# J. I. HOWARD.

## Rolling Wire Shutters.

No. 150,575. Patented May 5, 1874.

*Fig. 1*

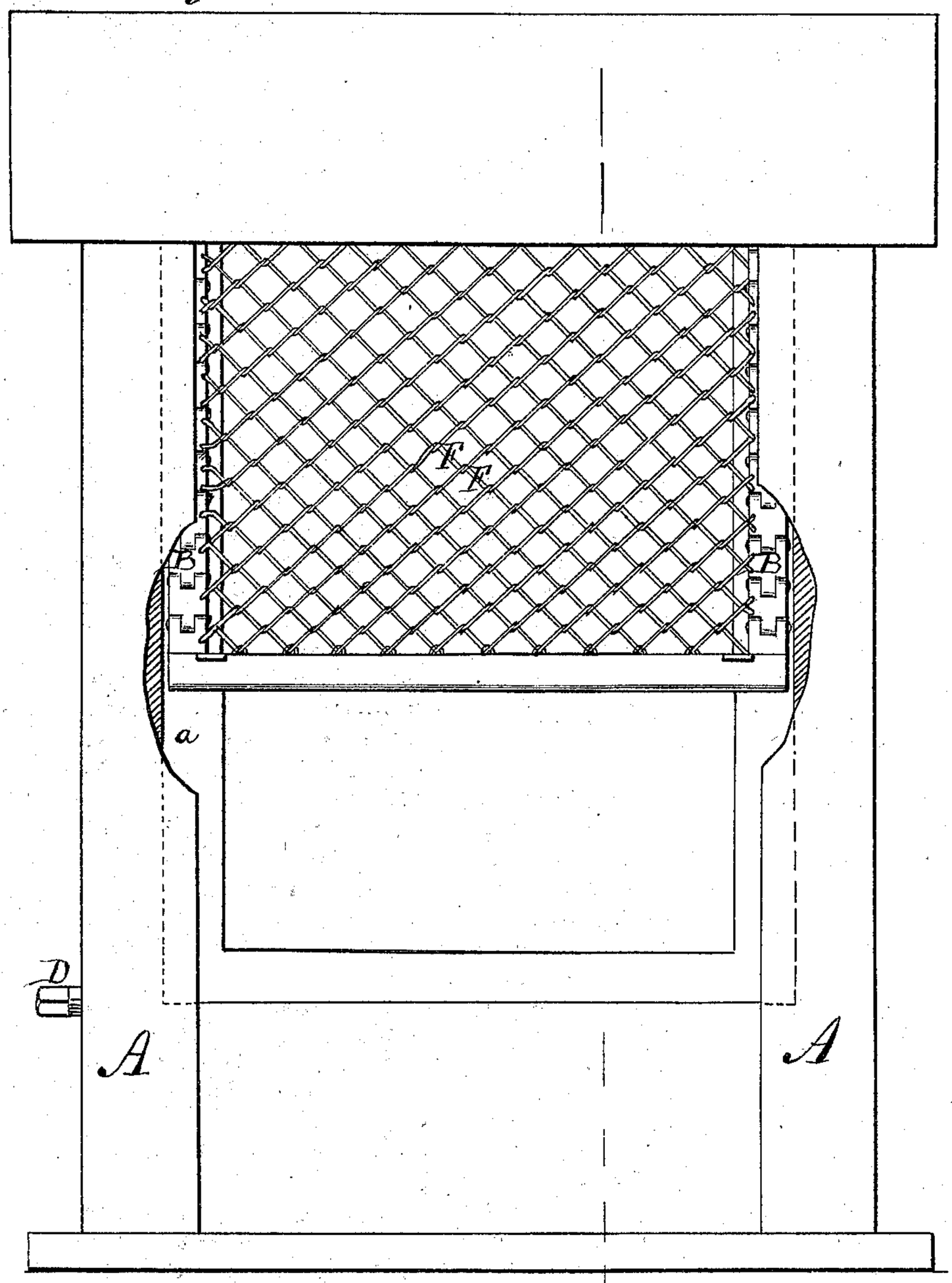



*Fig. 2*

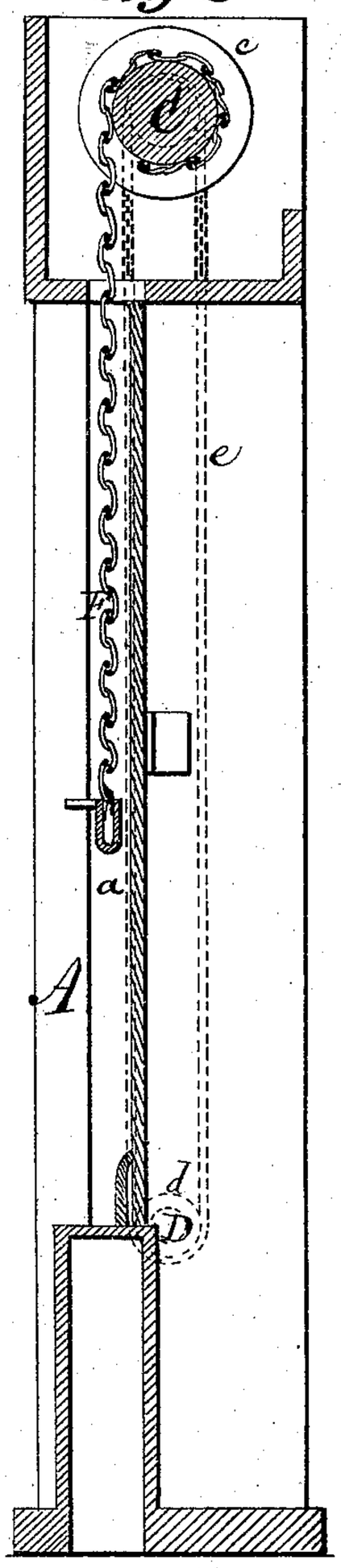



*Fig. 3*

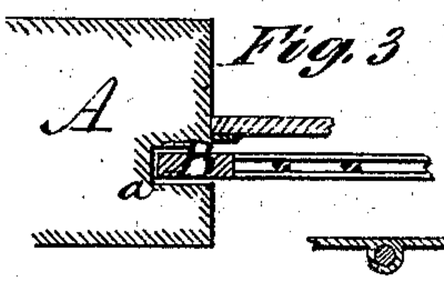
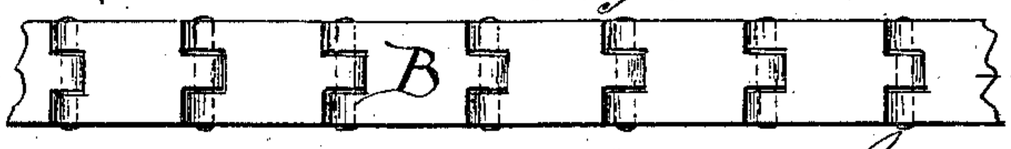



*Fig. 4*


*Fig. 5*




Witnesses.
Fred Haynes
Ferd Tusch

James Irving Howard.
by his Attorneys
Brown & Allen

# UNITED STATES PATENT OFFICE.

JAMES I. HOWARD, OF NEW YORK, N. Y.

## IMPROVEMENT IN ROLLING WIRE SHUTTERS.

Specification forming part of Letters Patent No. **150,575**, dated May 5, 1874; application filed April 6, 1874.

*To all whom it may concern:*

Be it known that I, JAMES IRVING HOWARD, of New York, in the county and State of New York, have invented a new and useful Rolling Wire Shutter, of which the following is a specification:

My invention relates to certain improvements designed more particularly for application to store-windows. The invention consists in a rolling shutter composed of two side or marginal chains formed of pivoted links, and a series of transversely-arranged interlacing zigzag wires connected with said chains, the pivots of the chain-links being in line with the lines of intersection of said wires, so that the shutter may be rolled around a cylinder.

In the accompanying drawing, Figure 1 is a a front view, showing the application of my improved shutter to a window. Fig. 2 is a vertical section. Fig. 3 is a horizontal section. Fig. 4 is a side view of the chain. Fig. 5 is a longitudinal section of the same.

The window-frame A is formed with a longitudinal vertical groove, *a*, on each side, in which run the chains to which the wires are attached. The chain B is formed of links pivoted to each other so as to be readily rolled around a cylinder, C, and unrolled therefrom, the cylinder being operated by an endless band, *e*, passing around a pulley, *c*, on one end, and around another pulley, *d*, on a crank-shaft, D. The chains are connected by wires F, of zigzag form, running across the shutter from one chain to the other, with the ends of the wires secured to the chains by passing through holes in the links, or in any other suitable manner. The angles in each wire are connected with corresponding angles in the next adjoining wire, so that when a number of wires are thus connected they form a continuous network, with the pivots of the links of the chains in line with the lines of intersection of the wires, and the network is readily rolled aronnd the cylinder or roller C with the chains. The network thus formed differs from a woven fabric, inasmuch as the wires do not bend in rolling or unrolling, but are hinged to each other by the intersection of their angles.

In order to provide for keeping the shutter extended laterally there may be a forwardly-projecting tongue on the outer edges of the chain-links working within an overlapping strip attached to the inner face of each side of the window-frame.

Instead of having the angles of the zigzag wires directly interlacing each other, as shown, said angles may be brought in juxtaposition and connected with each other by separate links.

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

A rolling shutter composed of two chains formed of pivoted links, and a series of transversely-arranged interlacing zigzag wires connected with said chains, the pivots of the chain-links being in line with the lines of intersection of said wires, substantially as shown and described.

J. IRVING HOWARD.

Witnesses:

M. RYAN,

VERNON H. HARRIS.