providing between the bar 41 and shaft 45 an efficient connection whereby the position of the fingers in relation to the rotary path of the holder heads can be readily adjusted. (See Figs. 3 and 4.)

Fixed to the rock shaft 45 is an upstanding arm 48 having a laterally-disposed roll 49 which is held by means, for example, of a suitably-disposed spring 50 in the path of a cam 51 on the driven shaft 22.

Adjacent the path of the holder heads 28 in their travel from the book loading to the book discharging position is a curved plate 52 which is hingedly connected at its upper end to the supporting bed 13 adjacent the tuckers, which plate is arranged and adapted to serve as a guard to prevent the books from flying out of the holder heads by centrifugal force during the rapid rotation of the reversing wheel.

Overhanging the receiving end of the packing trough are two spaced gripper members 53 having depending lips 54 which are effective to engage and hold each pair of books as the books are placed in the trough 19 by the oscillating fingers 38. The grippers are fast on a rock-shaft 55 which is journaled at its ends in bearings 56 on the respective sides of the trough. Fixed to one end of the shaft 55 is an arm 57 to which is pivoted, as at 58, the upper end of a depending bar 59 whereof the lower portion is guided in a slotted fixture 60 on the bracket 18. The rounded foot of the bar 59 is resiliently held in the path of a suitably-disposed cam 61 on the driven shaft 22, by means of a spring 62 which is secured at its respective ends to the fixture 60 and the pivot pin 58. The positon of the cam 61 in relation to that of the cam 51 is such that the grippers are periodically lifted to allow the books to pass into the trough and dropped to hold the books in position in the trough. Fast on the rock-shaft 55 is a forwardly and downwardly inclined arm 63 having at its lower end a laterally projecting pin 64 which rests on the opposing side of the trough and limits the descent of the gripper members. Loose on the rock-shaft 55 are two rearwardly depending blocks 65 which rest upon the underlying match books contained in the trough and serve as dogs to keep the rows of stacked books in the trough from pushing back too hard against the grippers. (See Figs. 1, 2, 3 and 6.)

As seen in Figs. 1, 2 and 3 the floor of the packing trough 19 is cut away at its receiving end, as indicated at 66, and is provided with a hinged bottom plate 67 which is normally held in raised position to close the opening, by means of retracting springs 68 which are secured to the ends of the plate 67 and to arms 69 projecting from the bed 13. The free longitudinal edge of the plate 67 is formed with spaced recesses 70 which are arranged to permit the free movement of the upper ends of the ejecting fingers 38 into and from the trough. The object of the resiliently supported plate 67 and its mounting is to allow a book or books which has or have become damaged in the process of manufacture to be carried down and discharged below the plate by the pressure thereon of the adjacent travelling holder or pair of holders, thus obviating the otherwise liability of a jam in the trough.

After the successive pairs of books have been delivered to the packing trough the empty holder heads in their return travel to the loading station are turned back on their axes to their previous loading positions wherein the toes 30 of the heads extend alternately in opposite directions and the respective arms 29 are trailing. This return movement is effected by the lateral contact of the progressing inwardly and outwardly extending arms 29 with suitable cams 71 and 72, respectively, which are situated adjacent to and in concentric relation to the left hand side of the reversing wheel. As shown there is a central cam 71 and also opposite side cams 72, the former being arranged in the path of the inwardly extending arms and the latter in the path of the outwardly extending arms. The cam 71 comprises a segmental plate bevelled or rounded at its lower or free end, as at 73, and having parallel sides 74 lying in close relation to the paths of the hubs of the two rows of arms 29 during the intermittent travel of the reversing wheel. The upper end of the cam plate 71 is fastened to the lower end of a substantially semi-circular guide bar 75 which is affixed to a base block 76 on a cross-bar 77 which is supported by side plates 78 bolted to the respective brackets 18. (See Figs. 1 and 2.) The guide-bar 75 is concentric with the reversing wheel and extends upward adjacent the loading station. The side cams 72 comprise short segmental bars which are fixed to arcuate guide bars 79 fastened to the base block 76 in spaced parallel relation to the respective sides of the cam plate 71.

When the inwardly and outwardly extending arms 29 of the alternate pairs of holder heads abut the respective cams 71 and 72, the arms of the successive pairs are turned to trailing position, thus setting the toes of the alternate holder heads in outwardly and inwardly extending positions as they travel to the loading station. The positions of the guide bars 75 and 79 in relation to the cams 71 and 72 are such that the flat sides 32 of the succeeding pairs of holder heads when they are partially turned in their travel as just described move in sliding contact with the opposing parallel sides of such guide bars, and are thereby laterally supported and guided in their progress to the loading station, where they are again supplied with the match books discharged from the tuckers.

It is to be understood that the invention is not limited to the particular exemplifying form thereof herein disclosed, as the mechanism may be modified within the principle of the invention and the scope of the appended claims.

I claim—

1. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by the said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, means for partially turning on their axes and in opposite paths during the continued movement of the supporting element to another location the alternate holders and their contents, means for ejecting at the latter location each succeeding packet flatwise from its holder, thus arranging the ejected packets with the flat back

of each in contact with the folded front of the next adjacent packet and with the ends of such packets reversed, and means for partially turning the empty holders on their axes to packet-receiving position during the return of said holders to the first-named location.

2. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by the said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, each of said holders comprising an open-face holder head, an axial stud therefor, an arm and a toe fast on said stud in angular relation to each other, cam means with which the toes co-act in succession as the holders travel to another location, thereby partially turning the alternate holder heads and their packet contents in opposite paths, means for thereafter ejecting each succeeding packet flatwise from its holder head, and means constructed and arranged to co-act with the arms of the empty holders during the return of the holders to the first-named location, and thereby turn said holders on their axes to their previous packet-receiving positions.

3. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, and each of said holders comprising an open-face holder head, an axial stud therefor, an arm and a toe fast on said stud in angular relation to each other, a plurality of parallel cams with which the toes co-act as the holders travel to another location, thereby partially turning the alternate holder heads and their contents in opposite paths, said toes in their travel passing between and being guided by the cams, means for thereafter ejecting each succeeding packet flatwise from its holder head, and means constructed and arranged to co-act with the arms of the empty holders during the return of such holders to the first-named location and thereby turn said holders on their axes to their previous packet-receiving positions.

4. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, each of said holders comprising an open-face holder head, an axial stud therefor, an arm and a toe fast on said stud in angular relation to each other, a plurality of parallel cams with which the toes co-act as the holders travel to another location, thereby partially turning the alternate holder heads and their contents in opposite paths, said toes in their travel passing between and being guided by the cams, means for thereafter ejecting each succeeding packet flatwise from its holder head, and a plurality of parallel cams constructed and arranged to co-act with the said arms of the empty holders and thereby turn said holders on their axes to their previous packet-receiving positions during the return of said holders to the first-named location, said arms in their travel passing between and being guided by the latter cams.

5. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, each of said holders comprising an open-face holder head, an axial stud therefor, an arm and a toe fast on said stud and in angular relation to each other, a plurality of parallel cams with which the toes co-act as the holders travel to another location, thereby partially turning the alternate holder heads and their contents in opposite paths, said toes in their travel passing between and being guided by the cams, means for thereafter ejecting each succeeding packet flatwise from its holder head, and a plurality of parallel cams constructed and arranged to co-act with the said arms of the empty holders and thereby turn said holders on their axes to their previous packet-receiving positions during the return of said holders to the first-named location, said arms in their travel passing between and being guided by the latter cams, and a guide member for the holders leading from one of said latter cams to the vicinity of the first-named location.

6. In a machine for assembling packets each including a cover having a flat back and a folded front portion, the combination with means for feeding the packets end to end, all in similar endwise and face arrangement, of packet reversing means embodying an intermittently movable supporting element, actuating means for said element, a continuous succession of travelling packet holders movable in succeeding order by the said element to a location under and in receptive position for the leading packet in the path of feed during a dwell of said element, said

holders mounted on said element at spaced intervals for independent oscillatory movement about axes at right angles to the planes of the respective holders during the travel of said element, means for partially turning on their axes and in opposite paths during the continued movement of the supporting element to another location the alternate holders and their contents, a packing trough having its receiving end adjacent the second-named location, vibrating arms arranged to push the packet flatwise from each succeeding holder and into the trough, thereby arranging the flat back of each packet in contact with the folded front of the next adjacent packet and with the ends of such packets reversed, and means for partially turning the empty holders on their axes to packet-receiving position during the return of said holders to the first-named location.

7. In a packet assembling machine comprising a travelling supporting element, spaced-apart open face packet holders thereon, each holder having a projecting member at the leading end of the contained packet, and means for ejecting a packet flatwise from each succeeding packet holder, a packing trough having at its receiving end a resiliently supported bottom member upon which each succeeding packet is vertically deposited by the ejecting means, said member arranged and adapted to support in the path of the projecting member of a holder an irregularly formed packet which may have been ejected from the immediately preceding holder, whereby said member in its travel passes the latter packet down and below the said bottom member.

8. In combination with the cover fold tucking member of a bocking machine and the actuating arm for said member, a pressure shoe carried by and movable with said arm, and operable thereby to depress each succeeding book advanced from the tucking member, a travelling supporting element, and spaced-apart open-face holders thereon movable in succeeding order by the said element to a location under the said shoe and in receptive position for each succeeding book advanced from the tucking member.

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