

V. M. SUMMA.  
STEEL UNDERFRAME FOR BOX CARS.  
APPLICATION FILED AUG. 28, 1908.

1,021,852.

Patented Apr. 2, 1912.

2 SHEETS-SHEET 1.

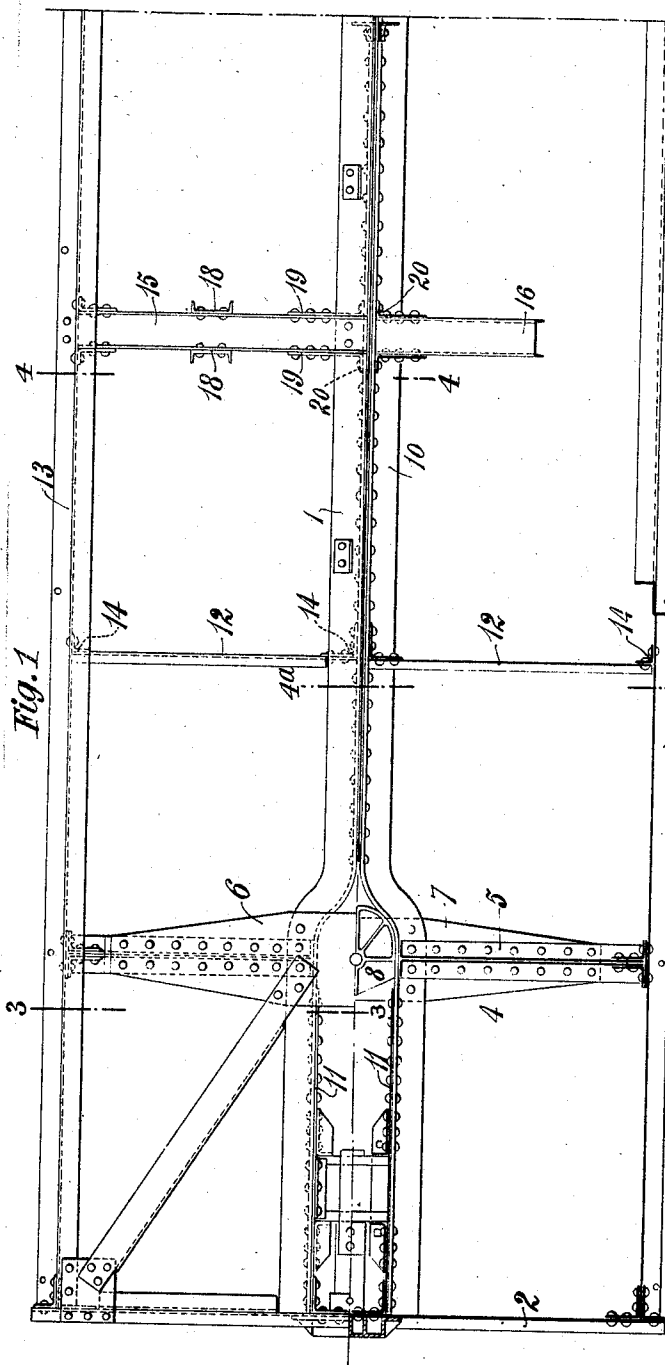


Fig. 1

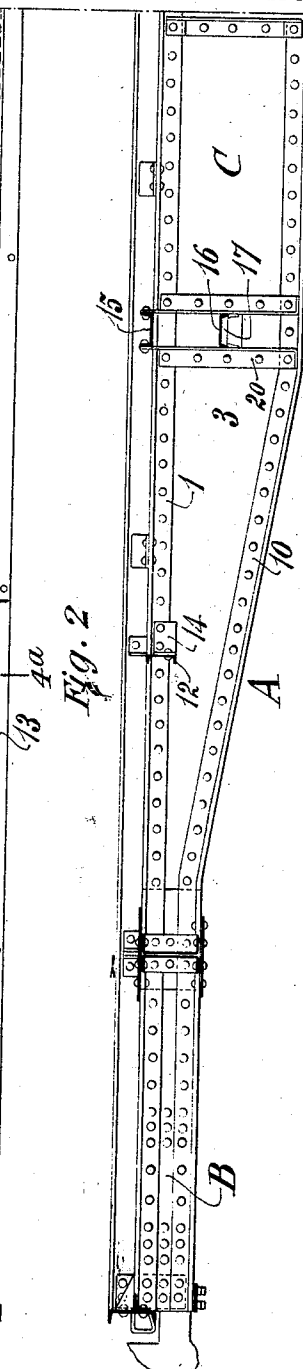


Fig. 2

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By his Attorney  
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2 SHEETS—SHEET 2.



Victor M. Summa Inventor  
By his Attorney J. H. Gibbs

# UNITED STATES PATENT OFFICE.

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## STEEL UNDERFRAME FOR BOX-CARS.

1,021,852.

Specification of Letters Patent.

Patented Apr. 2, 1912.

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*To all whom it may concern:*

Be it known that I, VICTOR M. SUMMA, residing at St. Louis, Missouri, and being a citizen of the United States, have invented certain new and useful Improvements in Steel Underframes for Box-Cars, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a plan view partly in section; Fig. 2 is a central longitudinal sectional view; Fig. 3 at the left is a transverse sectional view on line 3—3 of Fig. 1, with the diagonal end sill brace removed, and at the right is an end view; Fig. 4 is at the left a transverse sectional view on line 4—4 and at the right a similar view on line 4<sup>a</sup>—4<sup>a</sup> of Fig. 1.

The object of the invention is to provide a simple, light and strong steel underframe for railway cars which is especially adapted for use in box car construction, but which may be used in any and all classes of cars where available.

Referring to the parts, A is a central sill or supporting plate girder comprising the end portions B and intermediate portions C both of which are preferably of plate girder construction. The intermediate portion of the said girder forms the chief supporting member for the superstructure whether built in the form of a flat car or a box car, including all classes of cars whether intended for freight or passenger service, and said girder or center sill is provided with flanged compression members 1 which may be continuous or substantially continuous from end sill 2 to the corresponding end sill at the opposite end of the car, it being understood that but one-half of the underframe is illustrated, which may be duplicated at the opposite end portion of the car.

The compression member 1 may be formed of suitable flanged shapes as the angles 1 or any well known commercial substitute therefor which will best answer the

particular necessities as occasion arises, but it is understood that the compression member comprises two or more flanged shapes between which there is riveted the web plate 3 which is substantially continuous or of sufficient area to impart the necessary strength required in a girder of this character, said web terminating preferably in the intermediate portion of the central girder or sill near the bolsters 4 which may be of any suitable type but which are shown as composed of two diaphragms 5 back to back on each side of the central sill member with top and bottom cover plates 6—7 secured to the outstanding flanges of said diaphragms and a center casting 8 interposed for well understood purposes. The flanged tension member of my girder comprises two flanged shapes which may be of any suitable form, though in this instance comprising two angles 10 which are substantially continuous from end sill to end sill.

As the central girder or sill is disposed along the longitudinal central line of the car it is convenient to spread the compression and tension members to form draft sills which are slightly separated and adapted to receive between them the usual draft appliances. For this purpose the said members diverge between the bolsters and pass through the body bolsters in parallel lines at a sufficient distance to permit the insertion of web plates 11 therebetween, said web plates with the flanged members 1—10 forming plate girder draft sills extending to the end sills. The center casting 8 differs in form from that usually employed in that the rear portion thereof is curved to better adapt it for use in connection with the peculiar form of draft sills just described. Intermediate the bolsters, cross bearers 12 are provided consisting of rolled or pressed channel shapes having their end portions riveted to the center sill and to the light side sills 13 by suitable angle plates 14. There are also provided relatively truss shaped cross bearers comprising top and bottom channel members 15—16 respectively, the top member passing from the side sills over the center sill and the bottom member passing from below the Z-shaped side sills downwardly through slots 17 cut in the web plate 3 of the center sill member. Connected with said channels 15—16

- are web plates 18 of channel form disposed transversely of the car and at each side of the central web plate 3 are pressed brackets 19 having straight upper edge portions with flanges 20 and 21 shaped to clear the compression and tension member of the center sill through which flanges extend rivets 22 used to unite the several parts, the flange 21 resting on the horizontal legs of the angles 10 as best shown at Fig. 4, the flanges 20 being riveted together with the sill web plate between them and the shouldered portions 24 resting under the outstanding flanges of the compression members 1. Carried by the Z-shaped side sill members, which are supported by the ends of the bolsters and the transverse members are the usual nailing strips, shown in dotted lines in Fig. 3.
- 20 What is claimed as new is:—
1. A car underframe comprising bolsters, a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate terminating between the bolsters, a transversely extending supporting member composed of a plurality of parts one of which extends through the web plate of said center sill.
  2. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, transversely extending cross bearers comprising upper and lower channel members one of which passes through said girder, and reinforcing means connected with said girder in proximity to the member extending therethrough.
  3. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, a cross bearer comprising upper and lower channel members one of which forms a seat beyond the end of the other channel member, the member forming the seat extending through said central girder.
  4. A car underframe comprising bolsters, a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate terminating between the bolsters, said plate being deeper at its middle portion than near its ends, and a cross bearer comprising a plurality of parts one of which passes through the web of said central girder.
  5. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, a cross bearing member comprising two channels of unequal length one of which passes through the web of said girder and extends laterally beyond the end of its companion member to form a seat.
  6. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, said web plate being of less length than said compression member, in combination with a cross bearer one member of which extends through said web plate.
  7. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, said compression member extending from end sill to end sill and diverging portions within the bolsters to form separated draft sills.
  8. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, said web plate being perforated below the compression member, transversely extending channel members forming a cross bearer, one of said channel members passing through the perforation in the web plate and extending beyond its companion channel member.
  9. A car underframe comprising a central longitudinal girder with separately formed flanged compression member, flanged tension member and vertical web plate, in combination with end sills, body bolsters, said body bolsters being provided with an opening for the passage of diverging parts of said compression member, said diverging parts extending to the end sills, and a filler casting interposed between the diverging portions of said compression member and secured thereto and to said bolster.
  10. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, said web plate being provided with vertical stiffening members and having a perforation therein between said stiffening members, in combination with a cross bearer comprising a plurality of reversely disposed channels one of which is longer than the other and the longer channel passing through said vertical web plate.
  11. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, in combination with end sills, flanged side sills of less depth than said central girder and extending to a higher plane than said central girder, cross bearers comprising a plurality of flanged members at least one of which extends under and is connected with said side sills, one of said flanged members extending through said central girder and flanged brackets connected with both principal members of the cross bearer and with the web of said central girder.
  12. A car underframe comprising a cen-

- tral longitudinal girder with flanged compression member, flanged tension member and vertical web plate, in combination with brackets connected with said central girder and projecting laterally therebeyond, and a cross bearer comprising a plurality of flanged parts connected with said brackets, one of said flanged parts extending through a perforation in the central girder between said brackets.
13. An underframe comprising a single central longitudinal girder having a vertical web plate and upper and lower flanges, transverse cross bearers comprising a plurality of parts one of which passes through the web plate of said central girder, and brackets connected with the principal cross bearer members and with said central girder.
14. An underframe comprising a single longitudinal girder in the form of a plate girder having a vertical web plate and upper and lower flanges, cross bearers comprising a plurality of parts one of which extends through the web plate of said girder, brackets at each side of the member extending through said girder said brackets being connected with the principal members of said cross bearer and with the web of said central girder, and draft sills including extensions of said upper flanges of the central girder.
15. A car underframe comprising a central longitudinal plate girder having a flanged compression member and tension member, and a transversely extending supporting member comprising an upper member and a lower member said upper member extending above said longitudinal girder and said lower member extending through said longitudinal girder.
16. In a car underframe, a centrally disposed supporting plate girder comprising compression members, and a web plate fixed directly to said compression members, in combination with bolsters formed each with an opening for the passage of said compression members, said compression members being spaced apart beyond the ends of said web plate, and said separated portions being extended through said bolsters.
17. In a car underframe, a single built-up centrally disposed supporting plate girder comprising compression members, and a web plate fixed directly to said compression members, in combination with bolsters formed each with an opening for the passage of said compression members, said compression members being spaced apart beyond the ends of said web plate, and said separated portions being extended through said bolsters.
18. In a car underframe, a single built-up centrally disposed supporting plate girder comprising compression members, and a web plate fixed directly to said compression members, in combination with bolsters formed each with an opening for the passage of said compression members, said compression members being spaced apart beyond the ends of said web plate, and said separated portions being extended through said bolsters.
19. In a car underframe, a central longitudinal plate girder comprising a web plate, a tension member, and a plurality of separately formed compression members secured directly to said web plate for the larger portion of their length and diverging at their end portions from said web plate within said bolsters to form parts of draft sills.
20. In a car construction, a single center sill comprising compression members and tension members, said compression members being spaced apart for part of their length, and a separately formed web plate of less length than said compression members clamped between said compression members.
21. In a car construction, a single center sill comprising compression members and tension members, said tension members being spaced apart for part of their length, and a separately formed web plate of less length than said stress members clamped between said tension members.
22. In a car construction, a single center sill comprising compression members and tension members, said compression members being spaced apart for part of their length, said tension members being spaced apart for part of the length, and a separately formed web plate clamped between said compression members and between said tension members.
23. In a car underframe, a center sill, and a bolster filler casting having a curved wall adapted to fit parts of said center sill.
24. In a car underframe, a center sill, and a bolster filler casting having a curved wall adapted to fit snugly between parts of said center sill.
25. In a car underframe, a center sill comprising a compression and a tension member, and a bolster filler having a curved wall adapted to fit between parts of said compression member.
26. In a car underframe, a center sill comprising a compression and a tension member, and a bolster filler having a curved wall adapted to fit between parts of said tension member.
27. In a car underframe, a center sill comprising a compression and a tension member, and a bolster filler having a curved wall adapted to fit between parts of said tension and compression members.
28. In a car underframe, the combination with a transverse member, of a longitudinal sill having curved portions within said transverse member being fixed thereto.
29. In a car underframe, the combination

- with a transverse member, of a longitudinal sill having curved portions within said transverse member, and a filler for said transverse member fitting snugly to the curved portions of said sill.
30. In a car underframe, the combination with a transverse member, of a longitudinal sill having divergingly curved portions within said transverse member.
31. In a car underframe, the combination with a transverse member, of a longitudinal sill having longitudinally diverging portions within said transverse member.
32. In a car underframe, the combination with a bolster, of a longitudinal sill having curved portions within said bolster, and a bolster filler fitting snugly between the curved portions of said sill.
33. In a car underframe, the combination with a bolster, of a longitudinal sill having divergingly curved portions, and a bolster filler fitting snugly between the curved portions of said sill.
34. In a car underframe, the combination with a bolster, of a center sill comprising a web plate, a compression member, and a tension member, said stress members extending beyond said web plate and diverging within said bolster, and a bolster filler fitted between the diverging portions of said stress members.
35. In a car underframe, the combination with a bolster, of a center sill comprising a web plate, a compression member extending beyond said web plate, and diverging within said bolster, and a bolster filler fitted between the diverging portions of said compression member.
36. A car underframe comprising a central longitudinal girder with flanged compression member, flanged tension member and vertical web plate, a cross bearer comprising upper and lower channel members one of which forms a seat beyond the end of the other channel member, and one of said channels extending through said central girder.
37. In a car construction, a single built-up center sill comprising separately formed compression members and tension members and web plate, said compression members being spaced from the plane of said web plate for part of their length, said tension members being spaced from the plane of said web plate for part of their length, and a bolster member connecting all of said compression and tension members together.
38. In a car construction, a single built-up center sill comprising separately formed compression members and tension members and web plate, said compression members being spaced from the plane of said web plate for part of their length, said tension members being spaced from the plane of said web plate for part of their length, and a bolster member connecting all of the spaced portions of said compression and tension members together.
39. In a car construction, a single built-up center sill comprising separately formed compression members and tension members and web plate, said compression members being spaced from the plane of said web plate for part of their length, said tension members being spaced from the plane of said web plate for part of their length, and a bolster center filler casting connecting all of said compression and tension members together.
40. In a car construction, a single built-up center sill comprising separately formed compression members and tension members and web plate, said compression members being spaced from the plane of said web plate for part of their length, said tension members being spaced from the plane of said web plate for part of their length, and a bolster center filler casting disposed between the spaced portions of said compression and tension members and connecting all of said compression and tension members together.
41. In a car construction, a single center sill comprising a plurality of compressor members and tension members and a web plate, and a bolster member connecting all of said compression and tension members together beyond said web plate.
42. In a car underframe, the combination comprising bolsters, a single built up plate girder center sill between said bolsters, parts of said sill diverging and extending through the bolsters, side sills, cross bearers adapted to aid in supporting said side sills and transmitting weight therefrom to said center sill and through said sill to the bolsters at each side of the center thereof, and a bolster filler member between the diverging portions of said center sill.
43. In a car underframe, the combination comprising bolsters with an opening relatively at the middle thereof, a filler in said bolster opening, a single center girder with a vertical web plate between said bolsters, compression members forming parts of said center girders and extending through said bolster at each side of said bolster filler, side sills and a truss, a part of which passes through said web plate, adapted to aid in supporting said side sills.
44. In a car underframe, the combination comprising bolsters with an opening relatively at the middle thereof, a filler in said bolster opening, a single center girder with a vertical web plate between said bolsters, compression members forming parts of said center girder and extending through said bolster at each side of said bolster filler, side sills, a cross bearer utilizing said web plate as a strut and extending under said side sills to aid in supporting said side sills.

45. In a car underframe, the combination comprising bolsters, side sills, a single central plate girder sill with compression members extending beyond said bolsters, being supported at the bolsters, and cross members connected with and extending below said side sills and passing through said girder plate.

46. In a car underframe, the combination with a single centrally disposed plate girder center sill of a transverse truss supported upon and utilizing the web of said center sill as a strut member.

47. In a car underframe, the combination comprising bolsters, side sills, a centrally disposed plate girder sill with its compression members extending beyond the bolsters and a transverse truss with one member thereof extending under said side sills and through the web of said center sill.

48. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, a transverse truss one member of which passes over said compression members and one member of which passes through said web plate.

49. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, a transverse truss, one member of which passes over said sill, and the other member extends beyond the ends of the first mentioned member and under said compression members.

50. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, a transverse truss comprising an upper member extending to side sills, a lower member extending below said side sills and said truss utilizing a part only of the depth of said center sill as a vertical strut.

51. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, side sills, a transverse truss comprising an upper member extending across said center sill, a lower member extending through said center sill and brackets connected with said center sill, said upper truss member and said lower truss member.

52. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bol-

sters beyond which said compression members extend, means for supporting a side nailing strip, a transverse supporting truss therefor comprising an upper member secured to the upper part of said center sill and a lower part passing through said sill and under said supporting means, said transverse truss utilizing a part of the depth of said sill as a strut and supplemental members connecting the upper and lower truss members.

53. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, means for supporting the longitudinally extending nailing strips, a transverse truss supported upon and transmitting its load to said plate girder sill one member of said truss extending under said supporting means and through the web plate of said center sill.

54. In a plate girder monosill construction for use in car building, a centrally disposed plate girder sill with compression members, web plate and tension flanges, bolsters beyond which said compression members extend, center filling members in said bolsters separating the extensions of said compression members, and a transverse truss, a strut member of which comprises the web plate of said center sill.

55. In a railway car, bolsters, end sills, and draft sills extending from said end sills through said bolsters between which bolsters said draft sills converge and are connected together, and means clamped between the connected portions of said draft sills connecting all of said draft sills together.

56. In a railway car, the combination comprising bolsters, end sills and transversely separated draft sills between each bolster and end sill, said draft sills converging between said bolsters and being connected together, and means clamped between the connected portions of said draft sills connecting all of said draft sills together.

57. In a railway car the combination comprising bolsters, end sills and transversely separated draft sills between each bolster and end sill, said draft sills converging between said bolsters and being connected together to form parts of a single center sill and a web plate clamped between the connected parts thereof.

58. In a railway car underframe, the combination comprising end sills, bolsters with relatively central openings therethrough, relatively continuous draft sills extending from end sill to end sill, filler members in said bolster openings around which said draft sills are convergingly curved and beyond which said converging portions are connected together, and a web plate secured

between the connected portions of said draft sills between the bolsters by through rivets.

59. In a railway car underframe, end sills, bolsters provided with relatively central openings therethrough and fillers in  
5 said openings, each having a semi-circular wall, in combination with separated draft sills between said bolsters and end sills, said draft sills extending through the bolsters at  
10 the sides of said fillers and having converging portions fitting to the curved walls of said bolster fillers, and means for connecting the converging parts of said draft sills.

60. A car underframe comprising a bolster and a single plate girder center sill,  
15 said center sill comprising spaced compression and tension members and a web plate

connecting said members, said web plate terminating short of the ends of said compression member and a channel shaped cross  
20 bearer extending through said web plate.

61. In a car underframe, the combination with bolsters and a center sill formed with diverging portions within said bolsters, of  
25 a transverse supporting member between said bolsters.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

VICTOR M. SUMMA.

Witnesses:

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JOHN D. SEILER.