E. MÜLLER-MEYER.

HINGE FOR DOORS, WINDOWS, FLAPS, AND THE LIKE.

APPLICATION FILED FEB. 10, 1919.

1,298,547.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

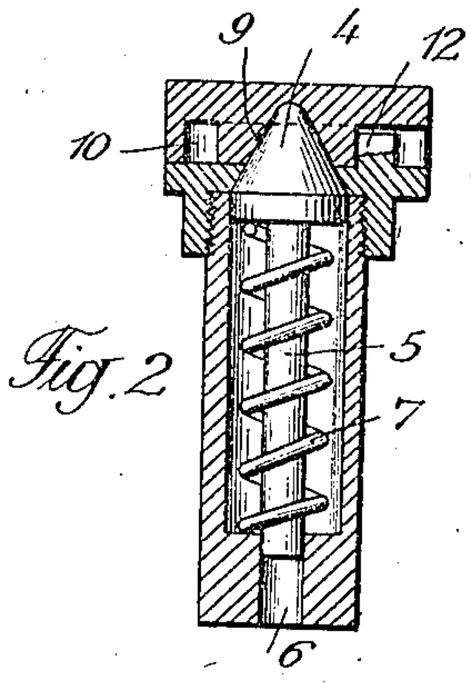

Fig. 2

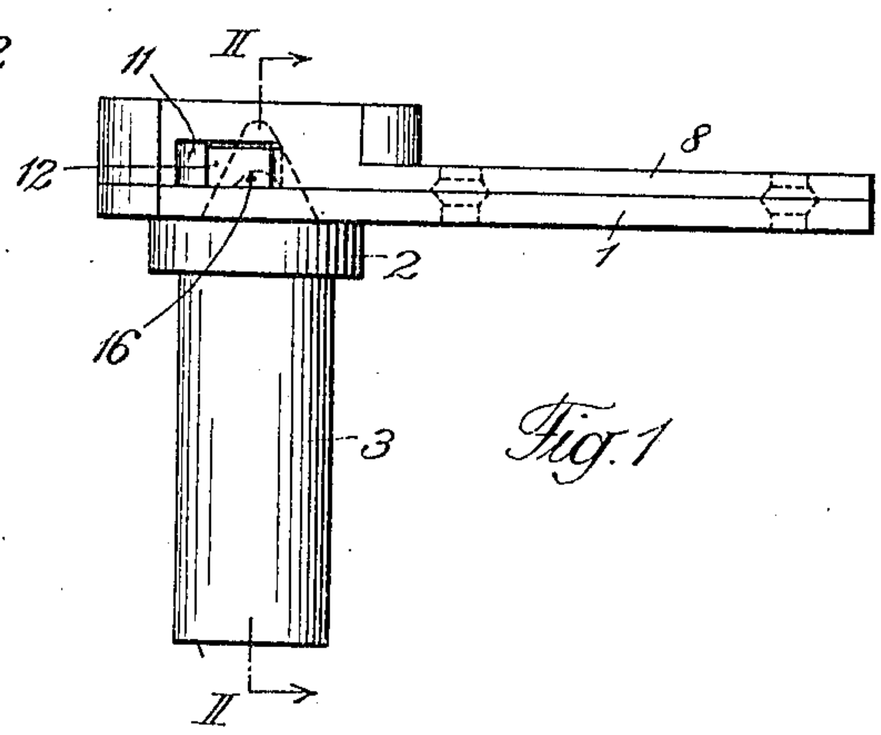

Fig. 1

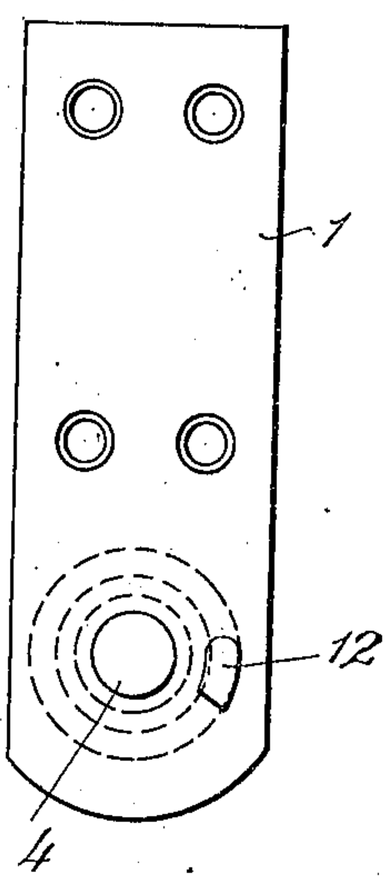

Fig. 3

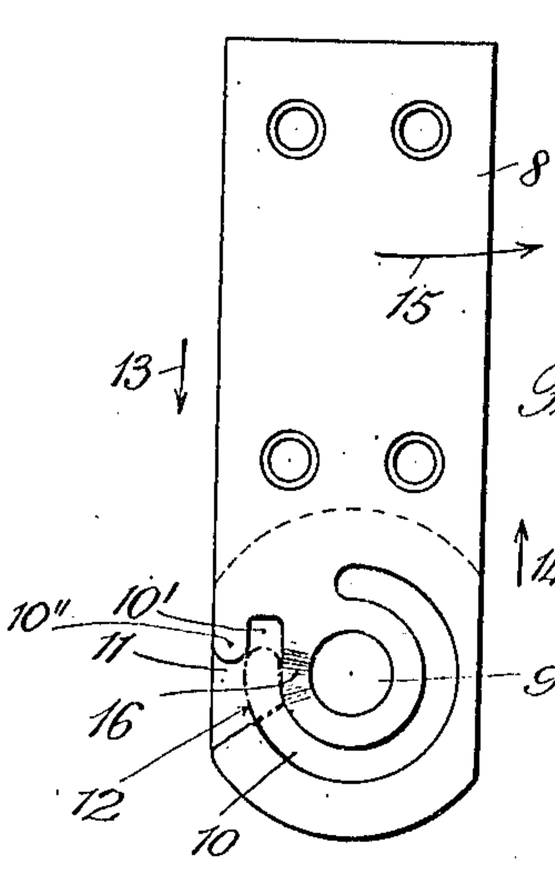

Fig. 4

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2 SHEETS—SHEET 2.

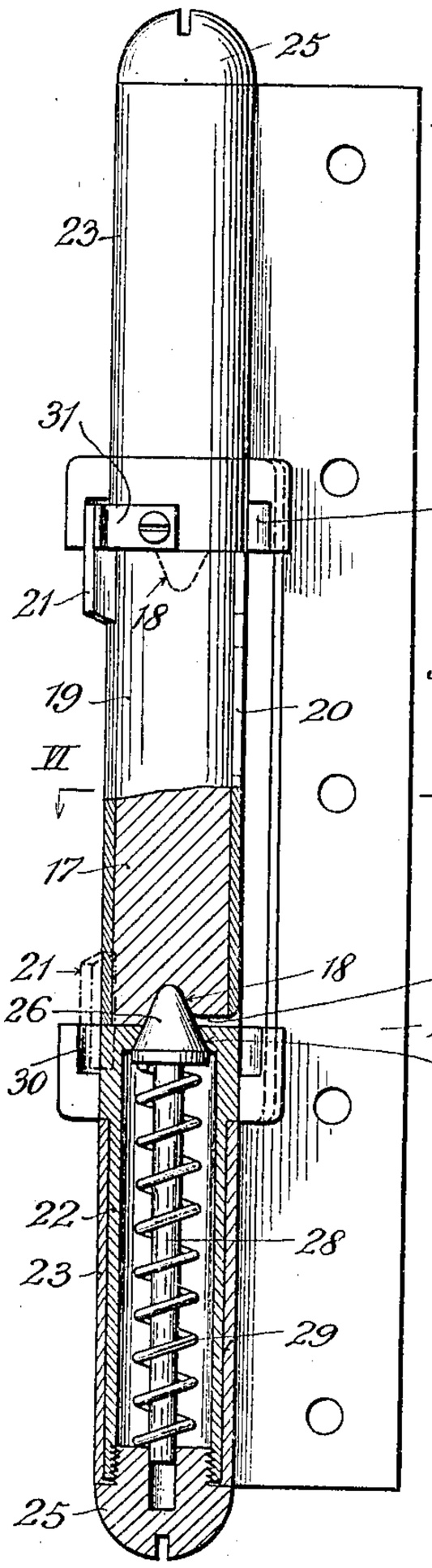

Fig. 5

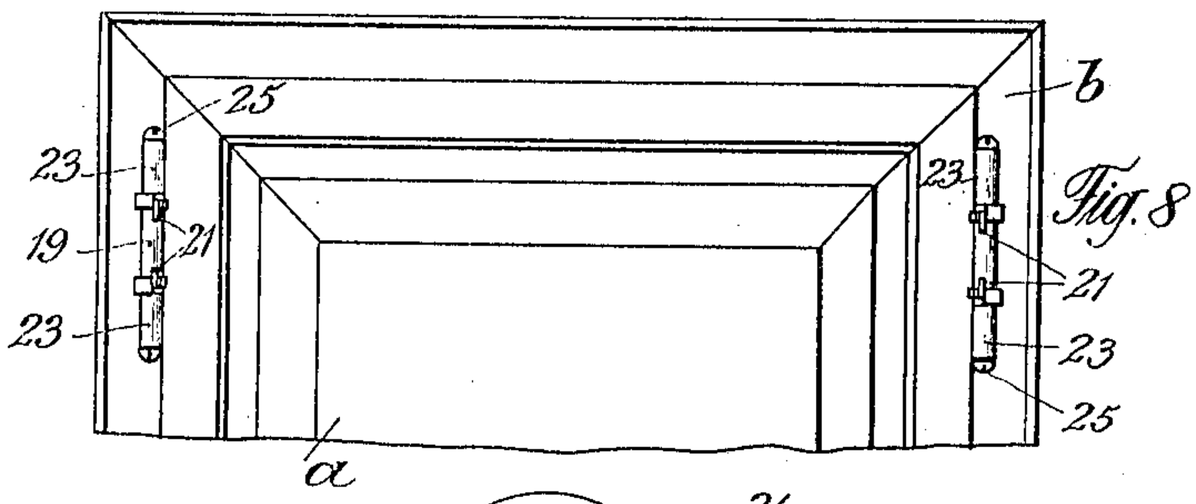

Fig. 8

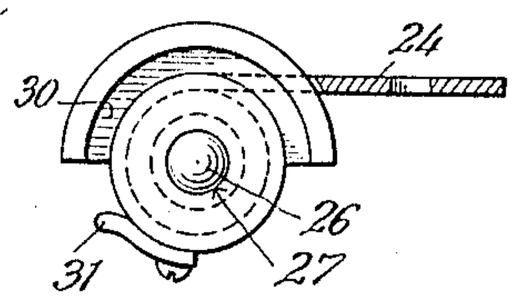

Fig. 7

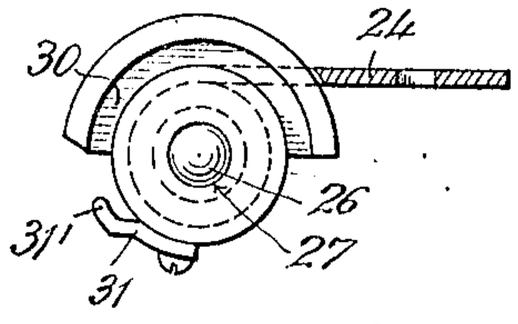

Fig. 9

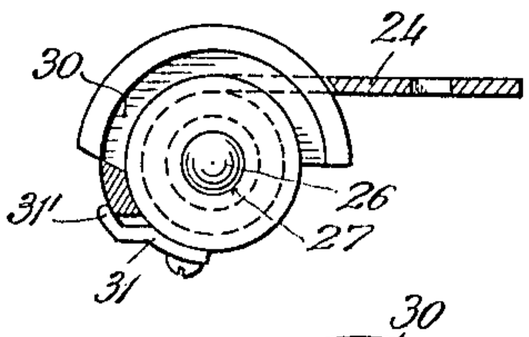

Fig. 10

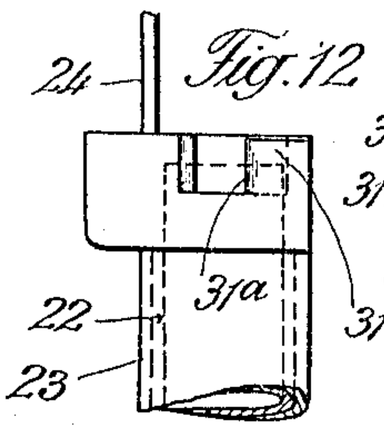

Fig. 12

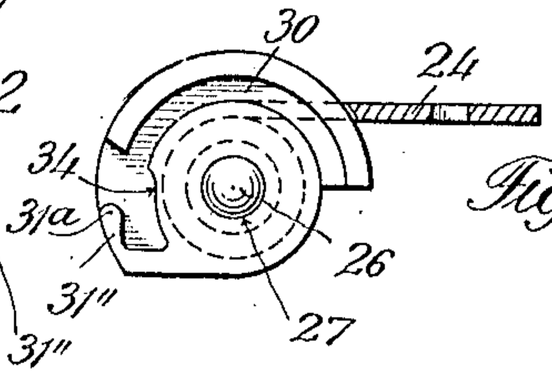

Fig. 11

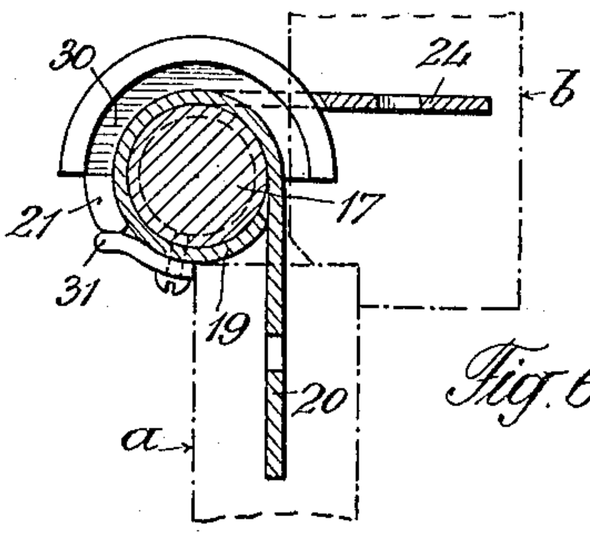

Fig. 6

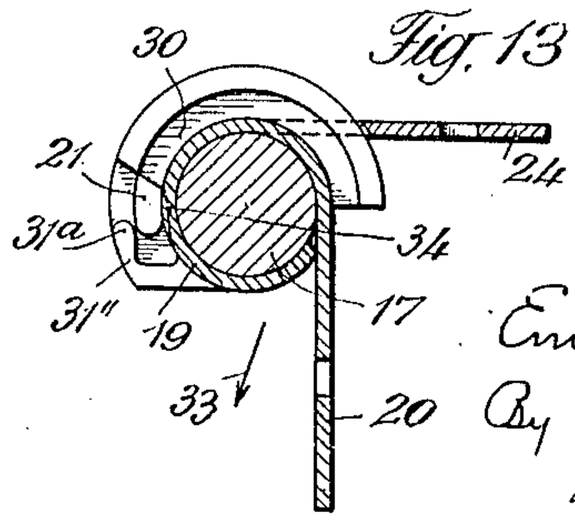

Fig. 13

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UNITED STATES PATENT OFFICE.

EMIL MÜLLER-MEYER, OF WALLISELLEN, SWITZERLAND.

HINGE FOR DOORS, WINDOWS, FLAPS, AND THE LIKE.

1,298,547. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed February 10, 1919. Serial No. 276,069.

To all whom it may concern:

Be it known that I, EMIL MÜLLER-MEYER, a citizen of the Republic of Switzerland, residing at Wallisellen, Bergliweg 410, Switzerland, have invented certain new and useful Improvements in Hinges for Doors, Windows, Flaps, and the like Adapted to be Used at the Same Time as Locks; and I do hereby declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in hinges for doors, windows, flaps and the like, adapted to be used at the same time as locks and admitting a swinging of the door, window or the like along either of its opposite vertical edges. In the hinge according to this invention the group of members provided in connection with the hinges hitherto proposed for locking the sections of the latter and comprising means adapted to be moved relatively to the sections of the hinges are avoided, so that the design of the hinge can be considerably simplified.

The hinge according to this invention comprises also means adapted to lock the movable part of the door, window, flap or the like, *i. e.* the leaf of the door or of the flap or the window-sash, to the stationary frame.

This invention will now be more particularly described with reference to the accompanying drawings illustrating by way of example several constructions of carrying out the invention. In these drawings:

Figure 1 is a side view of a strap- or plate-hinge according to this invention;

Fig. 2 is a cross-section on the line II—II of Fig. 1;

Fig. 3 is a top view of the lower section and

Fig. 4 a bottom view of the upper section of this strap-hinge.

Figs. 5–8 illustrate a butt-hinge according to this invention,

Fig. 5 showing this hinge in the closed position and some portions of it in section;

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

Fig. 7 is a top view of Fig. 5, the section of the hinge fixed to the movable leaf or sash being however omitted.

Fig. 8 illustrates the upper portion of a door to which the butt-hinge shown in Figs. 5–7 is fitted.

Figs. 9 and 10 show a modified construction of a butt-hinge, and

Figs. 11–13 show a further construction of such a butt-hinge,

Fig. 11 being a cross-section, whereby the section fixed to the leaf of the door is omitted, and

Fig. 12 illustrating a front view of a portion of the hinge shown in Fig. 11.

Fig. 13 shows a similar section as Fig. 11, the section fixed to the leaf of the door being also shown in this figure.

Referring at first to Figs. 1–4 of the drawing, 1 denotes a section of a strap- or plate-hinge provided on its bottom side with an annular flange 2. The latter has an internal thread. 3 denotes a sleeve screwed into the flange 2. In the sleeve 3 is mounted a pin 4 having a tapering upper end. This pin 4 has a cylindrical portion having a working fit with the inner wall of the sleeve 3 and it is rigidly connected to a shaft 5 of smaller diameter. The lower portion of the latter has a working fit in a hole 6 provided in the lower end portion of the sleeve 3. A helical spring 7 surrounding the shaft 5 presses the pin 4 into a hole provided in the section 1 of the hinge; the greatest portion of the pin 4 projects beyond said section 1.

8 denotes a second section of the strap- or plate-hinge having a tapering recess 9. 10 denotes a groove of circular shape, the axis of which coincides with that of the recess 9. The groove 10 communicates with a lateral slot 11 arranged substantially at right angles to the longitudinal axis of the section 8. A projection 12 of the section 1 of the hinge is adapted to fit into the groove 10.

The section of the strap- or plate-hinge just described is provided in order that it may be so fixed to the frame of a door, window, flap or the like that the axis of the pin 4 coincides with the line in which lies the pivot axis of the door, window or the like. The section 8 of the hinge is adapted to be fixed in a like manner to the leaf of a door or flap or to a window-sash. Similar strap- or plate-hinges are fitted in the same manner to the three remaining corners of the door, window or flap or the like and to the frame

of said door, window or flap respectively, so that a second pivot axis is provided besides that one already mentioned. In consequence of this arrangement, the door, window, flap or the like can be swung either to the right or to the left, as desired.

Let it be assumed for instance, that the described strap- or plate-hinge has been fitted to a door and that the leaf of the latter is just in the closed position. In this position of the leaf, the parts of the hinge assume relatively to each other the position shown in Figs. 1 and 2, *i. e.* the pin 4 projects into the recess 9 of the section 8. The projection 12 engages into the groove 10 and it assumes such a position relatively to the slot 11 that a portion of it extends into an end portion 10′ of the groove 10 which is not concentric to the recess 9, the greater part of said projection 12 being then situated between the recess 11 and a portion of the iner wall of the groove 10, while a small portion of it lies behind the tongue shaped member 10″ of the plate 8. Thus, it will be evident, that the leaf of the door is not only held in the locked position by the pins 4, but is also prevented from falling out of the frame owing to the fact that the projection 12 extends partly into the portion 10′ of the groove 10. When the door is so opened that the hinge illustrated in Figs. 1–4 lies in the pivot axis of the door, the leaf of the latter has to be moved at first in the direction of the arrow 13 (Fig. 4) until the recess 11 of the opposite hinge (which is not shown on the drawing) lies wholly opposite the projection 12 of this hinge, so that the section 8 of the latter can be uncoupled—while the pin 4 is forced back and the projection 12 is moved into the slot or recess 11 and out of the groove 10—from the section 1 of this hinge. While the leaf of the door is moved in the direction just referred to, the section 8 of the hinge illustrated in Figs. 1–4 is shifted in such a direction that the projection 12 of this hinge is forced into the portion 10′ of the groove 10. Owing to this, the section 8 of the hinge acting as pivot is coupled to the section 1 of this hinge by the projection 12 even when the leaf of the door is moved out of its closed position. After the sections of the hinge which is not shown on the drawing have been uncoupled, the pin 4 of the hinge shown in Figs. 1–4 is again forced wholly into the recess 9 upon a further opening of the leaf of the door, the groove 10 of the section 8 coöperating then with the projection 12, whereby the latter locks the section 8 to the section 1 of this hinge.

When it is intended to transfer the pivot axis of the leaf of the door into the hinge lying opposite that one shown on the drawing, the leaf of the door is moved at first together with the section 8 of the hinge illustrated in Figs. 1–4 in the direction of the arrow 14 (Fig. 4), so that the slot 11 comes to lie wholly opposite the projection 12 and the section 8 can be uncoupled from the section 1 in the direction of the arrow 15 (Fig. 4), *i. e.* in the sense in which the leaf of the door is opened. In order that the pin 4 does not have to overcome a too great resistance when the door is shut, a recess 16 is provided in the section 8 in proximity of the recess 11.

In the second embodiment of the invention illustrated in Figs. 5–8 and having the form of a butt-hinge, 17 denotes a cylindrical member provided at its two ends with conical recesses 18. Said member 17 is mounted in a plate 20, one end of which is so bent as to form a knuckle 19. This plate is for securing the butt-hinge to a flap or a leaf, for instance to the sash of a window, or, as shown in Fig. 8, to the leaf of a door *a*. 21 denotes projections provided on the cylindrical member 17 and which are for locking the leaf of the door.

The other section of the butt-hinge comprises two cylindrical sleeves 22 mounted in knuckles 23. The latter form a portion of a plate 24 bent to a cylindrical shape. The plate 24 is for securing said second section of the butt-hinge to the frame of a flap or leaf of a door. In Fig. 8 the plate 24 is fixed for instance to the frame *b* of the door. The sleeves 22 are held stationary in the knuckles 23 by means of screw-threaded heads 25. In each sleeve 22 is mounted a pin 26 having a tapering end passing through the tapering aperture 27 of an end wall of the sleeve 22. The pin 26 has an integral shank 28 guided in the screw-threaded head 25. 29 denotes a helical spring adapted to press the tapering head of the pin 26 into the aperture 27. Each sleeve 22 is provided at that of its ends arranged adjacent the part 20, with a head having a groove 30 lying outside the circumference of the sleeve 22 and having the shape of a semi-circular segment, the ends of which lie in a line parallel to the plate 24. 31 denotes resilient tongues, each of which is fixed on the level of the groove 30 to the sleeve 22 by means of a screw. The resilient end of this tongue 31 projects into that end of the groove 30 which lies farther away from the straight portion of the plate 24 and it is bent slightly away from the sleeve 22 (Fig. 7). Said resilient end of the tongue 31 is situated in the position of rest of the leaf or sash at a distance from the end of the groove 30 which is smaller than the width of the projection 21.

Upon a movement of the section of the butt-hinge fixed to the leaf toward the section of the butt-hinge fixed to the frame, *i. e.* when the leaf is shut, the cylindrical part 17 is moved into the space provided between the sleeves 22, the resiliently mounted pins 26 being thereby pressed somewhat apart

and effecting a coupling of the two sections of the butt-hinge as soon as they are caused to engage the conical recesses 18. When the cylindrical part 17 is moved into the space provided between the sleeves 22, the projections 21 are forced into that portion of the grooves 30 which is confined at one side by the tongues 31, the resilient end of the latter being thereby moved slightly away from the sleeves 22.

When this butt-hinge has to act as a pivot for the leaf of a door, or of the sash of a window or the like to be opened or closed, the tongues 31 press the projections 21 into the grooves 30, *i. e.* they prevent the projections 21 from being moved against the end wall of the portions of the sleeves 22 in which the grooves 30 are provided. The sections of the butt-hinge are consequently prevented from being uncoupled. The tongues 31 constitute in this embodiment of the invention the means preventing an accidental or automatic uncoupling of the sections of the butt-hinge and they provide for the proper passage of the projections 21 into the grooves 30. When the projections 21 have been moved into the grooves 30, any uncoupling of the sections of the butt-hinge is no longer possible, as the projections 21 are then locked in the grooves 30.

In order to facilitate the moving apart of the pins 26 when the sections of the butt-hinge are coupled together, the end forces of the section of the butt-hinge of which the cylindrical member 17 forms a part, are provided with recesses 32.

The third embodiment of the invention illustrated in Figs. 9 and 10, which figures show also a butt-hinge, comprises also a resilient tongue 31. The free end 31′ of this tongue is parallel to the circumference of the sleeve 22. When the parts of this butt-hinge are fitted together, the projection 21 forces the free end 31′ of the tongue 31 slightly outward and a portion of it is then moved, as shown in Fig. 10, behind said end 31′. When the sections of the butt-hinge are moved relatively to one another, the tongue 31 presses the projection 21 against the sleeve 22 until said projection 21 has been moved into the groove 30. This construction is particularly adapted to be fitted to lighter flaps and leaves, for instance to light doors.

In the fourth construction according to this invention illustrated in Figs. 11–13, the tongue 31″ is formed integral with the sleeve 22, it being thus rigidly connected to the latter. This tongue 31″ has in the same manner as the tongue 31 shown in Figs. 9 and 10 an end 31ª parallel to the circumference of the sleeve 22 behind which is moved a portion of the projection 21 when the leaf of the door or the sash of the window, to which the hinge is fitted, is shut.

When the butt-hinge illustrated in Figs. 11–13 has to act as a pivot for the leaf to be opened, the latter is moved at first to a small amount in the direction of the arrow 33 (Fig. 13), so that the projection 21 of the opposite butt-hinge not shown on the drawing is able to move in front of the end 31ª of the tongue 31″. As said movement of the leaf causes a small relative rotary movement between the sections of the butt-hinge that is just acting as a pivot, while no play is present between the end 31ª of the tongue 31″ provided on said butt-hinge and the projection 21, a notch 34 is provided in the sleeve 22 so that the projection 21 is able to assume an inclined position relatively to the sleeve 22 when the leaf is moved in the direction above referred to. When the projection 21 on the opposite butt-hinge has been moved past the end 31ª of the tongue 31″, the conical heads of the pins 26 of the butt-hinge acting momentarily as pivot effect a centering of the sections of this butt-hinge relatively to one another, the projection 21, which has prevented until now an uncoupling of the sections of the butt-hinge owing to its coöperation with the tongue 31″, being then moved into the groove 30.

What I claim now as my invention is:

1. In combination with a door, two hinge sections, one of said sections being fixed to the frame of the door, and the other one to the leaf of the door, resilient means mounted in said first mentioned section and adapted to detachably couple the two sections of the hinge, a projection provided on one of said sections adapted to engage an annular groove provided in the other section upon a movement of the two sections relatively to one another, and means adapted to positively force said projection into said groove when the two sections of the hinge acting as a pivot are moved relatively to one another.

2. In combination with a door, two hinge-sections, one of said sections being fixed to the frame of the door, and the other one to the leaf of the door, resilient means mounted in said first mentioned section and adapted to detachably couple the two sections of the hinge, a projection provided on one of said sections adapted to engage an annular groove provided in the other section when the two sections are moved relatively to one another, the section provided with said groove having a slot to permit access to said groove from the side, and a tongue like member formed integral with the last mentioned section and adapted to secure the proper entrance of said projection into the groove when the two sections of the hinge acting as a pivot are moved relatively to one another.

3. In combination with a door, two hinge

sections, one of said sections being fixed to the frame of the door, and the other one to the leaf of the door, a pin having a conical end movably housed in one of said sections and adapted to engage a recess provided in the other section, a spring also housed in the section housing said pin and adapted to press the latter into said recess, said pin being adapted to effect a coupling of the two sections when it engages said recess, a projection provided on one of said sections adapted to engage an annular groove provided in the other section upon a movement of the two sections relatively to one another, and means adapted to positively force said projection into said groove when the two sections of the hinge acting as a pivot are moved relatively to one another.

4. In combination with a door, window, flap or the like, a hinge plate adapted to be fixed to the frame of the door, and provided with a projection, a pin movably mounted in said plate and provided with a conical head, a spring acting upon said pin, a second hinge plate provided with a conical recess adapted to receive said conical head of the pin and further provided with a groove arranged concentrically to said conical recess as well as with a slot to permit access of said projection from the side into said groove, said second plate being also provided with a tongue formed integral therewith and confining a portion of said groove which is eccentric to the conical recess, the pin and said projection effecting a coupling of the two plates in the closed position of the door, while said tongue effects together with said projection the coupling of the two sections of the hinge when the latter acts as a pivot for the door and said slot admits a moving of the projection out of said groove when the door has to be rotated about its vertical edge lying opposite the hinge, *i. e.*, when the two plates of the hinge have to be uncoupled.

In testimony that I claim the foregoing as my invention, I have signed my name.

EMIL MÜLLER-MEYER.