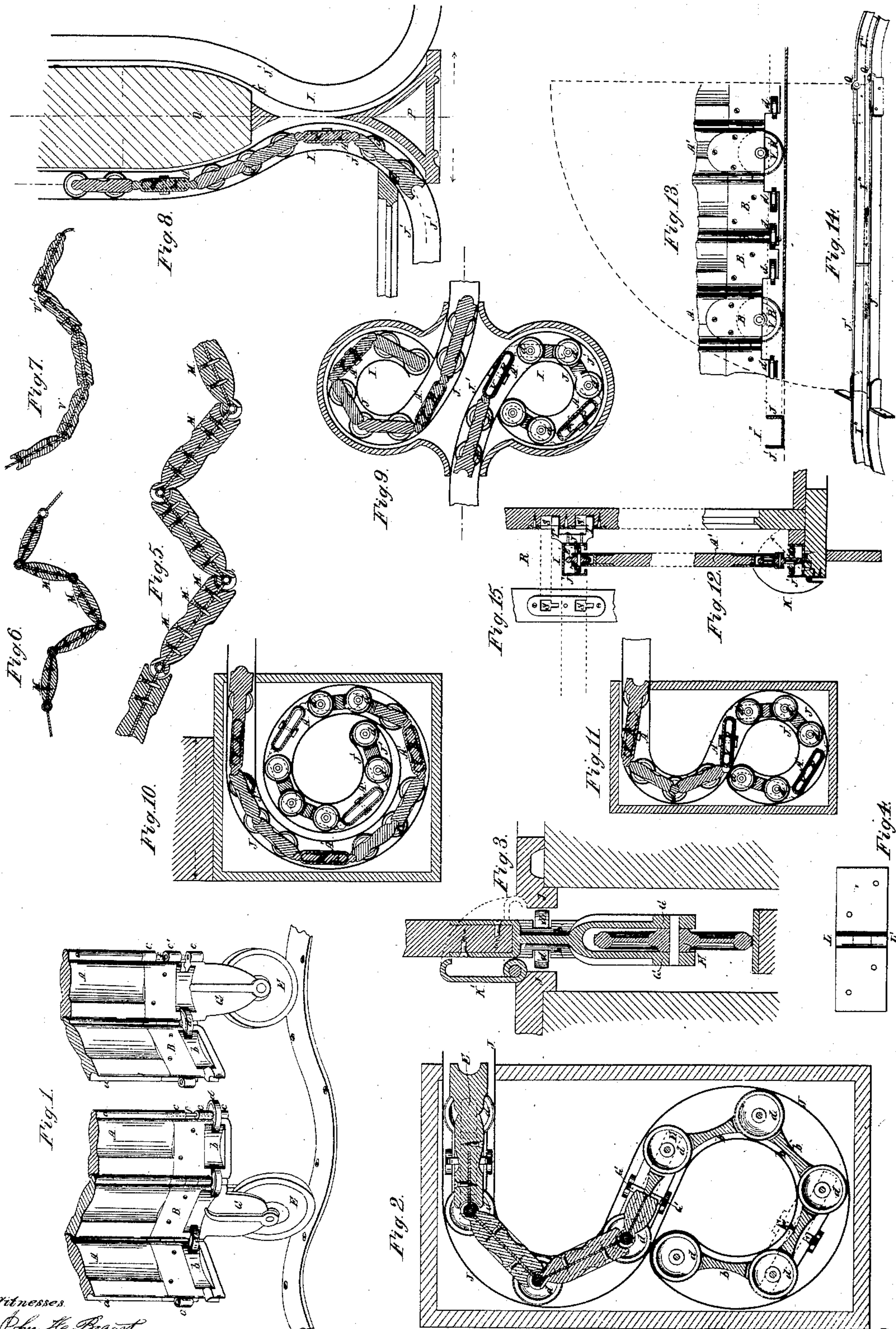


*J. A. Wyndolgh.*

*Shutter.*

*N<sup>o</sup> 45,366.*

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*Witnesses.*  
*John H. Bogart*  
*Francis A. Moore.*

*Inventor.*  
*John A. Wyndolgh.*



# UNITED STATES PATENT OFFICE.

JOSSE A. VRYDAGH, OF CINCINNATI, OHIO.

## IMPROVEMENT IN WINDOW-SHUTTERS.

Specification forming part of Letters Patent No. **45,366**, dated December 6, 1864.

*To all whom it may concern:*

Be it known that I, JOSSE A. VRYDAGH, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Flexible Shutters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My improvement relates to the class of shutters composed of a number of vertical slats flexibly connected together, and capable of being slid or run back when no longer required; and my invention consists chiefly in provisions for the abrupt flexure or folding of such shutters along a variety of horizontal curved or serpentine tracks.

Figure 1 represents, in perspective, a portion of the lower part of a flexible shutter on my plan. Fig. 2 is a horizontal section of the same, taken partly through the mountings and partly through the slats. Fig. 3 is a vertical transverse section through the lower part of a slat, including the mounting and one of the supporting-rollers or bearing-wheels. Fig. 4 contains an elevation and a horizontal section of the secret hinge. Fig. 5 is a horizontal section through a series of slats, showing my peculiar conformation of flexible joint, secret hinging, &c. Fig. 6 is a horizontal section of a form of my shutter which permits a flexure of ninety degrees or even less. Fig. 7 is a horizontal section of a form in which the hinges are replaced by a continuous strap of leather or of gum-elastic webbing. Fig. 8 represents a shutter capable of both right and left flexure in connection with a reversed track which affords an entirely unobstructed front between party-walls when the shutter is run back or housed. Fig. 9 shows by horizontal section a mode of boxing or housing two contiguous shutters by tracks curving in contrary directions within a hollow front pier or party-wall. Fig. 10 shows a shutter suitable for a warehouse, housed on a single convoluted track within a hollow front pier or party-wall. Fig. 11 shows a shutter suitable for a warehouse, housed on a serpentine track within a hollow intermediate front pier. Figs. 8, 9, 10, and 11 represent, furthermore, a shutter with another combination of slat-mountings having the peculiar arrangement of grouping the friction-rollers three by three, and a bearing-wheel be-

tween each group or every second group. Figs. 12 and 13 show perspective view and vertical transverse section of this latter mode of mountings. Fig. 14 shows a raising-track swung on hinge in a doorway. Fig. 15 shows a vertical section of a movable upper track of shutter on half the height of show-window or front.

My improvement consists, essentially, of a series of slats or strips, A, which for most purposes will be composed of wood, and may be plated with galvanized sheet-iron to the side exposed to the weather. The slats are jointed together by providing a round bead or tongue, *a*, on the edge of one slat and a corresponding half-round groove, *a'*, in the contiguous edge of the slat next in the series. The ends of slats are shod with iron or other metallic mountings, B, which mountings may have ears, *c*, forming parts of hinges, by means of which the contiguous slats are flexibly connected together. These ears *c* are also journal-bearings for the friction-rollers *d*, which guide the shutter in the tracks, and the hinge-pintle *f* may in some forms serve also as a roller's axle. These friction-rollers and mountings are combined in two distinct modes.

Figs. 1, 2, and 3 show the mode combined for deep tracks. Figs. 8, 9, 10, 11, 12, 13, and 14 show the mode combined for shallow tracks. Both modes are so devised as to have the slats of the greatest practicable width, or to have the least number of them in a given track, or as a proportion, five slats in a full-circled track, (see Figs. 2, 9, and 11,) and they are also so arranged as to allow of the largest rollers and bearing-wheels possible, so as to facilitate the easy motion of the shutter, all this being reached by—viz:

First mode, Figs. 1, 2, and 3, locating the bearing-wheels E of shutter entirely beneath the friction-rollers *d* and guides J by means of a bifurcated hanger or inverted pedestals, G, which affords journal-bearing. The bearing-wheel when so located is independent in its motion from the guides J, and can thus be made of any size required, and it also allows the mountings to be coved, *b*, at the friction-rollers, where they might rub the guides, and thus constructed it enables the use of the widest slats and largest friction-rollers and bearing-wheels. In the second mode (see Figs. 8 to 14, inclusive) it is reached by grouping the



friction-rollers, three in number, on two slats, and each succeeding group joined to the preceding by a slat, A', without any friction-roller. This arrangement throws the body of the mountings from the inner edge toward the outer edge of the curved track, which effect is most conspicuous on the slats A', without friction-roller, whose omission leaves room for the insertion of bearing-wheels V R, of a diameter about the full width of slats, which slats may then be rendered equal to the width and proportion above stated—that is, five slats within a circled track.

Of the above mountings the first mode may have a bearing-wheel every third, fourth, fifth, or sixth slat, as may be deemed necessary, and a friction-roller at every joint of slats, and the second mode takes a bearing-wheel housed in the mountings, (see V R, Fig. 13,) on each slat between groups, or on every second slat between groups, also, as deemed necessary, in the various cases of tracks. These bearing-wheels E and V R are made to run on a flat foot-track, which serves to support and conduct the shutter at its proper place, the shutter being at the same time laterally guided in its desired course by the contact of the friction-rollers *d* with side tracks or guide, J J'. Friction-rollers are exactly disposed in the track on top of shutter, as they are in the bottom track, and in some cases the shutters will be provided with vertical friction-rollers, (see E, Fig. 15,) in the upper track—one on each extreme slat, or more—to prevent the shutter binding or being lifted out from the lower track. All the bearing-wheels and friction-rollers are formed with convex bearing-edges and run on plane or flat tracks and guides.

K K' (see Figs. 3 and 12) are forms of track-covers to be closed down when the shutter is housed, so as to screen the track from the weather. Such covers may serve also as sign-plates.

Shutters will, in addition to the hinges above described on the mountings, be provided with intermediate hinges, L L', (see Fig. 4,) which are to be inclosed in the body of the slats, as shown particularly in Fig. 5, where each hinge is seen half-way mortised through the slat, and is secured by pins M, screw-threaded where they traverse the wooden portion, and smooth in that portion of the stem which is to enter the hinge-plate. For some purposes the barrel of the hinge may be exterior, as in Fig. 6, and if made of brass or German-silver will present a neat appearance. For yet other uses, a strap, V', (see Fig. 7,) of india-rubber webbing or of leather or other tough and flexible fabric, may replace the hinges altogether. A shutter composed of slats connected together by such a strap will tend to straighten out whenever at liberty to do so.

For the fronts of stores and warehouses, and the doorways of assembly rooms, &c., a form such as shown in Fig. 8 may be adopted, O

representing a party-wall coved out to receive reversely-curved tracks I and I' behind an iron pilaster, P, such an arrangement affording the singular advantage of laying open the entire front from wall to wall.

For the fronts of stores and warehouses, forms such as Fig. 10, a pier on party-wall, and Figs. 2 and 11, intermediate piers of front, may be adopted, these two forms representing shutters folded toward the street-line and housed in cast-iron hollow piers supporting the front, such an arrangement affording the singular advantage of leaving the space in front of the house unobstructed, while the night-doors actually in use project several feet inside the warehouses and greatly obstruct the handling and rolling of heavy packages.

A U-shaped iron bar, I'', (Figs. 12, 13, and 14,) may serve both to support and guide the shutter.

I''', Fig. 14, represents a portion of track crossing a doorway and connected by means of hinge Q, so as to be folded up and out of the way in day-time.

R, Fig. 15, represents a removable track for a half-height shutter to store-fronts. This track is secured to the window-sash by tenons and mortises S T.

I claim herein as new and of my invention—

1. The reversely-flexible shutter composed of slats A a a'', jointed together by tongue and groove of circular transverse section and connected by secret hinges, in the manner set forth.

2. A reversely-flexible shutter composed of vertical slats A a a', jointed and hinged as above and guided in a serpentine or other horizontal path by rollers *d*, bearing-wheels E and V R, and bearing and guiding lateral tracks I J, substantially as set forth.

3. The doubly-flexible shutter, Figs. 1, 2, and 3, composed of wide vertical slats shod with coved mountings *b b* and having vertical bearing-wheels journaled below the body of said mounting and lateral friction-rollers, for the purposes set forth.

4. The doubly-flexible shutter, Figs. 8 to 14, inclusive, composed of wide vertical slats, of which every third slat is without friction-roller and is provided with a large bearing-wheel, the whole being arranged and operating substantially as set forth.

5. In the described connection with a reversely-flexible shutter, the serpentine track I, Figs. 2 and 11, and the convoluted track, Fig. 10, substantially as described.

6. The serpentine track I, Fig. 8, occupying a coved party-wall, o, and enabling the housing of a reversely-flexible shutter, so as to afford an entirely unobstructed window or doorway, as herein explained.

7. The hollow pier, Fig. 9, having the two reversely-curved tracks I I', for the housing of as many independent shutters, as represented.

8. Connecting the slats of a reversely-flexi-

ble shutter by a ligature, V', of gum-webbing or like fabric.

9. The provision of the folding track I'', adapted and applied to a doorway in the manner explained.

10. In this connection, the removable track R S T, as herein described.

11. The mode of screening the lower track by means of the hinged folding sign-plate K, Fig. 12, and carpet strip K', Fig. 3.

JOSSE A. VRYDAGH.

Attest:

JOHN H. BOGART,  
FRANCIS M. MOORE.