

June 2, 1942.

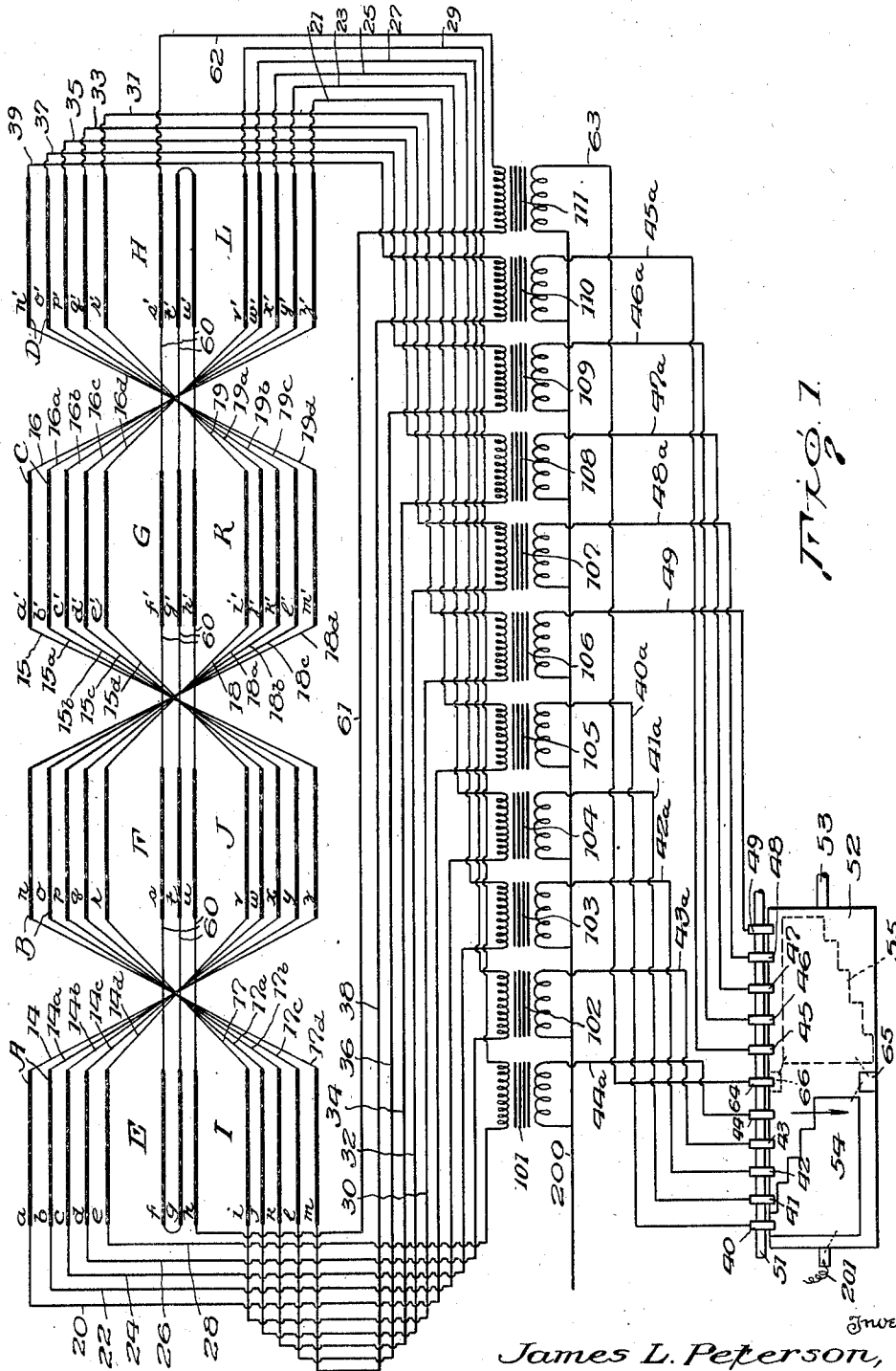
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2,285,168

TRAFFIC CONTROL SYSTEM

Filed Jan. 23, 1940

2 Sheets-Sheet 1



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FIG. 2

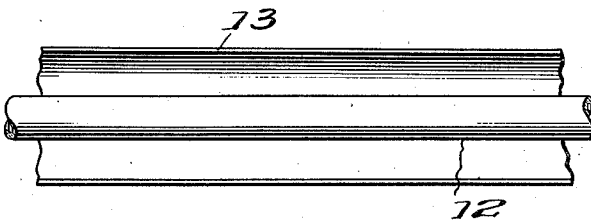
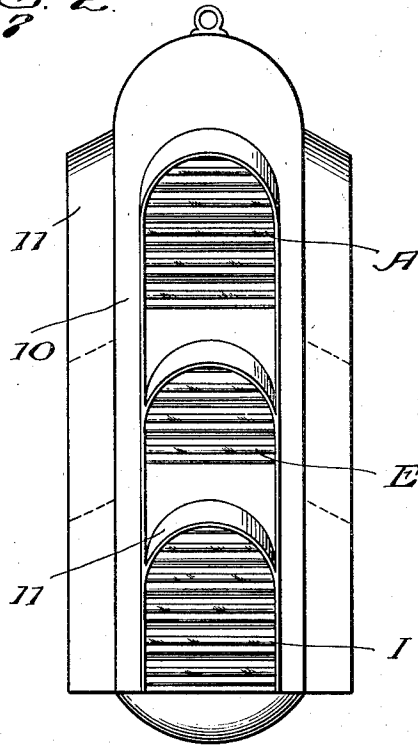


FIG. 3

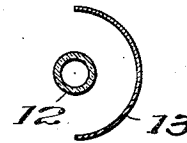


FIG. 4

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TRAFFIC CONTROL SYSTEM

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3 Claims. (Cl. 177-337)

This invention relates to improvements in traffic control signals.

The primary object of the invention is to provide a comparatively simple traffic light signal system which will operate with maximum efficiency.

A further object is to provide a traffic light signal in which the lighting elements are formed of gaseous discharge tubes, such as neon illuminating gas tubes.

Still another object is to provide a gaseous discharge tube signal light in which the lighting effects will be localized or concentrated so as to possess maximum visibility.

Another object is to provide a traffic control signal light which will indicate progressively the lapse of the time interval between the changes of the primary signals.

A further object is to provide a signal comprising three differently colored, vertically aligned, signal lights, composed of a series of neon tubes, and means for gradually diminishing the area of the upper and lower lights by extinguishing successive tubes in a direction away from the intermediate light.

A still further object is to provide a traffic light signal wherein the principal control or actuating elements are housed at a point exterior of the signal light itself, whereby there is less likelihood of the light failing to operate and, further, adjustments can be readily made to alter the timing of the signals.

With these and other objects in view, the invention consists in certain details of construction and combinations and arrangements of parts, all as will hereinafter be more fully described and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawings—

Figure 1 is a diagrammatic illustration of the wiring in a signal light system comprising four signal lights, such as are used for controlling the flow of traffic at the intersection of two highways;

Fig. 2 is a front elevational view of a signal light casing such as may be used for controlling the flow of traffic along both of two intersecting highways;

Fig. 3 is a detail elevational view of one of the gaseous discharge tubes; and

Fig. 4 is a detail sectional view on the line 4-4 of Fig. 3.

In accordance with present-day practices, this invention contemplates the use of a red light and a green light, called the primary signals, and a

yellow or amber light for controlling traffic moving along each of the approaches to an intersection of two highways or, in other words, there will be a signal light comprising a red, green and amber light exposed to traffic approaching the intersection from opposite directions along each of the two highways. These signals can be mounted in separate housings on the four corners of the intersection to properly display the signals or, as shown in the present instance, all the lights constituting the four sets of signals can be enclosed within the single housing 10, which may be suspended centrally of the intersection and which is formed with a display opening in each of four sides, whereby each set of lights will be plainly visible from one of the approaches to the intersection. If desired, suitable shields or visors 11 may be provided for the several exposure openings. As will hereinafter be more fully described, the several sets of lights or signals are each composed of a plurality of gaseous discharge tubes, such as the neon illuminating gas tubes 12 and, to concentrate the light or illumination of each signal light, the several tubes are disposed horizontally in the casing 10 in parallelism with one another, as best seen in Fig. 2. Preferably, the primary lights—the red and the green—each consist of five horizontally disposed neon tubes, indicated at A and I, respectively, in Fig. 2, and the yellow or amber signal consists of three tubes, E, interposed between the primary signal tubes. In order that these tubes will possess maximum luminosity and be visible as a concentrated group, they are provided at the rear thereof with reflectors 13, which are preferably substantially semicircular in cross-section so as to practically surround the rear half of each tube, as best illustrated in Fig. 4. Preferably, the tubes are substantially straight and, by being grouped in parallelism with one another and backed with the reflectors, the light of each group will be concentrated and each group will possess maximum luminosity. Either the tubes themselves may be colored or, if desired, colored glass may be used in the exposure openings of casing 10.

In order that pedestrians or vehicles traversing the intersection may rather accurately estimate the interval of time available to them for crossing the intersection, or the length of time they will have to wait before crossing the intersection, the present invention contemplates an arrangement wherein the several tubes constituting each of the primary signals will be energized simultaneously, but will be deenergized suc-

cessively. Thus, if the signal shows five green tubes as one approaches the intersection, it will be obvious that they have the full time interval of the green light for crossing. Assuming that the tubes are extinguished at intervals of, say, five seconds, a person, under these conditions, would know that he had twenty-five seconds to cross the intersection but if, say, two of the tubes had already been extinguished, he would know that he had only fifteen seconds to cross the intersection. In the case of the yellow or amber light, composed of three tubes, these are turned on and off simultaneously as a group.

To secure the results above outlined, where four signals are employed at an intersection, which is, in effect, the same as the signals being employed in pairs, a wiring arrangement, such as illustrated in Fig. 1, is used. It is believed it will lend clarity to the following description if the several sets of tubes are identified by indicating the group of red tubes of the group of signals at the left of Fig. 1 as A, with the individual tubes thereof denoted as *a, b, c, d, e*; the amber tubes of this signal individually as *f, g* and *h*, constituting a group E; and the green tubes individually as *i, j, k, l, m*, constituting a group I. In other words, these three sets of tubes will constitute the red, yellow and green lights of a signal facing one of the approaches to an intersection. The tubes for a second approach are indicated as groups B, F and J, with group B consisting of the individual tubes *n, o, p, q, r*; the group F of the individual tubes *s, t* and *u*; and the group J as consisting of the tubes *v, w, x, y, z*, it being understood that group B comprises the red tubes; group F the yellow or amber tubes; and group J the green tubes. The signals for the third approach to the intersection are indicated at C, G and K, with C composed of red tubes *a', b', c', d', e'*; G composed of yellow tubes *f', g'* and *h'*; and K composed of green tubes *i', j', k', l', m'*. Similarly, the set of signals for the fourth approach to the intersection is composed of groups D, H and L, D comprising the five red tubes *n', o', p', q', r'*; H, the three amber tubes *s', t'* and *u'*; and L, the green tubes *v', w', x', y', z'*. Tube *a* of group A is connected by line 14 to tube *z* of group J which, in turn, is connected by line 15 to tube *a'* of group C, and the latter is connected by line 16 to tube *z'* of group L. Similarly, tube *b* of group A is connected by line 14a to tube *y* of group J, and the latter is connected by line 15a to tube *b'* of group C, which is connected by line 16a to tube *y'* of group L. Tube *c* of group A is connected by line 14b to tube *x* of group J, and the latter is connected by line 15b to tube *c'* of group C which, in turn, is connected by line 16b to tube *x'* of group L. Tube *d* of group A is connected by line 14c to tube *w* of group J, and the latter is connected by line 15c to tube *d'* of group C which, in turn, is connected by line 16c to tube *w'* of group L. Tube *e* of group A is connected by line 14d to tube *v* of group J, which is connected by line 15d to tube *e'* of group C, and the latter is connected by line 16d to tube *v'* of group L. The tubes of groups I, B, K and D are similarly connected. The connections between I and B consist of lines 17, 17a, 17b, 17c, 17d, extending between tubes *i, j, k, l, m* and *n, o, p, q, r*, respectively. The connections between the tubes of group B and those of group K consist of lines 18, 18a, 18b, 18c, 18d, between tubes *r, q, p, o, n* and tubes *i', j', k', l', m'*, respectively, and the connections between group K and those of group

D consist of lines 19, 19a, 19b, 19c, 19d, between tubes *i', j', k', l', m'* and *r', q', p', o', n'*, respectively.

Tubes *a, z, a'* and *z'*, which are thus connected together, are connected by lines 20, 21, with the secondary of a transformer 105; tubes *b, y, b'* and *y'*, which are connected together, are connected by lines 22, 23, to the secondary of a transformer 104; tubes *c, x, c'* and *x'* are connected by lines 24, 25, to the secondary of a transformer 103; tubes *d, w, d'* and *w'* are connected by lines 26, 27, to the secondary of a transformer 102; and tubes *e, v, e'* and *v'* are connected by lines 28, 29, to the secondary of a transformer 101.

Similarly, the tubes of groups I, B, K and D are connected to the secondaries of a series of transformers. As illustrated, tubes *i, r, i'* and *r'* are connected by lines 30, 31, with the transformer 106; tubes *j, q, j'* and *q'* are connected by lines 32, 33, to transformer 107; tubes *k, p, k'* and *p'* are connected by lines 34, 35, with transformer 108; tubes *l, o, l', o'*, are connected by lines 36, 37, with transformer 109; and tubes *m, n, m'* and *n'* are connected by lines 38, 39, with transformer 110.

The primaries of the several transformers are connected to the power line 200, and the primary of each transformer is also connected to a contact member of a timing mechanism. As illustrated, the primary of transformer 105 is connected by line 40a to a contact member 40 on a support 51; the primary of transformer 104 is connected by line 41a to contact 41; the primary of transformer 103 is connected by line 42a to contact 42; the primary of transformer 102 is connected by line 43a to contact 43; the primary of transformer 101 is connected by line 44a to contact 44; the primary of transformer 110 is connected by line 45a to contact 45; the primary of transformer 109 is connected by a line 46a to contact 46; the primary of transformer 108 is connected by a line 47a to a contact 47; the primary of transformer 107 is connected by a line 48a to a contact 48; and the primary of transformer 106 is connected by a line 49a to a contact 49. These several contacts are adapted to intermittently engage electrical conductive surfaces 54, 55, on a timing commutator 52 mounted on shaft 53, these conductive surfaces being, in turn, connected to a power line 201. The conductive surfaces 54, 55, are diametrically opposed to one another on the commutator cylinder 52. As will be understood, the cylinder itself is of a non-conductive material and shaft 53 is rotated by suitable drive means (not shown). The conductive surfaces 54, 55, each have a straight, leading edge, so to speak, so that when the commutator cylinder 52 is revolved in the direction of the arrow in Fig. 1, surface 54 will simultaneously engage contacts 40 to 44, both inclusive and, after the cylinder has made a one-half revolution, the corresponding leading edge of surface 55 will come into engagement with contacts 45 to 49, both inclusive. The rear edge of each of the conductive surfaces 54, 55, is of stepped formation so that, as each one is moved relatively to the contacts it engages, it will move out of engagement with those contacts successively. In other words, taking surface 54, for instance, it is comparatively narrow at its right-hand edge, as viewed in Fig. 1, so that said surface will first move out of engagement with contact 44 but, due to its increased width in the path of contact 43, it will remain in engagement therewith for a somewhat longer

period. Similarly, the stepped formation of the rear edge of the plate permits it to pass out of engagement with contacts 42, 41 and 40, one after the other, in succession. Likewise, surface 55 moves out of engagement with its cooperating contacts 45 to 49, one after the other, in succession.

Conductive surface 55 is illustrated in dotted lines in Fig. 1 because it is on the rear side, so to speak, of commutator cylinder 52 and, with the parts in this position, the primary red and green signals will operate in the following manner, as the commutator cylinder revolves in the direction of the arrow: As the straight, leading edge of surface 55 comes into engagement with contacts 45 to 49, a circuit will be completed through each of lines 45a to 49a and the primaries of transformers 110, 109, 108, 107 and 106 to power line 200. This causes the secondaries of these transformers to be excited and, as a result, the green tubes of group I; the red tubes of group B; the green tubes of group K; and the red tubes of group D will all be simultaneously energized and illuminated. Then, as the commutator cylinder continues to revolve, the narrowest portion of conductive surface 55 will pass out of engagement with contact 49, which is connected to the primary of transformer 106, so that said transformer becomes deenergized, and tube *i* of group I; tube *r* of group B; tube *i'* of group K; and tube *r'* of group D are extinguished. Similarly, in turn, the transformers 107, 108, 109 and 110 will become deenergized, with the result that the several tubes of each of groups I, B, K and D will be successively extinguished. Thus, the banks of green tubes I and K which, it will be understood, face in opposite directions for controlling the traffic on one thoroughfare of the intersection, and the red tubes of banks B and D, which also face in opposite directions for controlling traffic on the other highway of the intersection, have been illuminated and extinguished.

Subsequently, as commutator cylinder 52 continues to rotate, the straight, leading edge of conductive surface 54 engages simultaneously the several contacts 40 to 44, inclusive, with the result that transformers 101, 102, 103, 104 and 105 are energized and the latter, through their secondaries, effect the illumination of the red tubes of groups A and C, and the green tubes of groups J and L, all of said tubes being illuminated simultaneously. As the narrowest portion of conductive surface 54 moves out of engagement with contact 44, transformer 101 will be deenergized and, as a consequence, tube *e* of group A; tube *v* of group J; tube *a'* of group C; and tube *v'* of group L, will be extinguished. Due to the stepped formation of the rear edge of conductive surface 54, the several tubes of each of these groups will thus successively be extinguished.

It is customary practice, in present-day traffic signal lights, to provide a warning signal in the form of an amber or yellow light and, hence, the provision of groups of tubes E, F, G and H, but it is not necessary that the tubes of these individual groups be extinguished successively. For this reason, all of the tubes of these four groups are connected together by lines 60, and tube *h* of group E is connected by line 61 to the secondary of a transformer 111, and tube *s'* of group H is connected by line 62 to the secondary of that transformer. The primary of transformer 111 is connected to power line 200 and, by line 63 to a contact 64 on support 51, which con-

tact is adapted to alternately engage comparatively small conductive surfaces 65, 66, on the commutator cylinder 52. These conductive surfaces 65, 66, are also connected to power line 201 and are of such size and so positioned on the commutator cylinder 52 with respect to conductive surfaces 54, 55, that surface 65 will come into engagement with contact 64 at the time surface 55 moves out of engagement with contact 45 and will remain in engagement with said contact 64 until surface 54 comes into engagement with its cooperating contacts. Likewise, surface 66 will engage contact 64 during the interval between the moment surface 54 moves out of engagement with contact 40 and the moment the leading edge of contact 55 comes into engagement with its cooperating contacts. Thus, transformer 111 is energized during that interval of time that all of transformers 101 to 110, inclusive, are deenergized, or during that time in which all of the primary red and green signal tubes are extinguished. In other words, taking the groups A, E and I, which constitute one set of red, yellow and green signals, as an example, as conductive surface 54 moves out of engagement with contact 40 to extinguish the last of the five red tubes in group A, surface 66 will come into engagement with contact 64 to energize transformer 111 and illuminate the yellow tubes of group E and, then, as the leading edge of conductive surface 55 comes into engagement with its cooperating contacts 45 to 49, inclusive, to illuminate the green tubes of group I, the conductive surface 66 will become disengaged from contact 64 to extinguish the yellow tubes of group E. To complete the cycle, as the last green tube of group I is extinguished, conductive surface 65 will come into engagement with contact 64 to again illuminate the yellow tubes E, and the same will remain illuminated until conductive surface 54 again engages its contacts 40 to 45 to again illuminate the red tubes of group A, at which time said surface 65 will move out of engagement with its contact 64 to extinguish the yellow tubes of group E.

The reflectors 13 are preferably highly polished and enclose the tubes at the rear of the latter. This arrangement, in combination with the horizontal parallel tubes, produces a concentrated light of maximum brilliance. The several lines are connected with their respective tubes but, as will be observed, there are no moving contacts or other apparatus within the light housing, so that the light itself is subjected to no wear and will not require repair or adjustment. Also, by successively extinguishing the red and green tubes in the order outlined, i. e., in a direction away from the intermediate set of tubes for the amber light, each light may be said to be clear-cut because, as the amber lights come on, the red or green tube farthest therefrom, in any one set of signals, will be last one observed. In other words, the last red or green tube which is seen before the amber light comes on is spaced what might be termed a maximum distance from the tubes for the amber light. Thus, there is provided a comparatively simple, but very efficient, set of signal lights for the intersection.

What I claim is:

1. In a traffic signal system, a series of gaseous discharge tubes, a source of energy, means for intermittently connecting and disconnecting said tubes as a group with said source of energy, a plurality of tubes arranged in parallelism with

each other at opposite sides of said series of tubes, and means for alternately connecting and disconnecting the last-mentioned groups of tubes with said source, said last-mentioned means being operable to simultaneously connect all the tubes of a group as said series of tubes is disconnected and to successively disconnect the tubes of each group with the tubes farthest from said series of tubes the last to be disconnected.

2. In a traffic signal system, a source of energy, two series of substantially straight gaseous discharge tubes spaced from each other with the tubes of the two series arranged in parallelism with each other but of contrasting colors, and means for alternately connecting and disconnecting the two series of tubes with said source of energy, the tubes of each series being simultaneously connected but successively disconnected in a direction from the inner tube of each series to the outer tube thereof.

3. In a traffic signal system, a casing, a plurality of substantially straight gaseous discharge tubes mounted in said casing, said tubes being arranged in three groups spaced from each other with the tubes of the several groups disposed substantially horizontally, electrical connections extending from said tubes to a point external of the casing, a source of energy, means associated with said connections externally of the casing for intermittently energizing the intermediate group, and means for alternately energizing and deenergizing the upper and lower groups, the tubes of each of said upper and lower groups being energized simultaneously and deenergized successively in the same order according to their disposition with respect to the intermediate group, the tubes in the upper and lower groups farthest from the intermediate group being the last to be disengaged.

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