

Connection device for a shuttering

The invention concerns a connecting device with a clamp strap for shuttering elements having on their edges strips projecting at right angles to the cover which are encompassed by the clamp strap in the operating position, whereby the clamp strap can be pivoted around an axis parallel to one of the strips into a loose position and an operating position and can be fastened in the operating position with a free arm of the clamp strap facing away from the pivot bearing to a rod or the like running parallel to the second strip and can be fastened in such a way that the two adjacent strips are pressed together and whereby the axis and the rod are each firmly connected to one of the shuttering elements to be connected and are arranged parallel to the longitudinal direction of the strips to be connected.

A comparable connection device is known from US-PS 3 550 898. In this case, the pivotable clamp strap consists of two parts, whereby the free arm of the clamp strap must be guided to slide relative to the pivot-mounted strap arm and is drawn back into a clamping position. In this case, drawing back is conducted by means of a wedge which penetrates elongated slots in the two associated parts of the strap. The free arm of the clamp strap in this case is formed like a hook and grips round a rod or bolt in its operating position. Whilst it is true that this enables the strips of two shuttering elements to be drawn together, nevertheless, as a result of the unavoidable play within the individual parts belonging to this connection device, there is a risk that they will be clamped together offset to one another, leading to subsequent graduations in the concrete.

Therefore, it is necessary to create a connection device of the type mentioned at the beginning which simultaneously facilitates alignment of the shuttering elements to be connected. A separate wedge, which might become lost, should be avoided.

To solve this task, the connection device of the type mentioned at the beginning is characterised by the fact that in the operating position, the clamp strap surrounds the opposed surfaces of the strips in such a manner as to cause them to interlock at least in certain areas and that to fasten the free arm of the clamp strap to the rod, a sliding extension is provided which moves roughly in the direction of the end of the strap and which secures the rod after sliding.

Interlocking facilitates alignment of the shuttering during clamping, or an aligned shuttering is held in this position. The sliding extension makes a separate clamping wedge superfluous.

Alignment of the shuttering elements to be connected flush with one another can be achieved particularly well and securely if the free edges of the strips lie against the inside of the strap in the operating position. In this way, clamping and fixing of the clamp strap eliminates any slight displacements of the strips which may occur.

The extension may preferably be arranged on a projection of the free arm of the clamp strap which can be swung past the rod and which is situated at a distance from the rod in the operating position. In this way, the arm of the clamp strap can be conveniently swung past the rod into its operating position with the extension pulled back, or after pulling back the extension, it can be returned to its loose position, and in the operating position, fixing and clamping can be conducted in a simple manner by

pushing out the extension. In this case, it is particularly expedient if the sliding extension with its upper side facing the rod runs obliquely to the direction of sliding and the side of the rod gripped from below, whereby the inclination rises in opposition to the direction of sliding. In this way, when the clamp strap is fixed in its operating position with the aid of the sliding extension, a clamping effect is simultaneously achieved by the latter, as a result of the aforementioned inclination. Subsequent loosening is likewise facilitated by this.

A simple design is produced if the extension is able to slide on a support running approximately parallel to the underside of the rod and is formed as a wedge. In this way, the required wedging and clamping is produced from the aforementioned consistent sliding of the extension into its clamping position, which is also sufficient for fixation purposes and which generates the required clamping forces quickly and simply. In this way, the fastening and clamping wedge - in addition to the guide on its underside facing away from the rod - can be guided in an elongated slot with a cross pin or the like which cannot be lost. Furthermore, the clamp strap may be mounted in such a way that it cannot be lost on the pivot axis which is particularly firmly installed, so that the entire fastening device is connected in an advantageous manner to the relevant shuttering and remains so, and is to a certain extent integrated in the shuttering unit.

A particularly favourable transmission of force results if the free arm of the clamp strap can be swung into its operating position with the extension between the strip and the anchoring rod. If the extension is then pushed and wedged between the free arm of the clamp strap and the rod, this produces the required pressure against the strip to be held.

To enable the extension to be slid simply but nevertheless effectively, it may have a projection at the end opposite the fastening end which protrudes opposite the guide and the arm of the clamp strap for the action of a tool, in particular, a hammer. This favours not only the extension being struck into its operating position, but also its loosening, whereby it is then possible to strike against or pull on the underside of this projection.

The internal contour of the clamp strap may largely correspond to the external contour of the two adjacent strips, whereby the free arm of the clamp strap should expediently have a projection towards the inside of the strap to serve as a stop against the strip on the rod side. Hence, the arm of the clamp strap is not necessarily in contact with this strip on the rod side along its entire length, with the result that certain dimensional differences, tolerances and clamping distances can be compensated, and the end of the clamp arm can be securely in contact with the corresponding strip, as the aforementioned projection is expediently provided at the end of the strap arm. In order to effect a certain movement of the two strips towards one another when swinging the clamp strap into its operating position, the two strips may run obliquely in cross-section at their upper sides facing away from the contact surfaces, from the cover to their free edges, and together form approximately a trapezium, and the strap opening may accordingly be essentially trapezoidal.

In order to also achieve effective location of the clamp strap against the strip on the bearing side of the shuttering provided with the strap, the bearing eye of the pivot bearing of the clamp strap may be in the form of an eccentric having, in its open position, a

clear distance from the neighbouring strip which corresponds to approximately double the eccentricity, and, in its closed position, being pressed against the strip with the inside of the strap. In this way, the force to be transmitted from the strap to the strip of the other shuttering is not transmitted exclusively via the bearing, but instead, in the desired manner, via the strip on the bearing side.

The rod for anchoring the clamp strap in its operating position may have a plane underside in cross-section for location of the extension, preferably designed in the form of square tube or the like, whereby the cross-section of its underside may be oriented approximately parallel to the direction of sliding of the extension. In this way, the direction of sliding of the extension may be at a less acute angle to a perpendicular to the cover than the free arm of the clamp strap and its inside which can be placed against the strip. Accordingly, by pushing out the extension, it is possible to achieve not only a clamping effect, but also, at the same time, a certain degree of interlocking in the operating position, because the extension will then grip beneath the rod in such a manner that it is prevented from swinging upwards. Hence, this simultaneously produces a locking effect, and the extension functions not only as a clamping element, but also as a retaining bolt.

It should also be noted that the pivot axis for the strap and preferably the fastening rod run between webs of the shuttering arranged at right angles to the strips to be connected and/or may be anchored to these webs, so that a special housing or bearings are not required but instead, bracing webs of the shuttering elements can be used to anchor the entire fastening device.

Further designs of the device according to the invention and possibilities of designing the clamp strap in such a manner that it cannot be lost but is, perhaps, nevertheless easy to dismantle and convert, together with designs which produce a symmetrical and thus arbitrary arrangement, are the object of claims 15 to 22. Above all, the combination of a mirror symmetrical arrangement and design of the pivot axes and rods with the opportunity of also dismantling the clamp strap, in spite of the fact that it cannot be lost, due to a closable gap in the penetration opening for the pivot axis, permits a rod which in one application forms the pivot axis to be used in another case as a fastening rod for the sliding extension and to create a pivotable fastening of the clamp strap to the rod formerly used to anchor the extension. In this way, clamp straps and shuttering elements can be combined in virtually any form, and when connecting the shuttering elements, it is not necessary to pay strict attention to the fact that in each case, a pivot axis is situated on one side of the connecting area and a fastening rod on the other.

The arrangement of such pivot axes or rods along the shorter narrow sides and edges of the shuttering elements also facilitates arbitrary arrangement of these shuttering elements in positions rotated through 90° , and also in combination with other shuttering elements which are not arranged in this rotated position. In this way, for example, shuttering walls, formed by shuttering elements with their longer edges arranged vertically, can be raised in height, because shuttering elements which have now been rotated through 90° may be placed on the upper edges of such shuttering elements and fixed with the clamp strap.

The essential features of several versions of the invention are described in greater detail below by reference to the drawing.

It shows:

- Fig. 1 in diagrammatic form, a top view of the fastening device with a cross-section through the pivot axis and the anchoring rod and with a front view of the strips to be connected, whereby these strips may be arranged vertically and/or horizontally.
- Fig. 2 in enlarged scale, a display corresponding approximately to fig. 1, although modified compared with figure 1, whereby the pivot axis and fastening rod are arranged in mirror image to the joint between the two strips to be connected, so that a clamp strap may be arranged either in one position or in the reverse position from fig. 1, as shown in fig. 2, whereby this clamp strap has a penetration opening for the pivot axis which opens laterally, so that it can be transferred.
- Fig. 3 a sectional view of the clamp strap in accordance with fig. 2 with a section through the spring-loaded locking pin for the lateral gap in the penetration opening for the pivot axis.
- Fig. 4 a rear view of a shuttering with fastening rods or pivot axes arranged on all four sides within the strips as well as
- Fig. 5 a top view of a shuttering in accordance with fig. 4.

A connection device, labelled 1 in its entirety, for shuttering elements 2, having on their edges strips 4 projecting at right-angles to the cover 3 and containing above all a clamp strap 5 which in the operating position, indicated with unbroken lines, encompasses the two strips 4 of shuttering elements 2 to be connected in alignment with one another.

In this case , the clamp strap 5 can be pivoted around an axis 6 parallel to the adjacent strip 4 into a loose position indicated with dot-dash lines, and conversely, from this loose position into the operating position.

In the operating position, the clamp strap 5 can be fastened in a manner to be described below with its free arm of the clamp strap 7, which faces away from the pivot bearing and the pivot axis 6, to a rod 8 running parallel to the second strip, and can be clamped in such a way that the two adjacent strips 4 are pressed together in the manner shown.

In order to hold the two shuttering elements 2 in an aligned position and, if necessary, to align them further upon clamping, the clamp strap 5 in its operating position surrounds the opposed surfaces 9 of the strips 4 in such a manner as to cause them to interlock at least in certain areas. Furthermore, in this operating position, the free edges 4a of the strips 4 lie against the corresponding inside of the strap to ensure good alignment. To fasten the free arm of the clamp strap 7 to the rod 8, a sliding extension 10 is provided which moves roughly in the direction of the free end of the strap and secures the rod 8 - as shown in the drawing - after sliding. Figures 1 and 2 clearly show that with the extension 10 in this position, the strap 5 is locked in such a way that it is unable to swing back.

In this case, the extension 10 is arranged on a projection 11 on the outside of the free arm of the strap 7 and that in the operating position, this projection 11 can be swung past the rod 8 and is also at a distance from the rod 8, which is bridged by the extension 10. In the example shown, the free arm of the clamp 7 can be swung into its operating position between the strip 4 and the anchoring rod 8, in other words, it is not swung over the side of the rod 8 facing away from the strip 4 and hooked in there.

The sliding extension 10 runs with its upper side 10a facing the rod 8 obliquely to its direction of sliding and guide, whereby this inclination rises in opposition to the direction in which the extension 10 is slid to reach the locking position portrayed in the figure. Thus, following initial touch contact of this upper side 10a with the corresponding underside 8a of the rod 8, when the extension 10 is slid further, clamping and pressing of clamp 5 against both strips 4 occurs in the required manner.

In order to facilitate the transmission of sufficiently high forces, the extension 10 can be slid on a support 12, indicated with a dashed line, running approximately parallel to the underside of the rod 8a, whereby the extension is designed virtually in the form of a clamping wedge with regards to the inclination of the upper side 10a. In addition to this guide against the support 12, the extension may also be guided by a cross pin 13 in an elongated slot 14 of a flange or a grooved wall or the like on the outside of the strap, as is clearly visible in the version shown, therefore providing still greater protection against becoming lost.

In the version shown, extension 10 has its own projection 15 for the action of a tool, such as a hammer, at the end facing away from its fastening end, projecting opposite the guide 12 and the strap arm 7 or the projection 11. In this case, this tool can either be used to hammer the extension 10 into its operating position, or to loosen it, by hammering against the projection 15 in the opposite direction. Hence, in practice, this produces an extension 10 which can be operated and functions in the manner of a push and pull bolt, as well as having the aforementioned wedge effect.

It has already been mentioned that the internal contour of the clamp strap 5 corresponds largely to the external contour of the two adjacent strips 4, whereby in the version shown, the free arm of the strap 7 has a stop projection 16 near its free end directed into the inside of the strap to act as a stop against the strip on the rod side. The remaining upper side 9 of this strip 4 therefore remains free, so that dimensional differences and tolerances do not have a negative effect and in fact, the clamp regions furthest apart in each case come into contact with the upper sides 9 of the strips 4 and produce the required clamping and connection under optimum lever action. In this case, the two strips 4 run obliquely in cross-section at their upper sides 9 facing away from their contact surfaces, from the cover 2 to the free edges 4a, and together form approximately a trapezium; accordingly, the strap opening is essentially trapezoidal. Thus, even if the strips 4 are still somewhat apart, the strap 5 can be swung into its operating position and thereby brings the two strips 4 closer to one another, as well as aligning them.

In order to be able to swing the strap 5 completely freely while it is open as well as bringing it firmly

into contact with strip 4 on the bearing side when it is in the closed position, the bearing eye 18 of the pivot bearing 19 is designed in the form of an eccentric and in the open position of clamp strap 5, which is indicated by dot-dash lines, its clear distance from the neighbouring strip 4 corresponds to approximately double the eccentricity, whereby in the closed position, it is pressed against strip 4 with the inside of the strap.

Rod 8 has a plane underside 8a in cross-section for good location of the extension 10 and in the version shown, it is designed in the form of a square tube, whereby the cross-section of its underside is oriented approximately parallel to the direction of sliding of the extension 10. In this case, from reference to the orientation of the elongated slot 14 and the guide support 12, it can be seen that the direction of sliding of the extension 10 lies at a less acute angle to a perpendicular to the cover 3 than the free arm of the strap 7 and its inside, which can be placed against the strip 4. This not only permits clamping pressure of the strap arm 7 against the strip 4 to which it is applied, but in the operating position shown, it also locks strap 5 in the required manner to prevent it from swinging up, which is undesirable.

The pivot axis 6 for strap 5 and the fastening rod 8 may advantageously and expediently run between the webs 20 arranged at right angles to the strips 4 to be connected, and may be anchored to these webs 20. Overall, this therefore produces a fastening device which cannot be lost, whereby naturally, several straps 5 may be located at a distance from one another on an axis 6 with relatively large distances between the webs 20.

Operation of this fastening device 1 is extremely simple, since once the two shuttering elements 2 have been assembled, it is only necessary to swing the strap or straps 5 into the closed position and anchor them by sliding the extension 10 in order to obtain a connection of the two shuttering elements 2 with high forces. Opening this device and removing the shuttering is equally simple.

Figures 2 to 5 portray a version which has been modified in particular with regard to the clamp strap 5 as well as the fastening rod 8. In spite of the modifications and alterations intended here, the reference numbers of the parts match those of the version described above.

In this second version, the clamp strap 5 has a penetration opening 19a for its pivot axis 6 as a pivot bearing 19, the edge of which has a gap 21, which can be at least partially closed, with a length corresponding to the cross-section of the pivot axis 6. Hence, if the gap 21 is opened, the clamp strap 5 may be removed from the pivot axis 6 by moving it away from the pivot axis 6 with its gap 21 transversely to the path of the pivot axis 6.

In this case, the penetration opening 19a for the pivot axis 6 is an elongated slot running transversely to the cover 3 in the operating position of the clamp strap 5 and in the version shown, running away from the cover 3 approximately at right-angles to it, and the gap 21 in the edge of this elongated slot is located in the vicinity of the end of this elongated slot facing away from the cover 3. Figures 2 and 3 show that the gap is still in the vicinity of the longitudinal wall of the elongated slot, and not directly at its end, and indeed on the side facing away from the actual clamp strap. In this way, the clamp can easily be moved away from

the shuttering 2 after swinging open the rear of the latter, whereby the pivot axis 6 is then released by the gap 21.

In the version shown, the closure for the gap 21 is formed by a pin 23 which can be lowered against a return force or return spring 22. However, a spring-loaded bow could also be used to bridge the gap, in a similar manner to an eye on a jewellery clasp, or a rebound wall area could be provided transversely to the gap, in a similar manner to a spring hook. However, as the closure need not bridge the entire gap 21, a pin 23 projecting into the gap 21 and which can be pushed back from the latter is sufficient.

In the version shown, the pivot axis 6 and the fastening rod 8 to be gripped by the sliding extension or locking piece 10 are arranged at the same height and at equal distances relative to the strips 4 of the shuttering elements 2 to be connected. They have a corresponding cross-section (in the version shown, the cross-section is circular), with the result that the pivot axis 6 and the rod 8 of two shuttering elements connected with the clamp strap 5 are arranged mirror symmetrically to a plane running through the contact joint of the two shuttering elements between their strips 4. As the clamp strap 5 can be dismantled by the aforementioned openable gap 21 in its elongated slot, in spite of the fact that its fastening cannot generally be lost, the pivot axis 6 and fastening rod 8 are interchangeable to a certain extent. Whereas in the version shown in figure 1, when joining the shuttering elements, it is essential to observe the fact that a pivot axis always lies on one side of the joint to be connected and a fastening rod on the opposite side, in the version shown here, this need not be taken into account.

Fig. 4 shows that the pivot axes 6 and/or rods 8 are provided along all four strips 4 of a rectangular shuttering 2, each with corresponding distances. Thus, in order to increase height, it is possible to fasten a shuttering on top of a shuttering wall consisting of shuttering elements 2 with their longer edges standing vertically, whereby the former is rotated through 90° in relation to the latter, so that it lies with its longer edge on the shorter edges of the first shuttering elements. A connection can also be made with a clamp strap 5 at this point.

Naturally, these shuttering elements also permit mutual height off-setting, because the clamp straps may in each case engage any given points of the pivot axes 6 and fastening rods 8.

Furthermore, fig. 4 also shows that the pivot axes 6 and rods 8 running parallel to the shorter edges and strips of the rectangular shuttering 2 are each butted to the pivot axes 6 and rods 8 of the other longitudinal sides of the shuttering 2 arranged at right-angles to them, and should preferably be connected to them e.g. by welding. This produces additional bracing of the entire shuttering 2, so that even those forces occurring via the clamp strap 5 can be absorbed well and conducted into the bracings and webs of the shuttering elements 2. Furthermore, fig. 4 also shows that the pivot axes 6 and rods 8 are arranged between the bracing ribs 20 of the shuttering 2 and in this case possibly intersperse them transverse to their course, and that the rods 8 and pivot axes 6 running parallel to such bracing ribs 20 and parallel to the shortest edges of a shuttering 2 have at least one support 24, and in the example shown, each have three such supports 24 against the strip 4. It would also be possible to have a support 24 against a bracing

rib 20, but as shown in fig. 4, this would have to be correspondingly longer.

In total, this produces a shuttering 2 also having bracing rods and axes for connection with a neighbouring shuttering at any edge and with any given height offset, engaging with clamp straps 5, being simple to operate, lock and anchor, which in the versions shown in accordance with figures 2 and 3 are also transferable in spite of the fact that their fixture cannot be lost, thereby simplifying installation of the shuttering elements.

Patent claims

1. Connection device (1) with a clamp strap (5) for shuttering elements (2) having on their edges strips (4) projecting at right angles to the cover (3) which are surrounded by the clamp strap (5) in its operating position, whereby the clamp strap (5) is pivoted about an axis (6) parallel to one of the strips (4) into a loose position and an operating position and which in its operating position can be fastened with its free strap arm facing away from the pivot bearing (19) on a rod (8) or the like running parallel to the second strip (4) and which can be clamped in such a manner that the two adjacent strips (4) are pressed together and whereby the axis (6) and the rod (8) are each firmly connected with one of the shuttering elements (2) to be connected and arranged parallel to the longitudinal direction of the strips to be connected (4), characterised by the fact that the clamp strap (5) in its operating position surrounds the opposed surfaces (9) of the strips in such a manner as to cause them to interlock at least in certain areas and that in order to fasten the strap arm (7) to the rod (8),



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Patent claims

1. Connection device (1) with a clamp strap (5) for shuttering elements (2) having on their edges strips (4) projecting at right angles to the cover (3) which are surrounded by the clamp strap (5) in its operating position, whereby the clamp strap (5) is pivoted about an axis (6) parallel to one of the strips (4) into a loose position and an operating position and which in its operating position can be fastened with its free strap arm facing away from the pivot bearing (19) on a rod (8) or the like running parallel to the second strip (4) and which can be clamped in such a manner that the two adjacent strips (4) are pressed together and whereby the axis (6) and the rod (8) are each firmly connected with one of the shuttering elements (2) to be connected and arranged parallel to the longitudinal direction of the strips to be connected (4), *characterised by the fact that the clamp strap (5) in its operating position surrounds the opposed surfaces (9) of the strips in such a manner as to cause them to interlock at least in certain areas and that in order to fasten the strap arm (7) to the rod (8),*



a sliding extension (10) is provided on the latter which moves roughly in the direction of the free arm of the strap and secures the rod (8) after sliding.

2. Device in accordance with claim 1, characterised by the fact that the free edges (4a) of the strips (4) lie against the inside of the clamp in its operating position.
3. Device in accordance with claim 1 or 2, characterised by the fact that the extension (10) is arranged on a projection of the free arm of the strap (7) which can be swung past the rod and is situated at a distance from the rod in the operating position.
4. Device in accordance with one of the claims 1 to 3, characterised by the fact that the sliding extension (10) runs with its upper side (10a) facing the rod (8) obliquely to its direction of sliding and the rod side gripped from below, whereby the inclination rises in opposition to the sliding guide.
5. Device in accordance with one of the claims 1 to 4, characterised by the fact that the extension slides on a support (12) running approximately parallel to the underside of the rod (8a) and is designed in the form of a wedge.
6. Device in accordance with one of the claims 1 to 5, characterised by the fact that the fastening and clamping wedge - in addition to the guide on its underside facing away from the rod - is guided in an elongated slot (14) by means of a cross pin (13) or the like so that it cannot be lost.



7. Device in accordance with one of the claims 1 to 6, characterised by the fact that the free arm of the strap (7) can be swung into its operating position between the strip (4) and the anchoring rod (8).
8. Device in accordance with one of the claims 1 to 7, characterised by the fact that the extension (10) has at its end facing away from the fastening end a projection (15) which protrudes opposite the guide (12) and the strap arm (7) for the action of a tool, in particular a hammer.
9. Device in accordance with one of the claims 1 to 8, characterised by the fact that the internal contour of the clamp strap (5) largely corresponds to the external contour of the two adjacent strips (4), whereby the free arm of the strap (7) preferably has a projection (16) near its free end directed towards the inside of the strap to act as a stop against the strip on the rod side.
10. Device in accordance with one of the claims 1 to 9, characterised by the fact that the two strips (4) run obliquely in cross-section at their upper sides (9) facing away from their contact surfaces, from the cover (2) to their free edges (4a), and together form approximately a trapezium and that the strap opening is essentially trapezoidal.
11. Device in accordance with one of the claims 1 to 10, characterised by the fact that the bearing eye (18) of the pivot bearing (19) of the clamp strap is in the form of an eccentric and in its open position has a clear distance from the neighbouring strip (4) corresponding to approximately double the eccentricity, and in the



closed position, presses against the strip (4) with the inside of the strap.

12. Device in accordance with one of the claims 1 to 11, characterised by the fact that the rod (8) has a plane underside (8a) in cross-section for location of the extension, preferably in the form of a square tube or the like, whereby the cross-section of its underside is oriented approximately parallel to the direction of sliding of the extension (10).
13. Device in accordance with one of the claims 1 to 12, characterised by the fact that the direction of sliding of the extension (10) stands at a less acute angle to a perpendicular to the cover (3) than the free arm of the strap (7) and its inside which can be placed against the strip (4).
14. Device in accordance with one of the claims 1 to 13, characterised by the fact that the pivot axis (6) for the strap (5) and preferably the fastening rod (8) run between webs (20) of the shuttering elements (2) arranged at right angles to the strips (4) to be connected and/or are anchored to these webs.
15. Device in accordance with one of the above claims, characterised by the fact that the clamp strap is mounted on the particularly firmly installed pivot axis in such a manner that it cannot be lost.
16. Device in accordance with one of the claims 1 to 15, characterised by the fact that the clamp strap (5) has a penetration opening (19a) for its pivot axis (6), the edge of which has a gap (21) which can be closed at least in part, and whose length



at least corresponds to the cross-section of the pivot axis (6).

17. Device in accordance with one of the claims 1 to 16, characterised by the fact that the penetration opening (19a) for the pivot axis (6) is an elongated slot running transversely to the cover (3) in the operating position of the clamp strap (5), preferably running away from the cover (3) approximately at right angles, and the gap (21) in the edge of this elongated slot, which is at least partially closable, is located in particular on or near the end of this elongated slot which faces away from the cover (3).
18. Device in accordance with one of the claims 1 to 17, characterised by the fact that the closure for the gap (21) of the contour of the elongated slot for the pivot axis is formed by a pin (23), wall section or the like which can be lowered against a return force or spring (22).
19. Device in accordance with one of the claims 1 to 18, characterised by the fact that the pivot axis (6) and the rod (8) to be gripped from below by the sliding extension (10) are arranged at the same height and at a corresponding distance relative to the strips (4) of the shuttering elements (2) to be connected and have a corresponding, particularly circular, cross-section, so that the pivot axis (6) and the rod (8) of two connected shuttering elements are arranged mirror symmetrical to a plane running through the contact joint of the two shuttering elements between their strips (4).
20. Device in accordance with one of the claims 1 to 19, characterised by the fact that pivot axes (6)



and/or rods (8) are provided along all four strips (4) of a rectangular shuttering (2) at equal distances.

21. Device in accordance with one of the claims 1 to 20, characterised by the fact that the pivot axes (6) and/or rods (8) running parallel to the shorter edges and strips of the rectangular shuttering (2) in each case butt flush onto the pivot axes (6) or rods (8) of the other longitudinal sides arranged at right angles to them and are preferably connected, e.g. welded, to them.
22. Device in accordance with one of the claims 1 to 21, characterised by the fact that the pivot axes (6) and/or rods (8) are in each case arranged between bracing ribs (20) of the shuttering (2) and/or intersperse the latter transversely to their course and that the rods (8) and/or pivot axes (6) running parallel to such bracing ribs (20) and parallel to the shorter edges of a shuttering (2) preferably have at least one support (24) against the strip (4) and/or a bracing rib (20).