J. G. WILSON.

FIRE RESISTANT SHUTTER.

APPLICATION FILED OCT. 20, 1908.

951,867.

Patented Mar. 15, 1910.

Fig. 1.

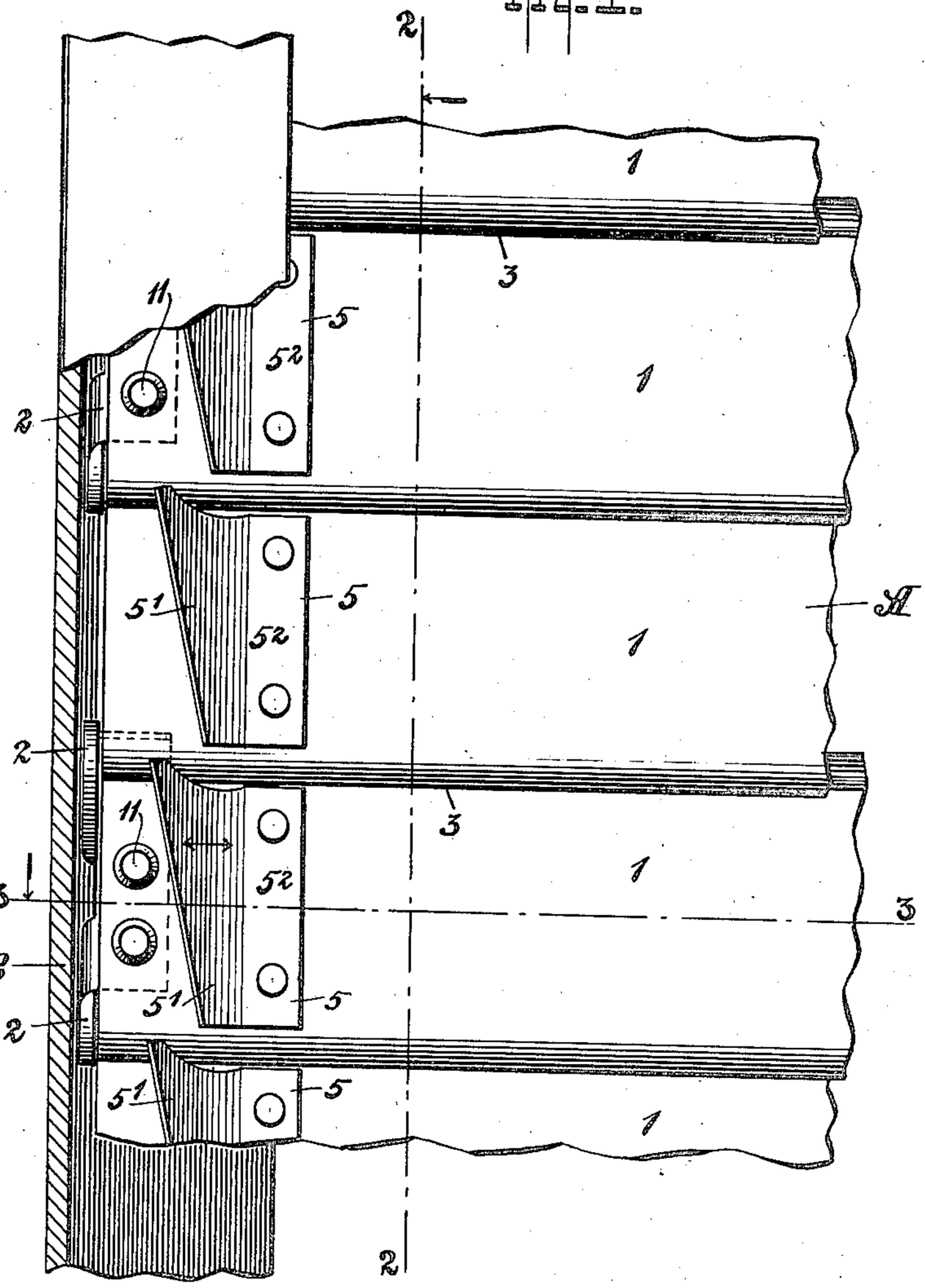


Fig. 2.

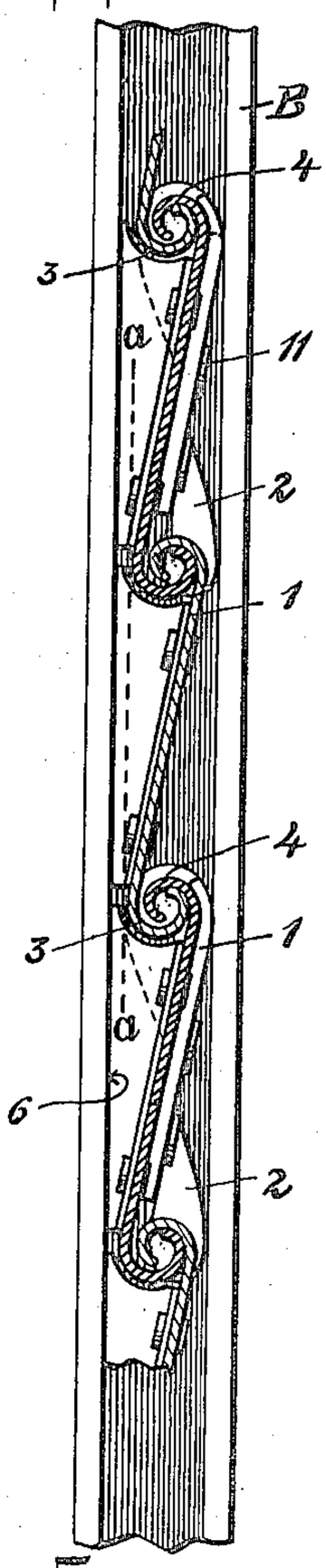


Fig. 3.

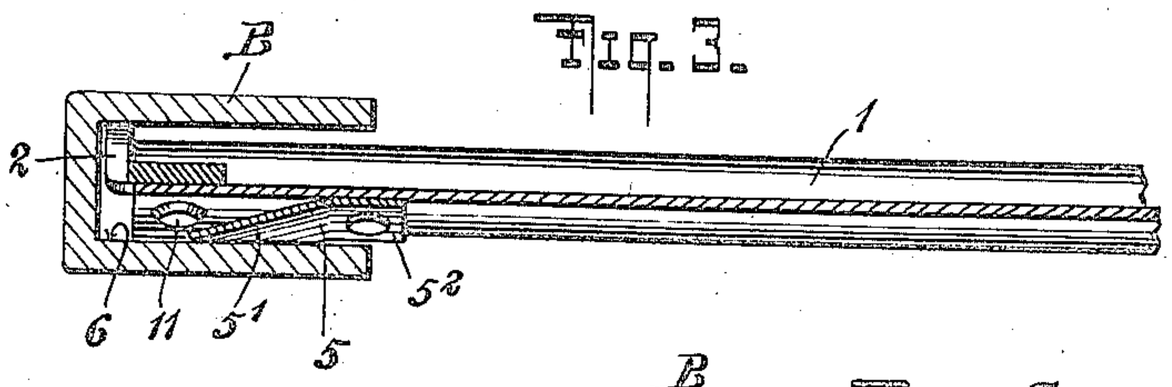


Fig. 4.

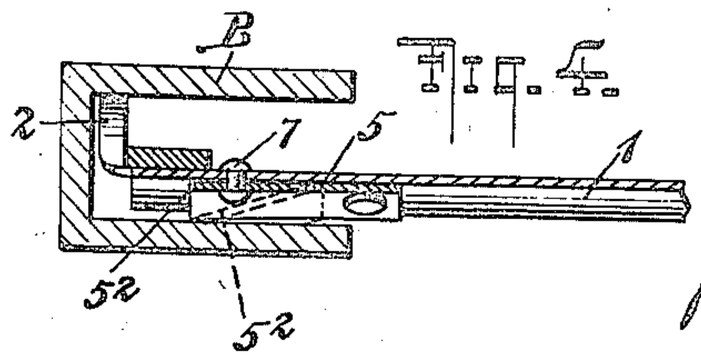
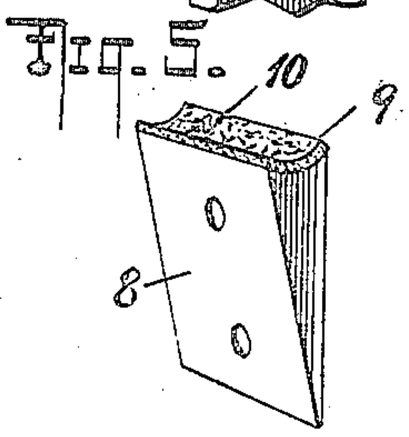


Fig. 5.



WITNESSES

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FIRE-RESISTANT SHUTTER.

951,867. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed October 20, 1908. Serial No. 458,690.

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 full, clear, and exact 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 invention applies to such shutters when constituted of interhinging metallic slats.

My invention is also peculiarly applicable to such shutters when arranged to roll from the grooves into a coil.

The object of my invention is, broadly speaking, to insure a closer juncture between the shutter edges and the grooves and, in one form, between the hinging members of adjacent slats, than is ordinarily obtainable, for purposes hereinafter set forth.

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 the 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 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 close joint between the shutter and the sides of the embracing groove. In one form of my invention this top 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 another form, 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 passage.

In another form of my invention, my sealing stops are ordinarily inactive so that any slight additional friction entailed by their presence is ineffective, but in case of excessive rise of temperature, such stops are made functional and to serve their desired purpose.

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 of the interhinging slats since the other side 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 sectional plan along the line 3—3 of Fig. 1. Fig. 4 is the same section as is shown by Fig. 3, but using the modified form of my invention just referred to as functioning only at a definite excess of temperature; and Fig. 5 is a perspective view of still another modification 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. Lateral separation of the slats from one another is prevented by lugs, 2, attached to alternate slats and bent at right angles to the plane of the slats, so as to cover the hinge members, 3, 4.

On one side of each slat and between the hinge members, are riveted thin metallic and resilient flaps 5. Each of these flaps has a freely projecting portion 5^1 bent outwardly from the part 5^2 fixed to the slat and is so

shaped, at top and bottom, as to fit quite closely against the hinge members.

As the depth of the groove in the plane of the shutter is considerable and its width transverse to the shutter relatively small, it is possible, although not necessary, to keep the flap, 5, entirely under cover of the groove, while at the same time the projecting portion, 5^1, may be sufficiently long (in the direction of the arrow) to enable it to press against the side, 6, of the groove without requiring it to be bent beyond its elastic limit.

If the spring flaps, 5, are properly shaped they will not interfere with the rolling of the curtain in the coil form nor will they increase the diameter of the coil; being resilient, the projecting portions 5^1 would normally spring outwardly of the line, *a*—*a*, tangent to the hinge members, as soon as they left the grooves to wind upon the coil, but the succeeding slats as they come over these in forming the coil would simply press them down below this tangent line without harm.

In Fig. 4 I show a modified form of my invention in which the projecting portion of the resilient flap 5 is normally sprung down and fixed against the flat of the slat by one or more fusible rivets, 7, 7, or other equivalent fusible means. Normally, the shutter operates as if my air seal device was not present, but in case of a predetermined rise of temperature in the vicinity of the shutter, the spring flaps will be released by the fusing of the rivets or other connection and will spring out to engage the grooves and perform their sealing function; this functional position is shown dotted.

Still another modification of my invention is illustrated in Fig. 5. Here I substitute for the spring flap, 5, a structure, 8, preferably a solid or hollow block. This block is, of course, 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. The top of each block, 9, is grooved so as to conform to the shape of the hinge and minimize the unavoidable open space between block and hinge; a pad of fire resistant material, 10, possessing some elasticity, as *e. g.*, asbestos, forms a facing for the groove, being attached to the block and lying between it and the hinge member. This block possesses all the advantages of the resilient flap form of seal previously described, blocking the air passages with the same effectiveness and lying inside the tangent line, *a*—*a*, so as not to increase the diameter of the shutter coil when the shutter is rolled; and, in addition, an important further advantage as follows: The interlocking hinge members of adjacent slats in a fire resistant shutter must generally be made with considerable play between them; otherwise, owing to the length of said hinge members, the resulting friction will be so great that the shutter can only be rolled and unrolled (the former particularly) with great difficulty. This being the case it follows that, as the shutter descends in its grooves and owing to unavoidable friction between slat ends and grooves, each slat will successively, from the bottom up, stick in the grooves so as to separate the coöperating hinge members to the full limit of the 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 its 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 clear across the shutter and the total cross-section thus opened up to the passage of smoke and vapors may become 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 padded groove, 9, against the next upper slat when the two slats are pressed apart. Whether being raised or lowered, therefore, the shutter is always tightly stretched and the hinge members in close contact throughout their entire length so that passage way across the face of the shutter 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 more sightly appearance.

The pads, 10, serve to fit the block, 8, more closely to the hinge member of the slat next above; a more important function, however, is that of giving the shutter as a whole a certain amount of elasticity in its length, so that, as it lowers into place, at a very considerable velocity, it will not be brought up at its limit as a rigid, unyielding structure, as this might result in serious damage to the shutter or to its mechanism, but will, on the contrary, give slightly at each pad so as to distribute and diffuse the shock. I may substitute, if I desire, a metal spring for the packing material here shown, without departing from the spirit of my invention. Or, I may attach the blocks, 8, to the slats by some form of resilient connection instead of by rigid rivets, and still be within the limits of my invention. I may also, in using this my block construction, fasten the blocks to the alternate slats carrying the retaining lugs 2, by the same rivets, 11, as are used for the lugs; or, I may make each alternate block integral with the lugs, 2, fastening the combined construction to the slats in any desired way; on the remaining

slats the blocks may be of the plain form. Or, again, I may have all the blocks similar and each provided with an integral retaining lug, 2, since, in this way, the end of each hinge will have its lug as before.

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 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.

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 adapted to slide between parallel guide walls and comprising interhinging slats of curvilinear section, fire resistant elements situated wholly inwardly of the shutter edge and having a section conforming both to a guide wall and to a slat section, said elements being interposed between said wall and said slats so as to substantially bridge any area therebetween, as and for the purpose described.

2. In a fire resistant shutter adapted to slide between parallel guide walls and comprising interhinging slats of curvilinear section, a fire resistant element fixed to each end of each slat, said element being situated wholly inwardly of said end and having a section conforming both to a guide wall and to the slat section so as to substantially bridge any area therebetween, as and for the purpose described.

3. In a fire resistant shutter comprising interhinging slats and sliding in grooves, movable fire resisting elements at the slat ends normally adapted to substantially seal the juncture of the slat ends with the grooves, in combination with means fusible at a predetermined temperature adapted to hold said movable elements free of said grooves.

4. In a fire resistant shutter comprising interhinging slats and sliding in grooves, movable fire resistant elements at the ends of each slat said elements being adapted normally to slidably engage the inside of the grooves so as to substantially seal the juncture of the slat ends with the grooves, in combination with means fusible at a predetermined temperature connected with the slat and adapted to maintain said movable element free of said groove until said predetermined temperature is attained, substantially as and for the purpose described.

5. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a sealing device fixed to the ends of each slat and embodying a resilient fire resistant material having a flexible tongue adapted to slidably engage the inside of the shutter groove so as to substantially seal the juncture of the slat ends with the grooves against the passage of smoke and vapors, as and for the purpose described.

6. In a fire resistant shutter comprising interhinging slats and sliding in grooves, a sealing device fixed to the ends of each slat and embodying a resilient fire resisting material having a flexible tongue normally held free of the shutter groove but releasable by means fusible at a predetermined temperature to slidably engage the inside of said groove so as to substantially seal the juncture of the slat ends with the grooves against the passage of smoke and vapors, as and for the purpose described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses this thirteenth day of October, 1908.

JAMES G. WILSON.

Witnesses:
ELMER G. WILSON,
PERCY H. WILSON.