

Sept. 10, 1968

L. HAIMES ET AL

3,400,958

INTERLOCKING CLOSURE

Filed Oct. 3, 1966

2 Sheets-Sheet 1

FIG. 1

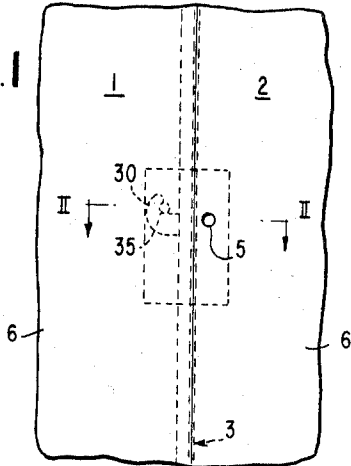


FIG. 2

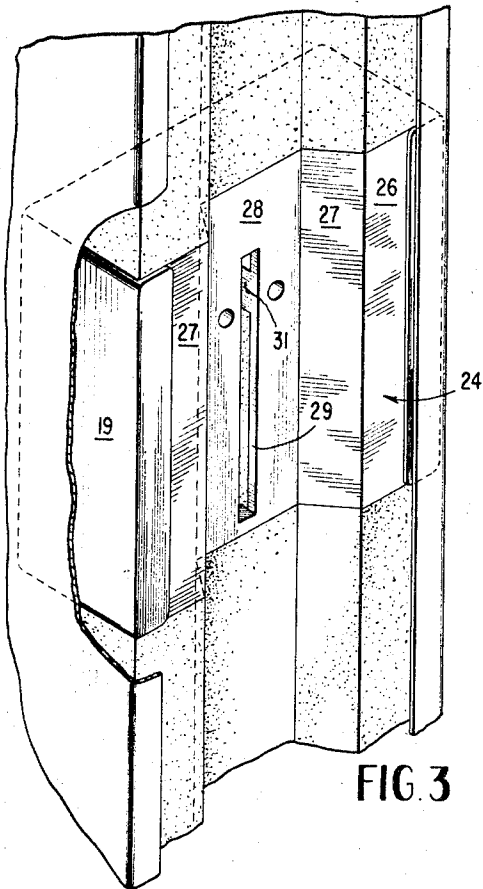
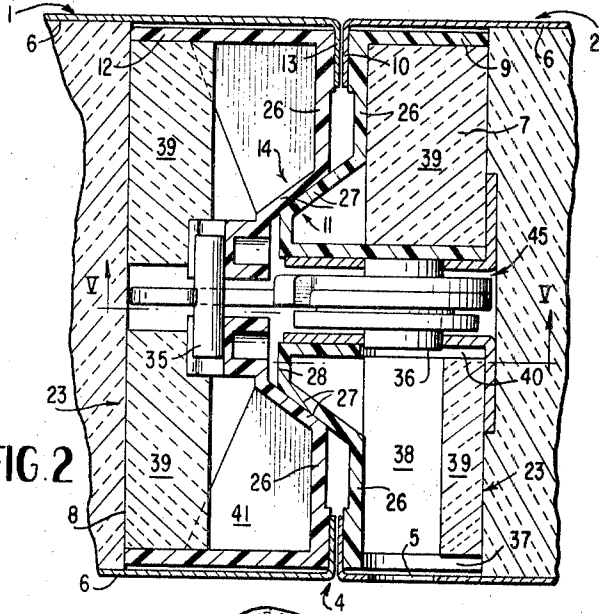


FIG. 3

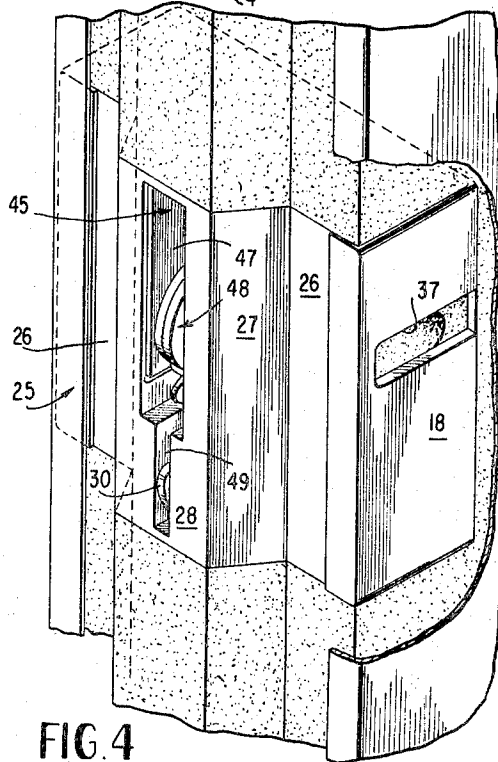


FIG. 4

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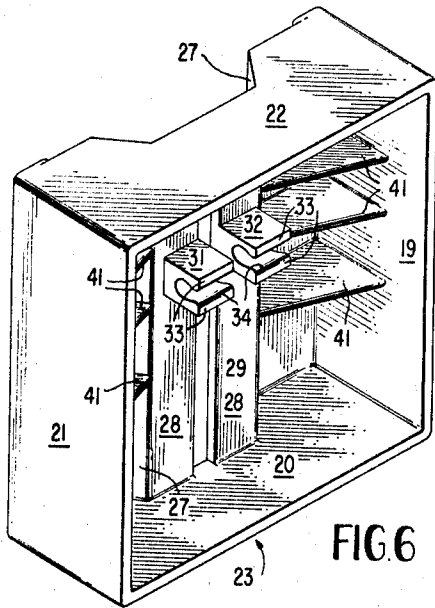


FIG. 6

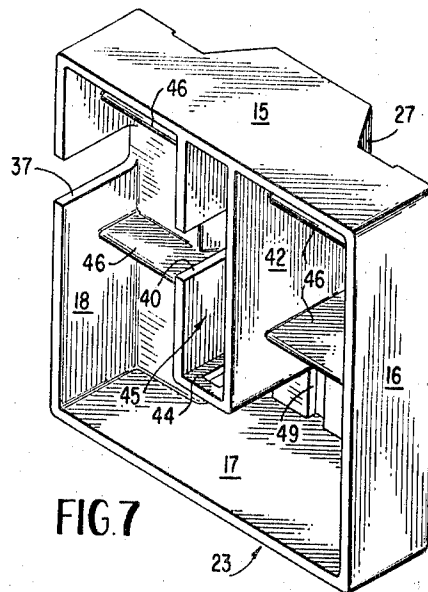


FIG. 7

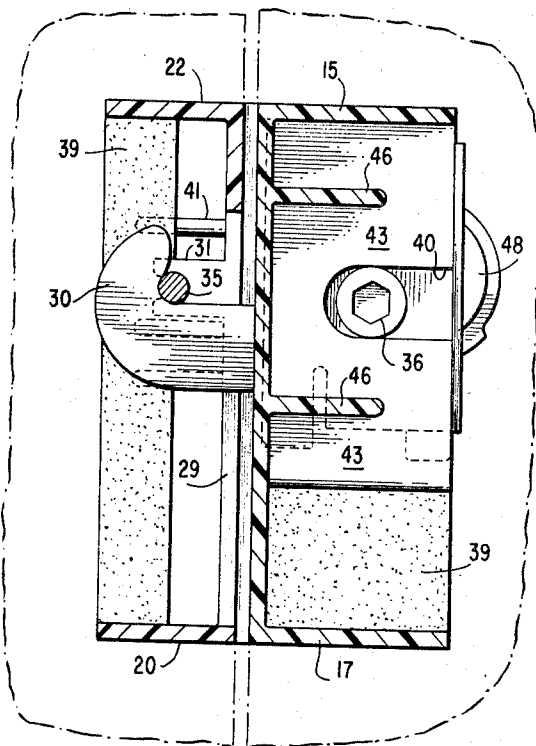


FIG. 5

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INTERLOCKING CLOSURE

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Filed Oct. 3, 1966, Ser. No. 583,674
22 Claims. (Cl. 287—189.36)

ABSTRACT OF THE DISCLOSURE

An insulated enclosure having at least two wall members joined at adjacent surfaces provided with respectively a tongue and groove sealing by a latch mechanism carried within housings mounted respectively within the two wall members. The housings are molded from synthetic plastic with mating tongues and grooves, and extend substantially the entire width of the wall members. The housings are provided with additional wall members forming a well for the latch mechanism and with reinforcing webs extending between their outside walls and the additional walls.

Background of the invention

In the prior art, there is no satisfactory closure, including housings, for rigidly interlocking two members in a sealed manner. This is especially true in the construction of insulated enclosures, for example, large commercial refrigeration units comprising a plurality of insulated walls or panels that are releasably secured together so that they may be completely disassembled to remove the contents of the insulated enclosure or transport the panels in the insulated enclosure separately in a space-saving manner. The prior art has not provided any closures that will satisfactorily rigidly secure such panels together in a sealed manner, while being simple to use and construct.

Summary of the invention

It is an object of the present invention to overcome the above disadvantages. It is a further object of the present invention to provide a satisfactory closure that will rigidly secure panels together in a sealed manner.

Another object of the present invention is to provide a closure that has mating housings provided with cooperating tongue and groove means to interlock the housings in a rigid manner and to provide a sealed construction for constructing a rigid knock-down type insulated enclosure and for reducing heat transfer, respectively.

The closure of the present invention is particularly well suited for use in the construction of an insulated enclosure that is made up of a plurality of separate insulated walls or panels. These separate walls may be releasably connected together to present a single larger wall or they may be connected together at right angles to provide the corner construction of the insulated enclosure. The closure of the present invention employs two mating housings, preferably made of plastic, that have cooperating tongue and groove means extending over the entire longitudinal direction of the enclosure to provide rigidity to the panel sections and to reduce any heat transfer between the housing members of the closure. The housings may be filled with foamed plastic to further reduce the heat transfer and may be provided with reinforcing webs to further increase the rigidity of the construction. Also, the panels may be constructed with interlocking tongue and groove means similar to the tongue and groove means of the housings to increase the rigidity and insulating characteristics of the structure. Furthermore, the housings of the present invention are provided with specific structural details for economically and satisfactorily mounting a latch mechanism; the latch mechanism per se forms no part of the present invention except in combination with the re-

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maining structure. Preferably, the housings are injection molded of styrene, and the foamed plastic used to fill the housings and the interior of the panels may also preferably be styrene. However, other suitable materials, including other synthetic plastics are contemplated within the broad scope of the present invention. The panels may be constructed wholly of wood or they may be corrugated, etc., within the broad teachings of the present invention.

Brief description of the drawing

Further objects, features and advantages of the present invention will appear from the following description of the accompanying drawing, in which:

FIGURE 1 is a partial side elevation view of an insulated enclosure showing two separate panels held together by the closure of the present invention;

FIGURE 2 is a partial cross-sectional view taken on line II—II of FIGURE 1;

FIGURE 3 is a perspective view of the left hand panel of FIGURE 1 when it is unconnected;

FIGURE 4 is a perspective view of the right hand panel of FIGURE 1, when it is unconnected;

FIGURE 5 is a partial cross sectional view taken on line V—V of FIGURE 2;

FIGURE 6 is a perspective view of the housing that is shown in FIGURE 3, showing the other side of the housing; and

FIGURE 7 is a perspective view of the housing that is shown in FIGURE 4, showing the other side of the housing.

Detailed description of the drawing

In FIGURE 1, two panels 1 and 2 are joined together at their abutting edges to effectively form one continuous panel. However, it is understood that the present invention may be employed with panels that are joined together at right angles to form a corner; this would necessitate a modified structure of one of the panels. The panels 1 and 2 have cooperating tongue and groove means 3, generally indicated with dotted lines, to provide for rigidity and stability of the panel connection and to prevent excessive heat loss through the panel connection. The panels 1 and 2 are securely held together by means of a latching closure 4, which may be selectively manually engaged and disengaged by an operator adapted to extend through a hole 5 in the outside wall of the panel 2.

As shown in FIGURE 2, the panels 1 and 2 are of substantially identical construction. Each panel has an outside sheet metal wall 6 that is formed to constitute a hollow substantially rectangular panel of sheet metal. The space between the outside walls 6 is completely filled with insulating material, preferably foamed plastic 7, except for recess portions 8 provided for receiving the latching closure 4.

A first housing 9 is mounted within the recess 8 of the panel 2 by a flange 10 of the outside wall 6. The housing 9 is provided with a tongue portion 11. A second housing 12 is mounted within the recess 8 of the panel 1 by means of a flange 13 on the outside wall 6. The housing 12 is provided with groove means 14 for tightly receiving the tongue portion 11. As shown in FIGURES 3 and 4, the tongue and groove connection is provided over the entire longitudinal extent of the housings 9 and 12. Also, it is seen that the tongue and groove connections are extended over into the insulating material 7 so that the entire connecting surfaces of the panels 1 and 2 are provided with a tongue and groove connection to increase the stability of the connection and to provide for decreased heat transfer.

Each of the housings includes four side walls 15—22 that are integrally connected together along their adjacent edges to constitute a rectangular tubular shaped member

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having one open end 23. Front walls 24 and 25 substantially close the other end of each tubular shaped member of housings 12 and 9, respectively. Each of the front walls 24 and 25 is of a similar construction; therefore, similar numerals will be used for similar portions. Each of the front walls 24 and 25 comprises outside wall portions 26 that are generally parallel and coplanar with respect to each other for each of the housings 9 and 12. Also, each of the front walls 24 and 25 comprise two generally rectangular inclined wall portions 27 that are connected along their outside edges with the adjacent inside edges of the outside wall portions 26. The inclined wall portions 27 are joined by a bridging wall portion 28 for each of the housings 9 and 12; the bridging wall portion is connected to the inside edges of the inclined wall portions 27 and extends substantially parallel to the outside wall portions 26. The inclined wall portions 27 and the bridging wall portion 28 for the housing 12 constitute the groove means 14. The inclined wall portions 27 and the bridging wall portion 28 for the housing 9 constitute the tongue portion 11.

As shown in FIGURES 2, 3, 5 and 6, the bridging wall portion 28 of the housing 12 is provided with an elongated narrow slot 29 for receiving the latch hook portion 30. Two U-shaped members 31 and 32 extend outwardly from the inside surfaces of the bridging wall portion 28 on each side of the slot 29. The free legs 33 of the U-shaped members are formed with cam surfaces 34 on the outward portion of their inside surfaces to provide for an internal area of increased diameter. The legs 33 can be deformed away from each other in a resilient manner, because they are preferably constructed of injection molded plastic in a one-piece construction with the remaining portions of the housing. A pin 35 is assembled into the area of increased diameter by forcing it along the cam surfaces 34 to resiliently spread the legs 33 so that the pin 35 is tightly held between the U-shaped members 31 and 32. As shown in FIGURES 2 and 5, the latch hook portion 30 engages the pin 35 when the closure is in the latched position. The latch hook portion 30 is movable between an open position wholly within the first housing 9, as shown in FIGURE 4, and a closed position extending outwardly from the housing 9 into engagement with the pin 35, as shown in FIGURES 2 and 5.

As mentioned previously, the actual latch including the latch hook portion 30 may be of a conventional construction. The latch hook portion is moved between the above mentioned two positions by means of an operator that includes a hexagonal opening driving connection that is adapted to receive an Allen-type wrench (not shown) as shown in FIGURES 2 and 5. To actuate the latch hook portion 30 an Allen wrench would be inserted from the outside through the opening 5 in the outside wall 6, through an aperture 37 in the side wall 18, through a channel 38 that is formed in the insulation material 39 filling the inside area of the housing, through a suitably formed aperture 40, and into the driving connection 36. The insulation material 39 is placed within the majority of the area enclosed by the housings 9 and 12 to decrease heat loss through the housing. This insulation material 39 may be foamed plastic similar to the insulation material 7.

To improve the rigidity of the housings, a plurality of reinforcing webs 41 extend between the side walls 19, 21, outside wall portions 26, and inclined wall portions 27 of the second housing 12. In the first housing 9, three additional wall portions 42, 43 and 44 are integrally attached to the front wall 25, the side wall 15 and each other to form a latch well 45 as shown in FIGURES 2, 4 and 7. The latch well 45 tightly receives the latch mechanism 36, 30. Also, the additional wall portions 42-44 contribute to the rigidity of the housing 9. A plurality of reinforcing webs 46 extend between the side walls 16, 18, the additional wall portions 42, 43 and the front wall 25 of the housing 9 to increase its rigidity. The latch well 45 is provided with a widened slot portion 47 for receiving the

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body 48 of the latch mechanism, and a narrow slot portion 49 for receiving the latch hook portion 30.

It is thus seen that the reinforcing web and the additional wall portions contribute greatly to the rigidity of the molded housings. The tongue and groove connection between the molded housings provide a rigid interlocking connection between the housings when the latch hook portion 30 engages the pin 35. The latch mechanism will tightly draw the housings toward each other to form a secure seal between the inclined wall portions 27, as indicated in FIGURE 2. This will insure a good heat transfer barrier and increase the rigidity of the connection. The simple and economical closure of the invention provides for a rigid and sealed connection between adjacent panel members in the construction of an insulated enclosure that may be easily disassembled in a rapid manner for transport, storage, or removal of its contents.

The above embodiments have been shown and described only as examples of the present invention; other modifications and embodiments according to the broad aspects of the invention are contemplated within the spirit and scope of the present invention as defined by the following claims.

We claim:

1. A closure for two members to be connected, comprising a first housing having a tongue portion; a second housing having groove means for tightly receiving said tongue portion to interlock said housings and resist relative movement; each of said housings including means for holding said first and second housing together with said tongue and groove portions tightly engaged; each of said bridging wall portions including a slot extending in the direction of said tongue portion and groove means; a latch mechanism comprising a pin mounted in one of said housings to extend transversely across the corresponding one of said slots and a latch hook portion mounted for movement between a position wholly within the other of said housings and a position extending outwardly through the other of said slots for engagement with said pin; two U-shaped members of synthetic plastic extending integrally from the inside surface of the bridging wall portion of said one housing on opposite sides of said one of said slots; said U-shaped members having cam surface means to tightly and resiliently engage said pin within and between said U-shaped members.

2. A wall, comprising: two wall members having joining surfaces to be connected; a first latch housing mounted within one of said two wall members at the respective joining surface and having a tongue portion; a second latch housing mounted within the other of said two wall members at the respective joining surface and having groove means for tightly receiving said tongue portion to interlock said housings and resist relative movement; each of said housings including means for mounting a corresponding part of a latch means for holding said first and second housings together with said tongue and groove portions tightly engaged.

3. The device of claim 2, wherein each of said housings includes four side walls rigidly joined on their adjacent edges to constitute a rectangular tubular shaped member having one open end; a front wall substantially closing the other end of said tubular shaped member; said front wall consisting essentially of two generally rectangular outside wall portions generally parallel and coplanar with respect to each other, two generally rectangular inclined wall portions connected along their adjacent edges to the inner edges of said outside wall portions, and a generally rectangular bridging wall portion connected to the inside edges of said inclined wall portions and extending substantially parallel to said outside wall portions; and the corresponding bridging and inclined wall portions of each of said housings constituting respectively said tongue portion and said groove means; and said side walls being joined along their corresponding edges to the outside

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edges of each of said outside, inclined and bridging wall portions.

4. The device of claim 3 wherein each of said housings consists essentially of a molded synthetic plastic.

5. The device of claim 4 wherein the interior of each of said housings is substantially filled with a foamed synthetic plastic.

6. The device of claim 5, wherein each of said wall members comprises a hollow rectangular panel of sheet metal and foamed synthetic plastic substantially completely filling the interior of said panel for connection to form an insulated enclosure; said joining surfaces having tongue and groove means that form extensions of and substantially correspond to said tongue portion and said groove means of said housing over their entire extent; said joining surfaces having recess portions for receiving said housings; and said housings being mounted in their respective recessed portions for alignment of said tongue portion and groove means with said tongue and groove means.

7. The device of claim 6, wherein each of said bridging wall portions includes a slot extending in the direction of said tongue portion and groove means; a latch mechanism comprising a pin mounted in one of said housings to extend transversely across the corresponding one of said slots a latch body mounted in the other of said housings and a latch hook portion mounted for movement between a position wholly within the other of said housings and a position extending outwardly through the other of said slots for engagement with said pin.

8. The device of claim 7, including two U-shaped members of synthetic plastic extending integrally from the inside surface of the bridging wall portion of said one housing on opposite sides of said one of said slots; said U-shaped members having cam surface means to tightly and resiliently engage said pin within and between said U-shaped members.

9. The device of claim 8 including a plurality of reinforcing webs extending between and rigidly attached to oppositely disposed side walls, said outside wall portions and said inclined wall portions.

10. The device of claim 9 wherein said latch means includes an operator for moving said latch hook portion between its two positions; said other housing having an opening in one of said side walls for providing access to said operator.

11. The device of claim 10 including additional wall portions substantially parallel to corresponding side wall portions and extending inwardly from the edges of said slot in said other housing to constitute a latch well for receiving the latch body that is completely enclosed about its periphery by said additional side wall portions; said reinforcing webs for said other housing extending to and integrally joined with the adjacent additional side portions of said latch well.

12. The device of claim 11 wherein said latch well has a widened slot portion for receiving the body of said latch means and a narrowed slot portion for receiving said hook portion.

13. The device of claim 2, wherein each of said housings consists essentially of a molded synthetic plastic.

14. The device of claim 2, wherein the interior of each of said housings is substantially filled with a foamed synthetic plastic.

15. The device of claim 2, wherein each of said wall members comprises a hollow rectangular panel of sheet metal and foamed synthetic plastic substantially completely filling the interior of said panel for connection to form an insulated enclosure; said joining surfaces having tongue and groove means that form extensions of and substantially correspond to said tongue portion and said groove means of said housing over their entire extent; said joining surfaces having recess portions for receiving said housings; and said housings being mounted in their respective recessed portions for alignment of said tongue portion and groove means with said tongue and groove means.

16. The device of claim 3, wherein each of said bridging wall portions includes a slot extending in the direction of said tongue portion and groove means; a latch mechanism comprising a pin mounted in one of said housings to extend transversely across the corresponding one of said slots and a latch hook portion mounted for movement between a position wholly within the other of said housings and a position extending outwardly through the other of said slots for engagement with said pin.

17. The device of claim 3, including a plurality of reinforcing webs extending between and rigidly attached to oppositely disposed side walls, said outside wall portions and said inclined wall portions.

18. The device of claim 16, wherein said latch means includes an operator for moving said latch hook portion between its two positions; said other housing having an opening in one of said side walls for providing access to said operator.

19. The device of claim 3, wherein each of said bridging wall portions includes a slot extending in the direction of said tongue portion and groove means; a latch mechanism comprising a pin mounted in one of said housings to extend transversely across the corresponding one of said slots and a latch hook portion mounted for movement between a position wholly within the other of said housings and a position extending outwardly through the other of said slots for engagement with said pin; additional wall portions substantially parallel to corresponding side wall portions and extending inwardly from the edges of said slot in said other housing to constitute a latch well for receiving the latch body that is completely enclosed about its periphery by said additional side wall portions; said reinforcing webs for said other housing extending to and integrally joined with the adjacent additional side portions of said latch well.

20. The device of claim 19, wherein said latch mechanism has a body pivotally mounting said hook portion; said latch well has a widened slot portion for receiving the body of said latch means and a narrowed slot portion for receiving said hook portion.

21. The device of claim 2, wherein each of said wall members comprises a hollow rectangular panel of sheet metal; said joining surfaces having tongue and groove means that form extensions of and substantially correspond to said tongue portion and said groove means of said housings over their entire extent; said joining surfaces having recessed portions for receiving said housings; and said housings being mounted in their respective recess portions and abutting on opposite sides with the interior surface of the sheet metal with said housings extending substantially the entire width of said wall members for alignment of said tongue portion and groove means with said tongue and groove means.

22. The device of claim 21, wherein the interior of said wall members is substantially completely filled with foam synthetic plastic providing the sole support for said housings in the direction of the extent of said tongue and groove means and the direction inwardly of and generally perpendicular to said joining surfaces; the sheet metal of said wall members being bent inwardly on opposite sides of said joining surfaces to overlap the respective housings and form abutment means preventing outward withdrawal of said housings generally perpendicular to said joining surfaces.

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