No. 736,668. PATENTED AUG. 18, 1903.

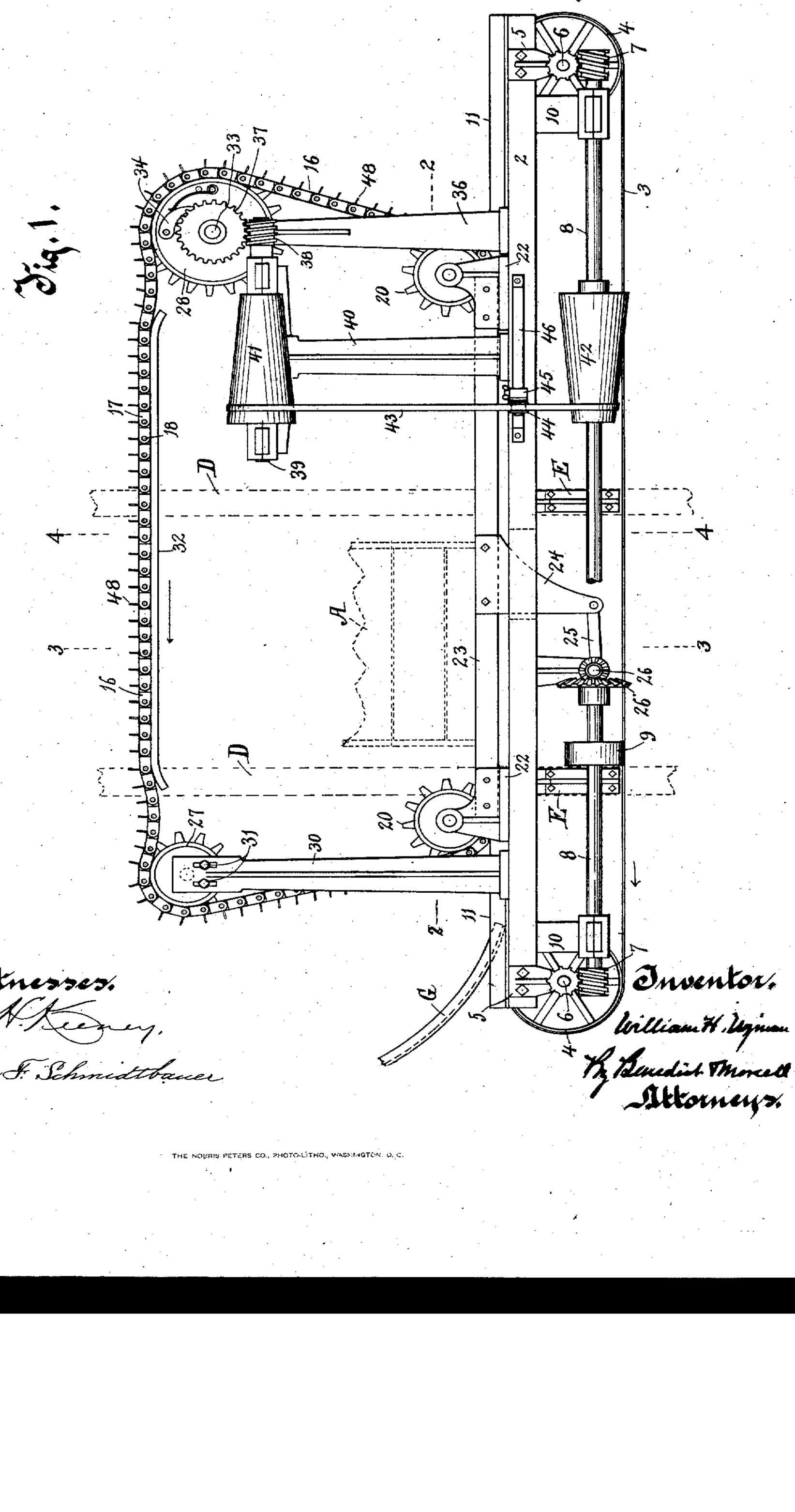
W. H. WYMAN.

BOX FILLING MACHINE.

APPLICATION FILED MAY 15, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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Anna F. Schmidtbauer

Inventor.
William H. Wyman
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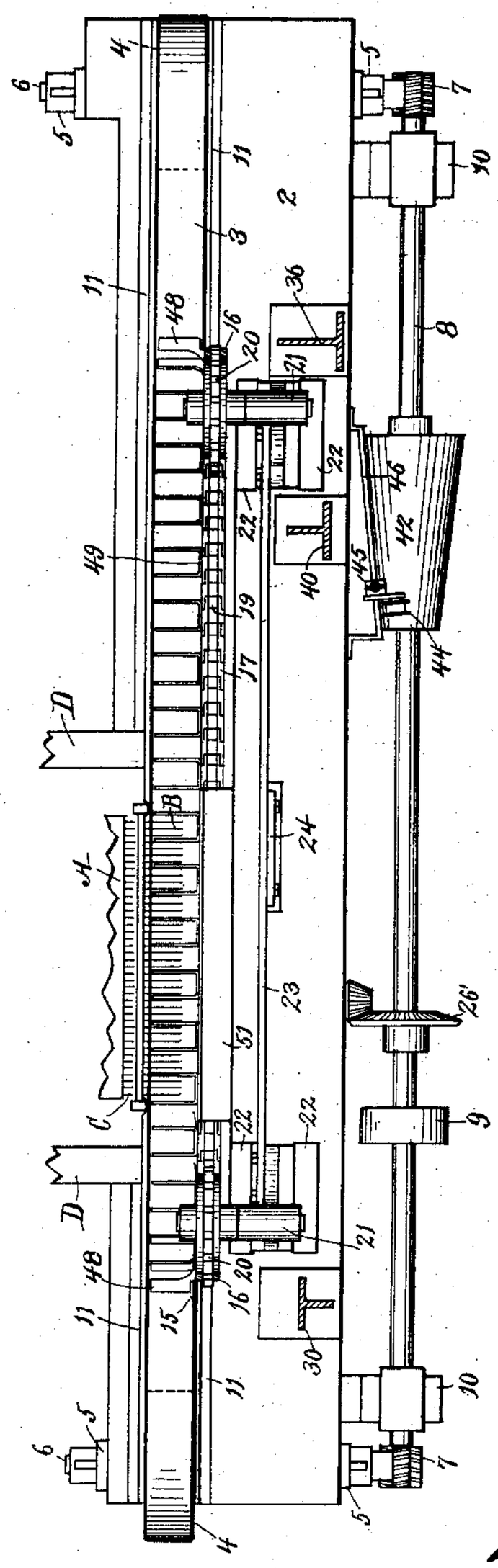
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



Witnesses.

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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

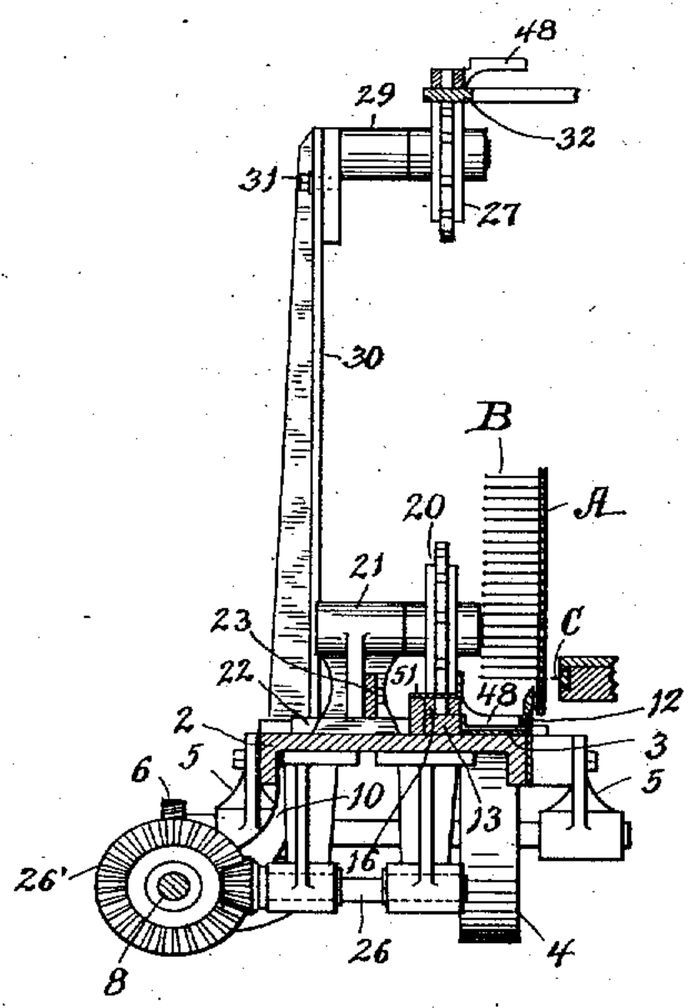


Fig. 5.

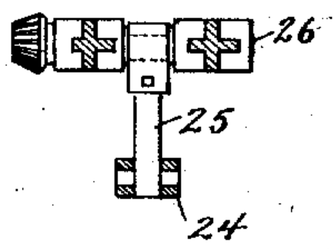
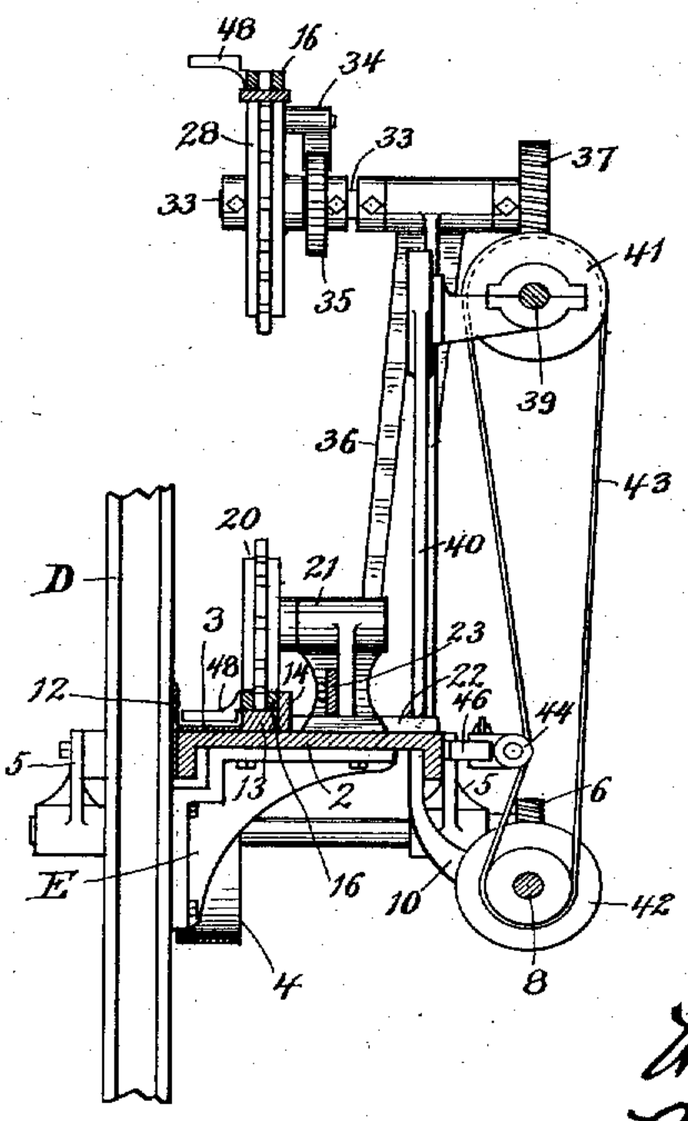


Fig. 4.



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BOX FILLING MACHINE.

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6.

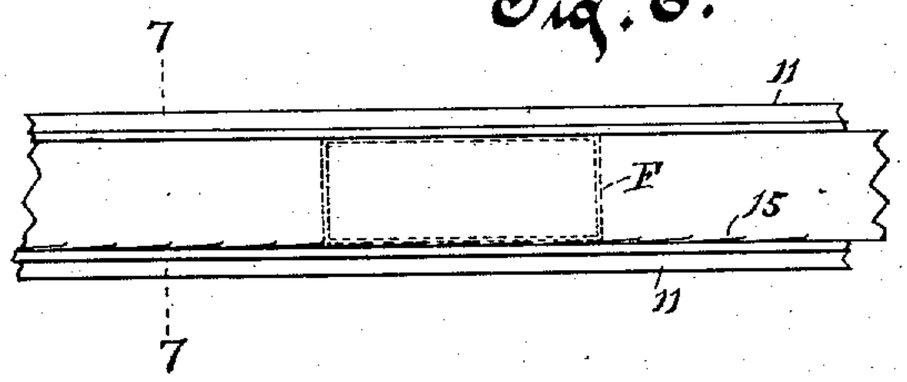


Fig. 7.

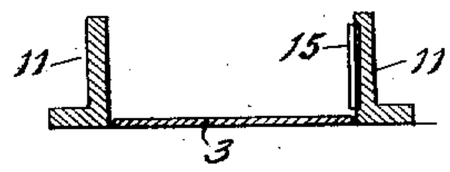


Fig. 8.

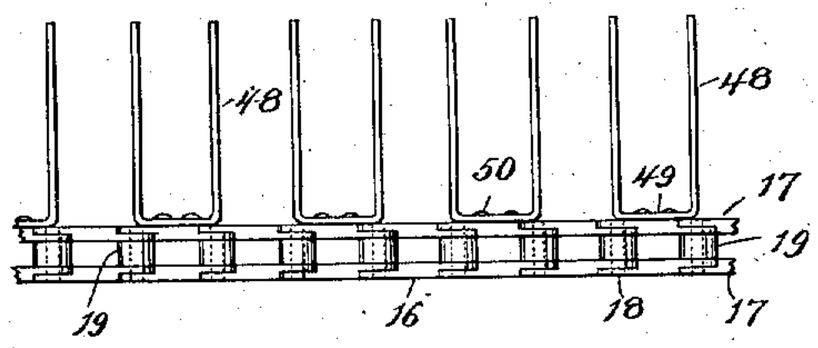
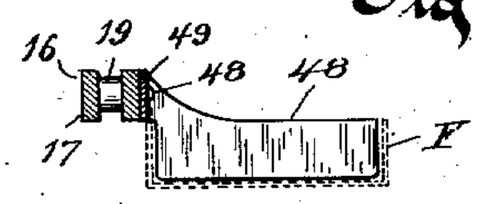


Fig. 9.



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No. 736,668. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM H. WYMAN, OF OSHKOSH, WISCONSIN, ASSIGNOR TO UNION MATCH COMPANY, OF DULUTH, MINNESOTA, A CORPORATION OF MINNESOTA.

BOX-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 736,668, dated August 18, 1903.

Application filed May 15, 1903. Serial No. 157,271. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WYMAN, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Box-Filling Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

In connection with modern match-machines in which large numbers of matches are produced, and especially with those machines in which match-splints are taken and held by a moving carrier while being paraffined and supplied with ignitible heads, and from which carriers the completed matches are discharged rapidly and usually in groups from rows of apertures in the carrier, it is desirable and indeed important to have means for taking the matches as they are discharged from the carrier of the match-machine and putting them into boxes ready for the market. Such means for filling the boxes with matches are already in use; but it is important that the matches when placed in the boxes shall be properly straightened and placed paralled with each other and in proper positions in the boxes and shall be shaken down, so as to occupy compactly and snugly the space in the boxes, so that the greatest number possible of matches can be put into a box of any given size and that when in the box the matches shall lie compactly together, so as not to be liable to rub against each other by shaking and so that they will remain constantly in their placed positions during handling and transportation.

My present invention relates to novel means for filling boxes with matches as they are discharged from a match-machine, the particular purpose of the invention being chiefly to arrange the matches paralled with each other and in proper positions in the boxes and by stirring them as they are being placed in the boxes to cause them to fit snugly and compactly into proper position, thereby most satisfactorily filling the boxes.

My invention consists in the mechanism, its parts, and combinations of parts, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 is a front elevation at one side of my improved mechanism. Fig. 2 is a section on line 2 2 of Fig. 1 looking downwardly, the section showing principal features of the construction in plan. Fig. 3 is a section on line 3 3 of Fig. 1 looking toward the left. Fig. 4 is a section on line 4 4 of Fig. 1 looking toward the right, parts being broken away for convenience of illustration. Fig. 5 is a detail, parts in section, of a connecting-rod and its attachment on a crank or eccentric employed in vibrating match-stirring fingers. Fig. 6 is a fragment in plan of a box-conveyer and guides and with a box shown in dotted lines thereon. Fig. 7 is a cross-section on line 7 7 of Fig. 6 of the box-conveyer and guides. Fig. 8 is a fragment of a chain belt and fingers thereon, the fingers being adapted for stirring the matches in the boxes. Fig. 9 is a cross-section of the chain belt of Fig. 8 with a finger thereon, a match-box being indicated by dotted lines to show the relation of the stirring finger or blade to the match-box.

In the drawings, A represents in dotted lines, Fig. 1, a fragment of a match-carrier forming a part of a match-machine in such relation to the box-filling machine embodying my present invention as indicates the method of using the box-filling machine in connection with a match-machine, from the carrier of which the matches are discharged. The fragment A of the match-carrier may represent a carrier consisting of a series of plates hinged together into an endless chain, each of which plates is provided with a plurality of transverse rows of apertures in which matches B are held, as indicated in Fig. 2, and from which the matches are discharged into the boxes of the box-filling machine. Also in Fig. 2 means consisting of a head and punching-pins C are shown, adapted to discharge the matches from the carrier into the boxes on the match-filling machine.

The operative parts of my improved match-filling machine are mounted on such suitable framing as is required therefor, either standing on its own base or connected to the frame of the match-machine, as most convenient. In the construction shown, which I preferably

employ for supporting my improved mechanism, the bed-piece 2 is mounted on posts D D of the match-machine and is supported thereon by means of brackets E E, fastened to and projecting from the posts. This means of supporting the bed-piece is not important, nor in fact is the use of a bed-piece necessary, as any other suitable framing might be employed therefor.

The endless flexible conveyer 3, disposed in horizontal direction and having its upper line arranged to be supported and travel on the upper surface of the bed-piece 2, runs at its extremity on the band-wheels 4 4, the axles of which wheels are mounted in hangers 5 5, secured to and depending from the bed-piece 2. The axles of the wheels 4 4 are provided with gear-wheels 6 6, which mesh with worms 7 7 on the driving-shaft 8, which is driven from any convenient source of power, conveniently by a belt running on the pulley 9, tight on the shaft. The shaft 8 has its bearings in hangers 10 10, depending from the bed-piece 2.

The flexible conveyer 3, running on the bed-piece 2, travels in a runway conveniently formed ont he bed-piece by angle-irons 11 11, secured to the bed-piece and forming side walls to the runway. In front of the carrier A and between the posts D D the angle-iron at that side of the runway adjacent to the carrier is omitted and a comparatively thin guard 12 is substituted forming a side for the belt-runway and for the boxes. On the other side of the runway, along the line of the chain belt hereinafter described, a guard or rail 13 is substituted for the angle-irons, which rail 13 serves both as a side wall for the conveyer and box-runway and also as a track for the support of the lower line of the chain belt. Alongside the rail 13 a guard-rail 14 is placed, which is fixed to the rail 13 and to the bed-piece 2.

The boxes F, which are to be filled with matches, may be placed on the traveling conveyer in any convenient or suitable manner; but for this purpose an inclined chute G may be employed, down which the boxes may run one after the other onto the conveyer and on and with which the boxes will be carried along in front of the match-carrier, from which the matches are discharged into them, and to the distant end of the conveyer, where they can be removed in any convenient manner. To prevent the boxes from moving rearwardly after they have entered the runway and become seated on the conveyer, I employ means to prevent such rearward movement, which may be some light spring-stops 15 15, secured to the side of the runway and projecting a little way therefrom into the runway, but so as to permit forward movement of the boxes, while preventing their rearward movement.

As the matches fall from the match-carrier, from which they are discharged into the boxes being conveyed past the carrier by the conveyer 2, they fall usually substantially parallel with each other and transversely of the boxes into which they are deposited but some of the matches are liable to fall or get into an inclined or diagonal position and they do not arrange themselves straight across the boxes, and even those that are parallel with each other and transverse to the boxes do not fit down snugly together in the boxes, and to accomplish this means are employed for stirring the matches in the boxes and putting them in proper positions, so as to fit snugly and compactly in the boxes, filling them in proper manner. For this purpose I employ a chain belt 16, advisably consisting of two lines of links 17 17, the links of each line overlapping the abutting links at each end and being pivoted thereto by a pin 18, passing through the two overlapping links of each line and through the links of the two lines and through an interposed separating-collar 19. This construction forms a sprocket-chain belt which runs on sprocket-wheels 20 20, mounted on arbors projecting from the blocks 21 21, which blocks are supported reciprocably in ways therefor on the bed-piece 2. The blocks 22 22 are connected together by a strap 23. A bracket-finger 24, secured to and projecting downwardly from the strap 23, extends through the bed-piece 2 in a slot therefor, and its extremity is connected to a rod or pitman 25, the other end of which rod rides on the crank or eccentric of a shaft 26, geared to the driving-shaft 8 by a pinion, and the beveled wheel 26′. By this construction the chain belt, or at least so much of it as runs on and is between the two sprocket-wheels 20, is given a reciprocating or vibratory movement for a purpose hereinafter more fully described.

The chain belt 16 also is carried on an idle sprocket-wheel 27 and on a driven sprocket-wheel 28, both located in planes other than the plane of the wheels 20 and preferably above them, as shown in Fig. 1 of the drawings. The sprocket-wheel 27 is mounted on an arbor in a block 29, mounted adjustably vertically on a standard 30, fixed on the bed-piece by means of set-screws 31 31, passing through slots therefor in the standard and turning into the block. Any undesired slack in the chain belt may be taken up by this construction. Between the wheels 27 and 28 the chain is supported and travels on a track 32, advisably provided, which track may be fixed to the match-machine posts D D. It should be understood that the carrier A in the match-machine has a path that carries it rearwardly below the guard 32. The sprocket-wheel 28 is loose on the shaft 33, but is held to rotation therewith in one direction by a spring-held pawl 34, pivoted on the wheel and engaging with a ratchet-wheel 35, fixed on the shaft 33. The shaft 33 is mounted in a standard 36, fixed on the bed-piece 2, and the shaft is provided with a worm-wheel 37, gearing with a worm 38 on a shaft 39, having its bearings in

brackets on a standard 40, fixed on the bed-piece 2. Speed-pulleys 41 and 42 are fixed respectively on the shaft 39 and on the driving-shaft 8, and a belt 43 running thereon is adapted to communicate motion from the driving-shaft 8 to the shaft 39 and to be employed to regulate the speed of the shaft 39. A guide-pulley 44 is mounted on a block 45, slidable laterally on a rod 46, fixed on the bed-piece, by means of which guide-pulley so slidable on the rod the belt 43 can be shifted for adjustment of the speed of the shaft 39.

The specific means for stirring or agitating the matches in the boxes for arranging them and settling them into place consists, preferably, of fingers, advisably thin blades of steel, fixed on the chain belt and adapted to enter the boxes from the top and by the vibratory motion given to the belt in its lower line to stir the matches, and thereby arrange them in parallel and compact relations to each other in the boxes under such stirring and gravity. These fingers as preferably formed consist of the thin blades 48 48, Figs. 8 and 9, substantially as long as the width of the boxes and as high as the depth of the boxes and advisably formed in pairs, the two blades of each pair being connected together by an intermediate tang or member 49, by which tang each pair or set of blades is secured to a link of one line of the chain belt, conveniently by rivets or screws 50 50. One pair of these blades is secured to each alternate link of one line of the chain belt and are located at one side of and below the chain belt, so as to be adapted to enter the boxes, while the chain belt travels alongside and adjacent to the top edge of one side of the boxes.

It will be understood from the construction that as the boxes are fed to the conveyer down the chute G they take position on the conveyer one after another and are carried forward by the conveyer at a predetermined rate of speed, and that the light spring-stops 15, located in the box-runway at the foot of the chute G and for a little distance ahead therefrom, will prevent the boxes from moving backward, that as the boxes traveling on and with the conveyer come in front of the match-carrier A, from which matches are being discharged, the matches will fall into the boxes, and that in the meantime the blades or fingers 47 will have entered the boxes and that these fingers are being vibrated forward and back by means of the construction that includes the pitman 25, riding on the eccentric of shaft 26, and that this vibratory motion of the fingers will constantly stir the matches a little in the boxes until the boxes shall have reached the extremity of the lower line of the chain belt, when the fingers are removed from the boxes by the chain running upwardly toward the sprocket-wheel 28. In connection with the vibratory movement of the fingers in the boxes, it will be understood also that the fingers are being constantly moved ahead on and with the chain belt, which should have a motion substantially synchronous and in the same direction as the travel of the conveyer.

A shield 51, of sheet metal and secured to the guard-rail 14, is advisably provided to cover so much of the chain belt as is opposite the carrier A to prevent any overthrown matches or splints from getting into the chain as they fall from the match-carrier into the boxes.

The loose pawl-engaging sprocket-wheel 28, in connection with the idle wheels on which the chain runs, permits the belt to be run ahead by hand when such movement is desired.

What I claim as my invention is—

1. In mechanism for filling boxes with matches, an endless traveling box-conveyer, an endless traveling chain belt disposed to travel alongside of boxes on the conveyer and substantially concurrently therewith, means on the belt adapted to enter the boxes and by differentiated movement to stir matches therein adapted to give that portion of the belt alongside the boxes and the stirring means thereon a vibratory motion forward and back.

2. Box-filling mechanism, comprising a traveling box-conveyer, a coincidently-traveling belt, fingers on the belt adapted to enter boxes on and traveling with the belt, and means adapted to give that portion of the belt traveling alongside the conveyer and the fingers thereon a vibratory movement forward and back.

3. In match-box-filling mechanism, means for conveying boxes past a source of match-supply, fingers mounted on an independent and coincidently-traveling device which fingers are arranged to enter the boxes, and means for giving the fingers a vibratory motion forward and back in the boxes.

4. In box-filling mechanism, means for conveying the boxes past the match-supply, a flexible belt arranged to travel independently of but substantially coincidently with the box-conveying device, fingers on the belt adapted to enter and travel with the boxes, and reciprocable means on which the belt travels adapted to give the belt and fingers a vibratory movement forward and back.

5. In a box-filling machine, means for stirring matches in boxes being filled therewith, comprising an endless chain belt provided with stirring-fingers, upper sprocket-wheels carrying and driving the belt, lower sprocket-wheels on which the belt runs at distant points, blocks on which the lower sprocket-wheels are mounted and means for reciprocating the lower wheels in the direction of the intermediate line of the belt.

6. In a box-filling machine, a bed-piece having a box-runway thereon, means for conveying boxes along in the runway, sets of blocks slidable on the bed-piece adjacent to and parallel with the runway, sprocket-wheels mounted on the blocks, a sprocket-belt provided with match-stirring fingers and running on

the sprocket-wheels, and means for reciprocating the wheel-carrying blocks in the direction of the runway.

7. In a match-box-filling machine, a traveling belt provided with match-stirring fingers, means for supporting and driving the belt including two lower belt-carrying wheels, blocks on which said lower wheels are mounted, means connecting said blocks, a driven shaft provided with an eccentric, a pitman riding on said eccentric and connected to a finger on the block-connecting means.

8. In box-filling mechanism, a chain belt including a series of links hinged one to another, and match-stirring fingers secured in pairs, one pair to each alternate link of the chain.

9. A means for stirring matches in a box being filled therewith, comprising a traveling chain belt consisting of successive links pivoted together, a pair of blade-like fingers secured rigidly to each alternate link of the chain and carried thereon, each finger being at the side of the chain and transversely of a plane parallel with the axes of the links but out of line with the chain.

10. In combination, a bed provided with a runway, band-wheels, an endless conveyer running on the wheels and in the runway, a driven shaft geared to said wheels and provided with a speed-pulley, a belt provided with match-stirring fingers, a sprocket-wheel arranged to drive said belt, a shaft geared to said sprocket-wheel, a complementary speed-pulley on said last-enumerated shaft, and a belt running on said speed-pulleys.

11. In combination, a bed provided with a runway, band-wheels, an endless conveyer running on the wheels and in the runway, a driven shaft geared to said wheels and provided with a speed-pulley, a belt provided with match-stirring fingers, a sprocket-wheel arranged to drive said belt, a shaft geared to said sprocket-wheel, a complementary speed-pulley on said last-enumerated shaft, a belt running on said speed-pulleys, and a shiftable guide-pulley adapted to shift the position of the belt on the speed-pulleys and to change the relative motion of the conveyer and the belt.

12. In combination, a bed provided with a runway, band-wheels, an endless conveyer running on the wheels and in the runway, a driven shaft geared to said wheels and provided with a speed-pulley, a belt provided with match-stirring fingers, a sprocket-wheel loose on a shaft and carrying said belt, the shaft of said loose pulley, a pawl on the pulley engaging in one direction a ratchet-wheel fixed on the shaft, a shaft geared to said loose-pulley shaft and having a complementary speed-pulley, and a belt running on said speed-pulleys.

13. In match-box-filling mechanism, a match-box runway, a chain belt traveling alongside said runway and having laterally-projecting fingers adapted to enter boxes in the runway, and a cover above and protecting the chain belt from overthrown splints or matches.

14. In match-box-filling mechanism, a runway for a conveyer and boxes thereon, a traveling box-conveyer, means adapted to vibrate forward and back and stir matches in the boxes, and stops in the runway adapted to prevent rearward movement thereof while permitting their forward travel.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. WYMAN.

Witnesses:
CHARLES WHITMER,
EMMA R. JACOBY.

Correction in Letters Patent No. 736,668.

It is hereby certified that in Letters Patent No. 736,668, granted August 18, 1903, upon the application of William H. Wyman, of Oshkosh, Wisconsin, for an improvement in "Box-Filling Machines," an error appears in the printed specification requiring correction, as follows: In line 90, page 3, after the word "therein" the words *and means* should be inserted; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of September, A. D., 1904.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.

the sprocket-wheels, and means for reciprocating the wheel-carrying blocks in the direction of the runway.

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