

G. F. CAHILL.

APPROACH TO MOVABLE WALKS, STAIRWAYS, &c.

APPLICATION FILED DEC. 18, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

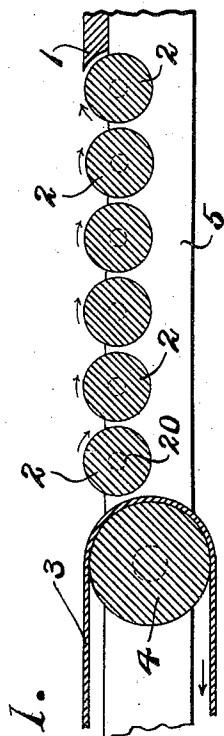


Fig. 1.

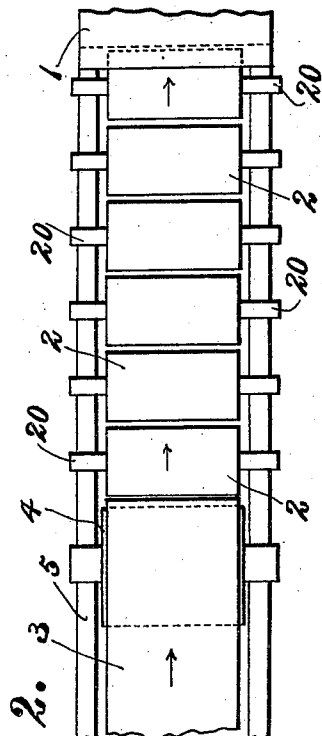


Fig. 2.

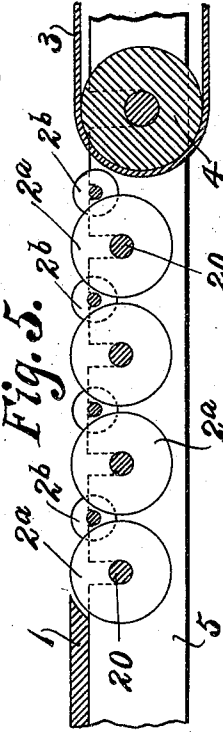


Fig. 3.

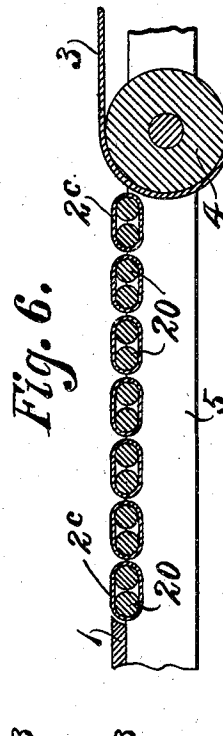
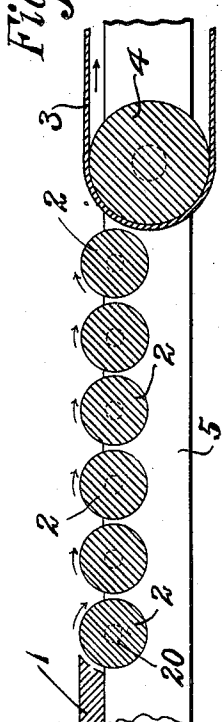
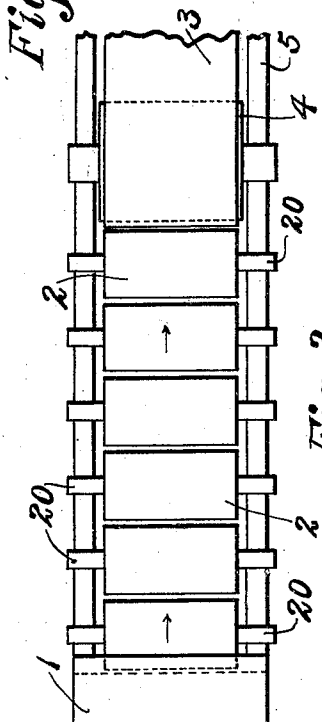


Fig. 4.



Attest And Signature
Jas. F. Brown.



Inventor.
Geo. F. Cahill

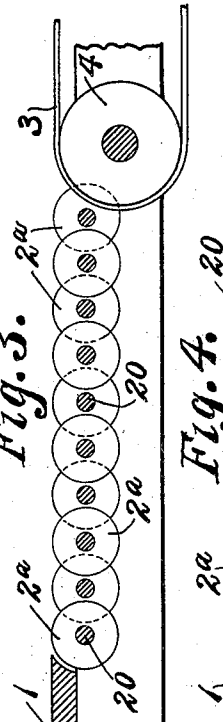


Fig. 7.

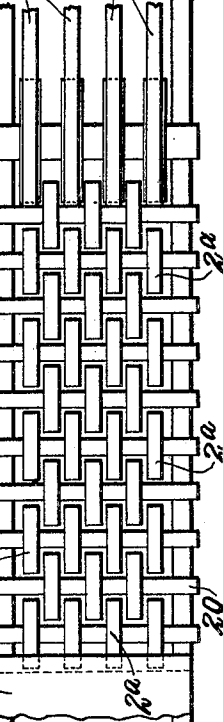


Fig. 8.

No. 770,260.

PATENTED SEPT. 20, 1904.

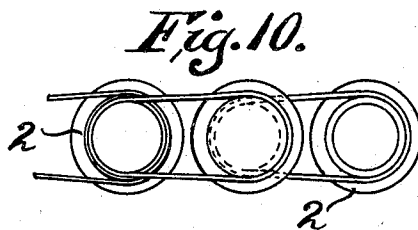
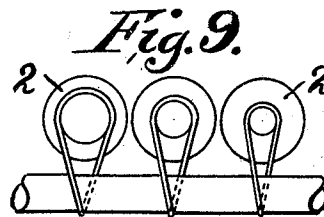
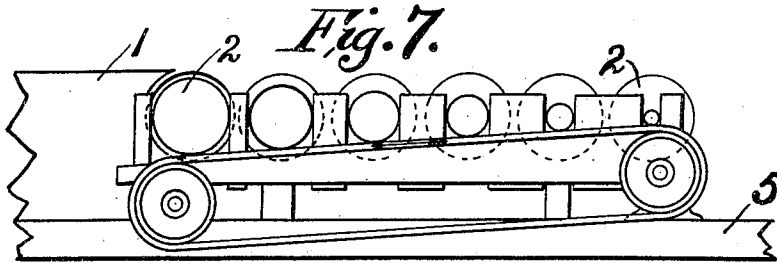
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NO MODEL.

2 SHEETS—SHEET 2.



Attest:
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UNITED STATES PATENT OFFICE.

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APPROACH TO MOVABLE WALKS, STAIRWAYS, &c.

SPECIFICATION forming part of Letters Patent No. 770,260, dated September 20, 1904.

Application filed December 18, 1903. Serial No. 185,756. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. CAHILL, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented a new and useful Approach to Movable Walks, Movable Stairways, and the Like, of which the following is a specification.

My invention relates to means for approaching or leaving movable walks, escalators, conveyers, telpherage apparatus, or other similar constantly-moving devices for the transportation of freight or passengers or for varying the speed of movement of freight or passengers while in transit; and the object of my invention is to provide means by which a passenger or a thing can be started forward very slowly and the rate of movement gradually accelerated until it is equal to or substantially equal to that of the moving device or devices onto which it is desired to transfer such person or thing.

Numerous forms of endless conveyer for passengers and for freight have been known for many years; but a chief obstacle to their general use, more particularly for the conveyance of passengers, is the difficulty and resulting danger in getting onto and off of such conveyers. In the case of the most approved movable stairway known to me, for instance, a person has to step from a stationary walk or floor onto a moving floor or stairway, and it is not every one who understands how to do so with perfect safety. The best means heretofore proposed to overcome this difficulty, so far as I am aware, is to employ other walks or belts close to and moving parallel with the main walk or belt, each of such approaching parallel walks or belts moving at a higher speed than the one farther out. The great and fundamental difficulty with this device, however, is that the successive belts or walks are moving at right angles to the direction in which a passenger naturally walks in passing from one to another onto the main walk or belt, the very surest way to be thrown. A second inherent difficulty is that the transition from one to another is still sharp and sudden, although the difference in speed has been reduced. By the invention herein proposed,

however, a person may step from a stationary floor or walk onto a tread or surface, which, although moving, is moving very slowly near to the stationary floor or walk and in the direction in which the person faces, and which walk or tread has within itself a gradually-increasing rate of movement until it equals that of the main walk or stairway itself before the passenger is transferred thereto, and the passenger has merely to stand still upon this moving tread or surface, which impels him forward with a gradually-increasing speed until he is deposited upon the moving walk or stairway itself. Departure from the moving walk or stairway is of course effected by a similar although reverse process.

In this specification for lack of a better I shall sometimes use the word "reproach," in its early and literal sense, as the opposite of "approach," in referring to the means by which a person or thing is transferred from the moving belt or walk to a stationary walk or floor by a gentle and gradual reduction of the forward movement.

The use of the invention herein described in the transportation of inanimate things would greatly reduce the strain upon the endless conveyer or belt, as they would not have to be started up suddenly, and also permit of a more rapid movement thereof.

In the accompanying drawings, Figure 1 is a longitudinal section illustrating a simple form of approach, a movable belt or walk, and a reproach therefrom, a part of the endless conveyer being broken away. Fig. 2 is a plan view of the device illustrated in Fig. 1. Fig. 3 is a longitudinal section of a modified construction in which in place of the solid rollers of Fig. 1 a series of disks set upon axes or rods is used, said disks being arranged to overlap each other and so form a closer and more even tread or advancing surface. Fig. 4 is a plan view of the construction illustrated in Fig. 3, the movable walk or belt being shown in these views as formed of strips to pass between the disks carried by the nearest axis or roller, although of course a solid belt, such as that shown in Figs. 1 and 2, might be used instead, in which case of course it could not pass between the disks carried by the

nearest axis or roller. Fig. 5 is a longitudinal section illustrating still another arrangement of axes and disks. Fig. 6 is a longitudinal section illustrating a construction in which a plurality of small endless belts passing over small rollers or axes are used, the upper surfaces of each of said endless belts moving toward the main belt or walk with a speed greater than that of the one next farther away and less than that of the one next nearer to the main belt. Figs. 7, 8, 9, and 10 show different forms of devices for rotating the forwardly-moving units.

Similar reference characters refer to similar parts in all the drawings.

1 is the stationary platform, walk, or floor from which the passenger or thing is to be transported to the movable walk, stairway, or other conveyer, or vice versa.

2 2 (sometimes used with an accompanying letter) are the rolls, wheels, or small belts whose upper surfaces are all moving toward or away from, but always in the same direction as, the moving belt or walk with differing speeds.

3 is an endless belt, walk, stairway, or other conveyer, shown for convenience sake in the several drawings as a belt.

4 4 are the wheels carrying the endless belt 3.

5 is the framework or supports for the platform 1, rolls or wheels 2 2, and belt-carrying wheels 4 4.

In the construction shown in Figs. 1 and 2 illustrative of the principle of my invention the platform or floor 1, from which the passenger or thing is to pass to the moving walk, stairway, or belt, is shown as broken away on account of the limitation of the sheet. The upper surfaces of all the rolls, axes, or drums 2 2 carried upon the axles 20 20 are moving toward the main belt in the direction shown by the arrows and in the same direction as the belt itself is moving. The roller 2 nearest to the stationary platform 1 is, however, moving forward very slowly, the next roller 2 at a somewhat increased rate of movement, the next at a still greater speed, and so on until the roller or rollers next to the main belt move at a speed equal to or substantially equal to that of the main belt or walk itself. In this manner anything placed upon said roller or drum is started forward very slowly and is passed on to the next and the next rotating or forwardly-moving surface until its rate of forward movement is brought up to a speed at which it can be transferred to the main belt or platform without jar or danger. An object of sufficient size—such, for instance, as the foot of a passenger—would generally cover or bear upon two or more of these forwardly-moving surfaces, in which case the rear part would be urged forward at one rate and the forward part pulled forward at another and higher rate of speed. Thus if a passenger's

heel rests on a wheel or roll making one revolution per second and the ball of his foot upon another roll or wheel making two revolutions per second the rate of forward movement of the foot or shoe as a whole would be a resultant probably greater than the slower-moving roll or wheel and less than the faster-moving roll or wheel. Both movements are of course in the same direction.

The number of forward-moving rolls, axes, drums, &c., is of course not a part of my invention. To obtain the best results, however, the difference in speed or rate of movement of adjacent forwardly-moving units should not be large. But six are shown in the drawing Fig. 1 on account of the limitations of the sheet, but a much larger number would almost certainly be used, especially in a device for use by passengers. It would seem desirable in an approach to a moving stairway, sidewalk, or other public conveyance for passengers to construct an approach with a large number of forwardly-moving units extending several feet in the direction of movement and one in which the forward movement of the units next to the stationary platform 1 was very slow indeed and the rate of acceleration small. On such an approach aged, timid, or infirm persons would be slowly and almost imperceptibly carried forward, while the young, active, and experienced could shorten the time of acceleration by stepping forward with and upon the forwardly-moving approach. Again, the rate of increase of movement from unit to unit might be regular or irregular. The rollers or drums shown in Fig. 1 might rotate with relative angular velocities of one, two, three, four, five, six, &c., or with a fixed rate of increase, as one, 1.5, 2.25, 3.375, 5.062, 7.594, &c., or at some other rate of increase. I wish it to be very distinctly understood, however, that it is not necessary to the carrying out of my invention that each wheel or roller in the ascending scale should move with a velocity greater than its predecessor and less than its successor. Such a construction seems to be preferable, but it would be no avoidance of the invention herein disclosed to so vary the rate of forward movement of the successive forwardly-moving units as to produce an irregular acceleration or even no acceleration at all at certain points of the forward movement.

The reproach or means for leaving the main belt or walk is of course substantially the same as the means for approaching thereto, as clearly illustrated in the drawings. In the construction illustrated in Figs. 3 and 4 the tread or surface of the approach or reproach is shown as formed of a plurality of wheels or disks 2^a 2^a set upon parallel axes 20 20 and so arranged that the edges of the disks on one axis lie between the edges of the disks on the adjoining axis. In these figures the main belt or moving way is shown as formed of

bands or strips arranged to pass between the edges of the disks 2^a 2^a. In the construction clearly illustrated in detail in Fig. 5 the tread is formed of disks or wheels 2^a 2^a, substantially such as those shown in Figs. 3 and 4 and of the smaller disks or wheels 2^b 2^b. In the construction shown in Fig. 6 as illustrative of the principle of my invention small endless bands or belts 2^c 2^c are formed around two drums, wheels, or axes 20 20. The constructions illustrated in Figs. 3, 5, and 6 are intended to produce a smoother and more uniform tread or surface than that illustrated in Fig. 1.

In Figs. 1 to 6, inclusive, no attempt has been made to show means for impelling the forwardly-moving units or the main belt or carrier. Any suitable means might of course be used for that purpose. Figs. 7, 8, 9, and 10 are detail views showing different ways of imparting the desired differences in rapidity of rotation to the different forwardly-moving units 2 2, &c. In Fig. 7 the ends of the rollers or axes, drums, or wheels having a uniform diameter at the tread or moving surface, but having ends turned down to suitable diameters, rest upon a moving belt, which imparts to each a rotational speed determined by the diameter of the end or axis resting upon the belt. In Fig. 8 a belt is shown passing around the end or a wheel on the end of any of said axes or drums and over an idler 21 between each pair of said axes or drums, while in Fig. 9 a belt from each axis or wheel is shown passing around a main drum or shaft by which all are impelled. In the drawings the ends of the axes or the wheels thereon are shown of different sizes and the drum of one size or diameter. The ends of the axes or wheels thereon might of course be made of a uniform size and different sizes of wheels be placed upon the driving shaft or drum to impart to the wheels or disks 2 2 differing angular velocities. Any suitable device may of course be used for this purpose, as the particular device used for imparting movement to the main carrier or to the parts of the approach is no part of my invention. In Fig. 10 each axis is shown as driving the next axis by means of an endless belt at a somewhat different speed of rotation.

When in this specification, and particularly in the statement of claim at the end hereof, I speak of an "approach to a constantly-moving conveyer" or an "approach to a moving carrier," or use other similar expressions, I wish it to be very clearly understood that I do not restrict myself to an approach in contradistinction to a reproach or means for leaving a moving carrier, but mean by such expression to include either an approach or a reproach whenever one word might have been substituted for the other or both an approach and a reproach, and when in the statement of claim at the end hereof—as, for example,

in claims 6 and 7—language is used descriptive of an approach, which might by slight and evident changes—such, for instance, as "moving away from" in place of "moving toward," "reducing the speed of said passenger or freight" instead of "accelerating the speed of said passenger or freight," &c.—in which a description applies to an approach which might with evident changes be read upon a reproach of similar construction, I wish it to be distinctly understood that the claim is intended to cover both cases in order to save duplication of claims. When in this specification, and particularly in the statement of claim at the end hereof, I speak of "forwardly-moving units" or "units having forward movement" or use other similar expressions, I wish it to be distinctly understood that I do not necessarily mean that such units are moving forward as a whole, but that the upper part of said units or the part or parts of said units which form the tread or surface of the approach are moving forward or in the direction of movement of the main carrier. When in the statement of claim at the end hereof I speak of a "constantly-moving" carrier or conveyer, I wish it to be clearly understood that I do not necessarily mean a carrier or conveyer which never stops, but merely a carrier or conveyer which does not ordinarily stop to receive or discharge that which it carries, and, further, that I use such expressions to cover generally movable walks or ways, movable stairways or escalators, telpherage apparatus, and the whole class of carriers or movable ways which do not usually stop to receive or discharge that which they transport.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An approach to a constantly-moving carrier, including a plurality of forwardly-moving units, constructed and operating in such a manner as to effect the transfer of passengers or freight from one to another.

2. An approach to a constantly-moving conveyer, including a plurality of constantly-moving units, constructed and operating in such a manner as to effect the acceleration of passengers or freight while being transferred from one to another.

3. An approach to a constantly-moving conveyer, including a plurality of forwardly-moving units, constructed and operating in such a manner as to effect the transfer of passengers or freight to the main carrier after accelerating the movement of said passengers or freight.

4. An approach to a moving carrier, including a plurality of units having differing rapidities of forward movement, constructed and operating in such manner as to effect the transfer of passengers or freight to the main carrier.

5. An approach to a moving carrier, including a plurality of units having axes substan-

tially at right angles to the line of movement of the main conveyer, constructed and operating in such manner as to effect the acceleration of passengers or freight resting thereon.

5 6. An approach to a constantly-moving carrier, including a plurality of forwardly-moving units interwoven or overlapped in such manner that the front ends or edges of one set are nearer to the main conveyer, in a line parallel to the line of forward movement, than the rear ends or edges of the set next in front.

10 7. An approach to a constantly-moving carrier, including a plurality of forwardly-moving units having differing speeds of movement, constructed and operating in such manner that a passenger's foot normally rests upon a plurality of said units, different ones of the units upon which such foot rests having differing forward speeds.

15 8. An approach to a constantly-moving carrier, including, (a) means near to a stationary floor or platform, having a movement toward the main carrier but slower than said carrier; (b) means near said main carrier moving in the same direction and having movement of substantially the same speed as the main carrier; and (c) means for automatically accelerating the speed of a passenger or freight in passing between said means first mentioned and said means second mentioned.

20 9. An approach to a constantly-moving carrier, including (a) means near to a stationary floor or platform, on which means a passenger or freight may rest, said means having a movement toward the main carrier but slower than

said carrier; (b) means near said main carrier moving in the same direction and having movement of substantially the same speed as the main carrier; and (c) means for automatically accelerating the speed of said passenger or freight in passing between said means first mentioned and said means second mentioned, said means near the main carrier being constructed and operating to automatically transfer said passenger or freight to said main carrier.

10. An approach to a constantly-moving carrier, including a plurality of forwardly-moving means, different of said means having differing rapidities of forward movement, the whole being constructed so that a line drawn at right angles to the line of forward movement will cross or intersect forwardly-moving means having differing rapidities of forward movement.

11. An approach to a constantly-moving carrier, having a tread or surface composed of a plurality of disks, wheels or cylinders having axes substantially at right angles to the line of forward movement of the moving carrier, said disks, wheels or cylinders having differing rapidities of peripheral movement.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. F. CAHILL.

Witnesses:

ARTHUR T. CAHILL,
JOSEPH GREGORY.