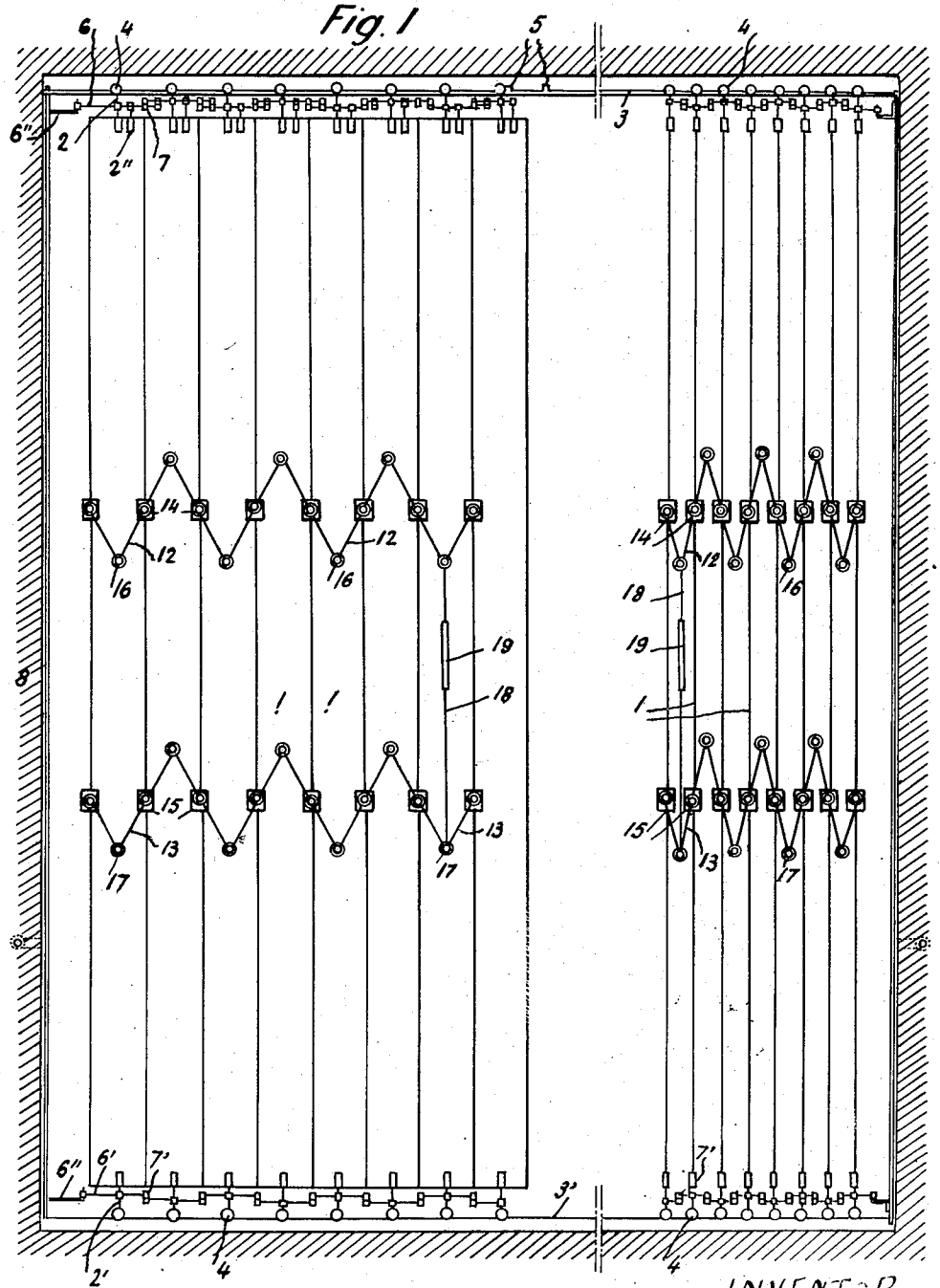
May 17, 1932. E. BOLARD 1,858,801

EXTENSIBLE SHUTTER

Filed April 30, 1931 3 Sheets-Sheet 1

Fig. 1



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EXTENSIBLE SHUTTER

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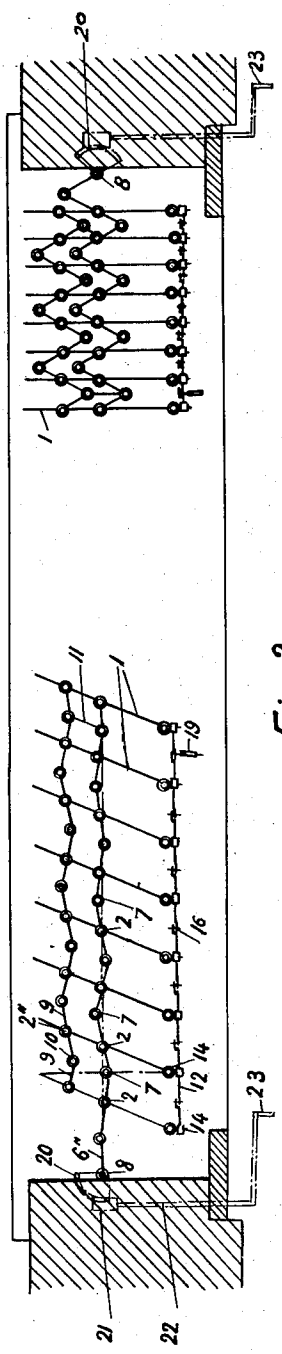

Fig.2

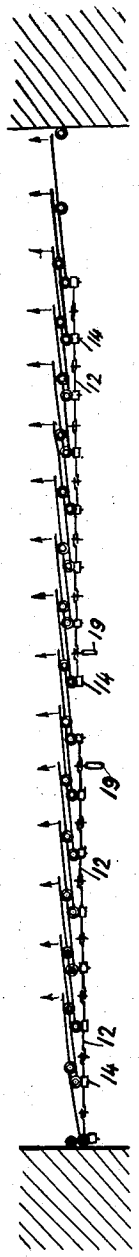

Fig.3

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Fig. 4

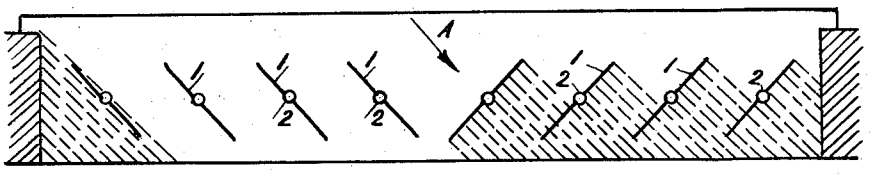


Fig. 5

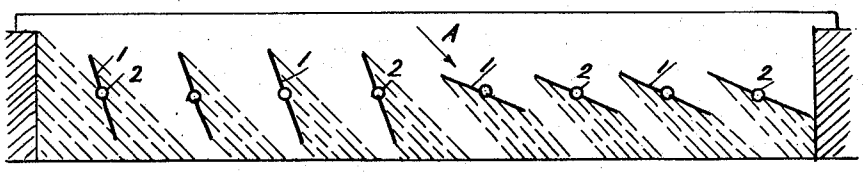
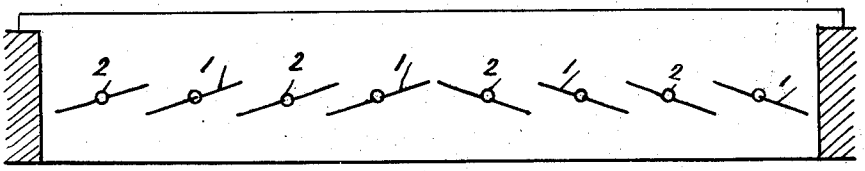


Fig. 6.



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UNITED STATES PATENT OFFICE

EDMOND BOLARD, OF PARIS, FRANCE

EXTENSIBLE SHUTTER

Application filed April 30, 1931, Serial No. 533,955, and in France June 5, 1930.

This invention is relative to an extensible shutter adapted for various uses and especially suited for the construction of Venetian blinds.

Said shutter is constituted of parallel laths pivotally mounted around likewise parallel axes and so interconnected as to remain constantly parallel and equidistant when extended or folded, whatever be the angle to which they are turned.

The axes of rotation of said laths may comprise rolls, balls or the like, whereby they may roll on and be guided by tracks.

The laths may be interconnected by one or more sets of rods, hinged at their ends and pivoting around the axes of the laths. The interconnection between the laths ensures that when one of these is turned, all others rotate to the same extent.

Attached drawings exemplify, without limiting the scope of the same, various constructional forms of the invention assumed to be applied to a two-sash Venetian blind of a room window.

In said drawings:

Fig. 1 is a frontal elevation of the shutter, one of whose sashes is completely extended and the other is partly extended, the laths of both being opened;

Fig. 2 is a corresponding plan view, as seen from below the upper guiding rail;

Fig. 3 is a similar plan view, the laths of both sashes being wholly closed or folded;

Figs. 4 to 6 show diagrammatically various applications of a shutter pursuant to the invention, in which the hatchings indicate zones of shade.

Each sash of the shutter pursuant to the invention comprises a number of laths 1 suited to the width of opening to be closed and to the extent by which the laths are required to overlap each other when closed.

Each lath is free to pivot around axes 2—2′, whose ends are adapted to slide or roll along fixed rails 3 and 3′, for which purpose each axis may have a roll 4 or the like. Stops 5 limit the run of each sash.

The axes or pivots 2 of the various laths are interconnected by a series of rods 6 pivotally mounted at 2 and interjointed at their ends 7.

The axes or pivots 2′ are likewise interconnected by a set of rods 6′ pivotally mounted at 2′ and interhinged at their ends 7′.

The fixing members 6″ of sets of rods 6 and 6′ are rigidly keyed to a vertical bar 8, so that the movements and distortions of both sets of rods 6 and 6′ are identical as to time and to scope. Axes or pivots 2—2′ thus always remain parallel to bar 8 and are always vertical.

Slightly above the horizontal plane constituted by the upper edges of laths 1, a second set of rods 9 is arranged, pivoting around axes or pivots 2″ and interhinged at 10. Sets of rods 6 and 9 are interconnected by one hinged bar such as 11, at least, so that their movements and distortions are simultaneous and identical and that the upper edges of laths 1 thus always remain parallel.

If desired, a second set of hinged bars, similar to those of set 9, may be fitted to the lower portion of the shutter.

Laths 1 are held vertically parallel to each other by means of two sets of rods 12 and 13, which are respectively pivoted to the edges of said laths at 14 and 15 and whose ends are respectively interhinged at 16 and 17 in a vertical plane, one connecting rod 18, at least, ensures that the movements of aforesaid two sets of rods shall be simultaneous and identical.

Said sets of rods 12 and 13 are not indispensable, but they ensure that the upper and lower hinged sets function smoothly.

19 designates an operating handle, mounted upon connecting rod 18.

The device works as follows:

The shutter (Venetian blind or the like) being in the drawn position (left hand side of Figs. 1 and 2), pressure upon handle 19 in the direction from right to left or from left to right will cause laths 1 to pivot around their axes 2—2′ until they are at the angle required.

Pressure in the direction from right to left upon the whole of the shutter will cause the various sets of hinged rods (right hand side of Figs. 1 and 2) to fold up, the laths or

slats 1 remaining parallel with each other and the Venetian blind or the like finally collapses against the side of the bay or other window or opening to be closed, whilst laths 1 shall have straightened out by manual or automatic action and come to lie parallel with said side.

Any suitable device may be used to enable the shutter to be worked from within, an appropriate means consisting of ratchets 20, pivoting with rods 8 and carrying with them fixing members 6'' of sets of rods 6 and 6', said ratchets being actuated by means of screws 21 and axles 22 rotated by any suitable mechanism, such as handle 23, for example.

Reverse movement enables the Venetian blind or the like to be opened, slats 1 unfolding until the travel of rolls 4 along rail 3 is arrested by stops 5 or by any other limiting device.

Figs. 4 and 5 show how, according to circumstances, the following alternatives may be made available:

1. The full sunlight may be allowed to enter the room (left hand side of Fig. 4) by turning the laths 1 parallel with the sun's rays.

2. The rays of the sun may be entirely intercepted (right hand side of Fig. 4) whilst diffused light is admitted inside the room, by turning the laths 1 perpendicularly to their direction as indicated by A.

3. Partly intercept (Fig. 5) the sun's rays by causing laths 1 to rotate by a suitable angle around their axes. The right hand side of Fig. 5 shows how such angularity of the laths may be adjusted to preclude a person inside the room from being seen from a house opposite, for example. This was likewise the case relatively to the left hand side of Fig. 2.

4. A full view of the street may be retained (Fig. 6) at night, whilst passers-by are prevented from looking into the room. It will be clear that a view may be secured in both directions, if two sashes are available.

It will have been noted from Fig. 3 that it is possible to secure complete darkness.

It is manifest that, in all the above alternatives, excepting the last one, full view of the outside is retained from within the room, such view being ample and extending throughout the height of the laths and not being, as is the case with known Venetian blinds, limited to a few horizontal slits.

It will likewise be clear that ample ventilation is always assured behind the shutter.

Shutters according to the invention may be of wood, of metal or of other materials and their laths or slats may be vertical or horizontal.

They are not only applicable to Venetian blinds for apartment windows but to shop shutters, awnings, screens, movable partitions airplane hangar doors, sample stands, post-cards and the like and when used for samples they may be extended to display goods to customers and thereafter folded up to avoid congestion. They are likewise adapted for use as weir sluices &c.

I claim:

1. An extensible shutter comprising in combination, a plurality of parallel upright slats pivotally mounted upon parallel axes extending longitudinally of the slats, a fixed rail overlying the ends of the slats, rollers carried by said slats and riding said rail, said rollers having their axes coincident with the axes of pivotal mounting of the slats, a plurality of bars fixed one to each slat on the pivotal axis thereof, the bars of adjacent slats having their ends juxtaposed and hinged together, fixed means for pivotally receiving and holding the bar of one end slat, means for maintaining the slats parallel to each other, means for varying the incidence of the slats and for collapsing or extending the shutter, and means for limiting the distance to which the shutter may be extended.

2. An extensible shutter as claimed in claim 1 having a plurality of bars fixed one at each end of each slat on the pivotal axis thereof, and having fixed means for pivotally receiving and holding the pair of bars of one end slat.

3. An extensible shutter as claimed in claim 1 wherein the means for varying the incidence of the slats comprises a plurality of bars successively pivoted together at their ends and each pivoted at a midpoint to an edge of an adjacent slat.

In testimony whereof I have signed this specification.

EDMOND BOLARD.