J. G. WILSON.

FIRE RESISTANT SHUTTER.

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951,868.

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Fig. 1.

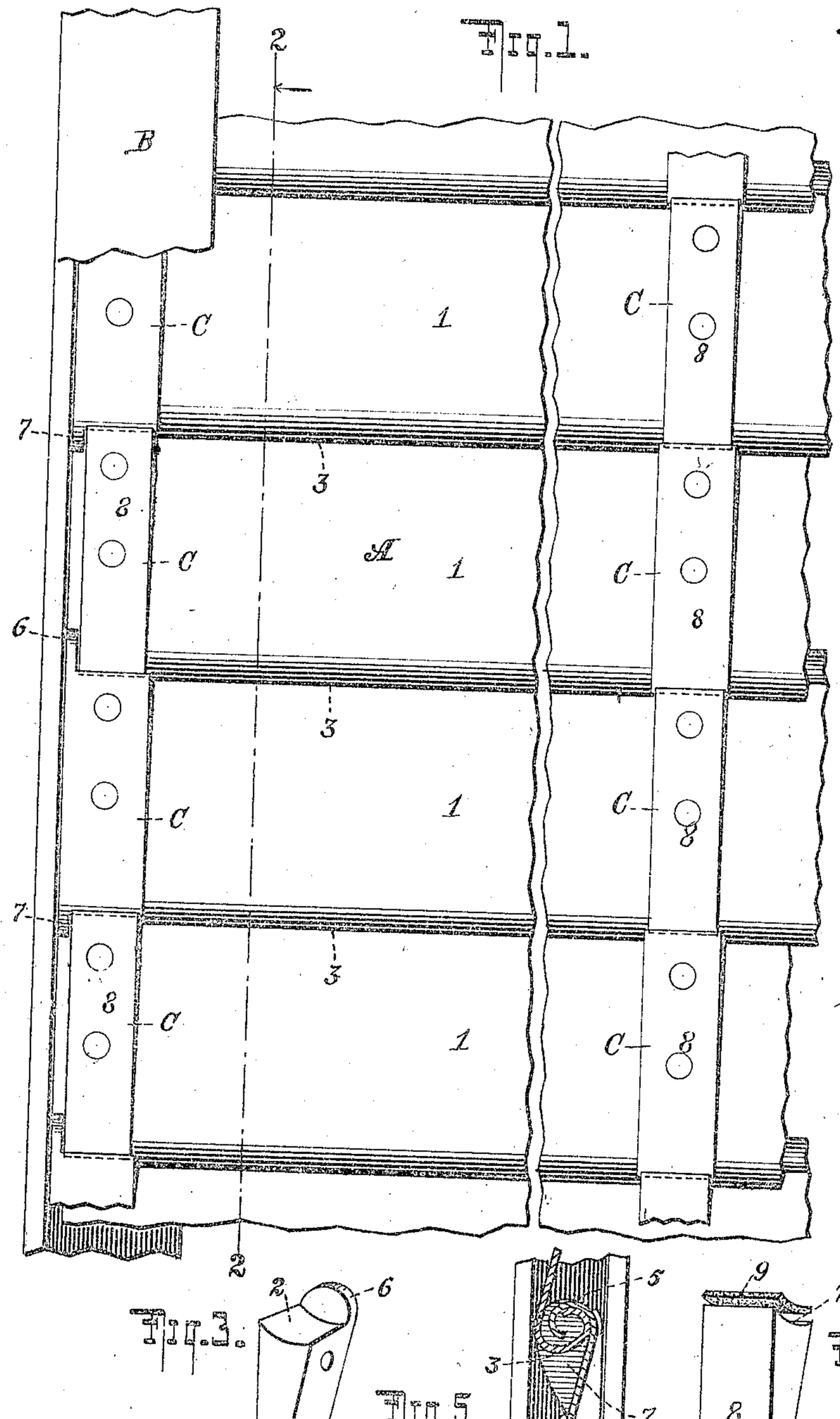

Fig. 2.

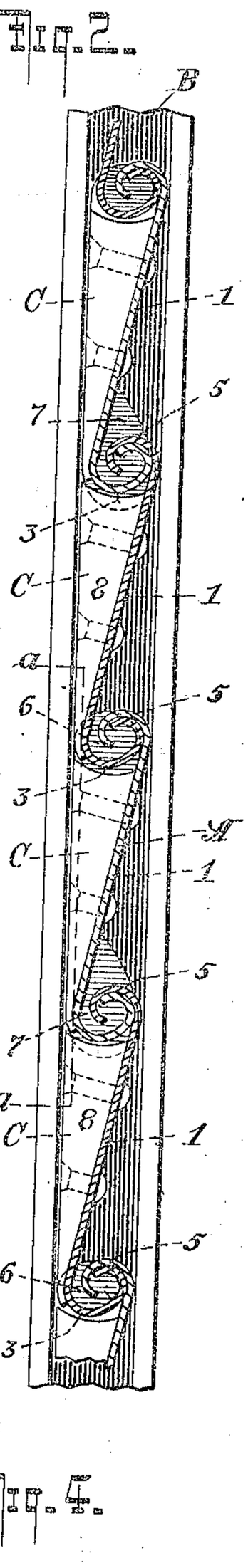

Fig. 3.

Fig. 5.

Fig. 4.

WITNESSES

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FIRE-RESISTANT SHUTTER.

951,868. Specification of Letters Patent. **Patented Mar. 15, 1910.**

Application filed January 9, 1909. Serial No. 471,390.

To all whom it may concern:

Be it known that I, JAMES G. WILSON, a subject of the King of Great Britain, and a resident of Larchmont, Westchester county, State of New York, have invented certain new and useful Improvements in Fire-Resistant Shutters, of which the following is a description.

My invention relates to shutters made of fire resistant materials and sliding in suitable grooves or guides as distinguished from hinged shutters.

More particularly my improvement pertains to shutters when constituted of hinging metallic slats; my invention is also peculiarly applicable to such shutters when arranged to roll from the grooves into a coil.

One object of my invention is, broadly speaking, to insure a closer junction between the shutter edges and the grooves.

A further object of my invention is to insure a closer junction between the hinge members of adjacent slats than is ordinarily obtainable.

A still further and most important object of my invention is to so stiffen and maintain a close contact between the hinging members of adjacent slats over the entire length of such hinges as to prevent much of the bulging, warping, buckling and twisting of metallic shutters as commonly obtains in such structures when subjected to intense heat as in case of fire.

Shutters of the above generally described type are used to protect door and window openings in case of fire, and are either thrown into place by intention or, in many cases, automatically. Complete protection from fire properly means not only protection from direct action of the flame and transference of heat, but should also include a complete cutting off of smoke and vapors, the effect of which in many cases is more damaging to merchandise as well as more dangerous to life, than the fire itself.

So far as I am aware, shutters of the above mentioned type and as heretofore made, have had openings or passageways of considerable aggregate area between the shutter edges and their inclosing grooves or guides thereby readily permitting smoke or vapor laden air to pass around such shutter edges and across the door or window opening into the room or rooms to be protected. This has necessarily resulted from the fact that lateral play between the shutter edges and the groove bottoms and transverse play between said edges and the groove sides, has been required to enable the shutter to be normally operable without excessive friction; while, in case of fire, the expansion of the shutter thereby produced would, without such play, absolutely lock the shutter, possibly even before completely closing.

I accomplish one feature of my invention essentially by placing on the side of each shutter slat at each end a permanently attached metal stop or abutment which makes a substantially closed joint between the shutter and the side of the embracing groove. In a modified form of my invention, which forms the subject of a separate application (No. 458,690, filed October 20, 1908), this stop is of resilient material bent so as to maintain close contact with the groove while, at the same time, yielding to any variations of pressure or irregularities of travel, as the shutter is operated.

In the embodiment of my invention which forms the subject matter of this application, I make use of a block which, although it may fill the free space only loosely, thereby not materially increasing the sliding friction, may yet be sufficiently long (*i. e.* in the direction of the shutter's width) to introduce excessive air friction, and thus substantially seal the air passage. This block is so shaped that besides thus sealing the junction of shutter slat and grooves it also performs the most important function of keeping the hinging members of adjacent slats in close contact. By placing these blocks at suitable intervals along the width of the shutter, the number of such blocks depending upon the width of the shutter, the dimensions of the slats, and the gage of which such slats are made, I am enabled to obtain this close contact relation of hinging members over the entire shutter.

Referring to the drawings, Figures 1, 2 and 3 illustrate a preferred form of my invention in which Fig. 1 is an elevation partly in section, with a portion of the groove cut away so as to bring out the structure; the figure is drawn to include but a part of one side of the shutter and a few interhinging slats since the other side of the shutter and the remainder of the slats above and below are similar; Fig. 2 is a sectional elevation along the line 2—2 of Fig. 1; Fig. 3 is a perspective view of a preferred form of the block, above referred to, as used at the edge

of the shutter; Fig. 4 is a modified form of the block in perspective, as used on that part of the shutter away from its edge; and Fig. 5 is a side view, partly in section, of a single slat showing a modified application of my invention.

A is a flexible metal shutter comprising interhinging slats 1, 1, and B one of the lateral grooves or runways in which the shutter normally slides and by which it is guided.

My stop proper comprises a structure C, preferably a solid or hollow block. This block is of approximately triangular cross-section (vertically to the plane of the shutter) and proportioned so as to fill, with a minimum amount of play, the space between the slats and the groove on one side of the plane of the shutter. The top of each block at 2 is grooved so as to conform to the shape of the hinge member, 3, above. This block lies preferably just outside the tangent line *a*—*a*, so as not to appreciably increase the diameter of the shutter coil when the shutter is rolled.

With the usual construction of shutters of the class here in question, the shutter will, as it descends in its grooves, owing to unavoidable friction between slat ends and grooves, so proceed that each slat will successively, from the bottom up, tend to stick in the grooves so as to separate the coöperating hinge members to the full limit of their allowed play; and even if the friction of shutter edges with grooves be eliminated, this separation would still take place, in lowering the shutter, when the bottom slat finally struck the bottom of the shutter opening. Such separation of the hinge members obviously forms a more or less continuous air passage through and around the hinge members and over the entire width of the shutter and the total cross-section thus opened up to the passage of smoke, vapors and flame, may become thereby much greater than that existing around the shutter edges between said edges and the grooves. With my block form of smoke guard the block is fixed on each slat with each groove 2, against the next upper slat at 3 when the hinge members of the two slats are pressed closely together, *i. e.*, when the slats involved are pressed apart. Whether being raised or lowered, therefore, the shutter is thereafter always tightly stretched by reason of these blocks and the hinge members are in close contact throughout their entire length so that passageway across the face of the shutter both through and around the hinge members is entirely cut off. This keeping the shutter always "in stretch" instead of allowing the slats to "bunch up" has the still further advantage of giving it a much more sightly appearance. Where the shutter is comparatively narrow, blocks as thus explained in each side groove would generally be sufficient to properly hold the hinge members of adjacent slats in close contact over the entire length of such hinge, but where the shutter has considerable width it is generally better to place one or more blocks suitably spaced across the front of the shutter to aid the groove blocks in maintaining the desired contact. These intermediate distance blocks are particularly desirable and necessary on wide shutters when there is a probability that any fire, which they are designed to guard against, may approach them closely, as at such time long slats tend to sag at the center and to buckle and twist, thereby opening up the hinges and allowing free passage for flames and vapors unless such hinges be held positively in place and stiffened.

I have described my invention as being applied to one side of the shutter only, viz., the outside, as the shutter coil is formed. I prefer the seal so placed but may, if I choose, place the seals and the distance or stretching blocks on the opposite side instead without departing from the spirit of my invention. Or, I may place the seals on both sides of the shutter; ordinarily however, the air passages are so completely cut off by placing the seals on one side only that the small gain in applying the seals to both sides will not repay the disadvantage of the extra friction entailed, to say nothing of the increased cost.

To provide against any lateral sliding or separation of the slats of a metallic shutter, it is common practice in the art to affix L-shaped lugs at the end of one slat with one leg of the L lying across the interlocked hinge members at the end. With my improvement I may dispense with such lugs, and still prevent lateral separation of the slats, by joining wings or lugs, 6 and 7, to the outside of the blocks C when used at the edge of the shutter; these lugs project over the ends of the hinge members as shown in Figs. 1 and 2. These lugs or wings are preferably formed integral with the blocks themselves.

I may obviously arrange my lugs, 6 and 7, both cast on the same block, as in Fig. 3, in which case the block is used only on every alternate shutter slat with the remaining blocks plain as at 8, Fig. 4, or I may use the same style of block on each slat end using, in such case, but one lug, either at top or bottom, to each slat and modifying the shape of the lug if necessary.

In Fig. 4 I show a thin asbestos pad which may, should I desire, be cemented or otherwise fastened to the groove 2 in case it is thought desirable to soften slightly the rigidity with which the hinge members are held together.

With the blocks C on the front of the shutter as in Figs. 1 and 2 the curved end of said block is at its top and presses against

the hinge member of the slat next above. Were the block to be placed on the reverse side of the shutter its large and curved end would be down instead of up and would press against the hinge member 5 of the slat next below. This is shown in Fig. 5 where C is a block placed on the reverse side of the shutter.

Many changes of detail may obviously be made in applying my invention without departing from its spirit.

My invention is effective, simple, and easy to apply, and having now fully disclosed the same, I hereby claim:

1. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a block of fire resistant material fixed to one side of each slat end and shaped so as to substantially fill the transverse section between the side of said slat end and a side wall of the groove, whereby the passage of smoke and vapors is substantially cut off without interfering with the normal operation of the shutter.

2. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a pair of opposite sides of each slat being curved to form hinge members, fire resistant elements fixed to each slat and conformed closely to the hinge member of an adjacent slat whereby the hinge members are kept in close contact and the passage of smoke and vapors around them and thus through the shutter opening is substantially cut off.

3. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a block of fire resistant material fixed to one side of each slat end and substantially bridging the transverse section between said slat end and the groove, said block having a grooved end adapted to closely but slidably fit the hinge member of an adjacent slat so as to press the slats apart and keep their hinge members in close contact, whereby the passage of smoke and vapors around the hinge members and between the shutter edges and the grooves is substantially cut off.

4. In a fire resistant shutter comprising interhinging slats, fire resistant means attached to said shutter and adapted to keep the hinge members of adjacent slats in close contact, said means having further means adapted to prevent lateral separation of said slats, substantially as and for the purpose described.

5. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a pair of opposite sides of each slat being curved to form hinge members, fire resistant elements fixed to each slat one end of each element being conformed closely to a hinge member of an adjacent slat and being adapted to press against said hinge member thereby keeping said slats in stretch and preventing the passage of smoke and vapors through said hinge members and across the face of the shutter.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses this 7th day of January, 1909.

JAS. J. WILSON.

Witnesses:

ELMER GHEILYOUNG.

JOHN A. KELLENBECK.