

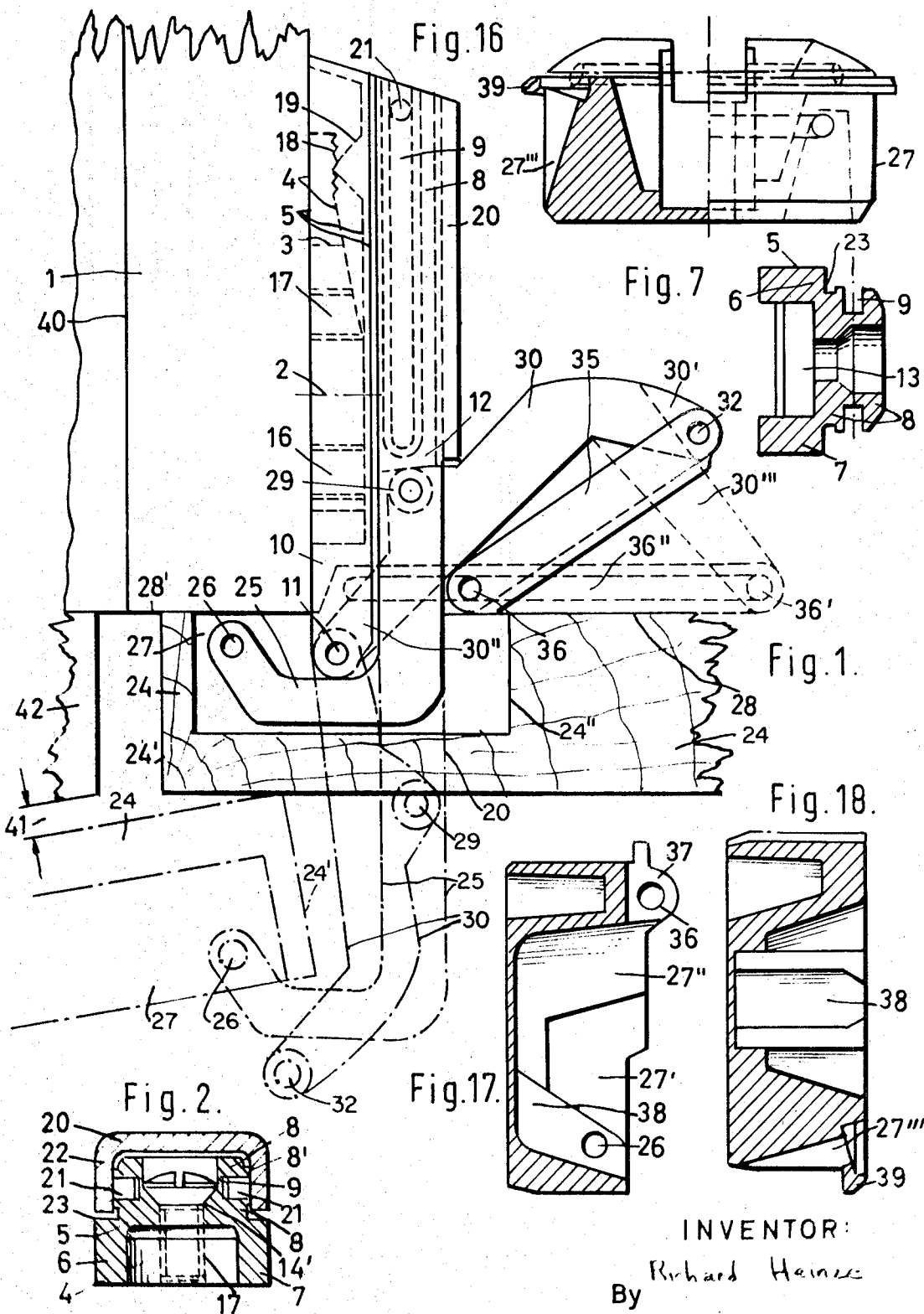
Nov. 24, 1970

R. HEINZE
FURNITURE HINGE

3,541,633

Filed Oct. 16, 1967

3 Sheets-Sheet 1



INVENTOR:
Richard Heinze
By
Sparrow and Sparrow
Attorneys

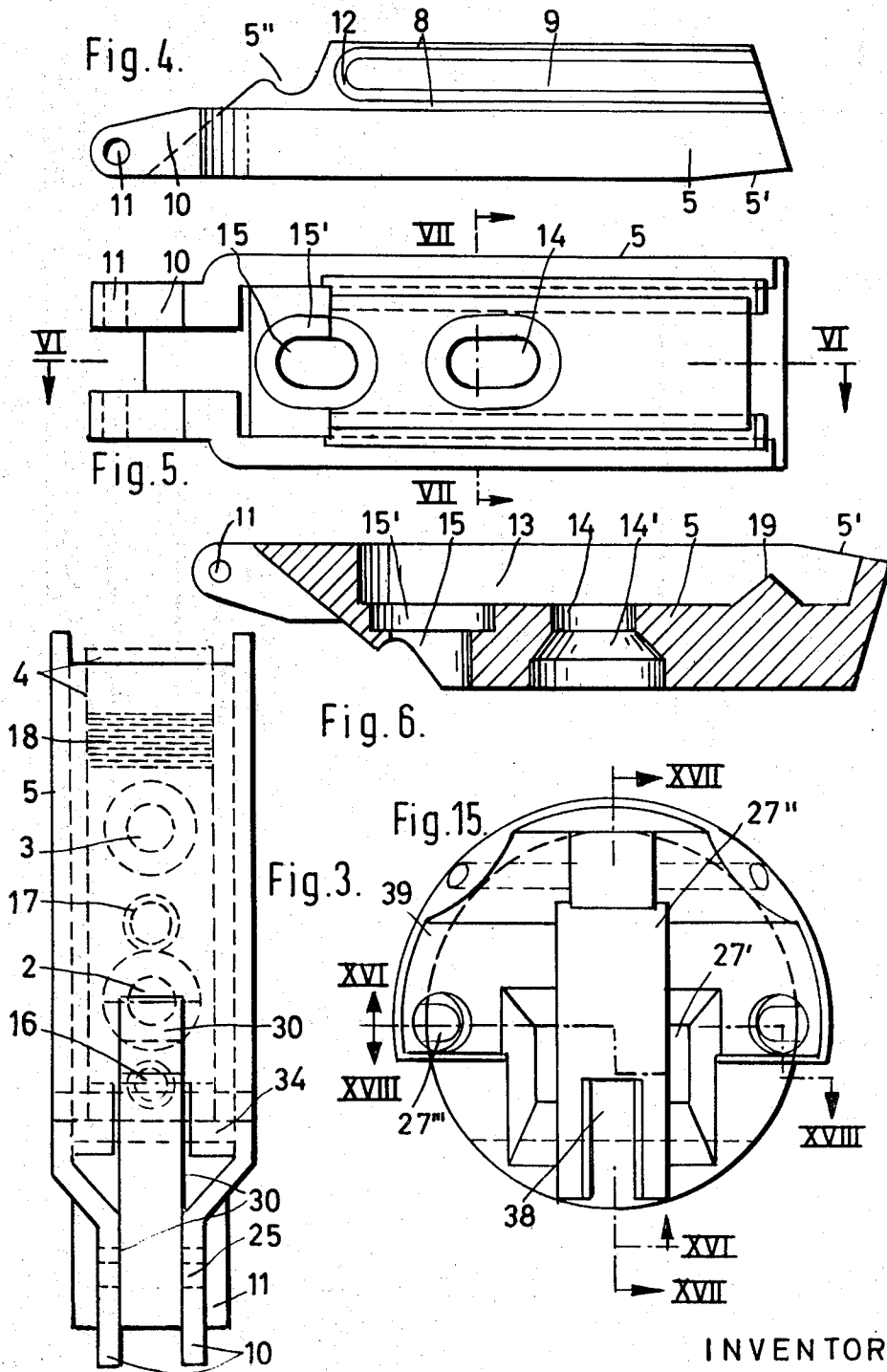
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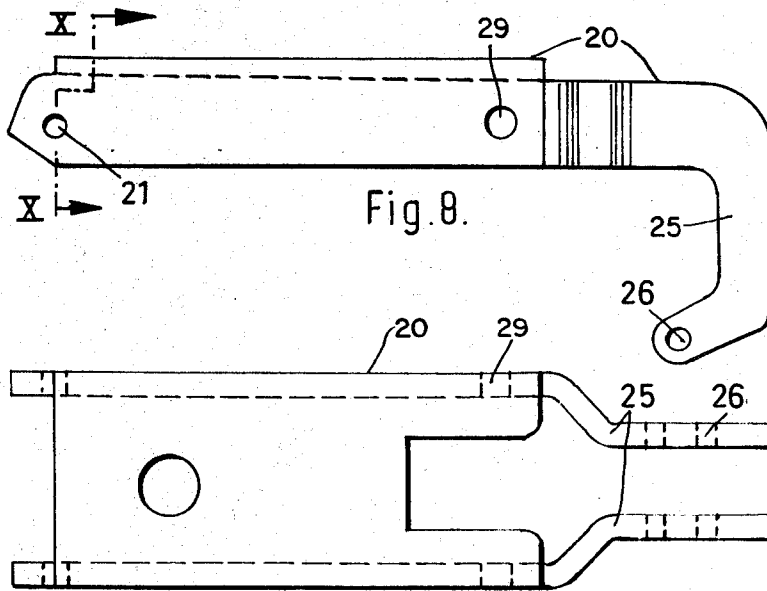


Fig. 9.

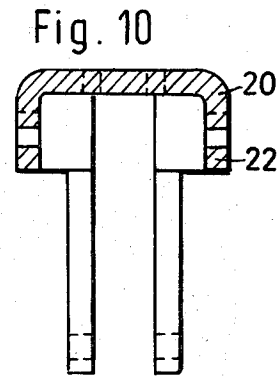
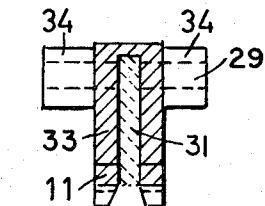


Fig. 13

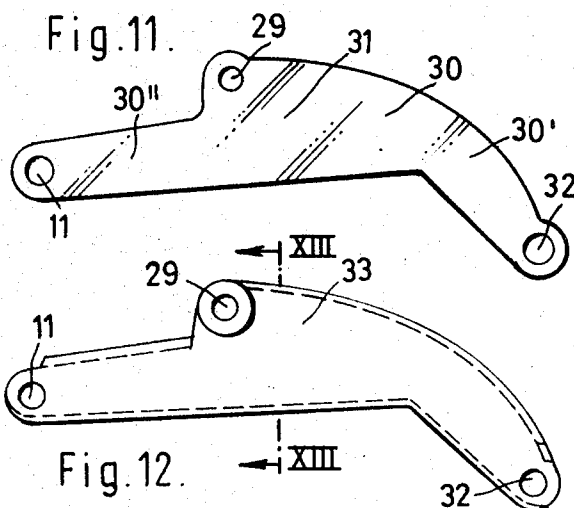
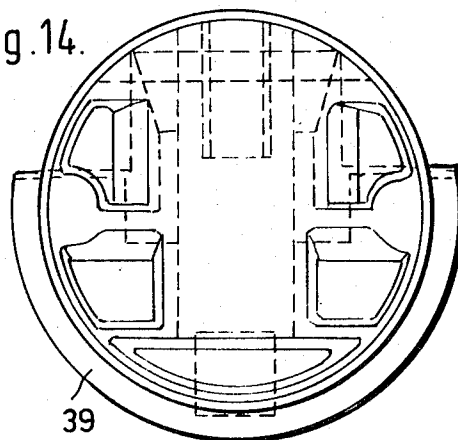


Fig. 12.

Fig. 14.



INVENTOR:

Richard Heinze
By
Sparrow and Sparrow
Attorneys

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FURNITURE HINGE

Richard Heinze, Herford, Westphalia, Germany, assignor to Firma Richard Heinze, Herford, Westphalia, Germany, a German company

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U.S. Cl. 16-164

11 Claims

ABSTRACT OF THE DISCLOSURE

An improved furniture hinge for a pivoting at an angle of between 170°-180°, in which when the door is pivoted at 90°, no portion of the door projects beyond the outer lateral surface of the piece of furniture, to which the hinge is attached whereas when the door is fully opened, a similar adjacent door is not touched and special guide-means for this purpose.

BACKGROUND OF THE INVENTION

In recent times, hinges have been developed in which the pivot point is displaced, during the opening movement of the hinge, in such a manner that the relevant piece of furniture can be placed up against a wall or another piece of furniture, without the door passing beyond the plane of the side wall, when opened as far as 90°, or striking an immediately adjacent wall or the door of an adjacent cupboard which has also been opened to 90°.

There are, however, cases where it is desired, over and above the foregoing conditions, to open a door to more than 90°, say for example, between 170°-180°, without such an opening angle being impeded by a similar closed and adjacent door. In this connection, the practical requirement is for the door to be raised, during its opening movement, not only away from the lateral surface of the door, but also to a similar distance from the front face of the piece of furniture, in fact far enough for the adjacent door still to be able to find room in the space when the first door is opened.

It has already been proposed to use for such purposes two intersecting hinge levers, and to provide the piece of furniture, the door, and the associated fittings, each with a pivot point in one and a sliding guide in the other, of the two hinge levers. However, these known types of hinge have solved the problem either very inadequately or not at all. It is true that some hinges have provided a pivoting angle of 180°, but these could only operate if not other door was close by. Furthermore, in some of them, the hinge parts have projected much too far into the interior of the piece of furniture, thus impeding access to the interior and requiring, moreover, a considerable amount of material and space.

SUMMARY

The present invention provides a solution whereby these disadvantages are overcome with a minimum amount of material and taking up a minimum amount of space. In addition, both longitudinal and vertical adjustment of the hinge away towards and away from the wall is possible, an advantage which was not provided for in the hitherto-known cases.

The present invention overcomes the above disadvantages in that a hinge point provided on one fitting part of the body of the piece of furniture is located, when the door is closed, in the interior of the body of the door in a hinge housing and includes a hook-shaped hinge lever also projecting into the interior of the said hinge housing. One end of the said hinge lever moves in a guide provided

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in the fitting-part of the body of the piece of furniture, the guide running parallel with the internal wall of the piece of furniture, while the other end is pivotably mounted in the hinge housing, adjacent to the end face of the door and adjacent to the plane of closing thereof. A double lever is also provided, having arms of unequal length, mounted at a central hinge point on the hook-shaped hinge lever, the short arm of the double lever being mounted at the hinge point fixed to the piece of furniture and, when the door is closed, outside the triangle formed by the three hinge points of the said hook-shaped lever, whereas the long arm of the double lever is either held at its end in a sliding guide in the door, or is in communication with a second hinge point in the hinge housing fixed to the door, via an additional hinge arm. In this design, a guide is provided in the fitting secured to the piece of furniture, which requires little effort, since this fitting, for reasons of adjustment etc., can be extended in accordance with the length of the guide. The second sliding guide requires somewhat more effort, but this also remains within limits due to the possibility of structural union with the hinge box provided in the door, e.g. by direct shaping. On the other hand, if an additional hinge lever is used, the design of a sliding guide on the side of the door is eliminated, and the hinge housing need have only the same dimensions as those required for a 90° hinge, and may therefore be attached to the door in a bore, in a manner similar to the said 90° hinge.

Further details of the invention are explained in an example of embodiment illustrated in the figures.

BRIEF DESCRIPTION OF DRAWING

In the following description and in the claims, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference characters denote like parts in the several figures of the drawings, in which:

FIG. 1 is a side elevation of the hinge, showing its closed position in full lines and its open position in dotted lines;

FIG. 2 is a cross section through the fitting secured to a piece of furniture, with the means of attachment;

FIG. 3 is a plan view of FIG. 2;

FIG. 4 is a side elevation of the adjusting and guide-plate, without the housing, for the fitting;

FIG. 5 is a plan view of the guide-plate shown in FIG. 4;

FIG. 6 is a longitudinal section taken through the plate in FIGS. 4 and 5 and on the line VI-VI of FIG. 5;

FIG. 7 is a cross section of the line VII-VII of FIG. 5;

FIG. 8 is a side elevation of the hook-shaped hinge lever;

FIG. 9 is a plan view of the lever shown in FIG. 8;

FIG. 10 is a section taken along the line X-X of FIG. 8;

FIG. 11 is an elevation of the steel core of the double lever;

FIG. 12 shows the plastic casing with the bearing casing of the double-ended lever;

FIG. 13 is a section taken along the line XIII-XIII of FIG. 12;

FIG. 14 is a bottom view of the hinge housing;

FIG. 15 is a top view of the housing shown in FIG. 14;

FIG. 16 is a section taken along the line XVI-XVI of FIG. 15;

FIG. 17 is a section taken along the line XVII-XVII of FIG. 15;

FIG. 18 is a section taken along the line XVIII-XVIII of FIG. 15;

DESCRIPTION

Referring to the drawings, and in particular to FIG. 1, 1 is the side wall of the body of a piece of furniture, to the internal surface of which, at 2 and 3, is screwed a baseplate 4 which is indicated in FIG. 1 in dotted lines. Baseplate 4 is closely enclosed at its top and bottom (in FIG. 2, its left and right hand side) by an adjusting guideplate 5 which is held thereby secured against rotation but which is adjustable, in relation to the wall, in depth, as well as longitudinally.

The adjusting guide-plate 5 is illustrated in greater detail in FIGS. 4 to 7 where it will be seen that it has elongated lateral legs 6 and 7, with which it embraces the baseplate 4, and a yoke 8 (FIG. 7) exhibiting lateral guide grooves 9 which are parallel with the interior wall surface of the piece of furniture. At the hinge end of the plate, lateral legs 6 and 7 are reduced in width so as to form cantilever arms 10 (FIGS. 4 and 5) having bores 11 to accommodate the hinge pin. Moreover, adjacent the hinge end, at 12, the guide grooves 9 are closed but they are open at the opposite end to permit the introduction of guide pins 21.

Located substantially in the central portion of yoke 8 is a recess 13 (FIGS. 6 and 7) and in the remaining portion of the wall of the yoke elongated holes 14 and 15 are provided, of which hole 14 is countersunk outwardly as at 14' and hole 15 countersunk inwardly as at 15'. The countersink 15' serves, with its edge, as a support for a supporting and depth adjusting screw, not shown in detail, which is screwed into the threaded portion 16 of baseplate 4 (see FIG. 1).

The slot in the screw is accessible from the outside through the elongated hole 15, which makes it possible to set the adjusting plate 5 in depth and in relation to the wall and to baseplate 4. In order to permit an unimpeded oblique position, plate 5 (FIG. 4) is slightly bevelled at 5'.

A screw engages, through elongated hole 14, with a thread portion 17 in baseplate 4. This screw, which being enclosed and engaged by baseplate 4 is relieved of weight by adjusting plate 5, secures the latter in depth in relation to baseplate 4. For the purpose of effecting a longitudinal setting, baseplate 4 is provided with a locking serration 18 engageable with a toothlike extension 19 of adjusting plate 5 (FIG. 1).

A hook-shaped lever 20 (see FIGS. 8-10) is furthermore guided on adjusting plate 5, the main portion of said lever having a U-shaped cross section. Two inwardly directed guide pins 21 (see FIG. 2) in the said lever engage in guide grooves or channels 9 formed in adjusting plate 5. For the reception of lateral legs 22 of lever 20, the adjusting plate 5 is provided with angular recesses 23 which are of a size such that legs 22 lie flush with the outer surface of plate 5. Contact between lever 20 and adjusting plate 5 is effected at guide surfaces 8' (FIGS. 2 and 4).

When the door 24 is closed, a hook-shaped portion 25 of lever 20 engages the pivot point 11, secured in the piece of furniture, at adjusting plate 5, the end of portion 25 being mounted at 26 in a hinge housing 27 adjacent to face 24 of the door and also adjacent to the plan of closing 28 in the door. In this position, the door lies adjacent the face 28 of lateral wall 1 of the piece of furniture.

Mounted at 29 on the hook-shaped lever 20 is a pivot lever 30 having arms of unequal length, the longer part being indicated at 30' and the shorter part being indicated at 30'', see FIGS. 1, 11-13. The said pivot lever consists of a rigid steel body having three hinge locations 11, 29 and 32. This steel body is embedded in a plastic body 33 (see FIG. 12) of U-shaped cross section (see FIG. 13), so that the steel body may be simply pushed in. Moulded to the said plastic body 33 are two bearing sleeves 34 (FIG. 13) which fit exactly into the width of the cross sectioned U-shaped portion of hook-shaped lever 20. Ad-

justing element 5 has a rounded recess 5'' (see FIG. 4) for the reception of sleeve 34 when the door is in the closed position. The main portion of double-arm lever 30 is accommodated between the hook-shaped portion 25 of hook-shaped lever 20 (see FIG. 3).

Hinged to location 32 FIGS. 1, 11, 12 of the double arm lever 30 end embracing the latter is a straight lever 35 of U-shaped cross section, the free end of which is pivotably mounted at 36 to hinge housing 27 and raised slightly above closing plane 28.

When the door is closed, the two short lever arms 25 and 30'' of hinge levers 20, 30 connected at central hinge point 29, are positioned in such manner, that they both project into recess 27', 27 in hinge part 27 inserted into a bore 24 in door 24. An acute angle 26-29-11 is thus formed between the two hinge points 26, 11 located at the ends of short lever arms 25, 30'', and central hinge point 29, the said angle lying outside the hinge-point triangle 21-29-26 of hook-shaped lever 20.

End point 26 of hook-shaped hinge part 25 lies in recess 27' of hinge part 27 very close to end edge 24' of door 24, while the overhang of baseplate 19 FIGS. 1 and 6, fixed to the piece of furniture, with hinge point 11 for the other hinge lever 30 FIGS. 1 and 11, projects into the adjacent portion 27'' FIG. 17 of the recess, so that while the door 24 is opening, pivot point 36 of hook-shaped lever 20, 25 and the adjacent edge 24' of door 24 move as a result of the difference in length between the two short lever arms 29-11 and 29-26, unimpeded past the overhang and its hinge point 11, and when the door is fully open, hook-shaped part 25 of the one hinge lever 25 engages around the edge of door 24 (shown in dotted lines in FIG. 1).

Details of the hinge housing 27 may be seen in FIGS. 14-18. The said housing is of circular cross section and may thus be inserted into a milled bore 24'' in the door 24. For purposes of attachment, use is made of oblique holes 27'', into which screws or pins may be fitted from above, the said screws or pins pressing into the adjacent wall of the door and retaining the housing immovable. Extension 37 (having two arms), exhibiting hinge point 36, encloses straight intermediate hinge lever 35. On the other hand, inner extension 38, containing hinge location 26, is enclosed by the two legs 25 of the hook-shaped lever. On that portion of its periphery which does not lie in front of face 28 of the side wall of the piece of furniture but projects into the free door opening, box 27 is provided with a bearing edge 39 which serves as a stop when hinge housing 27 is fitted and determines the vertical position thereof.

If, instead of the straight intermediate lever, an extended angled end 30''' of double-arm lever 30 is employed, then end 36 may be retained in a sliding guide 36'' in the door running parallel with the surface of the door and preferably moulded directly to box 27. However, the design with intermediate lever 35 is regarded as being more advantageous.

In use, when the door is opened from the position shown in full lines in FIG. 1, the said door is immediately raised sharply, so that during its pivoting motion no part strikes the face of the body 1 of the piece of furniture; moreover, the pivot point in FIG. 1 is displaced to the right, so that external side plane 40 of body 1 of the piece of furniture is also not passed when the door is pivoted up to 90°. The door finally passes into the position shown in FIG. 1 in dotted lines, in which a safety distance 41 from a similar adjacent door 42 still remains at a pivoting angle of about 170°.

What I claim is:

1. A hinge for a piece of furniture, said piece having at least one door, said furniture having a lateral outside surface and an inner sidewall surface, said hinge arranged for pivoting at an angle of 170-180 degrees, in which no portion of said door projects beyond said lateral outside surface of said piece of furniture, when said door is

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closed, abutting against the front plan of said piece of furniture, to which said hinge is attached, and also when said door is swung at 90 degrees, whereas when said door is fully opened, a similar adjacent door is not touched, comprising a first hinge point, an adjusting plate attached to said inner sidewall surface of said piece of furniture, a hinge housing in said door, said first hinge point located in said hinge housing when said door is in the closed position, and a hook-shaped lever enclosing said first hinge point, said hook-shaped lever projecting with the hook part thereof also into the interior of said hinge housing, said hook-shaped lever having guide pins said adjusting plate having a corresponding guide thereon, one end of said hook-shaped hinge lever moving with said guide pins in said guide running parallel with said inner sidewall surface of said piece of furniture, the other end of said hook-shaped lever being pivotally mounted in said hinge housing at a point close to the face of said door and close to said front plan, said hook-shaped lever having a central pivot point, a double-arm lever having arms of unequal length, the shorter arm thereof being mounted on said first hinge point, the centers of said guide pins, of said pivot mounting of said other end and of said central pivot point of said hook-shaped lever forming a triangle, said shorter arm lying in the closed position of said door outside said triangle and inside said triangle in the open position of said door, a guide on said door, the longer arm of said double-arm lever being held by the end thereof in said guide always outside said triangle and the length of said shorter arm extending between said central pivot point and said first hinge point on said piece of furniture is so short compared with the distance between said central point and said pivot point for said other arm mounted in said hinge housing in said door, that said shorter arm can unimpededly pass beyond the radial direction of the two latter pivot points and can freely enter said triangle and the space provided by said hook-shaped lever when said door is opened.

2. A hinge for a piece of furniture according to claim 1, characterized in that when said door is closed, said two short lever arms of said hinge levers, jointed at said first hinge point, lie approximately one above the other and both project in the recess of said hinge housing fixed to said door, which is inserted into a bore in said door, and in that with the formation of an acute angle between said two hinge points located at the ends of said short lever arms and said first hinge point, said hinge point of said hook-shaped lever is mounted in the recess in said door hinge housing very close to the edge of said door, while the overhang fixed to said piece of furniture, projects with the point of support for said other hinge lever into the adjacent part of said recess, whereby when said door is opening, said pivot point of said hook-shaped lever and the adjacent edge of said door move as a result of the difference in length between their two short lever arms, unimpededly past said overhang and the hinge point thereof, and when said door is fully opened the hook-shaped part of said hinge lever, which is mounted in said door engages around the edge of said door.

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3. A hinge for a piece of furniture according to claim 1, characterized in that said hook-shaped lever has in the area of the guide of said adjusting plate a U-shaped cross section and inwardly-directed laterally aligned guide pins said lever engaging said adjusting plate containing said guide, said adjusting plate being adjustably carried both in depth and in the longitudinal direction by a baseplate attached to said inner sidewall of said piece of furniture.

4. A hinge for a piece of furniture according to claim 1, characterized in that said double-arm lever having arms of unequal length consists of a flat body.

5. A hinge for a piece of furniture according to claim 3, characterized in that said double arm lever having arms of unequal length consists of a steel core with a plastic sleeve forming a bearing sleeve, the length of which being adapted to the internal width of said U-shaped cross section of said hook-shaped lever.

6. A hinge for a piece of furniture according to claim 1, characterized in that said hook-shaped lever has free inwardly bent flanges having holes for pivot pins, said flanges holding said double-arm lever pivotably between them.

7. A hinge for a piece of furniture according to claim 3, and a second hinge lever having a straight section between said one end of said double-arm lever and said hinge housing, said second lever having a U-shaped section between said double-arm lever and said hinge housing.

8. A hinge for a piece of furniture according to claim 7, characterized in that said straight second hinge lever is mounted internally on said double-arm lever and outside on a second hinge point of said hinge housing.

9. A hinge for a piece of furniture according to claim 8, characterized in that said second hinge point on said door for said straight second hinge lever is arranged at said hinge housing in such manner, that said second hinge point is raised and is located in front of the inner surface of said door.

10. A hinge for a piece of furniture according to claim 1, wherein said longer arm of said double-arm lever is retained in said guide on said door, said guide running parallel with the surface of said door.

11. A hinge for a piece of furniture according to claim 1, said hinge housing having obliquely arranged holes, and studs to be fitted into said holes from above, said studs pressing into the adjacent wall of said door over the greater part of the height of said housing and holding said housing immovable.

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BOBBY R. GAY, Primary Examiner

60 D. L. TROUTMAN, Assistant Examiner