United States Patent

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[45] Patented **Dec. 15, 1970**
[73] Assignee **Universal Corrugated Box Machinery Corporation**
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[54] **SHEET CONVEYING, STACKING AND DISCHARGE EQUIPMENT**
14 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **271/50,** 271/75
[51] **Int. Cl.** **B65h 9/14,** B65h 29/16
[50] **Field of Search** 271/50, 53, 60, 63, 68–69, 75

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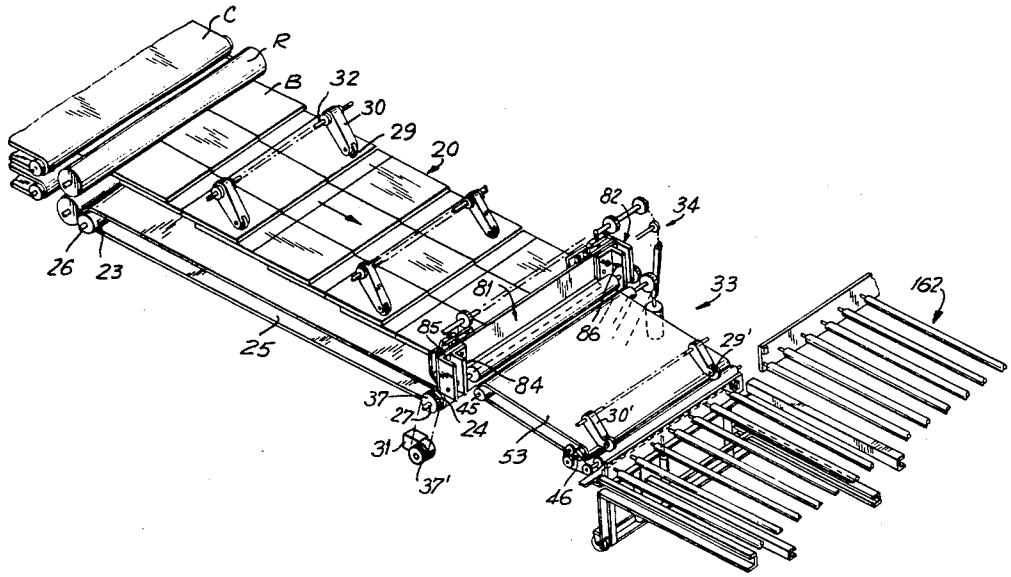
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ABSTRACT: This invention relates to the art of sheet conveying, stacking and discharge equipment and more particularly to an equipment which will receive flat sheets of corrugated board which are individually delivered at a high rate of speed and thereupon slow down the rate of speed of such sheets without reducing their speed of delivery, and then will form uniform stacks of such sheets on a takeoff unit by periodically interrupting the feed of such sheets onto the takeoff unit.



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SHEET 1 OF 8

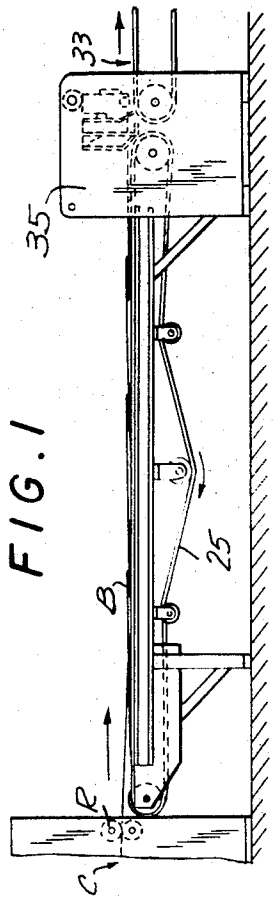


FIG. 1

FIG. 2

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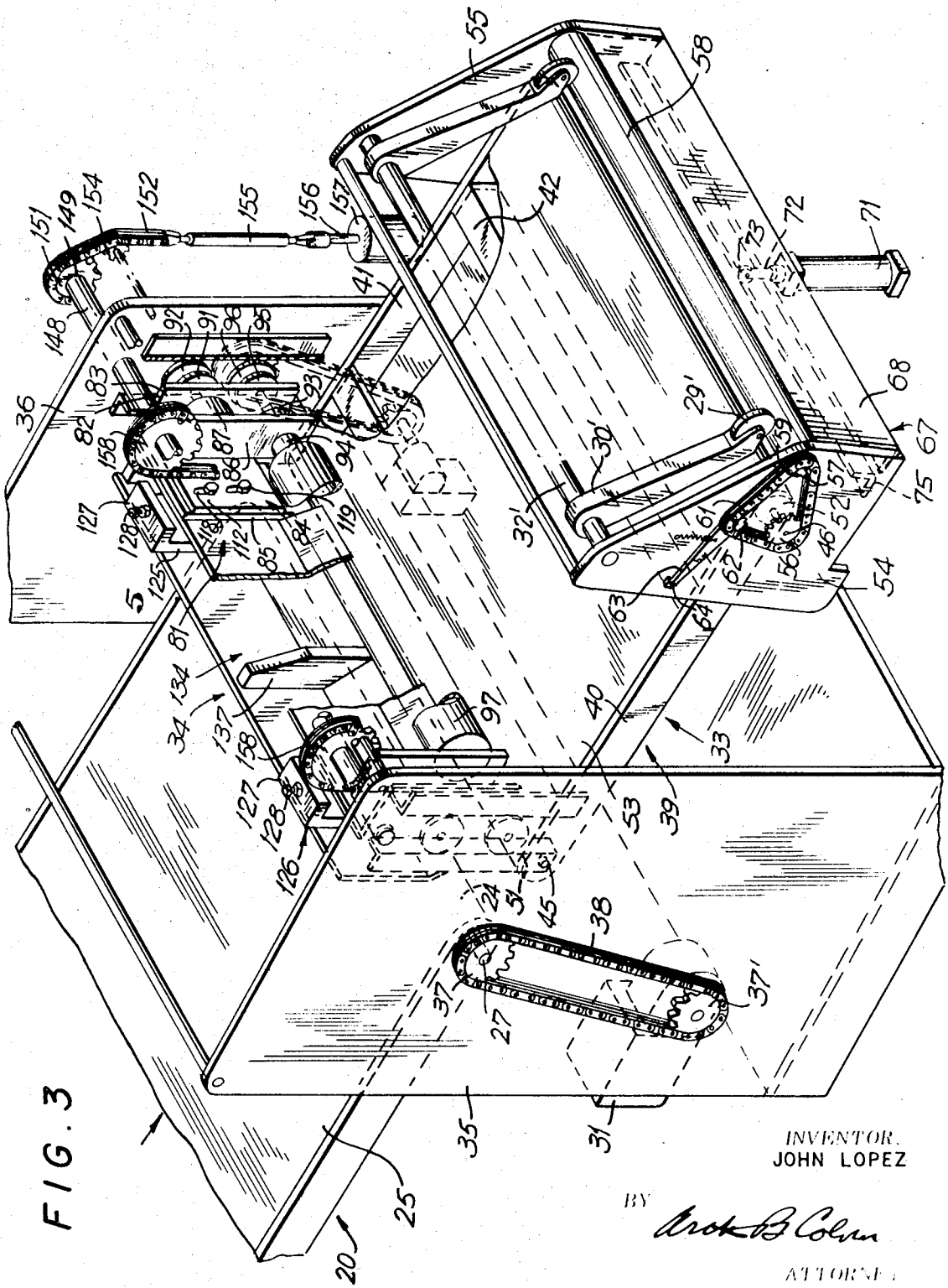


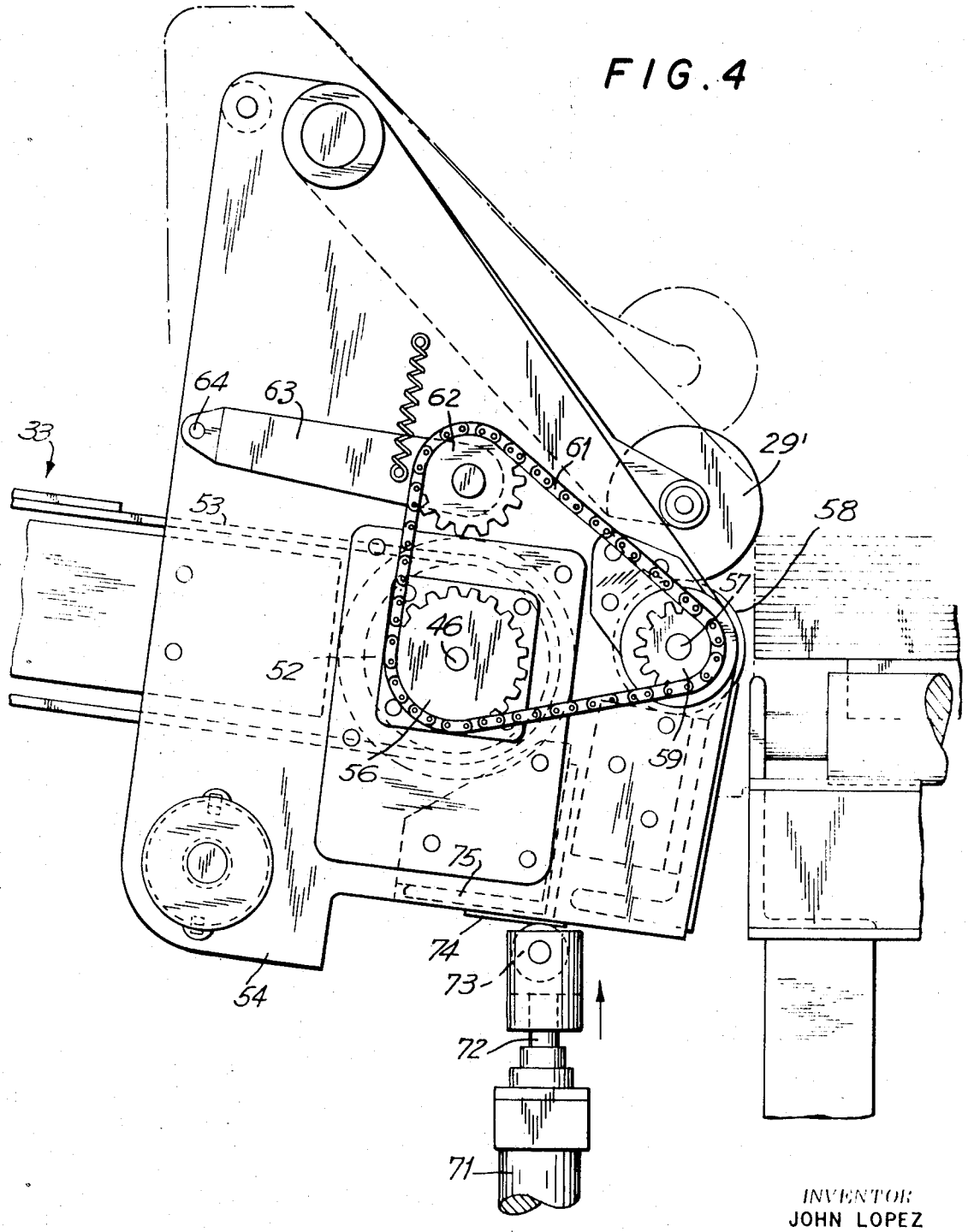
FIG. 3

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FIG. 4



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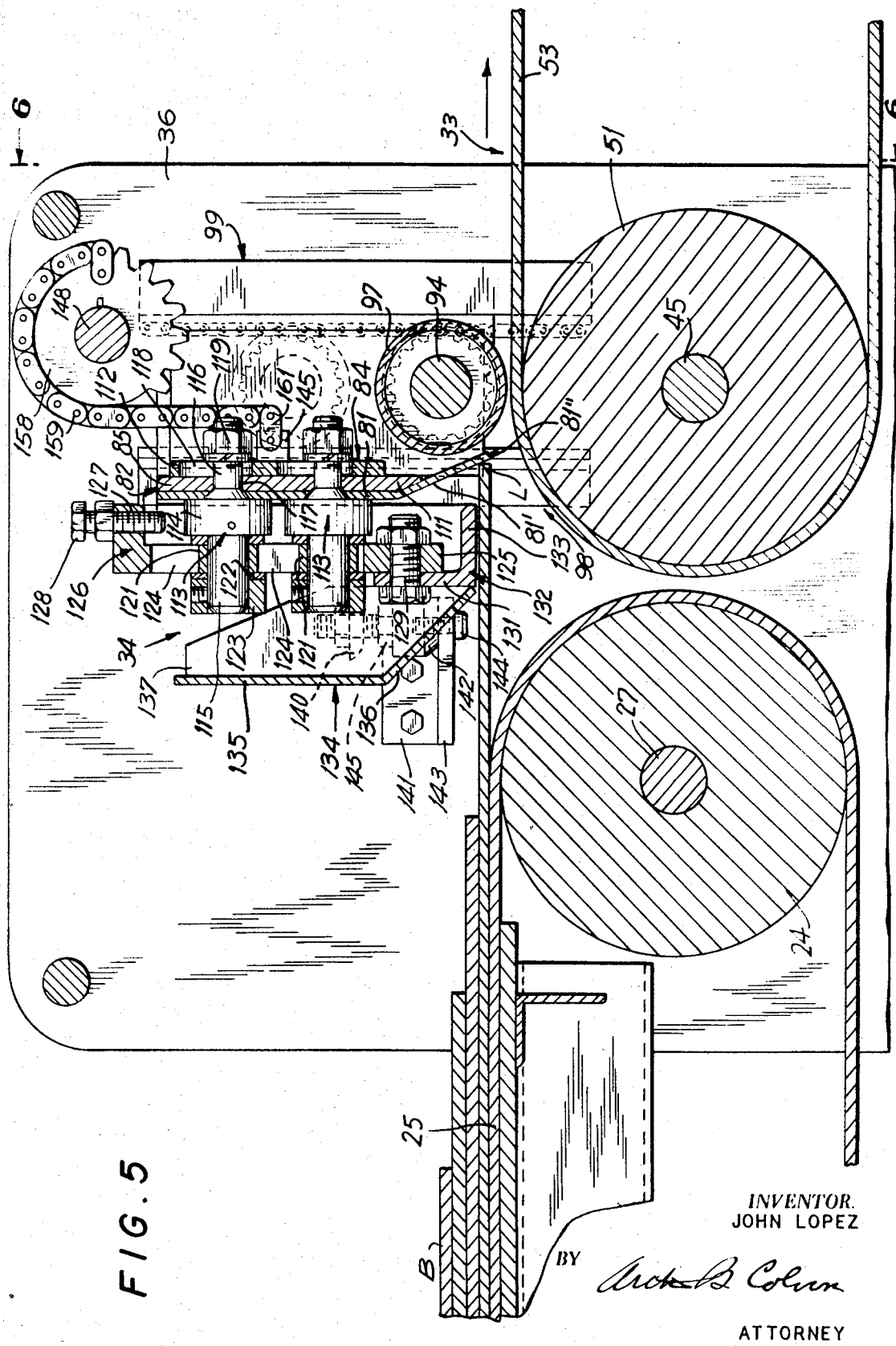


FIG. 5

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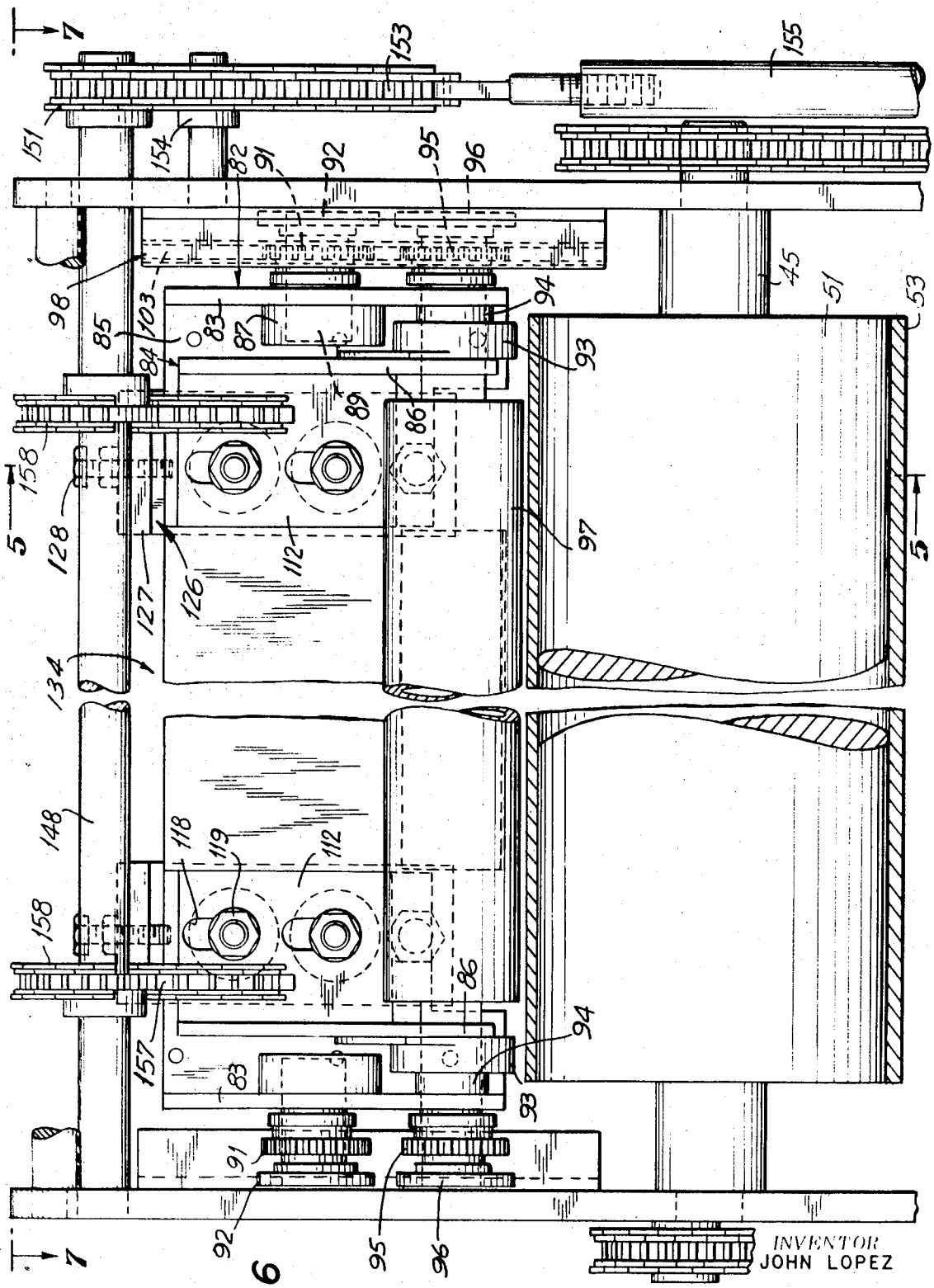


FIG. 6

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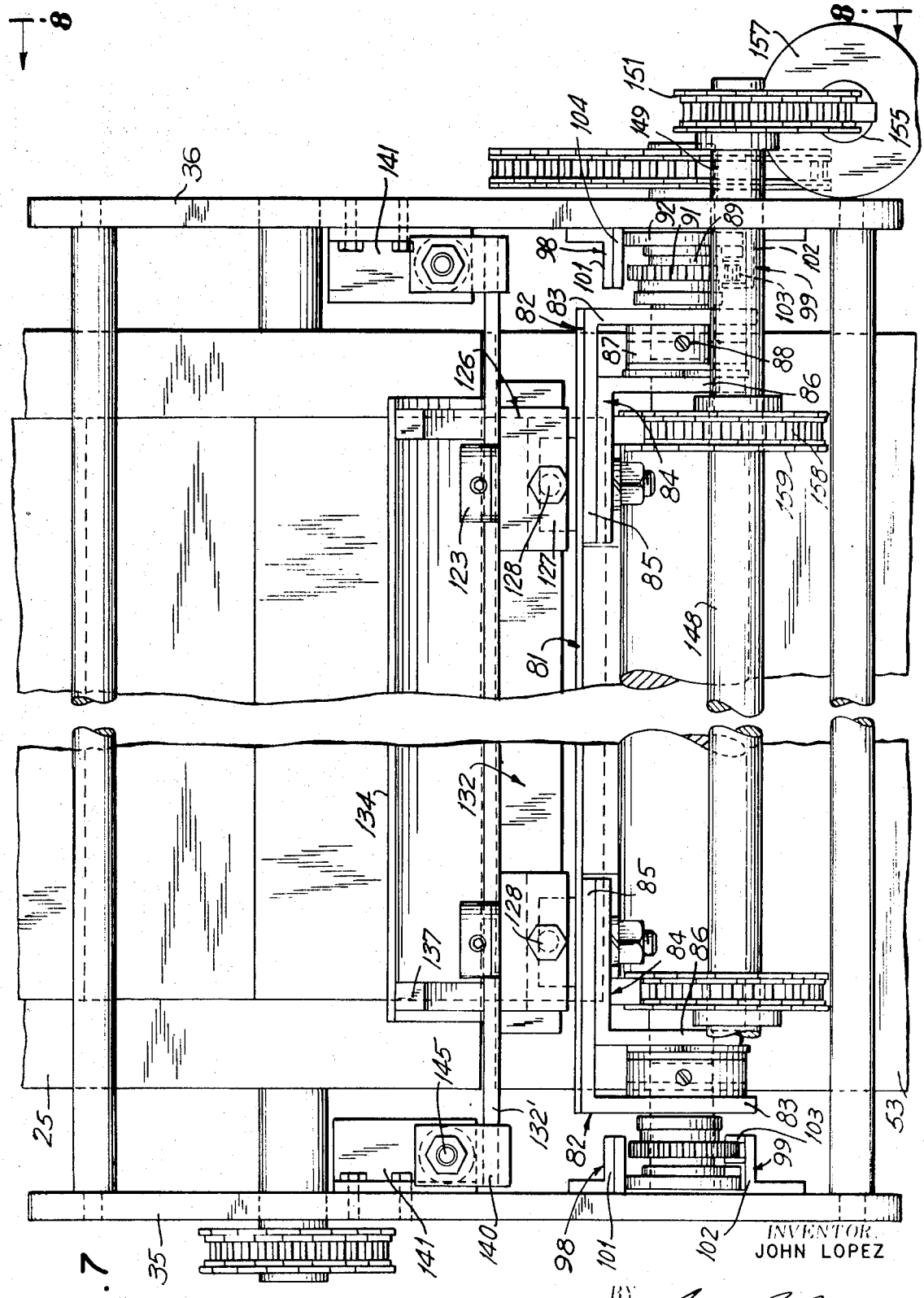


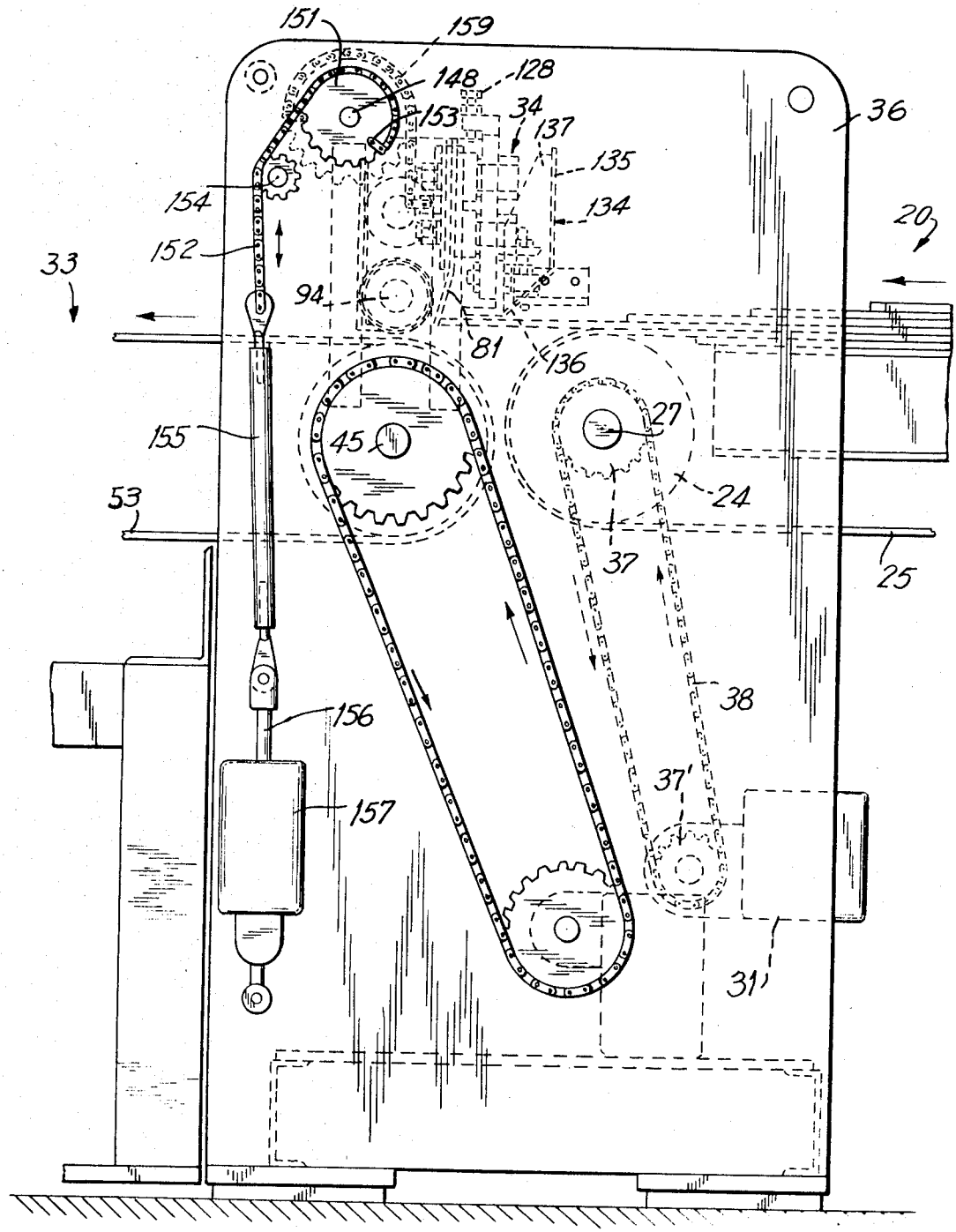
FIG. 7

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FIG. 8



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FIG. 10

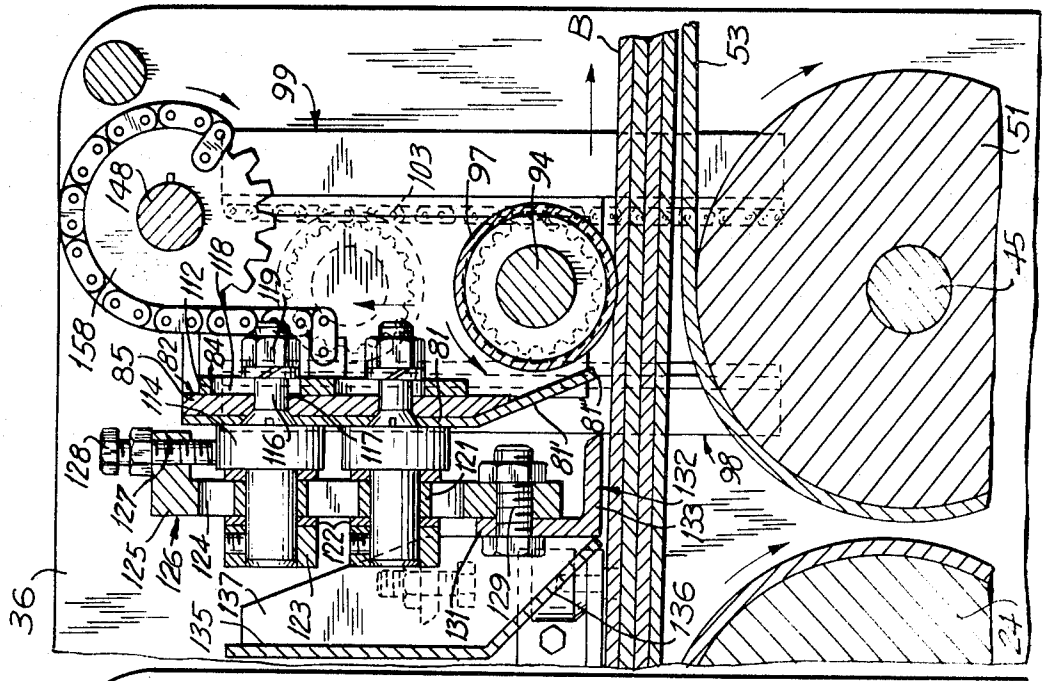
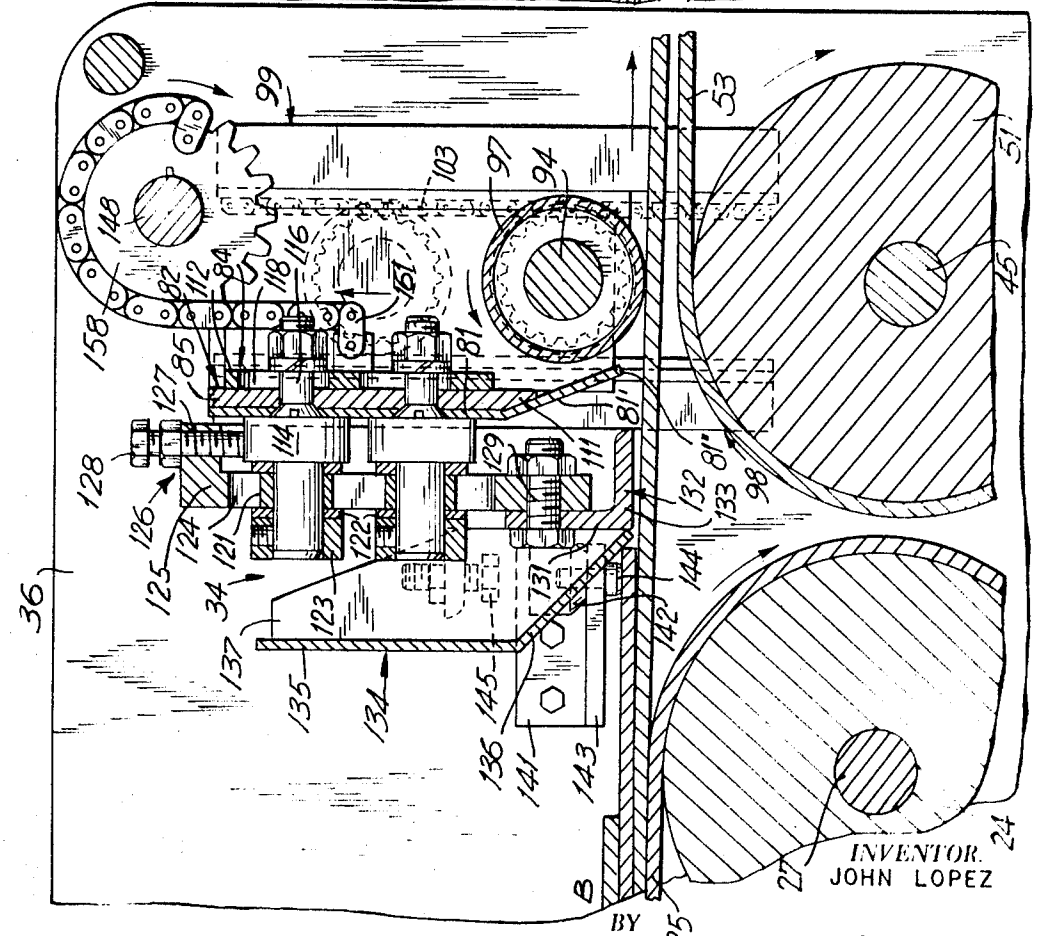


FIG. 9



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SHEET CONVEYING, STACKING AND DISCHARGE EQUIPMENT

This application is a continuation-in-part of co-pending application Ser. No. 702,717, filed Feb. 2, 1968, now U.S. Pat. No. 3,481,598 and Ser. No. 797,566, filed Feb. 7, 1969.

As conducive to an understanding of the invention, it is noted that in the formation of corrugated board, in the first stage of operation, a conventional corrugator machine will form a continuous strip of corrugated board at a relatively high rate of speed.

The strip of corrugated board as it is discharged from the corrugator is passed through slitters and cutoff knives which form parallel longitudinal strips and then cut such strips transversely to form a plurality of individual rectangular sheets of the desired length and width.

Since the slitters and cutoff knives are synchronized with the corrugator, they will discharge the sheets at a high rate of speed.

Where the plurality of rectangular sheets which are in side by side relation, in substantially the same plane, are discharged onto a takeoff table, in order to form a plurality of stacks and the sheets discharged thereon must drop a considerable distance until the stack is built up to a desired size, due to the surface area of the sheets, they tend to float as they move downwardly and will skew with the result that the adjacent stacks tend to interlock.

Where the plurality of stacks are removed from the takeoff table manually, if adjacent stacks should be interlocked the operation is extremely difficult for the workman, especially since the stacks are relatively heavy. As a result, a large number of workers would be required to handle the high rate of output and in addition, due to the fact that the stacks would not be uniform, when loaded on pallets, for example, for transportation to subsequent processing equipment, the stacks would fall off the pallets with attendant delays in processing.

The problem of nonuniform stacks is enhanced when automatic equipment is to be used to handle the stacks built up on the takeoff unit as such equipment generally does not work satisfactorily with nonuniform stacks.

Where a vertically movable gate is interposed between a conveyor which advances the plurality of individual rectangular sheets and an auxiliary conveyor from which the sheets are discharged onto the takeoff table, and such gate when raised lifts the leading edge of the sheets abutting thereagainst, as such sheets are continually being moved by the first conveyor, jamming of the equipment is likely to occur with resultant need for stoppage thereof to clear the jam.

It is accordingly among the objects of the invention to provide a sheet conveying unit which is relatively simple in construction and which can receive sheets of corrugated board delivered thereto at a relatively high rate of speed and thereupon slow down the rate of advance of such sheets while still maintaining the same in longitudinal alignment and which will intermittently at controlled intervals interrupt advance of such sheets and discharge the same onto a suitable takeoff unit with assurance that no jamming of the sheets will occur when their advance is interrupted and that the sheets when discharged, will remain in substantial alignment so that uniform stacks will be formed on such takeoff unit.

According to the invention, a conveyor unit is provided comprising an endless belt driven in timed relation with the slitting and cutoff machine, for example, but at a speed that is a fraction of such speed so that such sheets will be advanced by the conveyor in shingled relation.

The outlet end of the conveyor is provided with a gate mechanism having an auxiliary conveyor unit associated therewith, which receives the sheets advanced by the first conveyor and advances such sheets for discharge onto a takeoff unit. The gate mechanism includes a vertically movable gate which will restrain advance of the sheets when lowered and beneath which the sheets will pass when the gate is lifted, the sheets being stripped away from the gate during the lifting thereof to prevent jamming.

The right angle takeoff unit is designed to receive the sheets as they are discharged from the conveyor unit and to form uniform stacks of such sheets. As the stacks build up, the auxiliary conveyor unit will pivot upwardly so that the sheets discharged from the outlet thereof will only be slightly above the plane of the topmost sheet that has been collected in the stack. As a result, the sheets discharged from the auxiliary conveyor will only have a short distance to fall onto the stacks so that floating of the sheet is minimized, thereby insuring uniformity of the completed stacks.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of the invention,

FIG. 1 is a side elevational view of the conveyor unit and takeoff unit with parts broken away;

FIG. 2 is a perspective view of the equipment with parts broken away and showing the gate assembly;

FIG. 3 is an exploded perspective view of the gate assembly and auxiliary conveyor;

FIG. 4 is an enlarged side elevational view showing the outlet end of the auxiliary conveyor;

FIG. 5 is a longitudinal sectional view taken along line 5–5 of FIG. 6;

FIG. 6 is a front elevational view taken along line 6–6 of FIG. 5;

FIG. 7 is a top plan view taken along line 7–7 of FIG. 6;

FIG. 8 is a side elevational view taken along line 8–8 of FIG. 7; and

FIGS. 9 and 10 are views similar to FIG. 5 showing the gate assembly in various operating positions.

Referring now to the drawings, as shown in FIG. 2, the conveyor unit 20 comprises a pair of longitudinally spaced parallel rollers 23, 24 which mount an endless conveyor belt 25. The rollers 23, 24 are mounted on shafts 26, 27, the roller 23 illustratively being an idler roller and the roller 24 being driven by motor 31 (FIG. 8).

The conveyor 20 is associated with a sheet forming machine which has an outlet conveyor C with an associated pair of driven rollers R that discharge the sheets onto the conveyor belt 25.

The speed of the conveyor belt 25 is illustratively one-half that of the speed of the discharge rollers R. As a result, the sheets B will be shingled as they are advanced by the conveyor belt 25, being retained in position on such belts by the rollers 29 which are mounted on the ends of arms 30 pivotally mounted on transverse rods 32.

The conveyor belt 25, which is continuously driven, is designed to discharge the sheets B carried thereon onto an auxiliary conveyor unit 33 disposed at the outlet end of the conveyor belt 25, a gate assembly 34 being interposed between the outlet end of conveyor 20 and the inlet end of auxiliary conveyor 33.

As shown in FIGS. 1 and 3, a pair of upright parallel plates 35, 36 are positioned at the outlet end of the conveyor 20 and straddle the latter, said plates having suitable bearings mounted thereon which rotatably mount the shaft 27. As shown in FIGS. 3 and 8, one end of shaft 27 mounts a sprocket wheel 37 which is connected by sprocket chain 38 to a drive sprocket wheel 37', the latter being driven by motor 31 at a speed determined by the speed of the corrugator and hence the speed of the discharge conveyor R.

As shown in FIGS. 3 and 4, the auxiliary conveyor 33 comprises a frame 39 comprising two parallel side beams 40 and 41 retained in spaced-parallel relation by transverse angle beams 42. Each end of each of the side beams 40 and 41 has bearing openings through which extend shafts 45 and 46.

The shaft 45 extends through bearings in the opposed parallel plates 35, 36 which also straddle the conveyor frame 39. Thus, the shaft 45 acts as a pivot mount for one end of the frame 39. The shafts 45, 46 each has secured thereto a roller 51, 52, said rollers being encompassed by an endless conveyor belt 53.

Secured to the side beams 40 and 41 of frame 39 at the ends thereof adjacent the roller 52 are parallel support plates 54, 55. The shaft 46 is rotatably mounted in suitable bearings in said side plates 54, 55 and one end of said shaft 46 extends through the side plate 54 for example, and mounts a sprocket 56. Also mounted between the side plates 54, 55 forwardly of shaft 46 and roller 52 is a transverse shaft 57 to which is secured a roller 58 (FIG. 3). One end of the shaft 57 also extends beyond side plate 54 and mounts a sprocket 59. The sprockets 56 and 59 are encompassed by sprocket chain 61 which also rides around a takeup sprocket 62 rotatably mounted at one end of an arm 63 pivoted to side plate 54 as at 64 and normally spring-urged upwardly to maintain the sprocket chain 61 under tension.

With the arrangement above described, it is apparent that the roller 58 will be driven by the drive imparted to roller 52 in the manner hereinafter described.

Associated with the roller 58 are a plurality of presser rollers 29' each rotatably mounted at one end of an arm 30' which in turn is pivoted on a shaft 32' extending transversely between the plates 54 and 55. The rollers 29' are substantially aligned with the roller 58 to exert pressure against a box blank passing therebetween.

The frame 39 is pivoted by means of a hydraulic actuator 71, shown in FIG. 3 which has a vertical piston rod 72 carrying a roller 73 at its outer end designed to abut against a pad 74 mounted midway between the ends of an angle iron 75 extending transversely between the two side plates 54, 55 and rigidly secured thereto. Thus, upon energization of the hydraulic actuator, the frame will be pivoted upwardly about the shaft 45 which acts as the pivotal axis of the frame.

As shown in FIGS. 3 and 5, the gate assembly 34 which is positioned between conveyors 20 and 33 comprises an elongated substantially rectangular plate 81 extending transversely between the plates 35, 36 in substantially vertical position and as shown in FIG. 5, substantially aligned with the roller 51, the lower longitudinal portion 81' of plate 81 being inclined forwardly as shown.

As shown in FIGS. 6 and 7, an L-shaped angle member 82 is secured to each end of the plate 81 with the leg 83 of member 82 extending outwardly therefrom at right angles thereto. A second L-shaped angle member 84 is secured to the leg 85 of each of the members 82 with the leg 86 of each member 84 extending outwardly at right angles to the plate 81 and parallel to and inwardly spaced from the leg 83 of member 82.

Secured to the inner side of each of the legs 83 of members 82 at the upper end thereof as shown in FIGS. 6 and 7 is a block 87 in which is secured by set screw 88, a stud shaft 89 which extends outwardly from each of said legs. Rotatably mounted on each stud shaft, inwardly of its outer end is a sprocket wheel 91, a disc 92 being rotatably mounted on the outer end of each stud shaft 89.

Each of the legs 86 has a bearing 93 (FIG. 6) secured thereto through which extends a shaft 94, the latter also extending through associated openings in legs 83 and rotatably mounting a sprocket wheel 95 and a disc 96, vertically aligned with the sprocket wheel 91 and disc 92 respectively. A roller 97 is idly mounted on said shaft 94 to rotate independently of the latter.

In order vertically to guide the plate 81, a pair of L-shaped angle members 98,99 (FIG. 7) are secured to the inner surface of plates 35, 36 with their legs 101, 102 in spaced parallel relation. The sprocket wheels 91, 95 are adapted to engage a length of sprocket chain 103 secured to the leg 102 of each member 99 and the discs 92, 96 are adapted to ride along a bar 104 secured to the let 101 of each member 98. Thus, as the plate 81 is raised and lowered in the manner hereinafter to be described, it will be retained in vertical alignment without tilting, by the coaction of the sprocket wheels and discs with the associated sprocket chains 103 and bars 104.

As shown in FIG. 5, for example, the lower edge 111 of leg 85 of angle member 82 is beveled as shown to support the rearwardly bent lower edge 81' of plate 81. Associated with each leg 85 is the leg 112 of angle member 84 which serves as a sprocket chain supporting strip. Each pair of angle members 82, 84 is secured to the ends of gate plate 81 by vertically aligned pairs of studs 113. As shown in FIG. 5, each stud has a hub 114 between its end portions 115, 116, the portion 116 extending through aligned openings 117 in gate plate 81 and backing leg 85 and a vertical slot 118 in support leg 112. Thus, when a nut 119, positioned on the threaded ends of studs 113 is tightened, the vertical position of each support leg 112 can be set as desired. As shown in FIG. 5, each of the end portions 115 of the studs 113 is encompassed by a roller 121 positioned between washers 122 and retained in position by a locking collar 123.

Each of the vertically aligned pairs of rollers 121 extends through one of a pair of vertically aligned slots 124 in the vertical leg 125 of a substantially L-shaped mounting bar 126. The horizontal leg 127 of each bar extends over the uppermost hub 114 of each pair of vertically aligned studs 113 and carries an adjustable stop screw 128.

Secured to the lower end of each mounting bar 126 as by bolts 129 is the vertical leg 131 of an elongated substantially L-shaped presser bar 132, the horizontal leg 133 of which extends toward the bent lower portion 81' of the gate plate 81.

Positioned in the path of movement of the box blanks toward the gate plate 81, is an elongated deflector plate 134 which, as shown in FIG. 5, has a vertical upper portion 135 and an inclined bottom portion 136. As is clearly shown in FIGS. 3 and 5, a plurality of braces 137 are positioned along the length of deflector plate 134 being secured as by welding to said deflector plate and to the vertical leg 131 of presser bar 132, the deflector plate and pressor bar thus being rigidly secured together.

As the mounting bars 126 and the presser bar 132 and deflector plate 134 carried thereby are freely movable vertically with respect to the gate plate 81 on the studs 113 which define carriers for said mounting bars 126, means are provided adjustably to set the lowermost position of the presser bar 132.

Thus, as shown in FIGS. 5 and 7, a pair of L-shaped brackets 141 are secured respectively to the inner surfaces of support plates 35, 36 each of said brackets having an abutment block or bumper 142 preferably of rubber, secured to the horizontal leg 143 thereof as by screw 144.

Each of the blocks 142 is vertically aligned with the head of an adjustment screw 145 carried by an arm 140 secured to the upper edge 132' of the vertical leg of presser bar 132 at each end thereof. Thus, by setting the position of screw 145 the lowermost position of the presser bar 132 can be determined.

In the embodiment shown, the gate plate 118 is positively lifted and is lowered by gravity.

To this end, as shown in FIGS. 3, 5 and 8, a shaft 148 is provided which extends transversely across the frame, being supported at its ends in suitable bearings in side plate 35, 36. The end 149 of shaft 148 which extends beyond the plate 36 has a sprocket wheel 151 secured thereto.

Riding over said sprocket wheel 151 is a sprocket chain 152 which has one end secured to the sprocket wheel as at 153 (FIG. 8). The chain rides over an idler sprocket 154 and has its free end secured to a turnbuckle 155 that in turn is secured to the piston 156 of an air cylinder 157.

Thus, when the piston of cylinder 157 retracted, it will cause the sprocket wheel 151 to turn in a clockwise direction from the position shown in FIG. 3, causing corresponding rotation of said shaft 148.

As shown in FIGS. 3, 5 and 6, the shaft 148 has two spaced sprocket wheels 158 secured thereto. A sprocket chain 159 is secured to each of such sprocket wheels 158 and rides over the latter, with the free ends of each chain being secured to the supporting leg 112 as by a pivotal connection 161.

Thus, when the shaft 148 is rotated in a clockwise direction as shown in FIG. 5, corresponding rotation of the sprocket wheels 158 will cause upward movement to be imparted to each of the chains 159 and hence to the gate plate 81, rapidly to lift the latter.

When the air cylinder **157** is deenergized, the gate plate **81** will move downwardly by gravity, its downward movement being limited by the engagement of roller **97** with conveyor belt **53**.

The auxiliary conveyor unit **33** above described is designed to feed sheets of corrugated board onto a takeoff unit **162** for subsequent stacking and processing. As the takeoff unit can be of any suitable type, such as shown in copending application Ser. No. 797,566, filed Feb. 7, 1969, and forms no part per se of the present invention, it will not be described.

OPERATION

According to one application of the invention, a corrugator equipment which forms a continuous strip of corrugated board, feeds such continuous strip to a slitting machine which forms parallel longitudinal strips and to a rotary knife which cuts transversely to form rectangular sheets of corrugated board which are of the length and width desired. The sheets are then fed onto the discharge conveyor C.

The speed of advance of the strip and the speed of the slitting and cutting machines are the same. The discharge conveyor C, as shown in FIG. **2**, feeds through driven rollers R onto the shingling conveyor **20** which is driven by motor **31** in synchronization with the discharge conveyor C but at about one-half the speed so that the conveyor belt **25** will be advanced at approximately one-half the speed of the discharge conveyor C for shingling of the sheets as shown in FIG. **2**.

Assuming that the air solenoid **157** is deenergized, due to the weight of the gate, it will be in the lower position shown in FIG. **5**. Referring to FIG. **5**, in such lower position the lower edge **81''** of the gate plate **81** will lie in a plane slightly below the plane of the conveyor belt **25** so that the leading edge L of the lowermost box blank B will abut against such lower edge **81''**.

At this time, referring to FIG. **5**, due to the weight of the presser member **132** and deflector plate **134**, the support strips **126** will have moved downwardly by reason of the clearance afforded the rollers **121** in slots **124**, the lowermost position of the presser member **132** being determined by the position of the vertical adjustment screw **145** (FIG. **5**) which is set so that the leg **133** of the presser member will be just slightly above the lowermost box blank B.

As the result of the positioning of the gate plate **81** in the path of movement of the box blanks, forward advance of such box blanks will be restrained and they will pile up behind the deflector member **134**. When it is desired to permit further discharge of box blanks onto the auxiliary conveyor **33**, the air solenoid **157** is energized which will cause its piston rod **156** to be retracted. As a result, force will be exerted on the turnbuckle **155** and chain **152** to cause the sprocket wheel **151** to rotate in a clockwise direction. Referring to FIGS. **3** and **5**, the shaft **148** will be rotated in a clockwise direction thereby rotating the sprocket wheels **158** in the same direction to impart upward force on the sprocket chains **159** which are connected to the gate plate **81**.

Referring to FIGS. **5** and **9**, initial rotation of shaft **148** and consequent upward movement of the gate plate **81** will move the latter from the position shown in FIG. **5** in which the lower edge **81''** of the gate plate is in the path of movement of the lowermost blank B, to the position shown in FIG. **9** where it is above such path. Due to the inclination of the lower edge of the gate plate, such upward movement thereof will not tend to cause lifting of the leading edge of the lowermost box blank. Furthermore, referring to FIG. **8**, due to the lost motion connection between the support bars **126** for the presser bar **132** provided by the slots **124** through which stud shafts **113** extend, the initial upward movement of the gate plate **81** will not cause simultaneous upward movement of the presser bar **132**. Hence, as is clearly shown in FIGS. **5** and **9**, not only will the inclined lower edge **81'** of the gate plate prevent lifting of the leading edge of the box blank abutting thereagainst when the gate plate **81** is lifted, but due to the force exerted by the presser bar **132** against such box blank adjacent its leading edge, there will be assurance that such leading edge will not be cammed upwardly and hence will be free to be advanced between the roller **97** and the conveyor belt **53** immediately therebelow, for dependable advance thereby. With further rotation of the shaft **148** and consequent raising of the gate plate **81**, the uppermost hub **114** (FIG. **10**) will abut against the abutment screw **128** so that subsequent raising of the gate plate **81** will also cause the support bars **126** and presser member **132** and deflector member **134** carried thereby to be lifted to the position shown in FIG. **10**. As a result, full clearance is provided beneath the presser member and deflector member to permit the shingled box blanks to be advanced beneath the gate plate **81** and between the roller **97** and conveyor belt **53** for subsequent advance by the auxiliary conveyor onto the takeoff table **162**.

As noted in said copending application Ser. No. 797,566, as the stack of box blanks builds up on the takeoff table **162**, the free end of the auxiliary conveyor will be progressively lifted by actuation of the lifting actuator **71** so that as each sheet is discharged onto the stack being built up on the takeoff table **162**, it will have very little distance to drop, thereby preventing floating of such sheets which would cause the resultant stack not to be uniform.

With the gate construction above described, there is assurance that the advance of the sheets from the conveyor **20** to the conveyor **33** may be dependably restrained, yet when the gate **81** is lifted to permit continuation of the discharge of sheets from one conveyor to the other, there will be no tendency of the leading edge of the sheets abutting against the gate plate to be cammed upwardly by the lifting of the latter which would cause jamming of the equipment by reason of the fact that the conveyor **20** consistently provides forward impetus to the sheets, even when they are being restrained by the gate.

I claim:

1. A feeding conveyor adapted to receive sheets discharged thereon, said feeding conveyor having an inlet and an outlet end, a vertically movable gate positioned at the outlet end of the feeding conveyor and extending transversely thereacross and adapted to interrupt discharge of sheets therefrom, said gate comprising an elongated substantially rectangular plate having its lower portion inclined forwardly in the direction of the path of movement of such sheets, means to raise said gate from its lowermost sheet interrupting position in which the leading edge of the sheets advanced by said feeding conveyor will abut against the lower portion of said gate, to its uppermost sheet discharge position, in which the sheets advanced by said feeding conveyor may pass under said gate, and means substantially to restrain upward movement of such leading edge of such sheets when said gate is lifted.

2. A feeding conveyor adapted to receive sheets discharged thereon, said feeding conveyor having an inlet and an outlet end, a vertically movable gate positioned at the outlet end of the feeding conveyor and extending transversely thereacross and adapted to interrupt discharge of sheets therefrom, said gate comprising an elongated substantially rectangular plate having its lower portion inclined forwardly in the direction of the path of movement of such sheets, means to raise said gate from its lowermost sheet interrupting position in which the leading edge of the sheets advanced by said feeding conveyor will abut against the lower portion of said gate, to its uppermost sheet discharge position, in which the sheets advanced by said feeding conveyor may pass under said gate, means substantially to restrain upward movement of such leading edge of such sheets when said gate is lifted, guide means for said plate to insure vertical movement thereof and an actuator having a piston rod operatively connected to said plate to lift the latter when said actuator is energized.

3. A feeding conveyor adapted to receive sheets discharged thereon, said feeding conveyor having an inlet and an outlet end, a vertically movable gate positioned at the outlet end of the feeding conveyor and extending transversely thereacross and adapted to interrupt discharge of sheets therefrom, said

gate comprising an elongated substantially rectangular plate, means to raise said gate from its lowermost sheet interrupting position in which the leading edge of the sheets advanced by said feeding conveyor will abut against the lower portion of said gate, to its uppermost sheet discharge position, in which the sheets advanced by said feeding conveyor may pass under said gate and means substantially to restrain upward movement of such leading edge of such sheets when said gate is lifted, said means comprising a presser member mounted on said plate, said presser member being vertically movable with respect to said plate between a lowermost position and an uppermost position, and means to effect upward movement of said presser member after said plate has been lifted a predetermined amount.

4. The combination set forth in claim 3 in which a lost-motion connection is provided between said presser member and said plate and means are provided adjustable to set the upper and lowermost positions of said presser member with respect to said plate, permitted by said lost motion connection.

5. A feeding conveyor adapted to receive sheets discharged thereon, said feeding conveyor having an inlet and an outlet end, a vertically movable gate positioned at the outlet end of the feeding conveyor and extending transversely thereacross and adapted to interrupt discharge of sheets therefrom, said gate comprising an elongated substantially rectangular plate, means to raise said gate from its lowermost sheet interrupting position in which the leading edge of the sheets advanced by said feeding conveyor will abut against the lower portion of said gate, to its uppermost sheet discharge position in which the sheets advanced by said feeding conveyor may pass under said gate, means substantially to restrain upward movement of such leading edge of such sheets when said gate is lifted, said means comprising longitudinally spaced carrier means secured to said plate adjacent each end thereof and extending outwardly from the side thereof adjacent said conveyor, mounting means mounted on said carrier means and movable vertically with respect thereto, a presser member secured to the lower portion of said mounting means and extending transversely with respect to said conveyor, means adjustably to limit the upper and lower positions of said mounting means with respect to said gate plate, whereby when said presser member is in its lowermost position it will lie in a plane slightly above that of the lower edge of said gate plate.

6. The combination set forth in claim 5 in which a roller is provided extending parallel to said gate plate on the side thereof opposed to said conveyor, said roller being movable vertically with said gate plate and having the lower portion of its periphery extending slightly below the lower edge of said gate plate.

7. The combination set forth in claim 5 in which each of said carrier means comprises a pair of vertically aligned studs retained in fixed position with respect to said plate, said mounting means comprises a pair of bars each having a vertical slot through which an associated pair of vertically aligned studs extends, said presser member comprising a substantially L-shaped angle member having a vertical leg secured to the lower ends of said bars and a horizontal leg defining a presser foot, said presser foot when said presser member is in its lowermost position lying in a plane slightly above that of the lower edge of said gate plate.

8. The combination set forth in claim 7 in which a roller encompasses each of said studs and means are provided to retain said rollers in alignment with the slot in an associated support strip.

9. The combination set forth in claim 7 in which each of said mounting bars has a horizontal flange at its upper end, a vertical adjustment screw is threaded through an opening in each of said flanges, and is vertically aligned with the uppermost stud of each pair, whereby upon upward movement of said gate plate, said mounting bars will remain without movement until the uppermost stud engages said adjustment screws for subsequent lifting of said mounting bars and said presser member and means are provided to limit the lowermost position of said mounting bars.

10. The combination set forth in claim 9 in which a vertical adjustment screw is movable with said presser member and fixed abutment means are provided adapted to be engaged by said screw, the setting of said screw determining the lowermost position of said presser member.

11. The combination set forth in claim 7 in which a deflector plate is provided having a vertical wall at its upper portion and an inclined wall at its lower portion, said inclined wall extending in the direction of the path of movement of said conveyor and means are provided securely to mount said deflector member in fixed position with respect to said mounting means for movement therewith, said deflector member extending in the direction of the path of movement of said conveyor and means are provided securely to mount said deflector member in fixed position with respect to said mounting means for movement therewith, said deflector member extending transversely with respect to said conveyor.

12. The combination set forth in claim 7 in which a pair of vertical support members are provided aligned respectively with said presser member mounting means, a reinforcing member is positioned between each of said vertical support members and said gate plate, said reinforcing members having apertures through which said studs extend, said vertical support members each having vertical slot means through which said studs extend, said studs each having a hub rigid therewith on the side of the plate opposed to the side on which said reinforcing members and said pair of vertical support members are positioned, and means to clamp said reinforcing members and said vertical support members in fixed position with respect to said plate, said means to raise said gate being operatively connected to said vertical support members.

13. The combination set forth in claim 12 in which a pair of upright support members straddle said vertically movable gate, a shaft extends transversely with respect to said conveyor being rotatably mounted on said support members, one end of said shaft extending beyond its associated support member, a disc secured to said extending end of said shaft, an elongated flexible member having one end secured to said disc and riding around the periphery thereof, an actuator having a piston rod operatively connected to the other end of said flexible member, said shaft having a pair of disc mounted thereon and longitudinally spaced with respect thereto, each of said discs having an elongated flexible member secured thereto at one end and riding around the periphery thereof, the other ends of said flexible members being secured to said vertical support members, said last-named flexible members extending in direction opposed to said first named flexible member, whereby when said actuator is energized and tension is applied to the associated flexible member to rotate the disc and shaft, said flexible members connected to said vertical support members will have tension exerted thereon to lift said gate plate.

14. A feeding conveyor adapted to receive sheets discharged thereon, said feeding conveyor having an inlet and an outlet end, an additional conveyor positioned at the outlet end of said feeding conveyor and adapted to receive the sheets discharged therefrom, a vertically movable gate positioned between said additional conveyor and the outlet end of conveyor, feeding conveyor said gate extending transversely across said feeding conveyor and adapted to interrupt discharge of sheets from said feeding conveyor onto said additional conveyor said gate comprising an elongated substantially rectangular plate, means to raise said gate from its lowermost sheet interrupting position in which the leading edge of the sheets advanced by said feeding conveyor will abut against the lowermost portion of said gate, to its uppermost sheet discharge position, in which the sheets advanced by said feeding conveyor may pass under said gate, and means substantially to restrain upward movement of such leading edge of such sheets when said gate is lifted, said means comprising a presser member mounted on said plate and vertically movable thereon, said presser member being positioned between said plate and said feeding conveyor.