



(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.02.1999 Bulletin 1999/05

(51) Int. Cl.⁶: E05B 65/32

(21) Application number: 98114303.5

(22) Date of filing: 30.07.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor:
Ottino, Franco Giovanni
56017 San Giuliano Terme (IT)

(30) Priority: 31.07.1997 IT TO970695

(74) Representative:
Cerbaro, Elena et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(71) Applicant: ATOMA ROLTRA S.p.A.
86077 Pozzilli (IS) (IT)

(54) Lock for a motor vehicle door

(57) The lock (1) comprises a closure mechanism (28) arranged to be coupled with a striker (2) along the related coupling direction (B); a containing shell (34) for the closure mechanism (28) made of relatively yielding material and having a housing seat (54) for a head (16) on the striker (2); and a flexible strip component (52) made of one piece with the containing shell (34), demarcating the housing seat (54) in the direction of relative coupling (B) and in a transverse direction thereto, and defining a resting surface for the head (16) of the striker (2) in the said relative coupling direction (B).

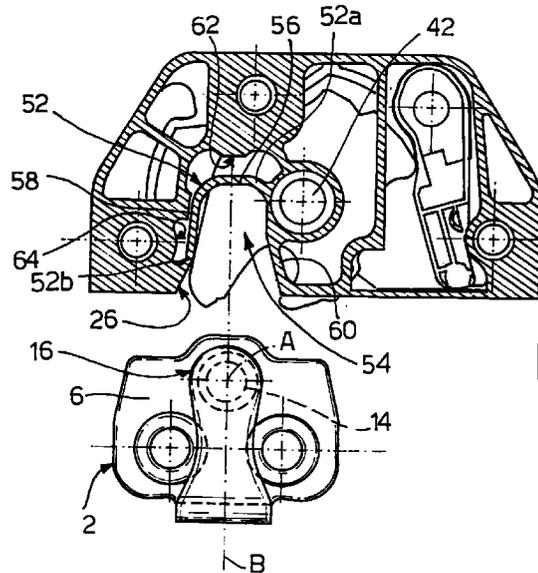


Fig.8

Description

[0001] The present invention relates to a lock for a motor vehicle door.

[0002] As it is known, the lock for a motor vehicle door is generally secured in a rigid manner to the door itself and is arranged to be coupled with a fixed striker integral with an upright of the motor vehicle body shell itself to ensure closure of the door.

[0003] Locks having a support structure are known at least partly housing a closure mechanism including a fork arranged to cooperate with a portion of the striker and a stop arranged to lock the fork in a releasable manner in an operative closure position on the portion of the striker.

[0004] In particular, the support structure comprises a metal frame arranged to be secured to the door of the motor vehicle and a housing shell for the closure mechanism having a holding housing seat for the portion of the striker in the fork engaging position.

[0005] The penetration of the portion of the striker into the seat is typically guided by walls vertically demarcating the seat itself, the walls having a converging path towards a base wall defining the resting position of the striker.

[0006] For the purpose of reducing the noise produced by the insertion of the portion of the striker into the seat a number of structural arrangements are used at present mainly based on the use of a buffer, typically made of rubber, placed inside the seat and coupled to the base wall of the said seat.

[0007] In addition, in order to ensure guidance of the striker in the vertical direction, one of the walls demarcating the seat is defined by a flexibly loaded pad, which may be integral or otherwise with the containing shell. The flexible loading may be provided by means of an independent elastic component or defined by a portion of the buffer.

[0008] The above structural arrangements are nevertheless relatively complex and costly and thus result in a greater complexity of the assembly cycle and an increase in manufacturing costs of the lock.

[0009] The purpose of the present invention is to achieve a lock for a motor vehicle door which allows in a simple and economical manner the reduction of the noise generated by the coupling of the lock and the striker.

[0010] According to the present invention a lock for a motor vehicle is achieved comprising a closure mechanism arranged to couple with a striker along a relative coupling direction; a container shell for the said closure mechanism having a housing seat for a portion of the said striker; and a relatively yielding matching means demarcating the said housing seat at least in the said relative coupling direction to define a resting surface for the said portion of the said striker and in a transverse direction to the said relative coupling direction; characterized by the fact that the said container shell com-

prises a relatively yielding portion made of an elastic material, demarcating the said housing seat and integrally defining the said matching means.

[0011] For a better understanding of the present invention two preferred forms of embodiment are now described, exclusively as non-restrictive examples and with reference to the appended drawings, wherein:

- Figure 1 is a perspective view of a first actuation form of a lock according to the present invention;
- Figure 2 is front view of a fixed striker associated with the lock;
- Figure 3 is a side view of the striker in Figure 2;
- Figure 4 is a right-hand side view of a closure module forming part of the lock in Figure 1;
- Figure 5 is a front view of the closure module in Figure 4;
- Figure 6 is a left-hand side view of the closure module in Figure 4;
- Figure 7 is a section along the line VII-VII in Figure 5;
- Figure 8 is a section along the line VIII-VIII in Figure 5, wherein the closure module appears uncoupled from the striker in Figure 2;
- Figure 9 is a section along the line VIII-VIII in Figure 5, in which the closure module appears coupled to the striker in Figure 2;
- Figure 10 is a section along line X-X in Figure 9, in which the closure module appears coupled to the striker in Figure 2;
- and Figure 11 is a section corresponding with that in Figure 9 of a second form of actuation of the present invention.

[0012] In Figure 1 a lock appears as an assembly under reference 1 produced according to the present invention.

[0013] The lock 1 is arranged to be rigidly secured to the door (not illustrated) of a motor vehicle (not illustrated) and to be coupled with a fixed striker 2 (Figures 2 and 3) integral with an upright of the body shell (not illustrated) of the motor vehicle to achieve the closure of the door.

[0014] In particular, the striker 2 comprises as illustrated in Figures 2 and 3, a support structure 4 essentially U-shaped and defined by a first plate component 6 with holes 8 for its securing to the motor vehicle upright, a second plate component 10 facing first plate component 6, and a third plate component 12 connecting the plate components 6, 10 integrally therewith and placed transversely between first end portions 6a, 10a of the said plate components 6, 10.

[0015] The striker 2 also comprises a matching dowel 14 of essentially cylindrical shape, having a longitudinal axis A, located transversely between two end portions 6b, 10b of the plate components 6, 10 opposing the first end portions 6a, 10a supported at their ends by the plate components 6, 10 and arranged to cooperate with

the lock 1 as is described below.

[0016] The end portion 10b of the second plate component 10 located to correspond with the matching dowel 14 is rounded and defines a head 16 on the striker 2, which has a greater cross section than that of the matching dowel 14.

[0017] Referring again to Figure 1, the lock 1 is of modular type and comprises a closure module 20 having engaging components for connecting with the striker 2, and an actuation module 22 for the closure module 20, not described in detail since it is not part of the present invention, provided with lever arrangements controlled from outside by the actuation of the engaging components of the said closure module 20.

[0018] The closure module 20 comprises, as is also illustrated in Figures 4-6, a box-shaped support structure 24 having a front aperture 26 for the coupling of the closure module 20 with the matching dowel 14 of the striker 1; and a closure mechanism 28 arranged inside the support structure 24 and arranged to be coupled through the front aperture 26, with the matching dowel 14 of the striker 2 along a coupling direction B transversely to the longitudinal axis A of the matching dowel 14 in a manner already known to achieve the closure of the motor vehicle door.

[0019] In particular, the support structure 24 comprises a first and a second metal material plate 30, 32, essentially flat and both placed face to face and parallel, and a housing shell 34 in elastic material relatively yielding interposed between the first and second plate 30, 32 and having internally an opening 36 communicating with the outside through the front aperture 26 and in which is located the closure mechanism 28.

[0020] In addition, on the first wall 30 of the support structure 24 a vent 38 (Figs. 1 and 4) is arranged extending to correspond with the front aperture 26 and along the relative coupling direction B to allow the penetration of the matching dowel 14 with the inside of the opening 36 and its coupling with the closure mechanism 28.

[0021] The closure mechanism 28 comprises as is shown in greater detail in Figure 7, a fork 40 mounted to pivot about a first pin 42, secured integral with the plates 30, 32 and extending in orthogonal manner between the plates 30, 32 inside the aperture 36 of the housing shell 34; and a stop 44 mounted to pivot on a second pin 46 also fixed integral to the plates 30, 32 and extending in orthogonal manner between the said plates 30, 32 inside the aperture 36.

[0022] The fork 40 has a U-shaped seat 48 arranged to engage the matching dowel 14 of the striker 2, and is normally held by a spring (not illustrated) in an operative opening position, in which the seat 48 is turned towards the front aperture 26 of the support structure 24. During the coupling of the striker 2 with the matching dowel 14, the fork 40 moves from the opening position to a closing position on the matching dowel 14 shown in Figure 7, in which the seat 48 is directed towards the inside of the

aperture 36 and is held in a releasable manner in such an operative closure position of the stop 44.

[0023] According to the invention, the container shell 34 comprises a relatively yielding portion 50, demarcating a holding seat 54 for the head 16 of the striker 2 and communicating with the outside through the front aperture 26.

[0024] In the actuation form in Figures 1 to 10, the portion 50 is made of one piece with the said shell 34, which consists entirely of relatively soft plastic material, usefully polyurethane resin, or as an alternative an elastomer material, it not being subject to mechanical loads since the loads to which the stop 44 is subjected with the fork 40 are absorbed by the plates 30, 32.

[0025] The portion 50 of the shell 34 comprises as illustrated in Figures 8-10 a flexible strip component 52 placed inside the aperture 36, made of one piece with the container shell 34 and demarcating the said housing seat 54 for the head 16 of the striker 2.

[0026] In particular the flexible component 52 is of arcuate form, has a first and a second end 52a, 52b secured integrally to the container shell 34 and comprises a first portion 56 transversely to the direction of relative coupling B and defining a rest surface for the head 16 of the striker 2, and a second portion 58 facing a guiding wall 60 of the container shell 34 demarcating the housing seat 54 in transverse direction in relation to the direction of relative coupling B.

[0027] In detail, the first end 52a of the flexible component 52 is integrally secured to the guide wall 60, whilst the second end 52b of the flexible component 52 is integrally to secured to the container shell 34 at the point of front aperture 26.

[0028] In addition, the second portion 58 of the flexible component 52 converges in relation to the guide wall 60 towards the first portion 56 of the said flexible component 52.

[0029] In greater detail, the first portion 56 of the flexible component 52, in its original condition, is faced towards and spaced from a bottom 62 of the aperture 36 which defines a limiting component for the distortion of the first portion 56 in the direction of relative coupling B, whereas the second portion 58 of the flexible component 52, in its original condition, is facing at a distance from the side surface 64 of the said aperture 36 which defines a limiting component for the distortion of the second portion 58 in transverse direction to the direction of relative coupling B.

[0030] The housing seat 54 has a portion 63 tapered outwardly for the insertion of the head 16 of the striker 2 placed opposite the front aperture 26.

[0031] The operation of the lock 1 is a follows.

[0032] After closure of the motor vehicle door, the matching dowel 14 shown in Figure 10 locates inside the housing seat 54 of the container body 34, thus rotating the fork 40 from the opening position shown in Figure 8 to the closed position shown in Figure 9, in which the matching dowel 14 is held steady in housing seat

54.

[0033] In particular, the arrangement of the head 16 of the striker 2 inside the housing seat 54 occurs first of all through the opening in the said head 16 in the insertion portion 63 of the housing seat 54 and thereby through the head 16 slipping between the second portion 58 of flexible component 52 and the guide wall 60 of the container shell 34.

[0034] Insertion of the head 16 of the striker 2 inside the housing seat 54 ends when the said head 16 bears against the first portion 56 of the flexible component 52, which defines the rest position for the matching dowel 14.

[0035] In that rest position, the head 16 of the striker 2 slightly distorts the first and the second portion 54, 56 of the flexible component 52; in particular, the first portion 56 of the flexible component 52 approaches the bottom surface 62 of the aperture 36 but does not bear against it, whereas the second portion 58 of the flexible component 52 comes to bear against the side surface 64 of the aperture 36.

[0036] In consequence, the first portion 58 of the flexible component 52 exerts upon the head 16 of the striker 2, jointly with the rigid guide wall 60, a locking action for the said head 16 inside the housing seat 54 which thereby prevents the movement of the door in a transverse direction to the direction of relative coupling B, or prevents the vertical movement of the door.

[0037] In Figure 11 a lock 1' is illustrated in accordance with another form of embodiment with this invention, which is described hereinafter exclusively insofar as it differs from lock 1 and using the same reference numbers to identify equal or similar parts already described.

[0038] In particular, the lock 1' comprises a container shell 34 made of essentially rigid plastic material, in which portion 50 in this case as a separate component is force-fitted. The portion 50 comprises two flexible strip components 56, 58, corresponding in function and position with portions 56, 58 of flexible component 52 of lock 1. Each of these flexible strip components 56, 58 is integrally secured to the portion 50 at the relevant ends.

[0039] The portion 50 comprises in addition integrally a dust excluding lip 65 extending integrally from portion 50 around the aperture 26, along the upper and lower sides and the side turned towards the plate 32. The lip 65 is arranged to be elastically compressed against the door, in service, to limit the ingress of foreign matter into the said door through the ingress aperture of the striker.

[0040] Following examination of the characteristics of the locks 1, 1' according to the present invention, the advantages this allows will become evident.

[0041] In particular, the use of a single portion 50 in flexibly yielding material demarcating the seat 54 allows the attenuation of the noise generated by the impact of the head 16 of the striker 2 and the guidance of the insertion of striker in a most efficient manner; the assembly cycle for the lock 1 becomes notably simpli-

fied in relation to that of known locks and consequently manufacturing costs for the lock 1 prove greatly reduced.

[0042] Finally, it will be clear that the lock described and illustrated herein may be subject to modifications and variations without going beyond the protective scope of the present invention.

[0043] In particular, the lip 65 may also be arranged accordingly in the event of the portion 50 being integral with the container shell 34.

Claims

1. Lock for a motor vehicle door comprising a closure mechanism (28) arranged for coupling with a striker (2) along a relative coupling direction (B); a container shell (34) for the said closure mechanism (28) having a housing seat (54) for a portion (16) of the said striker (2); and relatively yielding bearing means (52) demarcating the said housing seat (54) at least in the said relative coupling direction (B) to define a rest surface of the said portion (16) of the said striker (2) and in a transverse direction to the said relative coupling direction (B); characterized in that the said container shell comprises a relatively yielding portion made of elastic material, demarcating the said housing seat (54) and integrally defining the said matching means (52, 56, 58).
2. Lock according to claim 1, characterized in that the said matching means are defined by at least one strip-type flexible component (52, 56, 58) made of one piece with the said relatively yielding portion (50) of the said container shell (34).
3. Lock according to claim 2, characterized in that the said flexible component (52) has ends (52a, 52b) integrally secured to the said relatively yielding portion (50) of the said container shell (34).
4. Lock according to claim 3, characterized in that the said flexible component (52) has an arcuate form and comprises a first portion (56) transverse to the said direction of relative coupling (B) and defining the said resting surface, and a second portion (58) facing a guide wall (60) of the said relatively yielding portion (50) and demarcating with the said guide wall (60) the said housing seat (54) in the transverse direction in relation to the said relative coupling direction (B).
5. Lock according to claim 4, characterized in that the second portion (58) of the said flexible component (52) converges in relation to the said guide wall (60) towards the said first portion (56) of the said flexible component (52).
6. Lock according to claims 4 or 5, characterized in

that it also comprises limiting means (62, 64) against distortion of the said flexible component (52).

7. Lock according to claim 6, characterized in that the said relatively yielding portion comprises an aperture (36) in which is placed the said flexible component (52), limitation means (62, 64) against distortion of the flexible component (52) comprising a bottom surface (62) for the said aperture (36) turned away and at a distance from the said first portion (56) of the said flexible component (52) and a side surface (64) of the said aperture (36) turned away and spaced from the said second portion (58) of the said flexible component (52). 5
10
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8. Lock according to any of the preceding claims, characterized in that the said elastic material is a relatively soft plastic material. 20
9. Lock according to claim 8, characterized in that the said relatively soft plastic material is a polyurethane resin. 25
10. Lock according to one of claims 1 to 7, characterized in that the said elastic material is an elastomer material. 30
11. Lock according to any one of the preceding claims, characterized in that the said container shell is entirely made of the said elastic material, and comprises integrally the said relatively yielding portion (50). 35
12. Lock according to one of claims 1 to 10, characterized in that the said container shell (34) is made of essentially rigid plastic material, and that the said relatively yielding portion (50) is produced as a separate component and mounted on the said container shell (34). 40
13. Lock according to any one of the preceding claims, characterized in that they comprise a first and a second plate (30, 32) facing each other, including the container shell (34) in sandwich form and defining together with the said container shell (34) and the said closure mechanism (28), a closure module (20) for the said lock (1). 45
14. Lock according to any one of the preceding claims, characterized in that the said relatively yielding portion (50) of the said container shell (14) integrally defines a dust excluding lip (65) surrounding an aperture (26) of the said shell (14) for the penetration of the said striker (2) in the said lock (1, 1'). 50
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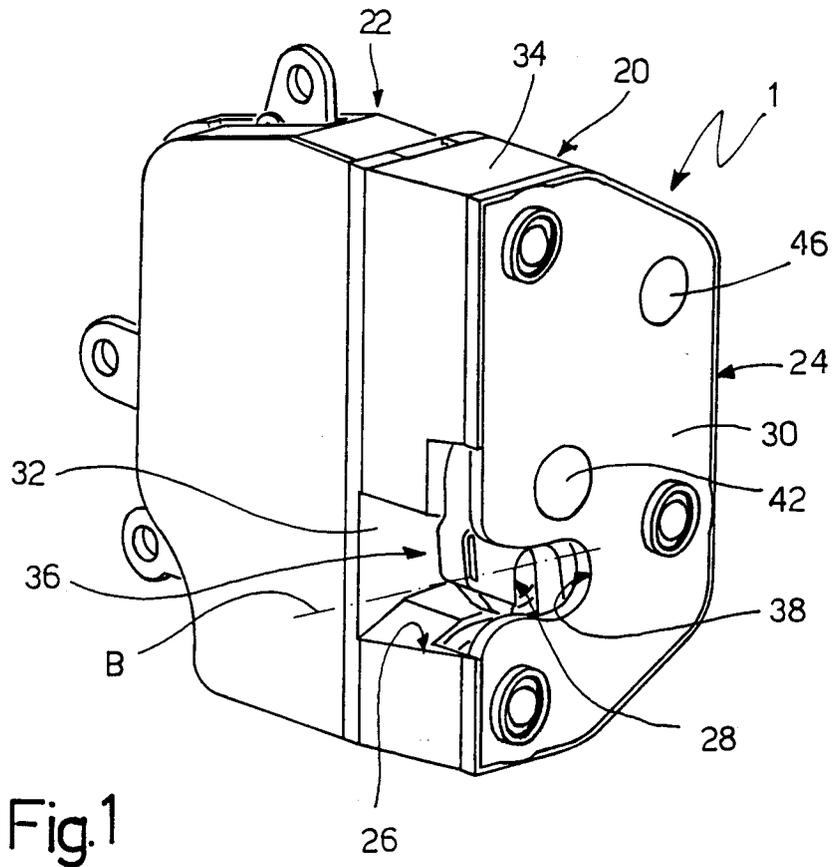


Fig.1

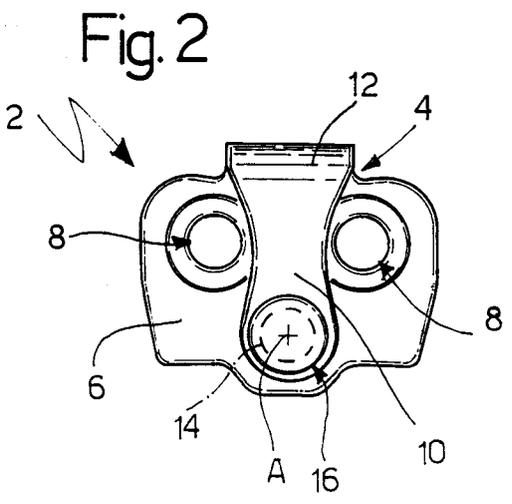


Fig. 2

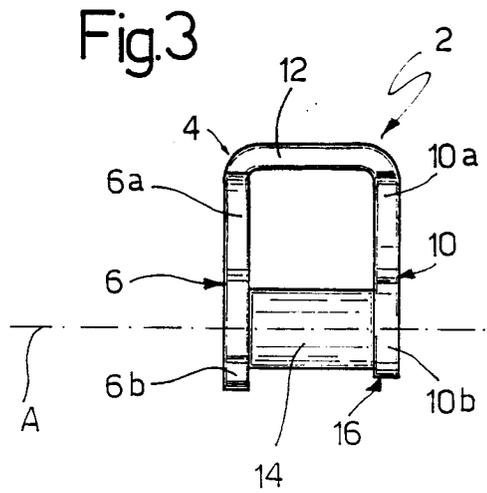


Fig. 3

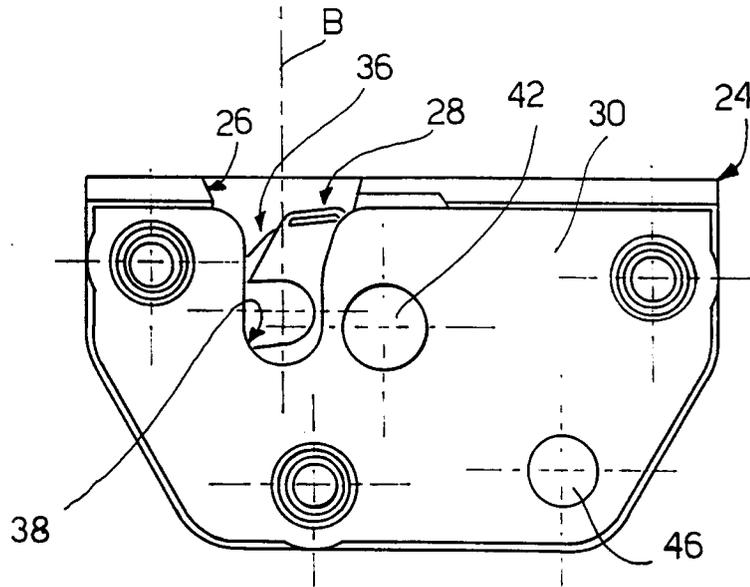


Fig. 4

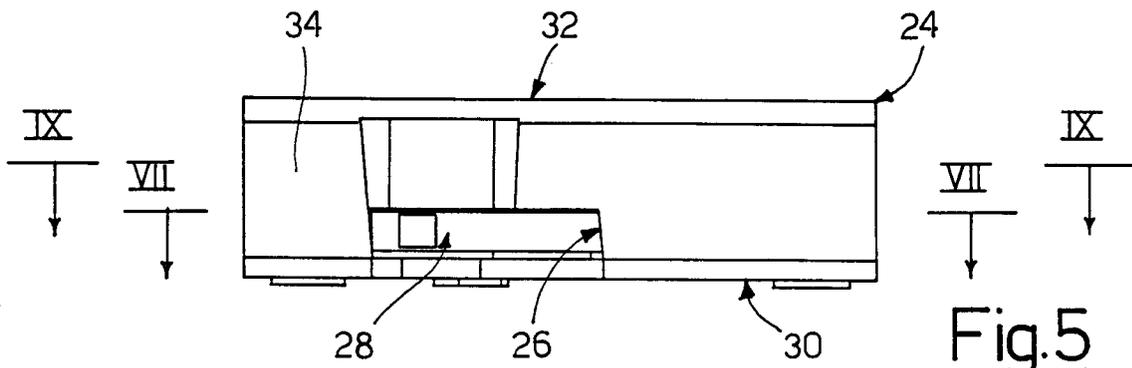


Fig. 5

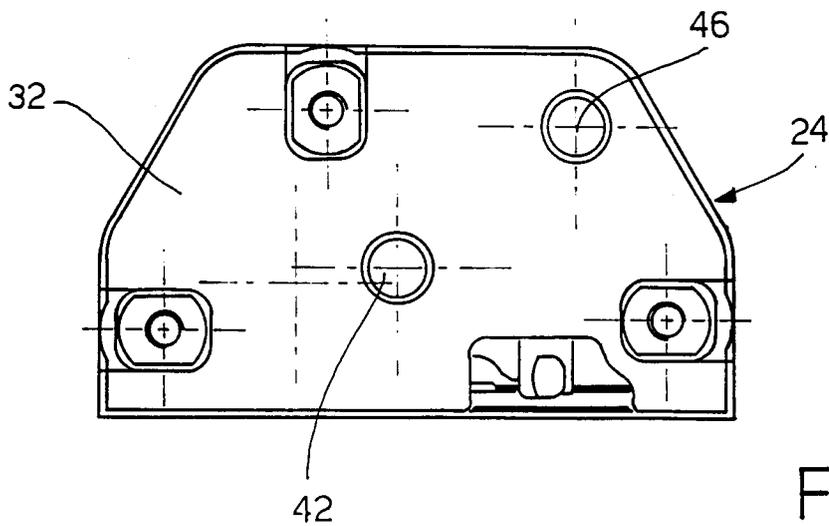


Fig. 6

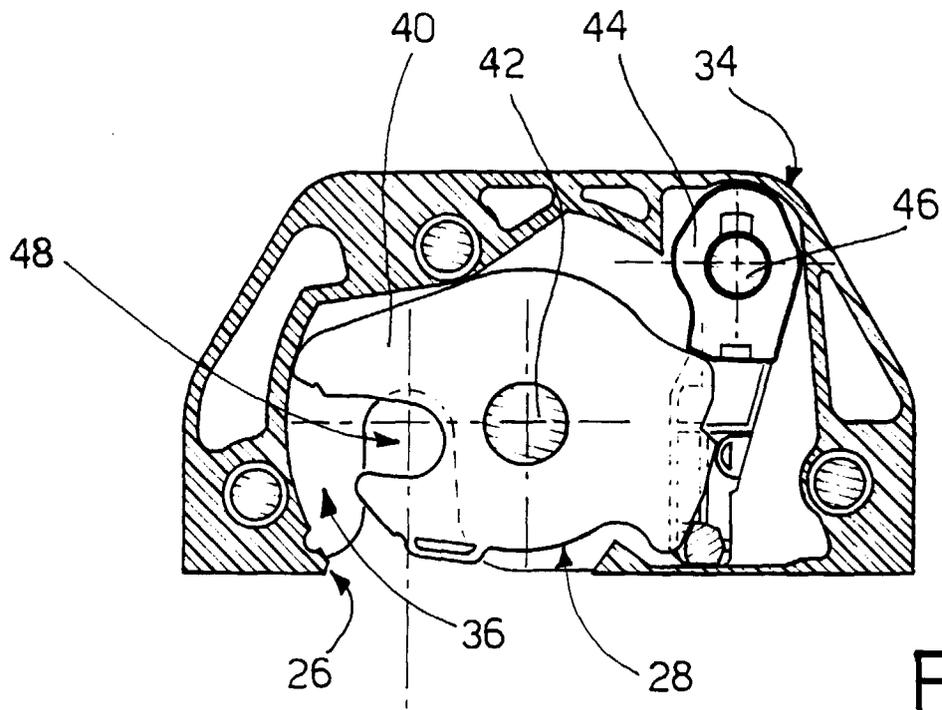


Fig.7

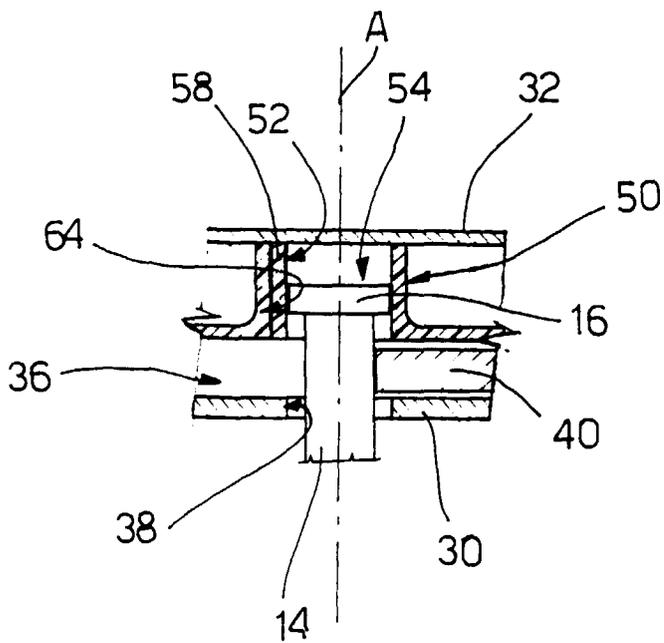


Fig.10

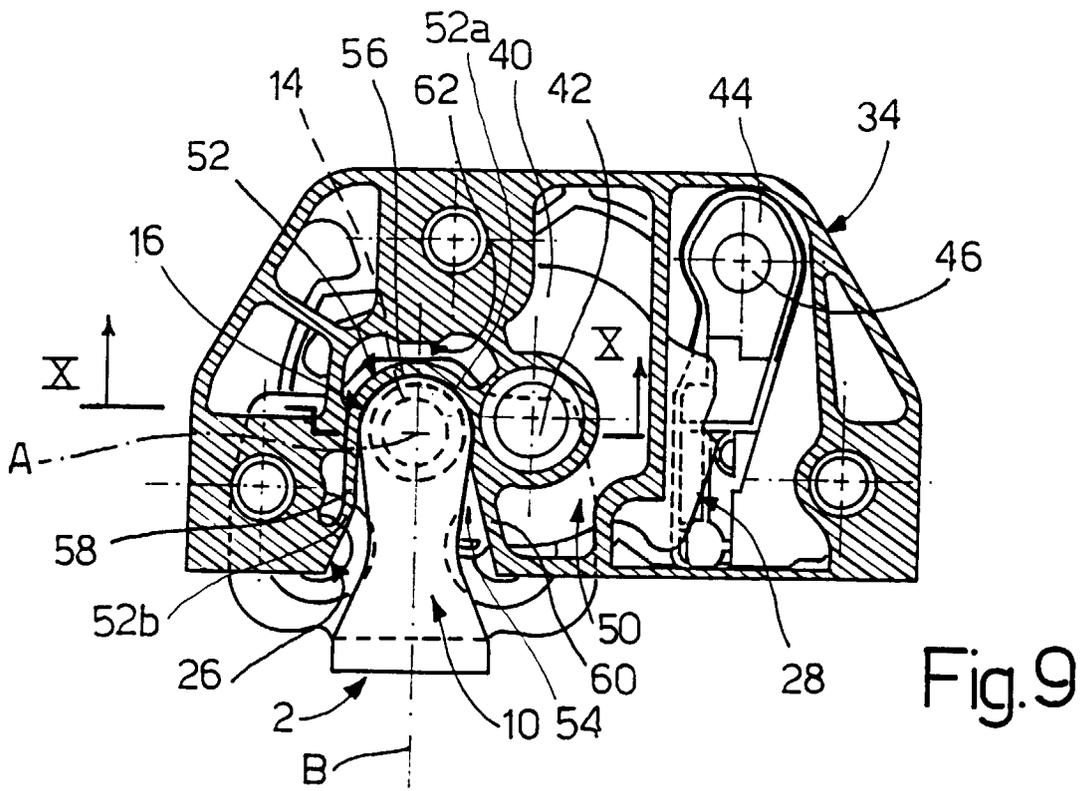


Fig.9

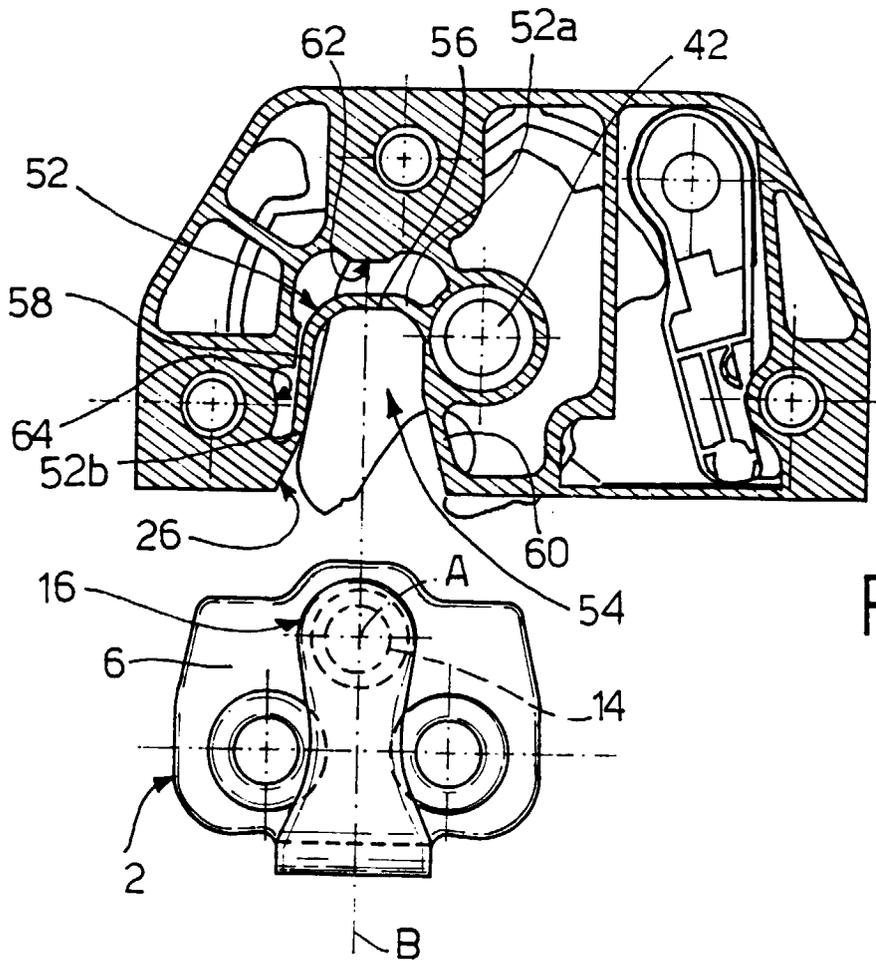


Fig.8

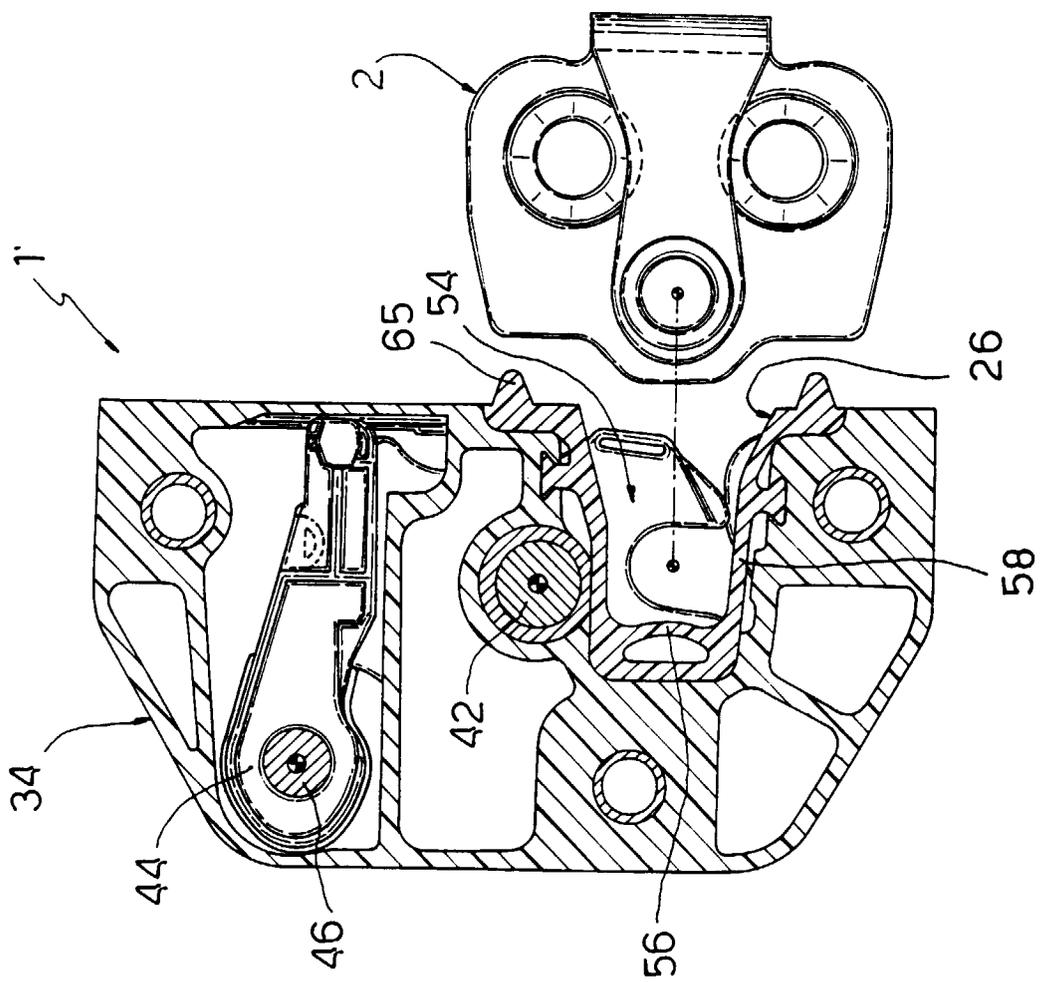


Fig.11



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 4303

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.6)
X	DE 25 51 288 A (GENERAL MOTORS LTD.) 20 May 1976 * page 4, last paragraph - page 5, paragraph 1 * * page 9, paragraph 3 - page 10, paragraph 1; figures 2-4 *	1-6,8,11	E05B65/32
X	FR 2 243 314 A (TACK & GABEL) 4 April 1975 * the whole document *	1,8,10	
X	US 4 679 836 A (PUPILLO ET AL.) 14 July 1987 * the whole document *	1,8	
A		12,13	
X	FR 2 175 434 A (FIRMA ARN. KIEKERT SÖHNE) 19 October 1973 * the whole document *	1,2,8, 11,13	
X	DE 89 15 280 U (BOMORO BOCKLENBERG & MOTTE GMBH & CO KG) 15 February 1990 * the whole document *	1,2,8,11	
A		12,13	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	FR 2 539 793 A (COMPAGNIE INDUSTRIELLE DE MECANISMES, CIM) 27 July 1984 * page 4, line 4 - line 21 *	1-5,8,11	E05B
A	FR 2 528 095 A (TACK & GABEL GMBH & CO. KG) 9 December 1983 * the whole document *	1,8,12, 13	
A	DE 88 06 550 U (BOMORO BOCKLENBERG & MOTTE GMBH & CO KG) 14 July 1988 * the whole document *	1,10,12	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		10 November 1998	Westin, K
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