May 17, 1938. E. J. ADAMS 2,117,391

CASEMENT SASH

Filed July 6, 1935

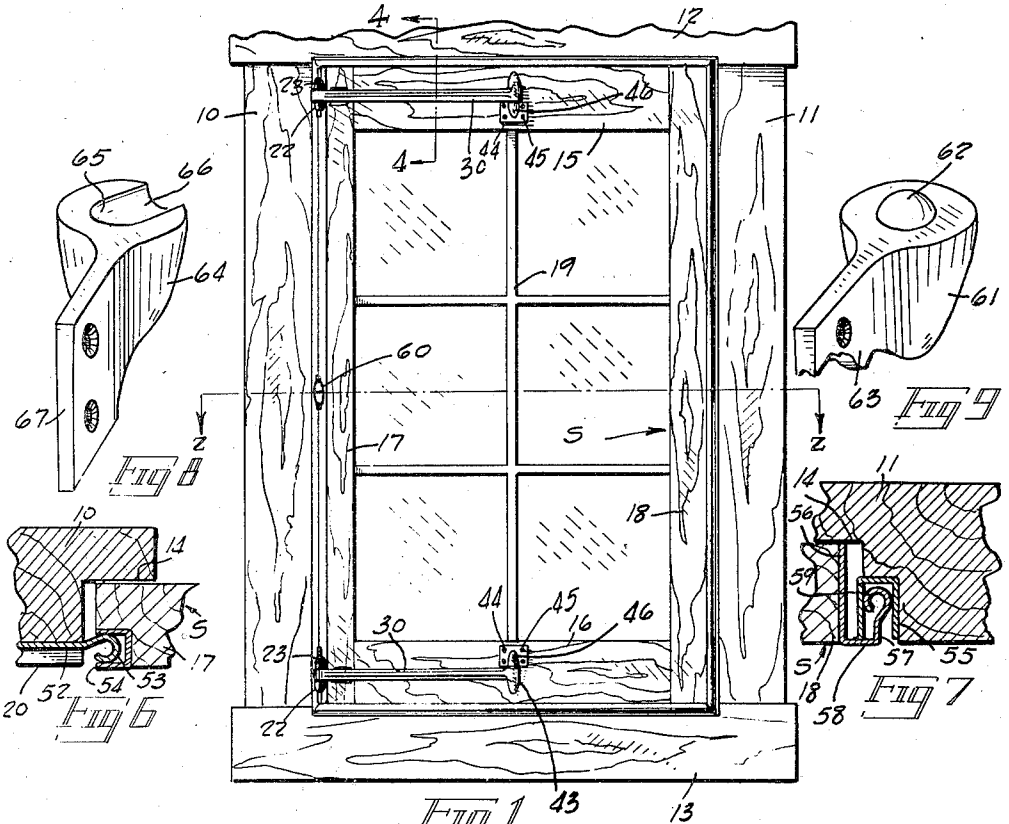


Fig 1

Fig 8

Fig 9

Fig 6

Fig 7

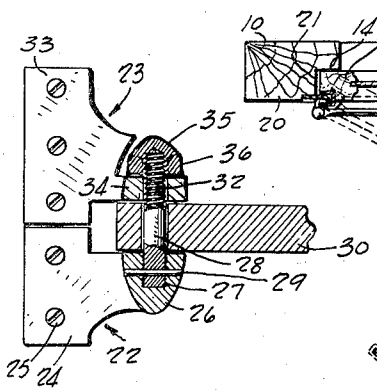


Fig 3

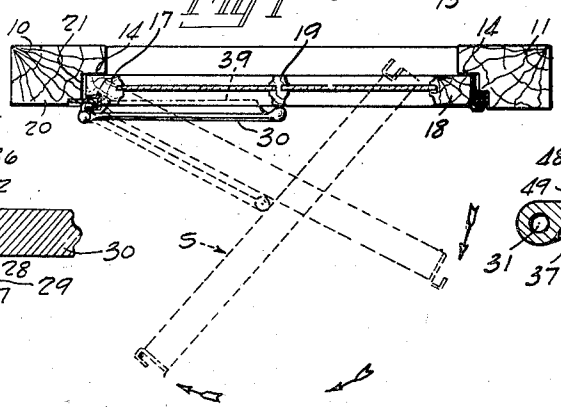


Fig 2

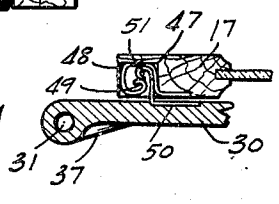


Fig 5

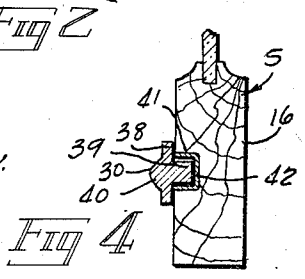


Fig 4

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CASEMENT SASH

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8 Claims. (Cl. 20—53)

This invention is concerned with casement sashes of the so-called reversing type, in which a sash is hingedly mounted at its side to a window frame, and is also pivotally mounted at its center to render the outer side available from the interior for cleaning and similar purposes.

This invention has in view as its primary object the provision of a casement sash of the type above noted, which is designed to meet with the approval of present day commercial architects by including features of construction which follow the modern trend in building.

The invention contemplates a casement sash in which simplicity is attained to a high degree, and in which the structural design is such as to lend longevity to the sash under severe service conditions.

An important objective of this invention is to provide a mounting for a casement sash which mounting affords a pivotal support for the sash proper centrally thereof, and also a hinged connection with the window frame. An important feature of the invention is associated with this hinged connection last mentioned in that this hinge is constituted a means for maintaining the sash in any open position.

A detailed object is to provide a hinged mounting for a sash, which includes means for setting up any desired degree of frictional engagement between the hinged parts.

In accordance with this invention it is this frictional engagement which maintains the sash in any open position and yet permits of its hinging movement under the application of sufficient force to overcome the friction.

Another object of this invention is to provide a casement sash of the reversing type above noted, which includes weather stripping for sealing the connection between the sash and the frame in which it is mounted. Inasmuch as the sash is hingedly mounted on one side, it is necessary to provide weather stripping for accommodating this pivotal mounting on one side and weather stripping of a different structural type for the other three sides.

A further end in view is to provide in a reversing casement structure a pair of arms for pivotally supporting the sash proper and which arms are provided with ribs for interfitting with the sash, whereby proper support for the latter is insured at all times.

In this connection another particular object of the invention is to provide interlocking means between the arms and the sash, whereby under normal conditions the arms and the sash move as a unit, but which interlock may be broken when it becomes desirable to reverse the sash.

In view of the fact that this invention contemplates a support for a reversing casement sash of the character above noted, which support comprises a pair of arms located at the top and bottom of the sash respectively, the supporting effects afforded by these arms may not be sufficient for sashes of unusually large dimensions.

This invention, therefore, has as an object to provide a hinged connection intermediate the extremities of the sash, and which connection supports the sash from the window frame. In accordance with this invention, the hinge is designed to break when it becomes necessary to swing the sash on its central pivots for reversing purposes.

A particular feature of the invention is the design of this hinge.

Various other more detailed objects and advantages are associated with the carrying out of the above noted objectives and practical embodiment.

The invention, therefore, comprises a sash which is pivotally mounted on a pair of arms, an arm being located at the top and bottom, respectively, each of these arms including a supporting rib interfitting with the sash, and a detachable interlocking connection is also provided between the arms and the sash. The arms are pivotally mounted by friction hinges to a window frame, and weather stripping is provided around the four sides of the sash. If occasion demands, a hinged connection may be included intermediate the said arms, and which connection is of the breakable type.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing, wherein:

Figure 1 is a view in side elevation of a window frame with a casement sash of the reversing type applied thereto in accordance with the precepts of this invention,

Figure 2 is a horizontal section through the frame and sash, taken about on the plane indicated by the line 2—2 of Figure 1,

Figure 3 is an enlarged detailed showing, partly in section and partly in elevation, of one of the friction hinges by which each arm is mounted on the frame,

Figure 4 is an enlarged detailed showing in section through one end of the sash; this view is taken about on a plane represented by the line 4—4 of Figure 1,

Figure 5 is a detailed horizontal section, also enlarged, bringing out the interlock between one of the supporting arms and the sash,

Figure 6 is an enlarged detail section taken on the same plane as Figure 2; this view develops the weather stripping at the hinge side of the sash,

Figure 7 is a view similar to Figure 6, bringing out the type of weather stripping used on the other sides,

Figure 8 is an enlarged detail showing in perspective of one of the hinge members making up the intermediate hinge, and

Figure 9 is a similar view of the other hinged part.

Referring now to the drawing, wherein like reference characters denote corresponding parts, the present invention is illustrated and described as employed in conjunction with a window frame of conventional design and an ordinary window sash. However, the invention is not to be limited in respect to these details as the window sash is used merely for illustrative purposes, and the principles of the invention could be employed with frames and sashes of any material or design.

A window frame is shown as comprising side parts **10** and **11**, and top and bottom frame parts **12** and **13**, respectively. As shown in Figure 2, the faces of the frame parts **10** and **11** which would be exposed to the weather, are cut away to provide abutments **14** on each side against which the sash, to be hereinafter described, engages. The top and bottom frame parts **12** and **13** are also cut away in a similar manner to provide a complete seat in which the sash fits.

A sash which is mounted in the frame above described is referred to generally by the reference character S and comprises top and bottom pieces **15** and **16** which are connected by side pieces **17** and **18**. These top, bottom and side pieces enclose a plurality of glass panels which are defined by the panel structure referred to generally by the reference character **19**. In the present instance the sash S is illustrated as including six panels. Obviously, this number may be varied as occasion demands.

Connecting the abutment **14** of the side frame **10** with the weather face of this member **10**, which is referred to by the reference character **20**, is an inner side wall **21**, and mounted on this side wall **21** at the top and bottom of the window, respectively, are a pair of hinges of duplicate construction, one of which is shown in Figure 3 in detail as comprising a lower part referred to generally as **22**, and an upper part as **23**. The part **22** includes a plate **24** which may be affixed to the wall **21** in any preferred manner, as by the screws shown at **25**, and to which plate is connected, preferably integrally, a so-called acorn formation **26** that is provided with a socket **27**. A pintle **28** has one end fitting in the socket **27** and this pintle is anchored therein in any preferred manner, as by a pin **29** that extends through aligned openings in the pintle **28** and acorn **26**.

A supporting arm is shown at **30** and the extremity of this arm is formed with an opening **31** through which the pintle **28** extends. Above the arm **30** the pintle **28** is provided with screw threads **32**.

The upper hinge part **23** is also formed with a plate portion **33** and is connected to the wall **21** in the same manner as is the plate **24**. Preferably integrally formed with the plate **33** is a hinged part **34** having an opening through which the upper extremity of the pintle **28** extends. A nut is shown at **35** as being threaded on the extremity of the pintle **28** and this nut **35** is of a shape so that the composite structure **34** and **35** affords substantially the same appearance effects as the lower acorn **26**. This nut **35** may be provided with a non-circular wrench-engaging part **36**.

It is evident that the nut **35** may be tightened to provide any desired degree of friction between the parts **26** and **32** and the arm **30** held therebetween.

Inasmuch as the arms **30** support the sash S, considerable stress is exerted thereon adjacent to the hinged connection above described. Accordingly, these arms **30** may be provided with supporting plates, indicated at **37**, which serve to adequately reinforce the arms at this point.

Referring now more particularly to Figure 4, one of these arms **30** is shown as comprising vertical flanges **38** from which extend a rib **39** on one side, and a rounded portion **40** on the opposite side. The rib **39** is designed to interfit in a groove which is formed in the top or bottom member with which the arm **30** is associated. In this figure this arm **30** is shown as interfitting with the bottom piece **16** which is cut out to provide a channel at **41** which may be lined with a channel piece shown at **42**. This interfit between the arm **30** and the bottom piece **16** insures of a good support for the sash S by the supporting arms **30**.

At their ends the arms **30** are formed with hinge parts designated **43**, these hinge parts also preferably being of the acorn type. Secured to each of the top and bottom pieces **15** and **16**, respectively, are a pair of plates **44** which may be affixed to the pieces **15** and **16**, in any preferred manner, as by screws **45**.

Preferably integrally formed with each of the plates **44** is a hinged part **46**, also of the acorn type, and a pin (not shown) extends from the acorn **43** into a socket formed in the hinged part **46**. This structure provides for the pivotal mounting of the sash S on the arms **30**.

Adjacent to the hinge mounting of the arms **30** on the side piece **10**, a detachable interlocking connection between each of the arms **30** and the sash S is provided. One of these connections is shown in detail in Figure 5 as consisting of a cutout portion **47** that is formed in the side piece **17**, in which is received a spring clip **48** having a rolled lip at **49**. A complemental clip member **50** is carried by the arm **30** and has a rolled lip **51** interlocking with the lip **49**. The members **48** and **50** are of spring metal so that upon sufficient pressure being applied the interlock between the lips **49** and **50** will be broken to permit pivoting of the sash S about the extremities of the arms **30** as a center.

Referring now to Figure 6, the weather stripping along the side piece **10** is shown as being located at the weather face of the sash. This is an important feature of the invention, because a particular location of the weather stripping prevents the weather from getting at the interfitting faces of the sash and frame.

The weather stripping comprises a strip **52** which is embedded in the side piece **10** and which has projecting from the wall **21** a rolled flange **53**. This rolled flange **53** is received in a channel of a channel member **54** which is carried at the exterior corner of the side piece **17**, the latter being cut away to accommodate this channel member

54. The fit between the flange 53 and the channel 54 is preferably rendered tight by the proper dimensioning of these parts and the resilient nature of this flange 53.

The weather stripping structure provided around the other three sides of the sash S is brought out in detail in Figure 7. In this view the stripping is shown as applied to the side frame 11, but this structure is duplicated at the top and bottom pieces 12 and 13. The corner at the weather face of the side frame 11 is cut away and a channel member 55 is fitted in this cutout. A strip 56 is secured, in any preferred manner, to the edge of the side piece 18, and this strip 56 is formed with a flange 57 that is spaced from the strip 56 proper by an intermediate part 58. The flange 57 terminates in a rolled lip 59 that is received in the channel 55 to provide a tight connection.

In the event the supporting effects provided by the arms 30 is not sufficient, a hinge, which is shown at 60, may be used. One of these hinges comprises a hinged part 61 that follows the acorn design of the other hinged mechanisms of this construction formed with a hemisphere 62 and a plate at 63 which constitutes a means for mounting the hinge part 61 on the wall 21. A complemental hinged part 64 is shown in Figure 8 that is formed with a socket 65 for receiving the hemisphere 62. This socket 65 is continued by a groove indicated at 66, which extends to the exterior wall of the hinge 64. Integrally formed with the latter is a plate 67 which is connected to the wall of the side piece 17.

Under ordinary conditions the hemisphere 62 turns in the socket 65 to provide the desired pivoting and supporting effect. When it becomes necessary to swing the sash S about the extremities of the arms 30 as a center, the connection between the hinged part 61 and 64 may be broken by swinging the sash open to a certain predetermined position, at which point the hemisphere 62 may be moved along the groove at 66 incident to swinging movement of the sash S. It has been found that an angle of approximately 22½° between the sash S and the window frame is a convenient angle at which to allow for breaking of the hinge at 60.

The operation and mode of functioning of the above described structure is thought to be obvious. However, it may be outlined by noting that, under ordinary conditions, the sash S moves with the arms 30 as a unit under which conditions the ribs 39 are received in the channels 42 to properly support the sash and the detachable connection shown in Figure 5 maintains this unitary relationship.

The sash may be swung on the hinges carried by the side piece 10 to any desired open position and will remain in that opened position due to the resistance to movement offered by the friction set up between these hinged parts, movement of the sash S always being accomplished under the influence of a force sufficient to overcome the resistance of this friction. When the sash S is closed with its inner face abutting the walls 14 the various weather stripping arrangements interlock to provide an efficient seal on the weather face of the frame. With this arrangement the deleterious effects of the weather are excluded from the inner faces of the sash S and the frame.

When it is desired to render the outer face of the sash S available, as for cleaning purposes, this sash S may be swung about the pivotal connection at the extremities of the arms 30 by opening the window to that angle which permits of the breaking of the hinge at 60. Upon sufficient pressure being applied the interlocking connection brought out in Figure 5 will be broken and the sash swung around in accordance with the dotted line showing of Figure 2.

While a preferred specific embodiment of the invention is hereinbefore set forth it is to be understood that I am not to be limited to the exact construction illustrated and described because various modifications of these details might be made in putting the invention into practice, within the purview of the appended claims.

I claim:—

1. A casement sash structure of the character described comprising a frame, an arm, a hinge pivotally connecting the arm to the frame including parts in frictional engagement, a sash pivotally carried by the arm, and means for varying the friction between said parts in frictional engagement.

2. In a casement sash structure of the character described, the combination with a frame cut away on the weather face to provide a sash-receiving seat, a sash in said seat having its weather face substantially flush with the corresponding face of the frame, an arm pivotally connected at one end to the sash and hingedly connected at the other end to the frame, weather stripping between the sash and the frame at the place of hinged connection between the arm and the frame, said weather stripping comprising a strip carried by the frame and having a rolled flange, and a channel member carried by the sash and having a channel receiving the rolled flange.

3. In a casement sash structure of the character described, the combination with a frame cut away on the weather face to provide a sash-receiving seat, a sash in said seat having its weather face substantially flush with the corresponding face of the frame, an arm pivotally connected at one end to the sash and hingedly connected at the other end to the frame, weather stripping extending entirely around the line of connection between the sash and the frame at the weather faces thereof, said weather stripping comprising a strip having a rolled flange carried by the sash, and a channel member having a channel carried by the flange, said rolled flange being received in the channel of the channel member.

4. In a casement sash of the character described, comprising a frame, a pair of arms hingedly mounted on the frame, a sash pivotally carried by the arms, and a breakable hinge connection between the sash and the frame, said connection being located intermediate the arms and comprising complemental interlocking hinge parts which are disengageable only at a certain relative angular position of the sash and the frame.

5. A casement sash comprising a frame having a side part, a pair of hinges connected to said side part, a pair of arms connected to the hinges and in frictional engagement therewith, means to vary the friction between the arms and the hinges, a sash pivotally connected to the arms along a line centrally of the sash, said arms and sash having interfitting parts, and a detachable interlocking connection between the arms and the sash.

6. A casement sash comprising a frame having a side part, a pair of hinges connected to said side part, a pair of arms connected to the hinges and in frictional engagement therewith,

means to vary the friction between the arms and the hinges, a sash pivotally connected to the arms along a line centrally of the sash, said arms and sash having interfitting parts, a detachable interlocking connection between the arms and the sash, and weather stripping extending entirely around the sash at the weather face thereof, said weather stripping including interlocking parts carried by the sash and the frame respectively.

7. A casement sash of the character described comprising a frame, a sash, a mounting for the sash in the frame consisting of a pair of arms pivotally mounted at one end to the sash and at the other end to the frame, and means disposed intermediate said arms for establishing a pivotal connection between the sash and frame, said means being breakable and only breakable at one angular position of the sash with respect to the frame.

8. A casement sash of the character described comprising a frame, a sash, a mounting for the sash in the frame consisting of a pair of arms pivotally mounted at one end to the sash and at the other end to the frame, and means disposed intermediate said arms for establishing a pivotal connection between the sash and frame, said means comprising interfitting hinge parts, one of which is formed with a socket and a passage in communication with said socket, the other hinge part being formed with a projection which is received in said socket and which is movable through the passage when the sash and frame are in a certain definite angular position.

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