M. PARIDON.

MACHINE FOR FILLING BOXES.

APPLICATION FILED JUNE 22, 1915. RENEWED SEPT. 11, 1918.

1,300,762.

Patented Apr. 15, 1919.

5 SHEETS—SHEET 1.

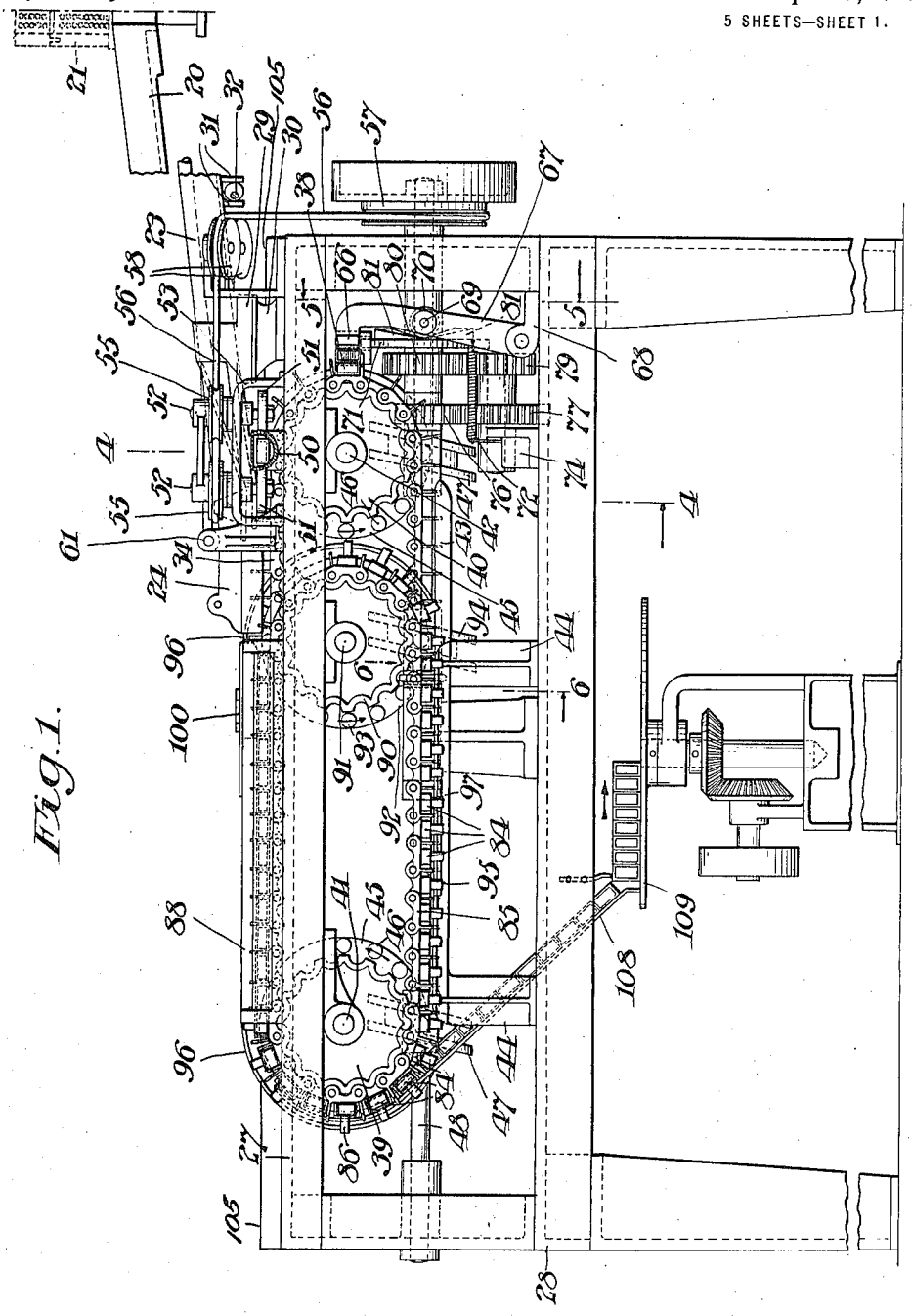


Fig. 1.

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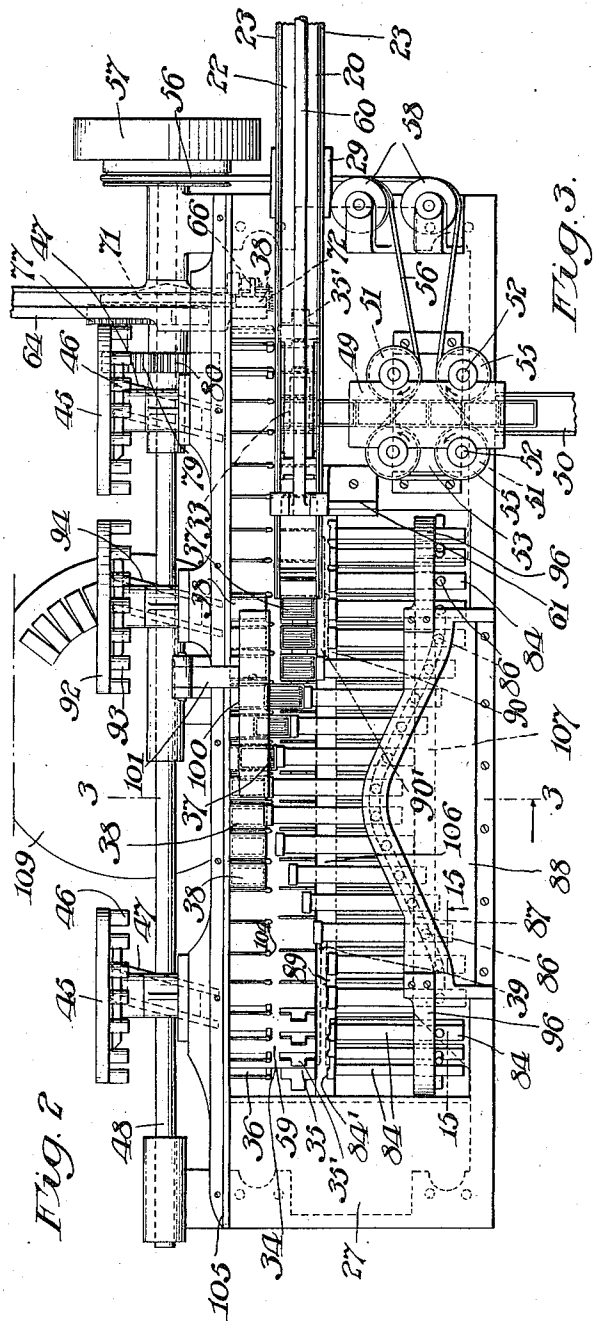


Fig. 2

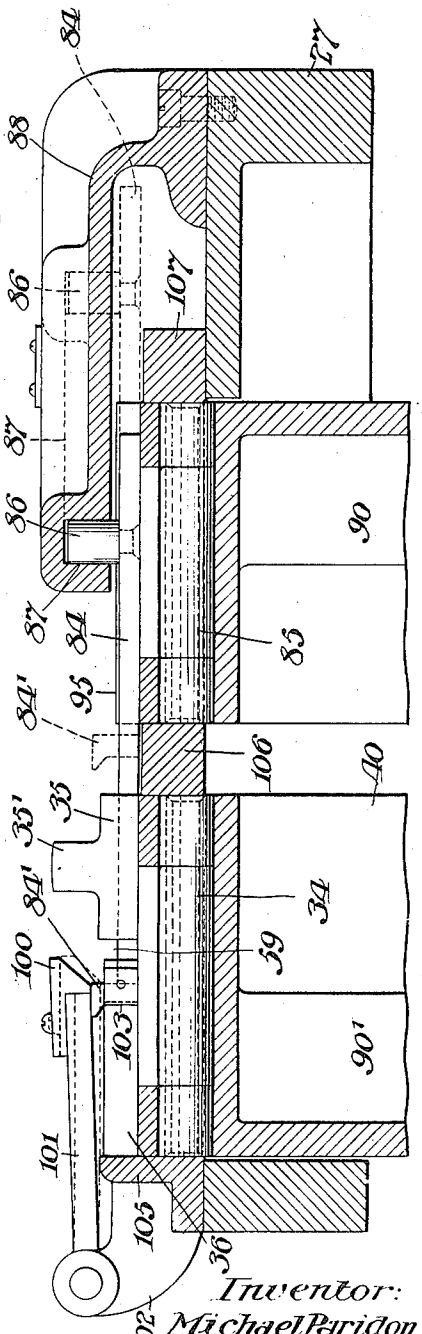


Fig. 3.

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Fig. 4.

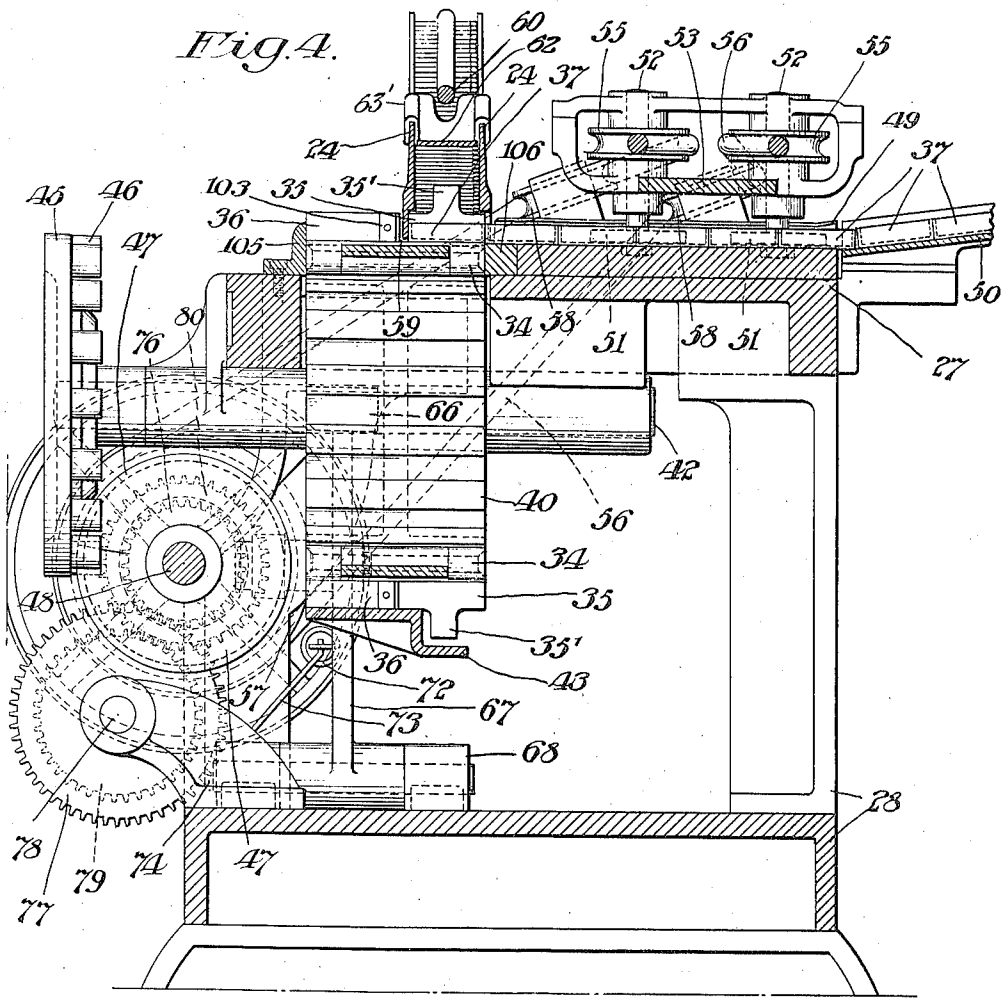


Fig. 5.

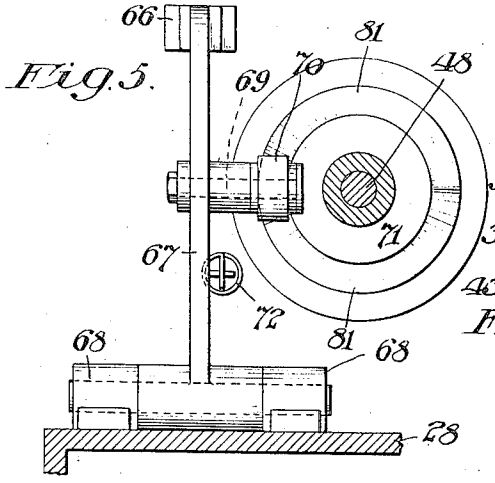
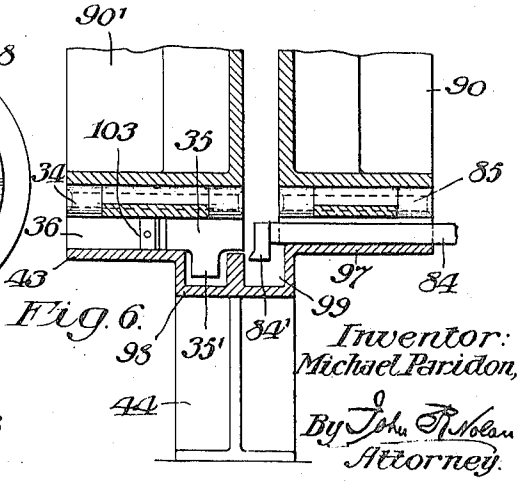


Fig. 6.



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Fig. 7.

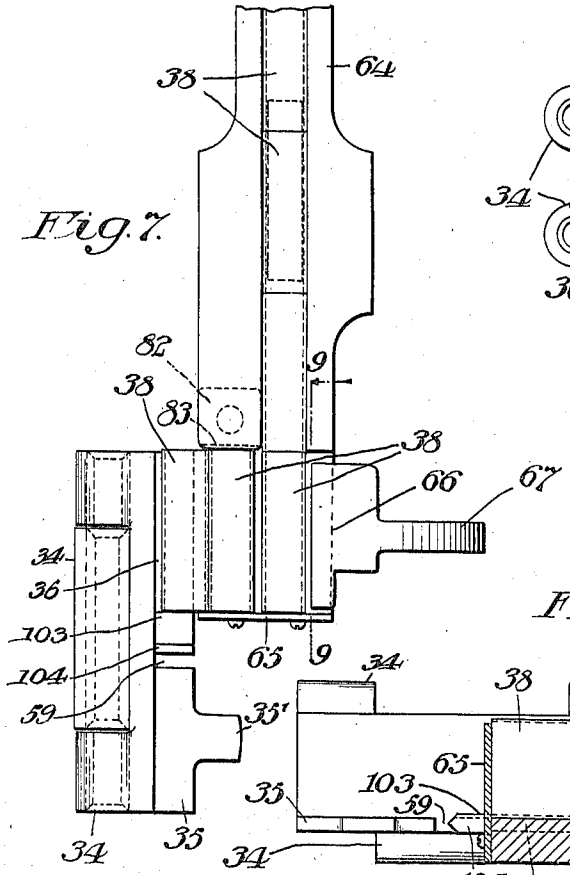


Fig. 8.

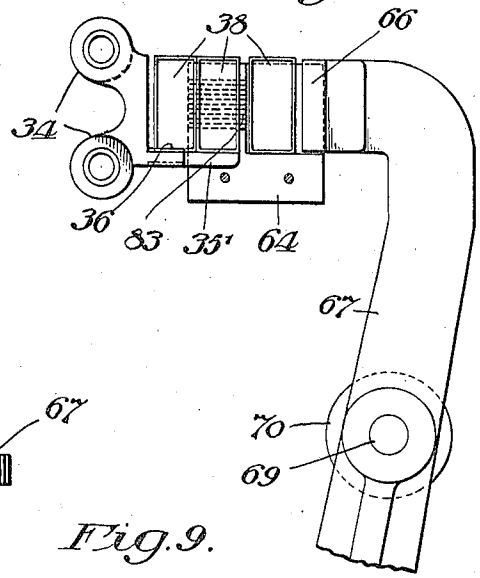
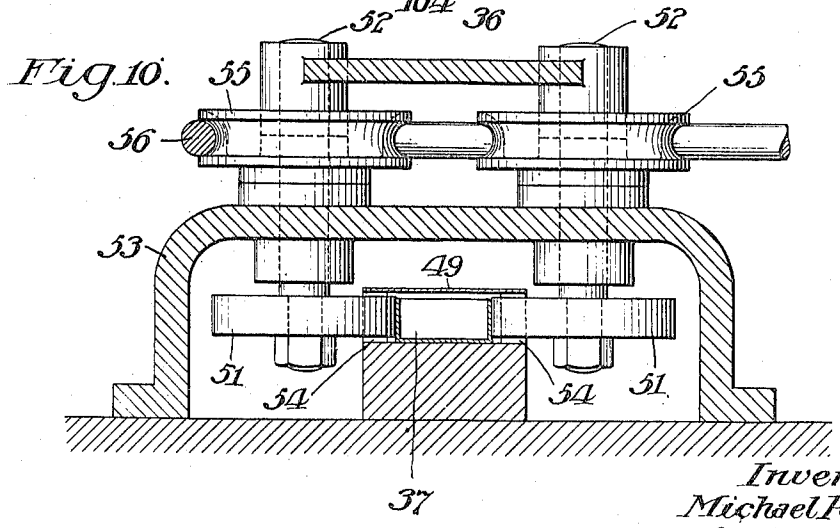


Fig. 9.

Fig. 10.



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Fig. 11.

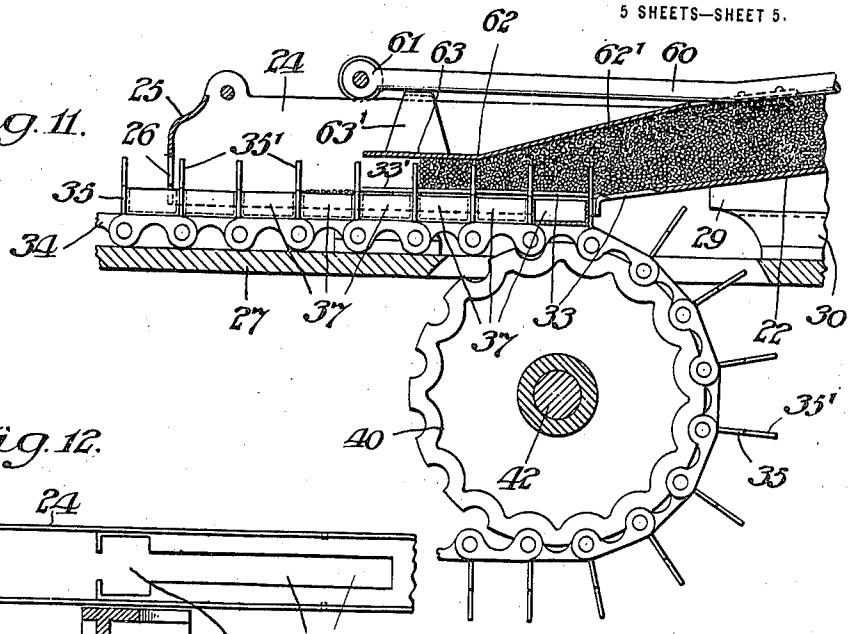


Fig. 12.

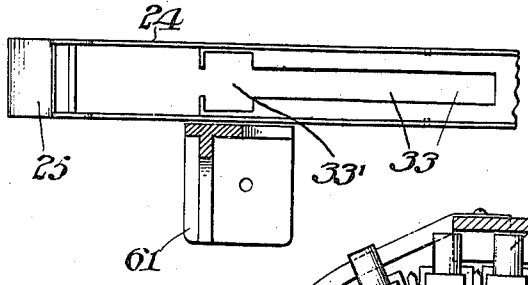


Fig. 15.

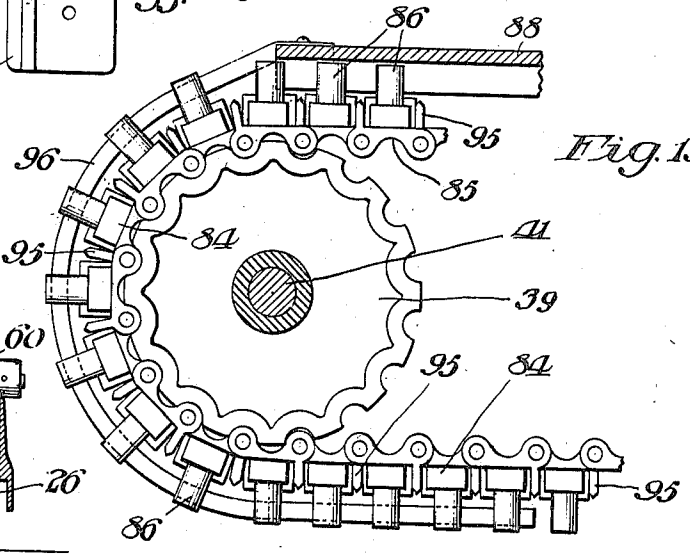


Fig. 14.

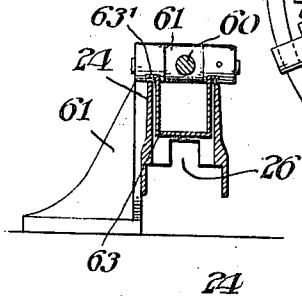
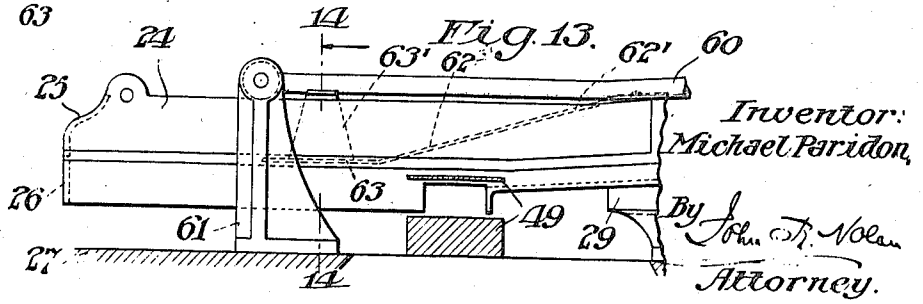


Fig. 13.



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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 FILLING BOXES.

1,300,762. Specification of Letters Patent. Patented Apr. 15, 1919.

Application filed June 22, 1915, Serial No. 35,541. Renewed September 11, 1918. Serial No. 253,647.

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 Filling Boxes, of which the following is a specification.

This invention relates to machines for filling match boxes, more especially the tray-and-shuck form of box.

The invention particularly though not exclusively concerns certain improvements in the automatic match-box filling machine illustrated in Letters Patent of the United States No. 1,064,452, dated June 10, 1913. In that machine the boxes are deposited upon an endless chain conveyer and thereby impelled consecutively to and past the delivery end of the match machine, being thus supplied with matches. The filled trays are carried to and between two conveyers, one of which, termed a "plunger-conveyer," bears a series of plungers, and the other of which, termed a "shuck-conveyer," carries the match shucks or slides for the trays. The plungers are successively reciprocated during their travel adjacent the filled trays, so as to push the opposing trays from the tray-conveyer and insert them into the complementary shucks on the adjacent shuck-conveyer, all as will more fully appear by reference to said Letters Patent.

The object of my invention is to provide a machine of the character mentioned whereby a uniform and rapid feeding and delivery of the matches to the match-box trays is attained; whereby the efficiency of the mechanism for positioning the empty trays and their complementary shucks or covers in relation to each other is increased, and whereby the filled trays are accurately and positively entered in their shucks or covers.

Accordingly the invention comprises various features of construction and combinations of parts which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a side elevation of a match-box filling machine embodying a preferred form of my invention; the match-feeding hopper being partly broken away, and a fragment of the match carrier of the match machine being indicated by dotted lines at the receiving end of the hopper.

Fig. 2 is a plan of the machine, showing several filled trays and shucks on the tray-and-shuck conveyer, and the progressive operation of the plungers on the trays

Fig. 3 is a transverse vertical section, enlarged, on a plane through the upper runs of the tray-and-shuck conveyer and the plunger conveyer, as on the line 3—3 of Fig. 2.

Fig. 4 is a transverse vertical section through the machine on a plane intersecting the delivery end of the match feeding hopper, as on the line 4—4 of Fig. 1.

Fig. 5 is a partial vertical section, as on the line 5—5 of Fig. 1, showing the shuck inserting lever, the cam and spring for actuating the same, and adjuncts.

Fig. 6 is a similar section, as on the line 6—6 of Fig. 1, showing the lower runs of the tray-and-shuck conveyer and the plunger conveyer, and adjuncts.

Fig. 7 is a plan of the delivery or throat end of the shuck-supply chute, showing a link of the tray-and-shuck conveyer, and the vibratory lever head for transferring the shucks successively to the conveyer. In this view shucks are shown in the chute and in the delivery or throat portion thereof, and the head is illustrated as retracted preparatory to its active stroke.

Fig. 8 is an end elevation of the parts shown in Fig. 7, the outer end plate of the delivery throat being removed.

Fig. 9 is a longitudinal section through the delivery throat of the chute, as on the line 9—9 of Fig. 7.

Fig. 10 is a transverse vertical section through the tray-feeding guide and adjuncts, showing the frictional feeding devices for the trays.

Fig. 11 is a longitudinal vertical section through the delivery end of the match-feeding hopper as supplied with matches, showing in side elevation a part of the tray-and-shuck conveyer as supplied with trays, and the selecting action upon the matches of the

upward extensions of the tray-holding members of the conveyer. In this view the gage or throat piece at the delivery end of the hopper and also the adjacent portion of the guard rod are shown.

Fig. 12 is a plan of the lower or delivery end of the hopper.

Fig. 13 is a side elevation of the same, and adjuncts.

Fig. 14 is a transverse section through the hopper, as on the line 14—14 of Fig. 13.

Fig. 15 is a longitudinal vertical section, partly in elevation, of one end of the plunger conveyer and its adjuncts, as on the line 15—15 of Fig. 2.

Referring to the drawings, 20 designates an elongated hopper to one end of which matches are delivered from a suitable source of supply, as, for example, the endless match carrier of a continuous match machine; a part of which carrier is indicated by dotted lines at 21 in Fig. 1. The form of hopper illustrated comprises an inclined bottom 22 having two parallel sides 23 providing between them a space slightly greater in width than the length of a match. The lower ends of the sides are horizontally extended, as at 24, and their outer extremities are connected by a transverse end plate 25 which is appropriately recessed on its lower edge, as at 26, for the free passage of traveling blade devices which will be hereinafter described. The side extensions and the adjacent part of the bottom overhang a horizontal bed or table 27 which is supported by the standards of a suitable supporting frame 28. The bottom is provided with a suitably-disposed slide 29 which is mounted on a guide piece 30 on the table, so as to permit longitudinal vibration of the hopper. The bottom is also provided with depending lugs 31 which embrace an eccentric carried by a shaft 32 which is driven in any suitable manner, so as to effect the rapid bodily vibration of the hopper and thus insure the feeding of the matches therealong from its upper to its lower or discharging end. (See Fig. 1). The lower end of the hopper bottom is provided with a longitudinal opening or slot for the free passage into and from the hopper of the traveling blade devices above referred to. The inner portion 33 of this opening is of less width than the length of a match, and hence, while the matches in the adjacent part of the hopper are supported at their ends, access can be had to the matches through the opening.

34 designates a continuously driven tray-and-shuck conveyer comprising in the form illustrated relatively wide metal links jointed together to constitute an endless chain. On this chain are two longitudinally extending rows of outwardly projecting blade-like members 35, 36 arranged in spaced relation to each other, so that the spaces of one row aline with and constitute, in effect, a continuation of the adjacent spaces of the other row. The row of blades 35 is adapted to receive and carry match trays (37), and the row of blades 36 is adapted to receive and carry the complementary shucks or covers (38) for the trays. The conveyer chain passes about wide sprocket wheels 39, 40 mounted on transverse shafts 41, 42, having their bearings in brackets beneath the table near its respective ends, the upper horizontal run of the chain traveling upon the top of the table and the lower run upon the longitudinal guide rail 43 supported by posts 44 on the main frame. Each of the shafts 41, 42 bears at one end a pin wheel 45 with the successive pins 46 of which engages a worm wheel 47 on a power-driven main shaft 48 extending longitudinally of and having its bearings in boxes in the main frame. The contour of the worm wheel and the coöperative relation of the parts are such that the endless conveyer is continuously driven but yet slows down at the successive points where the trays and shucks are applied thereto, so as to facilitate the entrance of the trays and shucks to the conveyer as will presently appear. The location of this conveyer relatively to the hopper is such that in the travel of the conveyer about the wheel 40 to a horizontal position, the reduced upper extensions 35′ of the blades 35 successively enter the slotted portion 33 of the hopper bottom and separate and select an approximately measured quantity of the opposing mass of matches; thence as the conveyer progresses the blades stand upright and advance the thus gathered matches along the narrow slotted portion of the bottom. See Fig. 11.

The box trays are delivered to the spaces between succeeding blades 35 of the conveyer 34 at a point directly beneath the slotted portion of the bottom where the blades are in upright position, or substantially so, the matches thus being supported above and in close relation to the inserted tray. (See Figs. 2 and 11.) The portion 33′ of the slot in rear of the tray is sufficiently wide to permit the matches to fall from the bottom of the hopper, and hence as each tray and the superposed matches pass to and beyond the slotted portion 33′ of the hopper the matches, being unsupported, are progressively deposited in the underlying tray, their uniform descent being contributed to by the short rapid vibration of the hopper. The width of the space between the side extensions 24 of the hopper is a trifle less than the length of a tray, and the width of each space between adjacent blades 35 of the conveyer is a little greater than that of a tray. Hence the trays imposed on and carried by

the conveyer are slightly pinched between the side extensions, and the latter thus effect vibration of the trays in contact therewith and insure the settling of the matches within the trays.

The trays are fed through a horizontal guide structure 49 on the table to the spaces between the blades 35 of the conveyer, which guide structure includes spaced top and bottom members arranged to provide a guide way at right angles to the upper horizontal run of the conveyer. The trays are fed end to end through the guide way from a suitable feed trough 50 (Figs. 1 and 2) leading thereto from any convenient source of tray supply, and they are moved thence toward the conveyer by frictional feeding means, such for example, as spaced rotating rollers 51 the peripheries of which contact with the respective sides of the opposing trays. These rollers are fast on the lower ends of vertical shafts 52 having their bearings in a bracket 53 which straddles the guide structure 49, the sides of the latter being open, as at 54, for the passage of the peripheries of the rollers to the opposing sides of the trays. (See Fig. 10.) The upper portions of the shafts 52 bear grooved pulleys 55 about which passes an endless belt 56 from a grooved drive wheel 57 on the main shaft 48. The belt 56 on its way from the drive wheel to the pulleys 55 is guided by suitably-disposed idlers 58. The belt turns the pulleys 55 in the directions indicated by the small arrows thereon in Fig. 2, thus correspondingly turning the feed rollers 51 and, perforce, advancing or tending to advance the proximate trays through the guide structure 49. As the space between adjacent blades 35 reaches a position in line vertically with the axis of the chain wheel 40, the leading tray is pushed into such space by the frictional action of the rotating feed rollers on the adjacent trays, the rearward blade 35 immediately moving laterally of the inserted tray and acting as an end stop for the next succeeding exterior tray until another tray-receiving space of the conveyer is in alinement with the latter tray, and so on.

It is to be noted that the friction rollers 51 are driven at a high surface speed compared with the speed of the conveyer 34, so as to project the leading tray fully upon the conveyer while the latter is moving a substantially inappreciable distance; such tray when positioned upon the conveyer impinging against the opposite side extension 24 of the match hopper. It is also to be noted that the inner adjacent ends of the two rows of blades 35, 36 are slightly separated, as at 59, to accommodate the lower depending edge of the side extension just mentioned, and provide sufficient clearance for the traveling conveyer.

60 designates a rod extending longitudinally of the hopper so as to overhang and bear yieldingly upon the mass of matches during their descent and thus prevent their overflowing the hopper. The lower end of this rod is conveniently pivoted to a bracket 61 on the table adjacent the lower end of the hopper. 62 designates a guard member arranged to lie within the lower portion of the hopper and overhang the adjacent upstanding blades of the tray conveyer. This member comprises an inclined portion 62′ which is conveniently secured at its upper end to the sides of the hopper, and a lower horizontal portion 63 which extends parallel with and near to the horizontal path of the blade extensions 35′. The portion 63 is provided near its free end with flanged side pieces 63′ which overhang and rest upon the upper edges of the side extensions of the hopper and thus permit limited yielding vertical movement of the guard member. This guard member thus provides for the lower portion of the hopper a yielding throat structure which effectually gages and limits the level of the matches flowing to and between the blade extensions above the trays while such extensions are entering into and passing through the lower portion of the hopper.

The shucks are delivered to the spaces formed by and between succeeding blades 36 of the conveyer; such shucks in the present instance being fed in end to end procession along a rearwardly extending chute 64, the delivery end of which lies adjacent the path of the blades 36 and in substantial horizontal alinement with the axis of the wheel 40. The chute comprises a bottom and upstanding side walls spaced thereon to guide the shucks, end to end, with one of the long narrow sides of each shuck supported on the bottom. The side walls are terminate in advance of the delivery end of the chute to provide a space equal to the length of a shuck or substantially so, so that the shucks upon entering the space may be shifted laterally therein toward the conveyer. (See Figs. 7, 8 and 9). The delivery end of the chute is provided with an end-plate 65 which acts as a stop for the leading shuck, and constitutes with the proximate parts of the chute a throat for the guidance of the shucks to the conveyer. Reciprocable within and transversely of the throat is a head 66, the face of which acting against the opposing shuck, moves it bodily toward the conveyer. This head 66 is formed on the upper end of a lever 67 which is fulcrumed at its lower end on a shaft supported in brackets 68 on the main frame. (See Figs. 1, 4 and 5). On the body of the lever is a laterally-projecting stud 69 bearing an antifriction roller 70 which is held yieldingly in contact with the functional face of

a cam 71 by means of a retracting spring 72 secured at its respective ends to the lever and to a pin 73 on a stationary bracket 74 on the frame. The cam is mounted to turn loosely on the main shaft, said shaft being geared with the cam through an appropriate gear train. In the present instance, the main shaft bears a spur wheel 76 which meshes with one, 77, of two spur wheels sleeved to turn as a unit on a stud-shaft 78 projecting from the bracket 74 above referred to, the other spur wheel, 79, of the pair meshing with a spur wheel 80 on the hub of the cam 71. This cam is provided with two high points 81 diametrically opposite to each other, and the ratio of the gears is such that the lever 67 is rapidly reciprocated when each succeeding shuck-receiving space of the conveyer is positioned to receive a shuck laterally from the delivery throat of the shuck chute. There is sufficient space in the delivery throat, between the path of entrance of a shuck thereto and the conveyer, to permit the lever head in its acting stroke to advance two shucks, side by side, toward the conveyer, one shuck entering the conveyer and the other remaining in proximity thereto in position for insertion by the succeeding active stroke of the lever head on the next shuck delivered to the throat. I preferably arrange on the inner wall of the throat, adjacent the conveyer, a block 82 having a serrated friction face 83 slightly wider than the open end of the shuck, so that each shuck which is advanced in close relation to the path of the conveyer is gripped and held between the block and the outer wall 65 of the throat until such shuck is forced into the conveyer.

The shucks when they are successively advanced by the conveyer to a position directly above the axis of the sprocket wheel 40 beneath the delivery end of the hopper, occupy a horizontal position in endwise relation to the trays as the latter are successively introduced to the conveyer. The shucks and trays thus positioned progress beyond the hopper, and thereafter the filled trays are entered into their respective complementary covers on the conveyer.

In the present instance the trays are gradually pushed endwise into the covers by means of an endless series of horizontally-reciprocative plungers 84 which are mounted in spaced parallel relation to each other on an endless conveyer 85, the upper run of which is mounted and arranged to travel adjacent to, and in the same direction as, and concurrently with the upper run of the tray-and-shuck conveyer. Each plunger, in its preferred form, comprises a bar provided at its inner or acting end with a thrust head 84′ designed to act upon the opposing end of a tray, which head is preferably provided with an underbeveled nose or shoulder which overhangs the opposing end of the tray when the head impinges against the latter, and also overhangs and presses upon the proximate end of the top of the shuck when the tray is pushed fully into the shuck. On the plunger bar is an upstanding stud 86 which is adapted in the travel of the plunger to enter an appropriate cam-way 87 in an overhanging plate structure 88 which is secured to the table, such stud thus being actuated to effect a gradual inward movement and then a corresponding return movement of the plunger.

The plunger conveyer in the form illustrated comprises links jointed together in endless series and supported by two sprocket wheels 89, 90, one, (89), of which is mounted on the shaft 41 and the other (90) of which is mounted on a shaft 91 having its bearings in brackets beneath the table. The shaft 91 is equipped with a pin wheel 92, similarly to the shafts 41, 42, with the pins 93 of which likewise engages a worm wheel 94 on the main shaft. Thus the plunger conveyer is timely driven in respect to the tray-and-shuck conveyer. The links of the plunger conveyer are provided on their outer faces with transverse ribs 95 which provide parallel guide spaces for the plungers 84. Alinement of the plunger studs with the ends of the cam-way 87 is insured by their contact with curved end irons 96 which are secured to the respective ends of the cam plate and extended in proximity to the flexures of the conveyer 85. (See Figs. 1, 2 and 15.)

Beneath the horizontal run of the plunger conveyer 85 is a rail 97 which serves as a guide and support for the lower run of the conveyer in its travel, and also as a guard to prevent the escape of the plungers from the conveyer. This rail is, in effect, a part of the rail 43 above referred to, and is correspondingly supported by the standards 44. The rails are provided with appropriate channels 98, 99 for the reception respectively of the blade extensions 35′ of the conveyer 34, and the heads 84′ of the plungers 84, as seen in Fig. 6.

I preferably provide a suitable hold-down device for the shucks in the region of their travel where the trays are successively entered into the open ends of the shucks, which device comprises a block 100 carried by the free end of a vertically-movable arm 101 overhanging the path of the shucks. The other end of the arm is pivoted to a suitably-disposed bracket 102 on the table, and the block by its weight exerts sufficient holding pressure on the successive shucks passing thereunder at the instant the trays are being entered into the proximate open ends of the shucks. (See Figs. 2 and 3.) The

inner end of the block is downwardly beveled as shown in order to permit the projecting nose of the plunger thrust-head 84′ to pass easily under and temporarily raise the block.

Referring again to the tray-and-shuck holding blades on the conveyer 34, it is to be observed that the inner vertical ends of the blades 36 are enlarged to provide shoulders 103 which act as stops for the inner ends of the shucks when they are applied to the conveyer 34, and that the outer ends of such shoulder portions are beveled, as at 104, to afford guides for the opposing ends of the filled trays when they are being pushed into their complementary shucks.

It is to be noted that the upper run of the conveyer 34 is guided along the top of the table by bars 105, 106 which are affixed to the table in spaced parallel relation to each other, so as to extend longitudinally of the table in proximity to the respective edges of the said conveyer. The guide bar 105 along the rearward edge of the table is of sufficient height to serve as a stop for the opposing ends of the shucks while the trays are being inserted thereinto. (See Fig. 2.) The other bar 106 is flush with or below the upper surface of the body of the conveyer so as to permit the free passage of the trays to the latter. The guide-bar 106 also serves in conjunction with another spaced parallel bar 107 on the table, to guide the upper run of the plunger conveyer on the table. (See Fig. 3.)

I preferably though not necessarily mount on the continuously-driven shaft 91 of the sprocket wheel 90 for the plunger conveyer, a corresponding sprocket wheel 90′ which receives the links of the tray-and-shuck conveyer and serves as an auxiliary driver therefor.

The shucks with the filled match trays contained therein are advanced by the carrier to a position partially around the wheel 39 and they are thence discharged by gravity down a chute 108 leading to a suitable receiving table, as 109, as seen in Fig. 1.

It is to be noted that the speed of the tray-and-shuck conveyer may be timed to permit the feeding of two or more trays and two or more shucks to the conveyer at each inserting operation of the feeding mechanisms, in which case the plunger conveyer will be operated concurrently with the tray-and-shuck conveyer.

The tray feeding and tray filling mechanisms herein illustrated form the subject of a divisional application for patent filed August 30th, 1916, under Serial No. 117,589.

My invention is not limited to the particular details of construction shown and described, as the mechanisms may be modified without departure from the fair spirit of the invention.

I claim—

1. In a box-filling machine, the combination of a conveyer having spaced shuck-holding members thereon, means for moving said conveyer, a guide-way for box shucks, said guide-way having a delivery throat adjacent the path of the conveyer, and means reciprocative in said throat for moving the shucks therefrom into the spaces between the successive members of the conveyer.

2. In a box-filling machine, the combination of a conveyer having spaced shuck-holding members therein, means for moving said conveyer, a guide-way for box shucks, said guide-way having a delivery throat adjacent the path of the conveyer, a friction element in a wall of said throat in close relation to the conveyer, a head movable in said throat toward and from the conveyer, said head being adapted in one active impulse to move a shuck into engagement with said friction element and in another active impulse to move such shuck into the space between successive members, and means for actuating said head.

3. In a box-filling machine, the combination with an endless chain conveyer having spaced shuck-holding blades thereon, and sprocket wheels whereby said conveyer is guided in two longitudinal paths, of means whereby shuck trays are supported laterally adjacent the conveyer as it travels from one path to the other, and means whereby the shucks thus supported are progressively fed to the conveyer.

4. In a box-filling machine, the combination with an endless chain conveyer having spaced shuck-holding blades thereon, and sprocket wheels whereby said conveyer is guided in upper and lower horizontal paths, of means whereby shuck trays are supported laterally adjacent the conveyer as it travels from the lower to the upper path, and means whereby the shucks thus supported are progressively fed to the conveyer.

5. In a box-filling machine, the combination of a conveyer comprising an endless chain of links having lengthwise thereof two rows of spaced transverse blades, means for inserting box-trays between the successive blades of one row, means for inserting box-shucks between the successive blades of the other row, means for supplying matches to the trays on the conveyer, and means for pushing the filled trays into their complementary shucks on the conveyer.

6. In a box-filling machine, the combination of a conveyer comprising an endless chain of links having lengthwise thereof two rows of spaced transverse blades, means laterally of the horizontal path of the conveyer for inserting box-trays between the successive blades of one row, means endwise of the conveyer for inserting box

shucks between the successive blades of the other row, means for supplying matches to the trays on the conveyer, and means for pushing the filled trays into their complementary shucks on the conveyer.

7. In a box-filling machine, the combination of a conveyer comprising an endless chain of links having two rows of spaced transverse blades extending longitudinally of the conveyer, said rows being separated from each other to provide a channel throughout the length of the conveyer, means for inserting box-trays between the successive blades of one row, means for inserting box-shucks between the successive blades of the other row, a hopper for supplying matches to the trays on the conveyer, said hopper having a wall entering the channel between the two rows of blades, and means for pushing the filled trays into their complementary shucks on the conveyer.

8. In a box-filling machine, the combination of a conveyer comprising an endless chain of links having two rows of spaced blades extending longitudinally of the conveyer, the inner ends of the blades of one row having beveled guide and stop portions, means for inserting box shucks between the successive blades having such portions, means for inserting box trays between the successive blades of the other row, means for supplying matches to the trays on the conveyer, and means for pushing the filled trays into their complementary shucks on the conveyer.

Signed at Barberton in the county of Summit and State of Ohio this 19th day of June A. D. 1915.

MICHAEL PARIDON.