

[54] TRAFFIC SIGNALS

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[22] Filed: **Mar. 20, 1973**
[21] Appl. No.: **343,145**

[30] **Foreign Application Priority Data**
Mar. 20, 1972 Great Britain 12959/72
[52] **U.S. Cl.** **404/16**
[51] **Int. Cl.** **G08g 1/00**
[58] **Field of Search** 116/63, 63 P; 404/10-16

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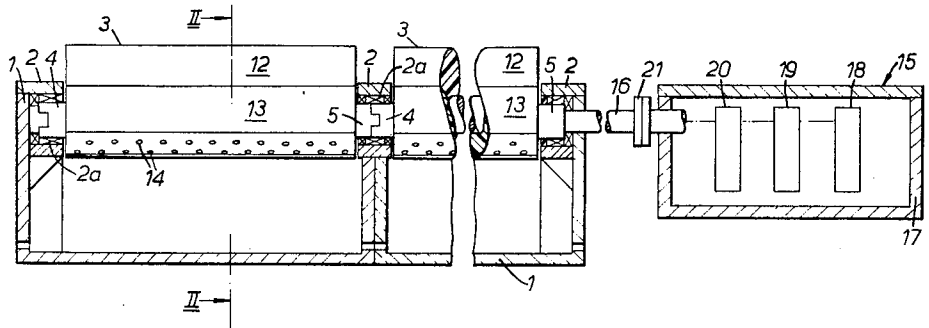
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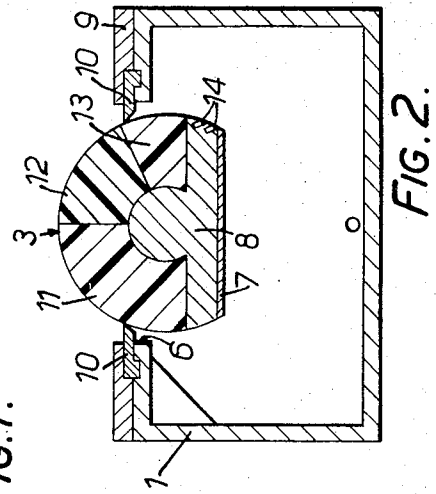
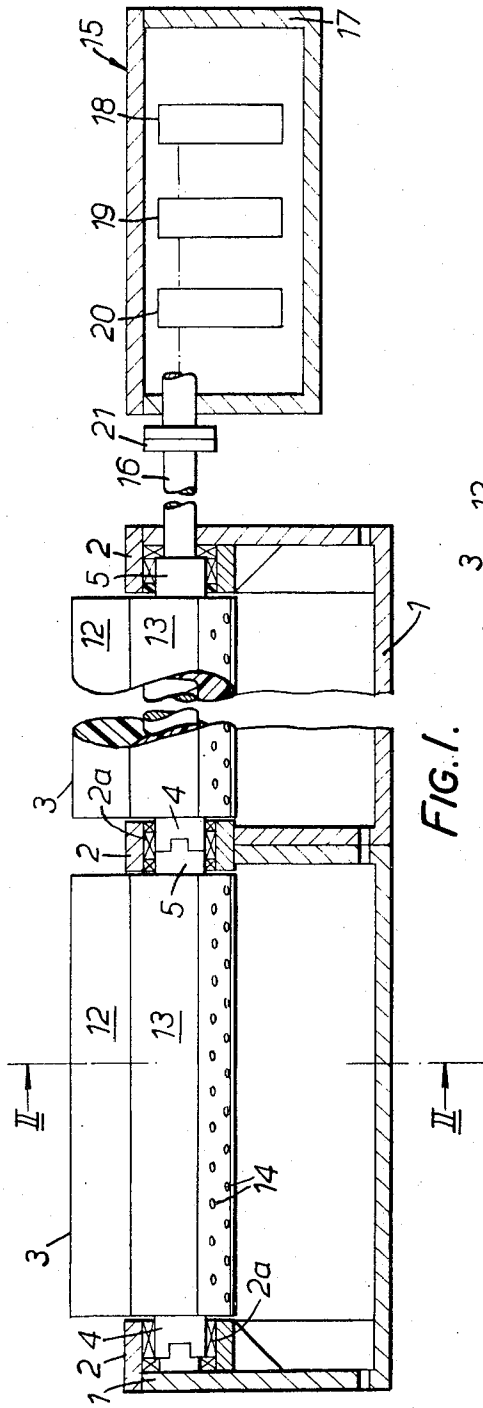
[57] **ABSTRACT**

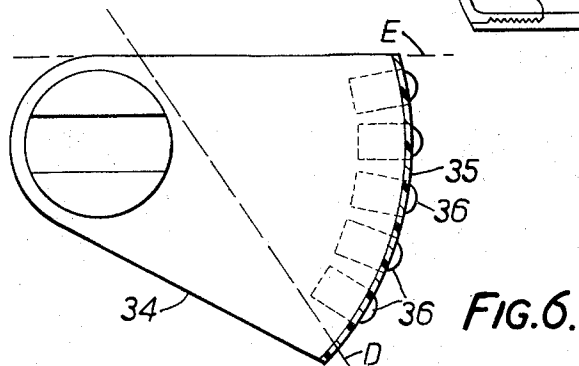
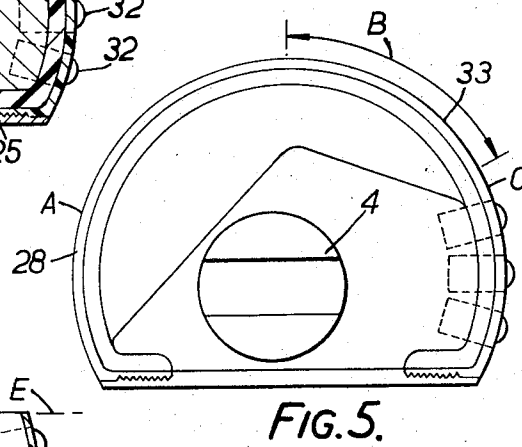
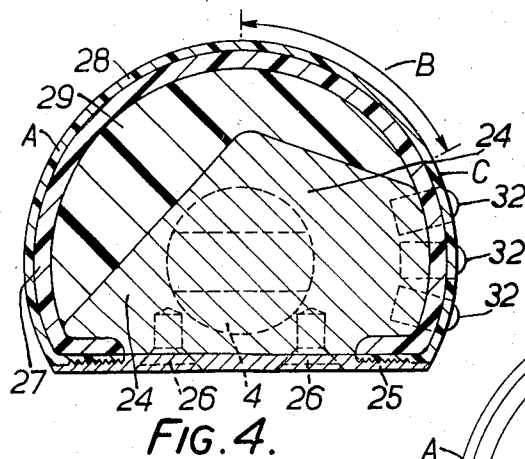
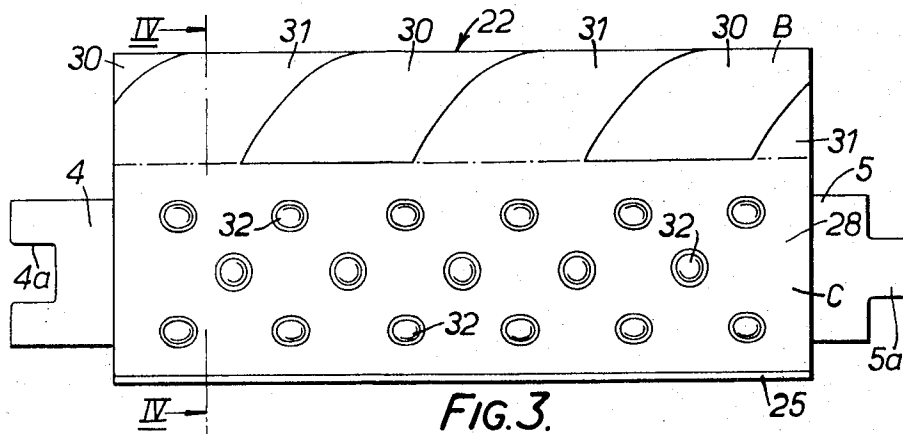
A traffic signalling device has a housing adapted to be inset into a road surface flush with the latter. It includes a signal member in the form of a roller which can be selectively turned from an inoperative position, in which it does not project above the road surface, to an operative position in which it does project so as to impart shock to the wheels of vehicles passing over the device. The roller has peripheral sections of different effective resilience so as to impart different degrees of shock according to the selected operative position of the roller. The sections also have a different visual appearance to provide corresponding visual signals.

In a traffic control system a plurality of such devices can be installed at spaced intervals in the road surface and controlled remotely. The shock effect as a driver passes the first device draws his attention to the signal and ensures that his attention is called to the signal provided by the subsequent device or devices.

14 Claims, 7 Drawing Figures







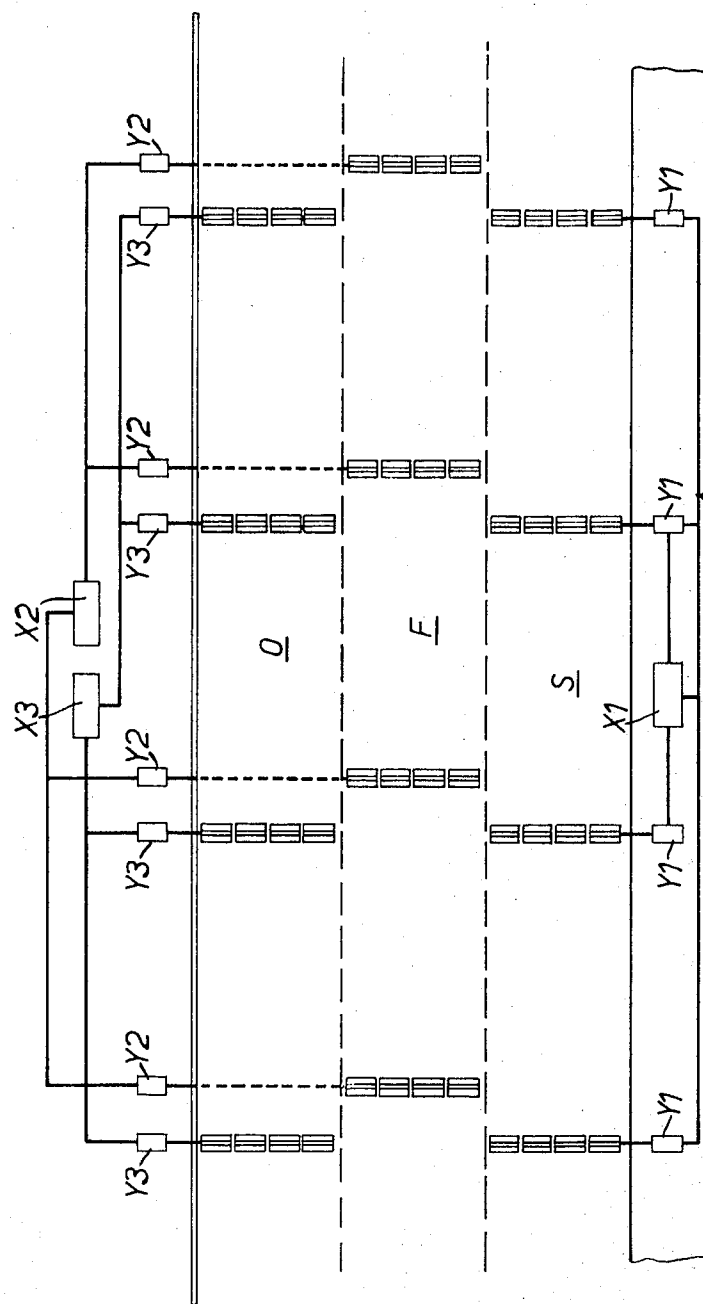


FIG. 7.

TRAFFIC SIGNALS

This invention relates to road traffic signals.

Conventional traffic signals can not only be ignored but they may be passed unnoticed. It is possible for drivers to become "hypnotised" in fog so that they are unaware of speed and objects and signals outside their own vehicle. On high speed roads it is also possible for drivers in fine weather or during darkness to lose concentration and become unaware of external events, so permitting a potential hazard to develop. The invention has for its object to provide a signalling device which cannot be passed unnoticed by a driver.

According to the invention a traffic signalling device is adapted to be inset into the road surface and includes a signal member selectively shiftable from an inoperative position to an operative position projecting from the road surface so as to impart shock to the wheels of vehicles passing over the device. Preferably the device includes a housing for fitting into the road surface and from which the signal member projects when in said operative position.

The housing is preferably adapted to be fitted flush with the road surface and the signal member desirably has an inoperative position in which it is substantially flush with an upper aperture in the housing through which aperture it projects when in the operative position. Thus, in the inoperative condition the device is substantially imperceptible, and the operative position may be one of a plurality of such positions which respectively impart different degrees of shock to the vehicle.

Preferably the housing comprises a long, hollow-section box with a wide longitudinal slot along the top face of the box providing said aperture. The signal member may be provided by a roller mounted longitudinally within the box on bearings, the design of the roller being variable to suit the signalling purposes. The roller may be one of a plurality of rollers mounted end to end along the box and rotationally coupled each to the next. The or each roller may comprise a central shaft with a flat plate attached thereto and which provides a flush closure for the top slot when in the inoperative position, and a portion or portions which project in the operative position or positions may comprise a body of resilient material of appropriate hardness bonded to the shaft. A suitable material for this purpose is a polyurethane, and in a preferred embodiment three such portions span the free periphery of the shaft between the opposite side edges of the flat plate, these bodies being of progressively increasing hardness and possibly of progressive eccentricity so that the hardest has the greatest projection when in the corresponding operative position. The periphery of the roller is cylindrical between the side edges of the plate.

The different portions of resilient material may, in addition to being of different hardness, have distinctive colouring so as to be identifiably visible ahead of the vehicle, and means for rotating the roller between its various effective positions preferably comprise a hydraulic motor at one end of the box. The motor may be controlled remotely from a traffic signal centre, and when a series of devices are fitted into the road they may be linked together for common control. A shock-absorbing coupling is preferably provided in the drive from the motor, whereby to absorb the shock of a vehicle hitting a projecting roller. The housing may be

made in one or more standard lengths adapted to be coupled together so that a plurality of devices, arranged end to end, can span any standard width of highway or traffic lane.

The control system associated with an installed device preferably allows alternative remote, local or manual control, or any combination thereof. The box forming the housing may be provided with resilient scrapers fitted along each side of the top slot in contact with the cylindrical periphery of the roller or rollers. These scrapers perform the dual purpose of wiping the roller during rotation and also providing a seal against the ingress of liquid or solid matter. The box may be provided with means of draining excess liquid and preferably also for flushing out to dispose of accumulated grit and other solid matter.

The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, signalling devices in accordance with the invention and with a housing in the form of a cast hollow-section box. In the drawings:

FIG. 1 is a diagrammatic front elevation of a plurality of similar devices arranged end to end with a common control system,

FIG. 2 is a sectional view on the line II — II in FIG. 1,

FIG. 3 is a front elevation of a modified form of signal member for use with the devices of FIGS. 1 and 2,

FIG. 4 is a sectional view on the line IV — IV in FIG. 3,

FIGS. 5 and 6 are diagrammatic end views of alternative forms of signal member, and

FIG. 7 is a diagrammatic lay-out of a number of signalling devices under common control installed in a three-lane carriage way.

Referring first to FIGS. 1 and 2, each device comprises an elongated rectangular hollow-section cast metal box 1 provided at the ends with aligned bearing housings 2 containing shell bearings 2a. A roller 3 providing the corresponding signal member has end stub shafts 4 and 5 which are mounted in the bearings 2a. The shaft 4 has a diametrical slot 4a across one end and the shaft 5 is formed with a complementary projecting dog 5a formed at the other end (see particularly FIG. 3), so that the dog 5a of one roller 3 couples into the slot 4a of the next and so on. The top of the box 1 is provided with a longitudinal slot 6, so that in the operative position a chosen proportion of the periphery of the roller 3 may protrude through the slot 6 as shown.

When a roller is turned to the inoperative position a flat steel plate 7, attached to the inoperative position a flat steel plate 7, attached to a forged metal core 8 of each roller 3, virtually fills the slot 6 in the corresponding box 1, so that the device is substantially imperceptible to passing traffic and the slot is closed against the ingress of liquid or solid matter. The box 1 is set into the road surface with its top flush therewith, and a slotted top plate 9 holds in position resilient scrapers 10 which extend along the longitudinal edges of the slot 6 and which provide a crude lip-type seal with respect to the periphery of the roller 3, which periphery is in part provided by side edges of the core 8 and the roller plate 7. On the shaft side of the plate 7 the roller 3 comprises a body of resilient polyurethane moulded about the core 8 and providing a part-cylindrical periphery for the roller between the side edges of the core 8, which

plate is disposed chordally with respect to a section of the cylinder.

In the operative position of the roller 3 shown the resilient periphery projects through the slot 6 and hence projects above the road surface. The resilient portion of the roller 3 consists of three segments 11, 12 and 13; the segment 11 is comparatively soft and is coloured yellow, the segment 12 is somewhat harder and is striped red with yellow, while the segment 13 is harder still and coloured red. This, the colours chosen being by way of example, renders the projecting roller visible to approaching traffic, and the resilient material drums under the tyres and produces a slight judder in the vehicle suspension. The loudness of the sound and the severity of the shock in the vehicle can be varied by altering the hardness of the resilient material and is, of course, also dependent on the degree of projection. The described roller can be rotated to selective positions in which oncoming drivers are presented with three different colour signals, for example "Caution," "Extreme Caution" and "Stop" in addition to the neutral inoperative position. One part-cylindrical edge surface of the core 8 is fitted with reflective buttons or "brilliants" 14 for visibility to approaching traffic at night.

It will be appreciated that any number of devices can be set into the road aligned end to end with the roller shafts 4, 5 of adjoining rollers 3 coupled together, with the end roller coupled (FIG. 1) to a drive unit 15 through a short shaft 16. The drive unit has a housing 17 alongside the road surface and comprises a low-speed hydraulic motor 18 connected in a control system for local or remote control, a flexible drive coupling (not shown) between the motor 18 and a torque limiter 19, a disc brake or detent tongue and rotary positional sensing device 20, and a torsion shockabsorber 21. The output member of the shock-absorber 21 is connected to the drive shaft 16. The disc brake or detent tongue is controlled in accordance with signals from the positional sensing device so that the coupled rollers 3 are accurately located in the correct signal position. The torque limiter 19 may be replaced by a relief valve in the hydraulic circuit of the motor 18, and the flexible coupling may in some circumstances not be necessary.

A preferred form of signal roller 23 is illustrated in FIGS. 3 and 4. The stub shafts 4 and 5 are embodied in the ends of a core forging 24, to which a flat plate 25 (corresponding to the plate 7) is attached by countersunk screws 26. Attachment of the plate 5 anchors the ends of a main polyurethane sheath 27, and of a display sheath 28 bonded thereto, to the core 24. The space between the sheath 27 and the core 24 is filled with in-situ moulded cellular polyurethane, which is thus bonded both to the core 24 and to the sheath 27.

The display sheath 28 is also made from polyurethane and, up to the top centre as drawn in FIG. 4, the left-hand section A of the periphery is coloured yellow, for example, and given a reflecting coating. It will be observed that this portion of the roller periphery bounds a considerable thickness of the cellular polyurethane filling, and is thus fairly easily flattened against the core 24. The next 60° section B of the periphery of the roller 22 is coloured with alternate red and yellow stripes 30, 31. This portion of the roller is more resistant to flattening due to the thinner cushion of cellular material

separating it from the core 24. The remaining section C of the display sheath periphery is coloured red and is separated from the core 24 only by the thickness of the main sheath 27; it is consequently virtually incompressible. Reflective buttons 32 fixed in the core 24 protrude through the display sheath 28.

The roller 33 shown in FIG. 5 is structurally similar to that of FIGS. 3 and 4, the only difference being that the rotational axis is disposed eccentrically with respect to the part-cylindrical periphery provided by the sheath 28. Thus the three peripheral sections A, B and C have a progressively increasing projection from the housing 1. The signal member 34 of FIG. 6 is, in effect, a solid roller segment the arcuate periphery of which has a resilient surface covering 35 from which reflector buttons 36 protrude. This member has one operative position, being designed mainly for use as a stop signal. The relative position of the road surface in the operative position is shown by the broken line D, the corresponding inoperative road surface position being alternatively shown by the broken line E.

A series of devices as described may be mounted in the road surface, for example being set a distance apart of about 44 feet. These devices may be commonly controlled so that they all show the same signal, and a typical lay-out of signalling devices in three traffic lanes of a dual track highway is shown in FIG. 7. A single power unit X1, which may be put into operation from a local or from remote stations, is connected hydraulically or electrically to four separate actuation and positional control units Y1. The units Y1 are each connected to a line of signalling devices spaced at 44 feet intervals along a slow lane S, four in-line devices spanning the lane width.

Similarly a power unit X2 is provided for four units Y2 controlling signalling devices in fast lane F, and a power unit X3 is provided for four units Y3 controlling the signalling devices in the overtaking lane O.

With such a signalling arrangement any driver passing over first device without noticing it upon approach would be made aware by sound and physical sensation that he had passed over a signal, and he would still have time to direct his attention to the road surface ahead at least in time to see the last one or two coloured signals provided by the successive devices. The different signal colours can be indicative of specific speed and other restrictions so that the appropriate authority can control traffic with the knowledge that although the signals may be ignored they cannot be passed unnoticed. If banks of signals are set at a specific distance apart, say half a mile, very close traffic control can be exercised from traffic control points. The traffic can be slowed progressively in advance of a particular hazard and, finally, the traffic in any lane or lanes can be brought to a halt if necessary.

It will be appreciated that various numbers of positions, colours and resilience combinations can be achieved with devices in accordance with the invention, the number obtainable being restricted only by the requirement for clarity of the signal to be transmitted to the drivers. The devices can be used to replace existing traffic signals, or to provide emphasis thereof, or they can be used to give advance warning of particular hazards. The hardness and/or projection of the resilient bodies can be such as to result in acute discomfort if the indicated speed limit is materially exceeded.

I claim:

1. A traffic signalling device adapted to be inset into a road surface and including an elongated signal member having a flattened side, means for mounting the signal member for rotation about its longitudinal axis, and selectively operable means for rotating the signal member between an inoperative position in which said flattened side is generally level with the road surface and an operative position in which it projects from the road surface so as to impart a noticeable shock to the wheels of a vehicle passing over the device whereby to give the vehicle driver a positive indication of the existence of the signal, said selectively operable means serving to maintain the signal member in the position into which it has been rotated.

2. A device according to claim 1, wherein said elongated signal member comprises a roller and said operative position is one of a plurality of selectable operative positions, the roller comprising different parts to provide different signals according to the selected operative position.

3. A device according to claim 1, wherein the means for rotating the signal member comprise a hydraulic motor and wherein a drive unit is provided including said motor and also including positional control means comprising means to brake the drive from the motor to the signal member.

4. A device according to claim 3, wherein rotary positional sensing means are provided controlling the braking means.

5. A device according to claim 1, wherein the signal member is in the form of a roller which has a shaft interengageable with the shaft of a roller of a similar device, with the devices aligned in end-to-end relationship.

6. A device according to claim 1, wherein the signal member is in the form of a roller which has a periphery which is eccentric with respect to the rotational axis of the roller whereby to give different degrees of projection in each of a plurality of operative positions.

7. A device according to claim 1, wherein the signal member is in the form of a roller the periphery of which includes portions which are distinctively and differently coloured.

8. A traffic signalling device adapted to be set into a road surface extending transversely thereof and including an elongated signal member rotatable about its longitudinal axis and having a flattened side, means for selectively displacing the signal member comprising a hydraulic motor coupled to the signal member through a shock-absorbing coupling, said motor being operable to move the signal member between an inoperative position in which said flattened side is generally level with the road surface and an operative position in which, in use, it projects from the road surface so as to impart a noticeable shock to the wheels of a vehicle passing over the device whereby to give the vehicle driver a positive indication of the existence of the signal.

9. A device according to claim 8 including a box like elongated and open-topped housing adapted to be set into the road surface and having a longitudinal slot along its top face through which the signal member

projects when in said operative position.

10. A device according to claim 9, wherein the signal member is provided by a roller mounted longitudinally within the housing and having a metal core covered by resilient material.

11. A device according to claim 10, wherein the resilient material covering the metal core of the roller has portions of different thicknesses extending over different sectors of the core.

12. A traffic signalling device adapted to be set into a road surface extending transversely thereof and including an elongated hollow-section housing with a longitudinal slot along its top face, an elongated signal member rotatable about its longitudinal axis and having a flattened side, means for holding the signal member in either an inoperative position with said flattened side flush with the longitudinal slot in the housing or an operative position in which the signal member projects through said slot so as to impart a noticeable shock to the wheels of a vehicle passing over the device, the member being selectively rotatable between said inoperative and said operative positions and being provided by a roller mounted longitudinally within the housing, the roller having a metal core covered by resilient material of different thicknesses over different sectors.

13. A traffic signalling device adapted to be set into a road surface extending transversely thereof and including an elongated hollow-section housing with a longitudinal slot along its top face, an elongated signal member rotatable about its longitudinal axis and having a flattened side, means for holding the signal member in either an inoperative position with said flattened side flush with the longitudinal slot in the housing or an operative position in which the signal member projects through said slot so as to impart a noticeable shock to the wheels of a vehicle passing over the device, the member being selectively rotatable between said inoperative and said operative positions and being provided by a roller mounted longitudinally within the housing, portions of the roller periphery projecting different distances through said slot in the housing such that there are at least three operative positions of the signal member.

14. A traffic signalling device adapted to be set into a road surface extending transversely thereof and including an elongated hollow-section housing with a longitudinal slot along its top face, an elongated signal member rotatable about its longitudinal axis and having a flattened side, means for holding the signal member in either an inoperative position with said flattened side flush with the longitudinal slot in the housing or an operative position in which the signal member projects through said slot as to impart a noticeable shock to the wheels of a vehicle passing over the device, the member being selectively rotatable between said inoperative and said operative positions and being provided by a roller mounted longitudinally within the housing, the roller being covered by a resilient material which includes portions of different physical characteristics.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,844,667 Dated October 29, 1974

Inventor(s) Rosslyn Fitton-Kearns

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the name of the assignee, "Makearm" should read
-- Makearn --.

Signed and sealed this 11th day of February 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks