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FLASHER DEVICE

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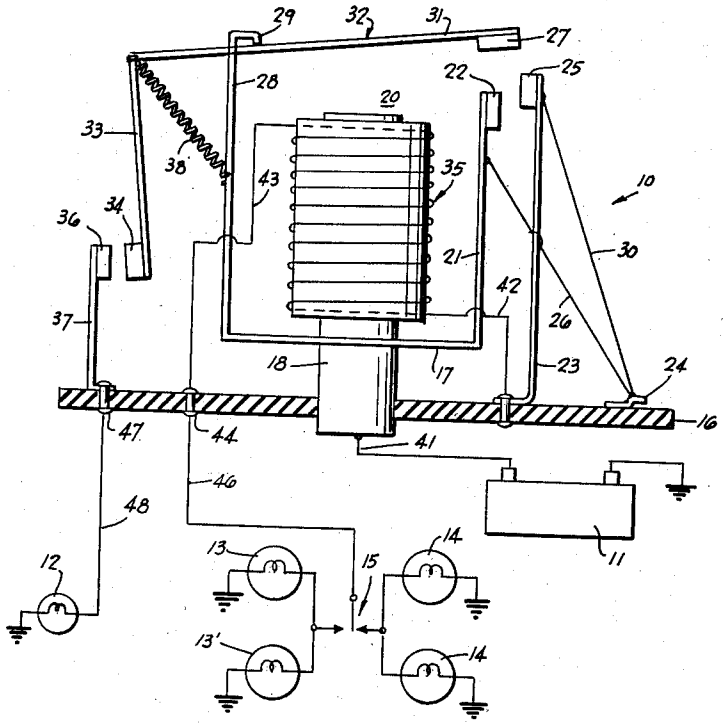


Fig. 1.

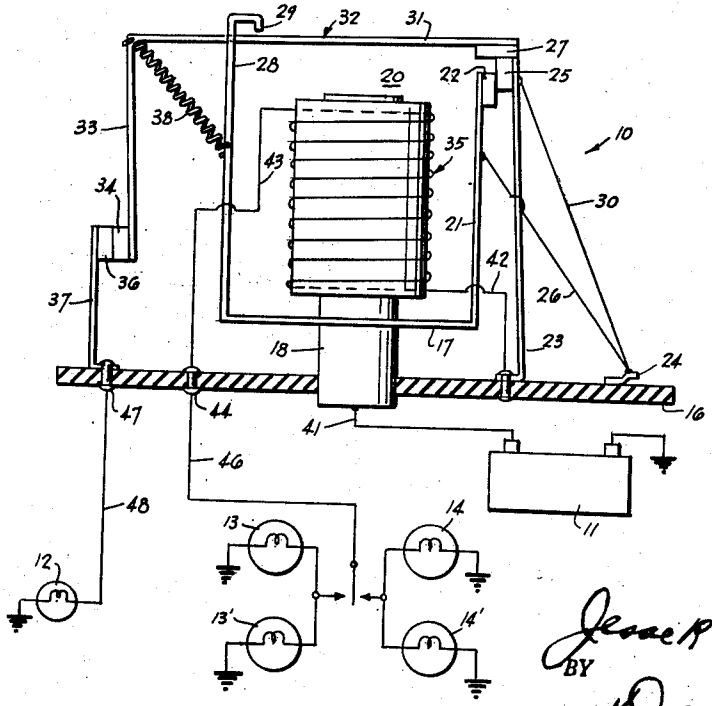


Fig. 2.

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FLASHER DEVICE

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This invention relates to periodic circuit interrupters, commonly known as "flashers," as used in signalling circuits to flash signal lamps. More particularly, the invention relates to an improved flasher having a novel self-cleaning contact arrangement.

Flashers of the type used in automotive vehicle signalling arrangements are generally of the thermal type, including a high resistance or "hot" wire of "Nichrome" or the like initially in the signal circuit, so that, when the circuit control switch is closed, the resistance wire is included in the lamp circuit. Its resistance is sufficiently high to prevent sufficient current flow to the signal lamps to illuminate the latter.

The current flowing through the high resistance wire causes the latter to become hot and expand. This expansion allows a pair of contacts, in shunt relation to the hot wire, to close, allowing sufficient current flow to illuminate the signal lamps. However, the shunted resistance wire cools and contracts to break the shunt circuit so that all current must again flow through the resistance wire. This operation is cyclically repeated, effecting flashing of the signal lamps.

The usual vehicle source of electrical energy is D. C., including a battery and a D. C. generator. Thus, the current flow through the flasher is D. C. As is known to those skilled in the art, unidirectional current flow across a pair of make and break contacts, which arc when they are separated under load, causes a mound to form on one contact and pitting of the other contact. This is due to the unidirectional current flow through the arc formed by the breaking contacts, and has resulted in inefficiency and short life of flashers. At the least, frequent dressing and replacement of the contacts is necessary, representing a maintenance expense.

The present invention is directed to a novel contact arrangement for flashers, in which arcing of the contacts is substantially reduced. Even more important, one of the contacts is arranged to wipe over the other contact during separation, thereby effecting automatically a cleaning or dressing of the contacts during each cycle of flasher operation. Consequently, the efficiency of the flasher remains substantially unimpaired, the contact life is very substantially lengthened, and the necessity of dressing of the contacts is reduced to a negligible amount.

A feature of the invention is that a relay armature is not connected to the "hot" wire, and is spring biased to the open position. When the relay is deenergized, the armature is snapped

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back by the spring, effecting a quick breaking of the circuit to further reduce the contact arcing.

For an understanding of the invention principles, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawing. In the drawing:

Fig. 1 is an elevation view of the invention flasher in the inoperative or open position, and schematically illustrating a source of power and a signal circuit connected to the flasher, and

Fig. 2 is a view similar as to Fig. 1 illustrating the flasher in the closed position.

Referring to Figs. 1 and 2, the flasher 10 of the invention is illustrated in connected circuit relation with a grounded battery 11, a grounded pilot lamp 12, and a control or selector switch 15 for selectively energizing left signal lamps 13, 13' or right signal lamps 14, 14'.

Flasher 10 includes a dielectric base 16 on which is mounted a metal frame 17 including a core 18 of a relay 20 mounted on frame 17. One upstanding arm 21 of frame 17 carries an outwardly facing contact 22. Adjacent this arm is a flat spring 23 carrying a contact 25, spring 23 normally tending to engage contact 25 with contact 22. A high resistance wire 30 of "Nichrome" or the like, is anchored at one end to the outer end of spring 23 and, at the other end, to a terminal 24 on base 16. Normally, wire 30 holds spring 23 away from frame arm 21.

Contact 25 is of such length and so mounted that it projects at least slightly beyond contact 22, extending sufficiently inwardly to have adequate surface engagement with contact 22. A conductor 26 connects frame arm 21 to terminal 24. Contact 25, when engaged with contact 22, is arranged to be engaged by a contact 27 on the outer end of arm 31 of relay armature 32. Due to the projection of contact 25 outwardly beyond contact 22, contact 27 does not engage contact 22.

Armature 32 is mounted through arm 28 of frame 17, this arm forming a fulcrum for the armature and having a reentrant outer end 29 acting as a limit stop for the armature. The armature includes a second arm 33 substantially perpendicular to arm 31, and a spring 38 anchored to the junction of arms 31 and 33, and to frame arm 28, biases the armature away from relay core 18. The free end of arm 33 carries a contact 34 engageable with a contact 36 mounted on a metal arm 37 on base 16.

Battery 11 is connected by conductor 41 to core 18 and frame 17. A conductor 42 connects

one end of relay coil 35 to spring 23. A conductor 43 connects the other end of coil 35 to terminal 44 connected by conductor 46 to switch 15. Terminal 47 and conductor 48 connect arm 37 to pilot lamp 12.

Flasher 10 operates in the following manner. When switch 15 is closed, current flows in a circuit from battery 11 through core 18, frame 17, arm 21, conductor 26, terminal 24, resistance wire 30, spring 23, conductor 42, coil 35, conductor 43, terminal 44, conductor 46, control switch 15, and either set of signal lamps 13, 13' or 14, 14' to ground. Due to the high resistance of wire 30, the current flow is insufficient either to operate relay 20 or to effect sensible illumination of the signal lamps.

As wire 30 becomes hot, due to current flow, it expands, allowing spring 23 to bias contact 25 toward and to engage with contact 22. This shunts wire 30, allowing current to flow, in a shunt circuit around wire 30, through contacts 22, 25, spring 23, and conductor 42 to coil 35. The current flow is now sufficient to operate relay 20 and to illuminate the signal lamps.

Armature 32 is now pulled toward the relay coil 35, as shown in Fig. 2, engaging contact 27 with contact 25 and contact 34 with contact 36. This lights pilot lamp 12. Armature 31 also establishes a second circuit, in shunt with frame arm 21, from frame 17 to spring 23 and thus to coil 35.

The shunted resistance wire 30 now cools and contracts, drawing spring 23 outwardly to disengage contact 25 from contact 22. Due to the last mentioned shunt circuit, however, there is substantially no load on contacts 22, 25 as they separate, and consequently no arcing. Also, the shunt circuit through armature 32 maintains the relay 20 energized and the signal lamps 13—13' or 14—14' lighted.

As contact 25 is moved further outwardly, it wipes over contact 27, causing contacts 25 and 27 to clean or dress each other. Before contacts 25, 27 separate, sufficient current is taken by the circuit including wire 30, due to separation of contacts 22, 25, to reduce the current flow across contacts 25, 27 to a low enough value to prevent arcing of these contacts as they separate. As contacts 25, 27 separate, the relay 20 is deenergized, and spring 38 snaps the armature 32 outwardly. This provides a fast circuit break, further reducing arcing of contacts 25, 27. Deenergization of relay 20 is due to the fact that, with the relay current flowing through "hot" wire 30, the current flow through coil 35 is insufficient to hold armature 32 in or to illuminate the signal lamps 13—13' or 14—14', and as the armature is swung away by spring 38, contacts 34, 36 are separated to extinguish pilot lamp 12.

Should a signal lamp be defective, the current flow through coil 35, in series with the signal lamps, will be insufficient to operate armature 32. While spring 23 will flex back and forth, as wire 30 expands and contracts, the pilot lamp 12 will not be lit as the armature 32 is not moved. However, the relatively low current flow across contacts 22, 25 as wire 30 contracts will not be sufficient to cause pitting or damaging of the contacts. With the "drag" of armature contact 27 eliminated, the cycle will be speeded, resulting in much faster flashing of the operative signal lamp. Noting this, the vehicle operator will be apprised of the necessity of checking the companion lamp.

The foregoing construction thus provides a durable flasher having low contact maintenance. Additionally, the pilot lamp circuit is independent of the relay coil circuit, and so arranged as to indicate when a signal lamp is defective.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be otherwise embodied without departing from such principles.

What is claimed is:

1. A flasher comprising, in combination, a high resistance-wire, a fixed contact, a movable contact engageable with said fixed contact, said high resistance wire being connected at one end to said movable contact, and being in circuit with said fixed and movable contacts, said high resistance wire being adapted when shunted to contract and thereby disengage said movable contact from said fixed contact, means biasing said movable contact to engage said fixed contact to complete a first shunt circuit for said resistance wire, a relay including an operating coil connected in circuit with said movable contact and said resistance wire, and a movable armature included in a second shunt circuit for said resistance wire, said relay coil being incuded in both shunt circuits, said armature carrying a third contact engageable with said movable contact when said coil is energized through said first shunt circuit closed by engagement of said movable contact with said fixed contact, said movable contact being disposed at an angle to said third contact and movable therealong when the shunted resistance wire contracts, and disengaging said third contact to break said second shunt circuit, in the full retracted position of said movable contact, to deenergize said relay coil.

2. A flasher comprising, in combination, a fixed contact, a movable contact engageable with said fixed contact, a high resistance wire connected at one end to said movable contact for normally biasing said movable contact away from said fixed contact, means biasing said movable contact to engage said fixed contact, a relay including an operating coil and a movable armature, a circuit, including said fixed contact, said resistance wire, said movable contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said movable contact, in engagement when the resistance wire expands, and said relay coil, said armature carrying a third contact engageable with said movable contact when said coil is energized, and a second relay energizing circuit, in shunt with said resistance wire, and including said third contact, said movable contact, and said relay coil, said movable contact being disposed at an angle to said third contact and movable therealong when the shunted resistance wire contacts, and disengaging said third contact to break said second shunt circuit, in the fully retracted position of said movable contact, to deenergize said relay coil.

3. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, a metal spring member mounted on said base and

extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected to said spring member and normally biasing said spring member to a position retaining said second contact out of the line of movement of said first contact, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a circuit including said fixed contact, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, and a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit.

4. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, a metal spring member mounted on said base and extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected to said spring member and normally biasing said spring member to a position retaining said second contact out of the line of movement of said first contact, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a circuit including said fixed contact, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit, a third contact carried by said armature, and a second fixed contact engageable by said third contact, when said armature is operated, to close an auxiliary circuit including said armature.

5. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, a metal spring member mounted on said base and extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected between the free end of said spring member and a terminal on said base, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a conductor connnecting said fixed contact to said terminal, a circuit including said fixed contact, said conductor, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, and a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit.

6. A flasher comprising, in combination, a dielectric base, an upright U-shape metal frame mounted on said base, a relay coil mounted in said frame, a metal armature pivotally mounted, in conductive relation therewith, on one arm of the frame and extending toward and beyond the other arm, a first contact extending along the inner surface of the outer end of said armature, a fixed contact extending along the outer surface of the outer end of said other arm, a spring member mounted on said base and extending in parallel spaced relation to such other arm and biased toward the same, a second contact extending along the inner surface of the outer end of said spring member and arranged to engage said fixed contact, said second contact extending outwardly beyond said fixed contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a high resistance wire connected between the free end of said spring member and a terminal on said base, a conductor connecting said fixed contact to said terminal, a circuit including said fixed contact, said conductor, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, and a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted

condition of said resistance wire, to break the relay energizing circuit.

7. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, a metal spring member mounted on said base and extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected between the free end of said spring member and a terminal on said base, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a conductor connecting said fixed contact to said terminal, a circuit including said fixed contact, said conductor, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit, a third contact carried by said armature, and a second fixed contact engageable by said third contact, when said armature is operated, to close an auxiliary circuit including said armature.

8. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, a metal spring member mounted on said base and extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected between the free end of said spring member and a terminal on said base, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a conductor connecting said fixed contact to said terminal, a circuit including said fixed contact, said conductor, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, said armature having a second arm extending from said pivotal mounting on said first frame arm, a third contact carried by said second armature arm, and a second fixed contact mounted on said base and engageable by said third contact, when said armature is operated, to close an auxiliary circuit including said armature.

9. A flasher comprising, in combination, a high resistance wire, a fixed contact, a movable contact engageable with said fixed contact, said high resistance wire being connected at one end to said movable contact, and being in circuit with said fixed and movable contacts, said high resistance wire being adapted when shunted to contract and thereby disengage said movable contact from said fixed contact, means biasing said movable contact to engage said fixed contact to complete a first shunt circuit for said resistance wire, a relay including an operating coil connected in circuit with said movable contact and said resistance wire, and a movable armature included in a second shunt circuit for said resistance wire, said relay coil being included in both shunt circuits, said armature carrying a third contact engageable with said movable contact when said coil is energized through said first shunt circuit closed by engagement of said movable contact with said fixed contact, spring means biasing said armature to the contact open position, said movable contact being disposed at an angle to said third contact and movable therealong when the shunted resistance wire contracts, and disengaging said third contact to break said second shunt circuit, in the full retracted position of said movable contact, to deenergize said relay coil, said spring means effecting fast disengagement of said third contact and said movable contact to reduce arcing thereacross.

10. A flasher comprising, in combination, a dielectric base, a metal relay frame mounted on said base, a relay coil mounted in said frame, a metal armature hingedly mounted on said frame in conductive relation therewith and carrying a first contact extending therealong, spring means biasing said armature to the contact open position, a metal spring member mounted on said base and extending toward said armature, said spring member having a second contact extending therealong in a direction substantially perpendicular to said first contact in the operated position of said armature, a high resistance wire connected to said spring member and normally biasing said spring member to a position retaining said second contact out of the line of movement of said first contact, a fixed contact carried by said relay frame and engageable by said second contact under the bias influence of said spring member when said resistance wire is heated and expands, the fixed contact being disposed inwardly of the edge of said second contact nearest said first contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a circuit including said fixed contact, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, and a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when

said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit, said spring means effecting fast disengagement of said first contact and said movable contact to reduce arcing thereacross.

11. A flasher comprising, in combination, a dielectric base, an upright U-shape metal frame mounted on said base, a relay coil mounted in said frame, a metal armature pivotally mounted, in conductive relation therewith, on one arm of the frame and extending toward and beyond the other arm, a first contact extending along the inner surface of the outer end of said armature, spring means biasing said armature to the contact open position, a fixed contact extending along the outer surface of the outer end of said other arm, a spring member mounted on said base and extending in parallel spaced relation to such other arm and biased toward the same, a second contact extending along the inner surface of the outer end of said spring member and arranged to engage said fixed contact, said second contact extending outwardly beyond said fixed contact whereby said first contact, when said armature is operated, will engage only the outer edge of said second contact, a high resistance wire connected between the free end of said spring member and a terminal on said base, a conductor connecting said fixed contact to said

terminal, a circuit including said fixed contact, said conductor, said resistance wire, said second contact, and said coil in series relation, effective to heat said resistance wire to expand the latter, a first relay energizing circuit, in shunt with said resistance wire, and including said fixed contact and said second contact, in engagement when the resistance wire expands, and said relay coil, and a second relay energizing circuit, in shunt with said resistance wire, and including said first contact, said second contact, and said relay coil, said second contact moving along said first contact, when said resistance wire contracts, and disengaging said first contact, in the fully contracted condition of said resistance wire, to break the relay energizing circuit, said spring means effecting fast disengagement of said first contact and said movable contact to reduce arcing thereacross.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,103,276	Schmidinger	Dec. 28, 1937
2,103,277	Schmidinger	Dec. 28, 1937
2,497,542	Frech	Feb. 14, 1950
2,503,303	Sitzer	Apr. 11, 1950