United States Patent

Lopez

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[54] **CONTROL ATTACHMENT FOR SHEET CONVEYING, STACKING AND DISCHARGE EQUIPMENT**

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[73] Assignee: **Universal Corrugated Box Machinery Corporation,** Cranford, N.J.

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 838,405, July 2, 1969, Pat. No. 3,574,024.

[52] **U.S. Cl.** **271/76,** 198/82

[51] **Int. Cl.** **B65h 29/68**

[58] **Field of Search** 271/76, 75, 50, 77, 78; 198/82

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[57] **ABSTRACT**

In a sheet conveying, stacking and discharge apparatus of the type in which feed from a sheet-forming apparatus to a stacking apparatus is periodically interrupted to permit the stacked sheets to be cleared, pivotal gate means for blocking movement of fed sheets to the stacking apparatus during the period in which stacked sheets are cleared. The gate means is characterized by a freedom from interference with the orientation of sheets stacked thereagainst in the course of movement from the blocking to the unblocking position.

6 Claims, 7 Drawing Figures

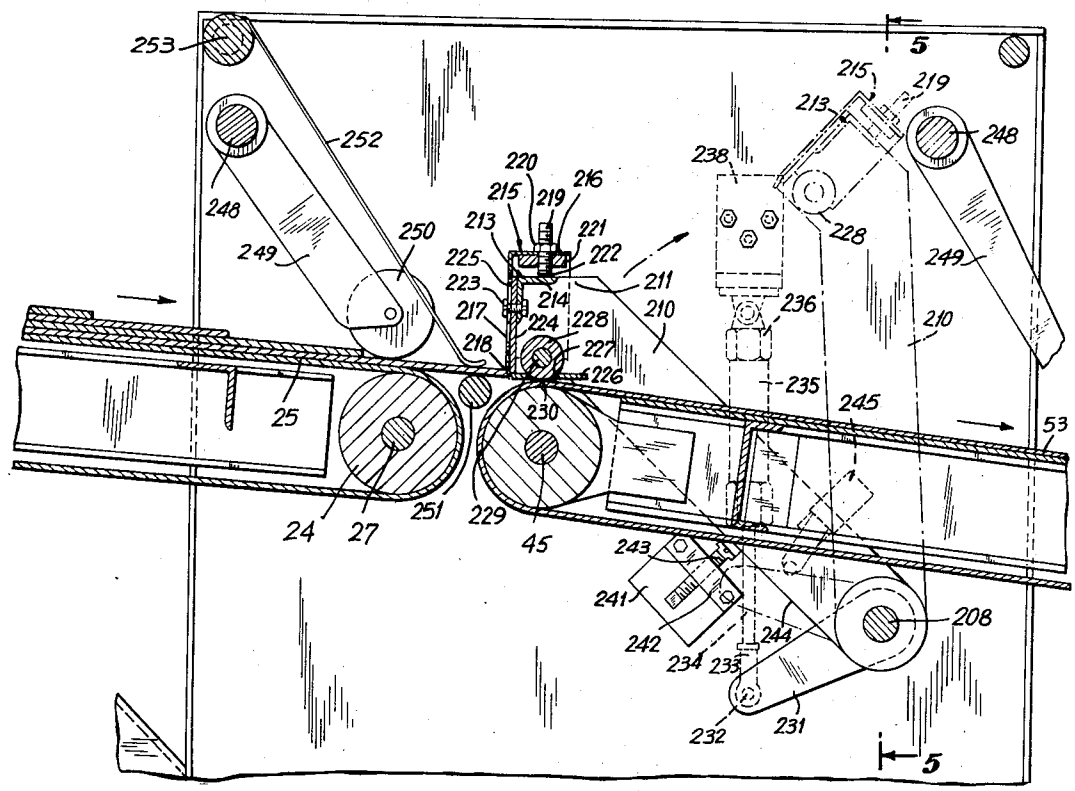


FIG. 1

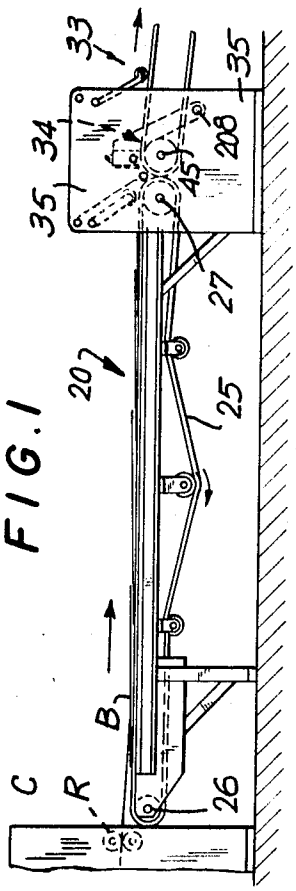
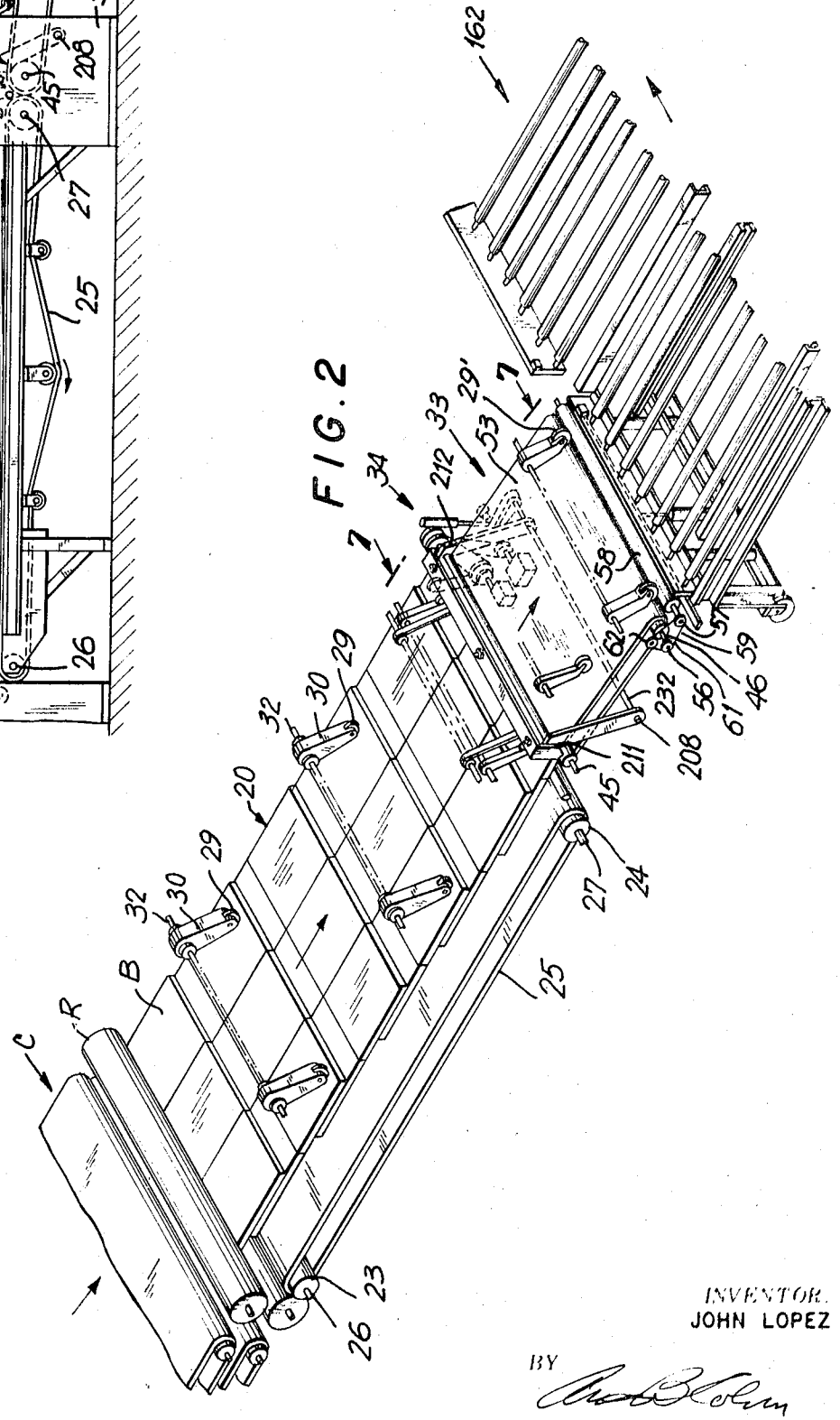


FIG. 2



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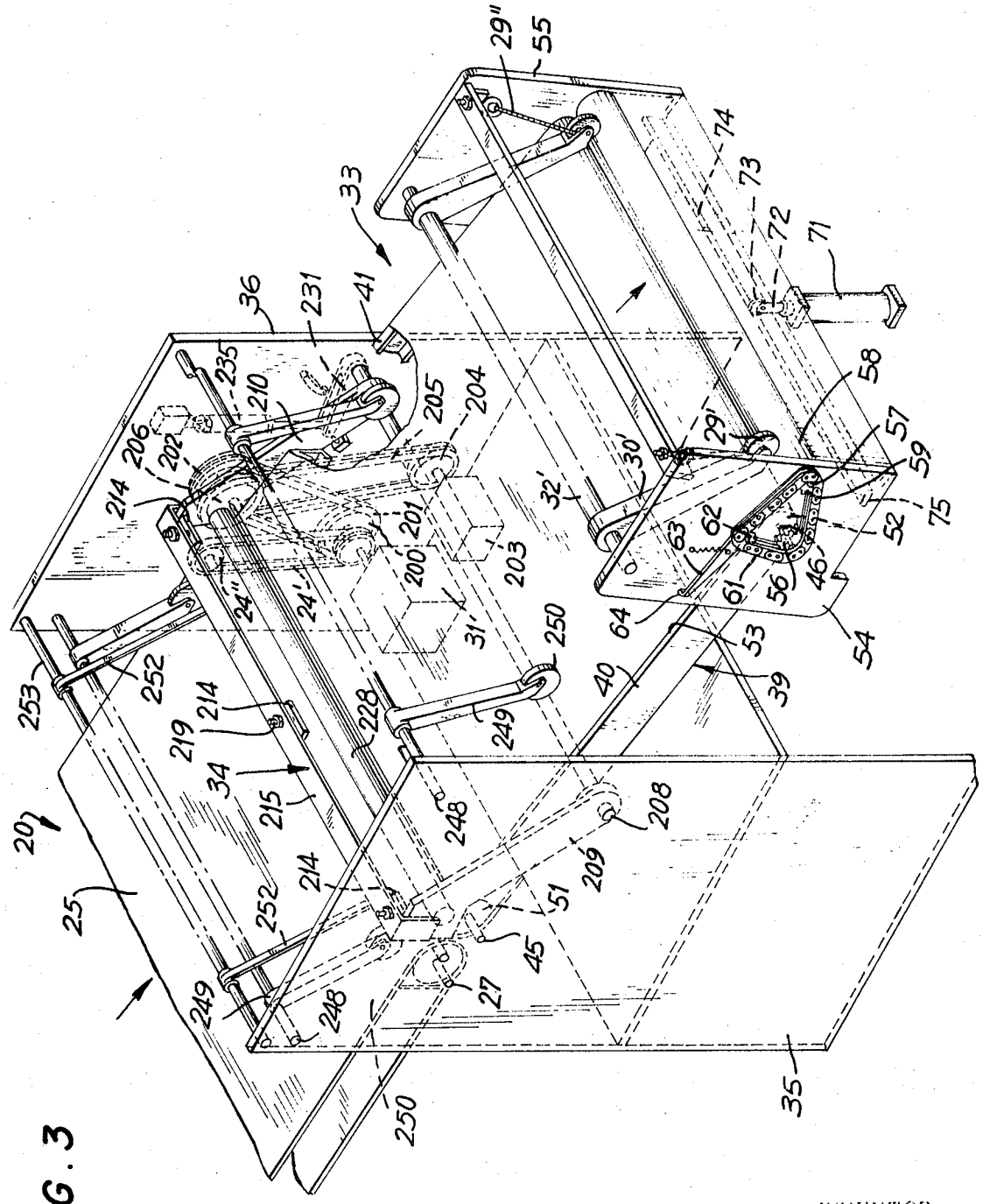


FIG. 3

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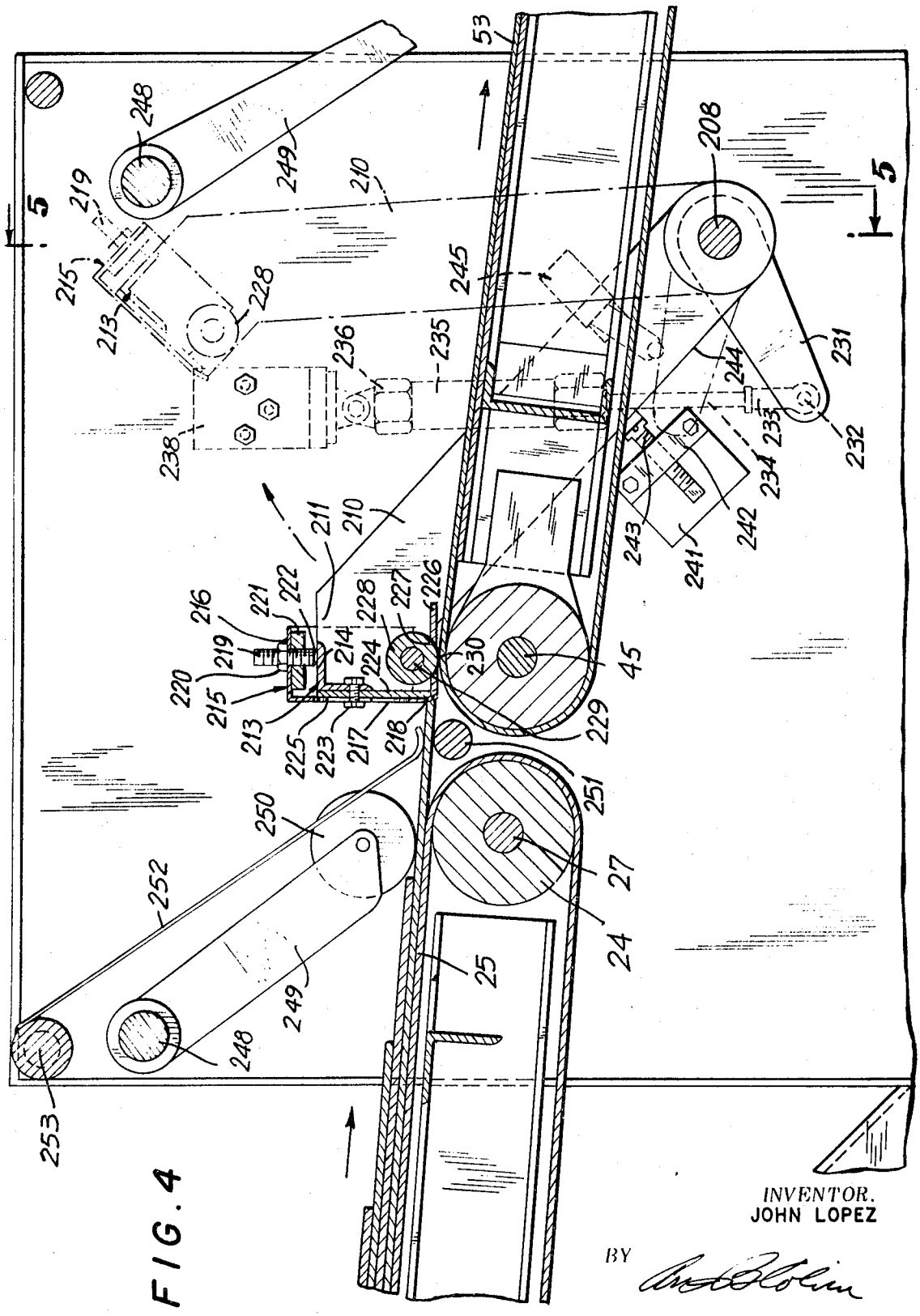


FIG. 4

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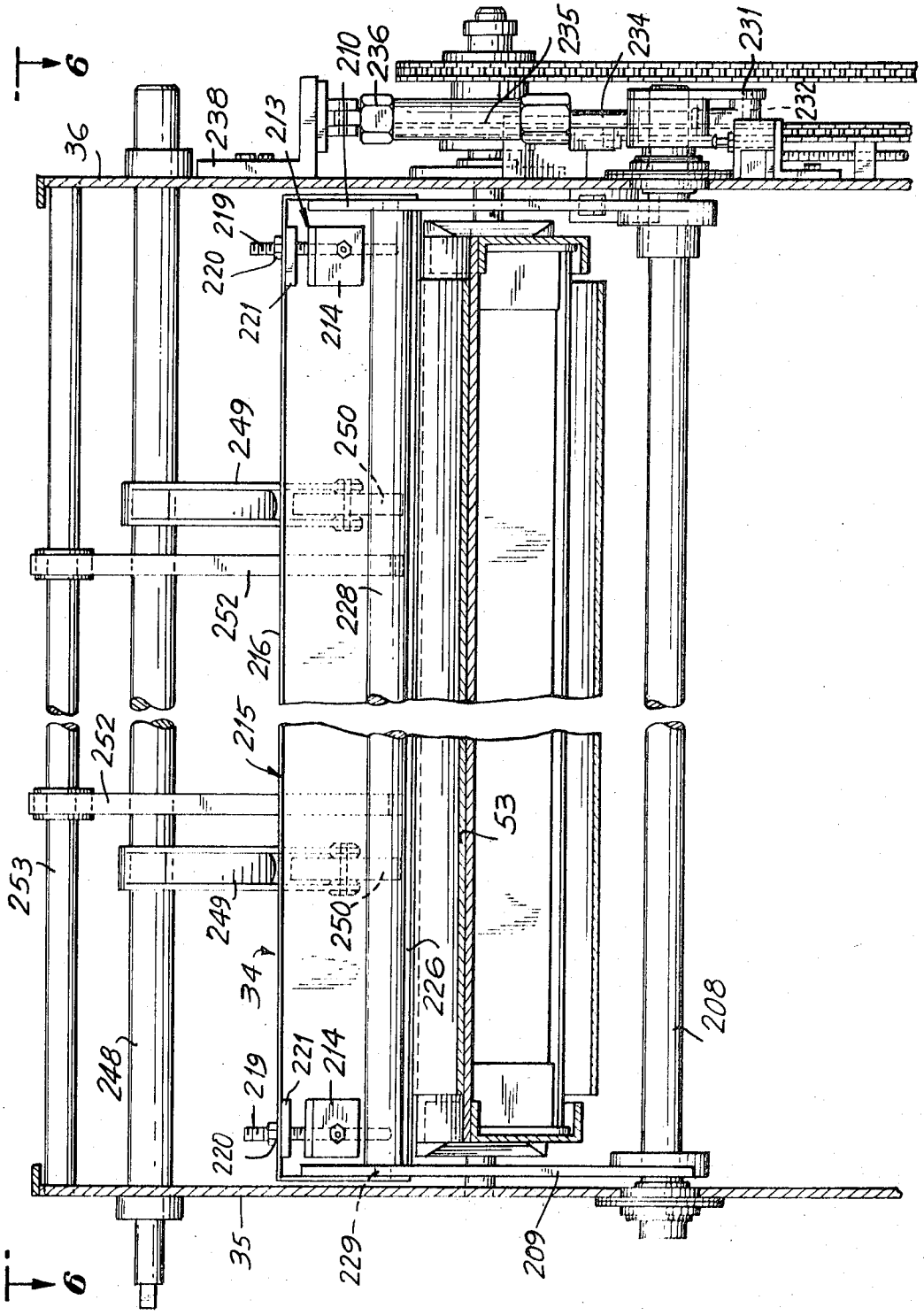


FIG. 5

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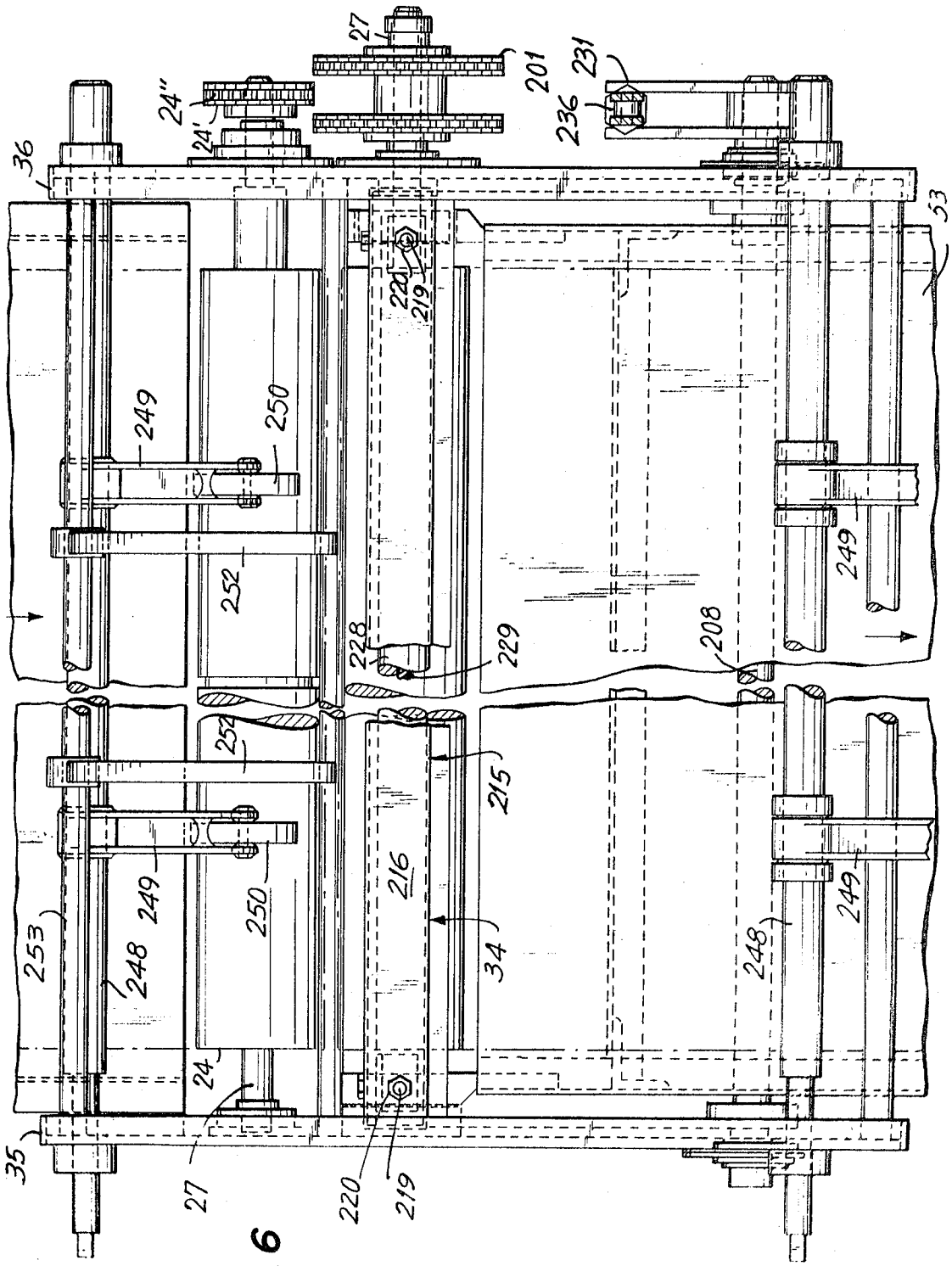


FIG. 6

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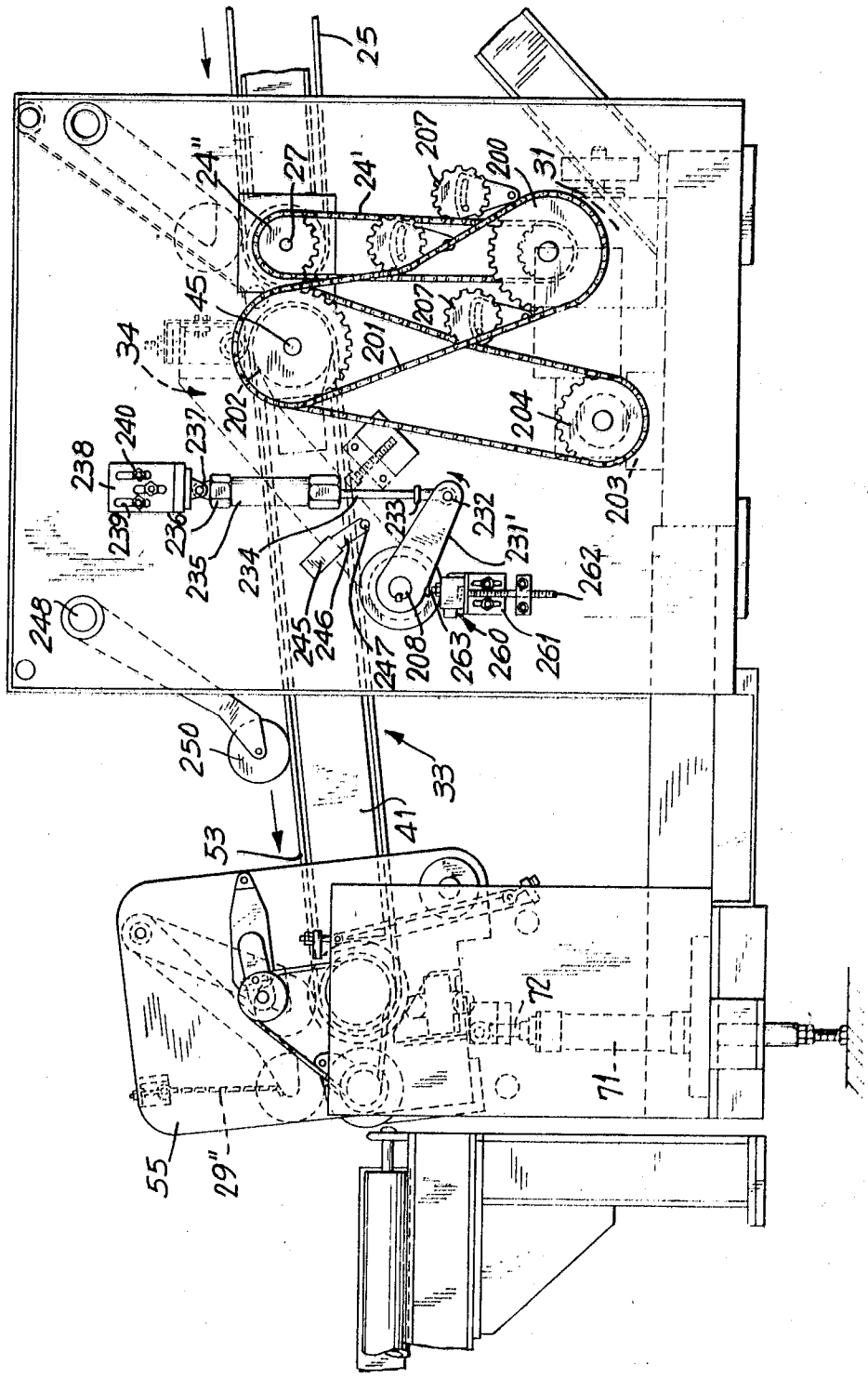


FIG. 7

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CONTROL ATTACHMENT FOR SHEET CONVEYING, STACKING AND DISCHARGE EQUIPMENT

CROSS-REFERENCE

This application is a continuation-in-part of my copending application Ser. No. 838,405, filed July 2, 1969, entitled "Sheet Conveying, Stacking and Discharge Equipment," now U.S. Pat. No. 3,547,024, issued Dec. 15, 1970.

In the aforementioned application, Ser. No. 838,405 there is disclosed apparatus for forming stacks of corrugated board emanating from a corrugated board fabricating machine. The corrugator machine forms a continuous strip of corrugated board at a relatively high rate of speed. The discharged strip is passed through slitters and cut off knives which respectively form parallel longitudinal strips and thereafter sever such strips transversely, to form a plurality of individual rectangular sheets or box blanks of the desired length and width. The slitters and cut off knives operate in synchronism with the corrugator, and discharge the sheets at a high rate of speed.

In order to speed the delivery while decreasing the actual rate of advance of the sheets or blanks, they are shingled or overlapped on a feed conveyor. The sheets are moved from the feed conveyor to a discharge conveyor, which carries the sheets from the feed conveyor to a stacking station, at which station the several adjacent stacks of sheets are formed.

The discharge conveyor in accordance with the above noted application is provided with a discharge end adjacent the stacking station which is heightwisely shifted in the course of the feed operation so that subsequently discharged sheets are disposed atop previously discharged sheets. When the height of the stacks of sheets at the stacking station has reached a selected level, it is necessary to interrupt the feed of sheets to the discharge conveyor to permit time for removal of the stacks at the stacking station.

In order to avoid interrupting the operation of the feed mechanism, corrugator, slitters, etc., the device of my copending application is provided with gate means which block continued feed of the sheets during the time that the stacked sheets at the stacking station are being removed. When the gate is in blocking position, the sheets engage against the gate means, and when the stacking station is cleared, the gate means is removed from obstructing relation between the feed and discharge conveyors, permitting the sheets which have been stacked against the gate to traverse the discharge conveyor and advance to the stacking station.

It will be evident, in view of the fact that the sheets may be of considerable size and weight, that a stack of sheets which has been carefully and accurately formed is far easier to handle than one which incorporates skewed or angularly related or inaccurately juxtaposed sheets.

As a corollary problem, if the adjacent stacks formed at the stacking station become interleaved, that is to say, if sheets from one stack become disposed between sheets of an adjacent stack, serial removal of stacks from the stacking station will be virtually impossible and the operation of the entire assembly must be interrupted, to permit separation of the stacks.

Obviously the problem of nonuniform stacks is magnified when automatic equipment is used to handle the stacks built up at the stacking station, since such equipment generally does not work satisfactorily with nonuniform stacks. A principal cause of nonuniform stacks is an interference or interaction between the gate unit and the sheets disposed against the gate during the period that prior stacks are being cleared from the stacking station. If, in the course of its opening movement, there is an interaction between the gate and the sheets or boards disposed against the gate, the stacks will become skewed, with the undesirable consequences previously noted.

In accordance with the copending application, there is disclosed, inter alia, a novel gate mechanism which permits efficient release of sheets stored adjacent the gate. The present invention is directed primarily to a further improvement in the gate mechanism, in combination with a device of the type set forth.

The present invention may be summarized as directed to an improved feeding device for advancing sheets in a selected direction, having a feed conveyor including an inlet and an outlet end, a discharge conveyor adjacent the outlet end and a gate interposed between the outlet end and the discharge conveyor and extending transversely across said conveyors, the gate being shiftable between blocking and unblocking positions and being pivotally supported for movement between said positions about a horizontal pivot axis. Powerized means are operatively connected to the gate for shifting the gate between said positions. The gate assembly is further characterized by the fact that all movements of the gate between the blocking and the unblocking positions include components of movement aligned with the direction of feed of the sheets as they advance from the feed conveyor to the discharge conveyor.

Accordingly, it is an object of the invention to provide an improved feed mechanism of the type described.

A further object of the invention is to provide a feed mechanism of the type described incorporating a novel powerized gate member, permitting release of sheets stacked thereagainst to a discharge conveyor, with a minimum of interference between the gate and the sheets so as to avoid any disorientation of the sheets.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, reference is made to the accompanying drawings forming a part hereof, in which:

FIG. 1 is an assembly view of a sheet feed device in accordance with the invention;

FIG. 2 is a perspective view of the feed conveyor, gate assembly, discharge conveyor and stacking station, details of the supportive framework having been eliminated for clarity of illustration;

FIG. 3 is a magnified perspective view of the gate portion of the apparatus.

FIG. 4 is a magnified vertical section showing details of construction of the gate assembly, and illustrating the blocking and unblocking positions of said gate;

FIG. 5 is a vertical section taken on the lines 5—5 of FIG. 4;

FIG. 6 is a top plan view taken in the direction of the arrows 6—6 of FIG. 5; and

FIG. 7 is a side elevational view of the machine components taken in the direction of the arrows 7—7 of FIG. 2.

Referring now to the drawings, the conveyor unit **20** as shown in FIG. 2 comprises a pair of longitudinally spaced, parallel rollers **23, 24** which mount an endless conveyor belt **25**. The rollers **23, 24** are mounted, respectively, on shafts **26, 27**, the roller **23**, for purposes of illustration, being an idler roller, and the roller **24** being driven by a drive chain **24'** in driving connection with a drive sprocket **24''**. It will be understood that the chain **24'** forms a portion of a synchronized drive system powered by motor **31**, see FIG. 7.

The conveyor **20** is associated with a sheet forming machine having an outlet conveyor C, with an associated pair of driven rollers R which discharge 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, resulting in a shingling or partial overlapping of the sheets B as they are discharged onto and advanced by the conveyor belt **25**. The sheet are maintained in the noted shingled relation by rollers **29** depending from arms **30** pivotally mounted on transverse rods **32** made fast to portions of the frame of the machine (not shown).

The conveyor belt **25**, which is continuously driven, is designed to discharge the sheets B 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 the conveyor **20** and the inlet end of the auxiliary conveyor **33**.

As shown in FIGS. **1** and **3**, a pair of upright, parallel frame 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**.

It will be understood that the motor 31 is driven at a speed coordinated with the speed of the corrugator and, hence, the speed of the discharge conveyor.

As shown in FIG. 3, the auxiliary conveyor 33 comprises a frame 39 including two parallel side beams 40, 41, retained in spaced parallel relation by transverse angle beams (not shown), adjacent the ends of the side beams 40, 41. Each end of each of the side beams 40 and 41 has bearing openings through which extend transverse shafts 45 and 46, respectively.

The shaft 45 extends through bearings in the parallel plates 35, 36, straddling the conveyor frame 39, the shaft 45 thus acting as a pivot mount for one end of the frame 39.

Shafts 45, 46 carry rollers 51, 52, respectively, the rollers being encompassed by an endless conveyor belt 53. Secured to the side beams 40 and 41 of the 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 the side plates and one end of the shaft 46 extends through the side plate 54, said extending end carrying a sprocket 56.

Also mounted between the sideplates 54, 55, forwardly of shaft 46 and roller 52, is a transverse shaft 57 to which is secured a roller 58. The shaft 57 extends beyond sideplate 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, the arm being normally spring urged upwardly to maintain 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 or idler rollers 29', each rotatably mounted at one end of an arm 30' pivoted on shaft 32' extending between plates 54 and 55. The rollers 29', as will be readily recognized, exert pressure against a sheet or box blank B passing between the roller 58 and the rollers 29'. Preferably a flexible chain 29'' extends between an arm 30' and a fixed portion of the frame, to control the degree of downward movement of the rollers 29'.

The frame 39 is pivoted about the shaft 45 by means of a hydraulic actuator 71, see FIG. 3, which actuator has a vertical piston rod 72 carrying a roller 73 at its upper 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 bodily pivoted upwardly about the shaft 45 acting as the pivot axis of the frame.

The drive mechanism for rotating shaft 45 is best seen in FIG. 7. This mechanism forms no part of the present invention, but may be described generally as a secondary drive sprocket 200 carried by the output speed reducer shaft of motor 31. The sprocket 200 is connected by a chain 201 to a complement sprocket 202 made fast to the shaft 45.

Optionally, but preferably, an auxiliary motor unit 203 is provided with a drive sprocket 204 connected by chain 205 to a secondary sprocket 206, including a clutch arrangement mounted on the shaft 45. The function of the auxiliary motor 203 is to permit a relative speed variation between the conveyor 53 and the conveyor 25, for purposes fully set forth in the above-referred-to copending application and the prior copending applications therein identified.

The chains 24', 201 and 205 may each be provided with a tensioning assembly 207 in the form of idler sprockets adjustably pressed against the chain flights to control the slack therein It will be understood that by this means a synchronized relation of feed is achieved in the various conveyors, which synchronized relation may be modified, if desired.

Further details of the drive mechanism need not be recited since the primary novelty herein resides in the gate assembly next to be described.

The gate assembly and its operation may best be understood by reference to FIGS. 2, 3, 4 and 7.

The gate assembly 34 is supported on a cross-shaft 208, the opposed ends of which are mounted in suitable bearings formed on the parallel plates 35, 36. A pair of gate arms 209 and 210 are keyed to the shaft 208 adjacent the inner faces of the plates 35, 36. It will be understood that the arms 209, 210 are disposed in parallelism and bear identical angular relations to the shaft.

The ends 211 and 212 of the arms 209, 210 are connected by a transversely extending angle iron 213, which is welded or otherwise rigidly secured to said ends. The transversely extending angle iron includes three horizontally spaced-apart adjustment ledges 214, 214, 214 (FIG. 3). A gate housing 215 is disposed in covering relation of the iron 213, the housing including an upper ledge 216 and a front face 217. The face 217 includes a dependent deflector lip 218 which is angularly downwardly directed, for purposes which will appear hereinafter.

As will be evident from an inspection of FIG. 4, the housing 215 may be upwardly or downwardly adjusted relative to the arms 209, 210. For this purpose, the upper ledge 216 of the housing is fitted with three depending threaded studs 219, in vertical registry with the adjustment ledges 214. The studs are threadedly directed through adjustment and lock nuts 220, the undersurface of the housing being provided with a reinforcement strut 221 through which the lower ends 222 of the studs 219 project.

From the foregoing description it will be evident that by upwardly or downwardly threading the studs 219 within their supports, the position of the lower ends 222 thereof are controlled. By this means the housing may be shifted upwardly or downwardly relative to the arms, thus to locate the vertical position of the depending lip 218 and other components of the housing with precision.

The housing may be locked in its desired adjusted position through the use of clamping bolts 223 which extend through front wall 224 of the angle iron. The front wall 217 of the housing is provided with a vertical slot 225 in registry with each bolt 223, to accommodate the vertical relative movement between the housing and the angle iron. After a desired adjustment is achieved through the use of the threaded studs 219, the bolts 223 which are loosened during the adjustment procedure, are merely tightened, thereby maintaining the housing in the desired position. To the front face 224 of the angle iron 213 is rigidly fixed a floor member 226 having a transversely extending opening 227. An idler roller 228 is mounted on shaft 229, journaled at its opposed ends in the arms 209, 210. A lowermost peripheral portion 230 of the roller 228 extends through the opening 227 and projects beneath the lowermost edge of the floor 226.

It will be appreciated that in the blocking position shown in solid lines, FIG. 4, the lower peripheral portion 230 engages against and rides on the belt 53 of the conveyor 33, to form a lower reference point for the gate mechanism.

As best shown in FIG. 4, the gate mechanism is shiftable between blocking and unblocking positions between the conveyors 25 and 53. In FIG. 4 the solid line position of the parts indicates the blocking position and the dot and dash lines indicate the unblocking position.

Mechanism for operating the gate is best understood by reference to FIGS. 3, 4 and 7. As seen in said figures, a pair of parallel crank lever members 231 are keyed to shaft 208, which supports arms 209, 210.

Stub shaft 232 links the distal ends of the levers 231, the shaft portions between the levers forming a trunnion or pivotal anchor for an end portion 233 fixed to the piston rod 234 of a double acting hydraulic or pneumatic cylinder 235. The other end 236 of the cylinder 235 is pivotally mounted at 237 to an adjustment bracket 238 bolted to parallel plate 36. The bracket 238 includes a plurality of vertically extending slots 239 which register with complemental holes formed in the plate 36, lock bolts 240 extending through the slots and the holes. It will be evident that the position and throw of the gate may be adjustably controlled responsive to the position of the bracket 238 relative to the plate 36.

A lower stop mechanism **241** (FIG. 4) may be mounted on the plate **36** to support the weight of the gate assembly, if it is desired that the roller **228**, in the lowered position of the gate, be spaced a slight distance from the conveyor belt **53**. The stop mechanism **241** includes a bracket **242** through which a headed bolt **243** is threaded in such manner that by adjusting the position of the head of the bolt relative to the bracket, the head may be made to engage against an undersurface **244** of the arm **210**.

The upper position of the gate is controlled by a limit switch assembly **245** fixed to the inner face of the plate **36**. This assembly includes a lever arm **246**, having a horizontal, inwardly directed finger **247** disposed in the path of the innermost crank arm **231'**.

It will be appreciated that as the gate is shifted from the lowered to the raised position, the crank arm **231'** will swing through an arc which intersects the finger **247**, tripping the switch mechanism **245** which controls a solenoid valve (not shown), which prevents further upward movement of the piston rod **234** within the cylinder **235**.

Limit switching mechanism is also provided for locating the gate member in its lowered condition. The lower limit switch assembly **260** includes a bracket **261** fixed to the plate **36**. An adjustment screw **262** extends through the bracket. The switch **260**, which may be either of the microswitch solenoid controlled type or of the direct valve actuating type is supported for heightwise adjustment on the adjustment screw **262**. The switch **260** includes a trip member **263** disposed in the path of crank arm **231'**, such that when the crank arm **231'** is rotated to its lowered position, it will engage against the trip **263** and interrupt further fluid flow into the cylinder **235**.

It will of course be appreciated that the cylinder **235** may be either of the hydraulic or the pneumatic type, mechanisms of either sort being suitable.

Optionally, but preferably, additional sets of holddown rollers are provided immediately preceding and following the gate, to hold the sheets or blanks against the conveyor belts **25** and **53**, respectively. Such holddown assemblies include a cross shaft **248**, depending roller support arms **249** and idler rollers **250**.

In the space between the terminal end of the conveyor **20** and the entry end of the conveyor **33**, there is disposed a transversely extending support roller **251** (FIG. 4), the distal ends of which are journaled for rotation within the plates **35**, **36**, see FIG. 4. The sheets, as they traverse the roller **251**, are pressed against the upper surface thereof by two or more of spring blades **252** mounted on fixed cross shaft **253**, the distal ends of which are secured to the plates **35** and **36**.

The auxiliary conveyor unit **33** above described, is designed to feed sheets of corrugated board into stacked relation on a takeoff unit **162**, for subsequent processing. The takeoff unit can be of any suitable type, such as shown in copending application Ser. No. 797,566, filed Feb. 7, 1969, now U.S. Pat. No. 3,527,460, issued Sept. 8, 1970 and forms no part per se of the present invention.

The operation of the apparatus will be readily understood from the foregoing description.

According to one application of the invention, the shingled sheets or boards B on the conveyor **20** are advanced toward the gate mechanism, which is normally in the up or unblocking position, to allow free communication of the sheets or boards from the conveyor **20** to the pivot conveyor **33**. The sheets pass from the one conveyor to the other beneath the various roller and spring holddown members onto the takeoff unit **162**.

It should be explained, although the same forms no part of the present invention, that the cylinder **71** is progressively filled as the feed continues, to induce an upward pivotal movement of the conveyor **33** adjacent the takeoff unit **162**, such that subsequently delivered sheets are disposed on top of previously delivered sheets, to form a neat stack. Due to the various holddown mechanisms juxtaposed over the conveyor **33**, skewing or lateral displacement of the blanks is prevented.

The rate of lift of the conveyor **33** is such as to assure that subsequently delivered blanks have only a very slight vertical distance to drop, thereby preventing floating of such sheets, which action might cause the resultant stack to be nonuniform.

Assuming that the stack has reached a desired height, the mechanism for shifting the gate from the upward position shown in dot and dash lines to the lowered position shown in solid lines in FIG. 4 is actuated. It will be appreciated that such actuation is effected by causing a fluid flow within the cylinder, to induce a downward movement of the piston rod **234**, with a concomitant anticlockwise movement of the crank levers **231**, as viewed in FIG. 4. When the crank levers are pivoted into engagement with the trip mechanism **263** of the switch **260**, further fluid flow is prevented, the gate then being in the solid line position shown in FIG. 4.

In this position the lower peripheral portion **230** of the roller **228** engages or rides closely adjacent the belt **53** of the conveyor **33**, thus to support the front face **217** of the gate in blocking relation of the path between the conveyors **20** and **33**. As best seen in FIG. 4, the lowermost blank or sheet will be projected against the downwardly angled lip **218** of the face **217**. Such orientation of the lip **218**, together with the downward pressing influences of the spring fingers **252** and the rollers **250**, prevent the sheets which are still being urged forward by the action of the conveyor from any tendency to climb upwardly over the gate. During the period that the stacked sheets are removed from the takeoff unit **162**, it will be appreciated that a supply of sheets will continue to accumulate against the front face **217** of the gate.

When the cylinder **71** has again been lowered and the takeoff unit cleared for the reception of further sheets, the gate-lifting mechanism is actuated to release the accumulated sheets previously stacked against the front face of the gate.

It is an important feature of the present invention that the shifting movement of the gate from the lowered or blocking to the lifted or free flow position be effected without interrupting, disturbing, dislodging or otherwise mispositioning the sheets stacked against the face **217** of the gate. Specifically, if in the course of lifting, the gates disorient any of the noted stacked sheets, it is evident that, at best, the sheets will pass in the same disoriented condition to the takeoff assembly. If the disorientation is sufficient, it will be evident that a jamming of the device may be expected, with the consequent necessity of shutting down the entire corrugator and feed mechanism, to permit the jam to be cleared.

Certain gate assemblies heretofore employed have been found, in the course of their lifting movement, to induce in some instances a concomitant lifting of the sheets, such that the feeding forces exerted on the trailing ends of the sheets produce a curling and climbing effect. It has been determined that the ability of the gate of the present invention to permit feeding without disorientation is due to the manner in which the gate moves from its blocking to its unblocking position.

More particularly, it is noted that the pivot shaft **208** on which the gate arms **209**, **210** are mounted is disposed at a height or vertical position below the lowermost portion **218** of the front face **217** of the gate. As a result of this relationship, even the initial movements of the gate from the blocking to the unblocking position include components of movement in the direction of travel of the sheets along the conveyors. In other words, and specifically with reference to FIG. 4, clockwise movement of the arms **209** and **210** from the blocking to the unblocking position includes right to left components of movement. It has been discovered that the normal tendency of the gate, upon lifting, to cause a concomitant lifting of the sheets is offset and, indeed, nullified, by the fact that there is some component of movement of the gate in the direction of the flow of the sheets.

Without limitation to any theory, it is believed that this desirable end result is due to the lowered friction with which the ends of the sheets are projected against the face of the gate, resulting from the simultaneous withdrawal or downstream movement of the gate as the gate is lifted.

When the gate is lifted, the accumulated sheets are shifted to the takeoff unit **162**. The pivotal conveyor **33** continues to rise, stacking additional sheets until the stacks have accumulated to the desired height, after which the operation is again repeated, i.e., the gate is again lowered to interrupt feed until the stacked sheets have been cleared, after which the pivotal conveyor is lowered and the gate is lifted, etc.

It will be evident from the preceding description that there is shown herein a simple and effective mechanism for rapidly transferring sheets from a forming and feeding station to a stacking station. In contrast to prior feed mechanisms, the device of the present invention has an improved gate control for blocking the feed of sheets during the stack unloading operations, without interrupting the preceding operations during such stack removal.

The gate mechanism exhibits substantially no tendency to disorient the sheets which are blocked from movement during the stack removal operation. While heretofore known gate mechanisms have been successful to a degree in counteracting such tendencies, the device of the present invention has been found more efficient in this respect, as well as less expensive to manufacture and simpler to adjust, maintain and operate.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A feeding device for advancing sheets in a selected direction comprising a feed conveyor having an inlet end and an outlet end, a discharge conveyor adjacent said outlet end, a gate member interposed between said outlet end and said discharge conveyor and extending transversely across said feed conveyor, yeildable holddown means adjacent said gate and aligned with said feed conveyor for urging said sheets against said feed conveyor, said gate member being shiftable between blocking and unblocking positions of said outlet end, a conveyor, ledge portion on said gate, said ledge portion, in the blocking position of said gate, being disposed in the path of sheets on said outlet end of said feed conveyor pivot means supporting said gate for movement between said positions about a horizontal pivot axis, powerized means operatively connected to said gate member for selectively disposing said gate in said blocking and said unblocking positions, said horizontal pivot axis being located in a plane below the level of said ledge portion whereby all movements of said gate from said blocking toward said unblocking positions include components in said selected direction.

2. A feeding device for advancing sheets in a selected direction comprising a feed conveyor having an inlet end and an outlet end, a discharge conveyor adjacent said outlet end, a gate member interposed between said outlet end and said discharge conveyor and extending transversely across said feed conveyor, said gate member being shiftable between blocking and unblocking positions of said outlet end, idler roller means on said gate, said roller means, in said blocking position, contacting said discharge conveyor thereby to support said gate, a blocking ledge portion on said gate, said ledge portion, in the blocking position of said gate, being disposed in the path of sheets on said outlet end of said feed conveyor, pivot means supporting said gate for movement between said positions about a horizontal pivot axis, powerized means operatively connected to said gate member for selectively disposing said gate in said blocking and said unblocking positions, said horizontal pivot axis being located in a plane below the level of said ledge portion whereby all movements of said gate from said blocking toward said unblocking positions include components in said selected direction.

3. A feeding device for advancing sheets in a selected direction comprising a feed conveyor having an inlet end and an outlet end, a discharge conveyor adjacent said outlet end, a gate member interposed between said outlet end and said discharge conveyor and extending transversely across said feed conveyor, said gate member being shiftable between blocking and unblocking positions of said outlet end, a blocking ledge portion on said gate, said ledge portion, in the blocking position of said gate, being disposed in the path of sheets on said outlet end of said feed conveyor, pivot means supporting said gate for movement between said positions about a horizontal pivot axis, powerized means operatively connected to said gate member for selectively disposing said gate in said blocking and said unblocking positions, said powerized means comprising a crank lever keyed to said gate member, and a double acting linear motor means interposed between said lever and a stationary frame portion of said conveyor, said horizontal pivot axis being located in a plane below the level of said ledge portion whereby all movements of said gate from said blocking toward said unblocking positions include components in said selected direction.

4. The device of claim **3** wherein said motor means comprises a hydraulic cylinder and piston.

5. A feeding device for advancing sheets in a selected direction, comprising a feed conveyor having an input end and an outlet end, a discharge conveyor adjacent said outlet end, a gate interposed between said outlet end and said discharge conveyor and extending transversely across the path between said conveyors, a stop ledge on said gate, pivot means extending in a horizontal plane below the plane of the top surface of said feed conveyor and supporting said gate for pivotal movement between blocking and unblocking position of the outlet end of said feed conveyor, and motor means operatively connected to said gate for shifting said gate and said stop ledge in an arcuate path between said positions.

6. The device of claim **5** wherein all the arcuate movements from said blocking to said unblocking position include vectoral components in said selected direction.

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