O. F. WEGENER.

STREET CROSSING ESCALATOR BRIDGE.

APPLICATION FILED NOV. 19, 1917.

1,292,938.

Patented Jan. 28, 1919.

2 SHEETS—SHEET 1.

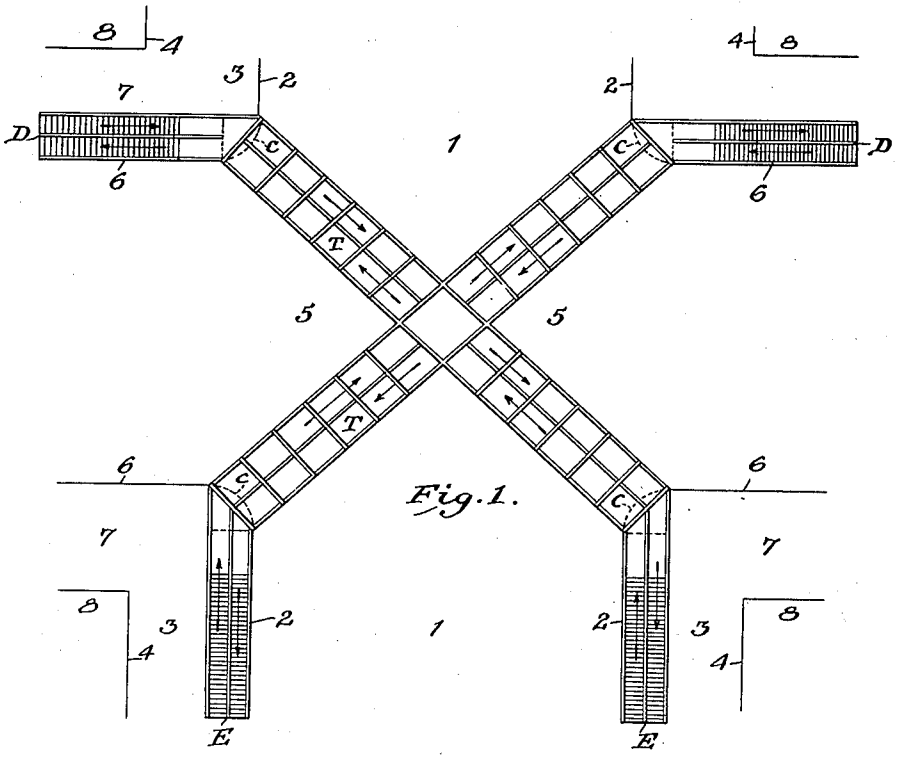


Fig. 1.

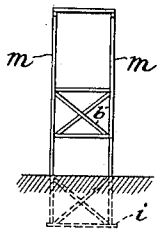


Fig. 2.

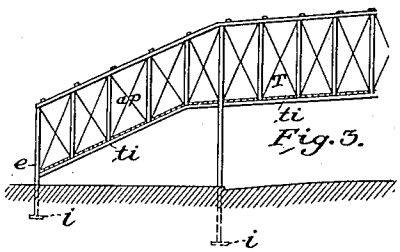


Fig. 3.

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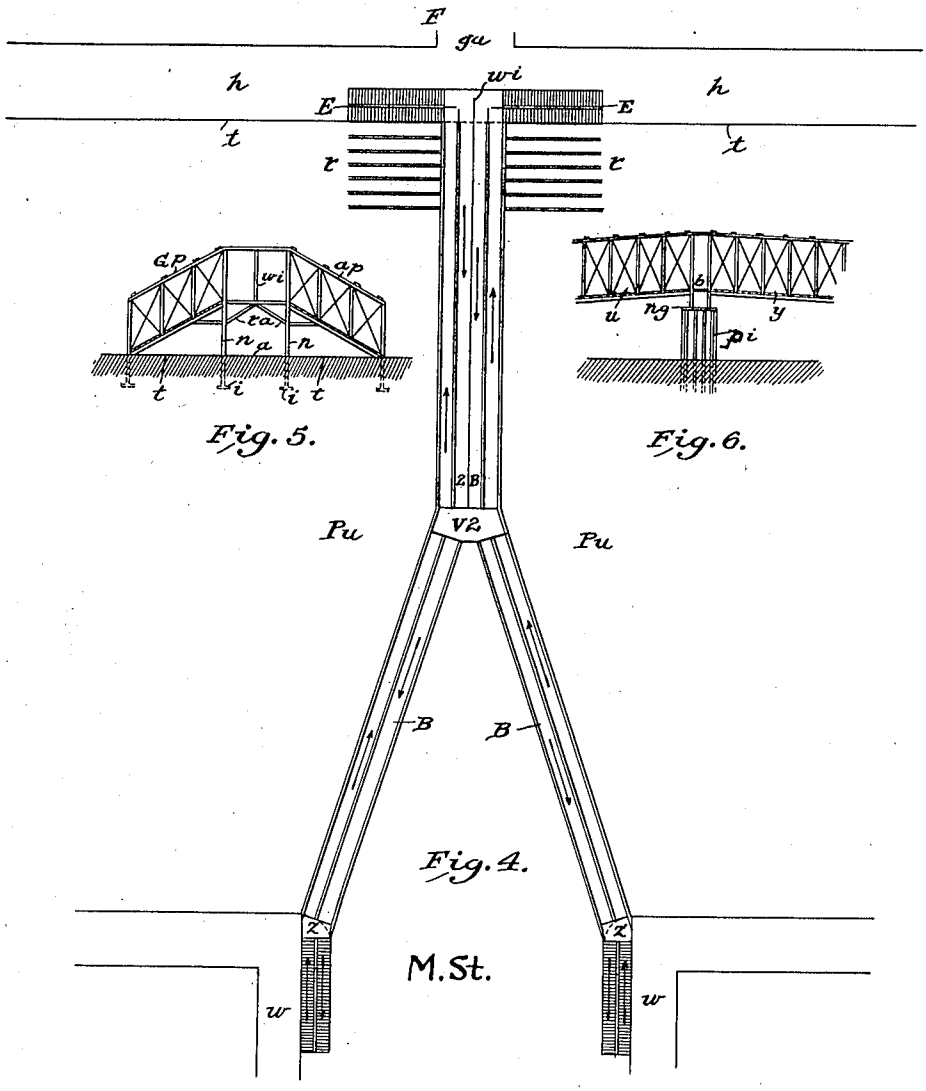


Fig. 5.

Fig. 6.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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STREET-CROSSING ESCALATOR-BRIDGE.

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To all whom it may concern:

Be it known that I, OTTO F. WEGENER, of Seattle, in the county of King and State of Washington, have invented Street-Crossing Escalator-Bridges, of which the following is a description.

Purpose of the invention.

The traffic in the larger cities of the United States has of late years, through the expansion of industries and trade, increased to such an extent, that in many business-streets of those cities it is, during many hours of the day, dangerous for pedestrians to cross them; and a loss of valuable time is caused to people riding in street-cars, automobiles, and other vehicles by having to stop so often, to let men, women and children cross the streets.

It has, consequently, become necessary for the city authorities, to place policemen at the most congested street crossings, where they let a large number of people desiring to cross gather and then stop all the vehicles long enough to let the waiting crowd hurriedly cross from sidewalk to sidewalk.

To supply that want, I have invented a street-crossing-escalator-bridge, which, by a combination of a street-crossing bridge with various kinds of escalators, carries the pedestrians, without any danger to them, and without any delay to them and the public, from any corner of a street to any of the other corners of an intersecting street. How that is to be done by my invention will be shown in the accompanying drawings, and by the following description.

The drawings.

Figure 1 shows a top-view of my bridge crossing a street intersection having four corners.

Fig. 2 is a front-view of a pair of end-posts or main verticals of the trusses.

Fig. 3 shows a side-view of an approach to the bridge, and part of the bridge-trusses.

Fig. 4 shows a top-view of the various escalators and the small spaces between them, as applied to my bridge and its approaches crossing a large public place from a side-walk—not a corner—to the sidewalk corners of the nearest street.

Fig. 5 is a side-view of a double approach from a side-walk to one end of my bridge.

Fig. 6 shows a side-view of the bridge-pier which supports, in the center of one of my bridges, the highest ends of the three trusses which form the bridge and carry the escalators.

Description.

Fig. 1 shows the form of my bridge there exhibited consists of two trusses, T. T., which cross each other in their centers over the center of the roadway of two intersecting streets. To show that it is immaterial, whether the streets are of equal width or not, I have chosen two of different widths. One of them has a roadway, 1, 1, of 70 feet width between the curbs; 2, 2 of the sidewalk, 3, 3, each of which is 22 feet wide, thus making the width of the entire street 114 feet between its houselines 4, 4. The other street has a roadway, 5, 5 of 60 feet width between the curbs, 6, 6 of the sidewalks 7, 7, each of which is 20 feet wide, thus making the whole street 100 feet wide between its houselines 8, 8.

The trusses, T. T. each rest with their lowest ends over the rounded off curb-corners, *c*, *c*, upon a pair of posts, *m*, *m*, of Figs. 2 and 3, which are the "main verticals" of the trusses. The latter are, preferentially, of the kind which throws the least part of its strain upon the center, and increases it gradually toward the ends of the truss. I choose that class of trusses for this form of my bridge, because it is to have the heaviest part of its "live load" on the large center-panel.

As "main verticals" of the bridge trusses the posts, *m*, *m*, must all be very strong and set deep into the ground upon trough-like iron sills, *i*, that are well bedded in concrete or, if the ground be soft, rest upon proper piling. In order not to encroach upon the sidewalks, the posts are set inside of, and close to, the curbs on the rounded off corners *c*, *c*, as shown in Fig. 3. The over-head cross-bars and braces, *b*, should be close under the floor of the trusses T, T.

The trusses, T. T. have, in their center, a panel without oblique or center rods, which form a square, *cs*, over the center of the intersecting streets underneath. As escalators are to be placed upon the ties, *ti*, *ti*, that form the floor of the trusses, and the machinery for operating the escalators is placed underneath that floor, in the center of the trusses, they must be about 6 feet higher there than at the ends over the sidewalk corners; bringing the height of the

center square, *cs*, about 21 feet, more or less, above the street roadways.

To get access to the trusses, T. T from below, approaches to them consisting also of trusses, *ap*. which carry escalators arranged on the sidewalks along the curbs. The escalators are double, one running up and the other down. There are on each street-corner two sidewalks, one of which is sufficient for the approach of that corner, except in cases of extraordinary street congestion by pedestrians, when, to double the capacity of the whole bridge, an approach may be built on each sidewalk. Fig. 1 shows two approach-escalators E, E, as built on the main street, 1, and two marked D, D, built on the side-street, 5. The approach trusses, *ap*. are of the "Pratt" kind. They must be strongly constructed, and for that purpose connected with the end-posts, *m*, *m*, of the trusses T, T, and also have a strong end-post, *e*, of their own, which is sunk in the ground and made solid there, like the end-posts, *m*, *m*, as shown in Fig. 3. The peculiarity that part of the main truss floor projects into the approach truss, *ap*, is caused by the desire to keep the main verticals, *m*, *m*, at the edge of the sidewalks, to save sidewalk space as much as possible from being used by the bridge.

The few spots on my bridge before referred to, where the escalators are left off, are the places where a bend in the direction of their path is changed. The escalator can not turn a corner, but must, where there is to be a bend in their direction, stop shortly before the turn, and commence new, shortly after, in the new direction. The passenger has to step there from one escalator, over an even place, to another one, which is done so easily and quickly, that it has been done before having been thought about.

These changes of the escalators are made at the junction of the approach-escalator with those on the bridge, so that the passengers have to step twice over the junction, once in coming up, and again when going down. They also have to step off the escalator, when arriving at the center-square, *cs*, where the passengers must get onto the escalator that will bring them down, to the street corner they each want to reach.

In Fig. 4 three places on the boundary lines of public place P*u*, must be connected with each other, viz: the sidewalk *w*, *w*, of Street M. St., and a place on sidewalk *h*, the center point of which has been marked with the letter *a* in Fig. 5, which place is opposite the main gate, *ga*. of the building F. Three trusses are needed to make those connections, one which commences at the sidewalk *h*, and is called *u;* and two which commence, each, at one of the sidewalks *w*, *w*, which are called *y*, *y*.

On account of the large distance to be crossed by those trusses, and the great number of passengers they will have to carry, it is advisable to build a bridge-pier, *pi*, preferentially in the center between the three end-points of the trusses heretofore named, as shown bv Fig. 4. The pier must be strongly built of piles, and have a suitable capping, *ng*, shown in Fig. 6; which is to receive the end-posts, of the three trusses, one of which is, in the side-view of Fig. 6, not to be seen, but exactly like the other one, both of which are therefore named alike, *y*.

The pier, *pi*, may be 15 ft. high, more or less, according to the legal height-line of the city; but the floors of the three trusses meeting there must be about six feet higher, to make room for the machinery operating the escalators which are to be placed on the trusses. As this extra height of 6 feet is not required under the approach trusses over the sidewalks, *w*, *w*, *k*, the trusses, *u*, *y*, *y* are slanting from the bridge-pier toward their respective ends, as shown in Fig. 6.

The connection of the two trusses, *y*, *y*, with the sidewalks, *w*, *w*, is exactly like the connection of the ends of trusses T, T with the sidewalks, 3, 3 shown in Figs. 1 and 2 of Sheet 1. Regarding the connection of truss *u* with the sidewalk *h*, it is to be considered that truss *u* is as wide as the two trusses, *y*, *y* together, each of which is, as will be shown later, provided with a duplex escalator while truss *u* carries two of them; because it has to transport all the passengers coming from, or going to, the two other trusses, *y*, *y*. Consequently truss *u* must also have double as large an outlet through its approach trusses, and approach escalators, as the trusses *y*, *y*. That is achieved by giving the end of truss *u* two approach trusses, one on each side, as shown in Figs. 4 and 5.

The braces, *ra*, give the wide opening between the end-posts, *n*, *n*, additional strength, while the opening itself, by having been placed opposite the gate, *ga*, gives the people who, in going or coming, want to make use of the street cars running to the city on the car-tracks, *r*, *r*, unimpeded opportunity to walk from the ferry gate to the cars or vice versa.

This mode of placing my escalator-bridge at any edge of a sidewalk which is not a corner, and providing it with escalators of any desired capacity is an especially useful part of my invention, because it adapts itself to outlying locations which have no regular system of streets, and where a bridge merely connecting the corners of intersecting streets would be more or less useless.

To show the exact manner in which escalators operate on such a bridge, as the one crossing the public place, P*u*, Fig. 4 furnishes a top-view of the escalators as applied

to the floors of the trusses *u*, *y*, *y* and their approach trusses, *ap*, *ap*. It also shows the different forms of them, and the vacant places between them, caused by change of the direction, or of the kinds of escalators used. The letter E indicates in all the figures of Sheet 2 an escalator of the "step-type" of the duplex kind whose two parts run in opposite directions. The path of these escalators begins at the sidewalks, *w*, *w* at the foot of the approach trusses, *ap*, on which they climb up to the floors of trusses *y*, *y*, where they disappear under the vacant place *v*, to make room for the "cleat type" escalators B, B which cannot commence their operations though, until after the crossing of the bends Z, Z, because, as stated before, escalators cannot turn a horizontal corner. From Z, Z the escalators, B, B, have been laid to the end of trusses, *y*, *y*, at another vacant place V^2 over the bridge pier, *pi*.

There the two narrow trusses *y*, *y* are connected with the double wide truss *u* having the double duplex escalators, 2 B, which run straight to their ends at the vacant space V^3, on either side of which the "step-type" escalators E begin to run down over the approach-trusses, *ap*, *ap* to sidewalk *h*. Place V^3 is a level platform divided in the center between the two approach escalators E, by means of a wire screen or partition, *wi*, as shown in Figs. 4 and 5, in order to prevent disorder among the people coming up on the two approaches.

I claim:

1. A cross-over bridge for pedestrians, comprising an elevated span having approaches disposed at an angle in a vertical plane to its ends, and escalators for elevating passengers on the approaches to and across the span, the main span comprising divergent branches each having it own system of escalators which terminate at the intersection of the branches, and foot stations at each intersection and horizontal change of direction of travel of the passengers on the bridge.

2. A cross-over bridge for pedestrians, comprising an elevated span having approaches disposed at an angle in a vertical plane to its ends, and escalators for elevating passengers on the approaches to and across the span, the main span comprising divergent branches each having its own system of escalators which terminate at the intersection and horizontal change of direction of travel of the passengers on the bridge, each approach escalator being horizontally deflected from the line of its respective branch.

3. A cross-over bridge for pedestrians, comprising an elevated span having approaches disposed at an angle in a vertical plane to its ends, and escalators for elevating passengers on the approaches to and across the span, the main span comprising divergent branches each having its own system of escalators which terminate at the intersection of the branches, and foot stations at each intersection and horizontal change of direction of travel of the passengers on the bridge, each approach being disposed close to and along the curbing of a side-walk when the bridge is arranged at a street crossing.

OTTO F. WEGENER.