Nov. 20, 1956 F. E. DRECHSEL 2,770,833

SEPARABLE HINGE

Filed Jan. 15, 1953

Fig. 1

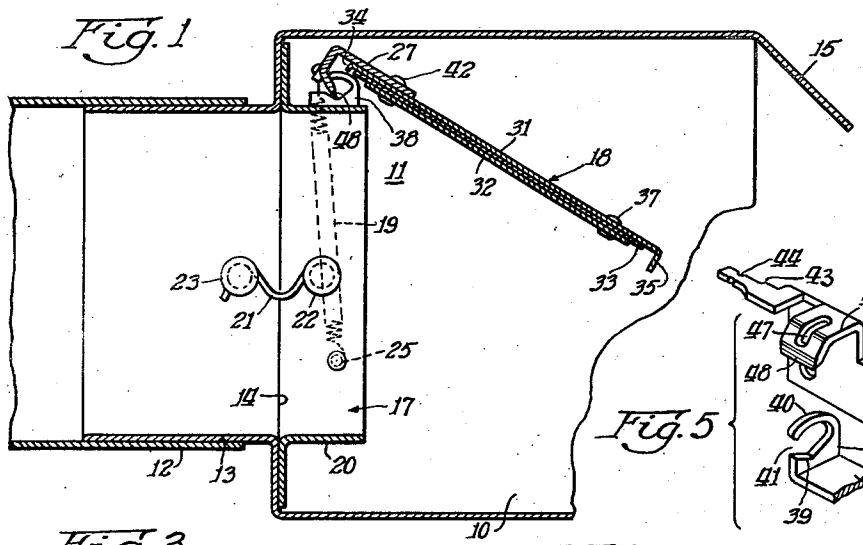


Fig. 5

Fig. 3

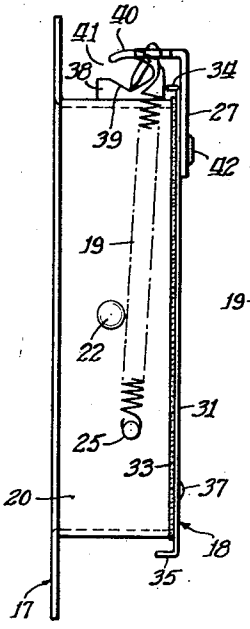


Fig. 2

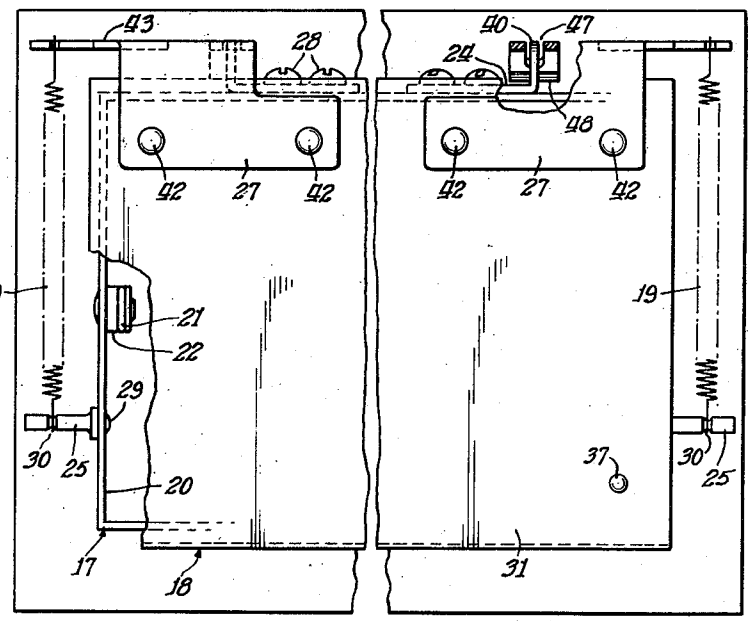
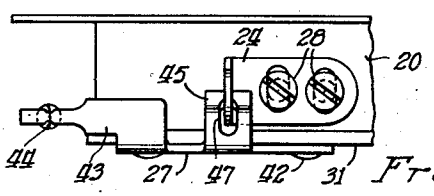


Fig. 4



Inventor:
Fred E. Drechsel
By: Soans Glaister & Anderson
Attys.

United States Patent Office 2,770,833 Patented Nov. 20, 1956

2,770,833

SEPARABLE HINGE

Fred E. Drechsel, Chicago, Ill., assignor to Ilg Electric Ventilating Co., Chicago, Ill., a corporation of Delaware

Application January 15, 1953, Serial No. 331,420

5 Claims. (Cl. 16—172)

This invention relates generally to hinge constructions and more particularly to the provision of an improved hinge construction which is especially adapted for, but not necessarily limited to, use in connection with a shutter for a ventilating duct outlet.

The main objects of the present invention are to provide an improved form and arrangement of a hinge construction for use in mounting a shutter for a ventilating duct outlet in a manner such that the shutter may be yieldably biased toward open or closed position during operation; to provide an improved hinge construction having interlocking portions which normally resist the disengagement of the hinge members, yet which is so arranged that the interlocking portions may be instantaneously disengaged when desired; and to provide an improved hinge construction which is economical to manufacture, durable in construction, and positive in operation.

In the accompanying drawings:

Figure 1 is a vertical longitudinal sectional view of a ventilator duct outlet box equipped with a shutter and mounting therefor constructed in accordance with this invention, the shutter being shown in open position;

Figure 2 is a front elevational view of the shutter and mounting shown in Figure 1 with portions broken away to show the underlying structure, the shutter being shown in closed position;

Figure 3 is a side elevational view of the shutter and mounting shown in Figures 1 and 2, the shutter being shown in closed position;

Figure 4 is a top plan view of one end of the shutter and mounting shown in Figures 1–3; and

Figure 5 is a perspective view of the hinge members.

An outlet box **10** with shutter means **11** mounted therein shown in Figure 1 of the drawings is adapted to be connected to an outlet duct **12** of a ventilating system. The ventilating system may be similar to that disclosed in Patent No. 2,579,395, in which a ceiling fan connects to a sealed ceiling duct which extends to an outlet box which is set into the outside wall of the house, with the open end of the outlet box substantially flush with the outside face of the wall.

The outlet box **10**, in its over-all dimensions, is somewhat larger than the duct **12** and has an integral sleeve part **13** which telescopes with the end of the duct **12** and defines the outlet **14** for the duct **12**.

A flash cap **15** is formed integrally with the upper edge of the outlet box **10** and is disposed at an incline so as to prevent rain from entering the outlet box **10**. A grating (not shown) formed of rods connected to angular bars disclosed in said prior patent, No. 2,579,395, may be attached to the front of the outlet box **10** by means of screws or the like so as to prevent birds, squirrels, or other animals from entering to the outlet box **10** or duct **12**.

The improved form of shutter means **11** for the duct outlet **14** comprises a frame **17** on which is hinged a shutter door **18** to which are attached a pair of springs **19** biasing the door toward a closed or open position depending upon whether or not air is being exhausted through the duct **12**. The frame **17** is a rectangular stamping with a transverse flange **20** defining an opening co-extensive with the duct outlet **14** at the end of the sleeve **13**. The frame **17** is held in fixed position within the outlet box **10** by a pair of hook members **21** which are fixed to and pivoted on pins **22** which extend inwardly from the sides of the frame **17**. The hooks **21** are engageable with pins **23** which are affixed to and extend inwardly from the side walls of the sleeve **13** of the outlet box **10**. The frame **17** also mounts a pair of hinge members **24** which engage hinge members **27** connected to the shutter door **18**. Extending outwardly from the flange **20** of the frame **17**, are pins **25** for anchoring the lower ends of the springs **19**. The hinge members **24** are attached to the upper corners of the frame **17** by means of screws **28**, whereas the pins **25** are attached to the lower corners of the frame **17** by means of riveting or the like as indicated at **29** in Figure 2. The pins **25** are provided with grooves **30** through which one of the ends of the springs **19** are looped.

The shutter door **18** as herein shown comprises a pair of plates **31** and **32** between which is interposed a sheet of insulating material **33**. The outer plate **31** is of a dimension a trifle larger than the outside dimension of the flange **20** of the frame **17** and may be provided with short inwardly extending upper and lower flanges **34** and **35** respectively for strengthening the shutter door and for preventing rain from entering the duct **12** when the shutter door **18** is closed. The plate **31** is formed of a light weight material, preferably a composition having a minimum capacity for heat conduction, the aim being to reduce, as much as possible, heat dissipation through the duct **12** when the fan is idle.

The insulator sheet **33** is preferably of a relatively soft material, such as felt, and is used to provide the best possible seal around the perimeter of the flange **20** of the frame **17** when the shutter door **18** is closed. This insulating sheet material **33** is secured to the plate **31** by the plate **32** which is bonded to the plate **31** by means such as rivets **37** passing through the two plates **31** and **32**.

The plate **32** is also of light weight material, low in heat conductivity. The plate **32** is slightly smaller than the interior of the flange **20**, thus exposing the perimetrical portion of the insulating material **33** to contact the edge of the flange **20**.

Each of the hinge members **24** includes a vertical flange portion **38** formed so as to provide a V-shaped notch **39** within which the cooperating hinge member **27** may be pivoted, an overlying hook portion **40** which functions so as to normally secure the hinge member **27** against accidental displacement, and an opening **41** which permits the hinge member **27** to be disengaged when desired.

The hinge members **27** are secured to the shutter **18** by means of rivets **42** which pass through the two plates **31** and **32** thereby helping to retain the insulating sheet material **33** against the plate **31**. The upper sections of the hinge members **27** include outwardly extending arm portions **43**, provided with grooves **44** through which the upper ends of the springs **19** are looped. The upper end of the hinge members **27** are also provided with hook-shaped portions **45** which are located inwardly of the arms **43**. These hook-shaped portions **45** are provided with central slots **47** through which the hook-shaped portions **40** of the hinge members **24** pass when the hinge members **24** and **27** are interengaged. The ends of the hook-shaped portions **45** are suitably pointed, as indicated at **48**, so as to provide knife edges which cooperate with the notches **39** for pivoting the hinge members **27** relative to hinge members **24**.

The hinge arms **43** are positioned on one side or the other of the pivotal axis depending upon whether the

shutter door 18 is in its open or closed position. As seen in Figure 3, when the hinge members 24 and 27 are interengaged and the shutter door 18 is in closed position, the hinge arms 43 are positioned forwardly of the pivotal axis of the hinge members 24 and 27. The springs 19 which connect with the arms 43 produce a force tending to rotate the hinge members 27 clockwise as viewed in Figure 3, thus keeping the shutter door 18 in closed position. On the other hand, when the shutter door 18 is in open position, as viewed in Figure 1, the arm 43 is positioned rearwardly of the pivotal axis of the hinge members 24 and 27. The force of the springs 19 on the hinge members 27 will tend to retain the shutter door 18 in open position. Such an arrangement provides a form of toggle so that the springs 19 serve to supplement the action of gravity when there is no air passing through the conduit 12 to secure the shutter door 18 in its closed position as shown in Figure 3. However, as soon as air is driven outwardly through the conduit 12, the springs 19 will supplement the force of the air and will tend to hold the shutter door 18 in its open position, as shown in Figure 1.

When it is desired to remove the shutter door 18, the upper ends of the springs 19 are unhooked from the notches 44 in the arms 43 and the hinge members 27 are then rotated until the hook portions 40 of the hinge members 24 are no longer within the slots 47 of the hinge members 27. The outer end portions of the hooks 45 of the hinge members 27 can then be passed through the openings 41 of the hinge members 24, thereby disengaging the hinge members 27 and disconnecting door 18 from the hinge members 24. In addition, the shutter frame 17 can be disengaged from the outlet box by simply raising the hooks 21 from the pins 23.

The operation of the shutter mechanism is believed to be apparent from the foregoing description.

Variations and modifications in the details of structure and arrangement of the parts may be resorted to within the spirit and coverage of the appended claims.

I claim:

1. A pair of cooperating hinge members comprising a first hinge member having a hook portion with a slot therein, the end of said hook portion being pointed so as to form a knife edge, a second hinge member having a vertical flange portion which includes a V-shaped notch at its base portion and an overlying hook portion, said first hinge member being interengageable with said second hinge member with said overlying hook portion of said second hinge member extending through the slot in said first hinge member and with said knife edge seating in said notch in said second hinge member, and said first hinge member being free to pivot on said knife edge relative to said second hinge member when said hinge members are interengaged.

2. A pair of cooperating hinge members comprising a first hinge member having one edge pointed so as to form a knife edge, a second hinge member having a vertical flange portion which includes a V-shaped notch, said first hinge member being interengageable with said second hinge member with said knife edge of said first hinge member seating in said notch of said second hinge member, said first hinge member being free to pivot on said knife edge relative to said second hinge member when said hinge members are interengaged, and said first hinge member having an arm extending outwardly of and offset from said knife edge which is adapted for engagement with a spring for assisting in controlling the relative movement of said hinge members.

3. A pair of cooperating hinge members comprising a first hinge member having a hook portion with a slot therein, the end of said hook portion forming a downwardly depending knife edge, a second hinge member having a vertical flange portion which includes a V-shaped notch at its base portion and an overlying hook portion, said first hinge member being interengaged with said second hinge member with said overlying hook portion of said second hinge member extending through the slot in said first hinge member and with said knife edge seating in said notch in said second hinge member, said first hinge member being free to pivot on said knife edge relative to said second hinge member when said hinge members are interengaged, and said first hinge member having an arm portion extending outwardly of said hook portion and offset from said knife edge which is adapted for engagement with a spring for assisting in controlling the relative movement of said hinge members.

4. Hinge means comprising a hinge member adapted to be attached to a frame and having a notched portion, a cooperating hinge member adapted to be attached to a plate normally disposed in a vertical closed position adjacent the upper edge thereof, said hinge member on said plate having a knife edge pivotally engaged with the notch in said hinge member on said frame for pivotal movement of said plate about a horizontal pivotal axis, said hinge member on said plate having an arm extending outwardly beyond one lateral edge of said plate and offset from said knife edge, said arm being positioned forwardly of said pivotal axis when said plate is in closed position and rearwardly of said pivotal axis when said plate is in open position, a tension spring having its lower end connected to said frame and its upper end connected to said offset arm whereby the tension of said spring on said arm biases said plate so as to supplement the action of gravity to hold said plate in closed position and also biases said plate to assist in holding said plate in open position.

5. Hinge means comprising a hinge member adapted to be attached to a frame and having an upper hooked portion and an underlying notch, a cooperating hinge member adapted to be attached to a plate normally disposed in a vertical closed position adjacent the upper edge thereof, said hinge member on said plate having a hook portion with a slot therein, said hook portion having a knife edge pivotally interengaged with the notch in said hinge member on said frame for pivotal movement about a horizontal pivotal axis, the hook portion on the hinge member on said frame normally extending through said slot in said hinge member on said plate, said hinge member on said plate also having an arm extending outwardly beyond one lateral edge of said plate and offset from said knife edge, said arm being positioned forwardly of said pivotal axis when said plate is in closed position and rearwardly of said pivotal axis when said plate is in open position, a tension spring having its lower end connected to said frame and its upper end connected to said offset arm whereby the tension of said spring on said arm biases said plate so as to supplement the action of gravity to hold said plate in closed position and also biases said plate to assist in holding said plate in open position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,007,406	Warner	Oct. 31, 1911
1,589,507	Bond	June 22, 1926
2,299,833	Mader	Oct. 27, 1942
2,321,118	Zechiel	June 8, 1943
2,579,395	Pfautsch	Dec. 18, 1951

FOREIGN PATENTS

643,792	Germany	Apr. 17, 1937