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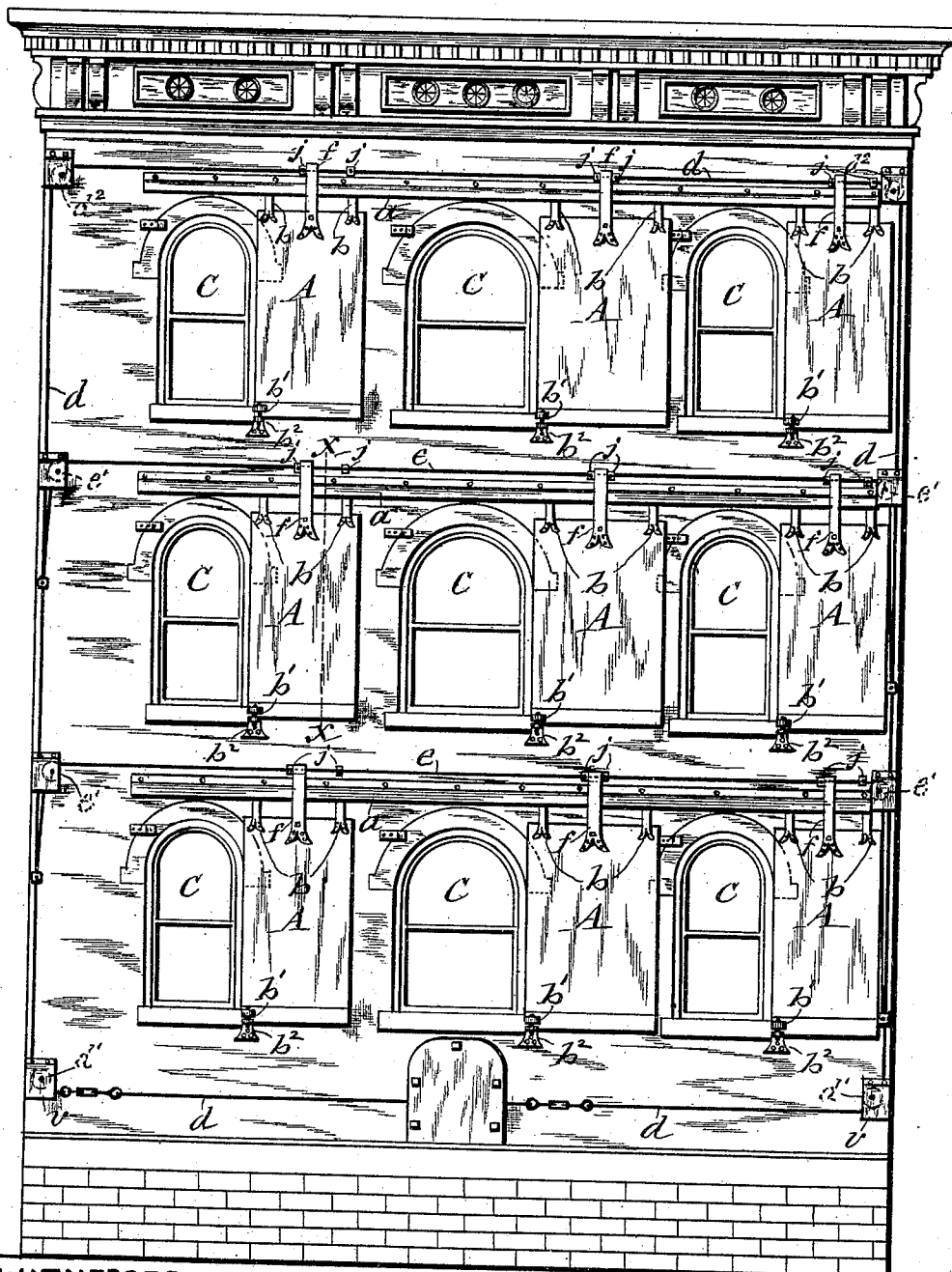
Patented Apr. 11, 1899.

W. H. BOLES & E. LAASS.
FIRE PROTECTIVE SHUTTER.

(Application filed Nov. 19, 1897.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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Fig. 1

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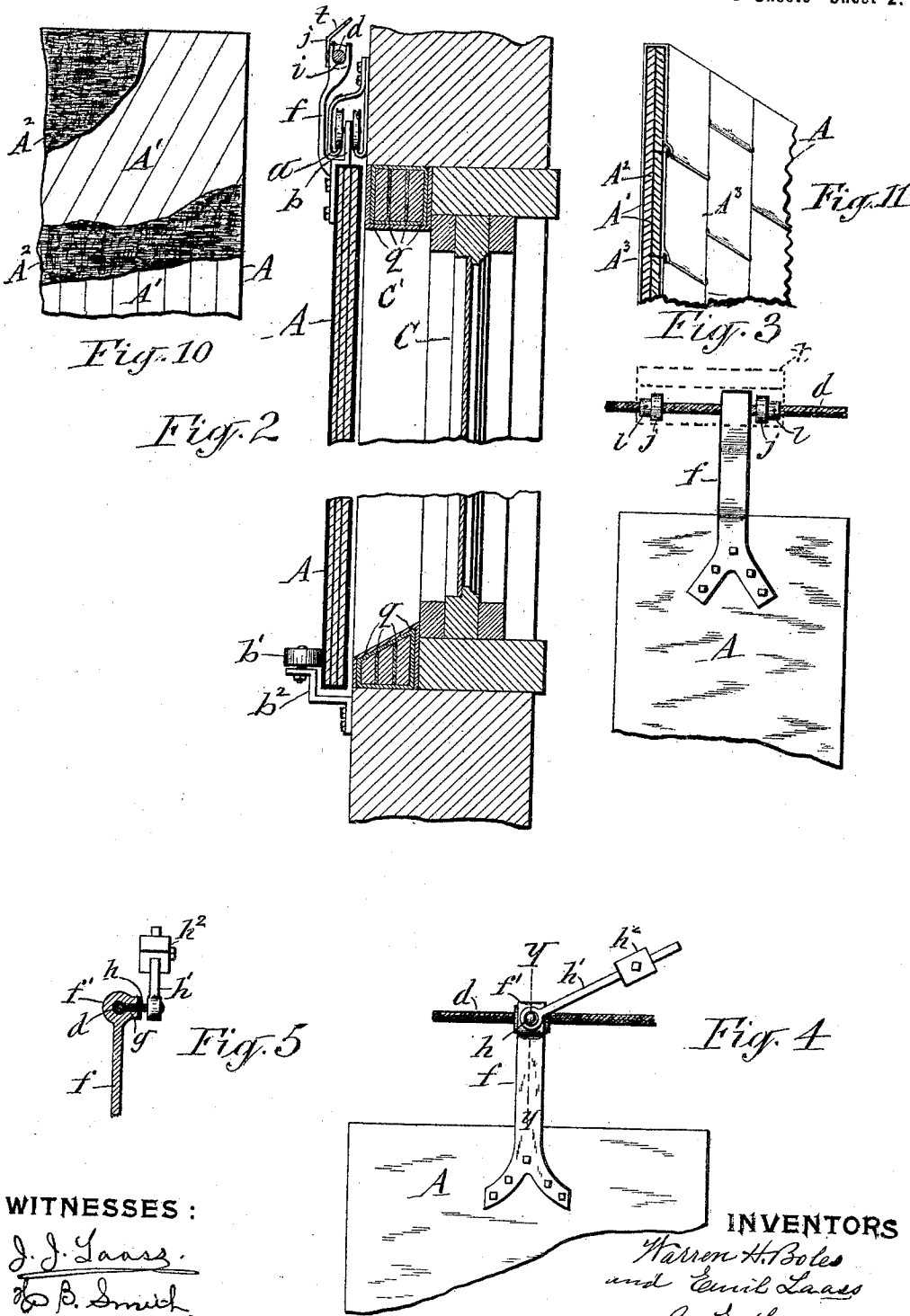
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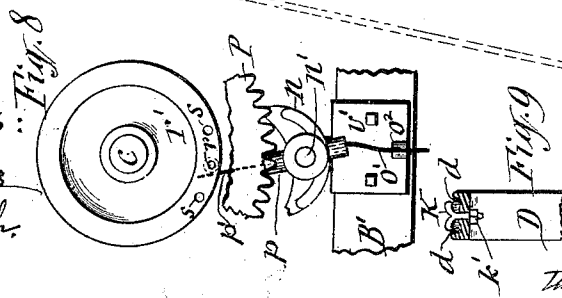
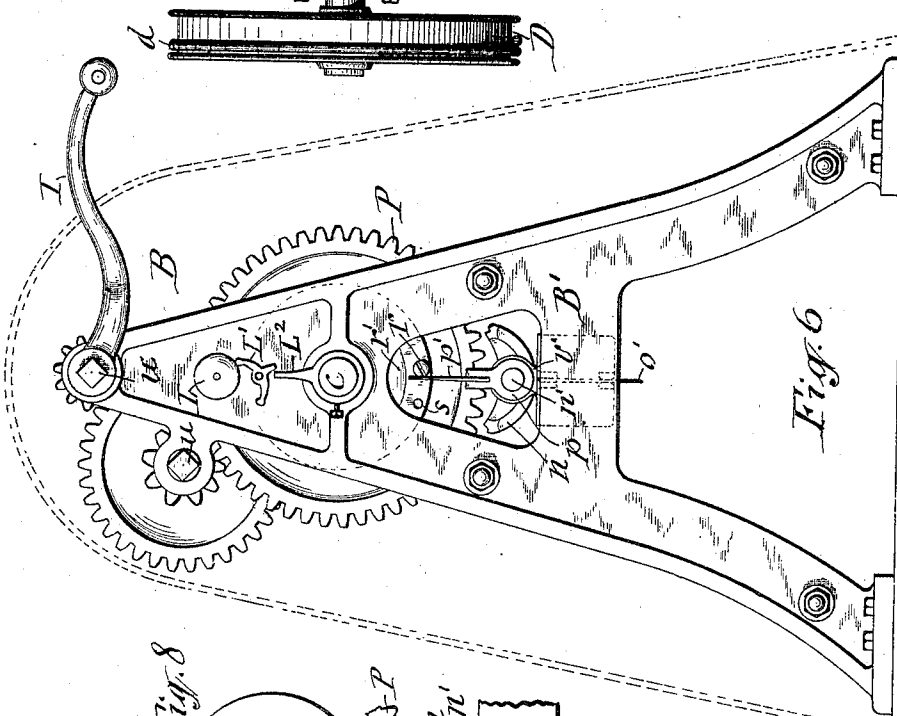
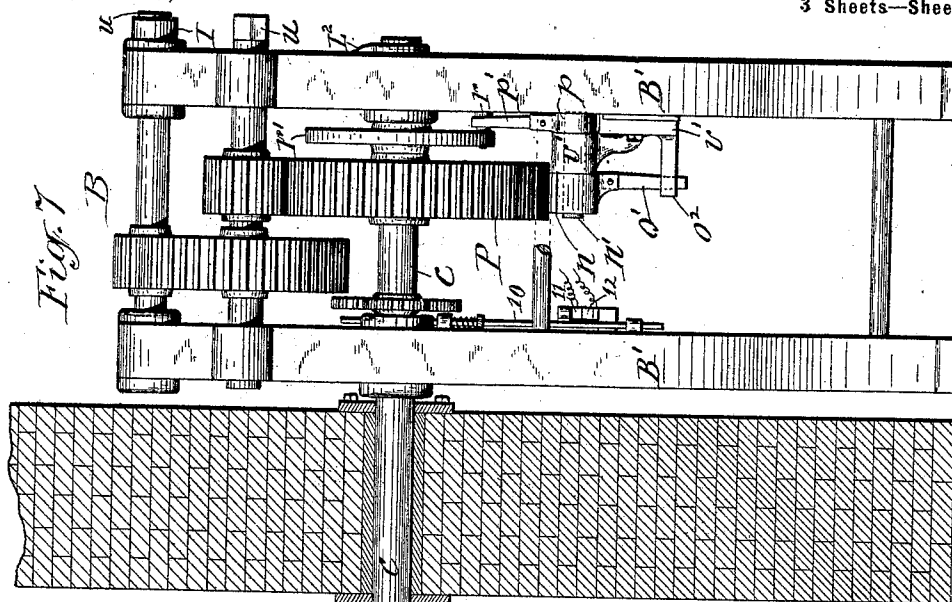
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(Application filed Nov. 19, 1897.)

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UNITED STATES PATENT OFFICE.

WARREN H. BOLES AND EMIL LAASS, OF SYRACUSE, NEW YORK.

FIRE-PROTECTIVE SHUTTER.

SPECIFICATION forming part of Letters Patent No. 622,754, dated April 11, 1899.

Application filed November 19, 1897. Serial No. 659,151. (No model.)

To all whom it may concern:

Be it known that we, WARREN H. BOLES and EMIL LAASS, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Fire-Protective Shutters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of window-shutters which are applied to the exteriors of buildings for the purpose of shielding the windows from fire in the vicinity of said buildings and are coupled together, so as to move all or a series of the shutters simultaneously.

The objects of the invention are, first, to provide more durable, reliable, and positively-acting means for moving a series of shutters simultaneously to and from their closed position and which shall permit the shutters to be disconnected from said actuating means, so as to allow one or more of the shutters to be opened and the building to be entered through the windows when required without disturbing the entire series of shutters; secondly, to provide more efficient and convenient means for connecting and disconnecting the shutters to and from the cable or chain employed for moving said shutters; thirdly, to provide means for guarding against excessive strain and injury of the devices pertaining to the fire-shutter system, and, fourthly, to provide a fire-shutter system which shall be simple in construction and durable, reliable, efficient, and convenient in operation and adapted for use on buildings having windows of different sizes and in various positions and to regulate the distances of the travels of the shutters according to the widths of the windows to which they are applied; and to these ends the invention consists in the improved construction and combination of parts hereinafter described, and set forth in the claims.

In the annexed drawings, Figure 1 is an elevation of a building equipped with our improved fire-protective window-shutter system. Fig. 2 is an enlarged vertical transverse section on line X X in Fig. 1. Figs. 3 and 4 are enlarged front views of the devices for detachably connecting the shutters to the cable. Fig. 5 is a vertical transverse section

on line Y Y in Fig. 4. Fig. 6 is a front view of the winch mechanism with the inclosing case indicated by dotted lines. Fig. 7 is a side view of said winch, showing the preferred way of applying it to the building. Fig. 8 is a detail view of the automatic stop of the winch. Fig. 9 is a sectional view of the attachment of the cable to the winch. Fig. 10 is a fragmentary view of a shutter minus its metallic sheathing, and Fig. 11 is a fragmentary perspective view of the shutter.

A A represent the shutters, which we prefer to construct of two or more thicknesses of matched boards A' A', with layers of asbestos A² between them and over them, and a sheathing A³, preferably of tin, formed with lap-joints without solder and secured to the shutters by means of nails or screws, the heads of which are covered by the laps of the tin. These shutters slide on tracks *a*, preferably arranged over the windows C C, from which tracks the shutters are suspended by means of suitable hangers *b b*, secured to the shutters. The bottoms of said shutters are guided by stay-rollers *b'*, pivoted to brackets *b''*, fastened to the building. For moving said shutters to and from their closed position a winch B is employed, located, preferably, inside of the building and close to the wall and having its main shaft *c* passing through said wall and a circumferentially-grooved wheel D fastened to the outer end of said shaft, as shown in Fig. 7 of the drawings. To the periphery of the wheel D are fastened the two ends of a continuous cable *d*, which extends around the exterior of the entire field of shutters and has its ends wound in opposite directions around said wheel, so that one end is unwound while the other end is wound upon the wheel. Said cable extends from the wheel D around the under sides of sheaves or rollers *d'* *d'*, pivoted to brackets *v v*, attached to the building at the corners thereof, thence up at said corners to sheaves *d'' d''*, pivoted to brackets on the building a suitable distance above the uppermost row of shutters, over which the central portion of the cable is supported in a taut condition by the sheaves.

Over each of the lower rows of shutters is a branch cable *e*, which extends completely across the building and passes with its end portions over sheaves *e'* adjacent to the verti-

cal portion of the main cable *d*, to which the branch cable *e* is fastened, and thus made continuous therewith. By said arrangement of the cables above the rows of shutters we obviate obstructing the windows and impairing the appearance of the building and also protect the cables from fire that may issue from a window from which the shutter is removed. To the horizontal portions of said cables we connect the shutters *A A* by means of our improved couplings, which are adjustable to permit one or more of said shutters to be disconnected from the cable when desired without breaking the continuity of the cables or interfering with the operation of the other shutters in the system. Said couplings we form of arms or suitable brackets *f f*, which are secured to the shutters and have the cables passing loosely through them, so as to allow the cables to slide in said brackets when desired, as hereinafter explained. To cause the cable to transmit motion to the shutter, we employ a suitable adjustable detent, which may be attached to either the bracket *f*, as shown in Figs. 4 and 5 of the drawings, or to the cable, as represented in Fig. 3 of the drawings.

In case the shutter is required to move synchronously with the cable and the same distance as the travel of the cable the aforesaid detent may consist of a perforated head *f'*, formed on the arm or bracket *f* and having the cable passing through it. A screw-threaded channel *g* extends laterally from the perforation, and in said channel is inserted a set-screw *h*, which can be turned so as to engage the cable and clamp it in the head *f'*, as shown in Fig. 5 of the drawings. To the outer end of said set-screw is fastened an arm *h'*, to the free end of which is connected a weight *h²*. By throwing the arm *h'* in the direction shown in Fig. 4 of the drawings the set-screw is turned to clamp the cable in the head of the bracket *f*, the weight *h²* serving to maintain the arm in said position. By throwing said arm in the opposite direction the set-screw is caused to release the cable and then the shutter can be moved independently of the cable. This release of the shutter from the cable is essential in case of fire when all the shutters are closed and it is desired to obtain access to one of the windows from the exterior of the building without exposing all the windows. However, a simpler means for detachably connecting the shutters to the cable is shown in Figs. 2 and 3 of the drawings, and consists of an arm or bracket *f* being provided with a groove *i*, which is open at the top and receives in it the cable *d*, which is retained in said groove by gravity of the cable and is readily thrown out and away from said groove when desired to disconnect the shutter from the cable. In this case the detent for transmitting motion from the cable to the shutter consists of lugs or collars *j j*, secured to the cable at opposite sides of the bracket *f*.

On buildings having windows of different

widths in the same row we mount the collars *j j* longitudinally movable on the cable and clamp them in position by set-screws *l*, as shown in Fig. 3 of the drawings. The collars are thus allowed to be adjusted in their position so as to leave sufficient play between the collars to reduce the travel of the narrow shutter corresponding to the difference of the widths of said shutter and wider shutter.

To protect the portion of the cable between the collars *j j* from snow and ice, we place over said portion a suitable shield *t*, attached to the bracket *f*, as shown in Fig. 2 and indicated by dotted lines in Fig. 3 of the drawings.

Another important part of our present invention consists of an automatically-operated stop device connected to the winch *B* to limit the movement of said winch, and thus guard against excessively straining and breaking the component parts of the system. For this purpose we prefer to employ the duplex dog *n*, which is fastened to a shaft *n'*, pivoted to a bracket *v'*, secured to the supporting-frame *B'* of the winch mechanism. To the hub of said dog is attached a spring-finger *o'*, the free end of which slides endwise in a slotted stud *o²*, projecting from the bracket *v'*. Said spring serves to hold the dog *n* normally out of engagement with the toothed wheel or gear-wheel *P*, which is secured to the same shaft *c* to which the cable-carrying wheel *D* is attached. Another hub *p* is fastened to the shaft *n'* and has projecting from it a finger *p'*, the free end of which is in the path of a lug *r*, attached to a disk *r'*, which is rigidly attached to the shaft *c*, and thus rotates synchronously with the cable-carrying wheel *D*. The result is that in the operation of the winch the disk *r'*, rotating in unison with the winch-wheel *D*, causes the lug *r* to strike the finger *p'*, and thereby tilts the dog *n*, so as to cause it to interlock with the toothed wheel *P* and arrest the movement of the winch. In the next reverse movement of the winch the dog becomes liberated from the wheel *P* and is then restored to its normal position by the spring *o'*. During said reverse movement the lug *r* strikes the opposite side of the finger *p'*, and thereby causes the dog to again engage the wheel *P*. To allow the said stopping device to be adjusted for properly limiting the movement of the winch, the disk *r'* is provided with a plurality of holes *s s* for the attachment of the lug *r*.

The winch may be geared in different ways, according to the power required for moving a greater or less number of shutters, and two of the shafts of different gears may have their ends squared, as shown at *u u*, or otherwise adapted for the attachment of the crank *I* for operating the winch.

The attachment of the cable *d* to the wheel *D* we preferably effect by means of a T or double-hook shaped clamping-bolt *K*, passing, with its shank, through the periphery of the wheel and receiving under its hooks the

ends of the cable and provided on its shank with a nut k' , by means of which said clamping-bolt is made to tightly grip the cable, as shown in Fig. 9 of the drawings.

5 C' represents a fireproof jamb secured to the building around the exterior of the window to more effectually protect the wood-work of the window. Said jamb also reduces the width of the space to be closed by the shutter, and consequently permits the use of narrower shutters, which is specially of great advantage on buildings having narrow buttresses between the windows. We prefer to form said jamb of two or more layers of boards, extending lengthwise of the jamb, and layers of asbestos q between the boards and around the exterior thereof and incased in sheet-tin or other suitable fireproof material. We preferably place said boards edgewise to the wall of the building in order to permit the jamb to be more readily and perfectly fitted to the wall.

We do not limit ourselves specifically to the use of cables for moving the shutters, as chains may be employed for the same purpose, or rods or bars may be used to some extent between the sheaves.

In order to apprise the operator of the limits of the movements of the shutters, and thus guard against excessive strain on the hereinbefore-described automatic stop mechanism, we employ an automatic alarm actuated by mechanically-transmitted power derived from the winch, said alarm being constructed in various ways. An exemplification of such an alarm is shown in the drawings, and consists of a suitable bell L , attached to the winch-frame B' and having the bell-hammer L' , actuated by a finger L^2 , secured, preferably, to the shaft c , as shown in Fig. 6 of the drawings.

What we claim as our invention is—

1. The combination with the shutters and their operating-cables, brackets attached to the shutters and provided with grooves for the reception of the cables and with outlets from said grooves for the casting of the cables from engagement with the brackets, and detents on the cables engaging the brackets to transmit motion to the shutters, as set forth.

2. In combination with the shutters and their operating-cables, brackets rigidly attached to the shutters and provided with grooves open at the top to receive the cable, longitudinally-adjustable collars mounted on the cables and adapted to engage said brackets as set forth.

3. In combination with the shutters and their operating-cables, brackets attached to the shutters and provided with grooves open at the top to receive the cable, detents on the cables engaging the brackets, and shields carried over the cables between the detents, as and for the purpose set forth.

4. In combination with the shutters and their operating-cables, a winch transmitting motion to said cables, and an automatically-operated stop device limiting the movement of the winch to the travel required of the shutters.

5. In combination with the shutters and their operating-cables, a winch-wheel having the main cable attached to and wound around in opposite directions thereon, and an automatic stop device limiting the movement of the winch as set forth.

6. In combination with the shutters and their operating-cables, a winch-wheel having the main cable attached to it, a toothed wheel operated by said winch, a dog held normally out of engagement with said wheel, a disk rotating in unison with the winch-wheel, and a lug on said disk throwing the dog into engagement during the rotation of the winch-wheel, as set forth.

7. In combination with the shutters, the winch and cables connecting shutters to said winch, an alarm actuated by mechanically-transmitted power derived from the winch to apprise the operator of the limits of the movements of the shutters.

In testimony whereof we have hereunto signed our names this 6th day of November, 1897.

WARREN H. BOLES. [L. s.]

EMIL LAASS. [L. s.]

Witnesses:

J. J. LAASS,

H. B. SMITH.