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Sivin

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[54] **OVERHEAD GRILLE**

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[52] **U.S. Cl.** **160/133,** 160/192, 160/310

[51] **Int. Cl.** **E06b 9/08**

[58] **Field of Search** ..... 160/133, 141, 194, 160/152, 243, 257, 283, 286, 192, 310; 49/139, 379; 185/40 R; 74/625

[56] **References Cited**

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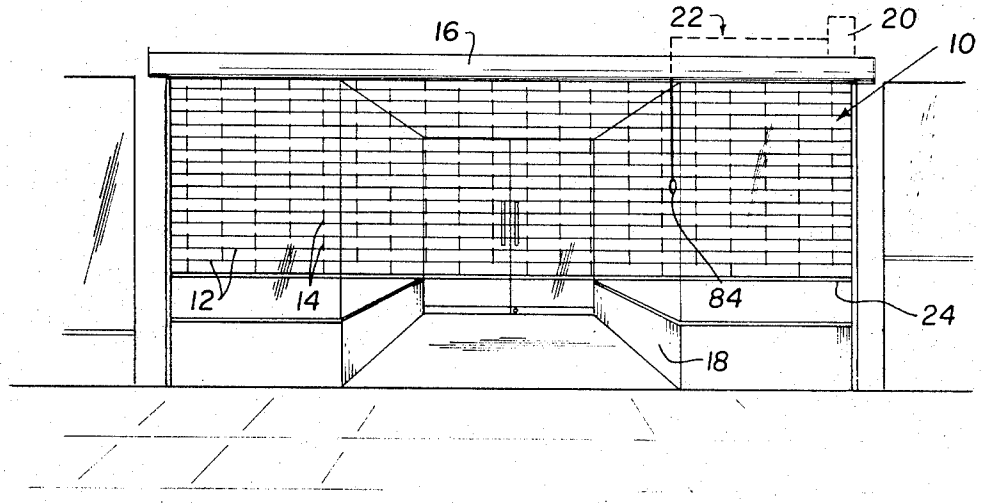
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Assistant Examiner—Conrad L. Berman
Attorney—Bauer & Amer

[57] **ABSTRACT**

A motor operated overhead grille in which the motor, when powering the grille in descent, also loads a spring of an emergency grille-opening means which spring, when called upon to do so, is thus effective in raising the grille sufficiently to provide an emergency escape or exit opening beneath the grille.

3 Claims, 6 Drawing Figures



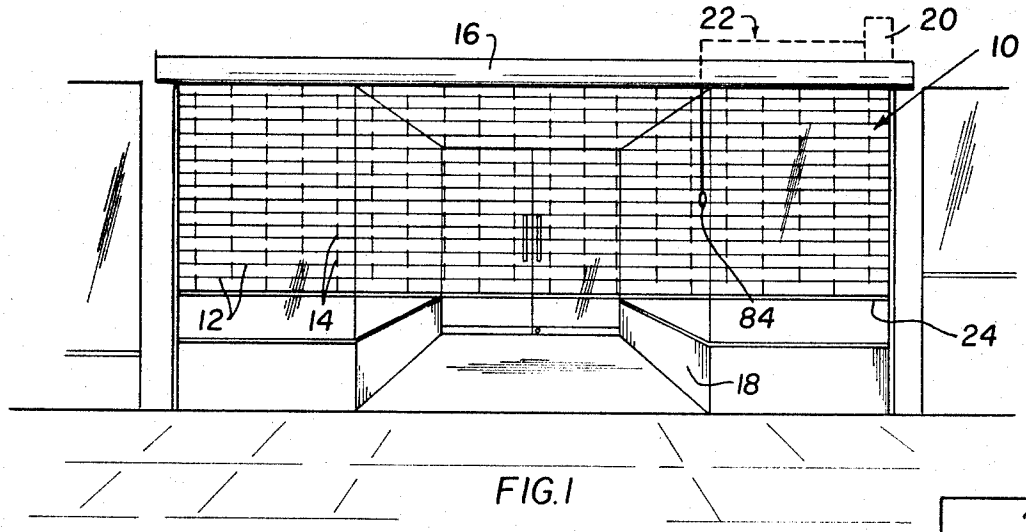


FIG. 1

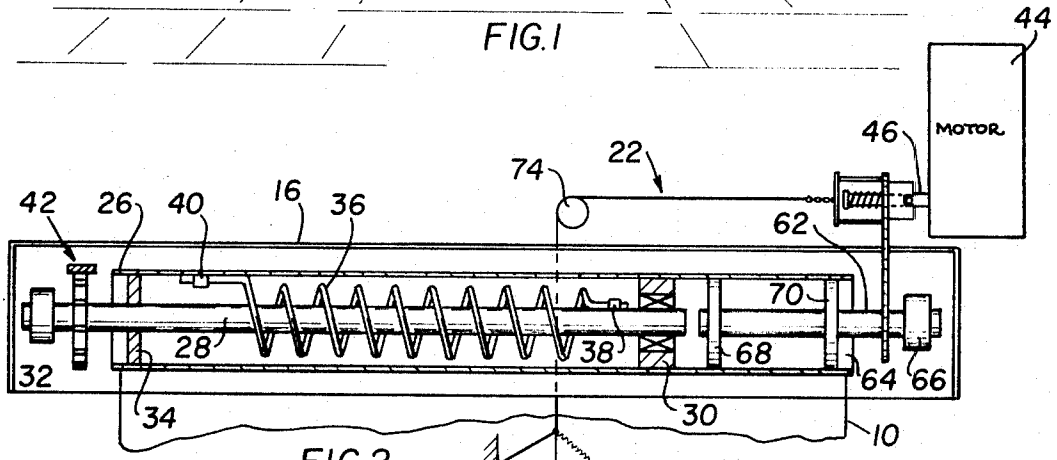


FIG. 2

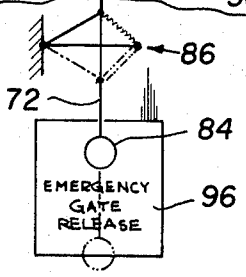
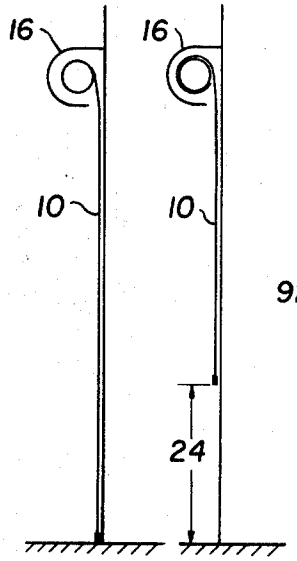


FIG. 3a FIG. 3b



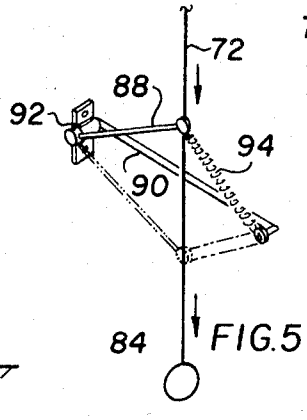


FIG. 5

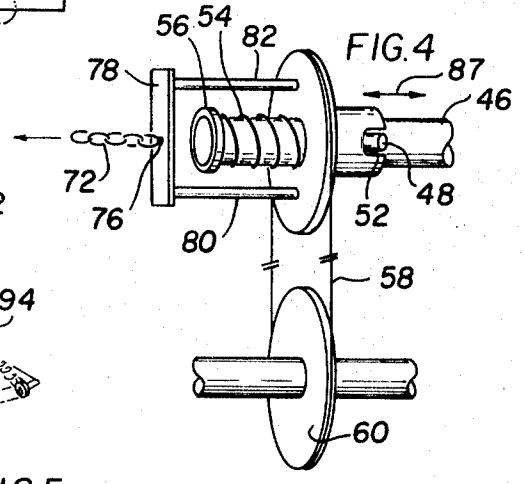


FIG. 4

OVERHEAD GRILLE

The present invention relates generally to an improved overhead grille, and more particularly an overhead grille capable of emergency ascending movement from its closed position so as to provide an emergency or exit opening beneath its lower edge.

In accordance with typical lock-up or closing procedures, a storekeeper will usually lower his overhead grille into its fully closed position in front of his store front at store closing time in order to prevent additional customers from entering the store. At the time of said closing, however, there may still be some customers within the store who have to be let out by the proprietor, sometimes even one at a time. The foregoing represents a dangerous situation since, when the grille is in its fully closed position across the store front and individuals are still within the store, in the event of a fire occuring at that time, the closed grille will prevent the escape of these individuals from the store. There is no provision for avoiding this dangerous situation with any known overhead grille except by causing ascending movement of the same by initiating operation of the powering motor. This might not be possible, however, because of a power failure caused by the fire.

Broadly, it is an object of the present invention to provide an overhead grille with an emergency opening capability to thereby overcome the foregoing and other shortcomings of the prior art. Specifically, it is an object to incorporate as part of the grille a means for automatically causing lifting movement therein merely upon the actuation of an emergency switch or other such control, thereby providing an emergency escape opening beneath the grille without the need to commence operation of the grille motor operator.

An overhead grille demonstrating objects and advantages of the present invention employs the motor that powers the grille through opening and closing movements to also load a spring capable of opening the grille, and includes an emergency disconnect of the motor drive connection to the grille which disconnect, when operated, releases the energy or urgency of the loaded spring so as to cause emergency opening movement in the grille.

The above brief description, as well as further objects, features and advantages of the present invention, will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment in accordance with the present invention when taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a front elevational view of an overhead grille in a partially open position providing an escape opening thereunder;

FIG. **2** is a partial front elevational view, in section, illustrating details of the overhead support for the grille and the manner of raising the grille to provide said emergency escape opening;

FIGS. *3a* and *3b* are simplified elevational views respectively showing the grille in its closed position and in its slightly raised position providing said emergency escape opening;

FIG. **4** is a partial perspective view illustrating details of the motor drive connection for the grille and of the manner of disconnecting the same incident to providing said emergency escape opening; and

FIG. **5** is a perspective view illustrating structural details of a toggle switch which is advantageously utilized in an emergency grille-opening means according to the present invention.

Reference is now made to the drawings and in particular to FIG. **1** wherein there is shown an overhead grille, generally designated **10**, demonstrating objects and advantages of the present invention. As generally understood, an overhead grille consists of a series of horizontally oriented tubes, or the like, individually and connectively designated **12**, which are joined together by strategically spaced links **14**. As further generally understood, grille **10** is helically wrapped about a horizontally oriented support within an overhead structure **16** above a store front **18** and is typically powered by a motor **20** through opening and closing movements relative to the store front **18**.

In accordance with normal or typical lock-up or closing procedures, a storekeeper will lower the grille **10** into its fully closed position in front of the store front **18** at store closing time in order to prevent additional customers from entering the store. At the time of said closing, however, there may still be some customers within the store who have to be let out by the proprietor, sometimes even one at a time. It has been recognized that a dangerous situation exists when the grille **10** is in its fully closed position across the store front **18** and individuals are still within the store, since in the event of a fire occuring at that time the closed grille **10** will prevent the escape of these individuals from the store. Thus, in accordance with the present invention, an emergency grille-opening means, generally designated **22**, is included as an operative part of the overhead grille **10**, said means **22**, when operated, resulting in the grille **10** automatically partaking of ascending movement to the extent illustrated in FIG. **1** which provides an emergency escape or exit opening **24** between the grille lower edge and ground level. That is, grille **10** moves from its completely closed position, as illustrated in FIG. *3a*, into a slightly raised position, as illustrated in FIG. *3b*, in which there is sufficient clearance **24** beneath the lower edge of the grille **10** for an adult to duck under the grille during an emergency escape, should it be necessary to do so.

An exemplary way of incorporating in the mode of operation of the grille **10** provision for providing the emergency opening **24** thereof is illustrated in FIGS. **2**, **4** and **5** to which reference is now made. Within the overhead structure **16** is a cylindrical member **26** which serves as a support for the grille **10** which is helically wrapped about the support **26**. At one end extending within the interior of the support **26** is a shaft **28** rotatably disposed through bearings **30** and **32** and an end closure member **34**, so that the shaft **28** can and does rotate relative to the support **26**. A helical spring **36** is disposed along the shaft **28** and has one end **30** affixed to the shaft **28** and its opposite end **40** appropriately fixed to the interior of the support **26**. As a consequence, shaft **28** can be rotated in a clockwise direction, as viewed from the left in FIG. **2**, for example, and thus cause a corresponding increase in the bias or urgency in the spring **36** which tends to produce rotation in the support **26** in a counterclockwise direction. This direction of rotation of support **26** will be understood to result in wind-up of the grille **10** upon the support **26** and thus ascending movement of the lower portion of the grille **10**, all as is illustrated in FIG. *3b*. In accor-

dance with the present invention, shaft **28** is rotated through an appropriate number of revolutions to load spring **36** so that the corresponding urgency of the spring **36** is sufficient to overcome the weight of the grille **10** and result in an appropriate number of revolutions of the support **26** which produces the previously noted opening **24** beneath the grille **10.** The amount of spring urgency within the spring **36** to achieve this is a function of the weight of the grille **10.** Once the shaft **28** is rotated to provide the urgency within the spring **36** as just indicated, the pawl and rachet arrangement **42** on the shaft **28** is utilized to hold the shaft **28** against rotation, and thus the spring **36** in its tensioned condition.

At the other end of the support **26,** said support has a driving connection to the powering motor **44** and thus until this driving connection is disconnected, spring **36** cannot raise grille **10** to provide said exit opening **24.** Specifically, and as is perhaps most clearly illustrated in FIGS. **4** and **5** in connection with FIG. **2,** the driving connection of the motor **44** includes a motor shaft **46** having a driving pin **48** extending therefrom. Cooperating with the driving pin **48** and slidably disposed on the motor shaft **46** is a driving member **58** which has a notch **52** in which the driving pin **48** is normally accommodated. A helical spring **54,** seated at one end against a stop **56** and at its other end against the driving member **50** is effective in holding notch **52** about the driving pin **48** and thus in providing a driving relationship between the motor shaft **46** and the driving member **50.**

Powering rotation of the driving member **50** is transmitted via an endless loop of chain **58** to a driven member **60** which is fixedly mounted on a shaft **62** which extends within the cylindrical grille support member **26.** As is perhaps best shown in FIG. **2,** shaft **62** is mounted in bearings **64** and **66** and is fixedly connected to disks **68** and **70** which are each fixedly connected in an appropriate manner, as by welding, to the interior wall of the support **26.** Thus, the rotation of driving member **50,** which is transmitted to driven member **60,** is transmitted to the shaft **62** and produces corresponding rotation in the support **26.** In this manner, motor **44** is effective in powering shaft **62** in one direction of rotation which results in descending movement of grille **10** into its closed position, or in an opposite direction of rotation which results in ascending movement of grille **10** into selected open positions.

As long as motor shaft drive pin **48** occupies its driving relation with respect to the notch **52** and thus the driving connection between the motor **44** and the support **26** is intact, there can be no ascending movement in the grille **10** caused by the urgency of the helical spring **36.** However, when the aforesaid driving relation or connection between the motor **44** and support **26** is disconnected, it should be readily appreciated that helical spring **36** is then effective in causing counterclockwise rotation in the support **26** and thus in lifting grille **10** into its FIG. **1** position, which provides the exit opening **24.**

To initiate said ascending movement of grille **10** there is provided a cable **72** which is threaded over a pulley **74** and has a swivel connection **76** to a bar **78** which has rod connections **80** and **82** to the driving member **50.** By pulling down on the free end **84** of cable **72,** driving member **50** is urged through sliding movement **87** along the motor shaft **46** which results in disengagement of notch **52** from about the driving pin **48.** It should be noted that the slight sliding movement **87** required in the driving member **50** is permitted within the normal slack of the chain **58** which is entrained about the driving and driven sprockets **50** and **60,** respectively.

Assuming that driving member **50** is moved into its clearance position from drive pin **48** when the grille **10** is in its fully closed position as illustrated in FIG. **3***a*, the result is that shaft **62** is no longer held against rotation by the motor **44** but instead is free-wheeling. In the free-wheeling condition of shaft **62,** support **26** is then subject to the urgency of the helical spring **36.** Specifically, spring **36,** as previously indicated, is wound in that direction of rotation which induces the same to cause wind-up rotation in the support **26.** As a consequence of this wind-up rotation in the support **26,** the grille **10** is raised through ascending movement which provides the exit opening **24.**

As illustrated in FIG. **4,** driving member **50** is normally under the urgency of spring **54** to assume a position on motor shaft **46** which establishes the driving connection between the notch **52** and pin **48.** Thus, after pulling manipulation of the cable **72** which disengages member **50** from the pin **48,** member **50** must be held in its position of movement during the interval of operation of the helical spring **36.** One exemplary manner of holding member **50** in its disengaged position is illustrated in FIG. **5** and consists of a toggle switch, generally designated **86.** As illustrated in FIG. **5,** toggle **86** includes bar **90** and link **88** pivotally connected to the cable **72** while the free end of bar **90** supports one end of a positioning spring **94.** As generally understood, when the link **88** is moved from its solid-line position, as illustrated in FIG. **5,** in response to pulling down on the cable **72,** into its position illustrated in phantom perspective in FIG. **5,** this rotatable traverse changes the biasing effect of the spring **94.** Specifically, in the phantom perspective position, spring **94** holds link **88** in its rotated position, and thus also holds cable **72** in its corresponding actuated position. Thus spring **94** effectively opposes spring **54** and driving member **50** is held disengaged from the driving pin **48.**

From the foregoing, it should be readily appreciated that there has been described herein an emergency grille-opening means which, when operated, will cause automatic opening movement in the grille **10** from its fully closed position to a slightly raised position which thus provides an exit opening **24** beneath the lower edge of the grille **10.** In a preferred embodiment, and as illustrated in FIG. **2,** a sign **96** is advantageously posted in a visible position adjacent the cable end **84** to indicate the herein described noteworthy emergency mode of operation of the improved overhead grille **10** hereof.

A latitude of modification, change and substitution is intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1. The combination with an overhead grille of a spring-operated emergency grille-opening means, said overhead grille comprising a horizontally oriented grille support having a hollow interior, a grille helically wrapped about the exterior of said grille support so as

to partake of descending and ascending movements relative thereto in response to rotation of said grille support, and said spring-operated emergency grille-opening means comprising a spring support member disposed within said hollow interior of said grille support, a helical spring operatively arranged along said support member so as to urge said grille support through rotation in accordance with the biasing urgency thereof, a motor in normal driving relation with said grille support to power the same in rotation in one direction to cause ascending movement of said grille and in an opposite direction to cause descending movement of said grille and also to simultaneously cause the winding of said helical spring in a direction inducing a spring urgency therein opposing said grille descent, said driving relation of said motor and said grille support including a cooperating pair of driving and driven members, said driven member being selectively slidable between a first operative position drivingly engaged to said driving member and a second operative clearance position removed therefrom disengaging said grille support from said driving relation with said motor, and an emergency means including switch means effective upon actuation to urge said driven member into said second operative position, whereby in response to actuation of said emergency switch means following the descent of said grille said helical spring powers said grille support through rotation causing an extent of ascending movement in said grille which is sufficient to provide an emergency escape opening beneath said grille.

2. The combination as defined in claim **1** including a motor shaft for said motor, a sprocket slidably mounted on said motor shaft, and an endless chain entrained about said sprocket and said driven member to provide said driving relation between said motor and said grille support without inhibiting sliding movement of said sprocket.

3. The combination as defined in claim **1** wherein said switch is a toggle switch and said emergency means further includes a cable connected from said toggle switch to said driving member, whereby actuation of said toggle switch is effective to both urge said driving member through sliding movement and to hold the same in said resulting position of movement.

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