

[54] GATE HINGE AND CLOSER ASSEMBLY

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[51] Int. Cl. E05f 3/20

[58] Field of Search 16/152, 153, 154,
16/155, 156, 50, 53, 72, 186; 248/417;
49/236, 237, 239

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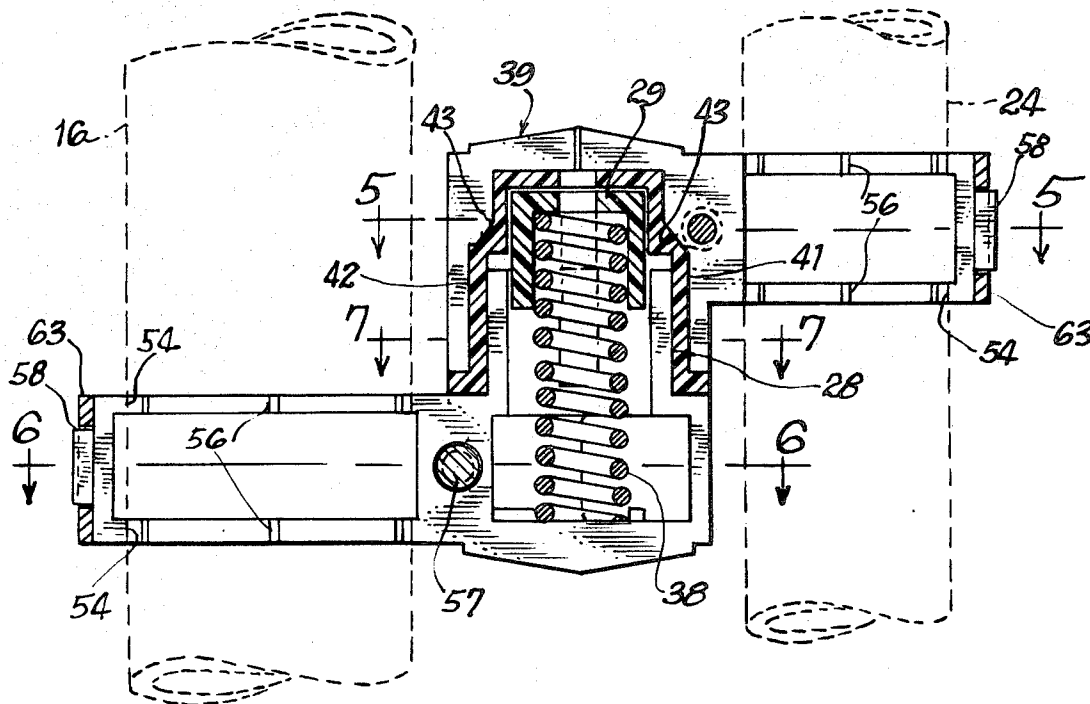
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[57]

ABSTRACT

A gate hinge and closer assembly arranged to close a fence gate includes a bearing component and a hanger component. Either component is attached to a fence post and the other attached to the fence gate. One of the components has a hollow open-ended pintle, a bearing member mounted in the pintle and biasing means while the other component has a pintle socket and a camming surface fixedly disposed in the pintle socket. When the gate is opened, the biasing means is compressed by the bearing member being cammed along the camming surface, thereby providing the necessary force for the return movement of the bearing member along the camming surface and the movement of the gate toward its closed position. The assembly is constructed for relative movement between the bearing member and the camming surface irrespective of whether the pintle or the camming surface is held stationary, and irrespective of the direction of the opening of the gate.

8 Claims, 10 Drawing Figures



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FIG. 1

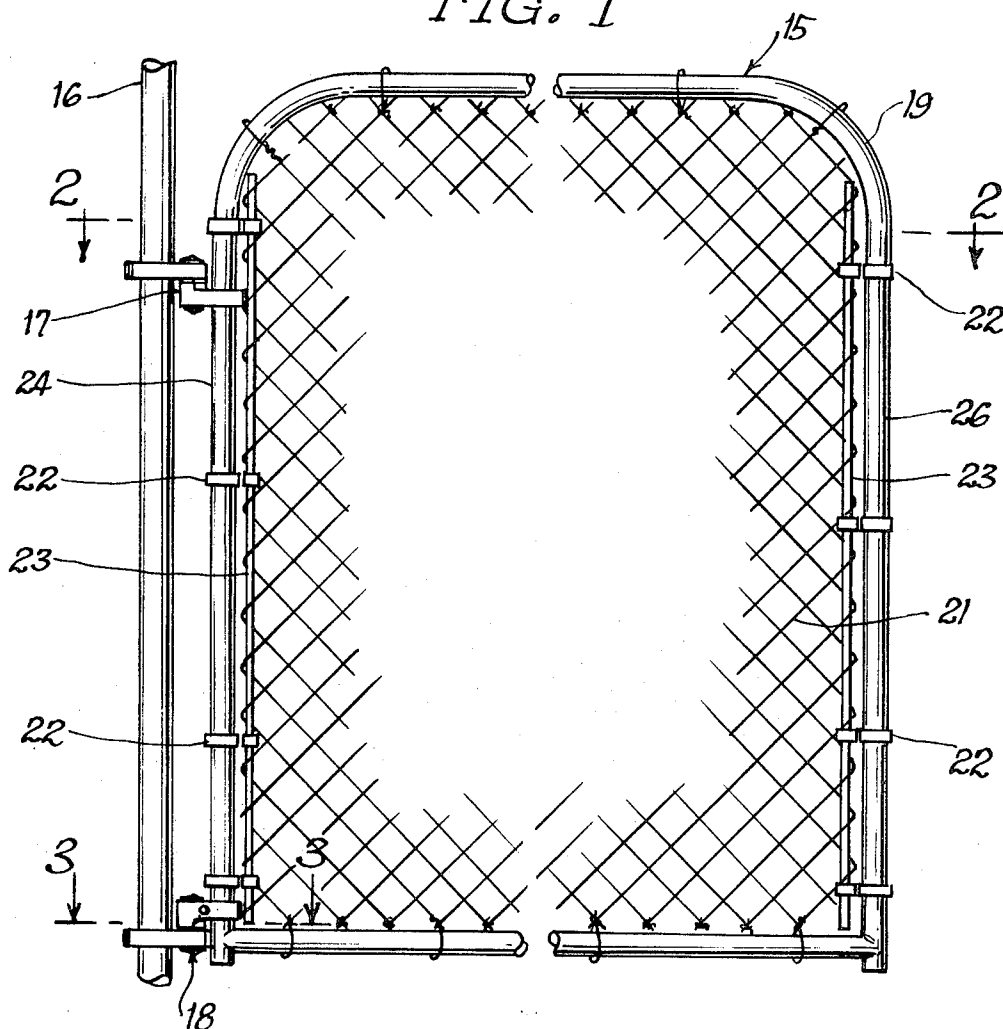


FIG. 2

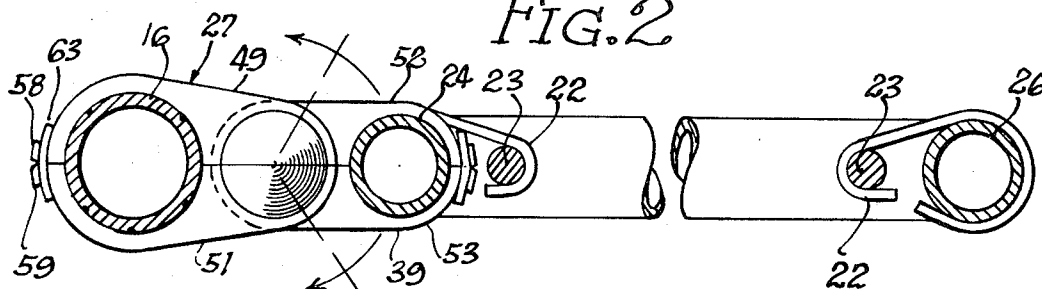
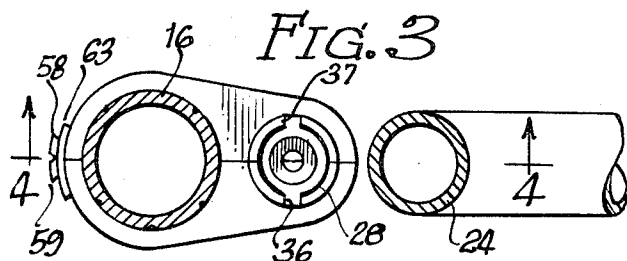


FIG. 3



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FIG. 4

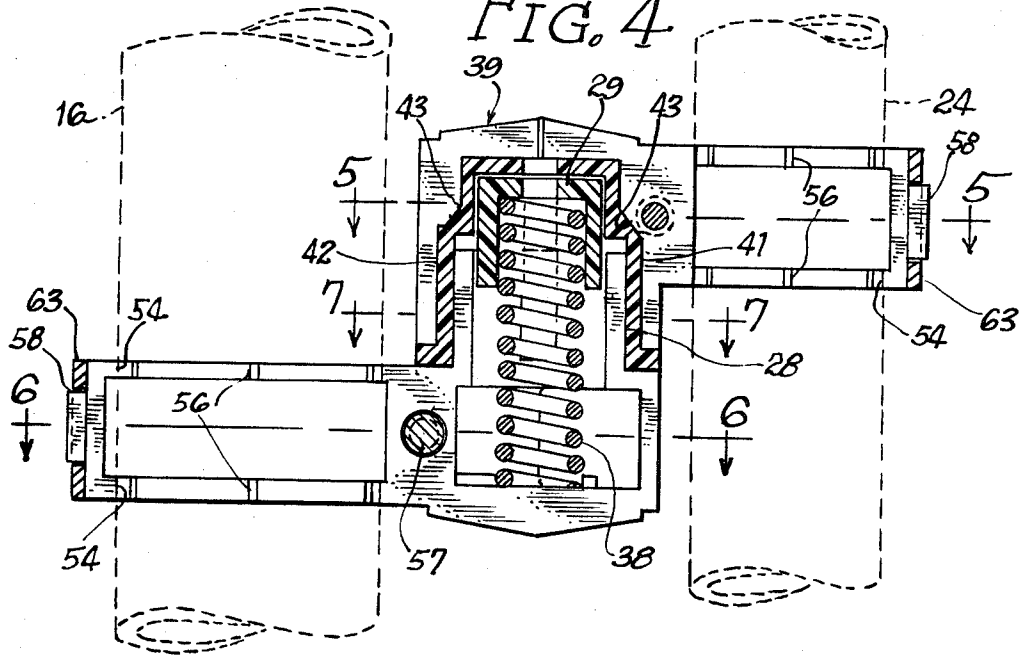


FIG. 5

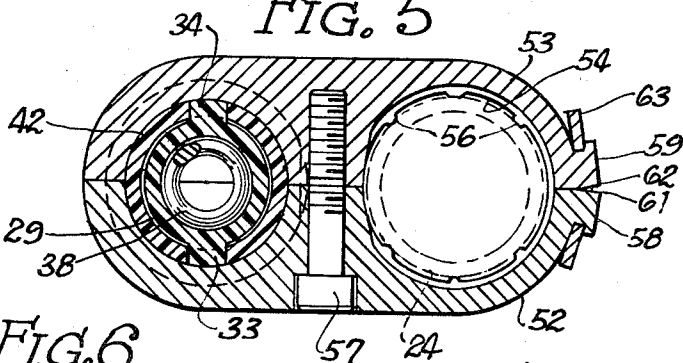


FIG. 6

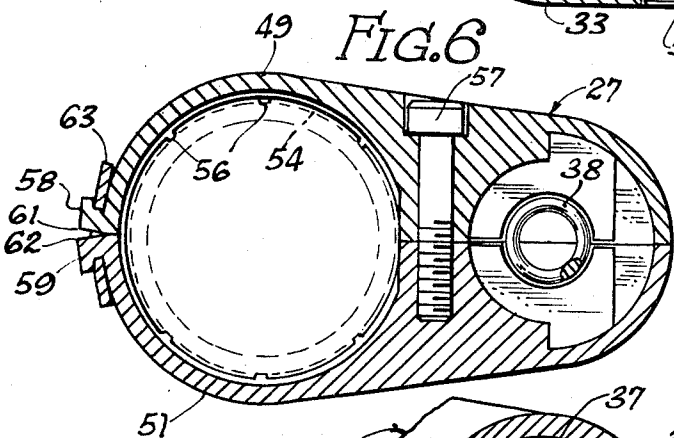


FIG. 8

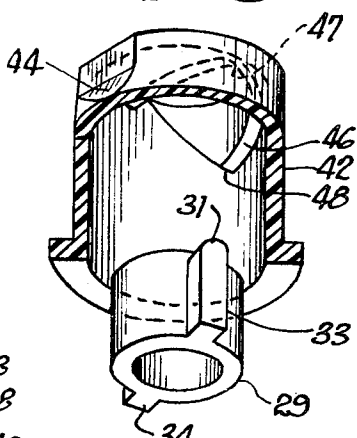
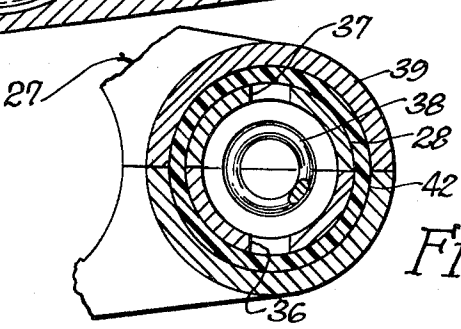


FIG. 7



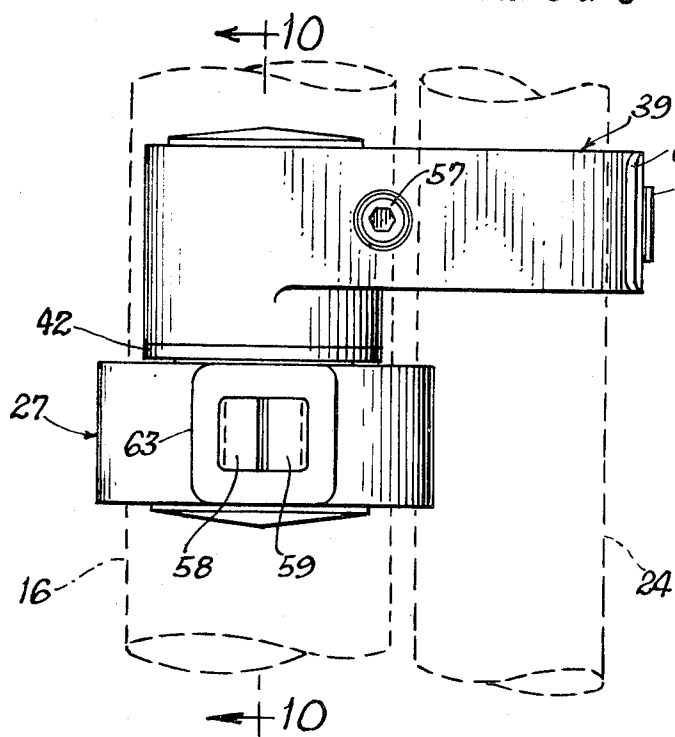


FIG. 9

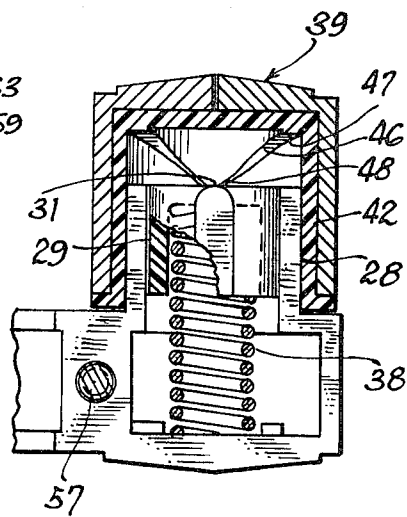


FIG. 10

GATE HINGE AND CLOSER ASSEMBLY

BACKGROUND OF THE INVENTION

The present invention relates to a gate hinge and closer assembly arranged to automatically close a fence gate after it has been opened from either side of the fence. Usually, fence gates are hinged to fence posts by simple pintle and pintle socket arrangements wherein no provision is made for automatically closing the gate after it is opened. Often a spring is attached between the fence and gate, in a manner similar to the spring on a screen door, to provide closing of the gate in one direction. More recently, a double spring and finger arrangement has been used to provide a closing mechanism for fence gates. However, these gate closers are separate from the gate hinges and necessitate the installation of the additional apparatus. Moreover, these separate gate closers do not provide for automatically maintaining the gate in a fully opened position, although such a position is often desirable.

SUMMARY OF THE INVENTION

One of the objects of this invention is the provision of a hinge and closer assembly for a fence gate which permits the opening of the gate in either direction and provides for automatically returning the gate to its closed position after the opening movement is completed.

Another object of this invention is the provision of a gate hinge and closer assembly which can be paired with a gate hinge of any type, including a simple pintle and pintle socket type hinge, for effectively providing for the hinging and automatic closing of a fence gate after the gate is opened in either direction.

A further object of this invention is the provision of a gate hinge and closer assembly having mounting components which are separable into portions for encircling a fence post or gate member and for clamping the components about such members.

Further objects and advantages of this invention will become apparent from the following description when the same is considered in connection with the accompanying drawings.

In accordance with the present invention there is provided a gate hinge and closer assembly arranged to close a fence gate which comprises a bearing component and a hanger component. One of the components is adapted to be mounted on a fence post and the other adapted to be mounted on a gate. One of the components has a hollow open-ended pintle, a bearing member mounted in the pintle for axial movement in relation thereto, and biasing means for biasing the bearing member away from the base of the pintle along the axis of the pintle. The other component has a pintle socket and a camming surface fixedly disposed in the socket for rotation therewith, the camming surface having at least one valley and at least one ridge. The bearing member has a bearing surface engageable with the camming surface and adapted to engage the valley when the gate is in a closed position. The bearing member is operable upon rotation of the two components of the assembly with respect to each other upon the opening of the gate in either direction to move along the camming surface away from the valley toward the ridge and axially toward the base of the pintle. The movement of the bearing member toward the base of the pintle compresses the biasing means, thereby providing a

force to urge the bearing member toward engagement with the valley of the camming surface thus urging relative movement between the two components of the assembly and the gate toward a closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a gate in closed position with a pair of gate hinge and closer assemblies, in accordance with my invention.

FIG. 2 is a cross-sectional view, on an enlarged scale, taken substantially on line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view, on an enlarged scale, taken substantially on line 3—3 of FIG. 1.

FIG. 4 is a cross-sectional view, taken substantially on line 4—4 of FIG. 3.

FIG. 5 is a cross-sectional view, taken substantially on line 5—5 of FIG. 4.

FIG. 6 is a cross-sectional view, taken substantially on line 6—6 of FIG. 4.

FIG. 7 is a cross-sectional view, taken substantially on line 7—7 of FIG. 4.

FIG. 8 is an exploded perspective view, partially broken, illustrating the pintle socket and bearing member in accordance with the present invention.

FIG. 9 is a view similar to FIG. 4, but completely in elevation, and showing the gate in fully opened position.

FIG. 10 is a cross-sectional view, taken substantially on line 10—10 of FIG. 9.

BRIEF DESCRIPTION OF A PREFERRED EMBODIMENT

In the particular construction shown in the drawings, a gate 15 is pivotally supported on a tubular fence post 16 by a pair of gate hinge and closer assemblies of the present invention 17, 18. The gate is arranged to swing in both directions, as indicated by the arrows in FIG. 2, to allow passage therethrough.

The gate 15 is of conventional construction and includes a tubular gate frame 19 which carries stretched fence material 21 held in position by clamps 22 which secure the end rods 23 passing through the loops of the fence material 19 to the vertical members 24 and 26 of the gate frame 19. The hinge and closer assemblies 17, 18 are identical and each includes a bearing component and a hanger component. As shown in FIG. 1, the assemblies are constructed so that either component of the assembly may serve as the bearing component or the hanger component. Thus, assembly 18 is installed adjacent the bottom portion of gate 15 while assembly 17 is disposed in mirror-image fashion towards the top of gate 15. Installation of the assemblies 17, 18 in this manner prevent lifting of the gate from the fence post 16. In addition, one of the gate hinge and closer assemblies 17, 18 can be replaced with a gate hinge of any other construction (not shown) and the remaining assembly of the present invention will provide the desirable automatic closing of the gate in accordance with this invention.

The gate and hinge assembly 17 or 18 includes two components, one being adapted to be mounted on the fence post 16 and the other adapted to be mounted on the vertical member 24 of the gate frame 19. The assembly of the present invention is constructed so that either component can be adapted to be mounted on the fence post 16 or the vertical member 24 as desired. For the purpose of illustration, only one of the components

is shown as being adapted to be mounted on the fence post 16 and the other as being adapted to be mounted on the vertical member 24 of gate frame 19. As shown in FIG. 1, the hanger component of assembly 17 is mounted on fence post 16 while the bearing component of assembly 18 is mounted on the fence post, although, as will be hereinafter described, the two components are identical.

As particularly shown in FIGS. 2-4, the assemblies 17, 18 of the present invention include a first housing 27 having a hollow open-ended pintle 28, the housing 27 and pintle 28 formed preferably as by die casting. A bearing member 29 is mounted in pintle 28 for axial movement in relation to the pintle. Bearing member 29 preferably is in the shape of a cap and has two diametrically opposed bearing surfaces 31 supported by integral flanges 33 and 34, respectively, extending outwardly along the sides of bearing member 29 and journaled in slots 36 and 37 respectively, formed in the wall of pintle 28. Also disposed within pintle 28 is biasing means, which can be a spring 38 as shown, which biases bearing member 29 away from the base of pintle 28 along the axis of the pintle. Pintle 28, bearing member 29 and spring 38 comprise one of the components of the present invention as described above.

The other component of the present invention includes a pintle socket and a camming surface fixedly disposed in the socket as will now be described. This component includes a housing 39 which is formed with a cup-shaped opening 41 adapted to support a pintle socket 42 disposed therein. Housing 39 is preferably formed of the same material as housing 27 preferably by die casting. Although pintle socket 42 is shown as a distinct member of synthetic resinous or plastic material, it is understood that pintle socket 42 can be formed integrally with housing 39, for example by machining housing 39 substantially to the interior configuration of pintle socket 42. It is preferable to have pintle socket 42 formed of synthetic resinous material, particularly materials of the nylon and Teflon-type materials for improved wear and noise-free operation of the assembly. Housing 39 preferably includes shoulders 43 which cooperate with shoulders 44 formed exteriorally on pintle socket 42 to fixedly mount pintle socket 42 to housing 39 for rotation therewith, while preventing rotation therebetween.

A camming surface 46 is provided on the interior of pintle socket 42 adjacent its bottom surface, as particularly shown in FIGS. 8 and 10. Preferably, camming surface 46 is interiorally, annularly formed on the bottom interior surface of pintle socket 42. Camming surface 46 is formed with at least one valley 47 and at least one ridge 48. Preferably, camming surface 46 is formed with a pair of diametrically opposed valleys 47 and a pair of diametrically opposed ridges 48. Additionally, the valleys 47 and the ridges 48 are aligned so that a plane defined by the pair of valleys and the axis of the pintle socket is perpendicular to the plane defined by the ridges and the axis of the pintle socket.

As illustrated in the drawings, in the preferred embodiment pintle 28 is cylindrically shaped and pintle socket 42 is formed in the shape of a cylindrical cup having an interior diameter only slightly larger than the exterior diameter of pintle 28.

The housings 27 and 39 are formed of two separable portions which are adapted for assembly about the fence post 16 or the vertical member 24 of gate 15. In

particular, housing 27 is separable into two portions 49, 51 and housing 39 is also separable into two portions 52, 53. The housings 27, 39 are constructed with encircling means, for example, an interiorally formed aperture 54 having interiorally facing ribs 56, for encircling the fence post 16 and the vertical member 24.

The assembly can be readily installed, for example, on fence post 16 by first separating the portions of housing 27 and then reassembling the housing about fence post 16. Housing 27 is disassembled by removal of machine screw 57 and separation of portions 49 and 51 to cause flanges 58 and 59 on portions 49 and 51, respectively, to abut at their corners 61 and 62. In this manner, clip 63 can be removed to complete the separation of portions 49 and 51. Installation of the assembly on fence post 16 is effected by placing the two portions 49 and 51 on either side of fence post 16 at a selected height, placing clip 63 over flanges 58 and 59, and fastening the portions 49 and 51 together by installing machine screw 57. Thereafter, spring 38 and bearing member 29 are installed in pintle 28 with flanges 33 and 34 disposed at least partially within slots 36 and 37, respectively, formed in pintle 28. To complete the installation of the assembly of the present invention, pintle socket 42 can be placed over bearing member 29 and pintle 28 so that bearing surfaces 31 and 31 are in contact with diametrically opposed valleys 47 of camming surface 46, followed by disassembly of housing 39 followed by reassembly of the housing about vertical member 24 of gate 15 at a selected height so that when the housing 39 is installed over and about pintle socket 42, spring 38 is slightly compressed, as shown in FIG. 4. As the assembly and disassembly of housing 39 are identical to the assembly and disassembly of housing 27 and since the flanges, clip and bolt are substantially identical to the designated parts with respect to housing 27, the parts bear the same reference numerals and further description thereof is unnecessary. In this manner, the assembly of the present invention is installed in operating position to swingingly attach gate 15 to fence post 16.

It will be recognized by those skilled in the art that other means may be provided to attach the assembly of the present invention to fence post 16 and vertical member 24 of gate 15. For example, a strap and clamp or bolt arrangement may be used in place of the encircling means provided by housings 27 and 39 to fasten pintle 28 and the portion of housing 39 supporting pintle socket 42 to fence post 16 and member 24, respectively. However, in the preferred embodiment of the present invention it is preferable to have housings 27 and 39 separable into two portions and to provide apertures 54 which provide encircling means for encircling the respective tubular members of the fence and gate. As shown in the drawings, it is preferred to construct housing 27 so as to be separable into portions 49 and 51 along a plane defined by the axis of encircling aperture 54 formed in housing 27 and by a diameter of that aperture. Similarly, it is preferred to construct housing 39 with a similar encircling aperture 54 formed in the housing, with the housing further constructed to be separable into portions 52, 53 along a plane defined by the axis of the encircling aperture 54 and a diameter of the aperture. As further shown in the drawings, it is even more preferred to construct housing 27 so as to be separable into two portions along a plane defined by the axis of the encircling aperture formed therein, the

axis of pintle 28, a diameter of the encircling aperture and a diameter of the pintle, and to construct housing 39 so as to be separable along a plane defined by the axis of the encircling aperture formed therein, the axis of the cup-shaped supporting structure for pintle socket 42 and diameters of the encircling aperture and the cup-shaped supporting structure. The diameters along which the planes are defined can be aligned, as shown in the drawings, so that the portions of the housings can be formed substantially as mirror images of each other. In this manner, the construction of the housings are facilitated.

The operation of the assembly of the present invention can be described starting with the rest or closed position, i.e., with gate 15 in its closed position, as illustrated in FIGS. 1-8. As particularly shown in FIG. 4, in this position bearing member 29 is extended axially of pintle 28 to the full extent of its travel with bearing surfaces 31 engaging valleys 47 of camming surface 46.

Upon opening gate 15 in either direction, gate 15 and the attached component of the assembly of the present invention, for example as shown in FIG. 4, the hanger component including pintle socket 42 is rotated about the other component, which as shown is the bearing component, which in this case includes pintle 28. It is understood that these components may be reversed, as for example, in the installation of assembly 17 shown in FIG. 1. Referring to FIGS. 9 and 10, upon rotation of pintle socket 42 about pintle 28, bearing surfaces 31 are caused to move along camming surface 46 away from valleys 47 toward ridges 48. Relative movement between bearing member 29 and camming surface 46 in this manner causes bearing member 29 to move axially toward the base of pintle 28 thereby compressing spring 38. The relative movement between bearing member 29 and camming surface 46 can continue as gate 15 is opened until bearing surfaces 31 engage ridges 48 of camming surface 46. This condition is illustrated in FIG. 10. Spring 38 in compression provides the necessary force which urges bearing member 29 to move back along camming surface 46, by causing movement therebetween, concurrently urging gate 15 to which camming surface 46 is fixed to rotate to a normal closed position upon its release.

Thus, as gate 15 is caused to be rotated in one direction or another, spring 38 is compressed and develops a force tending to restore gate 15 to a normal closed position when it is released. In addition, camming surface 46 in providing a pair of valleys 47 and a pair of ridges 48 for operation with the pair of bearing surfaces 31 provides a balanced operation. Further camming surface 46 provides for holding gate 15 in a fully opened position when gate 15 and pintle socket 42 are rotated a sufficient distance to cause bearing surfaces 31 to be cammed along camming surface 46 past ridges 48. In this position, gate 15 is held open until the gate is moved sufficiently to return bearing surfaces 31 back over ridges 48 where the action of spring 38 automatically returns gate 15 to its closed position.

Various changes coming within the spirit of my invention may suggest themselves to those skilled in the art; hence, I do not wish to be limited to the specific embodiments shown and described and uses mentioned, but intend the same to be merely exemplary, the scope of my invention being limited only by the appended claims.

I claim:

1. A gate hinge and closer assembly arranged to close a fence gate, said assembly comprising a bearing component and a hanger component,

one of said components adapted to be mounted on a fence post and the other adapted to be mounted on a gate,

one of said components having a hollow open-ended pintle, a bearing member mounted in said pintle for axial movement in relation thereto, and biasing means for biasing said bearing member away from the base of said pintle along the axis of said pintle, the other of said components having a pintle socket and a camming surface fixedly disposed in said socket for rotation therewith, said camming surface having at least one valley and at least one ridge,

said bearing member having a bearing surface engageable with said camming surface, said bearing member upon rotation of said components with respect to each other when opening of the gate in either direction being operable to move along said camming surface away from said valley toward said ridge and axially toward the base of said pintle, and thereby to compress said biasing means, and said biasing means urging said bearing member toward engagement with said valley of said camming surface and the gate toward a closed position.

2. The invention as defined in claim 1 wherein said camming surface includes a pair of diametrically opposed valleys and a pair of diametrically opposed ridges, said bearing member having a pair of diametrically opposed cam following bearing surfaces.

3. The invention as defined in claim 2 wherein said valleys and the axis of said pintle socket define a plane which is perpendicular to the plane defined by said ridges and the axis of the pintle socket.

4. The invention as defined in claim 3 wherein said pintle is cylindrically shaped and said pintle socket comprises a cylindrical cup fixedly mounted with respect to said other component, said camming surface being interiorally, annularly formed on the bottom of said cup.

5. The invention as defined in claim 1 wherein said components each comprise two separable portions adapted for assembly about a tubular member of a fence or fence gate and having fastening means to clamp said portions about said tubular member.

6. The invention as defined in claim 1 wherein said one component comprises a first housing including said pintle and defining first encircling means for encircling a tubular member, said first housing being separable into two portions along a plane defined by the axis of said first encircling means and a diameter of the said means, said other component comprising a housing including cup-shaped supporting means for supporting said pintle socket and defining second encircling means for encircling a tubular member, said first and second encircling means being adapted to encircle a tubular member of a fence or fence gate, said second housing being separable into two portions along a plane defined by the axis of said encircling means of said other component and a diameter of said means, whereby the separated portions of each housing together can encircle a tubular member, and wherein each component includes fastening means to maintain each of the housings in unitary relationship.

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7. The invention as defined in claim 6 wherein said first housing is separable into two portions along a plane defined by the axis of said encircling means defined thereby, the axis of said pintle, a diameter of said encircling means of said one component and a diameter of said pintle, and said second housing is separable into two portions along a plane defined by the axis of said encircling means defined thereby, the axis of said cup-shaped supporting means, a diameter of said encircling means defined thereby and a diameter of said

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cup-shaped supporting means.
8. The invention as defined in claim 7 wherein said first housing is separable along a plane defined by the said axes and the aligned diameters of said encircling means defined by said first housing and said pintle, and said second housing is separable along a plane defined by the said axes and the aligned diameters of said encircling means defined by said second housing and said cup-shaped supporting means.

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