

[54] **APPARATUS FOR OVERTURNING
STACKED SHEET MATERIAL**

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[58] Field of Search **198/33 AD; 214/1 QA**

[56] **References Cited**

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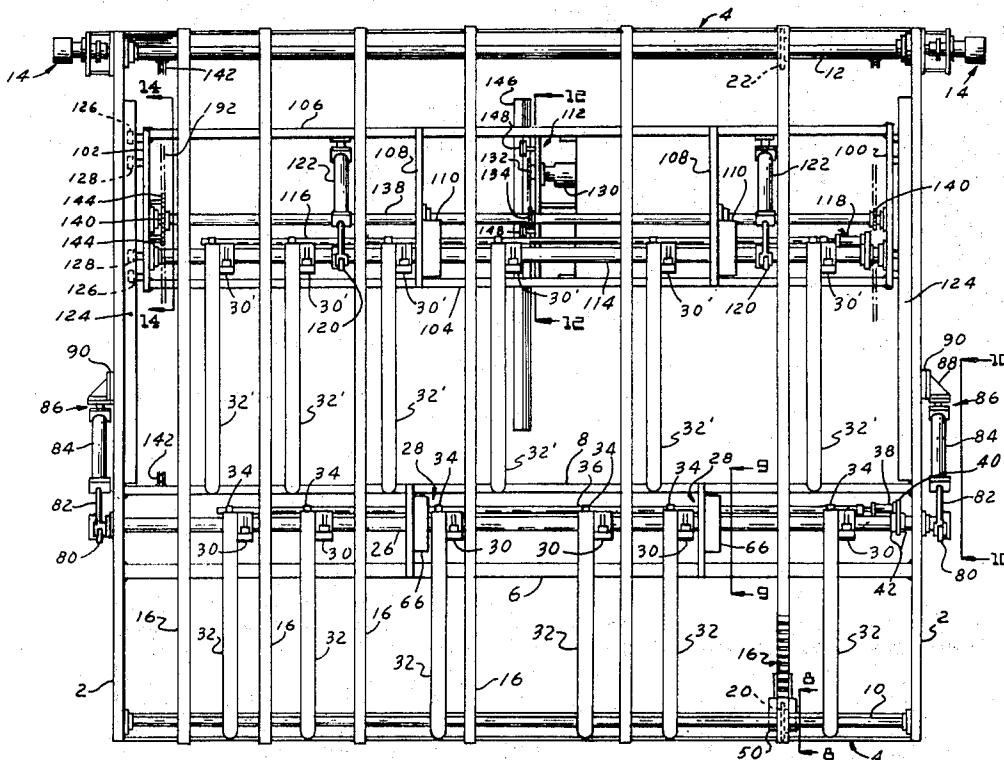
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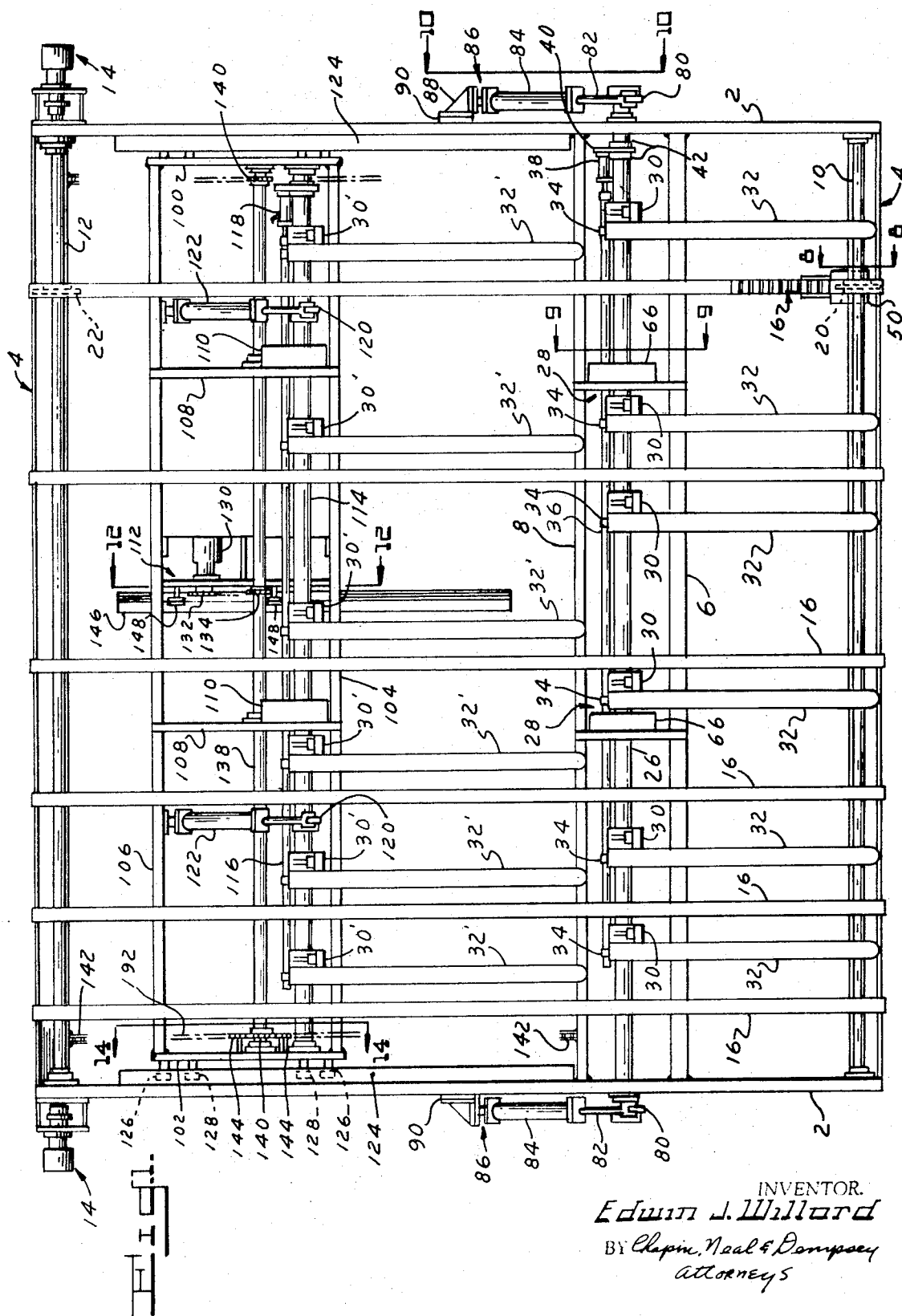
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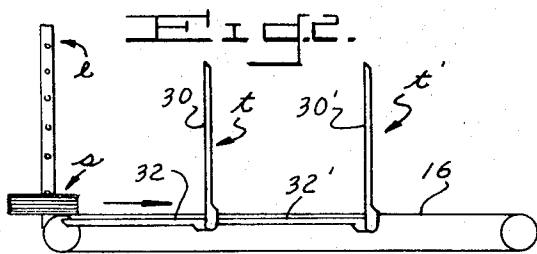
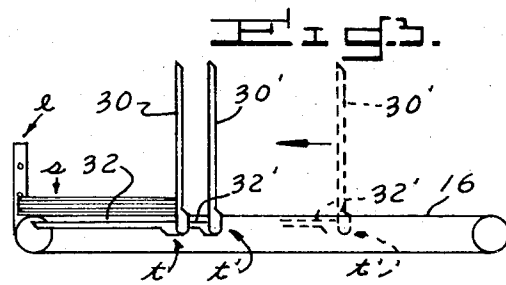
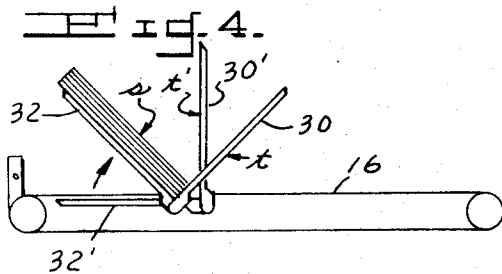
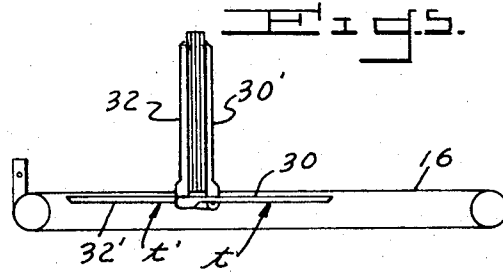
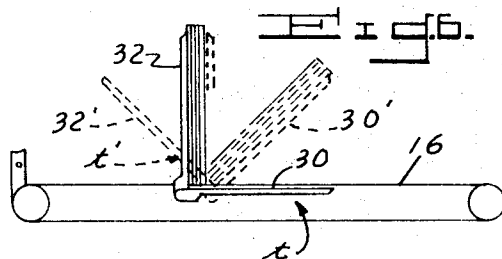
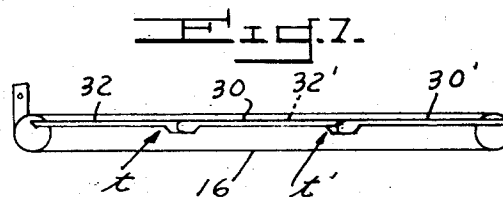
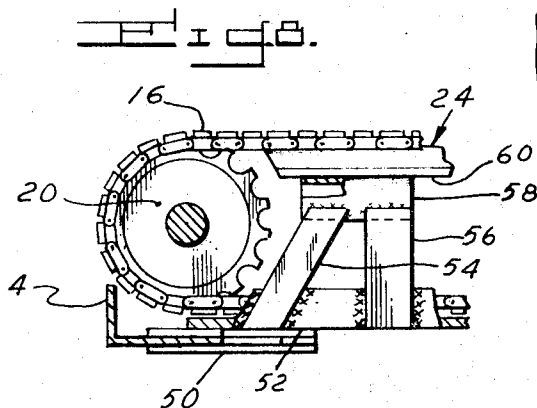
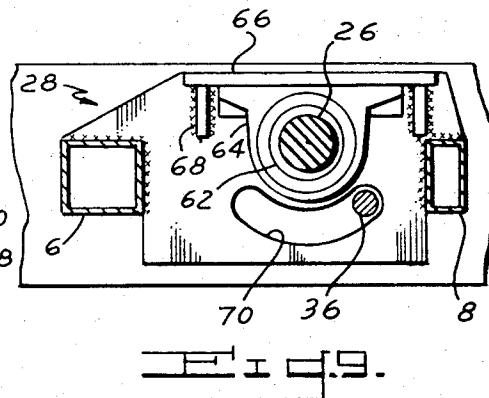
[57] **ABSTRACT**

Load turning conveyor apparatus, for overturning stacks of paperboard sheets and the like, having laterally spaced horizontally supported conveyor belts, load turning supports in upstream and downstream spaced relation and means to adjust the spacing thereof commensurate with the height of a stack, each support having two sets of load engaging legs pivotally movable upwardly through the belts to a vertical position above the belts and downwardly to a horizontal position below the belts, said legs being releasably engageable in right angled load engaging relation on each support, means for separately pivoting each support through an arc of 90° for rotating the upstream support and lifting a stack of sheets on edge and in position for the downstream support to rotate and lower said stack in overturned condition on the conveyor.

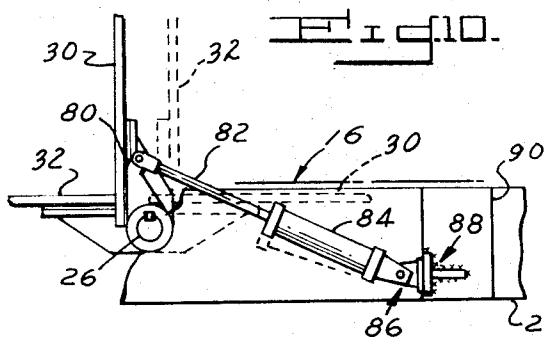
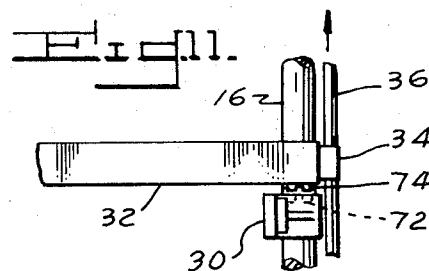
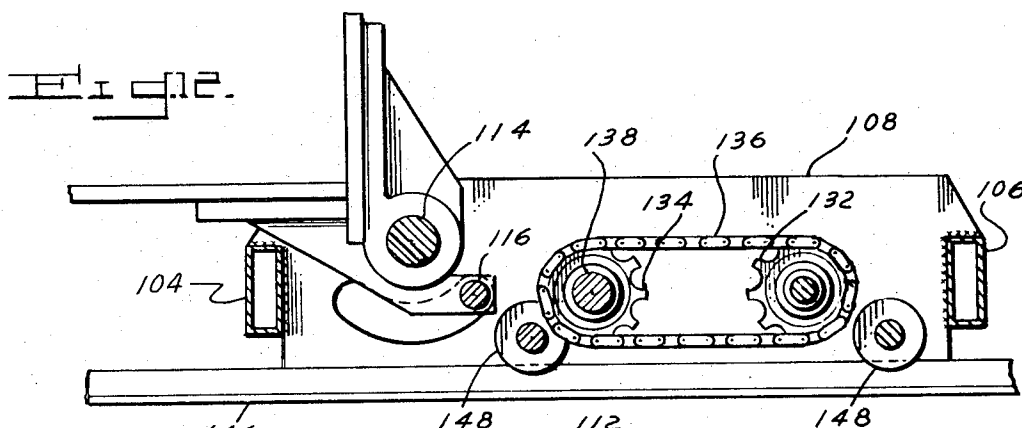
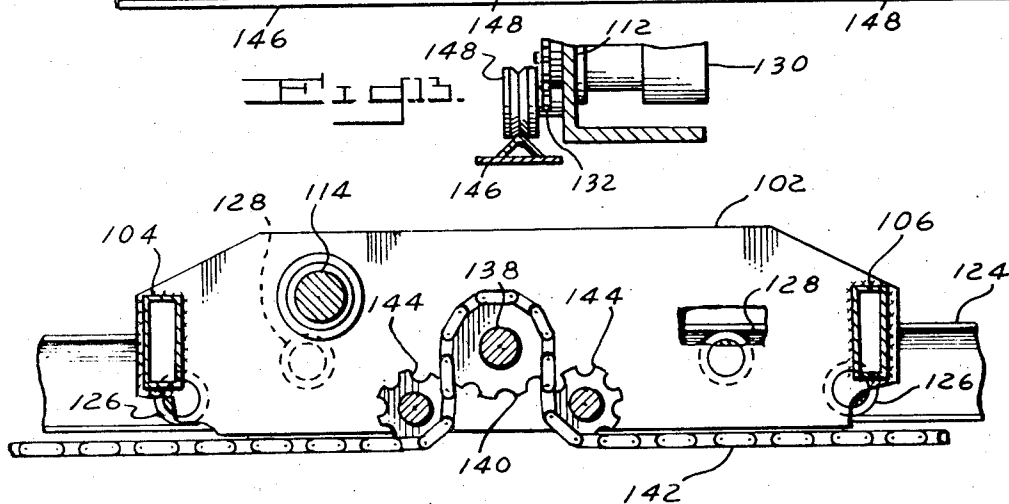
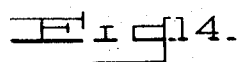
5 Claims, 14 Drawing Figures







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APPARATUS FOR OVERTURNING STACKED SHEET MATERIAL

INTRODUCTION

This invention relates to conveyor apparatus for overturning stacked bundles of cut blanks or sheets, particularly of paperboard material and the like such as large sheets of corrugated board stock commonly used for medium and heavy duty cartons, containers, and other varied purposes. More especially, the invention pertains to a conveyor and load overturning mechanism adjustable to accommodate sheets stacked in bundles of various heights and to turn such bundles upside down for proper orientation of the sheet surfaces as may be needed for subsequent processing machinery for treating the sheets or forming a desired end product. The invention is particularly designed to handle large rectangular sheet slabs having dimensions on the order of 105 by 180 inches and piled in stacks as high as 60 inches in height.

DESCRIPTION OF PRIOR ART

As will be recognized by those familiar with paperboard or corrugated board web forming machinery and related equipment the sheets are cut and gathered in stacks at the delivery end of a web former. Particularly with sheet stock for carton and box making purposes one side thereof will be finished to serve as an outer carton surface and thus this outside surface may be face up or face down as stacked. The carton blank forming, printing and other processing machinery which is to receive the sheets often requires the load to be turned in order to correctly orient the sheets for the desired operations. Under these circumstances the overturning of a stack of sheets has for the most part been done manually and in a piece-meal manner. Such machinery as has been available commercially for turning large loads is relatively cumbersome, elaborate, and costly, the stack being conveyed into the mouth of a U-shaped cradle type of unit and the cradle pivoted 180° to then deposit the load on a delivery conveyor. Furthermore, in such apparatus a clamping pressure is exerted on the top and bottom sheets and accordingly some of the material may be damaged and rendered unusable.

Insofar as is known the nearest prior art relating to apparatus of the present invention is disclosed in U.S. Pat. No. 3,297,174 for "Apparatus for Stacking Sheet Material" in which a turning device, having right angled load tilting support assemblies mounted in fixed longitudinally spaced relation, turns small batches of sheets alternately for piling the batches in a fixed stack and to prevent the sheets from warping while stored for an indeterminate period. The device is not adapted to overturn large stacks of sheets, nor is it designed for handling stacks of various heights without dismantling and re-fitting at least one of the supports.

Accordingly, it is an object of the present invention to provide apparatus for handling large full loads of stacked sheets which may be on the order of 5 feet high and to do so without risking injury to the sheets and also to provide mechanism for ready adjustment to handle stacks of less than full height. Another object is to provide for easily rendering the turning mechanism inactive in the event a load or series of loads on the conveyor line does not require turning action.

SUMMARY OF THE INVENTION

In carrying out the invention in the preferred form a conveyor table is provided to serve as a section of the infeed conveyor line leading to a processing machine, for example, a printer. The table frame is fitted with a series of laterally spaced endless belt members which are supported in a horizontal conveyor plane. Longitudinally spaced upstream and downstream load-tilting or turning supports are carried on the frame for rotation on an axis below the conveyor surface, each support including paired sets of support legs movable between the belts to upright and horizontal positions and mounted for releasable engagement at right angles to each other. In horizontal position the legs lie below the conveyor belt surface and all legs may be so located to eliminate turning operations. When perpendicularly engaged the load support planes of the legs intersect in a radially offset relation above the pivotal axis of the supports and a load is thus carried entirely above the belt surfaces during a major portion of turning movement. The upstream support is preferably mounted in fixed relation to the frame, the downstream support being mounted on a movable carriage to adjust the spacing between supports and thus handle stacks of varying height. The upstream support operates to lift and turn a stack onto the leading edges of the sheets, whereupon the downstream support picks it up and completes the overturning by depositing it onto the conveyor. The present unit is particularly adapted to existing processing machinery in a factory layout, to provide versatility, and may in fact be adapted to operate in either direction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a conveyor load turning apparatus embodying the present invention;

FIGS. 2 to 6, inclusive are diagrammatic views illustrating the operational sequence of the load turning mechanism;

FIG. 7 is a diagrammatic view showing the turning members collapsed and disposed for optional use of the apparatus as an ordinary conveyor;

FIG. 8 is a view on line 8—8 of FIG. 1 showing details of a conveyor belt mounting structure;

FIG. 9 is a view as on line 9—9 of FIG. 1 showing bearing mount structure for the turning support shafts;

FIG. 10 is a view on line 10—10 of FIG. 1 showing means for pivoting a turner support shaft and illustrating the relationship of the load engaging legs with respect to the shaft axis and conveyor belt surface;

FIG. 11 is a fragmentary view illustrating a releasable clutch engaging connection between load engaging legs of each pivotable support;

FIG. 12 is a view on line 12—12 showing motor drive shaft connections for the movable carriage on which the downstream support is carried for adjusting the spacing between the supports;

FIG. 13 is a fragmentary detail view showing the carriage motor mounting; and

FIG. 14 is a view on line 14—14 of FIG. 1 illustrating the carriage mounting on the table frame and tracking means for adjusting the position of the carriage and movable support.

DESCRIPTION

Referring first to FIGS. 2-6 an operating cycle of the load turning apparatus will be first described in connection with the handling of a load of less than the full size for which the unit is designed. In these views it will be noted that the right angled legs of the upstream load turning support, as the legs (30,32) of turner *t*, are pivoted on an axis below a conveyor 16 level and at a fixed longitudinally spaced location with respect to the infeed end, while the pivotal axis (similarly located) of the legs (30',32') of the downstream load turning support or turner *t'* may be moved longitudinally of the conveyor path so as to vary the spacing between the upright legs of the two turning supports. The spacing between the upright legs as seen in FIG. 2 indicates a maximum spacing therebetween. As will be appreciated, this spacing corresponds to the height of the largest load (i.e., stack of sheets) capable of being handled in the unit.

In FIG. 2 a stack of sheets *s* of less than full capacity is shown entering the upstream end of the unit. At this end a sensing means, as an electric eye scanner at *e*, may be located to sense the height of an entering load and thereby actuate mechanism for moving turner *t'* forwardly towards turner *t* and into a position of spaced relation therewith approximately equal to the load height. The conveyor continues to run until the load *s* abuts the upright legs of the turner *t* and the conveyor then stops. As indicated by FIG. 3 the turner *t'* meanwhile is moving forwardly until the full-line position is reached. At this time turner *t* is then actuated to start pivoting the load onto its front edge as indicated by FIG. 4. When fully pivoted to a 90° position as shown by FIG. 5, it is embraced between legs of the two turners. After the load is so disposed, turner *t'* is then actuated to pivot the load as in FIG. 6 and lower it onto the conveyor in a fully overturned condition. As soon as the load again rests fully on the table conveyor, the latter is again operated to discharge the load from the delivery end of the unit. Also, as soon as this load passes beyond the underlying legs of the turners, both turners *t* and *t'* may be pivoted back to their initial positions as illustrated by the full line showing in FIG. 3. It will be readily understood that where loads of the same height are being successively received for overturning, the actuating mechanism may be set to retain the positional spaced relation between the load turning supports as in FIG. 3, and without again returning turner *t'* to a position of maximum spacing (FIG. 2).

In FIG. 7 the legs of each turner are shown as lying in a 180° relationship below the conveyor level to illustrate as will be described that the table assembly may be converted to bypass and eliminate any load turning action and thus be available for use as an ordinary conveyor whenever desired.

Referring now to FIG. 1, a load turning table is shown in top plan with suitable rigid side and end frame members at 2 and 4. The side members 2 may be of rectangular box beam construction and the end members 4 may comprise angle irons fixed as by welding to the ends of the side members. A pair of intermediate cross beams at 6 and 8 are also shown fixed between side members 2. Beams 6 and 8 are also interconnected by bracing supports at 28 as will be later described. This rigid table framework supports various parts of the

device and the table surface may be positioned at any desired vertical elevation by suitable supporting leg members (not shown).

At the entrance or infeed end of the table a rotatably mounted cross shaft 10 extends between the sides 2, and a shaft 12 is similarly mounted at the downstream delivery end. Shaft 12 also serves as the table conveyor drive and each end thereof extends through bearing supports on opposite side members 2, the shaft being positively driven as by motors at 14 suitably mounted as shown on the outboard side of the table. Shaft 12 drives the conveyor members for advancing the stacks or bundles of sheets along the table, such members comprising a series of laterally spaced endless chain conveyor belts 16. Each belt passes around a sprocket as at 20 fixed on shaft 10 and around a sprocket 22 of shaft 12. The belts are supported against sagging along the upper run thereof by elongated rail members 24 (see FIG. 8) mounted as will be later described.

At the upstream section of the table between cross beams 6 and 8 a cross shaft 26 is mounted between the side frames for pivotably actuating the upstream load turning support legs. Shaft 26 is also supported in bearings carried by the reinforcing brace members 28 (see also FIG. 9) which extend between and are welded to beams 6 and 8.

On shaft 26 (FIG. 1) are carried a series of laterally spaced pairs of load turning legs 30 and 32. Legs 30, vertically disposed as shown by FIG. 1, are suitably fixed on shaft 26 to rotate therewith. Adjacent each leg 30 is a leg 32 mounted for rotatable and slidable movement on the shaft, the legs 32 being horizontally disposed in FIG. 1. In operative relation, legs 32 lie at approximately a 90° angle to legs 30. In the position shown by FIG. 1, legs 32 extend horizontally in the direction of the upstream or infeed end of the table, the load engaging surfaces thereof lying in adjacent planar relation below the plane of the conveyor belts 16. In such operative relation the hubs of each pair of legs 30 and 32 are clutched together and, as will be apparent, the legs may be rotated in unison on rotation of shaft 26 to lift and tilt the load in the initial turning operation.

Each leg 32 is further provided with an apertured projection 34 depending from its hub portion and in the opening of which a clutch actuating rod 36 is fixed. Rod 36 connects the legs 32 together for simultaneous lateral shifting movement in order to clutch and declutch each pair of legs. At one end rod 36 is fixed to a piston rod of an actuating cylinder at 38, the cylinder being carried on a bracket plate 40 rotatably mounted on shaft 36 between a pair of collars 42. When the cylinder is actuated to extend the piston rod from the position shown by FIG. 1, rod 36 will shift to the left and carry legs 32 with it to move from clutched engagement with legs 30. Shaft 26 is then free to rotate relative to legs 32. In this condition shaft 36 may thus be turned to pivot legs 30 from a vertical position towards the downstream table section and to lie in a horizontal position immediately below the conveyor belt level. It will be noted that the mounting bracket plate 40 for cylinder 38 is freely rotatable on shaft 26, and thus no angular movement of rod 36 or legs 32 will occur when legs 30 are pivoted as described. The downstream load turner means as will be more specifically described below is similarly constructed for a like positioning of

legs at 30' and 32'. The table is thus available for optional use as a simple conveyor if desired and as previously indicated in connection in FIG. 7.

FIG. 8 illustrates the mounting of an elongated rail member 24 supporting a conveyor chain belt from end to end as referred to above. Rails 24 for each belt may be suitably mounted on bracketing structure anchored to the angle iron end frame members 4. An anchoring platform shelf indicated at 50 may be welded on the inner edge of the angle iron 4 (see also FIG. 1). On the shelf 50 is fixed one end of a U-shaped channel member 52 extending to the other end of the table and similarly anchored at that end. The member 52 serves to support the return run of a belt. Adjacent belt sprocket 20 angled bracket legs 54 and vertical legs 56 are welded to the outer side faces of the U-shaped channel element 52 and between the upper ends thereof is supported a mounting pad 58 in the form of an inverted U-shaped element. On pad 58 is seated one end of a lower cross piece portion 60 of the rail member 24. The rail is in the form of an inverted T with the upstanding leg providing a tracking means on which the sprocket chain of the conveyor belt rests for travel in a supported horizontal path. The mounting bracket structure for rail 24 thus straddles the return run of the conveyor belt chain, and the belt 16 conveyor surfaces are accordingly positively supported at the desired table level. The belts 16 may be conveniently formed with blocks or cleats fixed to the chain links as best shown by FIG. 8 and provide a preferred conveyor supporting surface for carrying a stacked load of sheets.

In FIG. 9 the bracing plate 28 assembly previously mentioned is shown with its additional bearing support for the rotatable shaft 26 on which upstream turning legs are mounted. The plate 28 is notched at its end portions for welding securely to the cross beams 6 and 8. The bearing for the shaft at 62 is carried as by a depending portion 64 of a bearing mount having its upper portion 66 fixed on mounting pieces 68 which in turn are welded to the side of the plate. A 90° arcuate slot 70 is also formed in the plate for pivotal movement of clutch rod 36 when shaft 26 is rotated on its axis to lift a load of sheets on its edge as above outlined. In addition when legs 32 are de-clutched from legs 30 and are freely rotatable on shaft 26, rod 36 (connecting legs 32) will engage the end of slot 70 and prevent displacement of legs 32 from horizontal position.

In FIG. 11 an illustrative showing of a clutch connection between the hubs of legs 30 and 32 is indicated. As will be apparent the hub of the upright leg 30 may be keyed to the shaft in any suitable manner for rotation therewith. As shown the hub of leg 30 may further be provided with socketed recesses at 72 to receive facing lugs at 74 projecting from the hub of leg 32 and adapted to lock the hubs together when rod 36 is actuated to provide the clutched relation for rotating both legs together.

In FIG. 10 means are illustrated for pivoting shaft 26 and legs 30 and 32 through the 90° arcuate movement. Outwardly of side frame members 2 at each end of shaft 26 (see also FIG. 1) a cylinder actuated crank arm 80 is keyed to the shaft. The outer end of each arm is pivotally linked to a piston rod 82 of an operating cylinder 84 pivotally carried as at 86 by an angled bracket 88 welded to pad 90 of the side frame member

2. As will be apparent piston rod 82 may be retracted to rotate shaft 26 and swing the turner legs 30 and 32 between the full line and dotted line positions and thus turn a load on edge (as seen in FIGS. 4, 5). As previously mentioned the downstream load support legs may then be rotated to complete the load turning cycle. As seen from the dotted line position of FIG. 10 legs 30 are horizontally disposed below the conveyor belt level indicated at 16 and substantially in an in-line 180° relation to the full line position of leg 32.

From FIG. 10 it will also be noted that the support comprising the shaft 26 and legs 30 and 32, is designed to elevate a load above the table conveyor level during the major portion of the arcuate 90° travel. Legs 30 and 32 are carried on the hub structure thereof with the load contacting surfaces lying in tangentially disposed planes offset from shaft 26 as clearly indicated in FIG. 10. With the legs clutched in right angled relation the planes of the contacting surfaces of the legs intersect along a line immediately below the table conveyor level and in radially offset relation to the axis of shaft 26. Thus, on initial rotation of shaft 26 this line of intersection will very shortly be carried above the conveyor level and remain over it until near the end of the 90° travel. Accordingly, during the major portion of arcuate movement when pivoting loads, the sheets will be entirely elevated above the conveyor belts. The lowermost sheets of the bundle will thus clear the conveyor belts before any harmful movement of the sheets takes place against the belts during the initial lifting and tilting action of the arms. Such contact would otherwise take place since the load will of necessity shift forwardly as a result of pivotal action. Similarly, when a load is lowered by arms 30' and 32' the lowermost sheets will be almost horizontal before depositing the load back in the conveyor belts.

Referring now to the downstream support for completing a load turning operation, the shaft with legs mounted thereon is carried on a longitudinally movable carriage frame. As above outlined the adjustment of the longitudinal spacing between the two supports accommodates various load heights. It will be noted from FIG. 1 that the downstream legs at 30' and 32' are laterally offset relative to legs 30 and 32. Thus, when the horizontal legs 32' are shifted forwardly by the carriage as will be described clearance is provided for overlapping the corresponding horizontally disposed upstream legs 32. The upstanding vertical legs at 30 and 30' are likewise offset. Legs 30 may accordingly be rotated without interference with legs 30' and be lowered to rest horizontally below the conveyor belts and transfer a load to the downstream legs as above described.

The frame for the movable carriage on which the legs 30' and 32' are assembled comprises a pair of side plates 100 and 102 rigidly connected by front and rear beam members 104 and 106. These beams are further reinforced by intermediate plates at 108 which are slotted and carry shaft bearing mounts as at 110, similar to the plate 28 and intermediate bearing mounts 64 of the upstream frame plates as seen from FIG. 9. A centrally positioned motor support, as at 112, is also welded between beams 104 and 106 and, as will be described, carries a motor to shift the carriage for the desired positionally spaced location of the turner.

Mounted between bearings on the side member 100 and 102 and in the forward portion of the carriage is the downstream load turning shaft 114 on which legs 30' and 32' are mounted in the same manner as that previously described in connection with legs 30 and 32. The legs 32' are interconnected by clutch rod 116 actuated by piston cylinder 118 which is hung on shaft 114 in the same fashion as the corresponding cylinder 38 for clutching and declutching the upstream legs. Crank arms at 120, actuated by piston cylinders at 122, are also provided to pivot shaft 114, the cylinders 122 being carried on the rear beam 106.

The carriage is slidably supported at each end thereof for longitudinal shifting movement in channel-shaped runways or tracks at 124 fixed along the inner face of the table side frame members 2. Tracks 124 are U-shaped in form and pairs of rollers 126 and 128 at the ends of studs projecting from the sides 100 and 102 engage the same for tracking purposes. As best seen from FIG. 14, the endmost rollers 126 engage the lower flange of the track 124 while rollers 128 engage the upper flange thereof.

A reversible motor at 130 (FIGS. 1 and 13) provides the power to drive the carriage to a desired appropriate spacing between upstream and downstream supports. The motor is mounted on the vertical wall of the cradle support 112 fixed between end beams 104 and 106. A sprocket 132 on the end of the motor shaft drives a sprocket 134 by chain 136 (see also FIG. 12), sprocket 134 being fixed on a carriage drive cross shaft 138 extending between and journaled at its ends in bearings of the carriage side plates 100 and 102. Inwardly of the sides 100 and 102 on shaft 138 sprockets 140 are also fixed. As best seen in FIG. 14 each sprocket 140 engages a link chain 142 which is looped over the top thereof, the pair of sprockets at 144 also carried by the side members insuring positive engagement between the chain 142 and sprocket 140. Each chain 142 is anchored at its downstream end to angle iron 4 and at its forward end to cross beam 8. Thus, by actuating motor 130 the carriage is readily shiftable to change its position relative to the upstream support and thus conform the spacing between turner legs to the height of a particular load of stacked sheets.

At the center of the movable carriage and adjacent the motor drive assembly an inverted V-shaped rail 146 may be provided for additional tracking purposes. As shown by FIGS. 12 and 13, grooved rollers 148 are mounted on stud shafts extending from the vertical wall of the support 112 and engage rail 146, the rail being anchored in any suitable manner on mounting structure at the underside of the table (not shown).

The actuating mechanism for operating the various components of the apparatus embodying the invention disclosed herein may be triggered by any suitable control means (not shown) as may be desirable. It will be understood such control means may furthermore be modified to fit particular circumstances under which an apparatus is used. For example, where an assembly is installed as part of a delivery conveyor along which loads of a uniform size are passed and changes in load height are infrequent, the control circuitry may be designed without various sensing means such as the electric eye detector to automatically adjust the carriage position. Installations under other operating con-

ditions as where short runs of various size loads are received, one after another, and some of which may not need overturning, will require a greater amount of circuitry in order to obtain automatic operation to the fullest degree and without the need for more than periodic attention by an operator.

It may be noted the apparatus described may easily be added for use with existing processing machinery as in a corrugated carton manufacturing plant and without requiring the costly relocation of such machinery in order to take advantage of the automatic load turning. The unit as disclosed is primarily intended for handling full stacks or loads of sheets for continuously feeding a relatively high speed processing machine as a printer, stitcher or blank cutting machine. However, in the event any given product feeding operation were to require a turning of a single sheet only, or two or three sheets at a time, the unit is adjustable for that purpose. The conversion to a simple conveyor has been described above and as will be evident from the drawings larger size sheets may extend beyond the side edges of the conveyor platform. In addition, where found desirable in a given plant lay-out to provide for conveyor travel, with or without load turning, in both directions it will be appreciated that the unit may be equipped to reverse the conveyor drive and pivot the legs in a reverse sequence.

What is claimed is:

1. Conveyor table load turner apparatus for overturning bundles of stacked blanks of sheet material comprising,

a table having a series of laterally spaced horizontally supported conveyor belts,

a pair of longitudinally spaced bundle turning supports, each support including a transversely disposed rotatable shaft below said belts and two sets of bundle engaging legs carried in spaced relation on each shaft for releasably positioning the legs at approximately 90°, and when fixed in such position being rotatable to tilt a load vertically through a 90° path of movement, each said set of legs being movable between said belts and to and from an upright position and a position generally parallel to and below the conveyor path of said belts, and means to pivot said supports for said 90° movement,

one set of said leg members being fixed to each shaft, the other set being rotatably mounted on the shaft for movement to and from said 90° relationship with the first set and an in-line relationship therewith below said conveyor path, each of said rotatably mounted legs being paired with and in adjacent side by side relationship to a leg of said fixed sets of legs, and each such pair of adjacent legs having opposed releasably interfitting hub surfaces forming a leg clutch means engageable at said 90° relationship for releasably fixing each rotatable leg with respect to the shaft for rotation therewith, and a common clutch actuator mechanism therefor,

said common actuator mechanism including a clutch rod connecting each rotatably mounted set of legs and means for reciprocally shifting said rod and moving said rotatably mounted legs into and out of clutched engagement with the fixed legs,

the bundle contacting surfaces of said sets of legs lying in a tangential planar relation to the shaft axis and defining in said 90° position of the legs a line of planar intersection lying in upwardly offset relation from the shaft axis immediately below said conveyor belt surface at each limit of said 90° pivotal movement of the support shaft to thereby carry the end edges of a bundle of sheets above said conveyor belt level for the major portion of said tilting movement, and

a movable carriage frame carrying one of said bundle turning supports, and said pivot means and common clutch actuator means associated therewith, said frame extending between the sides of said table and being slidably supported thereon for longitudinal movement toward and away from the other support, and means on said table engaging said carriage for adjusting the spaced relation of said supports to correspond with the height of a bundle to be overturned.

2. Load turner apparatus as set forth in claim 1, in which,

said carriage on which the movable support is carried, is positioned in a downstream position relative to the other support,

said 90° swinging movement of the set of legs fixed on each shaft for rotation therewith is between an upright vertical position above the conveyor level and a horizontal downstream related position below the conveyor level,

whereby rotation of said shafts in de-clutched condition of said rotatably mounted sets of legs enables both sets of legs to lie disposed below the conveyor for optional use of the latter as an ordinary conveyor.

3. Load turner apparatus as set forth in claim 2, in which,

the corresponding sets of load engaging legs of the rotatable upstream and downstream shafts are

laterally offset from each other to provide clearance for a longitudinal overlapping of said legs when the carriage is moved to adjust the spacing between said supports and when the shafts thereof are rotated to move one of said sets of corresponding legs through said 90° angular path.

4. Load turner apparatus as set forth in claim 6, in which,

the rotatable shaft of a support member at the upstream section of the conveyor is mounted in side frame members of the table,

said means to pivot the shaft includes shaft crank arms mounted thereon outwardly adjacent said frame members and

piston cylinder actuating means mounted on the table frame members connected to said crank arms to rotate said shaft,

the rotatable shaft of the other longitudinally movable support member at the downstream section of the conveyor is mounted in bearings fixed at opposite sides of said carriage, and

said means to pivot the shaft includes shaft crank arms mounted thereon inwardly of the carriage sides,

and piston cylinder actuating means mounted on said carriage connected to said latter crank arms to rotate said shaft.

5. Load turner apparatus as set forth in claim 4, in which,

said carriage includes fore and aft cross beams between the table side frame members and side plates having roller members projecting therefrom and engaging facing channeled runway guides fixed to the opposing table side frame members,

said rotatable shaft on which the load turning legs are carried is disposed between said carriage side plates adjacent the forward beam, and

said piston cylinder shaft actuating means is mounted on said rear cross beam.

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