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Barnard

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[54] **ADJUSTABLE FLAT CAR**

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[52] **U.S. Cl.**..... **105/393,** 105/358, 105/367, 280/80 B, 280/405 R

[51] **Int. Cl.**..... **B61d 3/16,** B61d 5/00, B61f 01/00

[58] **Field of Search** ..... 105/358, 360, 367, 393; 280/80 B, 81 R, 404, 405, 407, 415 B, 5 C, 5 E; 296/34 A

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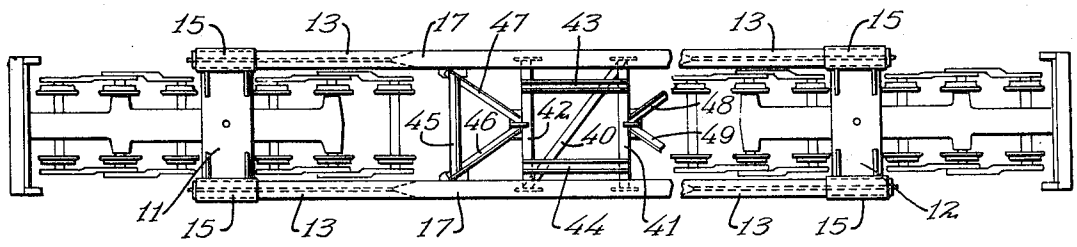
Primary Examiner—Drayton E. Hoffman

Attorney, Agent, or Firm—Neil B. Schulte

[57] **ABSTRACT**

An adjustable length railroad flat car having slideable body bolsters resting directly on the center of the rail trucks and adaptable to slide along two side sills so as to be able to carry heavy vessels or structures of varying lengths directly on the rail trucks.

6 Claims, 6 Drawing Figures



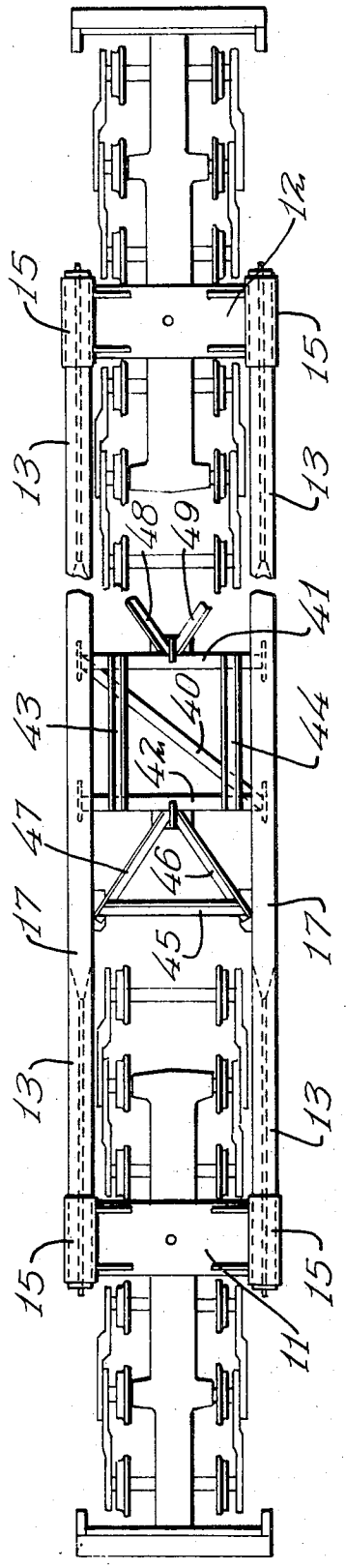


FIG. 1

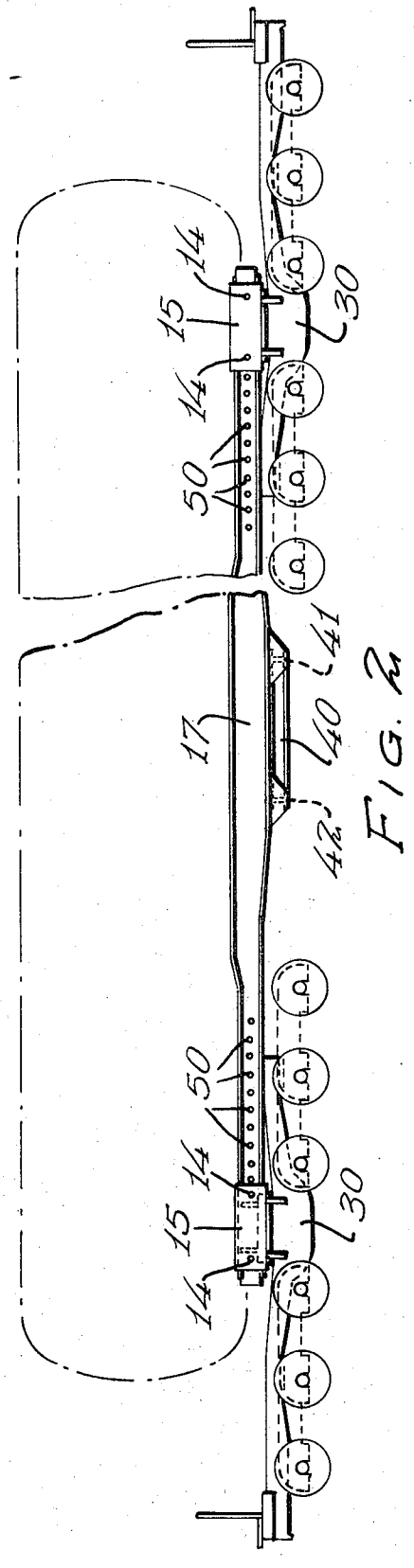


FIG. 2

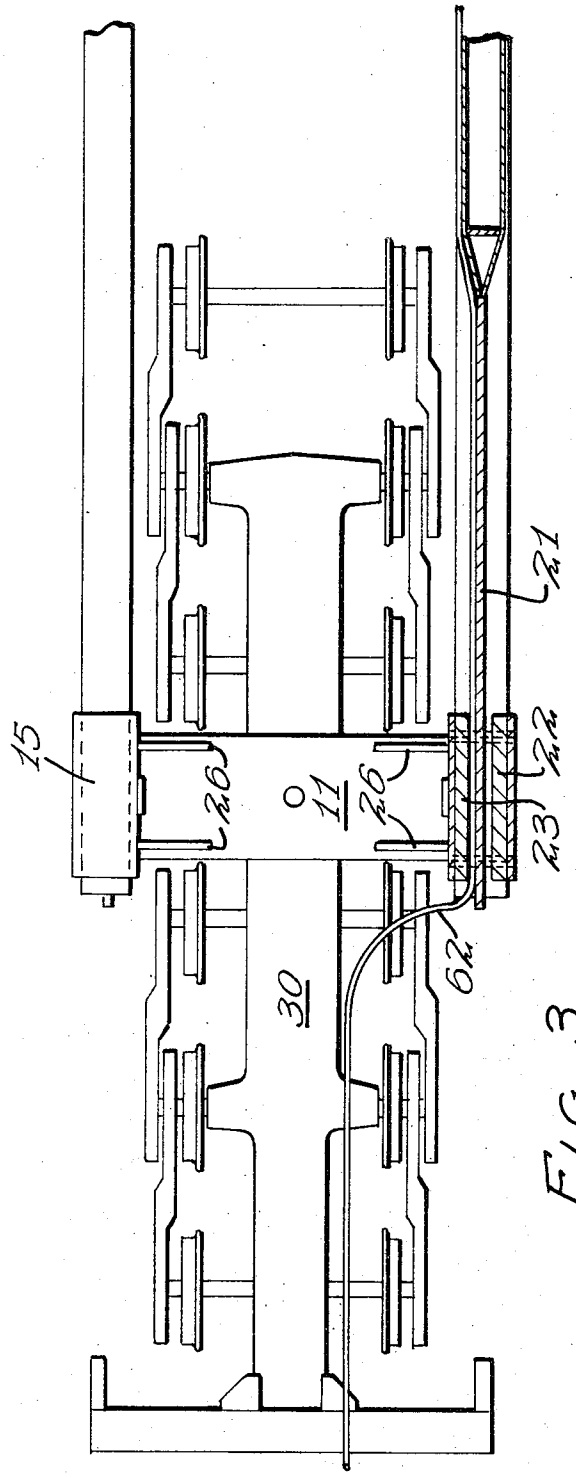


FIG. 3

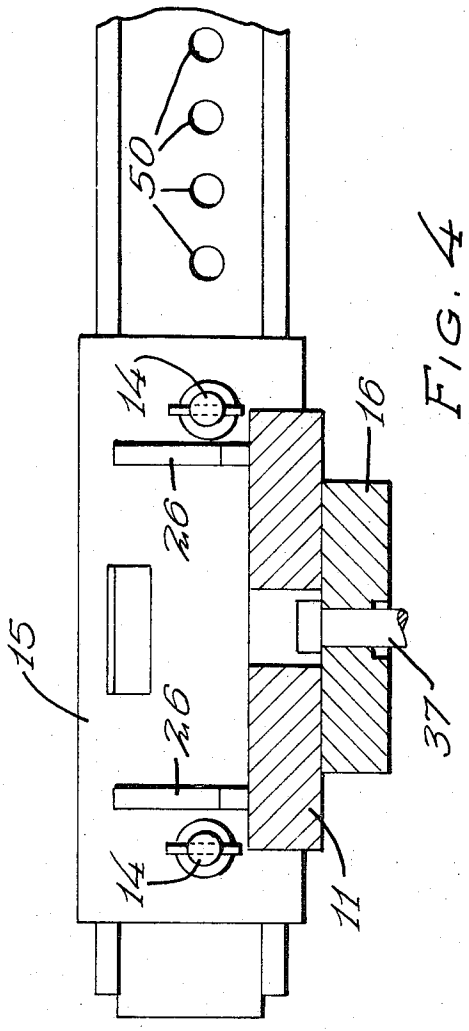


FIG. 4

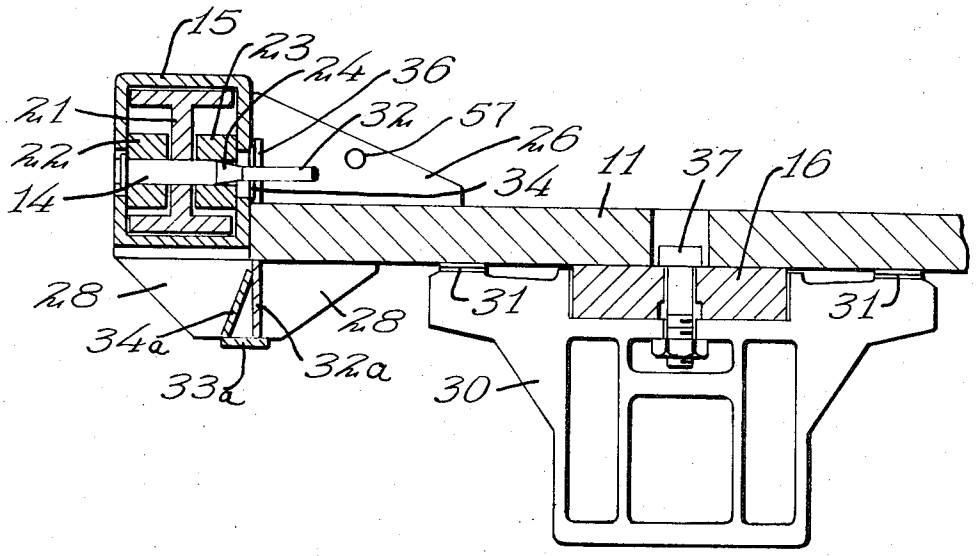

15
23
24
36
21
32
57
26
22
11
37
16
14
34
28
31
31
34a
28
33a
32a
30

FIG. 5

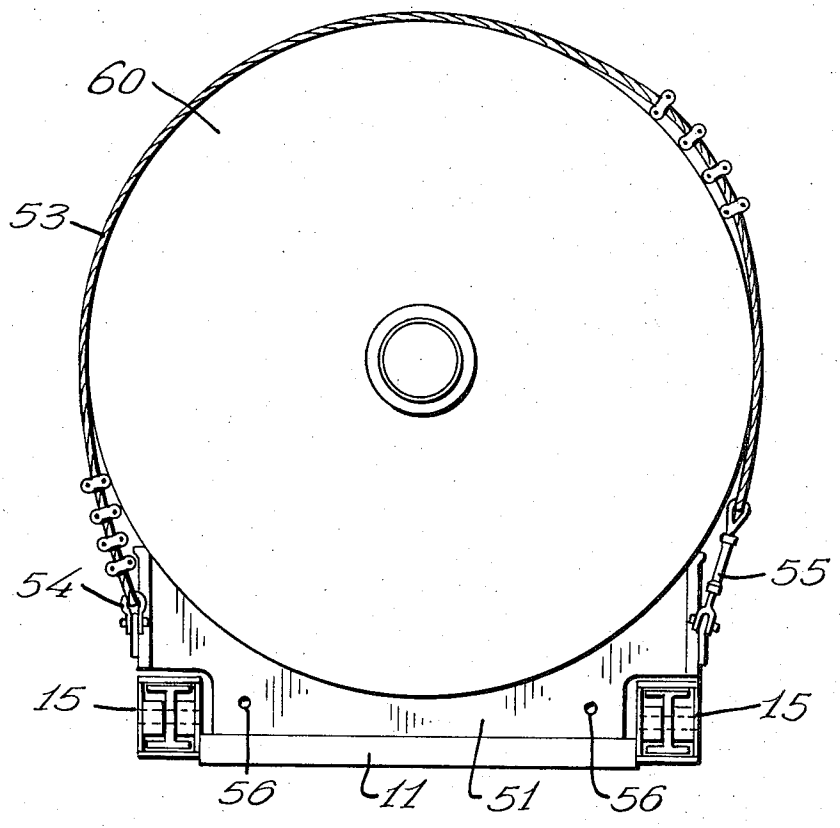

60
53
54
55
15
15
56
11
51
56

FIG. 6

ADJUSTABLE FLAT CAR

BACKGROUND OF THE INVENTION

In the prior art, unusually long and heavy loads, such as steam reheaters for nuclear power plants, have to be carried on two separate cars. The loads are typically carried by two saddles at structurally convenient spaces on the load and these saddles rest one each on two subsequent rail flat cars. Such an arrangement has a number of disadvantages. Since the load is carried generally near the center of each car in order to maintain balance and equal load distribution on the trucks of each car there results a limited range of lengths available for loading. The range becomes even more limited as the load approaches the full capacity of these cars. In addition, concentrated loads of this type produce excessive stresses in cars designed for distributed loads.

Another difficulty arises from the fact that with the load carried on top of the loading platforms the overall height produces a number of load clearance difficulties. With large loads this arrangement often necessitates circuitous routing of the train in order to avoid low bridges and the like. This high loading also increases the danger of upset since the center of gravity is carried unsuitably high. Yet another difficulty is produced when the train traverses sharp bends. Since the long load itself stretches over the chord of the bend it is necessary to mount the load on pivoting bases and additionally on at least one car with a fore and aft sliding capability so as to be adjustable to the movements of the flat cars which are not necessarily the same as that of the load. Such pivotable and slideable mountings are extremely difficult to produce and very expensive especially for use with large loads such as contemplated by the instant invention. My invention overcomes the above indicated difficulties as described below.

SUMMARY OF THE INVENTION

Briefly, my invention contemplates carrying large long loads on a single flat car which is adjustable in length to accommodate varying length loads. The car is comprised of two side rails or sills which carry slideable box members resting directly over the rail trucks. The load is carried in saddles which rest between the side sills on bolster members carried between the box members. In this way the load is carried directly on the rail trucks and there is no live loading at all, thus eliminating vertical flexing. Furthermore, the entire load is carried down low between the side sills thus lowering the center of gravity and alleviating the right of way clearance problems. Since a single car is used the load mountings can be fixed in place without the necessity of fore and aft adjustments, the chording effect on curves being eliminated. It may therefore be seen that it is an object of my invention to provide an improved railroad flat car for carrying large long loads which is adjustable in length to provide a safer, simpler, less expensive, load carrying capability. Further objects and advantages will become apparent in the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of the railroad flat car of my invention showing primarily the frame structure of the car itself. The car is shown mounted on trucks but the trucks are shown only schematically for simplicaity and clarity.

FIG. 2 is a side view of the car of FIG. 1.

FIG. 3 is a top view of one end of the car with one of the side rails shown partially in section to better indicate its construction.

FIG. 4 is a detail sectional side view showing the sliding box member and the body bolster.

FIG. 5 is a detail sectional view of the car as viewed from the end showing in particular the sliding box member and the body bolster.

FIG. 6 is an end view of the car with a load thereon, the side sills being shown in section to facilitate a showing of how the load is carried by saddles directly over the body bolsters.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring simultaneously to FIGS. 1, 2, 3 and 4 the general configuration of the railroad flat car of my invention is shown. The structure primarily incorporates two side sills running the entire length of the car which are comprised of box type girders 17 in the center shaped somewhat thicker near the center than at their ends. Extending out from the box girder sections 17 are I-beam shaped extensions 13. Extensions 13 pass through four box shaped members 15 which box shaped members are in turn welded to a pair of body bolsters or cross members 11 and 12. The side sills are held in place by a number of reinforcing girders numbered 40, 41, 42, 43, 44, 45, 46, 47, 48 and 49 in the drawing of FIG. 1. The particular arrangement of the reinforcing members is not critical to the instant invention and other designs may be equally suitable. For the purposes of the instant description, however, an arrangement is shown which has been found to work well in locating the two side sills and maintaining them completely parallel.

Referring to FIGS. 4 and 5, it may be seen that each of the I-beam shaped extensions 13 has a central vertical member 21 with a series of holes 50 positioned therethrough. A pair of spacer blocks 22 and 23 are welded to the inside of each box 15 as shown in FIG. 3. Holes are drilled therethrough and pins 14 are inserted through the holes 50 in extensions 13 and the holes in blocks 22 and 23. The center sections 21 of the I-beam extensions 13 are carried entirely by pins 14 so that once a pin 14 is inserted, extension 13 is held generally clear of the inside of box 15. Pins 14 are provided with a bevel 24 so as to narrow down a portion of them for easy insertion in the holes through blocks 22, 23 and I-beam vertical members 21. An extension 32 is provided on each pin 14 which is long enough to permit the pins to be driven out by hammering on the end extension 32. The length of the portion 32 insures that bevel 24 will be clear of hole 50 in member 21 while it is still possible to hammer on the extended portion 32. Upon removal of pin 14, once bevel 24 clears hole 50 I-beam 13 comes to rest inside box 15 thus relieving the pressure on pin 14 permitting easy removal and reinsertion. It is, thus, a relatively simple matter to relocate box 15 along extensions 13 to change the overall length of the car. The increments of change are determined by the number of holes 50 and their spacing and may be at any convenient distance desired. In the preferred embodiment the holes are spaced in multiples of

six and twelve inches although this is not considered to be a limiting factor.

Two pins **14** are used to secure each box **15.** This is preferable to a single pin arrangement due to the fact that large torque moments are induced in each box **15** due to the vertical eccentricity of coupler loads relative to the side sills. Consequently, large torque loads are generated on each box **15** which could distort box **15** if only one pin were incorporated. With the arrangement shown the torque moments are easily resisted by the dual pins **14.**

Each box member **15** is securely welded to the end of a body bolster. Suitable top gussets **26** are welded in place for additional strength and bottom gussets **28** are also added as shown in FIG. **5** for even more strength. In the preferred embodiment gussets **28** are separated by three reinforcing plates **32***a*, **33***a* and **34***a*. Body bolsters **11** and **12** are each provided with a cylindrical bearing **16** on the bottom which bearing rides in a lubricated cylindrical inset in the trucks **30.**

Trucks **30** are shown only schematically in the drawings and comprise standard railroad trucks well known to those skilled in the art. The embodiment of my invention is equally applicable to any type of truck from two axle up to sixteen axle varities. Since the weight of the load is carried directly on the body bolsters and the body bolsters are pivoted directly on the trucks it is clear that all of the load is carried directly over the rail trucks so that no live weight is carried by the side sills or other frame members of the flat car. Additional bearing surfaces **31** are provided on trucks **30** as shown in FIG. **5** at the outermost sides of trucks **30** so as to provide lateral stability to the car. The central bearings **16** are held securely in trucks **30** by locking center pins **37** in a manner well known to those skilled in the art.

The load is mounted as low as possible in order to increase clearance and lower the center of gravity as discussed earlier. Toward this end specially shaped saddles are employed such as shown in FIG. **6.** In FIG. **6** an end view of the load, which, in this case, is a steam reheater **60,** is provided. A saddle **51** is formed in a shape suitable to carry the load **60** nestled down between the two side sills directly on top of body bolster **11.** A similar saddle is used over bolster **12.** The load is secured in place by means of cables **53** which are run around the load from an attaching ring **54** on one side of saddle **51** to a tension adjusting turn buckle **55** on the other side of saddle **51.** Saddles insure that the load bears directly on the centers of the rail trucks so as to eliminate any live loading. The height is reduced to the minimum possible and the center of gravity is lowered as well. The saddles are positioned on the load at locations along it's length which are deemed to be most suitable for carrying the load itself. While the load is supported above the tracks the railroad flat car of my invention is positioned underneath and pins **14** are removed so that body bolsters **11** and **12** may be slid back and forth along extensions **13** to a position exactly underneath saddles **51.** In this way the load may be carried at the most ideal positions possible. When these locations are established pins **14** are then reinserted in holes **50** as shown in FIG. **5** and secured in place by means of washers **34** and cotter pins **36.** Small holes **56** are provided in each saddle **51** which are aligned with holes **57** in gussets **26** so that the saddle may be positively held down by horizontal pins driven through the holes **56** and **57.**

In the preferred embodiment it has been found desirable to insure that both pins in each box bear the weight equally. To achieve this objective the spacing of holes **50** has been held to a tolerance of 5/1000 of an inch. The pins themselves are constructed from hardened alloy steel and bear on holes **50** in a 2 inch thick side sill. The diameter of the pins in the preferred embodiment is approximately three and one half inches although this dimension is not considered critical to the present invention. Air brakes are connected by means of a flexible hose **62** as shown in FIG. **3** which readily adapts to the various positions of truck **30.** A car built according to the teachings of the instant invention was made to be adjustable from a minimum length of 35 feet to nearly 55 in length providing great versatility.

I claim:

1. An adjustable length railroad car comprising in combination:

a pair of side sills of a length corresponding to the maximum length desired for the flat car said side sills spaced in parallel relation by reinforcing cross members extending between said side sills generally near the center of said side sills and said side sills comprising generally box cross section girders near the center portions thereof and I-beam cross section shaped girders at the ends, and

body bolsters slideably attached to the ends of said side sills and pivotally mounted on railroad trucks so as to carry said side sills thereon said bolsters having a pair of generally vertical shear plate members welded to each end thereof between which said I-beam shaped portions of said side sills slide to permit the length of the car to be adjusted and further including a pair of pins through each pair of shear plate members and the corresponding side sill therein to locate said bolster longitudinally.

2. The apparatus of claim **1** in which said vertical shear plates are connected together at their top and bottom edges to form a circumferential member about said sills.

3. The apparatus of claim **1** including load carrying saddles shaped to fit between said side sills and directly on said body bolsters.

4. The apparatus of claim **1** in which said shear plate members incorporate spacers inside them to fit snugly about the vertical portion of said I-beam shaped ends of the side sills.

5. The apparatus of claim **4** including load carrying saddles shaped to fit between said side sills and directly on said body bolsters.

6. The apparatus of claim **5** including reinforcing gussets welded between said body bolsters and said shear plate members.

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