

3-54213, there is also proposed resinous glass made of a copolymer of an oligomer of a diallyl terephthalate series and a monomer of vinyl series. However, this resinous glass is poor in impact-resistance.

Japanese Laid-open Patent Applns. Nos. Sho. 57-28115 and 60-55007 disclose a resinous glass made of a copolymer of a styrene derivative with a heavy metal salt of an unsaturated carboxylate and a resinous glass made of a copolymer of a diallyl phthalate ~~phthalate~~ which is nucleus-substituted with a halogen atom or atoms and an allyl benzoate which is nucleus-substituted ~~nucleus-substituted~~ with a halogen atom or atoms, respectively. These resinous glasses in fact have high refractive indices of 1.58 - 1.60 but instead lose a merit of lightweight because they contain a large amount ~~amount~~ of a heavy metal ion and halogen atoms and thus have a heavy specific gravity.

In Japanese Laid-open Patent Appln. No. Sho. 55-13747, there is proposed a resinous glass made of a copolymer of an acrylic or methacrylic monomer containing Bis-phenol A, a monomer of styrene series and an aryl methacrylate monomer, etc. However, this resinous glass involves a problem that it incurs coloration of the resultant lens and is poor in impact-resistance and adhesivity to a hard coating film.

EP-A-0 114 080 discloses resins obtained by polymerizing 0 to 90 wt-%
of an allyl ester of an aromatic bicarboxylic acid and 10 to 90 wt-% of an
oligomer mixture of oligomers of bis-ally carbonate of an aliphatic dihydric alcohol.
According to EP-A-0 284 139 a similar resin may be obtained by polymerizing 30
to 65 wt-% of an diallyl carbonate of a diol containing aromatic groups, 15 to 65
wt-% diallyl iso- or terephthalate and 45 wt-% of an oligomeric, diethylene glycol
based polycarbonate having two allyl ester groups.

US-A-4 930 879 relates to resins consisting of 10 to 80 wt-% of at least
one diester of itaconic or mesaconic acid, 10 to 80 wt-% of the diallyl carbonate
of a phthalate, mono and/or triethylene glycol and 5 to 50 wt-% of diethylene
glycol bis-allyl carbonate.

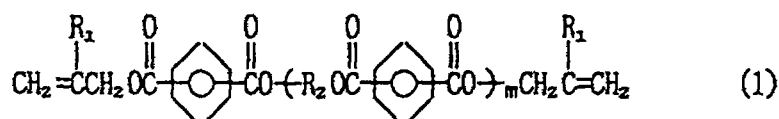
EP-A-0 082 204 discloses a plastic lens having a high refractive index of
at least 1.54 prepared from the terpolymer comprising diethylene glycol bis-ally
carbonate, benzylmethacrylate and diallyl isophthalate.

SUMMARY OF THE INVENTION

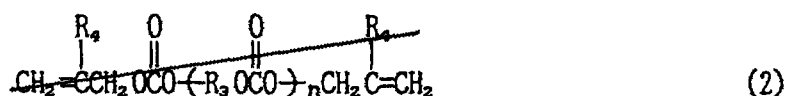
Accordingly, it is an object of the present invention to provide a new type cast resin suitable for optical use excellent in transparency and refractive index as well as having high mechanical strength, solvent-resistance and weatherability.

Other and further objects, features and advantages of the present invention will become apparent more fully from the following description.

According to the present invention, there is provided a cast resin for optical use obtained by polymerizing 40 - 90 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula:

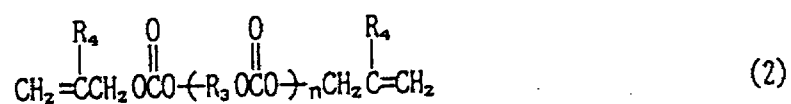


wherein -R₁ stands for a hydrogen atom or a methyl group, -OR₂ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20~~x with 10-60 % by weight of a polymerizable component 2 of an alkylene glycol bis allylcarbonate component represented by the formula:~~



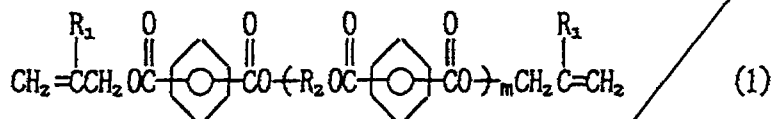
wherein the fraction of said component 1 where $m=0$ ranges from 20-70 % by weight, where $m=1$ ranges from 20-40 % by weight, where $m=2$ ranges from 1-20 % by weight, where $m=3$ ranges from 0-20 % by weight, where $m=4$ ranges from 0-15 % by weight, where $m=5$ ranges from 0-10 % by weight, and where $6 \leq m \leq 20$ ranges from 0-10 % by weight;

with 10-60 % by weight of a polymerizable component 2 of an alkyleneglycol bis-allylcarbonate component represented by the formula :

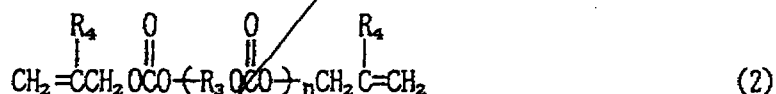


wherein $-R_4$ stands for a hydrogen atom or a methyl group,
 $-OR_3$ for a dihydric alcohol residue having 1-10 carbon
atoms, and n for an integer of 1-10.

According to the present invention, there is
 provided a cast resin for optical use obtained by
 polymerizing 40 - 89 % by weight of a polymerizable
 component 1 of a diallylphthalate component represented by
 the formula:



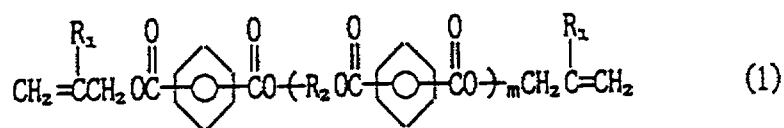
wherein $-R_1$ stands for a hydrogen atom or a methyl group,
 $-OR_2$ for a dihydric alcohol residue having 1-5 carbon
 atoms, and m for an integer of 0-20, with 10-59 % by weight
 of a polymerizable component 2 of an alkylene glycol
 bis-allylcarbonate component represented by the formula:



wherein $-R_4$ stands for a hydrogen atom or a methyl group,
 $-OR_3$ for a dihydric alcohol residue having 1-10 carbon
 atoms, and n for an integer of 1-10 and a polymerizable
~~component 3 of a vinyl compound represented by the formula:~~

wherein the fraction of said component 2 where $n = 1$ ranges from 20-60 % by weight, where $n = 2$ ranges from 25-40 % by weight, where $n = 3$ ranges from 5-25 % by weight, where $n = 4$ ranges from 1-20 % by weight, and where $5 \leq n \leq 10$ ranges from 0-15 % by weight.

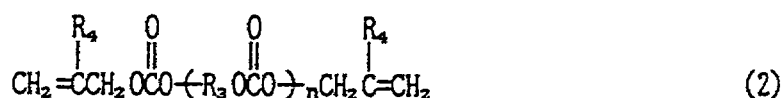
According to the present invention, there is provided a cast resin for optical use obtained by polymerizing 40-89 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula :



wherein - R_1 stands for a hydrogen atom or a methyl group, - OR_2 for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20 wherein the fraction of said component 1 where $m = 0$ ranges from 20-70 % by weight, where $m = 1$ ranges from 20-40 % by weight, where $m = 2$ ranges from 1-20 % by weight, where $m = 3$ ranges from 0-20 % by weight, where $m = 4$ ranges from

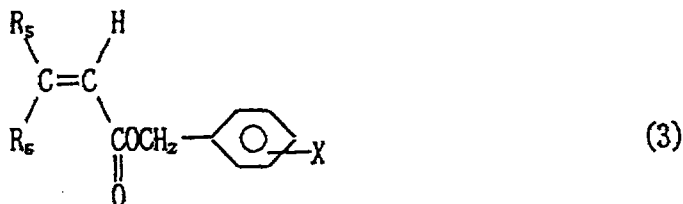
0-15% by weight, where $m=5$ ranges from 0-10 % by weight, and where $6 \leq m \leq 20$ ranges from 0-10 % by weight;

with 10-59 % by weight of a polymerizable component 2 of an alkylene glycol bis-allylcarbonate component represented by the formula :

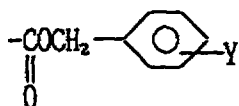


wherein - R_4 stands for a hydrogen atom or a methyl group, - OR_3 for a dihydric alcohol residue having 1-10 carbon atoms, and n for an integer of 1-10 wherein the fraction of said component 2 where $n=1$ ranges from 20-60 % by weight, where $n=2$ ranges from 25-40 % by weight, where $n=3$ ranges from 5-25 % by weight, where $n=4$ ranges from 1-20 % by weight, and where $5 \leq n \leq 10$ ranges from 0-15 % by weight;

and a polymerizable component 3 of a vinyl compound represented by the formula :



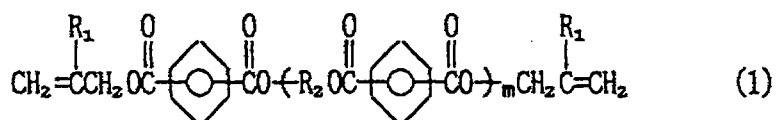
wherein one of R_5 and R_6 stands for a hydrogen atom and the other for a grouping:



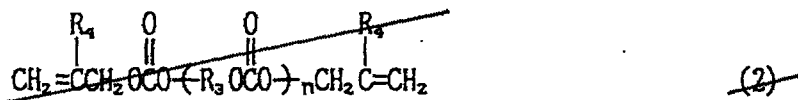
and X and Y are the same or different and stand for a hydrogen atom or a halogen atom other than a fluorine atom.

DETAILED DESCRIPTION OF THE INVENTION

In accordance with the present invention, the polymerizable component 1 of diallylphthalate component represented by the formula:

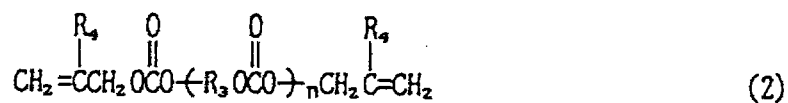


wherein $-R_1$ stands for a hydrogen atom or a methyl group, $-OR_2$ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20, ~~is polymerized or copolymerized with the polymerizable component 2 of alkylene glycol bis-allylcarbonate represented by the formula:~~



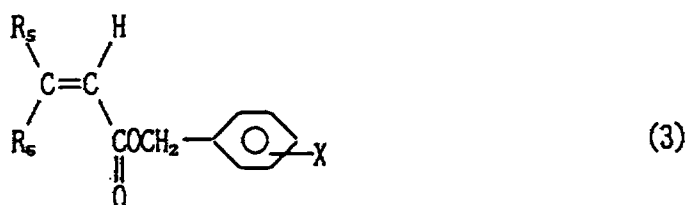
wherein the fraction of said component 1 where $m=0$ ranges from 20-70 % by weight, where $m=1$ ranges from 20-40 % by weight, where $m=2$ ranges from 1-20 % by weight, where $m=3$ ranges from 0-20 % by weight, where $m=4$ ranges from 0-15 % by weight, where $m=5$ ranges from 0-10 % by weight, and where $6 \leq m \leq$ ranges from 0-10 % by weight;

is polymerized or copolymerized with the polymerizable component 2 of alkylene glycol bis-allyl carbonate represented by the formula :

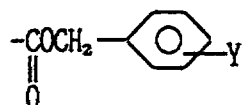


wherein R_4 stands for a hydrogen atom or a methyl group, $-OR_3$ for a dihydric alcohol residue having 1-10 carbon atoms, and n for an integer of 1-10 wherein the fraction of said component 2 where $n=1$ ranges from 20-60 % by weight, where $n=2$ ranges from 25-40 % by weight, where $n=3$ ranges from 5-25 % by weight, where $n=4$ ranges from 1-20 % by weight, and where $5 \leq n \leq 10$ ranges from 0-15 % by weight.

In accordance with the present invention, the polymerizable component 3 of vinyl compound represented by the formula:



wherein one of R_5 and R_6 stands for a hydrogen atom and the other for a grouping:



and X and Y are the same or different and stand for a hydrogen atom or a halogen atom other than a fluorine atom, may be polymerized or terpolymerized with the abovementioned components 1 and 2.

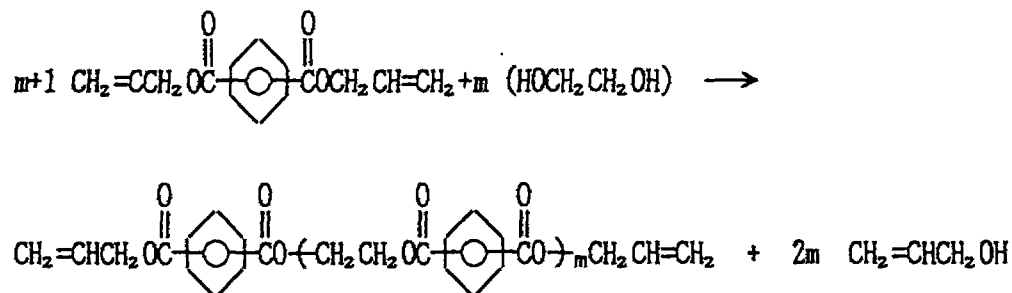
In the formula (1) of the polymerizable component 1, $-OR_2$ should be a dihydric alcohol residue having 1-5 carbon atoms. If the number of carbon atoms exceeds 5, the heat-resistance and the refractive index of the resultant polymer will be deteriorated. ~~As to the degree of polycondensation of the polymerizable component 1 wherein m~~

~~is an integer of 0-20, no limitation exists in~~
~~polycondensation so far as the number of m is an integer of~~
~~0-20.~~ Since exact control of the ^{molecular}~~molecular~~ weight is
difficult in case of preparing the above polymerizable
component 1 by transesterification, a mixture of the
component 1 each having a definite distribution of the
^{molecular}~~molecular~~ weight ^{is}~~can conveniently be~~ used in the present
invention unless the number of m exceeds 20. In order to
remarkably improve the impact-strength, refractive index
and viscosity of a resin to be co- or terpolymerized, the
distribution of the molecular weights ^{is}~~may preferably be~~ as
follows:

20 - 70 % by weight of $m=0$, 20 - 40 % by weight
of $m=1$, 1 - 20 % by weight of $m=2$, 0 - 20 % by weight of
 $m=3$, 0 - 15 % by weight of $m=4$, 0 - 10 % by weight of $m=5$,
and 0 - 10 % by weight of $6 \leq m \leq 20$. If the value of m in
case of zero is lower than 20 % by weight, the viscosity is
remarkably increased, thus not being ^{preferred}~~preferred~~, whereas in
excess of 70 % by weight, the impact-resistance of a resin
to be copolymerized or terpolymerized will be deteriorated.
On the other hand, if the value of m in case of at least 6
but not greater than 20 exceeds 10 % by weight, the
viscosity of a resin to be copolymerized or terpolymerized
will become extremely high.

dioxide, and antimony compound such as antimony trichloride.

When reacting diallyl isophthalate with ethylene glycol, the above transesterification reaction can be exemplified according to the following reaction formulas:



wherein m stands for an integer of 1 - 20.

In the formula (2) of the polymerizable component 2, $-\text{OR}_3$ should be a dihydric alcohol residue having 1 - 10 carbon atoms. If the carbon atoms exceed 10, the heat resistance of the resultant resin will become inferior. As to the degree of polycondensation of the polymerizable component 2 of the formula (2) wherein n is an integer of 1 - 10, no limitation exists in polycondensation so far as the number of m is an integer of 1 - 10. Since exact control of the molecular weight is difficult in case of preparing the above polymerizable component 2 by transesterification, a mixture of the component 2 each having a definite distribution of the molecular weight ~~can~~ ^{is} ~~conveniently be~~ used in the present invention, just like the case of the polymerizable component 1, unless the

number of n exceeds 10. In order to remarkably improve the impact-strength, refractive index and viscosity, the distribution of the molecular weights is ~~preferably~~ as follows:

20 - 60% by weight of $n=1$, 25 - 40% by weight of $n=2$, 5 - 25% by weight of $n=3$, 1 - 20% by weight of $n=4$, and 0 - 15% by weight of $5 \leq n \leq 10$.

preparation
example In ~~preparation~~ of the polymerizable component 2, for ~~example~~ diallylcarbonate is subjected to transesterification with dihydric alcohol in the presence of a catalyst preferably at 50-200°C for 2-12 hours. In order to set the distribution of m in the range as mentioned above, the amounts of the feed materials, temperatures, time periods and pressure are appropriately set to thereby readily prepare the polymerizable component 2. The examples of the dihydric alcohol include ethylene glycol, propylene glycol, 1,3-propanediol, 1,4-butanediol, 1,3-butanediol, neopentyl glycol, diethylene glycol and dipropylene glycol. The same catalyst as mentioned above in terms of the polymerizable component 1 may be used.

As mentioned above, the polymerizable component 3 may be polymerized or terpolymerized with the components 1 and 2. Illustrative of the polymerizable component 3 are, for example, fumarate compounds such as dibenzyl fumarate,

polymerizable component 1 may be terpolymerized with given proportions of the polymerizable components 2 and 3. The proportion of the polymerizable component 1 has to be ~~limited~~ ^{limited} to a range of 40 - 89% by weight based on the total polymerizable components. If the proportion of the polymerizable component 1 is less than 40% by weight, the resultant resin will be reduced in refractive index. In contrast, if the proportion exceeds 89% by weight, the resultant resin will be inferior in impact-strength and color hue. On the other hand, the proportion of the polymerizable component 2 is limited to a range of 10 - 59% by weight based on the total polymerizable components. If the proportion of the polymerizable component 2 is less than 10% by weight, the resultant resin will become inferior in impact-resistance, color hue and adhesivity to a hard coat. On the contrary, if the proportion exceeds 59% by weight, the resultant resin will be reduced in refractive index. The amount of the polymerizable component 3 is to be limited to a range of 1-30% by weight, preferably 3-20% by weight in respect of color hue, impact-strength and heat-resistance. If the proportion of the polymerizable component 3 is less than 1% by weight, the resultant resin will become inferior in color hue and impact-strength. In contrast, if the proportion exceeds

30% by weight, the resultant resin will become inferior in heat-resistance.

The above polymerizable components 1 and 2 may optionally be used conjointly with a vinyl monomer not represented by the formulas (1), (2) and (3). Illustrative of such vinyl monomer are, for example, aromatic vinyl compounds such as styrene, p-methylstyrene, p-chlorostyrene, α -methylstyrene, vinyl naphthalene and divinylbenzene; vinyl esters such as vinyl acetate, vinyl benzoate, allyl benzoate and divinyl phthalate; acrylic or methacrylic monomers such as acrylic and methacrylic acids, glycidyl acrylate and methacrylate, methyl acrylate and methacrylate, ethyl acrylate and methacrylate, isopropyl acrylate and methacrylate, n-propyl acrylate and methacrylate, isobutyl acrylate and methacrylate, sec-butyl acrylate and methacrylate, n-butyl acrylate and methacrylate, allyl methallyl acrylate and methacrylate, ~~methallyl~~ methacrylate acrylate and methacrylate, vinyl acrylate and ~~methacrylate~~, 2-hydroxyethyl acrylate and methacrylate, 2-hydroxypropyl acrylate and methacrylate, cyclohexyl acrylate and methacrylate, phenyl acrylate and methacrylate, benzyl acrylate and methacrylate, naphthyl methacrylate, ethyleneglycol diacrylate and dimethacrylate, diethyleneglycol diacrylate and dimethacrylate,

[Table 4]

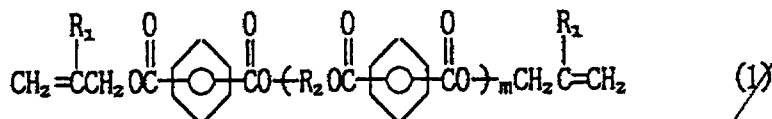
Ex.	Polymerizable Comp. (g)	Curing agent (g)	Curing temp. (°C)	Refractive index	Abbe's number	Impact-strength	Heat-resistance	S.G.	Solvent-resistance	Adhesivity to hard coat film
II-1	PDAIP-2VL PADC-2H DBzF (6.3)	IPP (0.2)	40	1.552	38	O	O	1.271	O	100
II-2	PDAIP-3VL PADC-2H DBzF (7.2)	NPP (0.2)	40	1.557	37	O	O	1.265	O	100
II-3	PDAIP-4VL PADC-2M BCBF (4.4)	TPB (0.3)	100	1.552	36	O	O	1.300	O	100
II-4	PDAIP-2L PADC-2H BCBM (6.1)	TPI (0.3)	100	1.574	33	O	O	1.262	O	100
II-5	PDAIP-3L PADC-2M BBBM (4.5)	BPO (0.1)	70	1.544	36	O	O	1.291	O	100
II-6	PDAIP-2M PADC-2M DBzF (4.5)	BPO (0.1)	70	1.540	39	O	O	1.294	O	100
II-7	PDAIP-3M PADC-3L DBzF (5.3)	IPP (0.2)	40	1.551	38	O	O	1.267	O	100
II-8	PDAIP-2H PADC-2L DBzF (8.5)	IPP (0.2)	40	1.558	37	O	O	1.255	O	100
II-9	PDAIP-2VL PADC-2H DBzF (4.4)	TCP (0.3)	40	1.549	39	O	O	1.280	O	100
II-10	PDAIP-3VL PADC-2H DBzF (5.3)	TPB (0.3)	100	1.554	38	O	O	1.268	O	100
II-11	PDAIP-3L PADC-2M DBzF (6.1)	NPP (0.2)	40	1.568	35	O	O	1.287	O	100
II-12	PDAIP-2M PADC-3L DBzF (5.4)	TPI (0.3)	100	1.533	41	O	O	1.294	O	100
II-13	PDAIP-3M PADC-2L Styrene (2.5)	IPP (0.2)	40	1.558	36	O	O	1.284	O	100
II-14	PDAIP-3VL PADC-2L BzMA (2.5)	NPP (0.2)	40	1.555	37	O	O	1.265	O	100
II-15	PDAIP-2M PADC-2L BMEPP DBzF (5.3)	TCP (0.3)	40	1.553	37	O	O	1.284	O	100

[Table 5]

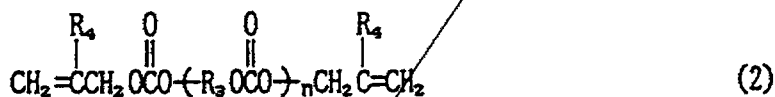
Comp. Ex.	Polymerizable Comp. (g)	Curing agent (g)	Curing temp. (°C)	Refractive index	Abbe's number	Impact-strength	Heat-resistance	S.G.	Solvent-resistance	Adhesivity to hard coat film
1	MMA (10)	BPO (0.1)	70	1.492	58	O	X	1.191	X	24
2	スチレン Styrene (10)	BPO (0.1)	70	1.591	32	O	X	1.054	X	7
3	ADC (10)	IPP (0.3)	40	1.499	55	X	O	1.327	O	100
4	DAIP (7) ADC (3)	IPP (0.3)	40	1.561	37	X	O	1.276	O	100
5	スチレン Styrene (5) BMEPP (5)	BPO (0.1)	70	1.582	33	X	O	1.170	O	14
6	PDAIP-2VL (10)	IPP (0.2)	40	1.570	35	X	O	1.249	O	100
7	PADC-2H (10)	IPP (0.2)	40	1.508	50	O	O	1.329	O	100
8	PDAIP-2L (7) ADC (3)	IPP (0.2)	40	1.547	38	X	O	1.271	O	100
9	DAIP (9) PADC-2H (1)	NPP (0.2)	40	1.564	36	X	O	1.276	O	100
10	PDAIP-2M (9.5) PADC-2M (0.5)	IPP (0.2)	40	1.561	36	X	O	1.256	O	91
11	PDATP-2M (3.5) PADC-2M (6.5)	IPP (0.2)	40	1.527	42	O	O	1.297	O	100

CLAIMS

1. A cast resin for optical use obtained by polymerizing 40 - 90 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula:



wherein -R₁ stands for a hydrogen atom or a methyl group, -OR₂ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20, with 10-60 % by weight of a polymerizable component 2 of an alkylene glycol bis-allylcarbonate component represented by the formula:



wherein -R₄ stands for a hydrogen atom or a methyl group, -OR₃ for a dihydric alcohol residue having 1-10 carbon atoms, and n for an integer of 1-10.

2. The cast resin defined in claim 1, wherein distribution of molecular weights of said polymerizable component 1 of the formula 1 represented by m is 20 - 70% by weight of m=0, 20 - 40 % by weight of m=1, 1 - 20 % by weight of m=2, 0 - 20 % by weight of m=3, 0 - 15 % by weight of m=4, 0 - 10 % by weight of m=5, and 0 - 10 % by

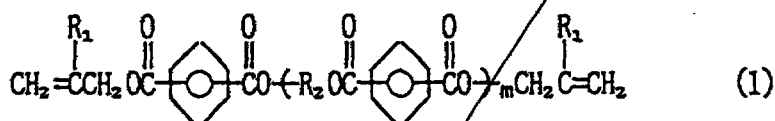
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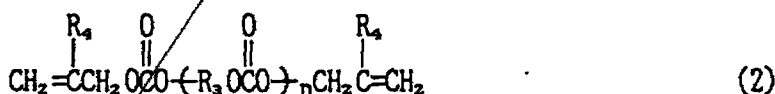
~~weight of $6 \leq n \leq 20$.~~

3. The cast resin defined in claim 1, wherein distribution of molecular weights of said polymerizable component 2 of the formula 2 represented by n is 20 - 60% by weight of $n=1$, 25 - 40 % by weight of $n=2$, 5 - 25 % by weight of $n=3$, 1 - 20 % by weight of $n=4$, and 0 - 15 % by weight of $5 \leq n \leq 10$.

4. A cast resin for optical use obtained by polymerizing 40 - 89 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula:



wherein $-\text{R}_1$ stands for a hydrogen atom or a methyl group, $-\text{OR}_2$ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20, with 10-59 % by weight of a polymerizable component 2 of an alkylene glycol bis-allylcarbonate component represented by the formula:

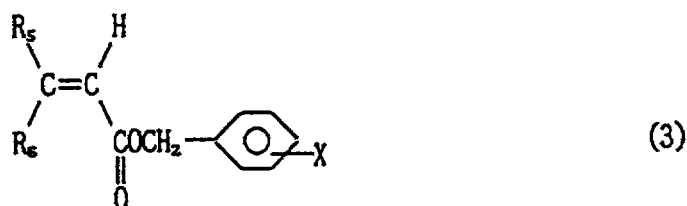


wherein $-\text{R}_4$ stands for a hydrogen atom or a methyl group, $-\text{OR}_3$ for a dihydric alcohol residue having 1-10 carbon atoms, and n for an integer of 1-10 and a polymerizable

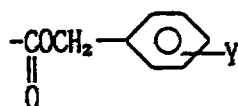
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~~component 3 of a vinyl compound represented by the formula:~~



wherein one of R_s and R_e stands for a hydrogen atom and the other for a grouping:



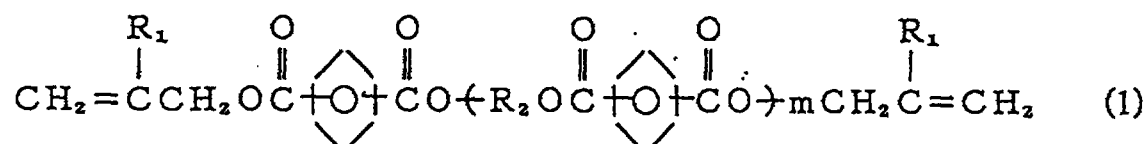
and X and Y are the same or different and stand for a hydrogen atom or a halogen atom other than a fluorine atom.

5. The cast resin defined in claim 4, wherein distribution of molecular weights of said polymerizable component 1 of the formula 1 represented by m is 20 - 70% by weight of $m=0$, 20 - 40 % by weight of $m=1$, 1 - 20 % by weight of $m=2$, 0 - 20 % by weight of $m=3$, 0 - 15 % by weight of $m=4$, 0 - 10 % by weight of $m=5$, and 0 - 10 % by weight of $6 \leq m \leq 20$.

6. The cast resin defined in claim 4, wherein distribution of molecular weights of said polymerizable component 2 of the formula 2 represented by n is 20 - 60% by weight of $n=1$, 25 - 40 % by weight of $n=2$, 5 - 25 % by weight of $n=3$, 1 - 20 % by weight of $n=4$, and 0 - 15 % by weight of $5 \leq n \leq 10$.

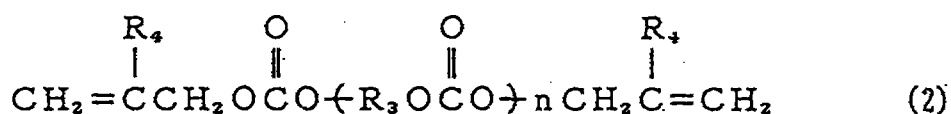
CLAIMS

1. A cast resin for optical use obtained by polymerizing 40-90 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula:



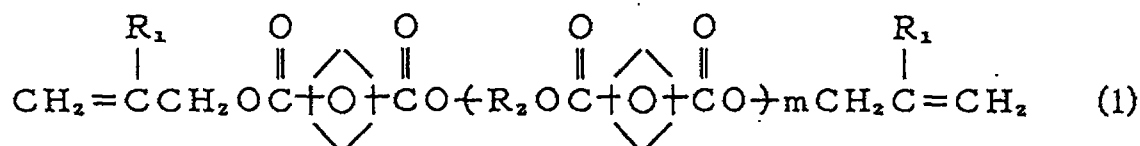
wherein $-\text{R}_1$ stands for a hydrogen atom or a methyl group, $-\text{OR}_2$ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20 wherein the fraction of said component 1 where $m=0$ ranges from 20-70 % by weight, where $m=1$ ranges from 20-40 % by weight, where $m=2$ ranges from 1-20 % by weight, where $m=3$ ranges from 0-20 % by weight, where $m=4$ ranges from 0-15 % by weight, where $m=5$ ranges from 0-10 % by weight, and where $6 \leq m \leq 20$ ranges from 0-10 % by weight;

with 10-60 % by weight of a polymerizable component 2 of an alkyleneglycol bis-allylcarbonate component represented by the formula:



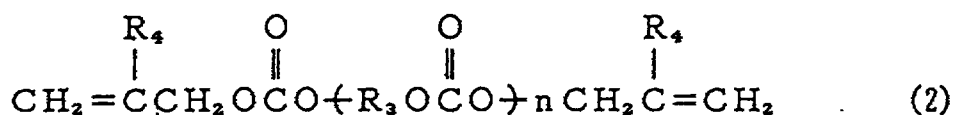
wherein $-\text{R}_4$ stands for a hydrogen atom or a methyl group, $-\text{OR}_3$ for a dihydric alcohol residue having 1-10 carbon atoms and n for an integer of 1-10 wherein the fraction of said component 2 where $n=1$ ranges from 20-60 % by weight, where $n=2$ ranges from 25-40 % by weight, where $n=3$ ranges from 5-25 % by weight, where $n=4$ ranges from 1-20 % by weight, and where $5 \leq n \leq 10$ ranges from 0-15 % by weight.

2. A cast resin for optical use obtained by polymerizing 40-89 % by weight of a polymerizable component 1 of a diallylphthalate component represented by the formula:



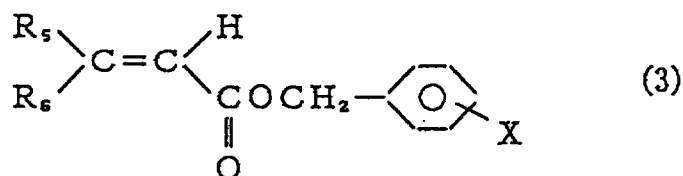
wherein $-R_1$ stands for a hydrogen atom or a methyl group, $-OR_2$ for a dihydric alcohol residue having 1-5 carbon atoms, and m for an integer of 0-20 wherein the fraction of said component 1 where $m=0$ ranges from 20-70 % by weight, where $m=1$ ranges from 20-40 % by weight, where $m=2$ ranges from 1-20 % by weight, where $m=3$ ranges from 0-20 % by weight, where $m=4$ ranges from 0-15 % by weight, where $m=5$ ranges from 0-10 % by weight, and where $6 \leq m \leq 20$ ranges from 0-10 % by weight;

with 10-59 % by weight of a polymerizable component 2 of an alkylene glycol bis-allyl carbonate component represented by the formula:

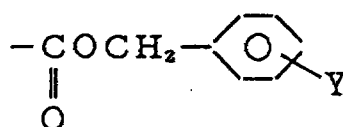


wherein $-R_4$ stands for a hydrogen atom or a methyl group, $-OR_3$ for a dihydric alcohol residue having 1-10 carbon atoms and n for an integer of 1-10 wherein the fraction of said component 2 where $n=1$ ranges from 20-60 % by weight, where $n=2$ ranges from 25-40 % by weight, where $n=3$ ranges from 5-25 % by weight, where $n=4$ ranges from 1-20 % by weight, and where $5 \leq n \leq 10$ ranges from 0-15 % by weight;

and a polymerizable component 3 of a vinyl compound represented by the formula:



wherein one of R_5 and R_6 stands for a hydrogen atom and the other for a grouping:



and X and Y are the same or different and stand for a hydrogen atom or a halogen atom other than a fluorine atom.