This invention relates to an adapter device for converting a traffic signal section having a small lens and a small lamp to one having a large lens and a large lamp.

Vehicular traffic signals in wide use today have an 8 inch round lens and a lamp consuming approximately 67 watts. The complete signal usually consists of three individual sections secured together to form a three section signal. Each of the three sections usually has a door to which is affixed a colored lens. The lenses may be red, amber, and green, with the red lens normally in the top section.

A new, larger signal has found increasing acceptance each year and employs a larger lens and a higher wattage lamp. The lenses are 12 inches in diameter and present approximately 125% more area. The lamp is usually 150 watts to give substantially the same luminosity to the large lens as was found satisfactory with the smaller lens.

The larger signals are found to be necessary at rural intersections where high speed traffic requires longer stopping distances, at large metropolitan intersections where the normal signal appears shall when viewed from across a wide expanse of pavement, and at hazardous intersections along a thoroughfare where background signs, obstructions, or sunlight obscures the smaller traffic signals.

It has been found that not all three sections of the traffic signal need to be large. If only the red section be the large size and the amber and green sections be the small size, substantially the same benefit results: the motorist is able to see and recognize the larger red section from a greater distance and have sufficient distance to stop when it is illuminated.

The availability of the larger signal sections and the desirability of increasing the size of the red signal has led to the installation of one 12 inch red signal section on top and two 8 inch amber and green sections below. This system is satisfactory for a new installation but requires considerable work with the bracket when converting a three section 8 inch signal to a 12 inch section and two 8 inch sections. The time required to disassemble the pipe bracket, remove one signal section, add a new 12 inch section, replace a portion of the pipe bracket, and reassemble the bracket and signal has been estimated to require three man-hours.

The importance of the invention will be realized when it is noted that perhaps 600,000 of the customary three section signals are in use in the United States representing an installed cost of at least $60,000,000. To replace one section of even 10 percent of these 600,000 traffic signals would involve tremendous cost.

The invention provides means to readily mount a signal adapter to an existing signal using the mounting holes that were previously used for attaching the visor.

The invention consists of a unitary structure designed to fit most 8 inch signal sections having square doors. In the preferred form of the invention the structure is cast of light weight material. It is designed to use an optic system, door, and visor of standard manufacture. The unit reaches the installer completely assembled and ready to attach to the existing signal door. The installer merely removes the old visor, lens, and reflector, attaches the new unit with four screws inserted in existing holes in the old door, and wires the new leads to a terminal block in the 8 inch signal section. It has been found that this can be done by one man in 15 minutes.

The principle object of the invention is to provide a traffic signal adapter to convert an 8 inch signal to a 12 inch signal.

It is another object to provide a traffic signal adapter for most facile assembly to an existing small traffic signal.

It is another object to provide a traffic signal adapter designed to use a reflector, lamp holder, door, and lens of standard manufacture.

It is another object to provide an adapter casting designed to be universally applicable to substantially all traffic signal doors in use today.

The invention will be described with reference to the following drawings of which:

FIGURE 1 is a projection of the traffic signal adapter affixed to a standard three section 8 inch signal.

FIGURE 2 is a side view of the adapter affixed to a standard signal assembly.

FIGURE 3 is a front view of the assembly.

FIGURE 4 is a projection of the traffic signal adapter with the large door open.

The traffic signal adapter is shown in FIGURE 1 attached to a standard three section 8 inch traffic signal. The three section signal 1 has had the topmost visor 2 removed and the adapter 3 affixed in its place. It can be seen that the adapter 3 consists of a rectangular body 4, a rectangular door 5, a circular lens 6 and a visor 7. The body 4 has two hinge bosses 8, 9 which coact with hinge bosses 10, 11 on the door 5. Two latches 12, 13 are provided on the opposite side for securing the door 5 to the body 4. The adapter 3 is designed with smooth lines and surfaces to reduce accumulation of dust and dirt and to present a pleasing appearance. The 12 inch lens 6 is located ahead of and above the smaller amber and green lenses 14, 15 to give it added effectiveness. The axis of the optical system in the 12 inch signal 3 is horizontal but the prisms in the lens 6 throw the light rays down so that the beam intersects the pavement some 300 feet from the signal.

A side view of the multi-section signal assembly is shown in FIGURE 2. The body 4 of the adapter has a larger rectangular front and a smaller semi-rectangular back. The front of the casting is designed to be closed with a standard 14 inch square door 5 which is hinged and latched to the adapter body 4. Latches 12, 13 are shown near the bottom and top edges of the rear side of the door. Semi-rectangular is here defined as generally rectangular with the midpoint of the sides displaced outward somewhat.

The sides of the adapter casting 4 form the simplest transformation from the rectangular front opening to the semi-rectangular rear opening. The center of the front opening is displaced upward from the center of the rear opening so that the adapter, when assembled to a multi-section signal, does not interfere with the signal door which opens below it. The bottom front edge of the adapter is located on a horizontal plane through the bottom edge of the signal door to which it mounts. This insures that it will not interfere with the opening of the door on the center signal section.

The front view of the completely assembled signal shown in FIGURE 3 illustrates the superior size and signal area of the 12 inch lens when compared with an 8 inch lens. Although the diameter of the lens is increased only 50 percent
The area of the lens is increased 125 percent.

\[ \frac{\pi \times d^2}{\pi \times 6^2} = \frac{6^2}{16} = 0.25 \]

The larger housing and optic system accommodates a larger bulb. The unit is shipped with a 150 watt bulb instead of the 8 inch signal sections normally used with a 67 watt bulb. Thus, the wattage is also increased 125 percent. The luminosity, or brightness of the lens, remains constant so as not to be disagreeable to the eye.

The adapter housing is shown in greater detail in FIGURE 4. An inside view of the body housing 4 shows the circular opening 16 in the rear surface, and the rectangular opening 17 in the front surface. Four elongated holes 18 are equally spaced around the circular opening in the rear surface of the housing and permit the attachment of the body to a standard traffic signal door 19. The holes 18 line up with four holes in a standard signal door 19 which were previously used to fasten the visor 2 to the door. On doors which do not have four holes located in line with the elongated holes 18, the body itself may be located in place temporarily and the door marked so that four holes may be drilled in the proper location. The contours which make up the optic system are also shown in FIGURE 4. They consist of a cast aluminum reflector holder 21, a silvered glass or aluminum reflector 22, a wire form lamp holder 23, a lamp socket 24, an electric lamp 25, and the lens 6.

The reflector holder 21 is hinged into the adapter housing 4 with two hinge pins 26 and 27. When it is hinged back into the housing it snaps into place because leg 29 springs over a raised detent in the bottom edge of the base 4. Leg 28 provides additional backing support for the reflector holder 21 when the unit is closed and the gaskets compressed.

The silvered glass reflector 22 is a true parabola and is seated in a gasket 30. The reflector is held against the reflector holder 21 by the spring force supplied by the wire form 23. A wide flange on the lamp socket 24 is compressed against the reflector 22 by wire form 23. A gasket, not shown, is provided between the flange on the lamp socket 24 and the rear surface of the reflector 22.

The lamp 25 may be a 150 watt bulb designed to have a fixed focal length. The bulb is screwed into socket 24. The socket may be moved forward or rearward by loosening the screw (not shown) compressing the wire form to the lamp socket. After the bulb is adjusted so that its filament is at the focal point of the reflector, the screw may be tightened to fix the socket in the wire form. Also available is a fixed focus socket which eliminates the need for adjustment when bulbs with a common fixed focal length are used.

The lens 6 is designed to refract the parallel light rays from the parabolic reflector into a pattern of the type prescribed by the Institute of Traffic Engineers, for example. The lens 6 is gasketed with a rubber ring 31 which is attached to the signal door 5 with four clips 32. The front surface of the silvered reflector is thus sealed against dust and moisture. The rear surface of the reflector is adequately protected with paint or varnish. Two electric conductors 33 from the lamp socket 24 lead down to a terminal block in a lower signal section and thence to the traffic signal controller.

The front edge of the rectangular front opening 17 of the housing body 4 is rounded into a lip which seals against the door 5. The front opening 17 is 1.25 units wide. Two latches 12, 13 are screwed down, the lip imbeds into gasket 34 and seals the front opening. The rear opening 16 is also sealed with a gasket compressed between the back of the casing 4 and the face of the small door 19. Thus, the entire unit is sealed against dust, dirt, and moisture.

The shape of the housing body 4 has not been explained thoroughly because the exact shape is unimportant to the invention. In the form of the invention disclosed herein the body 4 is in part rectangular and in part an offset truncated pyramid. Actually, the walls assume the simplest plane transition between a rectangular or square front opening and a semi-rectangular or circular rear opening. The only other condition imposed is that the walls must not interfere with the reflector holder 21, reflector 22, wire form 23, or lamp socket 24. The rear surface of the body may be closed solid if the body is made deeper, front to rear, or if the optic system is shortened. The body may also be made circular, as a truncated cone.

The traffic signal adapter disclosed herein may also be mounted on the bottom signal section by inverting the entire assembly. The lens and visor would remain in their normal position with their tops up, however, to provide the proper light distribution and sun shading. In this position the large signal would be particularly useful as a pedestrian signal with a WALK lens, or as a right turn or left turn unit with arrow lenses.

It is envisioned also that a two section signal could be converted to a pedestrian signal with one of the adapters mounted in its normal position on the upper signal section and a second adapter of the same design with its normal position on the lower signal section. The lenses would carry the legend Walk and Wait.

The adapter has been designed to use all standard parts but may also be designed to use specially built parts, or any combination of standard and special parts. The adapter, or parts of it, may be cast, die cast, fabricated, spun, or molded of plastic. The material may be aluminum, magnesium, cast iron or steel, or plastic.

The lens may be rectangular, square, or circular. The method of attaching the adapter to the small signal may be changed. The rear surface of the adapter may be shaped like the small door and hinged to the 8 inch signal section.

Any and all of these changes may be made without departing from the spirit of the invention as defined in the appended claims.

1. A vehicular traffic signal adapter which may be secured to the door of an existing substantially smaller traffic signal, including in combination: a traffic signal enclosure comprising a housing having a front face and a back face and an opening formed in each of said faces; said enclosure including walls connecting said front face and back faces, said front face opening being substantially larger than said back face opening, one edge of said front face lying in substantially the same horizontal plane with a corresponding edge of said back face; means for attaching said back face to the door of the existing smaller traffic signal; lens and sealing means secured to and enclosing the opening in said front face of said enclosure; optic means and light generating means mounted in said enclosure, said light means adapted to illuminate said lens; said lens displaced axially away from, and with the horizontal axis of said lens displaced upwardly from the horizontal axis of said back face opening and, when installed, of said door of said smaller existing traffic signal.

2. A traffic signal adapter for converting a multisection signal having nominal eight inch signal lenses to a signal having a nominal twelve inch lens in at least one section without disassembly of the multisection signal, including in combination: a traffic signal enclosure having a circular lens of nominal eight inch diameter; said section having a circular lens of nominal eight inch diameter; an adapter signal including a signal casing having an open back of generally circular configuration of nominal eight inch diameter, said signal casing also having an opening in the front thereof of generally circular configuration of nominal eight inch diameter, the lower portion of the circumference of said front circular opening being in substantially the same horizontal plane as the lower portion of the circumference of said rear
circular opening; means for attaching said adaptor signal to one section of said multisection signal with said rear circular opening in registry with the opening formed by removing the lens of said one section; a nominal twelve inch diameter circular lens mounted in said front opening of said signal casing; an optic means and light generating means mounted in said casing.

3. A traffic signal adaptor, comprising: a housing having substantially parallel front and rear faces; an opening in said rear face substantially the size of a lens opening of one section of a conventional three-section traffic signal; a door having an opening forming a part of said front face of said housing and pivotally mounted therein; a lens mounted in said opening in said door, said lens having at least twice the area of a lens of one section of said conventional three-section traffic signal; the horizontal axis of said lens in said opening and said door being parallel to and displaced upwardly from the horizontal axis of said opening in said rear face; a reflector pivotally mounted in said housing; means for supporting a lamp bulb in said reflector for projecting a beam of light from said bulb through said lens; and means passing through the lens opening of said one section to connect said bulb to a source of power.

4. In an apparatus of the character described for converting an end section of a conventional multisection traffic signal to an enlarged traffic signal, comprising: a housing having a front face, and a smaller rear face, and walls tapering from said front face to said rear face; door means having an opening formed therein pivotally mounted to said front face; an opening formed in said rear face; means for securing said housing in abutting relation to a section of said multisection signal with the opening in said rear face substantially coinciding with a lens opening in said section of said multisection signal; reflector mounting means pivotally mounted in said housing; a parabolic reflector mounted in said reflector mounting means; a lens mounted in said opening in said door means, with the horizontal axis of said lens and said door means being parallel to and displaced from the axis of said opening in said rear face and said lens opening in said section of said multisection signal; said lens being substantially larger than a lens of a conventional signal; means for mounting a lamp bulb in said reflector; and means for supplying power to said lamp passing through said lens opening in said section of said multisection signal.

5. An assembly for converting a traffic signal having a small lens, optic system, and lamp, to a traffic signal unit having a large lens, optic system, and lamp, comprising: an adaptor housing having a large front face and a smaller rear face and walls therebetween tapering rearwardly from said front face to said rear face; the bottom edges of the front and rear faces being in a common horizontal plane; a door having an opening formed therein pivotally mounted to said front face for obtaining access to the interior of said adaptor housing; a lens mounted in said front face substantially larger than said small lens; a reflector support pivotally mounted in said housing; a reflector mounted in said support; lamp bulb mounting means mounted in said reflector; an opening in said rear face adapted to be placed in abutting relationship with a lens opening in the traffic signal to be converted; means in said rear face for mounting said adaptor housing with said rear face in abutting relationship with said lens opening in said traffic signal to be converted, such that when the adaptor housing is assembled to the traffic signal to be converted, the horizontal axis of said lens in said door, and of said reflector is parallel to and displaced from the horizontal axis of the lens opening in the traffic signal to be converted.

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