

1,063,960

J. W. DENMEAD.
BOX FILLING MACHINE.
APPLICATION FILED MAY 20, 1909.

Patented June 10, 1913.

6 SHEETS—SHEET 1.

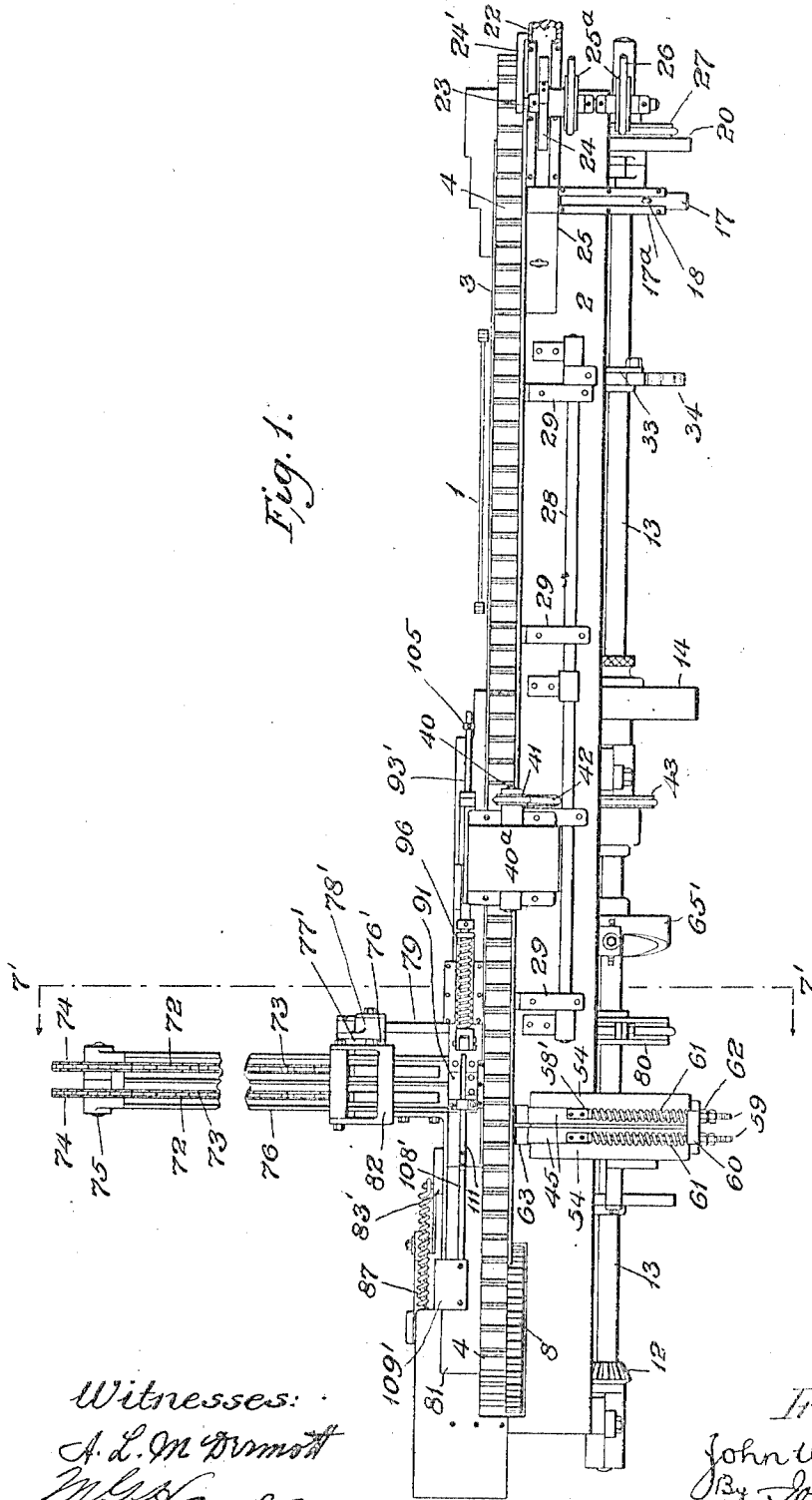


Fig. 1.

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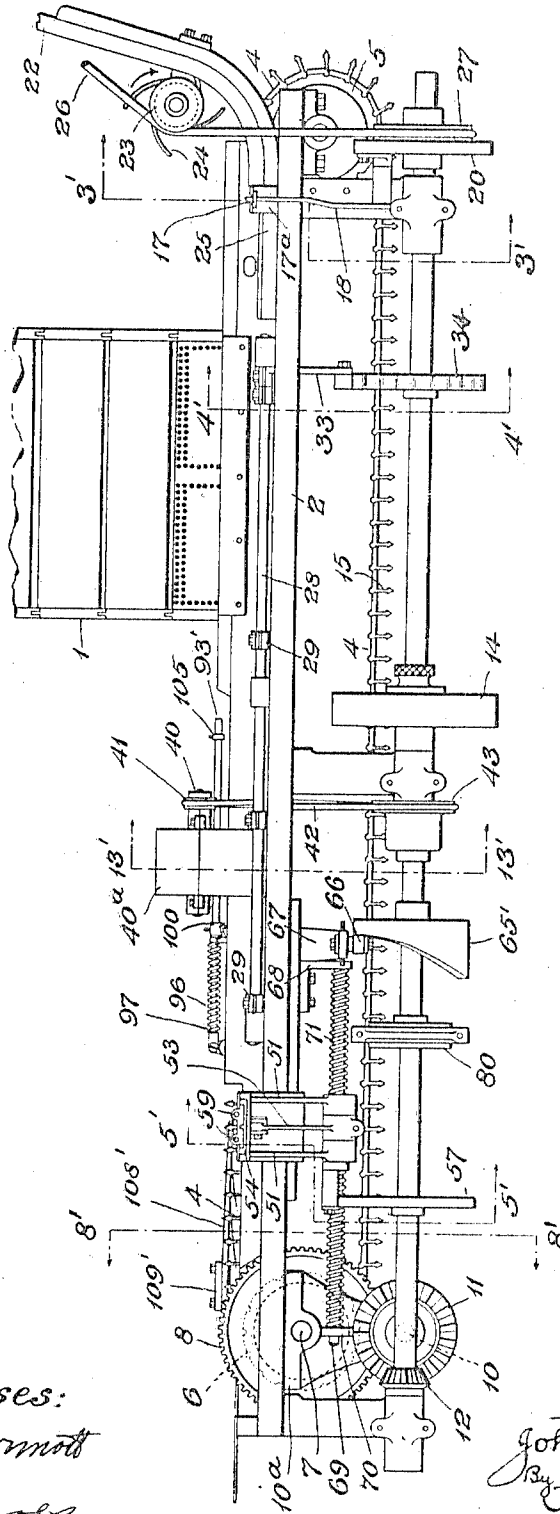
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6 SHEETS—SHEET 2.

Fig. 2.



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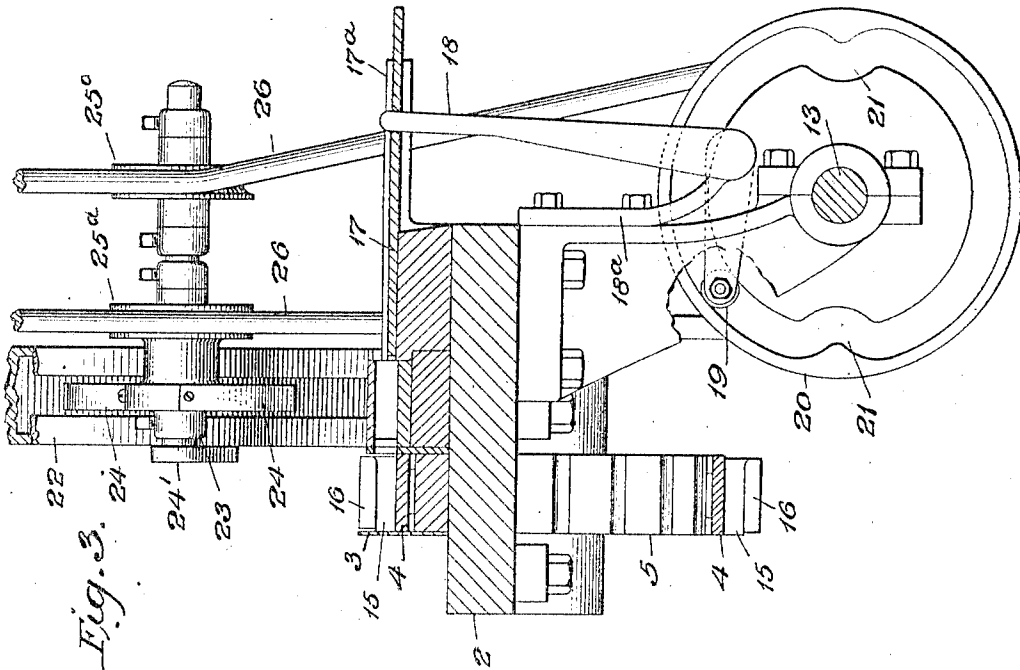


Fig. 3.

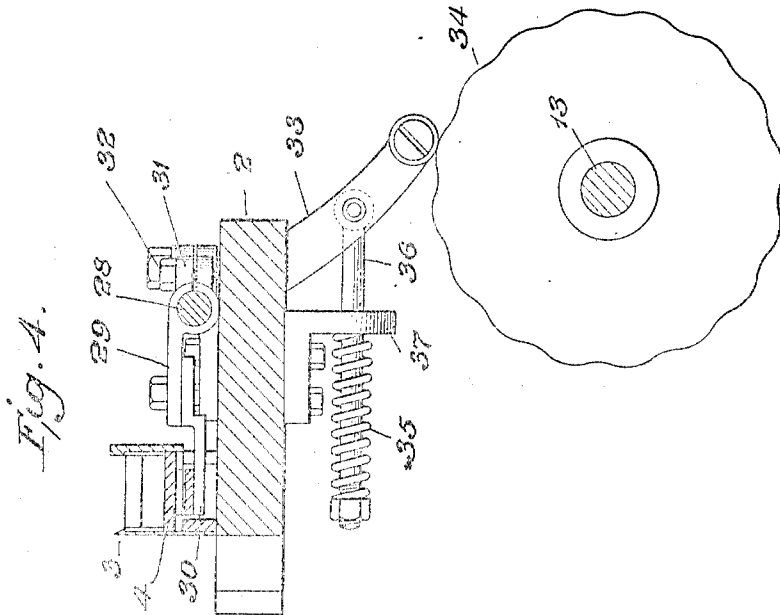


Fig. 4.

Witnesses:
A. L. M. Dermott
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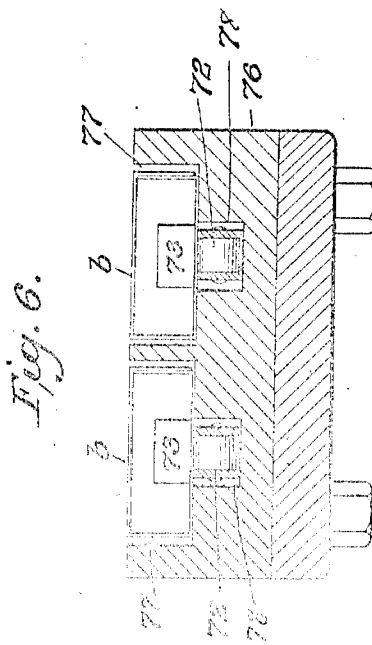
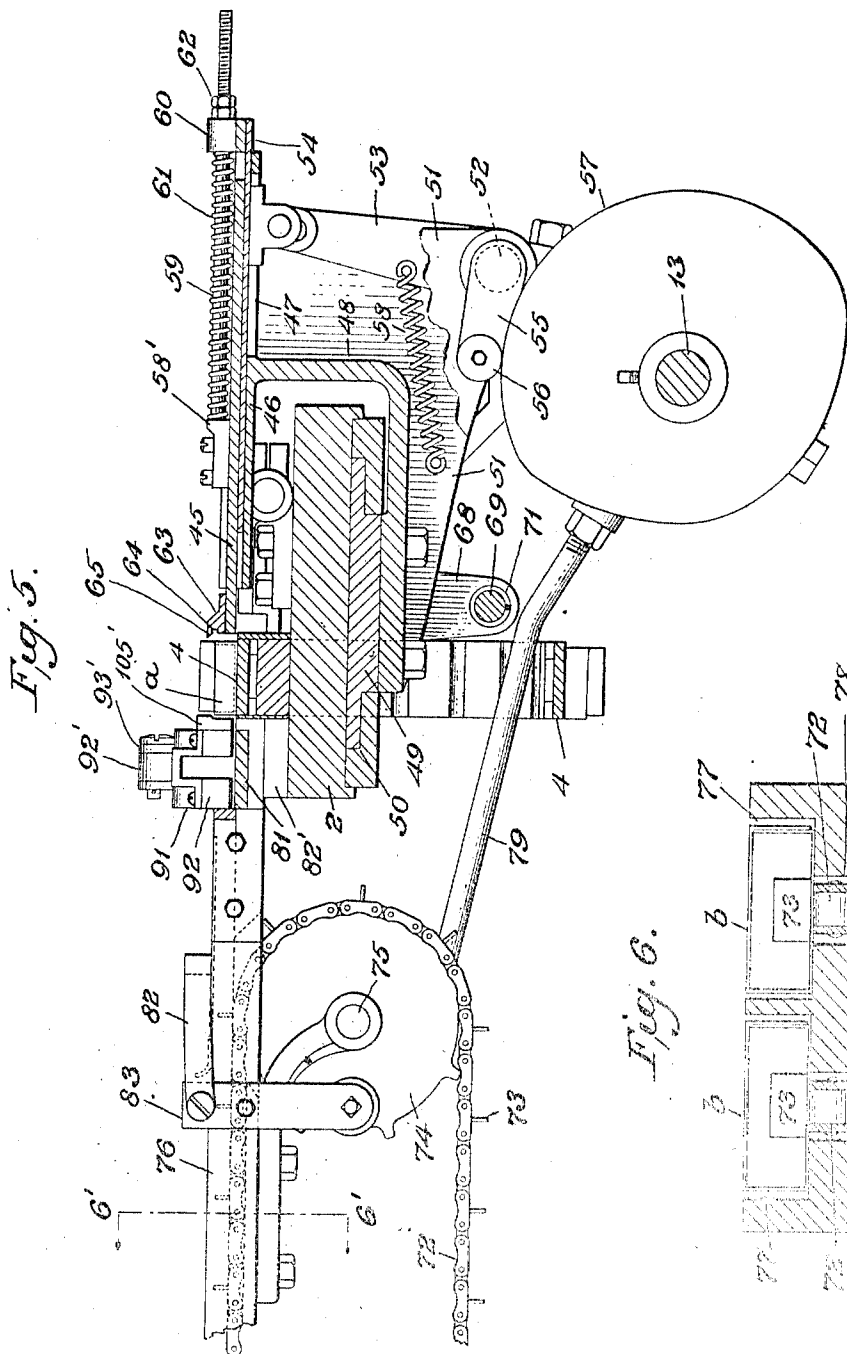
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8 SHEETS—SHEET 4.



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6 SHEETS-SHEET 5.

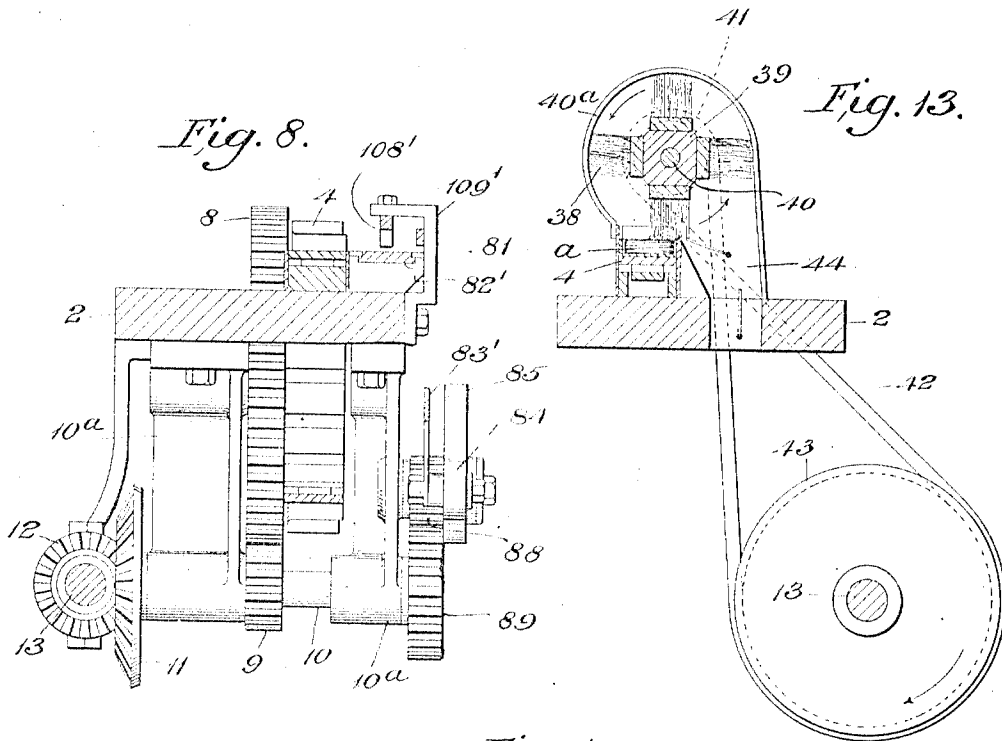
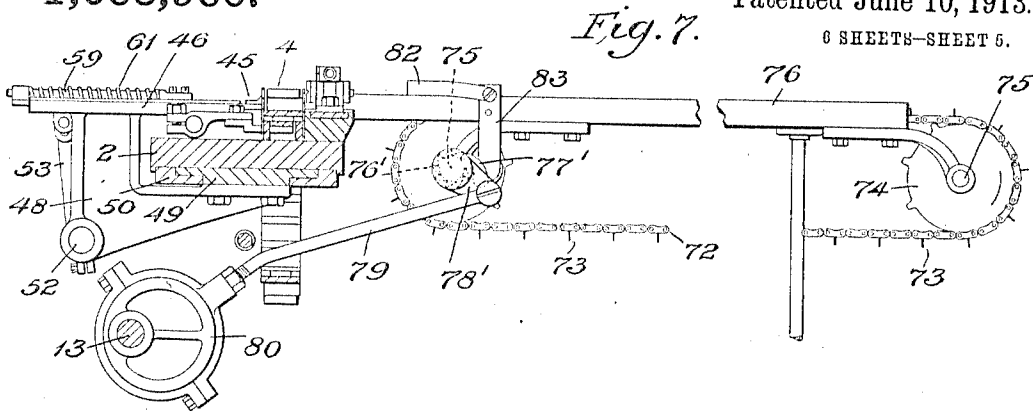
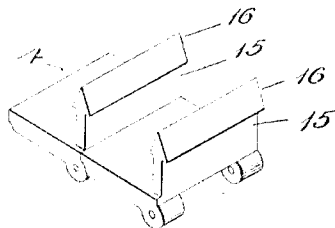


Fig. 14.



Witnesses:
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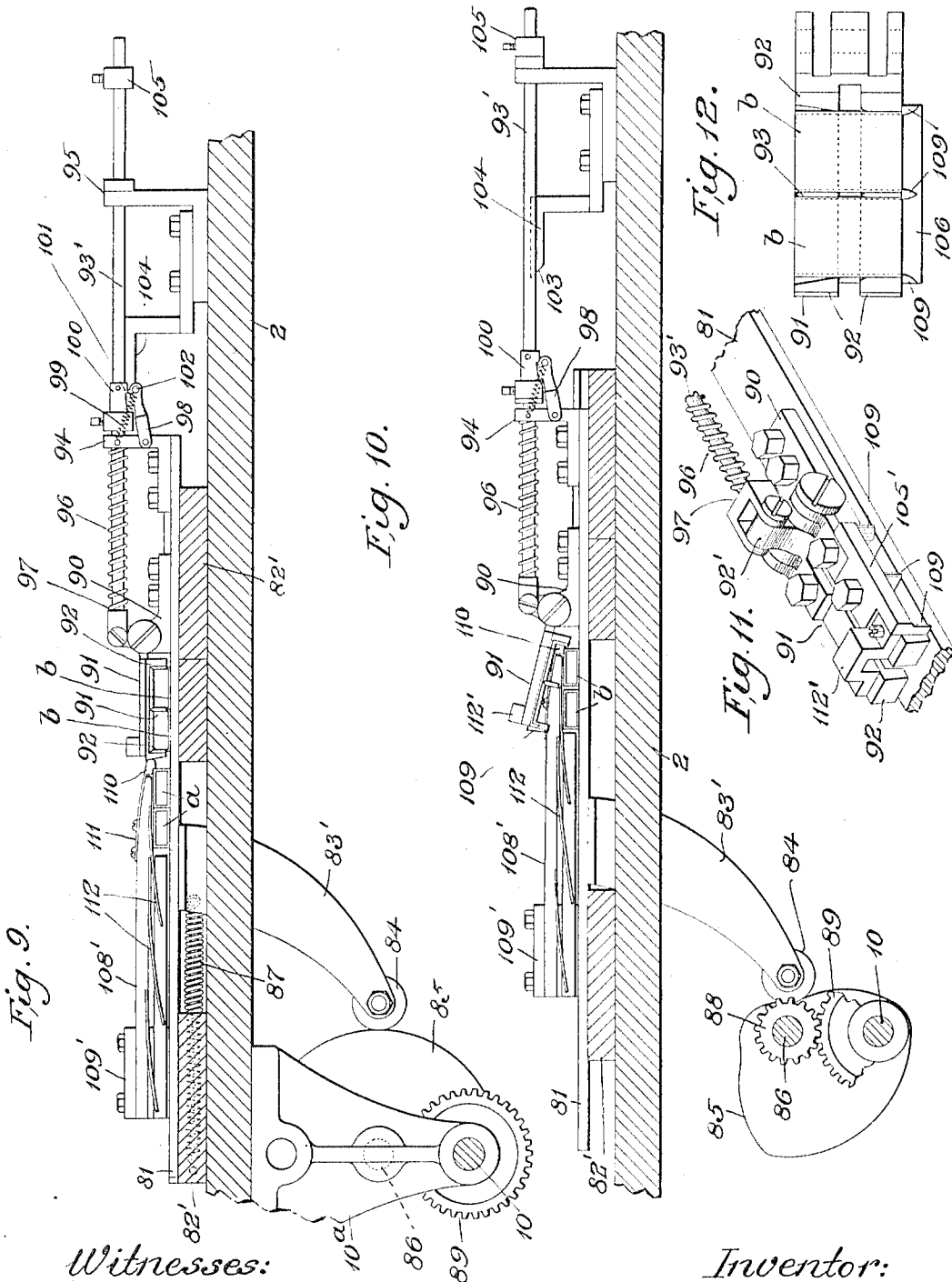
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6 SHEETS—SHEET 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN W. DENMEAD, OF AKRON, OHIO, ASSIGNOR TO THE DIAMOND MATCH COMPANY,
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BOX-FILLING MACHINE.

1,063,960.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed May 29, 1909. Serial No. 499,252.

To all whom it may concern:

Be it known that I, JOHN W. DENMEAD, a citizen of the United States, and resident of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Box-Filling Machines, of which the following is a specification.

This invention relates to machines for filling boxes with matches, or the like, having reference more especially to machines for filling and closing the tray-and-shuck form of box commonly employed for holding matches.

The object of my invention is to provide a machine of simple and efficient construction and operation, whereby box trays shall be delivered to a conveyer and transported thereby adjacent the discharging end of a match machine in a manner to receive the matches as rapidly as they are produced; whereby shucks shall be fed adjacent the path of, and in accurate alinement with, the filled box trays; and whereby such trays shall be uniformly and positively inserted into the shucks presented thereto.

Accordingly my invention, stated generally, 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 plan of a box filling machine embodying my invention. Fig. 2 is a front elevation thereof. Fig. 3 is a transverse vertical section on a plane through the devices for inserting the box trays in the conveyer, as on the line 3'—3' of Fig. 2. Fig. 4 is a similar section on a plane adjacent the devices for jarring the conveyer, as on the line 4'—4', of Fig. 2. Fig. 5 is a similar section on a plane through the devices for inserting the filled box trays into their shucks, as on the line 5'—5', of Fig. 2, a box tray (a) being indicated in the tray conveyer, and a portion of the shuck-feeding chains and adjuncts being shown in elevation. Fig. 6 is a transverse section through the said chains, and the channeled shuck supporting frame, as on the line 6'—6', of Fig. 5; shucks (b) being indicated in end view in the channels of the frame. Fig. 7 is a transverse section, as on the line 7'—7', of Fig. 1. Fig. 8 is a similar section, as on the line 8'—8', of Fig. 2. Fig. 9 is a longitudinal vertical section on a plane adjacent the devices for feeding the

box-shucks into position for the reception of the box-trays, said devices being shown as retracted and in shuck-engaging position. Fig. 10 is a similar section, showing the shuck-feeding devices as advanced and out of engaging position. Fig. 11 is a perspective view of the shuck-feeding head and adjuncts. Fig. 12 is a view of the under side of said head as detached, box-shucks being indicated therein. Fig. 13 is a transverse section through the brush devices for removing surplus matches from the box trays, as on the line 13'—13', of Fig. 2; a filled tray being indicated. Fig. 14 is a perspective view of two adjoining links of the tray-conveyer.

1 (Figs. 1 and 2) indicates a portion of the endless match carrier of a match making machine, from which carrier the finished matches are discharged row by row in a continuous stream during the operation of the machine.

Adjacent the discharging end of the match machine is a horizontal bed or table 2, upon the upper surface of which is a trough 3 in which is guided and supported the upper run of an endless conveyer 4 which passes around sprocket wheels 5, 6, mounted at or near the respective ends of the bed. The shaft 7 of one of these wheels is provided with a spur wheel 8 which meshes with a pinion 9 on a transverse shaft 10 journaled in suitable bearings in brackets 10^a beneath the bed. The latter shaft bears a bevel wheel 11 which meshes with a wheel 12 on a shaft 13 which also is journaled in bearings beneath the bed and extends from end to end of the latter. The shaft 13 is provided with a driving pulley 14 which is actuated from a suitable source of power, and hence, through the gearing described, the power is transmitted to the conveyer to impart continuous motion thereto longitudinally of the bed. (See Figs. 1, 2 and 8).

The conveyer preferably comprises metal links jointed together to constitute an endless chain and provided each, at one end, with a transverse wall 15 along the upper edge of which is an oppositely inclined shouldered portion 16. (Fig. 14.) The dimensions of the space between the opposite walls of adjoining links, below the overhanging shoulders thereof, are equal to those of the match trays to be filled, or substantially so, to the end that such trays may be

readily introduced between the opposing walls of the conveyer, from one side of the latter, at a point in advance of the stream of falling matches; thence transported across the path of such stream to receive the matches progressively, and thence carried onward and discharged from the opposite side of the conveyer. The overhanging shoulders prevent vertical displacement of the box trays on the conveyer, and also assist in guiding and directing the descending matches to the trays.

The trays are inserted successively into the holders of the conveyer by means of a plunger 17 which is reciprocative at right angles to the direction of travel of the conveyer. This plunger is slidably fitted to ways in a suitably disposed guide piece 17^a on the bed,—at the right hand end thereof, as viewed in Figs. 1 and 2,—and is perforated near its outer end for the free passage of the extremity of the longer arm of a bell crank lever 18 which is pivoted to a bracket 18^a depending from the bed. The lower arm of the lever bears a roller 19 which runs in a cam way of a cam 20 on the shaft 13, the contour of the cam way being such that the lever is quickly oscillated at predetermined intervals, and the plunger performs correspondingly reciprocated at right angles to the direction of travel of the adjacent run of the conveyer. (See Fig. 3.) In the present instance, the cam way is a concentric groove interrupted at two diametrically opposite points with actuating portions 21, and hence during each rotation of the cam the plunger is twice reciprocated at intervals, with an extended dwell between the operations. A box tray being fed in front of the plunger when it is retracted, the plunger upon its reciprocation impinges against the opposing end of the tray, quickly pushes the tray into the conveyer, and recedes; the relative speed of the parts being such that notwithstanding the continuous uninterrupted movement of the conveyer, the tray is accurately deposited therein.

While the box trays may be fed to the path of the plunger in any suitable manner, I prefer to employ for this purpose, devices of the following character: 22 (Figs. 1, 2 and 3) is an inclined chute arranged at the receiving end of the bed and curved at its lower end to communicate with the tray receiving space between the plunger and the conveyer. The trays, mouth outward, are introduced one by one to the upper end of the chute so that they can slide down therein in a continuous procession. At or near the lower curved portion of the chute is a continuously driven wheel 23 provided on its periphery with a series of light curved spring fingers 24 which extend outwardly and rearwardly from its path of rotation and are so disposed as to enter the

chute during the rotation of the wheel and engage the trays and feed them progressively toward the inserting plunger, the springs by virtue of their elasticity, riding yieldingly upon and escaping the opposing trays when the lowermost tray is in position for engagement by the plunger. A suitably disposed stop 25 maintains the tray in such position. The shaft of the wheel 23 is mounted in a projecting bracket 24^a on the chute, one end of the shaft being provided with a sheave or sheaves 25^a against which bears a continuously driven belt 26 passing from the pulley 27 on the shaft 13. The devices just described provide a simple and efficient means for advancing the trays to the inserting plunger; the yielding character of the springs, while positive and reliable in their feeding action, avoiding any liability of crushing the ends of the delicate trays engaged thereby. The trays thus presented to the plunger are successively delivered to the holders of the conveyer and transported thereby across the stream of falling matches to receive the same, as above mentioned.

In order to agitate or jar the trays during and after the filling thereof, and thus cause the matches to settle down snugly therein, I provide for a slight though rapid vertical jarring of the conveyer during its travel. To this end I journal in suitable boxes on the bed, longitudinally thereof, a rock shaft 28 (Figs. 1, 2, 4, 5 and 7) provided at intervals in its length with arms 29 which extend toward the conveyer and are provided with tappet fingers 30 that lie beneath the latter, whereby when the shaft 28 is rapidly oscillated the vibrating tappet fingers contact with the underside of the conveyer and effectively jar the same. In the present instance the arms are provided with split bosses 31 which are held together and adjustably secured to the shaft by screws 32 whereby said arms, or any of them, may be nicely adjusted in a vertical arc with respect to the conveyer to impart a more or less extensive jarring action to the latter. (See Fig. 4.) Thus a progressively decreasing jarring action may be imparted to the conveyer at different points of its travel by reducing the impact of the arms successively, the arm or arms at or adjacent the source of supply being arranged to give the conveyer a greater jar than the arms beyond such source. It is to be understood, of course, that after the boxes have been filled, a less degree of jarring is needed than during the filling thereof.

A depending arm 33 on the shaft 28 engages the scalloped periphery of a cam 34 on the shaft 13, and is held in contact therewith by a spring 35 which encircles a stem 36 extending from the arm 33, and bears against a nut or head on the free extremity

of the stem and against a bracket 37 depending from the bed. Thus during the operation of the machine the cam and spring coöperate to impart a continuous series of short, rapid oscillations to the arm 33 and its connections.

As a simple and efficient means to remove surplus matches endwise from the box-trays, a brush 38 is mounted to rotate above and transversely of the conveyer at a point beyond the source of match supply. This brush preferably comprises a series of radial brush members affixed to a hub 39 fast on a shaft 40 which extends longitudinally of the conveyer and is journaled in bearings in the sides of a casing 40^a supported by the trough. One end of the shaft extends outwardly beyond the side of the casing and is provided with a pulley 41 which is connected by means of a belt 42 with a pulley 43 on the shaft 13 whereby the brush is rapidly rotated in the direction indicated by the arrow in Fig. 13, in a manner to sweep down upon and across the tops of the subjacent filled boxes and remove the surplus matches endwise therefrom. Such matches are swept into a chute 44 leading from the interior of the casing to a discharge opening in the table.

It will be observed, by reference to Fig. 2, that one of the arms 29 is mounted adjacent the vertical plane of the rotating brush, so as to act upon the conveyer as it progresses beneath the brush, and hence the consequent vertical jarring of the conveyer at this point insures the efficient contact with the brush of the superfluous matches contained within the box trays.

The trays (a) filled with matches are transported by the conveyer 4 to the devices for ejecting the trays and inserting them into the shucks (b). I preferably eject two trays simultaneously from the conveyer and insert them into two shucks properly positioned and supported adjacent the conveyer in line with the trays, as by such twin ejecting and inserting operation the working capacity of the machine is materially enhanced without the otherwise necessity of running the conveyer at an undue rate of speed.

Referring to the ejecting and inserting devices herein illustrated, 45, (Figs. 1 and 5) designates two parallel plungers reciprocative at right angles to the direction of travel of the conveyer so as to enter two adjacent holders and push the filled trays therefrom. These plungers are mounted in a carriage 46 which is reciprocative longitudinally of the bed, as hereinafter described, whereby, when the plungers are within the conveyer they are moved onward therewith, but when they are retracted from the conveyer they are moved reversely of the direction of travel of the latter into position for a similar operation upon the trays in the two succeed-

ing holders of the conveyer, and so on. The carriage comprises a horizontal plate 47; a bracket portion or frame 48 depending therefrom and a slide 49 formed on or affixed to a lower horizontal limb of such portion, the slide being fitted to longitudinally extending guideways 50 on the underside of the bed. (Fig. 5.) The bracket is provided with a pair of spaced depending webs or arms 51 in which is journaled a rock shaft 52. Rising from this shaft is an arm 53, the upper end of which has a pin-and-slot connection with a depending lug on a slide 54 which is fitted to appropriate guideways in the upper surface of the plate 47 so as to be movable horizontally toward and from the conveyer. (See Figs. 5 and 7.) One end of the shaft 52 is provided with a crank arm 55 having a laterally extending stud or roller 56 which bears upon the periphery of a cam 57 on the shaft 13. The stud or roller 56 is held in contact with the cam 57 by means of a spring 58 conveniently secured to the arm and to the bracket, and the contour of the cam is such that during an interval of its rotation the crank shaft is oscillated in a manner to reciprocate the slide 54, that is to say, in a portion of the rotation of the cam the slide is maintained thereby in retracted position; in another portion the slide is being moved toward the conveyer by the action of the spring, and in the remainder of the rotation the slide is being retracted by the cam against the stress of the spring.

The plungers 45 are carried by the slide 54 so as to be movable thereby toward and from the conveyer, the inner or acting ends of the plungers projecting beyond the adjacent end of the slide in order to permit their entrance into and retraction from the conveyer. These plungers are mounted to have capacity for longitudinal movement relatively to the slide 54 and independently of each other, so that one or the other plunger can perform its function irrespective of any imperfection in the operation of its companion, arising, for example, from a defective or crushed tray or shuck, or other irregularity. To this end, the plungers are slidably fitted to parallel guide ways in the upper surface of the slide 54, and each plunger is provided with an upwardly projecting lug 58' from which extends rearwardly a stem 59 that passes freely through a perforated guide piece 60 on the slide. Encircling the stem between the lug and guide piece, is a spring 61 which, while permitting yielding retraction of the plunger, yet maintains the plunger normally beyond the inner end of the slide. Thus, it will be seen that when the slide is advanced toward the conveyer, the acting ends of the plungers are caused simultaneously to enter the holders and push the filled box trays

therefrom and into the shucks presented thereto; but if the progress of either tray be accidentally retarded, as above indicated, the movement of the opposing plunger will be discontinued without in any way affecting or impairing the continued travel of the slide and the other plunger. The outer ends of the stems 59 are preferably screw threaded and provided with nuts 62 which take against the guide piece 60 and thus permit the nice adjustment of the plungers in relation to the slide and conveyer.

I preferably provide the inner end of each of the plungers with a head 63 having in its inner face a horizontal recess or throat 64 substantially in the same horizontal plane as the upper edge of the shuck, and with an overhanging under-beveled lip 65 immediately above the recess, whereby when the filled tray has been fully entered into the shuck, by the action of the portion of the head below the recess or throat such upper edge is engaged by the beveled surface of the lip and pressed thereby slightly downward below the proximate edge of the tray; the recess or throat receiving the upper edge of the shuck as the proximate end of the tray is slightly advanced beyond such edge, and thus insuring the efficient action of the lip on the opposing upper edge of the shuck.

As hereinbefore mentioned, the carriage is reciprocated longitudinally of the bed while the plungers are within the traveling conveyer. A simple and efficient means for this purpose is as follows: Affixed to the shaft 13 is a face cam 65' against the acting surface of which bears a stud or roller 66 on an arm 67 depending from the carriage slide. (See Fig. 2.) Depending also from the slide is a bracket 68 to which is secured one end of a horizontal rod 69, the other end of which is slidably fitted to a perforated guide piece 70 affixed to the bed. A spring 71, encircling the rod, bears against the guide piece and the bracket, thus maintaining the stud or roller 66 in operative contact with the cam 65'. Hence during the operation of the machine, the cam and spring cooperate to effect the requisite reciprocation of the plunger carriage and its appurtenances.

72 (Figs. 1, 5, 6 and 7) indicates two endless horizontally-traveling conveyers mounted and arranged to receive two rows of box-shucks and feed them progressively toward the bed. These conveyers are preferably ordinary sprocket chains provided at intervals with suitable studs or lugs 73 to engage and impel the box-shucks when the latter are imposed upon or in the path of the chains by an attendant. The chains pass around sprocket wheels 74, the shafts 75 of which have their bearings in suitable brackets depending from a supporting frame which extends rearwardly from the bed or table.

This frame in the present instance includes a bar or bed piece 76 having therein two parallel longitudinally disposed channels 77 which afford guide ways for two rows of shucks deposited therein; the bottoms of the channels having medial depressions or ways 78 for the passage of the upper runs of the chains 72. (Fig. 6.) The shaft 75 of the forward sprocket wheels is provided with a ratchet wheel 76' with the teeth of which engages a pawl 77' on a rock arm 78' which is loosely hung on said shaft and connected by means of a rod 79 with the strap of an eccentric 80 on the shaft 13. By this construction the forward shaft 75, and, perforce, its sprocket wheels and the chains are intermittently impelled in a manner to advance the box-shucks toward the bed or table.

The forward sprocket wheel is mounted somewhat in rear of the bed or table so that the shucks, as they leave the chains, pass upon that part of the frame 76 between the wheel and the bed, and these shucks are then impelled by the advancing train of shucks in rear thereof and deposited in pairs upon the bed, or rather upon a slide bar 81 hereinafter described which is mounted on the bed adjacent to and longitudinally of the conveyer.

A U-shaped member 82 pivoted to a support 83 on the frame 76 overhangs and rests upon the shucks as they leave the chains, and thereby exerts sufficient friction upon the shucks to prevent their displacement.

When two shucks are deposited upon the slide bar 81 they are engaged by suitable devices and thereby positively moved longitudinally of the bed into the path of the filled trays which are being ejected from the conveyer. These devices in their preferred form, are as follows: The slide bar 81 is fitted to ways in a longitudinally disposed guide piece 82' on the bed, the upper surface of the slide bar being very slightly below the horizontal plane of the bottoms of the box trays in the upper run of the conveyer. Depending from the slide bar through appropriate openings in the guide piece and table, is an arm 83' on the lower end of which is a roller 84 which bears against an appropriate peripheral cam 85 on a transverse shaft 86 having its bearings in the brackets 10' beneath the table, the said roller being held in operative engagement with the cam by means of a spring 87 which is suitably secured to the bracket and to the table. On the shaft 86 is a gear wheel 88 in mesh with a gear wheel 89 on the driven shaft 10, whereby, during the operation of the machine, the shaft 86 and its cam 85 are rotated in a manner to effect, in conjunction with the spring and associated parts, the requisite reciprocation of the slide bar. On this bar is a bracket 90 to which is pivoted

one end of a head 91 which is movable in a vertical arc toward and from the slide bar 81. This head comprises a plate having on its under side a series of equally spaced depending walls or jaws, of which, in the present instance, there are three, namely, two side jaws, 92 and an intermediate jaw 93. Two parallel chambers or spaces are thus formed on the underside of the head, each space being equal to the width of a shuck, or substantially so. The head, with its walls or jaws, is preferably longitudinally slotted or bifurcated for a purpose presently explained. When the head is in its position to the right, and swung downward, as viewed in Figs. 9 and 11, the two spaces snugly receive the two shucks which have previously been advanced upon said bar by the feed devices above mentioned. If then the slide bar be moved to the left (as in Fig. 10) these two shucks will be carried thereby directly in line with the two ejecting plungers, and moved concurrently therewith and with the traveling conveyer, and hence the two filled boxes, as they are being expressed from the conveyer by the plungers, will be forced endwise into the opposing shucks. If the head then be swung above the shucks (as in Fig. 10) the slide can be retracted for a succeeding operation upon another pair of shucks.

The means for periodically oscillating the head is as follows: At the pivoted end of the head 91 is a lug 92' to which is pivoted one end of a rod 93' which is slidingly fitted to perforations in guide brackets 94—95, affixed to the slide bar and table, respectively. A spring 96 encircling the rod 93' bears against a shoulder 97 thereon and against the opposite side of the bracket 94, thereby tending to force the rod toward the head 91 and thus maintain such head normally in down position. Pivoted to the bracket 94 is a latch arm or trigger 98 which is held normally raised by means of a spring 99 secured thereto and to the bracket. On the rod 93', to the right of the bracket 94 as viewed in Figs. 9 and 10, is a collar 100 provided on its underside with a tooth or shoulder 101 which is so arranged that when the rod is moved backward, against the stress of the spring 96, that is, to the right, a tooth on the free end of the trigger will engage the tooth or shoulder 101 and thus keep the rod in retracted position with the head raised. But if the trigger be depressed from engagement with the tooth or shoulder 101, the rod 93' will be caused to resume its normal position with the head depressed. On one side of the trigger is a tappet stud 102 in the path of which, during the horizontal travel of the rod, is the beveled end 103 of a horizontal arm 104 which is formed on or affixed to a member rising from the bracket 95. This beveled end constitutes, in effect, a cam which is so arranged that as the slide

bar 81 approaches or reaches the limit of its stroke to the right, the tappet stud engages the cam and is forcibly depressed thereby to effect the release of the rod, whereupon the head 91 being lowered embraces two subjacent shucks which have been delivered to the slide bar 81, as above mentioned.

On the outer end of the rod 93' is a collar 105 which is so disposed that as the slide rod reaches the end of its stroke to the left, the collar abuts against the opposing side of the bracket 95, thereby slightly retracting the rod against the force of the spring 96 and raising the head above the boxes. At the same time, the toothed collar 101 being retracted, is engaged by the trigger, thereby temporarily locking the head in elevated position. The slide bar is then retracted as before for a repetition of the operation just described.

The collar 105 is adjustably held on the rod 93 by a set screw or the like, and is preferably so adjusted that it engages the bracket 95 and effects the elevation of the head 91 just before the filled box trays have been completely inserted into their shucks, the object being to obviate any liability of undue pressure and friction upon the heads of the matches at this time. It is to be noted that the heads of the matches are located at the ends of the trays against which the plungers bear, and hence the member 91 is raised, as above indicated, to permit the tops of the shucks to yield for the accommodation of any match heads that project slightly above the tops of the match trays.

I preferably affix to the head a bracket piece 105' having an under beveled lip or ledge 106 which overhangs the upper entrance edge of the head, and having also depending beveled extensions 109 which lie in front of the walls 92, 93. The ledge and extensions afford shoulders or abutments for the opposing ends of the shucks within the head, and the beveled surfaces presented to the ends of the filled trays facilitate the introduction of the latter to the shucks. Moreover, the under beveled surface of the ledge performs the function of a cam to force back into the trays any matches that may be projecting slightly beyond the leading ends of the trays.

The head 91 as it bears and feeds succeeding pairs of shucks to position for the reception of the filled trays, impinges against the opposing boxes previously acted upon, and thus advances them along the table to discharging position.

I preferably provide on the table a bar 108' which overhangs and supports the shucks as the filled trays are being inserted therein, and also the complete boxes as they are being advanced to discharging position. This bar is affixed at one end to a

suitably disposed bracket 109' on the guide piece 82 and extends longitudinally of and above the slide bar. At the free end of the bar 108' is a yielding dog or finger 110 which is arranged to engage the upper edge of the rearward shuck when the two shucks are advanced to their final tray receiving position by the head, and thus present displacement or retrograde movement of the shucks while the head is being raised or retracted. (See Fig. 10). This dog is affixed to the free end of a flat spring 111 which is secured to the overhanging bar. I preferably provide the under side of this bar with a series of inclined spring fingers 112 which bear yieldingly upon and steady the boxes during their travel.

In order to accommodate the free end of the bar the forward end of the shuck feeding head is slotted or bifurcated, as above mentioned and as shown most clearly in Figs. 5 and 11, the two limbs of the head being connected by a bridge piece 112'.

While I have herein shown and described a preferred form of embodiment of my invention, it is to be understood that I do not limit myself strictly thereto, as the mechanism may be variously modified without departing from the fair spirit of the invention.

I claim—

1. In a box-filling machine, the combination with a source of match supply, an endless conveyer for box-trays arranged to travel adjacent said source of supply, and means for continuously moving said conveyer, of continuously-operating means for yieldingly feeding trays laterally of said conveyer to a point in advance of the source of supply, a stop acting in opposition to the tray-feeding means to check the movement of the leading tray laterally of the conveyer, and means to engage said tray and push it to the conveyer transversely thereof.

2. In a box-filling machine, the combination with a source of match supply, an endless conveyer for box-trays arranged to travel adjacent said source of supply, and means for continuously moving said conveyer, of a chute or guide-way for box-trays, a continuously-rotating tray-feeding wheel adjacent said chute or way provided with a series of elastic fingers extending outwardly and rearwardly from the path of rotation of said wheel, and adapted yieldingly to engage and advance the trays consecutively, means for rotating said wheel, a stop acting in opposition to the tray-feeding means to check the movement of the leading tray laterally of the conveyer, a plunger for engaging said tray and pushing it to the conveyer transversely thereof, and means for actuating said plunger.

3. In a box-filling machine, the combination with a source of match supply, an end-

less conveyer for box-trays arranged to travel adjacent said source of supply, and means for continuously moving said conveyer, of a chute or guide-way for box-trays, a continuously-rotating tray-feeding wheel adjacent said chute or way provided on its periphery with a series of light curved springs constituting fingers which extend outwardly and rearwardly from the path of rotation of the wheel, and adapted yieldingly to engage and advance the trays consecutively, means for rotating said wheel, a stop acting in opposition to the action of said fingers to check the movement of the leading tray laterally of the conveyer, a plunger for engaging said tray and pushing it to the conveyer transversely thereof, and means for actuating said plunger.

4. In a box filling machine, the combination with an endless conveyer for box-trays, of a rock-shaft adjacent said conveyer, a series of tappet members arranged at intervals along said shaft and extended in proximity to the conveyer, and means for oscillating said shaft, whereby the said members are simultaneously agitated and a vertical jarring action imparted to the conveyer at various points of its travel.

5. In a box filling machine, the combination with an endless conveyer for box-trays, of a rock-shaft adjacent said conveyer, a series of tappet members arranged at intervals along said shaft and extended in proximity to the conveyer, means for adjusting said members about the axis of the shaft, and means for oscillating said shaft, whereby the said members are simultaneously actuated and a variable vertical jarring action imparted to the conveyer during its progress.

6. In a box filling machine, the combination with a conveyer for box-trays, of a brush mounted to rotate in a plane directly over and transversely of the conveyer about an axis extending longitudinally of the path of travel of the conveyer and thereby remove surplus matches endwise from the trays while being carried by the conveyer, and means for rotating said brush.

7. In a box filling machine, the combination with a conveyer for box-trays, of a brush mounted to rotate in a plane directly over and transversely of the conveyer about an axis extending longitudinally of the path of travel of the conveyer and thereby remove surplus matches endwise from the trays while being carried by the conveyer, a casing within which the brush is mounted, and means for rotating said brush.

8. In a box-filling machine, the combination with a source of match supply, and an endless traveling conveyer for box-trays arranged to travel adjacent said source of supply, of a brush mounted to rotate in a plane directly above and transversely of the

conveyer about an axis extending longitudinally of the path of travel of the conveyer, and thereby sweep surplus matches in the direction of their length from the trays and beyond the side of the conveyer while the filled trays are being carried by said conveyer, and means for imparting a vertical jarring action to the portion of the conveyer passing beneath the brush.

9. In a box-filling machine, the combination with a source of match supply, an endless conveyer for box-trays arranged to travel adjacent said source of supply, means for continuously moving said conveyer, and means for ejecting the filled trays transversely of the conveyer, of a source of shuck supply, and means for feeding shucks therefrom to the path of the filled trays immediately where they are ejected from the conveyer, and for moving said shucks in a path laterally adjacent to and longitudinally of the conveyer.

10. In a box-filling machine, the combination with a source of match supply, an endless conveyer for box-trays arranged to travel adjacent said source of supply, means for continuously moving said conveyer, and means moving in the direction of travel of the conveyer for ejecting the filled trays transversely of the conveyer, of a source of shuck supply, and means for feeding shucks therefrom to the path of the filled trays immediately where they are ejected from the conveyer and for moving said shucks in a path laterally adjacent to and longitudinally of the conveyer.

11. In a box filling machine, the combination with a conveyer for box trays, of means for ejecting the trays transversely of the conveyer, a head for feeding shucks to the path of the trays immediately where they are ejected from the conveyer, means for reciprocating said head in a path laterally adjacent to and longitudinally of the conveyer, and means for supplying shucks to said head.

12. In a box filling machine, the combination with a support for a plurality of box trays, of a plurality of plungers for simultaneously moving the trays endwise from their support, a slide in which said plungers have capacity for movement independently of each other toward and from the tray support, independent spring connections between the plungers and the slide, and means for reciprocating said slide toward and from the tray support.

13. In a box filling machine, the combination with a conveyer for box-trays, of a plurality of plungers for simultaneously ejecting a corresponding number of trays from the conveyer, a slide in which said plungers have capacity for movement independently of each other toward and from the conveyer, independent spring connections between the

plungers and the slide, and means for reciprocating said slide toward and from the conveyer.

14. In a box filling machine, the combination with a conveyer for box-trays, and means for continuously moving said conveyer, of a plurality of plungers for simultaneously ejecting a corresponding number of trays from the conveyer, a slide in which said plungers have capacity for movement independently of each other toward and from the conveyer, independent spring connections between the plungers and the slide, a carriage in which said slide is supported, means for reciprocating said slide toward and from the conveyer, and means for reciprocating the carriage and its appurtenances longitudinally of the conveyer.

15. In a box filling machine having provisions for supporting a tray and shuck in endwise alinement, a plunger for moving a tray endwise into its shuck, the forward or acting end of said plunger having in its inner face, immediately above the portion thereof which impinges against the opposing end of the tray, a recess or throat for the reception of the adjacent upper edge of the shuck, and having immediately above said recess or throat an over-hanging under-beveled lip for engaging the upper edge of the shuck, and means for actuating the plunger.

16. In a box filling machine, the combination with a conveyer for box-trays, and means for supporting box-shucks adjacent said conveyer, of a plunger for moving the trays transversely of the conveyer and into the opposing shucks, the forward or acting head of said plunger having in its inner face, immediately above the portion thereof which impinges against the opposing end of the tray, a recess or throat for the reception of the adjacent upper edge of the shuck, and having immediately above said recess or throat an overhanging under-beveled lip for engaging the upper edges of the shucks, and means for actuating the plunger.

17. In a box filling machine, the combination with a support for a box tray, of a chambered head for supporting a box shuck endwise of the tray, the inner upper edge of said head having an under-beveled lip or ledge, and means for moving the tray endwise into the shuck.

18. In a box filling machine, the combination with a support for a box tray, of a chambered head for supporting a box shuck endwise of the tray, the inner upper edge of said head having an under-beveled lip or ledge and the inner ends of the side walls of said head having beveled shoulder portions, and means for moving the tray endwise into the opposing shuck.

19. In a box filling machine, the combination with a support for a box tray, and means for moving the tray endwise there-

from, of a chambered head for engaging a box shuck and moving it to the path of the tray, a member to which the head is pivoted, means for reciprocating the said member, and means for periodically oscillating the head.

20. In a box filling machine, the combination with a conveyer for box-trays, and means for ejecting the trays transversely of the conveyer, of a chambered head for engaging box-shucks and feeding them to the path of the trays, the inner upper edge of said head having an under-beveled lip or ledge, and means for actuating said head.

21. In a box filling machine, the combination with a conveyer for box-trays, and means for ejecting the trays transversely of the conveyer, of a chambered head for engaging box-shucks and feeding them to the path of the trays, the inner upper edge of said head having an under-beveled lip or ledge, and the inner ends of the side walls having beveled shoulder portions, and means for actuating said head.

22. In a box filling machine, the combination with a conveyer for box-trays, and means for ejecting the trays transversely of the conveyer, of a chambered head for engaging box-shucks and feeding them to the path of the trays, a member to which the head is pivoted, means for reciprocating the said member longitudinally of the conveyer, and means for periodically oscillating the head.

23. In a box filling machine, the combination with a conveyer for box-trays, and means for ejecting the trays transversely of the conveyer, of a chambered head for engaging box-shucks and feeding them to the path of the trays, a member to which the head is pivoted, means for reciprocating the said member longitudinally of the conveyer, a rod extending from the said member, a spring acting upon said rod to maintain the head normally in down position, stop devices for retracting the rod at or near the limit of movement of the said member in the direction of travel of the conveyer, a device to lock the rod temporarily in retracted position, and means for unlocking the rod at or near the limit of movement of the said member in the opposite direction.

24. In a box filling machine, the combina-

tion with a support for a box tray, and means for moving the tray endwise therefrom, of a head for engaging a box shuck and feeding it to the path of the tray, means for actuating the head, and a stop device to engage the upper edge of the shuck when it is advanced by the head to tray-receiving position.

25. In a box filling machine, the combination with a conveyer for box-trays, and means for ejecting the trays transversely of the conveyer, of a head for engaging box shucks and feeding them to the path of the trays, means for actuating the head, and a stop device to engage the upper edge of the shuck when it is advanced to tray-receiving position by the head.

26. In a box filling machine, the combination with a conveyer for box-trays, of means for ejecting the trays transversely of the conveyer, a head for engaging the box-shucks and feeding them to the path of the trays, means for actuating the head, a shuck-conveyer for feeding shucks to the head, and means for actuating the shuck-conveyer.

27. In a box filling machine, the combination with an endless conveyer for box trays, and means for continuously moving said conveyer, of a plunger for inserting the trays in said conveyer, means for reciprocating said plunger, means for feeding trays between said plunger and conveyer, a source of match supply to and past which the contained trays are carried by the conveyer, a plunger by means of which the trays when they have passed the source of supply are ejected from the conveyer, means whereby said latter plunger is concurrently reciprocated transversely and longitudinally of the path of travel of the conveyer, and means reciprocative longitudinally to the path of travel of the conveyer whereby box-shucks are progressively fed adjacent the conveyer and in the plane of the first-named plunger.

Signed at Barberton in the county of Summit and State of Ohio this 25 day of May 1909.

JOHN W. DENMEAD.

Witnesses:

TOM A. PALMER,
B. C. ROSS.