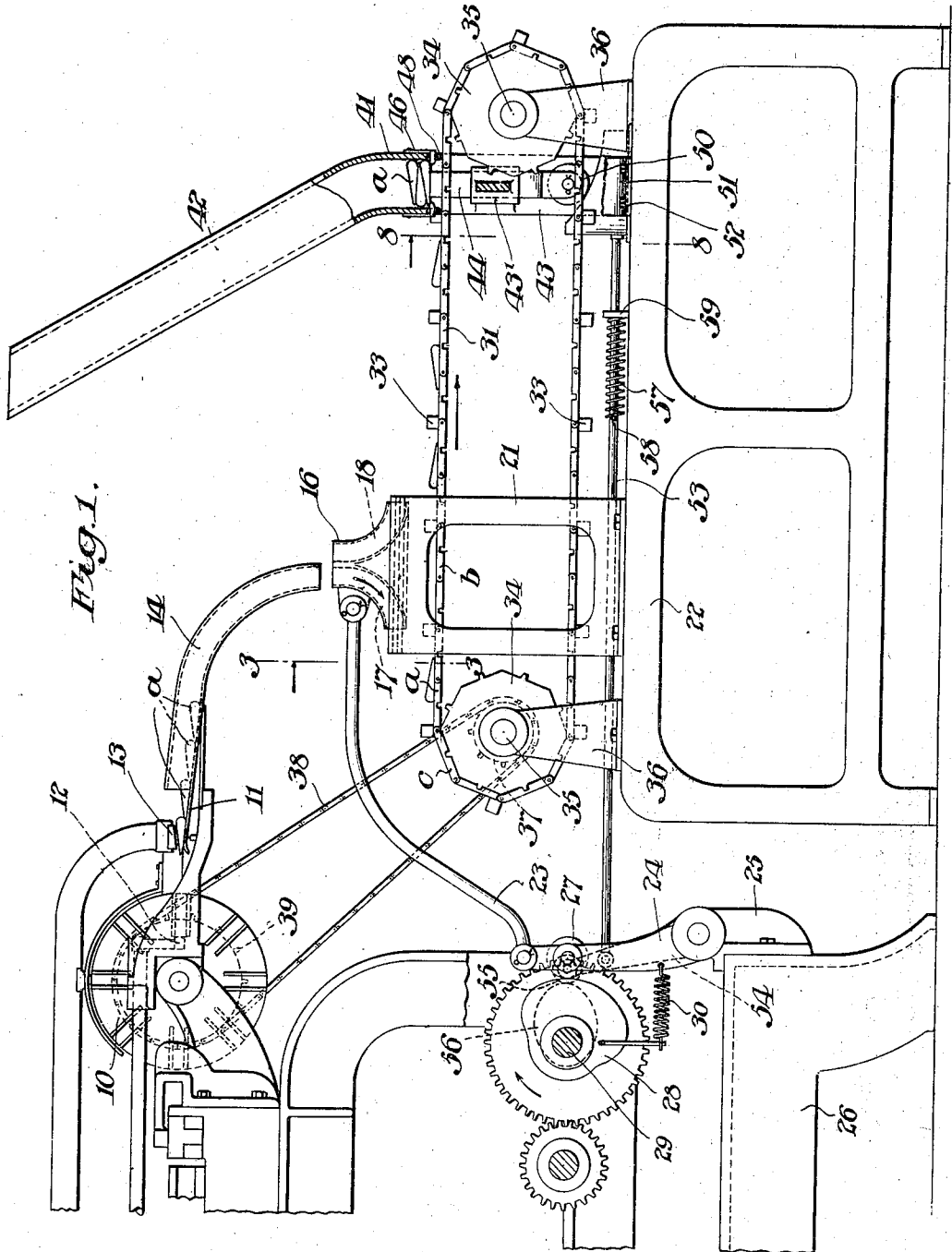


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APPLICATION FILED JUNE 17, 1916.

1,217,992.

Patented Mar. 6, 1917.
3 SHEETS—SHEET 1.



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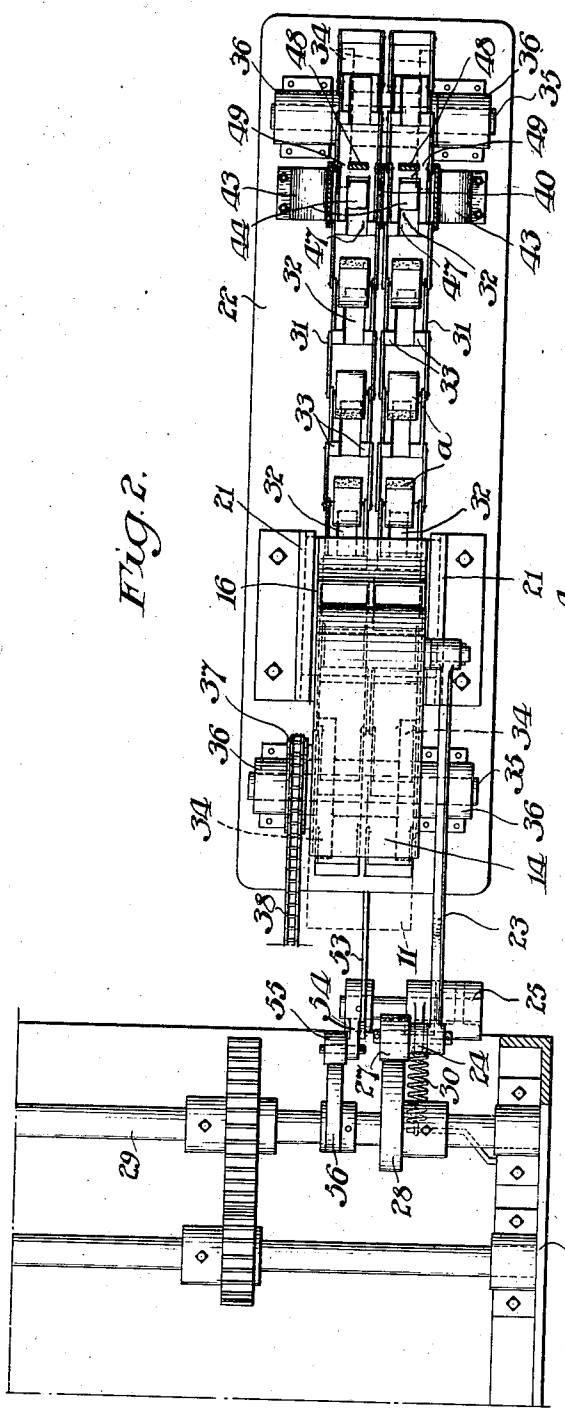


Fig. 2.

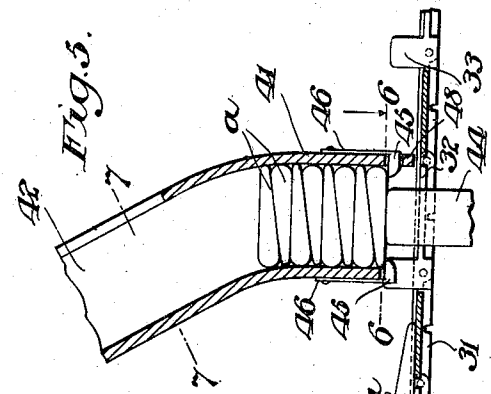


Fig. 3.

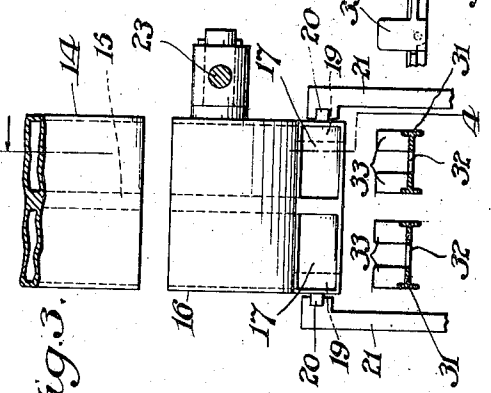


Fig. 4.

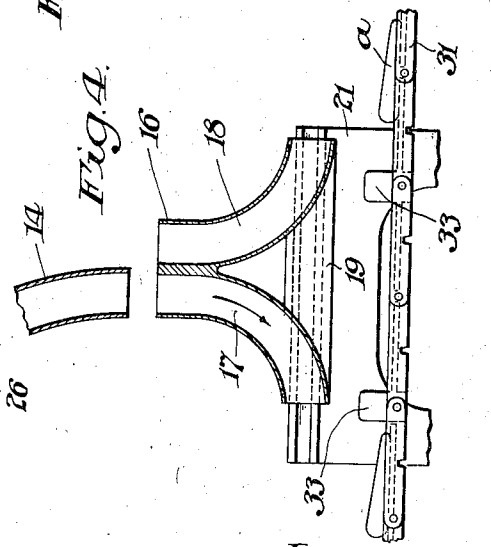


Fig. 5.

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Fig. 6.

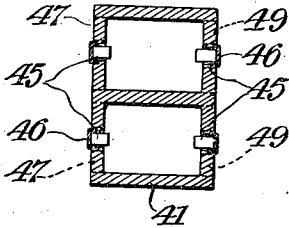


Fig. 7.

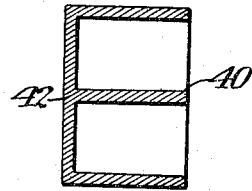


Fig. 8.

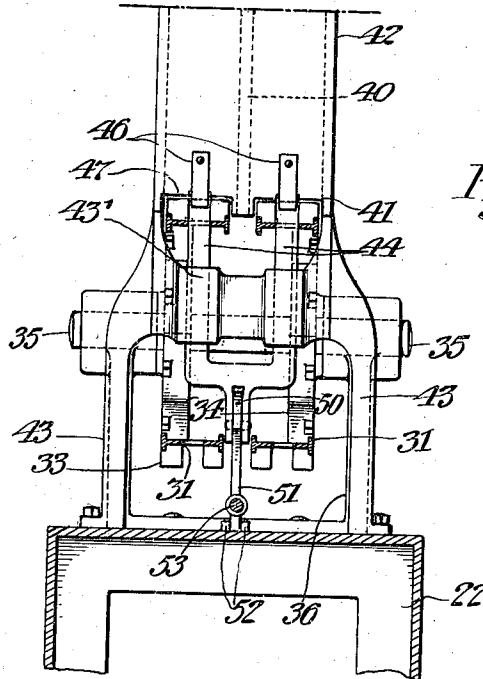
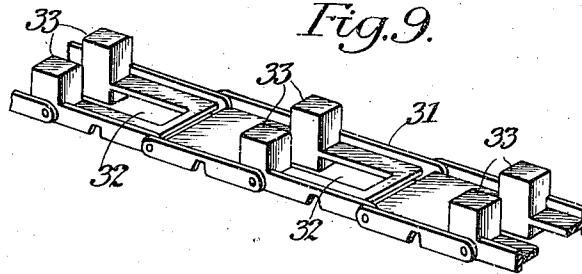


Fig. 9.



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UNITED STATES PATENT OFFICE.

MICHAEL PARIDON, OF BARBERTON, OHIO, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MACHINE FOR ASSEMBLING MATCH-BOOKS, &c.

1,217,992.

Specification of Letters Patent.

Patented Mar. 6, 1917.

Application filed June 17, 1916. Serial No. 104,205.

To all whom it may concern:

Be it known that I, MICHAEL PARIDON, a citizen of the United States, and resident of Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Machines for Assembling Match-Books, &c., of which the following is a specification.

This invention relates to that class of machines whereby book-matches and similarly shaped articles are assembled side by side with the corresponding ends of the contiguous articles in opposite relation to each other. Such machines are particularly though not exclusively designed for use in connection with a match-book machine of the character illustrated in Patent No. 1,042,472, dated October 29, 1912, wherein match-books, wedge-like or tapering in form (owing to the match heads of the covered cards or splints,) are discharged horizontally from an intermittently rotatable turret element in succeeding pairs with the larger ends of the books rearward.

The object of my present invention is to provide a simple and efficient construction and organization of mechanism whereby the succeeding articles are arranged flatwise in opposite endwise relation to each other and thence transferred to a suitable receptacle wherein they are assembled in a compact column or columns.

With this and other objects in view my invention, generally stated, comprises means whereby the articles are deflected from a horizontal to a vertical position, and means whereby the vertically-positioned articles are successively deflected laterally in opposite directions and partially turned, and a conveyer upon which the succeeding articles, thus oppositely-disposed as to their ends, are delivered in spaced relation to each other.

The invention also comprises, in combination with the conveyer, a receptacle adjacent the path thereof, and means whereby the articles are successively transferred from the conveyer to the receptacle and therein assembled.

The invention also comprises various novel features of construction and combinations of parts, all of which will be hereinafter described and claimed.

In the annexed drawings—

Figure 1 is a side elevation, partly in

section, of a book-match assembling machine embodying the principle of my invention, part of a book-match making machine with which it is associated being shown.

Fig. 2 is a plan, partly in section, of Fig. 1.

Fig. 3 is a transverse vertical section adjacent the book-positioning element, as on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal vertical section, as on the line 4—4 of Fig. 3.

Fig. 5 is a vertical section of the lower portion of the book receptacle, and adjuncts.

Fig. 6 is a transverse horizontal section of said receptacle, as on the line 6—6 showing auxiliary stops for the lowermost books.

Fig. 7 is a similar section of the receptacle, as on the line 7—7 of Fig. 5.

Fig. 8 is a transverse section through the conveyers and adjacent parts, as on the line 8—8 of Fig. 1.

Fig. 9 is a perspective view of several links of one of the conveyers.

Referring to the drawings, 10 designates the intermittently-rotatable wheel, or turret, of a match-book machine, from which the books (*a*) are discharged in successive pairs, larger or headed ends rearward, upon a yielding supporting plate 11 by the action of ejecting arms on a reciprocating frame 12.

13 designates one of two reciprocative fingers by means of which the free ends of the cover flaps of the books are tucked under the stapled end folds of the covers. When the tucking operation has been completed and the fingers leave the finished books the latter are simultaneously pushed rearwardly, abreast, by the next succeeding pair of books, and so on, as described in Patent No. 1,042,472 above referred to.

14 designates a rearwardly and downwardly curved feed chute extending from and constituting, in effect, a continuation of, the supporting plate, whereby the books are pushed from the latter into the chute and thus, in their passage through the chute, the books are deflected from a horizontal to a vertical position. The succeeding books, larger ends downward, are discharged from the lower end of the chute. Preferably the interior of the chute has a longitudinal partition (15) which provides separate feed passages for the books of each pair.

The successive pairs of vertically-disposed books are delivered by the feed chute to a

reciprocative book-positioning structure which constitutes, in effect, a switch for the books. This structure, in its preferred form, comprises two oppositely-disposed curved or elbow-like chute members 17, 18 respectively, each of which, in cross-section, corresponds substantially with that of the chute 14, so that by properly positioning the upper end or mouth of either member beneath the feed chute a pair of books may be delivered by the latter to either member and be deflected thereby from a vertical to a horizontal position, or substantially so, and thence discharged. Viewing the switch structure as it is represented in Figs. 1 and 4 the larger or leading ends of the pairs of books discharged from the chute member 17 will point toward the left while the corresponding ends of the pairs of books discharged from the member 18 will point toward the right. As illustrated the upper or receiving ends of the chute members are in close relation to each other, the bodies of such members curving thence downwardly and outwardly away from each other. The lower portions of the members are connected by side pieces 19 provided with longitudinal ribs 20 which are slidably fitted, similarly to a cross-head, to horizontal guide ways formed in standards 21 on a suitable supporting frame 22.

The switch structure is horizontally reciprocable within defined limits so as to position the chute members thereof for the reception of pairs of match books in alternation from the feed chute 14. In the present instance the structure is connected by means of a rod 23 with the upper end of a rocker-arm 24 which is pivoted on a stud on a suitably-disposed bracket 25 on the frame 26 of the match-book machine. On the arm is an anti-friction roller 27 which is maintained in operative contact with a cam 28 on a positively-driven shaft 29 of the match book machine, by means of a spring 30 which is secured to the arm and to a suitably-fixed support; the contour and speed of the cam being such as to effect through the coöperation of the spring the requisite reciprocation of the switch structure in relation to the delivery chute.

Suitable off-bearing means for receiving and advancing the articles discharged from the switch structure are provided. In the present instance such means comprises two intermittently movable chain conveyers 31 arranged in juxtaposition so that their upper horizontal runs travel in parallelism directly beneath the switch structure in such a manner as to receive the books flatwise as rapidly as they are discharged from said structure; that is to say, the two conveyers receive a pair of books from one chute member and then a pair of oppositely-disposed books from the other chute member; and so on successively. The alternate links of each

conveyer are slotted or open, as at 32, and they are each provided with a pair of up-projecting lugs 33. The books are deposited upon the conveyers in the spaces between succeeding pairs of lugs as shown in Fig. 1, and are borne thence to the assembling station, as will presently appear.

The endless chain conveyers illustrated are supported by appropriate sprocket wheels 34, the shafts 35 of which have their bearings in standards 36 on the frame 22. That shaft 35 adjacent the book-match machine bears a sprocket wheel 37 which is operatively connected by means of a chain 38 with an appropriate sprocket wheel 39 on the shaft of the turret 10 of the book-match machine, whereby the requisite intermittent motion is transmitted to the conveyers.

By reference to Fig. 1 it will be seen that the switch structure 16 is illustrated as positioned with the mouth of its deflecting member 17 directly under the feed chute 14 and that a pair of books, of which one is indicated at *a*, have been directed by said member to the conveyers. The adjacent book space on the conveyers (that is the space indicated at *b* directly under the switch) is vacant; but in the next operation the conveyers will be advanced one step (thereby moving the books *a* to the position indicated at *b*, and correspondingly advancing the vacant space) and the structure 16 will be moved to position the mouth of its deflecting member 18 directly under the delivery chute, whereupon, while the conveyers are at rest, a pair of books will be deposited upon the vacant space (*b*) of the conveyers.

In the next step of the conveyers the space *c* of the latter will be brought to the point *b*, and the next succeeding blank space accordingly be positioned at *a*; and at the same time the structure 16 will be shifted to the first described position, namely, that shown in Fig. 1, preparatory to a repetition of the operation, and so on.

The pairs of books, arranged alternately in opposite endwise relation to each other on the conveyers as just described, are carried successively beneath the open receiving end of a suitable receptacle and therein assembled in two adjacent columns with the corresponding ends of the contiguous books of each column in opposite relation to each other.

The receptacle preferably comprises an upstanding tubular structure divided into two longitudinal book-receiving compartments by means of a central partition 40. The lower or basal portion 41 of the structure includes a vertical body which merges with an upwardly inclined extension 42 having in its outer wall longitudinal openings which facilitate the removal of predetermined quantities of books by an attendant. The receptacle is formed on or affixed to a

suitable standard 43 on the frame 22, and is thereby firmly supported in position with its mouth directly overlying the path of the two conveyers.

5 The lower edge of the forward wall of the receptacle is appropriately recessed, as at 47, to permit the free passage of the conveyer lugs and the books beneath the mouth of the chute, and the lower edge of the opposite
10 wall extends in close relation to the tops of the conveyer links, as at 48, so as to afford a back stop against which the books are pushed and accurately positioned by the proximate forward lugs of the conveyer.
15 As the pairs of books are thus positioned beneath the mouth of the receptacle they are successively raised by means, for example, of a vertically-reciprocating plunger 44; the lugs of the conveyers being so arranged that
20 they pass under the lowermost books in the receptacle while the plunger is in raised position and remain thereunder until after the plunger is withdrawn and a succeeding pair of books advanced under the load of
25 books by the movement of the conveyers.

If desired auxiliary yielding stops may be employed to support the books in raised position when they are pushed up by the plunger, such stops being arranged on the
30 forward and rearward walls of the lower portion of the receptacle at a suitable distance above the conveyer. In the present instance each of these stops comprises a beveled latch head 45 secured to the free end
35 of a flat spring 46 which is fastened to the adjacent wall of the receptacle, said head projecting through an opening in the wall, as shown.

The rear wall of the receptacle is provided
40 with suitably-disposed recesses 49 to permit the free passage of the lugs in the continued travel of the conveyers after the transference of each pair of books to the receptacle by the reciprocating plunger 44.

45 The plunger, in its preferred form, comprises a bifurcated body, the respective limbs of which are reciprocative through the adjacent open links of the conveyers, said body being conveniently mounted in suitable
50 guides 43' on the standard 43. On the lower end of the plunger is an anti-friction roller 50 which rests, by gravity, on an inclined slide cam 51 by the horizontal reciprocation of which the plunger is positively lifted and
55 then permitted to descend. The cam is slidingly fitted to a guide 52 on the top of the frame 22, and is connected by means of a rod 53 with a rocker-arm 54 which is pivoted to the stud on the bracket 25 previously referred to. This arm bears an anti-friction
60 roller 55 which is maintained in operative contact with a cam 56 on the shaft 29 of the match-book machine by means of a spring 57, which, encircling the rod 53, bears
65 against a stud 58 on the latter and against

a suitably-disposed guide piece 59 through which the rod extends. The relative contours of the cams 51 and 56 are such as to effect through the co-action of the spring and connections, the timely operations of
70 the plungers across the path of the book-conveyers.

By the construction and organization of mechanisms above described it will be seen that the pairs of match-books after their
75 discharge from the match-book machine are successively deflected by the curved feed chute 14 from a horizontal to a vertical path, and thence delivered to the respective members of the book-positioning structure
80 which switches the succeeding pairs of books in opposite directions and deposits them flatwise in spaced relation to each other, with their adjacent ends oppositely-disposed, upon the upper runs of the intermittently
85 moving conveyers. It will also be seen that said conveyers advance the pairs of books successively to the mouth of the receptacle, and that the vertically-reciprocating plunger positively transfers the successive pairs of
90 books from the conveyers to the receptacle and therein assembles them in compact columns with the corresponding ends of the contiguous books of each column in opposite relation to each other.

95 While I have herein shown and described a preferred form of embodiment of my invention, it is to be understood that the invention is not specifically limited thereto, as the mechanisms illustrated may be variously modified within the scope of the ap-
100 pended claims.

I claim—

1. The combination with means for feeding a succession of flat articles in vertical
105 position, of a horizontally-reciprocative switch element having diverging guides, and means for reciprocating said element whereby its said guides are positioned to receive the articles in alternation.

2. The combination with a feed chute for diverting a succession of flat articles from a horizontal to a vertical position, of a horizontally-reciprocative switch element having
110 diverging guides, and means for reciprocating said element whereby its guides are positioned to receive the vertically-disposed articles in alternation.

3. The combination with means for feeding a succession of flat articles in vertical
120 position, of off-bearing means below the same, a switch element, and actuating means therefor, whereby the successive articles discharged from the first named means are directed in opposite directions and delivered
125 flatwise upon the second named means.

4. The combination with means for feeding a succession of flat articles in vertical
position, of underlying off-bearing means, a switch element interposed between said off-
130

bearing and feeding means, and means for effecting a relative movement between said element and feeding means whereby the successive articles discharged from the latter are directed in opposite directions and delivered flatwise to the off-bearing means.

5 5. The combination with feeder means for diverting a succession of flat articles from a horizontal to a vertical position, of underlying off-bearing means, a switch element
10 interposed between said off-bearing and feeder means, and means for effecting a relative movement between said element and feeder means, whereby the successive articles
15 discharged from the latter are directed in opposite directions and delivered flatwise to the off-bearing means.

6. The combination with means for feeding a succession of flat articles in vertical
20 position, of an underlying conveyer, a switch element interposed between said conveyer and feeding means, means for actuating said element whereby it is positioned to direct the successive articles in opposite directions
25 to each other and deliver them flatwise upon the conveyer, and means for intermittently moving said conveyer.

7. The combination with means for feeding a succession of flat articles in vertical
30 position, of a structure having diverging guides for said articles, means for effecting relative movement between said structure and feeding means whereby the successive articles are received by the guides in alternation, and off-bearing means to which the
35 said articles are flatwise delivered by said guides with adjacent articles in opposite endwise relation to each other.

8. The combination with means for feeding a succession of flat articles in vertical
40 position, of a structure having diverging guides for said articles, means for reciprocating said structure whereby the guides thereof are alternately positioned to receive the successive articles, and off-bearing means
45 to which the said articles are flatwise delivered by said guides with adjacent articles in opposite endwise relation to each other.

9. The combination with a conveyer and
50 means for supplying match books flatwise thereto, of an upstanding receptacle adjacent the path of the conveyer, and means for successively transferring the books from said conveyer to the receptacle.

55 10. The combination with a conveyer, and

means for supplying match books flatwise thereto with adjacent books in opposite endwise relation to each other, of an upstanding receptacle adjacent to which the books are successively delivered by said conveyer, and
60 means for successively transferring the books from said conveyer to the receptacle.

11. The combination with a conveyer, and means for supplying match books flatwise
65 thereto with adjacent books in opposite endwise relation to each other, of an upstanding receptacle under which the books are successively delivered by the conveyer, and a vertically-reciprocating plunger for impinging against the successive books on the conveyer
70 and transferring them therefrom to the receptacle.

12. The combination with means for feeding a succession of flat articles in vertical position, of an underlying conveyer, a switch
75 element interposed between said conveyer and feeding means, means for effecting a relative movement between said element and feeding means whereby the successive articles discharged from the latter are directed
80 in opposite directions and delivered flatwise upon the conveyer, a receiver adjacent to the path of the conveyer, and means for transferring the articles from the conveyer to the receiver.

13. The combination with a conveyer having up-standing members thereon in spaced relation to each other, and means for supplying match-books flatwise to the spaces between said members, of an upstanding
90 receptacle under which the books are successively delivered by the conveyer, a vertically-reciprocating plunger for impinging against the successive books on the conveyer and transferring them therefrom to the receptacle, means for actuating the conveyer, and means for actuating the plunger in such relation to the conveyer that each succeeding
95 upstanding member thereof is caused to pass under the lowermost books in the receptacle while the plunger is in raised position and remain thereunder until after the plunger is withdrawn and a succeeding book is advanced by the conveyer beneath the receptacle.

Signed at Barberton in the county of Summit and State of Ohio this 13th day of June, A. D. 1916.

MICHAEL PARIDON.