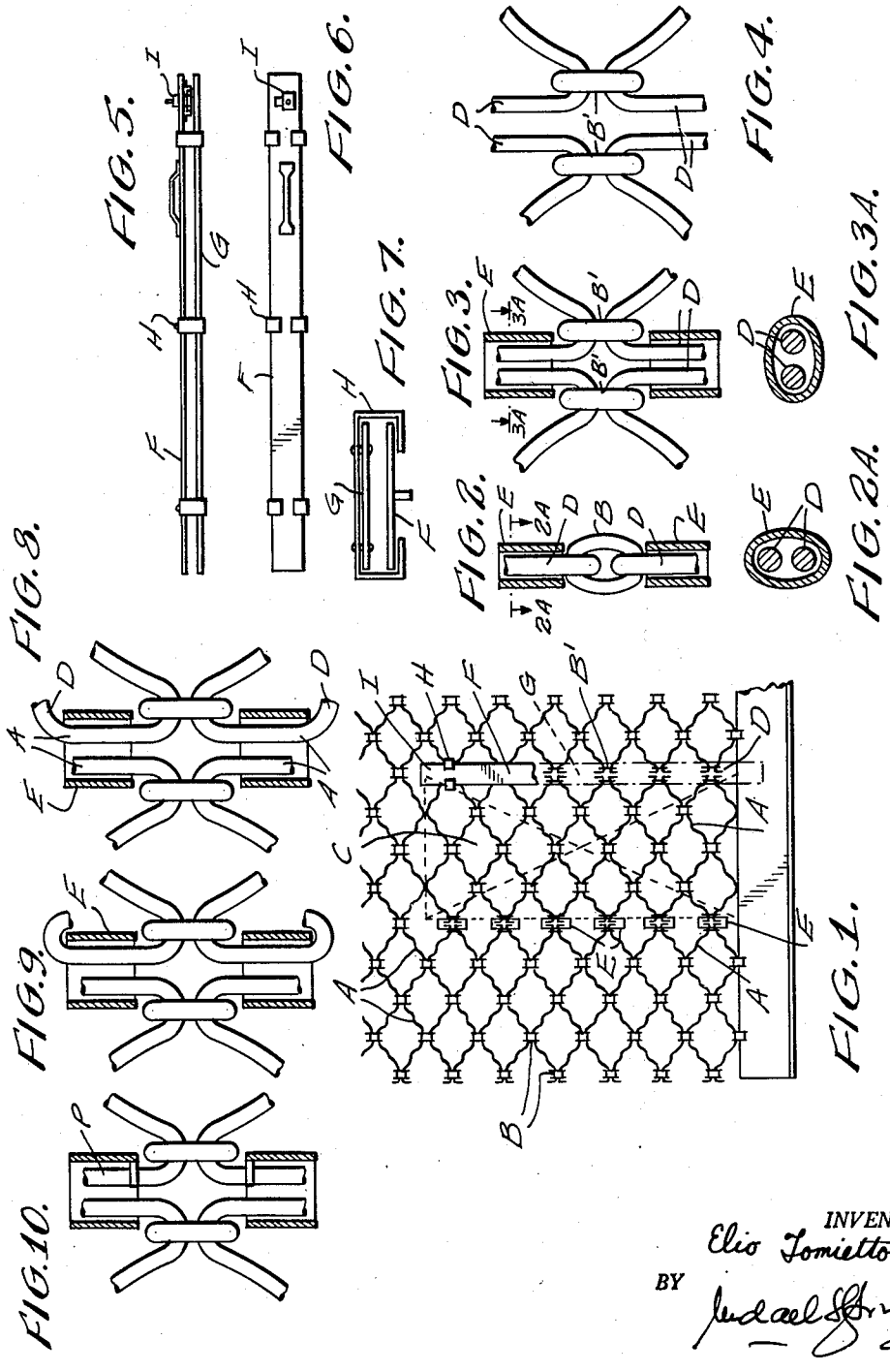
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ROLLING CURTAIN

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ROLLING CURTAIN

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The present invention refers to improvements in or relating to rolling curtains of the kind comprising an emergency door. Rolling curtains consisting of a network of metal rods are known in which each rod extends in a substantially horizontal zig-zag line and is joined at its upper and lower vertexes to the vertexes of each adjacent rod by means of tubular links permitting a free pivotal movement of each rod about the horizontal axis of said tubular link so that the rolling curtain may be wound up on a drum provided at the upper end of the same. Since curtains of this kind are mainly used at the entrances, show cases, windows, and the like, of shops, it is advisable to provide the same with an emergency door or gate allowing a person to enter or leave the shop even though the curtain be down. Up to now these emergency doors were inserted in an opening of the curtain and angle irons or V-shaped bars were employed to form the joint between the lateral sides of the opening and the door, the latter being hinged to these bars or irons so as to allow it to be opened or closed.

Obviously, the use of these V-shaped bars or angle irons renders impossible the winding up of the curtain, because of the rigidity of these bars, so that the curtain can be lifted only up to a given height. Moreover, the use of these bars increases considerably the weight and the cost of the curtain. Further the assembly of the door and curtain requires a considerable amount of work in order that the joint be inviolable which, of course, is an important factor in connection with these curtains which constitute safety devices.

One object of the present invention is to provide an emergency door for curtains of the kind specified which can be wound up together with the curtain. Another object is to bring about this result without adversely affecting the security of the curtain, to decrease at the same time the weight and expense, and to simplify the work involved in assembling the various parts.

In order to achieve these and other objects, which will be apparent from the detailed description given below, according to the present invention, the ends of the zig-zag shaped rods at the sides of the opening in the curtain and the ends of the zig zag shaped rods at the lateral side of the door are bent in such way that they extend in a vertical direction. Adjacent horizontal sections are joined together by means of tubular or annular members that allow a free

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pivotal movement of the rods on a horizontal axis while the bent vertical ends of the rods of the curtain are joined to the bent vertical ends of the rods of the door, at one lateral side of the door, by means of annular members that allow a pivotal movement of the door about a vertical axis.

Further features of the invention will become apparent from the following detailed description thereof, in which reference will be made to the accompanying drawings which show a preferred manner of carrying the invention into practice, and in which:

Figure 1 is a front view of a portion of the curtain with the emergency door provided therein;

Figure 2 is a transversal cross sectional view of one of the joints by which the door is connected to the network of the curtain;

Fig. 2*a* is a horizontal cross-sectional view taken on line 2*a*—2*a* of Fig. 2;

Fig. 3 is a longitudinal cross-section of the joint shown in Fig. 2;

Fig. 3*a* is a horizontal cross-sectional view taken on line 3*a*—3*a* of Fig. 3;

Figure 4 is a longitudinal cross section of one of the joints at the opposite lateral side of the door;

Fig. 5 is a side elevation of a preferred lock for the emergency door or gate;

Fig. 6 is a front view of the lock shown in Fig. 5;

Fig. 7 is a side view of the lock shown in Fig. 5;

Figs. 8, 9, 10 are longitudinal cross-sectional views of three different embodiments of the joints hinging the curtain to the door.

Throughout the several figures the same reference characters have been employed in order to designate equal or corresponding parts of the assembly, as shown.

With reference to Figure 1, it will be seen that the curtain and door assembly comprises a curtain made from horizontally arranged metal rods A each of which defines a horizontal zig-zag line. Each rod A is connected to the adjacent rods at the upper and lower vertices of the zig-zag line by means of a tubular link B which permits relative pivotal movement of adjacent rods about the horizontal axis of said tubular link B so that the whole curtain may be wound up on a drum or the like arranged at the upper end of the curtain.

The emergency door C consists of a similar net of horizontal rods A joined in a similar way by means of tubular members B.

The curtain is formed with an opening having the shape and size of a door C. The ends of the horizontal rods A are bent at the two lateral sides of the opening to form substantially vertical extensions D. Each of these ends is connected to the end of an adjacent rod A by means of the ring-shaped link members B' which, in a similar way as the links B, allow each of the rods to pivot about an horizontal axis, whereby the curtain may be wound up.

The ends of the rods A constituting the network of the door are in a similar way joined by means of the link members B'.

At one of the lateral sides of the door, namely at the left hand side of Figure 1, additional link members E have been arranged to connect the door to the ends of the rods confining the aperture. These annular link members E (see Figures 2, 3, 8, 9 and 10) encircle the vertical extensions D so that they allow the door to turn or pivot about a vertical axis, whereby the door can be opened or closed.

The annular link members E are connected to the vertical vertex portions D, as shown in Figs. 8, 9 and 10.

In the first of these embodiments, one or more of the ends D of bars A are bent back beyond their strictly vertical position whereby the sleeves or annular members E are definitely retained in their position to support the door. In practice, the sleeves or annular members E are first put on the ends D and thereafter these are bent back to lock members E in their position.

In the second embodiment, one or more of the extensions D are substantially vertical, but their outer ends are bent back at almost 180° so as to form hook-like ends whereby the members E are locked in their position.

In the third embodiment, annular members E are welded to one of the extensions D, preferably to the one belonging to the door, so that they can freely swing around the other one.

At the opposite lateral side the members E are missing but a locking element has been provided which is shown clearly and in detail in Figures 5 to 7. This element comprises two bars F, G, of rectangular cross section fixed to the door and to the network of the curtain by means of clamps H. There is further a bolt, latch or similar member I which allows one of the bars to be secured to the other one in which position they may be locked together by a key.

With regard to Figures 5 to 7 it will be appreciated that bars F and G are removably fixed together, with the corresponding part of the network between them, by means of clamp H (Figure 7), that is, the network adjacent to the borderline between door and curtain is in the space between F and G. Bar F is provided with a handle H and bar G comprises (Figure 5) a latch receiving member into which the latch is inserted when it is desired to lock the door with a key.

It will be evident that the use of the linking rings or sleeves B' and E at one of the lateral sides of the door provides a hinge-like joint (in which the members E provide the axis about which the door may pivot or turn) which, however, does not hinder in any way the winding up of the door in conjunction with the curtain.

In order to lift the curtain it is sufficient to remove the bars G and F, which are the only rigid parts that would obstruct the winding up of the curtain so that after the removal of the same the desired operation may be carried out

without any inconvenience, since the hinges formed by the links E do not hamper the same in any way.

It will be evident that several modifications may be introduced in the embodiment shown and described, without departing from the basic idea of the invention. Thus, for instance, it will be possible to bend back the outer ends of the extensions D at angles of up to 180° so that the annular members E be confined by the thus formed hook-like ends. If desired, in addition to this, the members E may be welded in order to fix them solidly to their respective rods. Instead of the bars represented in the drawing any other locking means may be employed, such as for instance a simple latch which will be horizontally arranged so as to be no obstacle to the operation of winding up the curtain, or a chain and a padlock may be simply used.

All these variations and others that will be obvious to those familiar with the art are desired to be included within the scope of the annexed claims which, therefore, should be interpreted and construed accordingly.

What I claim is:

1. A double axis hinge arrangement for hingedly attaching to each other four portions of a flat partition having four corners meeting in a common pivoting point turnably selectively about a first and a second axis intersecting each other at a right angle at said common pivoting point, said double axis hinge arrangement including four hook-shaped members, each secured to a different one of said four portions of said flat partition so that the vertices of said hook-shaped members face each other and the free ends of said hook-shaped members form two pairs of parallel end portions extending parallel to said first axis; two first pivoting means, each turnably pivoting the end portions of a different one of said pairs of parallel end portions to each other turnably about said first axis; and two second pivoting means each turnably pivoting the vertices of a different hook-shaped member to the vertex of the corresponding hook-shaped member located on the other side of said second axis of turning.

2. A rectangular rolling curtain, comprising in combination, a rectangular top portion; a first rectangular elongated lateral portion located at one side of the curtain extending downwardly from the lower edge of said top portion; a second rectangular elongated lateral portion located at the other side of the curtain extending downwardly from the lower edge of said top portion, parallel to said first rectangular lateral portion spaced therefrom and defining with the same and with said top portion a rectangular elongated door opening in the rolling curtain; a rectangular elongated door portion having a perimeter fitting into said door opening, each of said portions of the rolling curtain being composed of a plurality of substantially horizontally extending zig-zag shaped rods, each of said zig-zag shaped rods including a plurality of equally spaced vertex portions, the vertex portions of two adjacent zig-zag shaped rods being located adjacent to each other, the intermediate vertex portions of said zig-zag shaped rods extending in a substantially horizontal direction, and the end vertex portions of said zig-zag shaped rods being bent away from the adjacent end vertex portion of the adjacent zig-zag shaped rods and composed of a bent portion and a substantially vertical por-

tion; a plurality of horizontally extending tubular members having a length slightly shorter than the length of said intermediate horizontal vertex portions, each of said horizontally extending tubular members encircling two adjacent intermediate horizontal vertex portions of two adjacent zig-zag shaped rods of each of said portions, and of the lowermost zig-zag shaped rod of said top portion and of the uppermost zig-zag shaped rods of said lateral portions and hingedly connecting the same so as to permit rolling of the curtain about a horizontal axis; a plurality of ring members having substantially horizontal axes, each of said ring members encircling the adjacent bent portions of two adjacent end vertex portions of two adjacent zig-zag rods and hingedly connecting the same; a plurality of annular members having substantially vertical axes hingedly connecting one of said lateral portions to said door portion, each of said annular members encircling the adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portion located on the same level as said one zig-zag rod of said lateral portion so that said door portion may be turned about a vertical axis passing through said vertically extending annular members; and means retaining each of said annular members on one end vertex portion.

3. A rectangular rolling curtain, comprising in combination, a rectangular top portion; a first rectangular elongated lateral portion located at one side of the curtain extending downwardly from the lower edge of said top portion; a second rectangular elongated lateral portion located at the other side of the curtain extending downwardly from the lower edge of said top portion, parallel to said first rectangular lateral portion spaced therefrom and defining with the same and with said top portion a rectangular elongated door opening in the rolling curtain; a rectangular elongated door portion having a perimeter fitting into said door opening, each of said portions of the rolling curtain being composed of a plurality of substantially horizontally extending zig-zag shaped rods, each of said zig-zag shaped rods including a plurality of equally spaced vertex portions, the vertex portions of two adjacent zig-zag shaped rods being located adjacent to each other, the intermediate vertex portions of said zig-zag shaped rods extending in a substantially horizontal direction, and the end vertex portions of said zig-zag shaped rods being bent away from the adjacent end vertex portion of the adjacent zig-zag shaped rods and composed of a bent portion and a substantially vertical portion; a plurality of horizontally extending tubular members having a length slightly shorter than the length of said intermediate horizontal vertex portions, each of said horizontally extending tubular members encircling two adjacent intermediate horizontal vertex portions of two adjacent zig-zag shaped rods of each of said portions, and of the lowermost zig-zag shaped rods of said top portion and of the uppermost zig-zag shaped rods of said lateral portions and hingedly connecting the same so as to permit rolling of the curtain about a horizontal axis; a plurality of ring members having substantially horizontal axes, each of said ring members encircling the adjacent bent portions of two adjacent end vertex portions of two adjacent zig-zag rods and hingedly connecting the same; a plurality of annular members having substantially vertical axes hingedly connecting one of said lateral portions to said door portion, each of said annular members encircling the adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portion located on the same level as said one zig-zag rod of said lateral portion so that said door portion may be turned about a vertical axis passing through said vertically extending annular members; means retaining each of said annular members on one end vertex portion; and closure means for disengageably connecting the other of said lateral portions to said door portion so as to permit locking of the door.

4. A rectangular rolling curtain, comprising in combination, a rectangular top portion; a first rectangular elongated lateral portion located at one side of the curtain extending downwardly from the lower edge of said top portion; a second rectangular elongated lateral portion located at the other side of the curtain extending downwardly from the lower edge of said top portion parallel to said first rectangular lateral portion spaced therefrom and defining with the same and with said top portion a rectangular door opening in the rolling curtain; a rectangular elongated door portion having a perimeter fitting into said door opening, each of said portions of the rolling curtain being composed of a plurality of substantially horizontally extending zig-zag shaped rods, each of said zig-zag shaped rods including a plurality of equally spaced vertex portions, the vertex portions of two adjacent zig-zag shaped rods being located adjacent to each other, the intermediate vertex portions of said zig-zag shaped rods extending in a substantially horizontal direction, and the end vertex portions of said zig-zag shaped rods being bent away from the adjacent end vertex portion of the adjacent zig-zag shaped rods and composed of a bent portion and a substantially vertical portion; a plurality of horizontally extending tubular members having a length slightly shorter than the length of said intermediate horizontal vertex portions, each of said horizontally extending tubular members encircling two adjacent intermediate horizontal vertex portions of two adjacent zig-zag shaped rods of each of said portions, and of the lowermost zig-zag shaped rods of said top portion and of the uppermost zig-zag shaped rods of said lateral portions and hingedly connecting the same so as to permit rolling of the curtain about a horizontal axis; a plurality of ring members having substantially horizontal axes, each of said ring members encircling the adjacent bent portions of two adjacent end vertex portions of two adjacent zig-zag rods and hingedly connecting the same; a plurality of annular members having substantially vertical axes hingedly connecting one of said lateral portions to said door portion, each of said annular members encircling the adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portion lcated on the same level as said one zig-zag rod of said lateral portion so that said door portion may be turned about a vertical axis passing through said vertically extending annular members; means retaining each of said annular members on one end vertex portion; two substantially vertically extending bars disposed at the front and at the rear of said curtain and extending over the adjacent edges of the

other lateral portions and said door portion; and locking means for releasably securing said bars to each other and to the curtain for locking said door portion to said other lateral portion.

5. A rolling curtain as defined in claim 2 wherein each of said annular members is retained by a hook-shaped end portion of one of said adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portin lcated on the same level.

6. A rolling curtain as defined in claim 2 wherein each of said annular members is rigidly secured to one of said adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portion located on the same level.

7. A rolling curtain as defined in claim 2 wherein each of said annular members is rigidly

secured by a soldering connection to one of said adjacent vertical portions of the end vertex portions of one zig-zag rod of said one lateral portion and of one zig-zag rod of said door portion located on the same level.

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