June 27, 1939. J. M. PAVER 2,163,960

ROAD STRIP

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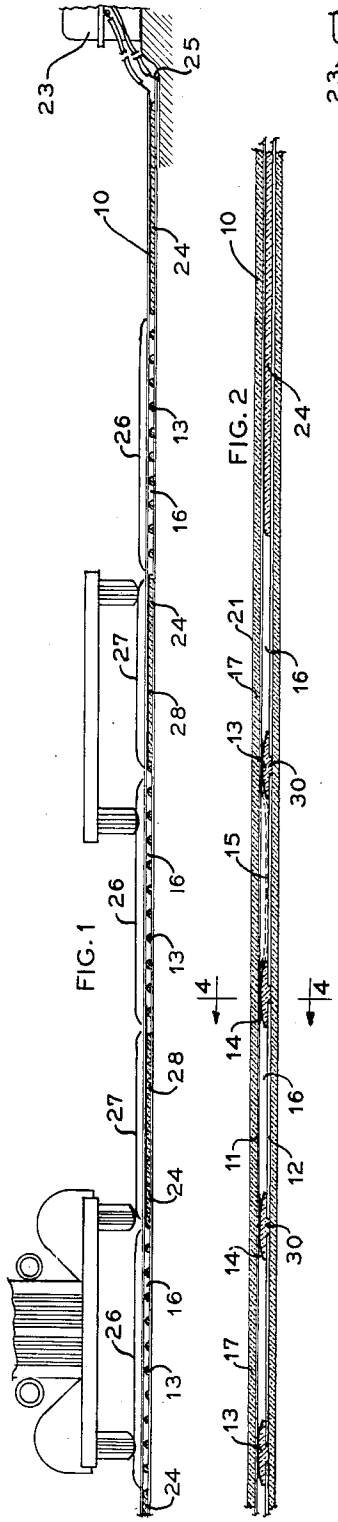


FIG. 1

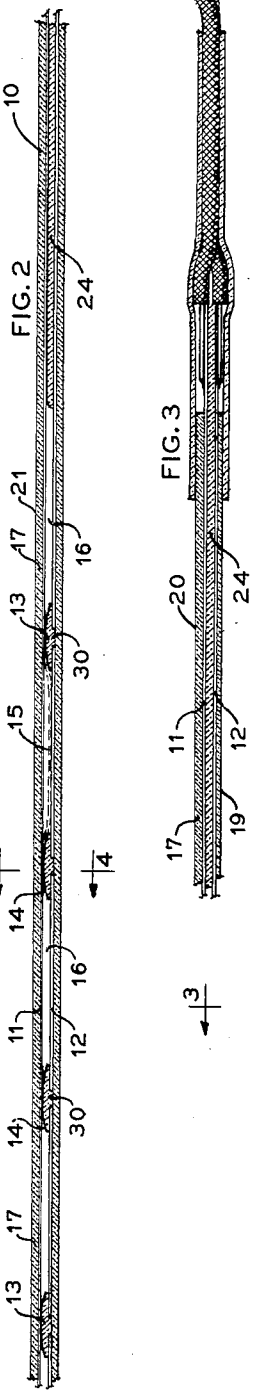


FIG. 2

FIG. 3

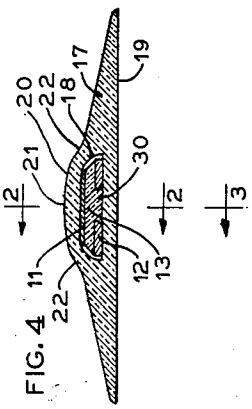


FIG. 4

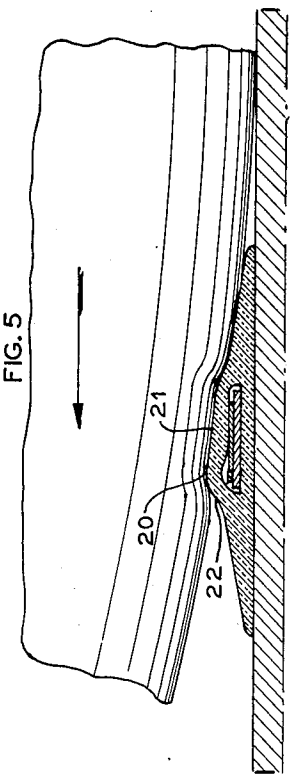


FIG. 5

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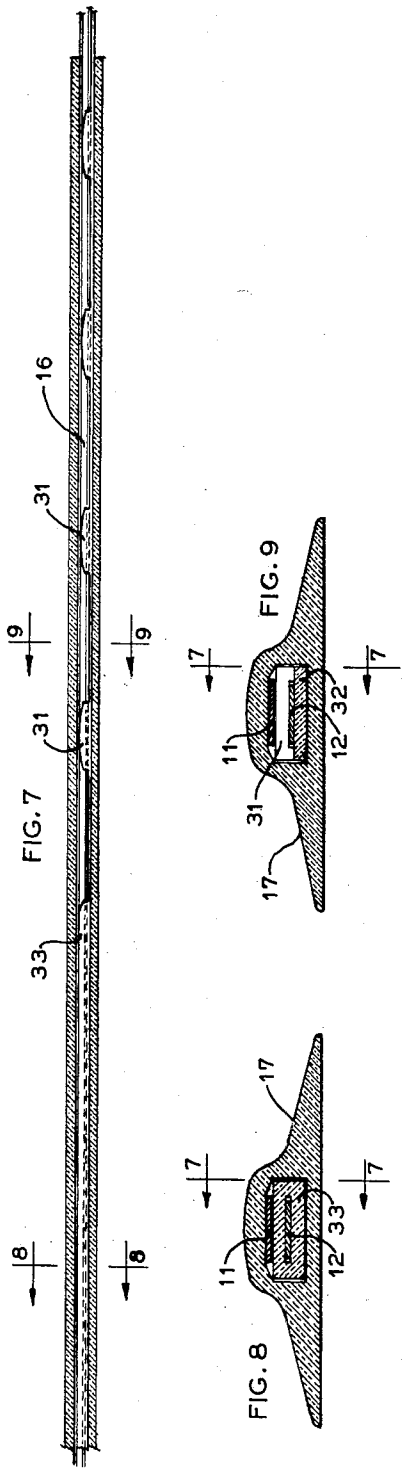


FIG. 7

FIG. 9

FIG. 8

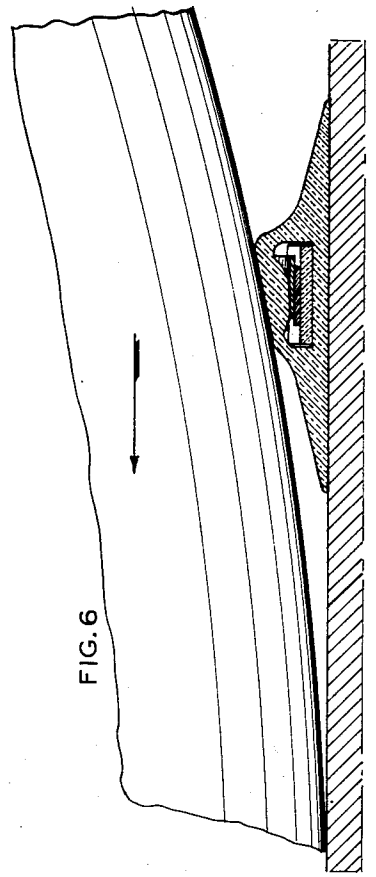


FIG. 6

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ROAD STRIP

John M. Paver, New York, N. Y.

Application December 7, 1936, Serial No. 114,597

5 Claims. (Cl. 200—86)

This invention relates to a road strip designed to be actuated by vehicles in connection with the counting of traffic and for other purposes.

The invention may be readily understood by reference to one illustrative embodiment thereof shown in the accompanying drawings.

In said drawings:

Fig. 1 is a longitudinal section of a strip applied to a roadway;

Fig. 2 is a longitudinal section of the strip on a somewhat larger scale, being taken on the plane 2—2 of Fig. 4;

Fig. 3 is a longitudinal section of the end of the strip showing the method of connecting terminals or lead-in wires;

Fig. 4 is a transverse section of the strip taken on the plane 4—4 of Fig. 2;

Figs. 5 and 6 are transverse sections of the strip illustrating the action of a vehicle wheel on the strip; and

Figs. 7, 8 and 9 illustrate another method of preventing displacement of the spacers, Figs. 8 and 9 being transverse sections on the planes 8—8 and 9—9 respectively of Fig. 7.

The illustrative road strip 10 is particularly advantageous in connection with the study or counting of vehicular traffic since it permits installation of the traffic counting apparatus quickly at strategic points without altering or impairing the road surface and without special structure in the pavement to receive it. Indeed it may be installed practically without interruption of traffic.

As here shown, the strip comprises a pair of spaced electrical conductors, at least one of which is movable relatively to the other and is resilient so that it will not be permanently distorted by the passing traffic. In the present instance these conductors are in the form of spaced strips 11 and 12 of resilient metal, such as Swedish high carbon ribbon steel which will not be permanently distorted or deformed by the forces exerted thereon by vehicle wheels. Such strips may be about ⅜ of an inch in width, although the upper strip be somewhat narrower than the bottom strip because of the tapering character of the upper surface of the road strip. In this instance the upper strip 11 is $\frac{5}{16}$ of an inch in width and .010 of an inch in thickness, and the bottom strip which is not displaced by traffic but which, nevertheless, should advantageously be resilient to avoid being distorted by a rough road surface, is ⅜ of an inch in width and .020 of an inch in thickness.

The strips are held in separated relation by resilient or compressible spaced members here shown in the form of short, soft rubber blocks 13 which are preferably secured to one of the metal strips to maintain their spacing. The upper surface 14 of the spacers 13 is preferably longitudinally rounded to conform approximately to the curvature assumed by the upper strip 11 when it is depressed by a vehicle wheel, as indicated by dotted lines 15 (Fig. 2). This avoids concentration of stress on the metal strip which would otherwise occur if the spacer blocks had sharp corners.

The spacers 13 may advantageously be about ½ inch long and preferably have gaps 16 of about 1 inch in length, between them. The length and spacing of the spacers 13 depend somewhat on the stiffness of the upper conductor 11, as well as the character of and pressure delivered by the vehicle tires. The present arrangement has been found to be efficient.

The conductors and the intervening spacers are housed within a protective covering in the form of a rubber sheath or strip 17 having a longitudinally extending conduit 18 for the conductors. The strip 17 is preferably formed with a relatively wide base 19 (in this case about 1½ inches wide) by means of which the strip may be cemented to the road surface. The strip is relatively thin and its upper surface 20 is preferably tapering in contour so as to minimize the obstruction present to the passage of vehicle wheels and thereby to minimize the side thrust delivered to the strip. The maximum thickness of the strip (which occurs along its center line) may be less than ¼ of an inch and in this case is .2 of an inch. The middle portion 21 of the top of the channel enclosing the contact strips is somewhat thickened (see Figs. 4 and 5); and at 22 (at the sides of the channel) the wall is made relatively thin so as to yield a bulge readily under tire pressure, to cause the thicker central portion 21 to bulge downwardly (see Fig. 5) to depress the upper contact strip so as to make a surface contact instead of a point contact. Figs. 5 and 6 illustrate both how the action of a wheel in passing over the strip slightly displaces the upper strip to cause rubbing which improves the electrical contact and how the strips are caused to separate over their entire contacting surfaces (as contrasted with a tilting separation which would concentrate at one point the actual breaking of contact), thereby avoiding destructive sparking.

The strip may be cemented across a roadway by means of a plastic cement such as ordinary

rubber tire cement, which will hold the strip with firmness, yet permit its removal without destruction of the strip. The rubber cement is quick drying and permits the laying of a strip with practically no interference with traffic. The conductors 11 and 12 are, of course, connected with the traffic counting apparatus 23 which may be of any appropriate design, such as that disclosed in my copending application, Serial No. 700,449, now Patent No. 2,067,336, dated Jan. 12, 1937 of which the present application is a continuation in part.

The road strip may advantageously be made up with long spacer strips 24 having such arrangement relative to the short spacers 13 as to make it certain that the wheels on at least one side of a vehicle will pass over on that portion of the strip wherein the conductor strips 11 and 12 are separated by short spacers (see Fig. 1). The long spacer strips have a number of advantages. For example, adjacent the side or curb 25 of a roadway, where parking is permitted, the elongated spacer strips prevent a continuous electrical contact in the event a vehicle is parked with a wheel resting on the contact strip. Adjacent the side of the roadway, the elongated strips 24 should be slightly in excess of the vehicle wheel gauge. Since a moving vehicle will ordinarily not travel in close proximity to the curb, its outer wheels will, of course, make an electrical contact in the live section 26 of the strip just beyond the end of the curb spacer strip 24. Most States require that when parked, the vehicle wheels must not be more than 6 inches from the curb. If the curb spacer strip 24 be about 62 inches in length (which is about 6 inches greater than the tread gauge of the ordinary vehicle wheels) a vehicle may safely be parked along the curb without danger of causing an electrical contact. On the other hand, the strip will not be long enough to prevent moving vehicles from making an electrical contact beyond the end of the spacer strip.

The elongated spacer also advantageously prevents a double count which would otherwise result from vehicles traveling diagonally across the road strip. For such purpose, dead sections 27 alternate with live sections 26, the dead sections being those embraced within the length of an elongated spacer 24 and the live sections being those having the short spacers 13. In such an arrangement, the live sections 26 should be somewhat in excess of the vehicle tread guage (a section of about 60 inches in length being satisfactory) and the dead sections 27 should be less than the vehicle tread gauge in length (a length of about 50 inches being satisfactory). The exact length of the intermediate live and dead sections 26 and 27 will vary somewhat depending upon the width of the road. The space between the inner ends of the opposite dead curb sections 24 should be divided into alternate live and dead sections in such a way that the live sections should exceed the vehicle tread gauge, the dead sections comprising the remainder but always being less than the vehicle tread gauge.

Where it is desirable to make a separate count of vehicles traveling in each direction on the roadway, independent road strips or circuits and counting apparatus are employed for each half of the roadway. In that event, the live portions of the road strips each should terminate short of the center of the roadway to leave a dead gap slightly in excess of a vehicle tread gauge, thereby making it impossible for a vehicle traveling down the middle of the road to register in both counting units. If both sets of counting apparatus be located on one side of the road, the road strip may be made physically continuous and the dead section at the middle of the road may be formed simply by an elongated spacer strip of the appropriate length. Lead wires from the outer half of the road strip may be carried through the other half of the road strip to the counting apparatus as disclosed in my copending application.

The spacers, and particularly the spacers 13 may advantageously be mechanically connected with one of the conductor strips (in this case the bottom conductor strip) so as to obviate the necessity of an adhesive, some of which might creep between the conductor strips and temporarily cement them together when they are brought into contact by a vehicle. One form of mechanical connection is illustrated in Figs. 2 and 4, wherein the bottom strip 12 is provided with longitudinal perforations through which portions 30 of the rubber body of the spacers may be pressed or extruded and if necessary vulcanized, to act as rivets in holding the spacers in place.

Figs. 7, 8 and 9 illustrate a different method of preventing displacement of the spacers. Here the spacing elements 31 are in effect an integral part of a rubber tubular member 32 which surrounds a contact strip, in this case the lower strip, 12, and are spaced to provide the usual gaps 16. Preferably the spacer unit is formed by vulcanizing or otherwise securing the side edges of separately formed spacer blocks to a rubber carrying strip which lies under the lower contact strip. The intermediate portions of the blocks should of course be free to provide slots or passages through which the contact strip may be threaded. The spacer unit may, of course, be formed from a tube in which sections had been cut out or omitted to provide gaps 16.

The dead or inactive sections of the strip are formed by surrounding a contact, in this case the lower strip, 12, by an imperforate tube 33 of rubber or the like which completely envelops the contact strip throughout the extent of the inactive sections.

In assembling a road strip, the aforesaid spacer units are cut to the lengths represented by the live and dead sections of the strip and then slipped over the lower contact strip, after which the latter strip and the upper contact strip are assembled and inserted in the outer sheath 17. The aforesaid arrangement effectively prevents displacement not only of the short spacers but the long spacer in the dead sections of the road strip.

The rubber covering 17 of the road strip may advantageously be formed by an extrusion process into strips of indefinite length, which may be cut to such length as required by the roadway. The rubber from which the strip 17 is made should be soft and of good quality, so as to withstand weathering and repeated impacts of the vehicle wheels without cracking or other damage.

Obviously the invention is not limited to the details of the illustrative embodiment, since these may be variously modified. Moreover, it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. An elongated contact strip adapted to be

placed on top of the surface of a roadway and comprising in combination an elongated electrical conductor made of a strip of resilient metal of such character as not to be permanently deformed by the forces exerted by heavy passing traffic, a return conductor and spaced insulating devices between said conductors for holding the same out of electrical contact with each other, the upper conductor being adapted to be deflected by the forces of traffic to bring said conductors into electrical contact, a cover around said conductors to protect the same and exclude dirt, said cover having a relatively wide and flexible bottom whereby it may be laid upon and cemented to the surface of the road and being relatively low in height and having the upper surfaces of its side margins beveled so as to minimize the tendency of rapidly moving traffic to displace said strip.

2. A road strip comprising in combination separated upper and lower metallic contact strips having spaced insulating devices between them to hold them normally separated, said strips being adapted to extend across a roadway and to be brought into electrical contact between said insulating devices by pressure of a vehicle wheel, a tubular rubber sheathing having a relatively low height around said strips, said strips being located along the central line of said sheathing inside its tubular portion, said sheathing having a wide base for attachment directly to a road surface and having its side margins tapered to provide thin side edges, said sheathing having a relatively thin wall adjacent the edges of said strips adapted to flex readily under a vehicle wheel running upon said strip, the tapered contour of said side margins permitting a vehicle wheel to cross the same without substantial lateral thrust and the pressure of the wheel upon said margins serving to anchor the strip against lateral movement as the wheel passes over the thicker central portion of said strip.

3. A road strip for use in traffic registering apparatus comprising in combination upper and lower metallic contact strips adapted to extend across a roadway and to be brought into electrical contact by the pressure of a vehicle wheel, spacer strips between said contact strips of a length less than vehicle wheel gauge, said spacer strips being separated longitudinally by distances greater than vehicle wheel gauge, said contact strips having short insulating separators between them in the regions between said spacer strips, said insulating separators being spaced so as to allow the upper contact strip to be depressed into contact with the lower contact strip under pressure of a vehiclel wheel, and a flexible sheathing covering said strips and having a wide base adapted to be cemented directly to a road surface.

4. A road strip for use in traffic registering apparatus comprising in combination a plurality of longitudinally extending contact sections having upper and lower metallic contact strips adapted to be brought into electrical contact by the pressure of a vehicle wheel, said contact sections being slightly longer than vehicle wheel gauge and being longitudinally separated by a distance slightly less than vehicle wheel gauge whereby to prevent erroneous traffic registration by vehicles crossing the strip diagonally, said sections being covered by a flexible protective covering having a relatively wide base by which the same may be applied directly to the surface of the roadway.

5. A road strip comprising in combination upper and lower metallic contact strips adapted to extend across a roadway, a plurality of insulating spacers between said contact strips and being spaced apart sufficiently to permit the upper contact strip to be depressed into contact with the lower strip under pressure of a vehicle wheel, spacer strips of a length slightly greater than vehicle wheel gauge being located between said contact strips adjacent the side edges of the roadway to prevent contact between said contact strips by a vehicle parked along the edge of the roadway, and a flexible covering surrounding said contact strips.

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