United States Patent [19]

Gwozdz

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[54] **ADJUSTABLE DOOR HINGE CONTAINING COIL SPRING**

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[73] Assignee: **McKenney Manufacturing Company,** Scranton, Pa.

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[52] **U.S. Cl.** **16/189,** 16/52

[51] **Int. Cl.** **E05f 1/12**

[58] **Field of Search** 16/189, 188, 132, 134, 16/129, 52

[56] **References Cited**

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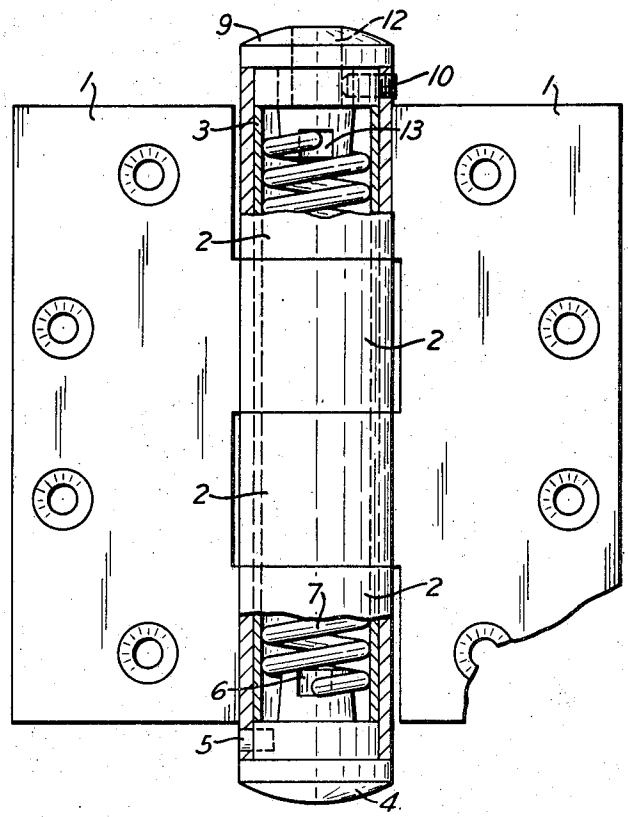
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Primary Examiner—Bobby R. Gay
Assistant Examiner—Doris L. Troutman
Attorney, Agent, or Firm—Brown, Murray, Flick & Peckham

[57] **ABSTRACT**

A tubular pivot pin inside the barrel of a pair of hinge leaves contains a coil spring. Mounted in the opposite ends of the barrel are plugs, one of which is provided with an axial passage through it having an adjustment member therein provided with an outer portion rotatably mounted in the passage and an inner portion projecting from the inner end of the plug. The ends of the spring are connected to the plugs. Releasable interengaging means normally prevent rotation of the adjustment member in the plug passage, but the outer end of that member has means for receiving a tool for turning it in the passage to adjust the tension on the spring when the interengaging means are disengaged.

6 Claims, 8 Drawing Figures



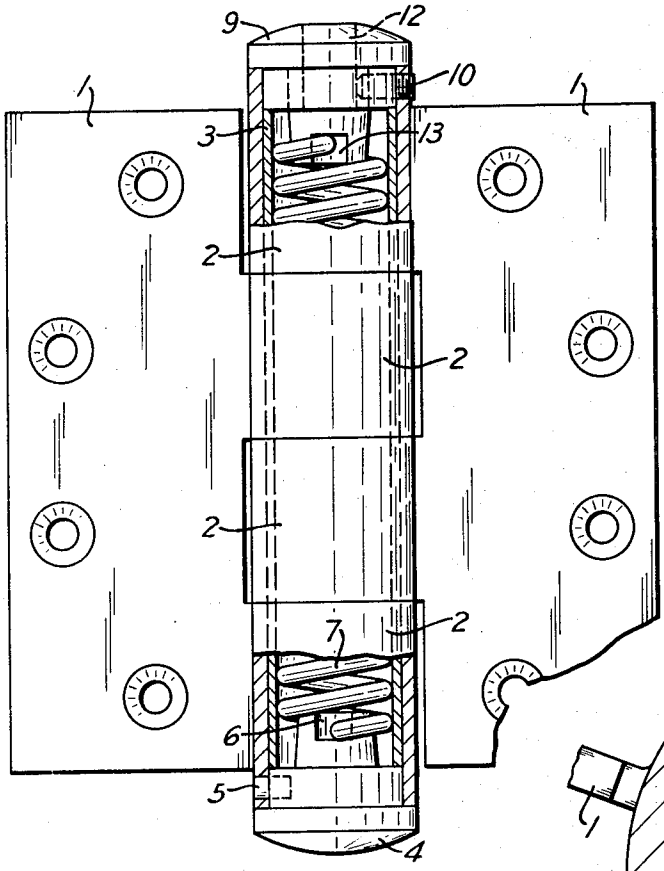


Fig. 1

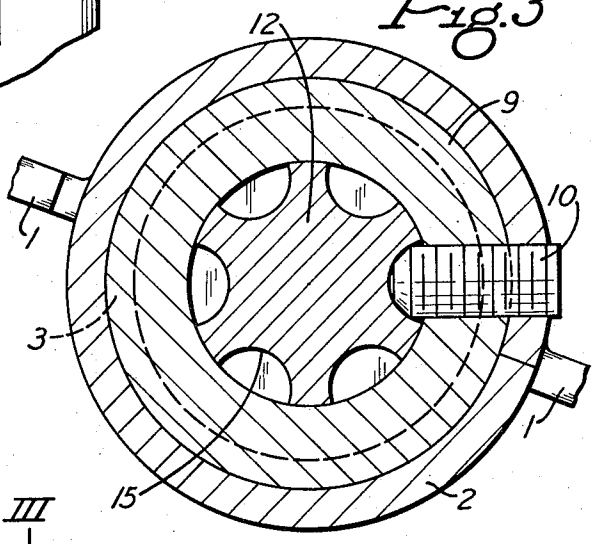


Fig. 3

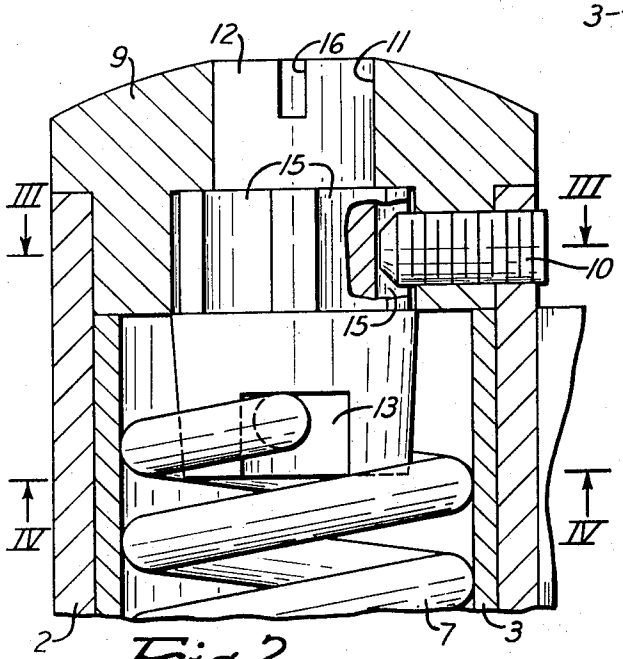


Fig. 2

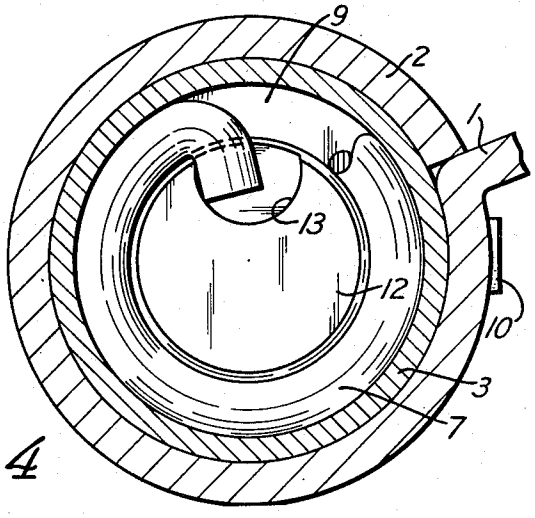


Fig. 4

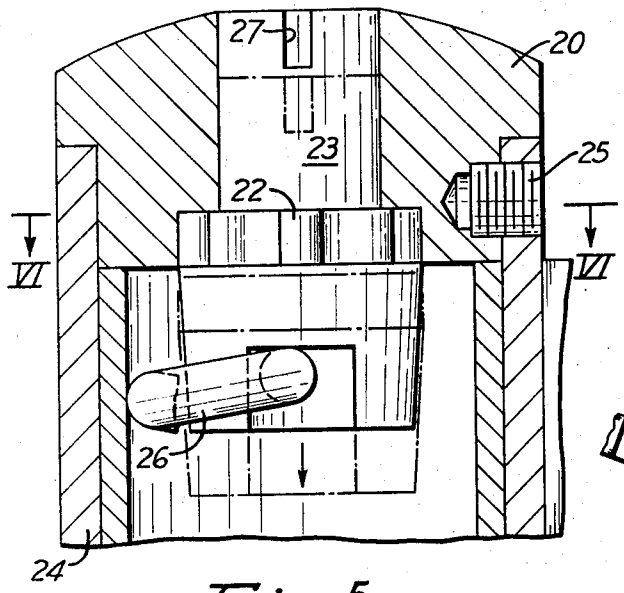


Fig. 5

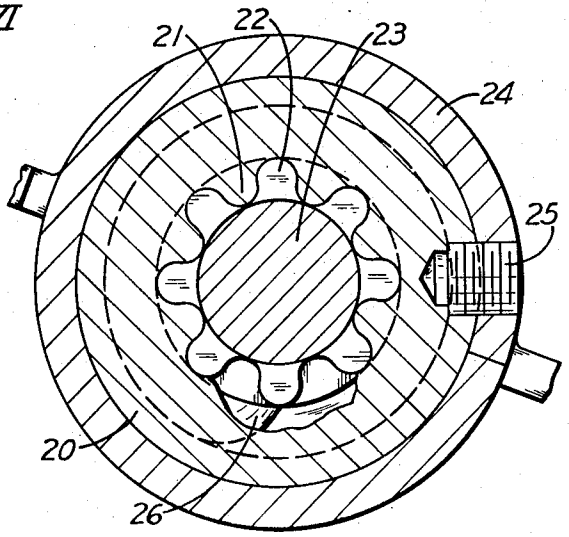


Fig. 6

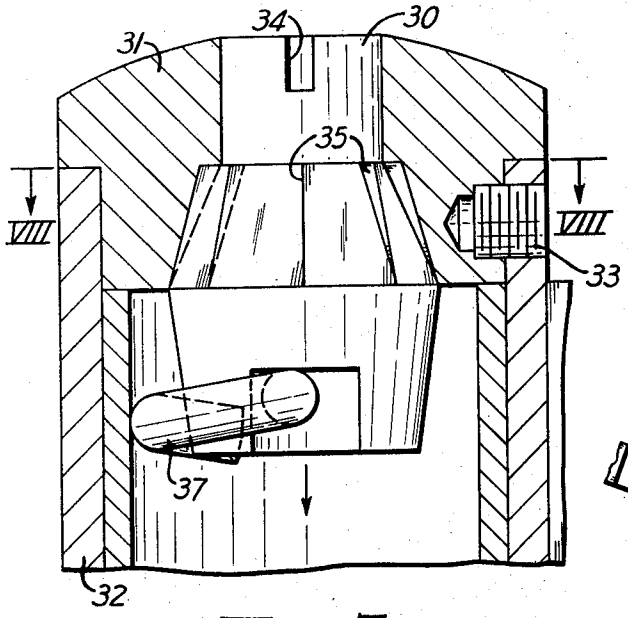


Fig. 7

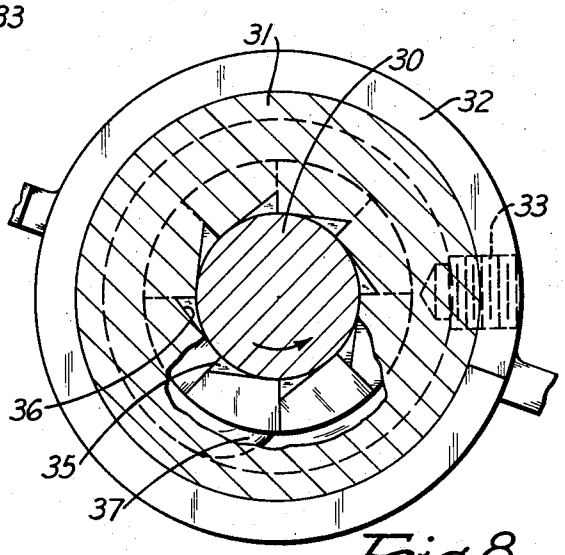


Fig. 8

ADJUSTABLE DOOR HINGE CONTAINING COIL SPRING

Door hinges that contain coil springs for closing the doors are well known. Hinges also are known in which the tension on the springs can be adjusted to suit conditions. However, heretofore the adjusting means have detracted from the appearance of the hinges and often require special tools for making the adjustments.

It is among the objects of this invention to provide a spring hinge which is pleasing in appearance and which can easily be adjusted, in some cases with only a screwdriver.

The invention is illustrated in the accompanying drawings, in which

FIG. 1 is a side view of the hinge while open, with top and bottom portions broken away in section;

FIG. 2 is an enlarged fragmentary vertical section;

FIGS. 3 and 4 are cross sections taken on the lines III—III and IV—IV, respectively, of FIG. 2;

FIG. 5 is a view, similar to FIG. 2, of a modification;

FIG. 6 is a cross section taken on the line VI—VI of FIG. 5;

FIG. 7 is a fragmentary vertical section of a further embodiment of the invention; and

FIG. 8 is a cross section taken on the line VIII—VIII of FIG. 7.

Referring to FIG. 1 of the drawings, a pair of hinge leaves 1 that are disposed side by side are provided with conventional hollow knuckles 2 that are staggered so that they can be disposed in axial alignment with one another to form a cylindrical barrel. The barrel may project above and below the hinge leaves a short distance, but it does not have to do so. Engaging the inside of the barrel there is a tubular pivot pin 3 that holds the knuckles in alignment and forms a pivot pin on which they can turn. Engaging the lower end of the barrel or lowest knuckle and extending a short distance up into it beneath the pivot pin is a plug 4 that is held in place by a pin 5 extending through the side of the knuckle and into the plug in tight engagement with it below the pivot pin. The plug also has an upper extension of reduced diameter projecting a short distance up into the hollow pivot pin and provided in its side with a notch 6 for receiving the hooked lower end of a coil spring 7 that fits inside the pivot pin and extends upwardly to a point near the upper end of the pin.

Mounted in the upper end of the barrel or upper knuckle is another plug 9 that rests on top of the knuckle. This plug is held in place by a set screw 10 extending through one side of the knuckle and into the plug above the pivot pin. As shown in FIGS. 2, 3 and 4, this upper plug is provided with an axial passage 11 through it that has an enlarged lower end portion, into which the inner end of the set screw normally projects. Disposed in this passage is an adjustment member 12 that has an outer or upper portion rotatably mounted in the passage, and a lower portion projecting from the inner or lower end of the plug. The diameter of the portion of the adjustment member in the enlarged lower end of the plug passage is greater than the diameter of the upper end of that passage so that upward movement of the adjustment member in the plug is limited by their superimposed radial shoulders. The lower portion of the adjustment member below the plug is provided in its side with a notch 13 that receives the hooked upper end of the coil spring. The coil spring is compressed lengthwise or vertically slightly so that it continually presses the adjustment member upwardly in the upper plug to its uppermost position, in which its upper end is flush with the top of the plug.

Releasable interengaging means normally prevent rotation of the adjustment member in the encircling plug. As shown in FIGS. 2 and 3, these means include circumferentially spaced depressions 15 in the portion of the adjustment member inside the lower end of the upper plug, and the set screw 10 that normally projects into one of these depressions.

To adjust the tension on the coil spring in order to have it close a door more slowly or more rapidly, the set screw 10 is backed off until its inner end is free of the depressions 15 in the adjustment member. A screwdriver inserted in the slot or kerf 16 in the upper end of that member then can be turned to rotate the adjustment member in either direction to increase or reduce the tension on the coil spring. When the desired tension has been obtained, the set screw is screwed back into the depression 15 that happens to be nearest to it, thereby locking the adjustment member against turning in the plug. It will therefore be seen that by simply turning the adjustment member by means of a screwdriver after the set screw has been retracted, the tension on the spring can be changed.

In the modification shown in FIGS. 5 and 6, the wall of the enlarged lower portion of the axial passage through the upper plug 20 is provided with inwardly projecting circumferentially spaced teeth 21 that receive between them similar teeth 22 projecting from an adjustment member 23 rotatably mounted in the plug. These interengaging teeth normally prevent the adjustment member from turning in the plug. The plug is anchored in the upper knuckle 24 by a set screw 25 or hollow rivet extending into the side of it from the knuckle. To adjust the tension on the coil spring 26, a screwdriver is inserted in a slot 27 in the upper end of the adjustment member and pushed down against the resistance of the spring to disengage the teeth of the adjustment member from the surrounding teeth 21 of the plug. The adjustment member then can be turned in either direction in the plug to obtain the desired spring tension and then it is allowed to move back up in the plug so that the two sets of teeth will fit together again and prevent relative rotation between the adjustment member and the plug. Only a screwdriver is required for making the adjustment. In fact, the adjustment could be made in the same way in FIG. 1 by not disturbing the set screw but, instead, pressing down on the adjustment member to free it from the screw and then turning the adjustment member before allowing it to move back up in the plug.

In the further embodiment of the invention shown in FIGS. 7 and 8, there is not even any necessity for pressing the adjustment member 30 down in the axial passage in the upper plug 31, which is rigidly mounted in the upper knuckle 32 by a hollow rivet or set screw 33. In this particular hinge the lower portion of the axial passage diverges downwardly, as does the portion of the adjustment member within that part of the passage. Here again the two elements are provided with interengaging teeth, but in this case the teeth are shaped like ratchet teeth with sloping sides and also sides in radial planes of the plug, so that when the adjustment member is turned counterclockwise as viewed in FIG. 8 by

a screwdriver in slot **34** in its upper end the pressure of its teeth **35** against the inclined surfaces of the plug teeth **36** will simultaneously force the adjustment member downwardly until its teeth can slip past the plug teeth. The coil spring **37** then will move the adjustment member back up in the plug. Turning of the adjustment member in the opposite direction in this hinge is prevented by the radial faces of the teeth. Therefore, to relieve the tension on the spring, if that is desired, it is necessary to press down on the adjustment member in order to disengage the two sets of teeth so that the inner set can be rotated within the outer set.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A spring hinge comprising a pair of hinge leaves disposed side by side and provided with hollow knuckles disposed in axial alignment with one another to form a cylindrical barrel having a knuckle of one hinge leaf at one end and a knuckle of the other hinge leaf at the opposite end, a tubular pivot pin inside the barrel in engagement therewith for holding the knuckles in alignment, plugs rigidly mounted in the opposite ends of the barrel, one of the plugs being provided with an axial passage therethrough, an adjustment member having an outer portion rotatably mounted in said passage and an inner portion projecting from the inner end of said plug, the plug and adjustment member having normally abutting surfaces limiting outward movement of said member in said passage, a coil spring inside said tubular pin with one end connected to said inner portion of the adjustment member and with its opposite end connected to the plug at the opposite end of the pin, the spring pressing said member outwardly against the adjoining plug, and releasable interengaging means normally preventing rotation of said adjustment member in said plug passage, the outer end of said member being provided with means for receiving a tool for turning it in said passage to adjust the tension on said spring when said interengaging means are disengaged.

2. A spring hinge according to claim **1**, in which said plugs overly the opposite ends of said barrel, and the outer end of the adjustment member normally is substantially flush with the outer end of the surrounding plug.

3. A spring hinge according to claim **1**, in which said abutting surfaces are a shoulder in said plug passage and a cooperating shoulder on said adjustment member within the passage.

4. A spring hinge according to claim **1**, in which said interengaging means include a set screw threaded in said one plug, and circumferentially spaced depressions in said adjustment member for selectively receiving the inner end of the screw.

5. A spring hinge according to claim **1**, in which said interengaging means include a set of inwardly projecting circumferentially spaced teeth around the wall of said passage at its inner end, and a set of teeth projecting from said adjustment member into engagement with the plug teeth, said sets of teeth being disengageable by pressing said member inwardly to permit it to be turned.

6. A spring hinge according to claim **1**, the inner end portion of said plug passage having a side wall diverging inwardly and provided with ratchet teeth, and said adjustment member having a tapered portion in said passage provided with ratchet teeth engaging with the plug teeth, said teeth forming said interengaging means, the adjustment member teeth sliding inwardly against said plug teeth and past them when said member is turned in one direction.

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