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GUIDEWAY FOR DOCUMENT SORTING MACHINES

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Fig. 1.

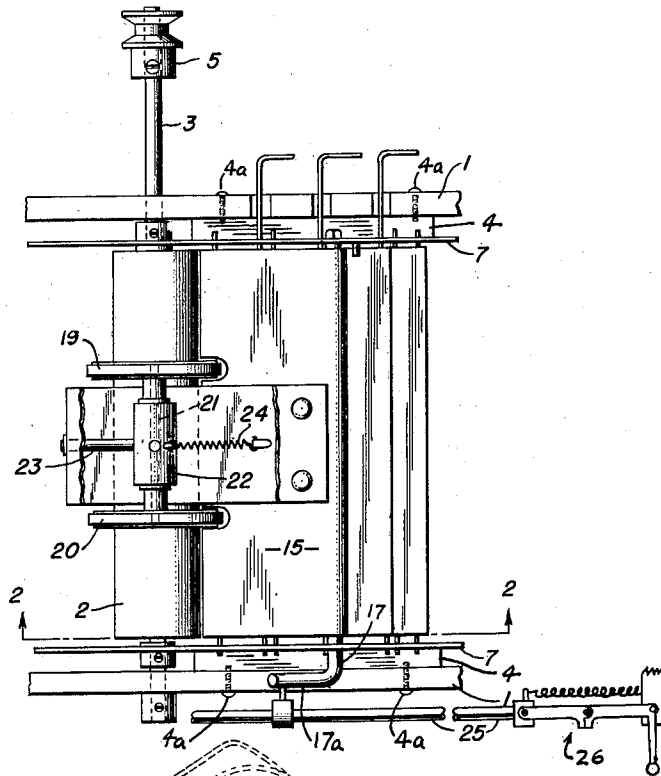
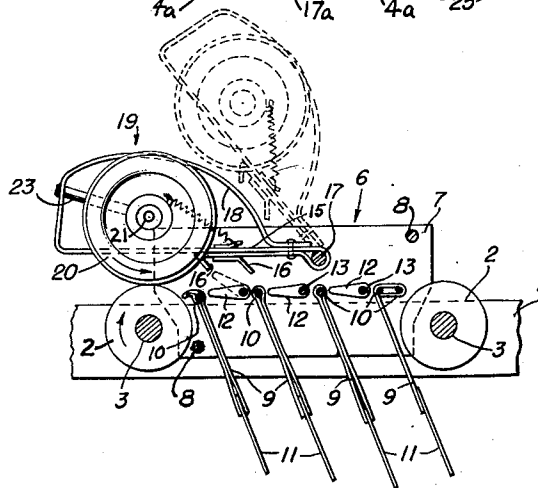


Fig. 2.



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GUIDEWAY FOR DOCUMENT SORTING MACHINES

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This invention relates to an improved guideway construction for document sorting machines of the type disclosed in U. S. Letters Patent No. 2,707,569 issued to LeRoy J. Benson and dated May 3, 1955.

The term "documents" as used herein refers to sheet-like articles generally, such as checks, vouchers, receipts, paper money, and the like.

An object of my invention is to provide a guideway construction in which the conveying rolls automatically align themselves to feed the documents being sorted in a straight path along the guideway.

Another object of the invention is to provide a guideway construction whereby the damage to any document which becomes jammed in the guideway is minimized.

Yet another object is to provide a guideway construction which allows convenient access to all portions of the guideway for the purpose of clearing documents which become stuck or jammed in the guideway.

A further object of the invention is to provide a sectional guideway construction which will allow convenient and rapid replacement of any portion of the guideway which is not operating properly in order that the machine may be returned to operating condition in a minimum amount of time.

A preferred embodiment of my invention is illustrated in the accompanying drawing in which:

Figure 1 is a top view of one section of the guideway showing part of one element broken away for the better showing of other elements; and

Figure 2 is a cross-sectional side view of Figure 1 taken along the line 2-2.

Referring to the drawing, two horizontal rails 1 form a track frame extending the entire length of the guideway, and driving rollers 2 are mounted between the rails 1 at spaced intervals upon transverse shafts 3 which are journaled in rails 1 by suitable bearings, not shown. One end of each shaft 3 has a pulley 5 mounted thereon and the shafts and attached rollers are all driven in the same direction by belts from a line shaft which is not shown. The rollers 2 may be formed of any material having a relatively low coefficient of friction, such as steel, but preferably are formed of a material such as laminate-reinforced phenolic material because of easier fabrication and quieter operation.

Mounted between the rollers 2 are removable guideway sections 6 which are supported by the rails 1 and form the floor of the guideway between the rollers 2. Each guideway section is composed of two side plates 7 which are held in spaced relation by tie-rods 8. On the outer face of each side plate 7 is secured a horizontal bar 4 arranged immediately adjacent the rails 1. Each section frame (formed of plates 7, tie-rods 8 and bars 4) is removably supported between rails 1 by screws 4a passing through rails 1 and threaded in bars 4. A series of double-wall transverse partition members 9 are supported between plates 7 by transverse rods 10 and engage opposite faces of the upper end portions of the bin walls 11 to form a continuation thereof. The openings thus

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formed are closed by gate members 12 which are pivotally mounted at their trailing edges by means of transverse rods 13 journaled in plates 7. These gate members normally are in a horizontal position but may be tilted to a raised position indicated by dotted lines in Figure 2, and in this position the gate serves to deflect a document being conveyed along the guideway into the bin associated with the gate member. In order to raise the gate members 12, each transverse rod 13 has an actuating lever at one end thereof, as by bending one end portion 14 at a right angle to the main portion of the rod. Each lever 14 is connected to an operating solenoid which is not shown.

When the gate members 12 are in the horizontal position they form a substantially continuous floor for the guideway between the rollers 2 and a portion of each driving roller forms a section of the guideway floor.

Mounted above the gate members 12 is a horizontal cover member or plate 15 having a series of deflector baffles 16 mounted on the underside thereof. These deflector baffles are positioned to cooperate with the gate members 12 so that the upper edge of a gate when in the raised position will be immediately behind a baffle. Thus, when the gate member 12 is in the raised position, the leading edge of the gate member is located behind and above the lower edge of the corresponding deflector baffle 16. The cover member 15 is pivotally mounted at its rear edge by a transverse shaft 17 journaled in plates 7, and that portion of the cover member which is wrapped around shaft 17 forms the deflector baffle for the last gate member in the guideway section.

Mounted on the upper side of cover member 15 and extending forwardly thereof is a lead frame 18 which supports an idler presser roll in a position to bear on driving roller 2. The presser roll is formed of two wheels 19 and 20 having an edge portion formed of rubber or similar material having a relatively high coefficient of friction and joined by an axle 21. The axle 21 is journaled in a bearing 22 which is suspended from the lead frame 18 by a strut or tether member 23 having its forward end pivotally connected with the forward portion of frame 18 and its rear end secured to the mid-point of bearing 22. One end of a tension spring 24 is attached to the bearing 22 at its mid-point on the upper side thereof, and the other end is attached to the cover plate 15 in a position to hold the axle 21 parallel with the axis of driving roll 2.

Since the bearing 22 can move a limited amount in any direction about the front end of the trailing strut 23 as a pivot point, and the only restraining force is that applied by tension spring 24, the idler presser roll is yieldably urged against the driving roller 2 when the cover member 15 is in the horizontal position and the two wheels 19 and 20 bear against driving roller 2 with equal pressure. Thus, any document entering between driving roll 2 and the presser roll is fed straight along the guideway instead of being turned to one side or the other by unequal pressure between different portions of the presser roll and the driving roll.

In order to hold the cover member 15 in the horizontal position, or to raise it to a vertical position (shown in dotted lines in Fig. 2) to allow free access to the guideway if it becomes necessary to clear a jammed document, transverse shaft 17 has one end portion 17a bent at a right angle to the main portion of the shaft to serve as an actuating lever. The actuating levers 17a on all of the cover plates 15 extend upwardly at an angle of about 45° to the horizontal when the cover plates are horizontal, and all the levers 17a are operated simultaneously by a single actuating bar 25 which is connected to each lever by a pivot pin 25a. By shifting the bar 25 longitudinally, the cover plates may be moved from the horizontal position to the vertical position. A suitable latch, such as

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the toggle-action linkage 26 holds bar 25 in the normal position, with the plates 15 locked in horizontal position, and a spring may be provided to hold the bar in its actuated or unlocked position.

In operation, the cover plates 15 are locked in the horizontal position by linkage 26 and the idler presser rolls are yieldably urged against driving rollers 2 by tension springs 24. Driving rollers 2 drive idler wheels 19 and 20 until a document being sorted is fed between the two rollers. At this point, the idler roll ceases to be driven by driving roller 2, but the idler roll has sufficient momentum to feed the document forward until it passes between the driving roller and the idler roll in the next section of the guideway. As previously mentioned, the two wheels 19 and 20 bear against driving roller 2 with equal force and so the documents are fed forward in a straight line.

Should a document become jammed for any reason, the idler roll will come to a standstill and, as long as wheels 19 and 20 are separated from driving roller 2, they will have no further tendency to feed the document forward and thereby crumple or tear it. The driving roller 2 continues to rotate, but since it is formed of a material having a relatively low coefficient of friction, it will slip on the surface of a jammed document and have very little tendency to damage the document.

I claim:

1. A guideway construction for a document sorting machine comprising a pair of parallel rails, a plurality of driving rollers journaled between said rails at regular intervals along the length thereof, and a plurality of unitary guideway sections removably mounted on said rails between said driving rollers, each unitary section comprising a pair of side walls and a floor joined together in a unitary structure independently of said rails, and a presser roll mounted in each guideway section in a position to have rolling engagement with one of said driving rollers.

2. A guideway construction according to claim 1 wherein said driving rollers have surfaces of relatively low coefficient of friction and said presser rolls have surfaces of a relatively high coefficient of friction.

3. A guideway construction according to claim 1 and including means pivotally supporting each of said presser rolls for movement away from said driving rollers and into a position elevated above said guideway.

4. A guideway construction according to claim 1 wherein a plurality of tiltable gates are embodied in the floor of each unitary guideway section, a cover plate mounted above said gates in parallel relation with said floor, means hinging said cover plate for tilting about an axis at its trailing edge, and means resiliently supporting the presser roll on said cover plate adjacent the front edge thereof.

5. A guideway construction according to claim 4 wherein each cover plate is pivotally supported by a shaft passing through said side walls and having an actuating arm carried by one end thereof, an actuating bar connected to all of said actuating levers for simultaneously raising said presser rolls from engagement with said driving rollers.

6. A guideway construction for sorting machines comprising a pair of side walls, a plurality of hinged gates forming sections of the floor of said guideway and extending transversely of said side walls, said gates being tiltable from a closed horizontal position to an open position, a cover plate arranged horizontally over said gates and in spaced relation thereto, a deflector baffle for each of said gates carried by said cover in positions to deflect articles downwardly in front of the corresponding gate when the gate is in open position, and means pivotally mounting said cover plate on an axis along one edge thereof transversely of said side walls, whereby said cover plate may be tilted from a horizontal position to a sub-

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stantially vertical position to provide access to said gates.

7. A guideway construction for document sorting machines comprising a driving roller disposed transversely of said guideway, a plurality of hinged gates embodied in the floor of said guideway adjacent said driving roller, and being movable from a closed position to an open position, a hinged cover plate disposed in spaced relation to said hinged gates and carrying a deflector baffle for each of said gates, said cover plate being movable from a locked position to a raised position whereby in said locked position said deflector baffles cooperate with the corresponding hinged gates when in the open position to deflect a document being sorted and in said raised position convenient access to documents which have become jammed in said guideway is provided, and an idler roller carried by said cover plate and yieldably urged against said driving roller when said cover plate is in said locked position.

8. A guideway construction for document sorting machines comprising a driving roller disposed transversely of said guideway, a pivotally mounted support frame mounted transversely of said guideway and movable from a locked position to a raised position, an idler roller mounted on said support frame and yieldably urged against said driving roller when said frame is in said locked position, said idler roller being raised from said guideway to provide convenient access thereto when said frame is in the raised position, said idler roller comprising two laterally spaced wheels connected by an axle, and including a trailing strut pivotally mounted at the forward end thereof to said frame so that the rear end thereof is capable of free movement laterally as well as vertically, said axle being journaled in a bearing mounted at the rear end of said strut, and a tension spring connecting said bearing with said frame at a point rearwardly of said axle.

9. A guideway construction for document-sorting machines comprising a guideway along which documents are to be conveyed, a driving roller disposed transversely of said guideway, driving means rotating said roller for conveying documents along said guideway in a given direction, an idler roller mounted in rolling contact with said driving roller and serving to press the documents against said driving roller as they move along said guideway, said idler roller comprising two laterally spaced wheels connected by an axle, a bearing member having said axle journaled therein for rotation of said idler roller about the axis of said axle, a tether member rigidly secured to said axle and extending rearwardly therefrom with respect to the direction of movement of said documents, and means for pivotally securing the rear end of said tether member for pivotal movement of the bearing member and tether member about a fixed point, whereby said idler roller is free to move about said point both laterally and vertically and to assume a position parallel with the axis of said driving roller.

10. A guideway construction in accordance with claim 9 wherein the peripheries of said spaced wheels are composed of material having a relatively high coefficient of friction and the periphery of said driving roller is composed of material having a relatively low coefficient of friction.

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