June 28, 1960 J. HIRSCH ET AL 2,942,557

DETACHABLE SKID FOR HIGH SPEED TRACK CARRIAGES

Filed Aug. 30, 1955 4 Sheets-Sheet 1

Fig. 1.

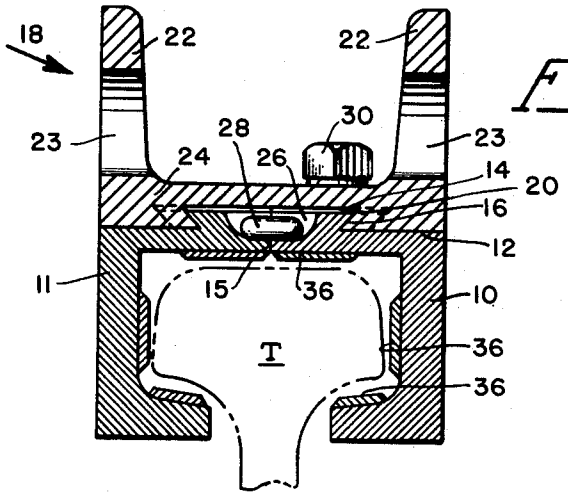
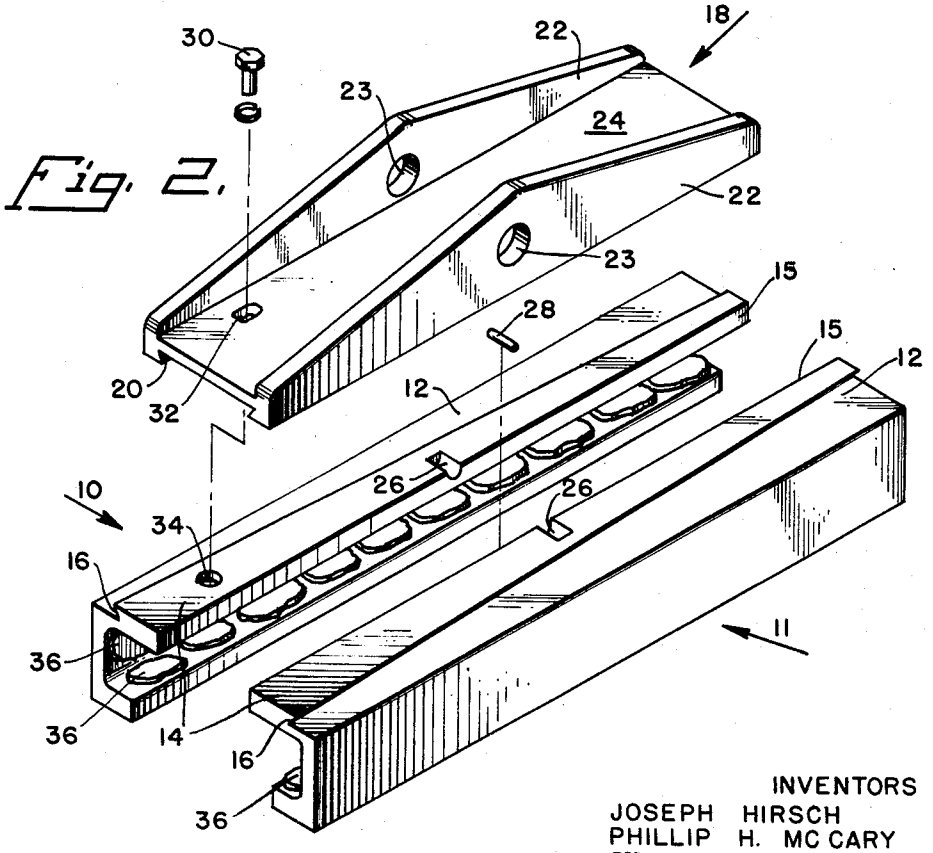


Fig. 2.



INVENTORS
JOSEPH HIRSCH
PHILLIP H. MC CARY
BY
A. W. O'Brien
V. C. Mueller
ATTORNEYS

June 28, 1960 J. HIRSCH ET AL 2,942,557

DETACHABLE SKID FOR HIGH SPEED TRACK CARRIAGES

Filed Aug. 30, 1955

4 Sheets-Sheet 2

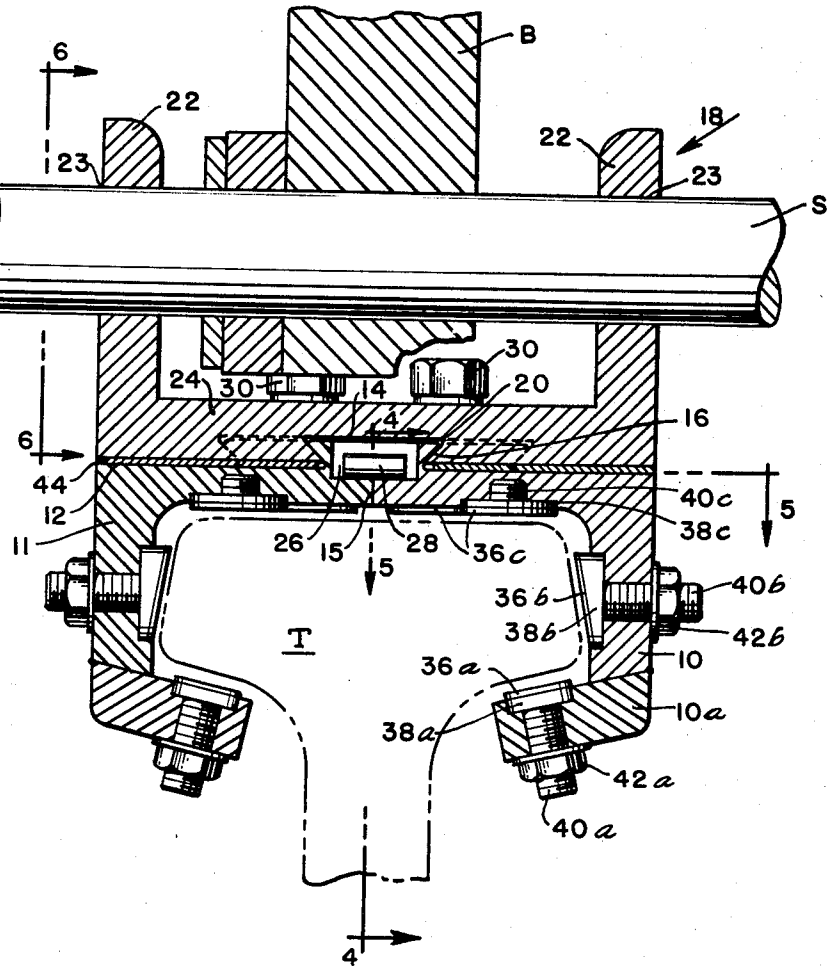


Fig. 3.

INVENTORS
JOSEPH HIRSCH
PHILLIP H. MC CARY
BY
G. D. O'Brien
V. C. Muller
ATTORNEYS

June 28, 1960 J. HIRSCH ET AL 2,942,557

DETACHABLE SKID FOR HIGH SPEED TRACK CARRIAGES

Filed Aug. 30, 1955

4 Sheets-Sheet 3

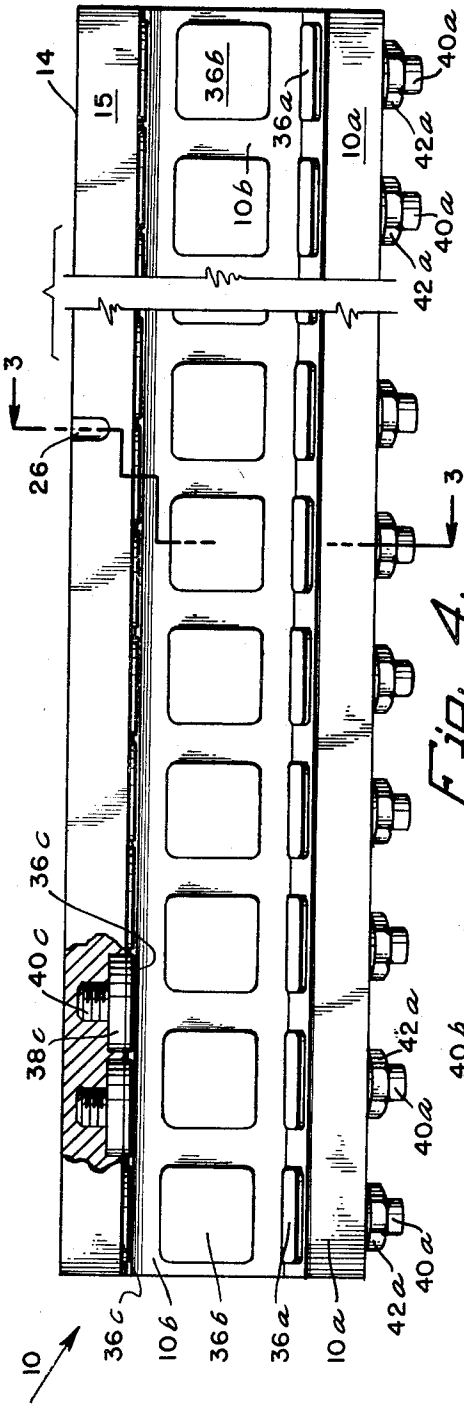


Fig. 4.

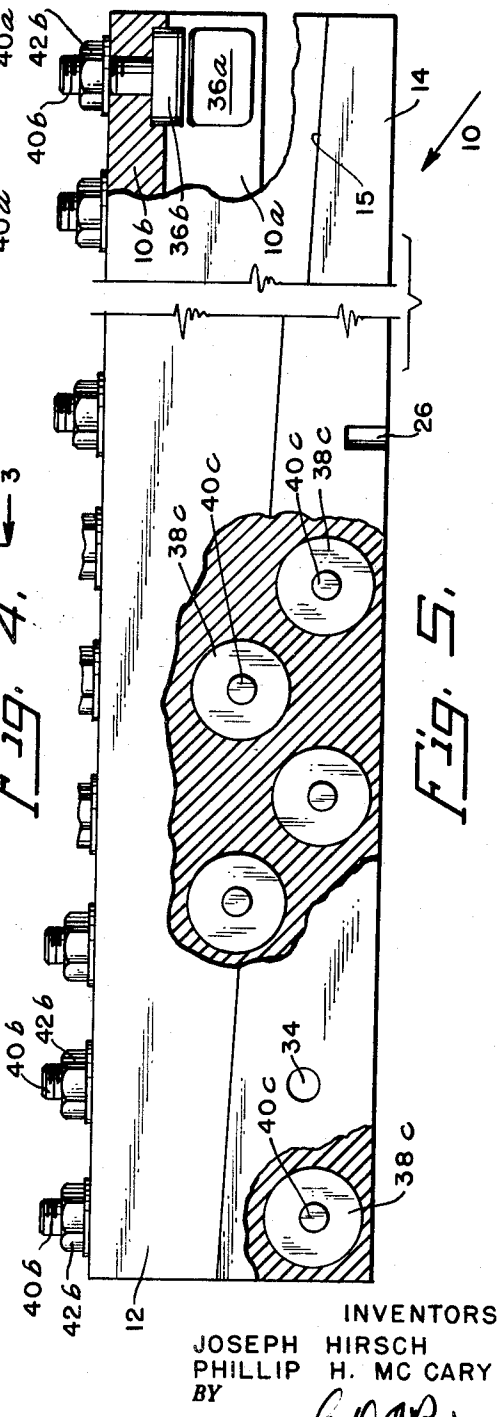


Fig. 5.

INVENTORS
JOSEPH HIRSCH
PHILLIP H. MC CARY
BY
G. D. O'Brien
V. C. Muller
ATTORNEYS

June 28, 1960 J. HIRSCH ET AL 2,942,557

DETACHABLE SKID FOR HIGH SPEED TRACK CARRIAGES

Filed Aug. 30, 1955

4 Sheets-Sheet 4

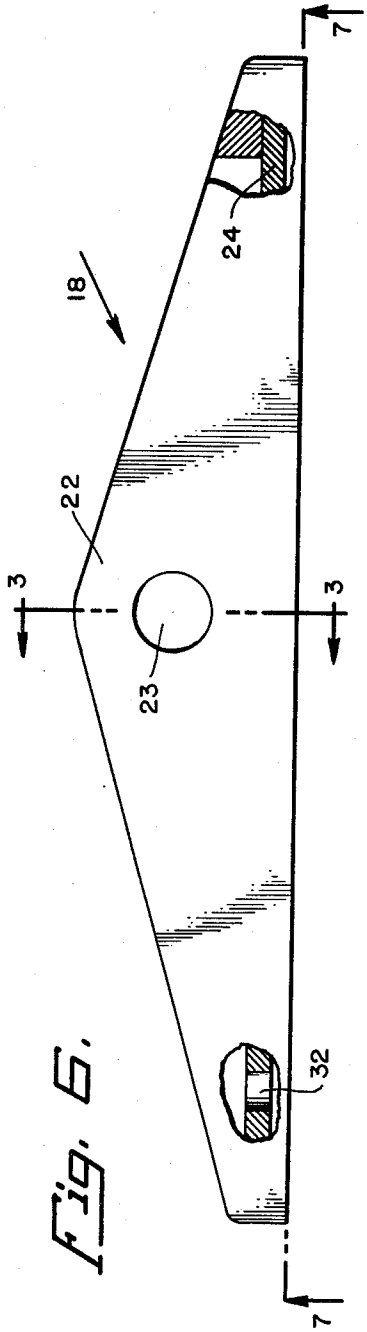


Fig. 6.

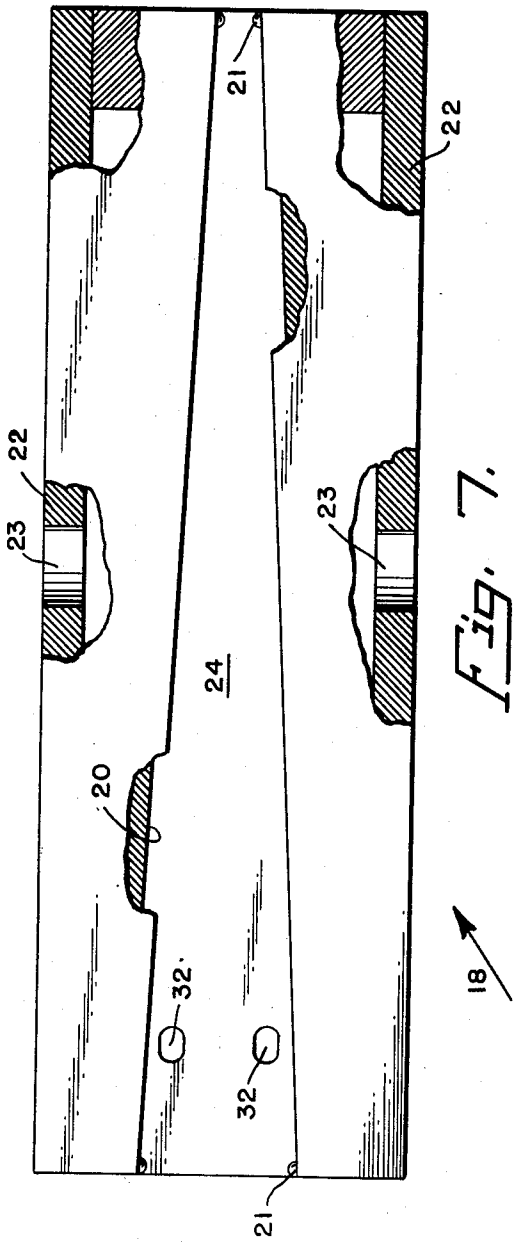


Fig. 7.

INVENTORS
JOSEPH HIRSCH
PHILLIP H. MC CARY
BY
G. D. O'Brien
V.C. Muller
ATTORNEYS

United States Patent Office 2,942,557
Patented June 28, 1960

2,942,557

DETACHABLE SKID FOR HIGH SPEED TRACK CARRIAGES

Joseph Hirsch, Pacific Palisades, and Phillip H. McCary, Los Angeles, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed Aug. 30, 1955, Ser. No. 531,621

14 Claims. (Cl. 104—134)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to skids for track guided carriages and more specifically to improved detachable skid means for high speed track guided carriages.

Track guided carriages or vehicles are generally supported by flanged wheels. However, there are many instances in which it is preferable to support such carriages or vehicles on skids for sliding rather than rolling contact with the track. Such skids may include rail engaging shoes having downwardly and inwardly directed flange means to grip the track to prevent vertical separation therefrom, and this last mentioned type, while of obvious general utility, has particular usefulness in conjunction with high speed track installations for test and research purposes.

The use of track-embracing shoes presents particular problems relative to assembly and to frictional wear of sliding surfaces. Especially where test or research purposes are involved it is essential, along with general ruggedness of construction, that the skids be easily detachable from the rail structure, that the shoes thereof contact the rail structure with closeness to avoid vibration and wear due to shoe hammer with the rail, and that the bearing surfaces be of such material and nature as to allow movement with a minimum of frictional restraint and minimum of wear. Prior devices have been designed with these requirements in mind but have generally failed to be completely satisfactory. We have invented an arrangement wherein the carriage shaft supporting element of the skid may be used as a wedge to hold plural separable shoe forming elements together to form a shoe and in which such elements may be provided with protruding track gripping bearing surfaces of less surface area than the elements themselves to provide ventilation of the frictionally heated bearing surfaces to reduce wear. The resulting novel skid arrangement is the subject of this invention and provides easier detachability and interchangeability of parts, and better wear and performance features than was possible with prior known skid arrangements.

It is, therefore, an object of this invention to provide new and improved detachable skid means for high speed rail guided carriages which are quickly and easily removable from the rails.

It is a further object of this invention to provide detachable skid means having plural part shoe elements which are held in assembled relationship by the carriage shaft supporting element of the skid means to form a sturdy and easily separable and detachable unit.

Another object of this invention is to provide detachable skid means having bearing elements in the form of spaced raised areas so as to provide for ventilation of the bearing area and to prevent the gathering of foreign matter in the shoe structure.

A still further object of this invention is to provide detachable skid means having shoe structures with removable and adjustable bearing inserts.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a vertical sectional view of one form of detachable skid according to this invention;

Fig. 2 is an exploded perspective view of the skid shown in Fig. 1, showing the various parts thereof and their manner of assembly;

Fig. 3 is a vertical sectional view, similar to Fig. 1, of another modification of detachable skid, according to the invention, the lines 3—3 on Figs. 4 and 6 indicating the location of the section relative to the elements shown in those figures;

Fig. 4 is a side elevational view of one of the shoe elements of the modification shown in Fig. 3, with a portion thereof broken away, the line 4—4 of Fig. 3 indicating the direction and extent of the view;

Fig. 5 is a top elevational view of the shoe element shown in Fig. 4, with portions thereof broken away to more clearly illustrate the bearing pad arrangement, the line 5—5 of Fig. 3 indicating the direction and extent of the view;

Fig. 6 is a side elevation of the carriage shaft supporting element of the skid shown in Fig. 3, with the shaft itself not shown and with pieces broken away for clarity of illustration, the line 6—6 on Fig. 3 showing the direction and nature of the view; and

Fig. 7 is a bottom, elevational view of the shaft supporting element as shown in Fig. 6 (see line 7—7 of Fig. 6), with portions broken away to more clearly show the nature thereof.

Attention is now directed to the drawings, in which like reference numerals indicate like parts in the various figures. The general main construction of the two illustrative embodiments of this invention specifically described and illustrated herein comprises three main components, namely a pair of complementary rail engaging shoe elements 10, 11 and an interengaging carriage shaft supporting element 18. Shoe elements 10, 11 are of generally C-shaped cross-section and are adapted, when assembled, to encompass a generally T-shaped rail or track T, as shown in dotted lines in Figs. 1 and 3. The top walls 12 of the shoe elements are of equal length and of a combined lateral width to provide an inner combined top surface at least as wide as the top of the rail T so that the downwardly extending side walls encompass the sides of the rail T.

The top walls 12 of the two shoe sections are each provided with raised portions 14 at the inner abutting edges of the complementary sections, such portions being of constantly increasing width from end to end of the sections to form a wedge-shaped raised portion when placed together in assembled relation. The inner edges 15 of the mating raised portions are perpendicular to the upper surfaces thereof to provide a rigid, sturdy structure upon assembly, and the outer edges are bevelled as shown at 16 to provide means to grip the carriage shaft supporting element 18 and form a rigid assembly therewith by cooperation with similar means 20 on said element, as best shown in Fig. 2.

The carriage shaft supporting element 18 is a unitary piece of generally C-shaped channel form, having side walls 22 which may be tapered from the center and rounded as shown in Figs. 2 and 6 and which have more or less centrally positioned aligned shaft supporting bearing openings 23. The bottom wall 24 of the element 18

is provided with an appropriate tapering depression on the underside thereof, having the bevelled portions **20**, as shown, for engagement with the complementary portions **16** of the shoe sections **10, 11** so that shaft supporting element **18** may be slid over the assembled pair of shoe elements to form a solid unitary assembly of the three pieces as shown in Figs. 1 and 3, the wedging nature of such engagement insuring a tight, vibration-free connection.

Rail engaging shoe elements **10, 11** are provided with matching dowel slots **26** to receive a centering dowel **28** to align the complementary shoe elements with one another. The assembly is completed and locked in position as by the insertion of cap screws **30** through appropriate holes **32** in the carriage shaft supporting member **18** and into engagement with screw threaded openings **34** in the shoe elements **10, 11**. Holes **32** may be slightly elongated, as shown, for purposes of adjustment and of ease of assembly.

One of the most important features of this invention is the provision of spaced bearing surfaces on the shoe members **10, 11** whereby the frictional contact as the shoes slide along the rail is made at spaced points so that the bearing area may be ventilated so that heat developed is more readily dissipated, and so that foreign matter will not collect in the apparatus. Illustrative examples have been disclosed showing two of the many ways possible to achieve this result according to the invention. The two modifications shown are generally alike in other respects and have been commonly described hereinabove, with like reference numerals applied to like parts.

With respect to the modification illustrated in Figs. 1 and 2, the spaced bearing surfaces are in the form of rows of spaced pads **36** arranged on the inner surfaces of shoes **10, 11** at the surfaces of the shoes **10, 11** which engage or may engage the track T. The pads are welded to the inner walls of track engaging shoes **10, 11** protruding therefrom to provide ventilating space therebetween and may be of any hard faced bearing material and are of such thickness as to provide straight combined contact with adjacent rail surfaces. The bearing pads may have a slight oval surface to prevent gouging and, if desired, a number of the pads may be made of graphite or other lubricating material to lubricate and protect the surface of the rail.

The modification illustrated in Figs. 3 to 7 is characterized by the provision of screw threaded bolt means to support the spaced bearing pads so that the pads are extended outwardly from the inner walls of the shoe and are removable, and interchangeable. As clearly shown in Figs. 3 through 5, the bearing pads of each shoe element are arranged in three groups. The bearing pads **36***a* are arranged in a row in spaced relationship along the bottom portion **10***a* of the shoe, which is in proximity to the underside of track T. The pads **36***b* are similarly arranged in a row on the side portion **10***b* of the shoe which is in proximity to the side wall of the track. The pads **36***c* are placed in alternately spaced arrangement in two adjacent rows as best seen in Fig. 5. Pads **36***a* and **36***b* are mounted, as by welding, to heads **38***a*, **38***b* attached to threaded studs **40***a*, **40***b* which are adapted to be placed through openings in the bottom portion **10***a* and the side portion thereof, respectively, as best seen in Fig. 3. The head elements **38***a*, **38***b* are preferably countersunk into pockets of similar cross-section, the particular shape illustrated being rectangular (see Figs. 4 and 5) and the heads are faced so that the pad welded thereto will properly bear against the track T. Thus, the heads **38***b* carrying the bearing pads **36***b* are bevelled to bring them into the plane of the side of track T, whereas the heads **38***a* carrying pads **36***a* are so supported that the faces may be perpendicular to the axes of their respective studs **40***a*. The illustration is not intended to be limiting since all that is critical is that the bearing surfaces be proximate to the track and aligned therewith and this can be accomplished in other various and obvious ways as, for example,

slanting the studs **40***b* which carry pads **36***b* rather than bevelling the heads thereof. Pads **36***a* and **36***b*, supported on studs **38***a*, **38***b* and heads **40***a*, **40***b*, as previously described, are fastened into position by threaded nuts **42***a* and **42***b*. This arrangement provides obvious removability and interchangeability of bearing pads and also permits adjustment, since than shim elements may be seated in the countersunk portions in which the head elements **38***a* and **38***b* are seated if it is desired to effect adjustment.

Pads **36***c* are preferably mounted, as by welding, on the heads **38***c* of headed screws **40***c*, which are adapted to be screwed into appropriate threaded openings in the lower sides of the top walls of the rail engaging shoe elements, as best seen in Fig. 3. The heads **38***c* are circular in cross-section and fit into appropriate countersunk areas in said top walls.

The modification of Figs. 3 through 7 depicts certain variations of the specific example of Figs. 1 and 2 which have not been previously mentioned. For example, the modification of Figs. 3 through 7 includes ball detent means **21** intended to cooperate with appropriate depressions in the shoe portions to fix the relative position of the parts, a plurality of cap screws **30** for locking the assembly in place and includes shim means **44** to assure a tight assembly. Moreover, as best seen in Fig. 3, the track engaging shoes need not each be a unitary C-section but may be built up to a desired shape by the joining together of pieces as shown by the construction of shoe **10** in Fig. 3 wherein the bottom section **10***a* is a separate piece connected to the remainder of the shoe by any suitable manner, as by welding.

To show the normal mode of attachment of vehicle bodies or carriages to skids of the nature herein disclosed, Fig. 3 includes some structure of such carriages. The carriages to be supported on such skids are provided with supporting frame structures including bearing means B in which a shaft S may be journalled, as shown, two opposed skids on a pair of rails thus being capable of supporting a single such shaft, and it being necessary, of course, in supporting a vehicle having two shafts to provide four appropriately positioned skids.

The foregoing description should suffice to clearly describe the invention. However, it is deemed best at this point to briefly describe the mode of assembly of a skid according to the invention. In either form of the invention specifically described herein, assuming the shoe structures **10, 11** to have the bearing pads either welded thereon (Figs. 1 and 2) or assemled therewith (Figs. 3 to 7) each skid may be assembled by mounting a pair of complementary shoe elements **10, 11** about the rail T in longitudinal alignment, with a dowel pin **28** inserted in dowel slots **26**. In this position, the raised portions **14** of the shoe elements form a single wedge shaped protuberance having bevelled sides **16**. Carriage shaft supporting element **18** is then slidingly moved across the aligned shoe elements with the wide portion of the bevelled tapering depression in the bottom wall thereof, first sliding over the narrow portion of said protuberance and finally engaging the wider portion thereof, the bevelled surfaces **16** and **20** locking the pieces together. If desired, a shim, such as the shim **44** (Fig. 3), may be included. Screw elements **30** are then inserted in holes **32** and **34** to lock the assembly together.

From the above, it should be clear that we have invented new and improved skid structures for high-speed track carriages which offer new and improved characteristics in that they are easily attached and detached from the rails; in that they provide for ventilation and cooling of the bearing surfaces and for the non-retention of foreign matter; and in that the bearing surfaces may be replaced and adjusted.

The two modifications specifically disclosed are by way of illustration of the principles of this invention and are not intended to be limiting, the scope of the invention

being limited only by the scope and language of the appended claims.

What is claimed is:

1. A detachable skid for high speed rail supported carriages comprising a carriage supporting channel member adapted to have pivotal connection with a portion of a carriage, a pair of complementary rail engaging shoe elements of substantially C-shaped configuration each constituting a half of a rail engaging shoe, said elements being adapted to be placed in opposed relation about a generally T-shaped rail to encompass the rail to form a rail engaging shoe, and interengaging means on said shoe elements and said channel member for releasably securing said channel member to said shoe elements, said last named means serving also to secure said shoe elements to one another in said encompassing relation to said rail.

2. A detachable skid according to claim 1, wherein said interengaging means comprises raised portions at the inner abutting edges of the top surfaces of said complementary shoe elements, said portions being of constantly increasing width from end to end of said elements to form a single composite wedge shaped portion when the elements are placed in abutting relation, the outer edges of said raised portions being bevelled inwardly and downwardly, and a complementary tapering bevelled depression in the underside of said channel member to engage the raised portions on said shoe elements to clamp the pieces together upon assembly therewith.

3. A detachable skid according to claim 1, wherein said shoe elements are each provided with a plurality of spaced bearing means protruding from the top, side and bottom surfaces thereof and adapted to slidably engage said rail.

4. A detachable skid according to claim 3 wherein said bearing means comprise removable insert means removably and detachably secured in said shoe elements.

5. A detachable skid according to claim 3 wherein said bearing means comprise pads of bearing material attached to the inner surfaces of said shoe elements.

6. A detachable skid according to claim 3 wherein said protruding bearing means are arranged in a plurality of rows, said rows being disposed longitudinally of said shoe means as disposed about said rail and being positioned along the lines of sliding contact with the top, sides and bottom of said rail, respectively, whereby the rail has sliding contact with said aligned spaced bearing means, the spaces between adjacent bearing means providing for ventilation and cooling of the bearing means and allowing the escape of foreign matter.

7. A detachable skid for high speed rail supported carriages comprising a carriage supporting channel member adapted to have pivotal connection with a portion of a carriage, rail engaging shoe means adapted to encompass a generally T-shaped rail, and means to attach said carriage supporting channel to said shoe means, said rail engaging shoe means having a plurality of spaced bearing means protruding from the surface thereof and adapted to slidably engage said rail, said protruding bearing means arranged in a plurality of rows, said rows being disposed longitudinally of said shoe means as disposed about a rail and being positioned along the lines of sliding contact with the top, sides and bottom of said rail,

respectively, whereby the rail has sliding contact with said aligned spaced bearing means, the spaces between adjacent bearing means providing for ventilation and cooling of the bearing means and allowing the escape of foreign matter.

8. A detachable skid according to claim 7 wherein said bearing means comprise removable insert means removably and detachably secured in said shoe elements.

9. A detachable skid according to claim 7 wherein said bearing means comprise pads of bearing material attached to the inner surfaces of said shoe elements.

10. Detachable rail engaging shoe means for use in skids for high speed rail supported carriages, said shoe means comprising a pair of complementary rail engaging shoe elements of substantially C-shaped configuration each constituting a half of a rail engaging shoe, said elements being adapted to be placed in opposed relation about a generally T-shaped rail to encompass the rail, each said shoe element having a raised portion at that edge of the top surface thereof which abuts the other element when they are assembled about said rail, the outer edge of said raised portion being bevelled inwardly and downwardly to provide means for attachment of the shoe elements to carriage supporting means and to one another in assembled relation on said rail.

11. Rail engaging shoe means as defined in claim 10, wherein each said shoe element is provided with a plurality of spaced bearing means protruding from the surface thereof and adapted to slidingly engage said rail.

12. Rail engaging shoe means as defined in claim 11 wherein said spaced protruding bearing means are arranged in a plurality of longitudinal rows along the inner surfaces of the top, side, and bottom portions thereof to provide interrupted bearing surfaces to slidingly engage the top, side, and bottom of the rail respectively.

13. Rail engaging means as defined in claim 12 wherein said bearing means comprise removable insert means removably and detachably secured in said shoe elements.

14. Rail engaging means as defined in claim 12 wherein said bearing means comprise pads of bearing material attached to the inner surfaces of said shoe elements.

References Cited in the file of this patent

UNITED STATES PATENTS

54,868	Crocker	May 22, 1866
245,389	Myers	Aug. 9, 1881
346,018	Bernstein et al.	July 20, 1886
425,408	Craw	Apr. 15, 1890
596,342	Tinney	Dec. 28, 1897
628,776	Dodge	July 11, 1899
1,033,769	Yerbury	July 23, 1912
1,231,513	Evans	June 26, 1917
1,419,726	Fixter	June 13, 1922
1,603,393	Malcolm	Oct. 19, 1926
1,777,578	Roberts	Oct. 7, 1930
2,185,630	Fridlund	Jan. 2, 1940
2,593,230	Walter	Apr. 15, 1952
2,724,966	Northrop et al.	Nov. 29, 1955
2,791,461	Goldenberg	May 7, 1957

FOREIGN PATENTS

564,515	Germany	Nov. 19, 1932