United States Patent

Wilson

[15] **3,658,170**

[45] **Apr. 25, 1972**

[54] DOCUMENT CONVEYING MEANS

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[22] Filed: **July 13, 1970**

[21] Appl. No.: **54,404**

[52] **U.S. Cl.** **198/131**

[51] **Int. Cl.** **B65g 15/00**

[58] **Field of Search** 161/53; 101/415.1; 24/204, 24/DIG. 18; 139/37; 128/DIG. 15; 198/41, 131, 198

[56] **References Cited**

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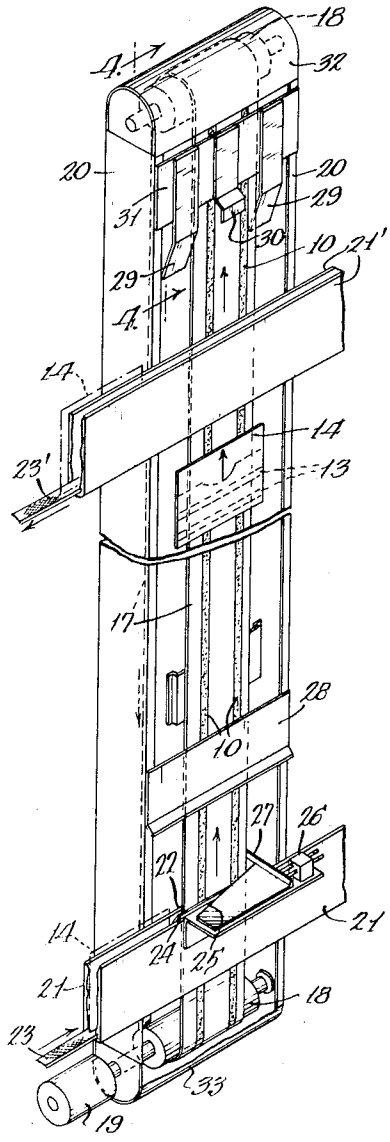
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[57] **ABSTRACT**

Vertically and/or horizontally traveling conveyor belt and a pocket member for conveying documents, one of said belt and document conveyors having fixed thereto pile fabric and the other complementary hook fabric whereby the conveyor can be releasably secured to and separated from the belt when desired.

5 Claims, 5 Drawing Figures



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2 Sheets-Sheet 1

Fig. 1.

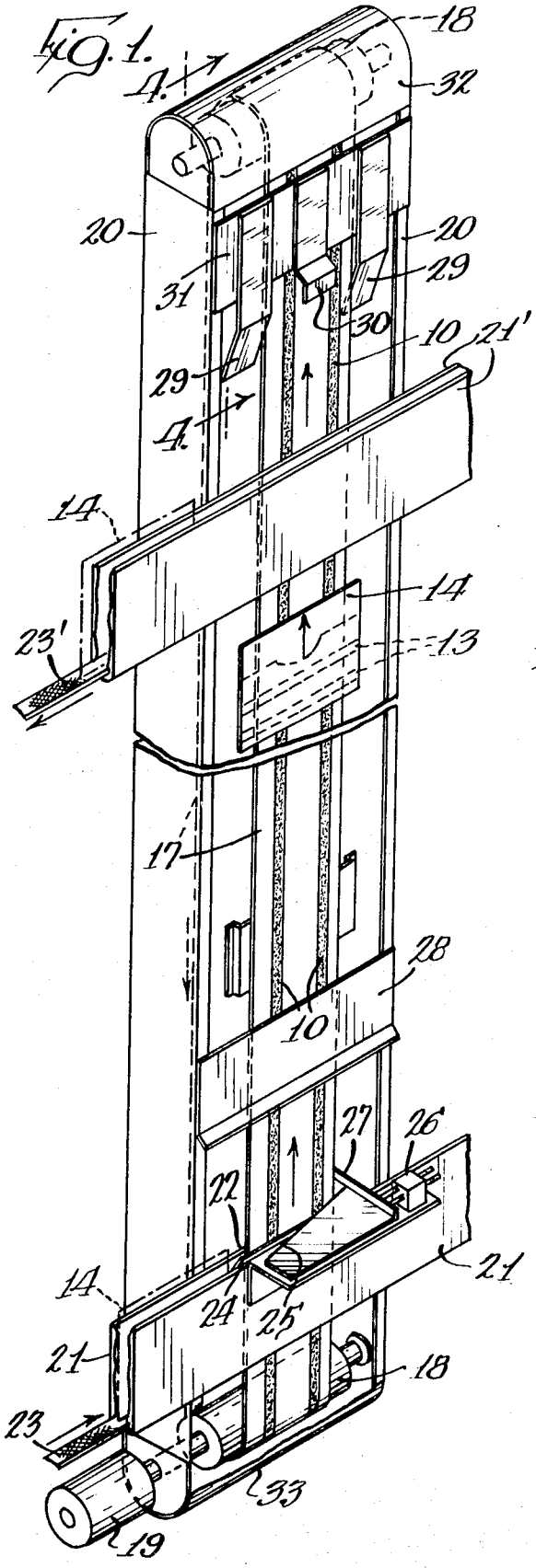


Fig. 2.

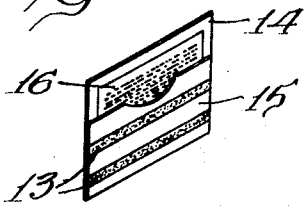


Fig. 3.

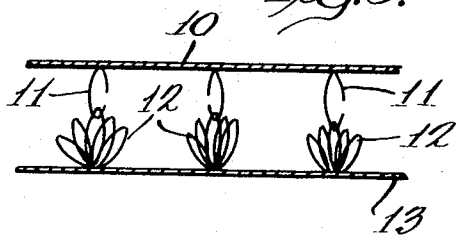
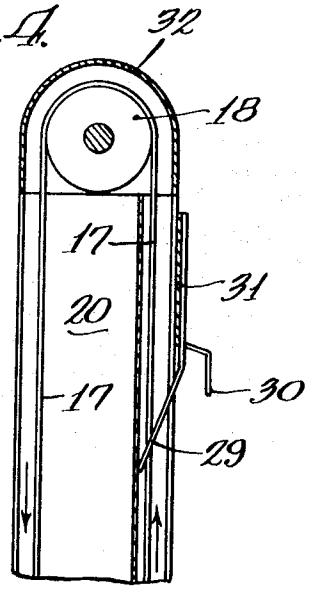


Fig. 4.



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2 Sheets-Sheet 2

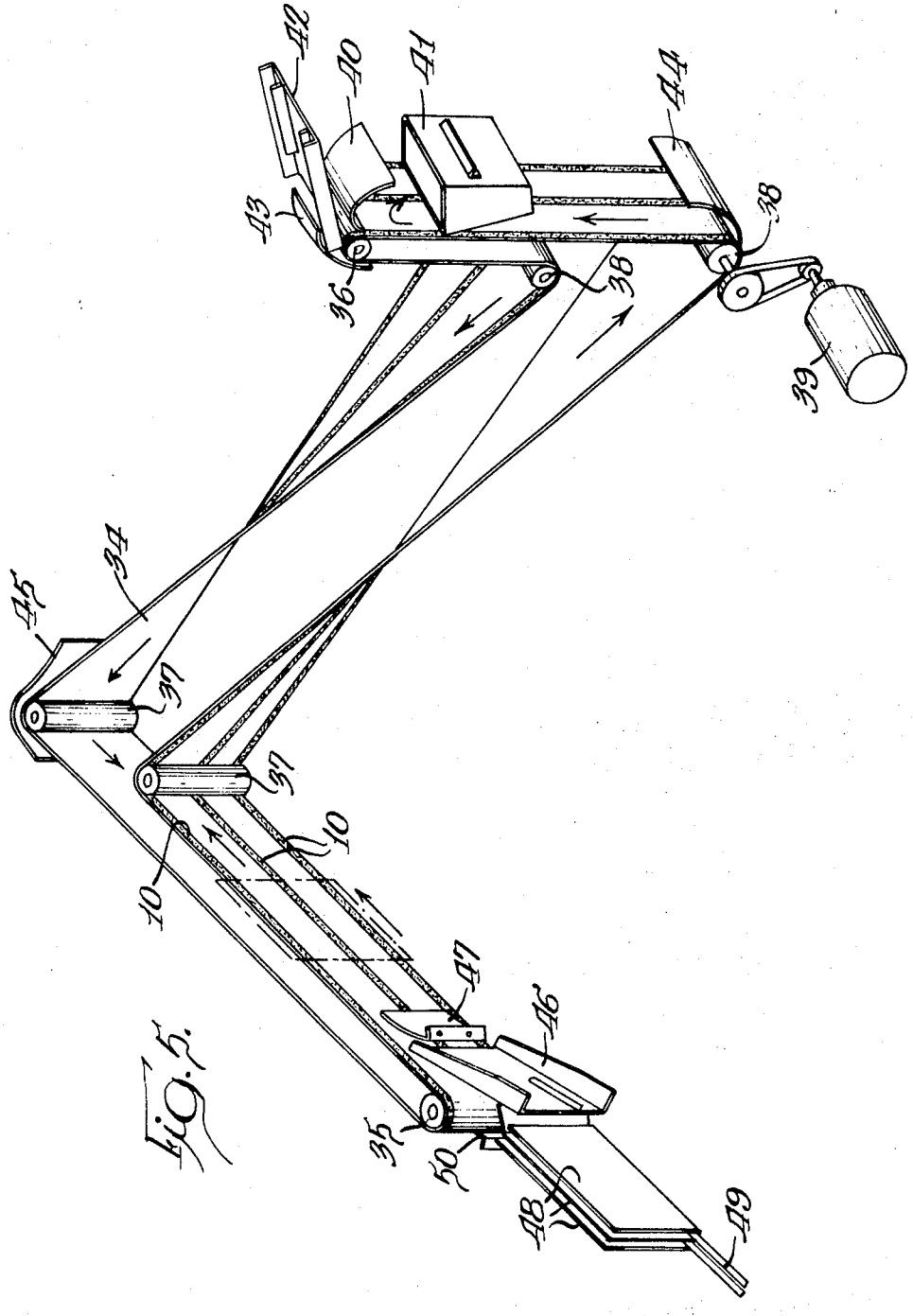


Fig. 5.

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DOCUMENT CONVEYING MEANS

The present invention relates to document conveying means which is particularly adapted to vertically convey documents between one or more floors and from or to suitable sending and receiving stations.

More particularly, the document conveying means of the present invention comprises a continuous belt stretched between spaced rolls and driving means therefor together with a document conveyor comprising a flexible pocket member for reception of documents to be conveyed and wherein one of said belt and said pocket members has fixed thereto pile fabric and other complementary hook fabric whereby the pocket member can be releasably secured to the belt by a simple pressure exerted manually or by a pressure device, the two being separable manually or by means interposed in the path of movement between the belt and the pocket member.

If desired the document conveying means of the present invention can comprise a horizontal component and a vertical component so that the documents can be moved first horizontally and then vertically, in which case direction changing rolls are disposed adjacent the opposed runs of the endless belt.

The document conveying means of the present invention may also suitably be combined with conventional document conveyors of the class comprising two or more channel defining upwardly open horizontally disposed walls with a conveyor belt running at the base thereof such as is described in U.S. Pat. No. 3,042,185 to G. A. Welch, and known under the trademark ORDA-FLO. This may be accomplished by disposing the conveyor belt of the present invention while passing around a roller at endwise open channels of conveyors of the aforesaid patent or by disposing the conveyor belt of the present invention adjacent to a lateral opening or openings in opposed channel walls of the conveyor of the aforesaid patent.

The document conveyor means of the present invention may also be associated with separator means in combination with hinged selectively electrically operated diverting gates projecting into and out of the path of movement of a belt and associated document conveyor of the present invention whereby the document conveyor pocket can be discharged at a preselected station or point of travel on the conveyor belt. The actual programming and selection of a specific document conveyor or point of discharge at a specific one of a plurality of stations can be accomplished as a result of providing the document conveyor pocket members of the present invention with a plurality of holes or plurality of projections disposed in the same position relationship as complementary photocells or microswitches on fixed programming heads disposed adjacent diverting gates as more particularly described in my copending U.S. patent application, Ser. No. 847,627, filed Aug. 5, 1969, now abandoned entitled Automatic Conveyor Discharge Station Selector.

The pile fabric and complementary hook fabric employed in the present invention is conventionally sold under the trademark VELCRO and more particularly described in U.S. Pat. Nos. 2,717,437; 2,933,797; and 3,009,235, one of the fabrics being covered with soft loops such as nylon and generally designated as the pile tape, and the other being formed with permanent hooks that can also be of nylon and designated as the hook tape. They can be joined by pressing them together into anchoring relationship and separated by simply peeling them apart.

The present invention, its details of construction, arrangement of parts, and the economies and advantages thereof will be apparent from a consideration of the following specification and accompanying drawings wherein,

FIG. 1 is a perspective view of the conveyor assembly of the present invention.

FIG. 2 is a perspective view of the document conveyor of the present invention.

FIG. 3 is a diagrammatic sectional view of the VELCRO pile and hook fabrics associated with each other.

FIG. 4 is a fragmentary vertical sectional view on the line 4—4 of FIG. 1.

FIG. 5 is a diagrammatic perspective view of another arrangement of the document conveyor with associated apparatus of the present invention.

Referring to the drawings and particularly FIG. 3, the VELCRO fabric comprises one layer 10 formed with hooks 11 which are adapted to interlock and to engage with the piles 12 of fabric 13, when the layers 10 and 13 are pressed together. They can be separated by simply peeling them apart, forming a temporary but firm interlock when desired.

The document conveyor pockets of the present invention comprise a backing member 14 which may be of somewhat flexible paperboard having associated therewith a suitably transparent layer 15 adapted to hold between them flatwise one or more documents 16 to be conveyed. The pocket forming layer 15 of the document conveyor in the illustration shown by FIG. 2 has two spaced strips of VELCRO pile fabric 13, 13 secured thereto as by adhesion and extending transversely thereof. In the alternative, they may extend vertically and in lieu of being on the facing 15 can be on the backing 14.

The conveyor belt to which the document conveyors are engaged comprise an endless belt 17 as shown in FIG. 1 stretched between an opposed pair of rollers 18, 18 and driven by suitable means such as diagrammatically illustrated by the motor 19. The rolls 18, 18 are journaled in suitably opposed housing walls 20, 20. The assembly shown in FIG. 1 can extend between two or more floors and the belt 17 has secured thereto and disposed longitudinally thereof one or more spaced strips 10 of VELCRO fabric.

Thus, by merely pressing a document conveyor pocket member and its VELCRO fabric strips 13 against the mating fabric strips 10 of the conveyor belt 17, the two may be associated as shown in FIG. 1 at some suitable point, either manually or by some pressing means. The means indicated in FIG. 1 for associating the two components, although the invention is not limited thereto, comprises a horizontally disposed ORDA-FLO document conveyor comprising the opposed vertically extending upwardly open channel walls 21, 21 with the lateral opening at 22 on one of the channel walls adjacent to which the belt 17 is disposed. As the document conveyor travels on the belt 23 at the base of the channels 21, 21, and as it arrives at the lateral opening 22, it is thereat diverted by means of a plate cam 24 and an offset guide 25 which is horizontally adjustable by the means 26. As the document carrier is cammed out of the opening 22 in the side of one of the conveyor walls 21 it is pressed against the belt 17 and the two mating pairs of the VELCRO strips grip and carry the document conveyor pocket upward as shown in FIG. 1, it being understood that on the opposed face or run of the belt 17 the document secured thereto will be carried in a downward direction when the belt is driven in the direction indicated.

The cushion strip 27 stops the horizontal motion of the document conveyor as it travels to the belt 17. As the document conveyor pocket moves up with the belt 17 it passes under the plate 28 which "wipes" the document conveyor pocket into tighter contact with the belt 17. As the document conveyor pocket reaches the upper transverse part it is lifted away from the belt 17 by two sloping fingers 29, 29 and thus the two portions of the VELCRO are stripped apart. Outer guide plate 30 is spaced out from the stripper plate 31 on which the stripper fingers 29, 29 are mounted and thus the document conveyor pocket goes up between the plate 31 of the guide 30. When the document conveyor pocket is stripped completely from the belt 17, it then drops by gravity into a suitable receptacle or between the channels 21', 21' of the horizontally disposed upwardly open ORDA-FLO conveyor and onto its moving frictional conveyor belt 23'. In the alternative in lieu of the horizontally disposed conveyor, there may be a mere collecting receptacle disposed for example on or adjacent to the desk of an operator. In the opposed direction the stripping parts are substantially the same but converse.

In some instances it may be desirable for the document conveyor to pass around, for example, the roller 18 as illustrated in FIG. 4, and for such purposes the facing 15 and backing 14

of the document conveyor are of flexible material and to retain the document conveyor with the belt **17** a shield such as the arcuate top **32** is provided as well as a similar arcuate bottom **33** in close proximity to the belt and the rollers **18**.

Although not shown, the assembly of the stripper plate **31** and its associated fingers **29, 29** and stop member **30** may be hingedly mounted so as to move out of the path of the belt **17** and alternately into position as shown in FIG. **1**, and this may be accomplished by remote control electrical means similar to the selective gates more particularly described in my aforesaid copending application.

Although the arrangement of FIG. **1** shows a vertically disposed conveyor assembly, the arrangement of FIG. **5** shows a combination of horizontal and vertical conveyor components wherein the conveyor belt **34** is endwise stretched between the rolls **35** and **36** and turned from a horizontal direction shown at the left of the drawing to a vertical position shown at the right of the drawing by means of the interposed pairs of rolls **37, 37** and **38, 38**. Means for driving the conveyor belt **34** over the aforesaid rolls is shown diagrammatically by means of the motor **39** associated by means of suitable belting and gearing to the roll **38** although it will be understood that other driving arrangements may be suitably employed.

The belt **34** is provided on its outer surface with in this case three longitudinally disposed strips of VELCRO hook fabric **10** to which there can be associated as by pressing engagement the companion VELCRO pile strips **13** of the document conveyor pocket. The horizontally disposed section of the conveyor belt shown in FIG. **5** moves in the direction of the arrow shown and passes under the roller **37** and outwardly of the roller **38**, and then moved vertically upwardly for example between two or more floors to a desired station where it is stripped by means such as shown in FIG. **1** or by a stripper such as **40** wherefrom the document conveyor drops into a receptacle **41**. In the reverse direction, feeding of the document conveyor onto a conveyor belt **34** may be accomplished from a platform **42** and beneath the guide **43** which not only holds the flexible document conveyor around upper roll **36** but presses it into engagement with the belt **34**.

When the document is conveyed upwardly around roller **38** it is bent and guided and held pressed against the belt **34** by means of the curved guide **44**. Other suitable curved or arcuate guide means where the belt **34** passes around rolls may be provided such as at **45** when the document moves along the outer surface of belt **34** around one of the rolls **37** as illustrated.

During the vertical run, document conveyor pockets may be fed into pressed engagement with the belt **34** between the holder **46** and plate **47**. **3,042,185**

In the illustration of FIG. **5**, there is also shown the combination of the conveyor means of the present invention with the ORDA–FLO conveyor such as shown in the aforesaid U.S. Pat. No. 3,042,185 comprising the upwardly open channel forming members **48** and frictional conveyor belt or belts **49** between the adjacent channel members **48**. The channels defined by the members **48** are here endwise open and disposed adjacent to the belt **34** as it passes around roller **35**. Instead of being guided around the roller **35** the document conveyors can be deflected therefrom by a deflector **50** and pass into the channel defined between the members **48** for horizontal conveying on the friction belt **49**. In a similar manner, pockets can be fed between a pair of adjacent channel members **48** onto and in engagement with the conveyor belt **34** where the document conveyor pockets and belt **34** are then held in association by means of their respective VELCRO components.

It will be understood that there may be associated with the aforesaid and/or vertical runs of the endless belt **34**, or with the components of the downwardly disposed upwardly open document conveyor defined by the walls **48**, the automatic conveyor discharge station selector of my aforesaid copending application, although not shown.

Although I have shown and described the preferred embodiments of my invention, it will be understood by those skilled in the art that changes may be made in the details thereof without departing from its scope as comprehended by the following claims.

I claim:

1. Document conveying means comprising a continuous belt having an outwardly facing surface, means for driving said belt, document carrying means for holding a document to be conveyed, pile fabric means fixed on either said document carrying means or the outwardly facing surface of said belt and complementary hook fabric means fixed on the other for enabling releasable securement of said document carrying means to said belt, means for bringing said document carrying means into contact and securement with said belt, and means for releasing and separating said document carrying means from said belt.

2. The document conveying means of claim **1** wherein means are provided adjacent said belt to receive said document carrying means beneath its point of separation from the belt.

3. The document conveying means of claim **1** wherein said means for bringing said document carrying means into contact with said belt comprises conveyor means for bringing said document carrying means in juxtaposition with said belt, and means for pushing said document conveyor means into contact with said belt.

4. The document conveying means of claim **3** wherein said means for bringing said document carrying means into juxtaposition with said belt includes means for stopping the document carrying means in a juxtaposed position with said belt.

5. The document conveying means of claim **1** wherein said document carrying means is wider than said belt and wherein the means for separating said document carrying means from said belt comprises a stripper disposed on an angle inwardly on the side of the belt.

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