Feb. 8, 1938. J. L. BRAUN ET AL 2,107,930

TRAFFIC SIGNAL

Filed Aug. 6, 1935 3 Sheets-Sheet 1

Fig. 1.

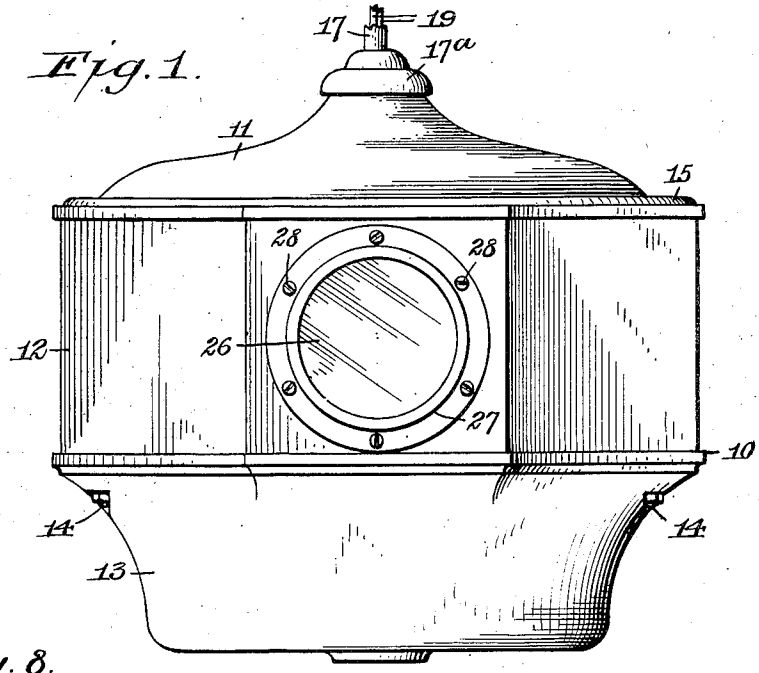


Fig. 8.

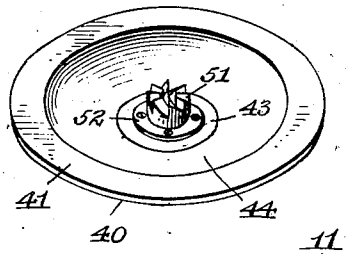


Fig. 9.

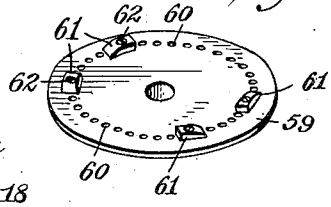


Fig. 2.

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Fig. 3.

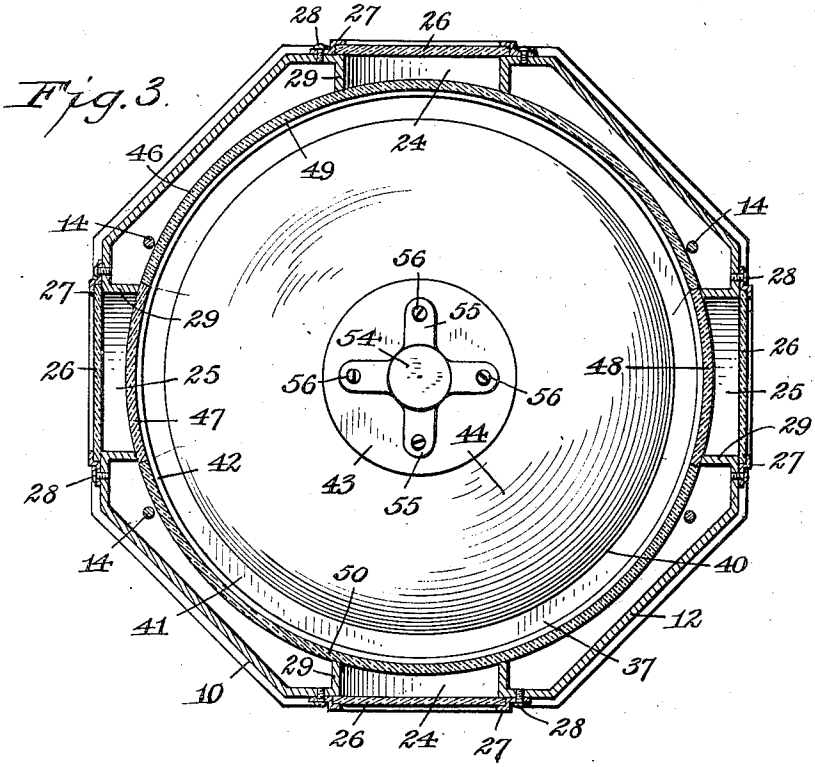
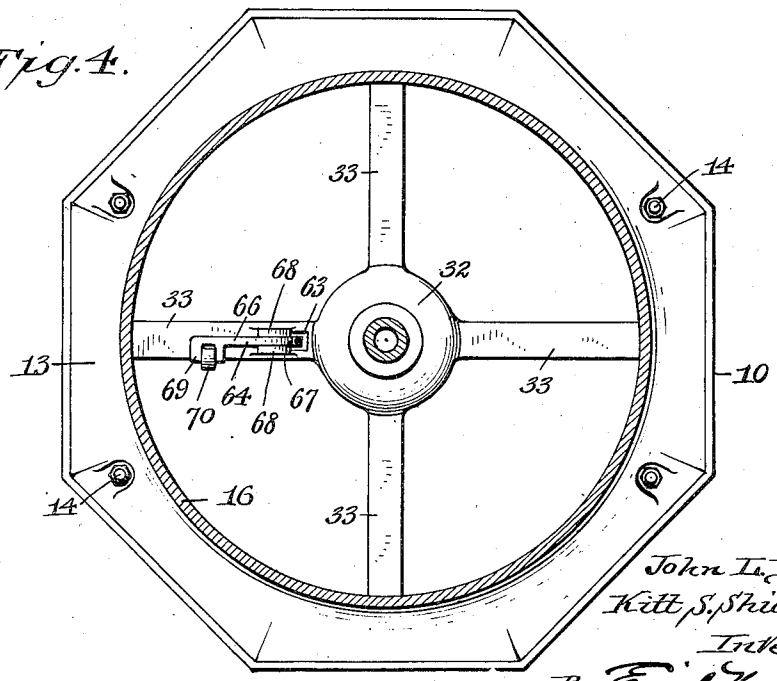


Fig. 4.



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Fig. 5.

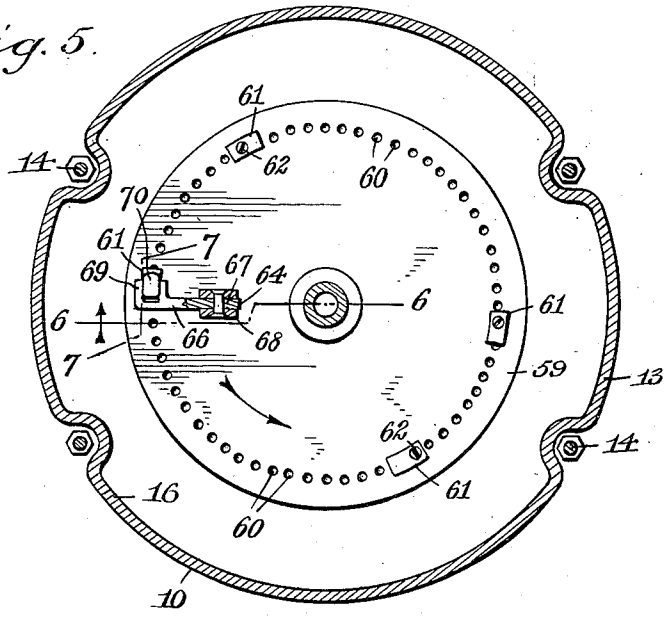


Fig. 6.

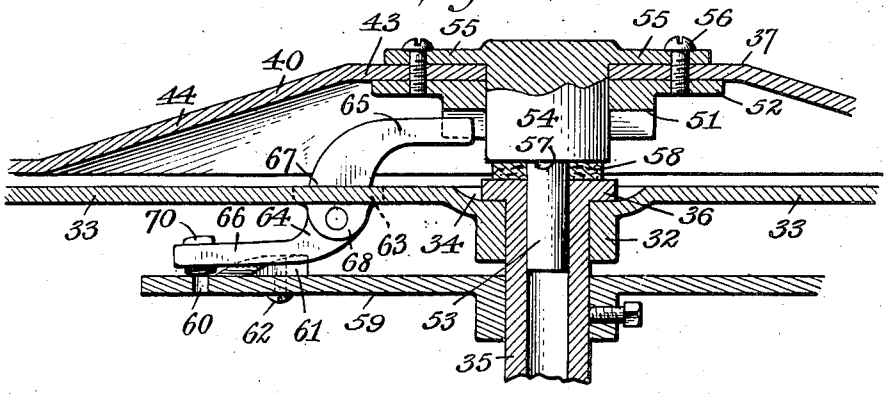
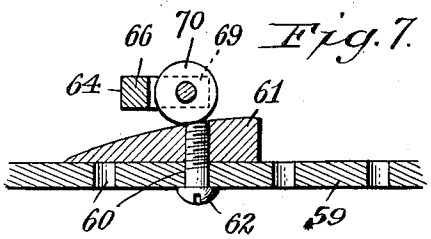


Fig. 7.



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UNITED STATES PATENT OFFICE

2,107,930

TRAFFIC SIGNAL

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Application August 6, 1935, Serial No. 34,904

12 Claims. (Cl. 116—63)

Our invention relates to improvements in traffic signals, and more particularly to that type employed at street or road intersections.

One of the objects of our invention is to provide a simple and effective signal, by means of which traffic approaching from different directions is effectively controlled and under the functioning of which operators of approaching vehicles will be informed of their right to continue in traffic as they approach the signal from certain directions, while those approaching from other directions are informed of their duty to stop; all vehicles approaching from all directions being fully informed of their rights without subjecting them to flash signals which necessitate sudden stops, or spurts of speed usually applied to enable the vehicle to cross an intersecting street before vehicles traveling on the intersecting street reach the center of the intersection.

Another object of our invention is to provide a traffic signal in which all flash signals are eliminated and all vehicles approaching a street or road intersection are informed, before reaching the intersection, as to their rights to proceed or the necessity of stopping without trapping of the vehicle at the intersection so as to interfere with intersecting traffic, or causing the vehicle to stop suddenly.

A still further object of our invention is to provide a signal of this type with means for conveniently changing the time allowances of the stop signaling element with relation to the intersecting streets so that the street having the heavier traffic can be given a clearance signal of longer duration than the street intersecting it.

A still further object of our invention is to provide a simple and effective signal, capable of being suspended at the center of intersecting streets or roads, or positioned at diametrically opposite corners of intersecting roads, two forms of locations of signals now in common use.

With the above and other objects in view to appear hereinafter, our invention consists in the novel features of construction, and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings, Fig. 1 is a side elevation of a signal constructed in accordance with our invention.

Fig. 2 is a central vertical section through the signal.

Fig. 3 is a horizontal section taken on line 3—3, Fig. 2.

Fig. 4 is a horizontal section taken on line 4—4, Fig. 2, looking up.

Fig. 5 is a horizontal section taken on line 5—5, Fig. 2.

Fig. 6 is an enlarged vertical section taken on line 6—6, Fig. 5, looking in the direction of the arrow crossing said line.

Fig. 7 is an enlarged section taken on line 7—7, Fig. 5.

Fig. 8 is an inverted detached perspective view of the bottom member of the hollow rotatable signaling member.

Fig. 9 is a detached perspective view of the timing disk.

Reference being had to the drawings in detail, the reference numeral 10 designates the signal casing, which is preferably formed in three parts, 11, 12, and 13; 11 being a cap or top member, 13 a bottom member, and 12 an intermediate member secured between the top and bottom members by means of bolts 14, or otherwise, the bolts 14 being passed downwardly through the flange portion 15 of the top member, the intermediate member 12, and through the downwardly-tapered peripheral wall 16 of the bottom member 13, nuts being applied to said bolts to fasten the three members securely together, yet permit the lower member to be easily detached for changing the timing mechanism when this is considered desirable; it being simply necessary to remove the nuts from the bolts 14 and lower the bottom member with the motor therein, the latter being described hereinafter.

In the drawings, we have shown the signal in the form in which it is suspended at the center of intersecting streets or roads, and the medium for suspending the same may include a tube 17 threaded into a collar 17a fastened to the cap or top member 11 by means of pins 18, or otherwise. Current conducting wires 19 are passed through this tube and are in electrical connection, respectively, with the cylindrical wall of a lamp socket 20 and with a center contact 21 within said socket, said lamp socket being fastened into the cap or top member 11 in any approved manner. This lamp socket and the tube are axially disposed with reference to the casing 10 and it has secured therein an electric bulb 22 which extends axially into the intermediate member 12 of the casing. We prefer to secure the cap or top member 11 and the intermediate member 12 together by means of screws 23, or otherwise, so that these two members do not entirely depend on the bolts 14 for securing them together, and by so connecting these two members, all parts of the signal, except

the bottom member 13 and the motor therein, will remain intact when changing the timing mechanism.

The casing, in the main, is preferably octagonal in cross section, and in the intermediate member 12 thereof, sight openings are arranged in pairs at right angles to each other, one pair being designated by the numeral 24 and the other by the numeral 25. Applied to the openings are panes of glass 26 or other transparent panels which are held in place by retainer rings 27 exteriorly fastened to the casing, such as by means of screws 28.

While a casing of octagonal formation will meet the requirements of the majority of intersecting roads, there are many instances, in cities, where intersecting streets are arranged at other than right angles, and where such conditions are encountered, the position of the sight openings in the casing will of course be changed. It follows therefore that the casing may be circular, quadrangular, pentagonal, or it may, more specifically, be in the form of a trapezium, or a trapezoid; in fact, it may have any other geometrical configuration, depending on the direction of the intersecting streets or roads, as will be understood.

In the drawings, wherein the casing is represented in octagonal form, the sight openings 24 and 25 are arranged to meet the requirements of intersecting streets at a right angle. Consequently, sight openings are arranged alternately in the panels of the octagonal intermediate member 12, and these are formed by directing annular flanges 29 inwardly from the wall of the casing. The upper and lower ends of the intermediate member 12 are open, inwardly extending flanges 30 and 31 being provided at the top and bottom respectively. The screws 23 employed to fasten the cap or top and intermediate members together are passed through the flange portion 15 of the top member and threaded into the flange 30, and the flange 31 at the bottom of the intermediate member is connected with an axial hub 32 by radial arms 33, the hub 32 being somewhat depressed from the plane in which the arms 33 are disposed to form a central cavity 34 in what may be termed the spider, which comprises the flange 31, the hub 32, and the arms 33. Fitted into the hub 32 is a sleeve or bushing 35 which has a collar 36 at its upper end lying mainly within the cavity 34 and serving as a stop to prevent downward movement of said sleeve or bushing.

Arranged within the intermediate member 12 of the casing is a signaling member 37 which is mounted for intermittent rotary movement therein and it comprises an upper ring 38 having a depending annular flange 39, a bottom 40 having a horizontal marginal portion 41 provided with an upwardly extending annular flange 42 and a horizontal central portion 43 connected with the horizontal marginal portion by an upwardly-tapered connecting wall 44. This bottom wall is, therefore, dished upwardly and provides a space 45 between the same and the spider-like bottom of the intermediate member 12. Positioned between the ring 38 and the bottom 40 of the signaling member so as to surround the respective flanges 39 and 42 thereof is a translucent intermediate member 46 which is formed of four arcuate or other glass sections 47, 48, 49, 50, and which sections are colored and secured in place in any approved manner. The sections of the intermediate member 46 form a cylindrical structure which travels in contact with or in close proximity to the inwardly extending annular flanges 29 forming the sight openings 24 and 25.

In the particular representation of our invention shown, the sight openings are arranged on the quarters so that space is provided between them to permit the use of comparatively long colored glass sections, and it is our intention to employ two comparatively short sections and two comparatively long sections, the short sections 47 and 48 being colored green and each having a horizontal dimension greater than the diameter of each sight opening, while the sections 49 and 50 are colored red and occupy the spaces between the smaller green sections, in consequence of which they have a horizontal dimension several times that of the smaller green sections. These sections, or segments as they may be termed, are so fastened to the bottom 40 and the top ring 38 that a unitary assembly is provided which includes said segments, bottom, and top ring, and which is rotatably arranged within the intermediate section 12 of the casing.

Secured within the upwardly dished portion of the bottom 40 of the signaling member is a ratchet hub 51, the ratchet teeth of which are formed on the lower end thereof and the upper end of this hub has an outstanding flange 52 bearing against the under side of the horizontal central portion 43 of said bottom. 53 is a shaft which extends into the upper end of the sleeve or bushing 35 and is provided with an enlargement or head 54 extending through an axial opening in the horizontal central portion of said bottom 40 and through the ratchet hub, the upper end of said enlargement or head having radial arms 55 lying against the upper face of said horizontal central portion. Screws 56 are provided for securing this head and the ratchet hub to said bottom, said screws being passed through the radial arms 55 and the horizontal central portion of said bottom and taking into the flange 52 on said ratchet hub. By providing the shaft 53 with an enlargement or head, such as 54, a downwardly facing shoulder 57 is provided on said shaft, between which and the upper end of the sleeve or bushing 35 a fiber or other friction disk or washer 58 is arranged, the shaft 53 passing through said disk or washer and the weight of the signaling member being supported wholly by said fiber disk or washer.

Secured to the sleeve or bushing 35 beneath the hub 32 of the intermediate member 12 of the casing is a timing disk 59 which is provided near its marginal portion with a circular series of openings 60, and 61 designates wedge-like riders or trip-elements which are adapted to be spaced in a selective manner around said timing disk, each rider lying over one or more of said openings and being secured in selected position by means of a screw 62 passed upwardly through one of said openings and threaded into said riders, as shown in Figs. 2, 6 and 7, or screw bolts may be passed through said riders from the top and extend through selected openings in the timing disk, as shown in Figs. 5 and 9, in which case nuts will be threaded onto the projecting ends of said screw bolts. The relative positions of these riders determine the intervals of time exposures for the colored sections or segments of the signaling member through the sight openings 24 and 25.

By reason of the timing element or disk 59 being secured to the sleeve or bushing 35 so that it rotates with the latter, said sleeve or bushing may

be considered as forming part of said timing element or disk.

The number of openings in the timing disk may vary, but we prefer to employ sixty and to cause the timing disk to make one revolution every two minutes. The spaces between the openings 60 therefore represent seconds in time, two seconds time being required to move each opening the distance between openings, center to center. This, however, may be otherwise timed, and might vary at different street or road intersections.

Formed in one of the arms 33 in the spider-like bottom of the intermediate member 12 of the casing is an opening 63 through which a lock or ratchet dog 64 is passed, said lock or ratchet dog having two substantially parallel arms 65, 66 offset by an intermediate portion 67 passing through said opening so that one of the arms of said dog lies above and the other below the spider arm 33. The intermediate portion 67 of said lock dog is pivotally connected between a pair of lugs 68 depending from said spider arm 33. The arm 65 is in engagement with a tooth of the ratchet hub 51, while the arm 66 is adapted to engage and be tripped successively by the wedge-like riders 61 on the timing disk, and for this purpose the outer end of said arm 66 is laterally extended and forked, as at 69, to receive a roller 70 which is designed to travel in contact with the upper surface of the timing disk and to ride over the wedge-like riders 61 for tripping the dog and causing the arm 65 of the latter to become disengaged from the ratchet hub; it being of course understood that the timing disk is rotated, and for this purpose a shaft 71 is inserted into the sleeve or bushing 35 from the bottom and secured therein by a set screw 72, or otherwise; said shaft having a worm gear 73 removably secured thereto which is in mesh with a worm 74 fastened to the shaft of a motor 75 arranged within the bottom member 13 of the casing, said motor being secured to the bottom of said section in any approved manner.

Due to the fact that the sleeve or bushing 35 is rotated and the timing disk 59 is secured to said sleeve, the timing disk is rotated at any desired speed, and for this purpose a variable change-speed gear-mechanism may be interposed between the motor and the shaft 71, or the speed of the timing disk may be controlled by changing the size of the worm gear 73 and shifting the motor accordingly. If desired the motor may be a variable speed motor. It will be apparent therefore that the motor rotates the timing disk and when the lock or ratchet dog 64 is in engagement with a tooth of the ratchet hub 51, the signaling member 37 is held against rotation. During this time the upper end of the sleeve or bushing 35 rides in contact with the under surface of the friction disk or washer 58, which is prevented from rotating by reason of the shaft 53 being held against rotation by the lock or ratchet dog.

It is to be noted that the ratchet hub 51 has eight teeth evenly spaced, and assuming the parts to be in the position shown in Figs. 2 and 5, a rider is traveling underneath and in contact with the roller of the lock or ratchet dog 64, with the result that said dog is disengaged from the ratchet hub 51. Consequently, under the weight of the signaling member 37 the friction created between the friction disk or washer 58 and the upper end of the sleeve or bushing 35 is sufficient to cause the signaling member to rotate within the casing. As the rider leaves the roller of said lock or ratchet dog, the signaling member continues to rotate with the timing disk, even though the lock or ratchet dog engages the next tooth of the circular series on the ratchet hub and the signaling member continues rotating until the abrupt or vertical end of the succeeding tooth comes in contact with the lock or ratchet dog. This occurs after the signaling member has made one-eighth of a complete revolution, due to the fact that eight equally-spaced teeth are provided on the ratchet hub.

Under this operation the green sections or segments of the signaling member will have moved from their positions behind the sight openings 25 to positions centrally between said sight openings and the sight openings 24, with the result that the red sections or segments of the signaling member will be exposed through all sight openings of the casing. These red signals will be so exposed until the next rider in the series on the timing disk engages the lock or ratchet lever, and when this occurs said lever will again be disengaged from the ratchet hub, permitting the signaling member to move with the timing disk and in unison therewith until the inner end of the lock or ratchet dog comes in contact with the next tooth of the ratchet hub.

During this last step in the operation of this device the green segments will have been moved from positions between the sight openings 24 and 25 to positions behind the sight openings 24. It will be clear therefore that each time the lock or ratchet dog is disengaged from the ratchet hub the signaling member will be moved one-eighth of a complete revolution, and by positioning the riders in desired positions on the timing disk the intervals for exposing red through all signals and the intervals for exposing green through each pair of sight openings can be easily controlled.

It will be understood that the short spaces between riders on the timing disk are employed to move the green sections or segments of the signaling member out of exposed positions and at the same time are utilized to determine the length of time such green sections or segments will be maintained centrally between the sight openings 24 and 25, while the long spaces between riders determine the length of time the green signals are exposed through the sight openings, which may be lengthened or shortened for the green exposure through one pair over their exposure through the other pair of sight openings.

Instead of providing a continuous series of openings in the timing disk in which the openings are spaced equidistantly, such series may be broken, for the reason that in the circle in which these openings are arranged blank spaces may be employed at diametrically-opposite regions between the riders on the timing disk closely spaced apart, and each of such blank spaces may be extended through one-eighth of the complete circle in which the series of openings are formed. Under such an arrangement there still would be a circular series of openings in the timing disk, although all the openings of the series would not be equidistantly spaced.

Having thus described our invention, what we claim is:

1. A traffic signal, comprising a casing having sight openings therein, a signaling member rotatably mounted within said casing having different signaling elements, a timing element un-

der constant rotation and having its axis co-incident with the axis of said signaling member, friction means between said timing element and said signaling member to cause the latter to move with said timing element, and means interposed between said timing element and signaling member to cause slippage of said friction means so as to allow independent rotative movement of said timing element.

2. A traffic signal, comprising a casing having sight openings therein, a signaling member rotatably mounted within said casing having different signaling elements, a timing element under constant rotation and having its axis co-incident with the axis of said signaling member, friction means between said timing element and said signaling member to cause the latter to move with said timing element, co-operating interlocking devices between said timing element and said signaling member whereby said signaling member is locked against rotation, one of said interlocking devices being actuated by and under control of said timing element to disengage it from the other.

3. A traffic signal, comprising a casing having sight openings therein, a signaling member rotatably mounted within said casing having ratchet teeth thereon, a timing element under constant rotation and having its axis co-incident with the axis of said signaling member, means between said timing element and said signaling member to cause the latter to move with said timing element, a ratchet dog carried by said casing and adapted for engagement with said ratchet teeth, and means carried by said timing element for tripping said ratchet dog to disengage the same from said ratchet teeth, said ratchet dog when in engagement with said ratchet teeth preventing rotation of said signaling member with said timing element.

4. A traffic signal, comprising a casing having sight openings therein, a signaling member rotatably mounted within said casing having a ratchet hub axially disposed thereon, a timing element under constant rotation disposed beneath said signaling member, means between said timing element and said signaling member to cause the latter to rotate with said timing element, a ratchet dog pivoted within said casing at a fixed point between said signaling member and said timing element and having two arms extending from its pivotal point, one of said arms engaging said ratchet hub to lock said signaling member against rotation and permit independent rotation of said timing element, and tripping elements on said timing element adapted to engage the other arm of said ratchet dog and to release the latter from said ratchet hub to cause said signaling member to rotate with said timing element.

5. A traffic signal, comprising a casing having a removable bottom member, a signalling member rotatably mounted within said casing above said bottom member, a timing disk within said bottom member having riders adjustably disposed thereon in spaced-apart relation and having friction connection with said signaling member, means for constantly rotating said timing disk, and locking means between said signaling member and said timing disk adapted to be successively tripped by the riders on said timing disk to cause rotation of said signaling member with said timing disk when said locking means is in engagement with a rider and to permit independent rotation of said timing disk when said riders are out of engagement with said locking means.

6. A traffic signal, comprising a casing having sight openings, a signaling member rotatably mounted within said casing, a timing disk co-axial with said signaling member and having a circular series of openings therein, means for constantly rotating said timing disk, riders spaced apart on said timing disk and secured thereto in selective positions through the medium of said openings, and a device between said signaling member and said timing disk actuated successively by said riders and controlling the rotative movement of said signaling member with said timing disk and the independent movement of said timing disk.

7. A traffic signal, comprising a casing having sight openings and an axial bearing therein, a sleeve rotatable in said bearing, a signaling member rotatably mounted within said casing and having an axial shaft rotatable within said sleeve, a ratchet hub surrounding said shaft, a friction device on said shaft bearing against said sleeve and supporting the weight of said signaling member, a timing device secured to said sleeve including tripping elements adjustably secured to said timing device, and a ratchet lever pivotally secured within said casing and having two arms, one of said arms adapted for engagement with said ratchet hub and the other for successive engagement with said tripping elements.

8. A traffic signal, comprising a casing having sight openings therein, a cylindrical signaling member rotatable within said casing and having a bi-colored translucent peripheral wall exposed directly through said sight openings, said peripheral wall comprising comparatively short green segments exposable through certain of said sight openings and comparatively long red segments exposable through the remaining sight openings, and means for intermittently rotating said signaling member in one direction within said casing so as to expose said green segments selectively through said sight openings for predetermined periods of time and for exposing said red segments through all of said sight openings while changing the green segments from certain of said sight openings to others, said means including a friction-device operative only when intermittent movement is imparted to said signaling member, and said friction device being operative under the weight of said signaling member.

9. In a traffic signal, a casing having sight openings therein, a cylindrical signaling element rotatable within said casing and exposed directly through said sight openings, said signaling element comprising a peripheral wall formed of segments of red and segments of green, the green segments extending through smaller arcs of circles than the red segments, friction means within said casing for rotating said signaling element and operative under the weight of the latter, restraining-means effective to lock said signaling element against movement, and means to release said restraining-means at predetermined times.

10. A traffic signal, comprising a casing having sight openings therein, a signaling member having differently colored portions adapted to be exposed successively through each of said sight openings, a timing disk rotatable within said casing and having a series of openings in its marginal portion, beveled riders applied to said timing disk, screws passed through selected openings in said timing disk and threaded into said beveled

riders, and means actuated by said riders for locking said signaling member against rotation while permitting rotation of said timing disk and for releasing said signaling member to permit rotation thereof with said timing disk.

11. A traffic signal, comprising a casing having sight openings therein, a signaling member rotatably mounted within said casing having different signaling elements, a rotatable timing element beneath said signaling member and coaxial therewith, said timing element causing rotation of said signaling member under frictional contact created by the weight of said signaling member, and means interposed between said timing element and signaling member to cause slippage so as to allow independent rotative movement of said timing element.

12. A traffic signal, comprising a casing and a signaling member, said casing and signaling member being relatively movable, a timing element continuously movable in one direction, means to move said timing element, friction-means between said timing element and said signaling member to cause the latter to move with said timing element, and means interposed between said signaling member and said timing element to cause slippage of said friction means at predetermined intervals and allow independent movement of said timing element.

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