

PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventors: MEURIG HILL EVANS, ROBIN ARTHUR WARREN ELSEY
and HAROLD PHILIP FREEDMAN

847.972



Date of filing Complete Specification (under Section 3 (3) of the Patents Act, 1949): Jan. 12, 1959.

Application Date: Jan. 22, 1958.

No. 2215/58.

Application Date: March 31, 1958.

No. 10259/58.

Application Date: July 28, 1958.

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COMPLETE SPECIFICATION

Improvements in or relating to Indicator Means

ERRATA

SPECIFICATION No. 847,972

Page 5, line 16, for "operation" read "operative"

Page 6, line 43, for "indicator" read "invention"

THE PATENT OFFICE
3rd April 1964

to provide a symbol thereon, this plate then
being illuminated by a source of light located
along one edge. Such an arrangement is very
25 efficient for providing a single indicator but
becomes inefficient when it is desired to provide
a plurality of symbols for selective display
in the same place. Thus, for many reasons
it is not practical to superpose a plurality
30 of flat plates and to edge-illuminate each one
selectively in this manner in order to provide
for the necessary indication, for if it is intended
to provide ten such plates in order to give
the selective indication of the numbers
35 0 to 9, it will be found that the dimensions
of the sources of illumination, e.g. pea lamps
or festoon lamps, are so great that the spacing
between the plates must be of the order of
5 to 6 mm. so that the overall thickness of
40 the stack would be of the order of 5 cm. or
more with the result that the angle of view
over which the bottom plate is adequately
visible is so limited that the arrangement is,

conveniently be made of a methyl methacrylate 65
resin such as that generally known under
the name Perspex (Registered Trade Mark).
The light transmitting passage may be in the
form of a projection arranged to extend rear-
wardly from, being unitary with, each plate 70
and the source of illumination being, therefore,
arranged in rear of the plates. Alternatively,
the light passage may be a solid bar or rod
of suitable transparent material such as perspex
75 which is caused, e.g. by means of an
effective mirror, to bend the ray of light
travelling up the passage to the required angle
to edge-illuminate the plate.

In order that the invention may more readily
be understood, certain embodiments of the 80
same will now be described with reference to
the drawings accompanying the Provisional
Specification of Application 2215/58, where-
in—

Figure 1 shows an arrangement using 85
festoon lamps;

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COMPLETE SPECIFICATION

Improvements in or relating to Indicator Means

5 We, K.G.M. ELECTRONICS LIMITED, a British Company, of Eardolph Road, Richmond, Surrey, formerly of The Barons, St. Margarets, Twickenham, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention concerns improvements in or relating to indicator means.

For many purposes it is useful to provide an indicator which is capable of selective showing of any one of a set of numbers, letters, etc., for example, the numbers 0 to 9, any of these numbers or letters (hereinafter called "symbols") being displayed in accordance with the selection made. For various purposes, it has been proposed to make use of a flat sheet of transparent material which is engraved, etched or otherwise treated so as to provide a symbol thereon, this plate then being illuminated by a source of light located along one edge. Such an arrangement is very efficient for providing a single indicator but becomes inefficient when it is desired to provide a plurality of symbols for selective display in the same place. Thus, for many reasons it is not practical to superpose a plurality of flat plates and to edge-illuminate each one selectively in this manner in order to provide for the necessary indication, for if it is intended to provide ten such plates in order to give the selective indication of the numbers 0 to 9, it will be found that the dimensions of the sources of illumination, e.g. pea lamps or festoon lamps, are so great that the spacing between the plates must be of the order of 5 to 6 mm. so that the overall thickness of the stack would be of the order of 5 cm. or more with the result that the angle of view over which the bottom plate is adequately visible is so limited that the arrangement is,

for all intents and purposes, impractical.

It is an object of the present invention to provide an improved stacked indicator of this type. 45

According to the present invention there is provided a stacked indicator comprising a plurality of plates arranged with their adjacent faces substantially in contact, a totally internally reflecting translucent passage arranged to extend rearwardly from each one of said plates and a separate source of illumination associated with each such light passage in order to provide for trans-illumination of the plates and of symbols thereon. 50 55

The aforesaid light transmitting passage may be a separate element or may be unitary with the plates and various arrangements are possible. Moreover, it is desirable that the plates should be made of a transparent plastic material, such a material offering obvious advantages over glass and the plates may very conveniently be made of a methyl methacrylate resin such as that generally known under the name Perspex (Registered Trade Mark). The light transmitting passage may be in the form of a projection arranged to extend rearwardly from, being unitary with, each plate and the source of illumination being, therefore, arranged in rear of the plates. Alternatively, the light passage may be a solid bar or rod of suitable transparent material such as perspex which is caused, e.g. by means of an effective mirror, to bend the ray of light travelling up the passage to the required angle to edge-illuminate the plate. 60 65 70 75

In order that the invention may more readily be understood, certain embodiments of the same will now be described with reference to the drawings accompanying the Provisional Specification of Application 2215/58, wherein— 80

Figure 1 shows an arrangement using festoon lamps; 85

Figure 2 shows an arrangement using pea lamps;

Figure 3 is a horizontal section through the embodiment of Figure 2; and

5 Figure 4 is a detailed view showing a modification.

The invention will also be described with reference to the drawings accompanying the Provisional Specification of Application 24276/58, in which the single figure shows an embodiment.

10 Referring firstly to Figure 1 of the drawings of the Provisional Specification of Application 2215/58, it will be seen that three perspex plates 1 are stacked almost with their operative faces in contact and that each of these plates 1 has a tail which is bent firstly to lie substantially parallel to the operative portions of the plates but in rear thereof and is then bent again to provide transverse portions 2 which are substantially at right angles to the plane of the operative portions of the plates. As shown in Figure 1, these transverse portions 2 are spaced apart by a substantial distance, for example of the order of 5 to 10 mm., as compared with the closeness of the operative portions 1. In proximity to the free edge of each of the transverse portions 2 is a festoon lamp 3, one such lamp being associated with each plate and it will be understood that selective illumination of the lamps 3 will cause edge-illumination of the end of the transverse portion 2 of the plate 1 associated therewith, and, due to total internal reflection at the bend, effective edge-illumination of the symbols on the operative portion of the plate 1. Desirably, in order to prevent obscurement of the symbols of the rear plate by the symbols of the overlying plates, the symbols will be in the form of small discrete portions as hereinafter more particularly described.

45 Figures 2 and 3 of the drawings of the Provisional Specification of Application 2215/58 show an arrangement using pea lamps and also a slightly modified arrangement of the plates in order to obtain increased compactness of the assembly. In this arrangement the perspex plates 1, as before, have their operative portions in contact but have the transverse portions bent through substantially a right angle and spaced apart so as to provide a spaced array of transverse portions 2 as can be clearly seen from Figure 2. These transverse portions are located in discrete slots 4 in a body 5 made of an opaque material and pea lamps 6 are provided in bores in the body 5, these bores being staggered and spaced in order to provide for compactness in the stacking of the lamp 6. It will be understood that the dimensions of the block 5 depend chiefly upon the compactness with which the lamps can be stacked and that the location of the transverse portions 2 depends upon the stacking. As can be seen from

70 Figure 3, the slots 4 are of such a depth that the transverse portions 2 of the plates do not reach the end of the associated slot and similarly it can be seen that the lamps 6 penetrate to a short distance into the slot to obtain more efficient edge-illumination of the plate. If desired, the edge of the slot remote from the plate may be curved as shown in dotted lines at 7 and this curved surface may be silvered or otherwise treated to increase the effective efficiency of the lamp 6.

75 Figure 4 shows, in perspective, the arrangement of one such lamp together with its associated plate and very conveniently the arrangement will be adopted which is illustrated in Figure 4 and in which the lower edge 8 of the plate, i.e. that edge remote from the lamp 6, is cut at an angle, polished and then coated with a strip of reflective material, e.g. aluminium foil, in order to provide for transverse internal reflection at this face to direct the light at other angles into the engraving forming the symbol and also to prevent the escape of light from this edge thus increasing the effective efficiency of the lamp 6. Similarly it will be understood that it may be desirable to polish and coat the other edges of the plate.

90 It will be clear from what has gone before that many forms of stacking are possible and in order to secure a more compact arrangement it is not necessary to provide all the lamps upon one side of the operative portions 1 and for example in the embodiment of Figure 1 the plates constituting the remainder of the stack may have their bends located to the left-hand side of the operative portion. Similarly, of course, any combination of stacking is possible so as to provide the most compact arrangement for the particular embodiment. Similarly the forms of bending adopted depend also upon the stacking arrangement and simple and double bends may be employed as necessary, it sometimes being convenient to provide reflective coatings upon the outside of the bends in order to ensure for total internal reflection.

110 Moreover, the coupling between the lamps and the plates may be affected various ways such as those illustrated or in other ways in which, for example, the end of the plate is shaped to mate with the bulb. Moreover, and particularly in the arrangement illustrated in Figure 3, the bore in the block 5 may be provided with a tube which houses the lamp 6 and which is extended to fit closely about the associated end of the plate, such tube being made of metal or the like and being highly polished on the inside.

125 Furthermore, it should be understood that a plate may have two or more lamps associated therewith and may have, for example, a bend at each end in order to provide for two spaced transverse portions and the two bulbs may be selectively illuminated or may be illuminated 130

together and may even be of different colours. Naturally, and particularly in the Figure 1 construction, a light shield may be interposed between the rear faces of the stack of plates and the bulbs.

5 In the arrangement shown in the drawings of the Provisional Specification of Application 24276/58 which illustrates a single plate of stacked plate indicator there is provided
10 a solid block 20 of perspex or like transparent material which has one edge in contact with the associated perspex plate and which may be secured thereto by means of a suitable transparent adhesive, e.g. a perspex adhesive.
15 The side of the block 20 remote from the plate 11 with which it is in contact is formed so as to provide for total internal reflection in the known manner and this may be assisted by an external coating of the relevant portion
20 of the block 20. Thus, the block and the edge of the plate 11 may be coated, in the parts in which they are in contact, with an opaque or silver finish in order to ensure total internal reflection. In this arrangement the
25 light from a bulb located in rear of the plate is taken to a point adjacent to the edge of the plate and is there applied to the plate in a direction generally parallel to the surface of such plate.

30 In a stacked indicator as generally described it is extremely desirable to arrange matters so that the bottom plate of the stack is as efficiently illuminated as the front plate, or at least so the symbol of the bottom plate
35 appears as bright as that on the top plate. If continuous line engraving is used on all the plates on the stack it may be found that when the bottom plate is illuminated the engraving on the other plates causes scatter
40 and the symbols thereon may even be illuminated to an extent such that they are partly visible, this obviously being a great disadvantage.

45 Therefore, as diagrammatically illustrated in Figure 4 of the drawings accompanying the Provisional Specification of Application 2215/58, the engraving on the plates is conveniently in the form of a plurality of discrete
50 dots or the like, such dots being separated by a distance which is small compared with the diameter of the dots themselves.

Very desirable, also, the engraving of the dots is shallow as compared with the diameter of the dots. In order to obtain the
55 necessary increased illumination of the lower plates the dots of which the symbols are formed may be arranged so as to have a larger size or a greater depth as is most convenient. It should
60 be understood that it is not necessary that such dots should be in the physical form of dots for the term is chosen as a suitable generic term and these dots may be circles, polygons or of any other suitable shape.

65 In one arrangement, the plates of perspex

are of thickness of order of $1/32$ in. and the symbols thereon are formed on the rear face by a suitable engraving, etching or like process so as to be in the form of dots or a disc-like form of a diameter of the order
70 of 15 thousandths of an inch, being separated by a clear space of an order of only 4—5 thousandths of an inch, as measured on the line joining the centre of two adjacent dots.
75 Thus the dots, having a diameter of approximately 15 thousandths of an inch, the centres are spaced by a distance of the order of 19—20 thousandths of an inch. The illustration of the dots in Figure 4 as aforesaid is purely
80 diagrammatic and the spacing does not represent the actual spacing used in practice.

The depth of the dots is also conveniently small as compared to the diameter of the dots and may generally be comparable with the spacing between the dots, thus in this
85 embodiment being of the order of 4—5 thousandths of an inch, the included angle desirably being 60° .

In order to increase the effective light transmission from the plate, it may be convenient
90 to bloom the surfaces of the plates, this serving the well-known function of reducing reflection at the surfaces and thereby loss of effective light.

Moreover, to increase the apparent intensity of the illuminated symbol a neutral density filter or a coloured filter may be provided at the front so that incident light is doubly filtered whilst light from the indicator
95 only suffers a single reduction while passing through the filter and therefore has its apparent intensity increased.

In this specification, no mechanical details have been given to the forms of connection for applying current to the lamps since such
100 forms of connection may be conventional and will in any event depend upon the exact dimensions of the unit and the use for which it is intended. Conveniently, however, it may be stated that the connections may be moulded
105 in to the mounting blocks for co-operation with a suitable socket.

It should be understood that the term "substantially in contact" as used herein means
110 that the plates are as close as possible without being actually in contact over any large area, actual contact being undesirable as it leads to light transfer between plates.

WHAT WE CLAIM IS:—

1. A stacked indicator comprising a plurality of plates arranged with their adjacent
120 faces substantially in contact, a totally internally reflecting translucent passage arranged to extend rearwardly from each one of said plates and a separate source of illumination associated with each such light passage in order
125 to provide for trans-illumination of the plates and of symbols thereon.

2. An indicator according to Claim 1, wherein said light passage is formed by bend-
130

ing a unitary portion of the plate to be disposed in rear of the plate.

3. An indicator according to Claim 2, wherein the end of the light passage is housed in a mounting block containing an electric lamp forming the source of illumination.

4. An indicator according to any of the preceding Claims, wherein the edges of the plates which are not adjacent to the source of the light are so formed as to be totally internally reflecting.

5. An indicator according to Claim 4, wherein the edges of the plates are inclined in such a manner as to cause the light reflected therefrom to traverse the plate in different directions to the incident light.

6. An indicator according to any of the

preceding Claims, wherein the symbols on the plates are formed by discrete dots spaced apart by a distance small compared to the diameter of the dots.

7. An indicator according to Claim 6, wherein the depth of the dots is comparable with the spacing between them.

8. An indicator substantially as hereinbefore described with reference to and as shown in the drawings accompanying the Provisional Specifications.

GEE & CO.,
Chartered Patent Agents,
51/52, Chancery Lane,
London, W.C.2, and
22, Whitefriargate, Hull.
Agents for the Applicants.

PROVISIONAL SPECIFICATION

No. 2215 A.D. 1958

Improvements in or relating to Indicator Means

We, K.G.M. ELECTRONICS LIMITED, a British Company, of The Barons, St. Margarets, Twickenham, Middlesex, do hereby declare this invention to be described in the following statement:—

This invention concerns improvements in or relating to indicator means.

For many purposes it is desired that an indicator should be provided which is capable of selective showing of any one of a set of numbers, letters, etc., e.g. the numbers between 0 and 9. For a similar purpose it has been proposed to make use of a sheet of transparent material which is engraved, etched or the like with the indication to be displayed and which is then "edge illuminated" by means of a suitable source of light. This is very efficient for providing a single indication but becomes inefficient when it is desired to provide a plurality of indications in the same space.

Thus, for many reasons it is not practical to superpose a plurality of plates and to edge illuminate each one selectively in order to provide for the necessary indication for if it is intended to provide ten such plates in order to give the necessary selective illumination to the numbers 0 to 9 it will be found that the dimensions of the sources of illumination, e.g. pea lamps or festoon lamps, are so great that the spacing between the plates must be of the order of 5 to 6 millimeters and the overall thickness of the stack would be of the order of 5 centimeters with the result that the angle of viewing is so limited that the arrangement becomes almost impracticable. It is an object of the present invention to provide an improved arrangement of this type.

According to the present invention there is provided a stacked indicator comprising a plurality of plates arranged with their adjacent faces substantially in contact, each of said

plates having one edge portion bent into a plane substantially normal to the plane of the stack, the location of the bend being such that although the stacked portions of the plates are in contact the transverse portions are separated by a relatively large distance.

Very desirably the plates are made of a methyl methacrylate resin, e.g. that known generally as perspex.

It will be appreciated that the spacing between the transverse ends of the plates is such that there is no difficulty in providing the necessary selective illumination of the edge of the desired plates, whilst the operative portions of the plates are stacked together in close proximity so that the angle of viewing is not minimised. It has been found that the optical characteristics of a material such as perspex are such that total internal reflection incurs at the bend and the light from the illumination edge is conveyed round the bend without transmission through the surface of the plate.

In order that this invention may more readily be understood certain embodiments of the same will now be described with reference to the accompanying drawings in which—

Figure 1 shows an arrangement using festoon lamps,

Figure 2 shows an arrangement using pea lamps,

Figure 3 is a section through the embodiment of Figure 2 looking in the direction of an arrow A, and

Figure 4 is a detailed view showing a modification.

Referring to Figure 1 of the drawings, it will be seen that three perspex plates 1 are stacked with their operative faces in contact and that each of these plates 1 has a tail which is bent firstly to lie substantially parallel to the operative portions of the plates but in rear thereof and is then bent again to provide

transverse portions 2 which are substantially at right angles to the plane of the operative portions of the plates. These transverse portions 2 are, as shown in Figure 1, spaced apart by a substantial distance, for example of the order of 5 to 10 mm. Engaged in close proximity to the free edges of the transverse portions 2 are a plurality of festoon lamps 3, one associated with each plate. Selective illumination of the lamps 3 will cause "edge illumination" of the end of the transverse portion 2 of the plate 1 associated therewith and, due to the total internal reflection previously referred to, effective edge illumination of the engraved or etched markings on the operation portion of the plate 1. Desirably in order to prevent obscurement of the engraved portion of the rear plate by the engraved portions of the overlying plates the engraving will be in the form of small discrete portions such as dots, e.g. as shown in Figure 4.

Figures 2 and 3 show an arrangement using pea lamps and also a slightly modified arrangement of the plates in order to obtain maximum compactness of the assembly. In this arrangement, the perspex plates 1, as before, have their operative portions in contact but have the transverse portions bent through substantially a right angle and separated so as to provide a spaced array of transverse portions 2 which are shown in Figure 2, these transverse portions being located in discrete slots 4 in a body 5 which is made of opaque material. Pea lamps 6 are provided in bores

in the body 5, these bores being staggered and spaced in order to provide for maximum compactness in the stacking of the lamps 6. Figure 3 shows that the slots 4 are of such a depth that the transverse portions 2 of the plates do not reach the end of the slot and similarly show that the lamps 6 penetrate to a short distance into the slot thereby to obtain a more efficient edge illumination of the plate. If desired the edge of the slot remote from the plate may be curved as shown in dotted lines at 7 and this curved surface may be silvered or otherwise treated to increase the effective efficiency of the lamp 6.

Figure 4 shows in perspective the arrangement of one such plate together with the lamp associated therewith and very conveniently the arrangement shown in Figure 4 will be adopted in which the lower edge 8 of the plate, i.e. that edge remote from the lamp 6, is cut at an angle, polished, and then coated with a strip of reflective material, e.g. aluminium foil, in order to provide for transverse internal reflection at this face to direct the light at other angles into the engraving and to prevent escape of light therefrom, thus increasing the effective efficiency of the lamp 6.

GEE & CO.,
Chartered Patent Agents,
51/52, Chancery Lane,
London, W.C.2, and
22, Whitefriargate, Hull,
Agents for the Applicants.

PROVISIONAL SPECIFICATION

No. 10259 A.D. 1958

Improvements in or relating to Indicator Means

We, K.G.M. ELECTRONICS LIMITED, a British Company, of The Barons, St. Margarets, Twickenham, Middlesex, do hereby declare this invention to be described in the following statement:—

This invention concerns improvements in or relating to indicator means and is particularly, but not exclusively, adapted to use with the invention described in our co-pending Application No. 2215/58.

For many purposes it is very desirable to provide an indicator which is capable of selective showing of any one of a set of numbers, letters etc. or the alternative showing of several sets of words and the like. In our said co-pending Application we described a stacked indicator which is capable of such selective showing. In any such stacked indicator it is extremely desirable to arrange matters so that the bottom plate of a stack of plates is as efficiently illuminated as the front plate or at least so that the indicator on the bottom plate appears as bright as the device on the top plate. If continuous line engraving is used on all the plates of a stack, it is found that when the

bottom plate is illuminated the engraving on the other plates causes scatter and may even be illuminated to such an extent as to be partly visible, this obviously being a great disadvantage.

According to this invention the engraving on an indicator plate is in the form of a plurality of discrete dots or the like, such dots being separated by a distance which is small compared with the diameter of the dots themselves.

Very desirably also the engraving of the dots is shallow as compared with the diameter of the dots.

It will be understood that although this invention is particularly suitable for stacked indicator plates, it may, nevertheless, be applied equally to single indicator plates. The material of the indicator plates is preferably a methyl methacrylate resin, e.g. that generally known as perspex.

In a very convenient arrangement the or each plate of perspex is of a thickness of the order of $\frac{1}{4}$ " and the plates may be stacked in accordance with our said co-pending Appli-

5 cation. The indica on the plates are formed
 by an engraving, etching or like process so
 as to be in the form of dots or similar discrete
 elements which may be of circular nature or
 10 of any other suitable shape depending upon
 the method of etching, engraving or the like.
 Very desirably these dots are of a diameter
 of the order of 15 thousandths of an inch
 and are separated by a clear space which is
 15 of the order of only 4 to 5 thousandths of
 an inch, this being the minimum clear space
 as measured on a line joining the centre of
 two dots. Thus, in the case of dots having
 a diameter of approximately 15 thousandths
 of an inch the centres will be spaced by a
 distance of the order of 19 to 20 thousandths
 of an inch.

20 Very desirably also the depth of the dots
 is small as compared with the diameter of
 the dots themselves and in a convenient ex-
 ample may be comparable with the spacing
 between the dots. Thus very desirably the

dots are some 4 to 5 thousandths of an inch
 deep.

It will be appreciated that the dots have
 a diameter which is very small as compared
 with the size of the indica and that the dots
 are separated by a spacing which is small as
 compared with the dot diameter, and more-
 over are shallow as compared with the dot
 diameter. It has been found that excessively
 deep dots, although more intensely illumi-
 nated, are liable to cause scatter in the case
 of stacked plates. Hence, in a stack of plates
 it may be desirable to have the engraving
 on the bottom plate deeper than the engraving
 on the top plate.

GEE & CO.,
 Chartered Patent Agents,
 51/52, Chancery Lane,
 London, W.C.2, and
 22, Whitefriargate, Hull,
 Agents for the Applicants.

PROVISIONAL SPECIFICATION

No. 24276 A.D. 1958

Improvements in or relating to Indicator Means

40 We, K.G.M. ELECTRONICS LIMITED, a
 British Company, of The Barons, St. Mar-
 garet's, Twickenham, Middlesex, do hereby
 declare this invention to be described in the
 following statement:—

This indicator concerns improvements in
 or relating to indicator means.

45 More particularly this invention concerns
 a stacked indicator which should be under-
 stood as comprising a plurality of plates
 arranged in super-position, each plate being
 engraved or otherwise marked with some
 50 indica and means being provided to cause
 selective edge illumination of the plates in
 order that the respective indica may become
 visible from the front of the stack. One par-
 ticular form of such indicator means is de-
 55 scribed in our co-pending Application No.
 2215/58 and comprises an arrangement in
 which the material forming the plate is bent
 into a position in rear of the plate and edge
 illumination is provided by this rearward part.
 60 In this way the problems of stacking the plates
 were considerably reduced as the order of
 thickness of the stack is determined by the
 total thickness of the plates and not by the
 space necessary to accommodate the illumina-
 65 tion means. The material of which the plates
 are made, desirably a methyl methacrylate
 resin e.g. perspex, is of high refractive index
 and total internal reflection occurs at the
 bend.

70 It is an object of the present invention to
 provide further improved stacked indicators.

75 According to the present invention there is
 provided a stacked indicator comprising a
 plurality of plates arranged with their adja-
 cent faces substantially in contact, a totally

internally reflecting light passage arranged to
 extend rearwardly from each one of said plates
 and a distinctive source of illumination asso-
 ciated with each such light passage way in
 order to provide for trans-illumination of the
 plates and the indica thereon.

It will be understood that the arrangement
 in the co-pending Application is such that an
 integral extension of the plate forms said
 totally internally reflecting passage way and
 it is a particular object of the present inven-
 tion to provide an arrangement wherein such
 passage way is formed by a separate integer
 or element. Thus, in accordance with an
 aspect of the present invention the passage
 way may be formed by a block of perspex or
 like material which is arranged to extend
 generally normal to the plate with which it
 is associated and which has an edge in con-
 tact with an edge of the plate and the portion
 remote from such edge either curved to pro-
 vide for total internal reflection and/or coated
 with a reflective substance to the same end.

In order that this invention may more
 readily be understood one embodiment of a
 the same will now be described with reference
 to the accompanying drawing, which illustrates
 the same in perspective.

In the arrangement of the drawing
 there is provided a solid block 20 of perspex
 or like material which has one edge in con-
 tact with the perspex plate 11 and which
 may even be secured thereto by means of a
 transparent adhesive, e.g. a perspex adhesive.
 The side of the block 20 remote from the plate
 11 with which it is in contact is suitably formed
 so as to provide for total internal reflection
 in the known manner and this may be assisted

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5 by an external coating on the block. Thus
the block and the edge of the plate 11 may be
coated with an opaque or silvered finish in
order to ensure total internal reflection. Thus
10 in this arrangement, the light from a bulb
located in rear of the plate is taken to a point
adjacent to the edge of the plate and is there
applied to the plate in a direction generally
parallel to the surfaces of such plate.
15 In certain applications of indicators in
accordance with the present invention, it may
be advantageous to actuate the lamps by
passing only a very small current from the
controlling circuit into the indicator, and it
20 may, therefore, be convenient to provide a
transistor relay circuit for each lamp. In other
applications it may be convenient for the
appropriate plate to be illuminated as the
result of a pulse and extinguished on the
passage of a further pulse, and to such end
a bi-stable transistor circuit may be provided

for each lamp with the lamp forming the load
of one transistor and so obviating the need
for a further relay circuit. It will be under-
stood that by providing suitable pulse transfer
25 circuits, such a form of indicator may provide
a self indicating counter.

The transistor circuits above described may
be of wired or printed circuit form and may
even be in the form of skeleton units having
integral connections so that at the discretion
of the user one or more such circuits may be
30 incorporated so as to provide the facilities
required, but without materially enlarging the
size of the indicator. 35

GEE & CO.,
Chartered Patent Agents,
51—52 Chancery Lane,
London, W.C.2, and
22 Whitefriargate, Hull
Agents for the Applicants.

847972

Provisional Specification No. 2255

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

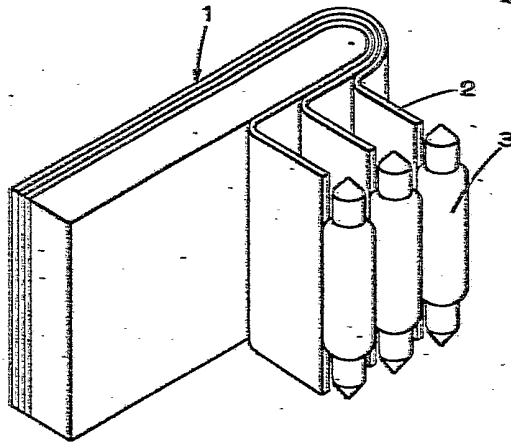


FIG. 1.

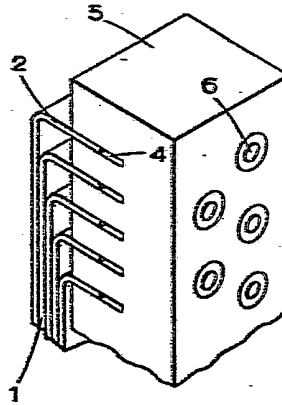


FIG. 2.

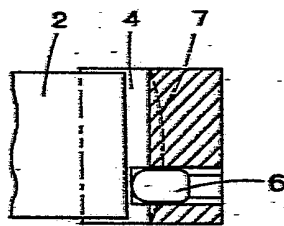


FIG. 3.

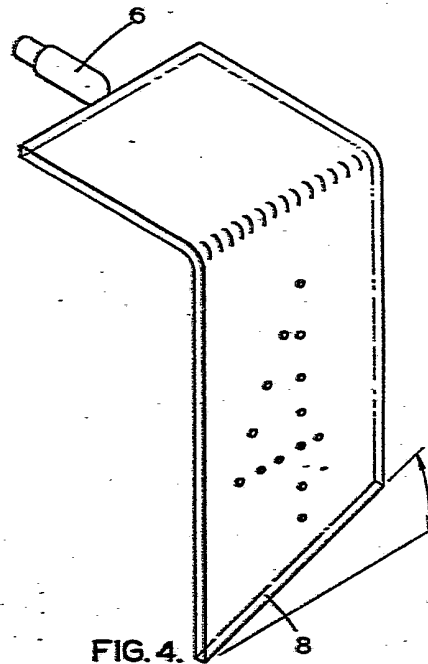


FIG. 4.

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Provisional Specification No. 24276⁵³

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale.*

POOR QUALITY

