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(54) **SAFETY CATCH RELEASE MECHANISM**

(57) The present disclosure relates to a safety catch release mechanism (19) for release of a safety catch in a hood lock of (7) a vehicle (1). The safety catch release mechanism comprises a handle member (23), which is adapted for manual operation, and a safety catch operating member (25), which is adapted to be connected to the hood lock in order to release the safety catch (17). The handle member is displaceable from a first position, corresponding to a closed hood, to a second position, in which the handle member is manually operable. The handle member is further displaceable from the second position to a third position corresponding to the hood lock

being released. The displacement of the handle member from the first position to the second position is independent of the safety catch operating member, but during displacement from the second position to the third position, the handle member concurrently displaces the safety catch operating member from a first position, corresponding to the hood lock being retained by the safety catch, to a second position, corresponding to releasing the safety catch.

The disclosure further relates to a grill (11) and a vehicle (1) comprising such a safety catch release mechanism and to a method of opening a hood (3) of a vehicle.

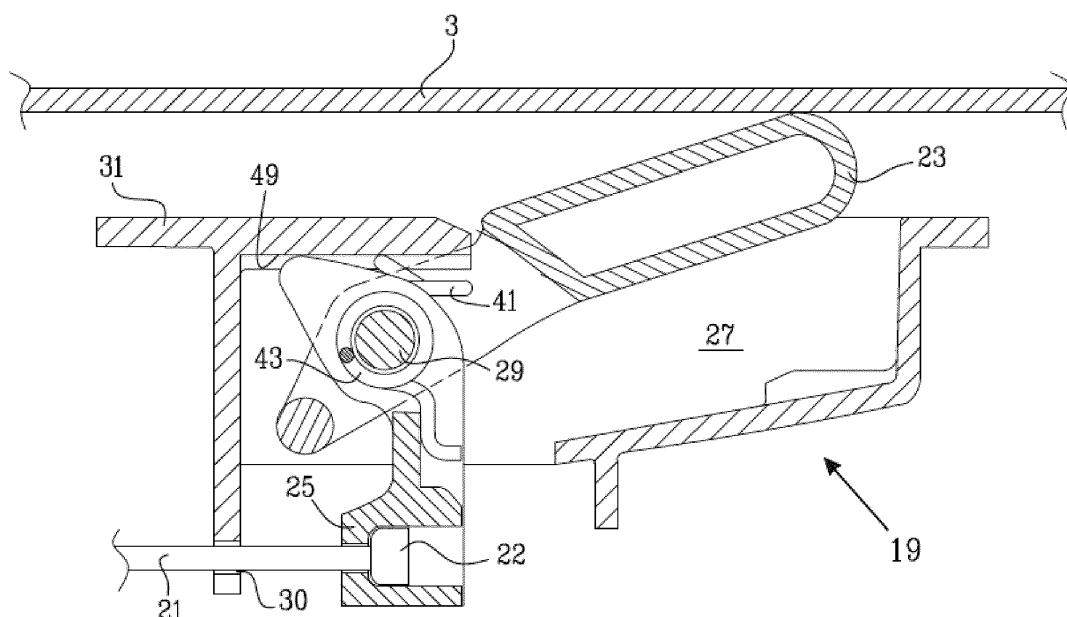


Fig. 5

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a safety catch release mechanism for release of a safety catch in a hood lock of a vehicle. The disclosure further relates to a grill and a vehicle comprising such a safety catch release mechanism and to a method of opening a hood of a vehicle.

BACKGROUND

[0002] Sometimes it is desired to open the hood of a vehicle for service and/or maintenance. However, in order to keep the hood closed during normal usage of the vehicle, such as when driving the vehicle or when the vehicle is parked, there is at least one hood lock provided.

[0003] It is well known to provide the hood lock with a safety catch. For such a hood, a person wanting to open the hood, in a first step of the opening procedure, operates a first release mechanism, which e.g. may be provided in a passenger compartment of the vehicle. The first release mechanism is directly or indirectly connected to the hood lock, such that the first release mechanism may set the hood lock to a safety position, in which the safety catch keeps the hood in a safety catch position, e.g. holding the hood in an intermediate position, in which there is a gap between the hood and a grill of the vehicle. In a following step of the opening procedure, the safety catch is released, e.g. by manually moving the safety catch to the side, thereby allowing the hood to be fully opened. The step of releasing the safety catch may be performed by the person desiring to open the hood standing at the front of the vehicle and manually operating the safety catch, e.g. by pushing it. An example of a hood lock being operated by such a two-step actuation may be found in patent document US 20140319848 A1.

SUMMARY

[0004] The object of the present disclosure is to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

[0005] The object above may be achieved by the subject-matter of claim 1. Embodiments are set forth in the appended dependent claims, in the following description and in the drawings.

[0006] Thus, in a first aspect of the present invention there is provided a safety catch release mechanism for release of a safety catch in a hood lock of a vehicle. The safety catch release mechanism comprises a handle member, which is adapted for manual operation, and a safety catch operating member, which is adapted to be connected to the hood lock, e.g. via a wire, in order to release the safety catch. The handle member is displaceable from a first position, corresponding to a closed hood, to a second position, in which the handle member is man-

ually operable. The handle member is further displaceable from the second position to a third position corresponding to the hood lock being released. The displacement of the handle member from the first position to the second position is independent of the safety catch operating member, but during displacement from the second position to the third position, the handle member concurrently displaces the safety catch operating member from a first position, corresponding to the hood lock being retained by the safety catch, to a second position, corresponding to releasing the safety catch.

[0007] The handle member can assume at least three positions: a first, a second and a third position. The handle member is adapted for manual operation by the person wanting to open the hood. The person may manually displace the handle member from the second to the third position, e.g. by using one or more of his/her fingers to move it.

[0008] In the first position of the handle member, the hood is closed, such as during normal usage of the vehicle, e.g. when driving the vehicle or when the vehicle is parked. In the first position of the handle member, the safety catch release mechanism as described herein has a low vertical height.

[0009] In the second position of the handle member, the hood lock is in a safety position, in which the safety catch keeps the hood in a safety catch position, e.g. holding the hood in an intermediate position, in which there is a gap between the hood and a grill of the vehicle. In the second position of the handle member, the handle member is easy to find for the person wanting to open the hood, such that he/she can manually, i.e. by hand, operate the handle member. The handle member may e.g. be easy to manually push, such as by one or more fingers.

[0010] In the third position of the handle member, the safety catch is released, allowing the hood to be further opened.

[0011] The safety catch operating member is adapted to be connected to the hood lock, e.g. via a wire, in order to be able to release the safety catch, thereby allowing opening of the hood. The safety catch operating member may assume at least two positions: In the first position of the safety catch operating member, the safety catch is not influenced, such that the safety catch e.g. may keep the hood lock in the safety position and thus the hood in the safety catch position. In the second position of the safety catch operating member, the safety catch is released, such that the hood may be fully opened. As mentioned above, the handle member may be used to displace the safety catch operating member from the first to the second position.

[0012] The term safety catch is utilized herein in a general sense for a mechanical component adapted to hold the hood in the intermediate position. The safety catch may be released to allow full opening of the hood. The safety catch may be a mechanical means, such as a hook or loop, which may assume at least two different positions

in the hood lock. See e.g. the above-mentioned patent document US 20140319848A1. As an alternative, or a complement, the hood may be held by e.g. an electric or a magnetic force in the safety catch position.

[0013] A safety catch release mechanism as described herein has a low height when the hood is closed, thereby occupying very little space at the front of the hood, while yet being adapted to cooperate with the safety catch to release it and yet making the hood easy to open. Further, a safety catch release mechanism as described herein allows a greater freedom of localisation in the vehicle than prior art safety catch release mechanisms.

[0014] The safety catch release mechanism may comprise an insert member at least partly housing the handle member and the safety catch operating member. The handle member and/or the safety catch operating member may be pivotally connected to the insert member. The pivotal connection allows them to be rotatably displaced between their different positions mentioned above.

[0015] The handle member and the safety catch operating member may be pivotally connected to the insert member via at least one shaft, preferably via a common shaft. In order to retain the components on the shaft in a desired way and at desired locations, the shaft may be provided with different diameters along its length.

[0016] As an alternative, or a complement, to the pivotal connection, the handle member and/or the safety catch operating member may be slidably connected to an insert member or to the grill itself.

[0017] The handle member may be biased from the first position to the second position, e.g. by a first spring member, such as a first coil spring. The first spring member may be adapted to urge the handle member upwards towards an inside of the hood, when the hood is in the intermediate position. The biasing force from the first spring member may then keep the handle member in the second position, in which the handle member is easy to find and easy to manually push, e.g. by one or more fingers. The first spring member may be arranged at the shaft, on which the handle member is pivotally attached. The biasing force on the handle member, e.g. the force of the first spring member, may be rather low, e.g. in the range from 0.5 N to 10 N, which is enough to counteract the weight of the handle member, but much too low to have an influence on the closed hood.

[0018] The safety catch operating member may be biased from the second position to the first position, e.g. by a second spring member, such as a second coil spring. This may result in that the safety catch operating member keeps the safety catch in place until it is deliberately released. The second spring member may be arranged at the shaft, on which the safety catch operating member is pivotally attached. The biasing force on the safety catch operating member, e.g. the force of the second spring member, may be in the range from 5 to 100 N, preferably in the range from 10 to 25 N.

[0019] The biasing force on the safety catch operating

member may be greater than the biasing force on the handle member, e.g. at least two times greater. Thereby, the safety catch operating member will stay in the first position, thereby holding the handle member in the second position. Accordingly, the second spring member may be stronger than the first spring member.

[0020] The handle member may in the second position assume an angle α in relation to an external surface plane of the insert member, the angle being in the range between 0° and 90° , preferably in the range from 10° to 80° , more preferably in the range from 20° to 70° , most preferably in the range from 30° to 60° , e.g. about 50° .

[0021] The handle member may in the second position assume a distance to the external surface plane of the insert member, the distance being in the range between 0 and 5 cm, preferably in the range from 1 cm to 4 cm, more preferably in the range from 2 cm to 3 cm.

[0022] The angle α and the distance may be selected such that the handle member can be moved manually, e.g. by one or more fingers being inserted in the gap between the hood and the grill. The angle α and the distance may be selected to be at least as large as a finger. The distance is determined as the shortest distance between the end of the handle member and the external surface plane of the insert member. The external surface plane of the inset member is determined at its upward-facing surface. If the upward-facing surface is not horizontal, the external surface plane is determined as a projection of the upward-facing surface on a horizontal plane going through a geometrical centre of the upward-facing surface.

[0023] The handle member may in the second position abut on the safety catch operating member. Thereby the handle member may be stopped from moving further, unless a supplementary additional force is applied. This may be a result of biasing force on the safety catch operating member being greater than the biasing force on the handle member, as mentioned above. The additional force, e.g. manually exerted by the person wanting to open the hood, may be utilized to displace the handle member from the second position to the third position, thereby concurrently displacing the safety catch operating member from the first to the second position, i.e. acting against the biasing force on the safety catch operating member.

[0024] The handle member may in the third position assume an angle β in relation to the external surface plane of the insert member, preferably the angle β being less than 90° , more preferably in the range between 70° and 90° , most preferably in the range from 75° to 85° , e.g. about 80° . The angle β of the third position is preferably larger than the angle α of the second position. It is advantageous, if the angle β is less than 90° , since then there is less risk of the handle member being pressed down in a wrong direction, when the hood is closed again. However, the angle β may also be above 90° , e.g. being in the range between 90° , and 120° .

[0025] The safety catch operating member may be

adapted to be rotated by an angle γ between the first and second positions, the angle γ being in the range from 10° to 60°, preferably in the range of from 20° to 40°, e.g. about 30°. By this rotation, the safety catch operating member may pull the above-mentioned wire adapted to release the safety catch.

[0026] Suitable material for the safety catch release mechanism as described herein would be plastics and/or metal. Purely as an example, the handle member, the safety catch operating member, the insert and the shaft may be made of plastics or metal. The first and the second spring member may be made of metal.

[0027] In a second aspect of the present invention, there is provided a grill for a vehicle comprising a safety catch release mechanism as described herein. The safety catch release mechanism, in particular the insert member, may be inserted in an opening in an upper panel of the grill. The insert member may be retained in the grill by means of friction, an adhesive and/or at least one snap-in member located at an outside of the insert member and/or in the grill.

[0028] In a third aspect of the present invention, there is provided a vehicle comprising a hood, at least one hood lock having a safety catch, and a safety catch release mechanism as described herein, wherein the safety catch release mechanism is configured to release the safety catch of the at least one hood lock, the safety catch release mechanism being directly or indirectly connected to the hood lock, e.g. via a wire.

[0029] In a fourth aspect of the present invention, there is provided a method of opening a hood of a vehicle. The vehicle comprises a hood, a grill, at least one hood lock having a safety catch, a first release mechanism, and a safety catch release mechanism adapted to release the safety catch. The method comprises:

- operating the first release mechanism in order to open the hood lock to a safety position, in which the safety catch keeps the hood in a safety catch position, thereby holding the hood in an intermediate position, in which there is a gap between the hood and the grill, the gap allowing a handle member of the safety catch release mechanism to be displaced from a first position to a second position independent of a safety catch operating member comprised in the safety catch release mechanism,
- manually displacing the handle member from the second position to a third position, thereby causing the handle member during displacement from the second position to the third position to displace the safety catch operating member from a first position, corresponding to the hood lock being retained by the safety catch, to a second position, corresponding to releasing the safety catch.

[0030] The handle member of the safety catch release mechanism may be displaced from the first position to the second position by means of a first spring member

comprised in the safety catch release mechanism. In the second position, the handle member may abut against an inside of the hood.

5 BRIEF DESCRIPTION OF THE DRAWINGS

[0031] The present invention will hereinafter be further explained by means of non-limiting examples with reference to the appended drawings wherein:

- 10 Fig. 1 is a schematic view of a vehicle comprising a safety catch release mechanism according to the invention,
- 15 Fig. 2-3 are perspective views of a safety catch release mechanism according a first embodiment of the invention,
- 20 Fig. 4 illustrates an exploded view of the safety catch release mechanism,
- Fig. 5 illustrates a cross-section of the safety catch release mechanism with the handle member in a first position,
- 25 Fig. 6 illustrates a cross-section of the safety catch release mechanism with the handle member in a second position,
- 30 Fig. 7 illustrates a cross-section of the safety catch release mechanism with the handle member in a third position,
- 35 Fig. 8 illustrates a cross-section of the safety catch release mechanism with the handle member in a bottom position,

[0032] It should be noted that the appended drawings are not necessarily drawn to scale and that the dimensions of some features of the present invention may have been exaggerated for the sake of clarity.

DETAILED DESCRIPTION

45 **[0033]** The invention will, in the following, be exemplified by embodiments. It should however be realized that the embodiments are included in order to explain principles of the invention and not to limit the scope of the invention, defined by the appended claims. Details from two or more of the embodiments may be combined with each other.

50 **[0034]** Figure 1 schematically illustrates a vehicle 1 comprising a hood 3, which may be opened thereby providing access to an engine compartment 5 for service and/or maintenance. In order to keep the hood closed during normal usage of the vehicle 1, such as when driving the vehicle 1 or when the vehicle 1 is parked, there is at least one hood lock provided, in the illustrated case

two hood locks 7, 9 whereof one is optional. The hood locks 7, 9 may e.g. be located in a grill 11 of the vehicle 1. If only having one hood lock, it is may be located close to a longitudinal centre line L of the vehicle 1. If using two, as illustrated in Figure 1, they may be located at a left-hand side and a right-hand side of the longitudinal centre line L.

[0035] In order to provide extra safety, e.g. preventing unintentional opening of the hood 3, at least one of the hood locks, here illustrated as the left-hand hood lock 7, is provided with a safety catch 17, schematically illustrated in Figure 1. The hood 3 is opened in a two-step actuation. A person wanting to open the hood first operates a first release mechanism 13, commonly provided in a passenger compartment 15 of the vehicle 1. The first release mechanism 13 is directly or indirectly connected to the hood locks 7, 9, mechanically, e.g. via a wire, and/or electrically, e.g. via an electrical cable. Thereby, the right-hand hood lock 9 is opened, while the left-hand hood lock 7 is set to a safety position, in which the safety catch 17 keeps the hood 3 in a safety catch position, thereby holding the hood 3 in an intermediate position, in which there is a gap between the hood 3 and the grill 11. The hood 3 may be biased to move from the closed position to the intermediate position, e.g. by a spring mechanism, or it may be raised by hand force of the person opening the hood 3. In a next step, the safety catch 17 is released, thereby allowing the hood 3 to be fully opened. The release of the safety catch 17 may be made by means of a safety catch release mechanism 19 as described herein. The safety catch release mechanism 19 is directly or indirectly connected to the hood lock 7, e.g. via a wire 21. The safety catch release mechanism 19 may be located at or in the vicinity of the longitudinal centre line L of the vehicle 1.

[0036] Figures 2-4 schematically illustrate a first embodiment of the safety catch release mechanism 19 described herein. Figures 2 and 3 illustrate two different perspective views, while Figure 4 shows an exploded view.

[0037] The safety catch release mechanism 19 comprises a handle member 23, a safety catch operating member 25, an insert member 27 and a shaft 29.

[0038] The handle member 23 is adapted for manual operation by the person wanting to open the hood 3. The person may e.g. use one or more of his/her fingers to move the handle member 23.

[0039] The safety catch operating member 25 is adapted to be connected to the hood lock 7, e.g. via the wire 21 as illustrated in Figure 1, in order to be able to release the safety catch 17, thereby allowing opening of the hood 3. The safety catch operating member 25 is adapted to retain an end of the wire 21.

[0040] The insert member 27 is insertable into an opening in the grill 11 of the vehicle. The insert member 27 at least partly houses the handle member 23 and the safety catch operating member 25. A side wall of the insert member 27 facing the first hood lock 7 comprises a wire

guide 30, through which the wire 21 is adapted to pass. The wire 21 may e.g. be snap-fitted into the wire guide 30. A portion of the insert member 27 forms a frame 31, being substantially flush with an upper surface of the grill 11. The insert member 27 may be retained in the grill 11 by means of friction, an adhesive and/or at least one snap-in member located at an outside of the insert member 27 and/or in the grill 11.

[0041] The shaft 29 is attached to the insert member 27 via two opposing holes 32a, 32b in the insert member 27 and forms a first rotation axis A1. The handle member 23 and the safety catch operating member 25 are pivotally connected to the shaft 29, such that they are able to rotate around the shaft 29. However, their degrees of possible rotation are at least partly determined by the configuration of the insert member 27, as is further described below in conjunction with Figures 5-8.

[0042] The insert member 27 may be configured such that the handle member 23 may be fully inserted in the insert member 27, as in the illustrated embodiment, see in Figure 8 below. The insert member 27 comprises an upper opening 33 allowing the handle member 23 to protrude, as is further described below. The insert member 27 further comprises a lower opening 35, through which the safety catch operating member 25 partly protrudes. Thereby, the wire 21 is located below the upper surface of the grill 11 and hence concealed from the outside of the grill 11.

[0043] In the illustrated embodiment, the handle member 23 comprises two legs 37a, 37b. However a single leg may be useful, even if the two legs 37a, 37b in the illustrated example help to provide mechanical stability to the handle member 23. The legs 37a, 37b are provided with openings 38a, 38b for receiving the shaft 29.

[0044] The safety catch operating member 25 also comprises two legs 39a, 39b, and also for the safety catch operating member 25, a single leg may be useful. The legs 39a, 39b are provided with openings 40a, 40b for receiving the shaft 29. It is illustrated that the legs 39a, 39b of the safety catch operating member 25 are located inside the two legs 37a, 37b of the handle member 23, but it may also be the other way around.

[0045] The safety catch release mechanism 19 further comprises a first spring member 41, illustrated as a first coil spring, operating on the handle member 23, and a second spring member 43, illustrated as a second coil spring, operating on the safety catch operating member 25. The spring members 41, 43 are located at the shaft 29. In the illustrated embodiment the coil springs 41, 43 surround the shaft 29. The functions of the spring members 41, 43 are further described below. The second spring member 43 is located between the two legs 39a, 39b of the safety catch operating member 25. The first spring member is located outside of the two legs 39a, 39b of the safety catch operating member 25 but inside the two legs 37a, 37b of the handle member 23.

[0046] In order to retain the components on the shaft 29 in a desired way and locations, the shaft 29 may be

provided with different diameters, as is best seen in Figure 4. The portion 45 of the shaft 29 having a somewhat larger diameter is intended for the first spring member 41. The diameter step 47 of the shaft 29 will provide a horizontal abutment for one of the legs 39a, 39b of the safety catch operating member 25. In order to allow for the different diameters of the shaft 29, the two openings 38a, 38b of the handle member 23 have correspondingly different diameters.

[0047] Figure 5 illustrates a situation when the hood 3 is closed, e.g. during normal usage of the vehicle. The handle member 23 assumes a first position, in which it abuts vertically on the inside of the closed hood 3, since the first spring member 41 urges the handle member 23 upwards. The force of the first spring member 41 is rather low, e.g. in the range from 0.5 N to 10 N, which is enough to counteract the weight of the handle member 23, but much too low to have an influence on the closed hood 3. In the first position, the handle member 23 has a vertically low height over the insert member 27, which makes it possible for the hood 3 to be located close to the grill 11.

[0048] The safety catch operating member 25 assumes a first non-pulling position, in which the wire 21 does not make the hood lock 7 release the safety catch 17. The safety catch operating member 25 retains the end 22 of the wire 21, e.g. by means of a thickened end or a loop. The wire 21 runs through the wire guide 30. The wire 21 may e.g. be snap-fitted into the wire guide 30. The second spring member 43 operates on the safety catch operating member 25, urging the safety catch operating member 25 towards the first non-pulling position. The safety catch operating member 25 abuts on a portion 49 of the frame 31 of the insert member 27, preventing the safety catch operating member 25 from being further rotated by the second spring member 43. The force of the second spring member 43 is higher than for the first spring member 41, e.g. in the range from 5 to 100 N, preferably in the range from 10 to 25 N.

[0049] After the first release mechanism 13 has been activated, cf Figure 1, the hood lock 7 is set to a safety position, in which a safety catch 17 keeps the hood 3 in a safety catch position holding the hood 3 in an intermediate position, in which there is a gap between the hood 3 and the grill 11. See Figure 6. The handle member 23 is then displaced to a second position by the first spring member 41. The handle member 23 is stopped from further rotation by the safety catch operating member 25, since a lower portion 51 of the handle member 23 connecting the two legs 37a, 37b abuts against the two legs 39a, 39b of the safety catch operating member 25. The biasing force from the first spring member 41 will keep the handle member 23 in the second position, in which the handle member 23 is easy to find and easy to manually push, e.g. by one or more fingers 55. As mentioned above, the force of the second spring member 43 is larger than that of the first spring member 41. Hence, the safety catch operating member 25 will stay in the first non-pulling position, thereby holding the handle member 23 in

the second position.

[0050] In the second position, the handle member 23 assumes an angle α in relation to an external surface plane 53 of the insert member 27, the angle being α in the range between 0° and 90° , preferably in the range from 10° to 80° , more preferably in the range from 20° to 70° most preferably in the range from 30° to 60° , e.g. about 50° as is illustrated. There is then a distance d to the external surface plane 53 of the insert member 27, the distance d being in the range between 0 and 5 cm, preferably in the range from 1 cm to 4 cm, more preferably in the range from 2 cm to 3 cm. The angle α and the distance d are selected such that the handle member 23 can be moved by one or more fingers 55 being inserted in the gap between the hood 3 and the grill 11. The distance d is determined as the shortest distance between the end of the handle member 23 and the external surface plane 53 of the insert member 27.

[0051] The finger/s may be used to push the handle member 23 to the third position, which is illustrated in Figure 7. In the third position, the handle member 23 assumes an angle β in relation to the external surface plane 53 of the insert member 27. It is advantageous if the angle β is less than 90° , since then there is less risk of the handle member 23 being pressed down in a wrong direction, when the hood 3 is closed again. Preferably the angle β is in the range between 70° and 90° , more preferably in the range from 75° to 85° , e.g. about 80° as is illustrated. The angle β of the third position is larger than the angle α of the second position.

[0052] In the second position, the handle member 23 is easy to find for the person wanting to open the hood 3. Further, it is easy to move the handle member 23 from the second position to the third position, since the handle member 23 protrudes from the insert member 27. According to the invention, a safety catch release mechanism 19 is provided which has a low height when the hood 3 is closed, is adapted to cooperate with the safety catch and yet makes the hood 3 easy to open. Further, a safety catch release mechanism 19 as described herein allows a greater freedom of localisation in the vehicle 1 than prior art safety catch release mechanisms.

[0053] When the handle member 23 is moved to the third position, it simultaneously moves the safety catch operating member 25 with it, since the lower portion 51 of the handle member 23 pushes the safety catch operating member 25 to a second pulling position, in which it pulls the wire 21, thereby releasing the safety catch 17 of the first hood lock. See also Figure 1. In order to move the handle member 23 to the third position, a force is used, which is at least high enough to counteract the biasing force of the second spring member 43 and any inertia forces in the safety catch release mechanism 19, the hood lock 7 and/or in the wire 21.

[0054] The safety catch operating member 25 is rotated until it reaches an abutment on the insert member 27, at the edge of the lower opening 35, as is illustrated in Figure 7, and/or when abutting against a wall 57 of the

insert member 27. The safety catch operating member 25 has then rotated an angle γ being in the range of from 10° to 60°, preferably in the range of from 20° to 40°, e.g. about 30° as is illustrated. The wire 21 is thereby pulled a distance x in relation to when the safety catch operating member 25 is in the first position, which distance x may be at least 5 mm, preferably at least 8 mm. The wire 21 is guided by the wire guide 30 during this movement. The desired angle γ and the distance x depends on how the hood lock is configured. The illustrated angles and the distances are suitable for e.g. the hood lock as schematically illustrated in Figure 1. When the safety catch 17 has been released, the hood 3 may be fully opened.

[0055] Since second spring member 43 biases the safety catch operating member 25 back from the second position towards the first position, the biasing force will tend to move the safety catch operating member 25 back to the second position, when the handle member 23 no longer is pushed. The safety catch operating member 25 then moves the handle member 23 in front of it, since the legs 39a, 39b of the safety catch operating member 25 pushes the lower portion 51 of the handle member 23. Thereby the handle member 23 is moved back to the second position.

[0056] When the person wants to close the hood 3 again, he/she can let the hood 3 press the handle member 23 back to the first position, as illustrated in Figure 5.

[0057] Figure 8 illustrates an optional safety feature of the safety catch release mechanism 19, wherein the handle member 23 may be pushed down to a bottom wall 59 of the insert member 27 without breaking the handle member 23 and/or the insert member 27 and/or the shaft 29. The handle member 23 then assumes a bottom position. The position of the safety catch operating member 25 is thereby not influenced: It stays in the first non-pulling position.

[0058] Further modifications of the invention within the scope of the appended claims are feasible. As such, the present invention should not be considered as limited by the embodiments and figures described herein. Rather, the full scope of the invention should be determined by the appended claims, with reference to the description and drawings.

Claims

1. A safety catch release mechanism (19) for release of a safety catch (17) in a hood lock (7) of a vehicle (1), said safety catch release mechanism (19) comprising
 - a handle member (23), which is adapted for manual operation,
 - a safety catch operating member (25), which is adapted to be connected to said hood lock (7) in order to release said safety catch (17),

said handle member (23) being displaceable from a first position, corresponding to a closed hood (3) of said vehicle (1), to a second position, in which said handle member (23) is manually operable, said handle member (23) further being displaceable from said second position to a third position, corresponding to said hood lock (7) being released, **characterized in that**

said displacement of said handle member (23) from said first position to said second position is independent of said safety catch operating member (25), and **in that** said handle member (23) during displacement from said second position to said third position concurrently displaces said safety catch operating member (25) from a first position, corresponding to said hood lock (7) being retained by said safety catch (17), to a second position, corresponding to releasing said safety catch (17).

2. The safety catch release mechanism (19) according to claim 1 further comprising an insert member (27) at least partly housing said handle member (23) and said safety catch operating member (25), said handle member (23) and said safety catch operating member (25) being pivotally connected to said insert member (27).
3. The safety catch release mechanism (19) according to claim 2, wherein said handle member (23) and said safety catch operating member (25) are pivotally connected to said insert member (27) via at least one shaft (29), preferably via a common shaft (29).
4. The safety catch release mechanism (19) according to any one of the preceding claims, wherein said handle member (23) is biased from said first position to said second position, e.g. by a first spring member (41).
5. The safety catch release mechanism (19) according to any one of the preceding claims, wherein said safety catch operating member (25) is biased from said second position to said first position, e.g. by a second spring member (43).
6. The safety catch release mechanism (19) according to claim 4 and 5, wherein a biasing force on said safety catch operating member (25) is greater than a biasing force on said handle member (23), e.g. at least two times greater.
7. The safety catch release mechanism (19) according to claim 2 or any one of claims 3-6 when dependent on claim 2, wherein said handle member (23) in said second position assumes an angle α in relation to an external surface plane (53) of said insert member (27), said angle α being in the range between 0° and 90°, preferably in the range from 10° to 80°, more

preferably in the range from 20° to 70°, most preferably in the range from 30° to 60°.

8. The safety catch release mechanism (19) according to claim 2 or any one of claims 3-7 when dependent on claim 2, wherein said handle member (23) in said second position assumes a distance (d) to said external surface plane (53) of said insert member (27), said distance being in the range between 0 and 5 cm, preferably in the range from 1 cm to 4 cm, more preferably in the range from 2 cm to 3 cm. 5
9. The safety catch release mechanism (19) according to any one of the preceding claims, wherein said handle member (23) in said second position abuts on said safety catch operating member (25). 10
10. The safety catch release mechanism (19) according to claim 2 or any one of claims 3-9 when dependent on claim 2, wherein said handle member (23) in said third position assumes an angle β in relation to said external surface plane of said insert member (27), preferably said angle β being less than 90°, more preferably in the range between 70° and 90°, most preferably in the range from 75° to 85°. 15
11. The safety catch release mechanism (19) according to claim 2 or any one of claims 3-10 when dependent on claim 2, wherein said safety catch operating member (25) is adapted to be rotated by an angle γ between the first and second positions, said angle γ being in the range from 10° to 60°, preferably in the range of from 20° to 40°, e.g. about 30°. 20
12. A grill (11) for a vehicle (1), said grill (11) comprising a safety catch release mechanism (19) according to any one of the preceding claims. 25
13. A vehicle (1) comprising a hood (3), at least one hood lock (7) having a safety catch (17), and a safety catch release mechanism (19) according to any one of claims 1-11, wherein said safety catch release mechanism (19) is configured to release said safety catch (17) of said at least one hood lock (7), said safety catch release mechanism (19) being directly or indirectly connected to said hood lock (7), e.g. via a wire (21). 30
14. A method of opening a hood (3) of a vehicle (1), said vehicle (1) comprising a hood (3), a grill (11), at least one hood lock (7) having a safety catch (17), a first release mechanism (13) and a safety catch release mechanism (19) according to any one of claims 1-11 adapted to release said safety catch (17), said method comprising: 35
- operating said first release mechanism (13) in order to open said hood lock (7) to a safety po- 40

sition, in which said safety catch (17) keeps said hood (3) in a safety catch position, thereby holding said hood (3) in an intermediate position, in which there is a gap between the hood (3) and the grill (11), said gap allowing a handle member (23) of said safety catch release mechanism (19) to be displaced from a first position to a second position independent of a safety catch operating member (25) comprised in said safety catch release mechanism (19),
 - manually displacing said handle member (23) from said second position to a third position, thereby causing said handle member (23) during displacement from said second position to said third position to displace said safety catch operating member (25) from a first position, corresponding to said hood lock (7) being retained by said safety catch (17), to a second position, corresponding to releasing said safety catch (17). 45

15. The method according to claim 14, wherein said handle member (23) of said safety catch release mechanism (19) is displaced from said first position to said second position by means of a first spring member (41). 50

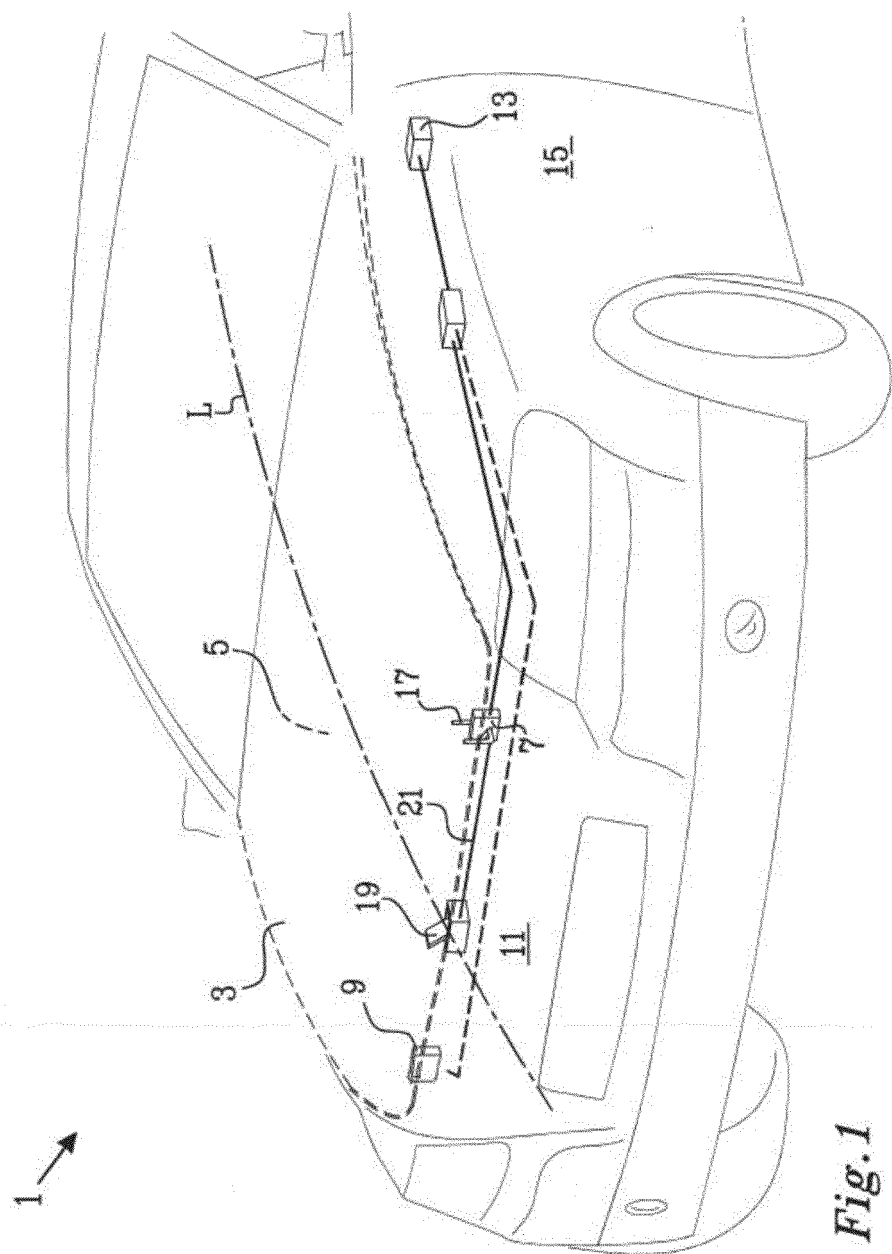


Fig. 1

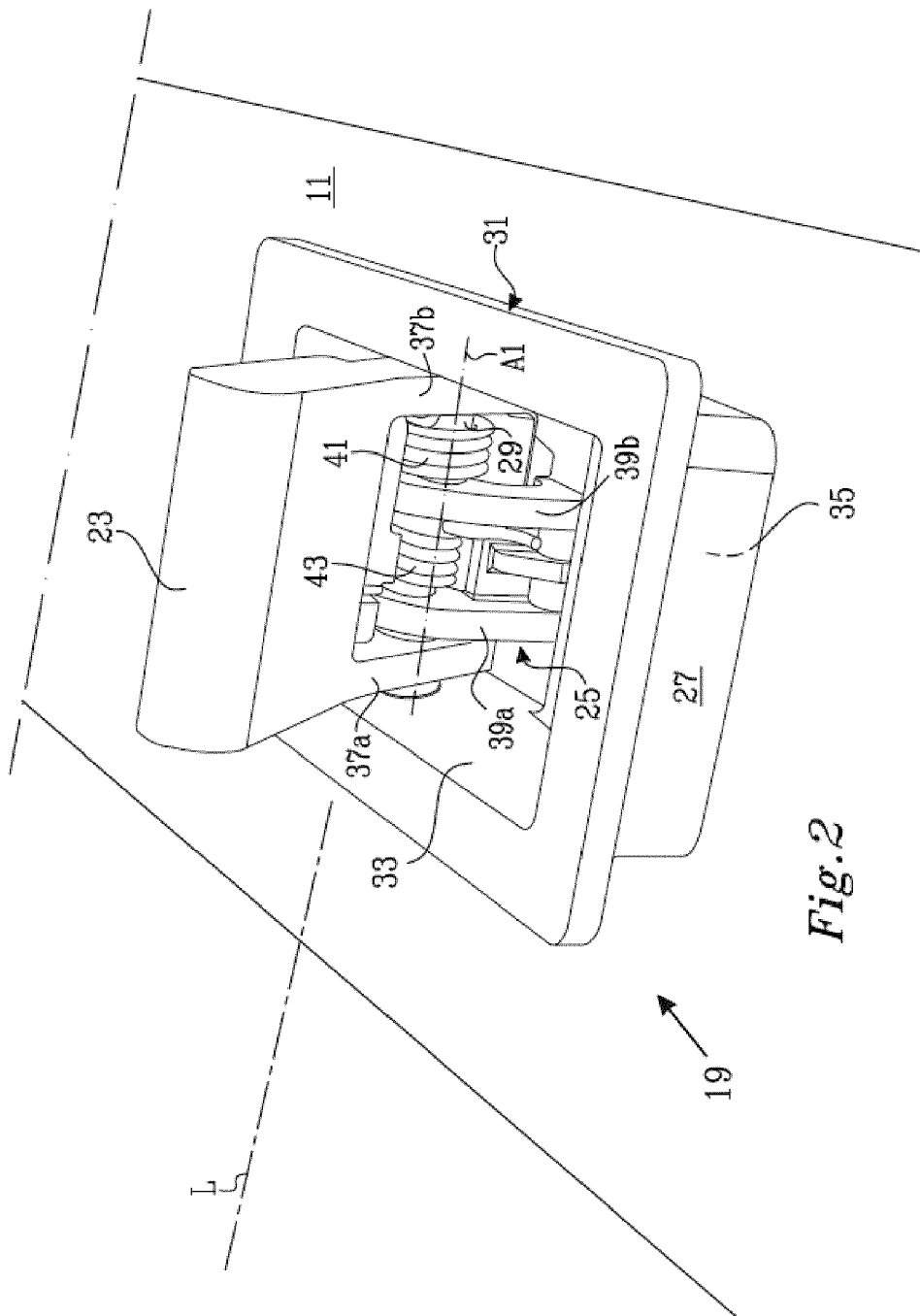


Fig. 2

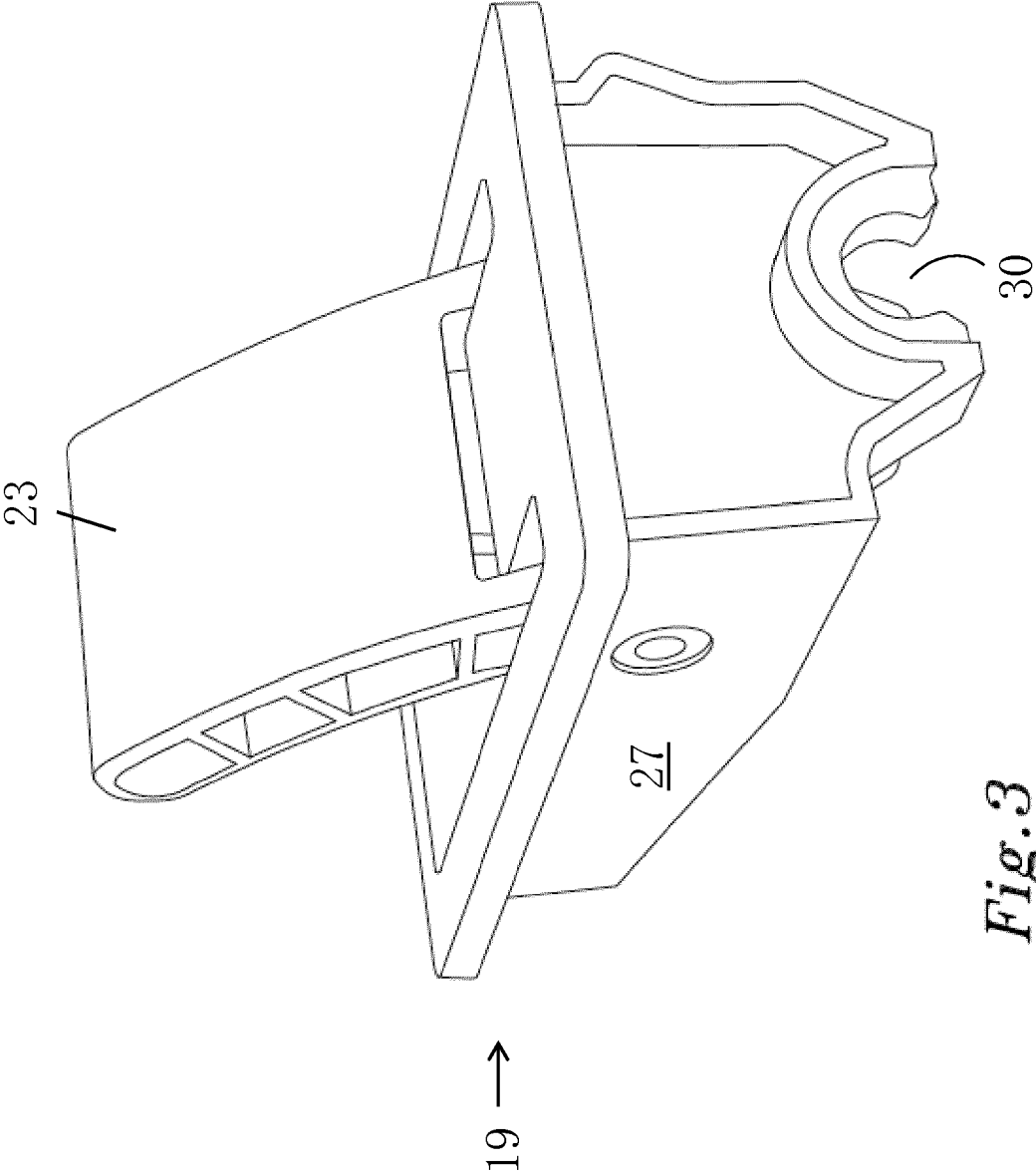
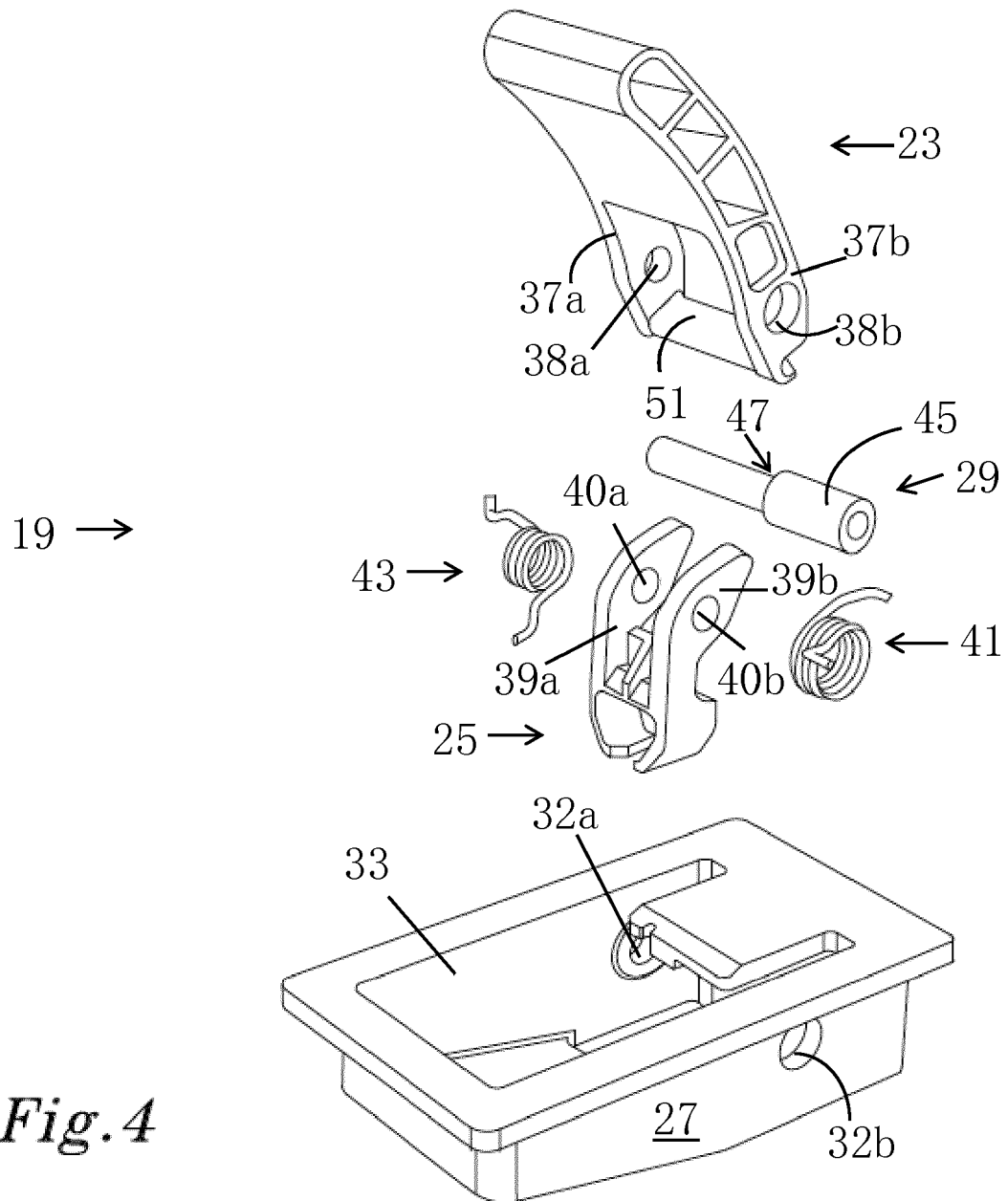


Fig. 3



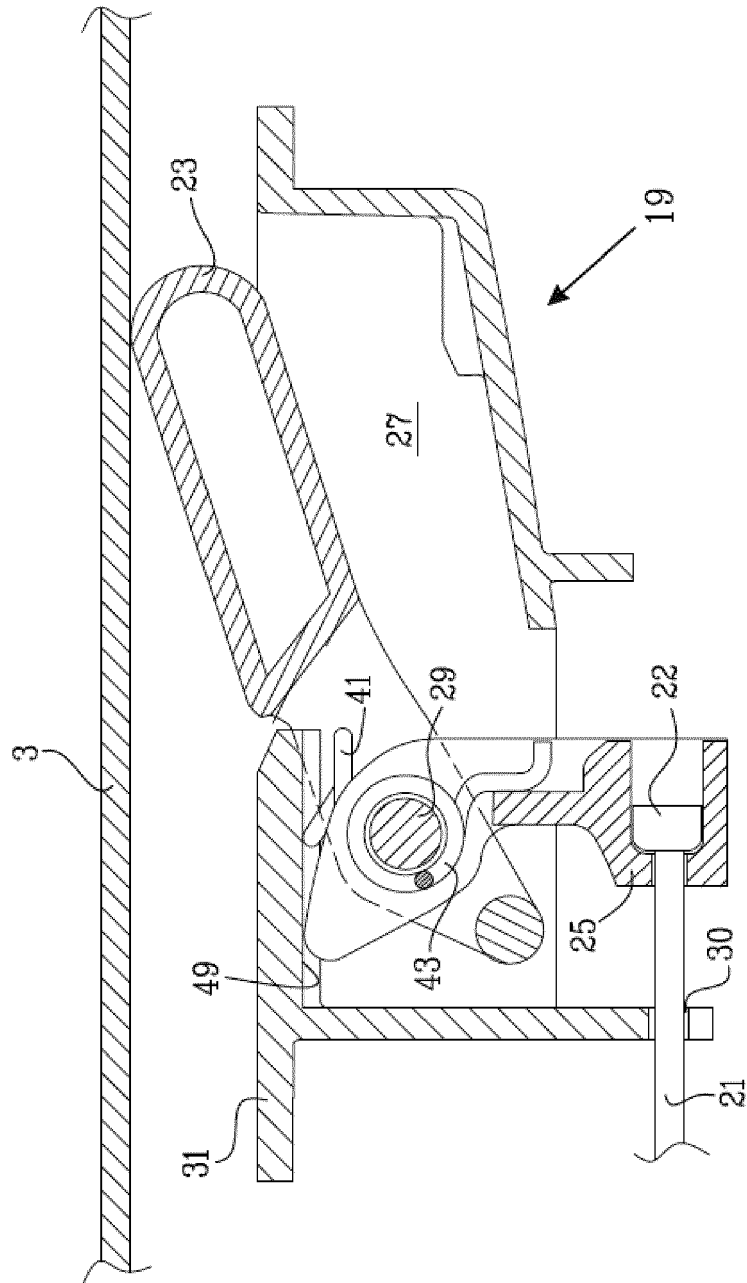
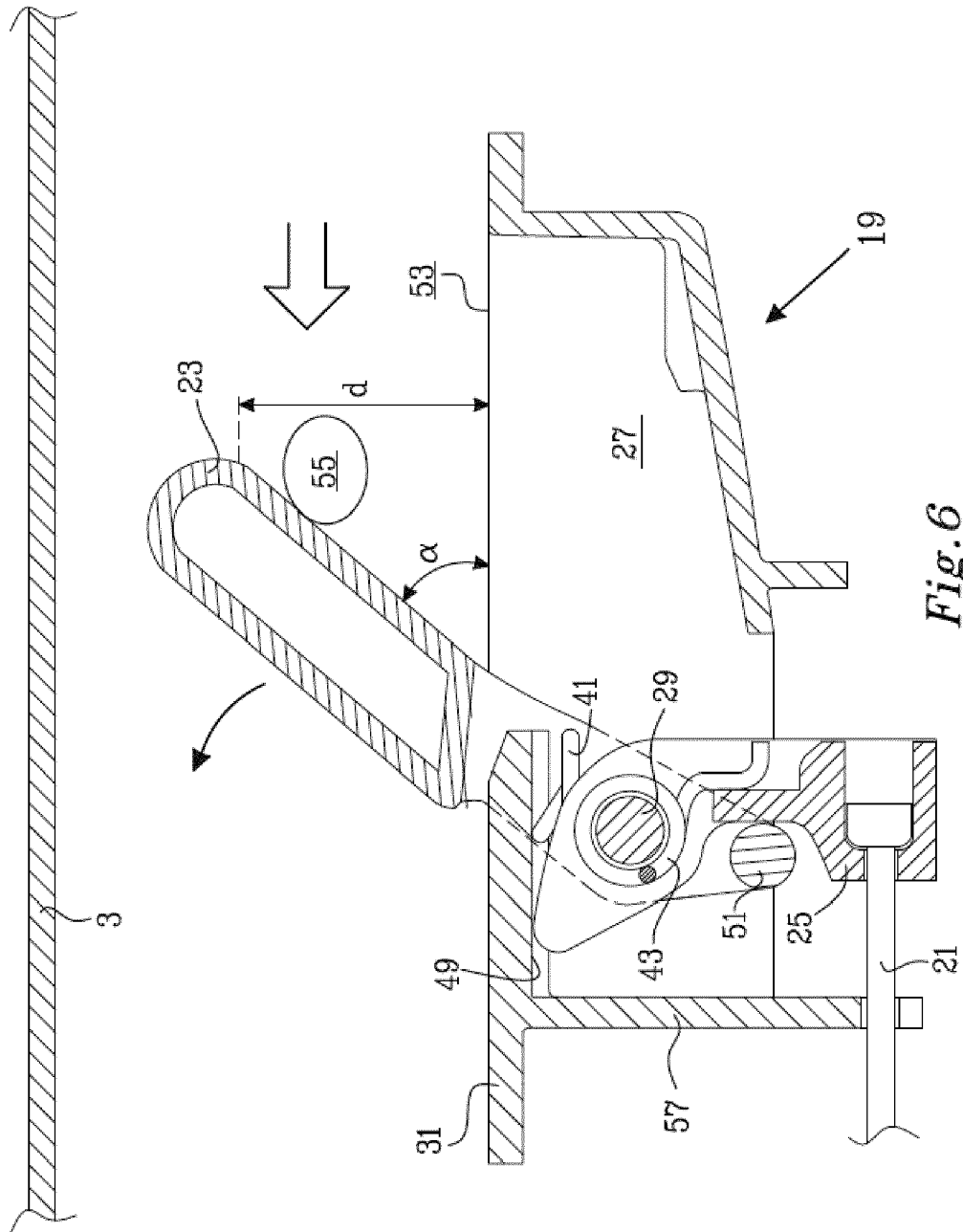
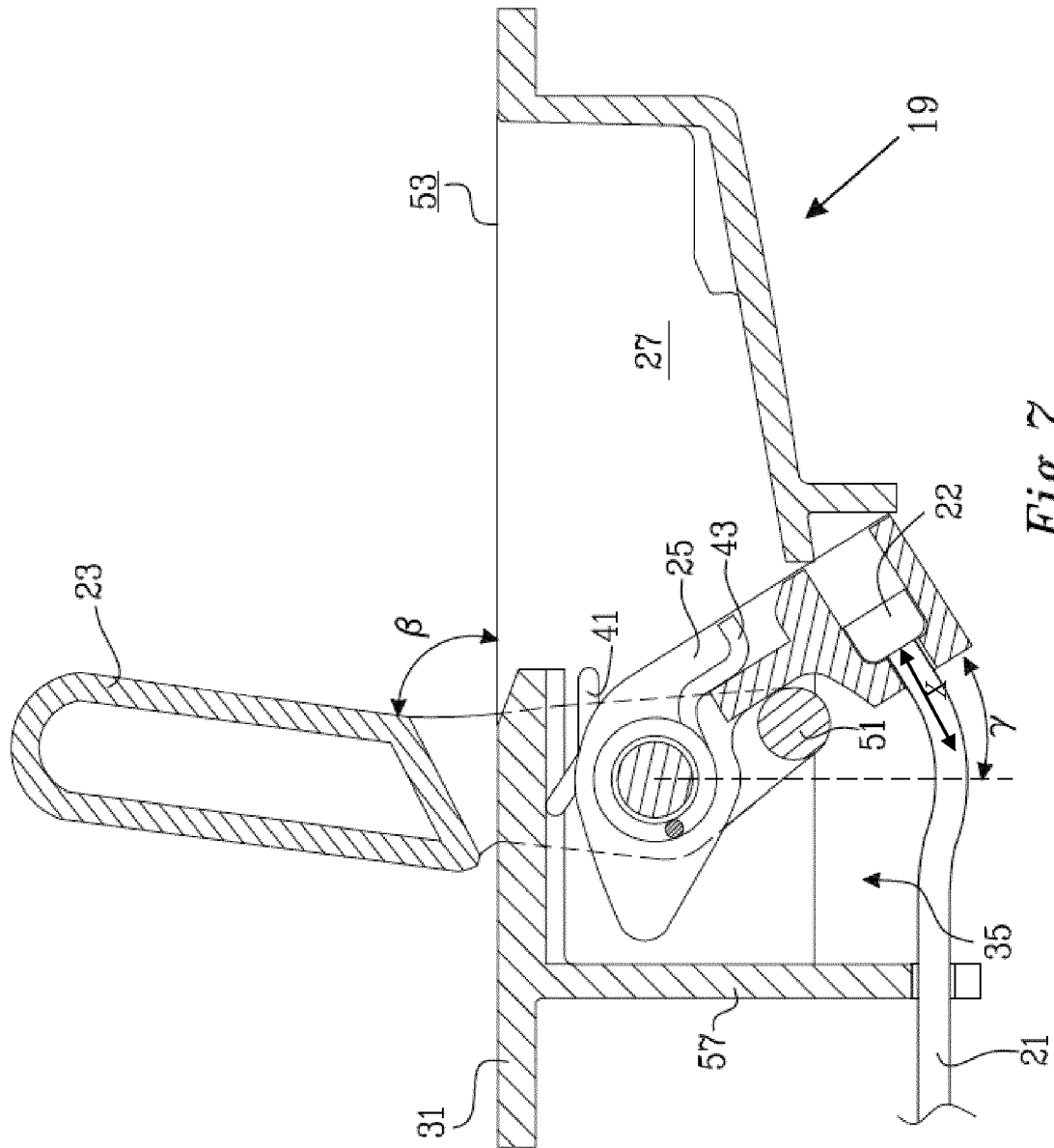
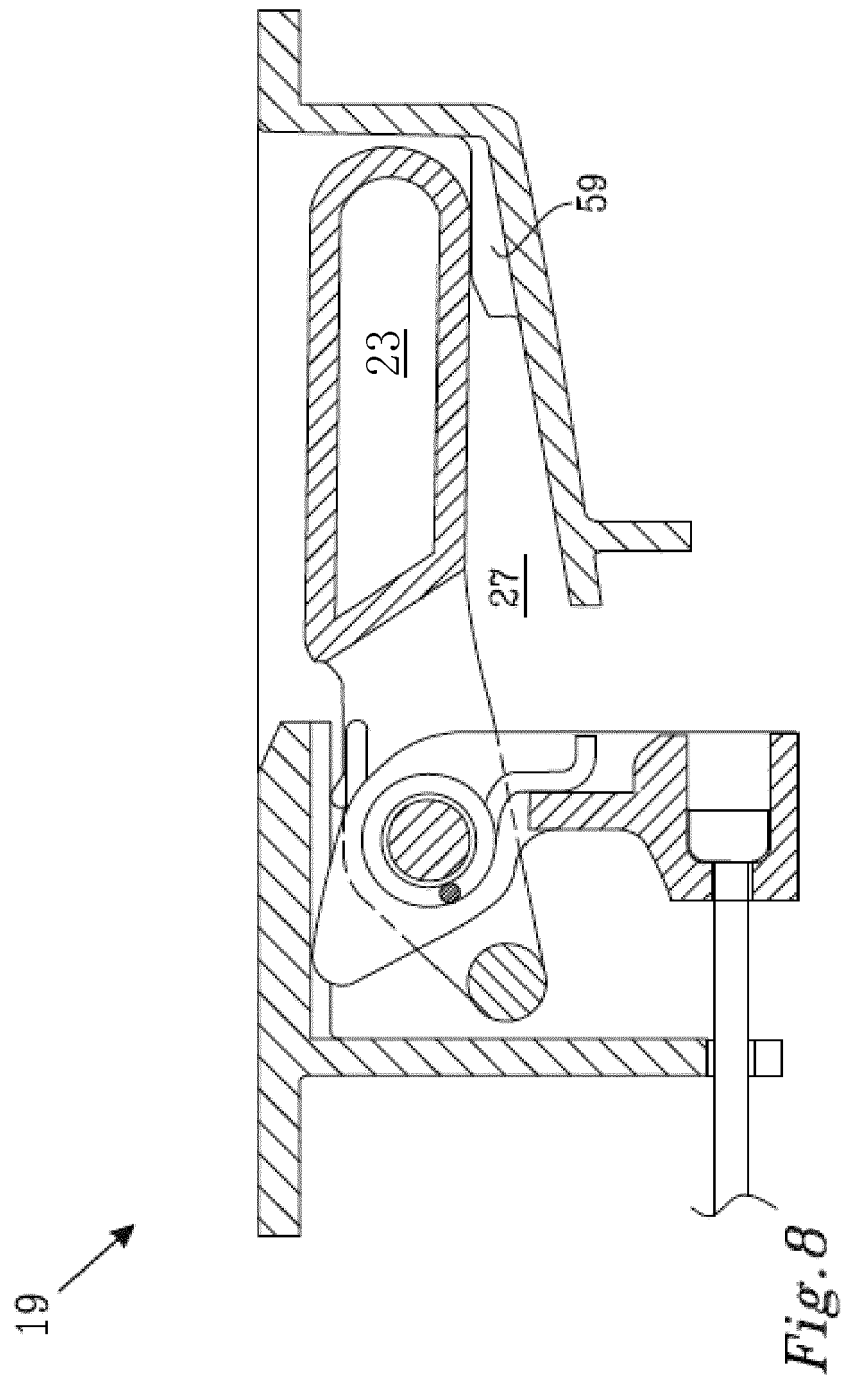


Fig. 5









EUROPEAN SEARCH REPORT

Application Number
EP 15 18 0756

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2014/015258 A1 (BARCZYNSKI DAREK [US] ET AL) 16 January 2014 (2014-01-16) * paragraph [0002] * * paragraph [0022] * * paragraph [0032] - paragraph [0040] * * figures 1-7 *	1-15	INV. E05B79/22 E05B83/24 E05B85/10 E05B15/00
X	DE 101 11 240 A1 (MAN NUTZFAHRZEUGE AG [DE]) 23 January 2003 (2003-01-23) * paragraph [0023] - paragraph [0030] * * figures 1-3 *	1-15	ADD. E05B79/20
X	EP 0 307 978 A1 (ALFA LANCIA IND [IT]) 22 March 1989 (1989-03-22) * column 2, line 17 - column 3, line 25 * * figures 1-3 *	1,4,7,8,10,12-15 2,3,5,6,9,11	
A			
X	WO 01/75252 A1 (HUF HUELSBECK & FUERST GMBH [DE]; WITTMER REINHARD [DE]) 11 October 2001 (2001-10-11) * page 3, line 3 - line 11 * * page 4, line 1 - line 16 * * page 5, line 7 - line 22 * * page 6, line 22 - page 7, line 15 * * page 9, line 9 - page 10, line 14 * * figures 1-6 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) E05B E05C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 February 2016	Examiner Antonov, Ventseslav
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 18 0756

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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23-02-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014015258 A1	16-01-2014	DE 112012000578 T5	21-11-2013
		US 2014015258 A1	16-01-2014
		WO 2012100328 A1	02-08-2012
DE 10111240 A1	23-01-2003	NONE	
EP 0307978 A1	22-03-1989	DE 3871298 D1	25-06-1992
		EP 0307978 A1	22-03-1989
		ES 2031229 T3	01-12-1992
		IT 211822 Z2	25-05-1989
WO 0175252 A1	11-10-2001	DE 10015887 C1	17-01-2002
		EP 1268959 A1	02-01-2003
		KR 20030011283 A	07-02-2003
		US 2003019261 A1	30-01-2003
		WO 0175252 A1	11-10-2001

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20140319848 A1 [0003] [0012]