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M. E. PHILLIPS, JR., ET AL

3,019,581

AUTOMATIC CATCHER

Filed June 20, 1958

3 Sheets-Sheet 1

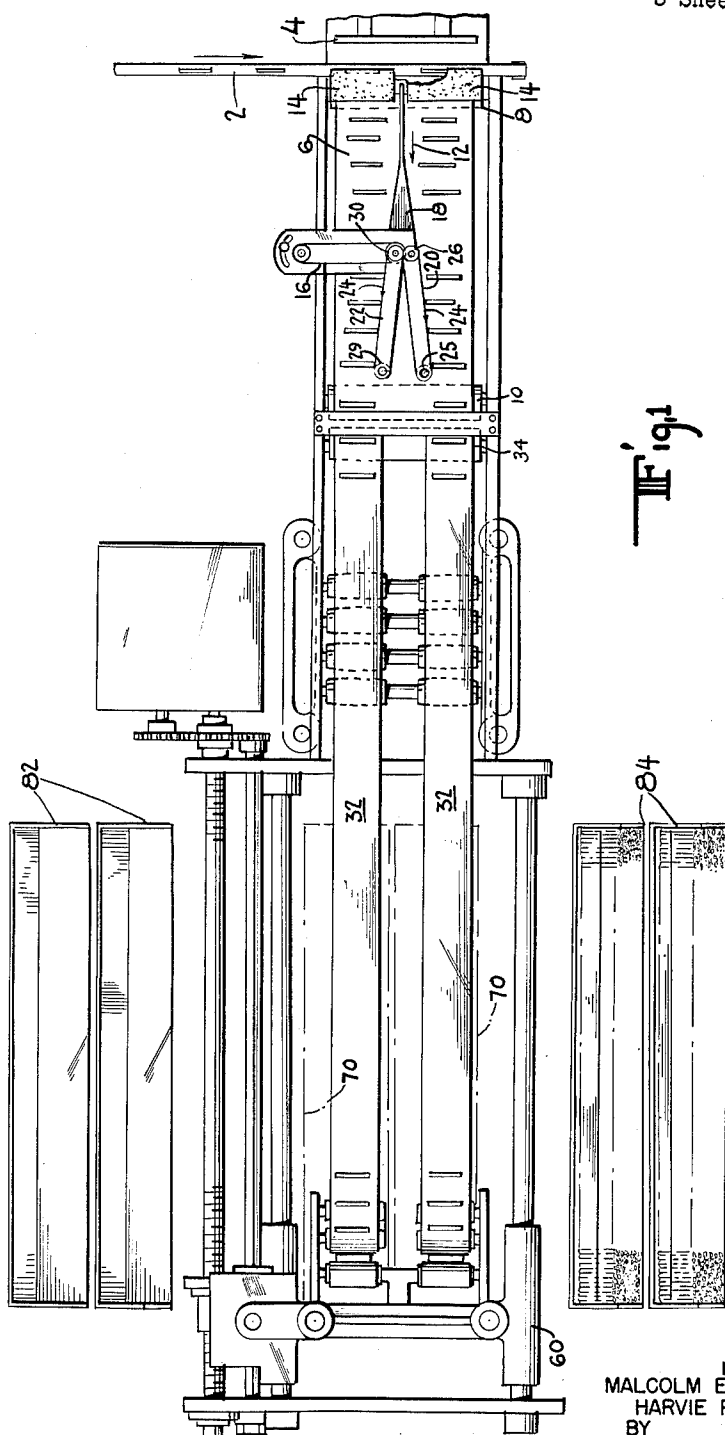


FIG. 1

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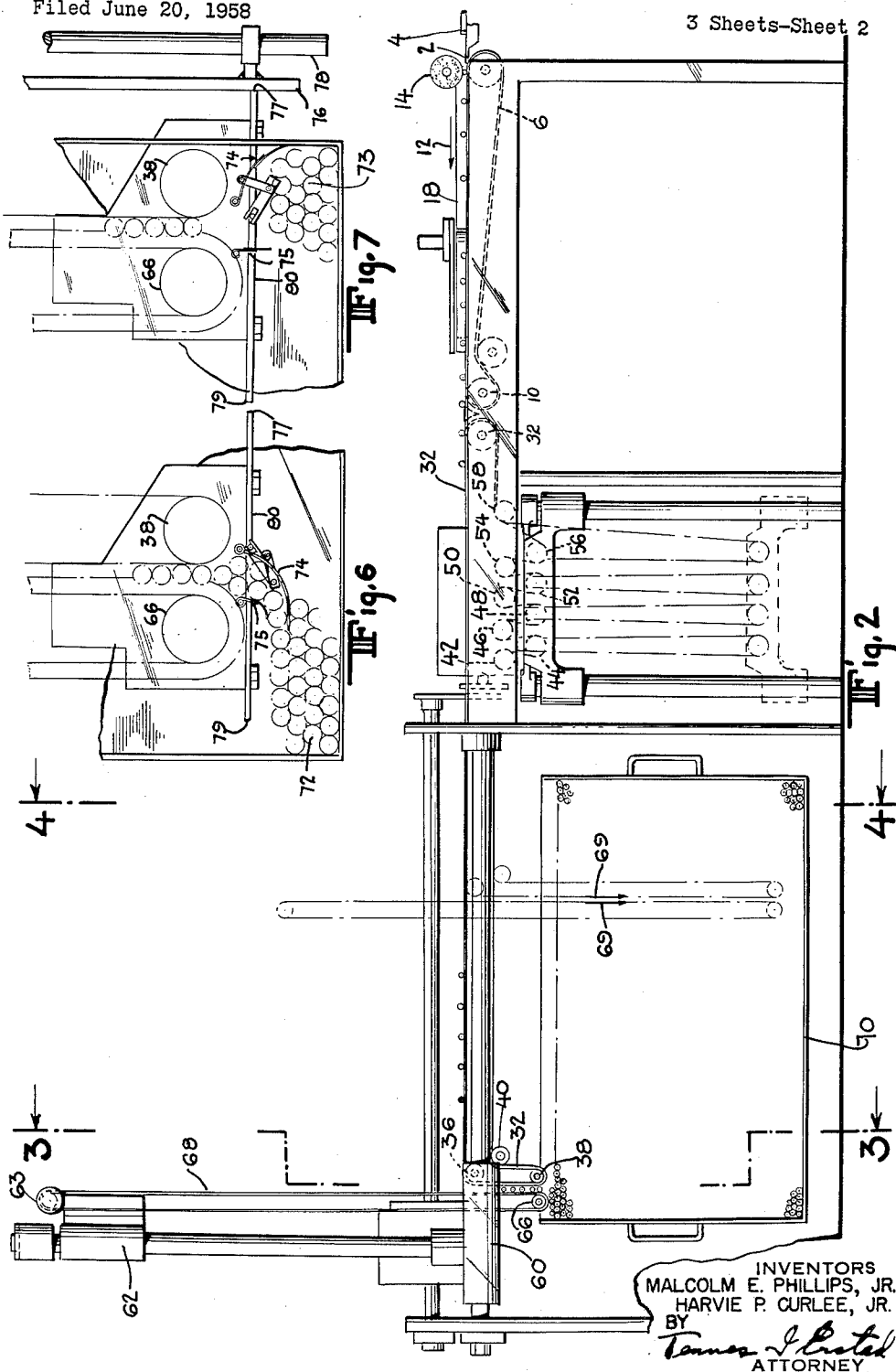
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AUTOMATIC CATCHER

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3 Sheets-Sheet 2



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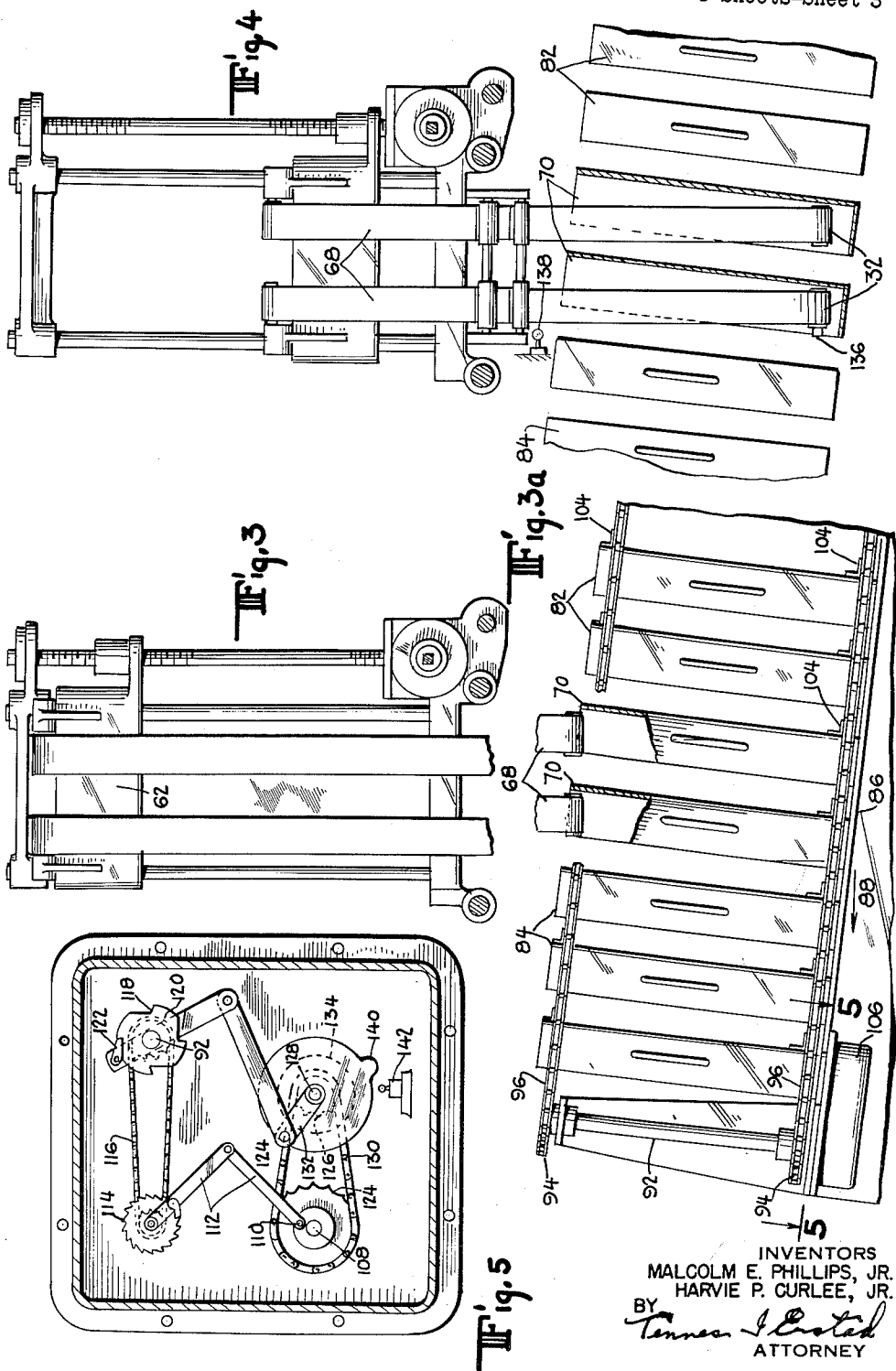
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3 Sheets-Sheet 3



1

3,019,581

AUTOMATIC CATCHER

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17 Claims. (Cl. 53—236)

This invention relates to cigarette making machines, and more particularly to an apparatus and method for automatically collecting finished cigarettes or other rod-shaped articles, in trays or other comparatively deep containers.

Heretofore, it has been the practice to accumulate the finished cigarettes on collecting belts which forward them to a collecting table. The cigarettes were then manually gathered and transferred to trays that were removed to cigarette packaging machines. This manual gathering, handling and placement of cigarettes had a deleterious effect upon the quality and appearance of the cigarettes. Previous machines for mechanically loading cigarettes into trays required trays of special design which was objectionable.

One of the objects of this invention is to provide an improved mechanical device for placing cigarettes into standard trays.

A further object of this invention is to provide an automatic device for collecting cigarettes or other rod-shaped articles which will be of simple design and be reliable in operation.

A further object of this invention is to provide a machine which will convey cigarettes gently to avoid loss of tobacco from the ends thereof.

A further object of this invention is to provide a cigarette collector having a cigarette feeder which only delivers cigarettes into receiving trays while moving in one direction, thereby allowing full loaded trays to be indexed or replaced with empty trays when the feeder travels in another direction.

A further object of this invention is to provide for periodic delivery of cigarettes from the delivery end of the belts while continuously and without interruption receiving cigarettes on the receiving end of the tromboning belt.

A further object of the invention is to provide a device for aligning cigarettes or other rod-shaped articles on a conveyor.

A further object is to provide an apparatus for collecting tipped cigarettes in trays which allows for differences in diameter of mouthpiece and cigarette filler lengths.

A further object of this invention is to provide a method and device for the automatic indexing of cigarette trays.

A further object of this invention is to provide a cigarette tray loader which may be built into the confines of an existing cigarette making machine.

A further object of this invention is to provide an automatic cigarette collector having a distributor resembling a "beak" which will descend inside a tray to evenly discharge cigarettes or other rod-shaped articles within the trays.

A still further object of this invention is to provide a cigarette collecting apparatus having a tromboning or

2

telescopic type of motion to uniformly load cigarette trays.

A further object of this invention is to provide a timed tray feed for feeding empty trays to a point beneath the cigarette feeder, and for simultaneously removing filled trays.

A further object of this invention is to provide means to take-up and play out the tromboning belt so as to maintain a uniform tension therein.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

FIG. 1 is a plan view of an embodiment of our invention.

FIG. 2 is a side elevation of FIG. 1.

FIG. 3 is a view taken through line 3—3 of FIG. 2, at the beginning of the cigarette feeding actuation, showing the tray almost completely filled.

FIG. 3a shows how the creep motion has moved the trays under the feeding belts.

FIG. 4 is a view taken through line 4—4 of FIG. 2, at the end of the cigarette feeding actuation, showing the tray partially filled.

FIG. 5 is a schematic diagram taken through line 5—5 of FIG. 3 showing an apparatus for obtaining a creep motion and an indexing motion for moving the cigarette trays under and away from the feeding belts.

FIG. 6 shows a detail of a feed control during the feeding actuation.

FIG. 7 shows a second position of the feed control of FIG. 6 at the end of the feeding actuation.

This invention is an improvement to the co-pending patent application of George Daniel Horgan, file Number 688,375, filed October 4, 1957.

In carrying our invention into effect it may be attached to any suitable cigarette making machine such as that described in co-pending U.S. patent application of George S. Dearsley, file Number SN 509,293, filed May 18, 1955, or as shown in FIGURE 1, it may be used in conjunction with a cigarette catcher machine of the type shown in U.S. Patent No. 2,124,397, wherein the severed cigarettes are discharged sidewise from the rod conveyor belt 2 by deflectors 4. The rod conveyor belt 2 is arranged to run at a linear speed somewhat in excess of the linear speed at which the endless tobacco rod is traveling before being cut into cigarette lengths. By this known technique the individual cigarettes are axially spaced from one another.

In the embodiment used to illustrate the invention, the cigarettes are ejected onto a collecting tape 6, traveling over suitably driven rollers 8 and 10, traveling in the direction indicated by the arrow 12. A sponge rubber roller 14 is mounted above roller 8 and spaced therefrom by a distance slightly less than the diameter of a cigarette, so that, as each cigarette passes in the space between those rollers 8 and 14, it is gently retarded and axial movement is stopped without injury to the cigarette ends.

The collecting moving surface of tape 6 may receive any desired number of rows of cigarettes from the cigarette maker. In this particular invention we have shown the collecting tape 6 receiving two rows of cigarettes.

While the cigarettes are deposited upon the receiving tape 6 in a position generally parallel with one another, their ends are not in proper alignment.

The aligning portion of our invention corrects this misalignment of ends, and arranges the cigarettes in proper axial and end alignment with one another and transverse to the direction of the tape.

It also permits a wider separation of the adjacent ends of the cigarettes on the catcher tape 6 than was effected by rod conveyor belt 2, thereby providing a positive method for transferring cigarettes onto belts 32.

A cigarette separator bar 18 is positioned by suitable means over the center of, and in close proximity with, the tape 6, at a point upstream of the roller 10.

A pair of diverging belts 20 and 22, and having their sides vertically arranged traveling in the direction of the arrows 24, over two pairs of vertical rollers 25 and 26, and 29 and 30 respectively shown in FIGURE 1, and supported by suitable means, are positioned at a point downstream from separator bar 18.

The belts 20 and 22 travel at a speed equal to the speed of the tape 6 with their lower edges being adjacent to the upper surface of the upper lap of the tape 6. Belts 20 and 22 are driven by belt 16 in any suitable manner such as by gearing or a friction drive.

The belt 16 travels at an elevation higher than pulleys 26 and 30. As the inside end of irregularly positioned cigarettes come into contact with the upstream surfaces of the belts 20 and 22, they are gently pushed endwise into alignment with each other as shown in FIG. 1.

The aligned cigarettes are then deposited, in an orderly and straight manner, on belts 32.

Referring to FIGS. 1 and 2, endless belts 32 travel over rollers 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58. The rollers 36 are rotatably mounted in horizontally reciprocal carriages 60.

Second carriages 62 are suitably supported on the carriages 60 and are vertically reciprocable. Second vertically reciprocable carriages 62 have rollers 38, 64 and 66 rotatably supported therein. Endless driven resilient surfaced belts 68 travel over rollers 64 and 66 and are so spaced with respect to the rollers 36 and 38 that the distance between the opposite vertical runs of belts 68 and 32 will be spaced from each other a distance equal to substantially the diameter of a cigarette. The cigarettes are transferred downwardly between the vertical parallel runs of belts 32 and 68 as shown in FIG. 2 and are deposited in horizontal rows in the receiving trays.

Sometimes when cigarettes are dropped a short distance they may have a tendency to bounce and fall askew. Cigarettes thus deposited would not be aligned nor parallel to one another and would create difficulties in the packaging operation. To prevent this problem from arising we have shown a modified version of the discharge end of the belts 32 and 68.

When commencing the filling of one tray 70, the initial row of cigarettes must lay squarely across the plane, flat surface of the tray bottom. Cigarettes deposited from above, on such smooth surface, sometimes tend to roll out of the desired position.

Also in the movement of the tromboning belt system back and forth in the tray, the center line of the cigarette flow can come no nearer the ends of the tray than a dimension equal to the diameter of pulleys 38 and 66. This being the case there may be a void space left at the end of each layer of cigarettes in the tray unless other provision is made.

To provide for this the lower portion of the parallel, downwardly moving belts 32 and 68 are provided with means to feed the cigarettes in a sidewise manner so as to exert a degree of control in the flow of cigarettes and to deposit cigarettes into the void space under the rollers at the end of the feeding actuation.

A time delay relay system has been built into the elec-

trical circuits controlling the magnetic clutches that drive the tromboning belts system back and forth across the tray. This delay will permit the corners of each path of the tromboning belt system to be filled when there is a deflecting mechanism to turn the flow of cigarettes into these void spaces.

When the tromboning belt system is in position as shown in FIG. 6, the flow of cigarettes is directed into the corner 72. The time delay is set to accommodate that many cigarettes. When the tromboning belt system is in position as shown in FIG. 7, the flap 74 is moved back as shown. The flap 74 is moved by an actuating bar 76 mounted on shaft 78. Shaft 78 has a rotary solenoid mounted on its end which rotates it in the direction required to contact bar 76 with the flap actuating bar 80 at point 77. When the flap 74 is moved back and up, the cigarettes are dumped into the corner 73, thereby, filling the space under the roller 38.

As the tromboning belts are returning toward position as shown in FIG. 6 with no cigarettes being dropped, the flap 74 is raised above the level of cigarettes laying in the tray. This prevents the misalignment of cigarettes already deposited in the tray. As the tromboning belt system approaches position as shown in FIG. 6, bar 80 comes into contact with the tray end at point 79, thereby, swinging flap 74 into position again to deliver cigarettes into the tray as shown by position of flap 74 in FIG. 6.

Flap 75 is suspended as shown in FIG. 6 at a distance of two cigarette diameters from flap 74. This is to facilitate the desired reservoir of cigarettes for proper control of cigarette flow. Flap 75 is also suspended in its shown position to dampen the bounce of the cigarettes as they are deposited into the tray. These flaps 74 and 75 are made of thin metal and felt. The metal part is the top or hinge-half and the felt part being the lower half that should be flexible when coming into contact with cigarettes in the trays. Flap 74 has the metal to form the contour of the flap and the felt to dampen the bounce of the cigarettes when leaving the control of the vertical elements of the tromboning belt system. Flap 74 has also a contour to suit the angle of the bottom of the tray. When the cigarettes roll off of flap 74 they are falling with their axis positioned in a parallel plane with the bottom of the tray.

The belts 32 and 68 and the carriages 60 and 62 are operated in timed relationship with respect to each other so that when empty trays are positioned under the lower end of the belts 32 and 68 below rollers 38 and 66, the carriages 62 will be lowered to bring the lower delivery end of belts 38 and 66 to a position close to the bottom of the empty collecting trays. As the belts 32 and 68 continue traveling in the direction indicated by the arrows 69 shown in FIG. 2, they will cause cigarettes to be deposited along the bottom of the trays 70 in horizontal tiers when the carriages 60 travel inwardly so as to deposit substantially horizontal layers of cigarettes across the respective trays.

When the carriages 60 have reached their innermost distance of travel, the carriages 62 are elevated a suitable distance from the cigarettes previously deposited, having finished their cigarette feeding actuation, and the carriages 60 commence traveling outwardly. The surface feed of belts 32 being driven by rollers 34, is equal to the reciprocating feed of carriages 60 so that when the carriages 60 travel outwardly, the cigarettes held between the opposed belts 32 and 68 do not move downwardly, hence no cigarettes are deposited in the tray during the outward travel of the carriages 60. However, when the carriages 60 commence traveling inwardly, cigarettes held between vertical runs of belts 32 and 68, will again commence traveling downwardly and another tier of cigarettes will be horizontally deposited along the receiving trays being filled. With this technique, a periodic delivery of cigarettes may be obtained from the delivery end of belts

5

32 and 68 while a continuous and uninterrupted flow of cigarettes is being received from the making machine on the horizontal run of belt 32.

The belts 32 have the tromboning effect described because of the vertical movable rollers 44, 48, 52 and 56, which take up the slack when the carriages 60 move inwardly and play out the belt 32 when the carriages 60 move outwardly. The movable rollers 44, 48, 52 and 56 impart the desired amount of tension to belts 32 and are interconnected by suitable means, so that they all move up and down together. The amount of tension exerted by the movable rollers may be controlled by the weight of the rollers or if desired, spring means may be employed to impart the amount of tension desired.

In FIGURES 3a and 4, the trays 70, 82 and 84 are shown supported on a suitable conveyor 86 and are intermittently indexed or advanced in the direction indicated by the arrow 88. In addition to this rapid indexing motion, a continuous slow creep motion is provided in the direction of arrow 88 to maintain the back of trays 70 in close proximity to the delivery end of belts 32 and 68 as the carriages 62 are retracted vertically out of the tilted trays 70. When the pair of trays 70 become full, vertical carriages 62 are elevated out of trays 70. Trays 70 are then indexed forward and empty trays 82 are indexed under carriages 62. In FIG. 5, it is shown how trays may be automatically indexed as will be described hereinafter.

The tray slide 86, having a width approximate to that of a cigarette tray, is positioned transverse to the direction of the movement of the tromboning belts 32, to support the trays on their way to a tray discharge station (not shown).

Tilted trays serve to better contain the cigarettes as the trays are being filled. The tilt facilitates the shifting of cigarettes lengthwise into the tray when disturbed by operational vibrations. It also permits sideways indexing of a full open-side tray without the danger of the column of cigarettes spilling out through the open side during the shock of indexing. This tilt is also required because filter tip and cork tip cigarettes have a large diameter end. This end builds up to about 5 degrees when the level of the cigarettes are nearing the top sections of the trays. While tilted trays afford a convenient means for controlling cigarettes in deep trays it must be understood that this invention is not limited by this consideration since it will function equally well with trays in a vertical position with other suitable control means to retain cigarettes in the trays. This may be accomplished with flaps or vertically moving tray covers attached to the retraction mechanism.

It has been ascertained that an inclination of 8 degrees of the slide 86 produces the best results. However, it should be understood that an incline of greater or less than 8 degrees will not materially affect its operation.

Substantially vertical rotatable shafts 92 are positioned at all four end corners of the tray slide 86 as shown in FIGURE 3a.

While we have shown how sprockets and sprocket chains may operate, any other suitable belt and pulley system may be used. Sprocket wheels 94 are mounted adjacent to the ends of these shafts 92 and rotate therewith.

These shafts 92 are set substantially perpendicular to the slide 86 so that the axis of the sprockets 94, and those of the sprocket chains 96 traveling over those sprockets 94, will likewise be substantially perpendicular to the slide 86.

Endless sprocket chains 96 having cleats or lugs 104 affixed to their outer surfaces, describe a closed path of travel around the sprockets 94.

The lugs 104 on all the sprocket chains 96 have a spaced relationship to the effect that as an empty tray 82 is positioned transversely on the slide 86, near its base, a lug 104 from each of the chains 96 supports each

6

corner of the rearward slide of the tray 84 during its ascent along the slide 86.

The shafts 92 are all in timed relationship with each other to ensure that the trays move at all times along the slide 86 in a position transverse to the slide 86.

One of the shafts 92 is power driven and transmits power and timing to all the other shafts in any suitable manner.

There are two distinct motions necessary to accomplish tray indexing. One is a creep motion for the slow constant movement of the sprocketed conveyor chains 96. This motion is needed due to the 8 degree tilt. The cigarettes are fed vertically into the trays and as carriages 62 are elevated the trays creep up slide 86 to stay under carriages 62.

The other is the indexing motion, serving to move two fully loaded trays 84 from the loading zone, and two empty trays 82 into loading position.

FIGURE 5 indicates schematically how these two motions may be obtained. All of the mechanism shown therein is located in the gear box 106 as indicated in FIG. 3a.

Mainshaft 108 is the prime mover of this system, driving both creep and index motions. A crank 110 serves to move ratchet arms 112 which turn ratchet 114. This in turn, through a suitable belt or sprocket chain 116, motivates the conveyor drive shaft 92 on which a tray conveyor sprocket 94 is mounted as shown in FIG. 3a.

Another method of obtaining this creep motion would be to connect the motion of mainshaft 108, through suitable gearing and speed reduction, directly to a conveyor shaft 92.

The sprocket or gear located at the conveyor drive shaft 92 would then be mounted on an overriding coupling to permit the indexing motion to function. This would provide constant creep for the tray conveyor chain 96. The ratchet type creep system gives intermittent motion and permits overriding of the indexing system movement.

As the creep motion moves a tray, the positioning notch 118 in the tray indexing ratchet 120 moves into position under the indexing ratchet pawl 122. This notch 118 may be ahead of the pawl 122 at the time of indexing, but it should never be behind the pawl 122 at the instant of indexing motion.

The indexing system works as follows. Sprocket 124 is located on the main drive shaft 108 and is keyed thereto. The indexing drive sprocket 126 is located on the clutch shaft 128 and is keyed thereto.

Sprocket chain 130 travels over sprockets 124 and 126. While we have shown sprockets and sprocket chains transmitting continuous motion from the main drive shaft 108 to the clutch shaft 128 any other suitable means may be used to accomplish this result.

Sprocket 124, located on the main drive shaft 108, turns the magnetic clutch 134 continuously. Crank arm 132 only moves when the magnetic clutch 134 is energized. The magnetic clutch 134 is energized when the switch cam 136 (shown in FIG. 4) operates starting switch 138.

The switch cam 140 (see FIG. 5) makes one complete turn and de-energizes the magnetic clutch 134 by bumping the stop-switch 142. During this one complete turn of the crank 132, ratchet 120 is partially rotated, thereby properly automatically indexing the trays.

As mentioned hereinbefore, when the carriages 60 travel outwardly, they move at a rate of speed equal to or faster than the belt 32 travels over pulley 34. The speed at which conveyor belt 32 travels is at least equal to the speed at which cigarettes are received from the deflector 4. When the carriages 60 are traveling outwardly in this manner, no cigarettes are being delivered downwardly by the belts 32 and 68 but the cigarettes are accumulated during this interval. It is during this period of travel that the full trays supported on the carrier

sprocket 96 are indexed in the manner hereinbefore described so as to present an empty set of trays under the vertical delivery runs of belts 32 and 68 guided over the rollers carried on the vertically reciprocable carriages 62.

During that interval of time when the trays are being indexed and the carriages 60 are moving outwardly the carriages 62 can remain stationary relative to carriages 60 or they can continue to move up at their constantly uniform rate of upward movement. When the empty trays 82 are in position to receive cigarettes the carriages 62 are driven downwardly until their lower end reaches a plane near the bottom of the empty tray 82. During this downward movement into the empty tray, it is desired that no cigarettes be delivered from the belts 32 and 68. This can be accomplished if the downward motion of carriages 62 takes place after the empty tray has been indexed into position but during the latter portion of the outward motion of the carriages 60. No cigarettes will therefore be delivered by belts 32 and 68 because they are still accumulating along the top run of belt 32. This may also be accomplished if the downward motion of carriages 62 begins after the trays have been indexed and at the time carriages 60 begin their inward travel, then carriages 62 are driven down at a speed equal to or greater than twice the linear speed of belts 32 so that no cigarettes are delivered by belts 32 and 68 because they accumulate between these belts as they extend down into the empty trays.

While the collecting apparatus used to illustrate our invention has been shown to consist of two pairs of parallel belts to fill two trays simultaneously, it will be appreciated that only one pair of parallel belts need be employed for filling one tray at a time as the cigarette machine discharges cigarettes in a single column, or if desired, a multiple unit of more than two pairs of parallel belts could be employed for filling more than two trays at a time where a similar number of rows of cigarettes are formed by a cigarette making machine.

From the foregoing description, it will be apparent that we have provided an apparatus which can be readily employed with cigarette trays of whatever design a manufacturer prefers and it does not require trays of a special design. One merely has to set the distance the horizontal carriages 60 and vertical carriages 62 are reciprocated. It will also be noted that the automatic tray loader is of such design that it allows for easy visual or mechanical inspection of the cigarettes while they are on top of the horizontal runs of belts 32 and that the cigarettes are not subjected to any undesirable stacking, squeezing or rolling actions in the type of apparatus we have disclosed.

The invention hereinabove described may therefore be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible embodiments of the same. The invention, therefore, it not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. An apparatus for automatically collecting rod-shaped articles from a source and delivering them into a tray, said apparatus comprising a first belt having a horizontal conveyor run and a vertical delivery run, a second belt having a run parallel to the vertical run of the first belt and spaced therefrom a distance sufficient to firmly hold the rod-shaped articles between said vertical runs, means for driving said belts simultaneously, means for the introduction of vertical runs of said belts and the rod-shaped articles held therebetween into a receiving tray, and means for causing said vertical runs to traverse said tray horizontally to deposit said rod-shaped articles within said tray while said belts are driven.

2. An apparatus for automatically collecting cigarettes from a source and delivering them into a tray, said apparatus comprising a belt having a horizontal conveyor run and a vertical delivery run, a second belt having a run parallel to the vertical run of the first belt and spaced

therefrom by a distance sufficient to firmly hold the cigarettes or rod-shaped articles between said vertical runs, means for driving said belts simultaneously, means for introducing the lower end of the vertical run of said belts into a receiving tray and means for causing said vertical run of said belts to traverse said tray horizontally while said belts are driven to deposit cigarettes in said trays and means to elevate the vertical run of said belts a predetermined distance after each layer of cigarettes has been deposited.

3. Apparatus for automatically collecting cigarettes or other rod-shaped articles from a source and delivering them into a tray, said apparatus comprising a belt having a horizontal conveyor run and a vertical delivery run, a second belt having a run parallel to the vertical run of the first belt and spaced therefrom by a distance sufficient to firmly grip cigarettes or rod-shaped articles between said runs, means for driving said belts simultaneously, means for introducing the vertical runs of said belts into a receiving tray, means for causing the lower end of said vertical runs to traverse said tray horizontally to deposit cigarettes while moving in one direction but not in the other direction and a drive for elevating the vertical belts a distance at least equal to the diameter of a cigarette after each depositing operation.

4. An apparatus for automatically collecting cigarettes or other rod-shaped articles from a source and delivering them into a tray, said apparatus comprising a belt having a horizontal conveyor run and a vertical conveyor run, a second belt having a run parallel to the vertical run of the first belt and spaced therefrom by a distance sufficient to firmly grip the cigarettes or rod-shaped articles between said vertical run, means for driving said belts in timed relationship with each other, the delivery ends of said belts being the vertical runs of said belts, means for introduction of the delivery ends of said belts into a receiving tray, and means for causing said delivery ends to traverse said tray horizontally within said tray to deposit cigarettes therein, said first belt being extendable and contractible to permit said horizontal traverse to occur.

5. In a cigarette feeding mechanism, for filling trays, a first conveyor belt having a fixed receiving end and a horizontally extensible and contractible movable delivery end, said belt having a horizontal conveyor run and a vertical run, a second belt having a run parallel to the vertical run on the first belt and spaced therefrom a distance sufficient to hold cigarettes between said vertical runs said first conveyor belt having a return run, means for automatically maintaining tension on said first conveyor belt during its extension and contraction, comprising a plurality of fixed and movable rollers, said return run passing over each of the fixed rollers and under each of the movable rollers, and means for reciprocating said first and second belts across a tray and for vertically reciprocating the vertical runs of said first and second belts in a tray to fill the tray with cigarettes.

6. In a cigarette feeding mechanism for filling trays, a first conveyor belt having a fixed receiving end and a horizontally extendible and contractible movable delivery end, said belt having a horizontal conveyor run and a vertical run, a second conveyor belt having a run parallel to the vertical run of the first belt and spaced therefrom a distance sufficient to hold cigarettes between said vertical runs, said first conveyor belt having a return run, means for automatically maintaining tension on said first conveyor belt during its extension and contraction, comprising a plurality of fixed and movable rollers, said return run passing over each of the fixed rollers and under each of the movable rollers, and means for spacing in a yielding manner the movable rollers from the fixed rollers for expanding and contracting the return run in accordion-like fashion, said spacing means being limited by the tension of the first belt, and means for reciprocating said first and second belts across a tray

and for vertically reciprocating the vertical runs of said first and second belts in a tray to fill the tray with cigarettes.

7. An apparatus for automatically collecting cigarettes or other rod-shaped articles from a source and delivering them into a tray, comprising an endless belt having a horizontal conveyor run and a vertical delivery run, a second belt having a run parallel to the vertical delivery run of the first belt and spaced therefrom by a distance sufficient to grip the cigarettes or rod-shaped articles between said runs, means for driving said belts in timed relationship with each other, a vertically movable carriage supporting the delivery end of said belts, means for moving said carriage to lower the delivery end of said belts into a receiving tray, a horizontally movable carriage supporting said vertically movable carriage to cause the delivery end of said belts to traverse the tray horizontally while said belts are driven, and means causing cigarettes to be delivered into the receiving tray only during travel in one direction of its horizontal motion.

8. An apparatus for automatically collecting rod-shaped articles received from a source of supply, said apparatus comprising a horizontally reciprocable carriage, a vertically reciprocable carriage supported on said horizontally reciprocable carriage, an extensible and contractible endless conveyor travelling over said horizontally and vertically reciprocable carriages, said conveyor having a delivery run over said vertically reciprocable carriage to deliver and discharge rod-shaped articles at the lower end of said carriage, and means for reciprocating said carriages in timed relationship with respect to each other to cause rod-shaped articles to be stacked horizontally in a container.

9. An apparatus for automatically placing cigarettes in a collecting tray comprising a horizontally reciprocable conveyor, means for delivering cut cigarettes transversely to said conveyor, said conveyor having a vertical delivery run for discharging one cigarette at a time said conveyor by its reciprocating action delivering the cigarettes in transverse rows, a movable tray support, and means for moving said tray support and the vertical delivery run of said conveyor relative to each other to cause cigarettes to be stacked in superimposed transverse rows horizontally in the collecting trays.

10. Cigarette handling apparatus comprising a tray for receiving cigarettes, a conveyor for receiving cut cigarettes from a cigarette making machine and piling them one at a time across said tray, a vertically and horizontally reciprocable support over which said conveyor travels having a downwardly extending delivery section to lower and deposit cigarettes inside of said tray, and means for moving said tray and said section horizontally relative to each other to cause cigarettes to be piled uniformly across said tray.

11. Apparatus for collecting and depositing cut cigarettes in trays comprising a conveyor for moving cigarette receiving trays, an endless conveyor for receiving cut cigarettes and conveying them to the tray, a cigarette conveyor belt support for extending and contracting the operative range of said cigarette conveyor belt, one portion of the travel of said belt being in a vertical direction, a guide belt spaced from the vertical section of said cigarette conveyor belt and traveling in time therewith so as to firmly hold cigarettes up against the cigarette conveying belt when the cigarette conveying belt conveys cigarettes downwardly, and means for raising and lowering the vertical section of said cigarette conveying belt to deposit cigarettes in said tray closely adjacent the area in which said cigarettes are to be piled, and a drive for effecting relative movement between the tray and the vertical length of said conveyor belt to maintain the piled cigarettes substantially level at all times.

12. Cigarette handling apparatus comprising an endless cigarette conveyor having a conveying surface which first travels along a horizontal path and then along a vertical

path of travel, a vertically reciprocable carriage having rollers over which said endless cigarette conveyor travels, a second horizontally reciprocable carriage mounted supporting said first carriage and having rollers over which said cigarette conveyor travels, movable tension applying rollers for taking in and playing out slack in said endless conveyor to enable the operative conveying surface of said cigarette conveyor to be lengthened and shortened, and means for reciprocating the tray and the delivery end of said cigarette conveyor relative to each other to effect a piling of cigarettes in said trays in horizontal tiers.

13. Cigarette handling apparatus comprising an endless cigarette conveyor having a conveying surface which first travels along a horizontal path and then along a vertical path of travel, a vertically reciprocable cigarette feed conveyor over which the vertical portion of said conveyor travels, shutter means at the base of said feed conveyor to permit the selective discharge of cigarettes from said feed conveyor, and a cigarette tray reciprocable beneath said feed conveyor to receive cigarettes discharged therefrom.

14. An apparatus for automatically collecting cigarettes from a source and delivering them into trays comprising a substantially horizontal inclined conveyor supporting the trays, a timing mechanism to cause a gradual upward lateral movement in said conveyor, a vertical feeding mechanism to feed cigarettes into said trays, means for raising and lowering said feeding mechanism, and another timing mechanism to move full trays horizontally away from the feeding mechanism as said feeding mechanism is retracted out of said full trays and ready to fill empty trays placed under it by said second timing mechanism.

15. An automatic cigarette tray loading device comprising a set of trays facing in opposite directions, a set of actuating conveyor belts having horizontal runs, vertical runs and runs interwoven into vertical loaded rollers to keep said conveyor taut, a set of vertical conveyors having one side at a distance from the first conveyor to firmly hold cigarettes fed between said conveyor, means to move both said belts so as to feed cigarettes downwardly into said trays, means to move said conveyors horizontally outwardly toward one side of said trays at the speed cigarettes are fed to said conveyors, means to feed said conveyors downwardly into one corner of said trays at a speed cigarettes are fed to said conveyors so as to prevent any cigarettes to be loaded into said trays when the conveyors are actuated horizontally outwardly and vertically downwardly and means to retract said conveyors horizontally inwardly so as to deposit cigarettes evenly in said trays in this retraction.

16. An apparatus for automatically collecting rod-shaped articles received from a source of supply, said apparatus comprising a horizontally reciprocable carriage, a vertically reciprocable carriage supported on said horizontally reciprocable carriage, an extensible and contractible endless conveyor traveling over said horizontally and vertically reciprocable carriages, said conveyor having a delivery run over said vertically reciprocable carriage to deliver and discharge rod-shaped articles at the lower end of said carriage, said delivery and discharge being made periodically due to the reciprocating motion of the horizontal carriage while a continuous and uninterrupted flow of rod-shaped articles is being received from said source of supply onto the non-tromboning end of said extensible and contractible endless conveyor.

17. Cigarette handling apparatus for filling trays comprising a source of supply of cigarettes for feeding cigarettes sidewise, a first conveyor belt having a substantially horizontal reciprocating portion to convey cigarettes from said source of supply and having a vertical reciprocating portion, a second conveyor belt having a substantially vertical reciprocating portion, the vertical reciprocating portions of the first and second conveyor belts

11

being spaced for receiving cigarettes from the horizontal reciprocating portion of said first conveyor belt and guiding them vertically downwardly into one of the trays, the first and second conveyor belts reciprocating horizontally in said one of the trays and reciprocating vertically in said one of the trays to deposit cigarettes in said one of the trays.

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540,723	Colgin	June 11, 1895
902,976	Lee	Nov. 3, 1908

5

10

1,305,561
1,474,448
1,535,784
1,828,232
1,964,084
2,592,642
2,613,861
2,678,125
2,819,576
2,863,553
2,889,676
2,956,382

12

Paridon	June 3, 1919
Scott	Nov. 20, 1923
Koerner	Apr. 28, 1925
Rowe	Oct. 20, 1931
Rundell	June 26, 1934
Bardet	Apr. 15, 1952
Goerlitz	Oct. 14, 1952
Bonney	May 11, 1954
Hendricks et al.	Jan. 14, 1958
Nordquist	Dec. 9, 1958
Griffith	June 9, 1959
Wardell	Oct. 18, 1960