Nov. 8, 1927. 1,648,629

E. S. TAYLOR ET AL

TRAFFIC REGULATION SYSTEM

Filed Aug. 13, 1925 6 Sheets-Sheet 1

Fig. 1.

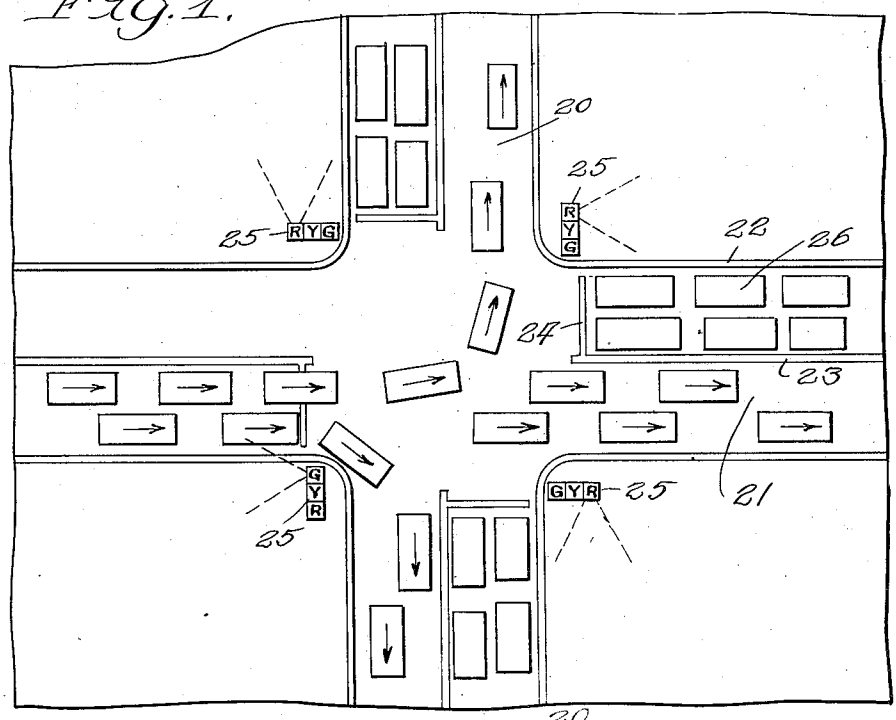
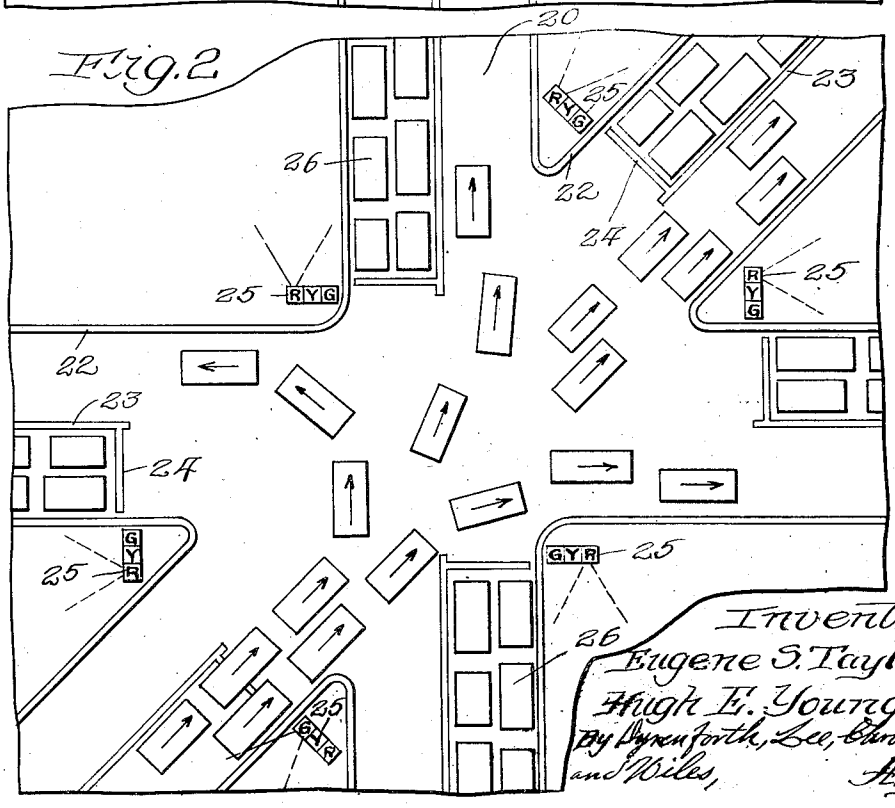


Fig. 2.



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Fig. 3.

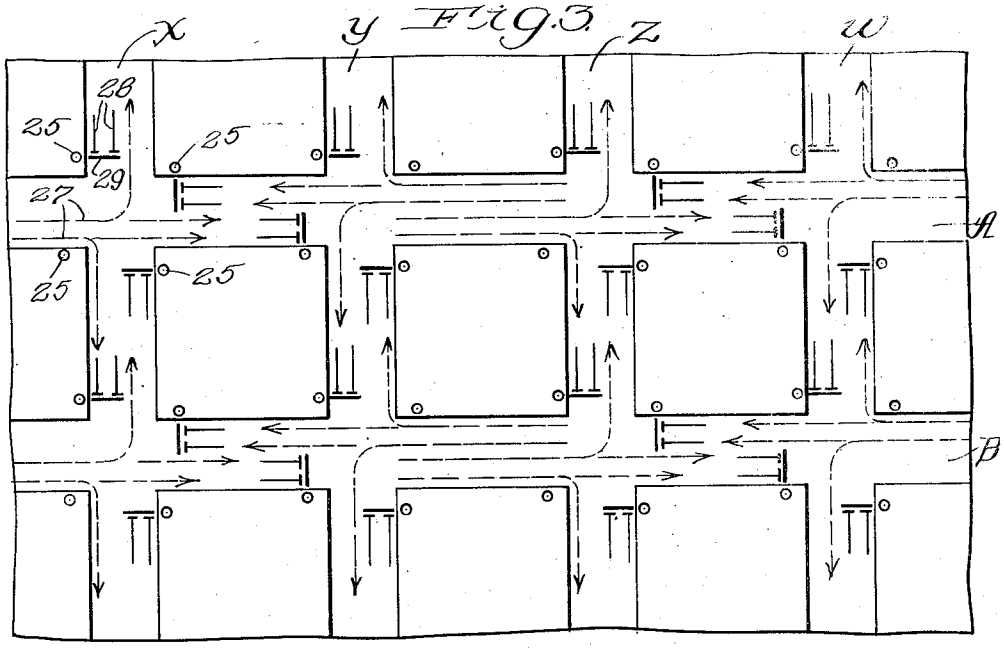
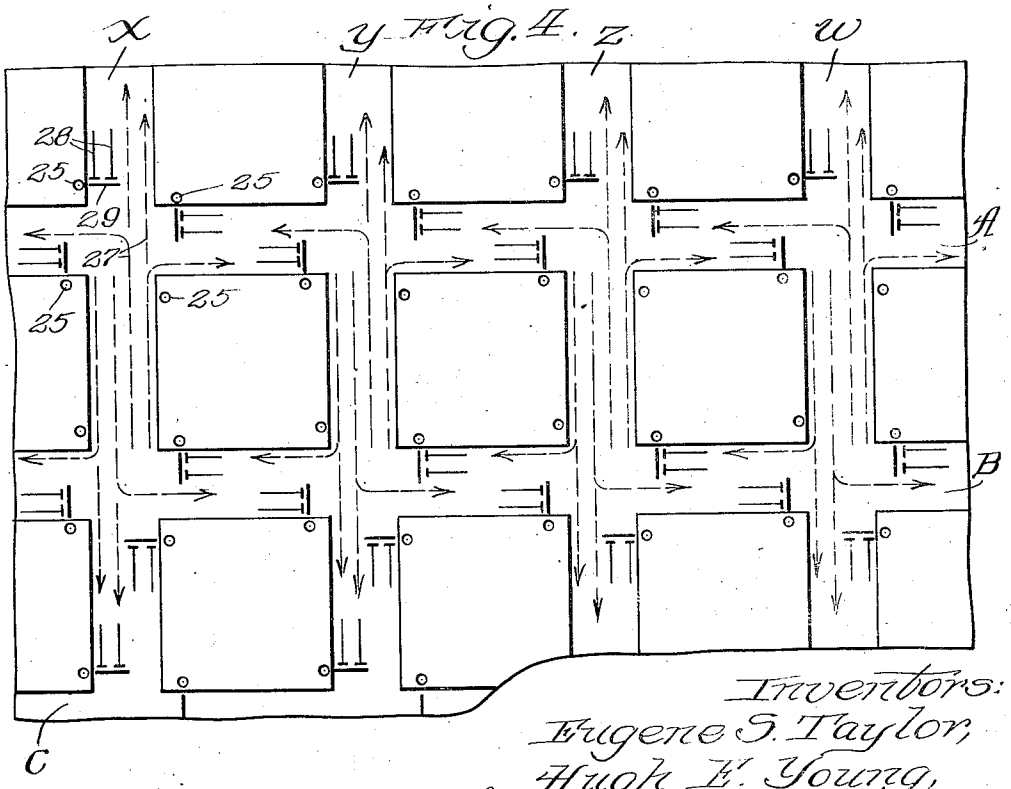


Fig. 4.



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E. S. TAYLOR ET AL

TRAFFIC REGULATION SYSTEM

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Fig. 5.

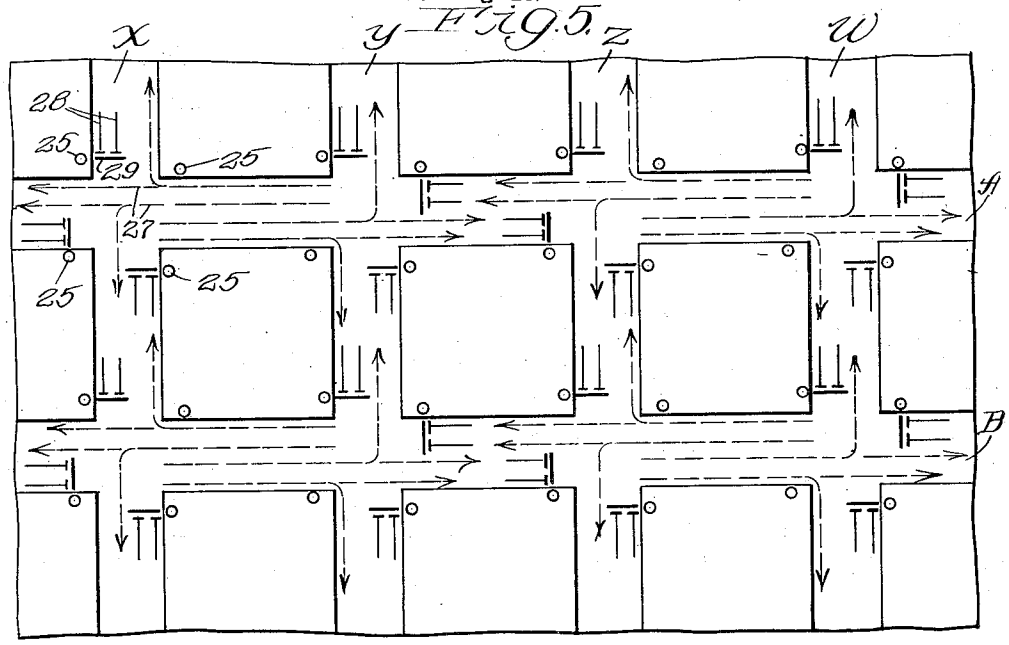
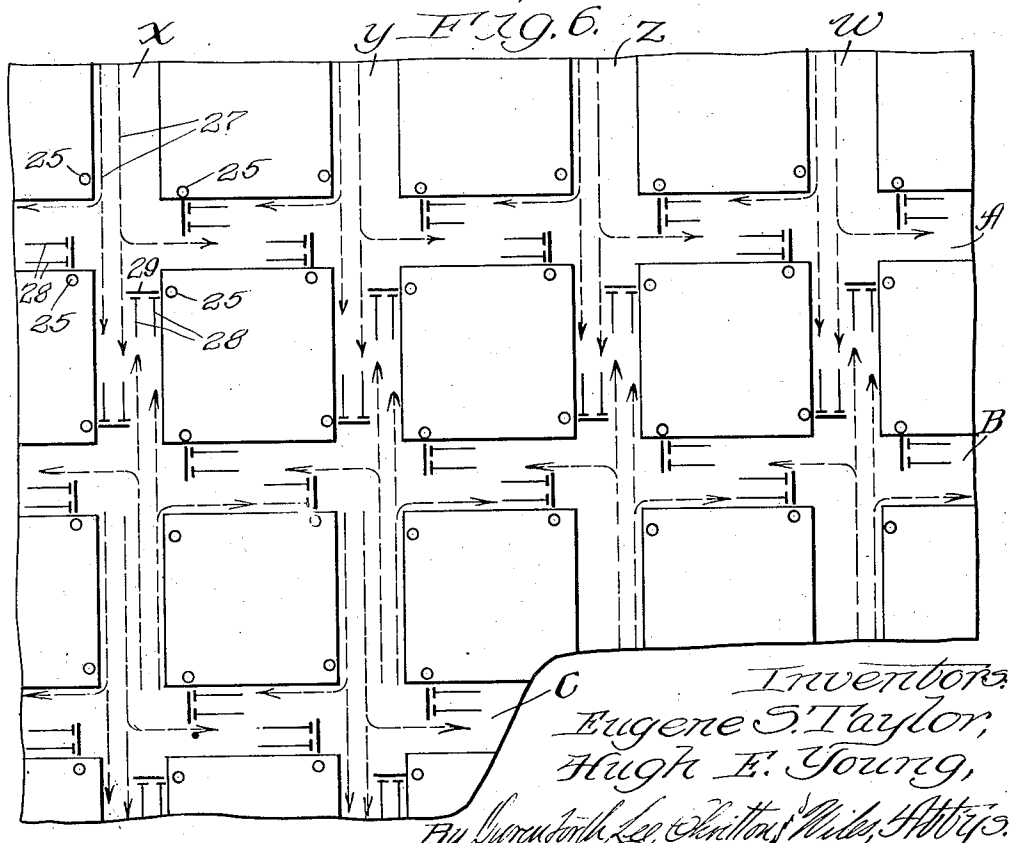


Fig. 6.



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E. S. TAYLOR ET AL

TRAFFIC REGULATION SYSTEM

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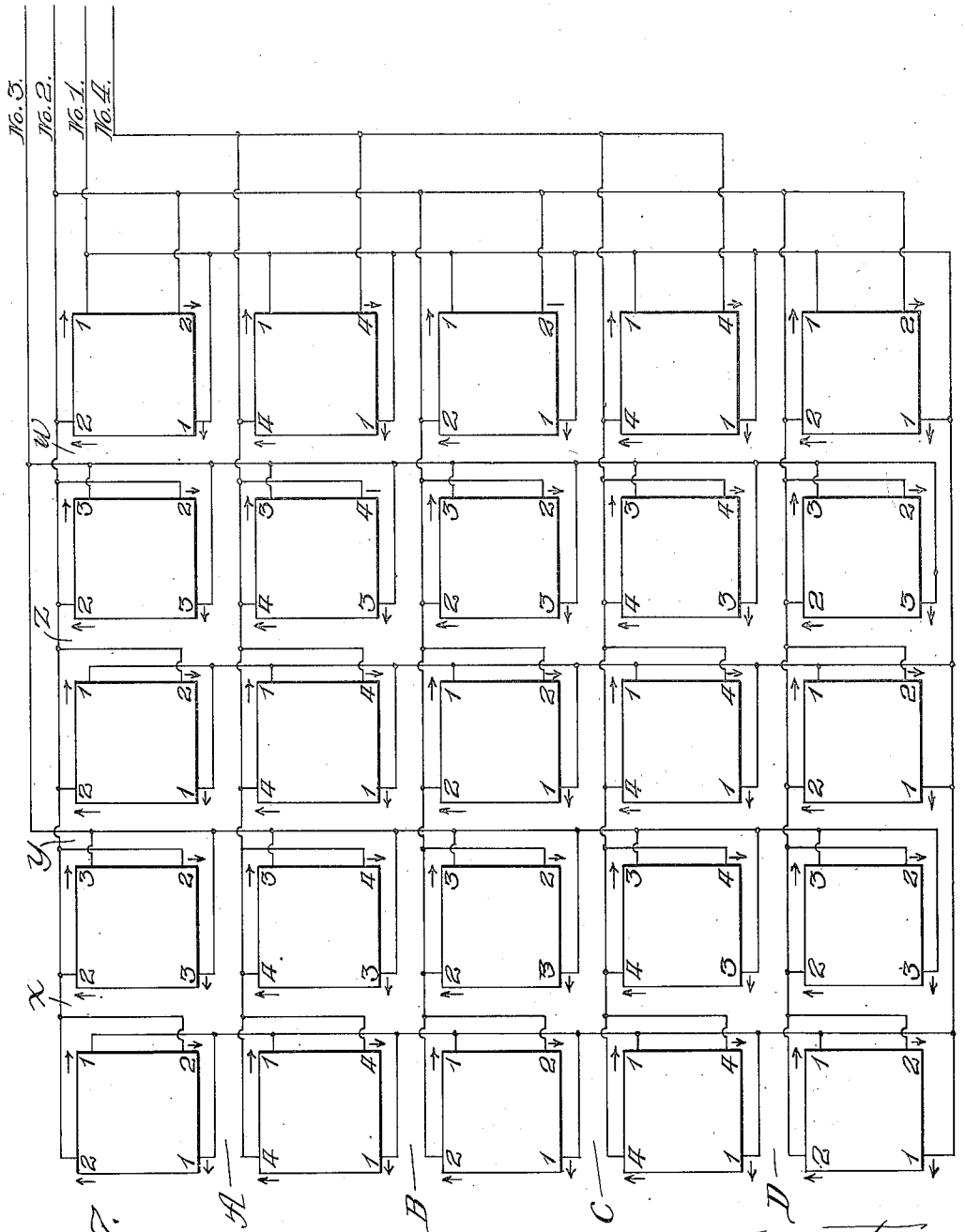


Fig. 7.

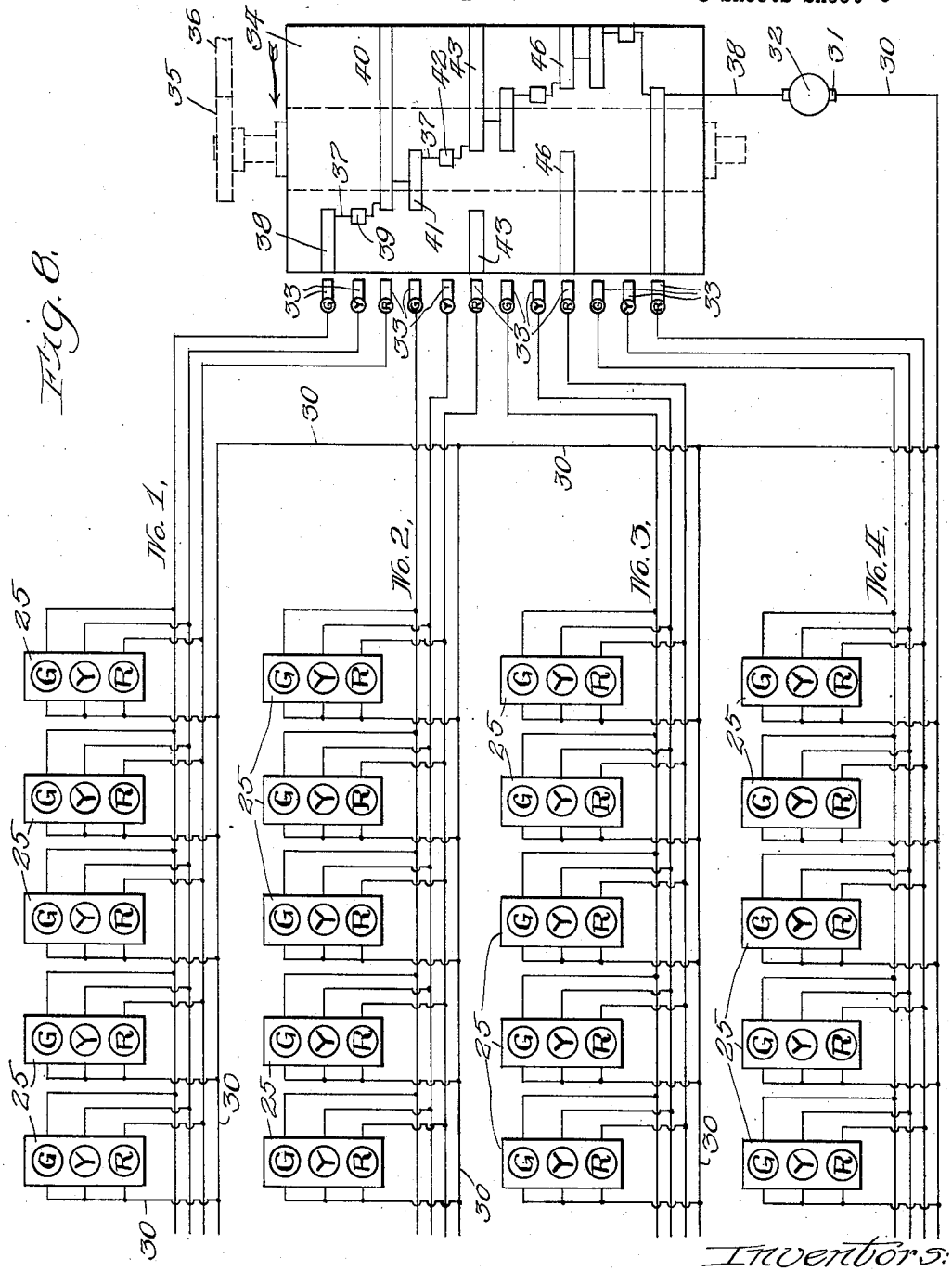
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Nov. 8, 1927. 1,648,629

E. S. TAYLOR ET AL

TRAFFIC REGULATION SYSTEM

Filed Aug. 13, 1925 6 Sheets-Sheet 5



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Nov. 8, 1927. 1,648,629

E. S. TAYLOR ET AL

TRAFFIC REGULATION SYSTEM

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Fig. 9.

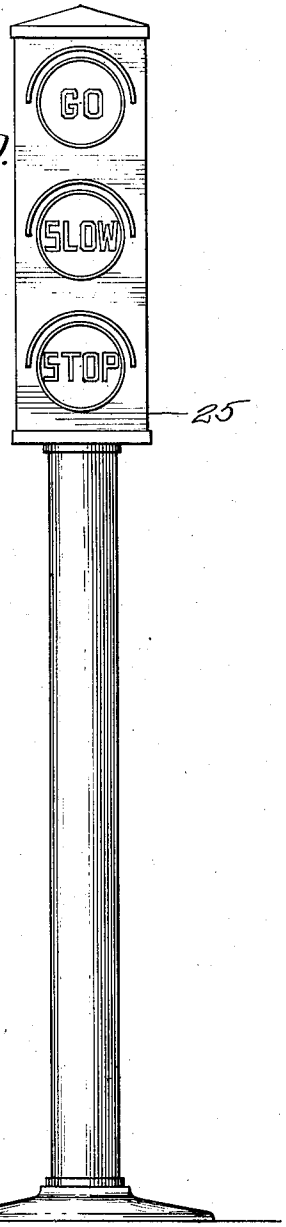
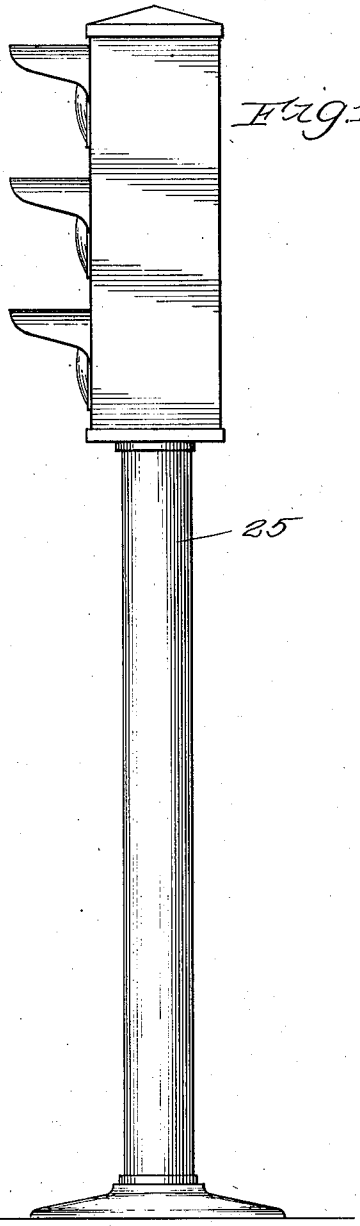


Fig. 10.



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Patented Nov. 8, 1927. 1,648,629

UNITED STATES PATENT OFFICE.

EUGENE S. TAYLOR AND HUGH E. YOUNG, OF CHICAGO, ILLINOIS.

TRAFFIC-REGULATION SYSTEM.

Application filed August 13, 1925. Serial No. 49,987.

This invention relates to improvements in traffic regulation systems, and more especially to such a system adapted for regulating vehicular traffic, such as automobiles, street cars, wagons and the like at and between street intersections.

One of the features of our invention is the provision of signaling means at an intersection of streets whereby traffic approaching such intersection from one direction only is permitted to move; the traffic approaching such intersection from all other directions being signalled to stop. Another feature is that the traffic permitted to move into such intersection is allowed to proceed in a straight forward direction and also permitted, if desired, to turn either to the right or the left.

Another feature of our invention is the provision of means at the intersection whereby traffic is permitted to enter such intersection from one direction only (right and left-hand turns and straight ahead being permitted) for a certain interval of time; then from another direction only for a certain interval of time; and so on during a complete cycle for traffic approaching such intersection from every direction.

Another feature of our invention is the provision of means for permitting traffic moving in one direction to enter alternate intersections on a certain street; permitting the traffic on the same street moving in the opposite direction also to enter the alternate intersections on said street; said intersections into which traffic is permitted to enter from opposite directions being staggered with respect to each other.

Another feature of our invention is the provision of means for alternating the signals back and forth between the alternate street intersections. For example, at one intersection there may be permitted to move first east traffic only and later west traffic only; north and south-bound traffic being permitted to move into said intersection at periods in between, first north and then south.

Another feature of our invention is the provision of means for synchronizing the operation of a number or series of traffic signals in alternate blocks upon parallel streets within the certain district of travel, as will be explained more in detail hereinafter.

It will be clear that our invention can be carried out with a variety of different forms of apparatus and signaling devices. For example, the traffic at one intersection can be regulated by a single signaling apparatus placed in the center of said intersection, or with four or more of said signals, placed at the right hand side of the oncoming traffic at each corner of intersection. For the purpose of illustration, in this application, we have shown four separate signals at each intersection, but it is to be understood that we are not to be limited herein by such showing.

Although we have shown herein one particular kind of signal or signaling device adapted to be used for carrying out our invention, and a certain means of operation thereof, it is to be understood that we do not intend to be limited thereby, as it is obvious that any kind of suitable signals can be employed and any method of operation used. For example, there may be independent operating units such as clock-work mechanism and the like in connection with each signal or group of signals at an intersection, or electrical or other apparatus that will change the signals automatically, which might be so timed as to produce the result of simultaneous operation at alternate intersections, and the like, as disclosed herein.

In order to facilitate a description of our invention, we have referred to the cardinal point of the compass, and to the directions northeast, southwest, and the like, in order to indicate directions of travel. It is to be understood, however, that the use of such terms is in no manner a limitation of our invention; such terms being used merely in order to indicate different directions of travel, or locations of streets, in order to bring out the relation of one to the other.

Other features and advantages of our invention will appear more fully as we proceed with our specification.

In the accompanying drawings, Figure 1 indicates the movement of traffic, as regulated by our system, at intersection of two streets; Fig. 2 is a similar view showing an intersection of three streets; Fig. 3 is a diagrammatic view showing the movement of traffic at street intersections in a certain district during the first interval of time in a complete cycle of operation, including four intervals; Fig. 4 is a similar view showing the movement of traffic during the second interval; Fig. 5 is a similar view showing the movement of traffic during the third interval; Fig. 6 is a similar view showing the

movement of traffic during the fourth interval of said cycle; Fig. 7 is a wiring diagram showing the wiring connections to the signaling devices at a plurality of street intersections in a district; Fig. 8 is a wiring diagram showing the connections between the signaling devices and the timing commutator; Fig. 9 is a view in front elevation of a signal post, and Fig. 10 is a view of the same in side elevation.

In Fig. 1 there is shown a typical intersection of two streets at right angles, for example, the north and south street 20 and the east and west street 21. 22 indicates the curbs. 23 is a band or line marking the center of the street. This band or line forms no part of our present invention and may or may not be used, as desired. Such a band or line is frequently painted in the center of the street in order to more clearly mark off the two sides of the street. This band is shown in Figs. 1 and 2 for the purpose of convenience in order to more clearly indicate the two sides of the street. In fact, all of the views of the drawings, with the exception of Figs. 9 and 10 are largely diagrammatic. Likewise, there is shown in Figs. 1 and 2 a cross-bar 24 just in front of the street intersection for traffic approaching such intersection from each direction. This cross-bar may or may not be painted on the street as desired. It is shown in the drawings in order to more clearly indicate the point at which oncoming traffic is supposed to stop when not given the "Go ahead" signal.

25 indicates in general a signaling device such as shown in Figs. 9 and 10. In Figs. 1 and 2 such signaling devices are indicated diagrammatically, the letters "R", "Y" and "G" standing for "red", "yellow" and "green", respectively. By reference to Figs. 9 and 10 it will be seen that each of these signaling devices has three lenses or lamps containing the words "Go", "Slow" and "Stop". It is to be understood that the "Go" signal shows through a "green" light, the "Slow" through a "yellow" light and the "Stop" through a "red" light. In other words, in the diagrammatic views of Figs. 1 and 2, the illumination of the "R" indicates a "red" light with the word "Stop", likewise, the "G" indicates a "green" light with the word "Go", and the "Y" a "yellow" light with the word "Slow".

The showing of the "yellow" or "Slow" signal forms no necessary part of our invention. This is merely a warning signal to indicate to drivers that the signal is about to change from "green" to "red", in order to give them a chance to come to a stop. Obviously, without detracting from the spirit of our invention, such warning signal may be dispensed with and the signal changed abruptly from "Go" to "Stop", or an interval of time elapse between the two without any signal to give the drivers a chance to come to a stop. Throughout this description, therefore, there will not be much reference to this warning signal, it being understood that the same may be used or not, as desired.

In Figs. 1 and 2 the rectangles 26 diagrammatically indicate vehicles of any type as, for example, automobiles, street cars, wagons and the like. Where the arrows are used they indicate the direction of travel of the vehicle; it being understood that those vehicles without arrows desire to enter the street intersection but are stopped at the bar 24 by a "Stop" signal. At each intersection of two streets there is shown, for convenience, four separate signaling devices, one for oncoming traffic from each direction. Likewise, at an intersection of three streets as shown in Fig. 2 there are six such signaling devices. It is obvious, however, that, without detracting from the spirit of this invention, such signaling devices can be made fewer in number at each intersection, as long as the proper signals are given.

In general, our system contemplates the use of four separate time intervals during one complete cycle of operation. For example, the complete cycle may be 100 seconds consisting of four intervals of 25 seconds each. At a typical intersection of two streets as shown in Fig. 1, the traffic during the first interval (as shown in the figure) may be permitted to enter the street intersection in an easterly direction only, the north-bound, south-bound and west-bound traffic being halted at the bars 24 by means of "Stop" signals shown at the three signaling devices 25 as indicated by the diverging broken lines from the letter "R". The easterly moving traffic is permitted to go by the signal 25 showing the "green" light or "Go". It is to be particularly noted that the easterly bound traffic which is permitted to enter the intersection may move straight ahead easterly, turn to the right to go south or turn to the left to go north. Permitting of left-hand turns is one of the important features of our invention. The west-bound traffic being halted, such left-hand turns may be easily and freely made. Heretofore, in other systems, it has been customary to permit the movement of traffic in opposite directions at one time at one intersection. When this is done, however, it is difficult or impossible to make left-hand turns. Wherever such a turn is made, traffic approaching from the opposite direction must be halted. Slowing up of the vehicles intending to make the left-hand turn also blocks all oncoming vehicles behind it. With the use of our invention, such left-hand turns are easily and freely made without hindrance to any moving traffic.

It is believed that no detailed description

of Fig. 2 need be given, since the operation of the invention as disclosed therein is probably clear from the description given in regard to Fig. 1. In Fig. 2, however, there is also shown cutting through the intersection a northeast-southwest street. Two extra signaling devices 25 are provided for this street and the operation of this system at such intersection is the same in principle as that described above. Traffic is permitted to enter the intersection from one direction only and may go straight ahead or turn to the right or the left. At such an intersection, however, the cycle of operation will have to be divided into six intervals. In the drawing, the movement of traffic during one of such intervals is shown. During this interval it will be seen that traffic moving northeasterly only is permitted to enter the intersection. This traffic may follow straight ahead along the northeast street, may turn to the right to go easterly, may turn part way to the left to go north, or may turn further to the left to go west. In other words, the traffic may move straight ahead or turn off of such intersection into any street entering the same.

In Figs. 3 to 6 inclusive we have shown diagrammatically the intersections of north and south streets in a given district, the four views illustrating the four intervals during any one cycle of operation. These views show the coordination of the signals in such district. The broken lines 27 with the arrows indicate the moving traffic at the intersection during a given interval. The solid lines 28 indicate traffic approaching the intersection blocked at the line 29 during the interval by one of the signaling devices 25 here shown merely diagrammatic. It is to be understood that in all cases where the traffic is moving that the signaling device 25 is showing "Go" and in all cases where it is blocked at the bar 29, such signaling device is showing "Stop".

In Figs. 3 to 7 inclusive, for convenience, I have indicated the east and west streets by A, B, C, etc. The north and south streets are indicated respectively by X, Y, Z, W.

By reference to Fig. 3, it will be seen that during the first interval north and south-bound traffic on all streets in the district is stopped. East-bound traffic on all streets in the district, as A and B is permitted to move at alternate streets as X and Z, being stopped at alternate streets as Y and W. At the same time, west-bound traffic on these streets is stopped at alternate streets as X and Z being permitted to move at alternate streets as Y and W. It is to be noted that the alternate streets X, Z and Y, W, at which the east and west-bound traffic is respectively stopped and permitted to go, are staggered with respect to each other.

By reference to Fig. 4, it will be seen that during the second interval east and west-bound traffic on all streets in the district is stopped, north-bound traffic on all streets in the district being permitted to move at streets A and C and stopped at B, while south-bound traffic is stopped at A and C and permitted to move at B.

During the third interval as shown in Fig. 5, north and south-bound traffic on all streets in the district is again stopped, west-bound traffic on all streets in the district being permitted to move at X and Z and stopped at Y and W, while east-bound traffic is stopped at X and Z and permitted to move at Y and W.

As shown in Fig. 6 during the fourth interval, east and west-bound traffic on all streets in the district is stopped, north-bound traffic on all streets in the district being permitted to move at B and stopped at A and C, while south-bound traffic is stopped at B and permitted to move at A and C.

Figs. 7 and 8 show the wiring diagrams for the signaling apparatus. In Fig. 8 the posts are shown diagramatically, and it will be seen that each one has three lights therein. There is a single return wire 30 for each post, and three lead-in wires, one for each light. It will be seen therefore that four wires are used for the operation of each post. For convenience, the four wires leading to a post are assembled into a cable and these cables, for convenience, are referred to in the drawings as "No. 1", "No. 2", "No. 3" and "No. 4".

It is obvious that all the lights which show the same during one interval of time may be attached to the same cable. For convenience, in Fig. 7, the four signals at each intersection are numbered "1", "2", "3" and "4". In Fig. 7, the single line leading from each signal indicates a cable of four wires and it will be seen that these cables are all brought together and numbered "No. 1", "No. 2", "No. 3" and "No. 4". The respective signals are attached to the different cables so that all the signals showing the same during a certain interval of time are attached to the same cable. It will be seen that in carrying out the operation of the signals during the four intervals during one complete cycle of operation as shown in Figs. 3 to 6, inclusive, all the signals marked "1" in Fig. 7 will show the same during one interval, likewise those marked "2", "3" and "4". All those marked "1" are attached to cable "No. 1", those marked "2" are attached to cable "No. 2", etc. In Fig. 8 there is shown diagrammatically one method of operating signals. It is to be understood, however, that other methods may be used without detracting from the spirit of our invention. As shown in Fig. 8, the ground wire 30 from each cable is led to one terminal 31 of the generator 32. The remaining three wires of each cable are led to the contact brushes or shoes 33, 34

indicates diagrammatically a cylindrical commutator here shown as developed. That is, the cylindrical surface of the commutator as shown in the drawing is laid out flat, in order to give a better view of the same. Any suitable means such as the pinion wheels 35 and 36 may be used for rotating the drum or commutator 34. The drum 34 has wound about it copper strips all connected by means of the wires 37 to the wire 38 leading to the other terminal of the generator 32. The copper strip 38 is adapted to be brushed by the shoe 33 connected to the wire of cable "No. 1" leading to the "green" lights of the "1" signals. Likewise the strip 39 is brushed by the shoe or brush 33 connected to the wire of cable "No. 1" leading to the "yellow" lights of the "1" signals. Likewise the copper bar 40 will operate the "red" lights of the "1" signals. In the same manner, copper bars are provided for operating all the lights of all the signals. It will be seen that the strips are so arranged on the drum 34 that as it rotates in the direction indicated by the arrow during the first of four intervals of a complete cycle of operation, the "1" signals will show "green", during the second interval the "2" signals will show "green", during the third interval the "3" signals will be "green" and during the fourth interval the "4" signals will be "green". During the remaining intervals, except as just stated, they will all show "red". It is to be noted also that each signal will show "yellow" for a short space of time before changing from "green" to "red". It is to be understood, of course, that the view of the copper strips on the drum 34 is a development thereof. For example, the strip 43 operating the "red" lights on "No. 2" cable is shown in the drawing as being in two parts. It is, however, actually one piece, likewise, the strip 46 operating the "3" "reds."

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is our intention to claim all novelty inherent in our invention as broadly as possible in view of the prior art.

What we claim as new, and desire to secure by Letters Patent, is:

1. Signaling apparatus at a four-corner cross intersection of streets, said apparatus including means for giving signals to indicate "Go" or "Stop" to oncoming traffic; and means for operating said signalling apparatus to indicate alternately: "Go" to oncoming traffic from a single direction only, and at the same time "Stop" to oncoming traffic from all remaining directions; and then "Stop" to oncoming traffic from said single direction.

2. Signaling apparatus at a four-corner cross intersection of streets, said apparatus including means for giving signals to indicate "Go" or "Stop" to oncoming traffic; and means for operating said signaling apparatus in cycles of operation, each cycle including an interval of time for oncoming traffic from each direction, to indicate in sequence "Go" to oncoming traffic from one and a different direction only during each interval, and at the same time "Stop" to oncoming traffic from all remaining directions.

3. Signaling apparatus at the intersection of a north-south street and an east-west street, said signaling apparatus including means for giving signals to indicate "Go" or "Stop" to oncoming traffic; and means for operating said signaling apparatus in cycles of operation, each cycle including four intervals, to indicate first, "Go" to oncoming traffic from one direction only during the first interval, then "Go" to oncoming traffic from another direction only during the second interval, then "Go" to oncoming traffic from a third direction only during the third interval, and then "Go" to oncoming traffic from a fourth direction only during the fourth interval, said means operating said signaling apparatus to indicate "Stop" to all oncoming traffic during each interval except that from the one direction permitted to "Go."

4. Signaling apparatus at a four-corner cross intersection of streets, said apparatus including means for giving signals to indicate "Go" to oncoming traffic from one direction only and at the same time "Stop" to oncoming traffic from all the remaining directions; and means for operating said apparatus in cycles of operation, each cycle including an interval for oncoming traffic from each direction, to indicate in sequence "Go" to oncoming traffic from a different direction during each of said intervals.

5. In a district having intersecting north-south and east-west streets, signaling apparatus at each intersection including means for giving signals to indicate "Go" or "Stop" to oncoming traffic; and means for operating said signaling apparatus in cycles of operation, each cycle including at least three intervals, to indicate; during one interval, "Go" to eastbound traffic at alternate intersections, "Go" to westbound traffic at alternate intervening intersections, and "Stop" to all north and south-bound traffic; during another interval, "Go" to north and south-bound traffic, and "Stop" to all east and west-bound traffic; and during another interval, "Go" to east-bound traffic at alternate intersections reverse from those of the first named interval, "Go" to west-bound traffic at alternate intervening intersections,

and "Stop" to all north and south-bound traffic.

6. In a district having intersecting north-south and east-west streets; signaling apparatus at each intersection including means for giving signals to indicate "Go" to oncoming traffic from each direction, and "Stop" to oncoming traffic from the other three directions at the same time; and means for operating said signaling apparatus in cycles of operation, each cycle including four intervals, to indicate; during one interval "Go" to oncoming traffic from the east at alternate intersections on each east-west street, and "Go" to oncoming traffic from the west at alternate intervening intersections on each of such streets; during another interval, "Go" to oncoming traffic from the north at alternate intersections on each north-south street, and "Go" to oncoming traffic from the south at alternate intervening intersections on each of such streets; during another interval, "Go" to oncoming traffic from the east at alternate intersections on each east-west street, such intersections on each street being the reverse from those at which "Go" was indicated during the first mentioned interval and "Go" to oncoming traffic from the west at alternate intervening intersections on each of such streets; and during another interval "Go" to oncoming traffic from the north at alternate intersections on each north-south street, such intersections on each street being the reverse from those at which "Go" was indicated during the second mentioned interval, and "Go" to oncoming traffic from the south at alternate intervening intersections.

7. The method of controlling traffic at a four-corner cross intersection of streets which consists of first simultaneously signaling traffic to move from one direction only and to halt in all other directions, maintaining such signals for a predetermined interval of time, and thereafter changing such signals to restrain traffic from said first mentioned direction for a predetermined interval of time, and then repeating the operation.

8. The method of controlling traffic at an intersection of streets which consists of first simultaneously signaling traffic to move from one direction only and to halt in all other directions, maintaining such signals for a predetermined interval of time and thereafter successively changing such signals to permit traffic to move from another and different one of the remaining directions only and restraining traffic in all other directions at successive predetermined intervals of time until traffic has been permitted to move from all directions, and then repeating the operation.

9. The method of controlling traffic in a district having intersecting north-south and east-west streets in cycles of operation, each cycle including at least three intervals, comprising, indicating; during one interval, "Go" to east-bound traffic at alternate intersections, "Go" to west-bound traffic at alternate intervening intersections, and "Stop" to all north and south-bound traffic; during another interval, "Go" to north and south-bound traffic, and "Stop" to all east and west-bound traffic; and during another interval, "Go" to east-bound traffic at alternate intersections reverse from those of the first named interval, "Go" to west-bound traffic at alternate intervening intersections, and "Stop" to all north and south-bound traffic.

10. The method of controlling traffic in a district having intersecting north-south and east-west streets in cycles of operation, each cycle including four intervals, comprising; indicating during one interval "Go" to oncoming traffic from the east at alternate intersections on each east-west street, and "Go" to oncoming traffic from the west at alternate intervening intersections on each of said streets; indicating during another interval "Go" to oncoming traffic from the north at alternate intersections on each north-south street, and "Go" to oncoming traffic from the south at alternate intervening intersections on each of said streets; indicating during another interval "Go" to oncoming traffic from the east at alternate intersections on each east-west street, such intersections on each street being the reverse from those at which "Go" was indicated during the first-mentioned interval, and "Go" to oncoming traffic from the west at alternate intervening intersections on each of such streets; and indicating during another interval "Go" to oncoming traffic from the north at alternate intersections on each north-south street such intersections on each street being the reverse from those at which "Go" was indicated during the second-mentioned interval, and "Go" to oncoming traffic from the south at alternate intervening intersections; and at each intersection when indicating "Go" to oncoming traffic from any one direction at the same time indicating "Stop" to oncoming traffic from the other three directions at said intersection.

In testimony whereof we have hereto set our hands this 21st day of July, 1925.

HUGH E. YOUNG.
EUGENE S. TAYLOR.