

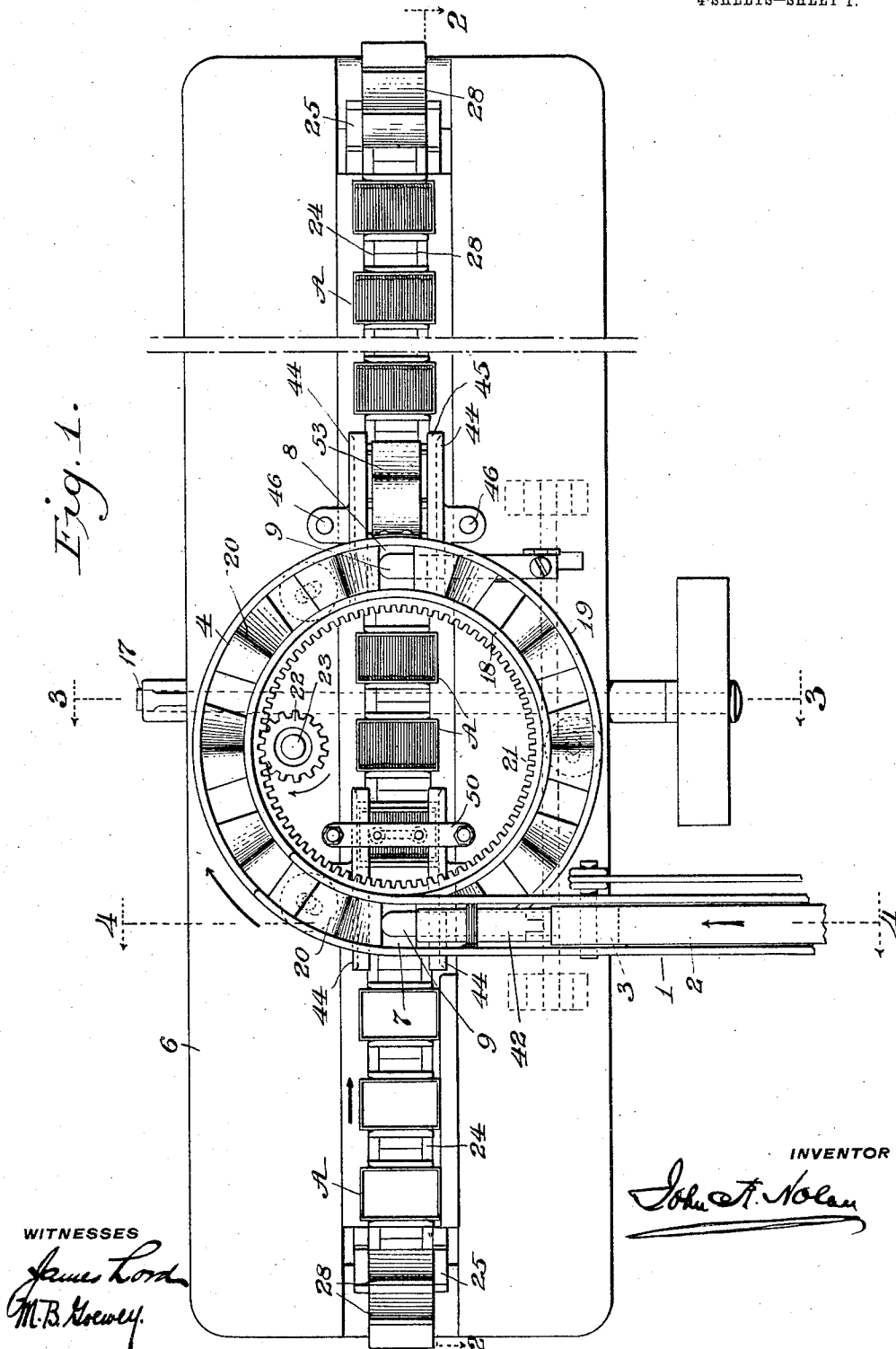
J. R. NOLAN.
MACHINE FOR PACKING MATCHES.
APPLICATION FILED MAY 22, 1911.

1,016,432.

Patented Feb. 6, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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John F. Nolan

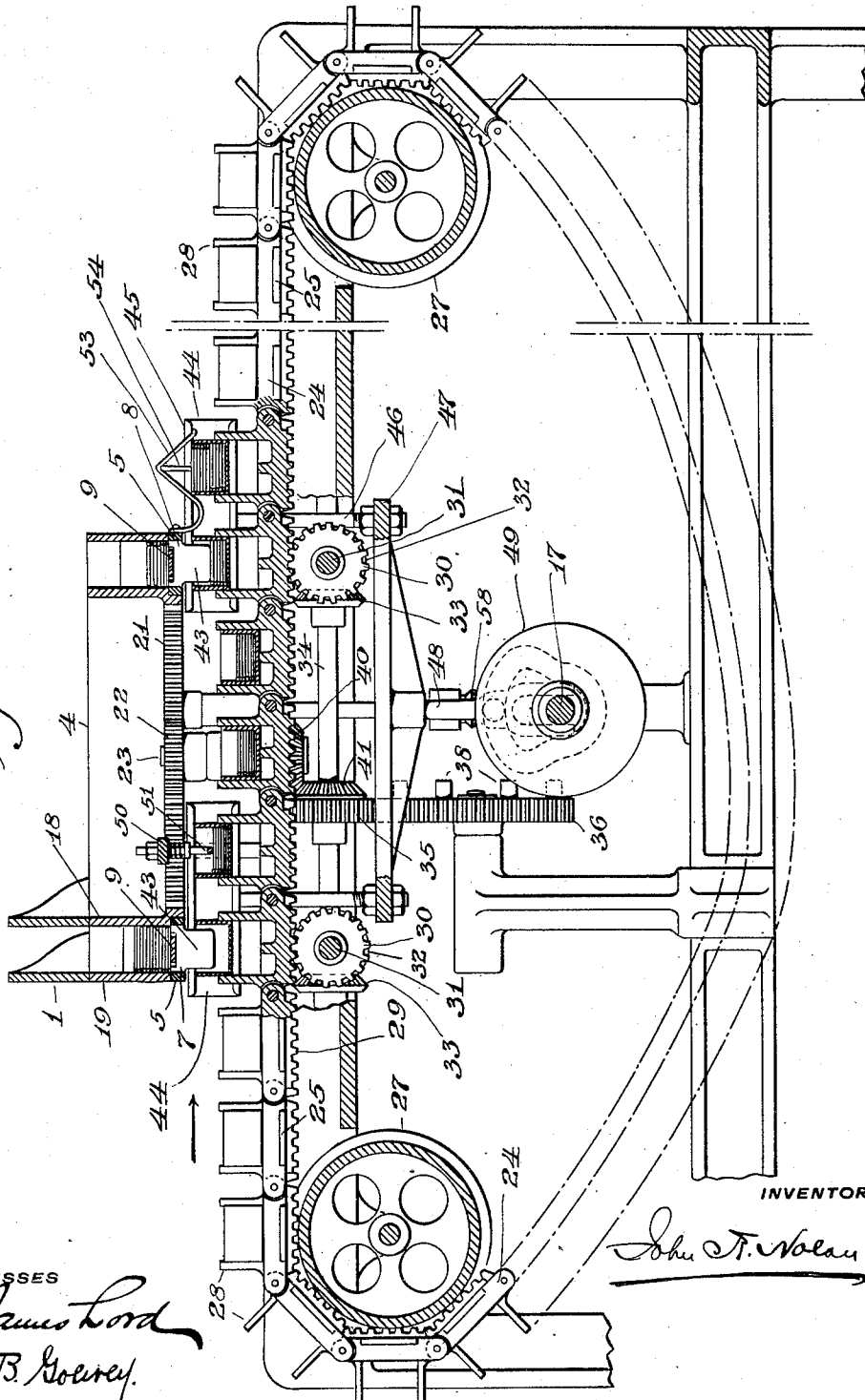
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4 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

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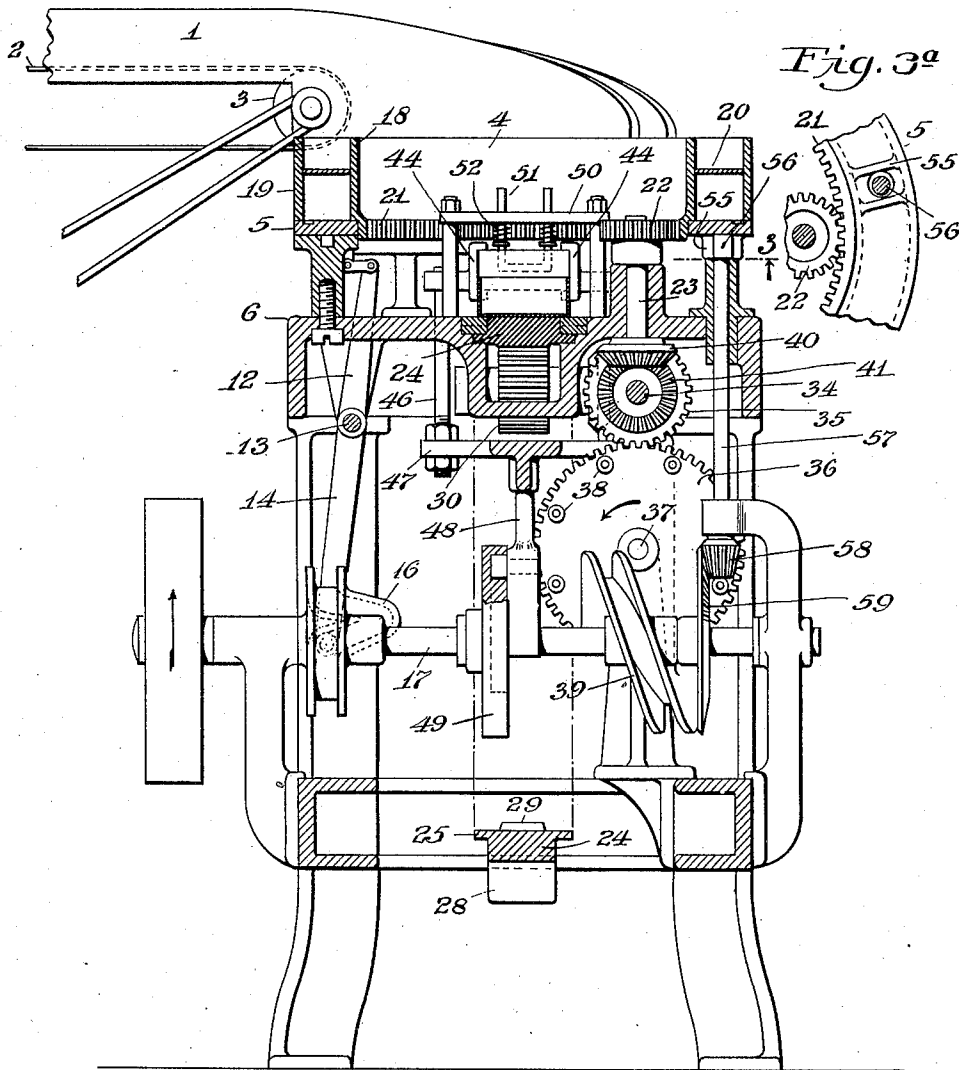
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4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

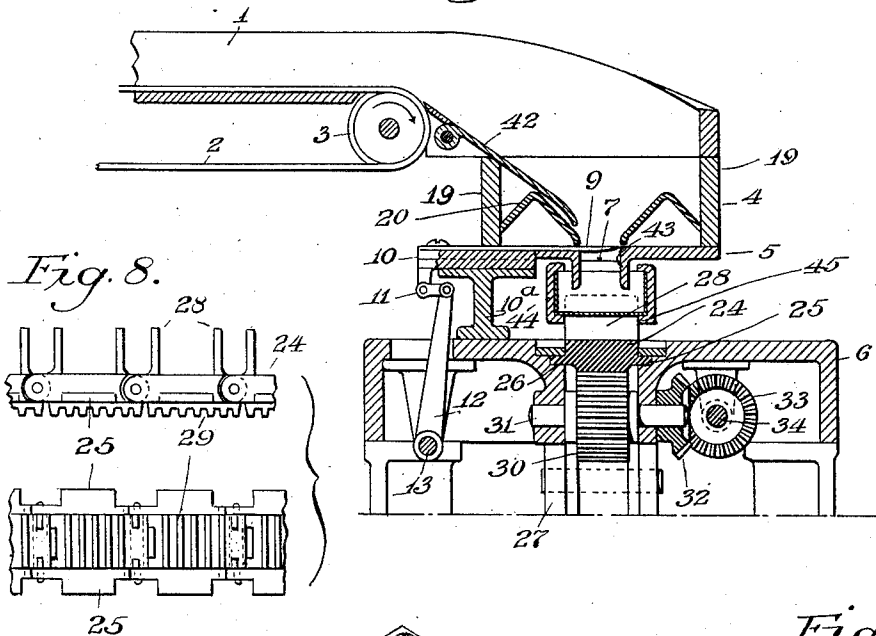


Fig. 8.

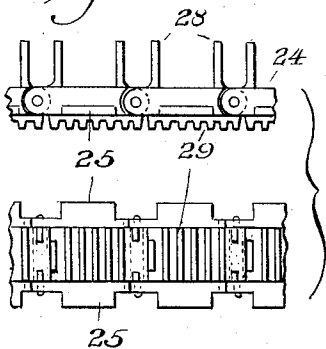


Fig. 5.

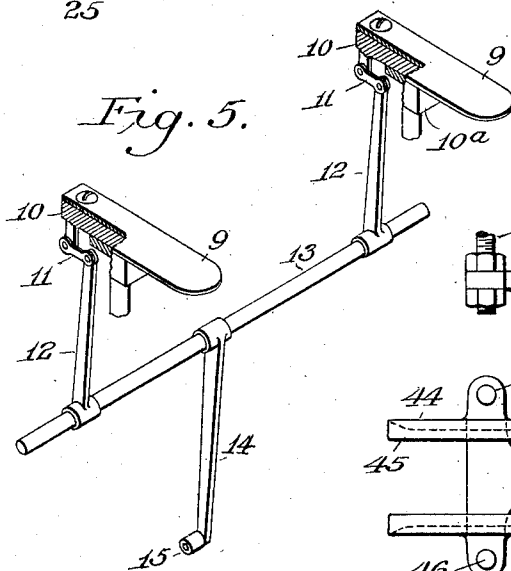


Fig. 7.

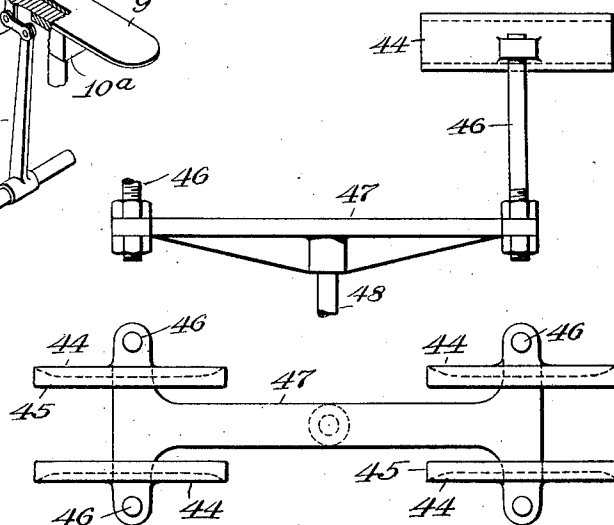


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN R. NOLAN, OF NEW YORK, N. Y., ASSIGNOR TO THE DIAMOND MATCH COMPANY,
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MACHINE FOR PACKING MATCHES.

1,016,432.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed May 22, 1911. Serial No. 623,822.

To all whom it may concern:

Be it known that I, JOHN R. NOLAN, a citizen of the United States, and resident of the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Packing Matches, of which the following is a specification.

This invention relates to machines for packing matches in boxes, having reference more especially to the machines which are associated with match making apparatus and are adapted to receive the matches in bulk as rapidly as they are produced and deliver them progressively to the box-trays in such a manner that two superposed layers of substantially parallel matches are arranged in each tray, with the heads of the matches of one layer pointing in one direction and the heads of the matches of the other layer pointing in the opposite direction.

The principal object of the invention is to provide a simple and efficient packing machine whereby the matches as they are delivered in bulk are separated into approximate quantities having their heads oppositely-disposed, and whereby such quantities are deposited progressively into box trays. To this end, the invention, stated in general terms, comprises provisions whereby the matches in bulk are impelled to two discharge stations, and endwise-reversed during their travel from one station to another, and whereby box trays are progressively advanced to or below the respective stations so that each box receives a supply of matches first at one station and then at the other station.

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

In the drawings—Figure 1 is a plan of a match packing machine embodying a good form of my invention. Fig. 2 is a longitudinal vertical section thereof, as on the line 2—2 of Fig. 1. Fig. 3 is a transverse vertical section of the machine, as on the line 3—3 of Fig. 1. Fig. 3^a is a sectional detail of the eccentric connection for intermittently jarring the bed of the match receiver, as on the line 3 of Fig. 3. Fig. 4 is a transverse vertical section through the

match receiver, and adjuncts, as on the line 4—4 of Fig. 1. Fig. 5 is a perspective view, partly in section, of the cut-off devices and the lever mechanism for operating the same. Fig. 6 is a plan of the reciprocating tray-lifter. Fig. 7 is a partial side elevation thereof. Fig. 8 represents in side and bottom view several links of the tray-conveyor.

In the drawings, which illustrate one form of embodiment of my invention—1 indicates a horizontally-arranged supply trough into which matches are delivered in substantial parallelism with each other and with their heads pointing in the same direction. This trough is preferably, though not essentially, arranged adjacent the discharging end of a match making machine so as to receive the matches either directly therefrom or from a primary receiving trough. On the bottom of the trough runs a belt 2 by means of which the matches are carried from the receiving to the discharging end of such trough; this belt being supported and guided by suitable pulleys 3 one of which is continuously driven from a suitable source of power.

The matches in bulk are delivered by the trough 1 to a circular receiver or hopper structure 4 which is intermittently rotated by suitable mechanism in a manner to feed the contained matches in or about a circular path in which are included two discharge stations. This structure is mounted to rotate on a bed 5 which is supported by posts rising from the main frame 6 of the machine, and which bed is of annular form preferably, and is provided at the discharge stations with openings 7, 8 which constitute match delivery ports, to which the matches are efficiently fed by the intermittently rotatable structure 4. The timely opening and closing of the ports are controlled by suitable valves or gates which, in the present instance, comprise cut-off blades 9 which are slidably fitted to ways in the top of the bed. The blades are attached to slides 10 in brackets or supports 10^a rising from the main frame, and these slides are in turn connected by links 11 with arms 12 rising from a rock-shaft 13 from which depends an arm 14 which is operatively connected by means of a stud or roller 15 with an appropriate cam 16 on the power driven shaft

17. The contour of this cam is such as to effect the timely reciprocation of the cut-off blades.

The match receiver or hopper structure in its preferred form comprises inner and outer concentric walls 18, 19, respectively, which are spaced and united by means of partitions 20 arranged at intervals to afford therebetween a circular series of hopper-like compartments or division chambers having open bottoms. The partitions are oppositely beveled or inclined, as indicated, and are appropriately shaped to afford at the bottom of each chamber a rectangular opening of radial width substantially equal to the length of a match. The tops or apices of the partitions are preferably below the tops of the circular walls so that the match contents of the structure may extend above and overlie the partitions. In the present instance the inner wall of the structure is provided with gear teeth 21 with which meshes a pinion 22 on a vertical shaft 23 which is intermittently actuated, as herein-after described, in such a manner that the chambers are successively moved to the respective ports.

24 indicates a tray conveyer comprising in the present instance an endless chain of links supported and guided on the main frame in such a manner as to travel in a straight path directly below the two delivery ports at the discharge stations. The links are conveniently provided with end lips 25 which are slidingly fitted to horizontal guideways 26 in the main frame, and the frame is equipped at its ends with idler wheels 27 for the support and guidance of the chain in its travel. Each of the links is furnished on its outer side with parallel walls 28 which afford therebetween a pocket or receptacle for a box-tray, as A, and on its under side with gear teeth 29 with which mesh suitably-located gear wheels 30. The gear teeth at the adjoining ends of the links are preferably cut-away, as indicated most clearly in Fig. 8, so as to overlap or register with each other when the chain is flexed as it rounds the idler wheels at the end of the frame. The gear wheels 30 are carried by shafts 31 equipped with bevel wheels 32 in mesh with corresponding wheels 33 on an intermittently-rotatable shaft 34. This shaft 34 is provided with a gear wheel 35 in mesh with a gear wheel 36 on a lower shaft 37, the latter wheel being provided on one face with a circular series of regularly spaced pins 38 with which engages an appropriate cam 39 on the driving shaft, the parts being so coordinated that the several links of the chain are impelled to and brought to rest directly under the respective match delivery ports. Any other suitable means for supporting and feeding the trays may be employed, if desired, in lieu of that

just described. The shaft 23 hereinbefore referred to is provided at its lower end with a bevel wheel 40 in mesh with a similar wheel 41 on the shaft 34; and hence the circular match feeding structure is operated in concert with the tray carrying chain.

The supply trough 1 is arranged to deliver the matches into the circular structure in the vicinity of one of the discharge stations, the flow of the matches being in a path substantially tangential of that of the structure. Preferably, though not essentially, the delivery end of the trough is provided with a pivoted inclined bottom plate 42 upon which the matches are deposited by the belt 2, which plate extends down into the underlying compartment of the hopper structure and directs the matches in an orderly manner thereto. The lower portion of this plate, through the contact of the successive partition walls therewith, is caused to rise and fall, thereby insuring the downward flow of the matches in substantial parallelism to the several chambers of the hopper. When the structure has been impelled a half rotation, one-half of the series of chambers has been supplied with approximate quantities of matches, those in the chamber located beneath the trough having their heads extending in one direction, and those in the diametrically-opposite chamber, by virtue of the semi-rotation of the structure in its travel from the point of supply, having their heads extending in the opposite direction.

When the diametrically-opposite chambers are supplied with matches and the trays to be filled are in position beneath the same, as above described, the gates 9 are first retracted through the agency of the cam 16 and lever connections to open the ports and permit a quantity of matches to fall from each of said chambers into the subjacent tray, and then moved to close the ports and cut off the match supply. During the travel of the conveyer the trays are advanced thereby from one port to the other, each tray thus receiving matches from both ports, and the contents of each tray in consequence comprising two quantities having oppositely-extending heads.

Preferably the ports are provided with depending side walls 43 which constitute, in effect, measuring chambers, and provision is had whereby the subjacent trays are periodically raised and lowered with respect to such chambers. The trays are raised preparatory to the delivery of the matches thereto, and are maintained in raised position during the period that the ports are open. When, however, the ports have been closed, following the introduction of the matches to the trays, the trays are lowered and the conveyer is then advanced.

Any suitable means for imparting the req-

uisite rising and falling movements to the trays may be employed. In the present instance a pair of vertically reciprocating heads 44 having each on its inner side upper and lower jaws or shoulders 45 are mounted below each of the ports in such manner that during the advancement of the chain a tray is moved bodily thereby into the embrace of the heads, so that during their reciprocation the tray is raised and lowered in respect to the over-lying match delivery port. The two pairs of heads are carried by vertical posts 46 which are conveniently supported and guided in the main frame, and these posts are affixed to a vertically-reciprocating frame 47 having a depending rod or arm 48 which is operatively connected by means of a stud or roller with a face cam 49 on the main shaft, said cam being of appropriate character to effect the timely reciprocation of the frame and tray-bearing heads.

Preferably each pair of heads is of sufficient length to receive two adjacent trays at the same time—one beneath the opening and the other in advance of it, and hence each tray, after it has been supplied with its quota of matches at and been moved beyond a discharge station, is raised and lowered concurrently with the next succeeding tray during the introduction of matches to the latter. Rising from the bed 5, in advance of the opening 7 are two posts supporting a bridge bar 50 which spans the conveyer. Slidably mounted on this bar is a vertically-disposed U-shaped member 51 the lower or cross limb of which lies directly above the median line of each tray immediately after the latter has been advanced beyond the opening 7. This member is normally depressed by means of suitably disposed springs 52, and hence when the partially filled tray is elevated the matches therein are pressed against the opposing member and thereby leveled within the tray.

Secured to the annular bed 5 so as to project in advance of the opening 8 is a yielding A-shaped member 53 between the inclined walls of which each tray is lifted after it leaves the opening 8, such walls thus pressing endwise into the tray any matches which may project laterally of the tray. A thin centrally-disposed blade 54 within the member 53 bears with yielding pressure upon the contained matches to level them similarly to the member 50. Preferably the annular bed is loosely mounted on its supporting posts so as to have capacity for slight to and fro or tremulous motion about its axis, such action being imparted to the bed when the hopper structure is at rest and being adapted to facilitate the descent of the matches into the underlying trays when the gates are open and also, through the agency of the depending side walls 43, to

effect the settling of the matches within the trays. As an efficient means for this purpose the bed is provided on its under side with a slotted or socketed projection 55 (Figs. 3, 3^a) which receives a small eccentric 56 on the top of a vertical shaft 57 and this shaft is equipped at its lower end with a pinion 58 in mesh with a mutilated bevel gear wheel 59 on the main shaft 17. The teeth of the gear wheel 59 are so disposed that the pinion is only rotated at the intervals when the hopper structure is at rest, and hence at such intervals the bed is rapidly vibrated. As the member 53 above mentioned is supported by the bed, such member, with its blade 54, is correspondingly agitated, thereby insuring, through the tremulous contact of the blade with the matches, the uniform spreading and settling of the matches within the trays. It is to be understood, of course, that the cams and gears are properly formed and proportioned to effect the sequential operations of the parts controlled thereby; that is to say the chambered match receiver and the tray conveyer are intermittently impelled in concert to advance the chambers and box trays progressively to the respective discharge stations; and during each dwell of the receiver and conveyer the annular bed is jarred, the tray lifters are elevated to raise the trays, the cut-off gates are reciprocated to open and close the discharge openings of the bed, and the tray lifters are lowered.

I do not claim herein any features or mechanisms shown and described in the application of Palmer and Paridon, Serial No. 485,469, filed March 24, 1909.

What I claim is—

1. In a machine for packing matches, the combination with a plurality of discharge stations, of means for receiving matches in bulk and in substantial parallelism with each other and for impelling approximate quantities thereof from one station to another and endwise-reversing the matches during their travel, whereby the matches preparatory to their discharge lie at one station with their heads extending in one direction and at another station with their heads extending in the opposite direction, and means for feeding box trays to the discharge stations successively.

2. In a machine for packing matches, the combination with two discharge stations, of means for feeding box trays to said stations successively, a series of chambers for receiving matches in bulk and supporting them in substantial parallelism, and means for impelling said chambers from one station to another through a path which effects the endwise reversal of the matches during their travel, whereby the matches preparatory to their discharge lie at one station with their heads extending in one

direction and at the other station with their heads extending in the opposite direction.

3. In a machine for packing matches, the combination with two discharge stations, 5 of means for feeding box trays to said stations successively, and means for feeding matches in bulk and in substantial parallelism in a rotary path over and across the said stations, whereby the matches preparatory to their discharge lie at one station 10 with their heads extending in one direction and at the other station with their heads extending in the opposite direction.

4. In a machine for packing matches, the combination with two discharge stations, 15 of means for intermittently impelling box trays to said stations, a match receiver comprising a series of division chambers mounted to travel in a rotary path over and across 20 said stations, means for intermittently rotating the said receiver whereby its chambers are brought progressively to said stations, and means for feeding matches in bulk and in substantial parallelism to each 25 other to said receiver.

5. In a machine for packing matches, the combination with two discharge stations, of means for intermittently impelling box trays to said stations, a match receiver comprising a series of division chambers mounted 30 to travel in a rotary path over and across said stations, means for intermittently rotating said receiver whereby its chambers are brought progressively to said stations, 35 and means for continuously feeding matches in bulk and in substantial parallelism to each other to said receiver in a path substantially tangential to the receiver.

6. In a machine for packing matches, the combination with two discharge stations including delivery ports, of means for feeding 40 box trays to said ports, means for feeding matches in bulk through a rotary path over and across said ports, and means for 45 periodically opening and closing said ports.

7. In a machine for packing matches, the combination with two discharge stations including delivery ports, of means for feeding 50 box trays to said ports, means for feeding matches in bulk through a rotary path over and across said ports, means for periodically opening and closing said ports, and means for effecting relative vertical 55 movement between the box trays and the ports at predetermined intervals.

8. In a machine for packing matches, the combination with means for feeding box trays, of a bed having two ports above the path of said trays, a match receiver having 60 a circular series of radial division chambers mounted to rotate on said bed, means for actuating said receiver to bring its chambers

progressively over said ports, and means for feeding matches in bulk and in substantial parallelism to each other to said receiver. 65

9. In a machine for packing matches, the combination with means for feeding box trays, of a bed having two ports above the path of said trays, a match receiver having 70 a circular series of radial division chambers mounted to rotate on said bed, the walls of said chambers being below the top of the walls of the receiver, means for actuating said receiver to bring its chambers progressively over said ports, and means for feeding 75 matches in bulk and in substantial parallelism to each other to said receiver.

10. In a machine for packing matches, the combination with means for feeding box 80 trays, of a bed having two ports above the path of said trays, a match receiver having a circular series of division chambers mounted to rotate on said bed, means for actuating said receiver to bring its chambers 85 progressively over said ports, a trough leading to said receiver, a swinging bottom portion at the delivery end of said trough extending into the match receiver, and means for feeding matches in bulk and in substantial 90 parallelism along said trough.

11. In a machine for packing matches, the combination with means for feeding box trays, of a bed having two ports with depending side walls above the path of said 95 trays, means for intermittently feeding matches in bulk through a rotary path over and across said ports, means for periodically opening and closing said ports, means for effecting relative vertical movement between 100 the box trays and the ports at predetermined intervals, and means for agitating said bed during the dwells of the match feeding means.

12. In a machine for packing matches, 105 the combination with means for feeding box trays, of a bed having two ports above the path of said trays, a match receiver having a circular series of division chambers mounted to rotate on said bed, means for intermittently rotating said receiver to bring 110 its chambers progressively over said ports, means for feeding matches in bulk to the receiver and in substantial parallelism, and means for agitating said bed during the 115 dwell of the receiver.

Signed at New York in the county and State of New York this seventeenth day of May 1911.

JOHN R. NOLAN.

Witnesses:

B. CHANDLER SNEAD,
JAMES LORD.