April 3, 1934. M. PARIDON 1,953,818

APPARATUS FOR ARRANGING BOOK MATCHES AND THE LIKE

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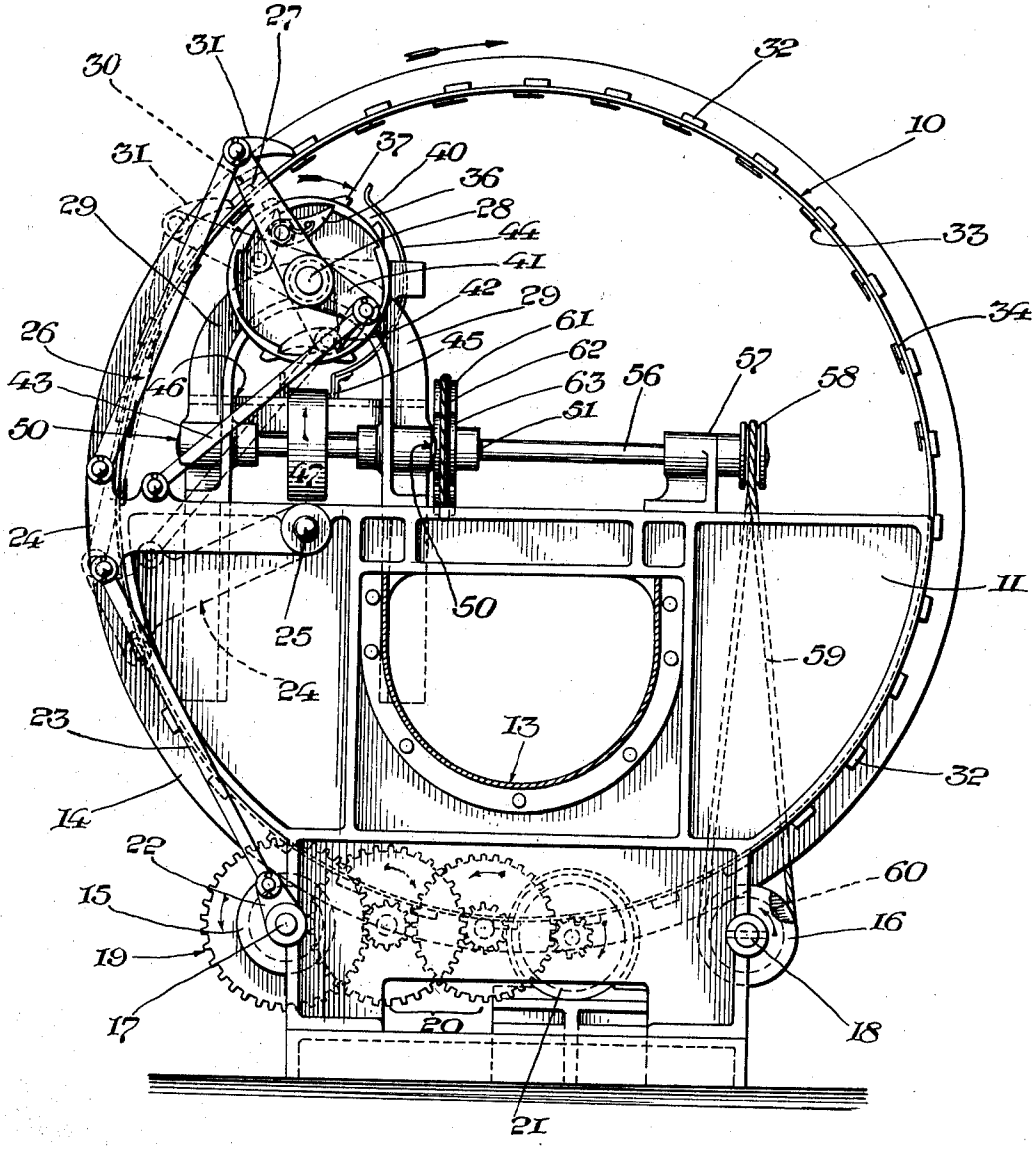
Fig. 1.



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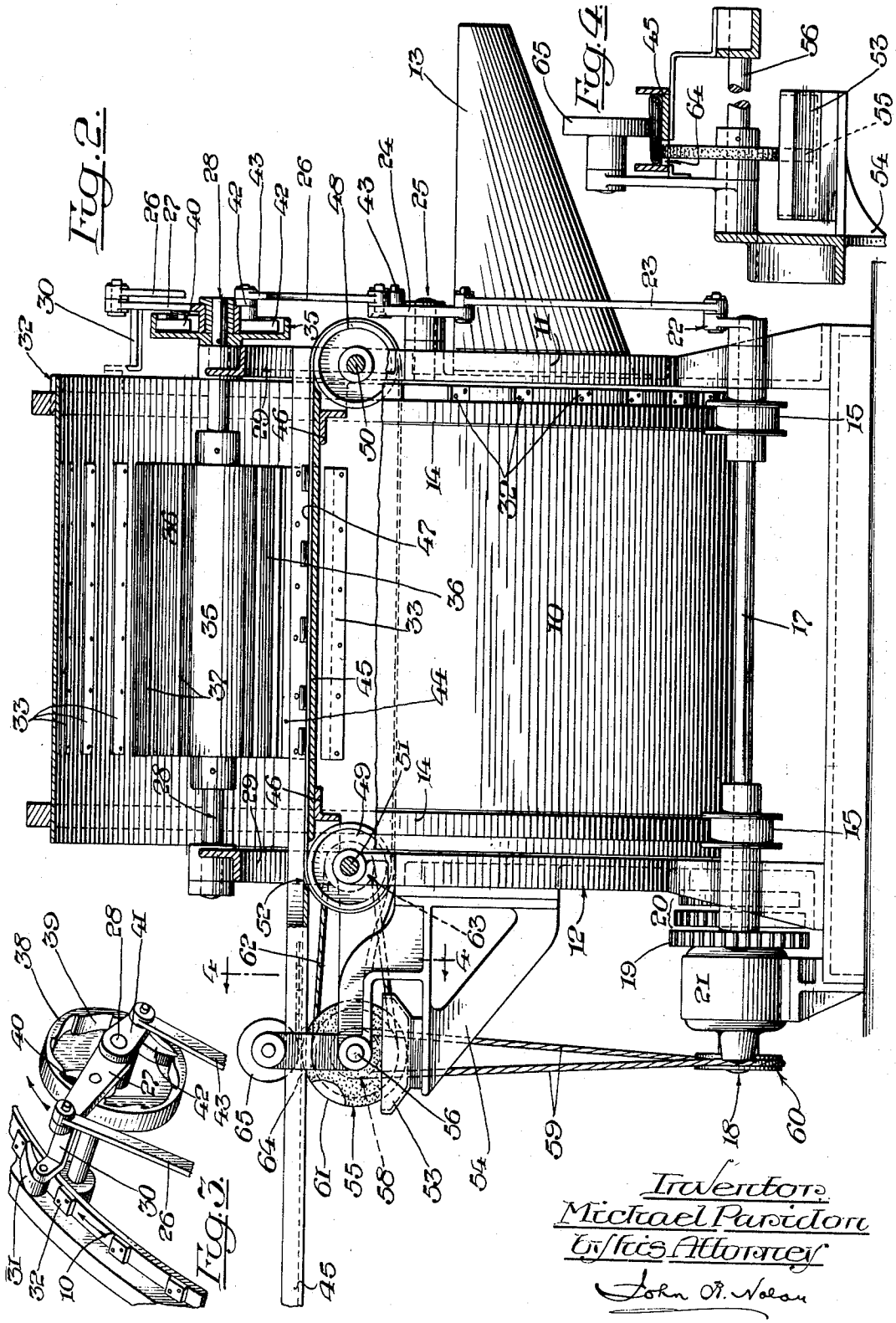

Fig. 2.

Fig. 4.

Fig. 3.

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Fig. 5.

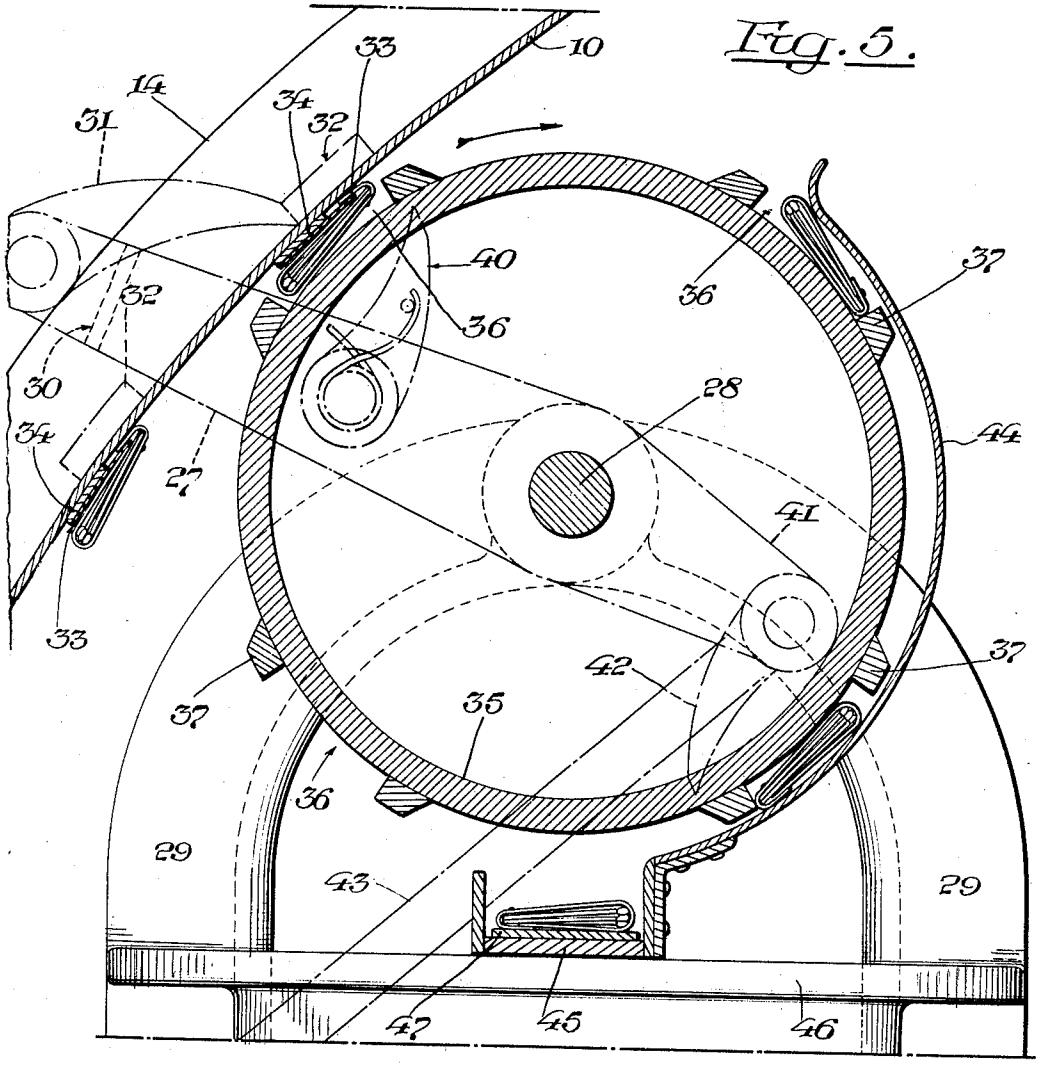
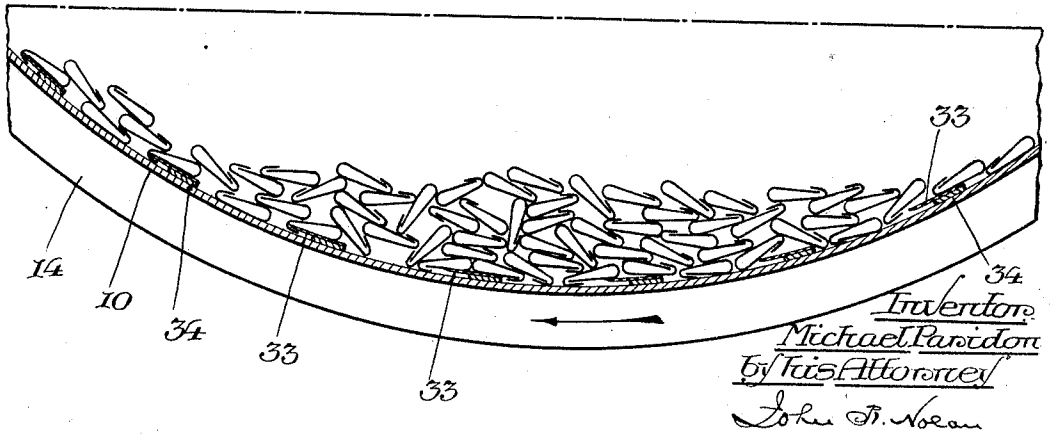


Fig. 6.



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UNITED STATES PATENT OFFICE

1,953,818

APPARATUS FOR ARRANGING BOOK MATCHES AND THE LIKE

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Application October 4, 1932, Serial No. 636,170

9 Claims. (Cl. 198—29)

This invention relates to an apparatus for rapidly and efficiently arranging in succeeding order promiscuously-disposed book matches and like articles having overlapping cover folds.

The preferred form of the invention herein illustrated embodies a rotary hopper within which book matches to be aligned are contained in mass, and which hopper is provided on its interior wall with a succession of blades constructed and arranged to engage the short cover folds of individual books in their path and thereby bodily lift the engaged books to a position where they are stripped from the blades and seated in a transfer element operative to deposit them correspondingly in flatwise position, folds downward, upon a horizontal take-off conveyer which impels the books in succeeding order through a suitable guide structure extending outwardly beyond the hopper. The stapled folds of the progressing books in the guide structure may be supplied with ignition material and advanced thence through a suitable drying path to a station for manual or machine packing, or, if the application of friction material be unnecessary, the aligned books may be advanced directly along the guide structure to the packing station.

The invention comprises novel features of construction and combinations of parts which will be hereinafter described, the scope of the invention then being expressed in the appended claims.

In the annexed drawings—

Figure 1 is an end elevation of a book-match arranging apparatus embodying the principle of my invention, the supply chute being in section.

Fig. 2 is a side elevation, partly in section, of the apparatus.

Fig. 3 is a detail, in perspective, of the ratchet devices for intermittently rotating the hopper and the pocketed transfer drum.

Fig. 4 is a transverse vertical section through the trough extension, adjacent the "painter", as on the line 4—4 of Fig. 2.

Fig. 5 is a transverse section on an enlarged scale through the pocketed transfer drum and adjuncts, as supplied with match books showing the adjacent portion of the hopper and match books supported thereon in cooperative relation to the drum.

Fig. 6 is a section through the portion of the hopper, showing the books in mass and the hopper blades co-acting therewith.

Referring to the drawings, 10 designates a rotary hopper comprising an open cylinder mounted to turn between spaced housing walls 11 and 12, one of which is provided with a chute 13 leading to the interior of the hopper and affording means whereby the book matches can be conveniently introduced in quantity into the hopper. The hopper is provided adjacent its ends with circumferential rails 14 which rest upon pairs of flanged wheels 15 and 16 on a pair of parallel shafts 17 and 18 which have their bearings in the bases of the housing, the wheels 15 being loose on the shaft 17 and the wheels 16 being fast on the shaft 18. The shaft 17 is positively rotated in any suitable manner. In the present instance this shaft has fast thereon a spur wheel 19 which is driven through a train of reduction gears 20 from a suitably-disposed electric motor 21. Fast on one end of the shaft 17 is a crank 22 which is connected by means of a link 23 with a rock arm 24 pivoted, as at 25, on the exterior of the adjacent housing wall 11, thus positively oscillating the arm.

The arm 24 is pivotally connected by means of a link 26 with the outer end of an arm 27 loose on a shaft 28 which extends transversely through the upper portion of the hopper adjacent the inner wall of the latter. The shaft 28 has its bearings in suitably-disposed stands 29 on the housing walls. The arm 27 is provided at its outer or free end with a laterally projecting angle-piece 30 to which is pivoted a pawl 31 in co-operative relation to a series of equally-spaced blocks or teeth 32 on the periphery of the hopper, and hence during the oscillation of the arm 24 the pawl bearing arm 27 is actuated and the hopper is intermittently rotated. (See Figs. 1 and 3.)

The inner wall of the hopper is provided with a series of transverse pick-up blades 33 parallel with said wall and corresponding in number and spaced relation with the circumferential blocks 32 of the hopper, which blades are secured to cross strips 34 on the hopper wall in such manner that the free ends of the blades are slightly spaced from the wall and project forwardly in the direction of rotation of the hopper.

During the intermittent rotation of the hopper the mass of book matches in the bottom thereof are kept in motion, and the cover folds of the book matches which are presented to the projecting ends of the blades are engaged by the latter, as seen in Fig. 2, such blades thus successively carrying up the engaged books to a radial position about 45° above the horizontal diameter of the hopper, as seen in Fig. 5. Thereupon the book or books thus positioned by each succeeding blade are stripped from the blade by and imposed on a transfer device which deposits them in an

orderly manner in a suitable take-off structure extending longitudinally of the hopper.

This transfer device in its preferred form comprises a drum 35 fixed on the shaft 28 and having spaced peripheral pockets 36 constituted by suitably-located strips or projections 37 extending longitudinally of the drum.

One end of the shaft 28 is extended and provided with an internal ratchet wheel 38 with the teeth 39 of which co-acts a forwardly-extending spring-pressed pawl 40 which is pivoted on the arm 27, and, therefore, during each upward stroke of the rock-arm 24 the wheel 38, together with the drum 35, is advanced concurrently with the hopper.

Loose on the shaft 28, adjacent the arm 27, is an inwardly-extending pawl arm 41 having a pawl 42 which extends in an opposite direction to the pawl 40 and co-acts with the teeth of the ratchet wheel 38. This arm 41 is pivotally connected by means of a link 43 with the rock-arm 24, and hence when the latter is actuated the arm 41 is oscillated and the pawl 42 in the downward stroke of the rock arm during the idle movement of the pawls 31 and 40 and the coincident dwell of the hopper, advances the wheel 38 and the drum 35 one step. Consequently the drum and the hopper are moved together one step by the active stroke of the associated pawls 31 and 40 on the teeth of the hopper and ratchet wheel, respectively, and then the drum is independently moved one step by the action of the pawl 42 on the teeth of the ratchet wheel, and so on the hopper and drum are relatively moved.

The peripheral pockets of the drum 35 are so relatively disposed that during the concurrent steps of the hopper and drum a pocket of the drum is advanced to and positioned at one of the book supporting blades 33, as seen in Fig. 1, so that the book or books carried by the blade is or are presented to the pocket at the limit of the concurrent movements of the hopper and drum, as seen in Fig. 5. Hence during the next succeeding independent forward movement of the drum, while the hopper is at rest, the rearward or trailing wall 37 of the pocket bears against the opposing end of the book and positively strips it from the blade, which book thereupon drops bodily into the pocket and is advanced therewith.

In the intermittent travel of the hopper and drum the book or books on each succeeding pick-up blade of the hopper is or are similarly stripped from the blade and deposited in each succeeding pocket of the drum. Such book or books progress with the drum until they are inverted and in horizontal position directly below the axis of the drum during a dwell of the latter, whereupon such book or books, flatwise and with their fold or folds downward, drop into the underlying take-off structure previously referred to. A suitably disposed segmental guard 44 rising from the structure adjacent the periphery of the pocketed drum 35 maintains the books in the descending pockets of the drum until the books are carried to discharging position. (Fig. 5).

In the present instance the take-off structure comprises a trough 45 which is conveniently supported by cross-members 46 on the stands 29 so as to extend longitudinally of the interior of the hopper and beyond the open end of the latter remote from the supply chute 13. The floor of the portion of the trough within the hopper supports the upper run of a conveyer belt 47 which passes about pulleys 48 and 49 on shafts 50 and 51 having their bearings in the respective stands 29, such floor having therein a suitable opening 52 to accommodate the pulley 49 and belt 47 at the discharging end of the hopper. The conveyer belt 47 is driven in any suitable manner to advance the imposed match books along the trough and into the outward extension thereof. The books deposited on the travelling conveyer are in various spaced positions thereon, and are thus advanced to the stationary floor of the extension which tends to retard the progress of the row of match books and ensure their movement into close edgewise relation. The orderly row of books thus attained may be advanced directly through the trough to a convenient location for manual or mechanical removal and packing, if desired.

In the present instance the machine is equipped with means for applying friction "paint" to the outer surfaces of the stapled folds of the books as they pass along the trough extension. This means in the form shown comprises a paint containing tank 53 which is supported on suitably-disposed brackets 54 beneath the trough, and also a paint applying roll 55 fast on a shaft 56 which has its bearings in the brackets. This shaft 56 is extended at one end, and the extension is journaled in a bearing 57 on the housing wall 12 and is provided with a sheave 58 which is connected by means of a belt 59 with a sheave 60 fast on the base shaft 18 which latter shaft is intermittently rotated by the action of the hopper rails 14 on the supporting wheels 16. The extension of the shaft 56 also has fast thereon a sheave 61 which is connected by means of a belt 62 with a sheave 63 on the shaft 51 of the adjacent conveyer belt pulley 49. By this arrangement motion is transmitted from the shaft 18 to the shafts 56 and 51, thus intermittently rotating the paint applying roll 55 and also intermittently impelling the conveyer belt 47.

The roll 55 rotates in the tank 53 and projects through a longitudinally extending slot 64 in the floor of the trough and in the path of the folds of the progressing row of match books, such roll thus transferring a film of paint from the tank to the opposing fold of each succeeding book. (See Figs. 3 and 4.) The row of books thus painted with friction material is advanced a suitable distance along the trough extension to ensure the setting and drying of the paint on the folds, whereupon the books are manually or mechanically removed from the trough and packed in predetermined quantities.

Preferably a pressure and guide roll 65 is arranged to bear upon the books as they pass over the paint applying roll.

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

I claim—

1. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, having spaced-apart pick-up blades arranged transversely of and parallel with its inner wall, the free ends of the blades being slightly spaced from the wall and projecting forwardly in the direction of rotation of the hopper and being operative to pass under the free ends of the cover folds opposed to the path of the blades and thus carry rows of engaged articles upward in parallel relation, and means for removing the elevated articles from the succeeding blades and discharging them in successive order.

2. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, having spaced-apart pick-up blades arranged transversely of and parallel with its inner wall, the free ends of the blades being slightly spaced from the wall and projecting forwardly in the direction of rotation of the hopper and being operative to pass under the free ends of the cover folds opposed to the path of the blades and thus carry rows of engaged articles upward in parallel relation, a take-off element leading from the interior to the exterior of the hopper, and means for removing the elevated articles from the succeeding blades and discharging them in successive order upon the take-off element.

3. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, pick-up blades arranged transversely of and concurrently movable with the hopper, said blades being parallel to the inner wall of the hopper and having their free ends slightly spaced from said wall and projecting forwardly in the direction of rotation of the hopper so as to pass under the free ends of the cover folds opposed to the path of the blades and thus carry rows of engaged articles upward in parallel relation, a take-off element within the hopper, a transfer device supported within the hopper and operative to remove the elevated articles from the succeeding blades and position them upon the take-off element, and means for operating said hopper, transfer device and take-off element in timed relation to each other.

4. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, pick-up blades arranged transversely of and concurrently movable with the hopper to pass under the free ends of cover folds opposed to the path of the blades and thus carry the engaged articles upward, a take-off element, a transfer drum supported within the hopper above the take-off element and adjacent the path of the blades, said drum having spaced peripheral pockets operative to remove the elevated articles from the succeeding blades and position them upon the take-off element, and means for operating said hopper, transfer drum and take-off element in timed relation to each other.

5. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, pick-up blades arranged transversely of and concurrently movable with the hopper to pass under the free ends of cover folds opposed to the path of the blades and thus carry the engaged articles upward, a take-off conveyer, a transfer drum supported within the hopper above the conveyer and adjacent the path of the blades, said drum having spaced peripheral pockets operative to remove the elevated articles from the succeeding blades and position them upon the conveyer, means for simultaneously rotating the hopper and drum step-by-step, means for independently moving the drum step-by-step during the intervals of rest of the hopper, and means for actuating the conveyer.

6. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, pick-up blades arranged transversely of and concurrently movable with the hopper to pass under the free ends of cover folds opposed to the path of the blades and carry the engaged articles upward, a take-off element comprising a guide trough arranged within and extending from the hopper and also a conveyer located in said trough within the hopper, a transfer drum supported within the hopper above the path of the blades, said drum having spaced peripheral pockets operative to remove the elevated articles from the succeeding blades and position them upon the conveyer, means for simultaneously rotating the hopper and drum step-by-step, means for independently moving the drum step-by-step during the intervals of rest of the hopper, and means for impelling the conveyer.

7. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to contain and agitate the articles in mass, pick-up blades arranged transversely of and concurrently movable with the hopper to pass under the cover folds opposing the path of the blades and thus carry the engaged articles upward, a take-off element including a guide trough arranged within and extending from the hopper and a conveyer belt arranged to receive rows of articles flatwise and deliver them upon the outwardly extending floor of the trough, which floor thus tends to retard the advancement of the articles thereon and effect their close endwise relation, a transfer device supported within the hopper and operative to remove the elevated articles from the succeeding blades and position them upon the conveyor belt, and means for operating said hopper, transfer device and conveyor belt in timed relation to each other.

8. In an apparatus for arranging book matches and like articles having cover folds, means including a travelling surface for receiving the articles in mass, and means for removing individual articles from the mass and depositing them flatwise in rows, said latter means including a succession of pick-up blades arranged transversely of and parallel with the said travelling surface, the free ends of the blades being slightly spaced from, and projecting forwardly in the direction of travel of, the said surface and being operative to pass under the free ends of the cover folds opposed to the path of said blades and thus carry the engaged articles upward.

9. In an apparatus for arranging book matches and like articles having cover folds, a rotary hopper to receive the articles in mass, and means for removing individual articles from the mass and depositing them flatwise in rows, said latter means including a succession of pick-up blades on the inner wall of the hopper, said blades arranged transversely of and parallel with the said wall, the free ends of the blades being slightly spaced from, and projecting forwardly in the direction of travel of, the wall, and being operative to pass under the free ends of the cover folds opposed to the path of the blades and thus carry the engaged articles upward.

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