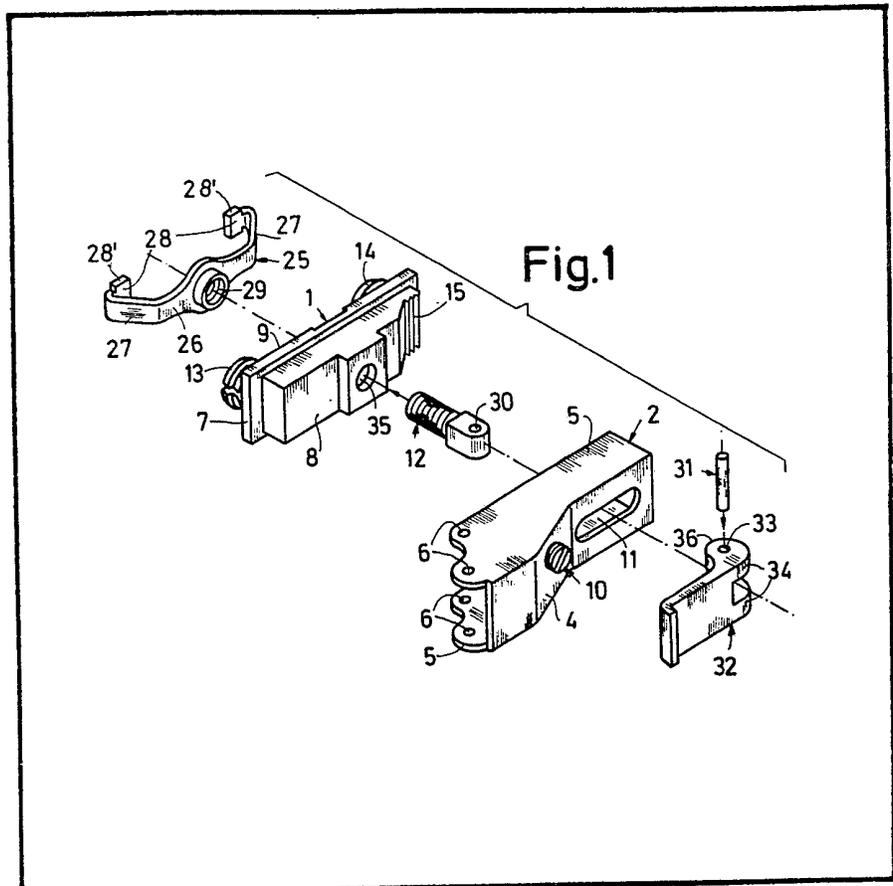


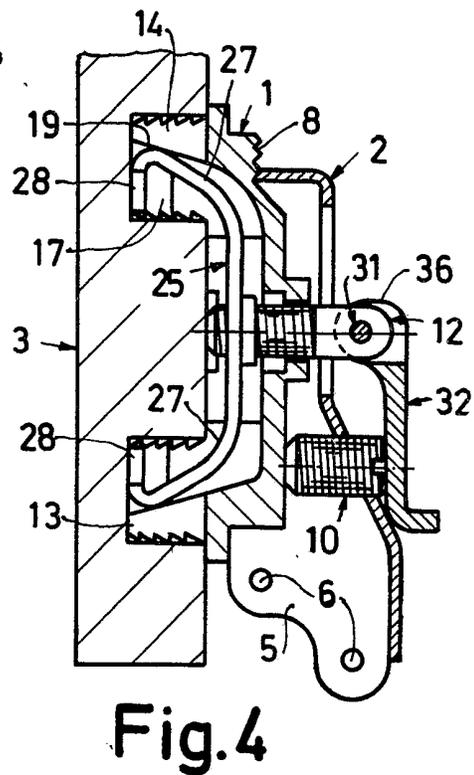
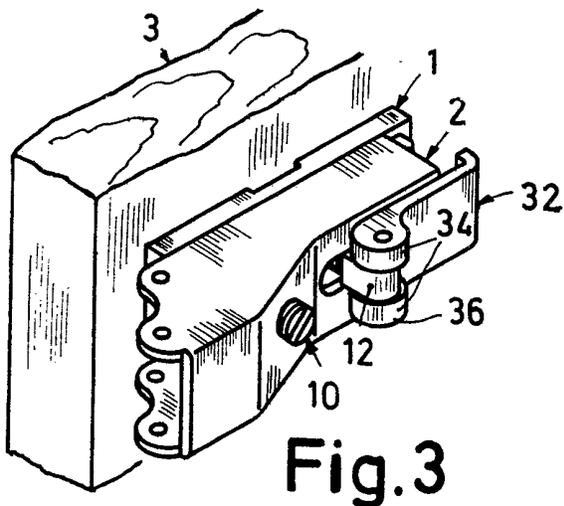
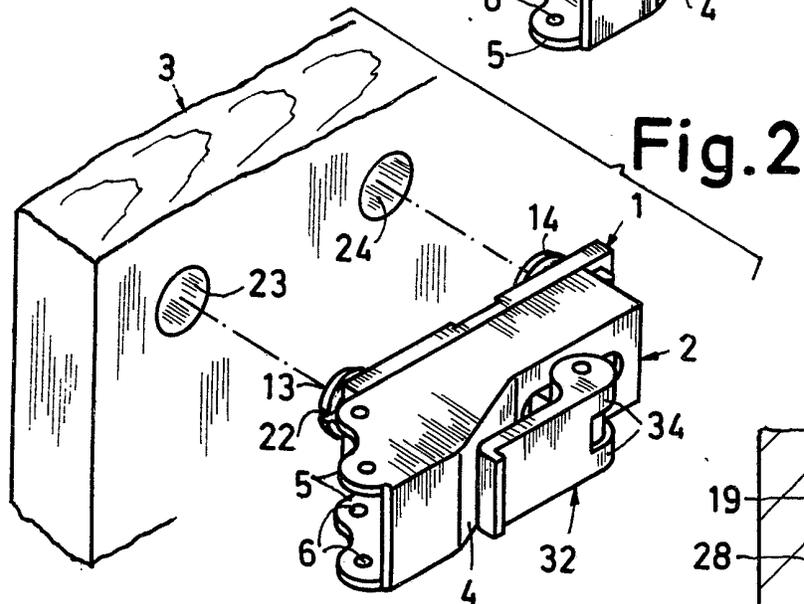
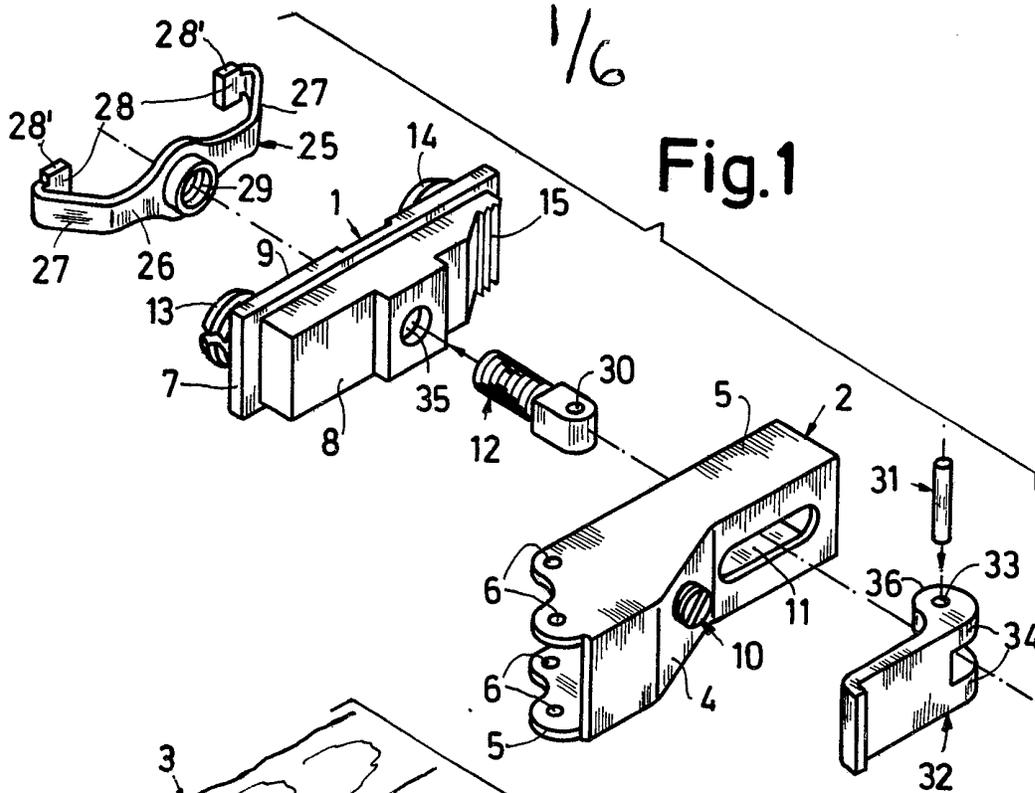
- (21) Application No 7916774
- (22) Date of filing 15 May 1979
- (23) Claims filed 15 May 1979
- (30) Priority data
- (31) 2837373
- (32) 26 Aug 1978
- (31) 2837327
- (32) 26 Aug 1978
- (33) Fed. Rep. of Germany (DE)
- (43) Application published
12 Mar 1980
- (51) INT CL³
E05D 7/04//5/02
- (52) Domestic classification
E2F 605 650 AC AD
- (56) Documents cited
GB 677448
GB 587302
GB 577156
GB 246981
- (58) Field of search
E2B
E2F
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(54) Furniture Hinge Mountings

(57) The invention relates to a mounting plate 1 for fastening a furniture hinge arm 2 on a furniture part, i.e. on a furniture side wall, and a two-part connecting element 12, 32 which engages said plate when the hinge arm is fastened on the plate and

which is in contact by means of a clamping face 36 against a contact face 4 on the hinge arm. The two parts of the connection element are pivotally connected by pin 31 so that on swivelling part 32 relative to the part 12, the clamping face is moved out of a locking position for locking the hinge arm on the mounting plate into an unlocking position (shown).





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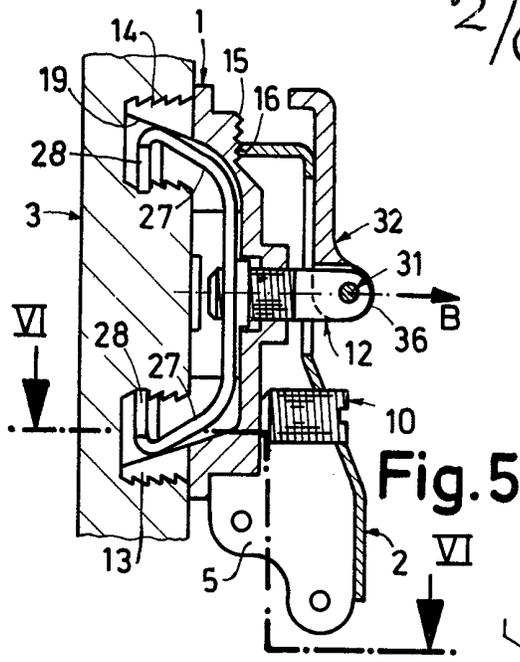


Fig. 5

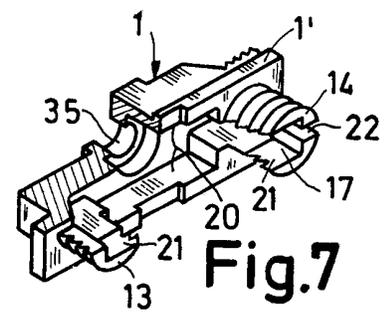


Fig. 7

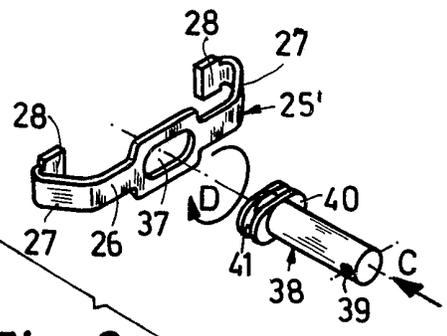


Fig. 8

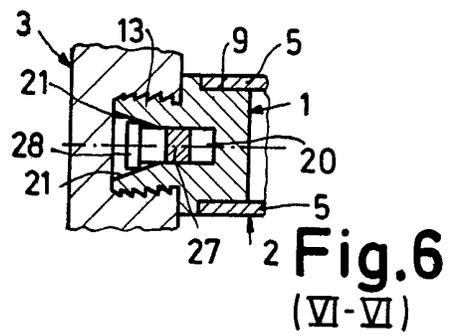


Fig. 6
(VI-VI)

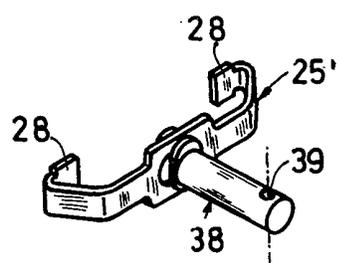


Fig. 9

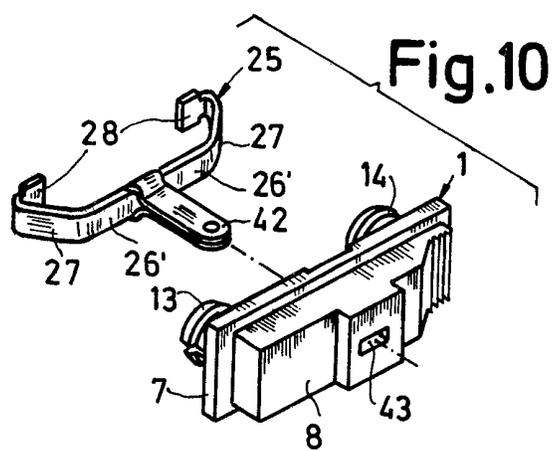


Fig. 10

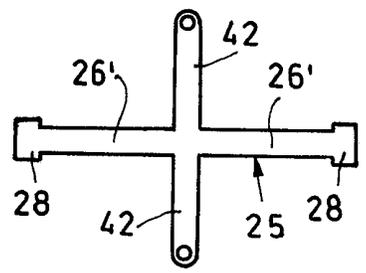


Fig. 11

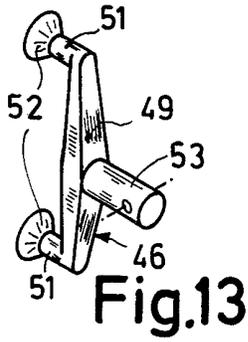


Fig. 13

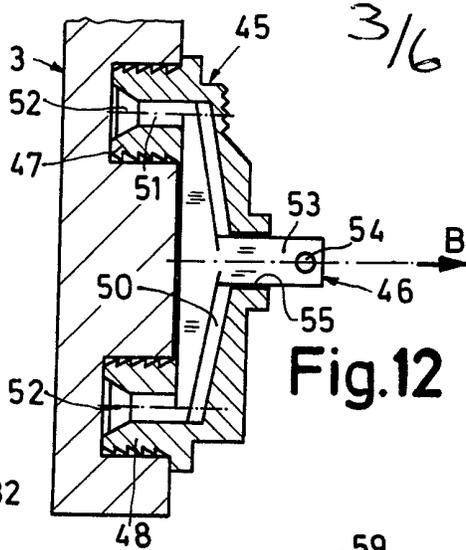


Fig. 12

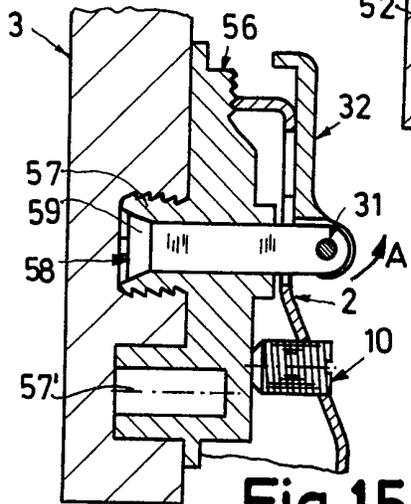


Fig. 15

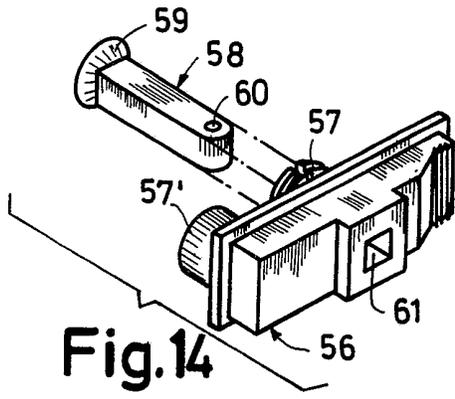


Fig. 14

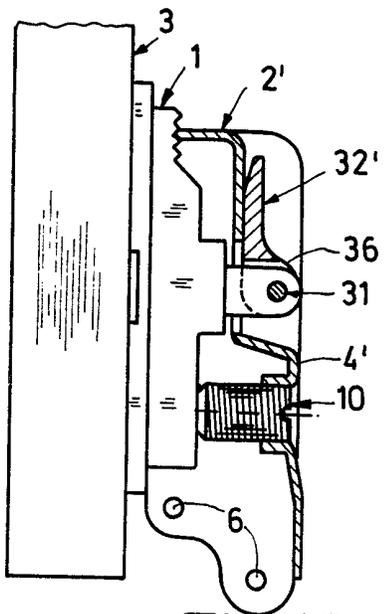


Fig. 16

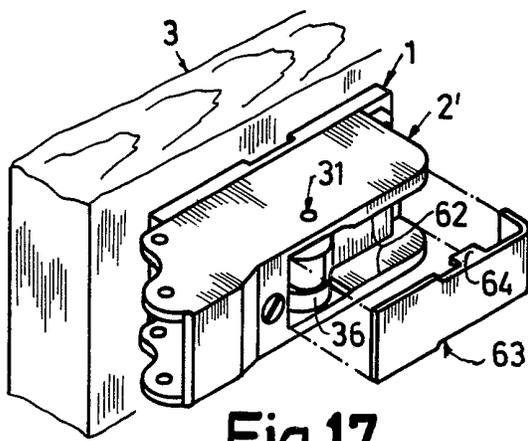


Fig. 17

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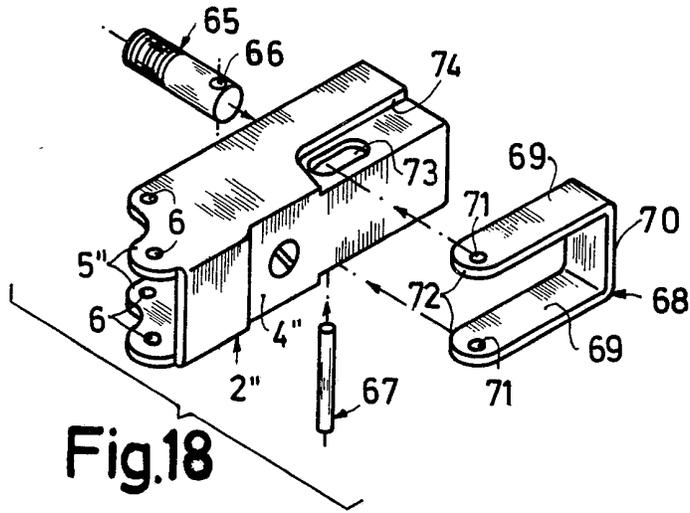


Fig.18

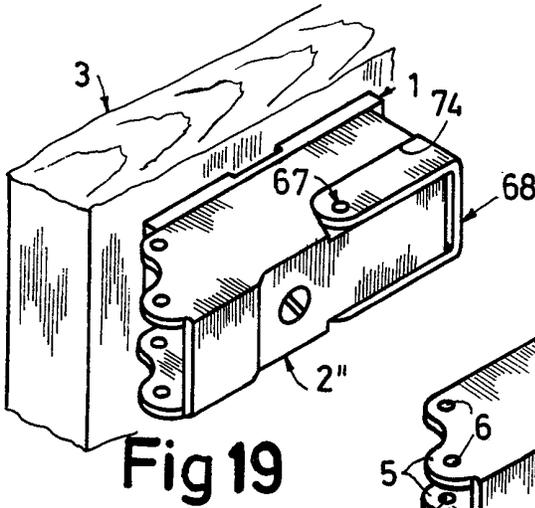


Fig.19

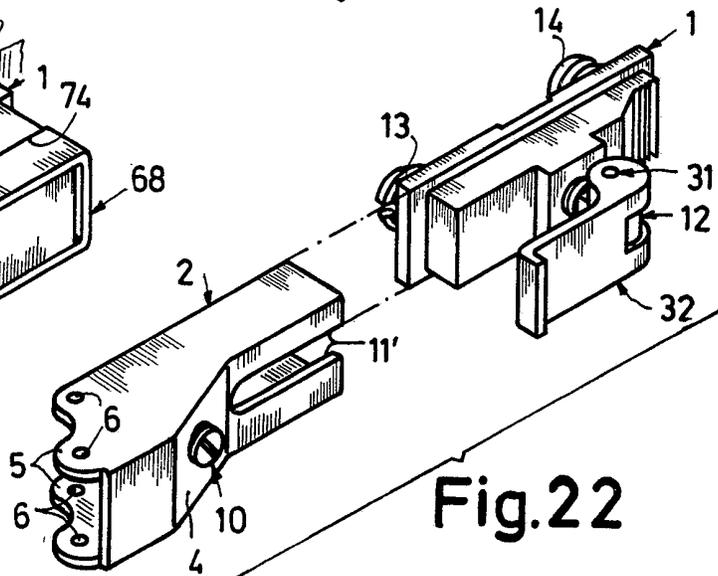


Fig.22

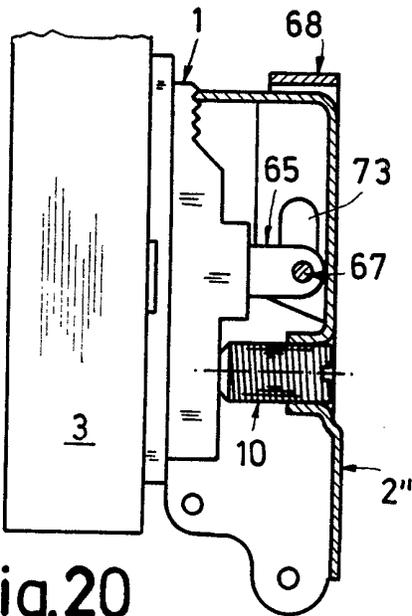


Fig.20

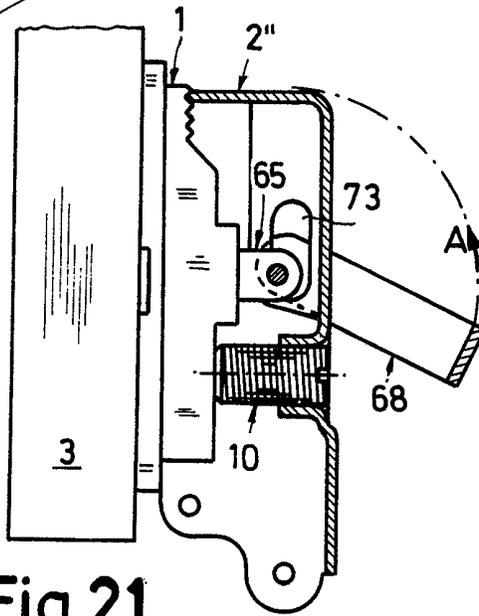


Fig.21

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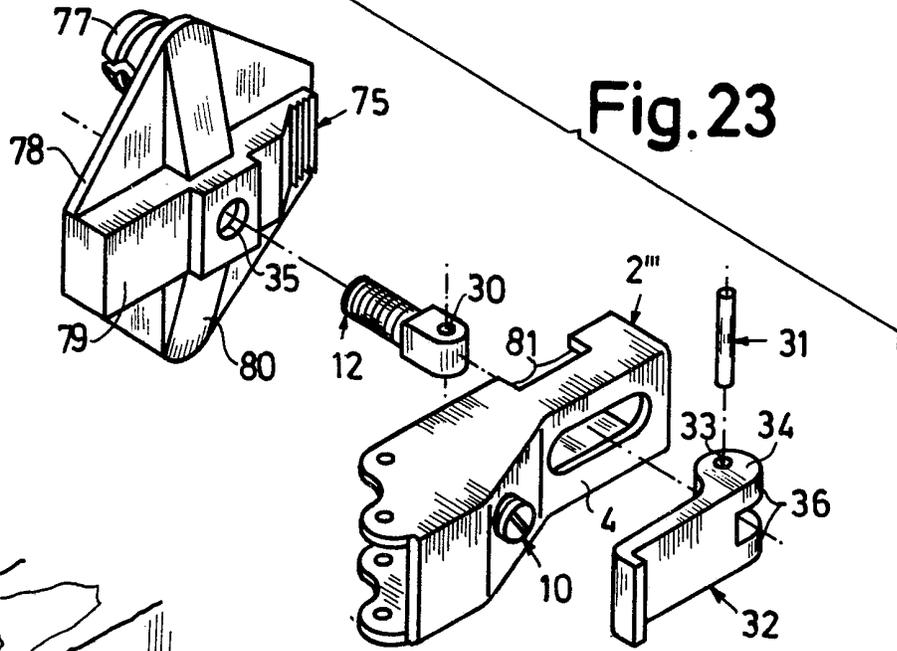


Fig. 23

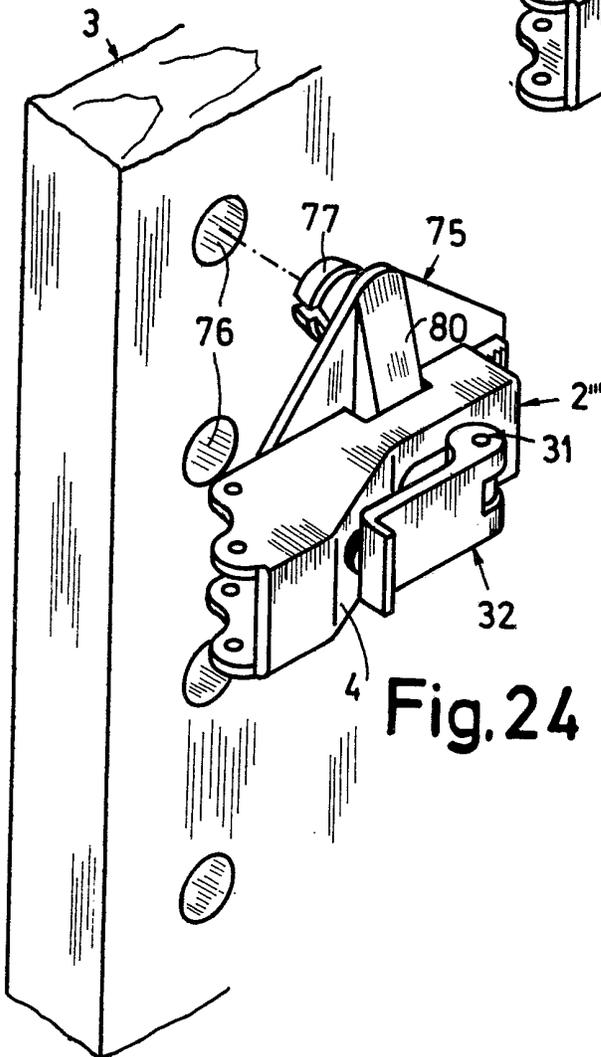


Fig. 24

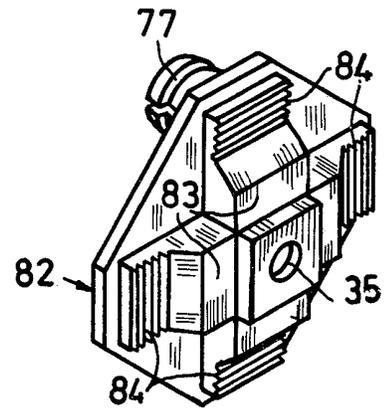
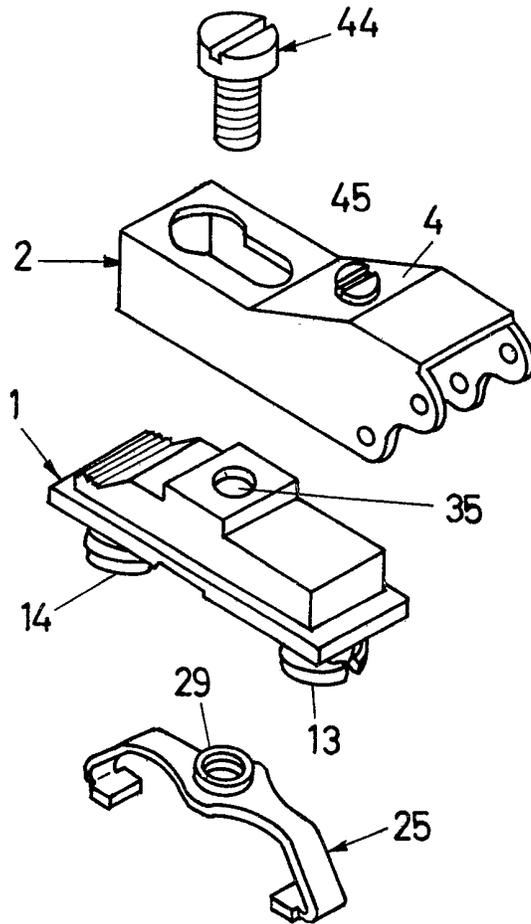


Fig. 25

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Fig.26



SPECIFICATION

Improvements in and Relating to Means for Fastening Furniture Hinges

5 The invention relates to means for fastening a furniture hinge arm on a furniture part, said means comprising a mounting plate and a connection element which projects into the mounting plate when the hinge arm is fastened on the plate. The connection element is in contact
10 by means of a clamping face against a contact face on the hinge arm.

It is nowadays generally accepted practice for furniture hinges that the hinge arm which is used as the bearing body, for example for the hinge
15 pivot fastened on the furniture, is not fastened directly on a furniture side wall, but this fastening is carried out with the assistance of a mounting plate, which, together with a suitable means, for example, by means of screws or fastening plugs,
20 is fastened on the furniture side wall and supports the furniture hinge arm preferably in an adjustable manner.

In the known furniture hinges, the furniture hinge arm as well as the mounting plate are
25 connected to each other by means of a clamping screw, the latter reaching through an opening in the hinge arm into a screw-thread on the mounting plate. For tightening the clamping screw, a special tool, namely a screwdriver, is
30 necessary. Moreover, the tightening of the clamping screw in these well known furniture hinges is relatively time-consuming, because the screwdriver, as a rule, must be rotated several times around its axis.

35 The object of the invention is to provide a mounting plate by means of which the attaching of a hinge arm by a single, rapidly executed manual movement is possible without the assistance of tools.

40 To this end, a mounting plate of the above described kind according to the invention is designed so that the connection element consists of at least two components pivotally connected to each other, and on swivelling one part relative to the other part the clamping face is moved from a
45 position locking the hinge arm on the mounting plate into a hinge arm non-locking position.

For fastening the hinge arm on the mounting plate or for releasing the hinge arm once again, it is only necessary according to the invention to rotate both parts of the connecting elements
50 relative to each other which can be carried out by pressure exerted with the thumb without any special tool. For the rotation of the parts from the nonlocking position into the locking position and vice versa, a swivelling angle of a maximum of
55 180°, but as a rule, a swivelling angle between 90° and 180°, is necessary.

60 According to one of the embodiments of the invention, the connection element consists of a clamping element and of a tilting lever, the clamping element extending at one end into the mounting plate and carrying at its other end a swivelling tilting lever. The clamping face is here

65 preferably formed as an eccentrically acting face on the tilting lever, said face being arranged around the swivelling axis of the tilting lever.

The face acting as eccentric is formed for example, by the circumferential face of a pivot eye
70 provided on the tilting lever, said circumferential face having at least one section in which the distance of the circumferential face from the pivot axis of the tilting lever increases progressively.

The tilting lever can, however, be made also of flat, strip shaped material, for example by a
75 punching or bending process in the form of a bracket-shaped element, in which both bracket arms are parallel to each other and are arranged edgewise to the swivelling axis of the tilting lever.
80 The bracket arms are rounded at their free ends and have there a hole for the pivot pin forming the swivelling axis. The rounded ends of the bracket arms form two faces acting as eccentrics, in which the holes are arranged preferably so that
85 the distance of each hole from one of the longitudinal sides of the associated bracket arms is smaller than from the other longitudinal side of the associated bracket arm.

The mounting plate according to the invention is furthermore designed preferably in such a
90 manner that the clamping element is used together with fastening plugs provided for anchoring on the mounting plate, or, however, for anchoring of two fastening plugs provided on the
95 mounting plate. This embodiment is especially advantageous because in this case with a single, simple manual movement (tilting of the tilting lever), the anchoring of the mounting plate on the furniture side wall is carried out as well as the
100 anchoring of the hinge arm on the mounting plate.

The mounting plate according to the invention is preferably delivered together with the hinge arm held on the mounting plate and together with the preassembled clamping element as well as
105 with the associated tilting lever by the fitting or hinge maker, so that the user (for example the furniture maker) can preassemble such a mounting plate merely, for example, by the insertion of the fastening plugs on a furniture side
110 wall, in which the final fastening is then carried out by the running over of the tilting lever.

The present invention relates especially also to a furniture fitting component, especially a mounting plate, for a furniture hinge arm,
115 together with two fastening plugs which are inserted into a bore of a furniture component and this fastening pin can have an opening, the fastening plug having in this opening possibly a sloping first inclined face arranged at an angle to the plug axis and, on the circumference and opposite the inclined surface this hole can be open; it can have also a locking element which has two locking sections connected to each other
120 by a connection section, one of the locking sections being arranged into an opening and sliding there, on sliding of the locking element, into a position in which the fastening plugs are not locked, into a position which locks the

fastening plugs and it slides on the first inclined face.

The furniture fitting component in this case is designed so that each locking section has at least one claw-like projection arranged across the axis of the fastening plug and projecting laterally away from the first inclined face, the free end of this claw-like projection being situated, in the nonlocked position, within the opening and within the circumferential line of the fastening plug and its free end projecting in the locked position beyond the circumferential line of the fastening plug.

By means of this design, a furniture fitting or a mounting plate is obtained which ensures by means of relatively simple design and above all also with scope for simple and low cost production, especially also of the locking element, a secure anchoring of both fastening plugs in the associated holes in a furniture component by means of a single locking element.

On moving the locking element out of the first, nonlocking position into the second, locking position—for example by means of a simple clamping screw or, however, by means of a clamping element—the locking sections on the given first inclined face are guided into the associated fastening plug in such a manner that the claw-like projection emerges to an increasing extent beyond the circumferential line of the fastening plug, by means of which this projection for the finally locked furniture fitting component is firmly in contact against the wall of the hole in the furniture component and/or it is pushed into this wall. By means of the claw-like projection which projects beyond the circumferential line of the fastening plug, at the same time the fastening plug is also firmly pressed on its circumferential region opposite the projection against the wall of the bore in the furniture component.

The fastening plugs in the furniture fitting component according to the invention are provided on their circumference with preferably several hooking circumferential ribs which run across or at right angles to the plug axis.

In a preferred embodiment of the invention at least one fastening plug, but preferably both fastening plugs, are provided in addition to the opening for the exit of the claw-like projection in its opening, with at least another, second inclined face, which acts in conjunction with the locking section of the locking element situated within the opening in such a manner that on sliding the locking element out of the nonlocking position into the locking position, yet another expansion of the parts of the fastening plug separated from each other by the longitudinal slot is obtained.

The locking element in accordance with the present invention is preferably a bracket-shaped element made of flat material. Such a locking element can be produced by means of a simple pressing and bending operation. Sheet metal can be used as the material for the locking element. It is preferable to use a material, for a spring steel, which can at least be deformed within certain

limits elastically. This then has advantages especially if the means for tightening or for moving of the locking element on a mounting plate, used for a hinge arm, are used at the same time for fastening of the hinge arm on the mounting plate. In the case of an elastically deformable locking element it is then possible by means of an adjusting arrangement, for example, by means of an adjusting screw provided on the hinge arm and/or on the mounting plate, the distance between the mounting plate and hinge arm and hence to vary the distance between the face of the furniture part carrying the mounting plate and the hinge arm, without previously operating means for clamping of the locking element and for holding the hinge arm on the mounting plate.

This latter advantage is obtained if the locking element which is to a certain extent elastically deformable, but which has no claw-like projections, which are pressed in the above described manner against the wall of the bores accommodating fastening plugs.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a perspective exploded view of a mounting plate in the form of a base or adjusting plate for a furniture hinge arm together with a locking element for anchoring the fastening plugs of the mounting plate into the bores in a furniture part, a clamping element in dismantled state as well as a hinge arm detached from the base or adjusting plate;

Fig. 2 is a perspective view of the base or adjusting plate together with a hinge arm fastened on this plate previous to the fastening of the plate on the furniture side wall;

Fig. 3 is a view similar to Fig. 2 but after fastening on the furniture side wall;

Fig. 4 is a longitudinal cross section through the base or adjusting plate as well as through the hinge arm after the insertion of the fastening plugs into the bores of the furniture side wall, while the clamping element is not yet clamped;

Fig. 5 is a view similar to Fig. 4 but with clamped clamping element;

Fig. 6 is a section along the line VI—VI of Fig. 5;

Fig. 7 is a perspective view of the base or adjusting plate according to Figs. 1 to 6, viewed from the underside provided with fastening plugs, partly in cross section;

Fig. 8 is a perspective view of a modified embodiment of the locking element together with the associated clamping element or clamping pin, before connecting the clamping pin with a locking element;

Fig. 9 is a view similar to Fig. 8 but after connecting the clamping pin and locking element;

Fig. 10 is a perspective exploded view of a further embodiment of the mounting plate according to the invention in a form of a base or adjusting plate for a furniture hinge arm with the

locking element and clamping pin are made as an integral unit;

Fig. 11 is a plan view of the blank for the locking element according to Fig. 10 made integrally with the clamping pin;

Fig. 12 is a cross section of a further embodiment of a mounting plate in the form of a base or adjusting plate for a furniture hinge arm;

Fig. 13 is a perspective view of a locking element together with the integrally formed clamping pin for use with the mounting plate according to Fig. 12;

Fig. 14 is a perspective exploded view of a further embodiment of a mounting plate in the form of a base or adjusting plate for a furniture hinge arm with the clamping pin provided with an expanding cone, the pin being removed from the mounting plate;

Fig. 15 is a longitudinal cross section through the mounting plate according to Fig. 14 fastened on one furniture side wall as well as a cross section through the hinge arm fastened on this mounting plate;

Fig. 16 is a side view of a further embodiment of the mounting plate in the form of a base or adjusting plate with fastened furniture hinge arm, partly in cross section;

Fig. 17 is a perspective view of the mounting plate as well as of the hinge arm according to Fig. 16 together with a covering cap;

Fig. 18 is a perspective view of the furniture hinge arm together with the clamping pin and tilting or clamping lever of a modified embodiment;

Fig. 19 is a perspective view of the hinge arm according to Fig. 18 after its fastening on the furniture side wall;

Fig. 20 is the hinge arm according to Fig. 19 fastened on the furniture side wall, as well as the associated mounting plate, for locked hinge arm, in which the hinge arm is shown in cross section;

Fig. 21 is a view similar to Fig. 20 but previous to the locking of the hinge arm;

Fig. 22 is a perspective view of a modified embodiment of the mounting plate together with the hinge arm detached from the mounting plate;

Fig. 23 is a further embodiment of the mounting plate in the form of a base or adjusting plate for a furniture hinge arm as well as for a fastening in the bores in the furniture wall, the bores being arranged in line in the vertical direction, together with the clamping element in the dismantled condition as well as with the hinge arm detached from the base or adjusting plate;

Fig. 24 is a perspective view of the adjusting plate together with the hinge arm fastened on this plate previous to the insertion of the fastening plugs into the bores of the furniture wall and previous to the clamping of the clamping element;

Fig. 25 is a perspective view of a base or adjusting plate, which can be fastened optionally in the holes arranged in the horizontal or in the vertical direction side by side in the furniture side wall;

Fig. 26 is a perspective exploded view of a

further embodiment of the mounting plate according to the invention together with the locking element and hinge arm.

In Fig. 1 to 7, the numeral 1 designates a mounting plate in the form of a base or adjusting plate, by means of which a hinge arm 2 can be fastened in an adjustable manner on the inner surface of a furniture side wall 3. The hinge arm 2 has a U shaped cross section, in which the webs 5 are connected by a yoke 4 said webs having at one end pivot bores 6 for supporting the pivoting axis not described here in detail, by means of which the hinge arm, by using hinge levers or links which are also not shown in detail, is pivotally connected to a second hinge part which can be fastened on a furniture door.

The mounting plate 1 consists basically of a rectangular plate section 7, on one side of which is formed a similar rectangular raised part 8; the longitudinal sides 9 of this raised part are enclosed by the webs 5 of the hinge arm 2 mounted on the mounting plate 1 so that rotation is prevented, and so that the hinge arm 2 is held in the longitudinal direction, i.e. parallel to the inner face of the furniture side wall 3 and parallel to the sides of the webs 5, as well as in the direction at right angles to the inner surface of the furniture side wall 3 so that they can be adjusted on the mounting plate 1. For the adjustment in the direction at right angles to the inner surface of the furniture side walls, and adjusting screw 10 is used, which is guided in a screw thread in the yoke 4 and which is in contact by its free end, not visible in Fig. 1, against the upper side of the raised part 8. For the adjustment in the longitudinal direction, i.e. in a direction parallel to the inner face of the furniture side wall 3 and parallel to the sides of the webs 5, a longitudinal slot 11 is formed in the yoke 4, through which passes a clamping bolt 12 of the clamping element yet to be described below in detail. It is also possible to arrange the slot 11 in such a manner that it is open at the end remote from the pivot bores 6 of the hinge arm so that subsequently, for fastening the hinge arm 2 on the mounting plate 1, this hinge arm can be pushed from the rear on the mounting plate with preassembled clamping bolt 12 and the remaining associated elements of the clamping element.

On the surface of the section 7 facing away from the raised part 8 are formed two fastening plugs 13 and 14 with a distance between them, the axes of these fastening plugs being at right angles to the corresponding surface sides of the plate parts. Each fastening plug 13 or 14 is situated in the region of an end of the plate section 7, the fastening plug 14 being situated approximately under the face region of the raised part 8 provided with several ratchet grooves 15, with which engages a ratchet tooth 16 when the hinge arm 2 is locked; the ratchet tooth 16 is provided on a cranked section of the end of the hinge arm 2 remote from the pivot bores 6. If the slot 11 in the above described manner is open

towards this end of the hinge arm 2 then, of course, the cranked part which carries the ratchet tooth 16 is also correspondingly slotted.

The fastening plug 13 is situated

5 approximately below a surface region of the raised part 8, against which (surface region) the adjusting screw 10 rests by its free end (cf. Fig. 4).

10 Each of the fastening plugs 13 and 14 is provided with an opening 17, which is open towards the free end of the fastening plug 13 or 14 as well as at 18 towards the circumference of the fastening plug 13 or 14. The openings 18 in this case are provided on the opposite facing circumferential regions of the fastening plugs 13 and 14.

20 Opposite the opening 18, moreover, the opening 17 of each plug is provided with a sloping face 19, which runs at an angle to the plug axis, the position and the inclination of the inclined face 19 being such that the distance between these inclined faces and the opening 18, starting from the free end of the fastening plug 13 or 14 towards the plate section 7, will steadily decrease or the distance of the inclined surface 19, starting from the enclosed circumference region of the fastening plugs 13, 14 opposite the opening 18, will steadily increase from the free end of the fastening plug towards the plate part 7.

25 This circumference region, however, can be provided with a longitudinal slot.

30 The openings 17 join an opening 20, which is provided on those surface sides of the mounting plate 1 which carry fastening plugs 14 and 13 and their openings project along the longitudinal direction of this mounting plate. The opening 20 becomes wider in the middle region of the mounting plate 1.

35 As shown further by Fig. 4 and 5, the inclined surfaces 19 project up to the opening 20 and into it.

40 In the embodiments shown, the inclined faces 19 are plane surfaces, which are situated across or at right angles to the longitudinal sides 1' of the mounting plate 1, so that, on both sides of the inclined face 19 within the opening 17, a face 21 is provided at right angles to this inclined surface which forms a boundary to the opening 17; this face 21 runs also at an angle to the plug axis in such a manner that the distance between the opposite faces 21 of the fastening plug 13, 14 becomes greater towards the free end of the fastening plug. Furthermore each of the fastening plugs 13 or 14 has on the inclined surface 19 a slot 22 in the longitudinal direction.

45 For locking the fastening plugs 13 and 14 into the bores 23 and 24 on the inner face of the furniture side wall 3 and hence for fastening the mounting plate 1 on the furniture wall 3, a locking element 25 is used, which has a bracket shape and which is preferably made of metal or sheet steel by pressing and bending.

50 This bracket shaped locking element 25 consists of a middle, basically flat section 26, on both ends of which are formed bracket arms

70 which are at an angle to the section 26 and project outwards, each bracket arm having on its free end an angle part 28, which is situated with its sides approximately parallel to the sides of the section 26. Both angle parts 28, which are situated on the same side of the section 26, are designed so that the free end of the angle parts are opposite each other.

75 The locking element 25 is designed so that the distance between the bracket arms 27 at the transition region between the bracket arm and angle part, is approximately equal to the interval which the inclined faces 19 of both fastening plugs 13 and 14 have in the region of the free ends of these fastening plugs. Moreover, the angle parts 28 are designed so that the width of these angle parts corresponds approximately to the distance of the surfaces 21 on the free end of the fastening plug 13, while the length of the angle part 28 is equal to or slightly smaller than the distance which the inclined faces 18 have from the edge of the opening 18 on the free end of the fastening plugs 13 and 14.

80 In the middle region, the flat arm 26 has a tapped hole 29, with which the threaded end of the clamping bolt 12 engages. On the other end of the clamping bolt 13 is provided a bore 30 which runs at right angles to the axis of this clamping bolt, this bore 30 being used for a pivot pin 31, by means of which a tilting lever 32 can be fastened about a pivoting axis on the clamping bolt 12. For this purpose, the tilting lever 32 is forked at one end and there it has two eye sections 34 which have a bore 33, the bores 33 being arranged with aligned axes behind each other. When the tilting lever 32 is fastened on the clamping bolt 12 so that the tilting lever can swivel, then the clamping bolt 12 provided with the hole 30 and with a flat end in the region of this hole, is situated between the eye sections 34, in which the pivot pin 31 arranged in the bore 30 extends at both ends, which project beyond the clamping bolt 12, into the bores 33.

85 For the fastening of the mounting plate 1 or of the hinge arm 2 on the furniture side wall 3, the clamping bolt 12 is first connected with the tilting lever 32 by means of the pivot pin 31 in the above described manner.

90 Subsequently the hinge arm 2 is placed on the mounting plate 1, so that the webs 5 of the hinge arm enclose the longitudinal sides 9 of the raised part 8 so that no rotation is possible.

95 After that, the locking element 25 is inserted into the mounting plate 1 from the side provided with the fastening plugs 13 and 14 in such a manner that the flat arm 26 of the locking element 25 in the opening 20 and in the angle part 28, together with the connected bracket arms 27, are situated within the openings 17 of the fastening plugs 13 and 14, in which the longitudinal sides 28' of the angle part 28 contact the surface 21 and in addition the bracket arms 27 are in contact at the transition point between the bracket arm angle part on the inclined surface 19 in the region of the free end of the relevant

fastening plugs 13 or 14. In this position the angle parts 28 do not project over the circumferential surface of the fastening plugs 13 and 14.

5 Now the clamping bolt 12 with its threaded end in front is screwed through the slot 11 as well as through a hole 35 in the middle part of the mounting plate 1 into the screw thread 29 of the locking element 25, so that the parts (hinge arm 2, mounting plate 1 and the locking element 25) are loosely held against each other.

10 In this condition the mounting plate 1 is inserted with its fastening plugs 13 and 14 into the holes 23 and 24 of the furniture side wall; subsequently the clamping bolt 12 is turned sufficiently far into the tapped hole 29 that the hinge arm 2 is to some extent in firm contact against the mounting plate 1 under pressure. This pressure is ensured by the fact that the eyes 34 are laterally away from the longitudinal sides of the slot 11 on that surface of the yoke 4 which faces away from the mounting plate 1. The parts then assumed the positions shown in Fig. 4, in which the pivot pin 31 is at right angles to the longitudinal axis or at right angles to the webs 5 of the hinge arms 2. The free end of the tilting lever 32 in this case is situated adjacent to the hinge arm 2 provided with pivot pin bearing holes 6.

20 As also shown in Fig. 4, the eyes 34 of the tilting lever 32 are designed so that the eye circumferences 36 form a surface acting as an eccentric, which surface has a distance which increases gradually from the pivot pins 31. In the conditions shown in Fig. 4, in which the fastening plugs 13 and 14 are not yet locked finally into the holes 23 and 24 of the furniture side wall 3, the eyes 34 are situated with that part of their circumference 36 on the yoke surface 4 which has the minimum distance from the pivot pin 31.

35 For the final anchoring of the fastening plugs 13 and 14 into the holes 23 and 24, the tilting lever 32 is tilted in the direction of the arrow A, i.e. for the view selected for Fig. 4 in the anticlockwise direction about the pivot pin 31 into the position shown in Fig. 5, in which the free end of this tilting lever is situated adjacent to the end of the hinge arm 2 facing away from the pivot bores 6 and in which the eyes 34 are in contact with the yoke surface 4 with that part of the eyes circumference 36 which has the maximum distance away from the pivot pin 31. On pivoting the tilting lever 32 in the direction of the arrow A, the clamping bolt, owing to the eccentric effect of the eye circumferences 36, is pulled out in the direction of the arrow B to an increasing extent from the slot 11, by means of which the locking element 25 is also moved in the same direction and the bracket arms 27 on their transition point from bracket arm to angle slide on the inclined surface 19 towards the mounting plate 1. This sliding on the inclined surfaces 19 causes the angle parts 28 to project by their free ends increasingly beyond the circumferential surface of the fastening plugs 13 and 14 so that they are

70 pushed with these free ends into the material of the furniture side wall or into the wall of the holes 23 and 24. At the same time the longitudinal slides 28' of the angle parts 28 slide on the sloping surfaces 21, by means of which follows also a spreading apart of the fastening plug halves produced by the slot 22.

75 As soon as the fastening plugs 13 and 14, owing to the completion of the expanding, are pressed sufficiently firmly against the wall of the holes 23 and 24 and the angle parts 28 with their free ends have been pressed sufficiently deep into the material of the furniture side wall 3, there follows, on further tilting of the tilting lever 32, basically only a deformation and if the locking element 25 is made of a flexible material, for example of a spring steel, then there follows only an elastic deformation of the locking element 25 until the tilting lever 32 has reached the position shown in Fig. 5.

80 It is especially advantageous if the locking element 25 is made of a spring material, because in this case, even if the fastening plugs 13 and 14 have been anchored and if the hinge arm 2 is fastened on a mounting plate, an adjustment of the distance between the hinge arm 2 and the inner face of the furniture side wall 3 is possible by means of the adjusting screw 10. If now the clamping bolt 12 has been already initially rotated so far into the tapped hole 29, that already by means of the adjusting screw 10, which is not in contact with the mounting plate 1, a locking of the fastening plugs 13 and 14 in the holes 23 and 24 is possible as well as a fastening of the hinge arm 2 on the mounting plate with sufficient strength, so that for adjustment of the distance between the furniture side wall and the hinge arm the adjusting screw 10 can be rotated to an increasing extent into the bore on the yoke 4, in which the hinge arm 2 on its end provided with the pivot bores 6 is then removed under elastic deformation of the locking element 25 to an increasing extent from the furniture side wall 3. By the reversed rotation of the adjusting screw 10, this distance between the furniture side wall 3 and hinge arm 2 can then be once again reduced.

85 Furthermore it is possible in the embodiment shown in Figs. 1—7, to select the width of the slot 11 so that the clamping bolt 12 with its flattened end which has the hole 30 can be secured in this slot against rotation. This embodiment has the advantage that the pivot pin 31 is situated in a constrained manner in the position necessary for the final locking of the fastening plugs 13 and 14 at right angles to the longitudinal axis of the hinge arm 2, so that the attaching of the mounting plate 1 with the hinge arm 2 on the furniture side wall 3 is simplified for non specialists. In this embodiment, however, it is necessary to continue work in the fastening of the locking element 25 and to the hinge arm 2 on the mounting plate 1 in such a manner that after the insertion of the locking element 25 into the opening 17 and 20, the clamping bolt 12, which is still separated from the tilting lever 32, is first

screwed through the bore 35 into the tapped hole 29, after which the hinge arm 2 is then mounted on the mounting plate 1 in such a manner that the end of the clamping bolt 12 provided with the bore 30 extends through the slot 11.

Subsequently the fastening of the tilting lever 32 on the clamping bolt 12 is carried out with the assistance of the pivot pin 31.

Figures 8 and 9 show a locking element 25', which differs from the locking elements 25 in Figs. 1—7 by the feature that the tapped hole 29 is replaced by a slot 37. Otherwise the locking element 25' corresponds to the locking element 25. In conjunction with the locking element 25' a clamping bolt 38 is used, which has basically a cylindrical shape and which has at one end a bore 39 for the pivot pin 31 used for pivoting connection of the tilting lever 32. On the other end the clamping bolt has an elliptical head 40 whose cross section matches the cross section of the slot 37. The elliptical head 40 has a circumferential groove 41, which is designed so that the bottom of this circumferential groove has a circular cylindrical section, the cross section of which is approximately equal to the cross section of the clamping bolt 38 outside the head 40.

For the connection of the clamping bolt 38 with the locking element 25, the clamping bolt is pushed at first in the direction of the arrow C with the head 40 into the slot 37, after which it is rotated from the position shown in Fig. 8, according to the arrow D, through 90° about the bolt axis, so that the parts have the position shown in Fig. 9 and the head 40 will, in the region of the circumferential groove 41, enclose on both sides the locking element 25 or the locking element section 26.

Figures 10 and 11 show a locking element 25'', which differs from the locking element 25 of Figs. 1—7 by the feature, that instead of a clamping bolt on the locking element 25'' or on the section 26' of this locking element, a formed bracket 42 is used.

This design of the locking element has the advantage that the locking element 25'' including the bracket 42 which acts as clamping bolt can be produced as an integral unit by a simple pressing and bending operation. Fig. 11 shows for this purpose the blank, produced by pressing. After pressing of the blank, both brackets 42 are bent upwards, so that they are at right angles to the section 26', while the subsequent bracket arms 27 as well as the angle parts 28 forming parts are bent at an angle downwards or towards the sides.

In this embodiment, in conjunction with the rectangular cross section of the bracket 42, there is used a mounting plate 1, which instead of the bore 35 has a through rectangular opening 43, in which the parallel brackets 42, which also are in contact with each other, are then guided so that they cannot rotate.

Figures 12 and 13 show the mounting plate 45 as well as the associated locking element 46, in which the mounting plate 45, as shown in the embodiments according to Figs. 1—11, differs

from the mounting plate 1 basically by the feature that the fastening plugs 47 and 48 provided on one side of the mounting plate 45 are used as expanding plugs with at least two longitudinal slots, which latter are not described here in detail. Each fastening plug 47 and 48 has a central bore, which is extended towards the free end thereof in a conical manner. The longitudinal slots of the fastening plugs 47 and 48 are arranged so that one longitudinal slot of a fastening plug 47 or 48 faces a longitudinal slot of the other fastening plug 48 or 47, the opposite longitudinal slots being sufficiently wide that an insertion of the locking element 46 into the mounting plate 45 or into the fastening plugs from the underside of the mounting plate 45 provided with these fastening plugs, is possible, i.e. the opposite longitudinal slots of the fastening plugs 47 and 48 have a width which is equal to or slightly greater than the width of the middle, web shaped section 49 of the locking element 46. The central openings of the fastening plugs 47 and 48 as well as the opposite facing slots of these fastening plugs join an opening 50, which is provided on the underside of the mounting plate 45 provided with the fastening plugs, and when the locking element 46 is mounted on the mounting plate, the section 49 accommodates this locking element. The opening 50, which projects in the longitudinal direction of the rectangular mounting plate 45, has a width which is equal to or slightly greater than the width of the section 49, so that the depth of the opening 50 is greater than the depth of the section 49 in the direction of the axes of the fastening plugs 47 and 48 (Fig. 12).

On both ends of the section 49 is formed a bolt 51, one end of which is connected with the section 49 and the other end of which expands to form a truncated conical expanding element 52. The bolts 51 are parallel to each other and they project from the same side of the section 49. In the middle part of the section 49 a clamping bolt 53 is formed on this section which bolt is also at right angles to the longitudinal axis of the section 49 and which runs parallel to the bolt 51. On the free end of the clamping bolt 53 is provided a hold 54, which is used, in the same manner as the holes 30 and 39 in the embodiments according to Figs. 1—11, for providing bearings for the tilting lever 32, which is not shown in Figs. 12 and 13, by means of the pivot pins 31.

For fastening the mounting plate 45 on the furniture wall 3, the mounting plate is at first preassembled with the locking element 46, i.e. the locking element 46 is pushed from the underside of the mounting plate 45 in such a manner that the bolt 51 together with its expanding element 52 are situated in the central openings of the fastening plugs 47 and 48, while the clamping bolt 53 projects through a hole 55 and projects beyond the surface of the mounting plate 45 which faces away from the fastening plugs 47 and 48. Subsequently the hinge arm, which is not shown in detail in Figs. 12 and 13, is placed on the mounting plate 45, so that the

webs 5 will firmly enclose the mounting plate 45 on the longitudinal side so that rotation is not possible, so that the end of the clamping bolt 53 projects through the slot 11 beyond the yoke 4 of the hinge arm 2. Now the tilting lever 32 is placed on the projecting end of the expanding bolt 53 so that the section of the circumference 36 which is closest to the hole 54 or the hole 33, is in contact against the upper side of the yoke 4.

In this case the free end is situated adjacent to the hinge arm end provided with pivot bores 6. Subsequently the pivot pin 31 is pushed into the holes 33 and 54. In this condition in which the mounting plate, preassembled with the hinge arm, is supplied by a fitting or hinge maker to the user, for example to a furniture maker, the fastening plugs 47 and 48 are pushed into the holes 23 and 24 of the furniture side wall 3. Subsequently the tilting lever 32 is rotated so that its free end is now adjacent to the other end of the hinge arm 2 free from the pivot bores 6. On swivelling the tilting lever 32, the circumference 36, acting as eccentric, slides on the upper face of the yoke 4, so that the expanding bolt 32 is moved in the direction of the arrow B and hence the bolts 51 are pulled, while expanding the fastening plugs 47 and 48, into these plugs.

Figures 14 and 15 show an embodiment, which differs basically from the embodiments according to Figs. 12 and 13 by the feature that a mounting plate 56 is used, which has only a single actuating plug designed as an expanding plug. This fastening plug 57 is once again longitudinally slotted and, in the same manner as the fastening plugs 13 and 14 as well as 47 and 48, has on its circumference, hooking, projecting ribs. For expanding the fastening plug 47, a clamping bolt 58 is used which has a rectangular cross section and which diverges at one end to form an expanding body 59 as a truncated cone. The clamping bolt 58 has at the other end once again a hole 60, which corresponds to the hole 54 and it is used for pivoting the tilting lever 32 by means of the pivot pin 31. Corresponding to the rectangular cross section of the clamping bolt 58 there is provided in the mounting plate 56 a matching rectangular opening 61, through which projects the clamping bolt 58. In addition, the mounting plate 56 has at its end which is adjacent to the bearing bore 6 in the hinge arm, a plug 57', which, when the mounting plate 56 is installed on the furniture wall 3, also engages into a hole in this furniture side wall so that the mounting plate 56 is secured against undesirable rotation. The expanding of the fastening plug 57 as well as the pressing of the hinge arm 2 against the mounting plate 56 are carried out once again by tilting the tilting lever 32 in the direction of the arrow A, as described in conjunction with Figs.

1—12. Figures 16 and 17 show an embodiment in which is used, for example, the mounting plate 1 of Figs. 1 to 11, together with one of the locking elements 25, 25' or 25''. It is, however, also possible in this embodiment, to use the mounting plate 45 together with the locking element 46 or

the mounting plate 56 together with the locking element or clamping bolt 58.

The embodiment according to Figs. 16 and 17 is different from the above described embodiments only by the feature that a hinge arm 2' is provided whose yokes 4' has a stepped arrangement in such a manner that the webs of the hinge arm 2' project somewhat from the middle region of this hinge arm up to the end remote from the pivot bore 6, beyond the upper face of the yoke 4', so that at this upper face a space 62 is formed between the projecting webs, in which the tilting lever 32' is situated when the mounting plate is locked as well as when the hinge arm 2' is fastened on this mounting plate. The tilting lever 32' differs from the tilting lever 32 of the embodiments according to Figs. 1 to 15 only by the feature that the tilting lever 32' is shorter, so that it does not project in the locked condition beyond the end of the hinge arm 2' which is remote from the pivot bore 6, (Fig. 16). For closing this space 62, a covering cap 63 is used which is preferably made from plastics and which has on both its longitudinal sides an angle part 64, by means of which the covering cap can be fastened by clamping fit on the hinge arm 2, so that the tilting lever 32 is no longer visible when the hinge arm is fastened.

Figures 18 to 21 show an embodiment in which a clamping bolt 65 is used which can be screwed by its one threaded end into the tapped hole 29 of the locking element 25 of the mounting plate 1 (Figs. 1 to 7). On the other end the threaded bolt 65 has a hole 66 for a pivot pin 67 for pivoting a bracket shaped tilting lever 68. This tilting lever 68 is made as a simple pressed and bent component of sheet metal and it has two flat webs 69 parallel to each other which are connected by a yoke 70. On the other end of each web is provided a hole 71 for the pivot pin 67, this hole 71 being disposed laterally away from the middle or the longitudinal axis of the webs 69 so that the rounded end of the web forms a circumferential surface 72 acting as an eccentric.

In the embodiment according to Figs. 18 to 21, a hinge arm 2'' is used which differs from the hinge arm 2 or 2' by the feature that on each web 5'' a slot 73 is provided, which extends in the hinge arm longitudinal direction and in addition the web 5'' has on its external side a contact edge 74 formed by a depression; this contact edge 74 projects from the slot 73 or from the middle of the hinge arm 2'' towards the end of this hinge arm which is free from the bearing holes 6, approximately parallel to the free longitudinal edges of the web 5'' and it is arranged between the yoke 4'' and this free longitudinal edge of the web 5''.

The assembling of the components is carried out in such a manner that after the fastening of the clamping bolt 65 into the locking element 25 provided in the mounting plate 1, the hinge arm 2'' is placed on the mounting plate 1. Subsequently the bracket shaped tilting lever 68 is pushed on the hinge arm 2'', so that the webs

69 enclose the webs 5'' of the hinge arm in the region of the slots 73, in which the tilting lever 68 is swivelled into the position shown in Fig. 22, i.e. the surface 72 is situated with a section adjacent to the hole 71 against the contact edge 74. Now the pivot pin 67 is pushed through the bores 71 and 66 and it is secured on the webs 69 of the tilting lever 68 in a suitable manner, for example by rivetting. The hinge arm 2'' is then already connected with the mounting plate 1 by means of pivot pins passing through the slots 73 as well as by the clamping bolt 65. Owing to the presence of the slots 73 the hinge arm can be moved in the longitudinal direction or adjusted. For final anchoring of the mounting plate 1 on the furniture side wall 3 as well as of the hinge arm 2'' on the mounting plate 1 the tilting lever 68 is moved from its position shown in Fig. 21 in the direction of the arrow A into the position shown in Figs. 19 and 20, in which, owing to the eccentric shaped surfaces 72, the clamping bolt 65 is increasingly pulled out of the mounting plate 1 and hence the fastening plugs provided on the mounting plates 1 are anchored in the furniture side wall 3. In order to make possible the necessary relative movement for this anchoring between the pivot pin 67 and the hinge arm 2'', the width of the slots 73 is considerably greater than the diameter of the pivot pin 67.

Figure 22 shows an embodiment, which corresponds basically to the embodiment shown in Figs. 1 to 7, in which instead of the slot 11 in the hinge arm 2, slot 11' is provided which is open towards the rear end of this hinge arm; this open slot makes it possible to push the hinge arm 2 on to the mounting plate 1 carrying the preassembled locking element 25, clamping bolt 12 and the tilting lever 32.

Figures 23 and 24 show an embodiment in which one mounting plate 75 is used, which makes it possible to fasten the hinge arm 2'' to the bores 76 aligned in the vertical direction with each other on the furniture side wall 3, in which the connection line of these bores as well as the connection line of the fastening plugs 77 provided on the mounting plate 75 run at right angles to the longitudinal axis of the hinge arm 2'' fastened on the mounting plate. The mounting plate 75 is provided for this purpose with two triangular fastening plates 78 which project laterally away from the raised part 79 of the mounting plate. For anchoring the mounting plate 75 by means of the fastening plug 77, a locking element, for example, is used which corresponds to the locking element 46 of Figs. 12 and 13, except that instead of an integrally moulded clamping bolt in section 49 there is provided a screw thread, which then engages the threaded end of the clamping bolt 12. This clamping bolt 12 and the associated tilting lever 32 are designed in the same manner as described in connection with Figs. 1 to 7.

In order to ensure sufficient space for the locking element, there is provided on each of the triangular fastening plates 78 a raised part 80 which is at right angles to the raised part 79;

under this said raised part 80 runs the opening, on that side of the mounting plate 75 provided with a fastening plug 77, for the middle part of the locking element, for example for the section 49 of the locking element 46. For these raised parts 80 an opening 91 is provided in each arm of the hinge arm 2''.

Figure 25 shows a mounting plate 82 for the hinge arm 2'', which is very similar to the mounting plate 75, except that the raised parts 80 are also designed so that the hinge arm 2'' can be fastened on these raised parts. Hence it is possible, by means of the same mounting plate 82, to fasten the hinge arms 2'' optionally on furniture walls by means of the vertically aligned bores 76 or by means of the bore 23 and 24 aligned on the furniture side wall in the horizontal direction. Moreover, the mounting plate 82 is designed so that the straight parts 83 which are enclosed by the webs of the hinge arm 2'', are designed symmetrically towards both of its ends, i.e. the raised parts 83 have on both ends several ratchet grooves 84, which can engage with the ratchet teeth of the hinge arm 2''. By means of this design the fastening of the mounting plate 82 is considerably simplified, because in the prepared holes 23 and 24 or 76 it is no longer necessary to pay attention on a positionally aligned or laterally aligned installation.

All the embodiments shown in Figs. 1 to 25 have a common feature in that the same means (clamping bolts and tilting levers) which are used for actuation of the locking elements for the fastening plugs, are also used for fastening of the hinge arm on the mounting plate.

Fig. 26 shows an embodiment in which the clamping element, consisting of the clamping bolt and tilting lever, is replaced by a screw 144. Moreover, instead of the slot 11, a keyhole shaped opening 145 is provided in the yoke 4 of the hinge arm 2. In this embodiment, which does not use a tilting lever, it is possible to preassemble the mounting plate 1 with the locking element 25 and with the screw 144 which engages through the bore 35 with the tapped hole 29, in which then, on mounting of the hinge arm 2 on the mounting plate 1, the head of the bolt 144 is guided through the greater cross section region of the keyhole shaped opening 145, so that this head is in contact with the surface, facing away from the mounting plate 1, of the yoke 4. After the insertion of the fastening plugs 13 and 14 into the holes 24 and 25 as well as after the mounting of the hinge arm 2 on the mounting plate 1, the screw 144 is tightened with a screwdriver, by means of which, in the above described manner, by means of the locking element 25, the anchoring of the mounting plate 1 and of the hinge arm 2 on the furniture side wall is carried out. Also in this embodiment the screw which actuates the locking element 25 is used simultaneously for anchoring the hinge arm 2 on the mounting plate 1.

The locking element, the clamping bolt, as well as the tilting lever are, in the same manner as the

clamping bolt as well as the screw possibly replacing the tilting lever, preferably made of metal, while the mounting plate consists, for example, of plastic.

5 Claims

1. Means for fastening a furniture hinge arm on a furniture part, comprising a mounting plate and a connecting element which extends into the plate when the hinge arm is fastened on the plate and which is in contact with a clamping face against a contact face of the hinge arm, wherein the connection element consists of at least two pivoted connected parts and, on swivelling of one said part relative to another part, the clamping face is moved out of the position which locks the hinge arm on the mounting plate into a nonlocked position.

2. Means according to claim 1, wherein one part of the connection element extends into the mounting plate and the second part has the clamping face.

3. Means according to claims 1 or 2, wherein the connection element is adapted to be guided through an opening in the hinge arm and the clamping face is adapted to act in conjunction with a contact surface on the hinge arm, which said contact surface is provided on one of the hinge arm surfaces facing away from the mounting plate.

4. Means according to any one of claims 1 to 3, wherein the clamping face is formed by one of the surfaces, acting as eccentric, of a tilting lever pivoted on the clamping element which extends into the mounting plate, and the surface which acts as eccentric, is arranged around the pivot axis of the tilting lever.

5. Means according to claim 4, wherein the tilting lever is a flat plate-shaped lever, which has at least one pivot eye at one of its ends for supporting a pivot pin and wherein the pivot pin enclosing the circumferential surface of the pivot eye has at least in one swivelling direction (A) of the tilting lever a circumferential section whose distance from the pivot pin increases in the circumferential direction of the pivot eye.

6. Means according to claim 5, wherein the pivot pin is arranged at right angles to the longitudinal axis of the tilting lever.

7. Means according to claims 5 or 6, wherein the pivot eye projects beyond one side surface of the tilting lever.

8. Means according to claim 7, wherein the pivot pin is situated laterally from one of the side surfaces of the tilting lever adjacent to the pivot pin.

9. Means according to any one of claims 5 to 8, wherein the section projects over an angular range of 90 to 180° on the circumferential surface of the pivot eye.

10. Means according to any one of claims 4 to 9, wherein the distance of the region which is in contact against the contact face of the surface, which acts as eccentric, from the pivot axis of the tilting lever is, in a first, nonlocking position of this

65 tilting lever, similar than in a second, locked position of the tilting lever.

11. Means according to claim 10, wherein the tilting lever is situated in the second position with its surface sides and/or with its longitudinal edges parallel to the contact face and/or parallel to the yoke of a hinge arm with U cross section.

12. Means according to Claim 10 or 11, wherein the tilting lever is situated in the first position at an angle to the contact face and/or at an angle to the yoke of a hinge arm with U cross section.

13. Means according to any one of claims 4 to 12, wherein the clamping element extends through an opening in the yoke of a hinge arm with U cross section and carries at the end which passes through this opening a pivoted tilting lever in which the contact surface is the yoke surface which faces away from the plate.

14. Means according to claim 13, wherein the web of the U cross section hinge arm also projects beyond the yoke surface which forms the contact side surface and a laterally limiting space for holding the tilting lever.

15. Means according to claim 14, comprising a covering cap for said space.

16. Means according to any one of claims 4 to 12, wherein the clamping element terminates within the space between the webs of the hinge arm, with U cross section, and the yoke and it has on its end, facing away from the plate, a pivot pin which forms the pivot axis of the tilting lever, said pivot pin being at right angles or across the surface side of the webs and which extends at both its ends through the openings in the webs and wherein between the opening and the plate there is arranged on the webs a contact face which runs across or at right angles to the web surface.

17. Means according to claim 16, wherein the contact face is formed by the edge surface of an opening or of a depression in the webs of the hinge arm.

18. Means according to claim 16 or 17, wherein the tilting lever is a bracket-shaped element made of flat strip material with two parallel bracket arms which are rounded at their free ends where there are holes for the pivot pin and whose surface sides are situated at right angles to the pivot pin, the holes being arranged so that the distance of these holes from one longitudinal side of the bracket arm is greater than the corresponding distance from the other longitudinal side.

19. Means according to claim 18, wherein the bracket arms enclose the hinge arm on its webs.

20. Means according to any one of claims 1 to 19, wherein there is provided on the mounting plate at least one fastening plug with an opening, within which is situated a locking element with a locking section so that it can slide, and wherein the connection element or the clamping element is in contact with locking element.

21. Means according to claim 20, wherein the clamping element has on its end facing away

from the tilting lever an expansion cone which is situated in the opening of the fastening plug.

22. Means according to claim 20, wherein for two lockable fastening plugs which are locked by a common locking element the locking element has two locking sections which are each situated in a fastening plug, the locking sections being connected to each other by a connecting section and wherein the clamping element is fastened on this connecting section.

23. Means according to claim 22, wherein each locking section has an expanding element.

24. Means according to claim 22, wherein each opening of each fastening plug has a first inclined surface which runs at an angle to the plug axis, and wherein the fastening plugs are open on their circumferential sides facing the first inclined face and wherein the locking sections of the locking element common to both fastening plugs, have claw-like projections across the axis of the fastening plug and projecting laterally from the first inclined surface, the free end of the projection being situated in the nonlocking position within the opening and within the circumferential like of the fastening plug and wherein its free end projects in the locked position of the locking element beyond the circumferential line of the fastening plug.

25. Means according to claim 24, wherein the distance of the free end of the projection from that part of the locking section which slides on the first inclined surface is equal to or smaller than the distance which separates the first inclined surface from the opening or from the edge of the opening for the claw-like projection.

26. Means according to claim 24 or 25, wherein the fastening plugs on the circumferential regions which face each other, are open for the projection of the claw-like projection.

27. Means according to any one of claims 24 to 26, wherein the locking element is a bracket shaped element made of a flat strip-shaped material, said bracket element having on its free end an angle part for forming the claw-like projection.

28. Means according to claim 27, characterised in that the locking element is made of flexible material.

29. Means according to claim 27 or 28, wherein the angle parts forming the claw-like projections are directed towards each other.

30. Means according to one of claims 27 to 29, wherein the locking sections arranged in the openings are formed by the arm of the bracket shaped element which arm reaches into the relevant opening, and wherein this arm projects at an angle outwards from the yoke or section which connects the webs to each other.

31. Means according to any one of claims 24 to 30, wherein the openings of the fastening plugs are provided second inclined surfaces against which contact the locking sections with a

surface and wherein fastening plugs are provided with a longitudinal slot at their open sides for allowing passage of the claw-like projections.

32. Means according to claim 31, wherein the surfaces which act in conjunction with the second inclined surfaces of the locking sections are formed by the longitudinal sides of the angle parts of the bracket shaped element.

33. Means according to any one of claims 24 to 32, wherein on the locking element or on its connecting section is connected a clamping element.

34. Means according to claim 33, wherein the clamping element consists of a clamping bolt which projects in the axial direction of the fastening plug, said clamping bolt is passed through an opening of the fitting and its free end is pivoted by means of a pivot pin and a tilting lever has an eccentric surface around the pivot pin, which eccentric surface is in contact against the surface facing away from the fastening plug.

35. Means according to claim 34, wherein the surface is formed by the yoke surface of a hinge arm.

36. Means according to claim 34 or 36, wherein the clamping bolt reaches into a screw thread on the locking element.

37. Means according to claim 34 or 35, wherein the clamping bolt is provided with a head with a circumferential groove and wherein this head encloses the locking element on both sides with the section situated in the circumferential groove.

38. Means according to claim 34 or 35, wherein on the locking element is integrally formed at least one bracket which acts as a clamping bolt.

39. Means according to any one of claims 20 to 38, wherein on the plate are integrally formed sideways projecting fastening plates which carry fastening plugs and a locking element common to both fastening plugs is provided.

40. Means according to claim 39, wherein the plate is designed so that the fastening plugs are optionally arranged into holes of the furniture side wall which are arranged side by side in a single line parallel to the longitudinal axis of the hinge arm, and wherein they can be fastened in the holes which are arranged side by side in a line across the hinge arm.

41. Means according to any one of claims 24 to 40, wherein there is provided as clamping element a screw which passes through an opening of the hinge arm as well as through an opening of the mounting plate, said screw engaging into a screw thread of the locking element.

42. Means for fastening a furniture hinge arm on a furniture part, substantially as herein before described with reference to the accompanying drawings.