May 24, 1960 A. E. LATHAM 2,937,398

SHUTTER CARRIER

Filed Aug. 14, 1958 2 Sheets-Sheet 1

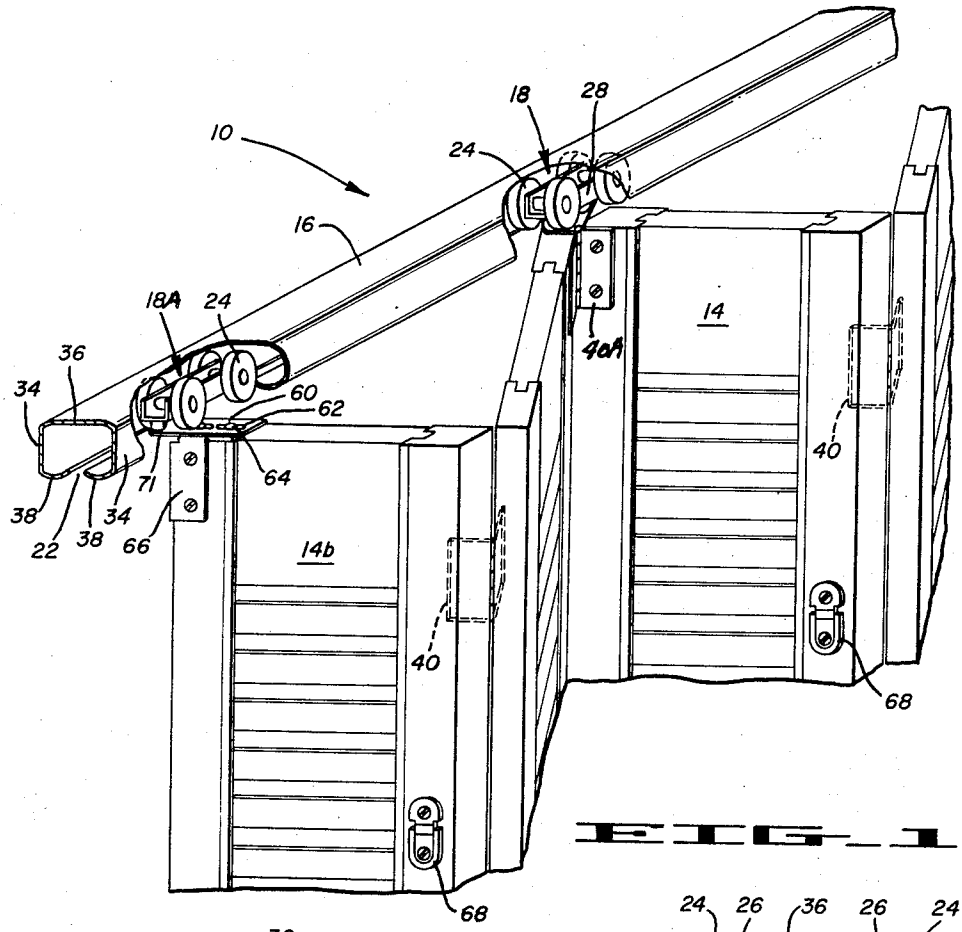



FIG. 1

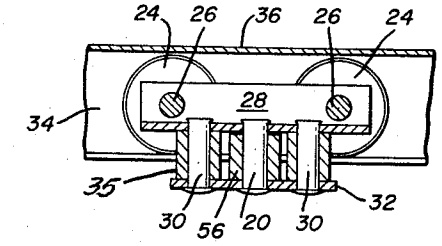



FIG. 3

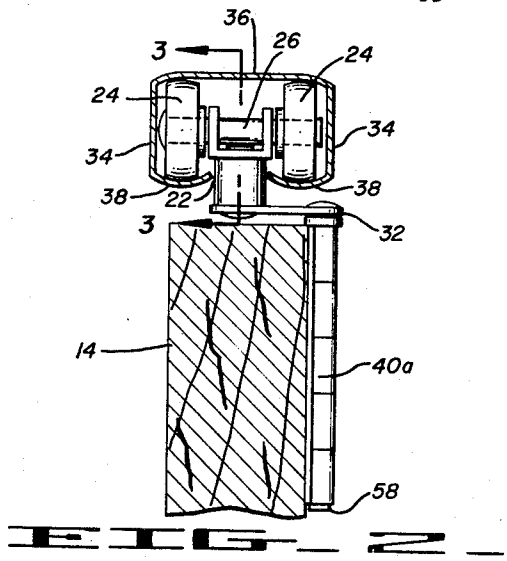



FIG. 2

INVENTOR.
ALLEN E. LATHAM

BY Emrich & Dithmar
His ATTORNEYS

May 24, 1960 A. E. LATHAM 2,937,398

SHUTTER CARRIER

Filed Aug. 14, 1958 2 Sheets-Sheet 2

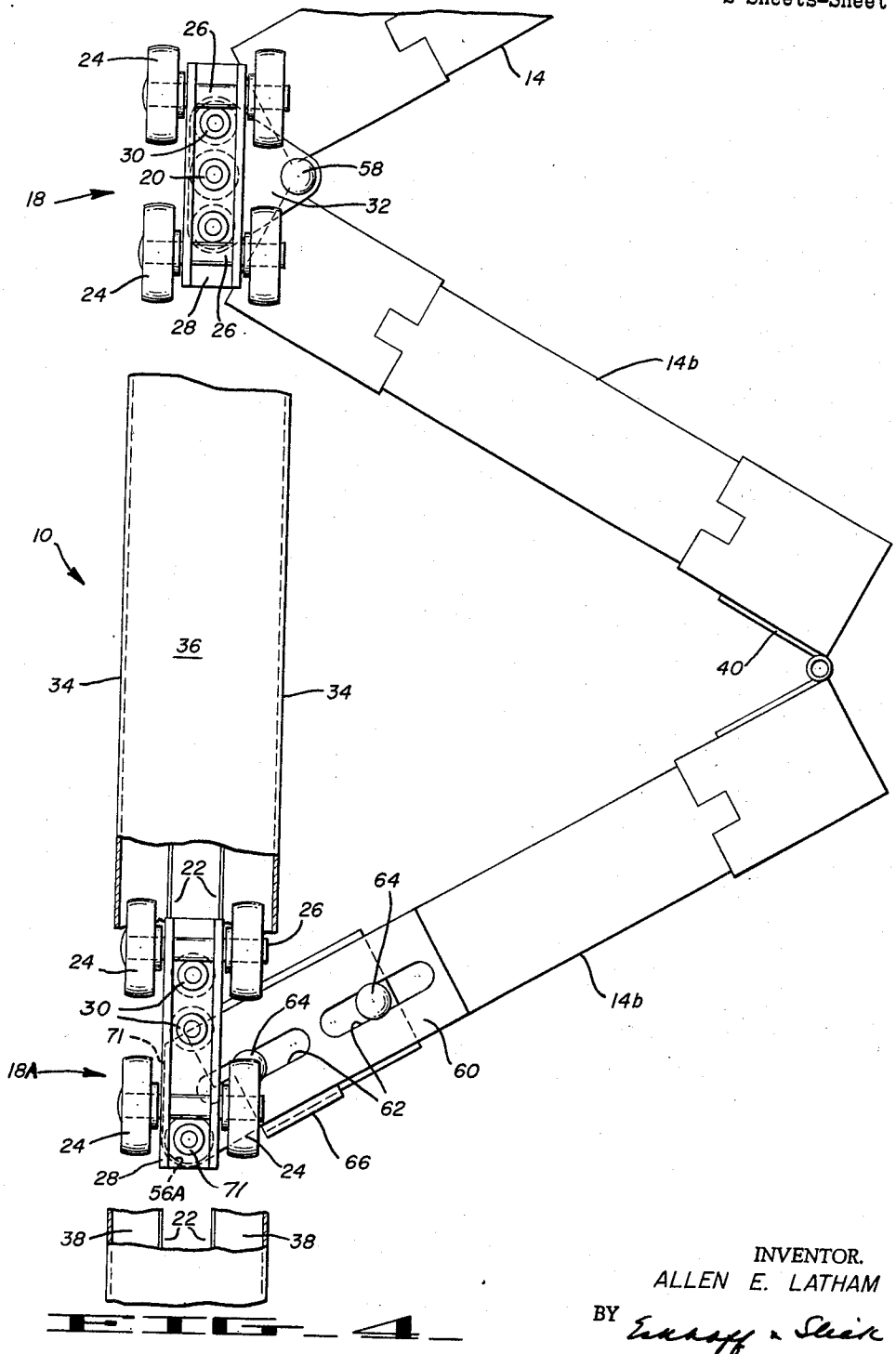



FIG. 4

INVENTOR.
ALLEN E. LATHAM

BY Ernsoff & Sleik

Its ATTORNEYS

United States Patent Office 2,937,398
Patented May 24, 1960



2,937,398

# SHUTTER CARRIER

Allen E. Latham, 650 Camelia, Berkeley, Calif.

Filed Aug. 14, 1958, Ser. No. 755,012

3 Claims. (Cl. 16—95)

This invention relates to shutter constructions and particularly to a novel form of a carrier mechanism which can be employed so that the shutters can be folded to a desired extent to reveal a wall opening.

The present invention is particularly concerned with the construction of the support means provided for several shutter panels. In accordance with this invention, these support means are relatively simple and inexpensive to provide. Further, they permit the panels to be moved readily into any desired position, adequate support being provided throughout the length of the several panels and for the end panel.

It is in general the broad object of the present invention to improve the carrier support mechanism utilized to provide a folding shutter assembly.

Another object of the present invention is to provide a carrier and track which are self-aligning, free-rolling, and non-binding under conditions of use and which provide adequate support for the several shutters.

The invention includes other objects and features of advantage, some of which, together with the foregoing, will appear hereinafter wherein the present preferred form of carrier structure is disclosed. In the drawings accompanying and forming a part hereof,

Figure 1 is a side elevational view of a folding shutter constructed in accordance with the present invention, mounted in position to cover an opening, portions of the structure being broken away to illustrate the construction.

Figure 2 is a side elevation taken through a shutter and showing the construction of a carrier utilized to support a pair of the depending shutters.

Figure 3 is a section taken along the line 3—3 in Figure 2.

Figure 4 is a plan view with portions of the structure broken away to show the carriers in the support track in relation to a shutter.

The folding shutter assembly of the present invention consists essentially of track means **10** which is usually mounted horizontally along one edge of an opening to be shuttered, and a plurality of shutter panels **14** and **14***b* dimensioned to fill the opening when the shutters are in a coplanar edge-to-edge relation, the panels being hinged together at their edges for folding back in the accordion manner shown in Figure 1 so as to leave the opening clear. The panels **14** and **14***b* may be of any material, usually wood, and may be plain, louvered, simulated louvered, adjustable louvered or of any other suitable type. The panels are usually of the same width and height and of a size to cover the opening to be shuttered.

The track means **10** includes an elongated track **16** upon which rides one or more carriers **18** attached to support a pair of panels **14** and a carrier **18***a* for supporting end panel **14***b*. Preferably, and as here shown, the track **16** is of hollow, tubular form and the carriers **18** and **18***a* travel along the interior of the track. A support pin **20** affixed to the carrier projects through a longitudinal slot **22**, formed in the track, for connection to



the panels **14** and **14***b* as will be described. The tubular track substantially encloses the carriers within the track and protects them from dust and from damage by accidental contact with other objects.

The track **16** may be of any suitable material, but is preferably formed of sheet metal which is bent to the U-shaped configuration shown best in Figure 2 of the drawings. A pair of spaced vertical walls **34** are formed integrally with a horizontal wall **36** and with a pair of in-turned flanges **38**, with the confronting edges of the latter being spaced apart to define the longitudinal slot **22**. Preferably, the outer portions of wall **36** and flanges **38** are of an arcuate form to match the convexity of wheels **24**. This causes the wheels to be self-aligning with respect to the length of the track and prevents cocking or binding of a carrier in the track even if some angular force is applied to the carrier.

In accordance with the present invention, carriers **18** and **18***a* are of a free-rolling design, making possible the installation of shutters across very wide openings. As here shown, the carriers are provided with four wheels **24** journaled on spaced parallel axles **26** mounted in a body **28** of channel form. The peripheries of the wheels **24** are somewhat convex to aid in making them self-aligning in the track. Secured to the body **28** on each carrier **18** and **18***a* by means of spacers **35** and rivets **30** is a support plate **32** (Figures 2 and 4). On each carrier **18** this plate is of a triangular form while on carrier **18***a* a flat rectangular plate is employed.

To permit the accordion-like folding action, the panels are hinged at their adjacent edges by vertically spaced hinges **40**, with the hinges being attached to the inner faces of the panels at one edge and to the outer faces at the other edge. The hinges may be of any suitable form such as the simple butterfly hinge shown in the drawings, it being noted that no hinge supports more than the weight of two adjacent panels.

The present shutter assembly is particularly suited for installation on the face of the casing or the face of a wall where the panels can not protrude into the opening when folded. Guide means are provided for controlling the panels so that the panels will not extend inwardly past the inner edge of the track **16**. As here shown, this guide means includes rollers **56** on each carrier **18** engaged in the track slot **22** and secured to the panels **14** at the fold nearest the opening. Preferably, the rollers **56** on carrier **18** are journaled on the support pins **20**, while roller **56***a* on carrier **18***a* is journaled on a similar pin **71** carried at the end of the body of the carrier as is shown in Figure 4, pin **71** being secured to a plate **60** having slots through which pass pins **64** attached to a mounting member **66** secured to the panel **14***b* to permit the carrier to move as panel **14***b* is rotated.

The desired tracking movement is obtained by pivoting the triangular support plates **32** of the carriers **18** to the hinge pins **58** of hinges **40***a* in the manner shown in Figures 1, 2 and 4 of the drawings and by the support of roller **56***a* on the sliding plate **60**. The carriers are thus free to swing relative to each panel. The freedom of movement provided by the described structure of carriers **18** and **18***a* ensures that the panels may be swung open and closed easily and quickly without binding and entering into the opening over which the structure is mounted as a controllable closure.

Installation of the present assembly is simple. The end panels are fixedly hinged to the edge of the opening after the track **16** is installed along the upper edge of the opening, although it is noted that if some unusual case requires, the track may be located at the bottom edge. In the latter case, the parts will be inverted from the position shown in Figure 1 and the wheels **24** will ride on the horizontal wall **36** instead of on the flanges **38**,

Suitable flush pull members **58** are attached to the panels for opening the shutters from their closed position. Each end panel **14***b* is positively supported by a carrier **18***a*, the latter extending inwardly toward the next adjacent carrier **18***a* as is shown in Figure 1 and so the abutting end panels will fit flush with one another.

The present structure is particularly suited for covering very wide openings. For example, an opening 30 inches high and 10 feet wide may be covered by sixteen panels each approximately 7½ inches wide; an approximation only is made because the exact width is, in part, a function of the hinge clearance provided between the several panels. These panels would preferably be arranged eight panels on each side with the inner panels **14***b* abutting each other when the panels are drawn to the center. A suitable lock or latch (not shown) may be provided for holding the panels in this position, if desired.

I claim:

1. In a folding shutter assembly wherein a plurality of shutter panels are dimensioned to fill an opening when such shutters are in co-planar edge to edge relation therein, said panels being hinged together at their confronting edges, the hinges being mounted alternately on the front and rear faces of said panels so as to permit folding back of the panels in an accordion manner, the improvement in the support therefor comprising: a hollow tubular track for mounting above said assembly having a horizontal slot therein, said hollow tubular track having a horizontal top, a pair of laterally spaced vertical walls integral with said horizontal top and a pair of inturned flanges integral with the lower edges of said vertical walls, said flanges defining said slot between their confronting edges, said track having a length sufficient to extend horizontally along said opening to be shuttered; at least two wheeled carriers mounted within said track for rolling movement therein, each of said carriers having wheels mounted on spaced axles, said wheels



being supported by said flanges, one of said wheeled carriers being secured adjacent the free end of the forwardmost panel and the second of said wheeled carriers being secured coaxially with a hinge joining two of said panels, the means for securing the said free end of the forwardmost panel to the first of said wheeled carriers consisting of at least a single pin fixed to the top edge of said forwardmost panel and extending vertically upward therefrom, said pin having a head thereon of greater size than the shank of said pin; a plate having a slot therein running longitudinally of the upper edge of said panel of sufficient width to receive said pin and allow said plate to slide relative to said pin, said slot being of a lesser width than the head of said pin, the length of said plate and the length of the slot in said plate being so proportioned that one end of said plate may be adjusted to a position substantially beyond the vertical lead edge of said forwardmost panel when in a first position and may be adjusted to a second position wherein said end of said plate is about even with the vertical lead edge of said panel; means extending upwardly from a point adjacent said end of said plate closest to the vertical lead edge of the said panel pivotally securing said plate to the second of said wheeled carriers.

2. The structure of claim 1 wherein each carrier has at least two pairs of wheels mounted on spaced axles said wheels being supported by said flanges.

3. The structure of claim 1 wherein the said wheeled carriers mounted on said track have wheels each of a diameter substantially equal to the height of the vertical walls of said track.

**References Cited in the file of this patent**

UNITED STATES PATENTS

| | | |
|---|---|---|
| 867,283 | Mann | Oct. 1, 1907 |
| 1,155,390 | Willard | Oct. 5, 1915 |
| 1,188,482 | Phillips | June 27, 1916 |
| 1,868,233 | Hungerford | July 19, 1932 |