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(54) HEADLIGHT SYSTEMS

(71) We, CIBIE PROJECTEURS, a Societe Anonyme organised under the Laws of France, of 17, Henri Gautier, 93 Bobigny, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to headlight systems and is an improvement in the invention the subject of British Patent 1,469,421. That Patent relates to a headlight system comprising at least two headlight assemblies, and, for each of the headlight assemblies a single-acting hydro-mechanical transducer which is arranged to act against a biasing force to vary the orientation of its associated headlight assembly, and has an input connected by a hydraulic connection to the output of a respective mechanical-hydraulic transducer, the mechanical hydraulic transducers having a common mechanical control element which is manually adjustable to vary the orientation of the headlight assemblies by causing a movement of liquid along the hydraulic connections, any adjustment of the control element which results in a movement of liquid in one of the hydraulic connections towards or away from the associated hydraulic-mechanical transducer also resulting in a corresponding movement of liquid in the or each of the other hydraulic connections in the same direction relative to the associated hydro-mechanical transducer, and the total liquid volume in each hydraulic connection and the associated transducers being the same or very nearly the same for each of the hydraulic connections.

Such an arrangement had the advantage that because the hydraulic connections have practically the same volume, and adjustment of the control element is transmitted by a hydraulic movement of the same sense in each of the hydraulic connections, expansion of the hydraulic liquid will have exactly the same effect as a movement of the control element, and can easily be offset by a corresponding manual adjustment in the opposite direction. Thus, temperature variations do not result in a change in the setting of one headlamp relative to the other.

However, it has been found that since the biasing force in each headlamp opposes movement of the control element in one direction, but assists its movement in the other direction, this is detrimental to the accuracy of the system.

According to the present invention resilient means are provided to assist operation of the mechanical control element in a direction which is opposed to the biasing forces.

The invention may be carried into practice in various ways but one specific embodiment will now be described by way of example with reference to the accompanying drawing which shows an adjusting device according to the invention.

In the drawing there can be seen two headlamps 10*a*, 10*b* of a more vehicle (not shown); the headlamps can be e.g. the main right-hand and left-hand headlamps of the vehicle. As is shown more particularly in the case of the headlamp 10*b*, each headlamp is pivotally mounted on a vehicle body 12 for pivoting around a substantially horizontal axis, e.g. through the agency of a swivel joint 14, so that the vertical setting of each of the optical axes Xa and Xb of the headlamps 10*a*, 10*b* can be adjusted, in a manner to be described hereinafter, by two appropriate separate adjusting circuits 16*a*, and 16*b*.

More particularly, and as described in the patent, each control circuit 16*a*, 16*b* comprises an associated hydro-mechanical transducer 18*a*, 18*b* which is secured to the vehicle body 12 by any appropriate means, the output element 20 of the transducer being connected via a stop screw 22 to a lug 24 at the bottom of the corresponding headlamp 10*a* or 10*b*. Restoring means, such as a spring 26, disposed between the headlamp and the body 12 maintains the screw 22 in bearing relationship with the output member 20. In the embodiment shown the output member 20 takes the form merely of a plunger or tappet, or the like bearing, at the end remote from the end cooperating with screw 22, on a flexible diaphragm 28 sealingly secured on its periphery to a casing

30 of the corresponding transducer 18*a* or 18*b*. Clearly, in such a system any movement of hydraulic fluid through an entry orifice 32 of the casing 30 causes a corresponding movement of the output member 20 and therefore a pivoting one way or the other around the swivel joint 14 of the headlamp 10*a* or 10*b* associated with the particular transducer 18*a* or 18*b* concerned. Preferably, the spring 26 is adapted to resist movements of the output member 20 resiliently in the direction corresponding to the extension of the transducer 18.

To control the movements of the hydraulic liquid supplying the input orifices of the transducers 18*a*, 18*b*, each adjusting circuit 16*a*, 16*b* has a mechanical-hydraulic transducer 34*a*, 34*b* respectively each associated by a respective connecting line 36*a*, 36*b* with the respective transducer 18*a*, 18*b*. Each transducer 34*a*, 34*b* comprises, just like the transducers 18*a* and 18*b*, a casing 38 appropriately secured to a stationary element 40 rigidly secured to the vehicle body 12. The casing 38 is formed with exit orifices 42 connected to the corresponding lines 36*a*, 36*b* and each is hermetically closed by a flexible diaphragm 44.

The positions of the diaphragms 44 relatively to the casings 38 of the transducers 34*a*, 34*b* are controlled simultaneously by a common mechanical control element 46 which in the embodiment shown takes the form of a fork whose two prongs 48*a*, 48*b* bear on the central portions of the diaphragms 44 of the corresponding transducers 34*a*, 36*b*; the central part of the element 46 is immobilized rotationally and screwed to a screwthreaded member 50 which cannot be displaced but which can be rotated around its axis by a knurled knob 52 operable by the vehicle driver. The volumes of fluid in the lines 36*a* and 36*b*, and the associated transducers are in practice substantially equal in order to gain the advantages described in the Parent Patent.

Resilient means such as a helical spring 54 are provided to assist operation of the element 46 in the direction corresponding to increased stressing of the springs 26—i.e., in the direction of the shortening of the transducers 34.

Preferably, the spring 44 is placed around the element 50 and is in compression between the element 46 and the stationary element 40.

As described in the parent patent, the element 46 can be controlled by way of a hydraulic transmission.

The advantage of the spring 54 is to equalise to an appreciable extent the forces necessary to move the element 46 in both directions, so that the headlamps can be adjusted satisfactorily.

Also, the resulting stress opposes accidental movement of the element 46 in either direction and therefore reduces the risk of headlamp setting going out of adjustment, e.g. because of vibrations experienced by the vehicle as it rolls.

Having regard to the provisions of Section 9 of the Patents Act, 1949, attention is directed to the claims of Patents Nos. 1,478,959 and 1,492,113.

WHAT WE CLAIM IS:—

1. A headlight system comprising at least two headlight assemblies, and, for each of the headlight assemblies, a single-acting hydro-mechanical transducer which is arranged to act against a biasing force to vary the orientation of its associated headlight assembly, and has an input connected by a hydraulic connection to the output of a respective mechanical-hydraulic transducer, the mechanical-hydraulic transducers having a common mechanical control element which is manually adjustable to vary the orientation of the headlight assemblies by causing a movement of liquid along the hydraulic connections, any adjustment of the control element which results in a movement of liquid in one of the hydraulic connections towards or away from the associated hydro-mechanical transducer also resulting in a corresponding movement of liquid in the or each of the other hydraulic connections in the same direction relative to the associated hydro-mechanical transducer, and the total liquid volume in each hydraulic connection and the associated transducers being the same or very nearly the same for each of the hydraulic connections, characterised in that resilient means are provided to assist operation of the mechanical control element in a direction which is opposed to the biasing forces.

2. A system as claimed in Claim 1 in which the resilient means comprises a spring compressed between a stationary part of the vehicle and the mechanical control element.

2. A system as claimed in Claim 2 in which the spring is disposed around a screwthreaded member screwed into a tapped hole of the mechanical control element and adapted to be turned by the user to adjust the headlamps.

4. A headlamp system substantially as described herein with reference to the accompanying drawings.

KILBURN & STRODE,
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Agents for the Applicants.

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