# United States Patent [19]

**Stansbury, Jr. et al.**

[11] **3,822,440**

[45] **July 9, 1974**


[54] **SPRINGLESS SELF-LATCHING HINGE**


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[73] Assignee: **Jaybee Manufacturing Corporation**, Los Angeles, Calif.



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[52] **U.S. Cl.** ..... **16/142**, 16/180

[51] **Int. Cl.** ..... **E05d 11/08**

[58] **Field of Search** ..... 16/142, 139, 180



[56] **References Cited**

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| | | | |
|---|---|---|---|
| 2,872,697 | 2/1959 | Hizza, Jr. | 16/142 |
| 3,381,332 | 7/1968 | Jekila et al. | 16/142 |



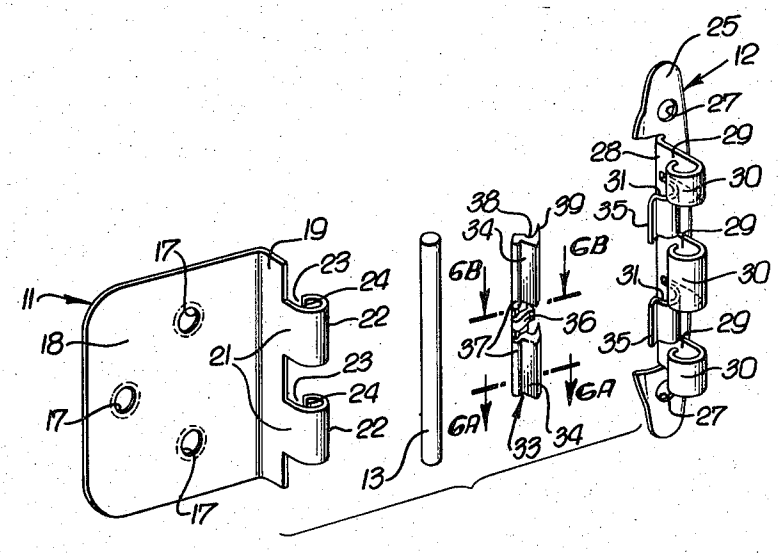
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[57] **ABSTRACT**

A springless self-latching hinge includes a pair of hinge leaves pivotally connected by a hinge pin. One leaf has a hinge knuckle the end of which incompletely encircles the pin to form a recessed bearing sleeve having a cam engaging edge. The other member has at least one hinge knuckle terminating at a hinge pin encircling bearing sleeve and at least one laterally extending, resilient spring leaf cooperating with a cam block disposed between the leaf and the recessed bearing sleeve to exert a force on the cam engaging edge for releaseably maintaining said hinge closed.


**10 Claims, 8 Drawing Figures**



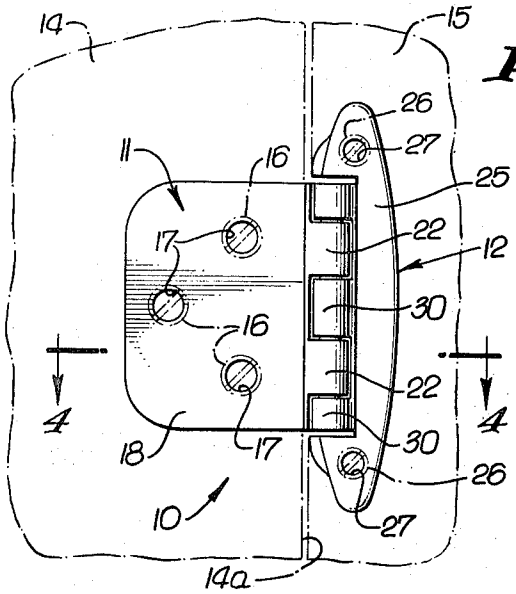



FIG. 1.

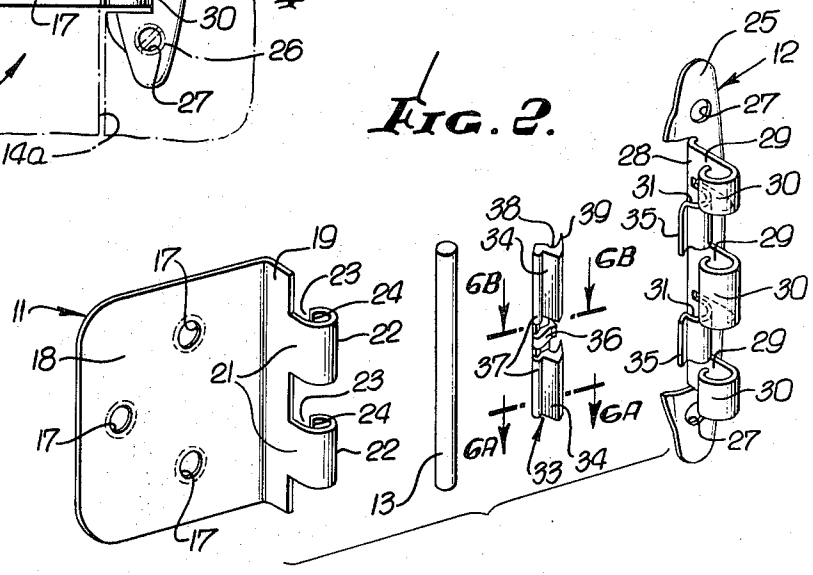



FIG. 2.

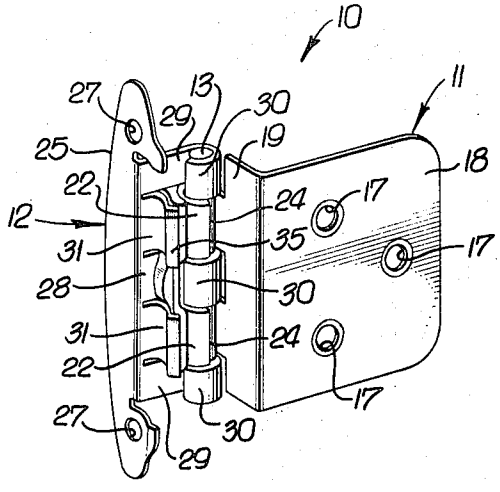



FIG. 3.

FIG. 4.

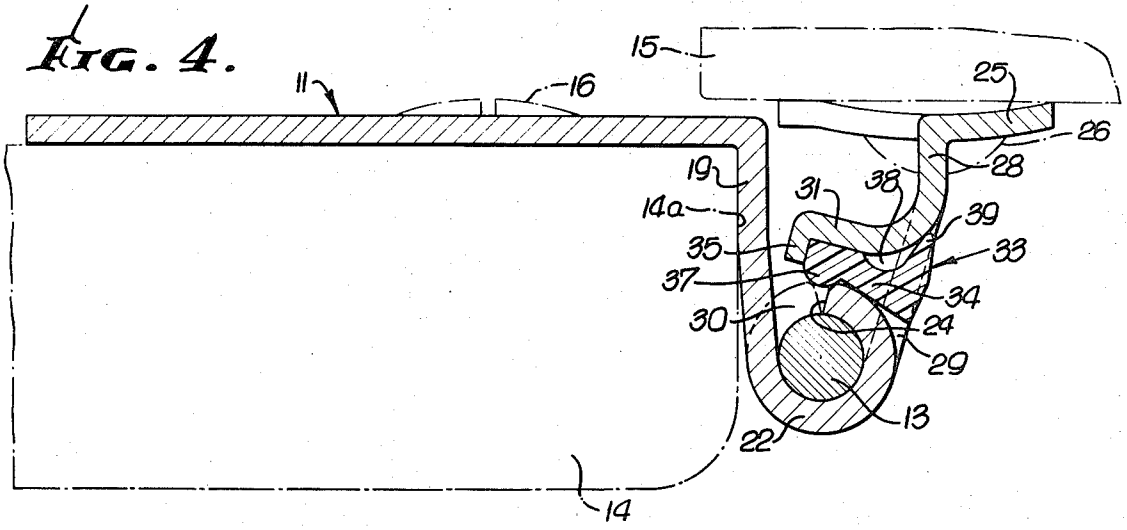



FIG. 5

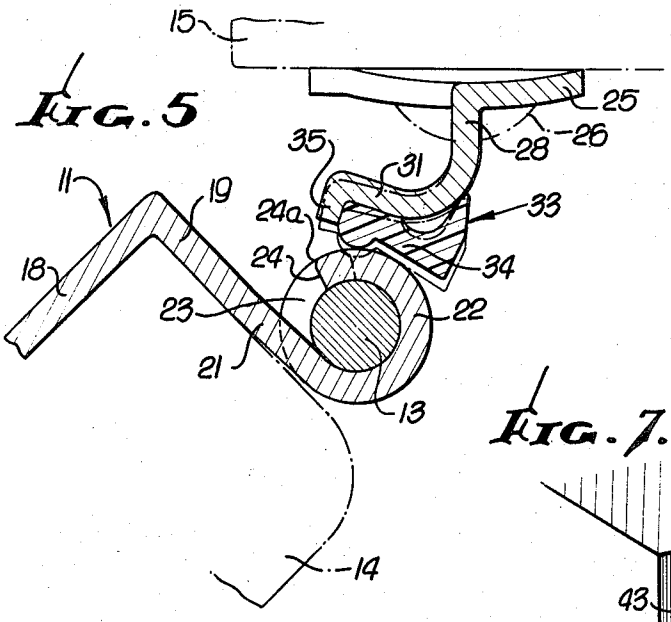



FIG. 6A.

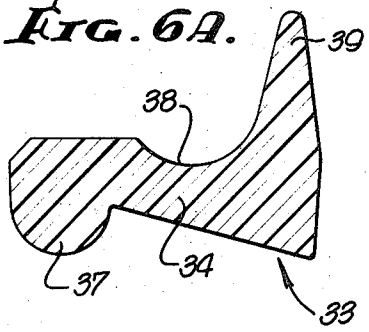



FIG. 7.

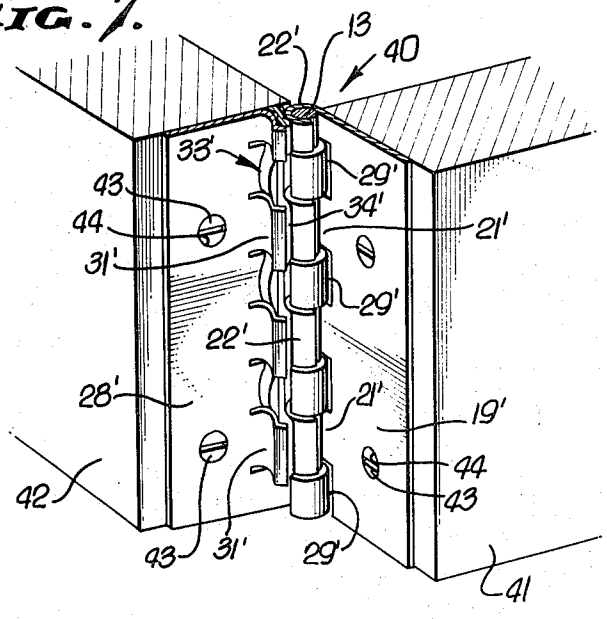
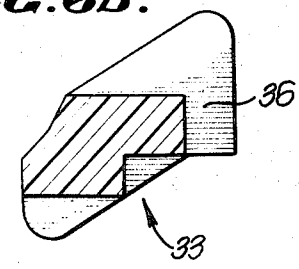



FIG. 6B.



# SPRINGLESS SELF-LATCHING HINGE

## BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to self-latching hinges, and particularly to such a hinge wherein the latching force is provided by the cooperating resilience of a knuckle and a spring leaf formed in one hinge leaf.

2. Description of the Prior Art

Self-latching hinges have gained widespread acceptance in the building industry for installation of cabinet doors and the like. Such hinges include a force providing mechanism which maintains the cabinet door closed without the need for a separate latch. Thus use of self-latching hinges does away with the cost of the latch hardware itself, and eliminates the even greater labor expense associated with installation of the latch.

Various self-latching hinge constructions are known in the prior art. In general, a spring biased roller or wedge element incorporated in one hinge leaf presses against a notched hinge pin bearing sleeve on the other leaf. Thus as the hinge members are rotated toward the door-closing position, the roller or wedge is biased against the bearing sleeve notch edge to force the hinge closed. Some effort is required to open the hinge against this biasing force.

In most prior art self-latching hinges, the roller or wedge biasing force is provided by a separate spring element mounted to one hinge leaf. Assembly is difficult, and the hinge leaves must be formed of relatively thick metal to withstand the substantial spring force. For a cabinet hinge, the spring force typically is on the order of 600 psi, requiring fabrication from steel having a typical thickness of between about 0.060 and 0.075 inches.

Simplicity of assembly and reduction of metal thickness thus are two benefits expected of a springless self-latching hinge. However, no such hinge of satisfactory design has been available in the past. In the old U.S. Pat. No. 588,642 to Hoffman, one hinge section has a spring which bears against a cam formed from the knuckle of the other hinge section. The cam is constructed with a gradually decreasing bearing surface which results in minimum spring pressure when the door is open and maximum when the door is closed.

Another construction, shown in the U.S. Pat. No. 2,872,697 to Hizsa, Jr., utilizes a separate leaf spring mounted with one hinge leaf and having an arcuate brake section which exerts friction force against the pin barrel of the other hinge leaf. The force is constant regardless of hinge angle, and tends to maintain the cabinet door at the selected angular position. The U.S. Pat. No. 2,571,430 to Durup shows another type of hinge wherein interlocking spring leaves are struck from the hinge members. These leaves do not exert a force on a bearing sleeve or cam, but rather engage each other to provide a latching effect.

It is an object of the present invention to provide a springless self-latching hinge of simple configuration, utilizing metal stock thinner than that used in prior art self-latching hinges, and providing an effective mechanism for releaseably maintaining the hinge closed.

## SUMMARY OF THE INVENTION

The foregoing objective is achieved by providing a springless self-latching hinge having a pair of leaves pivotally connected by a hinge pin. One leaf has a hinge knuckle the end of which incompletely encircles the pin to form a recessed bearing sleeve having a cam engaging edge. The second hinge member includes at least one hinge knuckle terminating at a hinge pin encircling bearing sleeve. This member also includes at least one resilient spring leaf struck laterally and cooperating with a cam block disposed between the leaf and the recessed bearing sleeve to exert on the recessed edge a force which releasably maintains the hinge closed. Both cabinet and butt or piano type embodiments are disclosed.



## BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the invention will be made with reference to the accompanying drawings wherein like numerals designate corresponding parts in the several figures. These drawings are to scale.

FIG. **1** is a front view of a springless self-latching hinge in accordance with the present invention, shown in a typical cabinet installation.

FIG. **2** is an exploded perspective view of the hinge of FIG. **1.**

FIG. **3** is a rear view of the same hinge, shown partly opened.

FIG. **4** is a transverse sectional view, along the line of **4—4** of FIG. **1,** showing the cabinet hinge in closed orientation.

FIG. **5** is a transverse sectional view like FIG. **4,** but with the hinge partly opened.

FIGS. **6A** and **6B** are transverse sectional views of the cam block used in the inventive hinge, as seen along the lines **6A—6A** and **6B—6B** of FIG. **2.**

FIG. **7** is a perspective view of a butt or piano type hinge in accordance with the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention since the scope of the invention is best defined by the appended claims.

Structural and operational characteristics attributed to forms of the invention first described shall also be attributed to forms later described unless such characteristics are obviously inapplicable or unless specific exception is made.

Referring now to the drawings, and particularly to FIGS. **1** through **3,** there is shown a springless self-latching hinge **10** in accordance with the present invention. The hinge **10** includes a first hinge leaf **11** pivotablly connected to a second hinge leaf **12** by means of a hinge pin **13.** As illustrated in FIG. **1,** the hinge **10** advantageously may be used to attach a cabinet door **14** or the like to a door frame member **15.** The hinge **10** functions to maintain the door **14** closed without the need for separate latch hardware.

The door **14** may be fastened to the hinge **10** by the use of screws **16** inserted through the holes **17** in an attachment plate **18** forming part of the hinge leaf **11.** Extending generally perpendicularly from one edge of the plate **18** is a planar section **19** which abuts against an edge **14***a* (FIG. **4**) of the door **14.** From the planar section **19** extend a pair of hinge knuckles **21** the terminal

ends of which are curled to form a pair of spaced, coaxially aligned bearing sleeves **22.** Each of the bearing sleeves **22** incompletely encircles the hinge pin **13** to define a notch or recess **23** having a cam engaging edge **24** parallel to the hinge pin **13.**

The other hinge leaf **12** includes a decorative mounting plate **25** which may be fastened to the door frame **15** by screws **26** inserted through a pair of mounting holes **27.** Extending forwardly from the backplate **25** is a generally planar section **28** from which project three hinge knuckles **29** the terminal ends of which are curled to form bearing sleeves **30.** As shown in FIGS. **1** and **3,** the sleeves **30** are situated in alternating, coaxial alignment with the sleeves **22** of the other hinge leaf **11,** so as to engage the hinge pin **13.**

The hinge leaf **12** also includes a pair of spring leaves **31** situated between the hinge knuckles **20** and extending laterally from the member **28** in the same direction as the bearing sleeves **30.** As described below, the combined resilience of the bearing sleeves **30** and the spring leaves **31** provide the latching force for the hinge **10.**

To exert this force against the recessed bearing sleeves **22,** there is provided a cam block **33** (FIG. **2**) having parts **34** which are disposed between each spring leaf **31** and the respective bearing sleeve **22.** The cam block **33** is retained in place by a flange or lip **35** provided at the free end of each spring leaf **31.** An integral offset projection **36** (FIG. **6B**) between the parts **34** limits sliding of the cam block **33** longitudinal of the hinge pin **13.**

Each cam block part **34** includes an arcuate bead **37** (FIG. **6A**) extending longitudinally of the hinge pin **13.** This bead **37** acts as a cam to engage the edge **24** of the notched bearing sleeve **22** when the hinge is closed (FIG. **4**). The combined resilience of the spring leaf **31** and the bearing sleeve **30** provides sufficient force via the cam block **33** to maintain the hinge **10** closed. Some effort is required to open the hinge as to the position shown in FIG. **5.** As the hinge **10** is opened, the bead **37** rides up on the outside surface of the bearing sleeve **22,** flexing the spring leaf **31** away from the hinge pin **13.** The cam block part **34** is provided with an elongated recess **38** and a rearward projection **39** which provide sufficient "give" to maintain the cam block **33** in place against the spring leaf **31** despite flexure thereof.

The cam engaging edge **24** of the bearing sleeve **22** itself may be arcuate or include a tapered portion **24***a.* The combined curvatures of the edge **24** and the bead **37** provide a camming force which is not exactly radial with respect to the pin **13** axis, but is at an angle thereto. This assists in maintaining the hinge **10** closed with a smaller force than necessary with prior art self-latching hinges employing spring biased rollers. Typically, the latching pressure of the hinge **10** may be about 400 psi, as compared with a pressure of 600 psi exerted by a prior art spring biased roller. This enables the hinge **10** to be made of thinner material than previously usable for self-latching hinges. For example, the hinge **10** may be fabricated of steel having a thickness of about 0.050 inches as compared with 0.060 to 0.075 inches for prior art hinges.

In FIG. **7** there is shown a butt or piano type hinge **40** utilizing a mechanism like that of the hinge **10.** The hinge **40** may be of any length, the combination of a spring leaf **31'**, a cam part **34'** and a recessed bearing sleeve **22'** in alternation with a knuckle **29'** being replicated for the entire length. The planar sections **19'**, **28'** are used as mounting plates. Thus the hinge **40** can be attached to the ends of two members **41, 42** by screws **43** inserted through mounting holes **44** in the sections **19'**, **28'**. As in the embodiment of FIG. **1,** latching force is provided by the combined resiliency of the hinge knuckles **29'** and the spring leaves **31'** as transmitted by the cam block **33'**. A hinge **40** of simple construction results.

The hinge **10** or **40** is easy to assemble. First the hinge leaves **11** and **12** are connected by the pin **13.** Then the spring leaves **31** are spread away from the bearing sleeves **22** and the cam block **33** is inserted. The cam block **33** advantageously is fabricated of nylon or like material. No spring is employed, the latching force being provided entirely by members formed integral with one of the hinge leaves.

Intending to claim all novel, useful and unobvious features shown or described, I make the following claims:

**1.** A self-latching hinge having a pair of hinge members pivotally connected by a hinge pin, characterized in that:

a. one member has a hinge knuckle the end of which incompletely encircles said pin to define a recessed bearing sleeve having a cam engaging edge,

b. the other member is unitary and includes a generally planar section having at least one hinge knuckle terminating at a hinge pin encircling bearing sleeve and at least on laterally extending resilient spring leaf, said spring leaf being struck from said section in the same lateral direction as said hinge pin encircling bearing sleeve,

c. there being a cam block disposed between said spring leaf and said recessed bearing sleeve to exert a force on said cam engaging edge to maintain said hinge closed, said force resulting from the combined resiliency of said spring leaf and said one hinge knuckle.

**2.** A hinge according to claim **1** wherein said recessed bearing sleeve is of substantially uniform radius and wherein said cam block includes a portion of arcuate cross-section for camming engagement of said edge.

**3.** A self-latching hinge according to claim **2** wherein said spring leaf has an arcuate cross-section and wherein said cam block is configured to maintain engagement with said spring leaf during flexure thereof.

**4.** A hinge according to claim **1** wherein said one member includes a plurality of like hinge knuckles and wherein said other member includes a plurality of spaced spring leaves alternating with ones of a plurality of hinge knuckles, and wherein said cam block includes a part disposed between each spring leaf and the corresponding one of said like hinge knuckles.

**5.** A hinge according to claim **4** wherein the free end of each spring leaf is flanged for retention of said cam block and wherein longitudinal sliding of said cam block is limited by an offset section between said parts.

**6.** A self-latching hinge comprising:

1. a hinge pin,

2. a first hinge leaf characterized by;

a. a mounting plate,

b. a spaced pair of hinge knuckles extending from said mounting plate,

c. the terminal ends of said hinge knuckles being curled to form a pair of spaced, coaxially aligned bearing sleeves receiving said hinge pin,

d. each of said bearing sleeves incompletely encircling said hinge pin to provide a notch or recess having a cam engaging edge,

3. second hinge leaf characterized by;

e. an attachment plate,

f. at least one hinge knuckle extending from said attachment plate,

g. the end of said one knuckle being curled to form a central bearing sleeve situated between and in coaxial, hinge pin receiving alignment with said pair of notched bearing sleeves,

h. first and second spring leaves extending integrally from said attachment plate on oppposite sides of said one knuckle and projecting laterally thereof in the same direction as said central bearing sleeve, said spring leaves being respectively radially spaced from but opposed to said notched bearing sleeves, and

4. a cam block having force transmitting parts disposed between said integral spring leaves and the respective notched bearing sleeves so that upon closing of said hinge said cam block engages said edge releasably to maintain said hinge closed.

**7.** A self-latching hinge according to claim **6** wherein the free end of each spring leaf is flanged for retention of said cam block and wherein sliding of said cam block parallel to said hinge pin is limited by an offset projection between said force transmitting parts.

**8.** A self-latching hinge according to claim **6** wherein said cam block parts each include a portion of arcuate cross-section for camming engagement of said notch edge.

**9.** A self-latching hinge according to claim **8** wherein said second hinge leaf further includes another pair of hinge knuckles disposed on opposite sides of said spring leaves and having hinge pin encircling bearing sleeves coaxially aligned with and separated by said notched bearing sleeves.

**10.** A self-latching hinge according to claim **1** wherein said other member includes an integral mounting plate, said planar section extending generally perpendicularly from said mounting plate, the end of said spring leaf furthest from said mounting plate being free and curled to exert force toward said hinge pin.

* * * * *