April 15, 1958 H. M. A. DE BORGER 2,830,660

ARTICULATED CLOSURE AND ELEMENT THEREOF

Filed Nov. 6, 1953 2 Sheets-Sheet 1

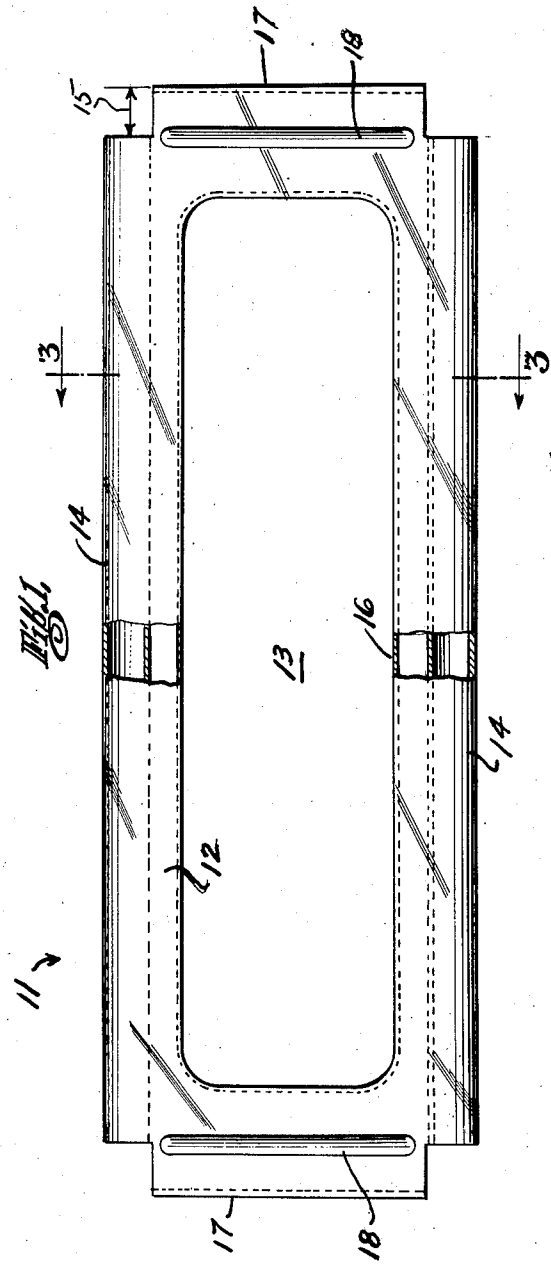


Fig. 1

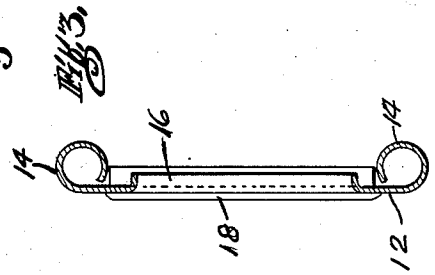


Fig. 3

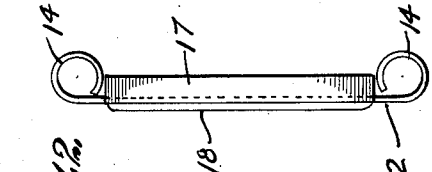


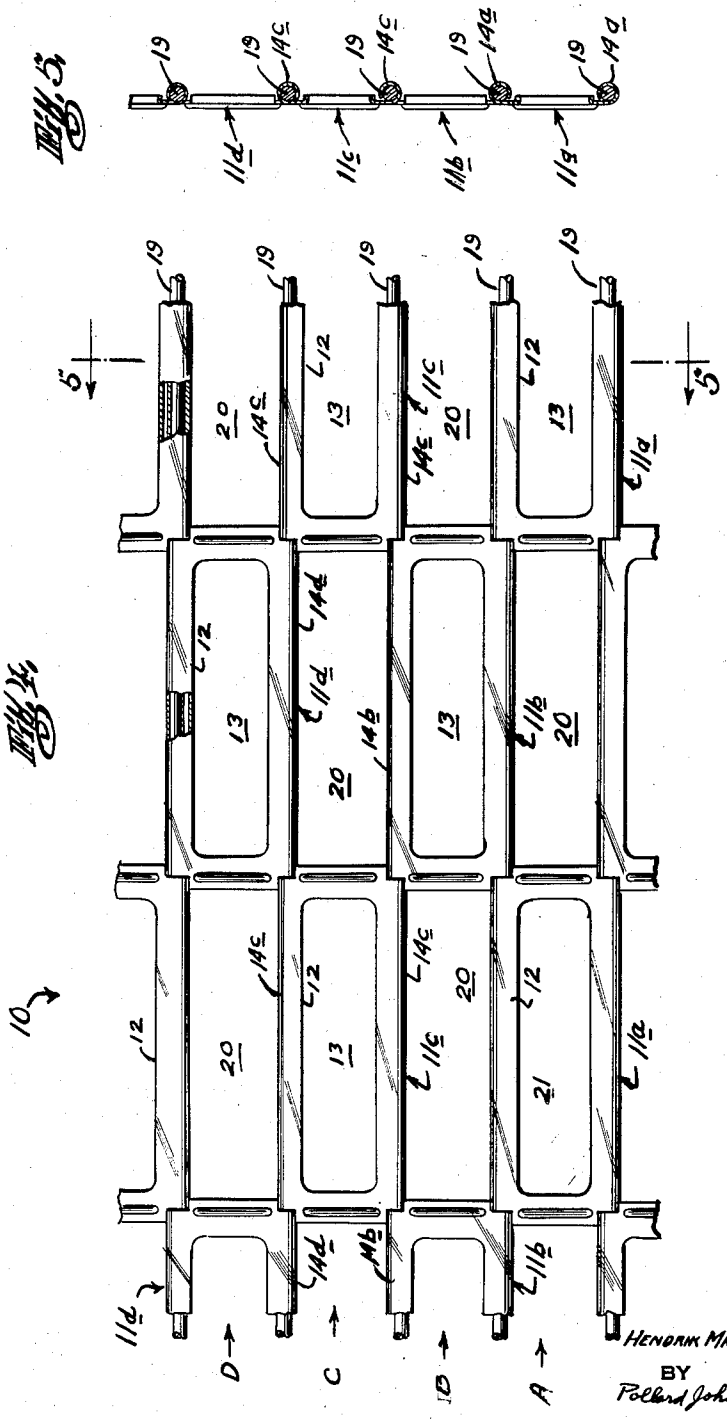
Fig. 2

INVENTOR
HENDRIK MARIA AUGUST DE BORGER
BY
Pollard, Johnston, Smythe & Robertson
ATTORNEYS

April 15, 1958 H. M. A. DE BORGER 2,830,660

ARTICULATED CLOSURE AND ELEMENT THEREOF

Filed Nov. 6, 1953 2 Sheets-Sheet 2



INVENTOR
HENDRIK MARIA AUGUST DE BORGER
BY
Pollard Johnston Smythe & Robertson
ATTORNEYS

United States Patent Office 2,830,660 Patented Apr. 15, 1958

2,830,660

ARTICULATED CLOSURE AND ELEMENT THEREOF

Hendrik Maria August De Borger, Antwerp, Belgium, assignor to Naamloze Vennootschap Voorheen Gebroeders Slaets, Antwerp, Belgium, a corporation of Belgium

Application November 6, 1953, Serial No. 390,686

1 Claim. (Cl. 160—229)

The present invention relates generally to removable closures for preventing access to store fronts, porches, halls, lobbies, doors, windows and other openings in buildings, warehouses and the like, and is particularly directed to an improved articulated grille which can be rolled for storage and to an element of which the grille is formed.

Heretofore, rolling doors, shutters, curtains and the like have been provided for the above mentioned purposes, but such constructions have been relatively complex and expensive to produce and assemble. These existing constructions usually include elongated elements which are hingedly connected together along their longitudinal edges and extend continuously across the entire door, shutter or curtain. Thus, the elements assembled together to form the rolling structure must be cut to the length required by each installation and these elements cannot be standardized and mass produced to take advantage of the economies thereby achieved. While the elements embodied in rolling structures of the above described character may have transparent windows provided in limited areas thereof, such windows are not adequate when the rolling structure is to be mounted in front of a store front or window where it is desirable to provide a substantially unobstructed view of the displayed merchandise. Although rolling grilles are available for association with store fronts, shop windows, entrances to buildings and the like, these existing grilles are generally formed of elongated bars, which may be straight or ornamentally bent or twisted, extending completely across the grille and hingedly connected together in spaced apart relationship by additional solid hinge elements which are in turn spaced across the grille so that openings are formed between adjacent bars and the successive hinge elements connecting the latter. However, these rolling grilles are also relatively expensive to produce and install in that the elongated bars or rods, which form the major part of the structure, must be fitted to the particular installation.

Accordingly, an object of the present invention is to provide a rolling grille construction formed of standardized elements, wherein the elements embody hinge members, as integral parts thereof, for hingedly connecting rows of the elements to define an open, mesh-like closure.

Another object is to provide a rolling grille construction formed of standardized elements which can be conveniently assembled to define a mesh-like closure of the desired height and width.

In accordance with the present invention, the foregoing, and other objects, features and advantages thereof appearing in the following detailed description of an illustrative embodiment, are achieved by providing a rolling grille of standardized elements, wherein each element is in the form of a rectangular, open frame having hinge barrels along the longitudinal outer edges thereof so that, when elements are arranged in spaced apart and staggered or alternating relationship in successive laterally extending rows and hinge pins are passed through the hinge barrels of the elements in adjacent rows, a mesh-like structure is formed having openings defined by the open frames of the elements and by the spaces between the elements in each row.

In order that the present invention may be fully understood, an illustrative embodiment thereof is hereinafter described in detail, merely by way of example, and shown in the accompanying drawings forming a part hereof and wherein:

Fig. 1 is an elevational view, partly broken away and in section, of an element embodying the present invention for incorporation in a rolling grille;

Fig. 2 is an end view of the element of Fig. 1;

Fig. 3 is a transverse sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is an elevational view of a rolling grille made up, in part, of elements of the kind illustrated in Figs. 1, 2 and 3; and

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 4.

Referring to the drawings in detail, and initially to Figs. 4 and 5 thereof, a grille embodying the present invention is there illustrated and generally identified by the reference numeral **10**. Grille **10** is formed of standardized elements or links, hereinafter described in detail, which are hingedly connected in rows to provide an articulated structure adapted for rolling to facilitate storage of the grille.

In the portion of grille **10** illustrated in Fig. 4, parallel rows A, B, C and D of standardized elements or links **11***a*, **11***b*, **11***c* and **11***d*, respectively, are shown, with the elements or links in each row being longitudinally spaced apart and staggered with respect to the elements or links in the adjacent rows. Thus, by way of example, elements or links **11***c* of row C are staggered longitudinally with respect to the elements or links **11***b* and **11***d* in rows B and D, respectively. While Fig. 4 shows only a portion of grille **10**, it is to be understood that the latter can be made up of any number of parallel rows of elements or links in addition to rows A, B, C and D to provide a grille of the desired height, and that the numbers of elements or links included in each row can be varied to provide a grille of the desired lateral dimension or width.

Figs. 1, 2 and 3 show the details of construction of a preferred form of link or element, generally identified by reference numeral **11**, for inclusion in an articulated grille of the kind illustrated in Figs. 4 and 5. Element **11** includes a rectangular frame **12** which is cut-out to define a relatively large rectangular opening **13**. Open-ended tubes **14** are provided along the opposite relatively long outer edges of frame **12**, and the opposite ends of tubes **14** are spaced from the related ends, or short sides, of the frame, as indicated at **15**.

Preferably, each element **11** is stamped or otherwise formed from sheet metal so that the open-ended tubes **14** can be rolled as integral extensions of the long sides of frame **12**, and the inner edge of the frame defining opening **13** and the opposite end edges are bent to provide stiffening flanges, as at **16** and **17**, repectively. Further rigidity is imparted to frame **12**, particularly at the ends of open-ended tubes **14**, by laterally extending beads **18**. In order to form an articulated grille from elements **11**, the necessary number of rows of such elements are arranged in the manner shown in Figs. 4 and 5 and previously described herein, so that the open-ended tubes **14** of the elements in each row are interposed between, and in end abutting relationship with, the opend-ended tubes of the elements in the rows adjacent thereto. For example, tubes **14***c* of elements **11***a* in row C are interposed between, and in end abutting relationship with, the tubes **14***b* and **14***d* of the elements **11***b* and **11***d* in the adjacent rows B and D, respectively. Elongated rods **19** extend

between the successive rows of elements **11** and through the tubes **14** of the latter to form hinge pins for hingedly connecting the elements in each of the rows to the elements in the rows adjacent thereto so that the grille **10** can be rolled about an axis parallel to the rods or hinge pins **19**.

When the several elements **11** are arranged and connected together by rods **19** in the manner herein described, the frames **12** of the standardized elements or links form a reticulated mesh having openings **13** defined by the frames and openings **20** defined by the spaces between the elements or links in each of the rows. Thus, the grille **10** can conveniently be employed to protect store fronts, show windows and the like while affording a substantially unobstructed view of objects in back of the grille, for example, of merchandise displayed in a show window.

Since the tubes **14** of the standardized elements or links **11** terminate short of the opposite ends of the related frame **12**, the short sides of the rectangular frames in each row are substantially aligned with the short sides of the frames in the rows adjacent thereto so that the reticulated mesh formed by the assembled elements or links has substantially straight intersecting lines parallel and transverse to the direction of the rows to present a neat and attractive appearance. Further, since the elements **11** are symmetrical about both their major and minor axes, such elements can be assembled together without regard to the orientation of the individual elements to facilitate the task of assembly and installation. It will also be noted that the rods **19**, which are cut to the desired length, are completely enclosed within the open-ended tubes **14** of the hingedly connected elements so that only the latter are visible in the completed grille, and the elements **11**, being identical, can be conveniently mass produced and pre-finished to provide an attractive assembly while obtaining the economies inherent in standardization and mass production. In connection with the mass production of elements **11**, such elements can be formed of sheet metal, as previously described, or molded from a suitably rigid plastic. The grille embodying the present invention provides an additional saving in material and production cost by reason of the staggered relationship of the elements in the successive rows which provides the desired reticulated mesh while employing spaced apart elements in each row, as distinguished from the end-to-end arranged, and hence more numerous, elements used in certain existing articulated shutters and the like.

While the several frames included in grille **10** can be left open, a pane of transparent material, for example, of methyl methacrylate or some other suitable plastic, may be fixed in the opening **13** of each frame, as is the pane **21** in the frame of element **11***a* at the left-hand end of row A on Fig. 4. Preferably, such a pane of transparent material is tinted or otherwise treated to act as a filter of the sun's rays, particularly to screen out the ultraviolet and infra-red rays, so that a grille embodying such filtering panes will protect goods displayed in a

show-case or store window therebehind from damage, such as, fading, commonly resulting from exposure to the sun's rays .

While a particular embodiment of the invention has been described in detail herein and illustrated in the accompanying drawings, it is to be understood that the invention is not limited to that precise embodiment and that various changes and modifications may be effected therein without departing from the spirit or scope of the invention as defined in the appended claim.

What is claimed is:

A rolling grille comprising a plurality of parallel rows of longitudinally spaced apart identical one-piece elements having a substantially flat front plane surface, each of said elements including a rectangular open frame having an integral open-ended tube extending from each of the relatively long sides thereof entirely rearwardly of said front plane surface and terminating a relatively small distance short of the opposite ends of said frame to provide end flanges extending along the relatively short sides of said frame, said end flanges extending rearwardly from said front plane surface and generally perpendicular thereto, the elements in each of said rows having the long sides thereof extending in the direction of the row and being longitudinally spaced from each other a distance equal to the length of a tube, the elements in each of said rows being longitudinally staggered with respect to the elements in the adjacent rows so that the tubes of the elements in each row are interposed between, and in end abutting relationship with, the tubes of the elements in the adjacent rows, and hinge pins extending between the successive rows through said abutting tubes and hingedly connecting the elements in each row to the elements in adjacent rows to provide a mesh-like network having a substantially flat front plane surface and in which said long and short sides of said frames of the elements in each row are substantially aligned with the long and short sides, respectively, of the frames of elements in said adjacent rows, and said hinge pins are completely enclosed by said tubes.

References Cited in the file of this patent

UNITED STATES PATENTS

1,437,947	Probert	Dec. 5, 1922
2,505,509	Varela	Apr. 25, 1950
2,563,549	Poggi	Aug. 7, 1951
2,621,726	Greegor	Dec. 16, 1952

FOREIGN PATENTS

16,540 of 1928	Australia	Apr. 17, 1929
643,191	Germany	Feb. 2, 1932
294,916	Italy	Apr. 8, 1932
407,482	Great Britain	Mar. 22, 1934
529,424	Great Britain	Nov. 20, 1940
471,774	Italy	Mar. 24, 1952
515,535	Belgium	Aug. 20, 1954