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(54) **CROSS STREET TRANSIT AND MULTIMODAL MULTI-LEVEL STATION AND PEDESTRIAN-ORIENTED INTERCHANGE**

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B61B 1/02	(2006.01)
E01C 1/00	(2006.01)
E01C 15/00	(2006.01)
E04H 3/00	(2006.01)
E04H 6/08	(2006.01)
E01C 1/04	(2006.01)

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CPC ***E04H 14/00*** (2013.01); ***B61B 1/02*** (2013.01); ***E01C 1/002*** (2013.01); ***E01C 15/00*** (2013.01); ***E04H 3/00*** (2013.01); ***E04H 6/08*** (2013.01); ***E01C 1/04*** (2013.01)
USPC **404/1**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

169,819	A *	11/1875	Lozier	104/124
671,686	A *	4/1901	Bergeron	405/132
1,515,251	A *	11/1924	Graves	104/27
1,628,934	A *	5/1927	Turner et al.	104/27
1,628,935	A *	5/1927	Turner et al.	104/27
1,629,787	A *	5/1927	Hackett	52/175
1,748,309	A *	2/1930	Rose	104/28
3,405,612	A *	10/1968	Pearson	404/1
3,847,496	A *	11/1974	Stankiewicz	404/1
5,671,681	A *	9/1997	Senior, III	104/138.1
7,857,543	B2 *	12/2010	Troster	404/1
8,172,478	B2 *	5/2012	Sing	404/1
2014/0205376	A1 *	7/2014	Derenoncourt	404/1

* cited by examiner

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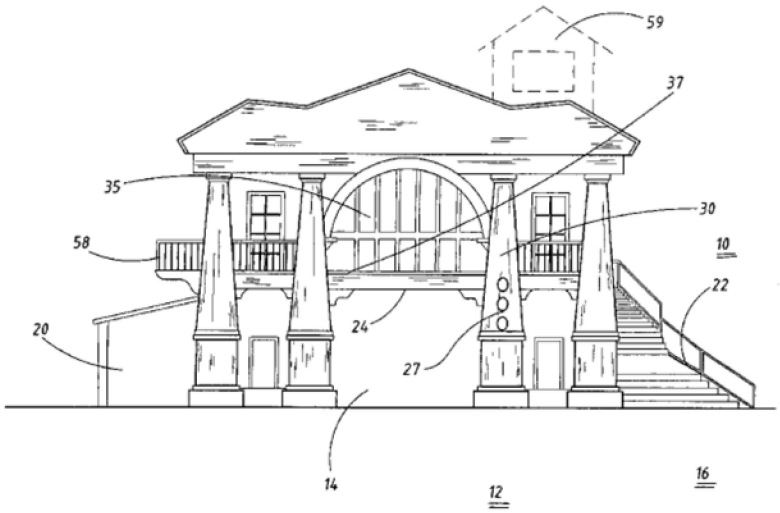
(57) **ABSTRACT**

A cross street station and interchange for use at the intersection of a local traffic artery with significant pedestrian-oriented improvements and features that runs between but not through two communities and a primary traffic artery that divides two dissimilar communities. It uses a variable bi-level regional mass transit platform for ticketed passengers lowered from the upper level of the cross street station and interchange to the street level and provide a platform level with the regional mass transit vehicle floor and a ramp to the height elevation of the sidewalk to disembark arriving regional mass transit passengers and allow for the boarding of the new mass transit passengers. The cross street station and interchange includes in close proximity to this platform a metropolitan mass transit stop on the primary traffic artery and local community transit services stop on the local traffic artery that can also accommodate paratransit passengers.

55 Claims, 7 Drawing Sheets



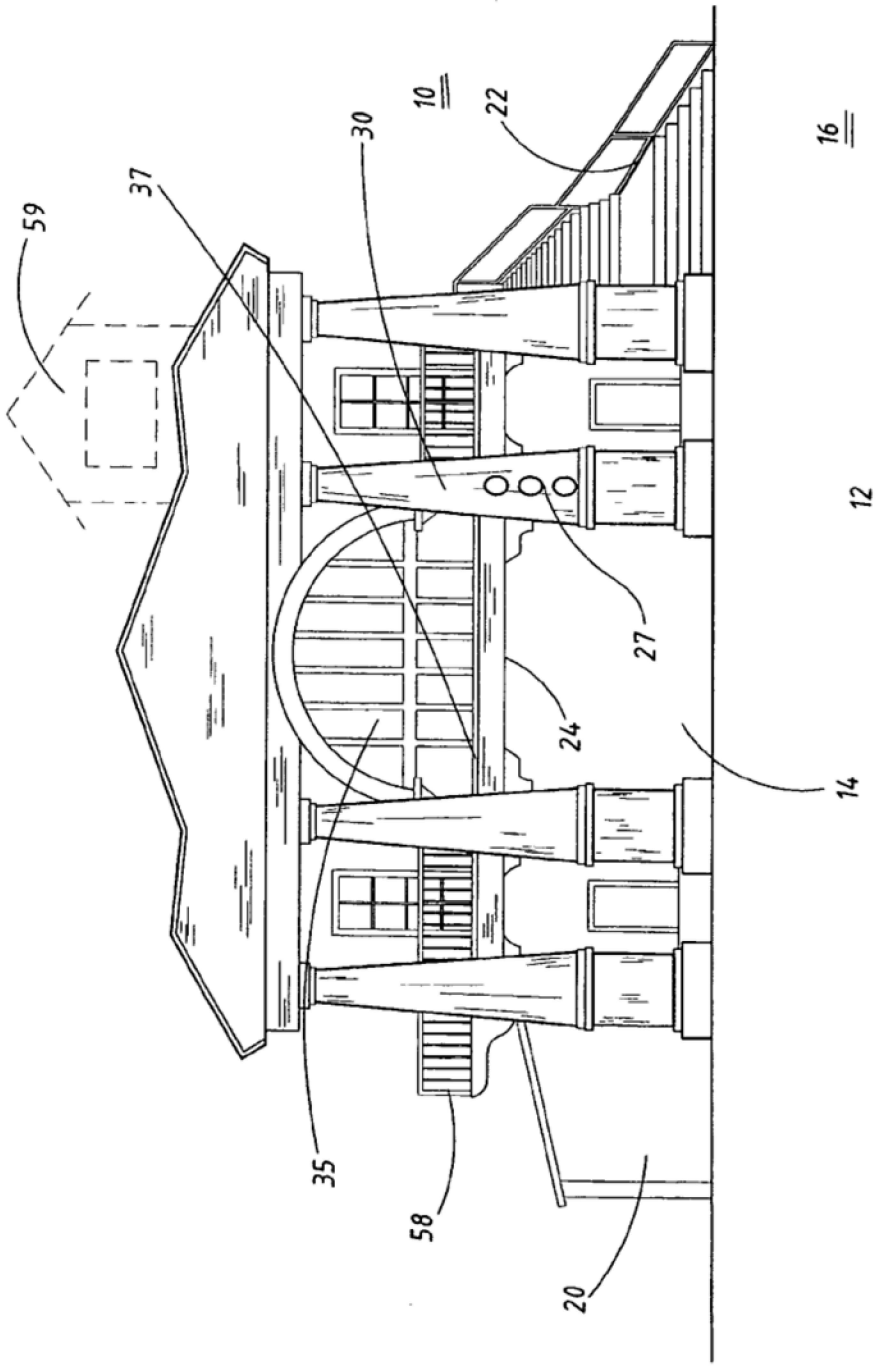


Fig. 1

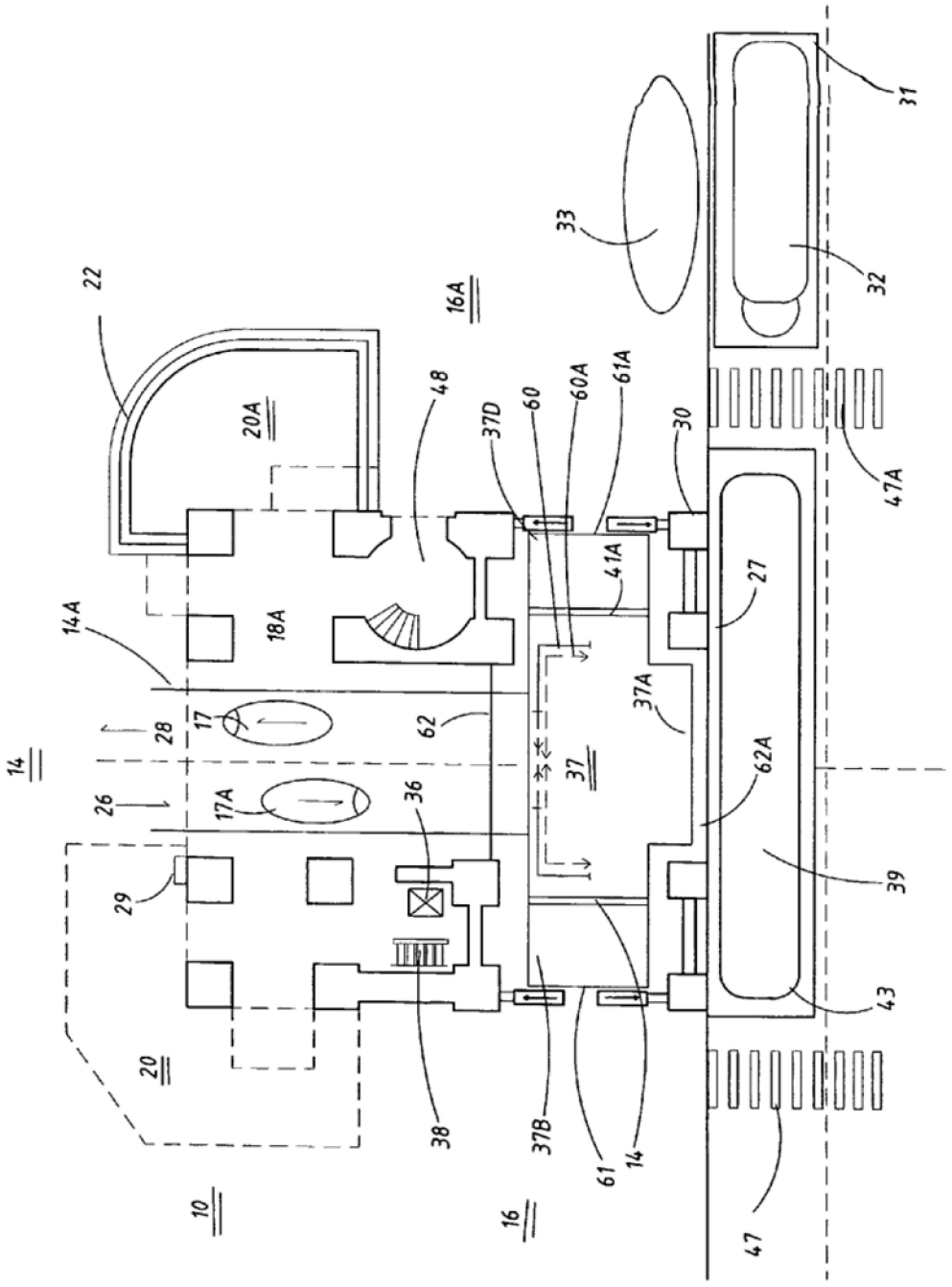

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Fig. 2

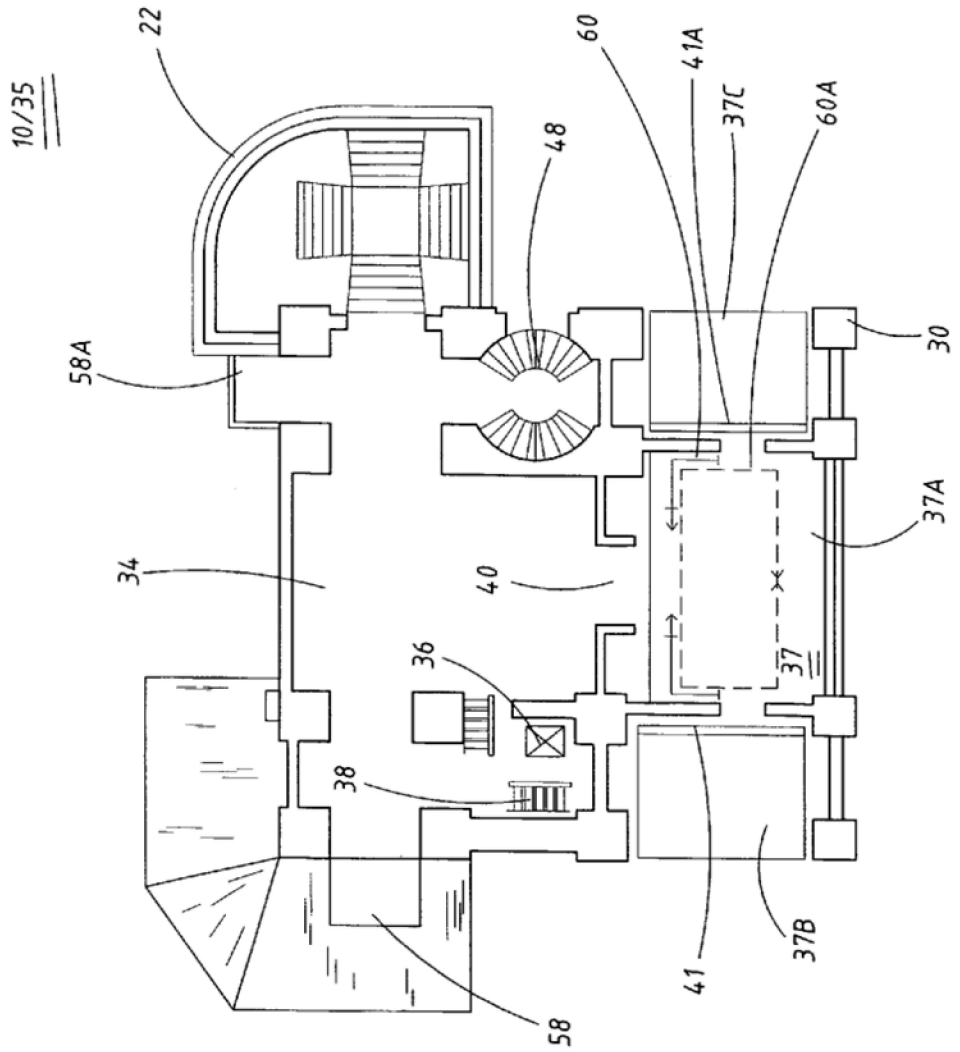

Fig. 3

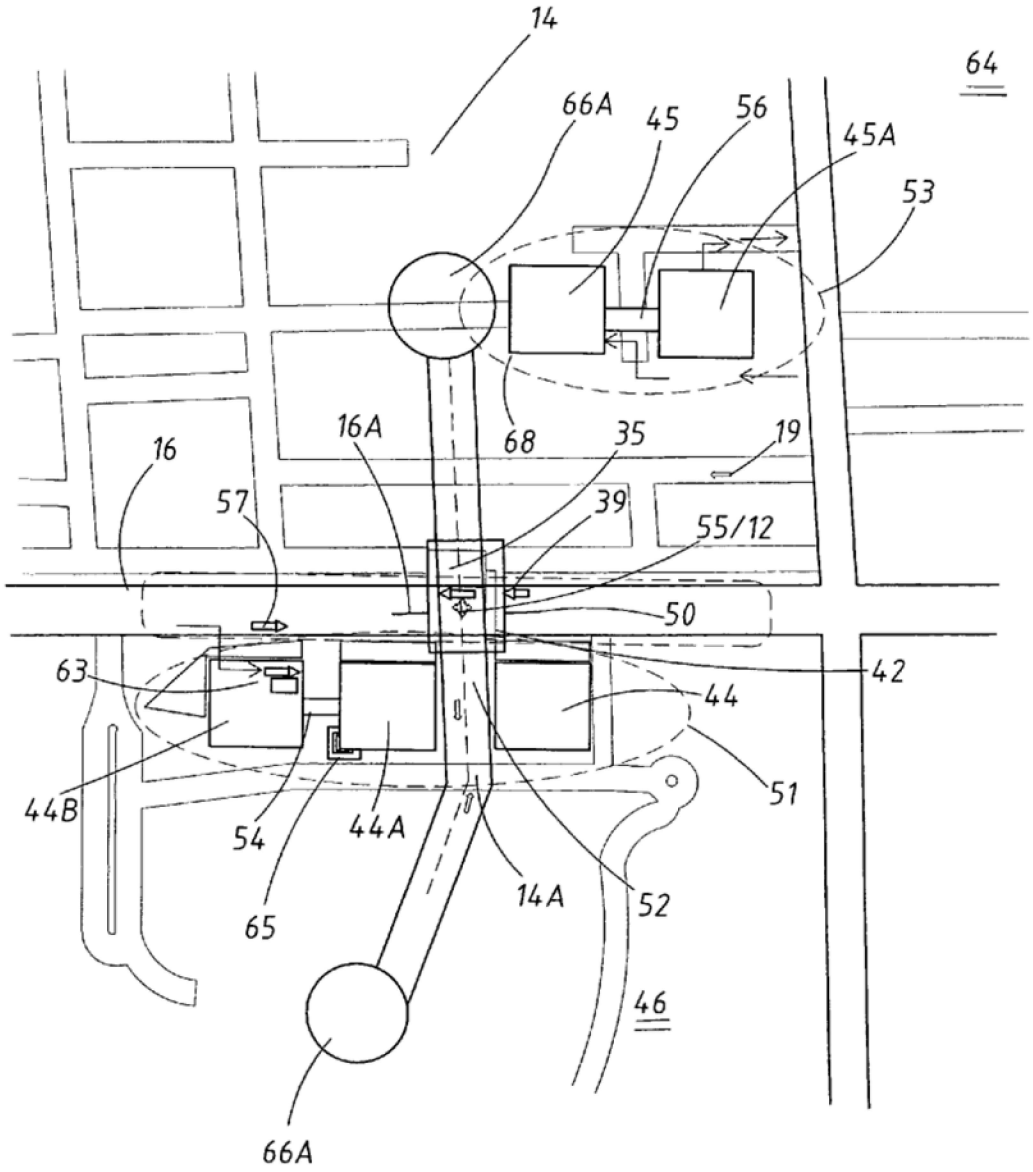
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Fig. 4

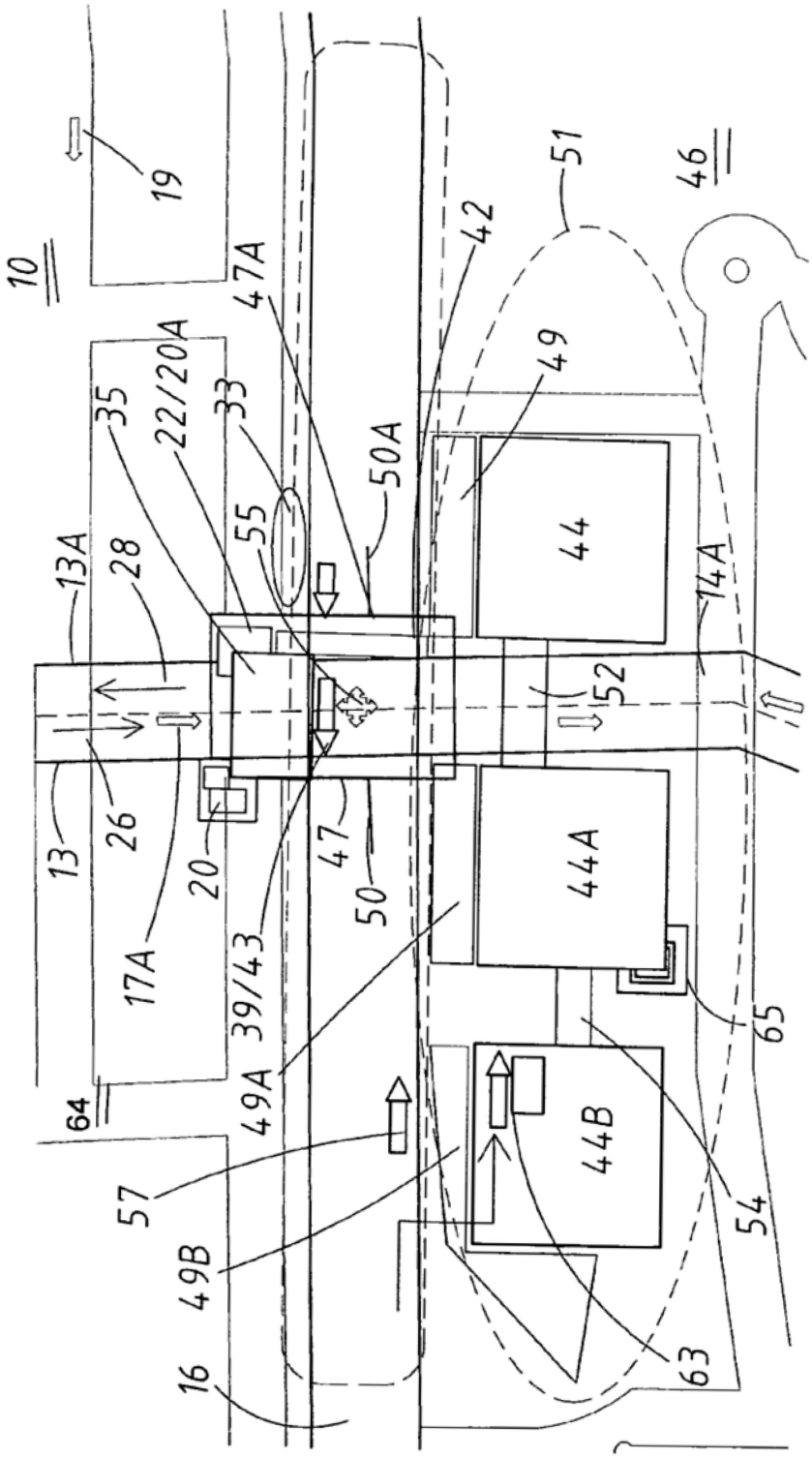
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Fig. 5

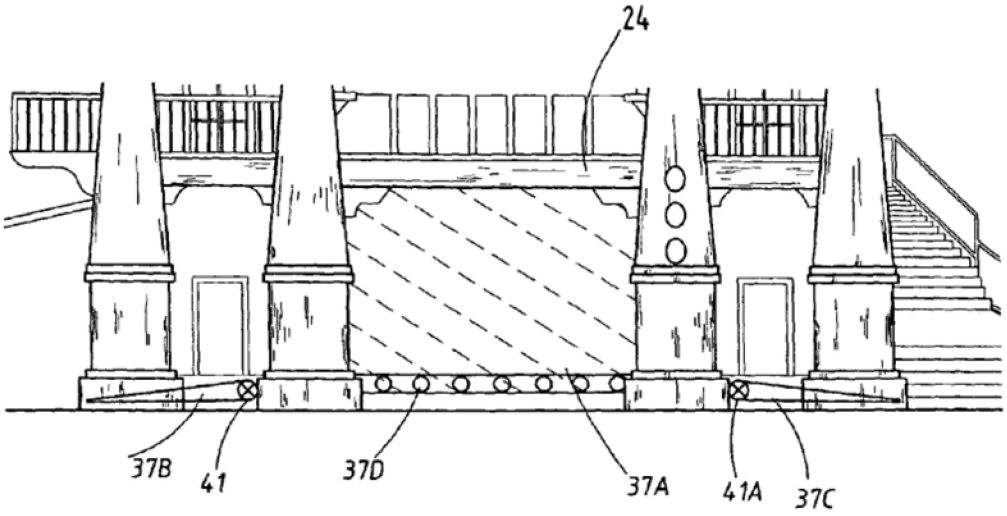

Fig. 6

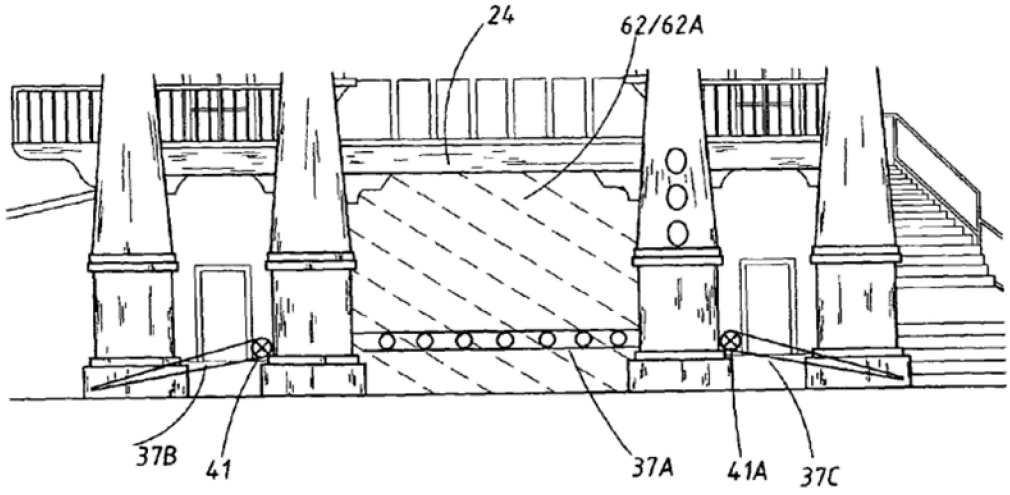

Fig. 7

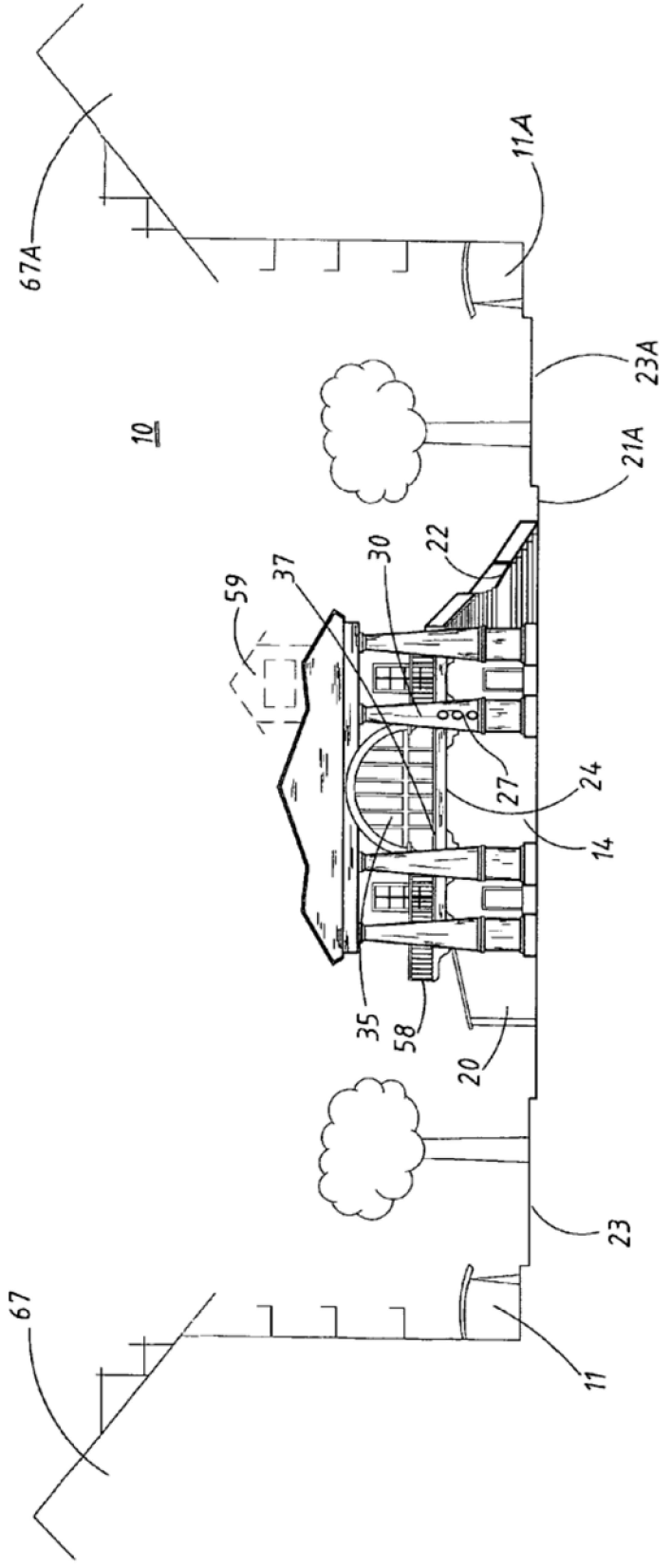

Fig. 8

CROSS STREET TRANSIT AND MULTIMODAL MULTI-LEVEL STATION AND PEDESTRIAN-ORIENTED INTERCHANGE

BACKGROUND OF THE INVENTION

People are attracted to a local street (hereinafter referenced as a local traffic artery) that possess but two narrowed lanes of slow traffic, wide sidewalks, shade trees, landscape and hardscape improvements, and multi-story mixed-use and community destination buildings, with frequent storefront retail uses, arcades, awnings, and building entry areas that line the street to shelter and support large-scale pedestrian movements by responding to their needs. Such a pedestrian-oriented street will exhibit various landscape and hardscape improvements including decorative lighting, benches, seating areas, fountains, public art and similar improvements that are useful, comfortable and safe from a pedestrian's point of view so as to establish what is referred to as and "outdoor living room" urban environment. In this document, "pedestrian-oriented" is a term used to describe any structure or service that is useful, comfortable, and safe for pedestrians as well as responsive to their specific needs.

When combined with other roadway improvements to slow vehicular traffic speeds and elevate the height of surfaces where people will be walking and sitting within the "outdoor living room", a community can be transformed from one that is dominated by congested automotive traffic and disbursed short pedestrian movements into one that exhibits fewer and shorter automotive trips, longer and more frequent regional, metropolitan and local transit trips, and longer more frequent pedestrian and bicycle trips focused into a community centric multimodal access environment and the identified mixed-use and community destinations contained therein. The nature and character of these pedestrian-oriented streets in the context of transit oriented development is well-known, but not often achieved due to complexities involved in establishing and maintaining so many environmental conditions within a system of interconnected pedestrian-oriented and transit-oriented improvements. In this document, 'transit-oriented development' means a community that provides superior access to multiple and frequently available transit vehicles used by pedestrians, bicyclists and motorists resident within or visiting the community to complete local, metropolitan and regional trips.

Pedestrian-oriented and transit-oriented development are discussed frequently in prior art (e.g., most recently at Ewing, Reid and Keith Bartholomew, *Pedestrian-and Transit-Oriented Design*. Washington, D.C.: Urban Land Institute and American Planning Association, 2013).

It is well understood from prior art and the comparison of pedestrian behaviors in different urban and suburban environments that large-scale pedestrian movements within a local traffic artery and community environment (i.e., where thousands or hundreds of thousands of people walking throughout the day) occur when pedestrian-oriented streets are built to protect pedestrians from the wind, rain, heat and cold and are more useful, safe, and comfortable than streets not so arranged. Further, when the activities of the pedestrian-oriented streets are interesting and fun larger numbers of pedestrians gather and stay longer.

Such pedestrian-oriented streets can improve the pedestrian travel connections between local destinations, increase the length and frequency of pedestrian trip segments, and provide improved access to comfortable, frequent, safe, and clean multimodal transportation that provides an easy connection to and from a multitude of useful and necessary

destinations within the local communities, the region, and beyond. See Community Intermodal Transit System (U.S. Pat. No. 7,886,910); and, Ergonomic Hybrid Transit Access Corridor Particularly for Town and Urban Centers (U.S. Pat. No. 6,561,727 B1).

To create a safe and high-quality pedestrian-oriented local traffic artery and community environments for pedestrians and bicyclists, vehicular traffic must be marginalized and when it is present, it must be reduced to operating speeds or 20 miles per hour or less. The laws of physics and human biological frailties indicate that when pedestrian and bicyclists come into direct physical contact with car and truck vehicles where the vehicular speeds are greater than 20 miles per hours, the consequences are often deadly for the pedestrian and bicyclists. When car and truck speeds increase to 35 miles per hour and higher speeds, such contact is almost always deadly to the pedestrian and bicyclist.

Local traffic artery and community environments deadly or adverse to pedestrians and bicyclists due to higher vehicular speeds cannot be safe, attractive, and high quality environments regardless of any other pedestrian-oriented improvements that are made since even the threat of deadly consequence will discourage most pedestrians and bicyclists from trying to use the street or experiencing the attributes the community has to offer. Creating a separation between faster vehicular movements and slower pedestrian and bicyclist movements at the intersection of pedestrian-oriented two lane and two directional local traffic artery (hereinafter referred to as a "local traffic artery" or where the context requires, "local traffic arteries", a "pedestrian-oriented local traffic artery" or "pedestrian-oriented local traffic arteries") and a much larger four lanes or more higher speed regional or metropolitan highway (hereinafter referred to as a "primary traffic artery") and collocating multimodal and multi-level transit opportunities at that intersection (hereinafter referred to as a "traffic artery intersection") can be very useful whenever communities seek to: reduce pedestrian and bicyclist traffic fatalities; reduce private passenger vehicle miles traveled and traffic congestion; increase average region trip speeds; increase frequency and length of pedestrian trips; and, increase multimodal transportation within the community and outward to the metropolitan area and region.

If is further observed that highway departments in many jurisdictions will approve at the intersection of a primary traffic artery and a local traffic artery at-grade safety crossing improvements, in addition to traffic artery intersection traffic stop lights, that include reducing traffic lanes to 11 feet in width and automotive operating speeds to less than 35 miles per hour. Highway engineers generally provide for 12 feet or more of traffic lane widths consistent with car and truck safe operating speeds of 35 miles per hour or higher speeds, but will accept somewhat more narrow traffic lanes at an intersection and for some distance before the intersection where pedestrian and bicyclists frequently cross the primary traffic artery lanes.

This is consistent with situations when and where a vehicle needs to slow its speed to 20 miles per hour or less in order to: stop at the traffic light controlled intersection (i.e., stopping at the red light); negotiate a turn at the intersection from the primary traffic artery to another roadway; or, avoid pedestrian and bicyclist fatalities at the traffic intersection where large numbers of pedestrians frequently cross the intersection at-grade (i.e., at a street level elevation).

For the same reason, despite the fact that most local traffic arteries are 12 foot or wider, local governments will approve 10 feet or less traffic lane widths for local traffic arteries where: pedestrians and bicyclists are frequently traveling

along with local car and truck traffic; higher vehicular speeds are not encouraged or allowed for safety reasons; and, the community's residents, business owners, and visitors want vehicles to stop at the mixed-use and community destination buildings found along the local traffic artery. This is the first of several roadway improvements that help to reduce vehicular speeds to 20 miles per hour or less and establish a local traffic artery.

It is also well recognized that safe vehicular speeds in the presence of pedestrian children have been established at 20 mile per hour or less. In school traffic zones across America, slower traffic speeds are required to create a safe walking environment for school children.

It is therefore the intent of this invention to extend this practice to residential communities, a local traffic artery that spans between them, a primary traffic artery that separates them, and the traffic artery intersection as between the local traffic artery and primary traffic artery in order to teach how multiple safe crossing improvements established at varying elevations adjacent to where the traffic artery intersection can serve the purpose of aggregating pedestrians, bicyclists, and other residents of and visitors to the residential community on one side of the primary traffic artery with the pedestrian, bicyclists, and other residents of and visitors to any adjacent community located immediately on the other side of the primary traffic artery within a compact multi-level area proximate to multimodal access opportunities so that intermodal transfers frequently occur. For purposes of this document, the safe crossing improvements to be discussed include pedestrian-oriented shared-use bridges or tunnels, frequent passage through the traffic artery intersection via community transit vehicle, and substantially all of enumerated at-grade safe crossing improvements: the narrowing of traffic lanes; making more rough the surface of those lanes of traffic; roadway stripping to clearly demark pedestrian and bicycle crossing areas; larger medians with shade trees or other vertical structures; rising the roadway surface to the sidewalk height elevation at midblock, intersections, and crosswalk areas within that raised roadway surface; pedestrian controlled traffic control lights; limited areas within the traffic artery intersection for tight turning radii; enhanced illumination during the nighttime; and, other at-grade safe street crossing improvements that tend to slow traffic. Further, by providing for varying elevations, vehicular traffic can be more completely separated from pedestrian and bicycle traffic, and where vehicular traffic must cross with and the movements of pedestrians and bicyclists, and the community possessing such varied roadway and walking areas vehicular characteristics.

The purpose of such a cross street transit and multimodal multi-level station and pedestrian-oriented interchange, referred to hereinafter as a "cross street station and interchange", is to create, over long time periods, multi-level structural and operational improvements that facilitate a safe crossing at the traffic artery intersection and also improve large-scale access and more frequent use of regional mass transit, metropolitan transit, local community transit services by making it easy for all residents of and visitors to the communities on both sides of the primary traffic artery to become pedestrians, bicyclists, or users of local community transit services before crossing the traffic artery intersection. The reference to multi-level structural and operational improvements "over a long time period" means that with minor alterations that can be quickly installed, the pedestrian-oriented and transit improvements will remain operational notwithstanding frequent inundation arising from expected climate change impacts during the next 100 years.

In this context, the invention can be viewed as a means to direct a defused local population within two adjacent communities to concentrate their pedestrian, bicycle, and slow moving local community transit services movements that enter or leave the communities between them to a single location where safe and large-scale passage through the primary traffic artery is assured and welcomed experience (i.e., useful, safe, and comfortable, in an area substantially protected from the wind, rain, heat, and cold) for many thousands of travelers each day. This phenomenon will be referenced as the "hourglass effect" or similar "hourglass" allusions. The passage through the primary traffic artery separating these two communities remains obscured and blocked elsewhere through the substantially pedestrian hostile environment of the primary traffic artery that exists as an obstacle to safe and frequent pedestrian and bicyclist crossings along the length of the primary traffic artery other than at the improved traffic artery intersection. This "hourglass effect" works best with public events that are interesting and fun (i.e., entertaining) and occurring within the local traffic artery, plaza, and public realm areas around the multimodal access improvements.

What is not yet understood by those skilled in the various areas of expertise (e.g., experts in the subject areas of pedestrian and bicyclists traffic safety, urban design, transit oriented development, traditional plaza architecture and functionality, mixed-mode streets, sustainable/livable community development, adaptation to the impacts of climate change, and related subject areas) is how to assemble of all known compatible traffic safety and intermodal transit station improvements into one system of systems, where all pedestrian-oriented structural and operational components are proximate to multimodal access areas including a variable bi-level passenger boarding and disembarking platform for regional mass transit vehicles. Such a regional mass transit platform can adjust to a location and height immediately proximate to the floor of various regional mass transit vehicles scheduled to stop at that platform equipped station location where virtually all of the cross street station and interchange improvements can lie within the publically available right-or-way and airspace above the local traffic artery proximate to the traffic artery intersection with the primary traffic artery and to a lesser degree within the right-of-way and airspace of the traffic artery intersection of these two traffic arteries.

Throughout this document the terms pedestrian, pedestrian-oriented, and walking include people traveling in wheelchairs and similar devices for the transportation disadvantaged and children when moving at speeds approximately equal to walking speeds of 3 to 4 miles per hour and all features described herein comply with applicable Americans with Disability Act (ADA) standards as enforced within the United States of America. In addition, as used herein:

1) "regional" means an urbanized area consisting of several adjoining counties or metropolitan jurisdictions where at least several millions of people live, learn, work and play within discrete metropolitan areas, cities or the many local communities where for many socioeconomic reasons the resident population frequently travels between discrete locations within the region;
2) "metropolitan area" means an urbanized area consisting counties or similar jurisdictional areas comprising of several or more cities and multiple local communities;
3) "local" means an area encompassing an urban or suburban city with multiple communities, a single community, or a grouping of related communities;
4) "regional mass transit" or "regional mass transit vehicle" means passenger train, fixed-guideway transit,

and express bus providing passenger transport to destinations within the region with approximately 2 miles distance or more between most stops and using limited access highway corridors or dedicated rail, guideway or highway corridors;

5) "metropolitan mass transit" or "metropolitan mass transit vehicle" means bus and other transit services where the vehicle that stops frequently (e.g., every 2 mile or less) at destinations throughout the county or metropolitan area using state and county highways that have traffic control lights at traffic artery intersections every few blocks or dedicated rail, guideway or highway corridors;

6) "community transit vehicle" means smaller buses, bus shuttle vehicles, passenger vans, small rubber tire trolleys, golf cart-type shuttle vehicles, narrow gauge trail trams (see FIGS. **8**A, **8**B, and **8**C from the Ergonomic Hybrid Transit Access Corridor Particularly for Town and Urban Centers, U.S. Pat. No. 6,561,727 B1) and similar vehicles that provide for a local community transit services with specific reference to the crossing the primary traffic artery along the alignment of the local traffic artery and passing through the cross street station and interchange;

7) "paratransit vehicle" means various automotive vehicles usually consisting of cars, trucks, and vans that are equipped for transport of the transportation disadvantaged throughout a county of metropolitan area;

8) "community-based paratransit vehicle" means a paratransit vehicle that is used locally to transport the transportation disadvantaged to a local destination where necessary services are provided to the transportation disadvantaged or to a multimodal station so that the trip can be completed via metropolitan mass transit or regional mass transit and, when needed, another community-based paratransit trip segment in order to complete such trips for the travel disadvantaged anywhere in the metropolitan area or region and that can provide for a local community transit services when not needed to be used as paratransit vehicles; and,

9) "local community transit services" means local passenger transport services provided by community transit vehicles and community-based paratransit vehicles or both.

Pedestrian-oriented streets work best to aggregate large numbers of pedestrians (i.e., thousands per day) when limited to: no more than two vehicular traffic lanes that are 10 feet wide or less; vehicular traffic speeds are limited to 20 miles per hour or less; sidewalks on either side of the traffic lanes are 10 feet wide or more; and, the terminal destinations on the local traffic artery are outward approximately one-half mile from a regional mass transit station or stop that provides access to local community, metropolitan, and regional mass transit.

Such local traffic artery aggregate larger numbers of pedestrians when substantially continuous mixed-use and community destination buildings are present at a height of four or more stories with frequent doorways, courtyards, entryways, optically transparent or open windows, balconies, exterior stairways, arcades, awnings, and similar façade or entry features and they are located outward from and adjacent to the sidewalks that are themselves outward and adjacent to the local traffic artery.

Further, pedestrians are attracted to plazas that have similar pedestrian-oriented improvements and that due to the additional public space found there are useful for frequent community events and attractions occurring therein. For purposes of this document, a plaza and the public space it defines:

1) A sidewalk-like walking surface wider than a pedestrian-oriented local traffic artery that presents an attractive surface pattern and texture suited for comfortable walking and that allows for gathering of all the socioeconomic population segments of the adjacent communities in a built environment that is useful, safe, and comfortable and circumscribed by mixed-use buildings typically built to a height of approximately six or more stories including buildings of great significant to the communities such as the city hall, a market, places of worship, library, educational facilities, theaters, museums, and restaurants with the understanding that plazas work best to gather the community population when the activities and events therein are also interesting and fun

2) Shade trees in parts of but not in all of the plaza areas

3) Landscaping and various streetscape improvements such as decorative lighting, benches, seating areas, fountains, public art and similar improvements that are useful and attractive from a pedestrian point of view

4) Very restricted or no vehicular traffic

5) Structural protections from the wind, rain, heat, and cold, but mostly in an open-air environment

Specifically, plazas as addressed herein have sidewalk areas at least twice as wide and frequently wider when compared to the local traffic artery or other streets leading to the plaza and they have more limited vehicular traffic than local traffic arteries and therefore such plazas have greater pedestrian-orientation than the local traffic artery. Compared to a local traffic artery, the plaza: has less vehicular traffic and more sidewalk area that is useful, safe and comfortable; is to a similar degree protected from the wind, rain, heat, and cold; allows for the a more safe and comfortable gathering of all segments of the community; and offers a venue for events that are more interesting and fun.

Plazas and the socioeconomic function they serve can be best witnessed in communities outside of America. See Lennard, Henry and Suzanne H. Crowhurst Lennard, Genius of the European Square. Carmel, C A: Gondolier Press and International Making Cities Livable Council, 2007. Also see Lennard, Henry and Suzanne H. Crowhurst Lennard, *The Forgotten Child: Cities for the Well-Being of Children*. Carmel, C A: Gondolier Press and International Making Cities Livable Council, 2007.

Vehicular movements at a plaza can be limited by one or more of several means: vehicular speeds can be reduced to approximately 10 miles per hour or less; private passenger cars and trucks can be prohibited all together or during times of the day and early evening when pedestrian, bicycle, and local community transit vehicles are most active; large commercial trucks can be prohibited; and, vehicular traffic can be limited to only a small subset of the area defined by the plaza improvements. Even with these vehicular limitations, community transit vehicle and community-based paratransit vehicle are allowed to be routed through the plaza and to pick up and discharge passengers at the plaza.

Bicycle movements occur in the local traffic artery traffic lanes (frequently drafting in behind community transit vehicle and community-based paratransit vehicle or within the sidewalks areas when the pedestrian crowds are reduced or when the bicyclist is quiet young and moving at pedestrian speeds. More frequently, the bicyclist walks the bike through the pedestrian crowd. See Zacharias, John, "The Amsterdam Experiment in Mixing Pedestrians, Trams and Bicycles", *ITE Journal* (1999). Bicycle lanes can be established and shared with faster moving pedestrian traffic at a higher elevation than adjacent the adjacent traffic lane used by motorized vehicles (i.e., approximately four to eight miles per hour).

Where a sidewalk has an initial sidewalk segment with a lower elevation relative to the local traffic artery and a second sidewalk segment higher than the first sidewalk segment along the local traffic artery, bicycle traffic at speeds less than 10 miles per hour can share this initial sidewalk segment with pedestrians walking at faster speeds and who intermittently give right-or-way to bicyclists.

When one plaza is attached at one or both termini of such a local traffic artery, large-scale pedestrian movements would occur on a daily basis (i.e., thousands of people walking) as the population of and visitors to the two communities are drawn from one event or attraction to the other event or attraction in the plazas along the local traffic artery. This works best if at least one plaza was located at least ½ mile outward from the primary traffic artery and a multimodal transit station and stops locate at the traffic artery intersection. In such case, events at a plaza adjacent to, for example, a city hall would attract people to it for all kinds of civic functions or a plaza adjacent to, for example, events at a university library would attract people to numerous educational and cultural events.

A well-known American example of this kind of phenomena between significant destinations is the large-scale pedestrian movements that occur daily at Inter Harbor in Baltimore, Md. along the improved waterfront (constituting a pedestrian street) between The National Aquarium and the Maryland Science Center. These two nationally recognized destinations are places of significant interest drawing pedestrians from one destination to the other and to the smaller venues in between. A similar phenomenon can be witnessed at any American shopping mall as shoppers walk between large nationally recognized retail businesses that anchor two or usually more "ends" of the mall and to or past smaller stores in between the anchor shopping destinations. A unique aspect of this invention would be that such large-scale pedestrian movements can be generated in an outdoor environment and without large proprietary destinations; plazas, local traffic artery, mixed-mode buildings, and locally significant destinations are sufficient for the intended purpose of facilitating the large-scale movement of pedestrians and other pedestrian-oriented movements between destinations and to local, metropolitan and regional mass transit.

As events occur at one plaza or another people are first drawn from the respective communities to their respective community plaza and the local traffic artery before walking, using their bicycles, or taking local community transit services to the multimodal transit station or stops adjacent the primary traffic artery in an hourglass effect that focuses all pedestrians, bicyclists and residents of and visitors to the respective communities to the improved and safe traffic artery intersection. By this means, the local traffic artery acts as a beam or rigid rod and the multimodal multi-level transit access areas at the safe crossing area functions as a fulcrum to establish for a simple community-to-transit-to adjacent community leveraging machine. As the input force of activities at one plaza and the local traffic artery is applied within the substantially residential community, an output force occurs within the other community when populations are draw to such activities across the primary traffic artery. As events occur at one plaza or the other, the effect of the multimodal and multi-level transit access improvements combined with the at-grade safe traffic artery intersection improvements, local community transit services, and the pedestrian-oriented shared-use bridge is that of an inclined plane over the primary traffic artery obstacle.

A primary traffic artery is a four or more lane highway for regional or metropolitan travel where the traffic speed authorized at 35 miles per hour or more and traffic lane widths are 12 feet or more wide. Adjacent to primary traffic arteries there are limited or no sidewalk areas for pedestrians and sidewalks that are provided are often 5 to 8 feet wide. Primary traffic artery street crossings may have traffic lights to control car and truck movements at the intersections with other regional, metropolitan area, and local traffic arteries, but short time periods are allocated for pedestrian or bicycle movement to cross the traffic arteries. Lighting is sized and positioned for primarily for traffic visibility.

Few shade trees exist along a primary traffic artery, although landscaping attractive to the motorist is often in view. Virtually every resident uses the primary traffic artery. Few pedestrians make daily use of the primary traffic artery (e.g., tens or upwards to a hundred people a day). Bicyclists will more frequently make daily use of a primary traffic artery if a bike lane is provided. Pedestrian and bicyclist traffic fatalities along primary traffic arterials can be quite common. In America for the last decade: pedestrian traffic fatalities have numbered 4000 to 5000 persons per year; and, bicyclist traffic fatalities have numbered in the hundreds per year.

This routine of killing of pedestrians and bicyclists phenomena on America's streets arises from the system of transportation improvements that result in "stop and go" traffic and the immediate juxtaposition of fast moving traffic in private passenger vehicles that are legally considered "dangerous instrumentalities" and slower moving and significantly more fragile pedestrians and bicyclists. What is needed is a means of transport that separates the fast vehicular movements from slower pedestrian and bicycle movements and uses each to create a much safer and regionally faster and more efficient "fast and slow" method of transportation.

When two communities are bisected by a primary traffic artery, especially when one is a less affluent suburban community and the other is a more affluent university campus or commercialized community, such that no safe crossing exists for pedestrians or bicyclists and assuming transit services between the two communities is limited or non-existent, then limited crossing of the primary traffic artery will occur from one community to the next via private passenger vehicles and even less via pedestrian, bicycles or various transit vehicles.

Further, many other related adverse outcomes arise:

1) Each community tends to exist separate from the other
2) Socioeconomic benefits the communities might gain from joint activities are largely absent despite such benefits being widely understood
3) Regional mass transit is underutilized and ridership is diminished as additional stops at each community must be added to the transit routes and travel times increase with more frequent stops (since the pedestrian, bicycle and local transit trips between communities that would allow both communities access the regional mass transit in but one community or the other is virtually non-existent)
4) When facilities shared by both communities are established and activities of mutual interest to both communities occur, pedestrian traffic injuries and death increase at the intersection of any street that crosses the primary traffic artery

If a means existed for pedestrians, bicyclists and local transit customers on a local traffic artery that crosses a primary traffic artery to more safely and in more comfort cross the primary traffic artery and to access regional mass transit and metropolitan transit within limited spaces mostly afforded by the local traffic artery right-of-way and airspace adjacent the intersection with the primary traffic artery and to a lesser degree, within the right-of-way and airspace of the

intersection of these two arteries, then the two communities would become more integrated and able to reinforce functionally useful, financially rewarding and personally enjoyable social interactions with themselves and others. There would also be a measurable: increase in regional mass transit use, the trip travel times between the two communities and regional destination, and the frequency and length of pedestrian trip segments; reduction in private passenger miles traveled and traffic congestion associated with local, metropolitan, and regional car trips to and from the two communities; and, fewer traffic fatalities and injuries, but especially those afflicted upon pedestrians and bicyclists.

Assuming a one mile or more segment of a local two-lane street was improved to become a more pedestrian-oriented local traffic artery as described above or as taught by the Ergonomic Hybrid Transit Access Corridor Particularly for Town and Urban Centers (U.S. Pat. No. 6,561,727 B1) and a plaza was located at each end of such a local traffic artery segment that was bisected by the primary traffic artery (placing a plaza at both termini of such local traffic artery segment on opposite sides of the primary traffic artery), residents and community visitors could have an improved transportation opportunities as pedestrians and bicyclists if an improved method to cross the primary traffic artery could also be devised at the intersection of the primary traffic artery and the local traffic artery.

When community residents and visitors depart from their homes, businesses, work locations, and local destinations within their respective communities and arrived at their community plazas and local traffic artery (or in the reverse during the return trip when arriving back home or similar destination), they would need a useful, safe, and comfortable access to the other community plazas and better access to the full length of the local traffic artery though some kind of interchange; like a modern, safe and efficient limited access highway interchange for vehicular traffic, but structured specifically to provide a means for multimodal access as well as safe passage across the primary traffic artery for pedestrians and bicyclists. It would have many functions observed within the operations of the Grand Central Station in New York City, N.Y. or other large multimodal stations as they exist in the world, but with functional differences appropriate to the much more localized conditions as described herein. Such functionalities would increase if the plazas and other public areas where venues for events that were interesting and fun.

If local community transit services frequently operated in both directions along the local traffic artery from one pedestrian-oriented plaza to another and a provision was made for a comfortable stop between plazas at such cross street station and interchange, pedestrians would be able to break the trip into a series of short walks and community transit trips. Alternating between walking and community transit vehicle could allow a pedestrian to be quickly reactive to weather and other changing conditions and undertake longer pedestrian trip segments intermixed with community transit vehicle trip segments. Similar intermittent walking and community transit vehicle rides could have the same benefit for bicyclists moving through the community at moderate speeds (i.e., 4 to 8 miles per hour).

Further, if the building heights, arcades, awnings and other building edge features could provide not only protection from the weather, but allow the pedestrian to change the weather by simply changing the location within the local traffic artery where the walking occurs (e.g., the use of microclimates to stay comfortable), then walking longer distances would be more common (i.e., a one-half mile or more walk to a community plaza, then another one-half mile or more walk along a local traffic artery to a cross street station and interchange faculties at the traffic artery intersection, and then either proceeding to the adjacent community along the continuation of the local traffic artery to a second plaza and beyond for another half-mile or more walk or accessing regional mass transit and metropolitan transit at stations or stops for destinations linked to such transit and after the mass transit trip segment ends, walking for another one-half mile more or less to the ending destination).

In all these situations, the willingness and ability to walk is expanded and willingness to take frequent and more rapid regional mass transit is increased. Community transit vehicles and metropolitan mass transit vehicles as well as the plazas and local traffic artery act as feeder systems to the regional mass transit station. As obstacles to walking and taking transit are removed, it is not surprising that people walk longer than typical distances in larger than typical numbers to access transit more frequently.

If structured parking was available in large supply (i.e., hundreds and collectively thousands of parking spots) near the plazas, the local traffic artery, and multimodal stations, then those residents from other communities, who travel by car to these communities as visitors, could be more inclined to park, walk and take transit for the remainder of their trip segments. Residents who have parked in the community parking garages will use their cars less once they vehicles are no longer immediately adjacent their residence. Pedestrian activity and use of adjacent transit opportunities will increase if liner buildings with arcades, awning and adjacent sidewalks with pedestrian-oriented landscaping, hardscape, and other features are developed around the parking areas similar to those associated with the local traffic artery. Such parking could consist of a Mixed-Use, Pedestrian-Oriented Parking Structure (U.S. Pat. No. 7,784,228 B2).

If the existing paratransit services for the transportation disadvantaged used the cross street station and interchange when transporting passengers, paratransit services could shorten its trips so as to be limited to the communities surrounding a cross street station and interchange. These community-based paratransit vehicle trips could be completed by allowing the transportation disadvantaged to use regional mass transit and then at the other mass transit stations and stops, use another cross street station and interchange, local traffic artery, plaza, and local community transit services located in different communities across the region to complete such trips. The returning trips could follow the same trip segments in reverse or involve the use of the existing larger paratransit vehicle being used throughout the metropolitan area for return paratransit trips throughout their useful life. Such community-based paratransit vehicle would not have to be as large as traditional paratransit vehicles for shorter community paratransit trips needing to put fewer passengers into the vehicle per short trip. Paratransit could thereby expand to serve regional destination without expanding the capacities of traditional paratransit services.

If such a cross street station and interchange situated in a low elevation coastal community was to remain operational after climate change conditions has caused sea level impacts to become obvious and debilitating due to frequent inundation, it would need its upper level to be at a significant height (i.e., at least 20 feet above the current street level of the traffic artery intersection) and the cross street station and interchange would need to be planned and constructed such that it remained operational even if the elevation of the adjoining traffic arteries and other properties within the adjacent com-