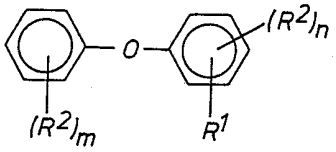
TABLE 2

Example	Compounds of the formula I	Inhibitory Concentration
26	4-chloro-2-hydroxydiphenyl ether	5
27	4,4'-dichloro-2-hydroxydiphenyl ether	0.5
28	2',4-dichloro-2-hydroxydiphenyl ether	0.5
29	2',4',4-trichloro-2-hydroxydiphenyl ether	5
30	3',4'-dichloro-2-hydroxydiphenyl ether	0.5
31	3',4'-dichloro-4-hydroxydiphenyl ether	0.5
32	2',4'-dichloro-4-hydroxydiphenyl ether	0.5

WHAT WE CLAIM IS:—

1. A method of controlling algae and inhibiting the growth thereof, which comprises the use of one or more diphenyl ethers of the general formula I



(I)

wherein

R^1 represents unsubstituted or substituted amino or the group R^3O—, in which

R^3 represents a hydrogen atom or the ester-bonded acid radical of an inorganic or organic oxyacid,

R^2 represents identical or different radicals and a hydrogen atom, a halogen atom, cyano, carboxyl, nitro, unsubstituted or substituted amino, alkoxy, cycloalkoxy, alkenyl, alkyl, cycloalkyl or acyloxy,

m is an integer from 1 to 5 and

n is an integer from 1 to 4,

or the salts of the hydroxy and acid derivatives thereof.

2. A method according to claim 1 wherein m is 1 to 3, preferably 1 or 2, n is 1 or 2 and R^2 represents identical or different radicals.

3. A method according to claim 1 wherein R^2 as an unsubstituted or substituted hydrocarbon radical is cycloalkyl and, in particular, alkyl.

4. A method according to claim 1 wherein R^3 as acyl contains 1 to 18, preferably 1 to 6, carbon atoms, and as carbamoyl, contains 1 to 12, preferably 1 to 6, carbon atoms.

5. A method according to claim 1 wherein R^2 as unsubstituted or substituted amino is substituted by one or two alkyl groups containing 1 to 12, preferably 1 to 6, carbon atoms, or by cyclohexyl.

6. A method according to claim 1 wherein R^2 as alkoxy, cycloalkoxy, alkenyl, unsubstituted or substituted alkyl or cycloalkyl and acyloxy contains 1 to 18, preferably 1 to 6, carbon atoms.

7. A method according to claim 1 wherein R^2 as alkyl or cycloalkyl is substituted by halogen, especially fluorine and chlorine, hydroxyl, carboxyl or alkoxy of 1 to 6 carbon atoms.

8. A method according to claim 1 wherein R^2 is chlorine, bromine, iodine, amino, nitro, carboxyl ,or trifluoromethyl.

9. A method according to claim 1 wherein the compound of the formula I is 4,4'-dichloro-2-hydroxy-diphenyl ether or 2',4',4-trichloro-2-hydroxy-diphenyl ether.

10. A method according to claim 1 wherein R^3 is a hydrogen atom, acyl or carbamoyl.

11. A method according to claim 1 wherein the compounds of the formula I are used in active ingredient concentrations of 0.01 to 40 ppm, preferably 0.03 to 20 and especially 0.03 to 10 ppm, referred to the algae to be controlled.

state and a negative potential pulse is applied to said gate electrode to switch the device from said quasi-equilibrium state to said equilibrium state.

3. A method as claimed in claim 1 for operating a device having source and drain regions of the N-conductivity type, in operation 2 of which a negative potential pulse is applied to the source region to switch the device from said equilibrium state to said quasi-equilibrium state and a positive potential pulse is applied to the source region to switch the device from said quasi-equilibrium state to said equilibrium state.

4. A method as claimed in any preceding claim when used for operating a device in which one of said source and drain regions surrounds the other of those regions forming an annular channel region and wherein said gate electrode is annular, said source and drain regions and said gate electrode forming an annular field effect transistor.

5. A method as claimed in any of claims 1 to 3, when used for operating a device in which there is means disposed at the extremities of said interconnecting region for isolating the top thereof from said substrate.

6. A method as claimed in claim 5, when used for operating a device in which said means for isolating includes a recessed oxide region disposed at the extremities of said interconnecting region.

7. A memory cell comprising a semiconductor substrate of one conductivity type; first, second and third regions of opposite conductivity type disposed in said substrate, each of said first and second regions and second and third regions having a channel region therebetween forming addressing and storage devices, respectively; an interconnecting region of said opposite conductivity type disposed in said channel region of said storage device extending from the surface of said substrate and interconnecting said second and third regions, the arrangement being such that the top of said interconnecting region is nowhere contiguous with said substrate; first and second gate electrodes disposed in insulated spaced relationship with the channel region of said addressing and storage devices respectively; means arranged to apply such a bias potential to said substrate and to the gate electrode of said storage device with respect to said second and third regions that an inversion layer is created at the surface of said interconnecting region, thus rendering the storage device conductive, when it is in a first, equilibrium state and a depletion region is created between said second and third regions, thus rendering the storage device nonconductive, when it is in a second quasi-equilibrium state; and means arranged to apply a potential pulse to the gate electrode of said addressing device to render it conductive and means arranged to apply such a potential pulse to the first region that when the addressing device is conductive the storage device is switched from said equilibrium state to said quasi-equilibrium state or *vice versa*.

8. A memory cell as claimed in claim 7, in which there is means disposed at the extremities of said interconnecting region for isolating the top of said interconnecting region of said storage device from said substrate.

9. A memory cell as claimed in claim 8, in which said means for isolating includes a recessed oxide region disposed at the extremities of said interconnecting region of said storage device.

10. A memory including a word line, a bit line and a memory cell as claimed in any of claims 7 to 9, in which the gate electrode of said addressing device is connected to the word line and the gate electrode of said storage device is connected to said bit line.

11. A method as claimed in claim 1, substantially as described with reference to Figures 4A and 4B or Figures 5A and 5B of the accompanying drawings.

12. A memory cell circuit substantially as described with reference to Figure 6 of the accompanying drawings.

13. A semiconductor storage arrangement comprising an array of memory cells devices as claimed in claim 7, substantially as described with reference to Figure 7 of the accompanying drawings.

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After the etching of the substrate surface in the region where the storage capacitor is to be formed, known process steps are employed to apply an insulating layer 6 to the surface of the substrate 1 outside the trenches, to produce a thin oxide layer 61 above the trenches 2 and 3, and finally to apply a conductor path 7 to the thin oxide layer 61. The conductor path 7, which preferably consists of aluminium or polysilicon, represents one electrode of the capacitor. The second electrode of the capacitor is constituted by an inversion layer which is formed at the surface of the substrate below the thin oxide layer 61 by connecting a suitable potential of the conductor path 7. The inversion layer is indicated schematically at 5. The thin oxide layer 61, which preferably has a thickness of about 0.12 μm, represents the capacitor dielectric.

Based on the dimensions shown in Figure 1, for two channels each having a flank angle of 60°, an increase of about 80% is achieved in the storage capacitor area as compared with capacitors formed on an unetched surface. It is thus advantageously possible to design simpler evaluator circuits and/or to achieve higher bit densities.

Figure 2 illustrates another embodiment of the invention in which a pyramid-shaped pit 3′ is used in place of the trenches 2 and 3. In this embodiment, with an angle 4 of 60°, it is possible to double the storage area. The pit 3′ is arranged in the surface of the semi-conductor substrate 1 and is produced by an anisotropic etching step. Then by means of process steps known *per se*, a thin oxide layer 61′ is produced in known manner on the flanks of the pit 3′ and a conductor path 7′ is applied to the thin oxide layer 61′. The conductor path 7′ again preferably consists of aluminium or polysilicon, and the thin oxide layer 61′, the thickness of which is preferably 0.12 μm, consists of SiO_2.

As before, the second electrode of the capacitor is represented by an inversion layer (indicated schematically at 5′) which is formed at the surface of the substrate below the thin oxide layer 61′, by connecting a suitable potential to the conductor path 7′.

In the construction of one-transistor storage elements, the transistor of the one-transistor storage element is conveniently arranged in the same substrate 1 as the capacitor in accordance with the invention.

WHAT WE CLAIM IS:-

1. A capacitor comprising a semiconductor substrate having at least one recess anisotropically etched into its surface, an electrically insulating layer covering the flanks of the or each recess, an electrode covering said insulating layer within said recess or recesses, and means for applying a potential to said electrode such as to produce an inversion layer at the surface of said substrate beneath said insulating layer in the or each said recess to serve as the second electrode of the capacitor.

2. A capacitor as claimed in Claim 1, wherein said at least one recess is constituted by at least one anisotropically-etched channel, having a V-shaped cross-section.

3. A capacitor as claimed in Claim 2, wherein at least two channels are provided in the surface of said semiconductor substrate, each said channel having flanks making an angle with one another of about 60°, and adjacent edges of said channels being spaced from one another.

4. A capacitor as claimed in Claim 1, wherein said recess is in the form of a pyramidal pit.

5. A capacitor as claimed in any one of the preceding Claims, wherein said substrate is of silicon.

6. A capacitor as claimed in any one of the preceding Claims, wherein said electrically insulating layer consists of SiO_2.

7. A capacitor as claimed in any one of the preceding Claims, wherein said electrode consists of aluminium or polysilicon.

8. A method of producing a capacitor as claimed in Claim 1, comprising the steps of anisotropically etching the surface of a semiconductor substrate to produce one or more recesses therein, applying a thin electrically insulating layer to the flanks of the or each recess, and forming an electrode on said thin insulating layer.

9. A method for producing a capacitor as claimed in Claim 1, substantially as hereinbefore described with reference to the drawings.

10. A capacitor substantially as hereinbefore described with reference to and as illustrated in Figure 1 or Figure 2 of the drawing.

11. A one-transistor storage element including a capacitor as claimed in any of Claims 1 to 7 or Claim 10.

12. A store comprising a plurality of storage elements as claimed in Claim 11.

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multiplet (broad quintet) extending from 4.2δ to 4.6δ for acetal methine hydrogens—2 protons.

IR Spectrum (neat oil)

Strong ether C—O—C stretch bands between 950 cm^{-1} and 1200 cm^{-1} with maxima at 973 cm^{-1}, 1034 cm^{-1}, 1065 cm^{-1} and 1132 cm^{-1}.

Example 4

1,2,3,4,5,6-Hexa-[(1'-Ethoxy) Ethoxyl Hexane

Into a 250 ml. flask, equipped with static nitrogen head and magnetic stirrer, was charged 18.6 g. of mannitol, 100 ml. of N-methyl pyrrolidinone and 64.8 g. of ethyl vinyl ether. There was then added 10 drops of concentrated HCl and the mixture stirred at between 22° and 28° for 4.5 hours and allowed to stand overnight. The next day an infrared spectrum of an appropriately worked up sample showed the virtual absence of hydroxyl absorption and strong ether C—O—C bands. The reaction mixture was poured, with stirring, into 750 ml. of water containing excess NaOH and extracted twice with 150 ml. portions of hexane. Each extract was washed consecutively with two 750 ml. portions of water. The combined organic phases were dried over solid sodium carbonate—sodium sulfate and vacuum evaporated at about 10 mm. Hg to give 59 g. of crude oil. Distillation was performed on a short path micro still under the following conditions:

Charge: 19 g. of crude+0.2 g. of Na_2CO_3.

Time (hr.)	Pot. Temp. (°C.)	Head Temp. (°C.)	Vacuum (mm. Hg.)	Fraction	Weight (g.)
0	55	22	0.5		
0.35	185	170	0.5	1	—
1.35	182	175	0.6	2	0.2
1.62	184	176	0.6	3	0.4
1.65	185	176	0.6	4	2.3
1.70	186	176	0.6	5	0.7
1.77	187	178	0.6	6	4.4
1.80	180	174	0.6	7	1.5
1.83	182	174	0.5	8	0.8
1.89	186	176	0.5	9	3.1
1.75	184	175	0.5	10	1.9
1.78	182	178	0.5	11	0.6

IR Spectrum (CCl_4 solution)

Weak, broad band at 3500 cm^{-1} indicating some free hydroxyl; strong C—O—C ether stretch bands extending between 990 cm^{-1} and 1200 cm^{-1} with maxima at 1044 cm^{-1}, 1082 cm^{-1}, and 1136 cm^{-1}.

NMR Spectrum (CCl_4 solution, TMS reference)

Non-symmetrical quartet extending from 1.0δ to 1.4δ with center of gravity about 1.25, methyl protons— 34.5 protons (theory 36); broad multiplet extending between 3.2δ and 4.0δ having a center of gravity about 3.6δ, hydrogens on monoalkoxy substituted carbons, 20 protons; broad complex multiplet extending between 4.45δ and 5.1δ, having its center of gravity at about 4.75δ, acetal methine protons, 5.5 protons (theory 6.0). A spectrum run in $CDCl_3$ showed the methyl to alkoxy to acetal methine proton ratios to be 33.9/20/5.9. A d_4-MeOD exchanged spectrum changed the ratio to 32.8/20/5.7 while a d_6-DOAc exchanged spectrum showed the ratios to be 34.9/20/5.9. Oximation analysis of acetal hydrolyzed at pH 3.5 in the presence of hydroxylamine showed 96.4% of the theoretical acetaldehyde to be generated, indicating no more than 20% of the sixth hydroxyl in the molecule to be free OH.

Example 5

A citrus drink was prepared at about 23°C. by combining 8 drops of a 1% solution of orange flavor in 95% ethanol and 14 ml. of citric syrup and bringing to volume with water in a 4 oz. container (about 114 g. of water was used). The orange flavor was orange terpenes containing 5% by weight of acetaldehyde. The citrus syrup was made by adding to 1 gallon of 67.5% sucrose in water, 14 ml. of a 25% by weight solution of sodium benzoate in water and 44 ml. of 50% citric acid in water. The pH of this syrup is normally about 3.1. A third drink was formulated using, as

naphtha washing. The carbon dioxide removed, through line 17, would be disposed of but the naphtha containing dissolved methane would be taken through line 18 to be used in the main process stream. By these means, the expense of producing gas with a high concentration of hydrogen by a high temperature tubular steam reforming process is avoided. Hydrogenating gas is conveyed to hydrocracker 6 through line 19 and sulphur-free vaporised naphtha is supplied through line 15 branching from line 10. Products and surplus reactants from the hydrocracker pass along line 20 to separation stage 7. Excess hydrogenating gas, after separation, is taken through line 21 to be introduced into the main stream, either directly as a component of the SNG or into a gasification reactor where it could improve catalyst performance. Alternatively, as is usual in a hydrocracking process, part of the hydrogenating gas could be recycled to the inlet of the hydrocracker. Unconverted feedstock is returned to line 10 through line 22 and the light hydrocarbons produced for enrichment of the SNG are taken alone line 23, which branches into line 14.

When light hydrocarbons to be used for gas enrichment are produced in this way a lower degree of conversion of the feedstock is tolerable in the hydrocracking stage for two reasons: firstly, unconverted feedstock can be transferred to the gasification stages for gas making or to be used as fuel; and secondly, the enrichment hydrocarbons need not consist solely of C_3 and C_4 hydrocarbons as in LPG. All of the C_1—C_4 hydrocarbons together with a certain amount of C_5 hydrocarbons in the hydrocracker products may be used as enrichment in the SNG so that a high degree of separation is unnecessary, leading to cost savings. Furthermore, selectivity of conversion to C_3—C_4 products is a less important feature of the catalyst, perhaps enabling the use of other, potentially cheaper, catalysts than are normally used and of a wider range of operating conditions. The hydrocracking stage may be operated at or near the pressure of the main process stages (e.g. 400—750 lb/in^2) thereby minimising the considerable expense and difficulty associated with compression of the hydrogenating gas. Conveniently, desulphurised feedstock is used in the hydrocracking stage so that the need to remove sulphur compounds from the products is eliminated, the same feedstock is used throughout the process and only the one purification stage is required. There could, however, be circumstances in which it would be more convenient to use undesulphurised feedstock and subsequently remove sulphur compounds (largely H_2S) from the hydrocracker products.

The basic concept of the invention involves the provision of enrichment by a hydrocracking step to meet the requirements of a base load SNG plant. In another embodiment the proportion of feedstock supplied to the hydrocracking stage may be increased, making it possible to produce, separate and store excess LPG or C_2—C_5 mixture for use as enrichment on other, e.g. peak load, SNG plants on the same or other sites. The hydrocracker is still completely integrated with the gasification plant and although it may take a substantial proportion of the total feedstock it remains essentially a 'side stream' unit entirely dependent on the main gasification train. This improves the overall process flexibility compared with processes in which enrichment is produced in a reactor through which most or all of the main gas stream passes.

Yet another embodiment of the invention provides for the manufacture of substitutes for natural gases having high calorific values, e.g. in the range 1100—1200 Btu/s. ft^3. For this purpose also it is necessary to increase the output of C_1—C_5 products from the hydrocracker relative to the output of the main gasification train. Conversion in the hydrocracker may be increased considerably, however, by using a more selective catalyst (several types are commercially available) or by increasing the hydrogen partial pressure, either by increasing the concentration of hydrogen in the hydrogenating gas or by compression. If it is desired to increase substantially the hydrogen concentration in the gas taken from the low temperature reformer, carbon dioxide removal may be preceded by a preheating and adiabatic reforming step, possibly in the presence of additional steam. Furthermore, when the local arrangements for gas distribution permit, the inclusion of C_5 hydrocarbons from the hydrocracker as enrichment can substantially increase the proportion of enrichment material avilable from the feedstock. Using this embodiment, 'rich' SNG may be produced without the need to resort to high temperature tubular steam reforming or to the use of very high operating pressures in the hydrocracking stage.

The invention is illustrated by the following example.

surface from said titanium anode through said oxide.

18. A method according to claim 17, wherein a voltage potential above nine volts is applied between said titanium electrode and said conductive surface, and wherein a current density between 25 and 250 milliamperes per square foot is developed on said conductive surface.

19. A method according to claim 17 or 18, wherein said titanium electrode includes a second metal in electrical contact with the titanium.

20. A method according to claim 17, substantially as hereinbefore described with reference to the accompanying drawings.

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As shown in Figures 3 and 4, the bottom end of the bottom leaf 16 bears two lateral rollers 24 which slide in a pair of lateral guides 26 in the vehicle body. Guides 26 have a U-cross-section and are secured to the vertical edges of the door opening.

Packing-strips for improved sealing are disposed round the periphery of door 12 and between the two leaves 14 and 16. In addition, the top leaf 14 bears a safety strip 30 at the bottom, in the space between leaves 14 and 16.

As shown in Figure 3, two stirrups 32 are secured to the sides of the top leaf 14. The free end of each stirrup 32 is secured to the piston rod 34 of an oleodynamic lifting device 60 of a known kind (not shown in detail). Device 36 is secured to the interior of the body of van 10.

As illustrated in Figures 5 and 7, the bottom leaf 16 bears locking means, i.e. a pair of outer rods 38 and a pair of inner rods 40. The inner pair 40 are jointed to a plate 42 which is keyed to the polygonal shank 44 of a handle 46 for externally actuating the internal rods 40. The pair of outer rods 38 are secured to a plate 48 having a lateral knob 50 for actuating the outer rods 38 from the interior of van 10.

As shown in Figures 6 and 7, the lateral ends of rods 38 and 40 fit into slots 52 formed in a plate 54 bearing a bolt 56. Bolt 56 engage in seats 58 in the vertical sides of the van door opening.

In order to open door 12, handle 46 or knob 50 is rotated through 90° so that bolts 56 come out of seats 58. Next, the bottom leaf 16 together with the top leaf 14 are raised, thus rotating the two lateral stirrups 32 around hinge 20 and progressively moving leaves 14 and 16 from the vertical aligned position to the horizontal position in which the leaves are superposed.

When the door 12 is in the resulting open position, the weight of leaves 14 and 16 is compensated by the pair of oleodynamic devices 36. In the open position, as illustrated in Figure 3, the axis of the pivot pin 60 of shank 32 of each device 36 is horizontally further to the exterior of the body than the axis of the corresponding lateral roller 24 (distance *f*).

Door 12 is closed by the opposite sequence of operations, devices 36 returning from an inclined position to a substantially horizontal position.

It can be seen from Figures 2 and 3 that when door 12 is open it forms a sort of roof, which is particularly useful for shelter from the weather during loading or unloading, not only for the operator but also for the goods conveyed by van 10.

Of course, without altering the principle of the invention, the constructional details and embodiments can be widely varied from those described and illustrated by way of non-limitative example, without thereby departing from the invention.

WHAT WE CLAIM IS:

1. A door for a vehicle, the door being hinged to the vehicle body and provided with locking means for locking it in the closed position, the door being made up of two leaves horizontally hinged together, the top leaf being hinged at the top to the body and connected to at least one lifting device which when the door is in the open position serves to retain the door in that position, whereas the bottom leaf bears the locking means.

2. A door according to claim 1 in which the lifting device is an oleodynamic device.

3. A door according to claim 1, in which the bottom end of the bottom leaf can run in a pair of lateral guides in the body.

4. A door according to claim 3, in which the bottom end of the bottom leaf bears two lateral rollers engaging in the guides.

5. A door according to any of claims 1 to 4, in which the top leaf has two lateral stirrups joined to the respective lifting devices.

6. A door according to claim 5, in which when the door is in the open position, the axis of the pivot for the stirrup of each lifting device is horizontally further to the exterior of the body than the axis of the lateral roller.

7. A door according to any of the preceding claims, in which the locking means comprise a set of horizontally movable rods, bolts being mounted at the two lateral ends of the rod system and adapted to engage in seats in the vertical edges of the door-opening to be closed.

8. A door for a vehicle, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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channels of said pair of columns being arranged, in use, to face each other for accommodating cutlery therebetween, and a plurality of laterally extendable handles fitted asymmetrically to the base plate.

2. A cutlery rack as claimed in Claim 1, the base plate and the columns being made of chromium-nickel steel, wherein the base plate is rectangular and the columns are of right-angled channel shape into which plastics material column insert elements of differing profiles can be inserted.

3. A cutlery rack as claimed in Claim 1 made of plastics material, wherein the columns have differing profiles.

4. A cutlery rack as claimed in either Claim 1 or Claim 3 further comprising a mobile underframe on which the base plate is mounted and wherein the base plate is round and the slideways are arranged radially on the base plate.

5. A cutlery rack substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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preceding claims in which the rotary unit includes a number of spaced generally radial rings or plates which act as supports for the heat pipes and/or heat exchange plates.

8. A heat exchanger substantially as described with reference to the accompanying drawings.

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The sheets are disposed parallel to one another and to the entry window 2 and are spaced apart from one another. Advantageously their transparency, i.e. the proportion of the total surface area of each sheet taken up by the perforations, is relatively high and is at least 30%, preferably at least 50%. This can serve to prevent too large a proportion of charge carriers produced as a result of the external X-ray photoelectric effect from impinging on the crosspieces defining the perforations and thus being neutralised and lost for use in the production of the image. The sheets may be 3 to 10 microns thick, for example, and may be spaced about 0.3 to 1 mm apart.

Using a stack *4* of sheets whose geometric measurements are adapted to the range of the emitted photoelectrons enables a relatively high quantum yield to be achieved. The individual sheets largely absorb the X-rays on the one hand, and, on the other hand, due to their transparency they let the charges produced directly or indirectly in the filler gas through, with the result that these charges can be collected on a suitable image carrier 8 and can yield an electrostatic image of the intensity distribution of the X-rays. To this end a sufficiently high electric field gradient across the sheets of the stack is required. This gradient is expediently produced by a different high potential applied to the front and reverse side of each sheet and to the entry window 2 and the image carrier 8. The potentials denoted U_1 to U_n indicated in the figure add up to a total potential difference between the window 2 and the image carrier 8.

A method of producing double layer perforated foil sheets for use in such a photocathode is illustrated in Figures 2 and 3 which show a sheet in cross-section at different stages in its manufacture. A simple perforated gold foil 10 produced by a known galvanic technique is first taken. By a simple perforated foil is meant a foil which consists of a single stratum or layer and on which no further layers are applied. According to a particular embodiment, one such gold perforated foil is about 3 microns thick and has a weight per unit area of 3.5 mg/cm^2. Its perforations 11, which are square in shape and have a side length of about 16 microns, are bounded by cross-pieces 12 having a width of about 9 microns.

This simple perforated gold foil *10* is provided on one side with an electrically insulating layer 13 of a positive photoresist lacquer. The layer can be a few microns thick. Then, as indicated in Figure 2 by single arrows denoted 14, the parts 15 of the photoresist lacquer covering the perforations of the foil are exposed to UV radiation through the foil. The UV radiation dissociates the parts 15 of the lacquer which are not covered by the crosspieces 12 of the foil *10*. After these lacquer layers parts 15 have been removed by a suitable chemical treatment a perforated insulating layer 16 is left on the underside of the perforated gold foil *10*, as shown in Figure 3. An electrically conductive layer 17 of gold or another metal or a suitable semiconductor is then applied in known manner on to this insulation layer 16, for instance by vapour deposition. The double layer perforated foil sheet thus produced and represented in Figure 3 is denoted *18*.

A further possible method of producing a double layer perforated foil sheet is indicated in Figures 4 and 5. As in Figure 2, the starting point is a simple perforated gold foil *10*. As indicated in Figure 4, by single arrows 19, a layer 20 of insulating material is then vapour deposited or sputtered on to one side of the foil *10*. Examples of suitable insulating materials are Al_2O_3, SiO_2 or organic polymers. According to Figure 5, a layer 17 of gold or another metal of high atomic number is then applied on to the insulating layer 20 according to the method of Figure 3. To do this, as indicated in Figure 5 by single arrows 21, the body consisting of the gold perforated foil *10* and the applied insulating layer 20 may be subjected, for instance, to a gold vapour beam. The double-layer perforated foil sheet produced by this method is denoted *22* in the Figure 5.

To complete the photocathode a number of sheets produced as described with reference to Figures 2 and 3 or 4 and 5 are arranged in a stack and suitable electrical connections are provided so that a voltage can be applied to the two layers *10* and 17 of each sheet which are made of electrically conductive material and are separated electrically from one another by an insulating layer 16 or 20, to provide the potential gradient required for removal of the charge carriers produced as a result of the external X-ray photoelectric effect. The stack arrangement of the individual double layer perforated foil sheets serves to prevent too high a total potential being set up.

Such a photocathode is particularly suitable for use in an electroradiographic or electrofluoroscopic device used in the field of medical engineering, as it comprises a plurality of double layer perforated foil sheets arranged in a stack and each sheet being provided on either side with an electrically conductive layer of a material of high atomic number.

A further method of producing double layer perforated foil sheets is indicated in Figures 6 to 15.

Figure 6 shows a cross-section through parts of a self-supporting insulating sheet 32, i.e. one not requiring a special supporting structure, whose thickness is between approximately 0.1 and a few microns. This

The measurement values shown in the graph have been normalised to define a coupling efficiency $\eta = 100\%$ measured for a coupling between two fibres where the distance between the end faces is 5μm and "air" is present between the end faces. The refractive index of the light-conducting core is ≈1.473 on the optical axis and ≈1.458 at the transition between the core and the cladding. The diameter of the light-conducting core is ≈50μm. The refractive index of air is taken as unity. As a result, relatively large reflection losses will occur at the end faces of the fibres.

The curve I of the graph shown in Figure 2 illustrates the variation in the efficiency η with the distance d between the adjacent end faces of the coupled optical fibres using air as the coupling medium, and it will be apparent that loss due to an increase in stray radiation rises rapidly with increased separation.

The curve II in Figure 2 illustrates the result of a series of measurements carried out when glycerine, n = 1.46 was introduced as the coupling medium between the end faces of the fibres. Reflections at the end faces are in this case substantially completely avoided as is known from prior art, and this will be apparent from the improvement in the coupling efficiency, as herein defined, to 106%, measured for a distance of 5μm between the end faces. As the distance d is increased, the coupling efficiency decreases as shown by the curve II due to increasing losses from stray radiation.

The curve III in Figure 2 illustrates the results of a series of measurements carried out using bromo-naphthalene as the coupling liquid having a refractive index n = 1.66 which can be regarded as considerably greater than the refractive index of the fibre core. Thus, significant reflection losses occurred at the end faces of the optical fibres due to the difference in refractive index. However, the light beam emerging from the end face diverged rather less than during the previous series of measurements relating to the curve II. This leads to a slight reduction in the efficiency, for a small distance between the end faces ($\eta = 104\%$ for a distance of 5μm between the end faces) but an improvement in efficiency for greater distances. (Compare the curve II and the curve III, measured for a coupling refractive index n = 1.46 and n = 1.66, respectively).

The curve IV illustrates the results of a further series of measurements using a liquid coupling medium having a refractive index n = 1.58 (in the present example, a transparent oil such as vacuum pump oil DC-705). In comparison with the measurements relating to the curve III, the light beam emerging from an end face will diverge slightly more, with the result that the losses due to stray radiation will be slightly greater, however, reflection losses will be reduced due to the smaller difference in refractive index. It will be apparent from the curve IV that a significant improvement in efficiency was achieved for any customary distance between the end faces of fibres thus coupled over the arrangements used in respect of the curves I, II and III.

Figure 3 shows a device embodying the invention for the pair-wise coupling of optical fibres 17a and 17b, whereby optical fibres 17a and 17b to be coupled are combined in an envelope of synthetic material in order to form tapes 19a and 19b in which the fibres 17a and 17b extend parallel to one another. The coupling device comprises an injection moulding of synthetic material which is formed as two trapezium-shaped portions 21 and 22 and a flat intermediate plate-like portion 23. The faces 24 and 25 of the portions 21 and 22 slope down towards the intermediate plate-like portion 23, are provided with wide guide grooves 26 and 28 for guiding the tapes 19a and 19b. The intermediate plate 23 is provided with grooves 27 in which the fibres 17a and 17b, projecting from the tapes 19a and 19b, can be guided towards each other in order to achieve a required axial alignment of corresponding pairs of fibres 17a and 17b. In the grooves 27 in the face 29 of the intermediate plate-like portion 23, a coupling medium is provided which has a refraction index which is greater than the refractive index n_1 of the light conducting cores of the fibres 17a and 17b to be coupled. Preferably, the difference in refractive index amounts to approximately 7%. After provision of the coupling medium, the fibres 17a and 17b are slid as far as possible towards each other in the grooves 27. The distance between the end faces of the various fibre pairs 17a and 17b is determined by the difference in the lengths of the individual fibres resulting from cutting the fibres.

In order to make a permanent coupling, a coupling medium can be used in the form of a transparent coupling liquid which sets after application (for example, a setting polymer, such as Stycast-35D, n = 1.59). In the case of a detachable coupling between the fibres 17a and 17b, use can be made of an adhesive coupling liquid, for example, the transparent vacuum pump oil DC-705. In either case it is beneficial to clamp the fibres 17a and 17b in the grooves 27 in known manner by means of a resilient cover plate (not shown), for example, made of rubber, which is clamped onto the intermediate plate-like portion 23.

Figure 4 shows a further coupling device embodying the invention, whereby two optical fibres have been coupled to each other.

substantially parallel to the engagement points of the previous strap between the cover plate and the platen means and aligned with the track for guiding the strap along the track during sealing of the previous strap loop, and means for opening the cover plate to release the sealed previous strap loop.

3. A machine according to claim 2, wherein the cover plate, grippers and platen means are aligned in a sealing passage in the track, means for moving the supply end gripper and the platen means laterally out of the sealing passage for moving the further strap supply end into engagement with the further strap free end held against the cover plate including an inner slide, the supply end gripper and the platen means being pivotally mounted on the inner slide, the means for moving the supply end gripper and the platen means laterally including means for moving the inner slide laterally, and means for cutting the supply end of the strap by the free end gripping means for forming a closed loop of the further strap joined in the sealing passage.

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8, in which the said relative movement is obtained by rotation of one end of the helical member around the support member.

10. Apparatus as claimed in Claim 9, including means permitting rotation in only one sense, and detent means for holding said means permitting rotation in a selected position.

11. Apparatus as claimed in Claim 10, in which said means permitting rotation comprises a free-wheel device.

12. Apparatus as claimed in any of Claims 4 to 11 in which said support member includes a ring for enabling the support member and helical member to be pulled through a pipe.

13. Apparatus for use in detecting flaws in interior coatings of elongate tubular members substantially as hereinbefore described with reference to and as illustrated in Figure 1, or Figure 2, or Figure 3, of the accompanying drawings.

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out the necessity of direct physical contact with electrical wires, such as situations where the point to be measured is submerged in a corrosive gas or liquid, must be isolated electrically or thermally, is in a vacuum, or is located on a moving part to which permanent leads cannot be conveniently connected. Further, absolute, internally calibrated temperature measurements may be made using the present invention over wider temperature ranges than would be possible with conventional thermographic phosphors or liquid crystals.

The present invention permits several specific temperature measurement improvements and offers solutions to heretofore unsolved temperature measuring problems. According to one more specific embodiment of the invention, remote, non-contact temperature measurements can be made of large surface areas, such as those in models being tested in wind tunnels, by painting the luminescent over the surface areas to be monitored. The model is then illuminated by an appropriate exciting radiation and intensity measurements of the selected luminescent lines are taken of selected points on the model from outside of the wind tunnel. Heating of the model surface by a flow of air thereover is thus monitored.

In another embodiment, remote measurement of point temperatures are made possible. Temperatures deep inside an apparatus, for instance, are extremely difficult to measure, and heretofore have not been measured in environments where metallic wires cannot be used. One such environment is in large electrical power transformers that are sealed, filled with oil, operated at high temperatures and have high levels of electric and magnetic fields that will not tolerate insertion of any metallic parts of a more conventional temperature measurement system. According to the present invention, the luminescent material is formed internal to a small sensor on the end of a long fibre optic cable. The sensor is then immersed in the location of the transformer where a spot temperature measurement is needed. The luminescent material is coupled to the detector by means of the fibre optic cable with the measurements of the luminescence being made outside of the apparatus.

The invention will now be described by way of example and with reference to the accompanying drawings wherein:

Figure 1 is a block diagram illustrating in general the basic concept of the present invention;

Figure 2 are curves that illustrate the fluorescent emission spectrum at two different temperatures of an europium-doped lanthanum oxysulfide phosphor when excited by ultraviolet radiation;

Figure 3 are curves that illustrate the intensity of specific strong emission lines from certain rare earth oxysulfide phosphors when

Figure 3A is a sample excitation spectrum curve for a rare earth oxysulfide at a single radiation output line;

Figure 4 schematically illustrates one specific form of the present invention wherein the temperature of the surface of a wind tunnel model is remotely measured;

Figure 5 shows one specific form of an optical detector 103 of the temperature measuring system of Figure 4;

Figure 6 shows another specific form of an optical detector 103 of the temperature measurement system of Figure 4;

Figure 7 schematically illustrates a large electrical power transformer utilising one aspect of the present invention for remotely measuring spot temperature thereof;

Figure 8 shows a phosphor temperature sensor and optical system therefor as one form of the temperature measurement system of Figure 7;

Figure 8A illustrates a modification of the temperature measurement system of Figure 8;

Figure 9 shows a variation in the temperature measurement system of Figure 8;

Figure 10 shows yet another variation of the temperature measurement system of Figure 8;

Figure 11 illustrates a rotating device with its internal temperature being measured according to another aspect of the present invention;

Figure 12 illustrates a moving belt with its temperature being measured according to another aspect of the present invention;

Figure 13 illustrates another aspect of the present invention wherein the temperature of fluid flow is measured;

Figure 14 illustrates the present invention applied to a system including a removable temperature probe sleeve; and

Figure 15 illustrates the present invention in an application monitoring an internal temperature of a biological specimen that is under heat treatment.

Referring to Figure 1, the basic features of all of the various aspects of the present invention are illustrated. Within some environment 1 is postioned a solid object 20 having a phosphor coating 40 over at least a portion thereof. The phosphor is characterized by emitting, when excited, electromagnetic radiation within separable bandwidths at two or more distinct wavelengths and with relative intensities to those bands that vary as a known function of the temperature of the phosphor 40. Thus, the temperature of the phosphor 40 is detected that is the same as or related to that of the object 20, and in some applications of the environment 1 as well.

Such luminescent emission of the phosphor 40 in the form of electromagnetic radiation 41, generally in or near the visible spectrum, is excited by a source 60 over a path 61. The source could be radioactive material, a source of cathode rays, an ultraviolet electromagnetic

force and is deformed into the shape shown in Figure 7a. This swaging force results in the buttress formations 34 compressing the hose wall between their crests 26 and the barbs 25 on the stem. As all of the stem and ferrule zones which contact the inner and outer walls of the hose are rounded, there is no tendency for the hose material to be severed, and the compression exerted between the ferrule and the stem causes material of the hose wall to tend to flow into the valleys 35 and around the barbs 25.

The gripping force exerted from the hose wall by the swaging action is relieved progressively, rather than suddenly by a flared entry 42 to the anulus 17 which is formed between the stem 15 and the swaged ferrule 16 as shown in Figure 7a. Formation of the flared entry occurs during swaging of the ferrule due to the provsion of the frust-conical taper 40 on the unswaged ferrule as shown in Figure 5.

It will also be noticed from Figure 7a that a shallow annular cavity 43 is formed between the wall portion 39 of the ferrule and the stem as a result of the swaging operation. The material at the terminal end of the hose is caused to flow into the cavity 43 during the swaging operation and is thereafter locked in the cavity axial displacement.

As abovementioned and as shown in Figure 7b, when the ferrule is swaged onto the stem, the crests 26 of the stem barbs locate centrally with respect to the ferrule valleys 35. This results in a corrugated formation being imparted to the hose wall and it avoids undue stress being induced in the hose wall. Some tolerance does exist in location of the barb crests relative to the ferrule valleys, this being indicated by the dimension *X* shown in Figure 7b, but the hose wall would be excessively stressed if, for example, the barb crests 26 were to be located below the buttresses 34 rather than below the valleys 35.

Figure 8 of the drawings hsows the shape of the outside wall of the hose after the connector has been swaged onto it, but with the hose subsequently removed from the connector. The wall of the hose is distorted, as a result of being located in the annulus between the stem 15 and the ferrule 16, into three axial zones. The first of these three zones if referenced 45 and is a pressure-relief zone which is formed by the flared entry 42 to the anulus. The progressive flaring lessens the possibility of undue stress occurring and provides for gradually increasing compression of the hose end where it first enters the connector.

The second or intermediate zone is referenced 46 and is where the major gripping of the connector on the hose is effected. The corrugated deformation of the hose wall which results is clearly shown, this being a product of the spacial relationship between the barbs and buttresses and providing for resistance against tensile removal of the hose from the connector.

The third of the three zones is referenced 47 and is formed into a bell-mouth configuration as a result of the terminal portion of the hose being deformed into the cavity 43 between the stem and ferrule.

Tests which have been conducted by the Applicant have shown that a hose connector which is constructed as abovedescribed is capable of being used with a thermoplastic hose without there being a risk of premature failure of the hose in the vicinity of the connector and without there being risk of the connector being blown from the end of the hose as a result of pressure surges.

CLAIMS

1. A hose-end connector for a thermoplastics material hose (10) having no metal reinforcement, the connector comprising a hollow stem portion (15) and a ferrule portion (16) which is arranged both to connect with the stem portion and to clamp the hose wall to the stem portion, the stem portion (15) having an annular peripheral groove (21) and, spaced in an axial direction from the groove, a hose-bore engageable portion (18) which is sized to locate within the bore (11) of the hose, the ferrule (16) having an annular inwardly directed flange (31) at one end thereof which is arranged to be swaged into the annular groove (21) of the stem portion (15) during a first stage of assembly of the connector, and the ferrule (16) having a main body portion (33) which defines with the stem portion an annulus (17) for receiving the hose end following the first assembly stage; characterized in that the hose-bore engaging portion (18) of the stem portion is formed with a plurality of annular-form barbs (25,25*a*) for non-severing engagement with the inner wall (11) of the hose, in that the interior of the main body portion (33) of the ferrule is provided with annular-form buttresses (34,38) for non-severing engagement with the outer wall (13) of the hose, and in that the crests (26) of the barbs (25,25*a*) are positioned to align with respective valleys (35) between the buttresses (34,38) when, during a second stage of assembly of the connector, the main body portion (33) of the ferrule (16) is swaged inwardly toward the stem portion (15) with the hose end located therebetween.

2. A connector as claimed in claim 1, further characterized in that the ferrule (16) has an integral collar portion (30) which surrounds the inwardly directed flange (31), the collar portion having a diameter approximately equal to that of the main body portion (33) of the ferrule prior to the first assembly stage being effected and the collar portion (30) being spaced in an axial direction from the main body portion (33) by a relieved portion (32) of lesser diameter.

3. A connector as claimed in claim 1 or claim 2, further characterized in that the main body portion (33) includes a frusto-conical portion (40) adjacent the end of the ferrule (16) which is remote from said one end of the ferrule, the frusto-conical portion (40) being movable in an outward direction relative to the remainder of the main body portion (33) during a swaging operation to thus provide a flared entry (42) to the annulus (17) between the stem portion (15) and the ferrule (16) during said second stage of assembly.

4. A connector as claimed in any one of claims 1 to 3, further characterized in that the barbs (25,25*a*) of the stem portion (15) are of saw-tooth configuration, with each barb having a slightly rounded crest (26), and the buttresses (34,38) of the ferrule are of

The average molecular weight of the above organic polymer may vary widely, for example, from 5,000 to 5,000,000 or even greater but is preferably within the range 10,000 to 200,000. Organic polymers having molecular weights outside these ranges may be used if desired.

Another group of organic polymers useful to form the blends of this invention are the so-called unsaturated polyesters. These polymers are available as mixtures of liquid unsaturated polyester resin and cross-slinking monomer.

The liquid unsaturated polyester resins usually comprise a linear or only slightly branched unsaturated polyester. The linear or slightly branched polyester is typically prepared as a condensation or reaction product of an unsaturated polybasic and a polyhydric compound; for example, the condensation product of an unsaturated dibasic acid of alpha-beta ethylenic unsaturation and a di– or trihydric compound, such as a glycol. Often a saturated polybasic acid or anhydride, such as a dibasic acid, is employed with the unsaturated acid or anhydride to modify the reactivity of the unsaturated resin.

Examples of typical polyhydric alcohols are ethylene glycol; 1,2–propane diol; 1,3–propane diol; diethylene glycol; dipropylene glycol; triethylene glycol; tripropylene glycol; 1,2–butane diol; 1,3–butane diol; 1,4–butane diol; neopentyl glycol; 2,2,5–trimethylpentane diol; cyclohexanedimethanol; dibromoneopentyl glycol; dibromobutane diol; trimethylolpropane; pentaerythritol; trimethylpentane diol; dipropoxy adducts of hydrogenated bis phenol A.

Examples of saturated polybasic acids are isophthalic acid; orthophthalic acid, terephthalic acid; tetrabromophthalic acid; tetrachlorophthalic acid; tetrahydrophthalic acid; adipic acid; succinic acid; azelaic acid; glutaric acid; nadic acid and the various anhydrides obtained therefrom.

Examples of unsaturated polybasic acids are maleic acids; fumaric acid, itaconic acid, citraconic acid and anhydrides obtained therefrom.

Examples of peroxide curable cross-linking monomers employed with the linear polyesters are styrene, vinyl toluene; acrylates and methacrylates like methyl-methacrylate; alphmethyl styrene, chlorostyrene; and diallyl phthalate. The liquid unsaturated polyester resins also typically contain small amounts of inhibitors in order to prevent premature reaction, such as, for example; hydroquinone; quinone and tertiary butyl catechol. These monomers, the saturated acids, the unsaturated acids and the polyhydric compounds may be admixed together in various proportions as is known in the art in order to obtain resins with varying properties, typically in amount of up to 50% by weight; for example 5 to 45%. Such liquid resin compositions may include a wide variety of other additives to include: viscosity index improvers; rheological agents; flame retardants; thermoplastic polymers; fillers such as hollow glass or plastic microsphere beands; wood flour; silica; diatomaceous earth; pigments, dyes; stabilizers; glass fibers; release agents; extenders; catalysts; silicone surfactants; and other additives (see, for example, compounds in "Unsaturated Polyesters", Modern Plastics Encyclopedia, Volume 50, No. 10a, 1973–1974, pp. 66–68 hereby incorporated by reference).

The components of the polyester resins may be varied to impart the desired properties to the cured resin. Typically, flexible resins employ greater amounts of adipates or azelates, while more rigid resins use phthalates, both with a variety of different glycols. Our invention is especially applicable to the manufacture of rigid and semi-rigid polyester foams useful as structural foams. Resins for such uses generally have a formulation, for example, of about 3 to 7 moles of glycol, 1.5 to 3.0 moles of adipic acid, 0. to 1.5 moles of phthalic anhydride, and 2 to 4 moles of maleic anhydride, with from 1.0 to 4 moles of styrene or vinyl toluene.

The liquid unsaturated polyester resins are employed in conjunction with a free-radical curing compound or a compound capable of forming a free radical. the cross-linking initiating compound is typically a peroxide capable of forming a free radical, particularly alkoxy-free radicals. Such peroxides are characterized by their reaction with amines metal salts or metal soaps which are a general class of agents known as accelerators or promoters and redox agents.

The plasticized blends of this invention are capable of formulation over a wide range of proportions. Preferably, the blend should comprise between about 15% to about 85% by weight of the phosphazene plasticizer and about 85% to about 15% by weight of the organic polymer, based on the mixture of the phosphazene and the organic polymer. More preferably, amounts of the above between about 20% to about 80% by weight are employed.

The novel mixtures of this invention, as mentioned above, generally have good thermal stability. The mixtures are soluble in specific organic solvents, e.g., as tetrayhydrofuran, benzene, xylene, toluene and dimethylforamamide and may be formed into films from solutions of the copolymers by evaporation of the solvent. The blends are water resistant at room temperature and do not undergo hydrolysis at high temperatures. The blends may be used to prepare, for example, films, fibers, coatings and molding compositions. They may be additionally blended with such additives as antioxidants, ultraviolet light absorbers, lubricants, plasticizers, dyes, pigments, fillers such as litharge, magnesia, calcium carbonate, furnace black, alumina trihydrate and hydrated silicas, other resins, or other adjuvants, known useful with the particular organic polymer, without departing from the scope of the present invention.

The plasticized blends may be used to prepare foamed products which exhibit excellent fire retardance and which produce low smoke levels, or essentially no smoke, when heated in an open flame. The foamed products may be prepared from filled or unfilled formulations using conventional foaming techniques and agents known to be useful with the organic polymer or the polyphosphazene. A review of foaming processes can be found in "Handbook of Plastics and Elastomers" (C. A. Haper, Ed.), McGraw-Hill, N.Y., N.Y., 1975,

than that of the shorter side of the L, and being provided, above but adjacent to said rib, with a supplementary flange of which the extremity bears against the panel of the partition thereby limiting the extent to which the rib can enter into the slot in the sole piece section, said rib being preferably not parallel with but being slightly inclined towards the shorter side of the upright L so as to force the outermost end of said shorter side against the panel of the partition.

2. A device in accordance with Claim 1, characterised in that there are two pairs of perpendicular flanges on the face of the sole piece section which is opposite to the face which is presented against the existing interior surface, said flanges forming two slots into which a flange or flanges of a supplementary element can be inserted.

3. A device in accordance with Claim 2, characterised in that the supplementary element provided with a flange for insertion into one of the two flange slots of the sole piece section is a section, preferably made of a plastics material, comprising two opposite flat support surfaces respectively for engaging a possible central core and opaque panels of the partition, the said flange itself terminating at one side of this supplementary element in a plane parallel to but set back from one of the said support faces.

4. A device in accordance with Claim 3, characterised in that the supplementary element terminates at the other side in another flange located in a plane parallel to but set back from the other support face, this other flange including a lug adapted for fixing of a section, preferably made of aluminium, for concealing at the outermost edges adjoining an existing interior surface the joint assembly of a partition having transparent or translucent panels.

5. A device in accordance with Claim 2, characterised in that the supplementary element, provided with two flanges for insertion into said two flange slots of the sole piece section, is a profiled section, preferably made of plastics material, comprising, at the side opposite to the two aforesaid flanges, two further perpendicular flanges each providing a lug adapted for fixing a section, preferably made of aluminium, concealing at the outermost edges adjoining an existing interior surface the arrangement for jointing a partition having transparent or translucent panels.

6. Means for jointing the edges of a panel partition to adjoining enclosing surfaces such as existing floor, ceiling and side wall surfaces, said means comprising a sole piece section in the form of a plastics strip which is applied to each respective edge of the partition in combination with at least one joint cover member in the form of an L-shaped metal section which fits externally over the joint between said edge of the partition and the adjoining enclosing surface, wherein the sole piece section has opposite outer and inner faces which are respectively presented outwardly towards the adjoining enclosing surface and inwardly towards the edge of the partition, said outer face being provided with a pair of longitudinal ribs forming projecting feet which have a forked dovetail configuration in cross-section and said inner face being provided with flat seating portions on which exterior panels and, in some cases, a central core component of the partition can rest and with longitudinal upstanding flanges against or between which the edges of said panels and other component of the partition can fit, said sole piece section also being formed at opposite sides with a longitudinal slot which extends laterally into the section and opens outwardly along the respective side edge of the section, and wherein said joint cover member is designed to fit over the joint with the outermost end of its shorter limb abutting against the side face of a said exterior panel of the partition and with the outermost end of its longer limb abutting against the adjoining enclosing surface, said joint cover member also being provided on its longer limb with an internal rib which extends inwardly away from said longer limb adjacent the outermost end thereof and which fits into a respective said side slot of the sole piece section to fix the cover member in place, the length of said rib in transverse cross-section being greater than that of the shorter limb of the cover member, and, disposed above but adjacent to said rib, with a supplementary flange of which the outermost end also abuts against the side face of said exterior panel of the partition and thereby limits the extent to which said rib enters into said side slot of the sole piece section.

7. Means as claimed in Claim 6, wherein the internal rib of the joint cover member is slightly inclined towards the shorter limb of said cover member thereby to facilitate fitting the joint cover member with close engagement between the outermost end of its shorter limb and the side face of said exterior panel of the partition.

8. Means as claimed in Claim 6 or 7, wherein there is also provided at least one supplementary joint element which fits internally in the edge portion of the partition and wherein there are two pairs of said longitudinal upstanding flanges on the sole piece section forming two spaced apart slots which receive a flange or flanges of said supplementary joint element or elements to hold the latter in position.

9. Means as claimed in Claim 8, wherein said supplementary joint element is a profiled plastics section in which opposite faces provide support surfaces for engaging, respectively, an interior side face of the panels of the partition and a face of a central core member within the interior of the partition, and a side edge portion lying in a plane parallel to, but set back from, one of said support surfaces provides a said flange which fits in one of the said two spaced apart slots of the sole piece section.

10. Means as claimed in Claim 9, wherein the supplementary joint element has an opposite side edge portion which lies in a plane parallel to, but set back from, the other of said support surfaces and provides a second flange having means adapted to engage and locate an internal cover or spacing member for use with partitions having a double glazed construction.

11. Means as claimed in Claim 8, wherein the supplementary joint element is a profiled plastics section comprising a base portion having opposite faces of which one face carries a pair of spaced said

SPECIFICATION

Sheet material detecting device

This invention relates to a device, for sensing the presence of a film or sheet material, such as X-ray plates or films, particularly for use in automatic developing equipment.

As is well known in the art, automatic X-ray developers require that the presence of the film or plate be sensed or detected upon the insertion thereof, this presence information being utilized to activate the developer functions and to replenish the processing baths.

Prior art film detectors are of two general classes. The first class relies on feelers interfering with the film, i.e. on the use of mechanical sensing members contacting the film upon its insertion into the machine. Like any device of a mechanical nature, these detectors have some shortcomings, among which are an unavoidable response delay, the risk of damaging the film, and the need for regular and careful maintenance routines. The detectors of the second class are instead based upon the interception of the X-ray film or plate with infrared light, or with ultrasounds; thus, the non-mechanical detectors successfully eliminate the problem related to response delay and possible damaging of the film, but only do this at the expense of considerable constructional complexity and high cost. In addition, a drawback common to both detector types, as indicated, is represented by the formation of static charges which build up on the X-ray film in some particular weather conditions. Static charges present on such films may discharge and create light effects, affecting the film with unwanted exposure marks and inducing false information therein.

This invention seeks to obviate the aforementioned drawbacks by providing an X-ray film detecting device, particularly for automatic developing equipment, free of any mechanical members and which can be quickly installed on existing equipment.

This object is achieved by a device for detecting the presence of a sheet or film material, particularly X-ray plates or films, characterized in that it comprises a pair of conductive, oppositely located, spaced apart, plate-like members, said conductive plate-like member-constituting the respective capacitor plates of a capacitor and being adapted for positioning at the inlet end for said film material in a processing apparatus, the gap separating said plate-like members being such as to permit the introduction of said film material between said plate-like members said detecting device further comprising circuit means electrically connected to said plate-like members, said circuit means being effective to change an operative parameter thereof upon introduction of said film material between said plate-like members and to supply signals representative of said introduction.

Further features and advantages of the detecting device of the instant invention will become apparent from the following detailed description of a preferred embodiment thereof, illustrated by way of a not limitative example in the accompanying schematical drawings, where:–

Figure 1 shows in perspective the detecting device of this invention, at a stage when the film to be detected is being introduced; and

Figures 2 and *3* show further operational stages of the inventive detecting device, with the film already introduced therein.

Making reference to the cited drawing figures, the film or sheet material detecting or sensing device, in particular for X-ray or ordinary plate, according to the invention, is generally indicated at 1. The device 1 comprises a pair of conductive, oppositely located, spaced apart, plate-like members 2 and 3, constituting respective plates of a capacitor, which are adapted for positioning at the inlet end of a processing apparatus, not shown for clarity, which may be an automatic developer for X-ray or ordinary plates; the gap between the plate-like members, 2 and 3, is such that a film or sheet material 4, in particular an X-ray plate to be developed, can be inserted therebetween. The film 4 is entrained for movement in the direction of the arrow shown in the drawing figures, the driving force being applied by a conventional drive, not shown. The plate-like members 2 and 3, constituting, as mentioned, the armature plates of a capacitor, are electrically connected, through leads 5 and 6, to a detecting circuit which is illustrated by a block and generally indicated at 7.

The operation of the detecting device according to this invention will be described next.

As the film 4, being driven by conventional means not shown, enters the gap between the capacitor plates 2 and 3, the capacity of the capacitor formed by the conductive plates 2 and 3 begins to vary. The capacity of a capacitor is, in fact, known to be directly proportional, subordinately to a proportionality constant which is the dielectric constant of the insulator separating the capacitor plates, to the surface area of the capacitor plates and inversely proportional to the distance therebetween. Thus, as soon as the film 4 is inserted between the plates 2 and 3, the dielectric constant of the insulating material between the plates 2 and 3 is caused to vary, the insulating or dielectric material being initially air and now air-plus-film, thereby the capacity of the capacitor formed by the plates 2 and 3 also varies. This capacity change is sensed or detected by the detecting circuit 7 which will not be discussed here in detail since it will be obvious to those skilled in the art. It will suffice to say that the detecting circuit 7 is a circuit which changes its operation mode or state upon insertion of the leading (in the direction of movement) edge of the film 4 between the armature plates 2 and 3. The detecting circuit 7 is a circuit the operational change whereof is triggered by the leading edge of the film 4. Conversely, the detecting circuit 7 can be returned to its original state upon detection of the trailing edge of the film 4. If suitable electronic components are included in the detecting circuit 7, such as a counter unit, then it will be possible to "count" both the mode change time of the circuit 7 and the elapsed time between the leading edge of the film 4 entering the capacitor formed by