Dec. 29, 1931. H. A. W. WOOD 1,838,204

INCLINED ELEVATOR

Filed Dec. 3, 1930

Fig. 1.

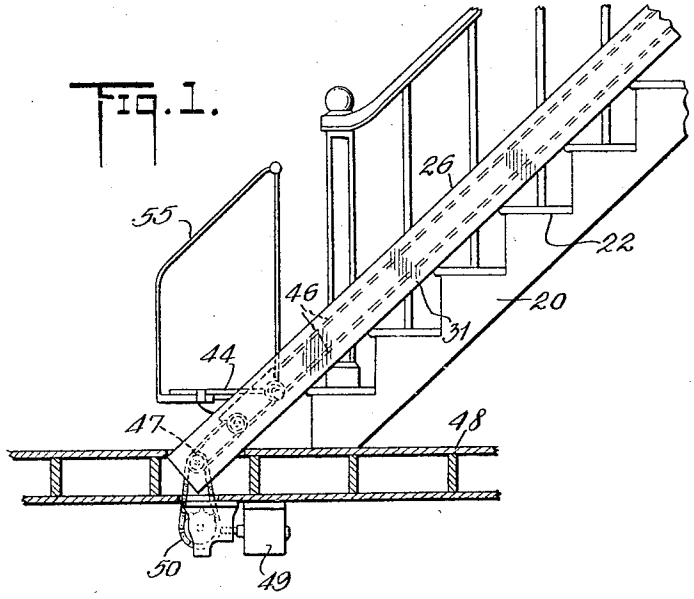



Fig. 2.

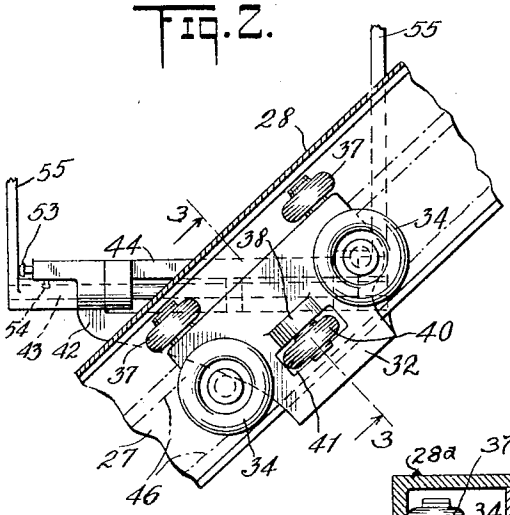



Fig. 3.

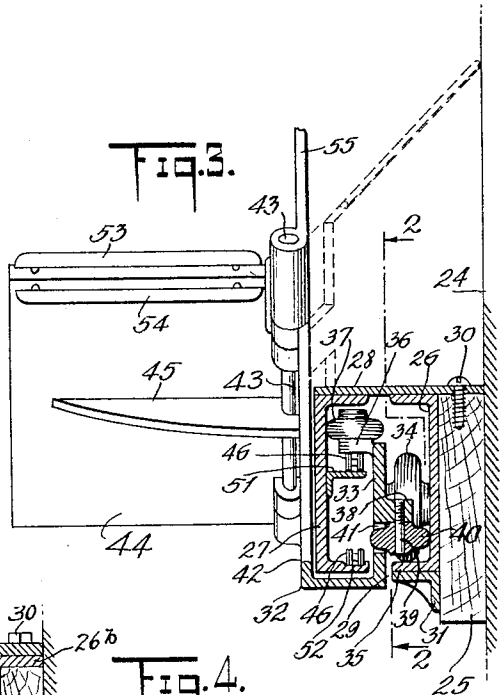
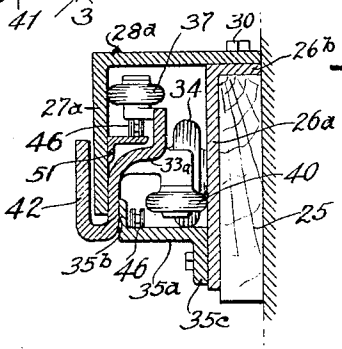



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## INCLINED ELEVATOR

Application filed December 3, 1930. Serial No. 499,622.

My invention relates to improvements in inclined elevators and particularly to elevators of a type which may be installed as an adjunct to a stairway in a dwelling house or other building.

An object of the invention is to provide a substitute for the ordinary household lift, which will be very simple and inexpensive in initial outlay and which can be operated at a very moderate cost.

Obviously, a lift of this sort, particularly when installed in so busy a thoroughfare as a stairway, must have its operating parts encased, not only to guard against personal injury and damage to clothing, but to protect the mechanism itself against meddlers.

The present invention is an improvement on that disclosed in my Patent Number 1,768,650, issued July 1, 1930, and a continuation in part of my application Serial No. 314,897, filed October 25, 1928. In said patent I describe a lift comprising an inclined conduit in which runs a truck or carriage, the latter being propelled along the conduit by a power driven chain belt. The carriage projects through a slot in the top of the conduit and supports a platform exterior to the conduit.

One form of lift disclosed in said application, I term a "single chain-way" lift, because the conduit has a single track therein and a single chain belt, the carriage being provided with a pair of wheels in tandem engaging the track. Another form also disclosed in said application, I term a "double chain-way" lift, because there are two laterally spaced tracks and the carriage comprises two tandem wheel trucks connected by a platform, with a chain belt for each truck. In the single chain-way lift a single slot is formed at the top of the conduit, while in the double chain-way lift two slots must be provided in the top of the conduit. Such exposed slots are liable to prove troublesome, particularly as they more or less directly expose the tracks on which the wheels travel. Dust and dirt entering through the slots may collect to such an extent as to clog the conveyor and prevent efficient service, also garments are likely to become entangled in the operating parts of the conduit. A stairway is a favorite playground for children and they are quite likely to drop trash of all kinds into the slots and even to stuff them full of paper, thus interfering with, if not actually arresting operation of the lift.

It is an object of the present invention to provide a lift of the general type disclosed in said patent, but with the conduit having a slot which is concealed or which opens downwardly from the conduit. Such a slot is not readily accessible to meddlesome persons, and will not be in a position to collect dirt and dust. Furthermore, there will be no danger of entangling garments in the operating parts in the conduit.

With the above named objects in view and the others which will appear hereinafter, I shall now describe certain embodiments of my invention as applied to a single chain-way lift and shall thereafter point out the novelty and scope of my invention in the claims.

In the drawings:

Figure 1 is a view in side elevation of my improved inclined elevator installed in a stairway, with the side wall of the stairway, in the foreground, removed;

Fig. 2 is a side elevation of the carriage shown on an enlarged scale with a portion of the chain-way in vertical section, the section being taken on the line 2—2 of Fig. 3;

Fig. 3 is a view partly in transverse section, the section being taken substantially on the line 3—3 of Fig. 2; and

Fig. 4 is a fragmental view in transverse section of a modified form of conduit and carriage.

The particular embodiment of my invention illustrated in the drawings is shown as applied to a stairway 20 without cutting into the stairs. The staircase is illustrated as bordered on one side by a balustrade and on the other by a wall 24 (Fig. 3) against which is secured a stringer 25. On this stringer is supported a conduit in which the elevator carriage rides.

The conduit comprises a pair of channel beams 26 and 27, connected at the top by a plate 28. The beam 26 bears against the stringer 25, with the channel flanges at the

top and bottom of the beam facing outward. The channel beam 27 is reversed, with its flanges facing inward. The beams 26 and 27 are secured in mutually spaced relation by a cover plate 28, leaving a slot 29 between the bottom flanges of the two channel beams. The plate 28 laps over the stringer 25 and is secured thereto by lag screws 30 or other suitable fastening devices. As an additional means of supporting the conduit, angle braces 31 may be fitted under the beams 26 and against the stringer 25 at suitable intervals.

The carriage which rides in the conduit comprises a substantially U-shaped plate 32, one leg 33 of which passes through the slot 29. Mounted on the part 33 are a pair of wheels 34 which are arranged to travel on the inner face of the bottom flange 35 of the channel beam 26. The upper end of the leg 33 is bent outward to form a lateral flange 36 on which are mounted a pair of wheels 37. The axes of the latter are disposed at right angles to the axes of the wheels 34, and the wheels 37 are adapted to bear against the web of the channel beam 27. Between the wheels 34 the leg 33 is formed with a boss 38 in which is secured a stub shaft 39, supporting a wheel 40. The latter turns in a plane perpendicular to that of the wheels 34 and is adapted to bear against the web of the channel beam 26, close to the flange 35. Immediately below the boss 38, the member 33 is formed with a slot 41 to clear the wheel 40.

The other leg 42 of the U-shaped plate has a hinge pin 43 secured at its upper end on which is hinged a platform 44. The hinge pin is horizontally disposed in a plane parallel to the plane of rotation of the wheels 34. The platform 44 carries a brace 45 secured to the underside thereof, which bears against the leg 42 and acts as a stop to hold the platform in horizontal position overlying the stair treads. However, the platform may be swung on its hinge to the position shown by broken lines in Fig. 3 when not in use, so as to lie clear of the stairs.

Since the wheels 34 are adapted to carry the main load of the elevator, they are arranged to run on the bottom flange 35 of the channel beam which is directly supported by the stringer 25. The platform and the weight it supports is offset from the plane of the wheel 34 and hence there is a moment tending to swing the platform outward. For this reason the thrust wheels 37 and 40 are provided to bear against opposite faces of the conduit and hold the platform truly horizontal.

The carriage is propelled positively, up and down the conduit, by an endless chain belt 46 which passes about sprocket wheels at the top and bottom of the guideway. Only the lower sprocket wheel 47 is shown in the drawings. The lower end of the conduit extends through the floor 48 at the bottom of the stairway and beneath the floor is located an electric motor 49 which drives the sprocket wheel 47 through suitable step down gearing 50. The upper reach of the chain is secured to the flange 36 and is supported on a shelf 51 projecting from the beam 27, while the lower reach of the chain rests on the bottom flange 52 of the beam 27.

It will be understood that a hand switch may be provided at the top and bottom of the stairway to start and stop the motor and, if desired, means, such as shown in said Patent 1,768,650, may be provided for automatically stopping the motor when the platform reaches the top or bottom of the stairway. Also as described in said patent, the platform may be provided with safety trips 53 at its forward and rear edges and with a safety trip 54 under its forward portion for automatically stopping the chain when any obstacle is encountered by the platform.

The operation of the elevator will be clear from the foregoing description. A passenger may stand on the platform when the latter is swung to the operative position shown by the full lines of Fig. 3. To steady himself on this platform a hand post 55 is provided which is secured to the hinge pin 43. The operator then turns a switch to drive the motor in the direction in which he wishes to travel and when the platform reaches the end of its travel, the motor is automatically stopped. If there should be an obstruction on the stairs in the path of the platform, one or other of the trips 53 or 54 would engage the obstruction and be depressed thereby, thus cutting the circuit of the motor and bringing the platform to an emergency stop.

The conduit described above is formed with a slot in the bottom thereof, but it is within the purview of my invention to place the slot in any part of the conduit, provided it is not exposed or is so concealed or covered as not to gather dust and dirt. Thus, in Fig. 4, I show a conduit with a slot opening downwardly therefrom, although the slot is not in the bottom of the conduit. In this figure, the parts that are substantially like those in Fig. 3, are indicated by the same reference numerals. The inner wall of the conduit is formed of a beam 26*a* which is provided at the top with a flange 26*b* that rests on the stringer 25. The outer side wall 27*a* and the top wall 28*a* of the conduit are formed by an angle beam, with the top wall supported on the flange 26*b* and secured to the stringer 25 by means of lag screws 30. A third beam of Z shape in cross-section forms the bottom of the conduit. This beam comprises a main web 35*a* provided at its outer edge with an upturned flange 35*b* and at its inner edge with a down-turned flange 35*c* which is bolted or otherwise fastened through the beam 26*a* to the stringer 25.

The flange 35*b* forms a part of the side wall of the conduit but is inwardly off-set from the web 27*a*, and is overlapped thereby. Between the web 27*a* and the flange 35*b* is a slot, opening downwardly out of the conduit.

The carriage which runs in the conduit is similar to that shown in Figs. 2 and 3 in the arrangement of the wheels 34 and the rollers 37 and 40. It also comprises the U shaped frame plate, one leg 33*a* of which passes through the slot in the conduit, while the other leg 42 carries the platform in the same way as illustrated in Fig. 3.

It will be evident that in a construction of this sort, the slot although disposed in the side wall of the conduit or between overlapping portions of the side wall, nevertheless opens downwardly from the conduit so that it cannot collect dirt. Furthermore, the slot is more or less concealed, so that there will be no danger of entangling garments in the mechanism within the conduit, and it will not offer the open temptation to meddlesome persons that would be offered by an exposed slot in the conduit.

It will be understood that various structural changes and modifications may be made in the form and arrangement of my invention and I wish it to be understood that I consider myself at liberty to make such variations, alterations or modifications as fall within the spirit and scope of the following claims.

I claim:

1. An elevator comprising an inclined conduit formed with a covered slot, a carriage movable in the conduit and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, and means for propelling the carriage.

2. An elevator comprising an inclined conduit formed with a slot opening downwardly therefrom, a carriage adapted to run in the conduit and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, and means for propelling the carriage.

3. An elevator comprising an inclined conduit having a side wall formed with a slot opening downwardly from the conduit, a carriage adapted to run in the conduit and projecting through the slot, a platform exterior to the conduit and supported by the carriage, and means for propelling the carriage.

4. An elevator comprising an inclined conduit formed with overlapping side wall portions providing a slot therebetween, said slot opening downwardly from the conduit, a conveyor in the conduit, a platform exterior to the conduit and a support for the platform projecting through the slot and driven by the conveyor.

5. An elevator comprising an inclined conduit formed with a slot opening downwardly therefrom, the platform being formed interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, stop means for holding the platform normally in horizontal position, and means for propelling the carriage.

6. An elevator comprising an inclined conduit formed with a slot opening downwardly therefrom and also interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform mounted on the carriage, a sprocket wheel at each end of the conduit, an endless chain passed about the sprocket wheels and secured to the carriage, a motor, and driving mechanism operatively connecting the motor with one of the sprocket wheels.

7. In combination, a conduit formed with a slot opening downwardly therefrom and also formed interiorly with a track, wheels engaging the track, a carriage projecting through the slot and supported by the wheels, and a conveyor chain in the conduit and connected to the carriage, the conduit being formed to give support to the chain throughout the length of the conduit.

8. In combination, a conduit formed with a slot opening downwardly therefrom and also formed interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a pair of sprocket wheels mounted on horizontal axes at opposite ends respectively of the conduit, an endless conveyor chain passed about the sprocket wheels and secured to the carriage, and a shelf within the conduit for supporting the upper reach of the chain.

9. In combination, a conduit formed with a slot opening downwardly therefrom and also interiorly with a track, wheels engaging the track, a carriage projecting through the slot and supported by the wheels, a pair of sprocket wheels mounted on horizontal axes respectively at opposite ends of the conduit, and an endless conveyor chain extending about said sprocket wheels and secured at opposite ends thereof to the carriage, the conduit being formed to support the upper and lower reaches of the chain substantially throughout the entire length of the conduit.

10. An elevator comprising an inclined conduit formed with a slot opening downwardly therefrom, a carriage projected through the slot, wheels mounted in tandem on the carriage and running on the bottom wall of the conduit, rollers mounted upon the carriage and bearing respectively against opposite side walls of the conduit, and a platform exterior to the conduit and supported by the carriage.

11. An elevator comprising an inclined conduit formed with a slot opening downwardly therefrom, and formed interiorly with a track, a carriage of U-form with one

leg thereof projecting through the slot into the conduit, wheels mounted on said leg and adapted to run on the track, rollers also mounted on said leg and bearing against opposite sides of the conduit, and a platform exterior to a conduit and hinged to the other leg of the carriage.

12. In combination with a stairway, an inclined conduit parallelling the stairway and formed with a slot opening downwardly from the conduit, a carriage in the conduit and projecting through the slot, means for propelling the carriage along the conduit, a platform mounted on the carriage and overlying the stairway, and a hand support carried by the carriage.

13. In combination with a stairway, an inclined conduit parallelling the stairway and formed with a slot opening downwardly from the conduit, a carriage in the conduit and projecting through the slot, means for propelling the carriage along the conduit, a platform mounted on the carriage and overlying the stairway, and a hand support carried by the carriage, the platform being hinged to the carriage so that it may be swung clear of the stairway.

14. In combination with a stairway, an inclined conduit parallelling the stairway and having a slot opening downwardly from the conduit, a carriage in the conduit and projecting through the slot, means for propelling the carriage along the conduit, a platform hinged to the carriage exterior to the conduit, said platform normally overlying the stairway, and trip means on the platform, said trips operating on engagement with an obstruction to stop the carriage.

15. An elevator comprising an inclined conduit formed with a slot in the bottom thereof and interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, and means for propelling the carriage.

16. An elevator comprising an inclined conduit formed with a slot in the bottom thereof and interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, stop means for holding the platform normally in horizontal position, and means for propelling the carriage.

17. An elevator comprising a conduit formed with a slot in the bottom thereof and interiorly with a track, wheels engaging the track, a carriage having a substantially U-shaped body with one leg thereof projecting through the slot and supported by the wheels and the other leg disposed exteriorly to the conduit, a platform hinged to said other leg, coacting stop means on the carriage and platform for holding the latter normally in horizontal position, and means for propelling the carriage.

18. An elevator comprising a conduit formed with a slot in the bottom thereof and interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, a stop on the platform normally engaging the carriage to hold the platform in horizontal position, a conveyor belt in the conduit and attached to the carriage, and means for driving the conveyor belt.

19. An elevator comprising an inclined conduit formed with a slot in the bottom thereof and interiorly with a track, wheels engaging the track, a carriage supported by the wheels and projecting through the slot, a platform exterior to the conduit and hinged to the carriage, a stop on the platform normally engaging the carriage and holding the platform in horizontal position, a guide wheel at each end of the conduit, an endless conveyor belt passed about and supported by the guide wheels, said belt being attached to the carriage, and means for driving said belt.

20. In combination, a guideway in the form of an inverted trough, a carriage projecting into the trough, wheels mounted in tandem on the carriage, the guideway being formed with a track for the wheels to roll upon, rollers mounted upon the carriage and bearing respectively against opposite sides of the guideway, and a platform exterior to the guideway and hinged to the carriage.

21. In combination, a conduit formed interiorly with a track and having a slot in the bottom thereof, a carriage of U-form with one leg thereof projecting through the slot into the conduit, wheels mounted on said leg and adapted to run on the track, rollers also mounted on said leg and bearing against opposite sides of the conduit, and a platform exterior to the conduit and hinged to the other leg of the carriage.

22. An inclined elevator comprising a pair of channel beams mounted in laterally spaced relation with the flanges of each beam projecting toward the flanges of the other beam, a cover plate securing the beams together and covering the spacing between the beams at the top thereof, a carriage provided with wheels adapted to run on the lower flange of one of the beams, said carriage being provided with rollers at the top and bottom thereof adapted to bear respectively against the webs of the opposite beams, the carriage having a U-shaped frame with one leg thereof passing out between the lower flanges of the channel beams and the other leg exterior to and rising to one side of the conduit, a platform hinged to the latter leg and adapt-

ed to swing on a horizontal axis lying parallel to the vertical plane of the conduit, stop means for holding the platform normally in horizontal position, and means for propelling the carriage along the conduit.

In testimony whereof, I have signed this specification.

HENRY A. WISE WOOD.