April 15, 1969 H. W. LONG 3,438,069

CRIB WARMER

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FIG. 1.

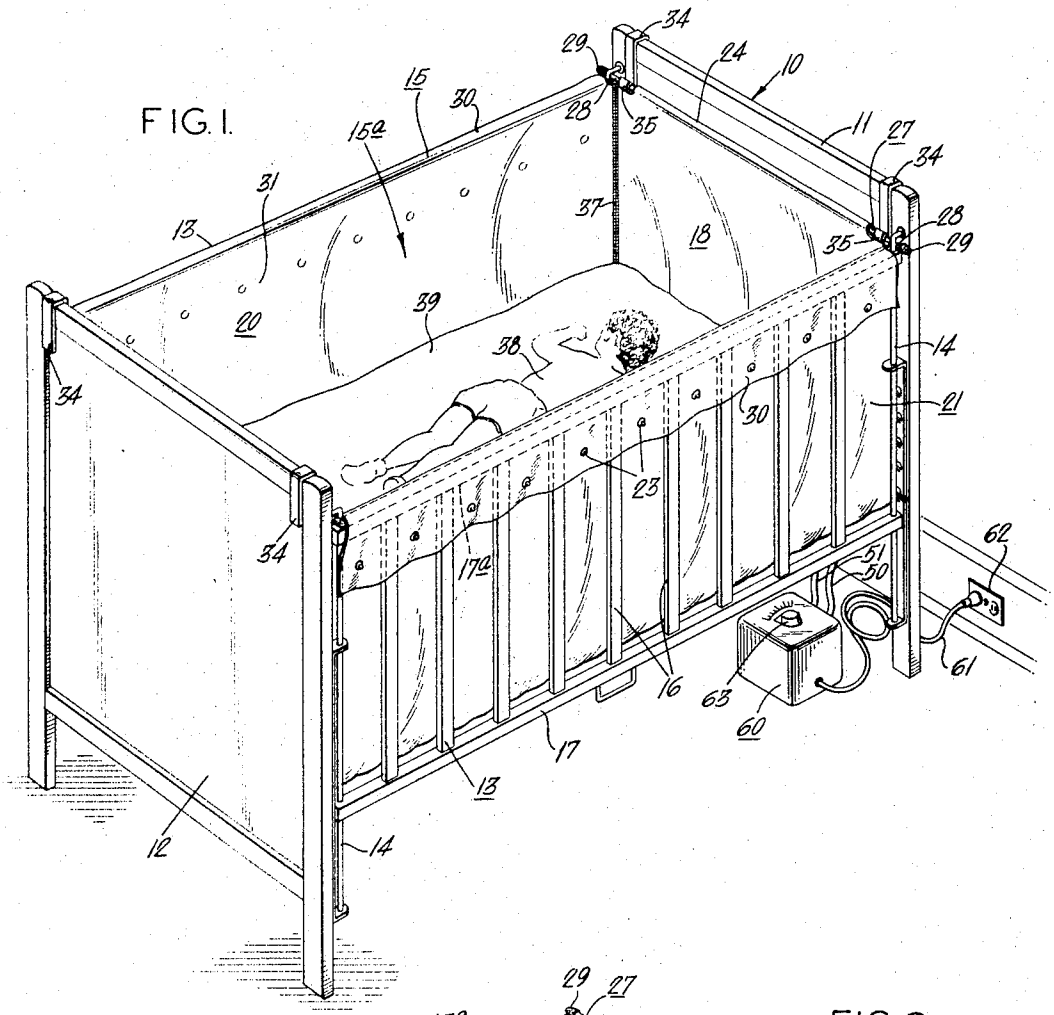
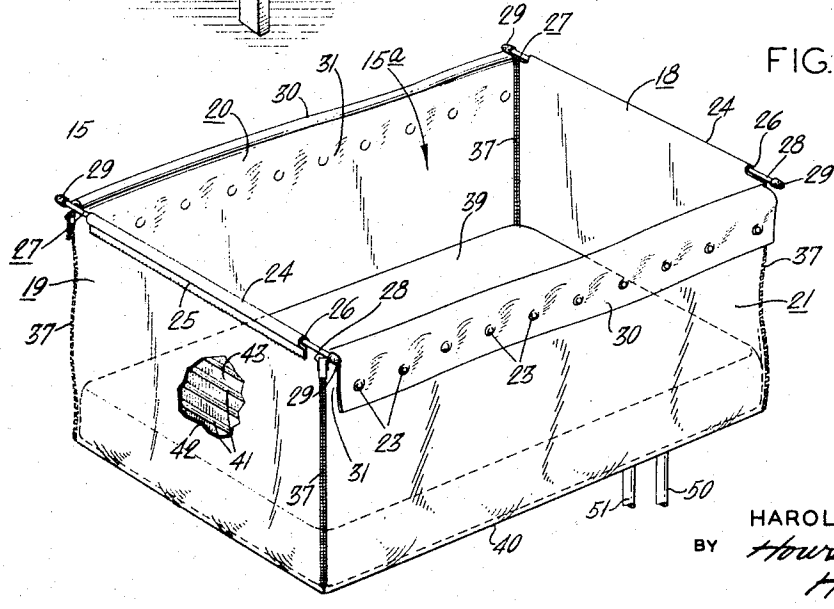


FIG. 2.



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FIG. 3.

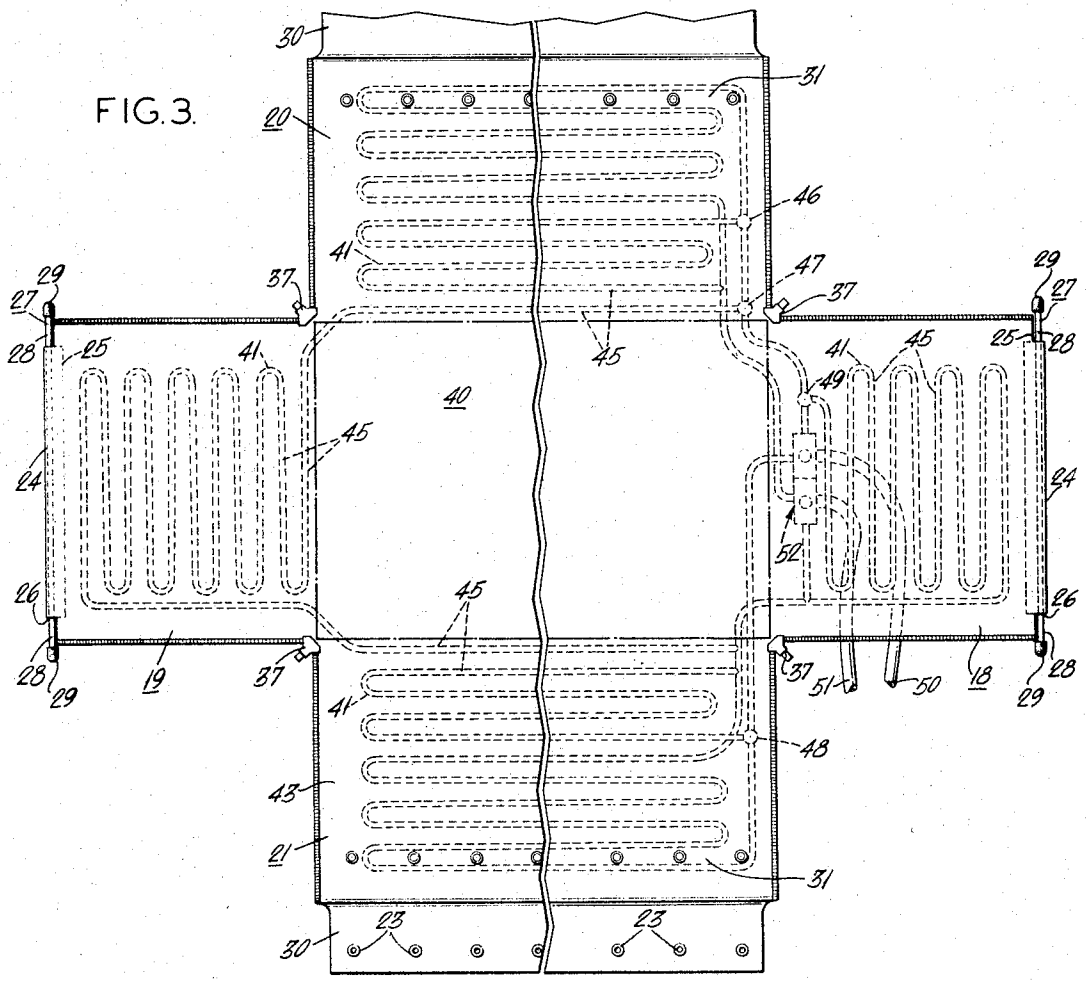
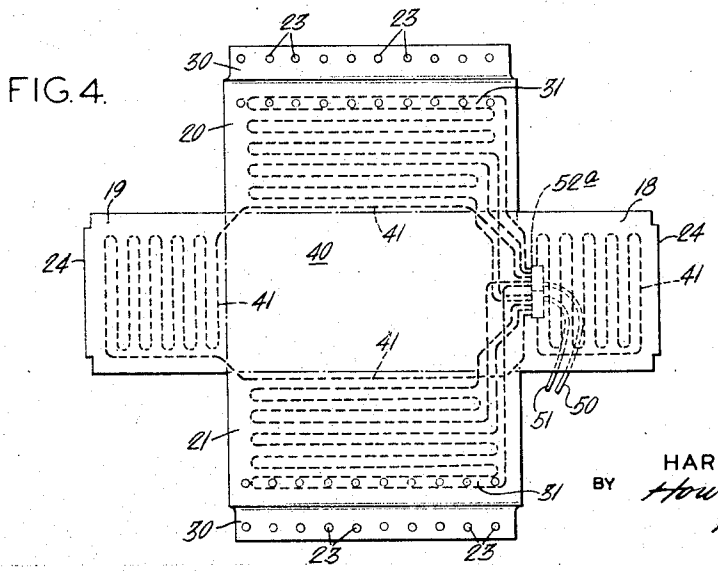


FIG. 4.



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CRIB WARMER

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U.S. Cl. 5—348 5 Claims

ABSTRACT OF THE DISCLOSURE

A baby crib having upstanding sides is provided with a flexible liner which forms an enclosure therein, and a series of passageways within the sides of the liner contain a heated fluid which is circulated therein to warm the enclosure. The fluid is heated by an electrical control unit, located near the crib, which also thermostatically regulates the fluid temperature. A circulating pump, contained within the control unit, is connected to the passageways for circulating the heated fluid.

This invention relates to heating devices, and more particularly, it relates to devices for warming the cribs of small children.

Today, there is available to the consumer a wide selection of heated blankets designed to increase sleeping comfort. Most of these blankets, more commonly known in the trade as thermal blankets, are heated by electrical current that is supplied to resistance elements within the blanket. In addition to this type of blanket is one which contains a series of fluid passageways through which a controlled temperature fluid is circulated to warm the sleeping user. With both of these types of blankets, however, it is contemplated that the user will remain under them throughout his sleep. As certainly any parent would realize, this situation is the exception rather than the rule with respect to infants and small children. While sleeping, the small child frequently becomes separated from his bed covers, thereby necessitating constant surveillance on the part of a parent to insure that the child remains properly covered, since upper respiratory infections might result from his being improperly covered. Another concern of parents is the possibility their child might smother himself with the bed covers that are located in his sleeping area.

Electrically heated bassinet liners, known in the prior art, possess certain disadvantages. Among these disadvantages is the inability of the electrical resistance elements within the liner to withstand rough treatment which may be expected from active children; thus their utility is limited primarily to infants. The mere presence of electricity in close proximity with small children also creates parental anxiety, especially in light of the probings of small children with their hands and teeth. Wet bedclothing and its known propensity for electrical conduction does not diminish parental concern about their child's safety.

In addition to the aforementioned disadvantages associated with electrically heated liners, there exists an ever present danger that the liner's resistance elements may locally overheat the liner or even start a fire within the lined enclosure. Although these liners may be provided with thermostats designed to prevent this, nevertheless, the malfunction of such a thermostat would prove highly injurious, if not fatal, to a small child.

One of the objects of this invention, therefore, is to provide the bed of a small child with an improved device that will keep the child warm in the absence of bed covers in order to preserve the child's health and to obviate the dangers associated with bed covers.

Another object of this invention, therefore, is to provide a sturdy, heated, baby crib liner that eliminates the safety hazards associated with having electricity in close proximity with active children.

As a further object, this invention provides a baby crib with a box-like, flexible liner which contains fluid passage means through which a heated fluid is circulated. Means, located a safe distance externally of the crib, is provided for heating and regulating the temperature of the fluid, so that the liner is maintained at a uniform temperature throughout. In this manner, localized overheating or fire within the liner is obviated, and a child occupying the lined enclosure is completely protected.

Other objects, features and advantages will become apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a baby crib having a flexible liner embodying the present invention;

FIG. 2 is a perspective view of the crib liner of FIG. 1 with an end panel partially broken away to illustrate the arrangement of flexible tubes therein;

FIG. 3 is a foreshortened, top plan view of the crib liner of FIG. 1 in its flattened condition, and illustrating the arrangement of the tubes within the side and end panels; and

FIG. 4 is a reduced, top plan view of the crib liner of FIG. 1 showing a modified arrangement for interconnecting the tubes.

The aforementioned objects are achieved in the present invention by providing a baby crib having upstanding sides with a flexible liner adjacent to the interior of the sides to form a box-like enclosure within the crib. The liner has a rectangular bottom panel and side panels along its periphery which forms the box-like enclosure when they are disposed upwardly about the bottom panel and are connected together by fasteners. A bank of flexible tubes, secured within each side panel in a sinuous pattern, are interconnected to provide parallel conduits for the flow of a heated fluid. A distribution header is connected to the tubes and distributes the heated fluid therethrough in order to provide each panel with a uniform fluid temperature. Connected to the header and located near the crib is an electrical control unit which contains a fluid heater and a circulating pump. The temperature of the fluid is maintained within a predetermined range by an adjustable thermostat located on the control unit. When power is supplied to the electrically operated control unit, the fluid is heated and circulated throughout the tubes in the liner side panels and transfers its heat to the enclosure. This heat warms the space within the enclosure to permit a child placed therein to sleep comfortably and safely without bed covers.

Referring now to the drawings, FIG. 1 illustrates a conventional baby crib **10** having a head end **11**, a foot end **12**, and sides **13**. The sides **13** are constructed in a conventional manner, with two elongated members **17** and **17***a* extending from the head end **11** to the foot end **12**, being secured together by means of parallel slats or rungs **16** to form spaces therebetween. The sides **13** are secured to the head and foot ends **11** and **12** respectively in a manner which permits them to slide along tracks or guides **14**. In this way each side **13** may be raised to its uppermost position as shown in FIG. 1, or lowered into an inoperative position as desired.

A flexible liner **15**, having end panels **18** and **19**, and side panels **20** and **21** respectively, is positioned within the crib **10** adjacent to the crib sides to form an enclosure **15***a* therein. The liner **15** also has a bottom panel **40** (FIG. 3) upon which a mattress **39** may be placed for use by a sleeping child **38**. The mattress **39**, disposed along the lowermost portion of the enclosure formed by the liner **15**, extends across the entire area of the bottom panel **40**. With this arrangement, the mattress **39** may

be readily removed from the enclosure for removing and replacing the bed sheets, or for removing the liner from the crib.

Means is provided to support the sides **20** and **21** of the liner **15** as they extend upwardly from the bottom panel **40**. To this end, each side panel is provided along its uppermost edge with a flap or extension **30**, having a series of snap fasteners **23** which are aligned within the spaces between the slats **16** when the sides **20** and **21** are in their upwardly disposed position and register with the complementary portions of the snap fasteners **23** located in the upper marginal portion **31** of each side panel. Thus, as shown in FIG. 1, each side panel is secured to the crib side **13** along its uppermost edge with releasable fasteners or other suitable fastening means which may be readily unfastened in order to facilitate the removal of the liner from the crib.

For the purpose of providing additional support for the liner **15**, the liner end panels **18** and **19** are each provided with a pocket **24** along the upper marginal edge **25** of the end panel. The pocket **24** is preferably formed by reversely bending an extending portion of each end panel and sewing or otherwise securing it along the edge **25**. In this manner, a pocket **24** is formed having an opening **26** which extends along substantially the entire upper edge of the panel **19** and which receives an elongated rod **27**. The elongated rod **27**, positioned within the opening **26** of the pocket **24**, has an end portion **28** projecting outwardly from the opening. These portions of the rod **27** engage the lower portion **35** of support members **34** located at the head and foot ends of the crib **10**. Each rod **27** is also provided with end caps **29** to avoid metal edges that would be dangerous to children. Thus the liner is maintained in proper position within the crib.

In accordance with a preferred feature of the invention, the liner may be removed from the crib and dismantled into flat condition for cleaning and/or storage. Referring again to FIG. 2, it may be seen that means are provided for releasably connecting the side and end panels along the upwardly extending corners' edges of the liner **15**. To this end, a slide fastener **37** is provided at each corner edge of the liner, in the present case a conventional zipper fastener with mating elements disposed along the lateral edges of the adjoining side and end panels. The slide fastener **37**, forming the box-like enclosure of FIG. 2 when engaged, may be partially or completely opened downwardly in order to facilitate the lowering of the crib sides. In this manner, the flexible side panels remain secured to the crib sides and move therewith to thereby obviate the necessity of unfastening the snap fasteners when the sides of the crib are lowered. In addition, wear on the side panels and the snap fasteners is reduced. It should also be appreciated that the cleaning and storing of the liner **15** is facilitated in the planar arrangement of FIG. 3 which is formed when the slide fasteners **37** are fully disengaged. Because the liner **15** is formed from a flexible, preferably cloth or plasticized material, the material forms hinges along the perimeter of the bottom panel **40**; however, if less flexible materials are used, a supplemental hinge arrangement may be necessary.

In accordance with a primary feature of the present invention, the warming of the enclosure formed by the liner **15** is accomplished by providing each of the side panels **18**, **19**, **20** and **21**, with passage means **41** for directing a flow of heated fluid therewithin. By referring to FIG. 3, it may be seen that the fluid passage means includes at least one tube **41**, preferably flexible, secured in a sinuous pattern in each panel. In the illustrated form of the invention the side panels are constructed from two layers or sheets of material **42** and **43**, as may be seen in FIG. 2. Both layers may be plastic in order to facilitate spot-cleaning of the liner **15**. However, it is desirable for at least the inner layer **43** to be plastic or of some other heat conductive material; whereas the outer layer **42** may be any flexible material. The tubes **41** are secured within each side panel between the layers **42** and **43** by any suitable securing means as would be readily apparent to one skilled in the art. The method of securing tubes to the side panels may vary depending upon the material from which the side panels are made; for example, if the material is plastic the tubes **41** may be heat-sealed in position within the side panels, and if the material is a fabric or a combination of a fabric and a plastic, it may be preferred to secure the tubes by stitching them in place. Regardless of the means used for securing the tubes in place, optimum results will be achieved with the tubes in contact with the inner layer **43** for conducting heat to and through the liner **15**.

Because of the desirability of uniformly heating the enclosure formed by the liner **15**, the tubes **41** are arranged within the side panels having straight, parallel, spaced-apart lengths **45** that are interconnected at their ends to form a continuous conduit within each side and end panel. The straight parallel lengths **45** extend substantially along the entire width of the heated side and end panels, upwardly or outwardly from the peripheral edge of the bottom panel **40** and generally parallel therewith to form a bank of tubes within each heated panel. The exact size and spacing of the tubes depends upon a number of variables, such as the temperature of the fluid circulated therein, the rate of fluid flow, and the volume of the enclosure to be heated. The rate of fluid flow within each bank may be regulated by flow regulators **46**, **47**, **48**, and **49**, which are connected with the tubes and are illustrated in FIG. 3. These flow regulators are connected to the upstream or supply end of the tubes **41** and preferably are manufactured to provide a predetermined proportion of flow through the respective banks, although they may be individually adjustable if desired.

For the purpose of supplying tubes **41** with a heated fluid, the tubes or passage means **41** are provided with an inlet means or supply conduit **50** and an outlet means or exhaust conduit **51** which are connected to the tubes in a suitable manner. Although a single tube arranged with a portion thereof within each side and end panel would be effective to heat the enclosure, it is preferable for each side and end panel to have a separate tube positioned therein and for the separate tubes to be connected to the inlet means **50** and the outlet means **51** in a manner which provides parallel paths for the flow of fluid therethrough. In order to achieve this, means for distributing the fluid is provided between the inlet and outlet means and each tube **41**. In the embodiment of FIG. 3, a header **52** cooperates with the flow regulators **46**, **47**, **48**, and **49** to afford parallel fluid communication between the separate tubes and the inlet and outlet means **50** and **51** respectively when a heated fluid is supplied thereto. It may be desirable to connect the ends of the tubes directly to a header **52***a* as shown in FIG. 4. In this case, the separate fluid flow regulators **46**, **47**, **48**, and **49** are eliminated and flow control devices are incorporated within the header **52***a*, thereby facilitating their adjustment and manufacture.

In a preferred embodiment of the invention, the source of heated fluid is a self-contained control unit **60** located near the head end of the crib. The control unit **60** is conventional and has within it a fluid reservoir, means including an electrical resistance element for heating the fluid contained within the reservoir, and a circulating pump which is connected to the inlet and outlet means **50** and **51** respectively to provide fluid circulation. Electrical power is supplied to the heating element and the circulating pump by means of a power cord **61** which is connected to a wall receptacle **62**. The control unit **60** also contains an adjustable thermostat which regulates the temperature of the heated fluid as it leaves the control unit, and it may be set to regulate the emperature of the discharged fluid within a predetermined

range by turning a knob **63** on the control unit **60** to a preselected temperature.

In operation, the reservoir within the control unit **60** is filled with a fluid, preferably water, and the control unit **60** is plugged into the wall receptacle **62**. With the knob **63** set at a preselected temperature, the electric heating element heats the fluid and the circulating pump supplies the heated fluid to the liner inlet means **50**. The heated fluid flows through the distribution header **52** and through each of the separate fluid passage means or tubes **41** to heat the enclosure, its temperature being slightly lower upon returning to the control unit **60**. This difference in temperature between the discharged fluid and the returning fluid is sensed by the thermostatic element and additional heat is supplied by the heating element as required.

Although a closed recirculating system is described in the preferred embodiment of the invention, where an adequate source of hot water exists it may be desirable to connect the inlet means **50** directly thereto and the outlet means **51** to a convenient drain for the cooler, return water. Also, although the fluid utilized in the recirculating system of the preferred embodiment is water, any one of a number of fluids which possess good heat-transfer properties may be substituted.

From the foregoing description it may be seen that the present invention provides a flexible, heated liner for baby cribs, which liner is rugged, safe, and obviates the need for bed covers and the dangers associated therewith. Although the preceding description refers to a preferred embodiment of the present invention, it must be understood that various modifications, alterations or changes may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A baby crib warmer for use in cribs having upright sides and a mattress support disposed therein along the lower portion of said sides, said crib warmer comprising:

a flexible crib liner having

a bottom panel,

side panels secured to said bottom panel along opposite edges thereof and extending upwardly therefrom, each of said side panels having means for releasably engaging an upper marginal portion of a selected pair of said crib sides, so that at least one of said pair may be disengaged therefrom, and

end panels secured to said bottom panel adjacent to said opposite edges and extending upwardly therefrom,

each of said side and end panels having an inner and an outer layer of flexible material,

means for releasably connecting adjacent side and end panels to form a box-like enclosure,

fluid passage means for directing a flow of fluid within each of said side and end panels, said passage means including at least one flexible tube secured in a sinuous pattern between said layers having an inlet means and an outlet means for communicating the interior thereof with a source of heated fluid,

means for circulating said heated fluid within said passage means, and

electrical means external to the crib for heating said fluid and electrical means for regulating the temperature of said heated fluid within a predetermined range,

whereby said heated fluid flows through said passage means and warms said enclosure so that said enclosure will be subjected to a controlled application of heat.

2. A crib warmer as defined in claim **1** wherein each of said end panels has means forming a pocket with an opening along the uppermost edge thereof and an elongated rod positioned within said opening and having a portion extending outwardly thereof to support said liner within said crib adjacent to its sides.

3. A crib warmer as recited in claim **1** wherein said tube has a bank of straight lengths disposed in parallel spaced relationship and interconnected at each end to form a continuous conduit intermediate said inlet and outlet means.

4. A crib warmer as defined in claim **1** wherein said passage means includes a series of separate flexible tubes with at least one tube of said series positioned within each of said panels, said tubes being interconnected to provide parallel fluid flow therethrough, and header means for affording parallel fluid communication between said tubes and said inlet and outlet means, so that when said heated flund is supplied to said inlet means a continuous flow occurs within said passage means.

5. A crib warmer as defined in claim **1** wherein said means for releasably connecting adjacent side and end panels to form a box-like enclosure includes slide fasteners having mating elements disposed along the lateral edges of adjoining side and end panels, said slide fasteners being opened downwardly to facilitate the lowering of the crib sides.

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U.S. Cl. X.R.

5—98, 284; 126—205; 128—400; 165—46, 76; 219—212, 217, 527, 537