

Aug. 14, 1951

L. W. BAILEY
MAIL SORTING APPARATUS

2,564,185

Filed June 17, 1946

3 Sheets-Sheet 1

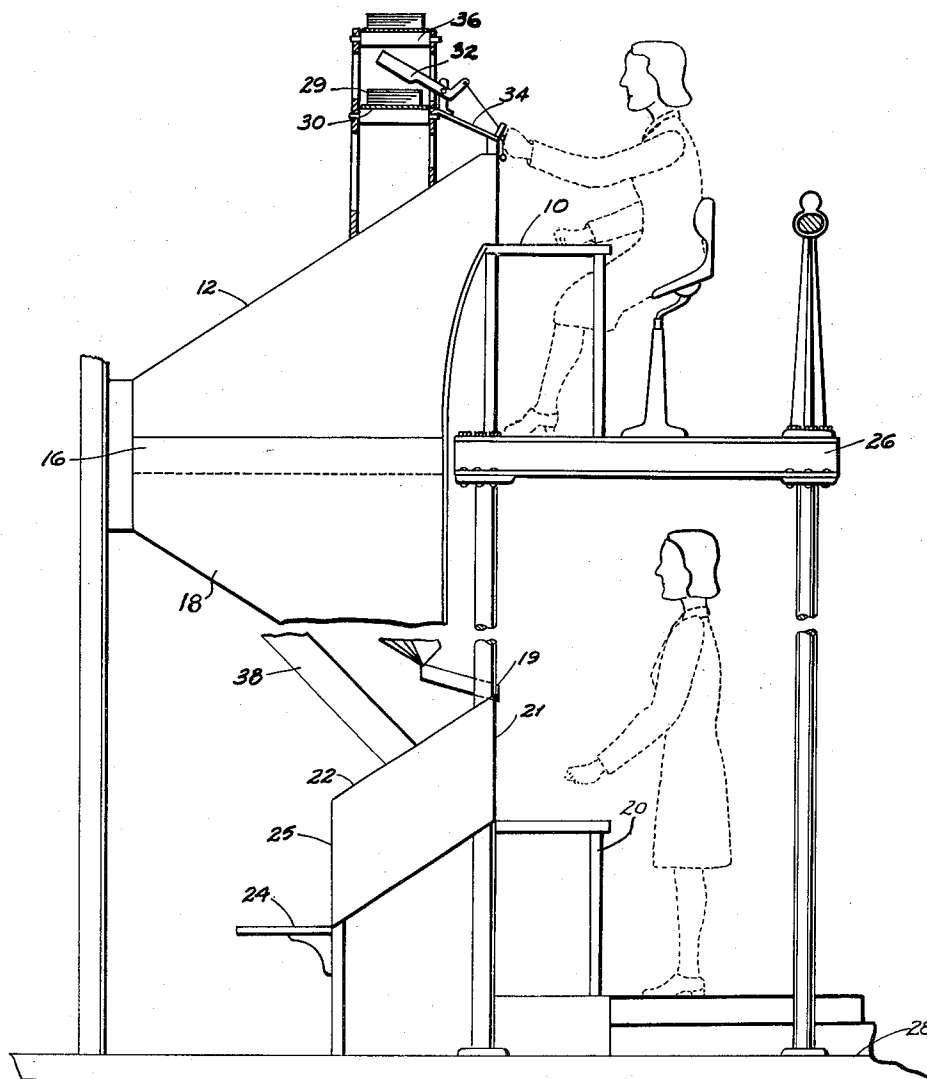


Fig. 1

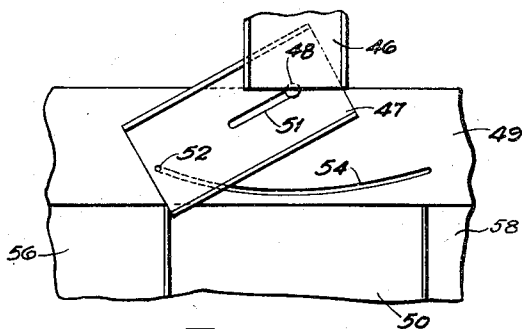


Fig. 5

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3 Sheets-Sheet 2

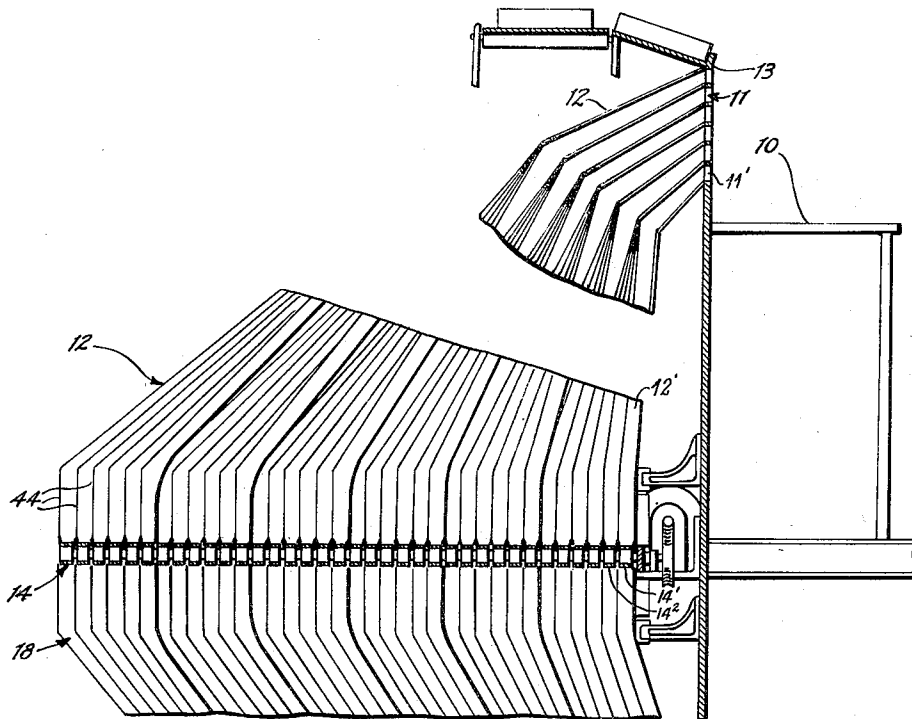


Fig. 2

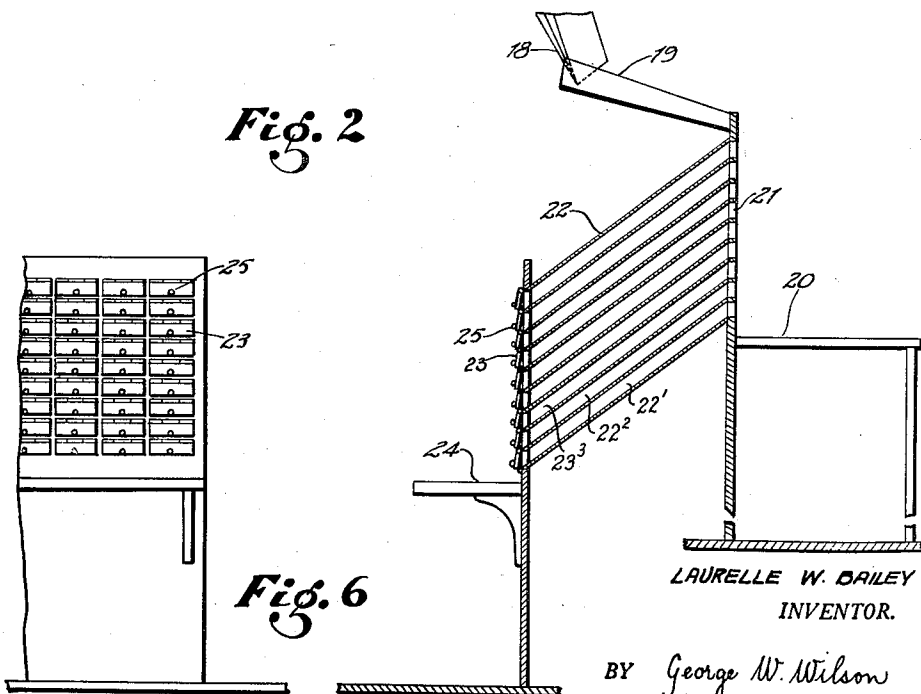


Fig. 6

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3 Sheets-Sheet 3

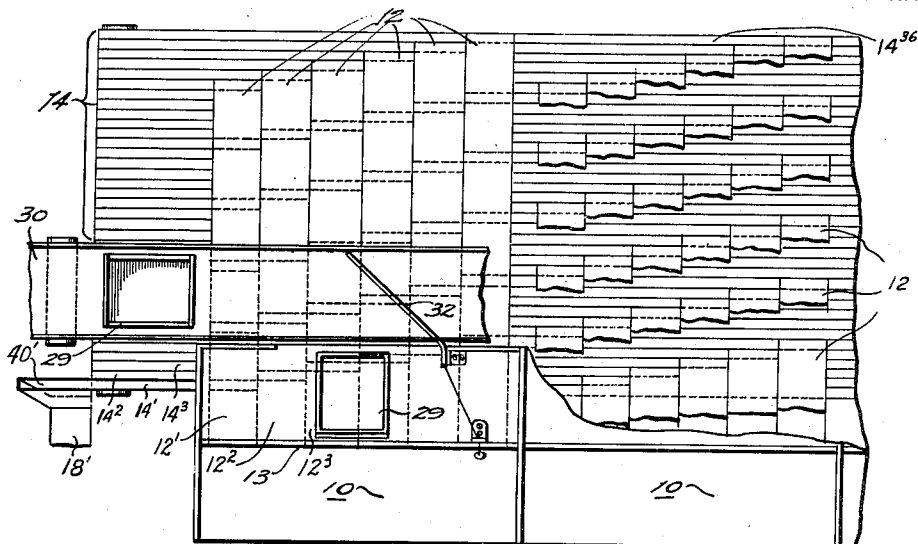


Fig. 3

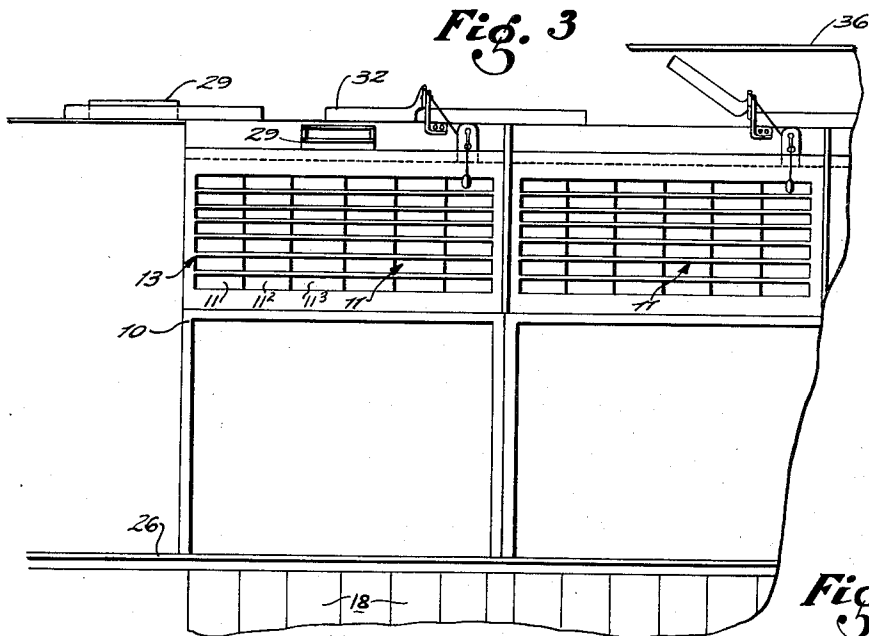


Fig. 4

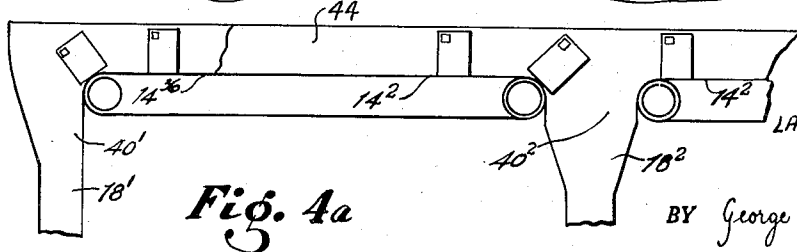


Fig. 4a

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MAIL SORTING APPARATUS

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2 Claims. (Cl. 209—122)

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My invention relates to mail sorting equipment and the general object of the invention is to provide equipment by the use of which the necessary procedure in sorting mail is greatly facilitated and space economized.

In sorting mail in modern communities of any appreciable size the procedure followed after the stamps have been cancelled at a cancellation station is to deliver the mail by hand to primary sorting stations and (a) effect a primary sorting of the mail into main categories such as "in city," "in state," "other states," and "foreign," in the case of outgoing mail, together with the segregation of "indirect mail" to specific localities, which is to be separated from the rest of the mail but is not to be further sorted until arrival at its destination. The sorted mail is placed in the proper one of a plurality of compartments in the sorting panel of the desks, from which compartments the mail is removed and taken by hand to secondary sorting stations; (b) effect a secondary sorting of the primarily sorted mail to break it down for instance into specific countries, States, towns and delivery routes, the sorted mail being again placed in compartments in the sorting panels of the secondary sorting desks from which it is removed by hand and taken to bundling stations; and (c) finally to tie the sorted mail into bundles of a size convenient to place in the mail sacks or mail carriers' delivery pouches.

The typical mail sorting procedure described involves the constant movement of personnel between cancelling, primary, secondary and bundling stations, and because of this movement of personnel the work is generally carried out on one floor level necessitating the provision of a great amount of floor space and much loss of time and interruption of the work of the mail sorters.

An object of the invention is to provide mail sorting equipment whereby in post offices requiring primary and secondary sorting of large quantities of mail, the pieces of mail are kept moving away from the sorting personnel and delivery by mechanical means or by personnel to the various stations without interfering with the sorting personnel, thereby effecting great savings in the time required for the sorting operations.

A further object of the invention is to arrange primary and secondary mail sorting stations and bundling stations at different levels whereby gravity feed of the mail from station to station may be utilized.

A still further feature of the invention is to provide means whereby if pieces of mail are accumulated temporarily at any point they are

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again moved by personnel or mechanical means not interfering with the sorting personnel, or by mechanism not interrupting the flow of mail to the points of temporary accumulation.

A still further object of the invention is to provide mail sorting equipment having means for transferring mail from station to station with the stamps on the pieces of mail in the same position so that an operator may readily check the cancellation of the stamps thereon.

A still further object of the invention is to provide mechanical means for sorting mail which is adaptable to the wide variety of conditions existing, such as variations in size of population, type of mail, or type or buildings in which post offices are located.

It is yet another object of the invention to provide mechanical mail sorting equipment which is simple in design and has a minimum of working parts resulting in avoidance of mechanical failure and low cost of maintenance.

Still another object of the invention is to provide mechanical mail sorting equipment which is light in weight and economical of space, thereby facilitating installation of the equipment in existing post office buildings or in space occupied by post offices in other buildings.

Still further features and objects of the invention will hereinafter appear in the following description taken in conjunction with the accompanying illustrative drawings.

In the drawings, Fig. 1 is a view in side elevation of a mail sorting arrangement incorporating the invention and suitable for sorting large volumes of mail;

Fig. 2 is a section through chutes used to transfer mail from one station to another in the arrangement shown in Fig. 1;

Fig. 3 is a fragmentary plan view showing the arrangement of primary sorting desks;

Fig. 4 is a fragmentary view in front elevation, parts being broken away and showing the arrangement of chutes delivering mail from the primary sorting desks to belts receiving and collecting the mail and delivering it to chutes (not shown) directing it to secondary sorting desks;

Fig. 4a is a fragmentary elevational detail showing the primary mail being delivered by the receiving belt to chutes leading to the secondary sorting desks;

Fig. 5 is a fragmentary detail showing a special arrangement for delivering mail to any one of a plurality of secondary sorting desks;

Fig. 6 is a fragmentary elevation of the bun-

dling station showing the chutes holding mail to be bundled.

The number of primary desks may vary from a dozen or so to some hundreds and the sorting panels are commonly provided with a set of thirty-six compartments each having an opening approximately six inches by two inches, the longer sides being arranged either lengthwise or vertically. In the drawings the sorting panels of the primary desks shown in detail are provided with six rows of slots of six tiers each, the slots being approximately six inches wide and two inches high arranged with the long sides horizontal.

In place of the compartments hitherto used in the sorting panels of the primary and secondary sorting desks I provide chutes communicating with the openings in the sorting panels.

The number of secondary sorting desks varies according to local conditions but in a typical case the secondary sorting desks are less in number than the primary desks and their sorting panels are provided with two or more times the number of the compartments of the primary desks.

Referring first to the sorting assembly shown in Fig. 1, the numeral 10 indicates the end desk of a row of identically arranged primary sorting desks.

The mail falls through chutes 12 connected to the slots in the sorting panels of all the primary desks and is collected on traveling bands generally indicated in Fig. 2 by 14 arranged within the casing 16 and delivered therefrom by chutes 18 to the receiving chutes 19 of the secondary desks 20.

From the sorting panels 21 of the secondary desks 20 the mail falls through chutes 22 to a bundling station 24 where it is held by doors 25 closing the ends of the chutes 22 for the persons effecting the bundling, who work along the bundling stations extracting the mail from the chutes and tying it into bundles of suitable size for placing in mail sacks or for placing in the pouches of mail carriers.

The equipment thus far has been described in outline only and will be more fully described hereinafter.

In Fig. 1 the primary desks 10 are shown as arranged on a mezzanine floor 26, the mail sorted by the primary desks 10 being delivered to the secondary sorting desks 20 located on the main floor 28, though preferably raised above floor level, while the mail sorted by the secondary desks 20 is delivered to bundling stations 24 behind the desks.

Mail on entering the post office is carried to the cancelling machines, not shown, and from these machines is placed in baskets 29 conveyed by an endless belt 30 along the tops of the primary sorting desks 10. A swinging arm 32 is provided at each primary desk which enables an operator to slide a basket of mail from the belt to the receiving panel 34 of each desk, the raising of the arm 32 freeing the remaining baskets on the belt to travel on to the other desks. Empty mail baskets are placed on the return run of the belt which may be supported on rollers 36 and carried back to the stamp cancelling station.

Mail handled by primary sorting desks assigned to indirect mail is delivered by a chute 38 directly to the bundling station 24 since it is not given a secondary breakdown at the point of origin. The various elements of the sorting system comprising primary and secondary sorting desks and

bundling stations may be combined in a variety of ways to provide mail sorting sections adaptable to post offices serving towns of medium size, such as of 50,000 inhabitants, in which case the belt-transferred mail may be dispensed with as will be fully explained later, or may be arranged as shown in Fig. 1 for handling any quantity of mail, or may be arranged to meet the specific requirements of mail sorting installations already set up in which case it may be desired to utilize as much as possible of the existing equipment and premises and yet achieve the economy of time and effort provided by the practice of my invention.

The chutes of the embodiment of the invention shown in Fig. 1 are arranged as illustrated in detail in Figs. 2, 3, 4, 4a and 5. Each slot 11¹, 11², 11³, etc. in the sorting panel 13 of a primary sorting desk connects with a separate chute 12¹, 12², 12³, etc. through which the mail falls upon one of a series of narrow elements 14¹, 14², 14³, etc. of the primary mail-collecting belt 14. Except extreme outside belt elements, each of the belt elements, which will number thirty-six in the case of the primary sorting desks arranged as shown in Fig. 3, consists of two endless lengths of belt separated to provide slots 40², etc. The end belts 14¹ and 14³⁶ drop the letters carried thereon into the chutes 40¹, and a chute not shown at the ends of those belts and leading to chute 18¹ and an opposite end chute. The lengths of belt except the first and last are driven in opposite directions to bring all mail on the elements over the openings to the secondary chutes 18², etc. each located over a different chute leading to a secondary sorting desk 20. The belt elements are separated from each other by partitions 44 with which the chutes 12 are connected, thus keeping the mail dropping through the individual chutes onto one belt element separated from the mail carried on adjacent belt elements. By these means all letters deposited on a specific element of the receiving belt are transported to one secondary sorting desk, each of the thirty-six elements of the belt delivering mail to a separate secondary sorting desk. It is obvious that the chutes 18 may if desired be brought down to a point beside the secondary desks since these are fewer in number than the primary desks and may be spaced apart without occupying any greater floor space.

It will be noted that it is customary for the primary sorting clerks to insert all letters in the same relative position in the slots in the sorting panels, to enable the sorters to check that the stamps have been properly cancelled. In my invention the chutes and transfer belts are arranged to keep the stamps in the same initial position in their travel to the secondary sorting desks 20, or should some of the letters change position in their travel the stamps will be in generally the same position when the mail reaches the secondary sorting desks.

From the slots in the sorting panels of the secondary sorting desks 20 in which it is placed by the sorting clerks, the pieces of mail are delivered down to the ends of the chutes 22¹, 22², 22³, etc. running from the slots in the secondary desk sorting panels 21 to the bundling stations 24. The lower ends of these chutes are closed by doors 23 of any suitable construction, those illustrated comprising doors hinged along their upper horizontal edges and held closed by the weight of metal knobs 25 by which they may be opened by the bundling personnel to extract the

pieces of mail held therein and tie it into properly sized bundles.

Since the arrangement of the secondary desks is similar to that of the primary sorting desks except for the number of slots in the sorting panels of the desks, which will depend on breakdown required, further description of these desks is not necessary.

It will be noted that very little power is required to operate the arrangement shown in Fig. 1 since there are only two mechanically driven parts, the mail delivering belt and the transfer belt for the primary sorted mail; the remainder of the movement of the mail being effected by gravity from primary desk to bundling station.

Preferably the chutes are arranged in any suitable manner so that the interior of the chutes may be cleared of any letter that may become jammed through the opening of its envelope or other unforeseen circumstances and the belts reached for maintenance purposes.

The mezzanine floor shown in Fig. 1 may obviously be reached by any suitable means such as a stairway (not shown).

It will be evident that the equipment described, in spite of its capacity for handling large quantities of mail, is very light in weight since the chutes may be made of sheet metal and the sorting desks may be made from light gauge angle material and metal sheet.

The volume of mail requiring to be sorted, is very much greater at some periods than at others to meet which condition it may be necessary to install some sorting desks which are not used in sorting normal volumes of mail, but even under normal conditions some particular category of mail such as sales advertising matter may throw too heavy a load on certain of the secondary sorting desks, and for this reason I provide a deliver chute construction shown in Fig. 5, whereby some of the mail delivered to such an overloaded secondary desk may be diverted to auxiliary desks.

The delivery chute 46 deposits mail into a tray 47 pivoted below the end of the chute on a pin 48 projecting from the receiving panel 49 of the special assignment desk 50 and passing through a slot 51 in the bottom of the tray 47 along the center line thereof. A pin 52 projects downwardly from the tray on its longitudinal centerline toward its front end and is guided in a curved slot 54 in the surface of the receiving panel of the specially assigned secondary desk 50 which is flanked by auxiliary secondary desks 56, 58. If the sorter at desk 50 receives mail too rapidly he can swing tray 47 to one side or the other to deflect mail to an auxiliary desk; in Fig. 5 the tray 47 is shown in position to enable the sorter at desk 56 to take mail from the tray 47.

The primary and secondary sorting desks are shown as arranged for ordinary letter mail which constitutes by far the greater bulk of the mail. Sorting desks for handling large size mail as for example pieces up to nine or ten inches in width and length—and more than average thickness can be handled by special desks having slots twelve inches by two inches or larger sizes with corresponding sized chutes connected to the slots; where it is not possible to use the collecting belts described for the letter mail such out size mail may be passed to the secondary sorting desks by manual transfer, using chutes to the secondary sorting desks if the latter are positioned on a lower floor, since this arrangements utilizes the principles and equipment specifically described

in other arrangements or minor variations thereof it is not thought necessary to further describe it or illustrate it.

Conclusion.

It will be apparent that the mail sorting equipment of my invention has the following advantageous characteristics:

The mail is moved from cancelling stations to bundling stations through primary and secondary stations along a path that moves the mail forward continuously resulting in the elimination of all confusion and interference between sorting personnel.

All pieces of mail are carried away from the slots in the sorting panels of the sorting desks by gravity as fast as each piece is dropped into the slots. There is thus no accumulation of mail at the sorting desks, any temporary accumulation of pieces of mail that occurs is away from the sorting panels so that the continuance of the sorting operation cannot be interrupted.

The equipment is simple, adaptable, light and economical in both cost and space required for installation.

Although the invention has been hereinbefore described with reference to the sorting of mail it is to be understood that it is equally applicable to sorting other material requiring to be processed or dealt with in a similar manner to mail.

While I have described and illustrated preferred embodiments of my invention it is to be understood that various changes and modifications may be made by those skilled in the art without departing from the scope of the invention as indicated by the scope of the annexed claims.

I claim as my invention:

1. Equipment for effecting a first sorting followed by further sorting and delivery to final collection receptacles of flat articles such as pieces of mail or cards comprising: a first group of sorting cabinets each having its face composed of partitions defining rectangular slots greater in one dimension than the other, a plurality of juxtaposed endless traveling bands having a width not greater than the smaller dimension of said slots and constituting collecting units, arranged at a lower level than said cabinets, vertical walls dividing said bands from one another, each element of the collecting units having two oppositely moving bands arranged in the same plane with their facing ends spaced to provide a gap, except the extreme side bands, each of which consists of a single belt which delivers to a space at opposite ends of the plurality of bands; partitions forming continuations of the cabinet partitions and guiding the packages placed in the slots and falling by gravity therefrom onto a unit individual to corresponding slots of each of said first group of sorting cabinets, said partitions constraining said packages to fall on said conveying units on an edge, a second group of cabinets arranged at a lower level than the first group of cabinets and said plurality of traveling bands each having its face composed of partitions defining rectangular slots greater in one dimension than the other; partitions guiding the packages falling through the gaps and spaces to which they have been delivered by the collecting units and effective to guide said packages to a particular cabinet connected with a particular gap or space by said partitions; a group of final collection receptacles arranged at a lower level than said second group of sorting cabinets; and partitions forming continuations of the partitions of the second group of cabinets and effective to guide

flat packages placed in and falling from each slot of said second group of cabinets by gravity while maintained in a predetermined position by said partitions, to final collection receptacles individual to each slot of each cabinet of the second group of cabinets, the fully sorted packages being removed from the final collection receptacles for bundling.

2. In sorting apparatus for flat articles such as pieces of mail or cards having a moving belt mounted to extend parallel to and adjacent a group of cabinets, sorting apparatus as set forth in claim 1 and in addition comprising: containers holding unsorted mail carried by said belt; and means normally held out of the path of said containers but operable by the sorting personnel to deflect a container from said belt to any of the cabinets of said first group of cabinets.

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