Nov. 7, 1933. P. J. BIRKMEYER 1,934,617

CONVEYER SYSTEM

Filed June 26, 1931 2 Sheets-Sheet 1

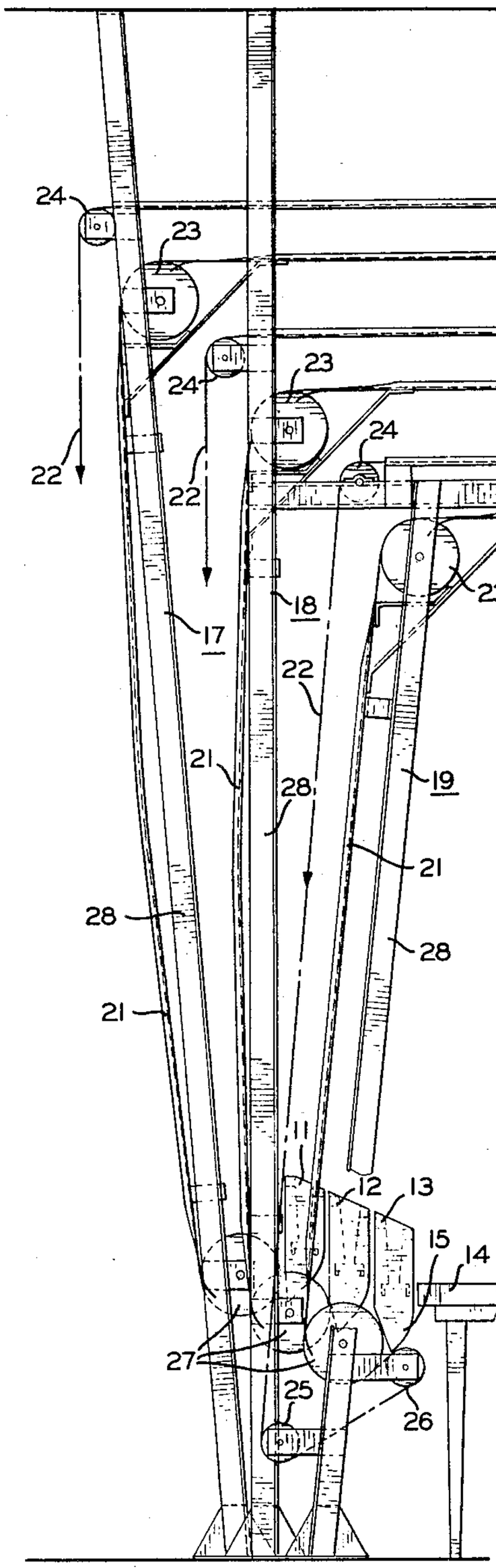

FIG. 1

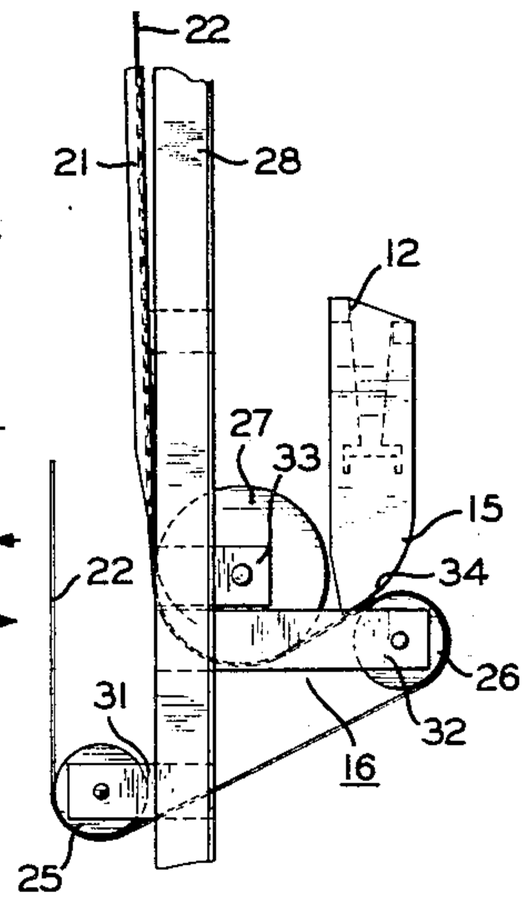

FIG. 5

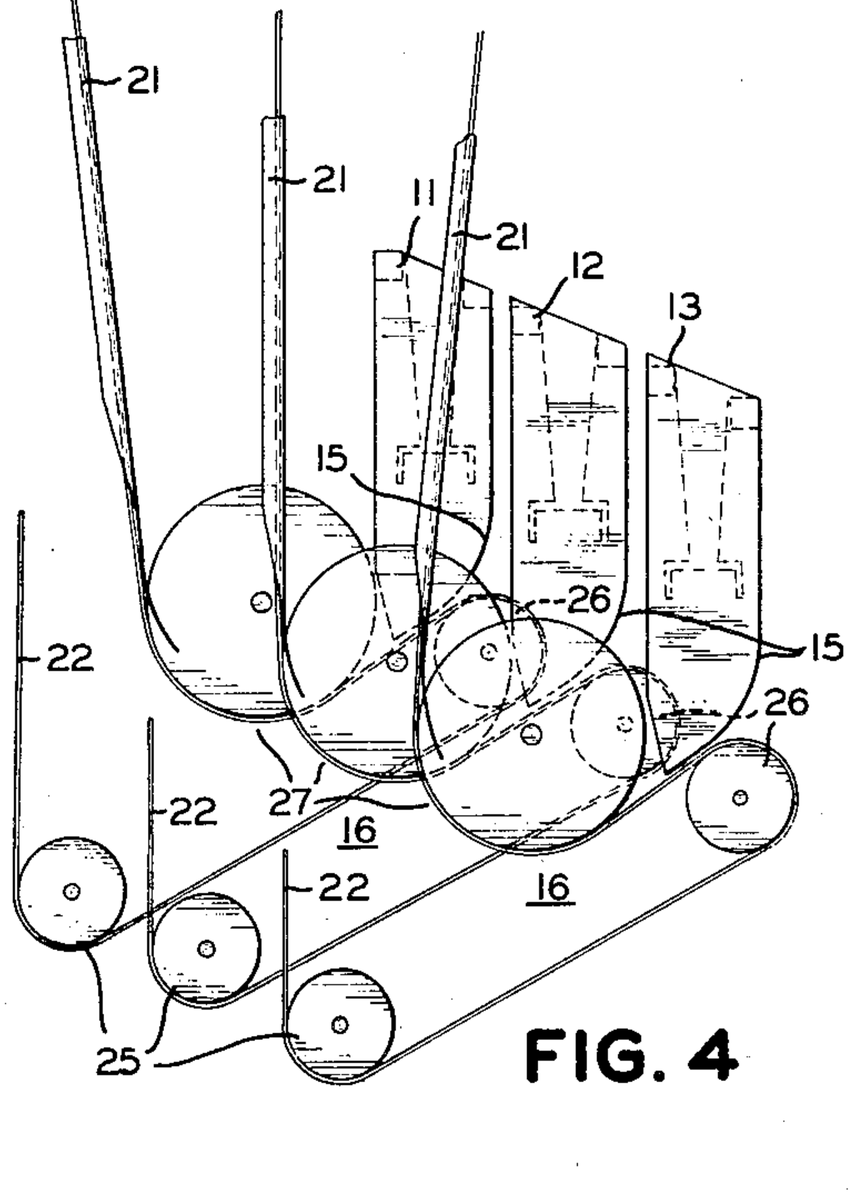

FIG. 4

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Nov. 7, 1933. P. J. BIRKMEYER 1,934,617

CONVEYER SYSTEM

Filed June 26, 1931 2 Sheets-Sheet 2

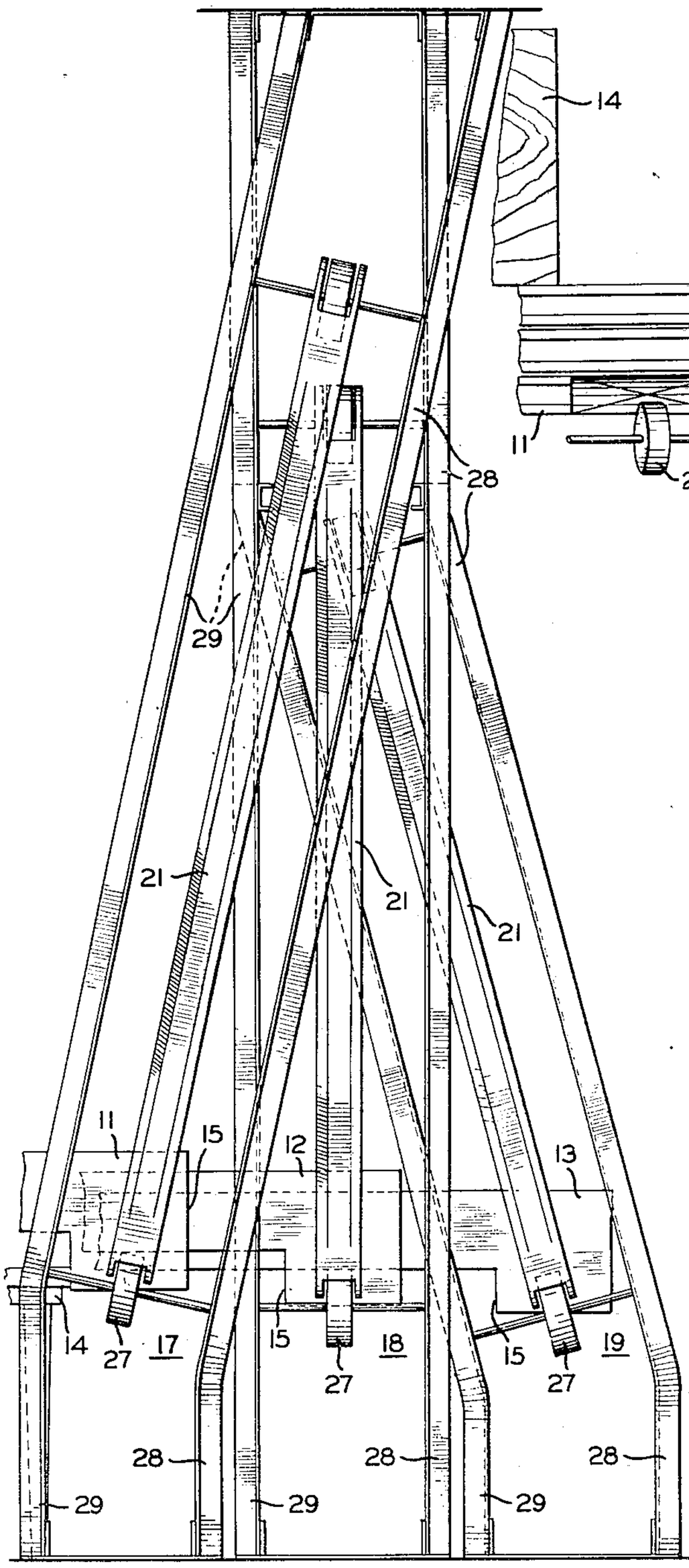

FIG. 2

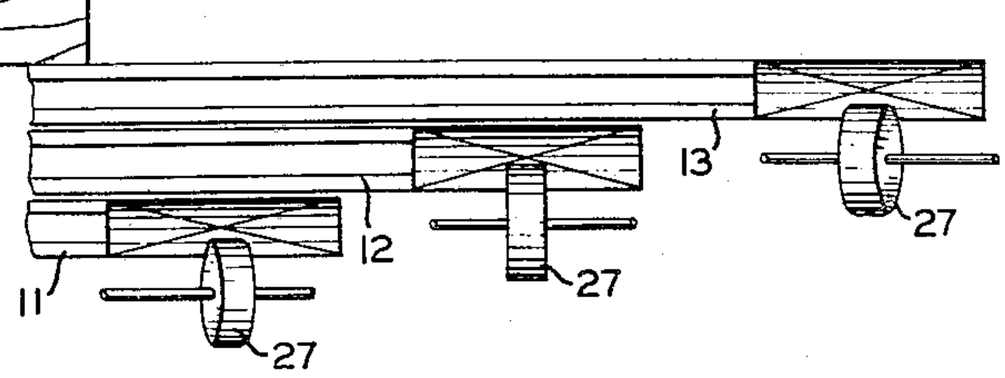

FIG. 6

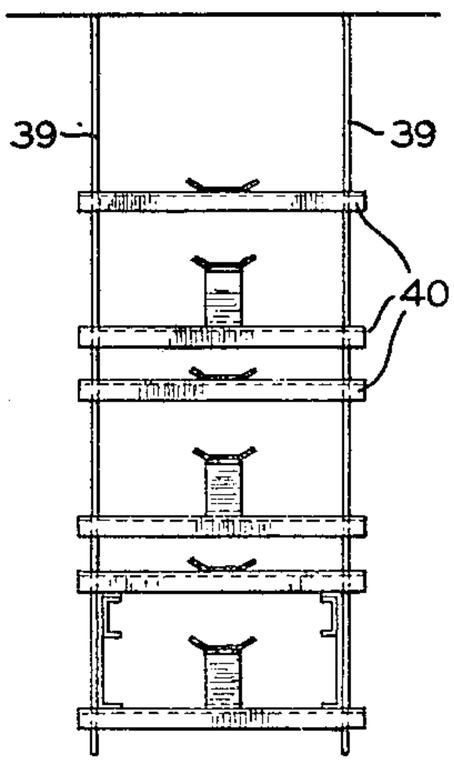

FIG. 3

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1,934,617

CONVEYER SYSTEM

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Application June 26, 1931. Serial No. 547,094

10 Claims. (Cl. 198—160)

This invention relates to conveyer systems for transporting sheet material such as telegram blanks, letters, messages and the like, and more particularly to systems including a plurality of conveyers disposed in side by side relation and arranged to communicate with other conveyers disposed in a substantially vertical relation and at a different elevation, and has for an object to provide such an arrangement which will employ substantially uniform communicating sections connecting directly with corresponding conveyers at the different elevations and which will require a minimum amount of supporting structure and occupy a minimum amount of space.

Conveyers for transporting message blanks and other sheet material have gone into extensive commercial use in office buildings and the like. One field of extensive use is in connection with conveyer systems employed in district or relay offices of commercial communication concerns where the messages that are received in one section of the building may have to be transferred to another section of the building to be sent out over the proper communication channel. The conveyer system is employed in collecting the messages and routing the same to the proper section for dispatching.

In such conveyer systems, the telegram blanks or messages to be transferred to other sections of the building are deposited into collecting conveyers of any suitable type, ordinarily arranged at the back of the operator's desk or table. The collecting conveyers discharge the message blanks into one or more pickup conveyers forming or leading to trunk conveyer runs which take the message blanks to a distribution center or area. These feed into other conveyers which take the message blanks to proper sections of the distribution area, such as a moving belt arranged on a table before a number of assorting or routing clerks. At the distribution center the message blanks are assorted and deposited into routing conveyers which discharge the same into suitable delivery conveyers by which they are delivered to the proper dispatching section.

Various applications of this invention may be made to conveyer systems of the foregoing type. However, for purposes of illustration only one or two examples will be considered.

Ordinarily, the layout of a communication relay office is such that the delivery conveyers are arranged substantially at right angles to the routing conveyers at the distribution center. The routing conveyers, as already set forth, are arranged so that message blanks may be assorted and deposited therein by the assorting clerks seated before a table or a moving belt. The dispatching center may be located on the same floor as the distribution center or it may be located on other floors below or above the distribution center. Consequently, the delivery conveyers may be located either above or below the routing conveyers.

Ordinarily, the routing conveyers are of the V-trough type in which the message blanks are transported on edge or in a substantially vertical position, while the delivery conveyers are of the drag type in which the message blanks are transported along a conveyer channel between the channel and a belt by frictional engagement with the belt. An arrangement of this type is described in a copending application by A. Plausics, filed September 27, 1930, Ser. No. 484,882, and assigned to The Western Union Telegraph Company. In a system such as above referred to and described in this application, an arrangement is necessary to permit the message blanks to be discharged at the end of the various V-trough conveyers and received into corresponding communicating conveyer sections which connect with the respective delivery conveyers. Usually the communicating conveyer sections are of the drag type and are merely sections of the delivery conveyers which extend downward or upward, as the case may be, to receive the material discharged from the routing conveyers. Where there are several routing conveyers arranged together, as in the above mentioned application, the problem of providing suitable inlet arrangements on the communicating sections to receive material from the several discharges of the V-troughs is one of some difficulty. In the conveyer system of the aforesaid application the V-troughs are arranged to terminate substantially at the same point, that is, the discharges are disposed adjacent each other at substantially the same transverse plane. By reason of this, a very complicated arrangement of inlets for the communicating conveyer sections is necessary.

According to this invention the V-trough conveyers instead of terminating at substantially the same point, are arranged to terminate at points spaced longitudinally of the conveyer troughs. In other words, one of the V-trough conveyers will terminate at a certain point while the next trough will extend beyond the end of the first conveyer and terminate at a point longitudinally spaced therefrom, and the next conveyer trough will extend beyond the end of the former and terminate at a point spaced longitudinally from

the same, and so on. In this manner, each of the discharges of the V-trough or routing conveyers are spaced apart so that the corresponding interconnecting section of the delivery conveyers may be located immediately in front of the throat of the routing conveyer discharge and, at the same time, the interconnecting sections will be spaced from each other sufficiently to prevent their supporting structures from interfering with each other.

In most instances, the delivery conveyers will extend for some distance in the same direction. When arranged in this manner, the delivery conveyers can best be supported vertically one above another in single brackets or supporting members at suitable points along their length. I have found that the communicating sections can be accommodated to this arrangement by joining the several sections to its corresponding delivery conveyer so that the sections will extend upward or downward, as the case may be, in the direction of the discharge of the routing conveyers from points spaced longitudinally of the group of delivery conveyers. Arrangoed in this manner, the communicating sections from the central routing conveyer to the central delivery conveyer will ordinarily extend substantially in a vertical direction. The communicating sections on either side of this central section are inclined toward the vertical plane, in which the horizontal runs of the delivery conveyers lie, and connected with the horizontal runs at longitudinally spaced points as already set forth. With this arrangement ample clearance is provided for the supporting structures of each of the communicating sections and the sections can be provided with substantially the same type of inlet and can be arranged to communicate directly with the discharge of the routing conveyers.

Another object of my invention, therefore, is to provide a plurality of longitudinally extending horizontal conveyers arranged in substantially side by side relation with longitudinally spaced discharges provided therefor, which deliver material into similar communicating sections connecting with a like number of horizontal conveyers disposed vertically one above another.

Still another object of my invention is to provide a first group of longitudinally extending conveyers arranged in side by side relation, a second group of longitudinally extending horizontal conveyers arranged one above the other in a substantially vertical relation and communicating sections connecting the several conveyers of the first group with a corresponding one of the second group of conveyers, said communicating sections being of substantially the same form and arranged so that their supporting structures have suitable clearance between each other.

These and other objects of my invention will appear from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Figure 1 is a view in elevation of the arrangement showing the sides of the uptake sections and the corresponding arrangement of the horizontal conveyers;

Figure 2 is a view in elevation of the front of the uptake sections showing the corresponding arrangement of the horizontal conveyers;

Figure 3 is a cross section of the high speed conveyer group taken along the line 3—3 of Figure 1 showing the supporting brackets and the vertical arrangement of the conveyers;

Figure 4 is an enlarged detail of the discharges and corresponding inlets of the arrangement shown in the lower part of Figure 1;

Figure 5 is an enlarged detail of a single V trough and discharge and the corresponding inlet arrangement of the uptake section; and

Figure 6 is a diagrammatic plan view showing the relation of the discharges from the side by side conveyers and the belt guide rollers of the corresponding uptake sections.

While my invention is applicable to several types of conveyers adapted to convey sheet material, I have shown the same as being embodied in an arrangement employing V trough type conveyers arranged in side by side relation feeding into up-take or communicating sections of conveyers of the drag type, or in other words, conveyers embodying a channel and a belt travelling over said channel which conveys the sheet material along the channel by frictional engagement with the belt. Any type of conveyer in which sheet material may be inserted throughout the greater portion of its length might be used in place of the V-trough type conveyers. On the other hand, any type of conveyer adapted to convey sheet material in an upward or downward direction and along extended horizontal runs with relatively rapid movement might be used in place of the drag type conveyers; for example, double strap conveyers in which the sheet material is conveyed between two moving belts or other conveying elements.

Referring now to the drawings, Figs. 1 and 2 show an embodiment of my invention in its preferred form. The system comprises a plurality of V-trough conveyers arranged in side by side relation and adapted to be disposed at a suitable height from the floor to provide ready access for the insertion of sheet material substantially throughout their length. In the drawings, three V-trough conveyers 11, 12 and 13 are shown arranged at the rear of a table 14 in side by side relation at a gradually increasing height from front to rear. These might be arranged on the same level with respect to each other or arranged in any other suitable manner. The V-trough conveyers are arranged to transport the material deposited therein toward the ends of the troughs shown in the drawings and deposited at the ends of the troughs into chutes 15 provided thereon which direct the material downwardly into the inlets 16 of the up-take sections 17, 18 and 19 of the drag conveyers.

Each of the up-take sections as clearly shown in Figs. 2 and 5, comprises a conveyer channel 21 in which a moving belt 22 travels in an upward direction along the channel, a set of guide rollers 23, 24, 25, 26 and 27 for the travelling belt, and a framework comprising longitudinally extending angle members 28 and 29 for supporting the conveyer channel, belt and guide rollers. In drag conveyers, such as are employed in this embodiment of my invention, the conveyer channel 21 is of relatively less width than the width of the message blanks or the sheet material to be conveyed and the conveyers are adapted to convey the sheets by engaging the central portion thereof between the belt and the channel with the outer edge portions overhanging the sides of the channel. For this reason, the channel supporting angle members or beams 28 and 29 are required to be spaced considerably from the sides of the channel member so as to avoid interference with the overhanging edges of the sheet as they are conveyed along the channel.

In order to prevent the up-take or communi-

cating sections from occupying considerable floor space at the discharge end of the V-trough conveyers, I have arranged the V-troughs to terminate at different points along their length which are spaced apart longitudinally a suitable distance to provide for accommodating a substantially side by side arrangement of the lower ends of the up-take sections and their supporting structure so that the inlets 16 of the up-take sections can be disposed immediately in front of the discharge chutes 15 of the several V-trough conveyers. The longitudinal spacing of the termination of the V-troughs and the discharge chutes are illustrated in Figs. 2 and 6. The V-trough conveyer 11 is terminated first and its discharge chute 15 attached at the end thereof. The V-trough conveyer 12 is extended beyond the termination of the other conveyer where it is provided with a similar discharge chute 15 and the V-trough conveyer 13 is terminated beyond the discharge chute of conveyer 12 and provided with its discharge chute 15 similar to the others. In this manner, sufficient space is allowed for setting each of the up-take sections 17, 18 and 19 directly in front of the corresponding discharge chute 15 which permits the use of a simple and effective inlet arrangement.

The inlets 16 for each of the up-take sections are of similar construction and arrangement, a detail of such arrangement being shown in Fig. 5. The inlet arrangement embodies a belt guide roller 27 being disposed before the outlet of the discharge chute and another guide roller 26 being disposed behind the outlet of the discharge chute, and a third roller 25 is disposed at a lower position beyond the outer side of the conveyer channel. Each of these rollers are supported on suitable brackets 31, 32 and 33 secured to the angle members 28 and 29. With this arrangement of guide rollers, the conveyer belt passes downward over the lower guide roller 25 and backward over the guide roller 26 and rear of the discharge chute and downward so as to clear the lower edge of the opening of the discharge chute 15 and meet the lower edge of the guide roller 27 where the throat of the inlet is formed by the converging surfaces of the belt and the guide roller 27. In this manner, message blanks or other material discharged from the end of the V-trough conveyer will fall into the discharge chute 15 and be directed by the curved portion 34 of the chute in between the moving belt and the revolving guide roller 27, whence it will be conveyed around the guide roller and enter the upwardly extending section 21 of the drag conveyer channel and be conveyed along this channel in the usual manner.

The arrangement of the discharge chutes and the inlets of the up-take sections with relation to each other as viewed looking endwise along the V-troughs, is shown at the lower portion of Fig. 1 and in an enlarged detail in Fig. 4.

In a conveyer system of the character herein described, the V-trough conveyers 11, 12 and 13 are arranged to serve as routing conveyers which feed the message blanks, deposited therein by the assorting clerks, into the corresponding uptake or communicating sections which connect with a corresponding number of independent delivery conveyers 35, 36 and 37 arranged to convey the material to the proper location in the building for dispatching the messages. Each of the delivery conveyers embodies a conveyer channel 21 in which the sheet material is transported and a return channel member 38 in which the conveyer belt travels in a return direction. Ordinarily, these several delivery conveyers extend for a considerable distance in the same direction.

In order that they may be arranged to occupy a minimum amount of space and held by the simplest form of support, I dispose the conveyer channels at different elevations, one above the other. In this way only a relatively narrow space is occupied, enabling the use of supports in the form of single brackets or hanger members which are secured to the overhead ceiling or other part of the building and are arranged to carry the conveyers with the forward and return channel members suitably spaced vertically from each other. These brackets may comprise two rods 39 or other suitable side members carrying cross members or supports 40 on which the conveyer channels are mounted. The brackets are spaced a suitable distance apart longitudinally of the conveyer channels to provide a substantially rigid support therefor.

As already stated, the usual practice is to arrange the distribution or V-trough conveyer sections at right angles to the horizontal runs of the delivery conveyers. In order that each of the up-take sections may extend directly up to connect with one of the horizontal sections, as already indicated, I have arranged the two outside upright sections 17 and 19 to be inclined toward the central section 18, so that they will come into substantially the same vertical plane at their upper ends for connecting directly with the horizontal runs 35, 36 and 37 which are supported one above another in the same brackets. When the upper ends are, in this manner, brought into substantially the same vertical plane, it is necessary to provide clearance for the structural supports and for the return section of the various belts. This is provided by spacing the termini of the various sections from each other in the vertical plane. In other words, the up-take section 17 connecting with the V-trough conveyer 11, is inclined both rearwardly as shown in Fig. 1 and inwardly as shown in Fig. 2. The central up-take section 18 is disposed substantially in a vertical plane in both directions, while the up-take section 19 in connection with the V-trough conveyer 13 is inclined forwardly as shown in Fig. 1, and inwardly as shown in Fig. 2 to bring the upper end thereof in proper location.

Arranged in the manner just described, the respective up-take sections provide direct connection with the corresponding horizontal runs. In other words, the front upright section 19 connects with the lower horizontal run 37 while the central up-right section 18 connects with the central horizontal run 36, and the rear up-right section 17 connects with the upper horizontal run 35. Although, described as connecting with the horizontal sections, the up-take sections may be properly considered as merely downward extending portions of the respective horizontal conveyers. The change in direction of the horizontal runs to extend downwardly is provided by the belt guide roller 23 at the apex of the angle made by the horizontal and downward section of the drag channel of each conveyer and another belt guide roller 24 for the return section of the belt so arranged as to provide proper clearance for the passage of the return section of the belt 22 downward to the guide rollers at the inlet end of the up-take sections.

As heretofore set forth, the delivery conveyers may be located below the routing conveyers as well as above the same. In such case, the communicating sections 17, 18 and 19 would extend downwardly from the discharge chutes 15 of the V-trough conveyers 11, 12 and 13, instead of upwardly. The lower ends of the communicating sections would join to the corresponding delivery conveyers by a suitable arrangement of the sets of direction changing rollers 23 and 24. With this arrangement the lower ends of the communicating sections would be positioned in the same vertical plane as the delivery conveyers, substantially as described in connection with the arrangement where the delivery conveyers are above the routing conveyers.

From the foregoing, it will be observed that by arranging the ends of the communicating sections connected with the V-trough conveyers to be spread apart substantially longitudinally of the V-trough conveyers and by arranging the other ends of the communicating sections to converge into a vertical plane adjacent the vertically arranged delivery conveyers, and by arranging the communicating sections to be spread apart in this latter vertical plane, one group of conveyers can be connected with another group angularly disposed thereto by communicating sections of a similar construction and arranged to extend directly from the terminus of the conveyers of one group to join the corresponding conveyers of another group. Also, communicating sections can be arranged so that ample space is provided between structural elements of the various sections and a minimum amount of space is occupied by such connecting sections as well as by both conveyer groups.

It will be apparent to those skilled in the art that my invention is not limited to the type of conveyers and conveyer system shown in the embodiment herein described but may be applied to various other types of conveyers and conveyer systems.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited but is susceptible to various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitation shall be placed thereon as are imposed by the prior art or as specifically set forth in the appended claims.

I claim as my invention:

1. In a conveyer system, the combination of a first group of horizontally extending conveyers arranged substantially in side by side relation, a second group including a corresponding number of conveyers arranged one above another in vertical relation and at a different elevation from the first group and disposed angularly thereto in a horizontal direction, and a like number of interconnecting sections connecting each conveyer of the first group respectively, with one of the conveyers of the second group, said interconnecting sections being so angularly disposed with respect to each other as to extend directly from the terminus of the conveyers of the first group to the entrant end of the conveyers of the second group.

2. In a conveyer system, the combination of a first group of horizontally extending conveyers arranged in side by side relation, a second group embodying a corresponding number of conveyers arranged one above another in a substantially vertical relation and at a different elevation from the first group and extending angularly thereto in a horizontal direction, each of the second group of conveyers being provided with a section extending to communicate with one of the conveyers of the first group, said sections being alined in the same vertical plane at their upper ends as the second group but spaced apart transversely of said plane at their lower ends.

3. In a conveyer system, the combination of a first group of horizontally extending conveyers arranged in side by side relation, each of said conveyers being provided with a discharge outlet spaced longitudinally from the discharge outlet of the other conveyers of said first group, and a second group of conveyers extending angularly from the first group and embodying a corresponding number of conveyers arranged substantially vertically one above another at a different elevation from the first group, said second group of conveyers embodying main sections and auxiliary end sections disposed at an angle to the main sections, said end sections being disposed in angularly spaced relation to each other and extending to communicate directly with the discharge outlet of one of the first group of conveyers.

4. In a conveyer system, the combination of a first group of horizontally extending conveyers arranged in side by side relation, discharge chutes provided for each of said conveyers and arranged in longitudinally spaced relation, a second group of conveyers comprising a conveyer corresponding to each conveyer of the first group, said second group of conveyers being arranged one above another in a vertical plane and disposed substantially at right angles to the conveyers of the first group, and a like number of interconnecting sections connecting each conveyer of the first group respectively, with one of the conveyers of the second group, each of said interconnecting sections having substantially the same type of inlet for receiving discharge material, said sections being angularly disposed with respect to each other to provide for connecting the conveyer at one side of the first group with the top conveyer of the vertically arranged group and the conveyer at the other side of the first group with the bottom conveyer of the vertically arranged group and for connecting the intervening conveyers in the first group in like order with the intervening conveyers of the second group.

5. In a conveyer system, the combination of a first group of longitudinally extending conveyers arranged in side by side relation, each of said conveyers terminating with a discharge opening which is spaced longitudinally from the openings of the other conveyers, a substantially straight uptake section corresponding to each conveyer in the side by side group, an inlet for each of the uptake sections arranged to receive material from the respective discharge openings, a second group of horizontal conveyers disposed in angular relation to the first group and arranged one above another with their ends spaced horizontally, said uptake sections being so angularly disposed with respect to each other as to connect the longitudinally spaced discharge openings with a corresponding conveyer of the second group.

6. In a conveyer system, the combination of a plurality of communicating conveyer sections so disposed in relation to each other that their lower ends are positioned substantially in a single vertical plane and are spread apart in said plane, and so disposed that their upper ends are position-

ed substantially in another vertical plane angularly disposed from the first plane and arranged to be spread apart in said latter plane, a first group of conveyers including a conveyer corresponding to each of the communicating sections and in communication with the lower end thereof, and a second group of conveyers including a conveyer corresponding to each of the communicating sections and in communication with the upper end thereof.

7. In a conveyer system, the combination of a plurality of communicating conveyer sections embodying a conveyer channel, an endless belt for conveying material along said channel, guide rollers for the belt, and a supporting structure for the channel belt and guide rollers, said sections being so disposed in relation to each other that their lower ends are positioned substantially in a single vertical plane and rise from horizontally spaced points in said plane and are so disposed that their upper ends terminate in another vertical plane angularly disposed to the former plane at points spaced both horizontally and vertically from each other in said latter plane, whereby suitable structural clearance is provided between the various communicating sections, a first group of conveyers including a conveyer corresponding to each communicating section and in communication with the lower end thereof, and a second group of conveyers including a conveyer corresponding to each communicating section and in communication with the upper end thereof.

8. In a conveyer system, the combination of a first group of longitudinally extending conveyers arranged in side by side relation, each of said conveyers terminating with a discharge opening, said openings being spaced from each other longitudinally of the conveyers, a substantially straight communicating section corresponding to each conveyer in the side by side group, an inlet for each of the communicating sections arranged to receive material from the respective discharge openings, a second group of conveyers arranged vertically one above the other and disposed substantially at right angles to the first group, a first communicating section being disposed substantially vertically, others of said communicating sections being inclined with respect to the first section so as to provide an arrangement for connecting each conveyer of the first group directly with a corresponding conveyer of the second group.

9. In a conveyer system, combination of a first group of conveyers, each embodying a main section and a corresponding auxiliary section, said main sections being arranged one above the other in a substantially vertical plane and terminating at horizontally spaced points in said plane, said auxiliary sections being arranged to extend angularly from the main sections in the general direction of said plane but with their outer ends spaced apart transversely of said plane, a second group of conveyers disposed angularly of the main sections of the first group, said second group embodying a conveyer arranged to communicate with the outer end of each of the auxiliary sections of the first group.

10. In a conveyer system, combination of a first group of conveyers, each embodying a main section and a corresponding auxiliary section, said main sections being arranged one above the other in a substantially vertical plane and terminating at horizontally spaced points in said plane, said auxiliary sections being arranged to extend angularly from the main sections in the general direction of said plane but with their outer ends spaced apart transversely of said plane, belts for said conveyers, the outer ends of said main sections being twisted in the vertical plane for alining the same with its corresponding auxiliary section, guide rollers at the extremities of the auxiliary section providing for the belt traveling in the main section to extend along the corresponding auxiliary section.

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