Oct. 1, 1935. W. COOPER ET AL 2,016,104

MOVING STAIRWAY

Filed Nov. 21, 1934

Fig. 1.

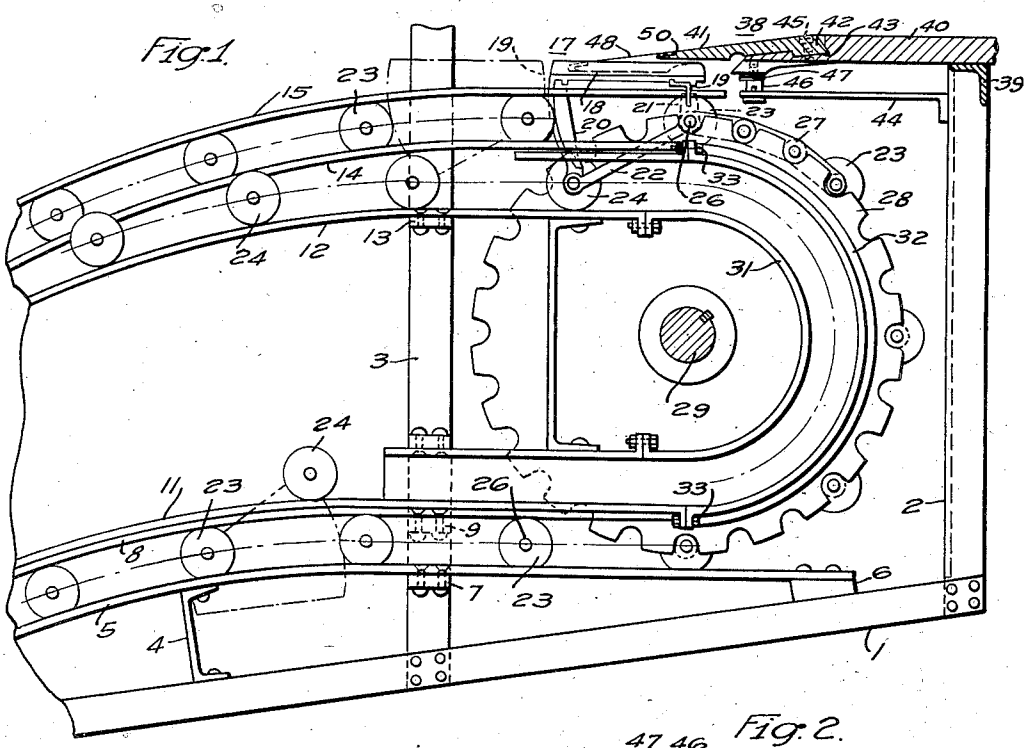


Fig. 2.

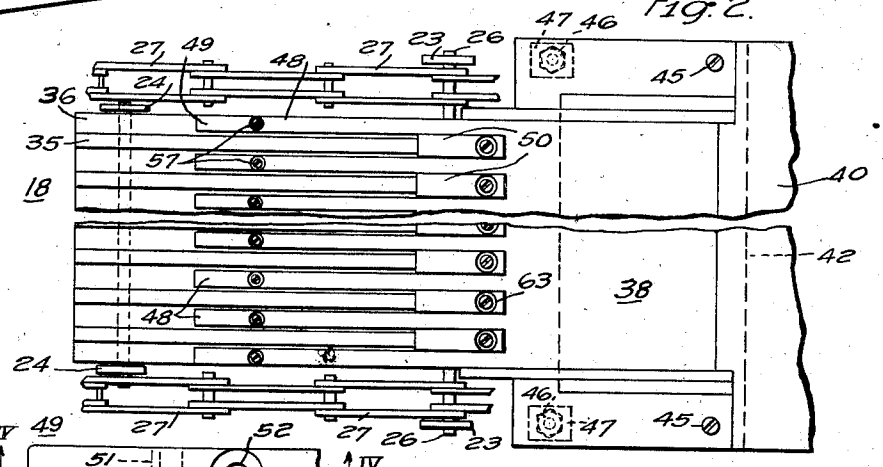


Fig. 3.

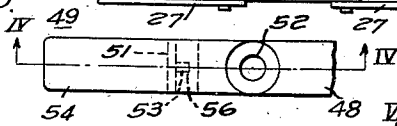


Fig. 4.

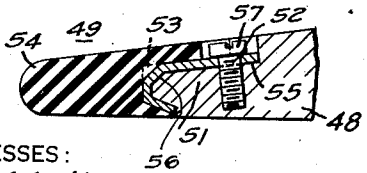


Fig. 5.

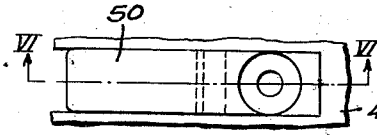
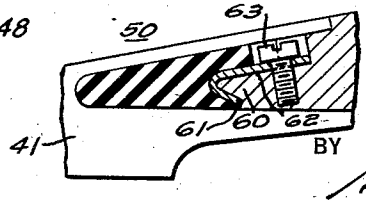


Fig. 6.



WITNESSES:
E. A. McCloskey.
Birney Hines

INVENTORS.
Will Cooper and
James Dunlop.
BY
ATTORNEY

Patented Oct. 1, 1935

2,016,104

UNITED STATES PATENT OFFICE

2,016,104

MOVING STAIRWAY

Will Cooper, Morton Grove, and James Dunlop, Park Ridge, Ill.; said Dunlop assignor to Westinghouse Electric Elevator Company, Chicago, Ill., a corporation of Illinois

Application November 21, 1934, Serial No. 754,028

12 Claims. (Cl. 198—16)

Our invention relates to moving stairways and particularly to the combplates disposed for cooperation with the steps at the entrance and at the exit of such stairways.

One object of our invention is to provide combplates which will increase the safety factor in the operation of moving stairways and which may be easily and economically constructed, placed in position and maintained in operation.

Another object is to provide a combplate with soft nosed teeth and webs which will prevent injury to any objects which may be temporarily caught on the combplate.

A further object is to provide a combplate with tips on its teeth and webs which may be easily and quickly removed and replaced and to prevent sidewise movement of the tips.

It is also an object of our invention to provide the teeth and webs of stairway combplates with soft nosed facings which may be bent upwardly without breaking the teeth of the comb or permitting ragged edges to remain which would damage any object which might come in contact therewith.

For a better understanding of our invention, reference may be had to the accompanying drawing in which

Figure 1 is a view, partly in side elevation and partly in section, of the upper landing portion of a moving stairway;

Fig. 2 is an enlarged top plan view of the combplate and the step under it shown in Fig. 1, with the longitudinal central portion broken away;

Fig. 3 is an enlarged top plan view of one of the flexible tips and a portion of the tooth upon which it is mounted in the combplate shown in Fig. 2;

Fig. 4 is a view taken on the line IV—IV of Fig. 3;

Fig. 5 is a top plan view of one of the soft nosed tips disposed on the web between the teeth of the combplate shown in Fig. 2; and,

Fig. 6 is a view taken along the line VI—VI of Fig. 5.

Referring more particularly to the drawing, we have illustrated that portion of a moving stairway which is usually known as its upper landing. This landing portion of the stairway is shown as supported by a structural steel truss or frame, the upper portion of which includes a supporting girder 1 upon which are disposed an end angle iron 2, a standard 3 and a channel iron track support 4. The angle iron or structural steel members may be riveted together in the usual manner to provide a substantially rigid structure.

A lower track rail 5 is mounted upon the support 4 and secured to the angle iron 1 through the medium of a block 6 and to the standard 3 by a bracket 7. A guardrail 8 is disposed above the track rail 5 and is held in position by a bracket 9 supported by the standard 3. A second track rail 11 is mounted above the guardrail on the standard 3, in cooperative position with the rail 5. The track rails 5 and 11 comprise the lower tracks for the moving stairway.

A third track rail 12 is mounted upon the standard 3 by a bracket 13 and a fourth track rail 14 mounted above the third track rail upon the standard 3. A guardrail 15 is also mounted upon the standard 3 above the track rail 14 in position to cooperate therewith. The track rails 12 and 14 comprise the upper tracks for the moving stairway.

As is well known, moving stairways comprise an endless series of movable steps 17 which are moved along their tracks in accordance with the speed at which the stairway is to be operated. Each of the steps 17, as shown in Figs. 1 and 2, comprises a step tread 18 disposed upon a frame comprising a pair of horizontal bars or joists 19 supported by suitable riser yokes 20 and 21. The lower ends of the riser yokes are suitably connected by bars 22 to form a compact frame for the step tread. The front part of the step, indicated by the yoke 21, is supported upon a pair of leading wheels 23. The rear portion of the step is supported upon a pair of trailer wheels 24. As shown, the trailer wheels 24 ride upon the upper track rail 12 and upon the lower track rail 11, while the leading wheels 23 ride upon the upper track rail 14 and the lower track rail 5.

The leading wheels 23 are mounted upon an axle 26 which extends through gear chains 27 at each side of the step. Each of the gear chains 27 is supported upon and driven by a suitable sprocket wheel 28 at the side of the stairway. The sprocket wheels are firmly mounted upon a suitable driving shaft 29, in order that rotation of the sprocket wheels will cause the gear chains 27 to move in accordance with the direction of operation of the sprocket wheels and thereby carry the endless series of steps around in operative position.

A curved track rail 31 is connected to the track rail 12 to form a track for the trailer wheels 24, as the moving steps are carried around the end of the stairway from the upper track to the lower track or from the lower track to the upper track, in accordance with the direction of operation of the stairway. A curved guardrail 32 is secured

by suitable bolts 33 to the lower track rail 11 and to the upper track rail 14 for the purpose of maintaining the trailer wheels in correct position on the track rail 31 as the steps move around the end of the stairway.

No track is provided for the front wheels 23 because, being mounted upon the axle supported by the gear chains, they do not need to be supported by a track while being carried around the sprocket wheel.

The tread plates 18 on the steps are provided with suitable cleats 35. They may be constructed of molded material or any other suitable material. As shown in Figs. 1 and 2, the cleats 35 are of such dimensions as will provide suitable supports for the feet of the passengers who ride the stairway and form grooves 36 in the upper surface of the tread plates. The grooves between the cleats should be narrow enough to prevent the heels of the passengers' shoes from entering.

The combplate 38 is mounted at the top of the stairway upon a plurality of brackets 44 (only one of which is shown) and a cross-angle bar 39 supported upon the end angle irons 2 (only one of which is shown). The combplate 38 comprises a base or plate 40 and a combbody 41. The combbody 41 is provided with an offset portion 42 which may be seated in a suitable depression 43 in a baseplate 40. A plurality of screws 45 are provided for securing the combbody in its position in the baseplate 40.

A bolt 46 is screwed into the underside of the fore portion of the baseplate 40 at each side thereof. The heads of the bolts 46 rest upon the bracket 44 and thereby support the combplate in the desired position. Suitable shims 47 may be placed between the head of the bolt and the baseplate 40, in order to raise or lower the baseplate to its proper position.

As shown in the drawing, the combbody is provided with a plurality of combteeth 48, the bases of which are supported by the web faces 60 on the combbody. The teeth 48 are so disposed as to enter the grooves 36 between the cleats of the stairsteps 18, as the steps are moved along their endless path. The teeth 48 are preferably close together and are of such size as will cooperate with the cleats 35 on each step to provide a firm surface for the feet of the passengers as they step upon or step off the stairway steps.

In order to prevent injury to any object which may be caught on the ends of the combteeth or on the webs between the combteeth, we have provided soft nose tips 49 and 50 for the teeth and the faces of the webs.

As shown in Figs. 3 and 4, the soft nose tip for each of the combteeth 48 is constructed preferably by taking a small piece of substantially rectangular sheet metal 51, brass for instance, and bending it into substantially the shape of the letter J. A suitable screw hole 52 is provided in the rear end of the metal base and an indentation 53 is made in its curved end. After the sheet metal base is formed, a suitable and somewhat pointed body of soft resilient material such as rubber 54 is vulcanized or otherwise secured upon its forward end, thereby providing a tip unit having a soft resilient nose and a firm metal base. The front end of each of the combteeth is provided with a cutout portion 55 upon which the tip 49 may be seated with the metal base 51 in engagement with the end of the tooth.

The extreme end of the combtooth is also provided with a slot 56 to receive the indented portion 53 of the tip base 51. When the tip 49 is placed upon the tooth 48, a fillister-like screw 57 is screwed through the screw hole 52 into the tooth to hold the tip in position, and the engagement of the indented portion 53 of the tip with the slot 56 in the end of the tooth prevents any sidewise movement of the tip. From this construction, it will be seen that the tip may be readily replaced by loosening the screw 57, removing the old tip, replacing it with a new tip and again inserting the screw 57 and tightening it in its position.

As shown in Figs. 5 and 6, the soft nose or tip 50 for each of the webs 60 between the teeth 48 is constructed of a suitable soft resilient material such as rubber. In constructing this nose, a short metal strap 61, such as brass, is bent into a hook-like shape to conform to an offset portion 62 on the web and then a soft nose of a suitable resilient material such as rubber is vulcanized or secured to the outer face of the metal strap. The metal strap is provied with a screw-hole through which a fillister-like screw 63 may be screwed into the web 60 to hold the tip in position. Inasmuch as the nose or tip 50 extends from the side of one tooth to the adjacent side of the next tooth, no extra screw or other device is necessary to prevent a sidewise movement of the nose.

It should be noted that the screw 57 and likewise the screw 63 are disposed in circular cut-away depressions in the tips and in the combplate in such manner that the surface at the joint between the soft tip material and the harder material of the combplate is practically unbroken.

By this construction it will be seen that if an object is caught on the soft nosed teeth or webs, the blow will be softened and the caught object will be lodged against a surface which is soft and resilient and which will thereby tend to lessen any damage to the object. It will also be obvious that if one of the tips of the combteeth or the soft noses of the web becomes broken or mutilated, it may be readily removed and easily replaced without removing the combplate from its fixed position in the moving stairway. It will also be obvious that, inasmuch as the noses of the teeth and the webs are soft and flexible, they will, if bent upwardly, fail to leave ragged metallic edges which would tend to greatly damage any object caught thereon.

Although we have shown and described only one specific embodiment of our invention, we desire it to be understood that many modifications thereof and changes therein may be made without departing from the spirit and scope of the invention.

We claim as our invention:

1. A combplate for moving stairway steps comprising a comb base, a plurality of teeth disposed on the base in position to permit cleats on the steps to pass between them, end tips disposed on the outer ends of the teeth, said tips being of softer material than the material in the teeth.

2. A combplate for moving stairway steps comprising a comb base, a plurality of metal teeth disposed on the base in position to permit cleats on the steps to pass between them, and rubber tips disposed on the outer ends of the teeth.

3. A combplate for moving stairway steps comprising a comb base, a plurality of metal teeth disposed on the base and positioned to permit cleats on the steps to pass between them, end tips disposed on the outer ends of the teeth, each of said tips comprising a thin metal plate adapted

to fit the outer end of a tooth and rubber vulcanized to said metal plate.

4. A combplate for moving stairway steps comprising a comb base, a plurality of metal teeth disposed on the base and positioned to permit cleats on the steps to pass between them and tips disposed on the outer ends of the teeth, each of said tips comprising a thin metal plate adapted to fit on the outer end of a tooth and rubber vulcanized on the surface of said metal plate opposite the tooth end.

5. A tip for moving stairway combplates comprising a substantially rectangular metal plate bent into substantially J-shape and provided with an aperture through which it may be fastened to a tooth and a rubber tip vulcanized on the outer surface of said metal J-shaped plate.

6. A combplate for moving stairway steps comprising a comb base, a plurality of teeth disposed on the base in position to permit cleats on the steps to pass between them, the outer end of each tooth being provided with an indented portion and an adjacent screw threaded aperture, a tip for each of said teeth comprising a metal plate provided with an indented portion to be disposed in the indented portion of the tooth with which it is to be associated and having an aperture through which a screw threaded means may be applied to the screw threaded aperture in the tooth to hold the plate in position on the tooth and a rubber tip vulcanized on said plate.

7. A combplate for moving stairway steps having a comb base, a plurality of teeth disposed on the comb base and a web between the base ends of each of the teeth, and tips disposed upon the outer edges of the webs and the outer ends of the teeth, said tips being of material softer than the material in the webs and the teeth.

8. A combplate for moving stairway steps, having a comb base, a plurality of teeth disposed on the base with webs disposed on the base between the base ends of the teeth, and rubber facing material disposed on the outer edges of the teeth and the webs.

9. A tip for the teeth of moving stairway combplates comprising a substantially rectangular metal plate bent to J-shape and having an indented section in the hook portion of the J-shaped plate disposed to cooperate with an indented portion in the teeth, and a portion of rubber vulcanized to the outside wall of the J-shaped metal plate.

10. A combplate for moving stairway steps having a comb base provided with a plurality of comb teeth and having webs between and connecting the base ends of the comb teeth, and a tip disposed on each of said webs, said tip comprising a substantially rectangular metal plate having one portion bent to hook over the outer edge of the web and being provided with an aperture by means of which it may be secured to the web and an edging of rubber vulcanized to the hook shaped end of the metal plate.

11. A combplate for moving stairway steps having a comb base, a plurality of teeth disposed on the base, webs disposed on the base between the base ends of the teeth, and a soft resilient material disposed on the outer edges of the webs.

12. A combplate for moving stairway steps having a comb base, a plurality of teeth disposed on the base, webs disposed on the base between the base ends of the teeth, and a facing disposed on the webs, said facing being of material softer than the material in the webs.

WILL COOPER.
JAMES DUNLOP.