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(54) Vehicle door latch.

(57) A vehicle door latch includes a forked element (14) encapsulated in an elastomeric coating (36). The coating (36) covers a face (58) of the forked element (14) engaged by a detent member (18) so that the elastomeric coating (36) quietens the latching engagement of the detent member (18) with the forked element (14). The elastomeric coating (36) is an inelastic, internally lubricated reinforced plastics material which wears progressively as the door latch is repeatedly latched and unlatched. Thus, the elastomeric coating (36) is sacrificed and eventually wears away so that the latching engagement reverts, over the lifetime of the door latch, to a direct metal to metal engagement of the detent (18) with the engagement face (58) of the forked element (14).

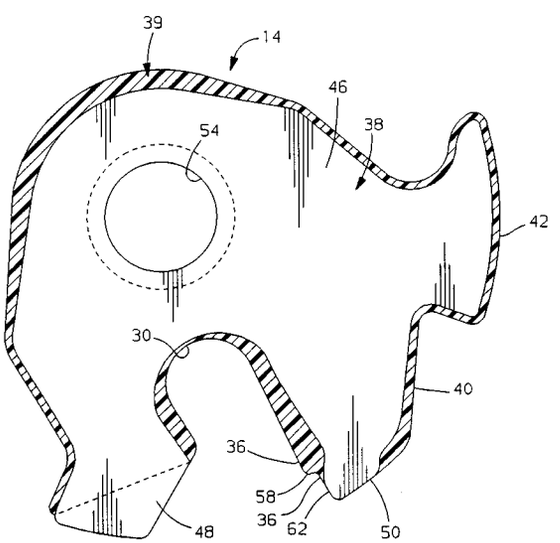

FIG. 4

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This invention relates to a vehicle door latch.

It is well known in motor vehicles to provide a latch on a vehicle door which engages a pin mounted on the vehicle body so as to latch the door in a closed position.

Conventionally, the door latch includes a pivotally mounted forked element which includes a slot opening towards the pin when the latch is in an open position. When the door closes, the pin slides into the slot and rotates the forked element to a latched position in which the pin is captured in the slot of the forked element. A detent member provided on the latch is also pivoted on the latch housing and engages an engagement face of the forked element to latch the forked element in the closed position.

It is desirable to provide a door latch which is relatively quiet when the door is closed. The prior art has heretofore taught that coating various portions of the forked element with elastomeric coatings would quieten the door closing operation, by eliminating metal to metal contact between parts of the door latch. However, in general, the prior art has taught not to provide an elastomeric coating on the face of the forked element which engages the detent member, so that metal to metal contact occurs between the detent member and the forked element on closing of the door. US-A-4,756,564 provides an elastic member of a soft material which is pushed or compressed into a recess on the forked element to permit direct engagement of the detent member with the latching face of the forked element.

The present invention seeks to provide an improved vehicle door latch.

According to an aspect of the present invention, there is provided a vehicle door latch as specified in claim 1.

In a preferred embodiment, the forked element of a door latch is encapsulated in an elastomeric coating, moulded in situ thereon, and covering the face of the forked element engaged by the detent member so that the elastomeric coating quietens the latching engagement of the detent member with the forked element. The elastomeric coating is an inelastic, internally lubricated reinforced plastics material which wears progressively as the door latch is repeatedly latched and unlatched. The elastomeric coating is sacrificed and, towards the end of the lifetime of the vehicle, it eventually wears away so that the latching engagement reverts, over the lifetime of the door latch, to a direct metal to metal engagement of the detent with the engagement face of the forked element.

An embodiment of the present invention is described below, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a front elevational view of an embodiment of door latch showing a forked element engaged by a detent member to capture a pin so as to latch a door in a closed position;

Figure 2 is a view similar to Figure 1 showing an elastomeric coating on the forked element worn away over the lifetime of the door latch to permit metal to metal contact of the detent member with the forked element;

Figure 3 is a plan view of the forked element showing the encapsulation of thermoplastics material thereon; and

Figure 4 is a cross-sectional of the forked element along line 4-4 of Figure 3, showing the elastomeric coating on the periphery of the forked element.

Referring to Figure 1, a vehicle door latch assembly 10 includes a housing 12 (shown in phantom) suitably bolted onto the end panel of a vehicle door. The door latch 10 includes a forked element 14 mounted to the housing 12 on a pivot 16. A detent member 18 for latching the forked element 14 is mounted on the housing 12 by a pivot 22.

Figure 1 shows the door latch in the latched position in which a pin 26, carried by a vehicle body mounted pin assembly 28, has been captured within a recess 30 of the forked element 14. The forked element 14 is retained in the latched position by the engagement of a detent face 34 of detent member 18 with an engagement face 36 of forked element 14.

Figure 1 also shows in phantom the unlatched position of the forked element 14. It should be appreciated that during closing movement of the vehicle door, the forked element 14 will be carried into engagement with the pin 26, thereby causing the forked element 14 to rotate in the counterclockwise direction from the phantom position of Figure 1, so that the detent member 18 rides along peripheral surfaces 40 and 42 of the forked element 14. This engagement of the detent member against the peripheral surfaces 40 and 42 is assured by the urging of a spring, not shown, which acts between the detent member 18 and the housing 12.

During door closing, the counterclockwise rotation of the forked element 14 proceeds beyond the solid line position shown in Figure 1, as permitted by the compression of the weatherstrips conventionally provided between the door and vehicle body. During this over-travel, the forked element 18 will pivot to its latching position, in which the detent face 34 of detent member 18 engages the engagement face 36 of the forked element 14.

Referring to Figures 3 and 4, it can be seen that the forked element 14 includes a metal core 38 encapsulated in an ejection moulded thermoplastics coating 39. As best seen in Figure 3, this

coating 39 covers both the front face 44 and rear face 46 of the forked element 14. Furthermore, as seen in Figure 4, the elastomeric coating 39 completely surrounds the periphery of the metal core 38 except at the tip 48 on the one side of recess 30 and the opposite tip 50 on the other side of the recess 30.

The thermoplastic coating is moulded in situ onto the metal core 38 by mounting the core 38 in a plastics injection mould. The core 38 is positioned in the mould by gripping the core 38 through the pivot opening 54 and gripping the tip 48. The elastomeric coating 39 is an internally lubricated and reinforced thermoplastics material, such as the polyester elastomer manufactured and sold by LNP Engineering Plastics of Exton, PA, under the designation "YL-4530". This type of thermoplastics coating is relatively inelastic under high load conditions, and experiences a low rate of wear under friction against the metallic detent member 18.

As can be seen in Figure 4, the elastomeric coating 39 becomes thicker from the core 38 intermediate the recess 30 and top 50 to form an elevated abutment face 58 for engagement by the detent member 18, as shown in Figure 1. Furthermore, the peripheral face of core 38 intermediate the tip 50 and abutment face 58 is free of thermoplastic coating to form an uncoated metal face 62. Thus, the engagement face 36 which registers and overlaps with the detent member 18 includes the uncoated metal face 62 arranged side by side adjacent the elevated elastomeric abutment face 58.

Referring again to Figure 1, it will be appreciated that the closing of the door will result in a plastic to metal engagement between the thermoplastics abutment face 58 of forked element 14 and the opposing detent face 34 of the detent member 18. This metal to plastic engagement enhances the quiet latching of the door while the detent face 34 remains spaced from the uncoated metal face 62 of the forked element 14.

Furthermore, it will be appreciated that the door is unlatched by rotating the detent member 18 in a clockwise direction (as shown in Figure 1) to withdraw the detent face 34 from its engagement with the thermoplastics abutment face 58.

Over the lifetime of the door latch, the latched element is latched and unlatched many thousands of times. During this time, the plastics abutment face 58 will progressively wear away as it frictionally engages and disengages from the metal detent member 18.

Figure 2 shows the door latch after the plastics abutment face 58 has been abraded to such an extent that the detent face 34 contacts the uncoated metal face 62 of the forked element 14. This reversion of the door latch to conventional metal to metal contact will increase the noise level associated with closing of the vehicle door. However, by choosing the proper thermoplastics material and providing such material in an adequate thickness, wear of the plastics abutment face 58 will occur over a substantial number of years, so that a relatively noisier operation of the door latch will only occur at the latter portion of the vehicle's lifetime.

The disclosures in United States patent application no. 075,901, from which this application claims priority, and in the abstract accompanying this application are incorporated herein by reference.

Claims

1. A vehicle door latch comprising a forked element (14) pivotally mounted within a latch housing (12) of a vehicle door, the forked element including a recess (30) for receiving a latching pin (26), and a detent member (18) pivotally mounted in the housing and engageable with a face (58) of the forked element so as to latch the forked element in a closed position; characterised in that the face of the forked element is coated with an elastomeric coating (38).

2. A vehicle door latch according to claim 1, wherein the coating is formed from an internally lubricated reinforced thermoplastics material.

3. A vehicle door latch according to claim 1 or 2, wherein the coating (38) includes an elevated abutment face (58) adjacent an uncoated portion of the forked element (14), the detent member (18) in use engaging the elevated abutment face.

4. A vehicle door latch according to claim 1, 2 or 3, wherein the coating is adapted to wear progressively as the door latch is repeatedly latched and unlatched in use.

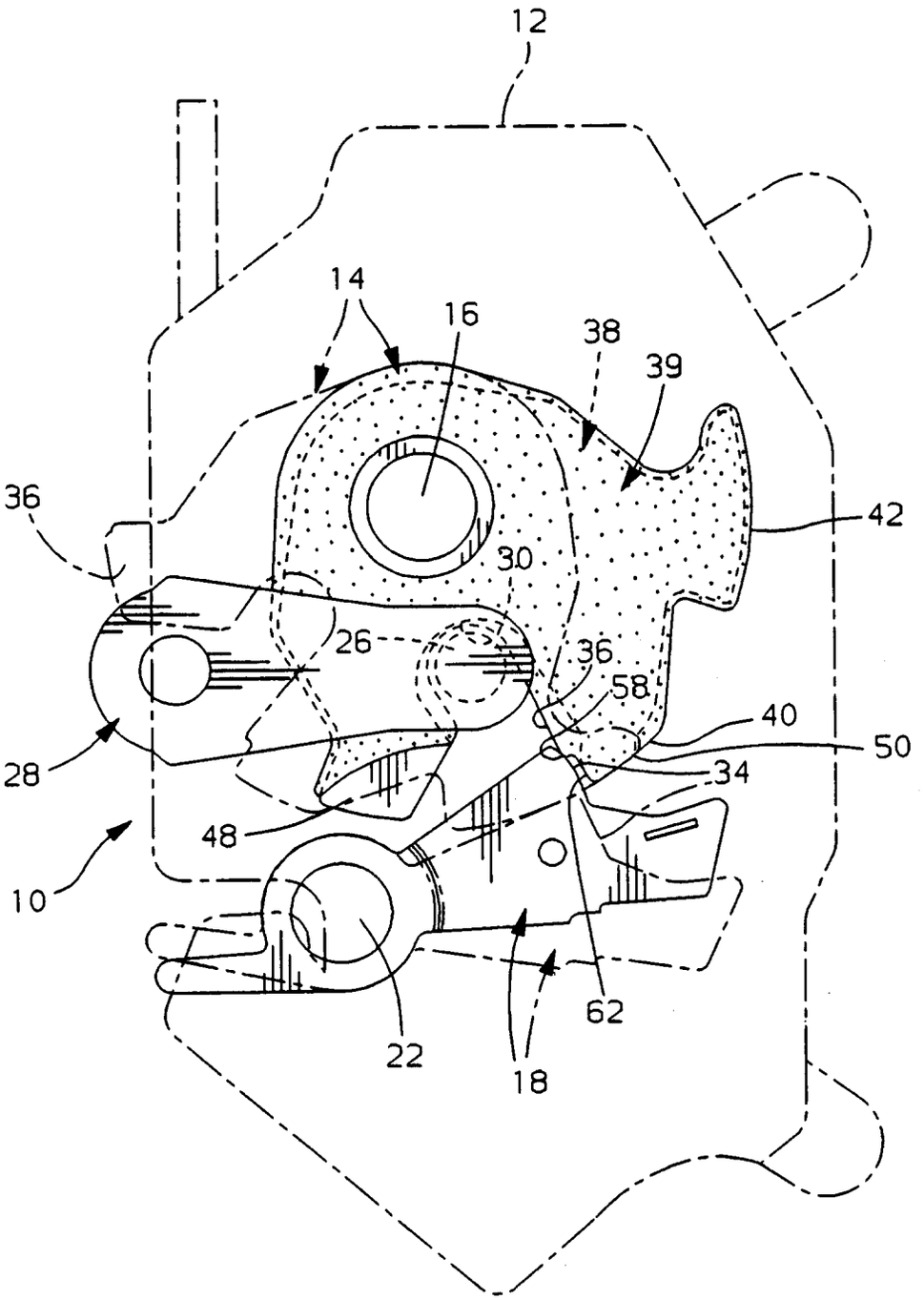

FIG. 1

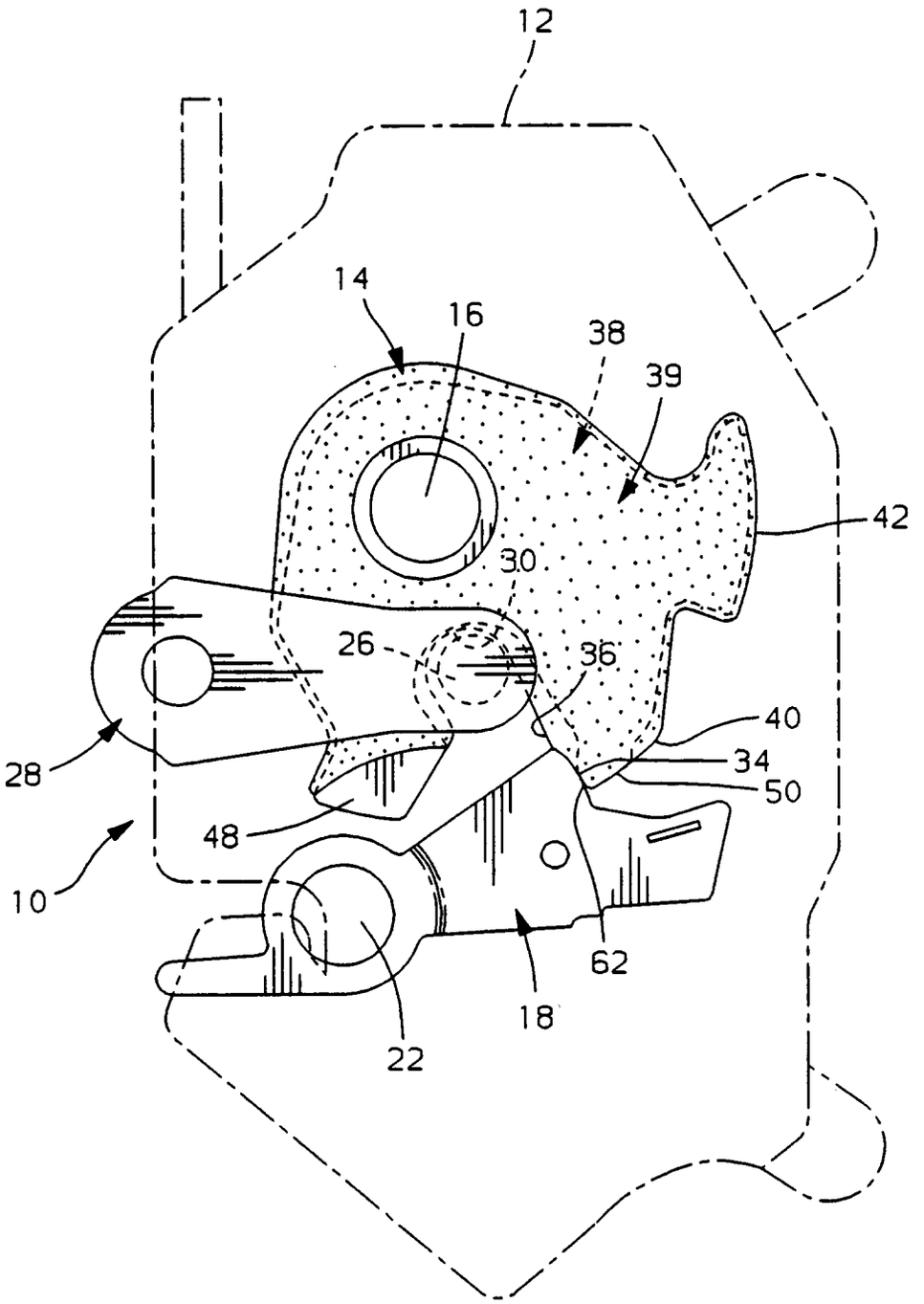

FIG. 2

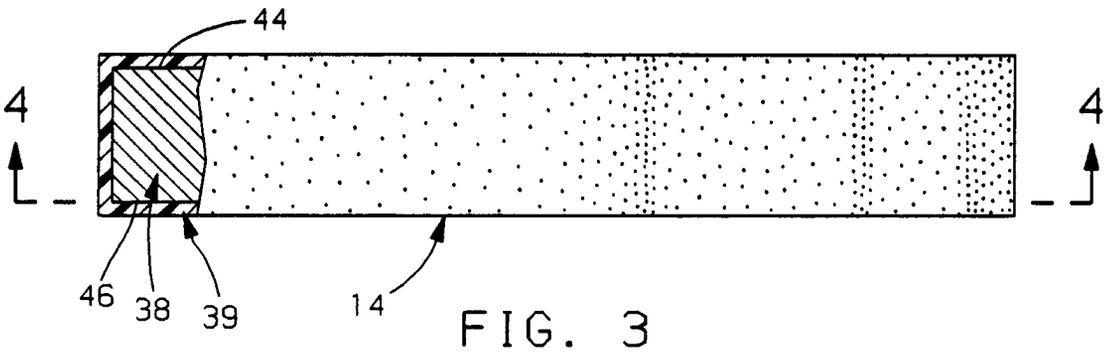

FIG. 3

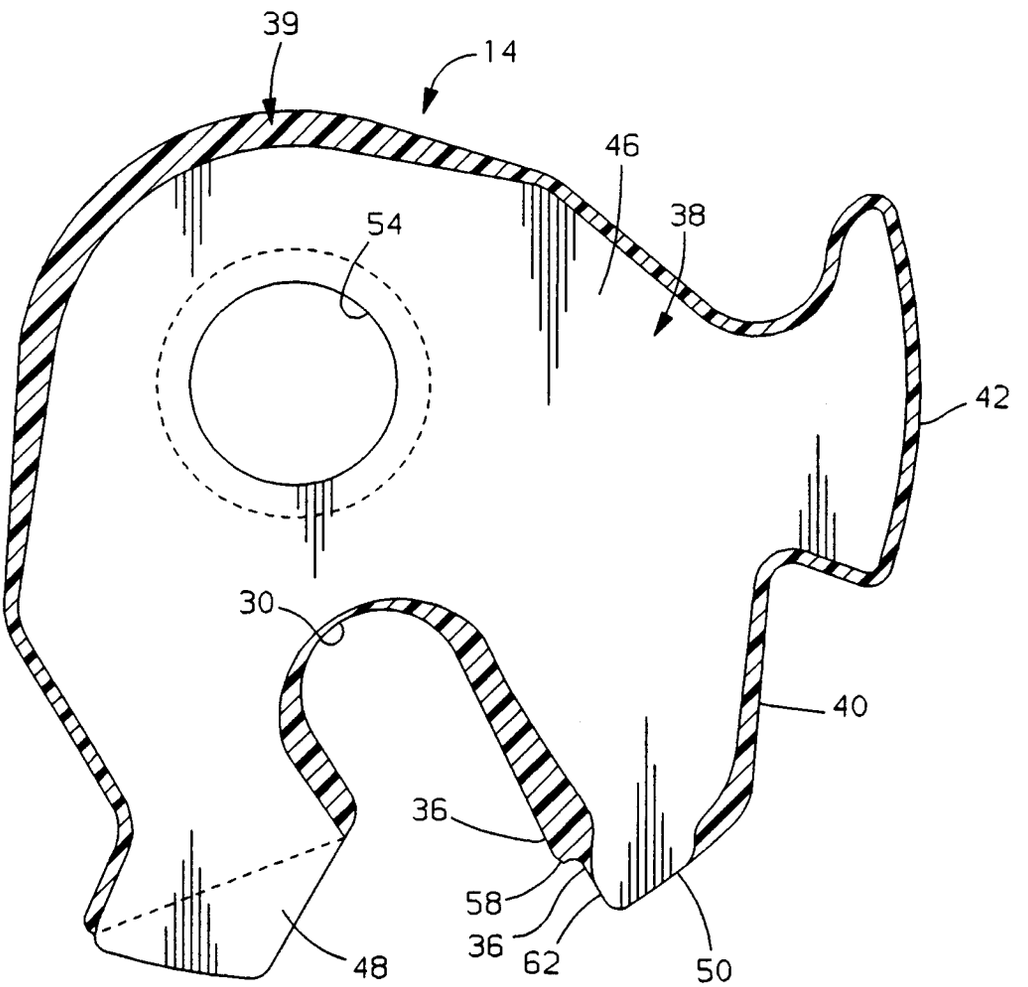

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1463

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	US-A-4 896 908 (KLEEFELD) * the whole document *	1,2	E05B17/00
A	EP-A-0 233 506 (SCHLEGEL) * the whole document *	1	
A	DE-A-37 21 023 (HAYAKAWA) * the whole document *	1	
D,A	US-A-4 756 564 (IKEDA) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 September 1994	Verelst, P

CATEGORY OF CITED DOCUMENTS

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