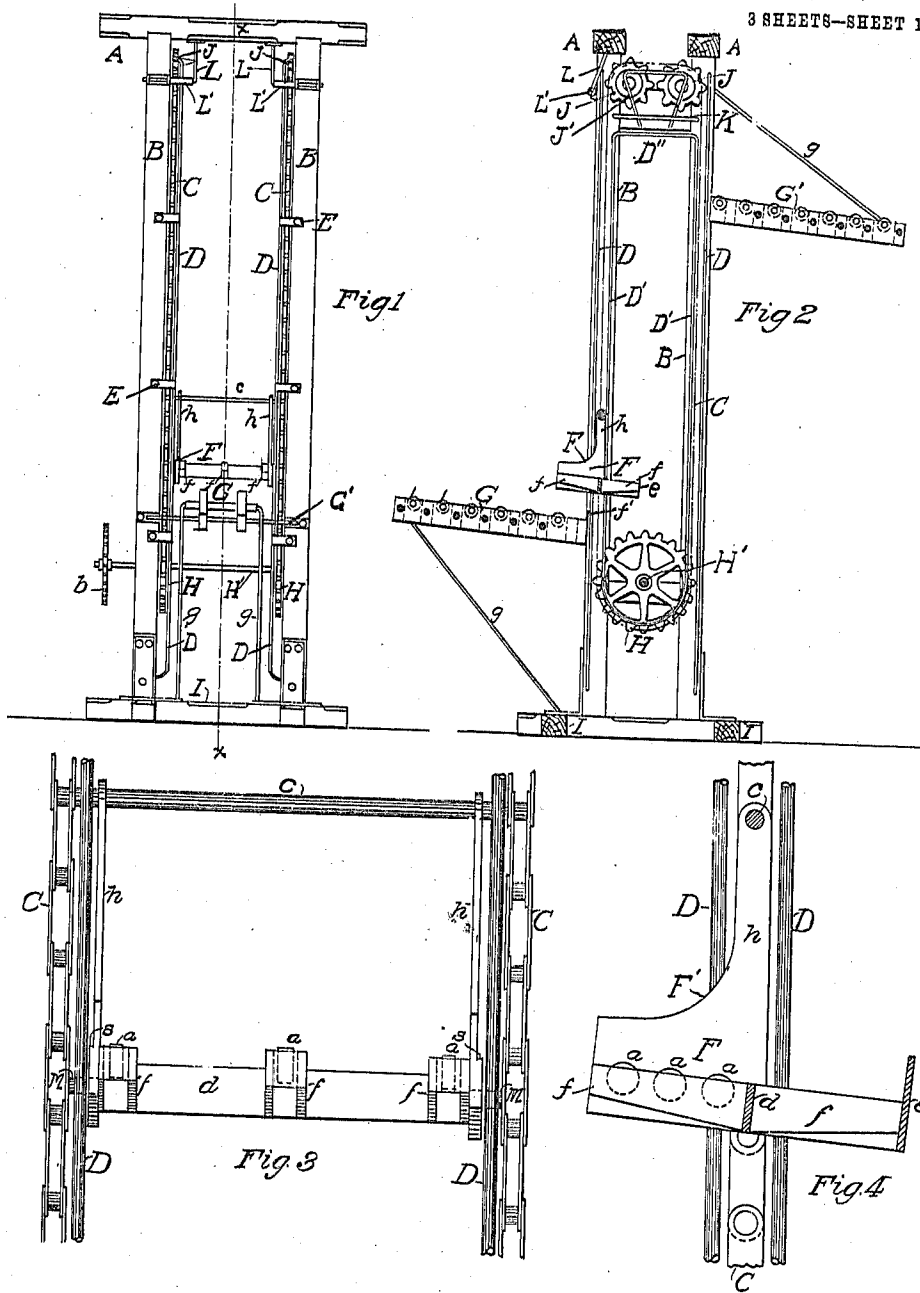


964,099.

A. L. GARDNER.  
AUTOMATIC ELEVATOR.  
APPLICATION FILED MAR. 24, 1906.

Patented July 12, 1910.

3 SHEETS—SHEET 1.



Witnesses.  
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3 SHEETS—SHEET 2.

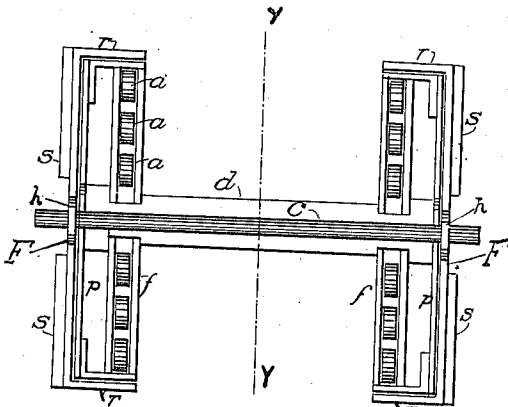


Fig. 5.

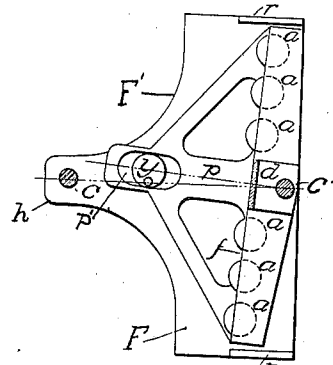


Fig. 7.

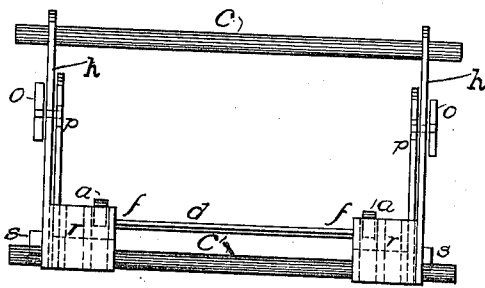


Fig. 6.

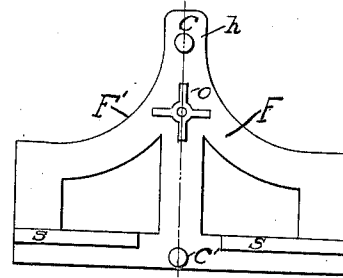


Fig. 8.

Witnesses

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3 SHEETS—SHEET 3.

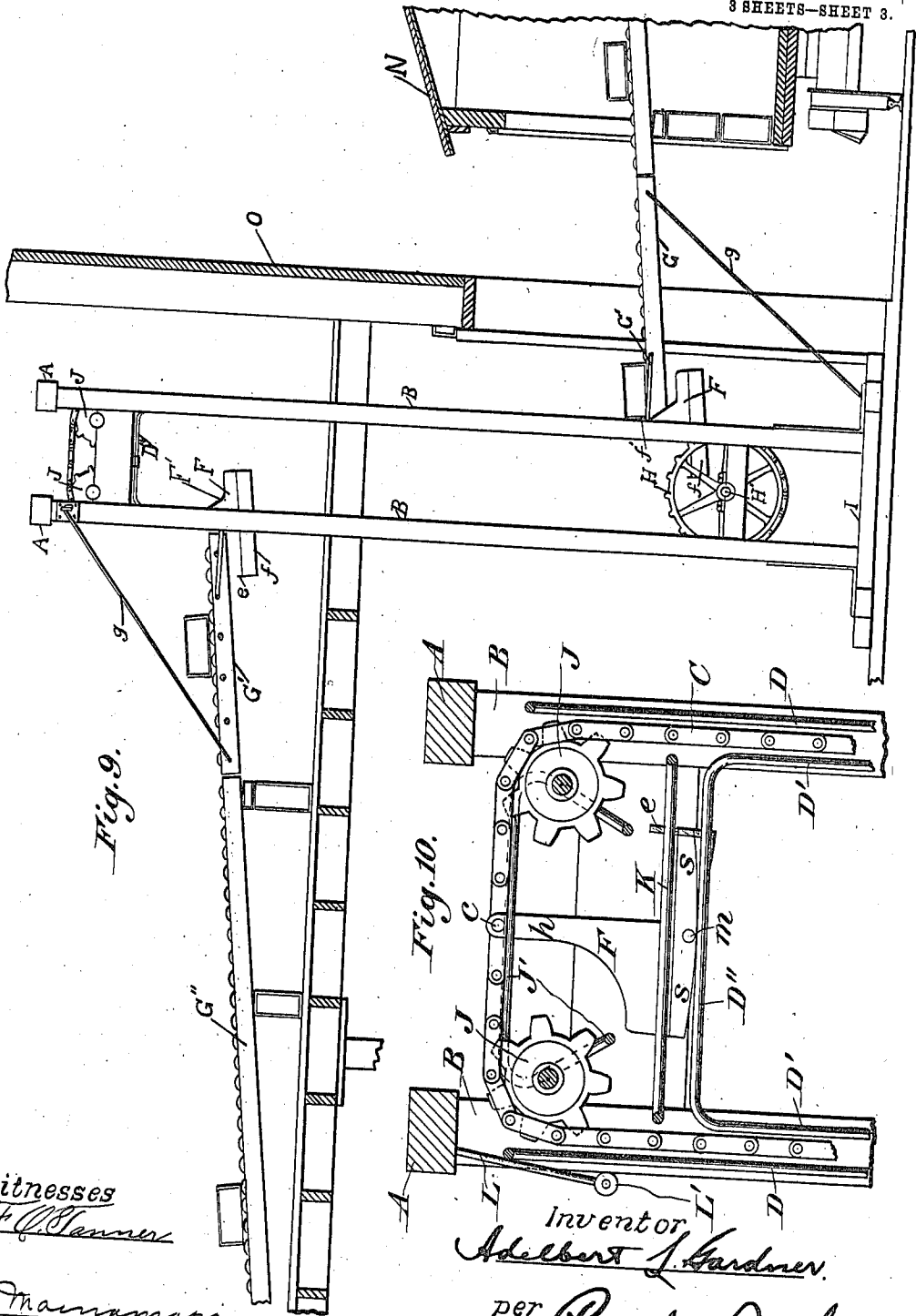


Fig. 9.

Fig. 10.

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# UNITED STATES PATENT OFFICE.

ADELBERT L. GARDNER, OF MINNEAPOLIS, MINNESOTA.

## AUTOMATIC ELEVATOR.

964,099.

Specification of Letters Patent. Patented July 12, 1910.

Application filed March 24, 1905. Serial No. 251,812.

To all whom it may concern:

Be it known that I, ADELBERT L. GARDNER, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Automatic Elevators, of which the following is a specification.

My invention relates to automatic elevating apparatus, and the object of the invention is to provide an automatic elevator by means of which packages of various shapes and sizes can be transferred from one floor in a building to another and distributed to any desired points on that floor, the apparatus requiring no attention, after it is started, except to supply the packages to the carrier leading to the receiving side of the elevator and receive them from the carrier on another floor of the building.

The invention consists generally in providing an automatic apparatus designed particularly for use in connection with gravity carriers for receiving and transferring packages of merchandise from one floor to another.

Further, the invention consists in an improved form of elevator carriage.

Further, the invention consists in a carriage capable of use either in lifting merchandise from a lower to an upper floor, or transferring it from an upper to a lower floor.

Further, the invention consists in improved delivery and discharge carrier sections provided in connection with the elevator and from which the carriage receives its load and to which it delivers it.

Further, the invention consists in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a front elevation of an elevating apparatus embodying my invention. Fig. 2 is a vertical section on the line  $x-x$  of Fig. 1. Fig. 3 is a detail of one of the carriages and the supporting chains and guides therefor. Fig. 4 is a sectional view through the carriage and illustrating the position of the guides on each side of the conveyer chain. Fig. 5 is a plan view of a modified form of carriage. Fig. 6 is a front view of the same. Fig. 7 is a sectional view on the line  $y-y$  of Fig. 5. Fig. 8 is an end view. Fig. 9 is a side elevation illustrating the apparatus in use

in a building. Fig. 10 is a vertical section of the upper part of the elevator showing the engagement of the guides upon the carriage with the guides upon the frame work.

In the form of elevator illustrated in the drawing, A and I represent the head and base timbers, connected by vertical timbers B to form the supporting frame of the elevator. Sprockets H are secured on a shaft H' supported in bearings on the timbers B near the base of the frame. Smaller sprockets J have bearings at the top of the frame, there being two of these sprockets J, on the same level and in the same plane, on each side of the elevator. Sprocket chains C connect the wheels H and J on each side of the frame and are driven with the shaft H' through a sprocket  $b$  from a suitable source of power. Mounted upon the timbers B between and on each side of the chains C are guide rods D and D', the former extending vertically from a point below the sprockets H to a point above the sprockets J (see Fig. 2), the guide rods D' being preferably continuous on each side and curved at the bottom to follow the sprocket wheels H, and at the top having horizontal sections D'' extending across the frame beneath the sprocket wheels J. Short horizontal rods K are supported above the sections D'' and parallel therewith, and triangular guards J' are provided near the faces of the sprocket wheels J. Guides L are carried by the frame and have anti-friction rollers L' for the purposes hereinafter described.

The sprocket chains C operate near the guide rods D and E' and past the guides E, mounted on the timbers B, and are connected across the frame of the elevator by a rod  $c$ . Side plates F have upwardly extending hangers  $h$  pivoted on the rod  $c$ , and are connected by a cross bar  $d$  having at each end and in the middle, on both sides, laterally extending bars  $f$  preferably arranged in pairs, those on one side of the bar  $d$  carrying anti-friction wheels that project above the upper edges of the bars. The bars  $f$  on the other side of the bar  $d$  project beyond the side plates F and terminate in stop plates  $e$ . Pins M are provided on the side plates F and adapted to travel between the guides D and D' and prevent the carrier from swaying to and fro during the elevating operation. G represents a carrier section pivotally supported on a rod G', see Fig. 9, on one side of the apparatus and inclined

downwardly into the path of the carriage to deliver the packages thereto. This carrier-section is preferably composed of bars having a series of anti-friction wheels mounted therein, or thereon, the bars being parallel with one another and separated a sufficient distance to allow the bars  $f$  on one end of the carriage to pass between them and pick up the packages thereon, and provided with stops  $f'$  at their inner ends. The outer ends of the bars are supported by rods  $g$  that are capable of being detached to allow the carrier section to swing to a vertical position and out of the path of the carriage. This carrier section forms a continuation of a carrier that may run into the open door of a freight car (as indicated in Fig. 9), or may extend a considerable distance along a platform, or within a building, and conduct packages by gravity from a distant point and deliver them to the carrier section G, from whence they are gathered up and elevated to another floor. The carriage is inclined slightly inward (as indicated in Fig. 4) and when a package is picked up from the carrier section G it will slide down over the anti-friction wheels against the stops  $e$  at the other end of the carriage. Another carrier section G', similar to the one described, except that it is located on another floor and on another side of the elevator, is inclined downwardly and has its receiving end in the path of the carriage on its down movement and engages the package that is lying on the carriage, against the stops  $e$ , and removes it therefrom, and the package passing by gravity down over the carrier section will move onto a gravity carrier G'' and be conducted away from the elevator to any desired point in the building, where a person may be stationed to remove the package.

To hold the carriage in a horizontal position while it is passing from one side of the elevator to the other, I prefer to provide guides  $s$  thereon which pass between the guides D'' and K, while the rod  $c$  slides across on the triangular guides J'. The carriage is thus held substantially level and there is no possibility of its tilting or the package falling off while it is moving horizontally from one side of the elevating apparatus to the other.

The sides F of the carriages have curved edges F' that engage the anti-friction rollers L' and are guided thereby, while the pivotal support of the carriage is passing up over the guides J' at the top of the elevator.

The carriage may be made of any suitable width according to the size of the package it is desired to handle, and it may be of sufficient width to pick up several packages on different levels, or on the same level if preferred, and deliver them to the same or different carriers on another floor. This

can be effected by increasing the width of the carrier sections and arranging the carriage so that it will pick up several packages at a time and deliver them simultaneously, or at different times, on different floors. Only one carriage is shown, but it will be understood that a number of them may be provided if preferred, and any number of carrier sections may be used in connection with the elevator, according to the height of the building and the number of floors on, or places to, which it is desired to deliver the goods.

In Fig. 9 the elevator is shown near the wall O of a building and having a carrier section arranged to receive packages from a gravity carrier within a freight car N. This car may be located at any suitable distance from the building in which the elevator is located.

In Figs. 5, 6, 7 and 8 I have shown a slight modification in the construction of the carriage to adapt it for operating in either direction to elevate freight from a lower to an upper floor, or return it from an upper floor to a lower one, or to a car or delivery wagon. In carrying out this part of my invention I provide a frame  $p$  having slots  $p'$  to receive eccentrics Y mounted in the sides of the carriage and operated by wheels  $o$ . The frame  $p$  is provided, on each side of the central bar  $d$  and rod  $c'$ , with the laterally extending bars  $f$  arranged in pairs, as heretofore described, and provided with anti-friction wheels  $a$ , and said frame  $p$  is free to rock in the carriage frame F, and inclined in one direction or the other, according to the position of the eccentrics  $y$  in the slots  $p'$ . Fixed stops  $r$  are mounted on the ends of the carriage at the ends of the bars  $f$ , and when these bars are tilted by the movement of the eccentrics their outer ends, on one side, will be moved to a point flush, substantially, with the top of the stops on one end of the carriage and depressed below the top of the stops on the other end; consequently the carriage will be adapted to pick up packages at one end which will move over against the stops at the other end and be gathered up by the carrier-section on the other side of the elevator. Upon reversing the position of the carriage arms, with respect to the stops  $r$ , the carriage can be adapted to work in the opposite direction and move merchandise from an upper to a lower floor instead of elevating it, as is usually done.

I claim as my invention:

1. The combination, with an elevating device and an elevating carriage therefor, of a carrier section G composed of parallel bars spaced apart and having anti-friction rolls thereon, said bars being inwardly inclined and having stops at their inner ends,

and hinged in the path of said elevating carriage, and a similar carrier section located on a higher level than said first-named section, and on the opposite side of said elevating device, and inclined outwardly therefrom, and whereto the packages are delivered by said elevating carriage.

2. The combination, with the elevating belts and their supports, of a carriage pivotally supported between said belts, and having a flat inwardly inclined floor, and a stop at its inner end, and adapted to receive packages on one end and discharge them from the other end, and receiving and discharging carrier sections provided in connection with said belts and carriage.

3. The combination, with the elevating belts, of a carriage supported thereon and provided with projecting pins or lugs on each side, guides between which said lugs are moved, said carriage being adapted to pick up packages on one end and discharge them from the other end, and being inwardly inclined and having stops near its inner end, and receiving and discharging carrier sections provided in connection with said belts and carriage.

4. The combination, with the elevating belts and their operating mechanism, of an elevating carriage pivotally suspended on said belts and having a bottom composed of parallel bars with spaces between them, said bars being inwardly inclined, and having anti-friction rollers near one end and stops at their other end, and means for delivering packages to said anti-friction rollers on one end of said carriage and receiving them from the other end of said carriage, substantially as described.

5. The combination, with the elevating belts and the operating mechanism therefor, of an elevating carriage pivotally supported by said belts and provided with projecting pins or lugs, vertical guides D' D' between which said pins are movable, and guides J' for said pins provided between said belts, and means for delivering packages to said carriage and receiving them therefrom, substantially as described.

6. The combination, with the elevating belts and the operating mechanism therefor, of an elevating carriage supported by said belts, the sides of said carriage being provided with curved edges, and a guide L provided with anti-friction rollers L' provided near the top of said elevating device in the path of said curved edges, for the purpose specified.

7. The combination, with the elevating belts having sprocket wheels H and J, the former being arranged one for each belt at the bottom, and the latter in pairs in the same plane at the top, an elevating carriage adapted to receive packages on one end and

discharge them from the other end, suitable guides for said carriage at the top beneath said wheels J and comprising rods D'' and K, and means for delivering packages to and receiving them from said carriage, substantially as described.

8. The combination, with the elevating belts and mechanism for operating the same, of an elevating carriage suspended between said belts, said carriage being provided with guides, and guide rods D'' and K arranged horizontally at the top of the elevating device and between which said guides pass, substantially as described.

9. In an elevating device, the combination, with a carrier frame provided with stops on each side, of a carriage supported in said frame between said stops and having a bottom composed of parallel bars with spaces between them, and anti-friction wheels mounted on said bars, mechanism for tilting said carriage to bring the receiving ends of said bars to a point on a level with the tops of the stops at that end, and the other ends of the bars below the tops of the stops at the other end, for the purpose specified.

10. In an elevating device, an elevating carriage adapted to receive packages at one end and discharge them at a different level from the other end, and mechanism for adjusting said carriage to adapt it for discharging the packages at one end or receiving them at that end and discharging them from the other end, according to the direction of movement of the carriage, the discharging end of said carriage being on a lower level than its receiving end.

11. In an elevating device, an elevating carriage adapted to receive packages at one end and discharge them at a different level from the other end, the package traveling from the outer to the inner end of the carriage between the receiving and discharging operations, and means for depressing either end of said carriage so that its discharging end will be below the level of its receiving end, regardless of the direction of movement of the carriage.

12. In an elevating device, the combination, with a carriage frame provided with suitable stops at each end, of a carriage supported in said frame between said stops, and mechanism for tilting said carriage to bring its receiving end on a level with the stops at that end and its discharge end below the stops at the other end, for the purpose specified.

13. In an elevating apparatus, the combination, with upright timbers, of elevating belts provided between the same, elevating carriages supported by said belts and having floors provided with anti-friction surfaces, a stationary gravity carrier provided on the discharging side of said elevating apparatus and a movable carrier section con-

tiguous to said elevating apparatus and adapted to receive the packages from the elevating carriages and deliver them to said stationary carrier or be moved to an inoperative position out of the path of said elevating carriages, substantially as described.

14. The combination, with an elevating device and an elevating carriage therefor, of a carrier section, composed of parallel bars spaced apart and having anti-friction rolls thereon, said bars being inwardly inclined and having stops at their inner ends, and a similar carrier section located on a higher level than said first named section and on the opposite side of said elevating device and inclined outwardly therefrom and whereto the packages are delivered by said elevating carriage.

15. The combination, with the elevating belts and their supports, of a carriage pivotally supported between said belts and having a flat inwardly inclined floor and a stop at its inner end adapted to receive packages on one end and discharge them from the other end, and receiving and discharge carrier sections provided in connection with said belts and carriage.

16. The combination, with the elevating belts and their operating mechanism, of an elevating carriage pivotally suspended on said belts and having a bottom composed of parallel bars with spaces between them, said bars being inwardly inclined and having anti-friction rollers near one end, and stops at their other end, and means for delivering packages to one end of said carriage and receiving them from the other end of said carriage, substantially as described.

17. In an elevator, an elevator shaft having an ascending and a descending path, a carriage adapted to go up the ascending path and down the descending path and adapted to carry a plurality of loads end to end, means whereby consecutive loads may be placed upon the carriage from different levels, and means whereby the loads may be consecutively discharged at different levels.

18. In an elevator, an elevator shaft having an ascending path and a descending path, a plurality of carriages adapted to go up the ascending path and down the descending path and adapted to receive consecutive loads in the ascending path and distribute said loads from the descending path.

19. In an elevator, an elevator shaft having an ascending and a descending path, a carrier terminating within the ascending path and a carrier leading from the descending path, a carriage adapted to go up the ascending path and down the descending path, and adapted to receive a load from the carrier terminating in the ascending path, transfer the load across the carriage

and discharge it upon the carrier leading from the descending path.

20. In an elevator, an elevator shaft, a carrier terminating within the said shaft, its terminal being provided with a stop to limit the travel of the load thereon, a carriage, having a receiving end and a discharging end, adapted to raise a load from said carrier and transfer it to its discharging end, there being a stop on the carriage to limit the travel of the load to the discharge end.

21. In an elevator, an elevator shaft having an ascending path and a descending path, a carriage adapted to go up the ascending path and down the descending path and adapted to carry a plurality of loads end to end, and means for delivering loads to the carriage at independent points in the ascending path.

22. In an elevator, an elevator shaft having an ascending path and a descending path, a carriage adapted to go up the ascending path and down the descending path and adapted to carry a plurality of loads end to end, means for delivering loads to the carriage at independent points in the ascending path, and means for discharging the loads from the carriage at independent points in the descending path.

23. In an elevator, an elevator shaft having an ascending path and a descending path, a carriage adapted to go up the ascending path and down the descending path, and adapted to carry a plurality of loads end to end, means for delivering loads in succession to the carriage at independent points in the ascending path, and means for discharging the loads in succession from the carriage at independent points in the descending path.

24. The combination, in an elevator, with an elevator shaft, having an ascending path and a descending path of an upright frame, endless belts in parallel relation, pulleys at the upper and lower ends of said frame, one vertically above each of the lower pulleys, a carrier section provided with anti-friction rolls and terminating within the ascending path, and a carrier section leading from the descending path, an elevating carriage pivotally suspended from said belts and adapted to go up the ascending path and down the descending path, and adapted to carry a load on one side of the center of the point of its attachment to said belts, and means for driving said belts, substantially as described.

25. The combination in an elevator with an elevator shaft, having an ascending path and a descending path of an upright frame having four corner posts, endless belts in parallel relation pulleys at the upper and lower ends of said frame, one vertically above each of the lower pulleys, a carrier

section, provided with anti-friction rolls and terminating within the ascending path and a carrier section leading from the descending path, an elevating carriage pivotally suspended from said belts, its free line of oscillation being from and toward the receiving and discharging side of said elevator, and adapted to go up the ascending path and down the descending path and adapted to receive and carry a load beyond the center of the line of gravity from its attachment to said belts.

26. The combination in an elevator, with an elevator shaft, having an ascending path and a descending path, of an upright frame having four corner posts, endless belts in parallel relation, pulleys at the upper and lower ends of said frame, one vertically above each of the lower pulleys, a carrier section provided with anti-friction rolls and terminating within the ascending path and a carrier section leading from the descending path, an elevating carriage pivotally suspended from said belts, its line of oscillation being from and toward the receiving and discharge sides of said elevator, and adapted to go up the ascending path and down the descending path and adapted to receive and carry a load beyond the center of the line of gravity from its attachment to said belts, and means for guiding said carriage throughout its course.

27. The combination, with an elevator, and an elevator shaft having an ascending path and a descending path, of an elevating carriage therefor adapted to go up the ascending path and down the descending path, and adapted to receive and carry a load when moving up the ascending path and adapted to carry and discharge a load when moving down the descending path, a section of carrier composed of parallel bars spaced apart and having anti-friction rolls thereon, said bars being inwardly inclined and having stops at their inner ends, and hinged in the ascending path of said elevating carriage from which said elevating carriage receives its load, substantially as described.

28. The combination, with an elevator, and an elevator shaft having an ascending path and a descending path, of an elevating carriage therefor, adapted to go up the ascending path and down the descending path, and adapted to receive and carry a load when moving up the ascending path and adapted to carry and discharge a load when moving down the descending path, a section of carrier composed of parallel bars spaced apart, having anti-friction rolls thereon, said bars being outwardly inclined and hinged in the descending path of said elevating carriage, and whereto the packages are delivered by said elevating carriage, substantially as described.

29. The combination, with an elevator, and

an elevator shaft having an ascending path and a descending path, of an elevator carriage therefor, and means for moving said carriage up the ascending path and down the descending path, a section of carrier composed of parallel bars spaced apart and having anti-friction rolls thereon, outwardly inclined and hinged in the descending path of said elevating carriage, and whereto said carriage delivers its load and hinged out of said descending path in a nonreceptive position when not required for service, for the purpose specified.

30. The combination, with an elevator, and an elevator shaft having an ascending path and a descending path, of an elevating carriage therefor, adapted to go up the ascending path and down the descending path, and adapted to receive and carry a load when moving up the ascending path, and to carry and discharge a load when moving down the descending path, a section of carrier composed of parallel bars spaced apart, and provided with anti-friction rolls being inwardly inclined and having stops thereon to limit the travel of said load and hinged in the ascending path of said elevating carriage, the hinged ends being in connection with stationary carriers by means of which packages are conveyed from a distant point and automatically received against said stops in the ascending path of said elevating carriage, for the purpose specified.

31. The combination, with an elevator, and an elevator shaft having an ascending path and a descending path, of an elevating carriage therefor, adapted to go up the ascending path and down the descending path and adapted to receive and carry a load when moving up the ascending path, and to carry and discharge a load when moving down the descending path, a section of carrier composed of parallel bars spaced apart and having anti-friction rolls thereon, and outwardly inclined and hinged in the descending path of said elevating carriage, the hinged end being in connection with stationary carrier, and adapted to automatically receive the package from said elevating carriage and transfer said package to said stationary carrier to be conveyed to a distant point therefrom substantially as described.

32. The combination, with an elevator, and an elevator shaft having an ascending path and a descending path, of an elevating carriage and means for moving said carriage up the ascending path and down the descending path, a section of carrier composed of parallel bars spaced apart and having anti-friction rolls thereon and stops at their inner ends inwardly inclined, and hinged in the ascending path of said elevating carriage, and whereto said carriage receives its load, and hinged out of said ascending



path and in an inoperative position when not required for service for the purpose specified.

33. In an elevating apparatus, the combination with an upright frame, of elevating belts, operating vertically in said frame, a carriage pivotally suspended from said belts, guides between said carriage and frame, and a section of gravity carrier on each side of said belts and intercepting the path of said carriage, substantially as described.

34. The combination, with an elevator an elevator shaft, having an ascending path and a descending path, endless belts, in parallel relation, an elevating carriage pivotally suspended from said belts, and suitable means for moving said elevating carriage up the ascending path and down the descending path, of a gravity carrier composed of parallel bars spaced apart and having anti-friction rolls thereon and stops at their inner ends, and projecting downwardly into the ascending path of said elevating

carriage and from which said carriage receives its load, substantially as described.

35. The combination, with an elevator, an elevator shaft, having an ascending path and a descending path, endless belts in parallel relations, an elevating carriage pivotally suspended from said belts, and suitable means for moving said elevating carriage up the ascending path and down the descending path, of a gravity carrier composed of parallel bars spaced apart and having anti-friction rolls thereon, projecting upwardly into the descending path of said elevating carriage, and leading outwardly therefrom, and to which said elevating carriage delivers its load, substantially as described.

In witness whereof, I have hereunto set my hand this 14th day of March 1905.

ADELBERT L. GARDNER.

Witnesses:

RICHARD PAUL,  
C. MACNAMARA.