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F. W. KUMNICK ET AL

3,540,171

INSULATED COVER FOR STEEL STORAGE AND THERMAL CONTROL

Filed June 18, 1968

3 Sheets-Sheet 1

FIG. 1

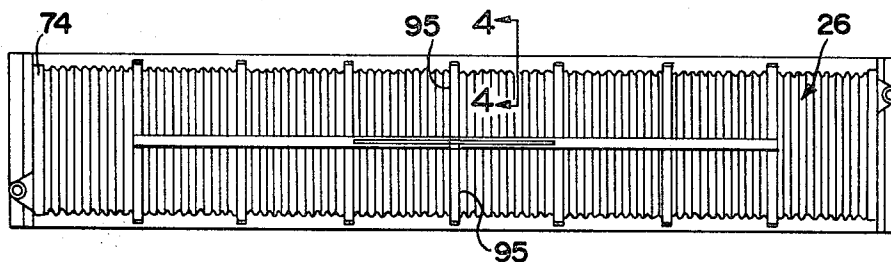
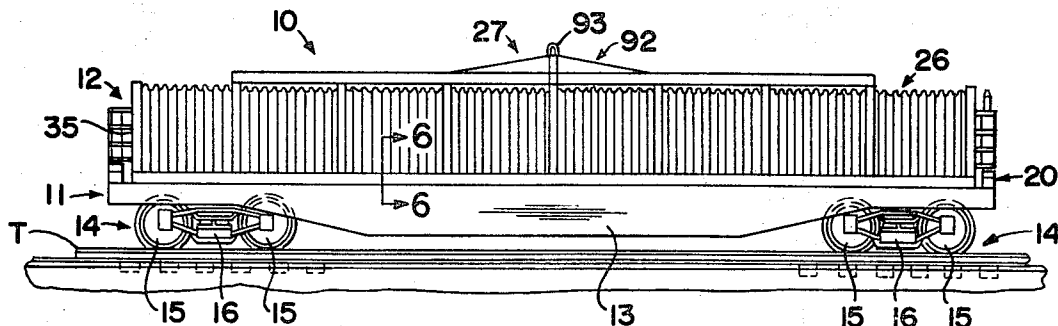


FIG. 2

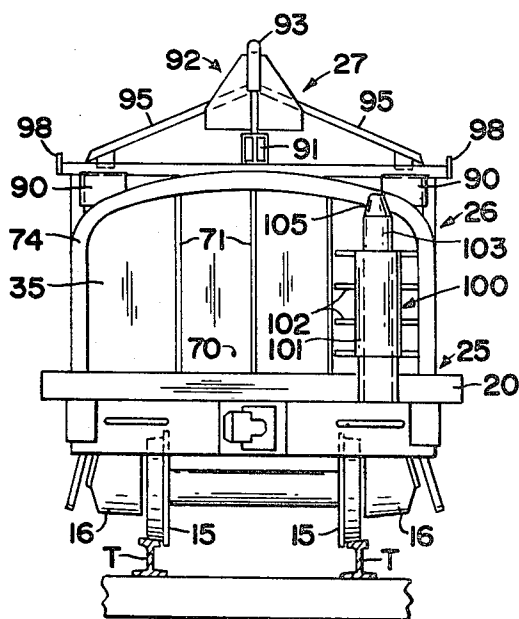


FIG. 3

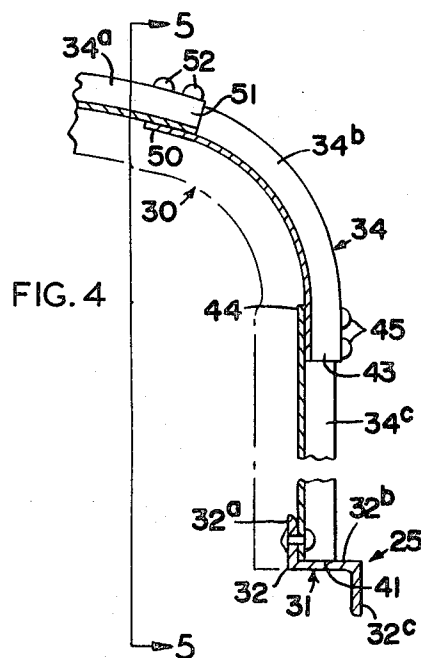


FIG. 4

INVENTORS
FREDERICK W. KUMNICK
CHARLES T. FLYNN

BY

Watts, Hoffmann, Fisher & Heinke

ATTORNEYS

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3 Sheets-Sheet 2

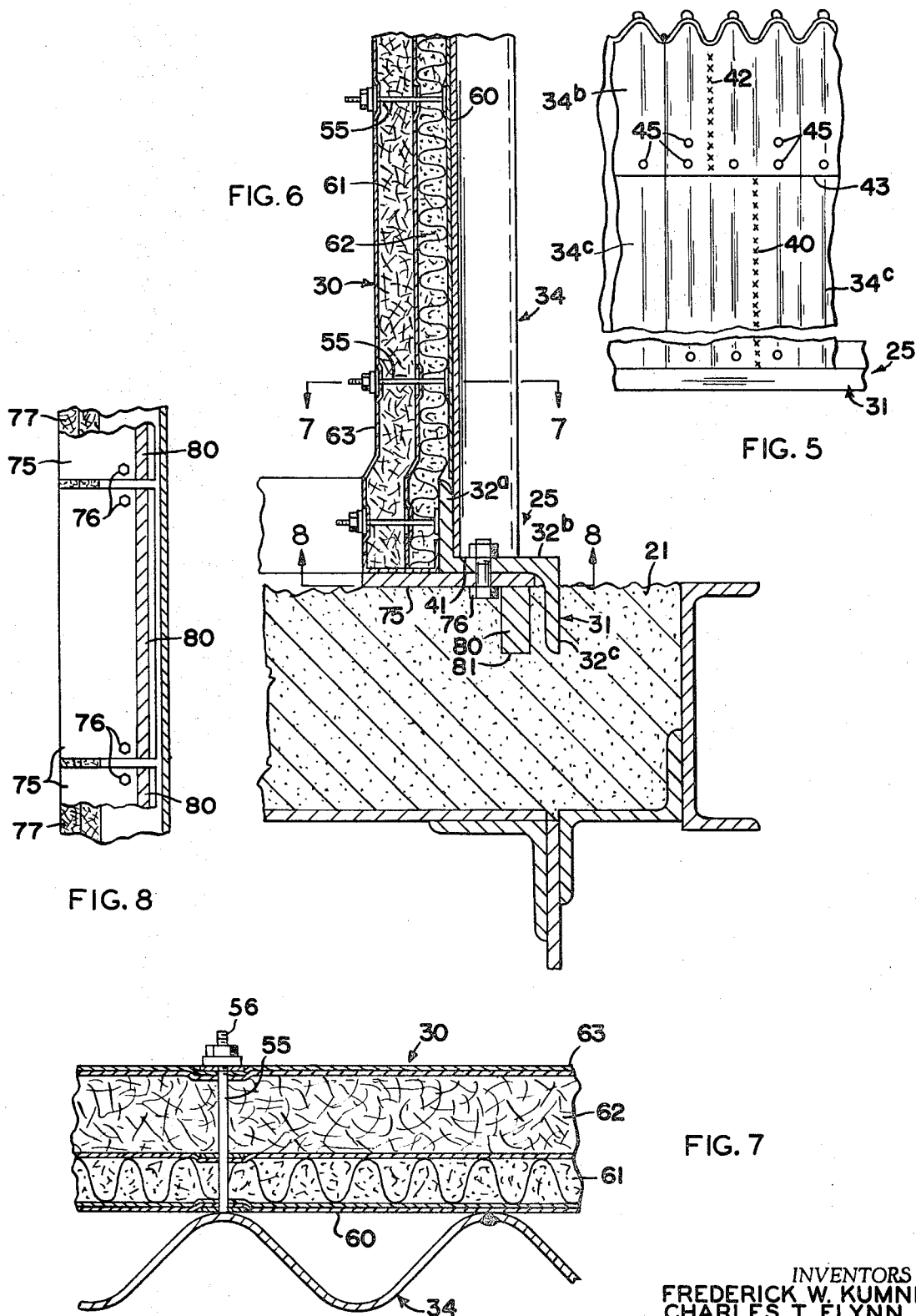


FIG. 7

INVENTORS
FREDERICK W. KUMNICK
CHARLES T. FLYNN

BY

Watts, Hoffmann, Fisher & Heinke
ATTORNEYS

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INSULATED COVER FOR STEEL STORAGE AND THERMAL CONTROL

Frederick W. Kumnick, Youngstown, and Charles T. Flynn, Boardman, Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio, a corporation of New Jersey

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U.S. Cl. 52—17 27 Claims

ABSTRACT OF THE DISCLOSURE

An insulated cover providing for controlled cooling of metal and adapted to be removably connected to a vehicle. The cover includes a base, a body attached to the base and extending over the vehicle, structure by which the cover is suspended, and locating structures on the cover which cooperate with structure on the vehicle to accurately position the cover.

The structure by which the cover is suspended includes a crane hook engaging member associated with guides so that a crane hook is guided to the member. The suspension structure additionally permits stacking of covers when not in use.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to covers for heated articles and more particularly relates to insulated covers providing for a controlled cooling rate of articles positioned on a vehicle or the like.

Hot worked articles such as steel forgings, billets, blooms, bars, etc., are worked on at temperatures above the transformation temperature of the steel. In many cases the temperature of such articles must be reduced to approximately ambient temperature before subsequent operations may be performed.

Since the rate at which steel articles are cooled determines some important characteristics of the cooled steel, it is often necessary to control the rate at which the articles are cooled. This is particularly true when subsequent operations are to be performed on the article. Thus, cooling rates are controlled to: (1) provide an article which is soft enough to permit subsequent finishing operations; (2) minimize internal stresses in the articles; and, (3) prevent internal ruptures in the steel which are commonly known as "flakes."

Controlled cooling of articles of the type referred to is effected in various ways. One method is to bury the article in a suitable refractory material. The rate of cooling of the article is dependent upon the mass of the article and the amount and type of refractory material surrounding the article. Positive control of the cooling rate by this method is not usually necessary.

Variations on this method involve placing articles in pits lined with refractory bricks, or the like. These pits may have removable insulated covers. The heat loss of the articles cooled in this manner is governed primarily by the radiation heat loss of the articles and their mass. Another variation involves the use of heavy steel box-like covers which are inverted over the articles disposed in suitable containers at ground level.

When burial pits are utilized, only a limited number of such pits may be constructed and due to the limitation in the number of pits it is often desirable to remove or bury articles during the time that other articles are cooling in the pit. As a consequence it is often necessary to

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move a number of articles in order to retrieve an article which has been cooled for a proper period.

All of these methods involve a relatively gradual reduction in temperature of the hot article through the transformation temperature range. This gradual cooling often requires many days, and production rates of the articles can be limited by the availability of pits or similar equipment in which cooling takes place.

It has been found that hot steel billets, etc., must be cooled slowly in order to provide the proper crystalline structure and to prevent cracks and inclusions. Closely controlled slow cooling for a particular period of time is required to complete transformation of the steel after which the articles can be air cooled. By the use of this method, mobile apparatus for controlling the cooling rate of steel articles is utilized only for a matter of minutes within the plant and hence production rates have been substantially increased where the space available for cooling the steel is limited. Production is also increased by the elimination of some material handling operations.

In this last-mentioned method, the controlled cooling of the steel is critical. Cooling the steel in accordance with this method has been accomplished in automatically-controlled furnaces, heated pits having temperature controls, and heated gondola cars having insulated covers.

The prior art

Heavy steel covers for articles have been proposed in the prior art. The use of covers has reduced unnecessary handling of hot steel which was encountered in the use of pits. These covers have greater mobility than pits since they can be transported about by the use of cranes. Thus, hot steel can be located where desired and covered to undergo gradual cooling.

In many instances such covers have been unsatisfactory because the extreme temperature ranges they are subjected to have resulted in undesirable thermally-induced forces in the cover. Since the covers have comprised heavy structural elements, the thermal expansion and contraction of the elements has resulted in distortion and parting of the structural elements.

The use of covered gondola cars, as proposed in the prior art, has several advantages over the other methods of cooling which have been referred to. Such cars are, in effect, movable burial pits. They may be loaded with hot steel at a convenient location and moved to an appropriate location during the cooling process. After cooling, the cars may again be moved to a location where the articles can be removed for air cooling to atmospheric temperature.

The provision of railroad cars having removable covers has eliminated unnecessary handling of cooling steel since (1) railroad cars can be provided in any desired number; and, (2) the hot steel in a given railroad car is a relatively small batch and therefore is normally all at one stage in the cooling process.

The thinking as to the construction of such covers, like the stationary covers mentioned above, has been that extremely rigid and heavy covers are necessary to provide the desired cooling rates. Covers constructed of heavy, high-strength steel parts are overly-susceptible to damaging stresses as a result of thermal expansion. These stresses are high because, among other reasons, the temperatures to which they are exposed at any given time often vary significantly. Where excessive distortion or failure of the cover occurs, the heat loss of the hot steel articles on the railroad car can become excessive and result in improper transformation of the steel.

The railroad car covers proposed by the prior art have been difficult to locate on a railroad car. Often, personnel are required to aid in guiding the covers into position. This is time-consuming and requires the presence of other-

wise unnecessary personnel. Further, the personnel guiding the covers are subjected to unpleasant conditions.

Covers for railroad cars have been manipulated by the use of cranes. In some cases, it is necessary for personnel on the ground to aid in guiding a crane hook into proper position for engaging the cover. Such procedures are also time-consuming and somewhat dangerous since the covers may have outside skin temperatures as high as 250° F.

SUMMARY OF THE INVENTION

The present invention provides a new and improved cover for hot steel or the like which provides a gradual cooling rate for the steel. For example 1600° F. steel is cooled to 1000° F. at a rate not to exceed 15° change per hour. The cover is constructed of relatively light components. The frame of the cover is shielded to minimize heat transfer to the structural elements and prevent undue temperature gradients, causing stresses and distortion.

The body of the cover includes an unframed, relatively light, corrugated supporting wall of generally arch-shaped cross section. Because of its unframed, arch shape, the cover is free to expand and contract due to thermally-induced forces in transverse planes of cross section. Longitudinal stresses are absorbed by bellows-like action of the corrugations.

The corrugated walls of the body support an insulating structure composed of layers of relatively light-weight insulation materials. The insulation construction is held in place by studs, expanded metal lath, and wire mesh. Since the lath and mesh will, like the corrugated wall, absorb expansion and contraction, thermally-induced forces developed between the walls and the frame are minimized and, in fact, substantially eliminated.

The insulation, at the base juncture of the walls and frame, is supported by spaced plates. These plates not only support the insulation, but also shield the frame against heat transfer from exposure to the hot metal under the cover.

A cover constructed according to the invention is particularly adapted to be used in connection with railroad cars of the flat or gondola types. A railroad car cover embodying the present invention includes a guide construction permitting the cover to be accurately located upon the car quickly and efficiently without need of personnel to guide movement of the cover. The locating structure includes guides at opposite ends of the cover which cooperate with vertically extending stakes connected to the car. The stakes have bodies of uniform cross section and tapered upper end portions. As the cover is lowered, the tapered portions coact with the guides to bring the guides onto the stake bodies and accurately position the cover on the car.

One of the stakes is of greater height than the other so that one end of the cover may be located relative to the car without regard to the position of the other end of the cover. The cover may then be pivoted about the taller stake to bring the other end of the cover into registration with the car.

The cover has a frame section extending above the body of the cover. This frame section includes an eye in the shape of an inverted U. The frame section has plates to guide a crank hook toward and into engagement with the eye without the assistance of personnel. The frame section atop the cover additionally provides a support so that when not in use a plurality of covers may be stacked.

A principal object of the present invention is the provision of a new and improved cover for controlling the rate of heat dissipation of heated articles.

Other objects and advantages of the present invention will become apparent from a following detailed description of a preferred embodiment made with reference to the accompanying drawings which form a part of the specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a railroad car equipped with a cover embodying the present invention; FIG. 2 is a top plan view of the railroad car of FIG. 1;

FIG. 3 is an end elevational view of the car of FIG. 1 and illustrated on a scale which is larger than the scale of FIG. 1;

FIG. 4 is a cross-sectional view of a portion of the cover having parts removed and as seen from the plane indicated by the line 4—4 of FIG. 2 and shown on a scale which is larger than the scale of FIG. 2;

FIG. 5 is a fragmentary elevational view of a cover as seen from the plane indicated by the line 5—5 of FIG. 4 and illustrated on a scale which is reduced with respect to FIG. 4;

FIG. 6 is a fragmentary cross-sectional view as seen from the plane indicated by the line 6—6 of FIG. 1;

FIG. 7 is an enlarged sectional view as seen from the plane indicated by the line 7—7 of FIG. 6;

FIG. 8 is a sectional view of a portion of the base of the side wall as seen from the plane indicated by the line 8—8 of FIG. 6;

FIG. 9 is an end elevational view on an enlarged scale of a cover and a car bed; and,

FIG. 10 is a fragmentary, sectional view as seen from the plane indicated by the line 10—10 of FIG. 9.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1, an apparatus for providing controlled cooling of heated articles is shown generally at 10. The apparatus 10 includes a vehicle. The illustrated vehicle is a railroad car 11. The apparatus 10 also includes a cover assembly 12. The railroad car 11 has a conventional frame 13 and bogies 14. The bogies 14 have wheels 15 on tracks T and journaled in a bogie frame 16.

The car frame 13 supports an open-top, box-like bed 20. The bed 20 is preferably constructed of structural steel members and contains sand, or similar refractory material, 21 upon which hot steel ingots, blooms, billets, etc., are placed. The sand 21 (FIG. 6) insulates the car frame 13 and the bed 20 from heated metal disposed on it.

The cover 12 includes a base 25, FIGS. 4 and 5, a body 26, FIGS. 2 and 3, which extends over the railroad car 11, and support structure 27, FIG. 3. The support structure 27 extends over the body 26 and is connected to the base 25. The support structure 27, the base 25, and end frame structure (to be described presently), together form a frame for the cover 12.

The cover 12 is positioned on the car 11 with the base 25 imbedded in the sand 21. Thus, the cover 12 and sand together completely surround the hot metal supported by the car 11.

The body 26 includes an insulating construction shown generally at 30 in FIG. 6. The insulating construction 30 is described in detail presently.

The base 25 includes a Z frame 31, FIGS. 4-6. The Z-frame 31 is defined by four structural members 32, each having a Z-shaped cross section. The members 32 are welded together at their ends to define the base 25 in the form of an open rectangle. Each of the members 32 is oriented to provide an upwardly extending flange 32a, a horizontal web 32b, and a downwardly extending flange 32c at the perimeter of the base 25. The frame members 32 are preferably mitered at their ends so that the flanges 32a, 32c and webs 32b extend continuously about the rectangular Z-frame.

THE BODY 26

The body 26 includes a supporting side and top wall 34 and end walls 35. The walls 34, 35 are connected to the Z-frame 31 and support the insulating construction 30. The wall 34 includes wall sections 34a, 34b, 34c which form the top, corners, and sides of the body. The wall

sections 34c are corrugated sheets of steel which extend along each side of the Z-frame 31. The wall sections 34c are connected at their ends by weldments 40, see FIG. 5. The upstanding flanges 32a are provided with spaced openings aligned with openings in roots 41 of the corrugations of the wall sections 34c. The wall sections 34c are connected to the frame member by suitable fasteners such as bolts or rivets which extend through the openings. The roots 41 abut the horizontal webs 32b.

The wall sections 34b, define relatively large-radius corners and interconnect the side-wall sections 34c with the top-wall sections 34a. The wall sections 34b, like the sections, 34c, are connected together at abutting ends by weldments 42, FIG. 5. As is best seen in FIGS. 4 and 5, the corrugations of the side and corner sections 34b, 34c are overlapped with lower portions 43 of the corner sections 34b disposed outwardly of upper side 44 of the side sections 34c. The overlapping portions 43, 44 are nested and connected together by fasteners shown in the form of rivets 45.

The top sections 34a are also corrugated sheet steel. The corrugations of the top and corner sections 34a, 34b are nested together with top portions 51 overlying portions 50 of the corner sections 34b. The sections 34a, 34b are connected by fasteners in the form of rivets 52. The rivets 45, 52 extend through crests of the corrugations.

When the wall 34 has been secured to the Z frame 31, a plurality of studs 55 are welded to the inner surfaces of the wall 34 at the roots of the corrugations. The studs 55 have threads 56 and are connected to the wall at regularly-spaced intervals (preferably on twelve-inch centers) and project toward the interior of the cover. In a preferred embodiment, the studs are approximately one-eighth inch in diameter, three and one-half inches long and are of stainless steel material.

THE INSULATING CONSTRUCTION 30

The walls 34a-34c and studs 55 support the high-temperature insulating structure 30. The insulation construction 30 includes a lath 60 of expanded metal, blankets 61, 62 of insulating material, and a double-thickness Inconel metal mesh 63 which holds the blankets 61, 62 in position. Stainless steel washers and nuts on the threads 56 hold the insulation construction in place.

In the preferred construction of the cover 12, the lath 60 is impaled over the studs 55 and moved to the bases of the studs. The lath 60 is laid up continuously about the interior of the wall structure 34. Next, the blanket 61 is impaled over the studs 55 and laid up around the wall structure to abut the lath. In the preferred construction, the blanket 61 consists of strips of mineral-fiber insulation blanket. The blanket 62 is then impaled over the studs to engage the blanket 61. The type and thickness of the insulating blanket 62 varies with the temperature control required.

Finally, to complete the insulation construction 30, the wire mesh 63 is impaled over the studs 55 and the nuts and washers are attached to the threads 56. The insulation construction 30 is highly efficient. For example, it is effective to reduce the temperature to approximately 250° F. at the wall 34 of the cover when the supporting mesh 63 is exposed to 1600° F. material.

THE END WALLS 35

After the insulating construction 30 has been applied to the interior of the wall 34, the end walls 35 are assembled. Each end wall is the same and accordingly only one is described in detail. The end wall 35 is defined by a substantially planar steel sheet 70. This sheet is provided with an insulating construction on its interiorly-facing surface which is the same as the construction 30 described above. Since heat rises, the end walls are not subjected to the temperature gradients to which the cover is subjected. This factor, coupled with the relatively short length of the end-wall-to-Z-frame connection as compared with the length of the connection of the wall 34 and Z-frame,

permit the use of plate as an end wall without causing the transmission of undue stresses to the frame. Moreover, since the length of the end wall connection to the frame is short, expansion of the Z-frame and end wall is relatively equal.

The outer face of the sheet 70 is provided with the end frame structure mentioned previously. The end frame structure includes vertically-extending stiffening bars 71 welded to the sheet 70. A guide structure described presently is also connected to the end wall.

The end walls 35, assembled as described, are placed across the open ends of the body 26 and bolted to the upstanding flanges 32a. The insulation construction 30 on the interior of the wall 34 and the insulation construction on the end wall 35 are tightly engaged at their junctures. When the end wall is positioned as described, end caps 74 are welded to the walls 34, 35 to seal the juncture of these walls. The end caps 74 are preferably constructed from steel angles which are welded together at their ends and shaped to correspond to the profile of the cover. The caps 74 are fixed to the Z-frame 31 and the bars 71 to form a part of the end frame structure.

THE BASE 25

The base 25 additionally includes a plurality of small plates 75 which are connected to the frame 31 about its periphery. The plates 75 are each connected to the lower surface of the web 32b and extend inwardly from the frame 31 to support the lowermost edges of the insulating structure 30. Each plate 75 is connected to the web 32b by a bolt 76. The plates 75 are spaced from each other to define narrow gaps 77 so that the insulating structure is supported and protected at closely-spaced locations around the periphery of the frame. Since the plates 75 are the only portions of the frame structure exposed to heat and since they are relatively short and spaced, distortion of the frame due to thermal expansion is avoided.

Each plate 75 has a depending foot 80. Each foot 80 extends across the length of the connected plate 75 and projects downwardly so that the lower-most side 81 of the member 80 coextends with the lower-most side of the flange 32c. The feet 80 serve to dissipate heat into the sand to protect the Z-frame 31 from the heated articles within the cover and thus minimize temperature gradients and undue distortion of the frame. The feet 80 also provide vertical support for the web 32b.

THE SUPPORT STRUCTURE 27

After the balance of the cover 12 has been fabricated, the support structure 27 is placed on the base 25. The support structure 27 includes a plurality of verticals 85 which are connected to the Z-frame 31. The verticals 85 are channels having their webs facing outwardly of the cover. The webs are of such length that the flanges of the channels extend to the roots of aligned corrugations in the wall 34. Thus, the verticals 85 are substantially flush with the sides of the cover. The verticals are arranged in spaced pairs, with the upper ends of each pair connected by one of a plurality of laterals 87. The laterals 87 are channels, each extending transversely across the cover. Corner braces 90 are disposed between the junctures of the laterals 87, verticals 85, and the cover to insure lateral stability.

A longitudinal stringer in the form of an I-beam 91 is provided. The bottom flange of the I-beam 91 is mounted on the laterals 87 along the centerline of the cover. The I-beam 91 supports a crane-hook-engaging structure 92. The structure 92 is a weldment which includes a hook-receiving eye 93, a support plate 94 connected between the I-beam 91 and the eye 93, and transverse braces 95 extending from the member 93 to laterally-spaced locations on the central lateral 87a, FIGS. 9 and 10. The connections of the braces 95 and the lateral 87a are reinforced by blocks 96.

The braces 95 are in the form of channels having flanges 95b extending upwardly from the web. The weld-

ment 92 additionally includes vertically-disposed guideplates 97 which are welded to the eye 93 and the support plate 94 and the flanges of the braces 95. The guideplates are generally triangular and each has a side 97a which slopes laterally between a connected brace 95 and the eye 93.

When a crane hook is lowered in the vicinity of the eye 93, the braces 95 and the guideplates 97 cooperate to maintain a hook in alignment with the eye 93 and to guide the hook to the eye 93 without the aid of personnel who otherwise would be required to position themselves on or near the cover.

Covers 12 can be stacked upon one another when not in use. For this purpose, plates 98 are fixed to the ends of the laterals 87. The plates 98 extend upwardly from the laterals and prevent a stacked cover from slipping from a supporting cover.

COVER GUIDE STRUCTURES

When the cover 12 is to be utilized in conjunction with railroad cars, guide structures 100, FIGS. 3 and 9, are provided for accurately and facily locating the cover upon a railroad car. The guide structures each include a guide tube in the form of a cylinder 101. The guide tubes 101 are connected to the end walls 35. The guide tubes 101 are secured to the end walls 35 by support brackets 102 which are welded to the tubes 101 and the end walls. The tubes 101 are situated on the cover so that a line passing through the centerlines of the tubes 101 extends diagonally of the cover through the center of gravity of the cover.

Cylindrical stakes 103, 104 are fixed to the body 13 of the railroad car and form part of the guide structure 100. The stakes 103, 104 include tapered upper guide portions 105, 105a which are frusto-conical. The guide portions 105, 105a facilitate the telescoping of the stakes 103, 104 into the tubes 101 as the cover is lowered toward the car. The stake 103 is preferably of greater height than the stake 104 so that, as the cover is lowered toward the car, the stake 103 is engageable with its tube 101 before the stake 104 contacts its associated tube.

In positioning the cover 12 on the car 11, the cover is lowered until the stake 103 has been started into its tube. The cover is then rotated about the axis of the stake 103 until the stake 104 is aligned with its tube 101. Then the cover is lowered into engagement with the railroad car in an accurately aligned position.

SUMMARY

In summary, the features of this cover construction are:

(1) A top and side wall structure which is stress-absorbing. Thus, the top and side wall structure is free of framing intermediate its ends and above the base so that it may rise and fall to absorb expansion and contraction forces in planes transverse to the cover without imposing undue stresses on the base. Additionally, all components of the wall structure, including the corrugated wall, the lath which supports the insulation, the wire mesh which also supports the insulation, and the insulation itself, are of such structure that forces established longitudinal of the wall-structure-to-base connection are absorbed by the wall structure itself. Thus, the forces which are transmitted to the base are minimized and will neither distort the base beyond its elastic limit, nor lift the base into spaced, heat-loss relationship with a supporting surface. Since expansion and contraction of the end walls is somewhat limited because they are subjected to less heat than the side and top walls, and because the stresses created therein are substantially in a single plane, and further because the end-wall-to-base connection is relatively short, plate construction may be utilized in the end walls.

(2) A superstructure-like framing which does not in any way interfere with the expansion and contraction of the wall structure, but permits stacking of the covers.

(3) A hook-engaging construction secured to the frame superstructure which facilitates engagement of a

crane hook without the crane operator requiring the assistance of other personnel.

(4) Guide structure for locating the cover on a railroad car or the like which similarly obviates the need for personnel to assist a crane operator.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that the numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention.

What is claimed is:

1. An insulating cover comprising:

- (a) a base having side and end portions;
- (b) a side and top wall structure connected to the base side portions;
- (c) the side and top wall structure including an insulating construction and a metallic wall;
- (d) stress-absorbing means at the juncture of said wall structure and said base for absorbing thermally-induced forces paralleling the wall-structure-to-base connection such that the stresses imparted to the base by the wall structure are minimized; and,
- (e) end walls connected to the base and closing the ends of the top and side wall structure.

2. The cover of claim 1 wherein the top and side structure is free of framing above the base and intermediate the ends, whereby it can rise and fall due to thermal expansion and contraction without imposing stresses on the base.

3. A removable cover for a vehicle comprising:

- (a) a base;
- (b) a body attached to said base for extending over said vehicle;
- (c) structure at an upper side of said cover and connected to said base including a member by which the cover may be suspended; and,
- (d) means for effecting positioning of said cover on said vehicle comprising at least first and second locating structures attached to said cover at spaced-apart locations and adapted to engage cooperating structure on said vehicle as said cover is moved toward the vehicle, said first locating structure operative before said second locating structure is operative.

4. A vehicle cover as defined in claim 3 wherein said cover is maintained in position on the vehicle by a stake member and cooperating tubular mechanism disposed about said stake member, one of said stake members and tubular mechanisms defining a portion of said first locating structure.

5. A cover for a vehicle as defined in claim 4, wherein said stake member and tube mechanism are engaged when said cover is at a first spacing from said vehicle and said second structure is operative to guide said cover only when said cover is substantially closer to said vehicle than said first spacing.

6. A cover for a vehicle as defined in claim 3 wherein said support structure includes an eye member adapted to engage a hook of a crane and means for guiding the hook into engagement with said eye member.

7. A cover for a vehicle as defined in claim 3 wherein said structure at an upper side of said cover includes horizontal structural members extending to locations vertically above said base, said structural members adapted to support a second cover stacked on said cover during storage.

8. A cover for a vehicle as defined in claim 3 wherein said body of said cover includes wall structure for establishing and maintaining relatively large temperature differentials thereacross, said wall structure comprising an outer wall portion of high-strength material and an insulating structure including a refractory material exposed to the interior of said cover.

9. A cover adapted to provide a gradual heat loss from high temperature materials comprising:

- (a) a base including a frame-like member;
- (b) a body connected to said base;
- (c) said body including wall structure for establishing and maintaining a relatively large temperature differential between the inside and outside of the cover, said wall structure comprising:
 - (i) a corrugated sheet-metal exterior wall;
 - (ii) insulating structure supported by said wall portion including a refractory insulation material; and
 - (iii) a perforate member engaging said refractory along a surface facing the interior of said body, said perforate member connected to said wall for supporting said insulation; and,
- (d) a plurality of stud-like members connected to said exterior wall and extending through said insulating structure and said perforate member, and parts connected to said studs to maintain said insulation structure and perforate member fixed on said wall structure.

10. A cover as defined in claim 9 wherein said body includes upwardly-extending side walls and a roof-like wall extending between said side walls, said side walls being defined by a plurality of attached wall sections and said roof being defined by a plurality of attached wall sections.

11. A cover providing for gradual heat loss of articles comprising:

- (a) a base including a structural frame member;
- (b) a body connected to said base;
- (c) said body including a relatively light-weight supporting wall construction adapted to overlie hot articles;
- (d) insulating structure supported by said wall construction; and,
- (e) shield means shielding said structural frame member against heat transfer from hot articles to minimize the effects of thermally-created forces on said frame.

12. A cover as defined in claim 11 wherein said portion of said wall construction is formed by corrugated sheet metal connected to said frame at spaced locations.

13. A cover as defined in claim 11 wherein said shield means includes members having a first portion connected to said frame member and extending from said frame member to support said insulating structure.

14. A cover as defined in claim 13 wherein said members include second feet depending from said first portions and interposed between a part of said frame and the interior of said cover.

15. A cover as defined in claim 11 and further including locating structures connected to said wall construction so that said cover is accurately positionable over articles.

16. A cover as defined in claim 11 wherein said insulating construction includes first and second blankets of insulating material, a perforate member interposed between one blanket and the interior of the cover, studs attached to said supporting wall and extending through said blankets and perforate member, and parts for securing said perforate member in position on said studs.

17. A cover as defined in claim 16 wherein said blanket adjacent said perforate member is comprised of a refractory material.

18. The cover of claim 11 wherein the frame is Z-shaped in cross section.

19. An insulating cover for use in combination with a railroad car having a bed and a quantity of loose refractory material on the bed comprising:

- (a) a hollow base structure having elongated sides and spaced ends;
- (b) a corrugated sheet metal wall of arch-shaped cross section connected to each of the sides of the base and forming the sides and top of a thermal en-

closure, the corrugations of the wall being disposed in planes transverse to the frame;

- (c) an insulating construction secured to the inner surface of said wall and covering the inner surface of said wall;
- (d) end walls secured to the frame and closing the ends of the corrugated wall; and,
- (e) the frame being of rectangular configuration and formed of elements of Z-shaped cross section, said elements each having an upstanding flange connected to one of the walls, a horizontally-disposed web and a depending flange for imbedding in the refractory material to provide a continuous interconnection around the perimeter of the cover between the cover and the refractory material.

20. The device of claim 19 wherein a plurality of plates are secured to the web of the frame members and project inwardly to provide vertical support for the insulating construction.

21. The cover of claim 20 wherein at least some of the plates have depending feet for further imbedment in the refractory material and for heat-shielding of the frame member.

22. The device of claim 20 wherein the plates are the only portions of the frame directly exposed to heat from the article, said plates having relatively short lengths and spaced apart along said frame so that thermal expansion of each plate is small and unrestrained, individual expansion of said plates preventing the length of the Z-shaped frame from increasing by an amount equal to the total change in length of said plates.

23. In combination, a floor having refractory material thereon for receiving hot metal objects and a cover on the refractory material constructed such that the cover and the refractory material together completely surround a heated metal object placed on the refractory material and a spaced pair of locating structures interconnecting the cover and the floor, each of said locating structures comprising:

- (a) a stake connected to a selected one of the floor and cover; and,
- (b) a tubular structure connected to the other of the floor and cover and disposed around the stake in cover-orienting relationship.

24. The combination of claim 22 wherein one of the locating structures is of differing vertical dimension than the other, whereby on removal of the cover, one of the structures will become disengaged before the other and on connection of the cover to the floor, the other structure will become engaged before the one structure.

25. A cover adapted to provide a gradual heat loss from high temperature materials comprising:

- (a) a base including a frame-like member;
- (b) a body connected to said base;
- (c) said body including wall structure for establishing and maintaining a relatively large temperature differential between the inside and outside of the cover, said wall structure comprising:
 - (i) a sheet-metal exterior wall;
 - (ii) insulating structure supported by said wall portion including a refractory insulation material;
 - (iii) a second insulation material between said refractory and said wall;
 - (iv) a perforate member engaging said refractory along a surface facing the interior of said body, said perforate member connected to said wall for supporting said insulation; and,
- (d) studs connected to said wall structure and extending through said insulating material and said perforate member, and parts connected to said studs to maintain said insulation material and perforate member fixed on said studs.

26. A cover as claimed in claim 1 wherein said metallic wall includes a corrugated sheet metal member, said sheet metal member connected to side portions of said

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base at roots of corrugations whereby thermal expansion and contraction forces applied by said wall to said base are minimized.

27. A cover providing for gradual heat loss of articles comprising:

- (a) a base including a structural frame member;
- (b) a body connected to said base;
- (c) said body including a relatively lightweight supporting wall construction adapted to overlie hot articles;
- (d) thermal shield means shielding said structural frame member against radiant heat transfer from hot articles to minimize the effects of thermally created forces on said frame; and,
- (e) said thermal shield means including a plurality of shielding members structurally connected to said frame member at spaced apart locations, adjacent sides of said members spaced apart to accommodate

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thermal expansion of said shielding members, and projecting portions of said shielding members shielding said frame member from radiant heat transfer from the hot articles.

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