

W. R. KINNEAR.
FIREPROOF WINDOW CONSTRUCTION.
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1,079,862.

Patented Nov. 25, 1913.

Fig. 1.

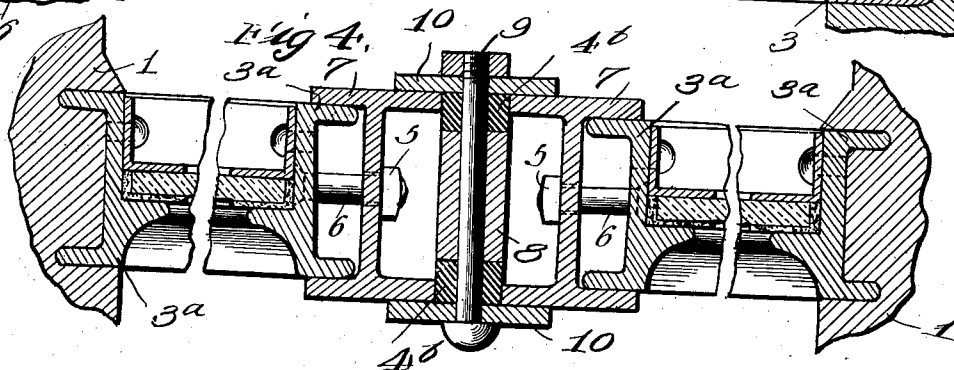
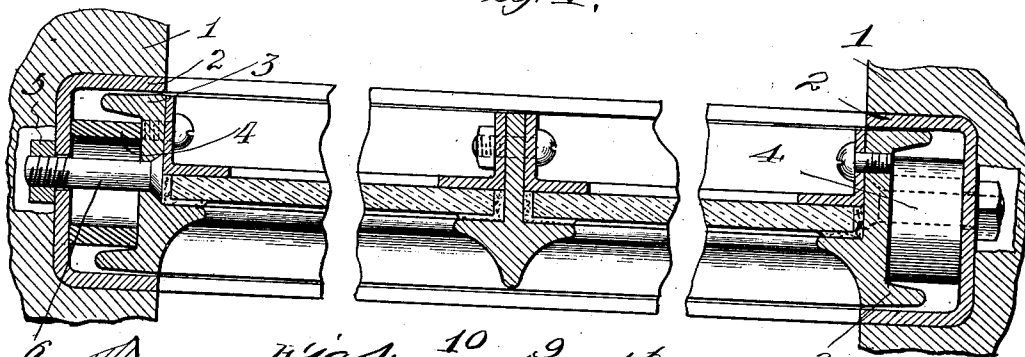
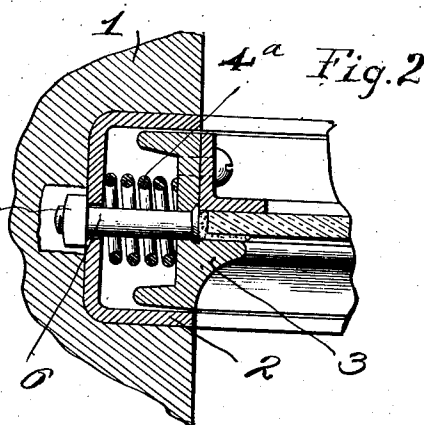
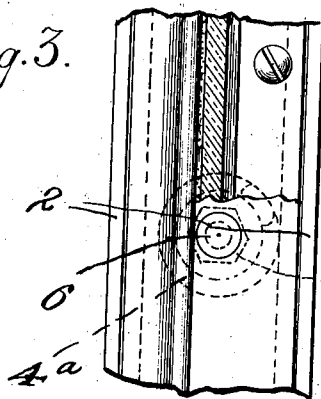


Fig. 3.



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FIREPROOF WINDOW CONSTRUCTION.

1,079,862.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM R. KINNEAR, a citizen of the United States, and resident of New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Fireproof Window Construction, of which the following is a specification.

This invention relates to the construction of light spaces or windows in buildings, and has for its object to provide a construction which will not be destroyed or sufficiently impaired to permit the passage of flame in the event of its being subjected to heat or conflagration.

Since the advent of wire-glass which prevents destruction of the glazing, one of the chief causes of impairment of glazed metallic frames or sash light openings, when subjected to intense heat, is the buckling of the glazed frame when expanding against non-yielding masonry. The present invention overcomes this objection by mounting the glazed frame in its casing or outer frame, through means which while at all times holding the glazed frame against transverse or edgewise displacement as a whole, will, under temperatures sufficient to develop destructive expansion, permit relative movement of a frame member or frame members, relatively to the confining outer frame sufficient to compensate for such expansion.

In carrying out the invention, a glazed sash, or a window frame is confined in channels of the surrounding frame or casing in a known manner, except that one or more spaces are left between faces of the confining and confined members, which are opposed in the direction of expansion. To prevent relative movement between parts, a confined member is secured to a confining member by tie bolts which while permitting movement of parts of the confined member, due to expansion, will not admit of movement of the confined member as a whole. Such tie bolts are, however, so introduced as to slip in one or both of the united members, when the confined member expands as a whole under heat. As a further positioning means, compressible filling pieces are introduced between the said opposed faces of the confining and confined members, and these compressible filling means may be either a resilient device such as a spring or a body of ductile metal of low fusibility. The tie bolts conveniently serve for holding the filling

pieces in place and putting them under initial compression.

The invention consists in certain novel features of construction which will be hereinafter fully described and particularly pointed out in the claims, reference being had to the accompanying drawings, in which,

Figure 1 is a sectional view of a window-frame construction together with a mounting for securing it in position between two masonry members of a building; Fig. 2 is a detail view of a construction similar to that shown in Fig. 1, but with a modified form of yieldingly resisting filling member between the frame and its mounting; Fig. 3 is a detail view, partly in section, showing by dotted lines the relative position of the yieldingly resisting filling members shown in Figs. 1 and 2; and Fig. 4 is a view corresponding to Fig. 1, but on a reduced scale, showing a further embodiment of the invention, wherein a single resisting or filling member of the character which adapts it to yield under excessive pressure or heat, is located in position to serve a plurality of frames.

Referring to Figs. 1 to 3, 1 represents the masonry, 2 a channel bar mounting inserted in the masonry and 3 a member of a window-frame which is confined transversely by the channel mounting 2, but which is so proportioned as to be free from direct abutment against said mounting. At suitable intervals between the members 2 and 3 are located filling members 4 which are of a material that will yield under excessive pressure developed by expansion under heat, either by the upsetting of a soft metal such as lead, or by the flowing of the metal and its displacement from resisting position, under temperature above the fusing point of the metal. These filling members are adapted to properly space the window-frame in the mountings and hold it normally against movement in the direction of the plane of the window, but their resistance is yielding in the sense that it will be overcome by the effects of a fire, either directly as by the melting of the filling member, or indirectly as by the upsetting of the filling member under the expansion of the frame. 5 represents adjusting nuts on tie bolts 6 passing through those walls of the confined and confining members which are opposed in the direction of expansion under heat.

According to Fig. 2, the yieldingly resist-

ing filling member is in the form of a stiff spiral 4^a, which may or may not have inherent resiliency so long as its convolutions are sufficiently spaced to permit its axial compression under excessive pressure of the window-frame due to expansion by heat. The filling members 4, 4^a, while ordinarily introduced under such pressure as will tend to prevent their displacement, as for instance by drawing side members 3 toward the mountings 2, through the medium of bolts 6, will nevertheless be prevented from displacement should they become loose, by having the bolts 6 or other equivalent means pass through the filling members. Bolts 6 likewise serve as tension members to center the window-frame in the opening of the building, which it is intended to close.

According to Fig. 4, the yieldingly resisting filling member is in the form of a plurality of lead or other soft metal washers or bodies 4^b, located between the I-beam mountings 7 of a pair of window-frames 3^a whose opposite sides may be in firm abutment against the masonry 1 without any provision for compensation or yielding in the event of expansion of the window-frames; expansion being wholly provided for in the intermediate yieldingly resisting filling member. Inasmuch as the abutting members 7 are flanged members, the yieldingly resistant portion of the filling member may be restricted in axial dimension to the planes of the flanges, the intermediate portion being for the sake of economy, supplied by a hard metal spacer 8, if desired, and the whole secured in position by a bolt 9. Or the member 8 may be omitted if the compressible parts 4^b are so mounted upon the bolt 9 as to prevent axial displacement thereon.

In the construction shown in Fig. 4, the bolt 9 draws firmly upon the abutting members 7 through the medium of sealing plates 10 which hold the window-frames in alignment without interfering with their expansion in the plane of the frames. In other words, the mounting for the frame or frames in this instance, comprises the plates 10 and the tying bolts 9 which provide for the frame or frames a channeled receiving bearing. The advantage of the construction shown in Fig. 4, arises from the fact that the plates 10 will readily communicate to the parts 4^b, heat sufficient to fuse said parts, when made of readily fusible material.

In using the expression "bolts" in the foregoing specification, it is intended to include rivets or other obvious equivalents capable of affording support or confinement for the compressible filling members and performing the other described functions of the bolts.

I claim:—

1. In a fire proof window construction, the combination of the confined and confin-

ing members fitted one within the other with a space between the faces of said members which are opposed in the direction of expansion under heat, tension means on each side of the confined member rigidly securing it against movement as a whole relatively to the confining member toward the other side, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member.

2. In a fire proof window construction, the combination of the confined and confining members fitted one within the other with a space between the faces of said members which are opposed in the direction of expansion under heat, means rigidly securing the confined member against movement as a whole relatively to the confining member, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member; said securing means comprising tie bars connecting the members together in the direction of expansion and movable in one of the members.

3. In a fire proof window construction, the combination of the confined and confining members fitted one within the other with a space between the faces of said members which are opposed in the direction of expansion under heat, tension means on each side of the confined member rigidly securing it against movement as a whole relatively to the confining member toward the other side, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member, and compressible filling pieces located in said spaces between the confined and confining members.

4. In a fire proof window construction, the combination of the confined and confining members fitted one within the other with a space between the faces of said members which are opposed in the direction of expansion under heat, tension means on each side of the confined member rigidly securing it against movement as a whole relatively to the confining member toward the other side, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member, and fusible metal filling pieces interposed in the spaces between the confined and confining members.

5. In a fire proof window construction, the combination of the confined and confining members fitted one within the other with a space between the faces of said members which are opposed in the direction of expansion under heat, tension means on each side of the confined member rigidly securing it against movement as a whole relatively to the confining member toward the

other side, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member, and fusible metal filling pieces interposed in the spaces between the confined and confining members, and abutting against the faces of said members which are opposed in the direction of expansion.

6. In a fire proof window construction, the combination of the confined and confining members fitted one within the other with a space between them in the direction in which the confined member expands when subjected to heat, fusible metal filling pieces interposed in said spaces, and tie bolts drawing said confined and confining members together upon said filling pieces.

7. In a fire proof window construction, the combination of the confined and confining members fitted one within the other

with a space between the faces of said members which are opposed in the direction of expansion under heat, means rigidly securing the confined member against movement as a whole relatively to the confining member, but permitting a part of the confined member to move relatively to the confining member under inherent expansion of the confined member; said securing means comprising tie bars connecting the members together in the direction of expansion and movable in one of the members, and compressible filling pieces interposed between said confined and confining members.

The foregoing specification signed at Detroit, Michigan, this 19th day of October, 1911.

WILLIAM R. KINNENAR.

In presence of—

PETER A. CUMMINS,
ALBERT G. REED.