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Giuliani

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[54] **HINGES AND MORE PARTICULARLY TO HINGES SUITABLE FOR ADJUSTABLE BACK RESTS OF SEATING MEANS**

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[51] **Int. Cl.** **E05d 11/10**

[58] **Field of Search** ..... 16/128 R, 139, 144, 16/145, 147, 175, 189; 297/373, 367

[56] **References Cited**

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[57] **ABSTRACT**

A hinge including a pair of hinge members rotatable relative to each other about a hinge axis; an arcuate toothed rack of concave configuration fast with the one hinge member and presenting teeth which are directed radially inwardly towards the hinge axis; a toothed locking element which is radially but not circumferentially movable relative to the other hinge member and which is interengageable with the arcuate rack in a plurality of circumferentially spaced positions; and actuating means for moving the locking element into and out of engagement with the arcuate rack. The actuating means comprises the combination of a single rotary actuating member located at least partially within a bore in at least one of the hinge members and rotatable about the hinge axis; two arcuate cam surface zones on the actuating member and disposed about the hinge axis, the spacing of each cam surface zone from the hinge axis varying between a maximum and a minimum value along the cam surface zone; a single cam follower connected to the locking element; and an arcuate bearing surface zone on the follower for each cam surface zone, rotation of the actuating member in opposite directions engaging either one of the two cam surface zones with its own associated bearing surface zone so as positively to urge the locking element into and out of engagement with the arcuate rack, at least the cam surface zone and the associated bearing surface zone which are engaged when the locking element is urged into engagement with the arcuate rack being complementary to one another.

16 Claims, 6 Drawing Figures

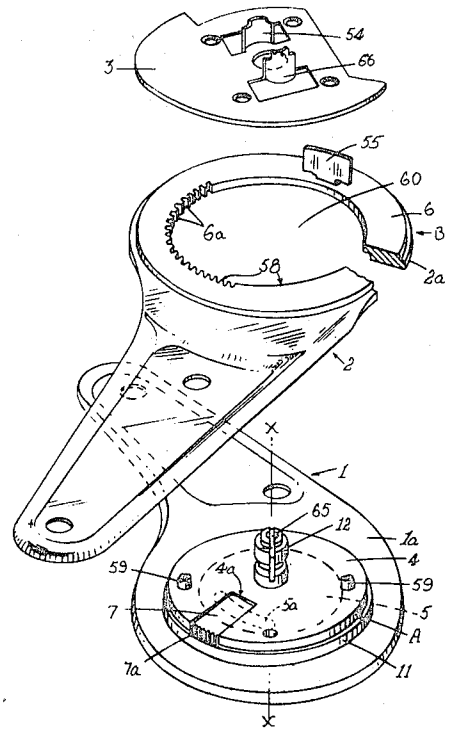


Fig 1.

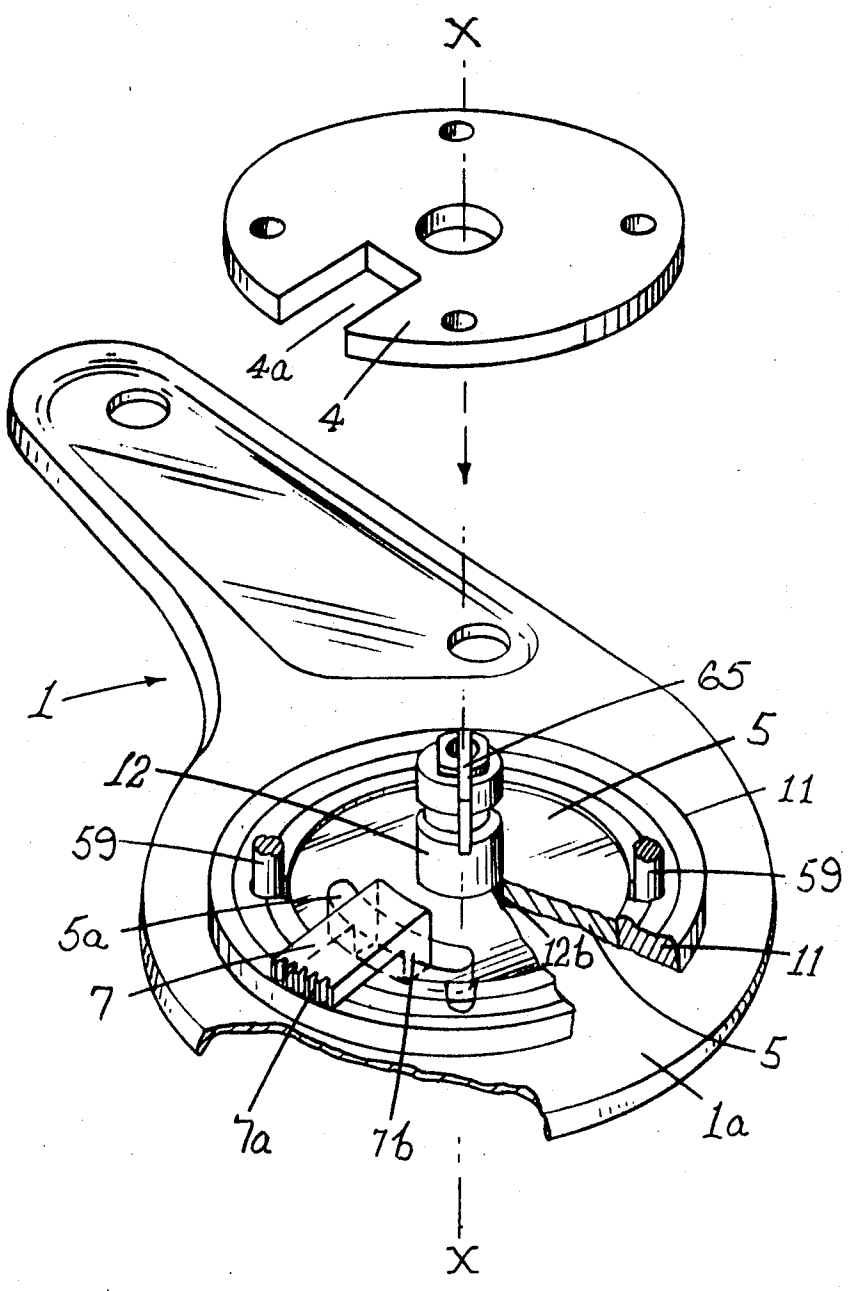
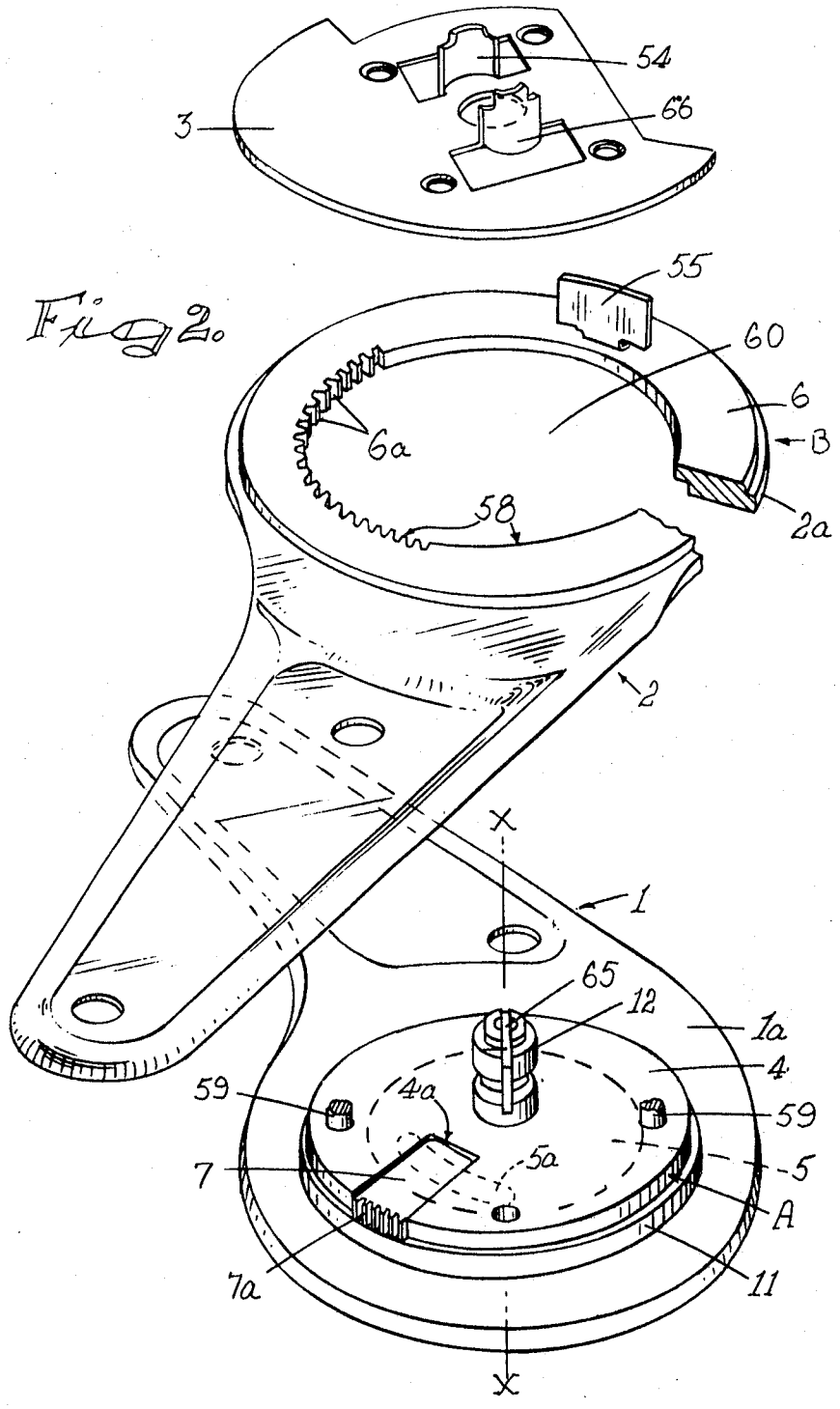


Fig 2.



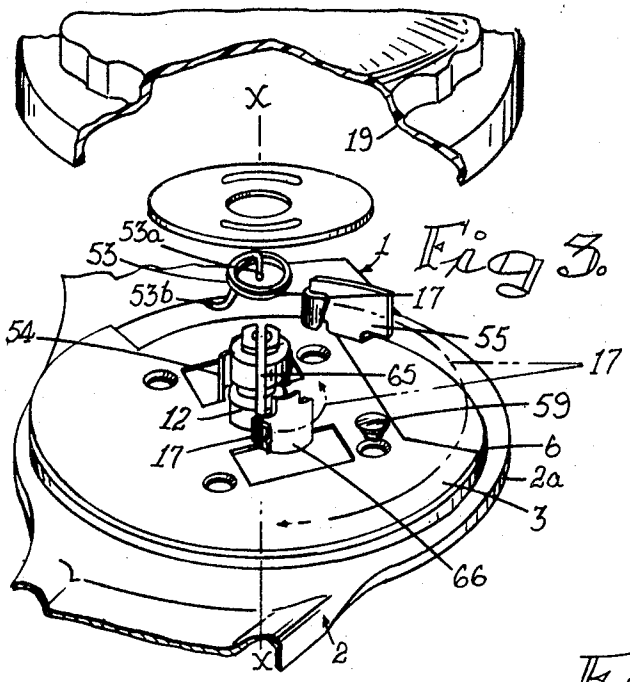


Fig 3.

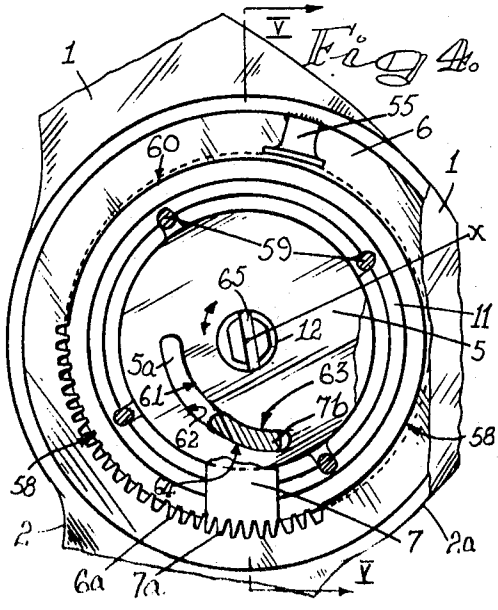


Fig 4.

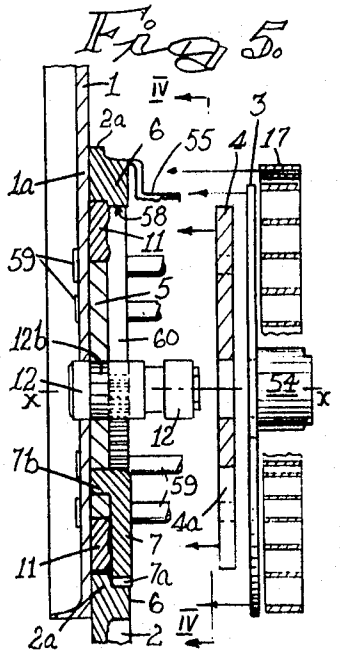
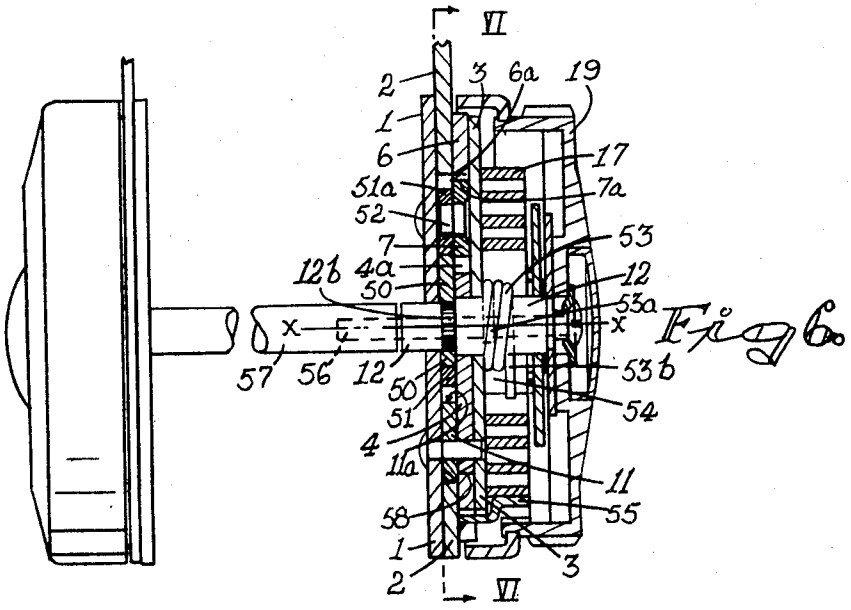


Fig 5.


VI
2
1
6
51a
52
7
4a
12b
50
57
56
12
51
4
11a
58
1
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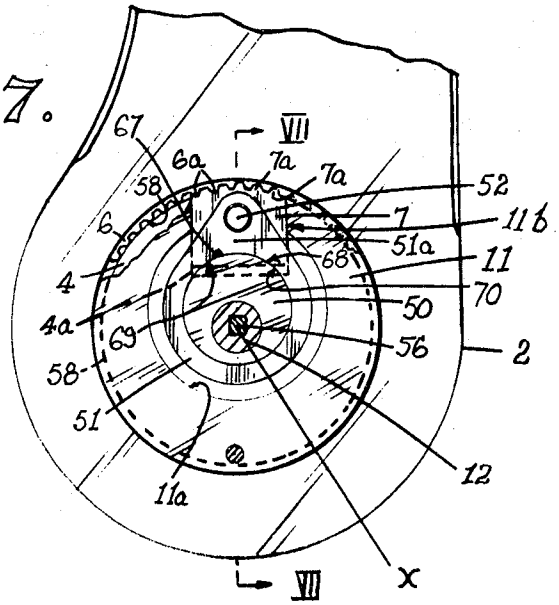
3
6a
19
17
7a
53
12
53a
53b
54
11
55
3
VI

Fig 6.

Fig 7.


VII
67
6a
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VII

HINGES AND MORE PARTICULARLY TO HINGES SUITABLE FOR ADJUSTABLE BACK RESTS OF SEATING MEANS

This invention relates to hinges and more particularly to hinges suitable for adjustable back rests of seating means.

It is well known for the back rest of the front seat of a motor car to be adjustable in position to suit the requirements of an occupant. Various types of hinge arrangements are known to permit an adjustment of the vertical position of a seat back rest and to lock the back rest in a required position. However, all the hinge arrangements for this purpose which are known to applicant, suffer from one or other disadvantage.

It is accordingly an object of the present invention to provide a new and improved hinge arrangement which is suitable for adjustable back rests of seating means.

According to the invention a hinge includes a pair of hinge members rotatable relative to each other about a hinge axis; an arcuate toothed rack of concave configuration fast with the one hinge member and presenting teeth which are directed radially inwardly towards the hinge axis; a toothed locking element which is radially but not circumferentially movable relative to the other hinge member and which is interengageable with the arcuate rack in a plurality of circumferentially spaced positions; a single rotary actuating member located at least partially within a bore in at least one of the hinge members and rotatable about the hinge axis; two arcuate cam surface zones on the actuating member and disposed about the hinge axis, the spacing of each cam surface zone from the hinge axis varying between a maximum and a minimum value along the cam surface zone; a single cam follower connected integrally, pivotally or otherwise to the locking element; and an arcuate bearing surface zone on the follower for each cam surface zone, rotation of the actuating member in opposite directions engaging either one of the two cam surface zones with its own associated bearing surface zone so as positively to urge the locking element into and out of engagement with the arcuate rack, at least the cam surface zone and the associated bearing surface zone which are engaged when the locking element is urged into engagement with the arcuate rack being complementary to one another.

The two arcuate cam surface zones on the actuating member may be presented by a single surface or by two separate surfaces.

Preferably, both the rotary actuating member and the cam follower are at least partially located in a bore in at least one of the hinge members.

The rotary actuating member and the cam follower may lie in substantially the same plane.

The hinge may include a guide member fast with the other hinge member; and a radially extending guide slot in the guide member, the locking element being slidably located in the guide slot.

The arcuate toothed rack may be located in axial spaced relationship to the other hinge member, the guide member being mounted on spacer means fast with the other hinge member, thereby to locate the guide slot in substantially the same plane as the arcuate rack.

The one hinge member may present a mounting head at one end thereof; and a bore in the mounting head, the arcuate rack being fast with the mounting head and extending round at least part of the periphery of the bore therein and the rotary actuating member being located at least partially in the bore in the mounting head.

The mounting head may comprise a plate-like end formation on the one hinge member; and a gear ring fast with the end formation in face to face relationship therewith, the gear ring presenting a toothed rack round at least part of its inner periphery.

The hinge may include a pivot formation fast with the other hinge member and presenting an outwardly directed bearing surface complementary to at least part of the bore in the mounting head, the mounting head being rotatably mounted on the pivot formation and the arcuate rack lying along a circumferential zone disposed radially in the vicinity of the bearing surface.

Where the hinge includes a guide member, such guide member may be of circular configuration and its outer periphery may constitute a pivot formation presenting an outwardly directed bearing surface complementary to an inwardly directed bearing surface round at least part of the inner periphery of the bore in the mounting head.

Where the guide member is mounted on spacer means fast with the other hinge member, the spacer means may be of circular configuration and its outer periphery may constitute a pivot formation presenting an outwardly directed bearing surface complementary to an inwardly directed bearing surface round the inner periphery of the bore in the mounting head.

The spacer means may comprise a ring within which the actuating member is located.

The rotary actuating member may include an arcuate slot, opposite sides of the slot constituting two opposed cam surface zones; and the cam follower may comprise a curved projection extending from the locking element and located in the slot, opposite sides of the projection constituting two arcuate bearing surface zones, rotation of the actuating member in opposite directions engaging either one of the two cam surface zones with its own bearing surface zone so as positively to urge the locking element into and out of engagement with the arcuate rack.

Alternatively, the rotary actuating member may comprise an eccentrically mounted member having an arcuate outer periphery constituting two adjacent arcuate cam surface zones; and the cam follower may comprise a coupling ring or other annular coupling link which is rotatably mounted on the actuating member and which is pivotally connected to the locking member, rotation of the actuating member in opposite directions engaging either one of the two adjacent cam surface zones of the outer periphery of the actuating member with its own associated zone of the inner periphery of the coupling ring or link so as positively to urge the locking element into and out of engagement with the arcuate rack.

The rotary actuating member may be fast with an operating shaft which is co-axial with the hinge axis.

The actuating member may be resiliently biased for rotation urging the locking element towards engagement with the arcuate rack.

The two hinge members may be resiliently biased towards a position in which their angular displacement is a minimum.

Two preferred embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of part of one embodiment of a hinge according to the invention, showing one of the two hinge members, a circular pivot ring, a rotary actuating cam plate and a toothed locking element in their operative positions and with a circular guide plate in exploded position.

FIG. 2 is a perspective view of part of the same hinge showing all the parts of FIG. 1 in their operative positions and with the other hinge member and a cover plate in exploded positions.

FIG. 3 is a fragmentary exploded perspective view of the same hinge showing all the parts of FIG. 2 in their operative positions and with a cam plate biasing spring and an operating knob in exploded positions.

FIG. 4 is a fragmentary view of the hinge on the line IV—IV in FIG. 5 with parts removed and broken away to show the engagement of the cam follower with the rotary cam plate.

FIG. 5 is a section on the line V—V in FIG. 4, showing certain parts in their operative positions and other parts in exploded positions.

FIG. 6 is a section view on the line VII—VII in FIG. 7, of another embodiment of a hinge according to the invention which is suitable for adjustable motor car seats.

FIG. 7 is a sectional view of the hinge on the line VI—VI in FIG. 6.

Apart from their rotary actuating members and cam followers, the two hinges illustrated in the accompanying drawings are similar in construction and like parts are indicated by like reference numerals.

Referring first to FIGS. 1 to 5 of the drawings, the hinge comprises a pair of hinge members, 1, 2 which are rotatable relative to each other about hinge axis X—X and which are adapted to be secured to the load carrying seat part (not shown) and the adjustable back rest (not shown) of a motor vehicle seat. Hinge members 1, 2 present plate-like, pivotally connected inner end portions 1*a*, 2*a*, which are located face to face to each other, the inner end portion 2*a* of hinge member 2 being of annular formation with an axial bore therethrough.

Circular pivot ring 11 is located face to face with hinge member 1 and is rivetted to it by means of rivets 59. Circular guide plate 4 has a diameter which is slightly smaller than the outer diameter of pivot ring 11 and is located face to face with pivot ring 11 in concentric relationship therewith. Guide plate 4 is also rivetted to hinge member 1 by means of rivets 59 so that both pivot ring 11 and guide plate 4 are fast with hinge member 1. The outer peripheries of pivot ring 11 and guide plate 4 present radially outwardly directed bearing surfaces to form a spigot-like pivot formation A of stepped configuration as shown in FIG. 2.

Circular gear ring 6 presents around part of its inner periphery an arcuate toothed rack of concave configuration with a set of teeth 6a which are directed radially inwardly towards hinge axis X—X. Gear ring 6 is located face to face with the inner end portion 2*a* of hinge member 2 and is fast with it, such as being welded to it or being integrally formed with it, to form on the inner end of hinge member 2 an annular mounting head B with a bore 60 passing axially therethrough. Gear ring 6 is therefore rotatable with hinge member 2 relative to hinge member 1 about hinge axis X—X.

The outer periphery of guide plate 4 is complementary with the inner periphery of gear ring 6 along the peripheral zone 58. Except in the region of radial slot 4a in guide plate 4, the tips of teeth 6a along the arcuate rack portion of gear ring 6, are also complementary with and mates with the outwardly directed bearing surface presented by the outer periphery of guide plate 4 along peripheral zone 58. In other words, the outer periphery of guide plate 4 is complementary with part of the bore 60 through mounting head B on hinge member 2. Similarly, the outer periphery of pivot ring 11 is complementary with and mates with the inwardly directed bearing surface presented by the bore through the annular, plate-like end formation 2*a* on the inner end of hinge member 2. In other words, the outer periphery of pivot ring 11 is complementary to part of the bore through mounting head B on the inner end of hinge member 2. Mounting head B on hinge member 2 with its stepped bore 60 is rotatably carried on pivot formation A which is fast with hinge member 1, so that the two hinge members 1, 2 are rotatable relative to each other. Cover plate 3 which is located face to face with guide plate 4 and overlies gear ring 6, is also rivetted to hinge member 1 by means of rivets 59, thereby to hold the assembly firmly together.

Locking element 7 with a series of outwardly directed locking teeth 7*a* which are complementary to the locking teeth 6*a* of the arcuate rack presented by gear ring 6 and which extend circumferentially along the arc of a circle, is slidably mounted in radial guide slot 4*a* in circular guide plate 4 which is fast with hinge member 1. Locking element 7 is thus radially but not circumferentially movable relative to hinge member 1 and is interengageable with the teeth 6*a* of the arcuate rack which is fast with hinge member 2, in any one of a plurality of circumferentially spaced positions, thereby to lock the two hinge members 1, 2 together in any one of a plurality of angular positions relative to each other.

Actuating means for locking element 7 comprises a single rotary actuating member 5 in the nature of a circular cam plate which is concentrically located within pivot ring 11 between hinge member 1 and guide plate 4 for concentric rotation about hinge axis X—X and which is splined to operating shaft 12 at 12*b* (see FIG. 1) for rotation therewith. Operating shaft 12 is co-axial with hinge axis X—X. Rotary cam plate 5 is operatively coupled to locking element 7 by means of a single curved cam follower 7*b* projecting from locking member 7 and engaging in curved slot 5*a* in cam plate 5. Opposite sides of slot 5a present two opposed arcuate cam surface zones 61, 62 (see FIG. 4) which are disposed about hinge axis X—X, the radial spacing of each cam surface zone 61, 62 from hinge axis X—X varying between a maximum and a minimum value from one end to the other of slot 5*a*. It will be seen that the two arcuate cam surface zones are presented by two separate surfaces. Cam follower 7*a* presents an arcuate bearing surface zone 63, 64 for each cam surface zone 61, 62 respectively.

Upon rotation of cam plate 5, in the one or the other direction by rotation of shaft 12, either one of the two cam surface zones 61, 62 is engaged with its own associated bearing surface zone 63, 64 respectively so as positively to displace locking element 7 radially out-

wardly or inwardly, as the case may be, thereby positively to urge locking teeth 7*a* into engagement with the complementary locking teeth 6*a* on the arcuate rack to lock hinge members 1, 2 together against relative rotational movement, or to disengage locking teeth 7*a* from locking teeth 6*a* to permit relative rotation between the two hinge members 1, 2. It will be appreciated that locking teeth 7*a* can be interengaged with locking teeth 6*a* in any one of a plurality of different circumferentially spaced positions, thereby to lock the two mounting members 1, 2 together in any one of a plurality of different angular positions relative to each other.

Shaft 12 is rotatably located in central apertures in hinge member 1, guide plate 4 and cover plate 3. Shaft 12 is fast with manipulating knob 19. Rotation of knob 19 causes rotation of shaft 12, thereby to rotate cam plate 5 and cause radial movement of locking element 7.

It will be seen from the drawings that the plate-line inner end portion 2*a* of hinge member 2 lies in the same plane as pivot ring 11. Gear ring 6 and the arcuate toothed rack presented by it lie in the same plane as circular guide plate 4 and as the toothed locking element 7 which is slidably contained in slot 4*a* in guide plate 4. Guide plate 4 and locking element 7 are thus located in the bore of gear ring 6. The single cam plate 5 and the single cam follower 7 which is located in slot 5*a*, lie in the same plane as pivot ring 11 and hinge member 2 and are both located within the bore of pivot ring 11 and the bore in hinge member 2, in a position between hinge member 1 and guide plate 4. The teeth 6*a* of the arcuate rack of concave configuration presented by gear ring 6, extend round part of the periphery of the bore 60 through mounting head B on hinge member 2. It will be seen that the toothed arcuate rack lies along a circumferential zone disposed radially in the vicinity of the outwardly directed bearing surfaces presented by pivot formation A on hinge member 1.

Pivot ring 11 also acts as a spacing or locating element which is located face to face with guide plate 4 and locking element 7 contained in radial slot 4*a*, to ensure that the toothed locking element 7 lies in the same plane as the toothed arcuate rack presented by gear ring 6, thereby to ensure smooth engagement and disengagement between locking element 7 and the arcuate rack. It will be appreciated that by utilizing pivot ring 11 to constitute a pivot formation and also to act as spacer means, the number of different parts required for the hinge can be reduced, thereby to simplify construction and improve compactness. Compactness is improved further by locating the rotary actuating cam plate 5 and its follower 7*b* in the bore through pivot ring 11.

Circular guide plate 4 not only guides locking element 7 for radial movement into and out of engagement with the arcuate toothed rack presented by gear ring 6 and restrains locking element 7 against circumferential movement relative to hinge member 1, but also constitutes a pivot formation on which hinge member 2 is rotatably mounted. This improves the rigidity and strength of the hinge. By locating guide plate 4 within gear ring 6 and rotatably mounting gear ring 6 on guide plate 4, a compact construction with a minimum number of parts can be obtained. By arranging for the arcuate rack presented by gear ring 6 to lie along a circumferential zone disposed radially in the vicinity of the bearing surfaces between the two hinge members 1, 2, certain parts can be utilized to serve a dual purpose.

As can be seen clearly from FIG. 4, cam surface zone 61 and the associated bearing surface zone 63 which are engaged when locking element 7 is urged into engagement with the arcuate rack, are complementary to one another. This prevents binding of the engaging parts and permits smooth and positive operation. If required, the cam surface zone 62 and its associated bearing surface zone 64 which are engaged when locking element 7 is urged out of engagement with the arcuate rack, may also be complementary to one another.

Locking element 7 is resiliently biased towards engagement with the teeth 6*a* of gear ring 6 by means of coil spring 53 embracing shaft 12. The one end 53*a* of spring 53 is located in a slot or kerf 65 extending diametrically through shaft 12. The other end 53*b* of spring 53 engages anchor 54 fast with cover plate 3 which, in turn, is fast with hinge member 1. This biases shaft 12 and actuating cam plate 5 for rotation relative to hinge member 1 to urge locking element 7 radially outwardly into engagement with the arcuate rack. Anchor 54 comprises a formation stamped out of cover plate 3 to extend away therefrom.

The two hinge members 1, 2 are resiliently biased by coil spring 17 towards a position in which their angular displacement is zero. The outer end of spring 17 engages anchor 55 fast with hinge member 2. The inner end of spring 17 engages anchor formation 66 stamped out of cover plate 3 and extending away therefrom. Since cover plate 3 is fast with hinge member 1, the inner end of spring 17 is in effect anchored to hinge member 1.

Referring now to FIGS. 6 and 7, the embodiment illustrated in these two drawings is similar in construction to that illustrated in FIGS. 1 to 5 with the exception of the actuating means for locking element 7.

In FIGS. 6 and 7, the actuating means for locking element 7 comprise a single rotary actuating member 50 in the nature of a circular plate which is eccentrically mounted on shaft 12 for rotation about hinge axis X—X and which is splined to shaft 12 at 12*b* for rotation therewith. Eccentrically mounted actuating member 50 is operatively coupled to locking element 7 by means of a single cam follower comprising annular coupling link 51 which is rotatably mounted on actuating member 50 and which is pivotally connected to locking element 7 by means of pivot pin 52 which is rotatably connected to projection 51*a* on coupling link 51. The outer periphery of actuating member 50 constitutes two adjacent arcuate cam surface zones 67, 68 each of which is disposed about hinge axis X—X and is complementary to its own associated bearing surface zone 69, 70 respectively presented by the inner periphery of coupling link 51. It will be seen from FIG. 6 of the accompanying drawings that actuating member 50 and coupling link 51 are located in the same plane as hinge member 2 and pivot ring 11 and are both located within the bore of pivot ring 11 and the bore in hinge member 2, in a position between hinge member 1 and guide plate 4.

The teeth 7*a* on locking element 7 may be moved into and out of engagement with the teeth 6*a* of the arcuate rack presented by gear ring 6, by rotation of shaft 12 in opposite directions. Rotation of shaft 12 causes rotation of eccentrically mounted actuating member 50 within coupling link 51, thereby to displace coupling

link 51 in a radial direction and move locking element 7 radially into or out of engagement with the arcuate rack. Shaft 12 can be rotated by manipulation of knob 19 which is fast with the outer end of shaft 12.

It will be appreciated that rotation of eccentrically mounted actuating member 50 in opposite directions engages either one of the two adjacent cam surface zones 67, 68 presented by the outer periphery of actuating member 50 with an associated bearing surface zone 69, 70, respectively presented by the inner periphery of coupling link 51. Each of the two cam surface zones is complementary to its bearing surface zone. It will be seen that the two arcuate cam surface zones are presented by a single surface.

The configuration and/or dimensions of the inner periphery 11*a* of pivot ring 11 are such as to permit radial movement of coupling link 51 in the same direction as the required radial movement of locking element 7 within guide slot 4*a*, as well as radial movement in a transverse direction. Coupling link 51 is located within pivot ring 11 with sufficient clearance to accommodate the radial movement of the coupling link 51 which is necessary to cause the required radial displacement of locking member 7 into and out of engagement with the arcuate rack presented by gear ring 6, when actuating member 50 is rotated. Pivot ring 11 is open at its upper end at 11*b* in registration with guide slot 4*a* in guide plate 4, to accommodate projection 51*a* on coupling link 51.

A hinge according to the invention is simple in construction yet effective in operation. Once the two hinge members 1, 2 are locked together, they can only be unlocked by a radially inward displacement of teeth 7*a* on locking element 7 away from teeth 6*a* on gear ring 6. In the arrangement illustrated in FIGS. 1 to 5 of the drawings, disengagement of locking teeth 6*a*, 7*a* can only be effected by rotation of cam plate 5. Pressure on the hinge members 1, 2 cannot cause unlocking, as the angle of curved slot 5*a* in cam plate 5 is such that it resists radially inward displacement of locking element 7, thereby to prevent accidental disengagement of the locking teeth 6*a*, 7*a*. This enhances the safety of a hinge according to the invention.

A hinge according to the invention can be made very compact and is relatively inexpensive to produce. Rattling of the component parts can be eliminated altogether or at least reduced to a minimum, particularly where biasing springs such as 17 and 53 are provided.

It will be appreciated that many variations in detail are possible without departing from the scope of the appended claims. For example, a pair of hinges according to the invention may be provided on opposite sides of a seat with an adjustable back rest. Instead of providing manipulating means for each hinge, a single handle, knob or other suitable manipulating means may be provided at one of the hinges, such manipulating means being suitably coupled, such as by means of a common operating shaft, to both of the hinges so that operation of the common manipulating means causes actuation of both hinges.

Where a pair of hinges according to the invention is to be provided in spaced positions on opposite sides of a seat with an adjustable back rest, the shaft 12 of each hinge may be provided with an axially extending bore of rectilinear cross-sectional configuration as shown in FIGS. 6 and 7, the bore being adapted to receive a complementary coupling rod 56, which, in turn, is adapted to be received in a complementary bore in a connecting element 57 extending between the two hinges, so that the shafts 12 of the two hinges are rotatably coupled.

In the embodiments described above, the rotary actuating member and the cam follower lie in substantially the same plane and wholly in a bore in the one hinge member. It is contemplated that there might be applications where the actuating member and the cam follower do not lie wholly within a bore in one of the hinge members but only partially in a bore in at least one of the hinge members. It is also possible for only the rotary actuating member to be located at least partially within a bore in at least one of the hinge members.

It will be seen from the drawings that the bearing surface presented by pivot ring 11 is slightly larger in diameter than the bearing surface presented by guide plate 4, so that the bore 60 through the mounting head B on hinge member 2 is stepped. This relationship may be reversed. It is also possible for the two bearing surfaces to be of substantially the same diameter so that the bore 60 through the mounting head B is of constant diameter throughout its length in an axial direction.

Instead of pivot ring 11 and guide plate 4 each presenting an outwardly directed bearing surface on which the mounting head on hinge member 2 is rotatably mounted, only one bearing surface may be presented by either pivot ring 11 or guide plate 4.

I claim:

1. A hinge including a pair of hinge members rotatable relative to each other about a hinge axis; an arcuate toothed rack of concave configuration fast with the one hinge member and presenting teeth which are directed radially inwardly towards the hinge axis; a toothed locking element which is radially but not circumferentially movable relative to the other hinge member and which is interengageable with the arcuate rack in a plurality of circumferentially spaced positions; a single rotary actuating member located at least partially within a bore in at least one of the hinge members and rotatable about the hinge axis; two arcuate cam surface zones on the actuating member and disposed about the hinge axis, the spacing of each cam surface zone from the hinge axis varying between a maximum and a minimum value along the cam surface zone; a single cam follower connected to the locking element; and an arcuate bearing surface zone on the follower for each cam surface zone, rotation of the actuating member in opposite directions engaging either one of the two cam surface zones with its own associated bearing surface zone so as positively to urge the locking element into and out of engagement with the arcuate rack, at least the cam surface zone and the associated bearing surface zone which are engaged when the locking element is urged into engagement with the arcuate rack being complementary to one another.

2. A hinge as claimed in claim 1, wherein both the rotary actuating member and the cam follower are at least partially located in a bore in at least one of the hinge members.

3. A hinge as claimed in claim 1, including a guide member fast with the other hinge member; and a radially extending guide slot in the guide member, the locking element being slidably located in the guide slot.

4. A hinge as claimed in claim 1, wherein the one hinge member presents a mounting head at one end thereof; and a bore in the mounting head, the arcuate

rack being fast with the mounting head and extending round at least part of the periphery of the bore therein and the rotary actuating member being located at least partially in the bore in the mounting head.

5. A hinge as claimed in claim **1,** wherein the rotary actuating member includes an arcuate slot, opposite sides of the slot constituting two opposed arcuate cam surface zones; and wherein the cam follower comprises a curved projection extending from the locking element and located in the slot, opposite sides of the projection constituting two arcuate bearing surface zones, rotation of the actuating member in opposite directions engaging either one of the two cam surface zones with its own bearing surface zone so as positively to urge the locking element into and out of engagement with the arcuate rack.

6. A hinge as claimed in claim **1,** wherein the rotary actuating member comprises an eccentrically mounted member having an arcuate outer periphery constituting two adjacent arcuate cam surface zones; and wherein the cam follower comprises an annular coupling link which is rotatably mounted on the actuating member and which is pivotally connected to the locking member, rotation of the actuating member in opposite directions engaging either one of the two adjacent cam surface zones of the outer periphery of the actuating member with its own associated zone of the inner periphery of the coupling link so as positively to urge the locking element into and out of engagement with the arcuate rack.

7. A hinge as claimed in claim **1,** wherein the rotary actuating member is fast with an operating shaft which is co-axial with the hinge axis.

8. A hinge as claimed in claim **1,** wherein the actuating member is resiliently biased for rotation urging the locking element towards engagement with the arcuate rack.

9. A hinge as claimed in claim **1,** wherein the two hinge members are resiliently biased towards a position in which their angular displacement is a minimum.

10. A hinge as claimed in claim **2,** wherein the rotary actuating member and the cam follower lie in substantially the same plane.

11. A hinge as claimed in claim **3,** wherein the arcuate toothed rack is located in axial spaced relationship to the other hinge member; and wherein the guide member is mounted on spacer means fast with the other hinge member, thereby to locate the guide slot in substantially the same plane as the arcuate rack.

12. A hinge as claimed in claim **4,** wherein the mounting head comprises a plate-like end formation on the one hinge member; and a gear ring fast with the end formation in face to face relationship therewith, the gear ring presenting the arcuate rack round at least part of its inner periphery.

13. A hinge as claimed in claim **4,** including a pivot formation fast with the other hinge member and presenting an outwardly directed bearing surface complementary to at least part of the bore in the mounting head, the mounting head being rotatably mounted on the pivot formation and the arcuate rack lying along a circumferential zone disposed radially in the vicinity of the bearing surface.

14. A hinge as claimed in claim **13,** including a guide member of circular configuration fast with the other hinge member; and a radially extending guide slot in the guide member in which the locking element is slidably located, the outer periphery of the guide member constituting a pivot formation presenting an outwardly directed bearing surface complementary to an inwardly directed bearing surface round at least part of the inner periphery of the bore in the mounting head.

15. A hinge as claimed in claim **13,** including a guide member fast with the other hinge member; and a radially extending guide slot in the guide member in which the locking element is slidably located, the arcuate toothed rack being located in axial spaced relationship to the other hinge member and the guide member being mounted on spacer means of circular configuration fast with the other hinge member to locate the guide slot in substantially the same plane as the arcuate rack, the outer periphery of the spacer means constituting a pivot formation presenting an outwardly directed bearing surface complementary to an inwardly directed bearing surface round the inner periphery of the bore in the mounting head.

16. A hinge as claimed in claim **15,** wherein the spacer means comprises a ring within which the actuating member is located.

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