No. 686,042. Patented Nov. 5, 1901.

E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 1.

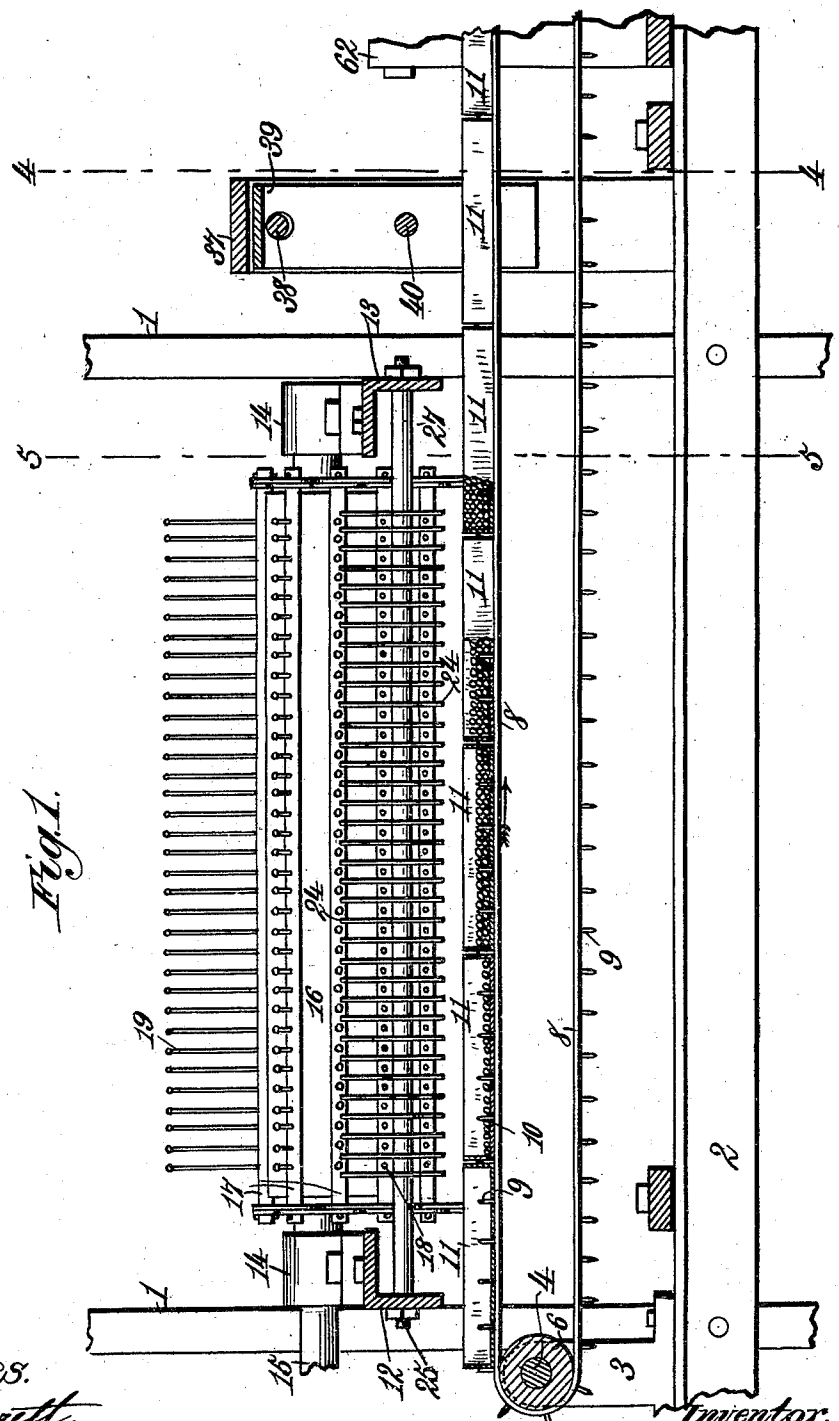


Fig. 1.

Witnesses.
Robert Everett,
Philip N. Tilden.

Inventor.
Edward H. Eisenhart.
By James L. Norris Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 8 Sheets—Sheet 2.

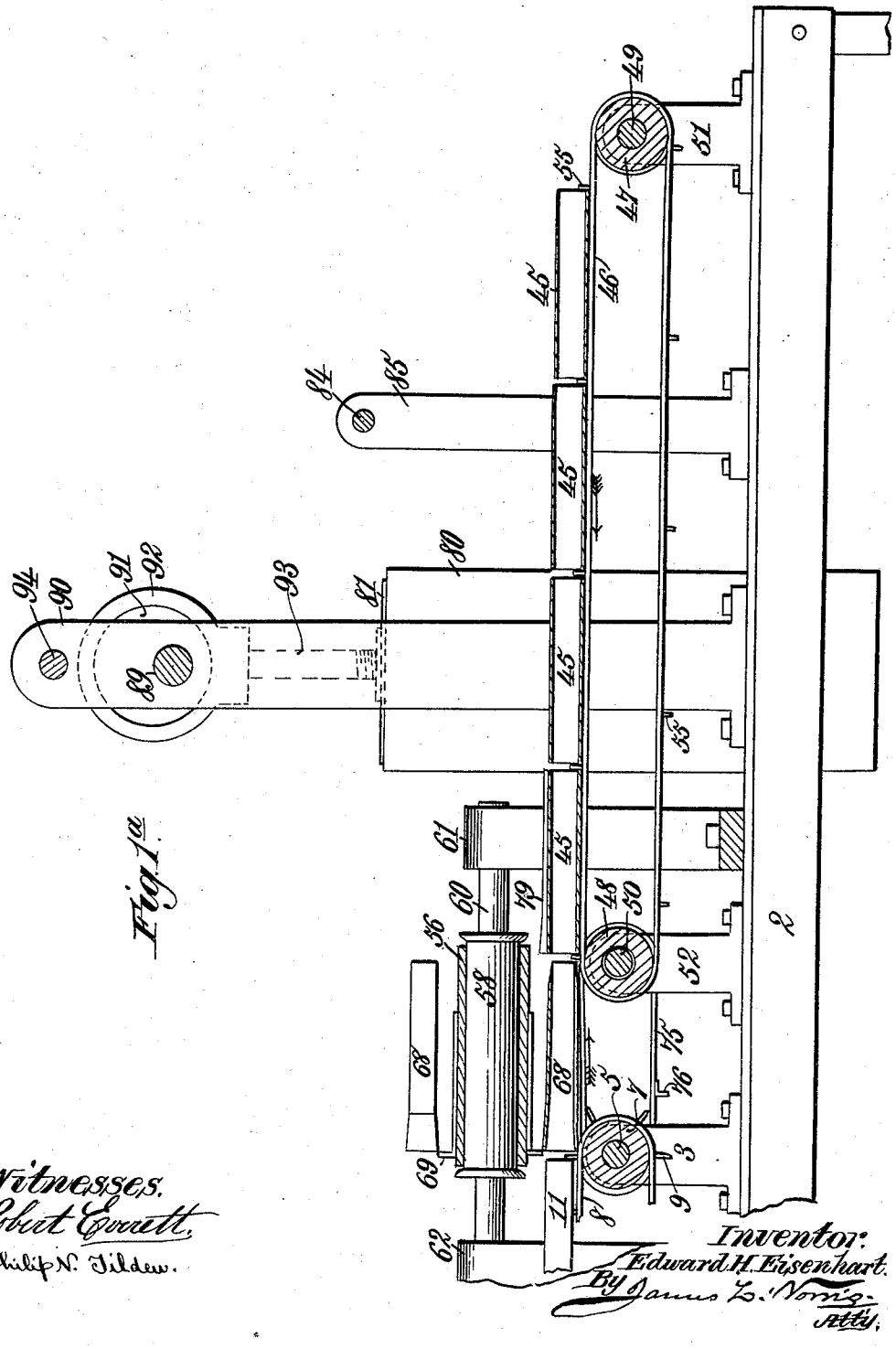


Fig. 1a.

Witnesses.
Robert Everett,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 8 Sheets—Sheet 3.

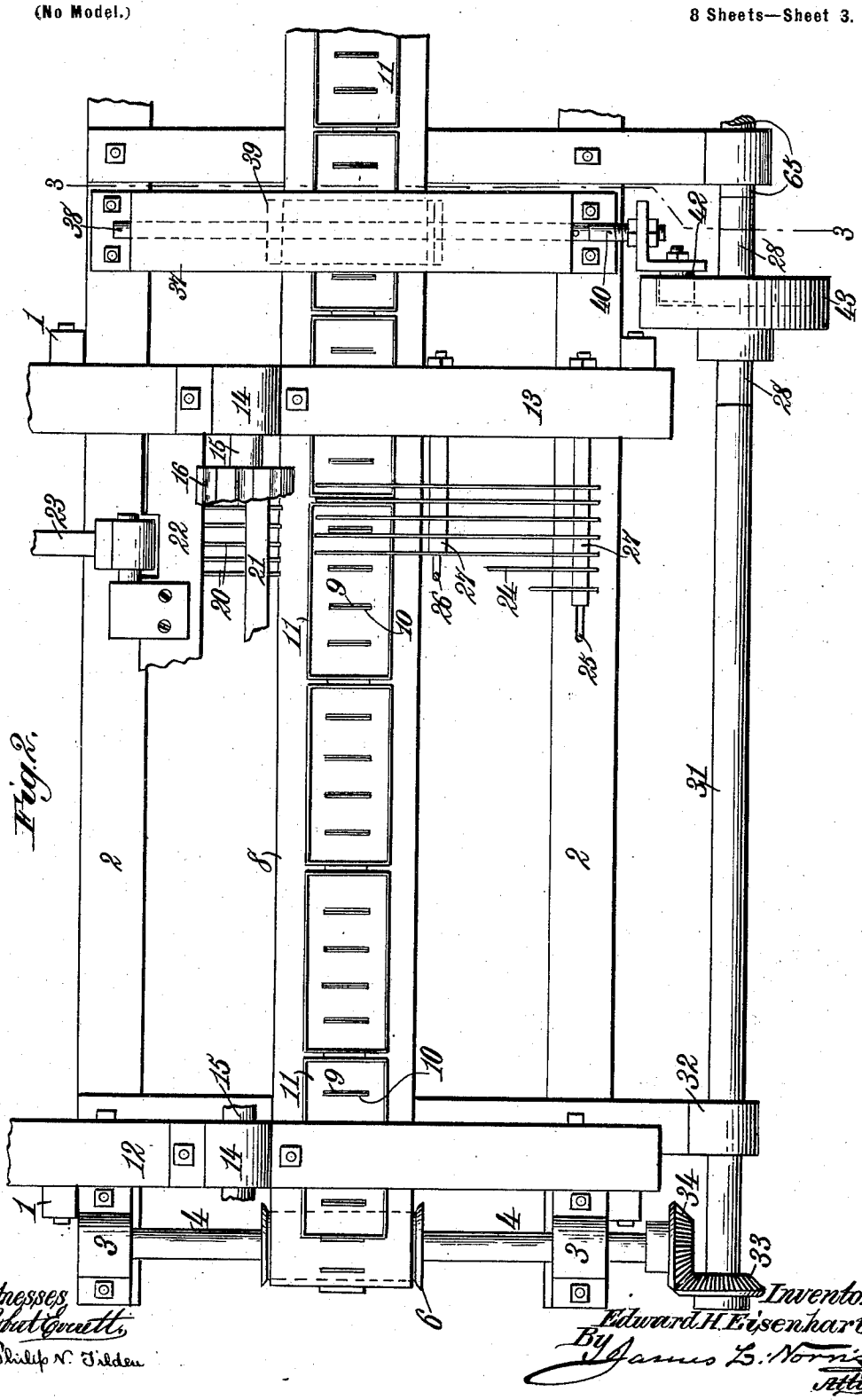


Fig. 2.

Witnesses
Robert Everett,
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Edward H. Eisenhart,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 686,042. Patented Nov. 5, 1901.

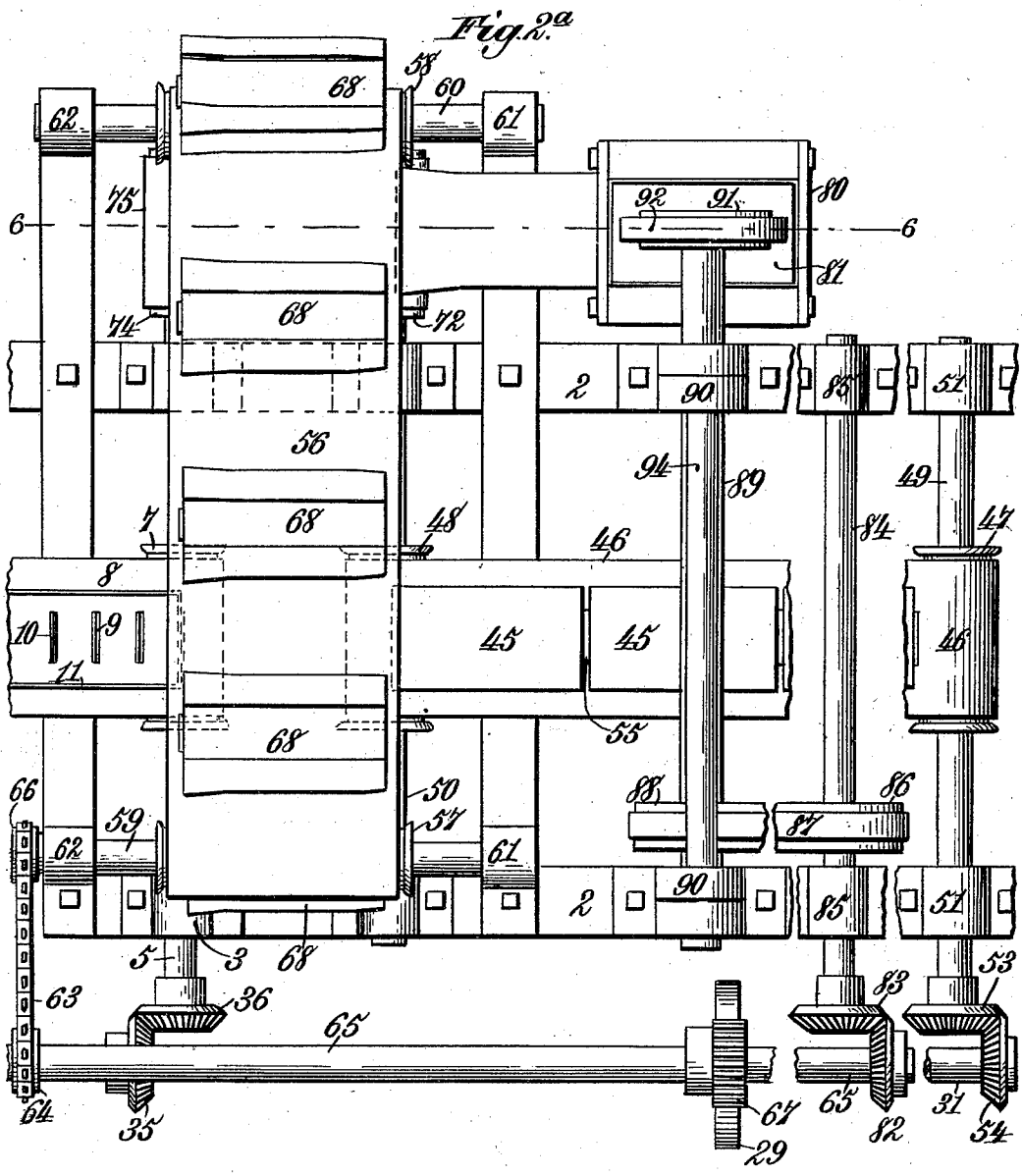
E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 4.

Fig. 2a.



Witnesses.
Robert Everett.
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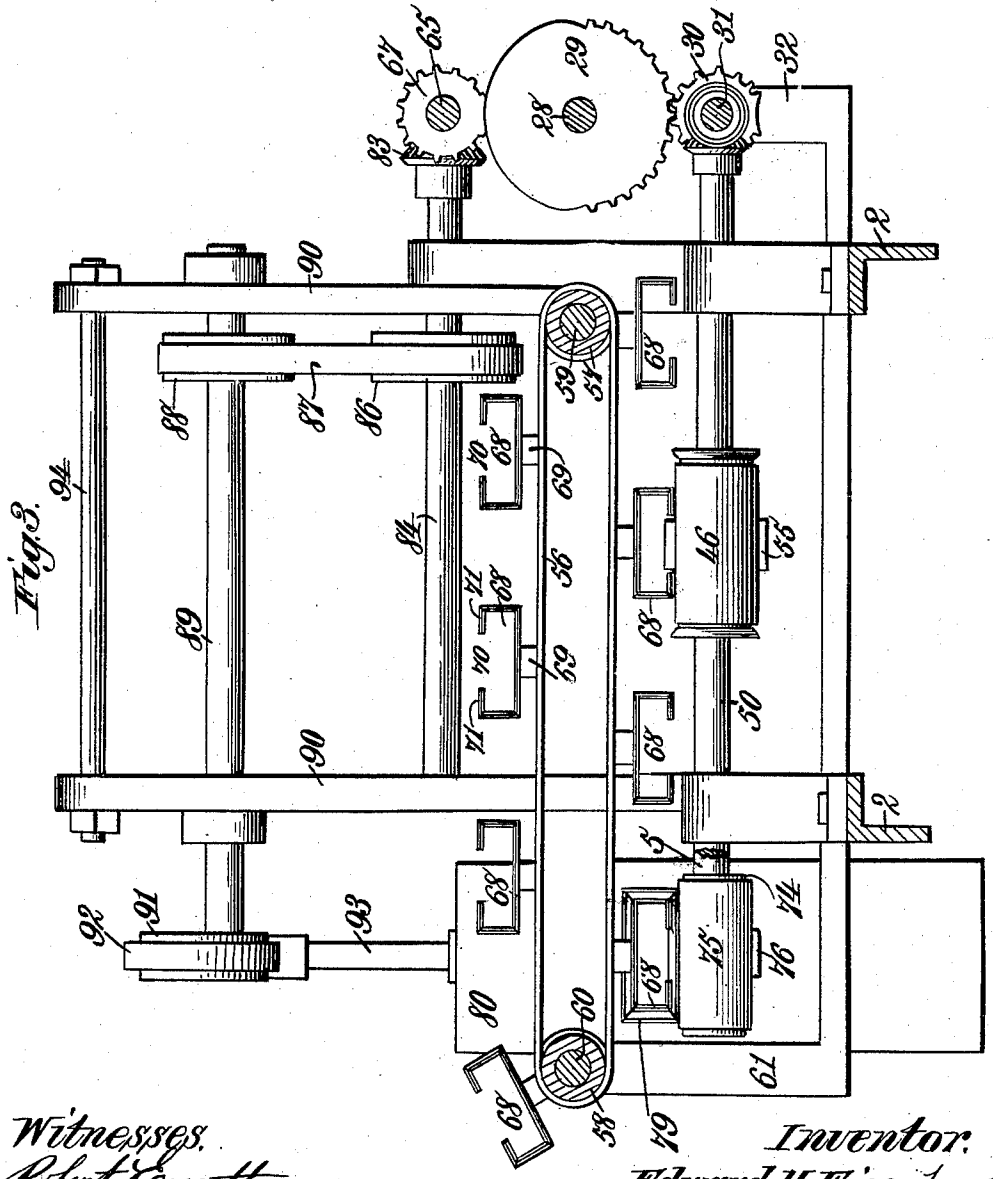
E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 5.

Fig. 3.



Witnesses.
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No. 686,042 Patented Nov. 5, 1901.

E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 6.

Fig. 4.

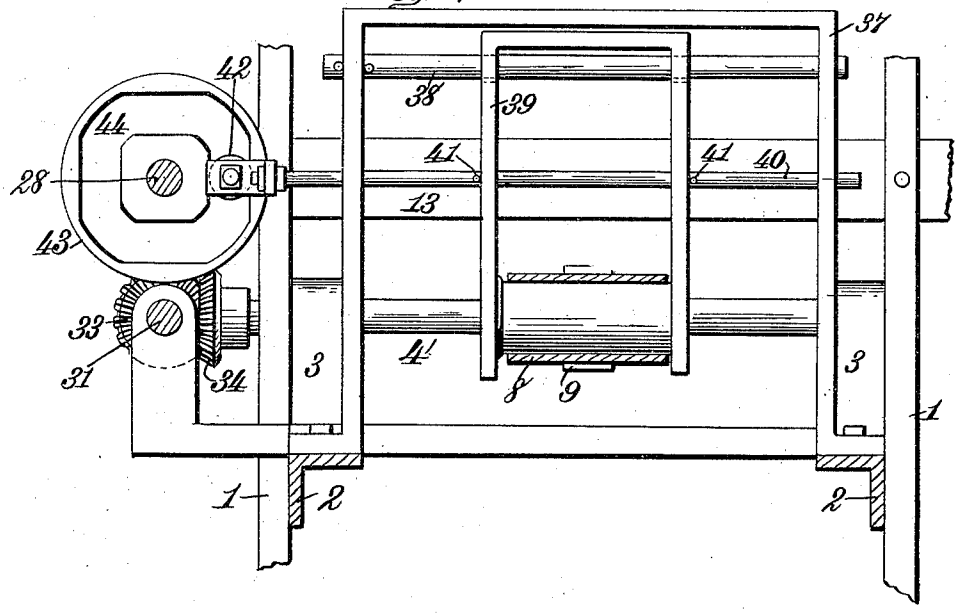
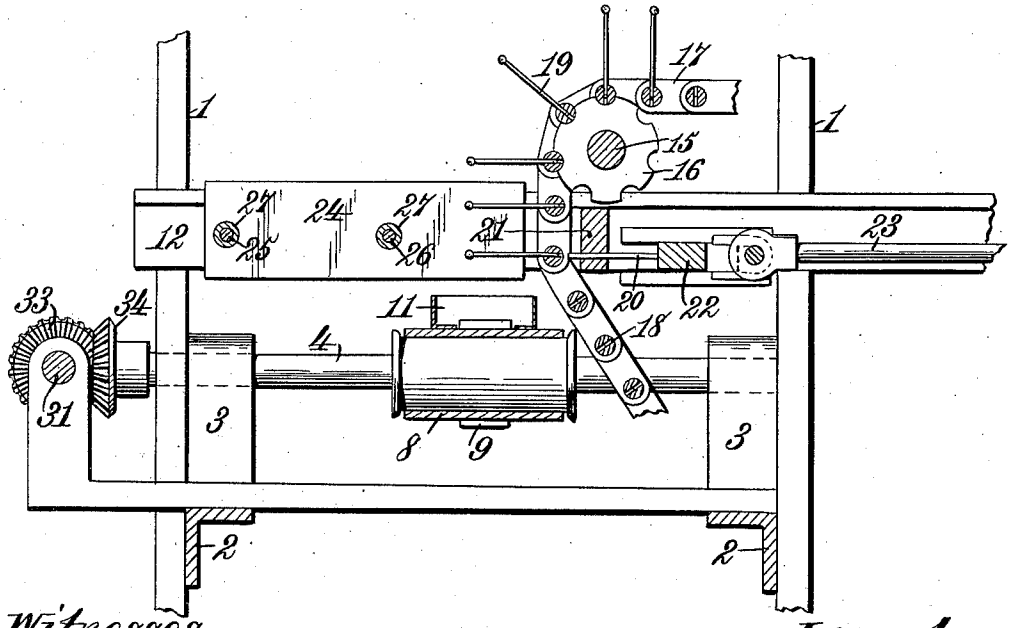


Fig. 5.



Witnesses.
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No. 686,042. Patented Nov. 5, 1901.

E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 7.

Fig. 6.

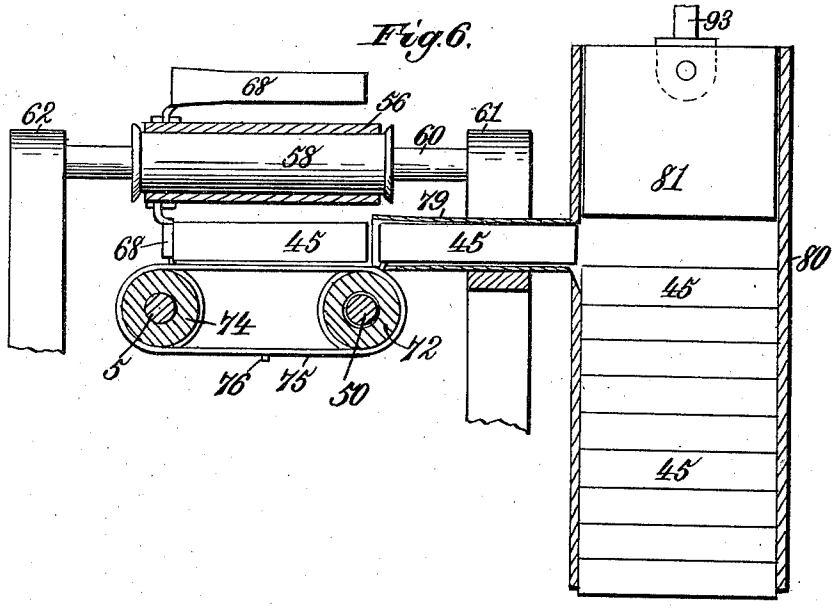


Fig. 7.

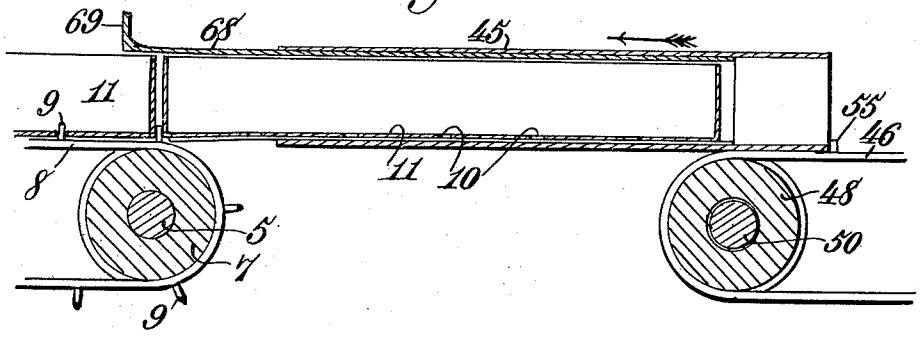
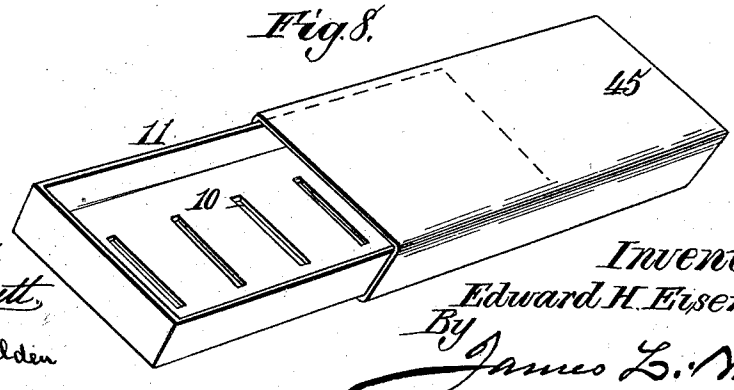


Fig. 8.



Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 686,042. Patented Nov. 5, 1901.

E. H. EISENHART.

BOX FILLING MACHINE.

(Application filed Dec. 17, 1900.)

(No Model.) 8 Sheets—Sheet 8.

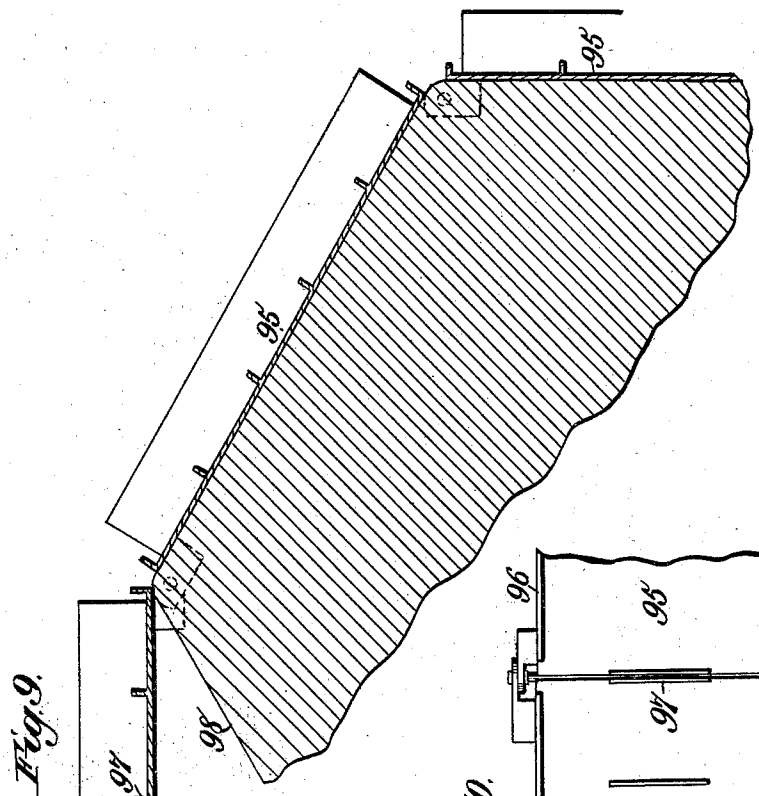


Fig. 9.

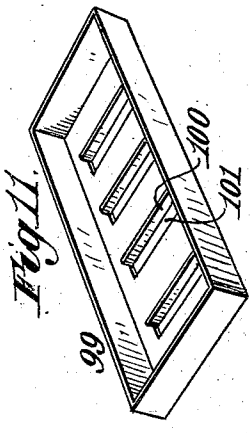


Fig. 11.

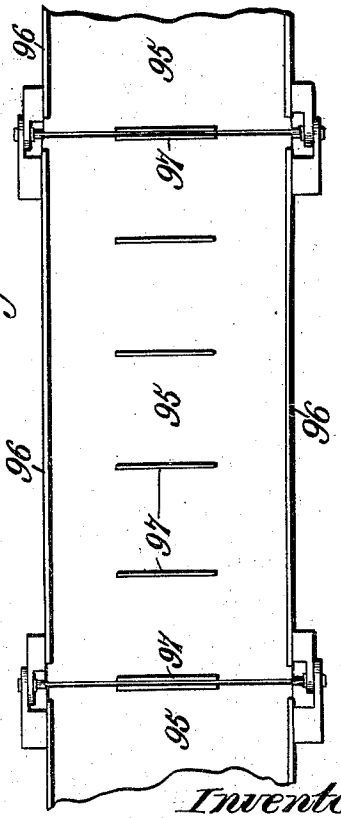


Fig. 10.

Witnesses.
Robert Everett.
Philip N. Tilden.

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Edward H. Eisenhart.
By James L. Norris
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD H. EISENHART, OF NEW YORK, N. Y.

BOX-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 686,042, dated November 5, 1901.

Application filed December 17, 1900. Serial No. 40,156. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. EISENHART, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Box-Filling Machines, of which the following is a specification.

My invention relates to box-filling machines, the same being especially designed for use in filling boxes with matches and the like.

Boxes used for containing matches generally consist of a tray or receptacle in which the matches are placed and a cover or wrapper which surrounds said tray.

One of the objects of my invention is to provide means whereby a series of trays may be successively filled with matches or the like and delivered to one part of the machine, and the wrappers or covers for said trays may be fed toward the same and placed upon the trays.

A further object of the invention is to provide means whereby the matches may be properly alined in the trays.

A further object of the invention is to provide means whereby the trays may be automatically agitated for the purpose of packing the matches therein prior to the application of the covers or wrappers to the trays.

A further object of the invention is to provide novel means for applying the covers or wrappers to the trays and means whereby the trays, with the covers applied, may be delivered from the machine.

Other objects of the invention will hereinafter appear, and the novel features thereof will be set forth in the claims.

In the drawings forming part of this specification, Figures 1 and 1ª represent a vertical central longitudinal sectional view of a machine constructed according to my invention, the same being shown in connection with the delivery portion of a match-making machine. Figs. 2 and 2ª represent a plan view of the same. Fig. 3 is a vertical transverse section on the line 3 3 of Fig. 2 looking toward the right. Fig. 4 is a similar view on the line 4 4 of Fig. 1 looking toward the left. Fig. 5 is a similar view on the line 5 5 of Fig. 1. Fig. 6 is a detail longitudinal central view on the line 6 6 of Fig. 2ª. Fig. 7 is a detail sectional view of one of the box-holders into which the trays are introduced and around which the covers are placed. Fig. 8 is a perspective view of one of the boxes employed. Fig. 9 is a detail sectional view showing a modified form of carrier. Fig. 10 is a plan view of the same. Fig. 11 is a detail view of another form of box that may be employed.

Like reference-numerals indicate like parts in the different views.

The frame of the machine is made up of the uprights 1 1, the longitudinal beams 2 2, extending from one end of the machine to the other and connected to the uprights 1, and suitable transverse tie-rods. The longitudinal beams 2 are shown in the form of angle-irons, but of course they may be of any other suitable form and construction.

Mounted in suitable bearings in brackets 3 3, secured to the beams 2 on the opposite sides of the machine, are the parallel transversely-extending shafts 4 5, the same having secured thereto the rollers 6 7, around which passes the endless carrier 8. This carrier is provided with laterally-extending slats or ribs 9 9, which project from the outer surface thereof and are arranged at regular intervals apart. These slats or ribs are designed to project through the openings 10 in the trays 11 of the boxes and also to engage the rear ends of said trays. The carrier 8 moves in the direction indicated by the arrows in the drawings, and when the trays 11, which are located on the upper part of said carrier, are being filled with matches the slats or ribs 9 on said carrier project up through the slots 10 into said trays and serve to properly distribute the matches in the trays and to cause them to properly aline with respect to each other—that is to say, to assume positions parallel with each other and with the ends of the trays.

The end pairs of the uprights 1 (shown in Fig. 1 of the drawings) are connected by transversely-extending angle-irons 12 13, upon which are supported the bearings 14 of a shaft 15, forming part of a match-making machine. On the shaft 15 are the sprocket-wheels 16, around which passes a match-carrier 17, made up of pivoted sections and having openings 18 in the pivot between said sections in which the ends of a series of rows of matches 19 are inserted. Passing down around the sprocket-wheel 16 the matches 19 in the car-

rier 17 assume a horizontal position and lie directly over the trays 11 on the carrier 8. Behind the carrier 17 and directly beneath the shaft 15 is an ejector consisting of a plurality of plungers 20, passing through openings in a guide 21 and designed to enter the openings 18, behind the matches 19 therein. The plungers 20 of the ejector are all connected to a reciprocating bar 22, actuated through a pitman 23 from any suitable source of power. Just above the carrier 8 and in front of the vertical portion of the match-carrier 17 and opposite the plungers 20 is a series of vertically-disposed transversely-extending parallel plates 24, which serve as guides for the matches 19 after they have been ejected from the carrier 17, so as to introduce the matches into the trays 11 as nearly as possible in parallel relation to each other. The plates 24 are supported upon the rods 25 26, which connect the angle-irons 12 and 13, and are held spaced apart on said rods by means of the collars 27. The tray-carrier 8 has an intermittent progressive movement imparted to it, the extent of which movement is preferably the distance of the length of one of the trays 11.

The means employed by me for imparting a progressive intermittent movement to the tray-carrier 8 consists of a continuously-rotating shaft 28, having a mutilated gear 29 thereon, the teeth of which are adapted to engage the teeth of a pinion 30 on a shaft 31, which extends throughout the entire length of the machine parallel to the longitudinal beams 2. The shaft 31 is mounted in bearings in the brackets 32, secured to the frame of the machine, and has a beveled pinion 33 on one end thereof, which meshes with a similar pinion 34 on the shaft 4. As the mutilated gear 29 is moved alternately into and out of engagement with the pinion 30 on the shaft 31 an intermittent movement is imparted to the latter shaft, and the same is transmitted to the shaft 4, which drives the carrier 8. The shaft 31 is further provided at a point intermediate its end with a beveled pinion 35, which meshes with a similar pinion 36 on the shaft 5, so that both of the shafts 4 and 5 are driven from the shaft 31, and both of the rollers 6 and 7 act as drive-rollers for the carrier 8.

In order to provide for the packing of the matches in the trays 11 while they are being filled, I provide means for causing a transverse agitation to be imparted to the tray-carrier 8 and to the trays 11 thereon while the latter are passing beneath the match-carrier 17, where they are filled. This agitator consists of an arc-shaped bracket 37, secured to the beams 2 on opposite sides of the machine and extending up over and around the carrier 8. Connecting the sides of the bracket 37 near its upper end is a horizontal rod 38, which supports an inverted-U-shaped agitating-frame 39, said rod 38 extending through openings in the sides of said frame 39. The vertical sides of the frame 39 extend downwardly to the carrier 8 and are adapted to engage the opposite side edges of said carrier. Said frame is adapted to slide on the supporting-rod 38 and is reciprocated back and forth transversely of the machine by means of a reciprocating bar 40, having pins 41 thereon, which engage the sides of the frame 39. One end of the bar 40 has an antifriction-roller 42 mounted therein and projecting laterally therefrom, the said roller being engaged by a cam 43, mounted upon the shaft 28. The particular form of cam herein shown consists of a rotating part having a cam-groove 44 therein. It will be evident that during the rotation of the shaft 28 the cam 43 will have a continuous rotation imparted to it, and, through the roller 42 and the rod 40, a continuous reciprocating movement will be imparted to the agitating-frame 39, which will serve to vibrate the tray-carrier 8 and the trays 11 thereon back and forth. This action will cause a settling of the matches in the trays and a more complete and thorough packing of the same.

As the shaft 5, on which the roller 7 is mounted, is located intermediate the ends of the machine, it will be noted from the foregoing description that the trays 11 are conveyed by the carrier 8 from one end of the machine toward the center. At the opposite end of the machine the tubular wrappers or covers 45 for the boxes are introduced and fed toward the center of the machine until the trays 11 coming in one direction and the covers or wrappers 45 coming in the other direction meet. To bring about this result, I provide at the end of the machine opposite the carrier 8 a wrapper-carrier 46, which passes around the rollers 47 and 48, mounted, respectively, on the shafts 49 and 50. The roller 47 is fast upon the shaft 49, whereas the roller 48 is loose upon the shaft 50. Said shafts 49 and 50 extend transversely of the machine and are of course parallel to each other, being mounted in suitable bearings in the brackets 51 and 52, secured to the beams 2. The wrapper-carrier 46 has an intermittent progressive movement imparted to it in the direction of the arrows on the drawings by means of a pinion 53, secured to one end of the shaft 49, which meshes with a pinion 54, secured to the intermittent shaft 31, heretofore referred to. By this construction it will be observed that the rotation of the shaft 31 causes, through the means described, the movement of the tray-carrier 8 in one direction and the movement of the wrapper-carrier 46 in the opposite direction. The wrapper-carrier 46, however, is not driven from both of the rollers around which it passes, as is the case with the tray-carrier 8, but is driven solely from the roller 47, which is secured to the driven shaft 49. The carrier 46 is provided at intervals with slats or ribs 55,

which are adapted to engage the rear ends of the wrappers or covers 45, so that said wrappers may be positively driven by said carrier.

Above the space between the shafts 5 and 50 and movable transversely of the machine is a carrier 56, the same passing around the rollers 57 and 58, mounted upon the shafts 59 and 60, extending longitudinally of the machine and mounted in bearings in the brackets 61 and 62. The said brackets extend transversely of the machine, have vertical uprights at the opposite ends thereof, are secured to the beams 2, and serve as tie-rods. An intermittent movement is imparted to the carrier 56 by means of a sprocket-chain 63, which passes around a sprocket-wheel 64 on an intermittently-rotating shaft 65 and around a sprocket-wheel 66 on the shaft 59. The said shaft 65 is located above the continuously-rotating shaft 28 and has a pinion 67 thereon, corresponding with the pinion 30 on the shaft 31 and adapted to be engaged by the teeth of the mutilated gear 29 on the shaft 28. By this construction it will be seen that during the rotation of the shaft 28 the gear 29 will be thrown into and out of engagement with the pinion 67 and an intermittent movement will be imparted to the shaft 65, which intermittent movement will be transmitted, through the means described, to the carrier 56. Secured to the carrier 56 and projecting outwardly therefrom is a series of box-holders 68, the same being designed for the purpose of receiving the filled box-trays 11 on the inside of the same and the covers or wrappers 45 on the outside. The said holders are secured to the carrier 56 by means of outwardly-extending arms 69, which are attached to the ends of the holders 68 adjacent to that end of the machine from which the trays 11 are fed. Each of said holders 68 is hollow and trough-shaped, having open ends, rectangular sides, and a longitudinally-extending slot or opening 70 in the bottom thereof, which provides the inwardly-extending flanges 71. The same is of proper size to receive one of the trays 11 within it and one of the wrappers or covers 45 upon the outside thereof. That end of each of said holders 68 adjacent to the feed end of the machine for the wrappers 45 is slightly beveled off, tapered, or contracted, while the opposite end of each of said holders, or that adjacent to the feed end of the machine for the trays 11, is slightly flared or bulged out. The object of this construction is obviously for the purpose of facilitating the introduction of the tray within the holder and the reception of the cover or wrapper upon the outside thereof. Now from the construction heretofore described it will be noted that the carriers 8 and 46, both driven from the same intermittent shaft 31, are moved simultaneously and in opposite directions, whereas the carrier 56, which is driven from the intermittent shaft 65, is at rest during the operation of said carriers 8 and 46, this result being effected by reason of the fact that the shafts 31 and 65 are both driven from the shaft 28 through the mutilated gear 29, and when the teeth of said mutilated gear are in mesh with the pinion 30 on the shaft 31 they are out of mesh with the pinion 67 on the shaft 65, and vice versa. The holders 68 are so arranged on the carrier 56 that when said carrier is at rest one of said holders 68 on the under side of the carrier 56 is directly in line with the paths of movement of the trays 11 and wrappers 45, coming in opposite directions. As these trays and wrappers are fed positively from the carriers on which they are mounted, it will be obvious that when the same reach the box-holder 68 which lies within their paths of movement the forward tray on the carrier 8 will be forced into the inside of the said holder 68 and the wrapper 45 which is advance will be forced around the outside of said holder 68. When the carriers 8 and 46, therefore, come to rest, we have a filled tray on the inside of a holder 68 and a cover 45 on the outside thereof. The carrier 56 is now thrown into operation by reason of the engagement of the teeth of the mutilated gear 29 with the pinion 67 on the shaft 65. The said carrier 56 is then moved until the next box-holder 68 thereof comes opposite the paths of movement of the trays 11 and wrappers 45 when the same comes to rest and is ready for a repetition of the operation just described. At the same time the filled tray and the wrapper which were introduced upon the holder 68 at the previous operation have been moved transversely of the machine toward the roller 58.

In connection with the foregoing mechanism I provide means for stripping the trays and wrappers from the holders 68 on the carrier 56 for delivering them into a chute and for discharging them from said chute onto a table or into a receptacle where they may be wrapped up into packages. Loose upon the end of the shaft 50 on the side of the machine opposite the main driving-shaft 28 is a roller 72, and secured to the shaft 5, parallel to and in the same horizontal plane therewith, is a roller 74. Around the rollers 72 and 74 passes a short carrier 75, having slats or ribs 76 thereon, adapted to enter the slots 70 in the holders 68. The carrier 75 is located beneath the carrier 56, and the upper surface of the carrier 75 moves in close contact with the under side of the flanges 71 of one of the holders 68 during each period of time that the carrier 56 is at rest. The intermittent movement is imparted to the carrier 75 from the lower intermittent shaft 31 through the pinion 35 on said shaft 31 and the pinion 36 on the shaft 5, which meshes therewith. As the shafts 31 and 65 are alternately thrown into operation, and as the carrier 56 is operated from the shaft 65, it will be obvious that when the carrier 75 is in motion the carrier 56 will be at rest, and when the carrier 56 is in motion the carrier 75 will be at rest. Adjacent to the delivery end of the carrier 75 is a casing or receptacle 79 of

substantially the same shape and dimensions as those of the filled box, both ends of which casing are open and one end of which communicates with a vertically-disposed chute 80. When one of the holders 68 on the carrier 56, containing a filled tray on the inside thereof and a wrapper or cover on the outside thereof, comes to rest at a point directly over the carrier 75, the latter carrier is thrown into operation by the rotation of the shaft 5 which drives the roller 74. One of the slats or ribs 76 on the carrier 75 then moves into the outer end of the slot 70 of said holder 68, and engaging the rear edges of both the tray 11 and wrapper 45 on said holder strips said tray and wrapper from said holder and forces it into the casing 79, where it remains until the next operation of said carrier 75. When the tray and wrapper from the next succeeding holder 68 are stripped therefrom by the succeeding operation of the carrier 75, the same are forced into the casing 79, and the tray and wrapper which were introduced into said casing at the previous operation are forced therefrom into the chute 80. The said chute is of such dimensions as to hold the boxes, consisting of the filled trays with the wrappers applied thereto, frictionally in place. To deliver the filled boxes from the chute 80, I employ a vertically-reciprocating plunger 81, which projects down into the upper end of the chute 80 and is actuated through intermediate mechanism from the upper intermittent shaft 65. Said shaft 65 is provided near its outer end with a pinion 82, which meshes with a pinion 83 upon one end of a transverse shaft 84, mounted in suitable bearings in uprights 85, secured to the longitudinal beams 2. The shaft 84 carries a pulley 86, around which passes a belt 87, the said belt also passing around a pulley 88 on a transverse shaft 89, mounted in bearings in the uprights 90, secured to the longitudinal beams 2. One end of the shaft 89 projects beyond its bearings over the chute 80 and has secured thereto an eccentric 91, which through the eccentric-strap 92 actuates a pitman 93, pivoted to the upper end of the plunger 81. The uprights 90 on opposite sides of the machine are connected together by the tie-rod 94. As the carrier 75 is operated from the intermittent shaft 31, and as the plunger 81 is actuated from the intermittent shaft 65, and as these intermittent shafts are thrown into operation alternately, it will be obvious that when the carrier 75 is operating to force one of the filled boxes from the casing 79 into the chute 80 the plunger 81 will be at rest. Just after one of said filled boxes has been delivered into the chute 80, however, the plunger 81 is thrown into operation, and being moved downwardly by the means described forces the pile of boxes in the chute 80 downwardly and discharges the lowermost one from said chute onto a table or other support, where they may be collected and wrapped up into packages for shipment or sale.

I have heretofore described the carrier 8 for feeding the trays 11 as being provided with projecting slats or ribs 9, said ribs adapted to project through the openings 10 in the bottoms of the trays and to engage the rear edges thereof. In lieu of this form of carrier I may employ the form of carrier illustrated in Figs. 9 and 10 of the drawings. The same is made up of what may be termed "links" 95, pivoted at their ends to each other, each of said links being formed with upright parallel sides 96, adapted to receive between them one of the trays 11 and having projecting ribs 97 thereon adapted to project through the openings 10 in the trays 11 and to engage the rear edges of said trays. The roller 98, which drives this modified form of carrier, is polygonal in cross-section, each of the sides or faces thereof being of a length corresponding to the distance between the pivots at the ends of the links 95, so that during the rotation of the roller 98 the angles between the faces thereon will come opposite the pivots between the links or sections 95, and one link only of the carrier will be in contact with each of said faces.

In Fig. 11 of the drawings I show a form of box which may be employed in this machine as a substitute for that illustrated in Fig. 8 of the drawings. In this box the tray 99 is formed along its bottom with upwardly-extending transverse ribs or projections 100, the said ribs or projections serving the same function as the slats or ribs 9 on the carrier 8, which project through the slots 10 in the trays 11—that is, they serve to cause the matches introduced into the trays to assume positions parallel to each other and to the ends of the trays. The ribs or projections 100 are preferably formed by forming U-shaped slits in the bottom of the tray and folding upwardly the tongues thereby produced. Slots 101, corresponding to the slots 10, are thereby produced, into which the slats or ribs 9 on the carrier 8 may pass. With this modified form of box, however, it is not necessary that the slats 9 enter the slots 101; but said slats 9 may be arranged on the carrier 8 at greater intervals apart and engage the ends of the trays.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means interposed between the feeding means for the trays and that for the wrappers for applying the wrappers or covers to said trays, and a carrier movable transversely of said feeding means for removing the filled and covered trays therefrom.

2. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable

in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means for agitating the trays while they are being filled, means interposed between the feeding means for the trays and that for the wrappers for applying the wrappers or covers to said trays, and a carrier movable transversely of said feeding means for removing the filled and covered trays therefrom.

3. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means acting through openings in the bottoms of said trays for causing the matches to be introduced into the trays in parallel relation to each other, and means for applying the wrappers or covers to said trays.

4. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means carried by the feeding means for the trays and operating inside said trays through openings in the bottoms thereof for causing the matches to assume a parallel relation with respect to each other, and means for applying the wrappers or covers to said trays.

5. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means acting through openings in the bottoms of said trays for causing the matches to assume a parallel relation to each other in said trays, means for agitating the trays while they are being filled, and means for applying the wrappers or covers thereto.

6. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, means for causing the matches to be introduced into the trays in parallel relation to each other, means operating inside said trays through openings in the bottoms thereof for causing the matches to assume a parallel relation with respect to each other in said trays, means for agitating the trays while they are being filled, and means for applying the wrappers or covers to said trays.

7. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a hollow box-holder having its ends open located between the feeding means for said trays and that for said wrappers and into which the trays are introduced and around which said wrappers or covers are forced, and means for stripping the trays and wrappers from said holder.

8. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a plurality of hollow box-holders adapted to be successively moved to a point between the feeding means for said trays and that for said wrappers, each of said holders having its ends open, adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, means for moving said holders for conveying the trays and wrappers from the feeding means therefor, and means for removing said trays and wrappers from said holders.

9. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a plurality of hollow box-holders adapted to be successively moved to a point between the feeding means for said trays and that for said wrappers, each of said holders having its ends open, adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, means for moving said holders for conveying the trays and wrappers from the feeding means therefor, and means for removing said trays and wrappers from said holders, the feeding means for said trays and that for said wrappers or covers being thrown into operation simultaneously with the means for removing said trays or covers from said holders, and while said holders are in a stationary position or at rest.

10. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a plurality of hollow box-holders adapted to be successively moved to a point between the feeding means for said trays and that for said wrappers, each of said holders having its ends open, adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, means for moving said holders for conveying the trays and wrappers from the feeding means therefor, a chute, means for removing the trays or covers from said holders and for delivering them one by one into said chute, and a plunger movable in said chute for forcing the boxes therefrom.

11. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers, movable in opposite directions toward each

other, of means for filling the trays during the feeding operation thereof, a plurality of hollow box-holders adapted to be successively moved to a point between the feeding means for said trays and that for said wrappers, each of said holders having its ends open, adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, means for moving said holders for conveying the trays and wrappers from the feeding means therefor, a chute, means for removing the trays or covers from said holders and for delivering them one by one into said chute, and a plunger movable in said chute for forcing the boxes therefrom, the feeding means for said trays and that for said wrappers being operated simultaneously with the means for removing said trays and wrappers from said holders and while said holders and said plunger are stationary or at rest.

12. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, and means for applying the wrappers or covers to said trays, the same consisting of a hollow box-holder, located between said tray and wrapper carriers and adapted to receive a tray on the inside thereof and a wrapper on the outside thereof.

13. In a box-filling machine, the combination with a flexible longitudinally-movable tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, means for laterally agitating the tray-carrier, and means for applying the wrappers or covers to said trays.

14. In a box-filling machine, the combination with a flexible longitudinally-movable tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, means for imparting a lateral, vibratory movement to said tray-carrier, and means for applying the wrappers or covers to said trays.

15. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, means on said tray-carrier operating inside said trays through openings in the bottoms thereof for causing the matches to assume a parallel relation with respect to each other in said trays, and means for applying the wrappers or covers to said trays.

16. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, means on said tray-carrier operating through openings in the bottoms of said trays for causing the matches to assume a parallel relation to each other in said trays, means for agitating the tray-carrier and the trays thereon while the latter are being filled, and means for applying the wrappers or covers to said trays.

17. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving said carriers in opposite directions toward each other, of means for filling the trays on the tray-carrier, means for causing the matches to be introduced into the trays in parallel relation to each other, means on said tray-carrier operating inside said trays through openings in the bottoms thereof for causing the matches to assume a parallel relation with respect to each other in said trays, means for agitating the tray-carrier and the trays thereon while the latter are being filled, and means for applying the wrappers or covers to said trays.

18. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving the same in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a plurality of box-holders adapted to be successively moved to a point between said carriers, each of said holders having its ends open and adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, a carrier on which said holders are mounted, extending transversely of the machine, means for moving the carrier for said holders intermittently, and means for removing said trays and wrappers from said holders, said tray and wrapper carriers being movable while the carrier for said holders is at rest.

19. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier and means for moving the same in opposite directions toward each other, of means for filling the trays during the feeding operation thereof, a plurality of box-holders adapted to be successively moved to a point between said carriers, each of said holders having its ends open and adapted to receive one of said trays on the inside thereof and one of said wrappers or covers on the outside thereof, a carrier on which said holders are mounted, extending transversely of the machine, means for moving the carrier for said holders intermittently, a chute, means for removing the trays and covers from said holders and for delivering them one by one into said chute, and a plunger movable in said chute for forcing the boxes therefrom, the said tray and wrapper carriers and the means for removing said trays and covers being actuated while the carrier for said holders is at rest.

20. In a machine for filling boxes, having transverse slots therein, with matches and the like, the combination with filling mechanism, of a carrier for the trays having projections thereon adapted to enter the slots in said trays, as and for the purpose set forth.

21. In a machine for filling boxes, having

transverse slots therein, with matches and the like, the combination with filling means for the trays, of a carrier for feeding the same, the said carrier being made up of pivoted sections or links having upwardly-extending parallel sides and ends and having projecting slats or ribs thereon adapted to enter the slots in said trays, as and for the purpose set forth.

22. In a machine for filling boxes, having transverse slots therein, with matches and the like, the combination with filling means for the trays, of a carrier for feeding the same, the said carrier being made up of pivoted sections or links having upwardly-extending parallel sides and ends and having projecting slats or ribs thereon adapted to enter the slots in said trays, and a roller around which said carrier passes, the same being polygonal in cross-section with the faces thereof of the same length as said links, as and for the purpose set forth.

23. In a box-filling machine, the combination with a flexible longitudinally-movable carrier having transverse slats or ribs thereon and boxes having transverse slots in the bottoms thereof adapted to receive said slats or ribs, of means for positively moving said carrier in both directions and thereby imparting a lateral vibration thereto, as and for the purpose set forth.

24. In a box-filling machine, the combination with a flexible longitudinally-movable carrier having transverse slats or ribs thereon and boxes having transverse slots in the bottoms thereof adapted to receive said slats or ribs, of means acting positively on opposite sides of said carrier for agitating the same laterally at a point intermediate its ends, as and for the purposes set forth.

25. In a box-filling machine, the combination with a flexible longitudinally-movable carrier having transverse slats or ribs thereon, trays having transverse slots in the bottoms thereof adapted to receive said slats or ribs and filling mechanism for said trays, of a laterally-movable agitator adapted to engage both sides of said carrier at a point intermediate its ends, as and for the purposes set forth.

26. In a box-filling machine, the combination with a flexible longitudinally-movable carrier having transverse slats or ribs thereon, trays having transverse slots in the bottoms thereof adapted to receive said slats or ribs and filling mechanism for said trays, of an agitating-frame adapted to engage both side edges of said carrier at a point intermediate its ends, and means for imparting a laterally-reciprocating movement to said frame, as and for the purposes set forth.

27. In a box-filling machine, the combination with a carrier for feeding the trays and filling mechanism for said trays, of an inverted-U-shaped agitating-frame whose side arms engage the sides of said carrier, and means for imparting a laterally-reciprocating movement to said frame.

28. In a box-filling machine, the combination with a carrier for feeding the trays and filling mechanism for said trays, of an arch-shaped bracket extending up and around said carrier, a rod connecting the side members of said bracket, an inverted-U-shaped agitating-frame supported upon said rod and engaging the sides of said carrier, a laterally-movable bar having pins thereon engaging said frame, a rotating shaft, and a cam on said shaft for actuating said bar.

29. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers movable in opposite directions toward each other, of a transversely-movable carrier, box-holders thereon adapted to be moved successively to a point between the adjacent ends of the feeding means for said trays and that for said wrappers, each of said holders being hollow, with both ends open and adapted to receive one of the trays on the inside thereof and one of the wrappers on the outside thereof, and arms connecting said holders to said carrier at the ends thereof adjacent to the feeding means for the trays.

30. In a box-filling machine, the combination with feeding means for the trays and feeding means for the wrappers or covers movable in opposite directions toward each other, of a transversely-movable carrier, box-holders thereon adapted to be moved successively to a point between the adjacent ends of the feeding means for said trays and that for said wrappers, each of said holders being hollow, with both ends open and adapted to receive one of the trays on the inside thereof and one of the wrappers on the outside thereof, and having the end adjacent to the feeding means for the wrappers beveled or contracted and that adjacent to the feeding means for the trays enlarged or flared, and arms connecting said holders to said carrier at the ends thereof adjacent to the feeding means for said trays, as and for the purpose set forth.

31. In a box-filling machine, the combination with a tray-carrier, a wrapper-carrier, and means for moving said carriers simultaneously but intermittently in opposite directions toward each other, of a transversely-extending carrier, box-holders thereon, means for moving said transversely-extending carrier intermittently to bring said holders successively to a point between the adjacent ends of said tray and wrapper carriers, each of said holders being hollow with both ends open and adapted to receive one of the trays on the inside thereof and one of the wrappers on the outside thereof, and means for removing the trays and wrappers from said holders, the means for moving said tray and wrapper carriers and that for moving said transversely-extending carrier being alternately thrown into and out of operation.

32. In a box-filling machine, the combina-

tion with a tray-carrier, a wrapper-carrier, and means for moving said carriers simultaneously but intermittently in opposite directions toward each other, of a transversely-extending carrier, box-holders thereon, means for moving said transversely-extending carrier intermittently to bring said holders successively to a point between the adjacent ends of said tray and wrapper carriers, each of said holders being hollow, with both ends open and adapted to receive one of the trays on the inside thereof and one of the wrappers on the outside thereof, and an intermittently-actuated stripping-carrier extending at right angles to said transversely-extending carrier for removing said trays and wrappers from said holders, the means for moving said tray and wrapper carriers and that for moving said stripping-carrier being thrown into operation during the periods of rest of said transversely-movable carrier.

33. In a box-filling machine, the combination with an intermittently-movable carrier, and box-holders thereon, each of said holders being hollow, having its ends open and provided with an elongated slot in the side opposite said carrier and adapted to receive a box-tray on the inside thereof and a box wrapper or cover on the outside thereof, of an intermittently-movable stripping-carrier extending at right angles to the carrier on which said holders are mounted, and slats or projections on said stripping-carrier adapted to engage the trays and wrappers in said holders and to move in the elongated slots therein, said stripping-carrier being actuated during the periods of rest of the carrier on which said holders are mounted.

34. In a box-filling machine, the combination with an intermittently-movable carrier, and box-holders thereon, each of said holders being hollow, having its ends open and provided with an elongated slot in the side opposite said carrier and adapted to receive a box-tray on the inside thereof and a box wrapper or cover on the outside thereof, of an intermittently-movable stripping-carrier extending at right angles to the carrier on which said holders are mounted, slats or projections on said stripping-carrier adapted to engage the trays and wrappers in said holders and to move in the slots therein, a chute, an open casing communicating with said chute and extending to a point adjacent to the discharge end of said stripping-carrier and a vertically-reciprocating, intermittently-movable plunger in said chute, said stripping-carrier being thrown into operation during the periods of rest of said plunger and the carrier on which said holders are mounted.

35. In a box-filling machine, a hollow transversely-movable box-holder, means for inserting a filled box-tray within the same and means for applying a box-wrapper upon the outside of the same.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD H. EISENHART.

Witnesses:
WM. M. STOCKBRIDGE,
GEO. W. REA.