To all whom it may concern:

Be it known that I, WILLIAM RAYMOND KINNEAR, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Fireproof Doors or Blinds: and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates more especially to doors or blinds composed of hinged fireproof or fire-resisting sections that fold vertically.

When such doors or blinds are made high, it is advantageous in the interest of economy of space, safety, and ease of operation that they be composed of four or more sections, and to facilitate the raising of such a structure I have found it advantageous to provide some means to impart automatically a starting or initial flexing of the hinges of the upper sections. The provision of such means constitutes the principal object of the present invention.

Another feature of this invention consists of an improved construction in covering wooden sections with sheet metal. Still another feature resides in a lock for this type of door or blind.

In the accompanying drawings, in which I have shown one embodiment of the invention, Figure 1 is a front view in elevation, the parts being broken out along the middle. Fig. 2 is an edge view showing the lock. Fig. 3 is a detail side view of the upper portion of the devices for starting the hinges of the upper sections. Fig. 4 is a horizontal sectional view on line x x, Fig. 1; and Fig. 5 is a sectional view of sheet-metal covering for wooden sections of a door.

In the several views, I designate vertically-arranged iron channels or ways located at opposite sides of the door or window opening.

2 designates the several sections of the door or blind, which are preferably covered, substantially as hereinafter described, with sheet metal to render them fire-resistant, and which are shown to be so hinged together as to fold with an accordion fold. These sections are to be provided with pintles or bearings to engage and run in the channels 1 and permit the folding of the sections preferably inside the building, as indicated in Fig. 2. The upper section, however, is preferably hinged at the top, so that the lower sections can be folded upward toward it.

Secured on the face of the channel at the left-hand side of the opening, as seen in Fig. 1, so as to be vertically movable in perforated ears 3, is a rod 4, having a cam or wedgeshaped head 4† at its upper end. The lower end of this rod rests upon the inner arm of a lever-dog 5, fulcrumed near the side of the door or window opening. Secured to the third section (reckoning from the lowermost) and near the hinged edge thereof is a finger 6, reaching out into the path of movement of the head 4†, so that when the rod carrying it is lifted the said head 4† will impinge upon said finger 6 and tend to throw the upper edge of said section inward and of course with it the lower edge of the section hinged to it immediately above. The upward vertical movement of the rod is effected by the impact of a runner-block 7 at the lower corner of the lower section, the block having for this purpose a projection 7†, reaching outward beyond the channel and in position to strike and pass the end of the inner arm of the lever-dog, but to engage it sufficiently to lift the rod 4 and its head 4† to move the upper portion of the aforesaid third section slightly inward, and therefore start or flex the hinges thereof connecting it with the section above. After such starting or flexing of the hinges the further folding operation becomes comparatively easy. When the projection 7† in this operation passes the lever-dog, gravity restores the latter and the rod to their original and ordinary position.

When the door or blind is closed, I secure it in that position by means of a lock consisting of a rockable rod 8, having affixed thereto laterally-extending fingers 8*, the rod being supported to rock in suitable perforated ears 9 on the face of the right-hand channel-iron. There will be, preferably, at least one finger 8* for each pair of hinged sections, as clearly indicated in the drawings.

A suit-
able pin 8° can be provided to lock the rod when it has been turned to fasten the shutters. One of the fingers 8° can be so placed as to serve to support the shutter when it is folded up, as seen in Fig. 2.

When the door or blind is heavy, it can be worked by means of a differential gearing, operating a drum-shaft to wind up or unwind chains attached to the lowermost section; but this does not constitute a part of the present invention, and therefore need not be referred to in detail.

In Fig. 5 I have shown an improved mode of construction of the wooden slat of which the sections of the folding door herein described can be constructed. I have illustrated in my application for Letters Patent of the United States filed June 11, 1901, Serial No. 64,136, another species of the same general idea. In the present instance I dispense with the tongues on the wooden portion therein specifically referred to.

In Fig. 5, referred to, 10 denotes the wooden portion of the slat, having in one edge two longitudinal grooves 10°, the opposite edge being plain. The sheet metal 11 covering the side of the slat is bent or hooped around into said groove, and fastened to it upon one or more sides of the wall forming the grooves. The metal on the sides of the adjoining slat is bent outward from the edge to stand in the groove, or at any rate to engage the metal in the groove, so that the edges of the metallic coverings or sheathing of adjoining slats are interlocked, and in case the door is subject to pressure, the covering cannot bulge out and become separated so as to expose the wood of the slat.

To separate the wood of the connected slats, I can employ a sort of beading, consisting of a metallic strip 11°, bent down along their edges, as shown, to also enter the grooves 10° and cover the wood between them. Where the metal of the strip 11° engages the metal coverings of the sides of the slat this strip serves to tie such sides together and assist in preventing separation in case the door or shutter is subjected to great heat.

The several slats and their coverings, constituting the whole or a section of a shutter or door, are held together by means of a bolt passed transversely through the slats and drawn and held tight by means of a nut or other device, substantially as pointed out in my former application.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with a door or blind composed of hinged vertically-folding sections, of means operated upon the operation of the lower section to flex the hinges of an upper section.

2. In combination with a door or blind composed of hinged vertically-folding sections, a finger or projection on an upper section, and a cam to be actuated by the upward movement of the lower section to flex the hinges of the upper section.

3. In combination with a door or blind composed of hinged vertically-folding sections, a finger or projection on an upper section, a cam-rod, a pivoted support for said rod adapted to be actuated by the upward movement of a lower section to cause said cam-rod to impinge upon said finger or projection and flex the hinges of the upper section.

4. In combination with a door or blind composed of hinged vertically-folding sections, a finger or projection on an upper section, a cam-rod having its cam portion arranged in line with said finger, a yielding or pivoted support for said rod to sustain said rod out of engagement with said finger, and a sliding projection on a lower section arranged to lift said rod-support to cause said cam-rod to impinge upon the finger on the upper section and flex the hinges thereof.

5. In combination with a door or blind composed of hinged vertically-folding sections, a finger or projection on an upper section, a cam-rod having its cam portion arranged in line with said finger, a yielding or pivoted support for said rod to sustain said rod out of engagement with said finger, a projection on the lower section arranged to lift said rod-support when the lower section is lifted to cause said cam-rod to impinge upon the finger on the upper section and flex the hinges thereof.

6. In combination with a door or blind composed of hinged vertically-folding sections, a lock therefor comprising a rock-shaft arranged at the side of said door or blind having fixed thereto locking members adapted to be turned toward or against said sections, and means for locking said rock-shaft when the locking members are in this position, substantially as described.

7. In combination with a door or blind composed of hinged vertically-folding sections, a lock therefor comprising a rock-shaft arranged at the side of said door or blind, a finger fixed to said shaft adapted to lock said door or blind when closed and support said door or blind when the same is open, substantially as described.

8. A door or blind composed of slats of wood or similar material of light weight, metal covering or sheathing for the sides or exposed faces of said slats, the edge of said metal covering at one side of a slat interlocking with the metal of the corresponding side of an adjoining slat, and a metallic connection between the interlocked edges.

9. A door or blind composed of slats of wood or similar material of light weight, metal covering or sheathing for the sides or exposed faces of said slats the edges of said metal covering at one side of a slat interlocking with the metal of the corresponding side of an adjoining slat, and a separate metal strip con-
necting the interlocking edges and separating the wood of the adjoining slats.

10. A door or blind composed of slats of wood or similar material of light weight grooved in one edge, metal coverings or sheathings for the sides of said slats having their edges interlocked in said grooved edge and a bolt passed transversely through the slats binding the slats and the coverings or sheathings together, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM RAYMOND KINNEAR.

Witnesses:

THEO. WEYANT,

GEORGE M. FINCKEL.