P. ZIRON.

RAILWAY SYSTEM.

APPLICATION FILED AUG. 29, 1910.

975,103.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

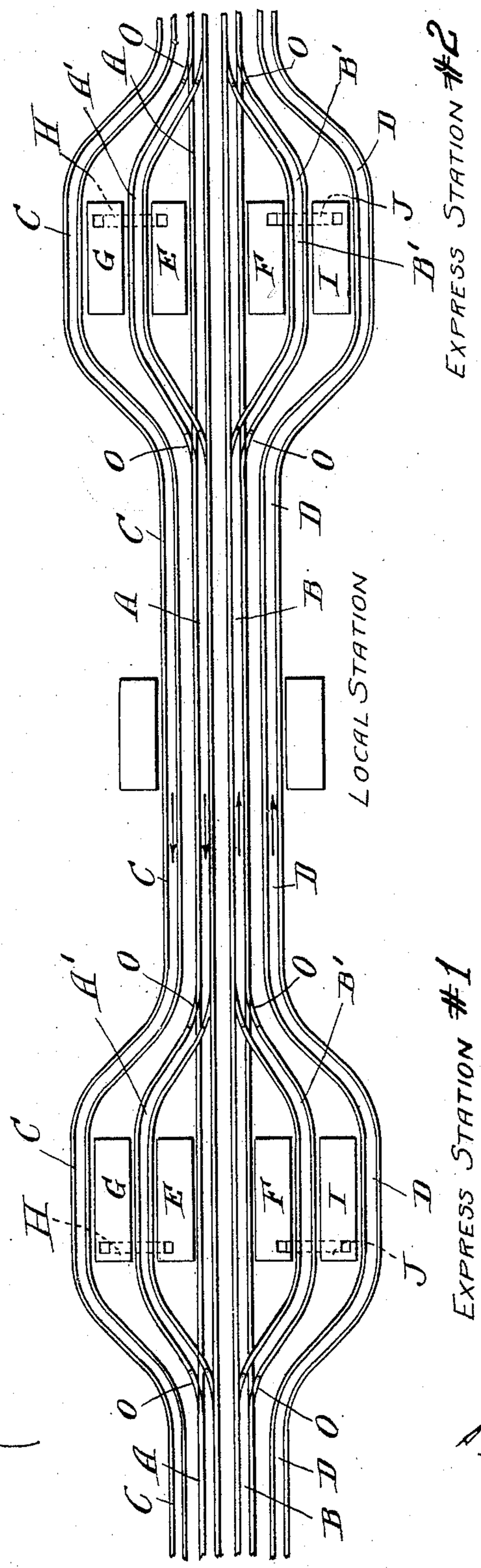

Fig. 1.

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2 SHEETS—SHEET 2.

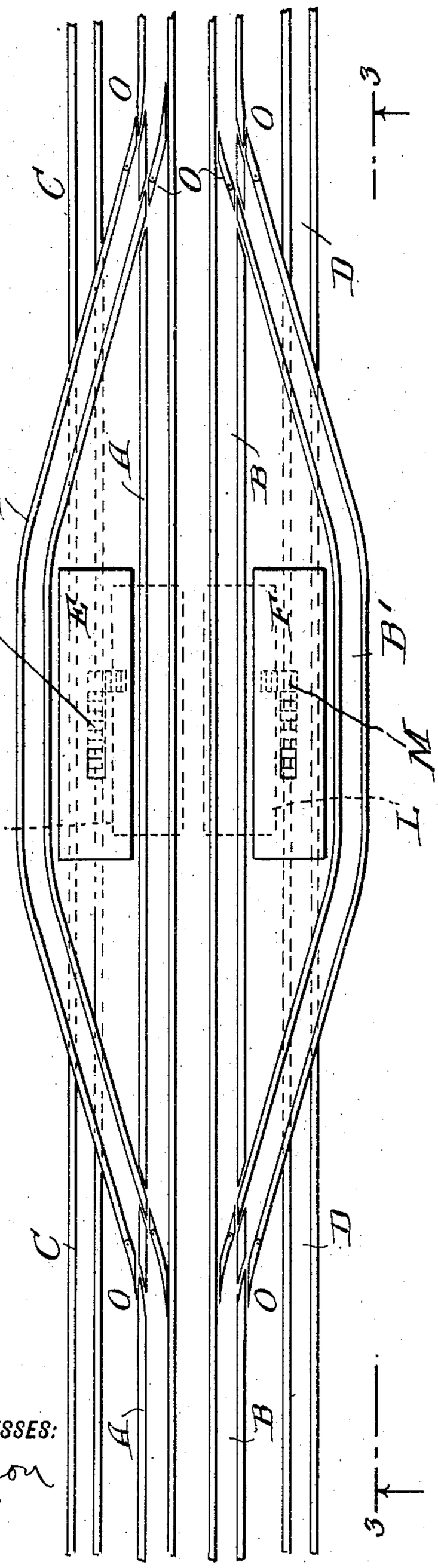

Fig. 2.

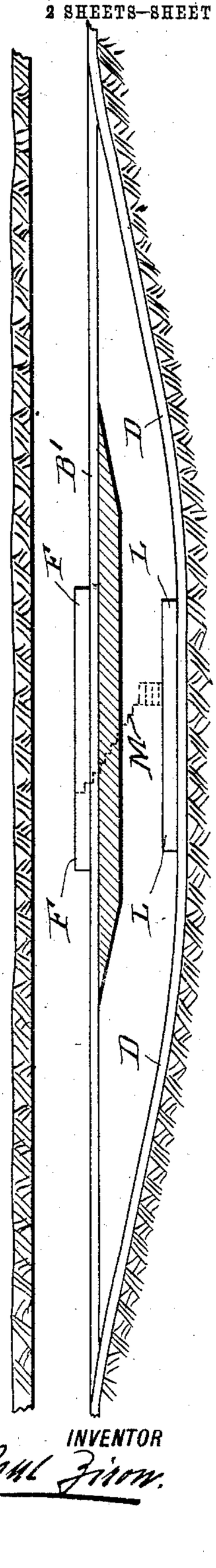

Fig. 3.

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UNITED STATES PATENT OFFICE.

PAUL ZIRON, OF NEW YORK, N. Y.

RAILWAY SYSTEM.

975,103. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed August 29, 1910. Serial No. 579,592.

To all whom it may concern:

Be it known that I, PAUL ZIRON, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Railway Systems, of which the following is a specification.

The present invention relates to a novel method of operation and construction of railway systems, special reference being had to those systems exclusively employed for the carrying of passengers, such for instance as the subway systems now in use in large and populous cities. Systems already in use are adaptable to the present invention; and to this end require alterations of construction which are relatively insignificant and inexpensive.

The principal object of the invention is to so construct and operate the system that it may have a passenger carrying capacity far in excess of that of any system now in use; and secondly, so that the speed of operation of the trains may largely exceed that prevailing in the present systems; all without increasing the number of tracks or introducing any element of danger in operation.

The carrying capacity of the systems now in use, and the speed of operation of the trains in the same, have heretofore been absolutely determined by the time required for the unloading and loading of passengers at the stations. The minimum headway between trains has always been such as to allow for the stops of the previous train at its several stations. These stops have been of variable and undeterminable duration according to the number of passengers handled at the stations. The headway has always, however, been fixed by the longest probable stops. The result is that the trains have been much farther apart than safety would demand had it been possible to shorten the stops, or even to fix the duration thereof. In the system of the present invention, on the other hand, the headway of the trains is made largely independent of the duration of the train-stops; and these latter are definitely fixed. The advantages immediately resulting are manifold. In the first place the headway is reduced to an amount determined by the safe running distance of one train behind another without regard to stops. Many more trains may, therefore, be operated on the same track than has heretofore been possible. In the second place one train is not delayed by the stops of the previous train, and therefore the time of the run is greatly shortened. Finally, as will presently appear, the time of the departure of the trains from the stations may be accurately fixed, and the time of the entire run therefore be a predetermined constant, instead of, as heretofore, an uncertain matter.

To accomplish the above results, in the system of the present invention, the track is provided at each station with a shunt which connects with the main track at each end of the station. The station platform for the track, so divided, is preferably between the two divisions thereof so as to constitute a so-called "island" platform. The up and down tracks will both be divided at the stations in this manner. Where, however, the system has four tracks, the outside two being local and the inside two being express, as in the New York subway, it will ordinarily be sufficient to divide only the express tracks. In the event the width of the street or way permits, the shunts of the express tracks will occupy at the stations the places heretofore occupied by the local tracks, and the latter will be turned out, at the express stations, sufficiently to pass around the shunts of the express tracks. Where the street or way will not permit of four tracks and two shunts abreast at the express stations, the local tracks may be depressed at such stations so as to lie below the shunts of the express tracks. No change is necessary in the local tracks at the local stations. The system so constructed is operated as follows: An express train enters a station on the main track, and on coming to rest commences to discharge and receive passengers. It is followed at a safe running distance by another express. The switch to the shunt is so set that the latter train must enter the station on the shunt. It is immaterial whether the first train has or has not departed when the second train enters. The headway has been so reduced as to take no account of the possible presence of the first train at the station when the second arrives. It is fixed to permit the first train to unload and depart on fixed time, before the departure of the second train. It leaves exactly on time. Any passengers failing to get into the first train may cross the platform and take the second train. The latter may invariably be

entering the station as the first is departing, and the fixed time of stop of each train at each station will be the time of headway between trains. The third train will enter the station at the time when the second train, on the shunt, is departing; and the fourth will enter on the shunt, etc.

Other objects and features of the invention will appear upon reference to the accompanying drawings in which:

Figure 1 represents a section of the railway the local tracks being shown at the express stations on the same level with the express tracks. Fig. 2 represents a section of the railway where the local tracks are depressed at the express station to pass under the shunts of the express tracks. Fig. 3 is a view in elevation of the track section shown in Fig. 2.

The up-town and down-town express tracks are represented by A and B respectively. The up-town and down-town local tracks are represented by C and D respectively, and in Fig. 1 are on the same level with the express tracks. The shunt to the up-town express track is represented by A′ and the shunt to the down-town express track by B′. Between tracks A and A′ at each express station is the up-town express platform E, and between the tracks B and B′ at each express station is the down-town express platform F. The local up-town platform G lies between the tracks A′ and C in Fig. 1, and may be connected with platform E by a viaduct H. Similarly the down-town local platform I lies between tracks B′ and D and may be connected to platform F by viaduct J. Viaducts H and J may be connected to each other, and each to the platform E and F if desired.

In Fig. 2 the local tracks are depressed, beginning at a point between the express station and the local station immediately to one side thereof, and ending at a point between the express station and the first local station to the other side thereof. The distance between the express station and the local stations immediately beyond the same is ample to permit of a gradual depression of the local tracks. The local up and down-town platforms K and L respectively, lie beneath the express platforms, E and F respectively, and are each connected to the latter by a stairway M.

Assuming that a minute is the maximum time required for the loading and unloading of the passengers of the express train at each station, then this length of time may be established as the headway or interval between express trains. One minute is an ample headway because a long train, particularly if driven by electric motors, can in as short a time as forty seconds after starting, place two signal blocks between it and the station from which it started. As heretofore stated, it is of no consequence that train #2 may overtake train #1 while the latter is resting at the next station, because the two trains do not enter the next station on the same track. Let us now assume that train #1 is traveling at a headway of one minute with respect to train #2, and enters express station #1 on track A at exactly twelve o'clock. It is supposed to start from station #1 at one minute after twelve. On a signal given ten or fifteen seconds before starting time the guards will close the train doors, and on a second signal given at exactly one minute after twelve, train #1 will start from express station #1 toward express station #2. Train #2 which is one minute behind train #1 will at the same time roll into station #1 on track A′ and begin the discharge of its passengers. Any passengers who failed to get into train #1 can cross the platform and enter train #2. The delay they may have suffered is so slight as to be of no consequence. At two minutes after twelve train #2 leaves station #1, and the running headway between that train and train #1 therefore continues to be one minute. Train #3 enters station #1 on track A as train #2 is leaving on track A′. In this manner the order of running and the headway between trains is maintained throughout the system. The necessity for a headway sufficient to allow for the stop of the preceding train is absolutely obviated.

Of course, suitable switches must be provided at the junction points O of the shunts with the main tracks. The operation of these switches may be automatic after the passage of a train, or may be manual. In any event the expense of operating such switches will be trivial as compared with the enormous increase of capacity and efficiency of the system. The switch O introduces no element of danger; it has always been employed for a similar purpose in all terminal stations.

The local tracks may, if desired, be divided and operated in the same way. There will ordinarily, however, be no necessity for such treatment of the local service. This service is generally satisfactory, as now operated, even in the most crowded systems. The local passengers travel only short distances either to their destination or to the nearest express station, so that the local trains are mere feeders or distributers for the express trains. They are seldom overcrowded, and at most the passenger is inconvenienced but for a short time. At the local stations, therefore, the arrangement of tracks and platforms is shown as in the systems heretofore in use.

Since the stop of one express train is not added *in toto* to the safe running headway between that train and the next, the stops

may be longer than in the systems as heretofore operated. The time allowed for the stops may be such that even if a train is late in arriving at a station, it may nevertheless depart exactly on time. If it should arrive so late as not to permit, before the time of departure, of the loading of all awaiting passengers, these latter may, as above stated, take the following train without suffering appreciable inconvenience.

The system has an incidental and important advantage over systems heretofore in use, in that, in event of a breakdown or accident to a train, there is always a nearby shunt which may be used as a siding onto which the crippled train may be pushed, whereupon the system may be operated in the manner of the systems heretofore in use, until the necessary repairs are made. Heretofore where such breakdowns occur, the entire system, or one track thereof, is generally tied up, until the repairs are completed.

It is understood that the use of the word "shunt" to denominate one of the branches or divisions of the express track, and the reference to the other branch as the "main track at the station", is for convenience of description. The two branches may each be out of alinement with that portion of the track beyond the station: and obviously the local tracks, if depressed, need not lie directly beneath either division of the express track.

Other modifications may be made in the structure shown, all within the scope of the invention.

What I claim is:

1. A method of operating a railway having a main track, provided at each of several stations with a shunt or branch track, which latter is of sufficient length to accommodate a train and is connected, beyond the station, at each end, to the main track; the method consisting in operating trains in the same direction on the track between stations, guiding every other train onto the shunt at the stations so that the trains alternately enter the stations on the main track and on the shunt, and despatching the trains from each station in the order of the arrival of the trains at the station.

2. A railway having express stations at intervals along the line of the road, and local stations between the same, an up-town express track and a down-town express track, an up-town local track and a down-town local track, a shunt or branch for each express track at each express station, said shunts being of sufficient length to accommodate a train and being connected each to its respective express track at each side of the station, and the local tracks being depressed at the express stations to permit the local trains to pass the branched or divided express tracks.

3. A railway system comprising four tracks; local stations at intervals on the outer tracks; express stations at greater intervals on the inner tracks; each inner track, beyond one end of each of the stations thereon, being divided into a number of branches which pass the station in parallel, and which beyond the other end of the station converge again to the track from which they originally diverged, each of the divisions of each inner track being of a length sufficient to accommodate a train; and the outside or local tracks being diverted at the stations of the inner tracks to pass the divisions of the latter tracks.

4. A railway system comprising four tracks; local stations at intervals on the outer tracks; express stations at greater intervals on the inner tracks; each inner track, beyond one end of each of the stations thereon, being divided into a number of branches which pass the station in parallel, one on each side of the station platform, and which beyond the other end of the station converge again to the track from which they originally diverged, each of the divisions of each inner track being of a length sufficient to accommodate a train; and the outside or local tracks being diverted at the stations of the inner tracks to pass the divisions of the latter tracks.

5. A method of operating a railway having a main track, provided at each of several stations with a shunt or branch track, which latter is of sufficient length to accommodate a train and is connected, beyond the station, at each end, to the main track; the method consisting in operating trains in the same direction on the track between stations, guiding every other train onto the shunt at the stations so that the trains alternately enter the stations on the main track and on the shunt, and despatching the trains from each station in the order of the arrival of the trains at the station, and at fixed intervals which maintain the same running headway between the trains on the main track, from each of the several stations to the stations next beyond.

Signed at the city of New York in the county of New York and State of New York this 26th day of August A. D. 1910.

PAUL ZIRON.

Witnesses:
WM. L. MORRIS,
RALPH O. L. FAY.