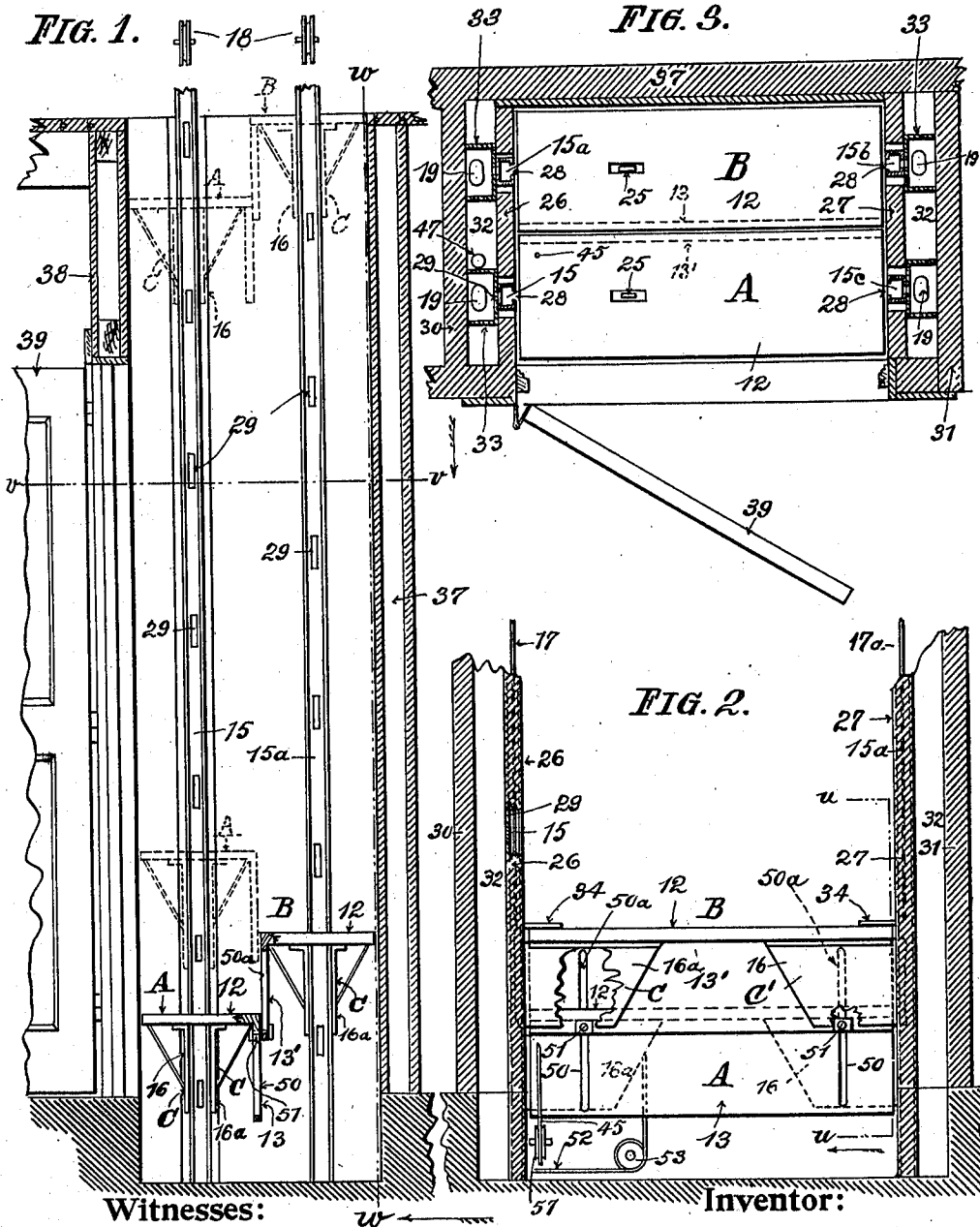


A. SWANSON.
MOVING STAIR.
APPLICATION FILED JUNE 4, 1910.

988,910.

Patented Apr. 4, 1911.

2 SHEETS-SHEET 1.



Witnesses:

Inventor:

E. R. Knudsen
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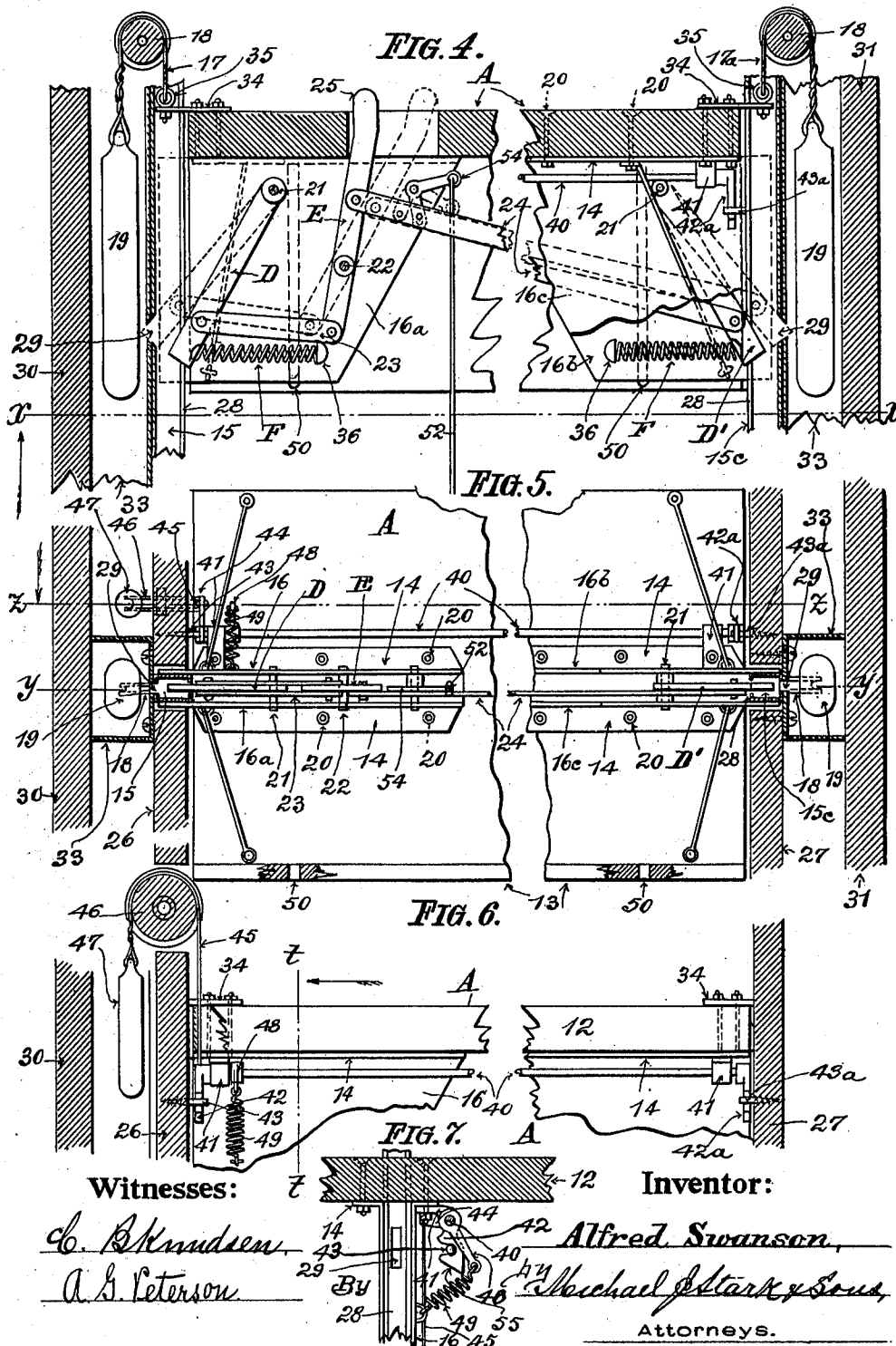
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UNITED STATES PATENT OFFICE.

ALFRED SWANSON, OF CHICAGO, ILLINOIS.

MOVING STAIR.

988,910.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed June 4, 1910. Serial No. 565,003.

To all whom it may concern:

Be it known that I, ALFRED SWANSON, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Moving Stairs; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheets of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to movable stairs; and it consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already referred to, which serve to illustrate this invention more fully, Figure 1 is a sectional elevation of the principal parts of this invention, said figure being drawn on line *u, u*, of Fig. 2. Fig. 2 is a sectional elevation on line *w, w*, of Fig. 1. Fig. 3 is a sectional plan on line *v, v*, of Fig. 1. Fig. 4 is a sectional elevation of one of the platforms detached, the figure being drawn on line *y, y*, of Fig. 5. Fig. 5 is an inverted plan above the line *x, x*, of Fig. 4. Fig. 6 is an elevation, partly in section, on line *z, z*, of Fig. 5. Fig. 7 is a sectional elevation on line *t, t*, of Fig. 6.

Like parts are designated by corresponding characters and symbols of reference in all the figures.

The object of this invention is the production of an efficient and serviceable moving stairs which shall occupy but little space in a building in which it is installed. This stairs comprises two platforms, A, B, each of which is formed of a tread 12, and a riser 13 and 13', respectively. These two platforms are independent of each other and they move vertically in a suitable well between guides 15, 15^a, 15^b, and 15^c, there being under each platform, and securely fastened thereto, slides or shoes C, which will be hereinafter more fully set forth and described, said shoes being adapted to partly

embrace said guides to maintain said platforms in proper position.

The platforms A B are suspended between the guides by means of ropes or cables 17, 17^a, Fig. 4, which ropes engage and pass over suitably-arranged overhead pulleys 18, and they carry at their ends counterweights 19, which are but slightly heavier than the platforms A B, as will hereinafter appear.

The slides or shoes C consist each of two sheet metal plates 16, 16^a, having their upper ends bent at right angles to their planes to afford flanges 14, by which and bolts 20, said plates are bolted underneath the treads 12 of said platforms. These plates 16, 16^a, are spaced apart so that their inner sides embrace the guides 15, and between these plates 16 and 16^a, and 16^b and 16^c there are pivoted arms D, D', by means of pivots 21, said arms D D' being, in turn, connected to a lever E, fulcrumed upon a pivot 22, the lower member of said lever E being connected to the arm D by a link or links 23, and the upper member of said lever E being connected to the arm D' by a rod 24, as clearly illustrated in Figs. 4 and 5. The upper end of this lever E protrudes from the upper surface of the tread 12 a short distance, as indicated at 25 in Figs. 3 and 4, so that the lever E, and by it its arms D D' may be manipulated as hereinafter described.

The guides 15, 15^a, 15^b, and 15^c, are, preferably, rectangular tubes located in the opposite side-walls 26, 27, Figs. 3 and 5. The front wall of these tubes is longitudinally slotted at 28, so that the lower portion of the arms D D' may enter these tubular guides, and in the back wall of these tubes there are slotted apertures 29, adapted to receive the ends of said arms D D' and thereby support the platforms A B at any elevation in said well. At a proper distance from the walls 26, 27, there are further walls 30, 31, affording spaces 32, wherein, and behind the tubes 15, 15^a, 15^b, and 15^c, there are located, preferably metallic, casings 33, in which the counterweights 19 move, there being on the upper surfaces of the treads 12 irons 34, entering the tubes to engage the cables 17 by which the platforms are suspended or lifted,

by eyes 35, so that these cables are out of ready reach.

In their normal position, which is indicated in dotted lines in Fig. 4, the arms D D' are in engagement with the respective slotted apertures 29 in the back walls of the tubes with their lower ends, and to retain these arms in this normal position, or to return them thereto when required, there are located between the plates 16 16^a, and the plates 16^b and 16^c, spiral springs F, bearing at one end against abutments 36 located between said plates, and at their other ends against the lower ends of said arms D D'.

The platforms A B are located in the well which is formed by the walls 26, 27, already mentioned, and further walls 37, 38, there being in the wall 38 a door 39, through which access is had to the platforms when it is desired to ascend in the well. These platforms A B are normally locked at the lower landing, or at any upper landing, in the following manner: Under the tread 12 of the platform A there is located a shaft 40, journaled in suitable brackets 41. Upon one end of this shaft 40 is mounted a bell-crank, one member, 42 of which is hook-shaped to engage a pin 43 secured in the wall 26, the other member 44, (Figs. 6 and 7) of said bell-crank being engaged by a rope or cable 45 passing downwardly into the pit of the well over a pulley 57, and then upwardly over an overhead pulley 46, located between the walls 26 and 30, to a counterweight 47, as illustrated in Figs. 5 and 6.

At the end of the shaft 40 opposite that where the bell-crank is located, there is mounted a hook-shaped arm 42^a, corresponding to the member 42 of said bell-crank and engaging a pin 43^a, the same as the member 42 engages the pin 43. Upon this shaft there is, furthermore, mounted an arm 48, to which one end of a spring 49 is secured, the other end of said spring being secured to the plate 16 in an efficient manner. Although there may be but one of these locking devices 42, preferably on the platform A, I may provide both platforms A and B with these locking means so that either platform, when reaching a landing, may be locked in position.

Between the members 16 and 16^a, and above the rod 24 which connects the lever E with the arm D', there is pivoted a bell-crank 54, one member of which engages the rod 24, while to the other member is hitched a rope 52, which rope leads downwardly into the pit of the well and may then lead upwardly to the several floors and provided with a counterweight, not shown, the same as the rope 45, said rope 52 being conveniently located to be within easy reach of an ascending or descending person.

The operation of this rising stairs is as follows: Assume the two platforms A B to

be down at the lowest landing as shown in Figs. 1 and 2, and that a person desires to ascend, also that the lowermost platform, A, is locked in position by the members 42, 42^a, and that the platform B is supported by the arms D D' engaging the slotted apertures 29 in the tubular guides 15^a 15^b. In the risers 13, 13' of these platforms there are slots 50, 50^a, through which bolts 51, are passed to limit the vertical movement of the platforms A B with respect to each other, to the length of said slots 50 50^a. The person steps first upon the platform A and then takes a step upward to stand upon the platform B. He now pulls the rope 45 upward to disengage the members 42 42^a from the pins 43 43^a, when the platform A will rise in virtue of the counter weights 19, and pass the platform B to a height limited by the slots 50 50^a in the risers thereof. In this position the arms D D' on the platform A will engage the slotted apertures 29 in the respective tubular guides to uphold the platform A when the person on the platform B takes one step upward and stands upon said platform A. Platform B being relieved of the weight of the said person, will rise and pass platform A and stop after having reached its limit of movement determined by the length of the slots 50 50^a. The person now takes another step upward to stand upon platform A again, and so continues to step from one platform upon the other until the proper landing is reached. It is desirable that there be a set of locking pins at each landing, and it is also evident that at each landing proper guards, not shown, be provided to prevent accidents when the platforms are at a different landing. When the person desires to descend, he steps from the uppermost platform B to the lower one A and pulls the rope 45 to disengage the uppermost platform from the locking means and then with one foot moves the projecting end 25 of the lever E sidewise to disengage the arms D D' on the platform B and then depresses platform B, which will descend past the platform A the proper distance and be locked in lower position by its arms D D'. The person now steps down upon the platform B and releases platform A as described with reference to platform B and pushes platform A down past platform B and then steps down upon the latter platform. These movements are continued until said person lands at the desired floor. Should the platforms A B be at an upper landing and a person below desire to ascend or descend, he pulls the ropes 45 and 52 which will disengage the arms D, D', and pull down both platforms, which, as already stated, are connected to each other by the bolts 51 passing through the slots 50, 50^a, in the risers 13, 13' of the platforms A, B, said ropes 52 leading downward into the pit of the well and may

then be led upwardly to the several floors and provided with counterweights the same as the ropes 45, as already stated. In order that the hooked members 42 42^a may engage their respective pins in descending, their lower ends are beveled at 55, as shown in Fig. 7, so that said hook-shaped arms are deflected when they reach said pins to pass the same, when the spring 49 will retract said arms 42 42^a to engage said pins.

In Figs. 1, 2, and 3, I have shown only the principal elements of this device for the reason that the details thereof would be so small as to be obscure. I have, therefore, drawn Figs. 4, 5, 6, and 7, at a larger scale so as to clearly illustrate these various details of construction.

Having thus fully described this invention, I desire it understood that the device is susceptible of considerable modification without materially departing from the principle and spirit of this invention and its scope, and for this reason I do not limit myself to the precise form and arrangement of the several parts of the device in carrying out this invention in practice.

I claim as new and desire to secure to myself by Letters Patent of the United States:

1. In rising stairs, a pair of separate platforms, means adapted to raise said platforms, said means being sufficient only to overcome the weight of said platforms, means adapted to lock said platforms at various predetermined distances, said platforms being located side by side and connected to each other in such manner that one platform can pass the other the distance of one step only, movable means adapted to support said platforms at predetermined intervals, and means for releasing said platforms, whereby a person desiring to ascend said rising stairs, steps alternately from one platform upon the other, the platform not occupied by said person being adapted to ascend by the means adapted to raise said platform, the distance past the occupied platform of one regular step of a stairs, the platform occupied by said person being prevented from rising by the weight of said person upon the same, said occupied platform being temporarily supported by said platform-supporting means.

2. In rising stairs, the combination, of two separate platforms, each of said platforms having upwardly-leading cables, counterweights on said cables, the preponderance in weight of said coacting counterweights being sufficient only to elevate said platforms when not loaded, guides for said platforms, there being in said guides apertures at predetermined intervals, the distance between said apertures in each coacting pair of guides being twice the height of the regular steps of a stairs, arms pivoted

below said platforms and projecting in opposite directions therefrom, said arms being adapted to engage said apertures in said guides, a lever pivoted underneath one of said platforms, one member of said lever protruding from the upper surface of said platform, links connecting said lever with said arms, and means on one of said platforms adapted to lock and to unlock said platform in lowermost position, said platforms being movably connected to each other, the limit of movement of said platforms past each other being the distance only of the usual steps in a stairs.

3. In a rising stairs, a well, two separate platforms in said well, oppositely located guides for each platform in said well, there being in said guides apertures in spaced relation, two pairs of slides on each platform, said slides comprising spaced plates, there being between one pair of said plates on each platform an inclined pivoted arm and a pivoted lever, one member of said lever being in linked connection with said arm, there being between the opposite pair of plates an oppositely inclined arm, said latter arm being in operative connection with said lever, upwardly-leading cables on each platform, a counterweight on each cable the preponderance in weight in a coacting pair of counterweights being sufficient only to lift said platform when not loaded, and means on said arms adapted to retain them in normal outwardly projecting position, said platforms being movably connected one to the other, the extent of movement of one platform past the other being the distance of one regular step in a stairs, said platforms being adapted to ascend and descend in said well by a person alternately stepping from one to the other platform in manner specified.

4. In a rising stairs, two platforms located side by side and movably connected to each other, the extent of movement past each other being the height of one step only, upwardly-leading cables connected to said platforms, a counterweight on each of said cables, the preponderance in weight of the coacting counterweights being sufficient only to raise said platforms when not loaded, means on said platforms adapted to support said platforms in loaded condition to retain same in temporarily fixed position, means adapted to lock said platforms in stationary position, and means adapted to unlock said locking means.

5. In a rising stairs, a platform comprising two steps located side by side and movably connected to each other, the extent of movement of said steps past each other being the height of one step only, upwardly-leading cables connected to said platform, a counterweight on each cable the preponderance in weight of the coacting counter-

weights being sufficient only to raise said platform when not loaded, automatically operating means on said platform adapted to support said platform in temporarily
5 fixed position when being loaded, and means on said platform adapted to move said platform supporting means to permit said platform to descend.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand in the presence of two subscribing witnesses. 10

ALFRED SWANSON.

Attest:

MICHAEL J. STARK,
A. G. PETERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
