

Specification

INSTALLATION STRUCTURE OF STORAGE BOX

Field of the Invention

The present invention relates to an installation structure of a storage box for a fire extinguisher, etc. installed within an opening of a building wall.

Prior art

Disclosed in Japanese Patent Laid-open Publication No 2002-336369 is an installation structure of a storage box for a fire extinguisher in which the storage box is fixed in position by means of screws in a condition coupled within a rectangular frame welded to each side surface of spaced vertical structure members arranged behind a wall of a building.

In the installation structure of the storage box for the fire extinguisher, it is difficult to accurately weld the rectangular frame to the structure members of the wall. If the welded position of the frame is displaced in a fore-and-aft, the front edge of the storage box fitted with the frame protrudes or caves in from the front surface of the wall. This spoils the beauty of the wall. The welding work of the frame is carried out before the surface finish of the wall to avoid damage of the front surface of the wall, and the storage box is fitted with the frame after the surface finish of the wall. This causes trouble in the installation work of the storage box. For welding the frame to the structure members, it is required to carry a welding machine into a work field. This results in increase of the installation cost of the storage box.

Summary of the Invention

A primary object of the present invention is to provide an installation structure capable of accurately installing a storage box for a fire extinguisher etc. within an existing surface finished wall in a simple manner without any welding work.

According to the present invention, the object is attained by providing an installation structure of a storage box for a fire extinguisher etc. to be fitted with an opening of a building wall and fixed in position in a condition where the box is opened at its front surface, which comprises lower support means placed on a floor between a pair of laterally spaced vertical structure members behind a building wall and engaged with a bottom surface of the storage box for positioning the storage box supported thereon moveably in a back and forth direction and a vertical direction, and upper support means placed behind an upright attachment portion formed on an upper portion of the storage box for vertically fixing the attachment portion to the vertical structure members, wherein the storage box is horizontally supported and positioned at its bottom surface by means of the lower support means and vertically positioned at its upper portion by means of the upper support means in a condition wherein the storage box has been fitted within the opening of the building wall and placed in contact with the front surface of the building wall at its front peripheral edge, and wherein the storage box is fixed at its bottom portion to the lower support means and at its upper portion to the upper support means by means of fastening elements to be operated from the inside of the box.

In a practical embodiment of the present invention, it is preferable that the lower support means is composed of a support means mounted on a floor located behind a building wall and adjustable in height and a support bracket supported on the support means in such a manner as to be displaceable in a back and forth direction for engagement with the bottom surface and rear surface of the storage box and that the upper support means is composed of a pair of holding metal fittings supported on at least a connecting rod to be laterally moveable for engagement with the vertical structure members and a set of fastening bolts inserted through a lateral slit formed in the upper attachment portion and threaded into the holding metal fittings.

In the practical embodiment, the lower support means may be also composed of a support means mounted on a floor located behind the building wall and adjustable in height and a set of fastening elements to be operated from the inside of the storage box for fixing the bottom portion of the storage box to a structure member of the support means in a condition where the bottom portion of the storage box has been horizontally supported on the support means.

Alternatively, the lower support means may be composed of a support means mounted on a floor located behind the building wall and adjustable in height, a pair of laterally spaced brackets fixed to the bottom portion of the storage box, and a pair of fastening bolts laterally threaded in the brackets to be fastened from the inside of the storage box, wherein the fastening bolts are fastened outward and pressed into contact with the side surfaces of the vertical

structure members of the wall at their distal ends to restrict lateral movement of the storage box in a condition where the bottom portion of the storage box has been horizontally supported on the lower support means. On the other hand, the upper support means may be composed of a pair of laterally spaced brackets fixed to the upper surface of the storage box, and a pair of fastening bolts laterally threaded into the brackets, wherein the fastening bolts are fastened outward and pressed into contact with the side surfaces of the vertical structure members of the wall at their distal ends to restrict lateral movement of the storage box in a condition where the storage box has been fitted within the opening of the wall and retained in contact with the front surface of the wall at its front peripheral edge.

In another practical embodiment of the present invention, there is provided an installation structure of a storage box for a fire extinguisher etc. to be fitted within an opening of a building wall and fixed in position in a condition where the box is opened at its front surface, which comprises support means composed of two pairs of laterally spaced brackets fixed respectively to the upper surface and the bottom surface of the storage box, and two pairs of fastening bolts laterally threaded into each pair of the laterally spaced brackets to be fastened from the inside of the storage box, wherein the fastening bolts are fastened outward and pressed at their distal ends into contact with the side surface of a pair of spaced vertical structure members of the wall to position the storage box in place in a condition where the storage box has been fitted within the opening

of the wall and retained in contact with the front surface of the wall at its front peripheral edge.

Preferred embodiments of the Invention

In Figs. 1 ~ 5 of the attached drawings, there is illustrated an embodiment of an installation structure of a storage box for a fire extinguisher in accordance with the present invention. In this embodiment, the storage box 10 for the fire extinguisher is in the form of a rectangular solid box opened at its front and fitted within a rectangular opening O of an existing wall W of a building. In a condition where a rectangular rim 11 formed on the front peripheral edge of storage box 10 has been placed in contact with the front surface of the wall W, the storage box is installed on a floor located between spaced vertical structure members in the form of light weight iron frameworks F behind the wall W and positioned in place by means of a lower support device 20 and an upper support device 30 assembled with an upper portion of the frameworks F.

As shown in Figs. 1 ~3, the lower support device 20 is composed of a stud-bolt 21 vertically welded to a metallic base plate 21a to be fixed on the floor of the building, a rectangular support plate 22b welded to the upper end of a sleeve-like nut 22a threaded on the stud-bolt 21 to be displaced in a vertical direction, and a support bracket 23 mounted on the support plate 22b to be displaceable back and forth. The support bracket 23 is in the form of a L-letter shape in cross-section and has a flat portion 23a formed with a pair of slotted

holes 23c and formed at its opposite ends with a pair of ribs 23f. The support bracket 23 is positioned in place by means of screws 23d fastened to the support plate 22b through the slotted holes 23c. In addition, the support bracket 23 has a vertical portion 23b formed with a lateral screw hole through which a screw 23e is fastened to the rear plate of storage box 10 across a lateral hole 13 formed therein.

In the lower support device 20, a base plate 21a of stud-bolt 21 is mounted on a floor of the building by means of a pair of screws 21c at a position faced to the bottom rear end of storage box 10 before the storage box 10 is fitted in the opening O of the wall W. Thereafter, the height of support bracket 23 is adjusted by operation of the sleeve-like nut 22a so that the ribs 23f of support bracket 23 are positioned to horizontally support the bottom of storage box 10. In a condition where the height of support bracket 23 has been adjusted in place, the vertical portion 23b of support bracket 23 is engaged with the back surface of the lower portion of storage box 10, and the screw 23d is fastened to fix the support bracket 23 in position.

As shown in Figs. 4 and 5, the upper support device 30 is composed of a pair of holding metal fittings 31 to be engaged with the light weight iron frameworks F located at the opposite sides of opening O behind the wall W, two connecting rods 33 whose opposite ends are passed across each U-shaped bent portions 31a of holding metal fittings 31 and assembled in parallel for supporting the holding metal fittings 31 at their opposite ends, and two fastening

bolts 32 threaded through each U-shaped bent portions 31a of holding metal fittings 31 positioned between the two connecting rods 33. As shown in Figs. 1 and 2, the fastening bolts 32 are inserted through a lateral slit 14 of a mounting portion 12 projected upward at the upper portion of storage box 10 and threaded into the U-shaped bent portions 31a of metal fittings 31, respectively.

In the upper support device 30, the U-shaped bent portions 31a of metal fittings 31 are threaded on the fastening bolts 32 inserted through the lateral slit 14 of the mounting portion 12 of storage box before the storage box 10 is fitted within the opening O of wall W. In such a condition, the fastening bolts 32 are displaced laterally inward along the lateral slit 14 in such a manner that the metal fittings 31 are positioned behind the back surface of storage box 10.

Hereinafter, an assembling process of the storage box 10 in the opening O of wall W by using the lower support device 20 and the upper support device 30 will be described. In a practical embodiment of the present invention, the opening O for installation of the storage box 10 is formed in an existing wall W at a position between the light weight iron frameworks F arranged as structure members behind the wall W. As described above, the storage box 10 is fitted within the opening O of wall W in a condition where the lower support device 20 has been mounted on a floor located approximately at the center of opening O behind wall. When the storage box 10 is pushed into the wall until the rim 11 of front peripheral edge is fitted to the front surface of wall W, the bottom of storage box 10 is supported on the ribs 23f of bracket 23 of the lower support device 20,

and the back surface of the lower portion of storage box 10 is brought into engagement with the vertical portion 23b of support bracket 23. Thus, the storage box 10 fitted within the opening O is horizontally supported at its bottom portion. In such a condition, the fastening screw 23e is threaded into the vertical portion 23b of support bracket 23 through the lateral slit 13 formed in the lower portion of back plate of storage box 10 to position the bottom portion of storage box 10 in place. At the upper portion of storage box 10, the fastening bolts 32 are displaced outward along the slit 14 so that the holding metal fittings 31 are laterally moved along the connecting rods 33 and engaged at their flanges 31b with each back surface of the iron frameworks F. In such a condition, the head portion of each fastening bolt 32 is positioned on the inner surface of storage box 10 and fastened by a screw driver engaged therewith so that the metal fittings 31 are clamped to the iron frameworks F respectively to fix the storage box 10 in a vertical direction.

In the assembling process described above, the head portion of fastening screw 23e is positioned on the inner surface of the lower portion of storage box 10 fitted within the opening O of wall W and is fastened by a screwdriver, and the head portion of each fastening bolt 32 is positioned on the inner surface of the upper mounting portion of storage box 10 and fastened by the screwdriver. With such fastening operation of the fastening screw 23e and bolts 32, the storage box 10 is fixed in place in a simple manner in a condition where the front peripheral edge of storage box 10 is retained in contact with the front surface of wall W.

Although in the embodiment described above, the support bracket 23 has been mounted on the upper end of sleeve nut 22a threaded on the stud bolt of lower support device 20 to support the bottom portion and the back surface of the lower portion of storage box 10 at its rib 23f and vertical portion, the support bracket 23 may be replaced with a disc 23A mounted on the upper end of sleeve nut 22a as shown in Figs. 6 and 7 to support the bottom portion of storage box 10 thereon. In this case, the bottom portion of storage box 10 is fixed to the disc 23A by means of a fastening screw 23B. Preferably, an appropriate mark or a screw hole is provided on the inner surface of the bottom portion of storage box 10 so that the bottom portion of storage box 10 can be positioned at the center of disc 23A in a condition where the storage box 10 has been fitted within the opening O of wall W and retained in contact with the front surface of wall W at its front peripheral edge.

Illustrated in Figs. 8 ~ 10 is another embodiment of the present invention, wherein the support bracket 23 of the lower support device 20 shown in Figs. 1 ~ 3 is replaced with a pair of brackets 41 of U-letter shape in cross-section fixed to the bottom portion of storage box 10 and fastening bolts 42 laterally threaded in each bracket 41. In this embodiment, a disc 22A is mounted on the upper end of the sleeve-like nut 22a threaded on the stud bolt 21, and the bottom portion of storage box 10 is horizontally supported on the disc 22A. In such a condition, the fastening bolts 42 laterally threaded in the brackets 41 are twisted in by a tool inserted through a window aperture 16 formed in the bottom portion of storage box 10 and pressed at their distal ends into contact with the side surfaces of the

iron frameworks F located at the both sides of opening O thereby to restrict lateral movement of storage box 10.

In this embodiment, the holding metal fittings 31 and connecting rods 33 of the upper support device 30 shown in Figs. 4 and 5 are replaced with a pair of brackets 51 of U-letter shape in cross-section fixed to the upper surface of storage box 10 and fastening bolts 52 laterally threaded in the brackets 51. In this upper support device, when the storage box 10 has been supported on the disc 22A fixed the sleeve-like nut 22a in a condition where the storage box 10 was fitted within the opening O of wall W and retained in contact with the front surface of wall W at its front peripheral edge, the fastening bolts 52 are twisted in by a tool inserted through each window aperture formed in the upper surface of storage box 10 and pressed at their distal ends into contact with the side surfaces of iron frameworks F positioned at the both sides of opening O thereby to restrict lateral movement of the storage box 10.

Although in the lower support device 20 of the embodiment described above, the bottom portion of storage box 10 is supported on the disc 22A fixed to the upper end of sleeve-like nut 22a, the storage box 10 may be supported in place by means of the fastening bolts 42 pressed into contact with the side surfaces of iron frameworks F without support at its bottom portion.

Although in the embodiment, the support bracket 23 of the lower support device 20 was replaced with the pair of brackets 41 of U-letter shape in

cross-section fixed to the bottom portion of storage box 10 and the fastening bolts 42 laterally threaded in each bracket 41, while the holding metal fittings 31 and connecting rods 33 of the upper support device 30 were replaced with the pair of brackets 51 of U-letter shape in cross-section fixed to the upper surface of storage box 10 and the fastening bolts 52 laterally threaded in the brackets 51, only the lower support device 20 or the upper support 30 may be provided to support the storage box 1.

Brief description of the drawings

In the drawings:

Fig. 1 is a front view of an installation structure of a storage box;

Fig. 2 is a sectional view taken along A – A in Fig. 1;

Fig. 3 is a sectional view taken along B – B in Fig. 1;

Fig. 4 is a rear view of an upper portion shown in Fig. 1;

Fig. 5 is a plan view of Fig. 1;

Fig. 6 is a front view of a modification of the installation structure of the storage box shown in Fig. 1;

Fig. 7 is a sectional view taken along C – C in Fig. 6;

Fig. 8 is a front view of another embodiment of the installation structure of the storage box;

Fig. 9 is a sectional view taken along D – D in Fig. 8; and

Fig. 10 is a plan view of Fig. 8.

Claims:

1. An installation structure of a storage box for a fire extinguisher etc. to be fitted within an opening of a building wall and fixed in position in a condition where the box is opened at its front surface, comprising

lower support means placed on a floor between a pair of laterally spaced vertical structure members behind a building wall and engaged with a bottom surface of the storage box for positioning the storage box supported thereon moveably in a back and forth direction and a vertical direction, and

upper support means placed behind an upright attachment portion formed on an upper portion of the storage box for vertically fixing the attachment portion to the vertical structure members,

wherein the storage box is horizontally supported and positioned at its bottom surface by means of the lower support means and vertically positioned at its upper portion by means of the upper support means in a condition wherein the storage box has been fitted within the opening of the building wall and retained in contact with the front surface of the building wall as its peripheral edge, and wherein the storage box is fixed at its bottom portion to the lower support means and at its upper portion to the upper support means by means of fastening elements to be operated from the inner surface side of the box.

2. An installation structure of a storage box as claimed in claim 1, wherein the lower support means comprises a support means mounted on a floor located behind a building wall and adjustable in height and a support bracket supported on the support means in such a manner as to be displaceable in

a back and forth direction for engagement with the bottom surface and back surface of the storage box.

3. An installation structure of a storage box as claimed in claim 1, wherein the upper support means composes a pair of holding metal fittings supported on at least a connecting rod to be laterally moveable for engagement with the vertical structure members and fastening bolts inserted through a lateral slit formed in the upper attachment portion and threaded into the holding metal fittings.

4. An installation structure of a storage box as claimed in claim 1, wherein the lower support means comprises a support means mounted on a floor located behind the building wall and adjustable in height and fastening elements to be operated from the inside of the storage box for fixing the bottom portion of the storage box to a structure member of the support means in a condition where the bottom portion of the storage box has been horizontally supported on the support means.

5. An installation structure of a storage box as claimed in claim 1, wherein the lower support means comprises a support means mounted on a floor located behind the building wall and adjustable in height, a pair of laterally spaced brackets fixed to the bottom portion of the storage box, and a pair of fastening bolts laterally threaded in the brackets to be fastened from the inside of the storage box, wherein the fastening bolts are fastened outward and pressed

into contact with the side surfaces of the vertical structure members of the wall at their distal ends to restrict lateral movement of the storage box in a condition where the bottom portion of the storage box has been horizontally supported on the lower support means.

6. An installation structure of a storage box as claimed in claim 1, wherein the upper support means comprises a pair of laterally spaced brackets fixed to the upper surface of the storage box, and a pair of fastening bolts laterally threaded into the brackets, wherein the fastening bolts are fastened outward and pressed into contact with the side surfaces of the vertical structure members of the wall at their distal ends to restrict lateral movement of the storage box in a condition where the storage box has been fitted within the opening of the wall and retained in contact with the front surface of the wall at its front peripheral edge.

7. An installation structure of a storage box for a fire extinguisher etc. to be fitted with an opening of a building wall and fixed in position in a condition where the box is opened at its front surface, comprising:

support means composed of two pairs of laterally spaced brackets fixed respectively to the upper surface and the bottom surface of the storage box, and two pairs of fastening bolts laterally threaded in each pair of the laterally spaced brackets to be fastened from the inside of the storage box,

wherein the fastening bolts are fastened outward and pressed at their distal ends into contact with the side surfaces of a pair of spaced vertical

structure members of the wall to position the storage box in place in a condition where the storage box has been fitted within the opening of the wall and retained in contact with the front surface of the wall at its front peripheral edge.