# PATENT SPECIFICATION

413,490

Convention Date (France): July 13, 1932.

Application Date (in United Kingdom): June 27, 1933. No. 18,315/33.

Complete Accepted: July 19, 1934.

COMPLETE SPECIFICATION.

## Improvements in Flexible Joints for Machine Parts.

I, ADOLPHE KEGRESSE, a French Citizen, of 156, rue Armand Silvestre, Courbevoie, near Paris, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to improvements in flexible joints for machine parts. In many machines, for example in the sets of carrying wheels for endless band or track apparatus, joints are required which do not require maintenance, while being silent in operation and allowing an automatically limited stroke or movement. It is also advantageous if such joints are resilient so as, in certain applications, to participate in the suspension of the machine.

Flexible joints are known more particularly for use in shock-absorbing devices for engine and like mountings which comprise a relatively oscillatable member and a substantially rigid pivot-member, separated by resilient material such as rubber, one or both of said members being provided with ribs, helical ramps or the like, the function of which is to ensure a yielding of the resilient material without slip when oscillatory motion takes place at the joint.

According to the present invention, however, a rigid pivot is not employed but the oscillatable member in the form of an equaliser or lever is pivoted directly in the resilient material upon which it acts by means of pronounced projecting portions disposed opposite each other on two of the lateral faces of the equaliser or lever at the position of the imaginary axis of articulation, the said resilient material being secured in one or more housings fixed to the machine.

Such a flexible connection complies with the conditions above set forth and is particularly useful for the carrying sets of endless track apparatus while allowing of the use of the resilient material with the minimum possible bulk and maximum efficiency.

The invention is illustrated by way of example in the accompanying diagrammatic drawings in which:

Figure 1 shows an elevation of the device with its cover removed.

Figure 2 is a view in plan sectioned along the line A—B of Figure 1 with portions of the resilient material removed.

Figure 3 is a cross-section.

Figure 4 is a modification in elevation sectioned along the line A—B of Figure 5.

Figure 5 shows the same device in side view.

Figure 6 shows the device applied to a simple lever.

Figure 7 is a plan view of this last modification.

The device described herein may be varied in an infinite number of ways without altering the principal idea of the invention.

Referring to the figures, it is assumed that the equalizer or lever is mounted on any machine whatsoever. The element 1 (shown in all the figures) is fixed to the frame of the machine and may have any desired external form. In Figures 1 and 3, it is provided with attachment lugs 2 for bolting to the frame 3 (Figures 2, 3, 5, 6 and 7) of the machine.

In Figures 1, 2 and 3, the equalizer 4 carries in its centre and on either side pronounced projections constituting a cross-shaped piece 5 integral with the equaliser.

The frame attachment element 1 is provided with a rectangular opening of suitable dimensions in which are fitted pieces of resilient material 6 (Figures 2 and 3), which material envelops the cross-shaped part 5 of the equalizer 4. This resilient material may be more or less elastic and more or less compressed in its housing. The flexibility and the magnitude of the movement or stroke of the equalizer depend upon the compression and elasticity of the said material.

The manner in which such a device operates will be readily appreciated. The flexible material 6 maintains the equalizer 4 in position. The arms of the cross-shaped part 5 limit the movement of the equalizer 4 by compressing more or less the resilient material 6 according

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to the amplitude of the stroke or movement of the equalizer itself. In this way, a jointed arrangement answering the conditions set forth in the preamble is obtained.

This principle of construction may comprise numerous modifications. Figures 4 and 5 show one modification.

In this case, the equalizer is constituted by two side plates 7, each carrying on one side pronounced ribs 8, similar for each plate, the whole being connected together by a single bolt 9 (Figures 4 and 5). The joint, instead of being effected on each side of the equalizer as in Figures 1, 2 and 3, is effected between the two side plates constituting the equalizer. The resilient material 6 is held fast in the element 1 for attaching the device to the frame of the machine, and acts upon the cross-shaped ribs 8 of the plates 7.

Figures 6 and 7 show a simple lever 10, the joint of which is obtained as in the preceding cases. By way of example, the cross-shaped ribs have been replaced in this case by pronounced ribs in the form of a three-armed star. The diagram of this Figure will serve to make the device understood, without the necessity of entering into further details.

It is obvious that, in order to obtain the same result, it is not necessary for the projections of the equalizer, embedded in the resilient material, to be in the form of a cross, but one or more simple ribs may suffice, according to the circumstances. On the other hand, according as to whether the equalizer has to support a more or less considerable load, with for example a greater effort in a well-determined direction, the rib or ribs may be directed to resist the said effort. In some cases, they may even be of unequal dimensions, either in order to cause one part to be stressed more than the other, or to afford more resistance in a certain direction. Furthermore, the elements of resilient material may be of irregular form. For example, the upper part may be thicker than the lower part, or vice versa. One of these parts may likewise be made of more flexible material than the other, and so on.

It will be appreciated that it is possible to obtain widely varying effects, either by varying the form or number of the projections of the equalizer, or the quality or the degree of compression of the resilient material, such effects influencing either the amplitude of the stroke or movement, the smoothness of working, the resiliency of the system itself or its rigidity.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A joint for an equalizer or lever characterised in that the equalizer or lever is pivoted directly in resilient material upon which it acts by means of pronounced projecting portions disposed thereon opposite each other on two of the lateral faces at the position of the imaginary axis of articulation, the said resilient material being secured in one or more housings fixed to the machine.

2. An equalizer joint as claimed in claim 1, characterised in that on each of the lateral faces of the equalizer or lever at the position of the imaginary axis of articulation are provided pronounced cross-shaped projections embedded in elements of resilient material held in a member serving as support.

3. An equalizer having a joint as claimed in Claim 1 and comprising two side plates which, on one face only and at the position of the imaginary axis of articulation, comprise pronounced projecting parts or ribs similar for the two plates, the whole being assembled, rib against rib, by a single bolt and the ribs being embedded in the resilient material held in the support.

4. A simple lever comprising a supporting joint as claimed in Claim 1.

5. Flexible joints substantially as described or substantially as shown in the accompanying drawing.

Dated this 27th day of June, 1933.

Per: BOULT, WADE & TENNANT,
111/112, Hatton Garden, London, E.C. 1,
Chartered Patent Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

Fig.1.

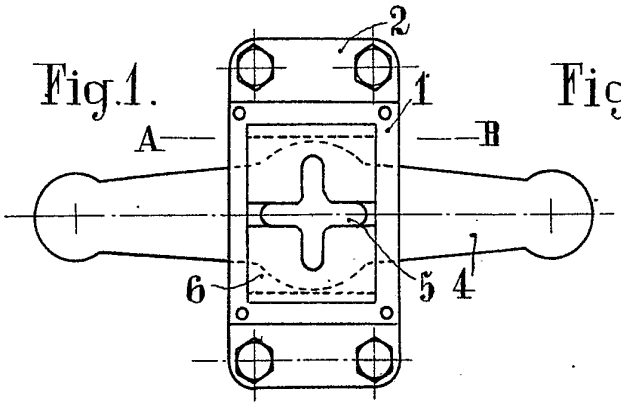



Fig.2.

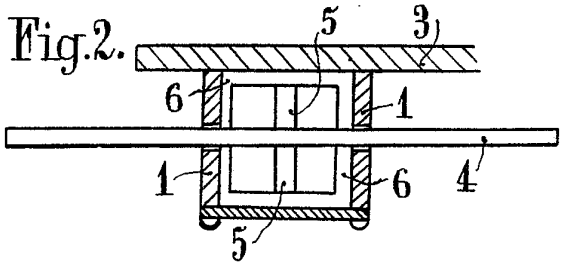



Fig.3.

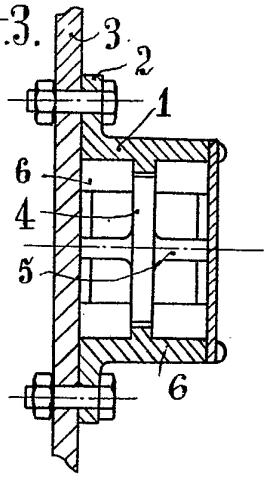



Fig.4.

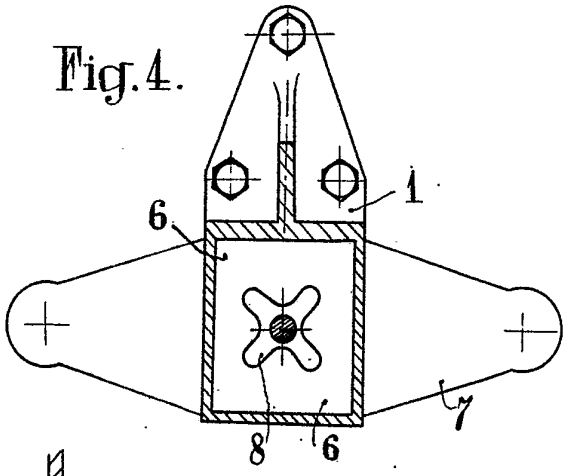



Fig.5.

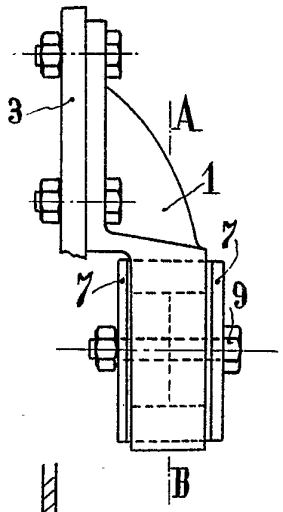



Fig.6.

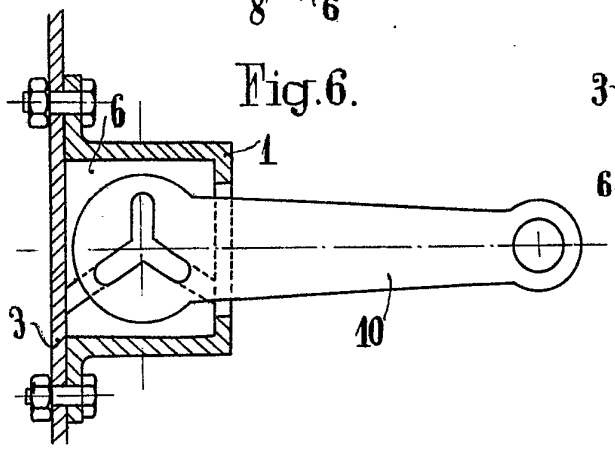
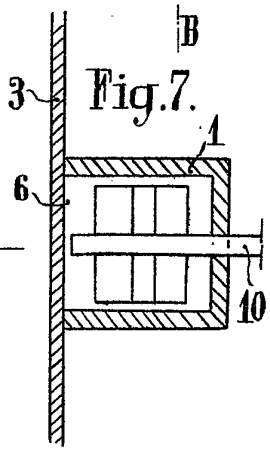



Fig.7.

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