

The invention relates to fittings for a pivoting and tiltable wing of a door, window or the like with a sash which partially covers the window frame, comprised of a square bracket and a folding stop-arm fixed in fillisters and both comprising an auxiliary folding-arm leg connected, on the one hand, to the lower rail or the upper rail of the sash-frame and, on the other hand, to the lower rail of the sash or a leg of the main folding-arm co-operating with the upper rail of same.

There are already known fittings for a pivoting and tiltable wing of a door, window or the like which are accommodated in fillisters of the sash and the sash-frame and coinciding with the above description.

Thus, these fittings are comprised of a hinging member, referred to as folding stop-arm, intervening in the upper part of the door or window, the function of which is, on the one hand, to ensure the rotation of the wing about a vertical axis, when opening in the French way, and, on the other hand, to limit the tilting of this wing in tilting position.

They furthermore comprise another hinging member, referred to as square bracket, arranged in the lower part of the door or window and alternatively enabling a tilting of the wing about a horizontal axis and its pivoting about a vertical rotation axis.

For criteria of aesthetics, but also of improvement as far as the safety is concerned, it is a present tendency to insert these hinging members in fillisters of the wing and the sash-frame of the door or window.

Thus, there is already known a folding stop-arm formed of a main folding-arm leg the ends of which are slidably mounted onto the upper rail of the wing and the upper rail of the sash-frame, respectively. In addition, a first connecting rod is arranged between the folding-arm leg and the sash and a second connecting rod connects this very folding-arm leg to the sash-frame.

Furthermore, there is also known a square bracket comprised, on the one hand, of a vertical spindle inserted onto the end of the lower rail of the wing, at the side of the strap hinge, and comprising a

roller slidingly mounted in a slide secured to the lower rail of the sash-frame. On the other hand, a connecting rod connects same to the wing.

5 The effect of this arrangement is to cause the offset, in a direction parallel to the plane of the door or window, of the rotation axis of the sash, when opening in the French way, and to thus release the rear stile of this wing with respect to the sash-frame.

In the case of opening by tilting, only the existing backlash of the spindle, provided with its roller, in the slide located on the
10 sash-frame enables the pivoting of the wing about a horizontal axis.

As a matter of fact, the known solution of this square bracket and this folding stop-arm only corresponds to doors or windows the wing of which is flush with the sash-frame. In the case of partial re-
15 covering, because of the position in fillisters of the fictive rotation axis of the wing, it is necessary, when opening in the French way, to offset this fictive rotation axis outside the vertical plane of the door or window.

For this purpose, there have been designed folding stop-arms and
20 square brackets with a design substantially identical to those above-described and furthermore comprising an auxiliary folding-arm leg connected, by means of hinged joints, according to the case, to the upper or lower rail of the sash-frame and the rear end of the main folding-arm leg or the lower rail of the wing. This arrangement
25 has however made necessary the slidingly mounting of the various connecting rods, which are referred to above, onto said lower rail of the wing or onto the main folding-arm leg.

This results in that, at the moment of the opening in the French way, the rotation of the auxiliary folding-arm leg causes the offset, with respect to the sash-frame, of the rear stile of the wing
30 and, simultaneously, the offset of the fictive rotation axis of same outside the plane of the door or window, more particularly, towards the inside of the room.

Although they bring a solution for the above-mentioned problem of
35 wings which partially cover the sash-frame, these fittings have

nevertheless a disadvantage, i.e. their application limited to small-size and small-weight wings.

It should indeed be appreciated that, because of the offset of the wing outside the sash-frame, when opening in the French way, the auxiliary folding-arm leg and the connecting rod of the square bracket are obliged to bear the full weight of the wing. These constraints have a tendency to increase proportionally to the opening angle of the door or window. In addition, the proximity of the hinged joints connecting the connecting rod and the auxiliary folding-arm leg to the sash-frame is a problem as far as the wrenching-safety of their securing to their respective support, viz. in maximum opening position in the French way, is concerned.

Solutions have been provided to compensate the load represented by the wing provided with such built-in locking fittings. Viz., there has been proceeded to the adjunction of an additional folding-arm leg to the square bracket, which leg has a tendency to provide a connecting point for the sash-frame away from the fictive rotation axis of the wing and, viz., from the hinged joint of the auxiliary folding-arm leg connecting same to the lower rail of said sash-frame. This auxiliary folding-arm leg is furthermore slidably inserted, at its one end, onto the lower rail of the wing.

Thus, from DE-A-3,601,278 is known a square bracket according to the preamble of claim 1 capable of taking position in the fillister of a door or window with a wing which partially covers the sash-frame. As a matter of fact, this square bracket is comprised, according to a first embodiment, of an auxiliary folding-arm leg connected, at the level of its ends, on the one hand, to the lower rail of the sash-frame and, on the other hand, to the lower rail and close to the rear stile of the wing. This square bracket furthermore comprises a connecting rod also made integral, by means of hinged joints, on the one hand, with the lower rail of the sash-frame and, on the other hand, with the lower rail of the wing.

It should be appreciated that the hinged joints connecting the auxiliary folding-arm leg and the connecting rod to the wing are necessarily close to each other, which arrangement is not much adapt-

ed for heavy wings.

According to another embodiment described in this previous document, the auxiliary folding-arm leg is pivotingly mounted, at its one end, onto a slide block capable of moving in a slide provided
5 for on the lower rail of the sash-frame. While a connecting rod, in this case, of a larger length, is pivotingly inserted, at its ends, on the one hand, onto the lower rail of the wing and, on the other hand, onto the lower rail of the sash-frame. In addition, a secondary lever arm ensures a better distribution of the forces of the
10 connecting rod onto the wing. For this purpose, it is hingedly mounted, at its one end, onto said connecting rod, while its opposite end is pivotingly mounted onto the aforementioned slide block. As a matter of fact, within the framework of this second embodiment, the offset of the wing, in a direction parallel to the plane
15 of the sash-frame, is larger with respect to the initial solution. In any case, the square bracket provided in this previous document, irrespective of its embodiment, does not allow to confer to the wing a rotation of more than 90°, the peripheral rim of same striking, each time, against the auxiliary folding-arm leg.

20 Furthermore, from EP-A-0,112,681 are known fittings having a structure strictly identical to the square bracket corresponding to the second embodiment described in the above-mentioned document. Therefore, they also have their disadvantages.

As a matter of fact, the object of this invention is to cope with
25 all the aforementioned disadvantages and to provide fittings and, viz., a square bracket and a folding stop-arm with identical technical characteristics and capable of being positioned, with smaller space requirements, in fillisters of a door, window or the like, the wing of which partially covers the sash-frame.

30 More particularly, the reduction of the space required by this square bracket and this folding stop-arm in the fillisters should be achieved by avoiding the multiple folding-arm legs usually connecting the wing to the sash-frame, without it being necessary to limit the application of these fittings to small-size and small-
35 weight wings. There should also be ensured a better distribution of

the forces exerted onto the components of these fittings.

Furthermore, these fittings should be capable of enabling an opening angle of the wing of more than 90°.

There is a last object which should be achieved thanks to this invention and which consists in a minimum reduction of the limit of displacement of the rear stile of the wing with respect to that of the sash-frame in a direction parallel to the plane of the door or window, this so as to provide a largest possible size of opening.

The invention as characterized in the claims solves the problem residing in providing fittings for a pivoting and tiltable wing of a door, window or the like with a sash which partially covers the window frame, comprised of a folding stop-arm and a square bracket fixed in fillisters and both comprising an auxiliary folding-arm leg connected, on the one hand, to the upper rail or the lower rail of the sash-frame and, on the other hand, to the leg of the main folding-arm co-operating with the upper rail of the sash or to the lower rail of same, the folding stop-arm and the square bracket furthermore comprising:

- a second folding-arm leg slidably mounted, at its one end, onto the upper or the lower rail of the sash-frame and the other end of which is connected, by hinging means, to the main folding-arm leg or the lower rail of the sash,
- and a connecting rod one end of which is hingedly mounted onto this second folding-arm leg, the other end being pivotally secured to the upper or the lower rail of the sash-frame.

The advantages achieved thanks to this invention mainly reside in that the sliding connection of the second folding-arm leg to the upper or lower rail of the sash-frame enables to apart, at a maximum, the point of securing, which it forms, to the sash-frame with respect to the hinging point of the auxiliary folding-arm leg on these very upper and lower rails. Thus, there is achieved a better distribution of the load, which the wing represents, over these fittings and, more particularly, over the square bracket.

However, it should be appreciated that this advantage is not to the detriment of the rotation angle of the wing in the case of opening

in the French way, since this angle may reach values of much more than ninety degrees.

In addition, the advantage of fittings of an identical design for simultaneously carrying out the upper and lower connection of a
 5 pivoting and tiltable wing to the sash-frame of the door or window allows to achieve a standardization of some of their components and to reach a simplified manufacturing and storage management.

The invention is explained more in detail hereinafter with reference to drawings showing only one embodiment.

- 10 - Figure 1 shows a schematical and plan view of a square bracket according to the invention and inserted onto a door or window the sash of which is in an opening position in the French way;
- Figure 2 shows a schematical and cross-sectional view of the square bracket shown in figure 1;
- 15 - Figure 3 shows a schematical elevation and cross-sectional view of a folding stop-arm made according to the invention and inserted onto a door or window the sash of which is in tilted position;
- Figure 4 shows a schematical and cross-sectional view of the folding stop-arm shown in figure 3;
- 20 - Figure 5 shows a schematical elevation view of the square which is secured in the lower corner of the sash and forming one of the components of the hinging means connecting the auxiliary folding-arm leg to said sash;
- Figure 6 shows a cross-sectional view according to VI-VI in Figure 5;
- 25 - Figure 7 is a schematical cross-sectional view of the hinging means connecting, at the level of the square bracket, the auxiliary folding-arm leg to the sash, this latter being in locked position;
- Figure 8 shows a view identical to Figure 7, the wing being in an opening position in the French way;
- 30 - Figure 9 shows a view identical to the preceding Figures 6 and 7, the wing being in a tilted opening position;
- Figure 10 shows a detailed view of the upper corner of the sash shown schematically and cross-sectionally.
- 35 The fittings according to the invention and shown in the figures 1

through 4 are inserted onto doors or windows the wing 1 of which is of the pivoting and tiltable type. Thus, this wing 1 is capable of pivoting about a vertical axis passing through the rear stile 2 and corresponding to a so-called opening position in the French way.

5 Furthermore, this wing 1 may tilt about a horizontal axis often materialized by its lower rail 3, such an opening corresponding to the tilted opening.

Among the various wings of the pivoting and tiltable type, one distinguishes those which partially cover the sash-frame 4. Such wings
10 1 have, on their periphery, a rim 5 which, in closing position, applies against the inner face 6 of said sash-frame 4, thus contributing to a better tightness of the door or window.

This invention applies, more particularly, to such wings and relates to fittings which are located in fillisters 7, 8 of the sash-
15 frame 4 and the sash 9.

These fittings are comprised of a square bracket 10 ensuring the lower connection of the wing 1 to the sash-frame 4 and a folding stop-arm 11 which forms the upper connection of same. Thus, the square bracket 10 allows both to confer to the wing 1 a rotation
20 about a vertical axis and a rotation about a horizontal axis, while the folding stop-arm 11 ensures the pivoting about a vertical axis of the main folding-arm 12 which, because of its connection to the wing 1 repercutes this rotation onto this latter. This folding stop-arm 11 furthermore enables to limit the tilting angle of the
25 wing 1 when rotating about the horizontal axis.

More particularly, the square bracket 10, as shown in the Figures 1 and 2, comprises, on the one hand, an auxiliary folding-arm leg 13 connected, at its one end 14 and through hinging means 15, to the lower rail 3 of the sash 9. Preferably, this connection of the auxiliary folding-arm leg to the wing 1 is located as close as possible to the lower corner 16 of same. A hinged joint 17 connects the auxiliary folding-arm leg 13 to the sash-frame 4 and, viz., to a support 18 formed by an elongated plate 19 inserted, by means of fixing members 20 in fillisters 7, onto the lower rail 21 of said
35 sash-frame 4.

The main interest of this auxiliary folding-arm leg 13 consists, when opening in the French way, in releasing the rear stile 2 of the wing 1 with respect to the rear stile 22 of the sash-frame 4 and, simultaneously, in off-setting said wing 1 in a direction perpendicular to the vertical plane 23 of the door or window. This offset preferably occurs towards inside the room.

It should indeed be appreciated that, because of the arrangement of the fittings in fillisters, it is absolutely necessary to confer such a kinematics to a wing which partially covers the sash-frame 4, otherwise its peripheral rim 5 co-operates with the inner face 6 of said sash-frame 4 and impedes its rotation about a vertical axis and, hence, the opening in the French way.

The square bracket 10 comprises, on the other hand, and according to a feature of the invention, a second folding-arm leg 24 connecting the sash 9 to the sash-frame 4. More particularly, this folding-arm leg 24 is slidably mounted, at its one end 25, onto the lower rail 21 of the sash-frame 4, while the other end 26 is secured, by means of a hinged joint 26A, in fillister 8 and onto the lower rail 3 of the sash 9.

According to a preferred embodiment, the slidably mounting of this second folding-arm leg 24 onto the sash-frame 4 is achieved by means of a slide 27 provided in the support 18 inserted onto the lower rail 21 of said sash-frame 4. As a matter of fact, this slide 27 consists of an elongated opening 28 provided in the plate 19 and, viz., in its front part 29 oriented towards the front stile of the sash 4. Into the opening 28 is engaged a trunnion 30 secured to the end 25 of the second folding-arm leg 24 and projecting with respect to the lower face 31 of same. This trunnion 30 is furthermore provided, at its free end 32, with a side plate 33 co-operating with the lower side 34 of the plate 19. It thus avoids the unexpected disengagement of the second folding-arm leg 24 of the slide 27 during the handling of the wing 1.

Preferably, rims 35, 36 are provided on the lower side 34 of the plate 19, at the level of the longitudinal edges 37, 38 of the opening 28. This feature enables to substantially improve the qual-

ity of the guiding of the trunnion 30 and, hence, to contribute to a reduction of the backlashes existing between the various components of the square bracket 10. It should however be appreciated that such an improvement in no way results into an increase of the thickness of the plate 19. These rims 35, 36 can indeed be achieved by means of an unexpensive deep-drawing operation.

Advantageously, the square bracket 10 is also provided with a connecting rod 39 hingedly mounted, at its one end 40, onto the second folding-arm leg 24 and co-operating, by means of an hinged joint 41 and at its opposite end 42, with the support 18 or the plate 19. The main function of this connecting rod 39 is to distribute the action of the folding-arm legs 13 and 24 over the wing 1. In this respect, it should be appreciated that the hinged joint 41, connecting this connecting rod 39 to the support 18, is preferably located between the opening 28 and the hinging means 15 of the auxiliary folding-arm leg 13. As a matter of fact, the hinged joint 41 of the connecting rod 39 is arranged as close as possible to these hinging means 15, in order to enable an as large as possible opening angle of the wing 1. Because of the features of this invention, this opening angle of the wing 1 may reach values of much more than ninety degrees.

It should furthermore be appreciated that, in a position perpendicular to the vertical plane 23 of the door or window, the wing 1 comprises points of fixing to the sash-frame 4 which are relatively distant from each other. It therefore maintains an irreproachable stability irrespective of its weight and size.

According to a preferred embodiment of the invention, the second folding-arm leg 24 is cambered in its centre 43, enabling the introduction of the connecting rod 39 between said second folding-arm leg 24 and the plate 19, in closing position of the wing 1. However, care has been taken for the total thickness 44 of the square bracket 10 to be kept smaller than the backlash existing between the fillisters 7, 8 of the sash-frame 4 and of the sash 9, so as to avoid any notching of same.

As regards the auxiliary folding-arm leg 13, located, in closing

position of the wing 1, in the extension of the second folding-arm leg 24 and the connecting rod 39, it is chosen with a thickness 45 equivalent to the sum of these latter. Thus, reinforced, this auxiliary folding-arm leg 13 is capable of bearing the weight represented by the wing 1 when same is offset outside the vertical plane 23 of the door or window.

For this same scope of mechanical strength of the square bracket 10, in the case of application to large-size and large-weight wings, the hinged joint 17 connecting the auxiliary folding-arm leg 13 to the sash-frame 4 is formed by a vertical spindle 46 largely introduced into the lower rail 21 of this latter. In addition, the end 47 of this vertical spindle 46, which is projecting with respect to the support 18, is engaged into a bore 48 provided for at the end 17A of said auxiliary folding-arm leg 13.

As regards the folding stop-arm 11, excepted the main folding-arm leg 12, it has a structure substantially identical to the square bracket 10. Thus, as shown in Figures 3 and 4, it comprises an auxiliary folding-arm leg 113 connected, at its one end 114 and by means of an hinged joint 115, to the rear end 116 of said main folding-arm leg 12. Furthermore, an hinged joint 117 ensures the connection of this auxiliary folding-arm leg 113, at its opposite end, to a support 118 formed by an elongated plate 119 made integral, by means of securing members 120 in fillister 7, with the upper rail 121 of the sash-frame 4.

This folding stop-arm 11 is also provided with a second folding-arm leg 124 one end 125 of which is slidably mounted into a slide 127 provided for on the support 118. The other end 126 of this second folding-arm leg 124 is made integral with the main folding-arm leg 12 by means of an hinged joint 126A.

The structure of the slide 127 is identical to that described within the framework of the square bracket 10. Thus, it is formed by an elongated opening 128 provided for in the plate 119. This latter comprises, on its face 134 oriented in the direction of the upper rail 121 of the sash-frame 4, rims 135, 136 located on the longitudinal edges 137, 138 of the opening 128. Into this slide 127 is en-

gaged a trunnion 130 integral with the end 125 of the second folding-arm leg 124, which trunnion 130 comprises, at its free end 132, a side plate 133 co-operating with the rims 135, 136 and impeding its disengagement from the opening 128.

5 A connecting rod 139 hingedly mounted, at its one end 140, onto the second folding-arm leg 124 also connects this latter to the upper rail 121 of the sash-frame 4. For this purpose, this connecting rod 139 co-operates, at its end 142, with the support 118, by means of an hinged joint 141 arranged in the immediate vicinity of the
10 hinged joint 117 connecting the auxiliary folding-arm leg 113 to this same support 118.

There too, the second folding-arm leg 124 comprises, at its centre 143, a cambering enabling, in closing position, the engagement of the connecting rod 139 between said second folding-arm leg 124 and
15 the plate 119. It should however be appreciated that the auxiliary folding-arm leg 113 is not necessarily reinforced, since it does contribute only to a small extent to supporting the weight of the wing. In these circumstances, the distance 144 existing between said auxiliary folding-arm leg 113 and the plate 119 is compensated
20 for by an emboss 145 on the lower face 146 of same and onto which is mounted the hinged joint 117.

It should be appreciated that, within the framework of the square bracket 10 as well as of this folding stop-arm 11, the hinged joints 17, 117 and 41, 141 connecting the auxiliary folding-arm leg
25 13, 113 and the connecting rod 39, 139 to the support 18, 118 are as close as possible to each other and arranged as close as possible to the rear stile 22 of the sash-frame 4.

As regards the main folding-arm leg 12, same is connected to the wing 1 according to techniques known by the Professional. Thus, the
30 front end 147 is provided with a (not shown) trunnion slidably mounted into an elongated slot 148 provided for in a face-plate 149 arranged in fillister 8 on the upper rail 150 of the sash 9. More particularly, this face-plate 149 covers a groove 151 made on the periphery of the wing 1 and in which slide operating rods actuated
35 by a locking mechanism, such as an espagnolette bolt or bolt lock.

In addition, a connecting rod 152 connects the main folding-arm leg 12 to the sash 9, impeding same from off-setting with respect to the sash-frame 4 in case of opening by tilting.

The maintaining of the main folding-arm leg 12 on the face-plate 149 in opening position in the French way can be ensured by any known means, such as keepers integral with said main folding-arm leg 12. These keepers are thus capable of co-operating with locking organs secured to an operating rod and projecting from the face-plate 149 through openings provided for this purpose. However, because of the space required by the folding stop-arm 11 in fillisters 7, 8 of the sash-frame 4 and the sash 9, it would be necessary to widely off-set the aforementioned keepers with respect to the vertical rotation axis of the wing 1. Now, in such circumstances, the slightest backlash existing between the keeper and the locking organ arranged on the operating rod results, for wings with a large width, into a backlash of several millimeters at the level of their rear stile.

In order to cope with such disadvantage, the rear end 116 of the main folding-arm leg 12 is extended, as shown in Figure 10, by a length 155, folded in the shape of a square, which, in opening position in the French way, covers the upper corner 153 of the sash 9 and, viz., of the face-plate 149. In the vertical leg 156 of this length 155 folded in the shape of a square is provided a slot 157 into which engages the end 158 of an operating rod 159 projecting from the rear vertical edge 154 of said sash 9. By contrast, the operation of the espagnolette bolt or bolt lock, when opening by tilting, causes the drawing back of this projecting end 158 of the operating rod 159, thus releasing the main folding-arm leg 12.

As regards the pivoting of the sash 9 with respect to the sash-frame 4, about a horizontal rotation axis, this can be made possible thanks to a sufficient backlash at the level of the hinged joint 17 connecting the auxiliary folding-arm leg 13 to the support 18.

More particularly, the projecting end 47 of the spindle 46, which has been referred to above in the description, has a conical shape

and is engaged into the bore 48 provided for in the end 17A of the auxiliary folding-arm leg 13. Such a configuration enables the pivoting, at a limited angle, of same about a horizontal axis.

In these circumstances, the hinging means 15 connecting this very auxiliary folding-arm leg 13 to the wing 1 are comprised of a vertical spindle 49 made integral, at its lower end 50, with the free end 14 of said auxiliary folding-arm leg 13. In addition, a square 52 covers the lower corner 16 of the wing 1 and is inscribed in notches 53, 54 provided for in the rear stile 2 and the lower rail 3 of the wing 1 and usually serving as an accommodation for the operating rods and the face-plate. This square 52 is made integral with the wing 1 by means of securing members, such as screws or the like and comprises, in its lower edge 55 and in the corner 56, a cylindrical recess 57 with dimensions which match those of the spindle 49 in order to enable the passing through and the rotation of same.

In some cases, viz. for ranges of more or less large wings, such a backlash at the level of the connection of the auxiliary folding-arm leg 13 to the support 18 may be a disadvantage being at the origin of a quicker fatigue of the components of the fittings.

In these circumstances and according to another embodiment according to the invention and shown in Figures 5 through 9, the projecting end 47 of the spindle 46 matches the diameter of the bore 48 present in the auxiliary folding-arm leg 13, so that only the rotation about a horizontal axis of same be enabled.

In addition, the vertical spindle 49, which partly forms the hinging means 15 of said auxiliary folding-arm leg 13 on the sash 9, is inserted into an elongated opening 57A machined in the lower edge 55 and in the corner 56 of the square 52. This elongated opening 57A communicates with a recess 58, preferably of a cylindrical shape, with a vertical axis, provided for in the vertical leg 59 of said square 52. A bushing 60, integral with a transmission rod 61, slides in this recess 58 and co-operates with the vertical spindle 49.

More particularly, the bushing 60 has, on its lower face 62, a

blind hole 63 which matches the diameter of the vertical spindle 49 in order to enable the engagement of same.

As regards the transmission rod 61 connected to the bushing 60, it comes out of the recess 58, at the level of the upper edge 64 of the vertical leg 59 corresponding to the square 52. This transmission rod 61 is thus capable of co-operating, at its upper end 65 and through connecting means 66, with a (not shown) operating rod. This latter is accommodated in the notch 53 present in the rear stile 2 of the wing 1 and co-operates with the locking mechanism, such as an espagnolette bolt or bolt lock.

Hence, under the action of this operating rod, controlled by said locking mechanism, the bushing 60 slides in the recess 58 of the square 52 co-operating or not, according to the case, with the vertical spindle 49. More particularly, in closing position of the wing 1, corresponding to Figure 7, the bushing 60 is completely engaged onto the vertical spindle 49. By actuating the locking mechanism, to control the opening in the French way of the door or window, the set of operating rods causes the raising of the bushing 60, same being kept in a position partially engaged onto the vertical spindle 49, such as can be seen in Figure 8. This vertical spindle 49 is, in this case, capable of pivoting about a vertical axis.

Finally, in opening position by tilting of the wing 1, corresponding to the configuration of the hinging means 15 as shown in Figure 9, the bushing 60 is completely raised in the recess 58, releasing the vertical spindle 49.

Hence, and because of the elongated opening 57A provided for in the square 52, this latter is capable of pivoting about a horizontal axis. However, in order to avoid a limitation of the angular movement of the vertical spindle 49 inside the recess 58, the square 52 and, viz., the vertical leg 59 has, in the vicinity of the corner 56 and on his face 67 oriented outwardly of this door or window, an opening 68. This latter, thus arranged in front of the vertical leg 49, enables the free end 69 of same to project from the square 42 in maximum tilted position of the wing 1.

It is undeniable that such a configuration improves the hold of the sash 9 with respect to the sash-frame 4 in case of opening in the French way of the door or window.

As a consequence, the square bracket 10 and the folding stop-arm 5 11, objects of this invention, provide unquestionable advantages in the field of the built-in fittings for a pivoting and tiltable wing of a door or window. Their special design indeed enables their application with an irreproachable reliability for large-size and large-weight wings while ensuring an angle of opening in the French 10 way of more than ninety degrees. These fittings according to the invention thus associate efficiency and aesthetics.



C L A I M S

1. Fittings for a pivoting and tiltable wing of a door, window or the like with a sash (9) which partially covers the window frame (4), comprised of a square bracket (10) and a folding stop-arm (11) fixed in fillisters (7, 8) and both comprising an auxiliary folding-arm leg (13, 113) connected, on the one hand, to the lower rail (21) or the upper rail (121) of the sash-frame (4) and, on the other hand, to the the lower rail (3) of the sash (9) or to a main folding-arm leg (12) co-operating with the upper rail (150) of same, fittings characterized in that the square bracket (10) and the folding stop-arm (11) furthermore comprise:
- a second folding-arm leg (24, 124) slidably mounted, at its one end (25, 125), onto the lower (21) or the upper rail (121) of the sash-frame (4) and the other end (26, 126) of which is connected, by means of an hinged joint (26A, 126A), to the lower rail (3) of the sash (9) or the main folding-arm leg (12),
 - and a connecting rod (39, 139) one end (40, 140) of which is hingedly mounted onto this second folding-arm leg (24, 124) and the other end of which is pivotally secured to the lower (21) or the upper rail (121) of said sash-frame (4).
2. Fittings according to claim 1, characterized in that the square bracket (10) and the folding stop-arm (11) comprise a support (18, 118) formed by an elongated plate (19, 119) inserted, by means of fixing members (20, 120) in fillisters (7), onto the lower (21) or upper rail (121) of the sash-frame (4), to this support (18, 118) being connected, on the one hand, the auxiliary folding-arm leg (13, 113) and the connecting rod (39, 139) by means of hinged joints (17, 117) and (41, 141) and, on the other hand, the end (25, 125) of the second folding-arm leg (24, 124).
3. Fittings according to claim 2, characterized in that the plate (19, 119) comprises, in its front part (29) oriented towards the front stile of the sash (4) a slide (27, 127) formed by an elongated opening (28, 128) into which is engaged a trunnion (30, 130) integral with the end (25, 125) of the second folding-arm leg (24, 124) and comprising, at its free end (32, 132), a side plate (33,



133) co-operating with the lower side (34) or the upper face (134) of said plate (19, 119).

4. Fittings according to claim 2, characterized in that the hinged joints (17, 117) and (41, 141) connecting the auxiliary folding-arm leg (13, 113) and the connecting rod (39, 139) to the support (18, 118) are as close as possible to each other and arranged as close as possible to the rear stile (22) of the sash-frame (4).

5. Fittings according to claims 1 and 2, characterized in that the second folding-arm leg (24, 124) is cambered in its centre (43, 143), enabling the introduction of the connecting rod (39, 139) between said second folding-arm leg (24, 124) and the plate (19, 119), in closing position of the door, window or the like.

6. Fittings according to claims 1 and 2, characterized in that the auxiliary folding-arm leg (13), located, in closing position of the sash (9), in the extension of the second folding-arm leg (24) and the connecting rod (39), has a thickness (45) equivalent to the thickness represented by the sum of these latter.

7. Fittings according to claim 2, characterized in that the hinged joint (17) connecting the auxiliary folding-arm leg (13) of the square bracket (10) to the support (18) is formed by a vertical spindle (46) largely introduced into the lower rail (21) of the sash-frame (4) and the end (47) of which, projecting with respect to said support (18), is engaged into a bore (48) provided for at the end (17A) of said auxiliary folding-arm leg (13).

8. Fittings according to claim 7, characterized in that the end (47) of the vertical spindle (46) has a conical shape and is engaged into the bore (48) provided for in the auxiliary folding-arm leg (13) in order to enable the pivoting of same, at a limited angle, about a horizontal axis and to allow the opening by tilting of the sash (2).

9. Fittings according to claims 1 and 8, characterized in that the square bracket (10) comprises hinging means (15) connecting the auxiliary folding-arm leg (13) connected to the sash (9) and comprised, on the one hand, of a vertical spindle (49) made integral, at its lower end (50), with the free end (14) of said auxiliary



folding-arm leg (13) and, on the other hand, a square (52) covering the lower corner (16) of said sash (9) and inscribing in notches (53, 54) present in the rear stile (2) and the lower rail (3) of said sash (9), the square (52) comprising, in its lower edge (55),
5 a cylindrical recess (57) which matches the spindle (49) in order to enable the passing through and the rotation of same.

10. Fittings according to claim 7, characterized in that the end (47) of the vertical spindle (46) matches the diameter of the bore (48) present in the auxiliary folding-arm leg (13), so that only
10 the rotation about a vertical axis of same be enabled.

11. Fittings according to claims 1 and 10, characterized in that the square bracket (10) comprises hinging means (15) connecting the auxiliary folding-arm leg (13) to the sash (9) and comprised, on the one hand, of a vertical spindle (49) made integral, at its low-
15 er end (50), with the free end (14) of said auxiliary folding-arm leg (13) and, on the other hand, of a square (52) covering the lower corner (16) of the sash (9) and inscribing in notches (53, 54) present in the rear stile (2) and the lower rail (3) of said sash (9), the square (52) comprising, in its lower edge (55) and in the
20 corner (56), an elongated opening (57A) serving as a passageway for the vertical spindle (49) and communicating with a recess (58) provided for in the vertical leg (59) of said square (52).

12. Fittings according to claim 11, characterized in that the hinging means (15) furthermore comprise a bushing (60) sliding in the
25 recess (58) of the vertical leg (59) corresponding to the square (52) and co-operating with the vertical spindle (49) in order to enable or not the tilting of the sash (9) about a horizontal axis.

13. Fittings according to claim 12, characterized in that the bushing (60) has, on its lower face (62), a blind hole (63) which
30 matches the diameter of the vertical spindle (49) in order to enable the engagement of same, this bushing being furthermore made integral with a transmission rod (61) coming out of the recess (58), at the level of the upper edge (64) of the vertical leg (59) and co-operating, through connecting means (66), with an operating rod
35 actuated by a locking mechanism, such as an espagnolette bolt or



bolt lock.

14. Fittings according to claim 12, characterized in that the vertical leg (59) of the square (52) comprises, in the vicinity of the corner (56) and on its face (67), oriented outwardly of this door, window or the like, an opening (68) communicating with the recess (58) and through which projects the free end (69) of the vertical spindle (49) in the position of maximum tilting of the sash (9).

15. Fittings according to claim 1, characterized in that the main folding-arm leg (12) of the folding stop-arm (11) comprises, at its rear end (116), a length (155), folded in the shape of a square, which, in opening position in the French way, covers the upper corner (153) of the sash (9) and having, in its vertical leg (156), a slot (157) into which engages the end (158), with respect to the rear vertical edge (154) of said sash (9), of an operating rod (159) actuated by a locking mechanism, such as an espagnolette bolt or bolt lock.