No. 897,856. PATENTED SEPT. 1, 1908.

C. D. SEEBERGER.

ELEVATOR.

APPLICATION FILED JAN. 30, 1903. RENEWED FEB. 16, 1905.

4 SHEETS—SHEET 1.

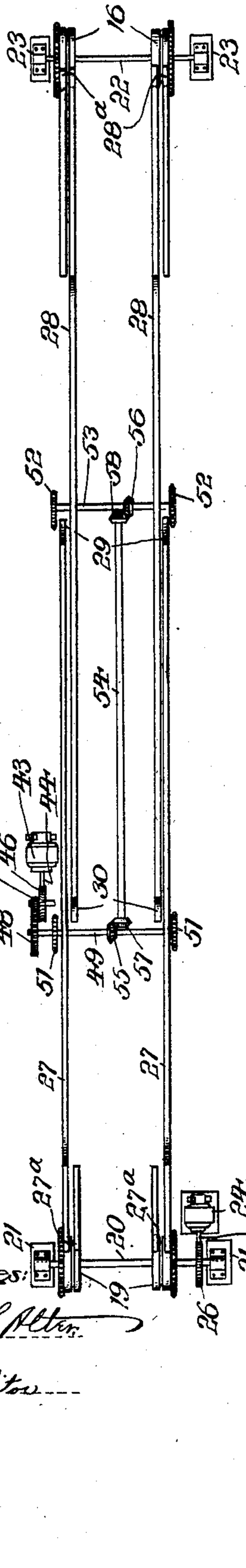

Fig. 1.

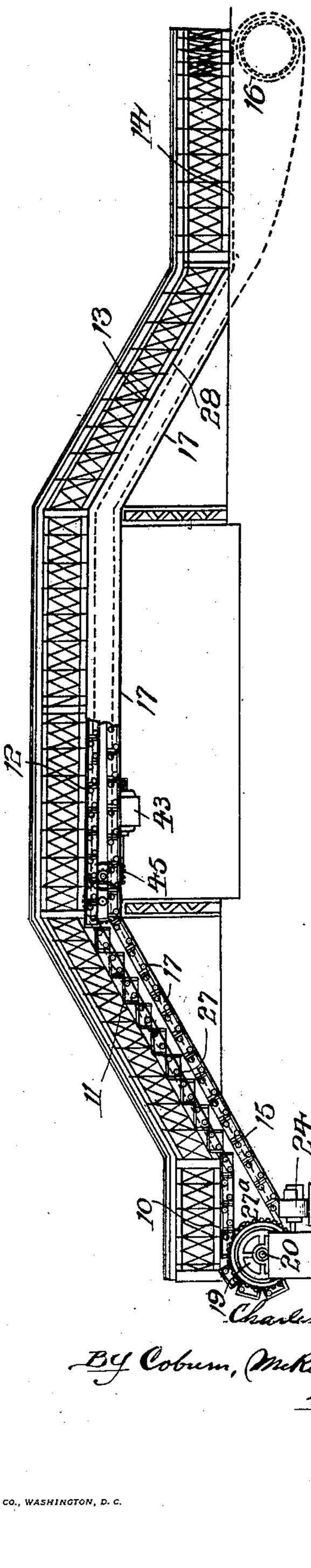

Fig. 2.

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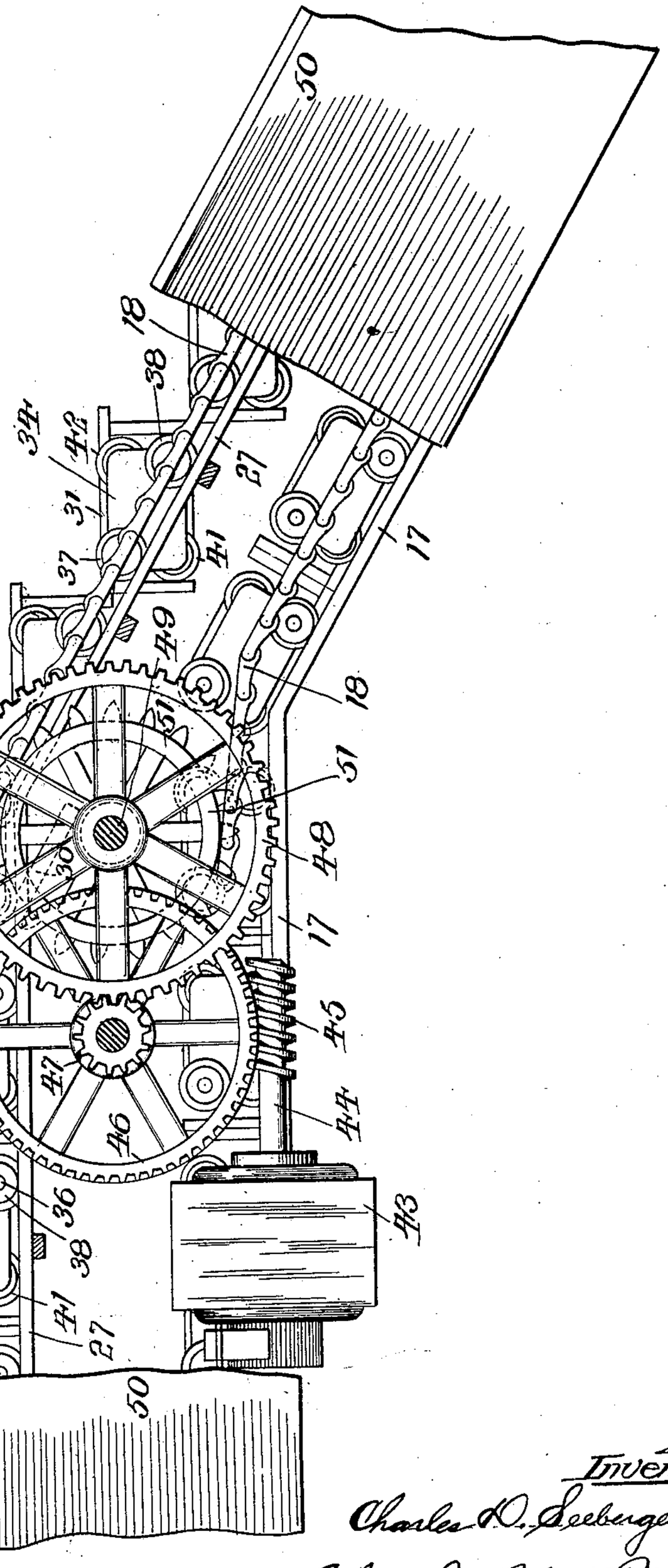
4 SHEETS—SHEET 2.

Fig. 3.



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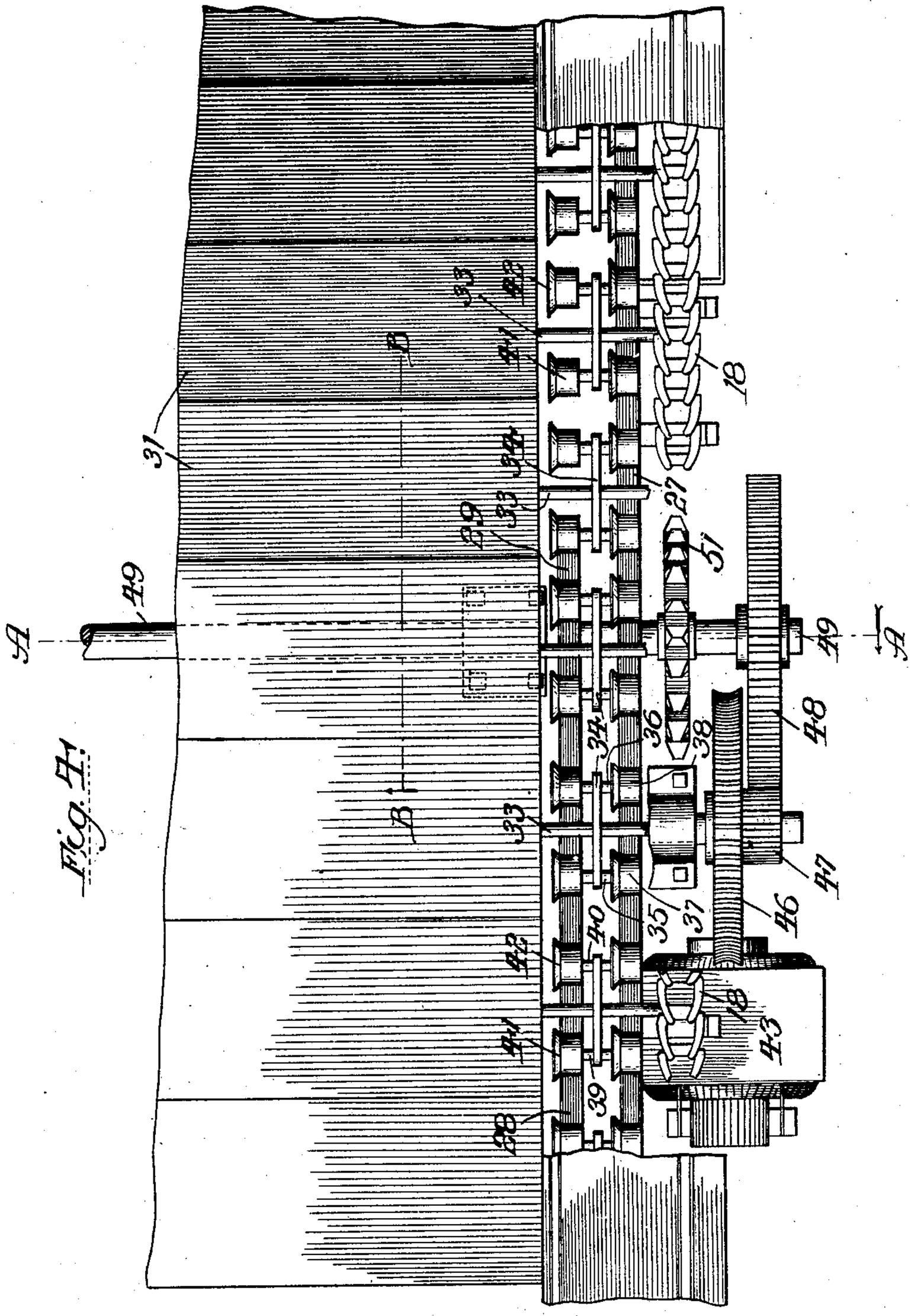
4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 5.

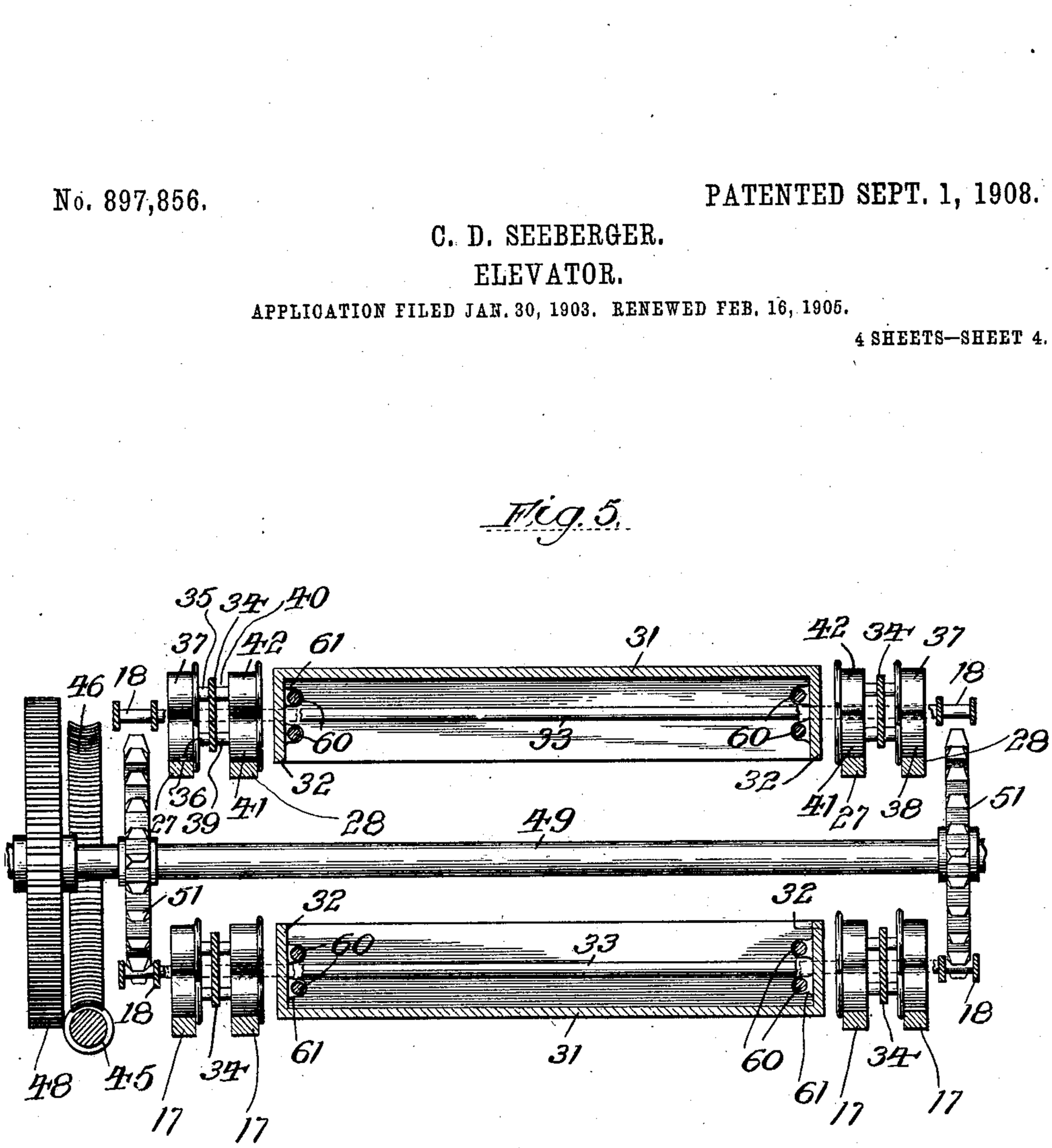
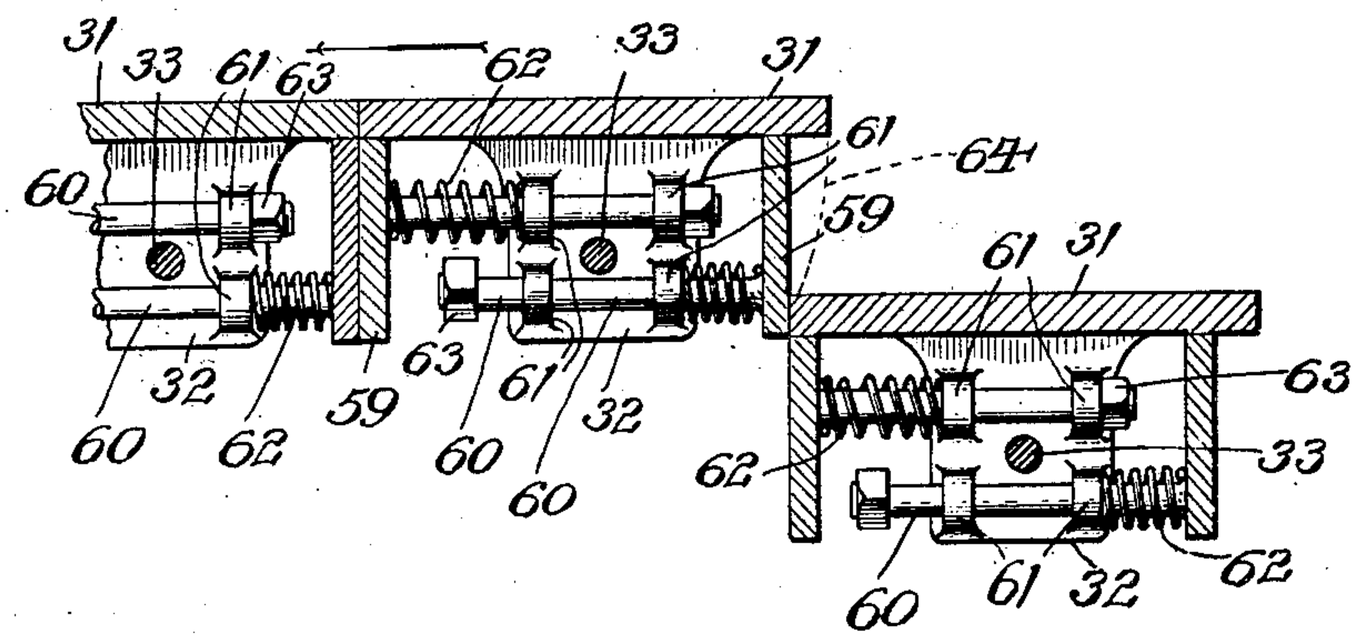


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES D. SEEBERGER, OF YONKERS, NEW YORK.

ELEVATOR.

No. 897,856. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed January 30, 1903, Serial No. 141,102. Renewed February 16, 1905. Serial No. 245,874.

To all whom it may concern:

Be it known that I, CHARLES D. SEEBERGER, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

My present invention is concerned with that class of elevators known as traveling stairways, and is designed to produce a device of the class described in which the driving mechanisms, both main and auxiliary, shall be located in position to produce the best possible results with respect to economy of power and stress on the angles.

My invention is further concerned with certain novel arrangements and construction of the tracks, and the wheels on the carriers or steps, by which the steps are maintained with their tread surfaces horizontal on their ascending and descending inclined portions, and on the landings.

My invention is further concerned with a novel construction of the risers by which the advancing nose of any step may be kept in contact with the riser of the preceding step, and that without the necessity of employing the curved riser hitherto used to secure this result.

To illustrate my invention, I annex hereto four sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which—

Figure 1 is a top plan view, somewhat diagrammatic in its nature, showing the tracks and driving mechanism of a traveling stairway embodying my present inventions, but with the supporting framework and steps omitted; Fig. 2 is a side elevation of the system as applied to an elevated railroad station or similar structure showing how the steps ascend on one side, and form a horizontal landing at the top, and descend on the other side, a portion of the structure being broken away to show the steps throughout half of their course, the remaining half being indicated by a dotted line; Fig. 3 is a side elevation, on a large scale, and with some of the structural work broken away, showing the driving mechanism located at the head of the incline; Fig. 4 is a top plan view of a portion of the same mechanism; Fig. 5 is a vertical section on the line A—A of Fig. 4; and Fig. 6 is a sectional view on the line B—B of Fig. 4.

In the design illustrated, I form the lower getting-on landing 10 at one end, from which the steps ascend forming the ascending stairs at 11. On the upper landing 12, the steps have their tread surfaces horizontal and flush with each other entirely across this portion of the structure, and continue thence down the descending incline 13 to the lower getting-off landing 14, where the chain of steps 15 pass around the sprocket wheels or spiders 16 and then return over suitable tracks, the position of which is indicated by a heavy line 17 in Fig. 2, which tracks have the same general arrangement and inclination as the tracks carrying the steps over the operative portion, and the tracks 17 are preferably substantially parallel and located directly beneath them. The steps 15 are connected at their ends by the sprocket chains 18, which connections will be explained more fully hereafter. From the returning tracks 17, the chain of steps passes around the sprocket wheels or spiders 19, which are secured on the shaft 20, mounted in suitable bearings on the supports 21. It may be mentioned in passing that the wheels or spiders 16 are similarly mounted upon a similar shaft 22 journaled in bearings on the supports 23. As the main driving device for this system, I may employ an electric motor 24, which is conveniently located so that its armature shaft 25, which is provided with a worm may mesh with the worm gear 26 secured on the shaft 20, thereby, by means of the sprocket wheels or spiders 19 with which the chain 18 meshes, driving the system. The rails or tracks for the operative portion of the course on each side are in two different vertical but parallel planes, the rails 27 for the landing 10, incline 11 and upper landing 12 being outside of the rails 28 for the upper landing 12, descending incline 13, and getting-off landing 14. The rails 27 are provided at their upper ends with the short inclined portion 29, and the rails 28 are similarly provided with the portions 30, which are for a purpose to be explained.

Each of the steps consists of the tread surface 31 from the ends of which the side pieces 32 project downwardly. A step rod 33 extends through the side pieces 32 a considerable distance beyond said ends, and has the chains 18 secured to the ends thereof. Secured near the ends of the step bars 33 between the side pieces 32 and the chains 18 are the vertical bearing plates 34, each of

which has a bearing stud 35 projecting outwardly from its uppermost and advancing corner, while a similar bearing stud 36 projects outwardly from the diagonally opposite corner. These bearing studs 35 and 36 have the wheels 37 and 38 respectively journaled thereon. These plates 34 also have projecting inwardly from the lowermost and advancing corner and the diagonally opposite corner the bearing studs 39 and 40, upon which are mounted the wheels 41 and 42 respectively. From an examination of the positions of these wheels relative to the tracks 28 and 29, as seen in Figs. 3 and 4, it will be apparent that on the ascending portions of the tracks 27 the steps are supported by the wheels 37 and 38, the axes of which are set at the same angle to the horizontal as is that portion of the track 27 so that the steps are held thereby with their tread surfaces horizontal. On the upper landing 12, it will be apparent that the wheels 38 resting on the tracks 27 and the wheels 41 resting on the tracks 28 support the steps and hold them with their tread surfaces 31 horizontal and flush so as to form the continuous level landing. On the descending incline 13, it will be apparent that the steps are supported by the wheels 41 and 42 resting on the tracks 28. The steps will be supported on the landings 10 and 14 by the wheels 38 and 41 resting on the tracks 27 and 28, as the case may be, and additional tracks 27^a and 28^a extend over the landing portions and in the same horizontal plane as the landing portions of the tracks 27 and 28, and in the same vertical plane as the tread surfaces of the wheels with which they coöperate. The purpose of the inclined portions 29 of the tracks 27 and the inclined portions 30 of the tracks 28 will now be apparent as they are necessary to first receive the wheels which coöperate with their respective tracks on the landing and prevent any possibility of the wheels not being properly positioned on the tracks.

As an auxiliary drive for the chain 18, I provide the motor 43 suitably supported from the structure and having its armature shaft 44 provided with a worm 45 which meshes with a worm gear wheel 46 which has the gear pinion 47 thereon meshing with the gear wheel 48 secured on the shaft 49 journaled in suitable bearings in the structural portion 50. The shaft 49 has near the ends thereof the sprocket wheels 51 which mesh with both the ascending and descending lines of the chain 18, and which are located at the head of the incline where the steps change their direction of movement. I preferably provide similar sprocket wheels 52 meshing with the chain 18 and correspondingly located at the other end of the landing 12, these sprocket wheels 52 being secured on the shaft 53 similar to the shaft 49, and preferably driven therefrom by means of the interposed countershaft 54 and the bevel gears 55 and 56 secured to the shafts 49 and 53 respectively and meshing with the bevel gears 57 and 58 secured on the ends of the countershaft 54. By this arrangement of shafting, the strain of the steps caused by their weight on the incline is removed from the landing 12 and from the angles formed by said landing 12 and the inclines 11 and 13, thus preventing any undue stress or friction in passing said angles.

In order to keep the noses of the steps always in contact with the risers 59 having the straight vertical outer faces, I mount each riser 59 so that it is free to slide in and out a short distance in order to accommodate itself to the position of the nose of the adjacent step which varies on the horizontal and inclined portions as best seen in Fig. 6. The risers 59 are provided at each end with the inwardly extending rods 60 which pass through suitable apertures formed in the lugs 61 projecting inwardly from the side pieces 32. For convenience in assembling the parts and in order that a uniform design may be used for all the treads, I place the lugs 61 for the rods of the advancing riser 59 above the step bar 33 while the lugs 61 for the other riser on the same step are placed below said step rod. Helically coiled expanding springs 62 are interposed between the outermost lugs 61 and the inner faces of the risers 59 so that the risers are held in their outermost position by stress of the springs. The nuts 63 on the ends of the rods 60 prevent the risers from being forced by the springs 62 beyond the noses of the steps.

As the steps pass from the horizontal to the incline or from the incline to the horizontal, they have a movement relative to each other shown by the curved dotted line 64 in Fig. 6, and it will be seen that when they are making the change, as for instance in passing from the ascending incline to the horizontal, the springs 62 will force the risers 59 outward keeping them in contact with the noses of the adjacent steps 31 and preventing any gap forming between the riser and the step, which would occur if the risers were stationary. When the steps pass from the horizontal to the incline, the reverse movement occurs, the riser 59 being forced inward against the stress of the springs 62 by contact of the adjacent nose moving through the curve 64 relative to the step to which it is secured.

While I have shown my invention as embodied in a form which I at present consider adapted for carrying out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. In an apparatus of the character described, the combination of an endless platform comprising a series of sections, a pair of driving chains secured to the ends of said platform-sections, a main motor for driving said platform, and a series of auxiliary motors disposed throughout the length of the platform, said motors imparting motion to said platform through the driving chains.

2. The combination in a moving platform or stairway, of sections, connections therebetween, guides therefor, a main driving device at one end of the mechanism, and an auxiliary driving device engaging with said connections between the two ends of the platform or stairway and at or near a point where the sections change direction of movement; substantially as described.

3. In a device of the class described, the combination with the steps, connections therebetween, of the tracks therefor, a main driving device at one end of the mechanism, and an auxiliary driving device engaging with the said connections between the two ends of the mechanism and at or near a point where the steps change direction of movement, substantially as described.

4. In a device of the class described, the combination with steps, chain connection therebetween, of tracks therefor having inclined and horizontal portions, a main driving device at one end of the mechanism, and an auxiliary driving device engaging with both the ascending and descending lines of chain between the two ends of the mechanism and at or near the top of the incline.

5. In a device of the class described, the combination with steps connected at their ends by chains, of tracks therefor having inclined and horizontal portions, a main driving device at one end of the mechanism, and an auxiliary driving device engaging with the said chains between the two ends of the mechanism and at or near the top of the inclined portion of the tracks.

6. In a device of the class described, the combination with the steps or carriers each provided with four wheels, two of which are in the same vertical plane and adapted to cooperate with an inclined portion of the tracks, being set at the same angle as said portion, and the other two are on another vertical plane and adapted to coöperate with another oppositely directed inclined portion of the tracks, being set at the same angle as said portion, of tracks having said inclined portions and the two landing tracks on the same horizontal level and with which the lower wheels of each pair coöperate, and means for driving said steps.

7. In a device of the class described, the combination with the step provided with the step bars and the vertical bearing plates, two wheel bearings projecting from diagonally opposite corners on one side of said plate and two wheel bearings projecting from the other diagonally opposite corners of said bearing plate on the other side, wheels on said bearings with the single inclined tracks adapted to coöperate with the two wheels on the same side of the bearing plate, and the double landing tracks adapted to coöperate with the lower wheels on both sides of said bearing plates, and means for driving said steps.

8. In a device of the class described, the combination with the steps or carriers each provided with four wheels at each end, two of which are in the same vertical plane and adapted to coöperate with an inclined portion of the tracks, being set at the same angle as said portion, and the other two are on another vertical plane and adapted to coöperate with another oppositely directed inclined portion of the tracks, being set at the same angle as said portion, of tracks consisting of the single tracks at each end on said inclined portions and the two landing tracks on the same horizontal level with which the lower wheels of each pair coöperate, and means for driving said steps.

9. In a device of the class described, a way having an inclined and a horizontal portion, a series of steps moving on the way and having straight risers maintained substantially in contact with adjacent steps both on the inclined and horizontal portions of the way.

10. In a device of the class described, a way having angularly disposed portions, and a series of steps moving on the way and having straight risers automatically maintained substantially in contact with adjacent steps both on the inclined and horizontal portions of the way.

11. In a device of the class described, a way consisting of inclined and horizontal portions, and a series of connected steps moving on the way and having straight risers automatically maintained substantially in contact with adjacent steps throughout the transporting run.

12. In a device of the class described, a way consisting of inclined and horizontal portions, and a series of connected steps moving on the way and having straight risers automatically maintained substantially in contact with adjacent steps both on the inclined and horizontal portions of the way as well as when the steps pass from one of such portions to the other.

13. In a device of the class described, the combination with the tracks having the inclined and horizontal portions, of the steps coöperating therewith and connected to move together, and the risers depending therefrom and movable to and from the noses of said steps.

14. In a device of the class described, the

combination with the tracks having the inclined and horizontal portions, of the steps coöperating therewith and connected to move together, and the sliding risers depending therefrom and movable horizontally to and from the noses of said steps.

15. In a device of the class described, the combination with the tracks having the inclined and horizontal portions, of the steps coöperating therewith and connected to move together, the risers depending therefrom and movable horizontally to and from the noses of said steps, and the springs pressing said risers outward.

16. In a device of the class described, the combination with the tracks having the inclined and horizontal portions, of the steps coöperating therewith and connected to move together, downwardly projecting side pieces on said steps provided with the inwardly projecting pair of horizontally slotted lugs, and the risers having the inwardly projecting horizontal arms passing through said lugs.

17. In a device of the class described, the combination with the tracks having the inclined and horizontal portions, of the steps coöperating therewith and connected to move together, downwardly projecting side pieces on said steps provided with the inwardly projecting pairs of horizontally slotted lugs, the risers having the inwardly projecting horizontal arms passing through said lugs, and the helically coiled expanding springs surrounding said arms and interposed between the risers and the lugs.

18. In a device of the class described, the combination with the main tracks each consisting of the inclined and horizontal portions, of the steps provided with six or more contact surfaces therefor, said tracks and contact surfaces being arranged so that only four thereof are in contact with said tracks at one time.

19. In a device of the class described, the combination with the tracks on the ascending incline in different vertical planes from the tracks on the descending incline, and the steps having contact surfaces adapted to cooperate therewith; substantially as described.

20. In a device of the class described, the combination with the tracks arranged with a single rail on each side of the inclined portions and with two rails on each side in the same horizontal plane on the landings, of the steps having the four bearing surfaces adapted to coöperate with said tracks.

21. In a device of the class described, the combination with the tracks arranged on the respective inclines in a single oblique plane and on the landings in a single horizontal plane, of the steps having the contact surfaces adapted to coöperate with said tracks to maintain the tread surfaces horizontal; substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES D. SEEBERGER.

Witnesses:

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THOS. M. LOGAN.