June 10, 1958 E. S. PERSSON 2,838,109

WINDOW

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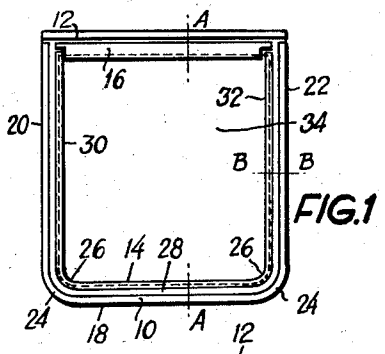


FIG.1

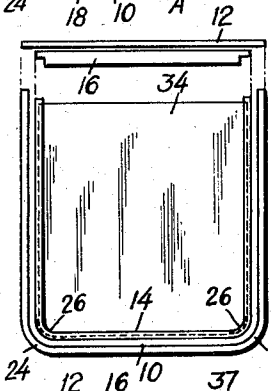


FIG.2

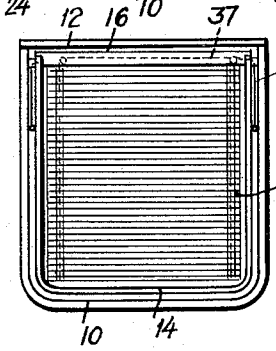


FIG.1a

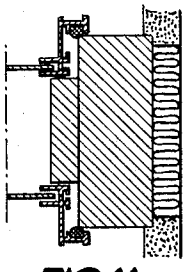


FIG.11

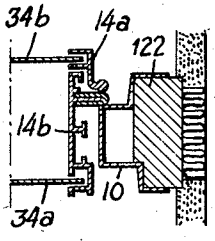


FIG.3a

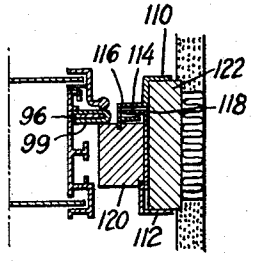


FIG.10

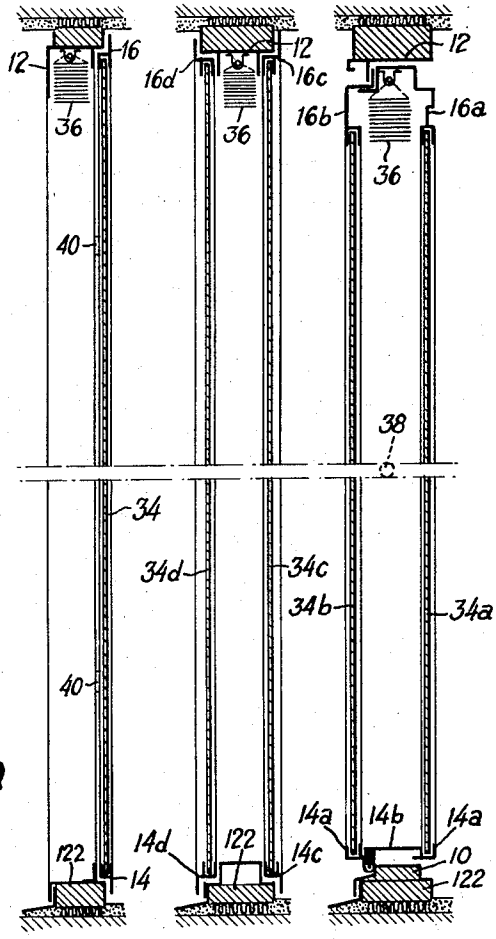


FIG.4 FIG.5 FIG.3

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FIG. 9

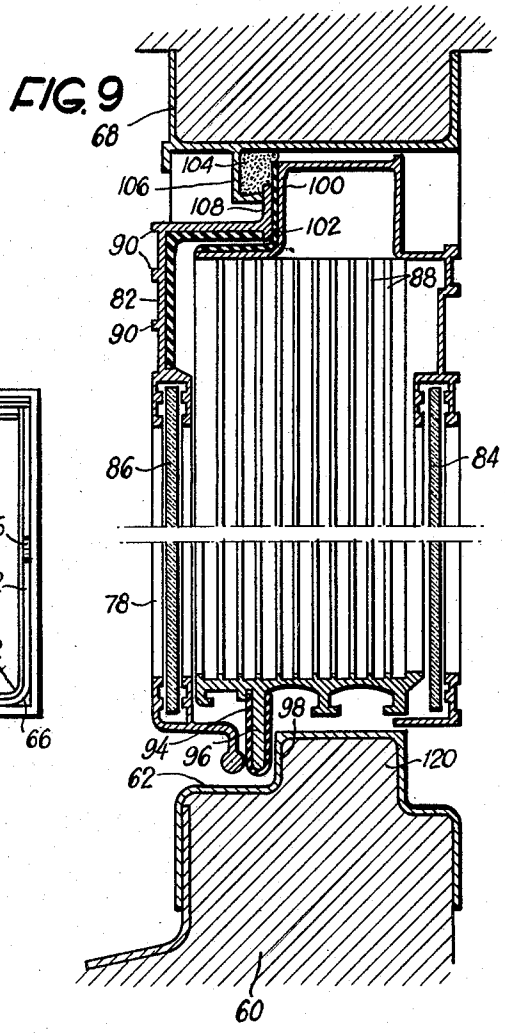
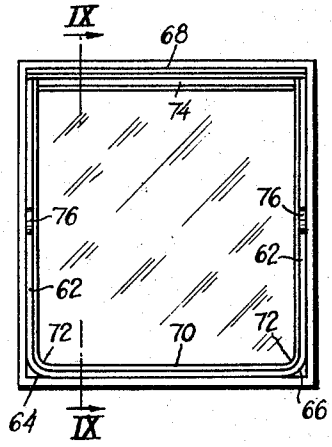


FIG. 6



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FIG. 7

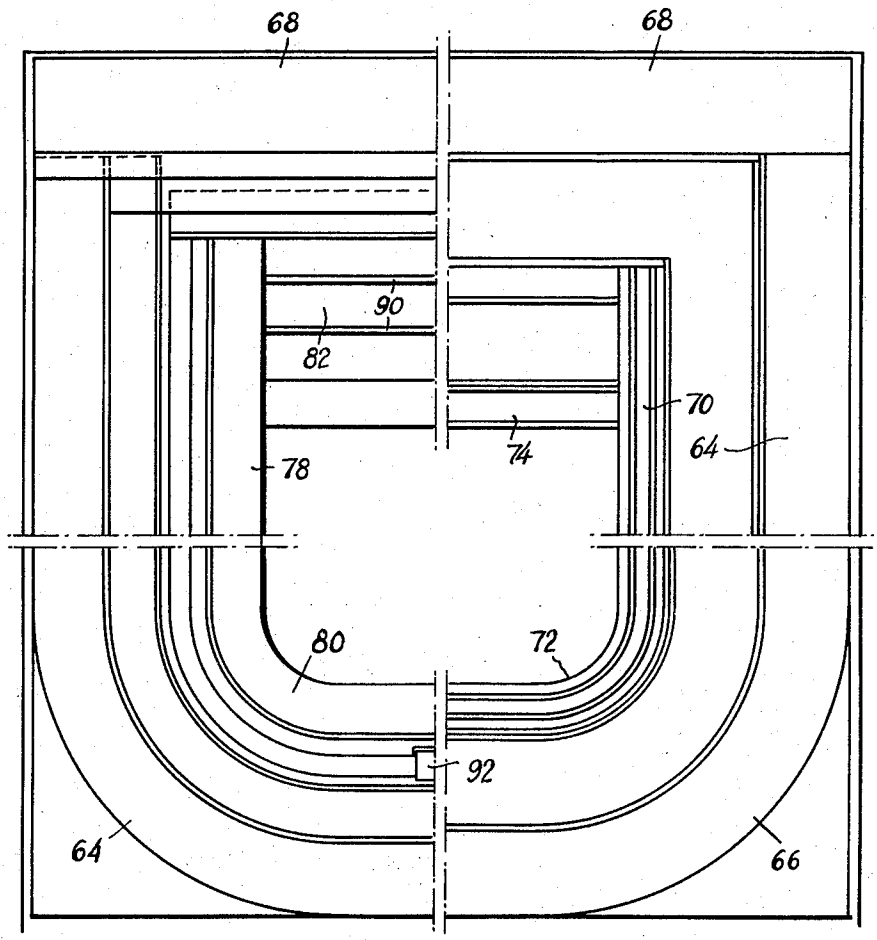


FIG. 8

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WINDOW

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Application March 26, 1952, Serial No. 278,619

Claims priority, application Sweden June 11, 1951

1 Claim. (Cl. 160—107)

A modern window comprises a screening means of some kind, such as a Venetian blind, jalousie or roller blind, and in many window constructions produced nowadays, the screening means is counted with as an integrating part of the window. In certain types of windows, particularly in windows suspended on pivots, that is to say, in windows where the sash or sashes are swingable about a horizontal axis approximately at the center of the window, the arrangement of the screening means in the sash or one of the sashes entails considerable advantages with respect to the unobstructed mobility of the window in opening and closing the same.

In windows for certain purposes of use, as in railway carriages, buses and motor cars, it is known to make the principal part of the window frame from a metallic sectioned bar curved at four points into a rectangular frame with round corners. It is also known in a similar frame composed of a number of parts welded together to arrange a pair of displaceable sashes having at least one pair of round corners. However, these windows have no screening means, nor are they constructed so as to permit an arrangement of such means adapted to be drawn across and back. Consequently, these windows have a restricted use and are not suited for dwelling-houses, for example.

The known metallic windows, where the principal elements of the frame and the sash consist of a plurality of parts welded or soldered together also have certain drawbacks from the point of view of manufacture, inasmuch as the points of joining the parts call for working prior to joining and finishing operations after joining. In metallic windows of this kind intended to be used in countries with a moist climate there are also risks of destruction through corrosion at the joints, where metals of a different nature contact each other, as is the case in the soldered or welded joints.

However, there are also windows consisting of wood as well as of metal. Thus windows have been proposed, in which the frame is a wooden one, while the window sash is made from metal. The metallic sash carrying the glass pane is in a certain window construction of this type made with an integral frame part extending along a whole lateral border and at least along a portion of two further sides of the window and forming round corners at the transition between said side and side members. Sashes with single or double panes and coupled sashes with a pane in each sash are conceivable in this construction. The wooden frame offers certain advantages from the point of view of heat-insulation, but on the other hand it suffers from numerous drawbacks in combination with a metallic sash of the construction set forth. Among these drawbacks the following might be mentioned:

The difference in material of the frame and sash entails complications with respect to the manufacture. Windows are nowadays commonly manufactured in factory-production. The manufacture of a metallic sash calls for quite other machines than does the manufacture of a wooden frame. In spite of the fact that similar constructions (frames) are involved in the manufacture of a frame and

a sash, a factory for the manufacture of windows having a metallic sash in a wooden frame therefore must be equipped with at least two sets of machines of quite different kinds, namely, with metal working machines as well as with wood working machines. This involves great costs of lay-out for the factory. In operation, a factory of this kind becomes comparatively expensive and calls for a relatively great number of workers.

A wooden frame is generally made from at least four straight wooden pieces, i. e. two side members, one upper lintel and a lower cross member, and these parts are joined with one another at the corners of the window. The joining calls for working of each end of these four frame members. In the frame alone there are thus no less than eight joint ends calling for working for the joining of them. Should the window be provided with a sash consisting of four wooden sash members, as is the case in ordinary wooden windows, eight further joint ends are involved, and consequently such a window has at least sixteen joint ends all in all. Obviously, the mere working of the joint ends of this window is a considerable one. A window having a wooden frame and a metallic sash extending along three sides of the window will be somewhat more favourable from the point of view of working, but there are still at least six parts in this window, namely, in addition to the four frame members, at least two sash frame members, one of them consisting of the frame yoke and the other of a straight frame member uniting the yoke shanks. In this case, the number of joint ends calling for working becomes still twelve.

In the above discourse on the number of joint ends necessarily subjected to working, only the principal parts of the sash and the frame have been brought into consideration, while tightening fillets and fittings of various constructions as occurring in different types of windows have not been considered.

The screening means of the modern window should be so constructed as to permit of being applied in a simple manner without additional working in the place of erection in mounting the window into the building. According as the screening means can be made as a detail of the remaining window construction in factory-production, a better and more rational window will be obtained.

The present invention is based on the problem of making a window provided with a screening means, or a window suited for the arrangement of a screening means, in simple manufacture and possessing a small number of working points. According to the invention, this problem has been solved through a window construction, which is distinguished, above all, by the feature that not the sash alone but also the frame comprises an integral frame member from a metal profile extending along a whole side and along the whole or substantial length of two remaining sides of the window and forming round corners at the transitions between said sides, while the fourth side is constituted by a straight member forming right angles with the adjacent side members. The straight member is principally intended to form a holder for or the head of a Venetian blind or other screening means, In this construction, the principal parts of the window can be reduced to the number of four in the simplest application of the window as compared with a minimum number of six in previous similar constructions, that is to say, to a yoke-shaped frame member and a straight frame member both in the frame and in the sash. The frame member forming the frame may in its substantial outline be broadly similar to that of the sash frame, and thus two pairs of substantially uniform elements will be obtained for the manufacture, which may, all of them, consist of metal.

The yoke-shaped frame member forming the principal part of the window frame corresponds to a similar yoke-

shaped frame member in the sash, and on account of the similar nature of these parts the manufacture will be facilitated. The small number of parts and the few places calling for working also contribute to said result. Welded joints and the like may be avoided entirely, depending on the object of the straight frame members, which involves that they may be removably connected to the corresponding yoke-shaped members.

The straight frame member is well suited as a carrying member for a Venetian blind or other screening means, or may constitute a part of such means, that is to say the so-called head of the same, which constitutes a carrying element for members for drawing the screening means across and back. However, the straight frame member may also form a holder for the head of a Venetian blind or other screening means. This holds true, whether the straight frame member of the window frame or the sash is brought into consideration.

Through the invention a modern metallic window has been provided with a screening means comprised therein, said window consisting of a small number of principal parts and lending itself admirably to manufacture on a factory-scale while permitting of being used in buildings of various kinds, particularly in house buildings.

The parts required for the window are broadly limited to four principal parts, which in comparison with previous similar constructions with six parts mathematically involves a saving of up to one third of the earlier working costs. With respect to the facilities of rationalizing the operation, saving of machines and so forth offered by the novel window construction, the lay-out costs of a factory for this manufacture can be kept relatively low.

Obviously, the invention is also applicable to windows having double (coupled) sashes, that is to say, to windows having an outer sash and an inner sash coupled to each other, corresponding advantages being thus achieved in comparison with known windows provided with double sashes. Here, the screening means may be arranged between the glass pane of the sashes to special advantage.

The risk of the occurrence of corrosion in soldered or welded joints is substantially eliminated in a window construction according to the invention through the formation of the yoke-shaped frame members in view. This is so for the reason that the jointless points of curvature distinguishing these frame members are primarily intended to be located at the two lower corners of the window, that is to say, in the part of the window where rain water or melting water from snow and ice flows down the window pane. Through the rounding of the lower corners of the frame as well as of the sash the water will be deflected from the corners of the wall opening receiving the window frame, said corners being sensitive and not seldom permitting the leakage of water into the wall in connecting with ordinary windows. The only joined point in the window is located at the top, that is to say, in that part of the window which is the last to be subjected to the leaking-in of water.

In a window according to the invention, the outside of the frame can be simply heat-insulated from the inside thereof to prevent transfer of cold from the outside in cold weather and the formation of condensate in consequence thereto. It is true that it will then be necessary to make the window frame in the form of an outer frame member and an inner frame member, which frame members are separated by a heat-insulating packing, but the joining of these frame members may be carried out mechanically in connection with the working operation in which the corners of the yoke-shaped frame members are being formed, and for this reason said joining need not make the manufacture more expensive to any appreciable extent. In windows having an inner sash and an outer sash coupled thereto, a heat-insulating packing may be arranged between the two sashes in addition to a heat-insulating packing adapted to interrupt the transfer of cold in the window frame. Hereby the window will actually be arranged, as far as heat conduction is concerned, with the whole of its outside (the side thereof turned from the room) separated from the inside of the window (the side thereof facing the room) both in regard to the frame and the sashes.

The accompanying drawings illustrate a few examples of applying the invention, wherein the straight frame member of the window frame and of the sash forms the upper part of the same. Figs. 1 and 1*a* are vertical projections by way of diagrammatic representation of a window with the frame and sash thereof assembled, Fig. 1 showing the window with and Fig. 1*a* the window without a screening means mounted therein. Fig. 2 shows the same window with the straight frame lintels of the sash and the frame in a raised position. Fig. 3 shows diagrammatically a vertical cross section on line A—A in Fig. 1 of a window of the construction represented in Fig. 1 as applied to a window having the sashes thereof swingable about a horizontal axis approximately at the center thereof (such a sash being termed a pivotally suspended sash in the following). Fig. 3*a* shows a cross section on line B—B in Fig. 1. Fig. 4 shows in the same way as Fig. 3 an application to a window having a sash adapted to be swung out from the frame about a vertical axis for the whole width of the sash (termed a laterally suspended sash in the following). Fig. 5 shows in the same way as Figs. 3 and 4 a vertical section through a window having double sashes and a Venetian blind between the glass panes of the sashes. Figs. 6–9 show a pivotally suspended window more in detail, Fig. 6 being a vertical projection of the window to a smaller scale, viewed from the inside. Fig. 7 shows the upper and lower corners of this window in detail in a vertical projection, viewed from the outside, and Fig. 8 shows in the same way as Fig. 7 the upper and lower corners of the same window, viewed from the inside. Fig. 9 shows a vertical section of a portion of a frame and sashes according to a modified construction. Fig. 10 is a view similar to Fig. 3*a* but showing the provision of heat insulation between inner and outer frames. Fig. 11 shows a section through a frame piece and the corresponding portion of the sashes in another modified construction.

Figs. 1 and 2 show the four principal parts comprised in the window, i. e. a curved frame member **10** and a straight frame member **12**, and a curved sash member **14** and a straight sash member **16**. The frame member **10** consists of a single sectioned piece of metal bar extending along the lower side **18** of the frame, and the two vertical sides **20, 22** thereof are continuously curved at the corners **24** without any alteration of the profiled section. The straight frame member **12** consists of a single straight piece of sectioned metal bar, which is removably connected at the ends thereof to the upwardly projecting ends of the frame member **10**. The sash member **14** is uniform with the frame member **10** in its general shape and consequently has, like the latter, continuously curved corners **26** at the transition between the lower side **28** and the vertical sides **30, 32**. The straight sash member **16** is removably secured with the ends thereof to the ends of the sash member **14**. The sash members **14, 16** consist, like the frame members, of metal profiles. The sash carries a glass pane **34**, which is thrust from above into the curved sash member **14**.

Thus each of the closed frame members forming the window frame and the sash have two round corners at the bottom and two right-angled corners at the top, in the example shown.

One or both of the straight frame members **12, 16** may be formed as holders for the carrying of a Venetian blind or other screening means. One or both frame members **12, 16** may instead form a head or lintel in a screening means. It is possible to form both frame members **12, 16** as holders for a screening means, so as to permit mounting of the latter on the one or the other frame member, as desired.

In windows with a pivotally suspended sash, whether windows having a single sash or double (coupled) sashes be considered, the screening means is preferably arranged on the sash or on one of the coupled sashes, but in laterally suspended windows it may be arranged on the window frame or on the sash or one of the sashes, as desired. Fig. 1*a* is a plan view of a Venetian blind **36** in its pulled-down position, the same being suspended from the lintel **16** of the sash, which forms a blind head and is consequently provided with members in the form of cords **37** to draw the Venetian blind across and back and to control the same.

For the three different embodiments of the frame and the sash or sashes shown diagrammatically in Figs. 3, 4 and 5, the reference numerals are analogous to those occurring in Figs. 1, 1*a* and 2. Fig. 3 shows diagrammatically the application of the invention to double sashes, the yoke-shaped lower frame member of the window frame being denoted by **10** and the straight lintel thereof by **12**. The yoke-shaped frame member of the inner sash receiving the glass pane **34***a* is designated by **14***a* and the straight lintel thereof by **16***a*, and the corresponding parts of the outer sash are denoted by **34***b*, **14***b* and **16***b*, respectively. The pivot axis is designated by **38**. The Venetian blind **36** is in this case carried by the straight lintel **16***a* of the inner sash in such manner as to be located between the sashes.

In the construction according to Fig. 4, the Venetian blind **36** is carried by the straight lintel **12** of the frame, the sash **14**, **16** with its glass pane **34** being then laterally suspended on hinges **40**.

In the construction according to Fig. 5, the Venetian blind **36** is also suspended from the lintel **12** of the frame, but in this instance there are double sashes, i. e. an inner sash **14***c*, **16***c* and an outer sash **14***d*, **16***d*, the Venetian blind being housed between the glass panes **34***c*, **34***d* of said sashes.

In the construction shown in Figs. 6–9, **60** designates the wall having the window inserted therein; **62** denotes the part of the frame provided with round corners **64**, **66**; **68** is the straight lintel of the frame; **70** is the part of the inner sash provided with round corners **72**, **72**; **74** is the straight lintel of the inner sash, and **76** denotes the pivot hinges. The yoke-shaped part of the outer sash with its round lower corners **80** is designated by **78**, and **82** denotes the straight lintel thereof. The window pane of the inner sash is designated by **84**, and the pane of the outer sash is denoted by **86**. The yoke-shaped parts **62**, **70** and **78** of the window frame, the inner sash and the outer sash respectively are, like the straight lintels **68**, **76** and **82**, made from metal profiles, which may be provided with ridges or fillets **88**, **90**, on a portion of the visible surfaces to avoid disturbing light reflections and to achieve an aesthetically attractive appearance. The outer sash is suspended on the inner sash by means of coupling hinges **92** at the lower border thereof.

The inner sash is cold-insulated from the outer sash by a packing **94** laid over a flange **96** and secured thereto, said flange being formed on the yoke-shaped portion **70** of the inner sash and extending along the lower side and the vertical borders thereof. This packing **94** also forms a tightening member against a channel **98** in the portion of the frame located below the pivot hinges **76**. Provided above the pivot hinges and on the lintel **76** of the inner sash is an abutment **100**, along which is laid

a corresponding packing **102** forming an abutting surface and a tightening member against a channel **106** in the lintel **68** of the frame, said channel being preferably provided with an additional tightening strip **104**. A flange **108** on the outer sash may also extend upwardly inside the channel **106** so as to tighten against the tightening strip **104**. The abutting surfaces and the channels set forth permit the window to be opened by turning the sashes about a horizontal axis determined by the pivot hinges, with the lower border of the sashes outwardly, by a maximum of approximately half a revolution into a position where the outer sash will face the room so as to permit of being readily cleaned.

In order that the outside of the window shall become entirely cold-insulated from the inside thereof an insulating packing may also be provided in the window frame, namely, as shown in Fig. 10. Here, the frame consists of an outer frame member **110** and an inner frame member **112**, the latter being provided with a flange **114** engaging a U-shaped part **116** on the outer frame member **110**. A packing **118** is laid over the flange **114** so that the frame members become insulated from one another. An abutting fillet secured to the upper half of the frame is designated by **120**. As the packing **94** on the flange **96** of the inner sash also insulates the outer sash and the inner sash from one another, the whole outside of the window is insulated from the inside thereof, so that transfer of cold will be reduced or prevented.

If desired, the window may obviously be completed by special abutting fillets on the frame and the sash. If the window is mounted in a wall opening with right-angled corners, the metallic frame may be supplemented at the round corners thereof by means of insets in any suitable manner. Frequently, it will be found suitable to secure a rectangular frame of wood or some other material in the wall opening, the metallic frame being then secured in said rectangular frame. Such a frame is designated by **122** where it occurs, said frame being generally entirely concealed by the metallic frame, supplemented, if found suitable, by a special sheet-metal covering.

What I claim is:

A window comprising an outer stationary frame, an inner stationary frame connected with the outer frame, heat insulating means mounted between said frames, an outer sash, an inner sash connected with said outer sash to form a unit pivoted to one of said frames, at least one of said frames and at least one of said sashes each comprising an integral member made from a single metallic bar extending along a whole side and along the whole or a substantial portion of two adjacent sides of the window, the fourth side being formed by a straight member forming right angles with the adajcent side members, the straight member of one of the frames being formed as a holder or a head of screening means.

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