

April 7, 1964

W. D. HIGHSMITH ET AL

3,128,093

GUIDEWAY FOR DOCUMENT SORTING MACHINES

Filed May 11, 1961

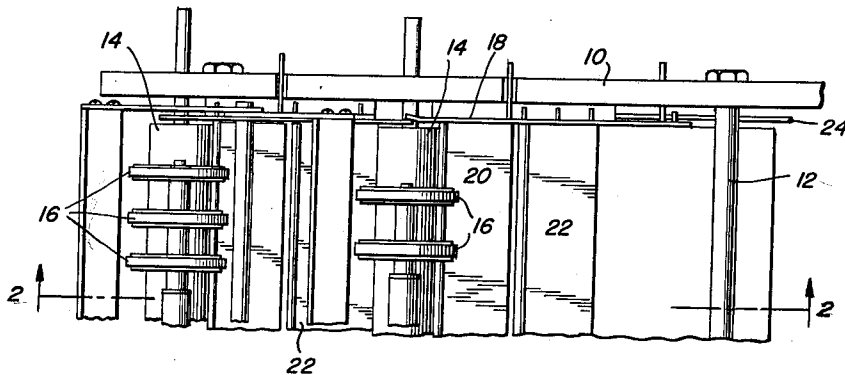


Fig. 1.

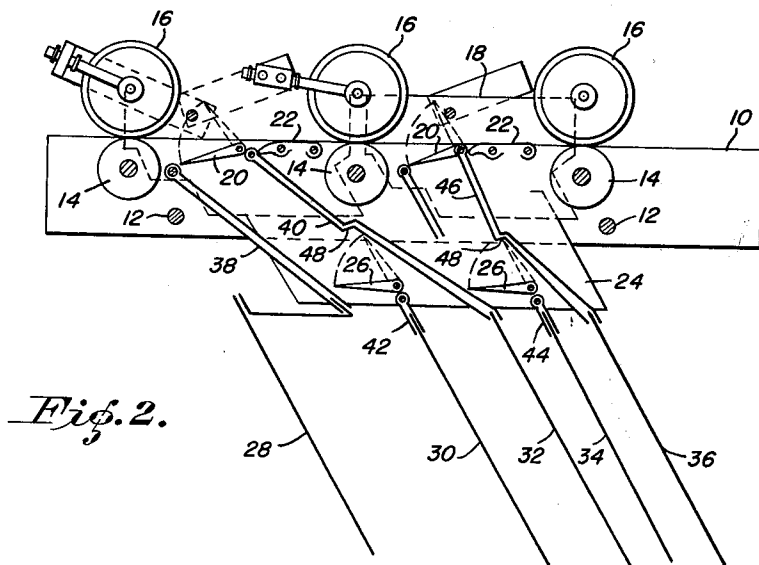


Fig. 2.

INVENTORS
WILLIAM D. HIGHSMITH
BY RICHARD L. SWARTZ
Kemon, Palmer, Stewart & E. Blakewell
ATTORNEYS

1

3,128,093

GUIDEWAY FOR DOCUMENT SORTING
MACHINES

William D. Highsmith and Richard L. Swartz, Columbia, S.C., assignors to Universal Business Machines, Inc., Columbia, S.C., a corporation of South Carolina
Filed May 11, 1961, Ser. No. 109,427
3 Claims. (Cl. 271-64)

This invention relates to sorting machines and more particularly 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 present guideway construction is also an improvement on the guideway which is shown and described in U.S. Letters Patent No. 2,823,031, issued to William H. Rives and dated February 11, 1958.

An object of the present invention is to provide a guideway construction having in addition to the floor gates shown in the above-mentioned Patent 2,823,031, a plurality of secondary gates positioned below the floor level of the guideway and operative to effect a further sorting operation in addition to the one effected by the floor gates.

Another object of the present invention is to provide a guideway which is completely open along its upper surface to provide immediate access to any document which might become jammed or otherwise stuck during the sorting process.

A still further object of the present invention is to provide a guideway and double gate construction, which is capable of effecting a double sorting operation without increasing the length of the guideway proper.

Other objects of the present invention will be apparent from the following detailed description, when read in conjunction with the attached sheet of drawings in which:

FIG. 1 is a top plan view of a guideway in accordance with the present invention; and

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

In general, the objects of the present invention are achieved by providing a guideway having opposed parallel side rails between which are positioned in repetitive sections a floor construction which comprises a driven roller, a pivotal floor gate, and a fixed floor section. Each floor gate communicates with a pair of bins positioned below the floor and a second gate also positioned below the floor is effective to cause documents diverted downwardly by the floor gate to be received in one or the other of the pair of adjacent bins in each instance.

Referring now to the drawing, a pair of horizontal rails 10 spaced from and parallel to each other define a track frame which extends throughout the entire length of the guideway. It will be understood that FIG. 1 shows only one half of the guideway, because all components are symmetrical about a center line parallel to the side rails. The side rails are joined and held in spaced relationship by means of tie bars 12 spaced longitudinally of the guideway at regularly recurring intervals. Journaled in the side rails, also at regularly spaced and recurring intervals, are a plurality of driven rollers 14, which are preferably rubber coated. It will be understood that these rollers are conveniently belt-driven from a common shaft, so that all will rotate at the same speed. A plurality of idler presser rolls 16 are also provided at regularly spaced intervals along the guideway, one presser roll assembly cooperating with each driven roll to provide the means for rapidly advancing documents or other sheet material rapidly along the guideway.

A plurality of removable guideway sections 18 are positioned one between each successive pair of driven rollers 14. These sections are individually supported be-

2

tween the side rails 10 and each pair of guide sections provides a support for the floor of the guideway. Each successive floor section comprises first a gate member 20 pivotally supported between the guideway sections and with its leading edge immediately adjacent to the driven roller. Immediately adjacent each floor gate 20, is a fixed floor plate 22 of substantially the same longitudinal dimension as the gate 20. Each guideway section 18 further provides support for the pivotally mounted presser roll assembly which cooperates with the driven roll of the next downstream section.

Positioned below the guideway sections 18 and mounted between the sections 18 and the side rails 10 are a series of lower guideway sections 24. These lower guideway sections, which are also repeated at fixed intervals along the entire assembly have pivotally supported between them the lower gates 26, there being one lower gate for each upper gate.

Positioned below the lower gates 26 are a plurality of bins which are open at their top and along one side so that the opening into the upper portion of the bins is in direct communication with the upper and lower gates. Referring to the movement of documents along the guideway, the downstream wall of each bin comprises the upstream wall for the next adjacent bin and the lower gates 26 are each pivoted substantially in the plane of the common walls between adjacent pairs of bins. Thus, walls 28, 30, 32, 34 and 36 define four bins with walls 30 and 34 being the common wall respectively between the first and second and third and fourth bins. It will be noted that the upper edges of the walls 28, 30, 32, 34 and 36 are received within double wall members 38, 40, 42, 44 and 46. Members 40 and 46 both have a step as indicated at 48, which receives the movable end of the lower gates 26 when they are raised to the dotted line position indicated in FIG. 2.

It will be understood that the presser roll assemblies are suitably biased into engagement with the driven rolls, and further that the mounting of the presser rolls is such that the bearing in which they are mounted is free to pivot about an axis perpendicular to the axis of the presser rolls, all substantially as described in the aforementioned Rives Patent No. 2,823,031.

In operation therefore the floor gates 20 form together with the floor plates 22 a substantially continuous floor for the guideway between successive rollers, and a portion of each roller completes the section of the guideway floor, but the floor is interrupted by raising one of the floor gates 20 to its upper dotted line position as indicated in FIG. 2. The control of the floor gates is generally linked to a keyboard at the lead end of the machine so that gates in desired sections are pivoted to their raised position in response to information going from the keyboard to the gate actuating assembly. The lower gates 26 are also controlled from the same keyboard so that if we assume that the first gate 20 is in its raised position and the corresponding lower gate 26 is in its horizontal position, then a document passing along the guideway will fall between bin walls 30 and 32. On the other hand, should lower gate 26 be in its raised position simultaneously with the corresponding floor gate 20, then the document in question will fall into the first bin between walls 28 and 30. It will be apparent therefore that a double sorting operation becomes readily feasible by suitable control of the upper and lower gates without the necessity of increasing the overall length of the machine.

Any individual section of the overall machine may be readily removed and replaced in the event of damage, and further, the entire upper area of the guideway is completely clear of any structural member except for the presser roll assemblies which are readily pivotally moved to a position to get them out of the way in the event

that it becomes necessary to remove a jammed or damaged document. As described in the aforementioned Rives Patent 2,823,031, the coefficient of friction of the surfaces of the driven rollers is preferably lower than that of the surface of the presser rollers, so that when the presser rollers are pivoted to a position out of contact with the drive rollers, forward motion of documents along the driven rollers will stop and documents will not be damaged.

We claim:

1. A guideway construction for sorting machines comprising: a pair of side walls; a first plurality of hinged gates forming sections of the floor of the guideway, said gates being tiltable from a normally closed horizontal position to an open position; a plurality of pairs of bins located below the floor of said guideway, each pair having a common wall and communicating with one of said gates; a second plurality of gates located below the first, said gates being tiltable from a horizontal position closing one of each pair of bins to a second position opening said one and closing the other bin of said pairs, the tilting axis lying substantially in line with said common wall of each adjacent pair of bins; and means for advancing articles to be sorted along said guideway.

2. A guideway and sorting gate construction for a document sorting machine comprising: a pair of parallel rails; a plurality of driven horizontal rollers journaled between said rails at spaced intervals therealong; a plu-

5 rality of idler roll assemblies, one for each driven roller, and biased into engagement therewith; a floor for said guideway, said floor including between each adjacent driven roller a first gate member pivotally supported along its trailing edge between said rails, said gate being normally horizontal but pivotable to a position above the said floor to deflect downwardly, documents moving therealong; a plurality of pairs of open top bins positioned below said floor, one pair communicating with each said 10 gate, and each adjacent pair of bins having a common wall; and second gate members positioned below said floor and pivotally mounted along their trailing edges at points substantially coinciding with the upper end of said common wall, said second gate members also being normally horizontal but pivotable to a raised position to deflect documents deflected by said first gate into one or the other of said pairs of bins.

3. Apparatus as defined by claim 1 in which the leading edges of said floor gates are normally positioned immediately downstream of the next upstream driven roller. 20

References Cited in the file of this patent

UNITED STATES PATENTS

1,203,261	Powers	Oct. 31, 1916
1,307,681	Lasker	June 24, 1919
2,668,483	Sykes	Feb. 9, 1954
2,823,031	Rives	Feb. 11, 1958