April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

Filed April 9, 1927 11 Sheets-Sheet 1

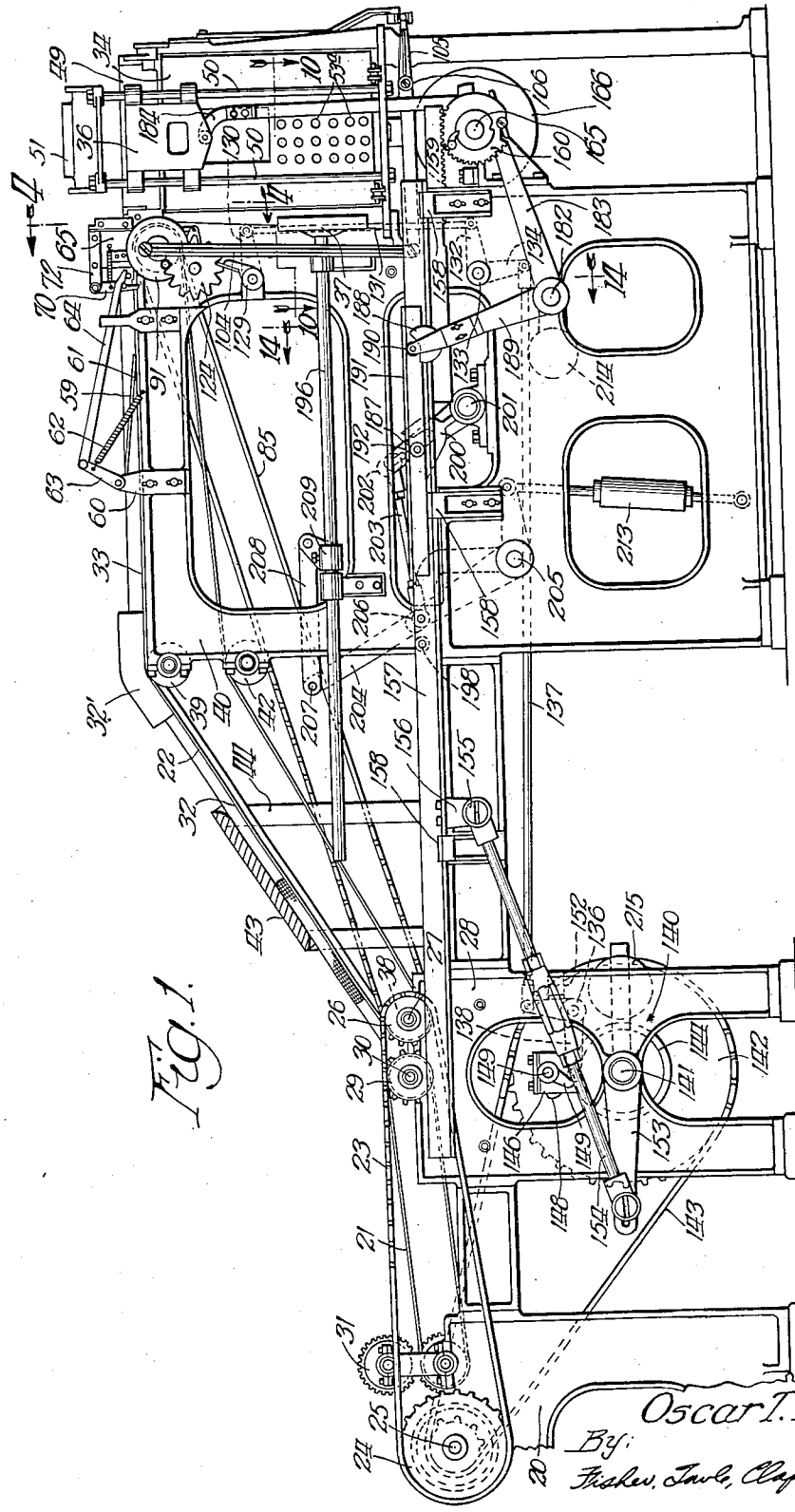


Fig. 1.

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Oscar T. Thompson.
By: Fisher, Towle, Clapp & Sears Attys.

April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

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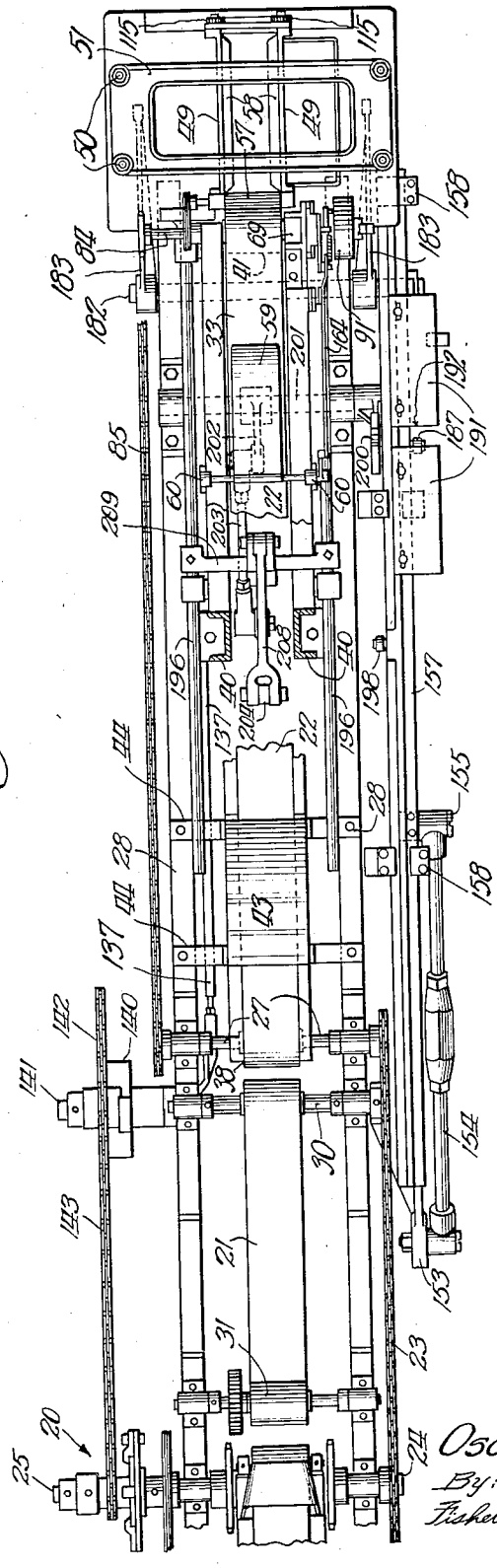


Fig. 2.

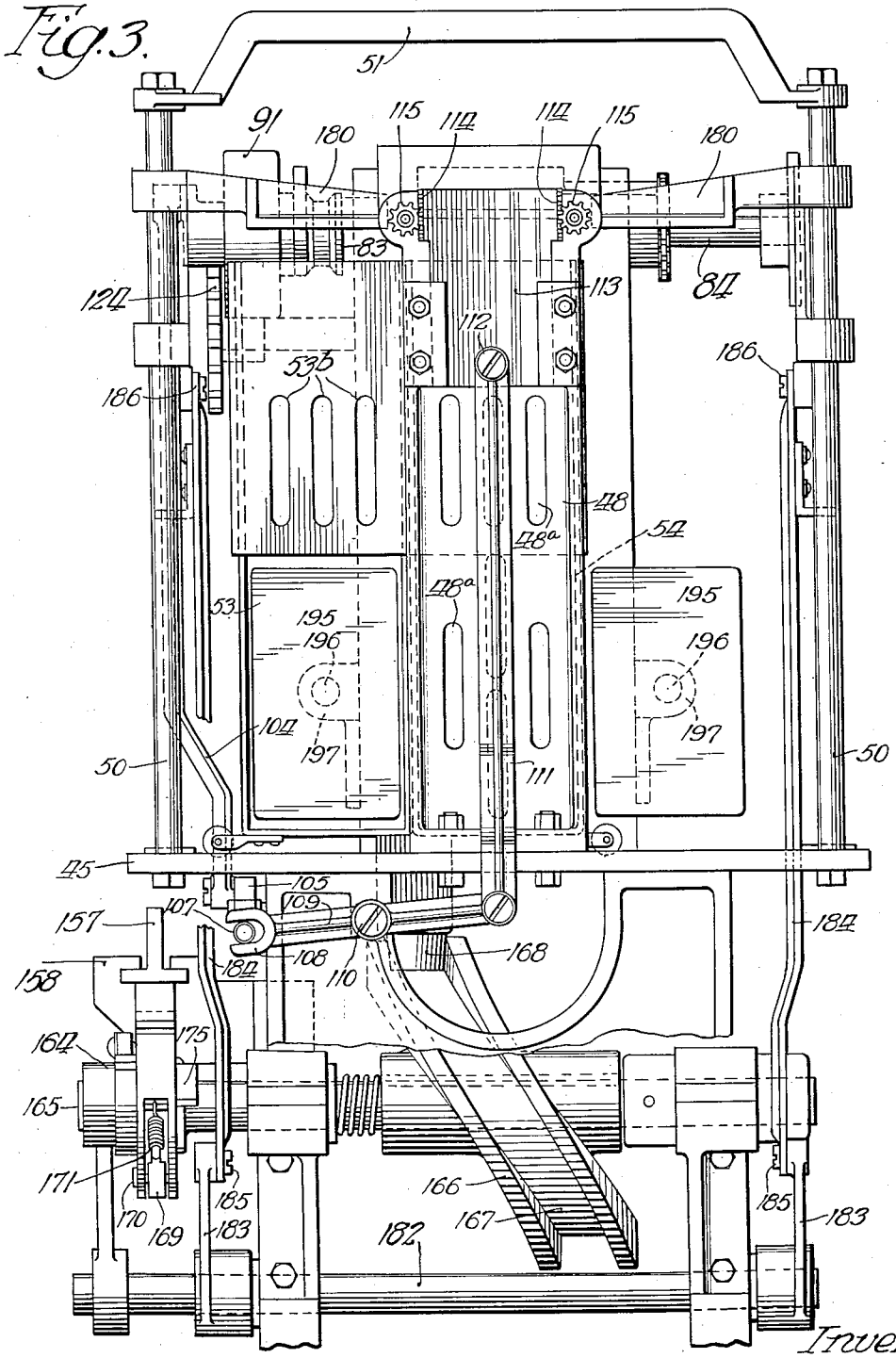
Inventor
Oscar T. Thompson
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April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

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Fig. 3.



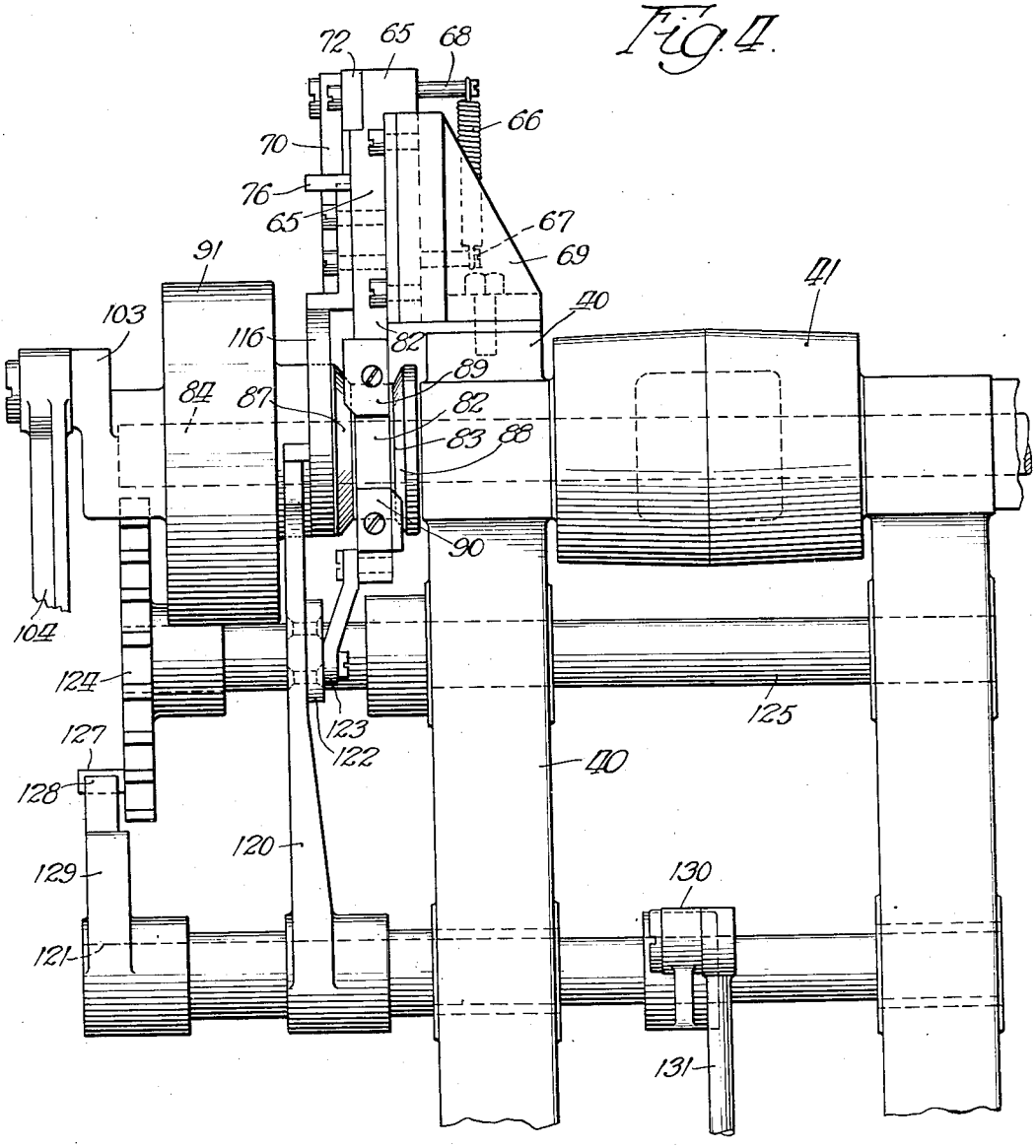
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April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

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Fig. 4.



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PACKAGING MACHINE

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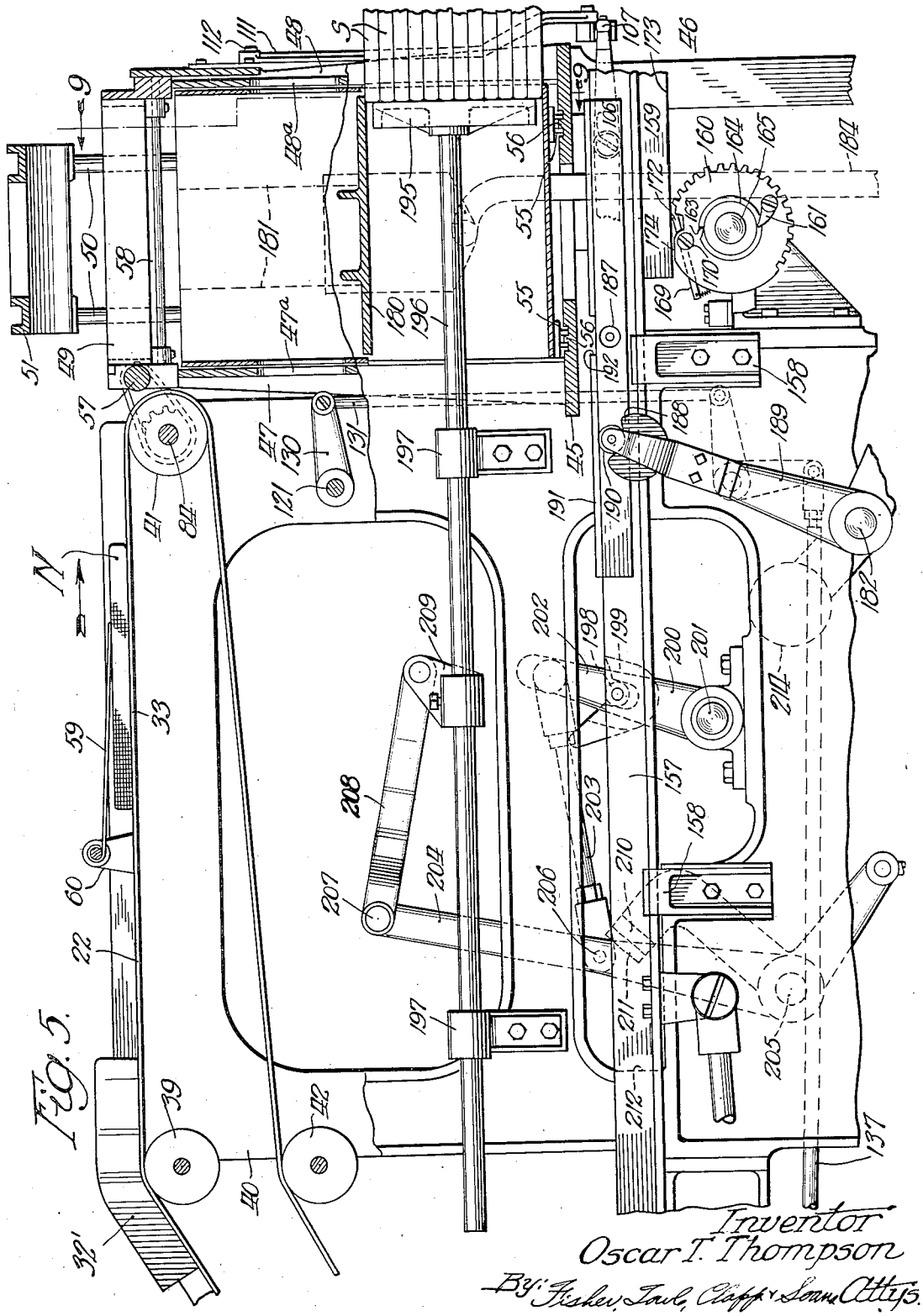


Fig. 5.

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PACKAGING MACHINE

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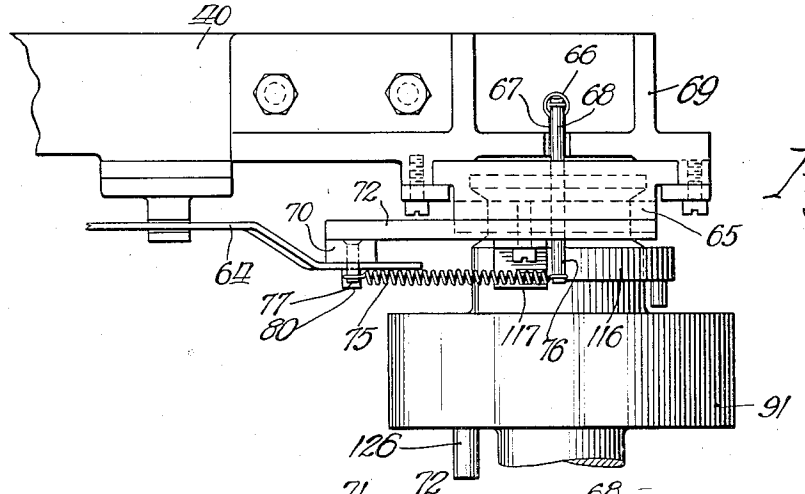


Fig. 7.

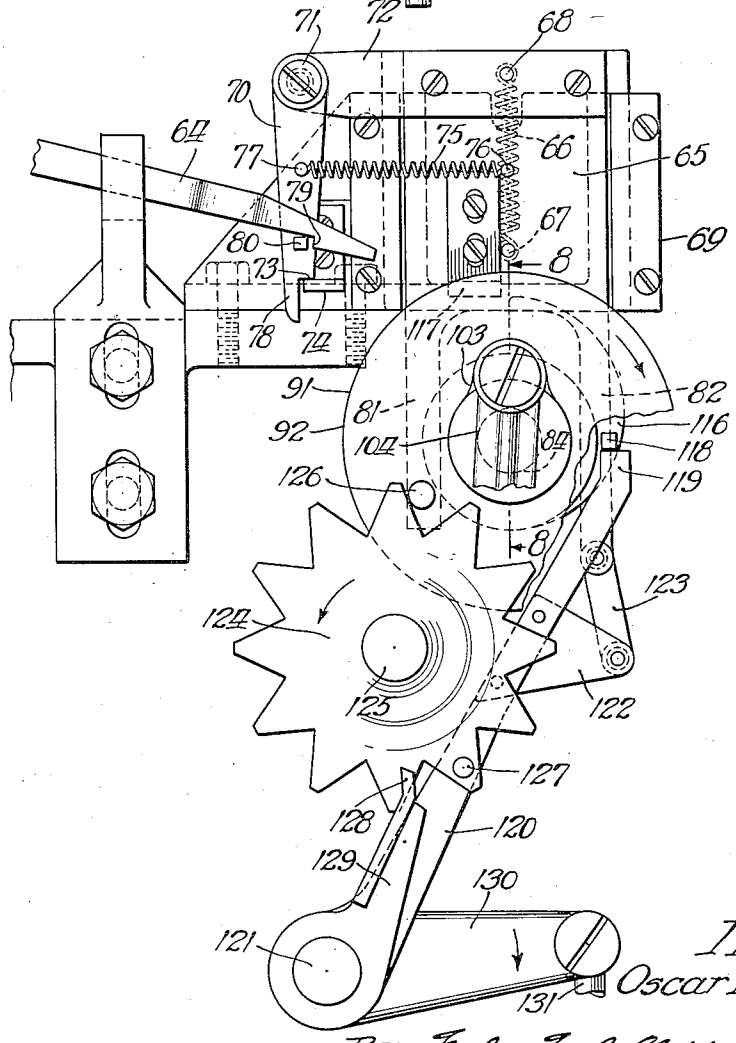


Fig. 6.

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April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

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Fig. 8.

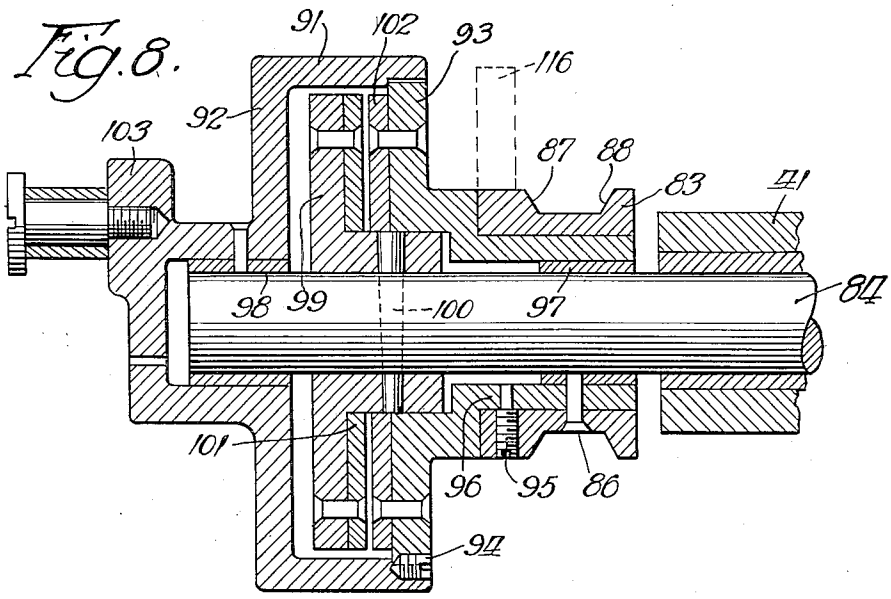
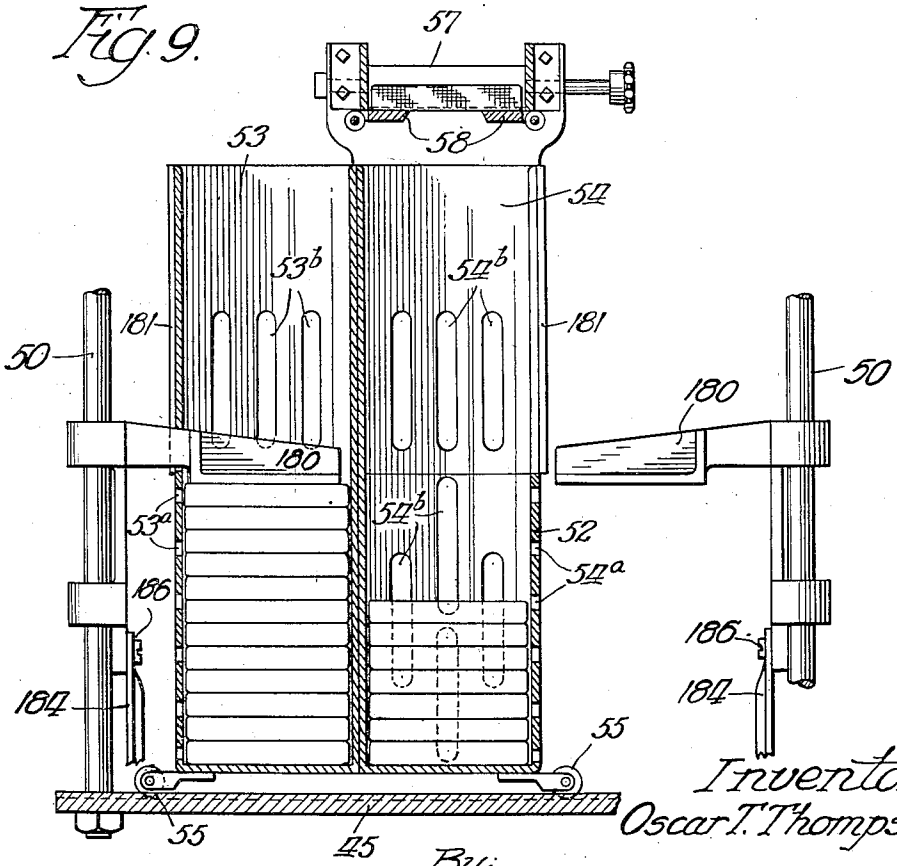


Fig. 9.



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PACKAGING MACHINE

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Fig. 10.

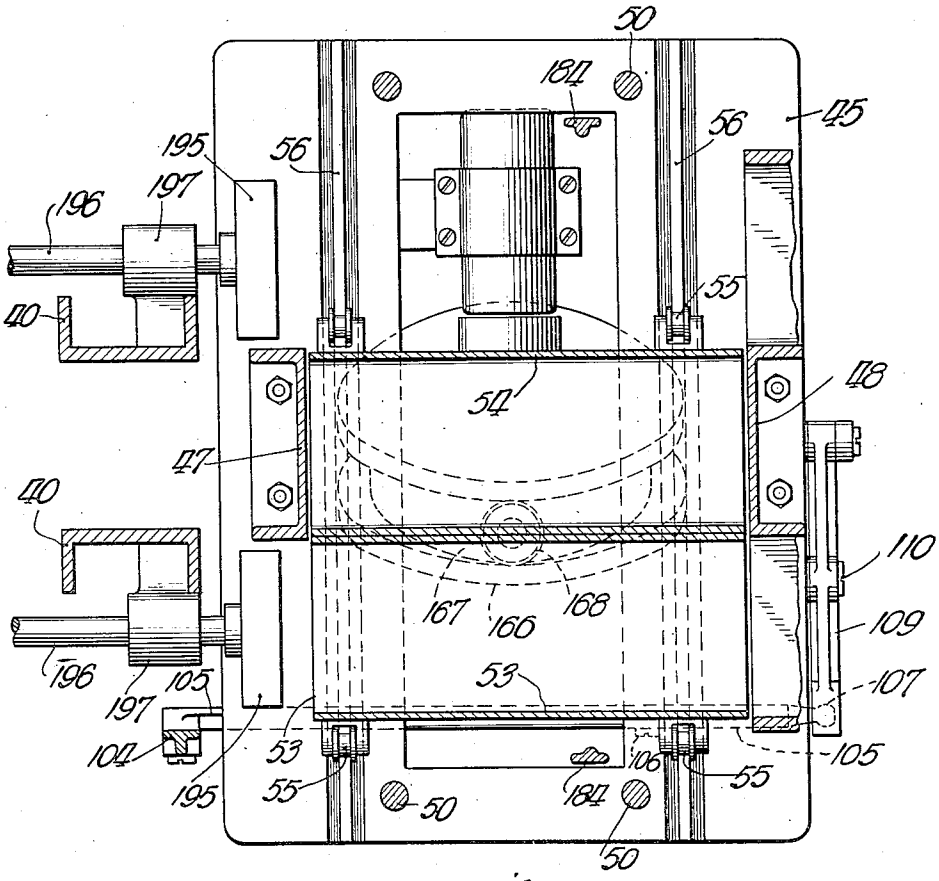
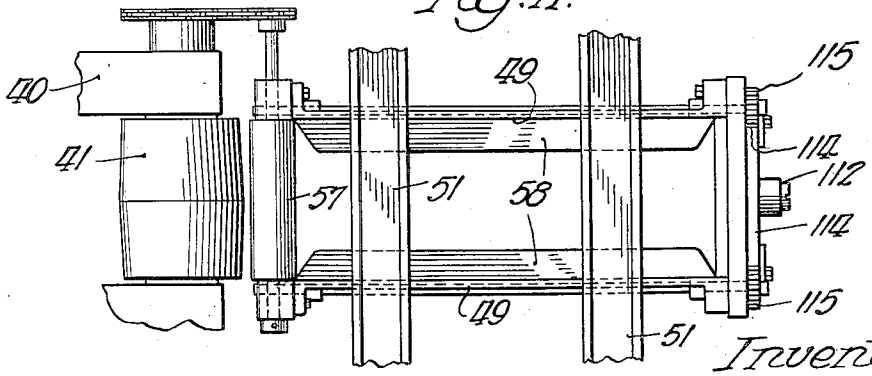


Fig. 11.



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PACKAGING MACHINE

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Fig. 13.

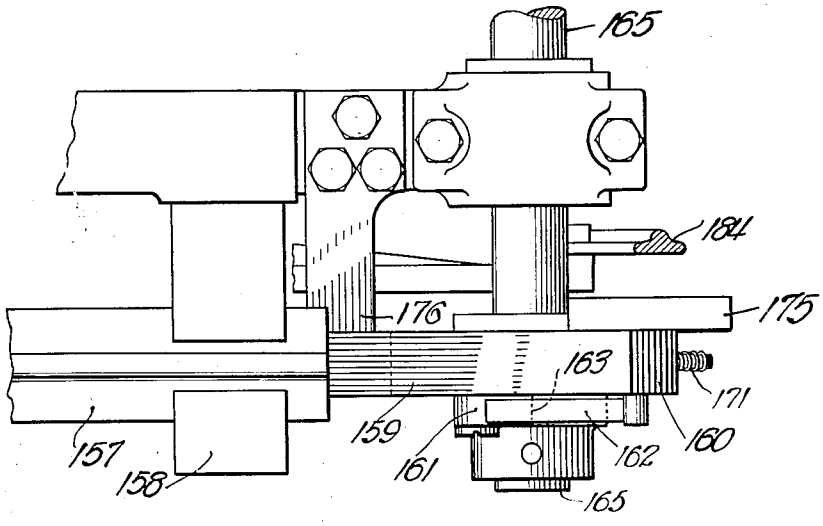
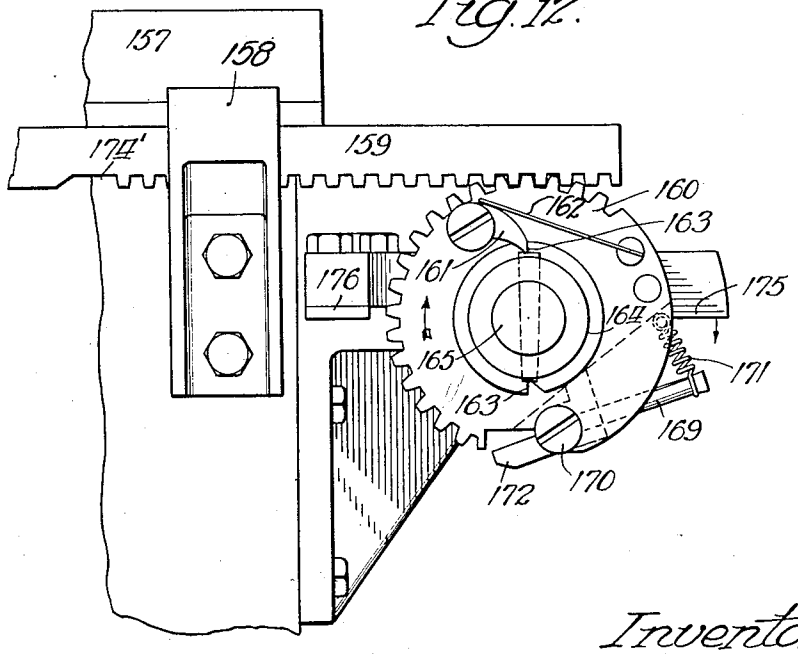


Fig. 12.



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April 9, 1929. O. T. THOMPSON 1,708,686

PACKAGING MACHINE

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Fig. 14.

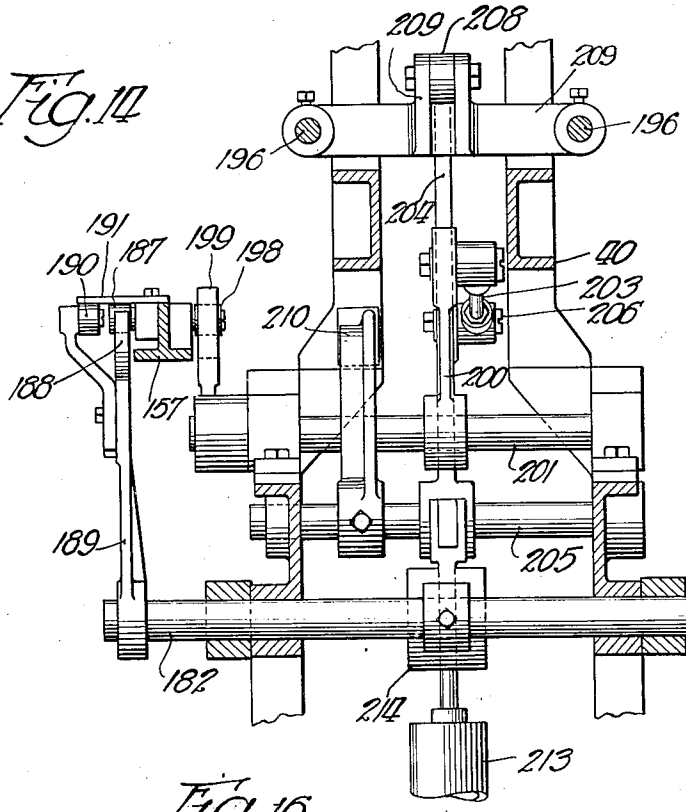


Fig. 16.

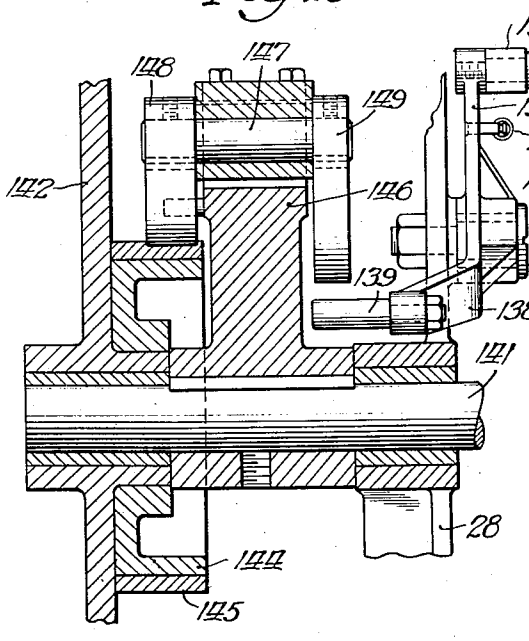
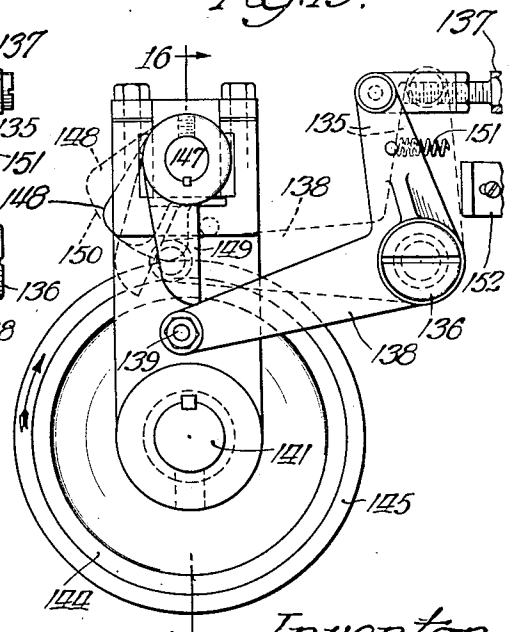


Fig. 15.



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PACKAGING MACHINE

Filed April 9, 1927 11 Sheets-Sheet 11

Fig. 17.

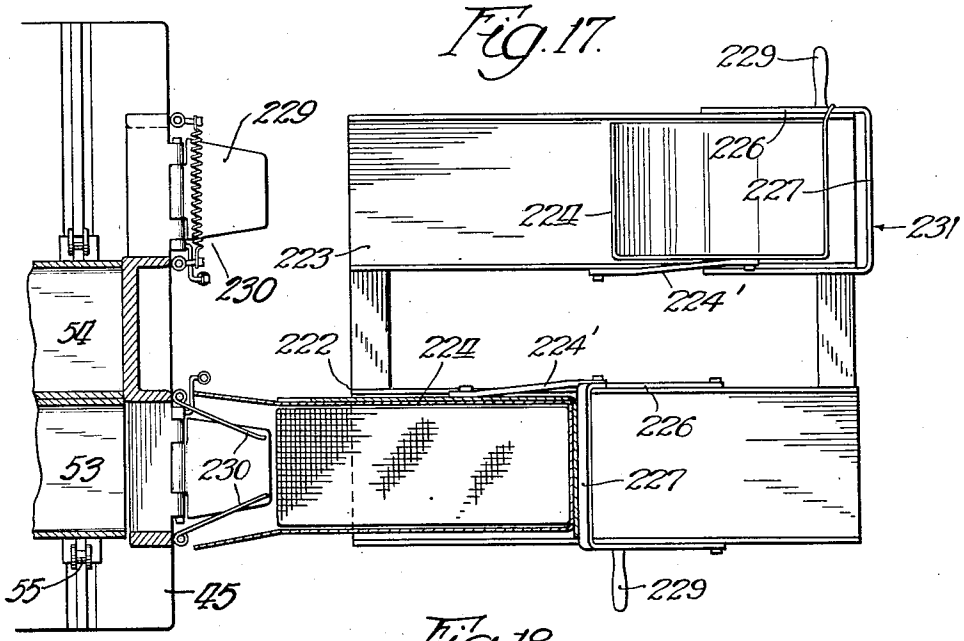
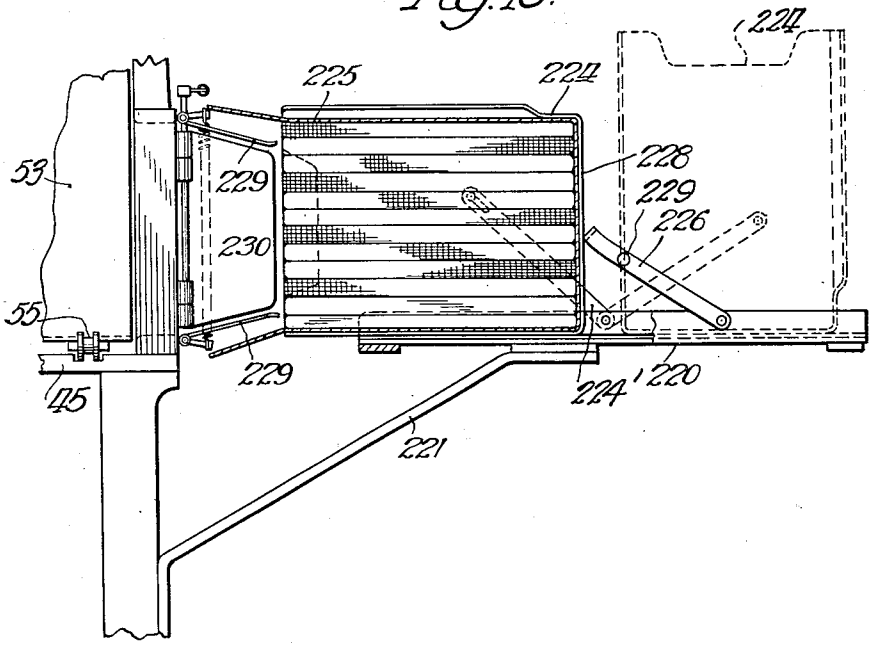


Fig. 18.



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Patented Apr. 9, 1929. 1,708,686

UNITED STATES PATENT OFFICE.

OSCAR T. THOMPSON, OF NEENAH, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INTERNATIONAL CELLUCOTTON PRODUCTS CO., OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

PACKAGING MACHINE.

Application filed April 9, 1927. Serial No. 182,347.

This invention relates to packaging machines and particularly to machines for packaging relatively soft and compressible articles, such as sanitary napkins, in a suitable carton or wrapper.

One of the objects of the invention is to provide a machine of the above described class which will be capable of receiving the articles to be packed successively one by one from a source of supply such as a napkin making machine, and to arrange the napkins so received in a compact stack and thereafter to insert the stack into a suitable carton.

Other objects of the invention are: to provide a machine such as above described having means for automatically arranging a predetermined number of articles to be packed, in a stack; to provide means for compressing the stack; to provide means for facilitating stacking of the articles flatwise one on top of the other; to provide means for propelling the stack, after it is compressed, from the machine and into a carton; to provide means for positioning the carton with respect to the stack so that the carton will be firmly held in position to receive the stack as it is propelled from the machine, and to provide means for continuously carrying on the packing operation without interruption during the compressing and ejecting operations.

Another object of the invention is to provide a packaging machine of the class described which is adapted to be operated in connection with a pad making machine such as described in the co-pending application of William Bauer, Serial No. 687,012, and a pad folding machine such as described in the co-pending application of Oscar T. Thompson, Serial No. 148,322, and to operate therewith as a continuation of the operation of the said machines, whereby handling of the articles is entirely dispensed with, and whereby cleanliness of the finished product is promoted.

Other objects of the invention are to provide means whereby articles such as above described may be packaged compactly, quickly and neatly, and in general, to provide an improved machine of the class described.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings in which I have illustrated a machine embodying a selected form of the invention and in which:

Fig. 1 is a side elevation of the machine showing the same connected to the rear end of a pad folding machine such as described in the above mentioned co-pending application of Oscar T. Thompson.

Fig. 2 is a plan of the machine as shown in Fig. 1, certain portions being omitted so as to facilitate illustration of certain other parts.

Fig. 3 is an end elevation of the right hand end of Figs. 1 and 2.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a side elevation of a portion of Fig. 1, but on an enlarged scale and certain parts being shown in section to facilitate description of the structure.

Fig. 6 is a detail elevation of a portion of Fig. 1 on a greatly enlarged scale.

Fig. 7 is a plan of the elements shown in Fig. 6.

Fig. 8 is a section on the line 8—8 of Fig. 6.

Fig. 9 is a section on the line 9—9 of Fig. 5.

Fig. 10 is a section on the line 10—10 of Fig. 1.

Fig. 11 is a detail plan of a portion of Fig. 2 on a greatly enlarged scale.

Fig. 12 is a detail elevation of a portion of Fig. 1 on an enlarged scale.

Fig. 13 is a plan of the elements shown in Fig. 12.

Fig. 14 is a section on the line 14—14 of Fig. 1.

Fig. 15 is a detail elevation on an enlarged scale of certain mechanism shown in Fig. 1.

Fig. 16 is a section on the line 16—16 of Fig. 15.

Figs. 17 and 18 are plan and side views respectively of carton holding mechanism adapted to be attached to the right hand end of the machine as shown in Fig. 1, parts of this mechanism being shown in section to facilitate illustration and description thereof.

The operation of the present embodiment

of my invention as disclosed in Figs. 1 and 2 will first be described briefly, in order to facilitate subsequent more detailed description and understanding thereof.

The delivery end of a machine for making or folding napkins is indicated at 20, and that machine may correspond to a machine described in the above mentioned copending application of Oscar T. Thompson. The napkins are delivered from the delivery end 20 to an intermediate or connecting conveyor 21 by which conveyor they are delivered to a conveyor 22 which forms a part of the packaging machine of the present invention. The conveyor 21 and the conveyor 22 may both conveniently be driven by means of a sprocket chain 23 disposed about a sprock 24 which is secured to a driven shaft 25 on the napkin folding machine and about a sprocket 26 secured to a shaft 27 which is mounted on the frame 28 of the packaging machine. The chain 23 also engages a sprocket 29 which is secured to the shaft 30 on which shaft a suitable roller is secured and over which roller the conveyor belt 21 passes. I have also found it desirable to provide a driven roll 31 adjacent the front end of the conveyor 21 for causing the napkin to lie flat on the conveyor 21 as it is delivered thereto.

The napkins are carried upwardly by an inclined portion 32 of the conveyor 22 and forwardly by a horizontal portion 33, guiding means 32′ being provided for insuring proper positioning of the napkin on the conveyor as it begins its horizontal travel. The horizontal portion 33 is effective to deliver the napkins to a receptacle 34 having two compartments. The receptacle is mounted so as to be reciprocable crosswise of the length of the machine or of the direction of travel of the conveyor 22 and is so controlled that one of the compartments is in alignment with the conveyor and capable of receiving the napkins fed thereby while the other compartment is out of alignment with the conveyor. The receptacle is moved to bring one of the compartments out of alignment with the conveyor when the compartment has received a supply of napkins and when the filled compartment is out of alignment, a compressor member 36 is actuated to compress the napkins in the compartment after which a plunger member 37 is caused to eject the compressed stack of napkins therefrom. Suitable means may be provided at the right hand end of the machine as shown in Fig. 1 for positioning a carton or other receptacle for receiving the napkins as they are ejected from the machine.

Referring now more particularly to Figs. 1 and 5, it will be seen that the conveyor 22 is guided upwardly from an initial roller 38 which is fixed upon the shaft 27, by a roller 39 pivotally mounted on the upstanding portion 40 of the frame 28, and then horizontally, as indicated at 33, and around a roller 41 which is also pivotally mounted in the upstanding portion 40 of the frame. The conveyor 22 returns underneath the said roller 41 and over a roller 42 and then downwardly under the initial roller 38. A bridge or smoothing plate 43 extends crosswise over the inclined portion 32 of the conveyor 22 for smoothing the napkins as they pass thereunder and for causing the napkins to adhere more closely to the conveyor belt. The bridge 43 is supported by suitable means such as leg members 44 on the frame 28.

A bed plate 45 is fixedly mounted on a portion of the frame 28 and a suitable supporting leg 46 at its outer end. The bed plate 45 supports a cage structure comprising inner and outer upwardly extending members 47 and 48 respectively, which members are connected at their upper ends by means of spacer bars 49—49, which bars are spaced apart a distance slightly greater than the width of the napkins which are to be packaged. The bed plate 45 also supports pairs of upright guide posts 50—50, which are connected at their upper ends by means of a bridge member 51 whereby the guide posts are maintained in parallel relation.

The inner faces of the spacer bars 49—49 and the inner faces of the upwardly extending members 47 and 48 serve as guide means for positioning the napkins over the receptacle so that they will be in proper alignment therewith, whereby entrance of the napkins into the receptacle is facilitated.

A receptacle 52 comprising a pair of compartments 53 and 54 is reciprocably mounted on the bed plate 45, by means of rollers 55—55 which are secured to the bottom of the receptacle and which are adapted to engage tracks or guideways 56—56 provided on the bed plate 45. The receptacle is controlled by means which will be hereinafter described, so that one of the compartments is in alignment with the conveyor 22 and therefore capable of receiving the napkins fed thereby, while the other compartment is disposed out of alignment with the conveyor as will be readily understood from an inspection of Figs. 3, 9 and 10.

Napkins are propelled, as indicated in Fig. 5, from the conveyor 22 over a small roller 57 and into the space between the spacer bars 49—49 which are, of course, disposed above and aligned with the compartment of the receptacle which is in alignment with the conveyor. The napkins are thus fed into such position above the respective compartments of the receptacle that they will, by gravity, descend flatwise into the compartment. However, in order to insure flatwise descent of the napkins, I prefer to provide means for positively positioning the napkins in a horizontal or flatwise position before they actually enter the compartment thereunder. In the present instance, this means comprises

a pair of relatively narrow gate members 58—58 which extend substantially the entire length of the space between the spacer members 49—49, which length is substantially that of the napkins, and these gate members are pivotally mounted on the inner and outer members 47 and 48. As best shown in Fig. 9, the gate members are adapted to receive the napkins as they are fed thereto, the roller 57 being rotated at a relatively high rate of speed by suitable means such as indicated in Fig. 5 whereby the napkins are fed across the entire length of the gates 58—58, so that they will lie flatwise thereon.

Suitable means are provided for tripping or swinging the gates 58—58 about their pivots so as to permit the napkin supported thereby to pass downwardly therebetween and into the compartment of the receptacle which is positioned thereunder. The side walls of the receptacle are apertured as indicated at 53^a and 54^a and the end walls as indicated at 53^b and 54^b so as to permit the air which is trapped in the respective compartments beneath the flatwise descending napkin to escape from the compartment, thus facilitating the said flatwise descent of the napkin. The inner and outer upright members 47 and 48 are provided with apertures as indicated at 47^a and 48^a respectively. In Figs. 3 and 5 the apertures 47^a and 48^a register with the apertures 53^b and 54^b respectively, in the end walls of the receptacle when the latter are in alignment with the conveyor. In the present embodiment of my invention the above mentioned tripping means is controlled or actuated by the napkin on the horizontal portion 33 of the conveyor 22, which succeeds the napkin already deposited on the gates 58—58. This means comprises a detector member or finger 59 which is pivotally mounted in suitable brackets 60—60 on the frame portion 40. The detector member is normally held depressed at its outer end, as indicated at 61 in Fig. 1, by suitable means such as a spring 62 tensioned between a portion of the frame and an arm 63 which is connected to the pivot of the detector. The tension of the spring 62 is such that a napkin indicated at "N" in Fig. 5 fed by the conveyor 22 will be effective to raise the detector member in the said figure. Such raising or swinging of the detector member 59 of course, causes the arm 63 to swing correspondingly, and a hook member 64 is pivotally connected thereto and is arranged to unseat a latch for automatically clutching certain mechanism to a driven shaft so as to effect the said swinging of the gates 58—58.

The mechanism which is actuated through the agency of the said hook member 64 comprises a block 65 which is slidably mounted, preferably in a vertical direction in suitable guideways provided in a bracket member 68 which is mounted on the upper edge of the frame portion 40 as best shown in Fig. 7. The block 65 is normally urged to move downwardly by means of a tension spring 66 connected at one end to a pin 67 projecting from the frame bracket 69 and at its other end to a pin 68 projecting from the block 65 adjacent its upper end. The sliding block 65 is normally held in its raised or elevated position against the tension of the said spring 66 by means of a latch member 70 which is pivotally mounted at 71 on a bracket 72 which is mounted on and extends sidewise from the block 65. The latch 70 is provided at its lower end with a shoulder or seat 73 which engages a stop 74, which stop is fixedly secured to the bracket 68. A tension spring 75 connected at one end to a pin 76 projecting outwardly from the sliding block 65 and at its other end to a pin 77 projecting outwardly from the latch member 70 is effective to urge the latch member to swing about its pivot 71 towards the stop 74, the movement being limited by the extension 78 of the latch as clearly shown in Fig. 6. It will now be readily understood that when the detector member 59 is elevated as shown in Fig. 5, the hook member 64 will be pulled to the left, Figs. 1 and 6, whereby the latch member 70 will be unseated from the stop 74 through engagement of the shoulder 79 on the hook member, and a projecting pin 80 on the latch member 70. When the latch is thus unseated the tension spring 66 will be permitted to move the sliding block 65 downwardly.

The sliding block 65 is forked at its lower end so as to provide fingers 81 and 82 which straddle a clutch collar 83 which collar is axially slidably and rotatably mounted on a shaft 84. The shaft 84 is continuously driven by means of a chain 85 which engages a suitable sprocket on one end of the shaft 84 and a suitable sprocket on the corresponding end of the driven shaft 27. By inspection of Figs. 1, 2, 5 and 6, it will be seen that the shaft 84 is the shaft on which the roller 41 is mounted, over which the conveyor 22 passes. The clutch collar 83 is provided with a groove 86 having inclined shoulders 87 and 88 and the downwardly extending fingers 81 and 82 are provided with suitable cam means for engaging the faces 87 and 88 so as to move the clutch collar 83 accordingly. As shown in Fig. 4, the finger 82 is provided with a cam member 89 which is adapted to engage the cam surface 87 on the downward movement of the sliding block 65 so as to move the clutch collar outwardly or towards the left in Fig. 4. The said finger 82 is also provided with a cam member 90 which is adapted to engage the cam surface 88 of the clutch collar 83 on upward movement of the sliding block 65 to move the clutch collar inwardly or towards the right in Fig. 4. Means for moving the sliding block upwardly from the tension of the spring 66 will presently be described.

The clutch collar 83 is connected to and controls clutch mechanism which comprises a cage member 91 consisting of an outer cup-shaped portion 92 and an inner closure member 93 which are rotatably mounted on the shaft 84. The member 93 fits snugly within the cup-shaped portion 92, and is secured therein by suitable means such as a screw 94 which threadedly engages a suitable aperture disposed partly in the member 93 and partly in the member 92 as clearly shown in Fig. 8. It will be observed that the two parts 92 and 93 are connected so that they will necessarily rotate together. The said cage 91 consisting of the members 92 and 93 is also axially slidably mounted on the shaft 84 and is connected to the clutch collar 83 by means of a set screw 95 which threadedly engages a suitable aperture in the collar and engages an annular extension 96 of the member 93. Suitable anti-friction bushings 97 and 98 are provided in the tubular extension 96 of the member 93 and in the member 92 respectively.

A clutch plate 99 is fixedly mounted within the cage 91 and on the shaft 84 by means of a pin 100, and the inner face of the plate is provided with suitable friction material 101, which is adapted to engage similar friction material 102 secured to the inner face of the member 93. It will now be apparent that the member 99, being fixed to the continuously rotated shaft 84 will be continuously rotated, and the cage 91 is adapted to be thereby rotated when the cage is moved outwardly or to the left in Fig. 8 so as to bring the friction disks 101 and 102 into engagement.

The outer end of the member 92 is provided with a crank arm 103 to which a connecting rod 104 is pivotally connected at its upper end. The lower end of the connecting rod 104 is pivotally connected to one end of a lever 105 which is pivotally mounted intermediate its ends on the supporting frame as indicated at 106. The outer end of the lever 105 is provided with a roller 107 which engages the forked end 108 of a lever 109, which lever is pivotally mounted intermediate its ends as indicated at 110. To the opposite end of the lever 109 is connected an upwardly extending connecting rod 111, which is pivotally connected as indicated at 112 to a vertically slidable block 113 which is mounted so as to be capable of vertical sliding movement on the outer upwardly extending member 48. The block 13 is provided adjacent its upper end with oppositely facing rack bars 114—114 which mesh with pinions 115—115 secured to the outer ends of the pivots of the gates 58—58. It will now be apparent that when a napkin raises the detector finger 59 and thereby causes the sliding block 65 to be lowered, and the cam means 89 causes the clutch mechanism to be engaged, the crank arm 103 will be rotated so as to cause the levers 105 and 109 to be oscillated, whereby the block 113 will be pulled downwardly through the connecting rod or link 111. Such downward movement of the block 113 will be effective to rotate the pinions 115—115 and the respective gate members so that a napkin supported thereby will be permitted to drop flatwise into the compartment which is disposed thereunder.

Means for restoring the gates 58—58 to horizontal or supporting position comprises a cam member 116 which is preferably formed as an integral part of the clutch collar 83 as indicated by dotted lines in Fig. 8. The sliding block 65 is provided with an outwardly projecting foot member 117 which is adapted to be engaged by the cam and whereby the sliding block is elevated against the tension of the spring 66 as the cam member 116 rotates. The active surface of the cam engages the foot member 117 during the last half of a revolution of the clutch collar 83 and connected parts. When the sliding block 65 moves upwardly, the cam 90 carried by the finger 82 is effective to force the clutch collar 83 to the right in Fig. 4 and thereby to disengage the clutch. The cam 116 carries a stop pin 118 which engages the upper end 119 of a stop lever 120 so that the cam will be held in a pre-determined position and so that the cam will always start its operation from the same position whereby proper timing of engagement between the active cam surface and the foot member 117 for raising the sliding block 65 is insured. The stop lever 120 is rotatably mounted on a rock shaft 121 and is provided with a lug 122, to the outer end of which a link 123 is connected at one end, and which link is connected at its other end to an extension of the finger 82 as clearly shown in Fig. 6. When the block 65 moves downwardly as above described, the lever 120 is swung through the connecting link 123 so that the upper end 119 of the lever is moved out of the way of the stop pin 118 so as to permit rotation of the clutch collar 82 and cam member 116 carried thereby. On upward movement of the block 65 the lever 120 will of course, be restored to the position illustrated in Fig. 6 where it will be effective to engage the stop pin 118 and thereby position the cam 116 in the said pre-determined position.

It will be understood that when the sliding block 65 is elevated to the highest position which the cam 116 effects, the latch member 70 will be pulled to the right in Fig. 6 by the tension of the spring 75 so that the shoulder 73 of the latch member will be in position to engage the stop member 74 as illustrated in the said Fig. 6, whereby the block will be maintained in operative position after the active cam surface leaves the foot member 117. It will be apparent that upward movement of the block 65 is effective to restore the gate members 58 through reverse

movement of the connecting rod 104, levers 105 and 109 and the link 111. It will also be noted that the above described operation of the gate members is effected each time one of the napkins passes under and raises the detector member 59 whereby a napkin is deposited in one of the compartments of the receptacle.

In packaging napkins it is desirable to package a certain number, for instance, twelve in a carton, and accordingly I provide means for automatically moving the receptacle so as to bring the empty compartment into alignment with the conveyor, after twelve napkins have been deposited in the other compartment. This means comprises a star wheel or disk 124 having its periphery provided with a number of teeth corresponding to the number of napkins to be packaged in a single package, and this disk is rotatably mounted on a stud shaft 125 carried by the supporting frame. The toothed disk 124 is adapted to be rotated to the extent of the distance between the centers of adjacent teeth, or in other words, one notch for each revolution of the clutch member 92. The clutch member 92 is provided with a pin 126 projecting laterally therefrom so as to engage one of the teeth of the disk during a final portion of the rotary movement of the said clutch member 92. The disk 124 is provided with a lug or pin 127 which in the present instance will engage the free end 128 of an arm 129 which is secured to the rock shaft 121 when the disk 124 has been moved twelve notches. When the disk is moved the twelfth notch, the pin 127 will rock the arm 129 and shaft 121 so that another arm 130 also secured to the rock shaft 121 will be swung in clockwise direction in Fig. 6. To the outer end of the arm 130 is pivoted one end of a connecting rod 131, the other end of which is connected to one arm 132 of a bell crank 133 which is pivotally mounted on the supporting frame. A depending arm 134 of the bell crank is connected to an upwardly extending arm 135 of another bell crank 136 by means of a connecting rod 137. The bell crank 136 is pivotally mounted in the supporting frame and is provided with another arm 138 which is provided at its free end with a laterally projecting pin or stud 139. The pin 139 controls clutch mechanism which in turn controls the operation of the receptacle reciprocating mechanism, the compressor mechanism, and the plunger or ejecting mechanism.

The last mentioned clutch mechanism is indicated generally at 140 in Fig. 1 and is associated with a shaft 141 which shaft is journaled in the supporting frame 28, as best shown in Figs. 1, 2 and 16. A sprocket wheel 142 is rotatably mounted on the shaft 141 and is continually driven by means of a chain 143, which chain engages a sprocket on the driven shaft 25 of the napkin making machine 20, as best shown in Fig. 1. A drum 144 having a relatively wide face 145 is secured to the sprocket wheel 142 so as to continually rotate therewith, and an arm 146 is keyed to the shaft 141 so that rotation imparted to the arm 146 will be also imparted to the said shaft.

In the outer end of the arm 146 is rotatably mounted a short shaft 147 which projects at its ends from the opposite faces of the arm and to which projecting ends are secured levers 148 and 149. As best shown in Fig. 15, the lever 148 consists of a segment of a disk, the periphery 150 of which is slight eccentric to the axis of the shaft 147. The arm 148 is so positioned with respect to the drum 144 that it will tend to assume a vertically disposed position due to gravity and consequently, the eccentric surface 150 of the arm will be tightly jammed against the face 145 of the drum whereby the arm 146 and shaft 141 will be caused to rotate with the drum and sprocket 142.

As shown in dotted lines in Fig. 15, the arm 138 of the bell crank 136 is normally held in such position that the pin 139 carried thereby is effective to engage the arm 149 so as to hold the eccentric surfaced segment 148 out of engagement with the face of the drum. When the rock shaft 121 is rocked in clockwise direction (Fig. 1), as above explained, and the connecting rods 131 and 137 correspondingly moved, it will be seen that the bell crank 136 is rocked in a counter clockwise direction (Figs. 1 and 15) so that the pin 139 is lowered so as to clear the arm 149 whereby the eccentric segment 148 is permitted to engage the drum as above explained. Suitable means may be provided for restoring the bell crank 136, arm 129 and interposed parts to normal position. In the present instance I have illustrated a spring 151 tensioned between the arm 135 of the bell crank 136 and a portion of the frame 28 which spring is of sufficient strength to restore the members, the movement of the latter being limited by a stop 152 secured to the frame 28 and in position to engage the arm 135 when in its normal position. A crank arm 153 is secured to the shaft 141 on the end remote from the sprocket 142 and to the free end of the arm 153 is pivotally connected one end of an adjustable connecting rod 154. The other end of the connecting rod is pivotally connected as at 155 to a bracket 156 secured to the under side of a bar, preferably a T-rail indicated at 157. The rail 157 is slidably mounted by suitable means indicated at 158 on the supporting frame and is adapted to be reciprocated as an incident to rotation of the shaft 141, through the above described adjustable connecting rod 154 and crank arm 153.

To the forward end of the T-rail 157 is secured a rack member 159 which rack mem-

ber is adapted to engage a gear segment 160. On forward movement of the rail 157 and rack 159, the gear segment 160 is rotated in a clockwise direction (Fig. 12). A pawl 161 carried by the said segment 160 is pressed by the spring 162 into engagement with a notch 163 in a collar 164 which is pinned to the shaft 165, and accordingly rotates the said shaft. To the shaft 165 is keyed a rotary cam 166 having a cam groove 167 which receives a roller 168 rotatably secured to the bottom of the receptacle 5.

The cam 166 is arranged so that one-half revolution thereof will be effective to move the receptacle 52 a distance sufficient to move one of the compartments of the receptacle out of alignment with the conveyor 22 and the other compartment into alignment with the said conveyor. On a succeeding half revolution of the cam 166, the receptacle is returned to its first position with the formerly aligned compartment out of alignment with the conveyor. For purposes which will presently appear, the travel of the rail 157 and rack 159 is considerably greater than the travel which is necessary for imparting one-half revolution to the shaft 165 through the above described rack and segment action, and I have therefore provided means whereby the rack may leave the gear segment and then on return movement reengage the same. For this purpose I provide a spring actuated pawl 169 which is pivotally mounted as at 170 in the segment member 160 (see Figs. 3, 5 and 13). The pawl 169 is actuated by the spring 171 so that its free end 172 is yieldingly held in an outward position corresponding to a tooth in the segment 160.

On forward movement of the rack bar 159 in excess of the amount required for turning the shaft 165 one-half revolution, the gear segment assumes a position such as illustrated in Fig. 5 where a flat and untoothed portion 173 of the rack bar slides over a flat portion 174 of the gear segment and the free end 172 of the pawl 169 is pressed inwardly. On return movement of the bar 159, the free end 172 of the pawl 169 will be caused to enter a notch 174′ in the rack bar whereby the segment is caused to rotate in a reverse direction and the rack and segment teeth caused to properly mesh so as to be operative on the succeeding forward movement of the rail and rack bar. As clearly shown in Fig. 13 the collar 164 is provided with a pair of notches 163 at diametrically opposite points so that the shaft will be rotated one-half revolution in a forward direction each time the gear segment is so rotated one-half revolution. I also find it desirable to provide a stop member 175 on the gear segment which is adapted to engage a stop 176 carried by the frame for positively limiting forward rotation of the gear segment.

It will be apparent from the above description that the initial forward movement of the T-rail 157 is effective to shift the receptacle 52 so as to move the filled compartment thereof out of alignment with the conveyor, thereby bringing an empty compartment into alignment with the said conveyor. Filling of the empty compartment therefore takes place, since the conveyor 22 is continuously driven and continuously feeds the napkins. After the filled compartment has been moved out of alignment with the conveyor, it is desired to compress the napkins in this compartment and after they are compressed to eject the same therefrom and preferably, into a carton. Compressing mechanism is best shown in Figs. 3, 5 and 9, and the mechanism for operating the compressing mechanism is best shown in Figs. 1, 3, 5 and 14.

The compressing mechanism comprises a compressor member having a pair of heads 180—180 which are respectively slidably mounted on the corresponding pairs of upright guide posts 50—50 as clearly shown in Fig. 3. The heads 180—180 are adapted to be reciprocated in a vertical direction simultaneously, one only of the heads being effective. As shown in Fig. 3, the receptacle 52 is moved to the left so that the compartment 54 is in alignment with the conveyor and the compartment 53 is disposed in alignment with the left-hand compressor head 180. When the said left-hand compressor head 180 is moved downwardly, it will enter the compartment 53, and compress the napkins which have previously been deposited therein. The opposite side walls of the receptacle, being the outer walls of the respective compartments, are slotted as indicated at 181—181 to permit the respective heads to enter the respective compartments (Fig. 9).

The mechanism for actuating the compressor heads comprises a rock shaft 182 which is pivotally mounted in the side frames of the machine and to which shaft are secured levers 183—183. To the outer ends of the levers 183 are pivotally connected links 184—184 as indicated at 185 and these links are pivotally connected at their upper ends to the respective compressor heads 180 as indicated 186—186. The rock shaft 182 is rocked as an incident to forward movement of the T-rail 157 and for this purpose the T-rail is provided with a roller 187 pivotally secured thereto and adapted to engage the end 188 of a lever 189 which is secured to the outer end of the said rock shaft 182.

From an inspection of Fig. 1 it will be noted that the rail 157 will travel a considerable distance before the roller 187 engages the end 188 of the lever 189, during which time the hereinbefore described mechanism is actuated for reciprocating the receptacle. During such preliminary movement, the lever 189 is prevented from following the rail by means of a roller 190 secured to the

outer end thereof which engages a horizontally extending flange 191 secured to the T-rail. The said horizontal flange 191 is provided with a notch 192 in the vicinity of the roller 187 so that when the lever 189 is moved, the roll 190 will be permitted to project beyond the flange 191 and on continued movement of the rail 157, the roller 187 leaves the end 188 of the lever 189, this lever then being maintained in the position indicated in Fig. 5 by engagement of the said roller 190 with the rearward portion of the horizontal flange 191. It will be seen by an inspection of Fig. 5 that when the lever 189 has been moved from the position indicated in Fig. 1 to the position indicated in Fig. 5, the compressor heads 180—180 will have been moved downwardly to the position indicated in Figs. 5 and 9 where they are maintained during the succeeding operation of ejecting the napkins in compressed condition from the compartments.

For ejecting the napkins from the compartments after they are compressed, I provide plunger mechanism which includes a pair of plunger heads 195—195 mounted on rods 196—196 which are slidably mounted in suitable brackets 197 secured to the supporting frame. The plunger heads 195 are normally disposed to the rear of the receptacle 52 as clearly shown in Fig. 1, and the lower portion of the front and rear walls of the respective compartments are apertured to permit the plunger to pass therethrough as will be apparent from an inspection of Fig. 5.

The plunger mechanism is actuated by further continued movement of the T-rail 157 after the compressing operation is completed as above described. For this purpose I provide a roller 198 which is pivotally mounted on the rail 157 and adapted to engage the forked end 199 of a lever 200, which is secured to a shaft 201, which shaft is rotatably mounted on the frame as shown most clearly in Figs. 1 and 5. Another lever 202 is secured to the shaft 201 and is connected by means of a connecting rod 203 to a lever 204 which is secured to a rock shaft 205 rotatably mounted in the supporting frame. The lever 204 extends upwardly beyond the point of connection 206 of the connecting rod 203 therewith, and at its upper end is pivotally connected as at 207 to a link 208 which at its other end is pivotally connected to a cross head 209, the latter being secured to the slidably mounted rods 196—196 as most clearly shown in Figs. 1 and 14.

The roller 198 is so positioned on the rail 157 that it will not engage the arm 200 until the compressing mechanism has been actuated and brought to its depressed position of rest. When the roller 198 does engage the arm 200, the shaft 201 is rocked in a clockwise direction and the lever 204 is also moved through the connecting rod 203, the plunger rods 196—196 being accordingly moved forwardly through the agency of the link and cross head connection 208 and 209.

As shown in Fig. 5, the plunger mechanism is approaching its limit of forward movement, the stack of napkins indicated at S being almost entirely ejected from the receptacle compartment. On return movement of the rail 157, the rolls 198 and 187 will of course, be effective to actuate the respective levers in the reverse direction and in inverse order.

For the purpose of positively limiting rearward movement of the plunger rods 196—196, I provide a stop arm 210 on the rock shaft 205 and the outer end of the stop arm is provided with a cushion of suitable material such as rubber, indicated at 211, which is adapted to engage the face 212 of the foot portion of the supporting frame member 40. I also find it desirable to provide a dash-pot mechanism indicated at 213 connected to the rock shaft 205, and a counter-weight 214 connected to the rock shaft 182 for the purpose of steadying the operation of the mechanism. A counterweight 215 is also preferably provided on the shaft 141 to counter balance the weight of the arm 153 and in general, to steady the operation of the mechanism connected thereto.

I prefer to provide means for holding a carton in position to receive the napkins as they are discharged from the respective compartments of the receptacle, and for this purpose I provide mechanism such as indicated in Figs. 17 and 18. This mechanism comprises a table 220 which is supported by suitable means such as a bracket 221 secured to the supporting frame of the packaging machine. This table is divided into two sections 222 and 223 which are spaced and disposed in position corresponding to the positions of the filled compartments of the receptacle which are out of alignment with the feeding conveyor 22. On each of the table sections 222 and 223 I mount a carton receptacle 224, which consists of a box-like structure having one end and one side open. A paper carton such as indicated at 225 may be inserted into the carton receptacle 224 through the open side and open end with the flaps of the carton projecting beyond the open end of the receptacle as clearly shown in the said Figs. 17 and 18. The receptacles 224 are hingedly connected to the respective table portions by means of links 224′ under the control of which links the receptacles are adapted to be swung from a vertical position, as indicated in dotted lines in Fig. 18, to horizontal position, as indicated in full lines in the said figure. U-shaped members 226 are pivotally connected at their ends to the respective table sections, as will be apparent from an inspection of the drawings, and these U-shaped members are adapted to be swung about their pivots so that the portions 227 will engage the ends 228 of the

receptacles and be effective to force the receptacles towards the discharge end of the packaging machine. To facilitate manipulation of the U-shaped members 226, hand members 229 are provided.

For the purpose of insuring the entrance of the napkins into the carton, I provide oppositely facing spring controlled flap members 229 and 230 which are pivotally mounted respectively on the end of the packaging machine. The flap members are yieldingly urged inwardly by suitable spring mechanism, as indicated in Figs. 17 and 18, so that the flaps of the carton will pass over the outside thereof, and when the napkins are discharged from the respective compartments, they will be effective to force the flaps outwardly so that the carton flaps will not interfere with their entrance into the carton and the insertion thereof into the carton is smoothly accomplished. When the carton has been filled, as indicated in Fig. 18, the member 226 is swung on its pivots to the position indicated at 231 in Fig. 17, and the receptacle 224 is then swung to the dotted line position thereof, indicated in Fig. 18. The filled carton of napkins may then be readily removed from the receptacle and the flaps of the carton folded and secured, to seal the carton.

I have thus provided mechanism for packaging relatively soft and flat articles without manually handling the articles and which mechanism is capable of relatively rapid operation.

I am aware that many changes in the form and construction of parts as well as in the arrangement thereof may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the latter being construed as broadly as possible, consistent with the state of the art.

I claim as my invention:

1. In a machine for packaging sanitary napkins, the combination of means for automatically stacking a plurality of the napkins, means for compressing the stack and means for inserting the compressed stack into a wrapper.

2. In a machine for packaging sanitary napkins, the combination of a receptacle, means for feedng the napkins one by one to said receptacle, so as to stack the napkins therein, means for compressing the stack, and means for ejecting the compressed stack from said receptacle.

3. In a machine for packaging sanitary napkins, the combination of means for automatically stacking a plurality of the napkins, means for compressing the stack and means for ejecting the compressed stack from the machine preparatory to wrapping thereof.

4. In a machine for packaging sanitary napkins, the combination of means for feeding the napkins successively one by one, means for receiving and stacking the napkins as they are fed, and means for automatically compressing the stack after a predetermined number of the napkins have been stacked.

5. In a machine for packaging sanitary napkins, the combination of means for continuously feeding the napkins successively one by one, means for receiving and stacking the napkins as they are fed, means for compressing the stack, means controlled by the napkins for actuating the compressing means after a predetermined number thereof have been stacked, and means for ejecting the compressed stack from said stacking means.

6. In a machine for packaging sanitary napkins, the combination of means for continuously feeding the napkins successively one by one, means for receiving and stacking the napkins as they are fed, means for compressing the stack, means controlled by the napkins for actuating the compressing means after a predetermined number thereof have been stacked, and means for inserting the compressed stack into a wrapper.

7. In a machine for packaging sanitary napkins, the combination of a receptacle, means for depositing a plurality of the napkins in said receptacle so as to form a stack, means for compressing the stack, means for propelling the compressed stack from said receptacle, and means for positioning a wrapper for receiving said stack as it is propelled from the receptacle.

8. In a machine for packaging sanitary napkins, the combination of means for continuously feeding the napkins successively one by one, means for receiving and stacking the napkins as they are fed, means for automatically compressing the stack, after a predetermined number of the napkins have been stacked, and means for continuing the stacking operation as to the succeeding napkins during said compressing operation.

9. In a machine for packaging sanitary napkins, the combination of means for feeding the napkins successively one by one, stacking means, means for receiving the napkins from said feeding means and operative to deposit the same in said stacking means, means for compressing the stack, and means for automatically actuating the compressing means after a predetermined number of the napkins are stacked.

10. In a machine for packaging sanitary napkins, the combination of means for feeding the napkins successively one by one, stacking means, means for receiving the napkins from said feeding means and operative to deposit the same in said stacking means, means for compressing the stack, means for automatically actuating the compressing means after a predetermined number of the

napkins are stacked, and means for ejecting the compressed stack from said stacking means.

11. In a machine for packaging relatively soft and compressible articles, the combination of a receptacle, means for depositing a plurality of the articles in said receptacle so as to stack the articles therein, means for compressing the stack, and means for propelling the compressed stack from said receptacle.

12. In a machine for packaging relatively soft and compressible articles, the combination of a receptacle having a pair of like compartments, means for feeding a predetermined number of articles one by one into one of said compartments, means for automatically moving said receptacle so as to bring an empty compartment into alignment with said feeding means after the other compartment has received the said predetermined number of the articles, means for compressing the articles in the filled compartment, and means for ejecting the compressed articles therefrom while the empty compartment is being filled, and said means for automatically moving said receptacle being operative to automatically return the first filled compartment into alignment with said feeding means after said predetermined number of articles have been fed to said empty compartment and after the articles have been ejected from said first filled compartment.

13. In a machine for packaging sanitary napkins, the combination of a receptacle, means for feeding the napkins successively one by one flatwise into said receptacle so as to stack the napkins face to face, means for compressing the stack, and means for ejecting the compressed stack from the receptacle.

14. In a machine for packaging sanitary napkins, the combination of a receptacle, means for feeding the napkins successively one by one into said receptacle so as to stack the napkins, guide means for aligning the napkins with said receptacle as they are fed thereinto, means incorporated in said guide means for causing the napkins to be deposited flatwise in the receptacle, means for compressing the stack, and means for ejecting the compressed stack from the receptacle.

15. In a machine for packaging sanitary napkins, the combination of a receptacle, means for feeding the napkins successively one by one into said receptacle so as to stack the napkins, and means for causing the napkins to drop flatwise in the receptacle into stacked position.

16. In a machine of the class described, the combination of a receptacle, a conveyor for carrying articles to be packaged to said receptacle and operative to discharge such articles into said receptacle, compressing means controlled by the articles for compressing the articles in said receptacle and operable after a predetermined number thereof are discharged thereinto, and means for ejecting the compressed articles from said receptacle.

17. In a machine for packaging relatively soft and compressible articles, the combination of a continuously driven conveyor for continuously feeding the articles, a receptacle for receiving the articles from said conveyor, means for causing the articles to enter the receptacle in a flatwise position, a compressor for compressing the articles in said receptacle, means controlled by the articles for automatically actuating the compressor after a predetermined number of the articles have been deposited in the receptacle, means for ejecting the compressed articles from the receptacle, and means for positioning a carton for receiving the articles as they are ejected.

18. In a machine of the class described, the combination of a continuously driven conveyor for propelling articles to be packaged, a receptacle for receiving the articles from said conveyor, means for compressing the articles in said receptacle after a predetermined number thereof have been deposited therein, means for effecting operation of said compressor after said predetermined number are so deposited, said last mentioned means comprising a detector member disposed over said conveyor for engaging each of the articles propelled by the conveyor as the article passes thereunder, and means actuated by movement of said detector finger for actuating said compressor operating means.

19. In a machine of the class described, the combination of a continuously driven conveyor for propelling articles to be packaged, a receptacle for receiving the articles from said conveyor, means for compressing the articles in said receptacle after a predetermined number thereof have been deposited therein, means for effecting operation of said compressor after said predetermined number are so deposited, said last mentioned means comprising a detector member disposed over said conveyor for engaging each of the articles propelled by the conveyor as the article passes thereunder, a rotatably mounted wheel having a plurality of teeth corresponding in number to the number of articles desired in each package, means actuated by movement of said detector member each time one of the articles engages the same for turning said wheel the distance of one tooth, a projection on said wheel, and means engaged by said projection once in each revolution thereof for actuating said compressor operating means.

20. In a packaging machine of the class described, the combination of a supporting frame, a continuously operated conveyor for feeding articles to be packaged, a receptacle having a pair of compartments and mounted

on said frame so as to be reciprocable whereby said compartments are adapted to be alternately brought into alignment with said conveyor so as to be capable of receiving articles fed by the latter, means for so reciprocating said receptacle, a compressor member having a pair of heads, each of said heads being respectively adapted to enter one of said compartments when out of alignment with said conveyor, and means for actuating said compressor member.

21. In a packaging machine of the class described, the combination of a supporting frame, a continuously operated conveyor for feeding articles to be packaged, a receptacle having a pair of compartments and mounted on said frame so as to be reciprocable whereby said compartments are adapted to be alternately brought into alignment with said conveyor so as to be capable of receiving articles fed by the latter, means for so reciprocating said receptacle, a compressor member having a pair of heads, each of said heads being respectively adapted to enter one of said compartments when out of alignment with said conveyor, a plunger for ejecting the articles from said last mentioned compartments after the articles are compressed, and means for actuating said compressor member and said plunger member in synchronism.

22. In a packaging machine of the class described, the combination of a supporting frame, a continuously operated conveyor for feeding articles to be packaged, a receptacle having a pair of compartments and mounted on said frame so as to be reciprocable whereby said compartments are adapted to be alternately brought into alignment with said conveyor so as to be capable of receiving articles fed by the latter, means for so reciprocating said receptacle, a compressor member having a pair of heads, each of said heads being respectively adapted to enter one of said compartments when out of alignment with said conveyor, a plunger member having a pair of heads, each of said heads being respectively adapted to eject the articles from one of said compartments when out of alignment with the conveyor, and means for actuating said compressor member and said plunger member is synchronism.

23. In a machine of the class described, the combination of a supporting frame, a receptacle on said frame, means for feeding articles to be packaged into said receptacle, a compressor for compressing the articles in said receptacle, a plunger for ejecting the compressed articles from said receptacle, and means for actuating said compressor and plunger and comprising a bar slidably mounted on said frame, means for reciprocating said bar, a pair of levers each pivotally mounted on said frame and connected respectively to said compressor and plunger, said levers having their free ends adjacent said rail, and means carried by said rail for engaging said free ends and thereby moving said levers as an incident to forward movement of the rail.

24. In a machine of the class described, the combination of a receptacle for receiving the articles to be packaged, means for compressing the articles in said receptacle, means for ejecting the compressed articles from said receptacle, means for operating said compressing and ejecting means, a continuously driven power shaft, clutch means for operatively connecting said operating means to said shaft, and means controlled by the articles for automatically actuating said clutch means after a predetermined number of the articles have been deposited in said receptacle.

25. In a machine for packaging relatively flat articles, the combination of a receptacle, means for feeding the articles to be packaged to said receptacle, and means for causing the articles to be deposited flatwise in the receptacle, and comprising a pivotally mounted gate member adapted to receive and support one of the articles flatwise adjacent the top of said receptacle, means for swinging said gate on its pivot so as to permit said article to drop flatwise past the gate to the bottom of the receptacle.

26. In a machine for packaging relatively flat articles, the combination of a receptacle, means for feeding the articles to be packaged to said receptacle, and means for causing the articles to be deposited flatwise in the receptacle, and comprising a pair of relatively narrow gate members pivotally mounted at opposite sides of said receptacle and adjacent the top thereof, means for simultaneously swinging said gate members on their respective pivots so as to permit the article supported thereby to drop flatwise past the gates to the bottom of the receptacle.

27. In a machine for packaging relatively flat articles, the combination of a receptacle, means for continuously feeding the articles one by one to said receptacle, and means for causing the articles to be deposited flatwise in the receptacle and comprising a pivotally mounted gate member adapted to receive and support one of the articles flatwise adjacent the top of said receptacle and means actuated by the succeeding article for swinging said gate on its pivot so as to permit said article to drop flatwise to the bottom of the receptacle.

28. In a machine for packaging relatively flat articles, the combination of a receptacle, means for continuously feeding the articles one by one to said receptacle, and means for causing the articles to be deposited flatwise in the receptacle and comprising a pivotally mounted gate member adapted to receive and support one of the articles flat-wise adjacent

the top of said receptacle and means actuated by the succeeding article for swinging said gate on its pivot so as to permit said article to drop flatwise to the bottom of the receptacle, said means also being effective to restore the gate to supporting position so as to be in position for receiving said succeeding article.

29. In a machine for packaging relatively flat articles, the combination of a receptacle having side walls provided with apertures adjacent the bottom thereof, and means for feeding the articles flatwise into said receptacle so as to permit the articles to drop flatwise to the bottom thereof, the apertures in the side walls being effective to permit air trapped in the receptacle beneath the article to escape, whereby flatwise descent of the article is facilitated.

30. In a machine for packaging relatively flat articles, the combination of a receptacle having side walls provided with apertures adjacent the bottom thereof, a pivotally mounted gate member adapted to receive and support one of the articles flatwise adjacent the top of the receptacle, and means for swinging said gate on its pivot so as to permit the article to drop flatwise to the bottom of the receptacle, said apertures facilitating flatwise descent of said article by permitting air trapped in the receptacle below the article to escape therefrom.

31. In a machine of the class described, the combination of a supporting frame, a continuously driven conveyor for propelling articles to be packaged, a receptacle having a pair of compartments for receiving the articles to be packaged, said receptacle being reciprocably mounted whereby said compartments are adapted to be alternately brought into alignment with said feeding means so as to be capable of receiving the articles fed thereby, a cam for reciprocating said receptacle, a compressor for compressing the articles in the compartment which is out of alignment with said conveyor, a plunger for ejecting the compressed articles and means for actuating said cam, compressor, and plunger in synchronism and comprising a member movably mounted on said supporting frame, means for automatically actuating said member when a predetermined number of said articles have been fed into one of said compartments, means actuated by said member during initial movement thereof for operating said cam, means secondly actuated by said member during continued movement thereof for operating said compressor, means thirdly actuated by said member as an incident to further movement thereof for operating said plunger.

32. In a machine of the class described, the combination of a supporting frame, a continuously driven conveyor for propelling articles to be packaged, a receptacle having a pair of compartments for receiving the articles to be packaged, said receptacle being reciprocably mounted whereby said compartments are adapted to be alternately brought into alignment with said feeding means so as to be capable of receiving the articles fed thereby, a cam for reciprocating said receptacle, a compressor for compressing the articles in the compartment which is out of alignment with said conveyor, a plunger for ejecting the compressed articles and means for actuating said cam, compressor, and plunger in synchronism and comprising a member reciprocably mounted on said supporting frame, means for automatically actuating said reciprocably mounted member when a predetermined number of said articles have been fed into one of said compartments, means actuated by said member during initial forward movement thereof for operating said cam, means secondly actuated by said member during continued forward movement thereof for operating said compressor, means thirdly actuated by said member as an incident to further forward movement thereof for operating said plunger, said reciprocable member being also effective on return movement to restore said cam, compressor and plunger operating means to initial position.

33. In combination, means for feeding a succession of articles singly to a predetermined position for stacking the same, and means for moving a completed stack horizontally to one side of the stacking position while maintaining the feeding means in continuous operation thereby permitting continuous stacking of the articles fed by said feeding means.

34. In combination, means for feeding singly a succession of articles to be stacked, a plurality of means for supporting separate stacks of said articles, and means for conducting the flow of said articles to one of said supporting means while a completed stack of said articles is being removed from the other of said supporting means.

35. In combination, a pair of stack supports, means for feeding singly a succession of articles to said supports to stack the same thereon, and mechanism for effecting relative shifting of said feeding means and stack supports, thereby to cause said feeding means to deliver the flow of articles alternately to said supports.

36. In combination, a pair of stack supports, means for feeding singly a succession of articles to said supports to stack the same thereon, and mechanism for effecting relative shifting of said feeding means and stack supports, thereby to cause said feeding means to deliver the flow of articles alternately to said supports whereby continuity of the article feeding and stacking operation is maintained.

37. In combination, a pair of stack supports, means for feeding singly a succession of articles to said supports to stack the same thereon, mechanism for effecting relative shifting of said feeding means and stack supports, thereby to cause said feeding means to deliver the flow of articles alternately to said supports whereby continuity of the article feeding and stacking operation is maintained, and a stack discharger synchronized with said shift mechanism for automatically removing the stacks alternately from said supports intermediate shifts.

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