(No Model.) 2 Sheets—Sheet 1.

H. N. H. LUGRIN.

FLEXIBLE DOOR.

No. 490,448. Patented Jan. 24, 1893.

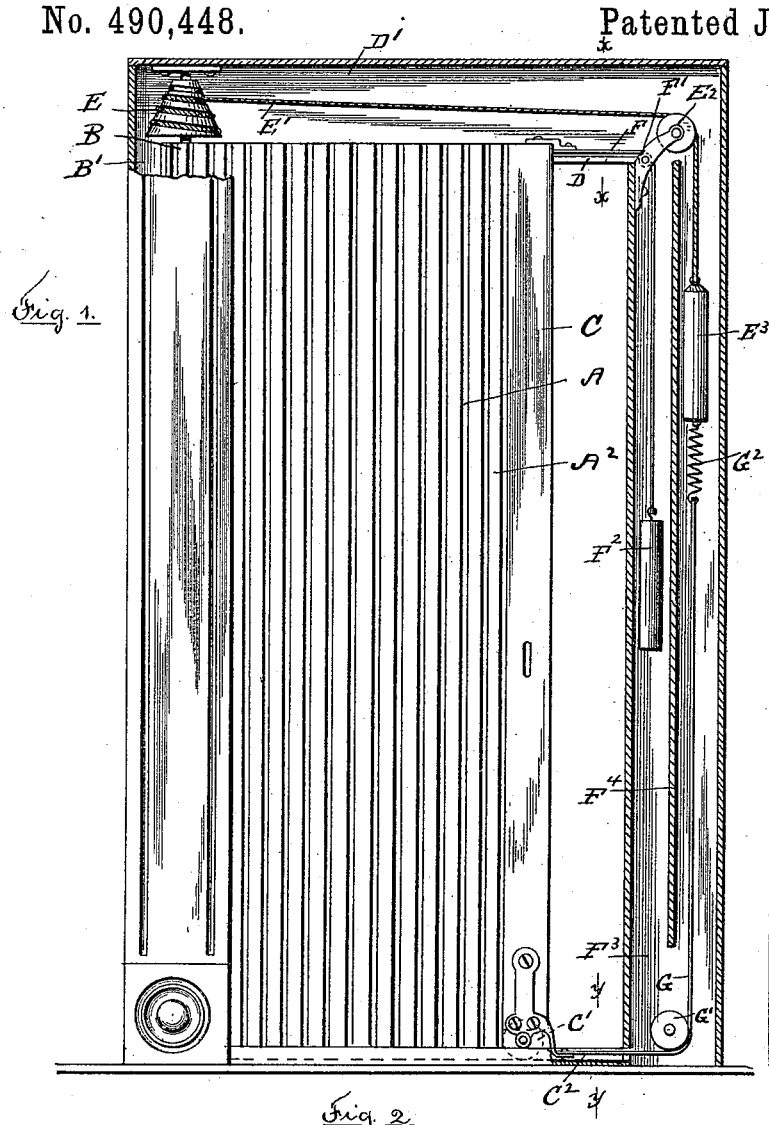


Fig. 1.

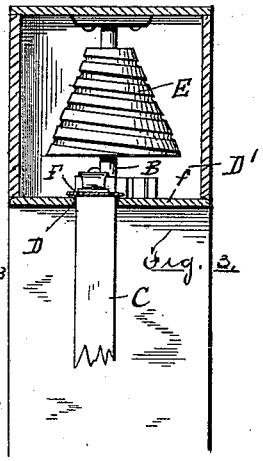


Fig. 3.

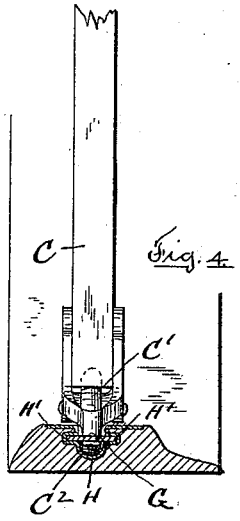
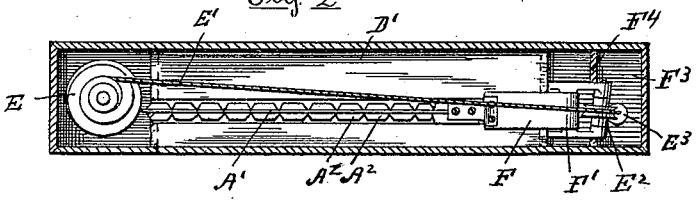


Fig. 4.

Fig. 2



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Inventor
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(No Model.) 2 Sheets—Sheet 2.

H. N. H. LUGRIN.

FLEXIBLE DOOR.

No. 490,448. Patented Jan. 24, 1893.

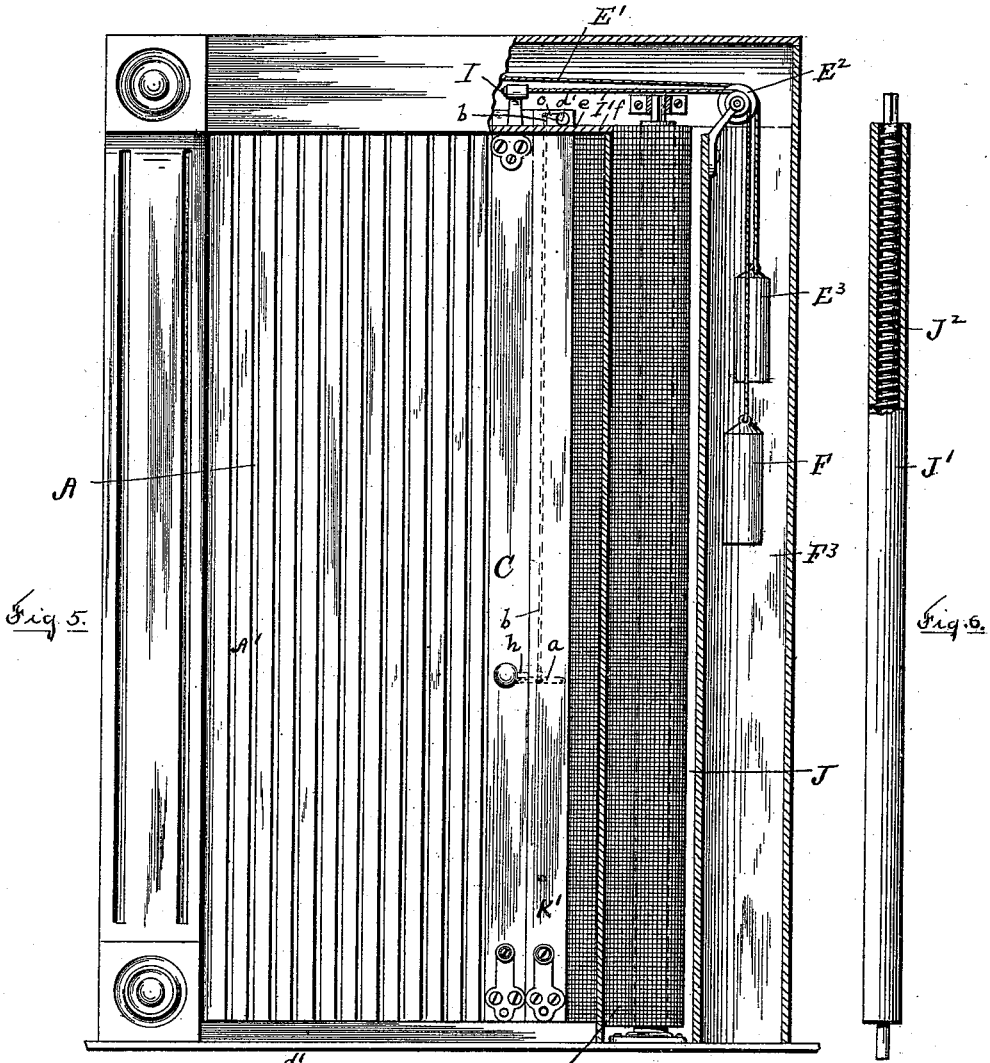

Fig. 5.

Fig. 6.

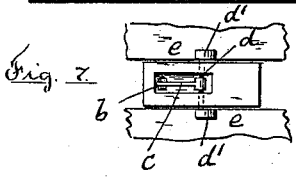

Fig. 7.

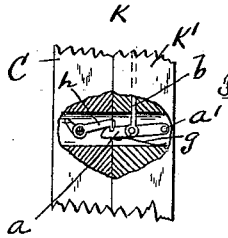

Fig. 8.

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UNITED STATES PATENT OFFICE.

HORATIO N. H. LUGRIN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE LUGRIN FLEXIBLE DOOR COMPANY, OF PORTLAND, MAINE.

FLEXIBLE DOOR.

SPECIFICATION forming part of Letters Patent No. 490,448, dated January 24, 1893.

Application filed May 29, 1890. Serial No. 353,569. (No model.)

To all whom it may concern:

Be it known that I, HORATIO N. H. LUGRIN, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Flexible Doors, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the specification, and in which—

Figure 1 represents a front elevation of one of my improved flexible doors, with the door casing at one side and at the top removed in order to disclose the pockets which contain the operative devices which aid in the movement of the door. Fig. 2 shows a top view of the same, with the top casing removed, Fig. 3 is a sectional view on line X X, Fig. 1, slightly enlarged, Fig. 4 is a sectional view on line Y Y, Fig. 1, upon the same scale as shown in Fig. 3, Fig. 5 is a front elevation of one of my improved flexible doors, with a rolling screen door operatively connected therewith, Fig. 6 is a detached view, shown partly in section, of the roll upon which the screen door is wound, Fig. 7 is a top view of the latching mechanism by which the screen door is held in any desired position against the tension of its spring, and Fig. 8 is a front view of a portion of the door stile of the flexible door and the portion of the door stile of the screen door, a portion of each of the stiles having been removed in order to disclose the latch inclosed within the body of the door stiles and shown in Fig. 5 by broken lines.

Similar letters refer to similar parts in the several views.

My present invention relates to those flexible doors, which are wound upon a vertical roll, and are adapted to close an opening by a horizontal sliding movement, and it consists in certain improvements in the operative mechanism connected with the door, and further in certain accessory improvements, as hereinafter fully described and specifically pointed out in the claims.

In the accompanying drawings A, denotes a flexible door, which consists of a strip or sheet of heavy canvas, A′, Fig. 2, having attached to each side the narrow strips, preferably of wood, and shown at A^2, in elevation in Fig. 1 and in end view in Fig. 2. This flexible door A, is wound upon a roll B, Fig. 1 held in vertical bearings, in a pocket B′ at the side of the opening, which forms the door way. The edge of the door is provided with a stile C, which carries a roll, C′, at the bottom, running in a shallow groove C^2 forming a horizontal track in the upper surface of the threshold, this roll is represented by broken lines in Fig. 1 and a portion of it in edge view in Fig. 4. The upper edge of the door passes through a groove D in the upper door jamb, entering a pocket D′ above the door.

The upper end of the vertical roll carries a helical drum E, to which a cord E′ is attached. The cord E′ passes over a scored pulley E^2 turning upon an axis placed at right angles to the line of the cord E′, and to the free end of the cord E′ is attached a weight E^3, which acts by the force of gravity, to rotate the roll B and wind up the door A as the door is pushed to the left in the operation of opening the door, by a force applied to the stile C of the door. As the door A is closed by drawing upon the stile C, and unwound from the roll B, the rope E′ is wound up upon the helical drum E, and the diameter of the steps upon which the cord E′ is wound is made to correspond with the variation in the diameter of the roll of the door A as it is wound upon the roll B, by this means the force of the weight E^3 is made to vary as the door is wound or unwound, by the variation of the diameter of the drum upon which it is wound.

To the upper end of the stile C is attached a metallic band F, which is wider than the groove D through which the upper edge of the door A passes, so as to overlap the edges of the door jamb and close the groove D. The flexible metallic band F passes over a roll F′ and to the free end of the band is attached a counter weight F^2, acting as a counter balance to the action of the weight E^3. The weights E^3 and F^2 rise and fall within a pocket F^3 inclosed by the casing of the door upon the side of the opening opposite the pocket B′, containing the roll B, and a partition F^4 serves to prevent the contact of the weights. Attached at the lower end of the

stile C is a similar flexible metallic band G, which passes in a line parallel with the surface of the threshold into the pocket F^3, and over a roll G′, with its opposite end attached to a spiral spring G^2, which is attached to the lower end of the weight E^3. As the door is opened the descent of the weight E^3 will allow the metallic band G to be drawn out and over the groove C^2 in the threshold, and as the door is closed the ascent of the weight E^3 will serve to draw the metallic band, into the pocket F^3. The interposed spiral spring G^2, allows for any slight variation which in practice may occur between the varying diameter of the roll formed by the door A as it is wound upon the roll B and the corresponding diameter of the successive steps of the helical drum E, for example in case the door A in the operation of opening should move faster than the descent of the weight E^3 the spring G^2 will expand and allow the metallic band G to follow the door A, and in case in closing the door the weight should not move as fast as the advancing edge of the door A, the spring G^2 will contract and take up the band G. The groove C^2 in the threshold which forms the horizontal track for the door is preferably lined with a sheet metal lining H, Fig. 4, having the side grooves H′ H′, in which the metallic band G is held, and in which it moves as the door A is opened or closed. It will be seen that as the door is opened the bands G and F will close the groove C^2 in the threshold and the groove D.

In Fig. 5 of the drawings is shown in front elevation a flexible door, which is wound upon a vertical roll inclosed in a pocket upon the left side of the figure, of precisely the same construction, and having attached to its upper end a helical drum like that shown in Fig. 1 and already described, and the door is wound upon the vertical roll by the action of a cord E, attached to the helical drum at one end in the same manner as the door represented in Fig. 1, the vertical roll, with its helical drum, is therefore not shown in Fig. 5. The cord E passes over a scored pulley E^2 and to the free end of the cord E^2 is attached a weight E^3, by which the door is wound on the vertical roll as already described by means of the gravity of the weight E^3. An arm I projects from the upper end of the stile C, to which a cord I′ is attached carrying the weight F^2, acting as a counterbalance of the weight E^3, in the same manner as shown in Fig. 1. The weights E^3 and F^2 are inclosed within the pocket F^3 and between the pocket F^3 and the door opening I form another pocket J in which I place a vertical roll J′ upon which is wound a screen of wire-cloth or other material, with its free edge attached to a stile K. The roll J′ incloses a coiled spring J^2 similar to the spring of a curtain roll, held in a state of tension by which the screen K is wound upon the roll J′. Inclosed within a mortise in the stile K′ is a latch *a*, pivoted at *a′*, and to the latch *a* is connected a rod *b* which serves as a link to connect the latch *a* with an arm *c* projecting from a spindle *d* journaled in the upper end of the stile K′. The outer ends of the spindle *d* carries the eccentrics rigidly attached to the spindle and arranged to bear upon the track *e* formed upon the upper surface of the jamb *f*. A spring *g* beneath the latch *a* holds it up and maintains the eccentrics in position so as to engage the track *e*. Within the stile C is pivoted a latch *h*, having a hooked end to engage the hooked end of the latch *a*, as the stile K′ is brought against the stile C thereby uniting the two stiles K′ and C. As the door is closed against the stile K′ the latch *h*, will engage the hooked latch *a*, thus uniting the door A and the screen door K and as the door A is opened the screen door K will be closed.

The screen door is held in any desired position after the latches *h* and *a* are disengaged by the action of the eccentrics *d′*, *d′* upon the track *e*. The eccentrics are disengaged from the track *e* by depressing the free end of the latch *a* and through the link *b* the arm *c* and rocking the spindle *d* in its bearings.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The combination of a flexible door, a vertical roll upon which said door is wound, a drum carried by said roll, a cord wound upon said drum a weight attached to said cord and acting by the force of gravity to wind up said door, a cord attached to said flexible door, and a weight attached to said cord and acting as a counterbalance to said winding weight, substantially as described.

2. The combination with the casing of a door, of a flexible door with its edge entering a groove in said casing, a band attached at one end to said door and covering said groove as the door is opened, substantially as described.

3. The combination with a flexible door, arranged to move along a grooved track, of a band having one end attached to said door, so as to be drawn over and cover said track, substantially as described.

4. The combination with a flexible door arranged to move along a horizontal track, of a vertical roll upon which said door is wound, a helical drum attached to said roll, a cord wound upon said drum, a band with one end attached to said door so as to be drawn over and cover said track as the door is opened, said band being connected with said cord wound upon the helical drum, so as to be drawn from the track as the door is closed, substantially as described.

5. The combinatian with a flexible door arranged to move along a horizontal track, of a roll upon which said door is wound, a helical drum attached to said roll, a cord wound upon said drum, a band attached at one end to said door and connected at its opposite end with said cord, and a spring interposed between

said band and said cord, substantially as described.

6. The combination with a flexible door wound upon a vertical roll and arranged to move upon a horizontal track, of a screen door wound upon a vertical roll, and connected with said flexible door so that the screen door will be closed as the flexible door is opened, substantially as described.

7. The combination with a flexible door and a grooved track in which said door is moved, said track having grooves upon its opposite sides, of a band with one end attached to said door and sliding in said grooves, substantially as described.

8. The combination with a flexible door arranged to move upon a horizontal track, of a band attached to said door and arranged to be drawn over and cover said track as the door is opened, substantially as described.

Dated May 27, 1890.

HORATIO N. H. LUGRIN.

Witnesses:
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RUFUS B. FOWLER.