No. 649,183. Patented May 8, 1900.

W. E. SYMONS.

BOLTLESS CAST STEEL CAR TRUCK.

(Application filed Dec. 12, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

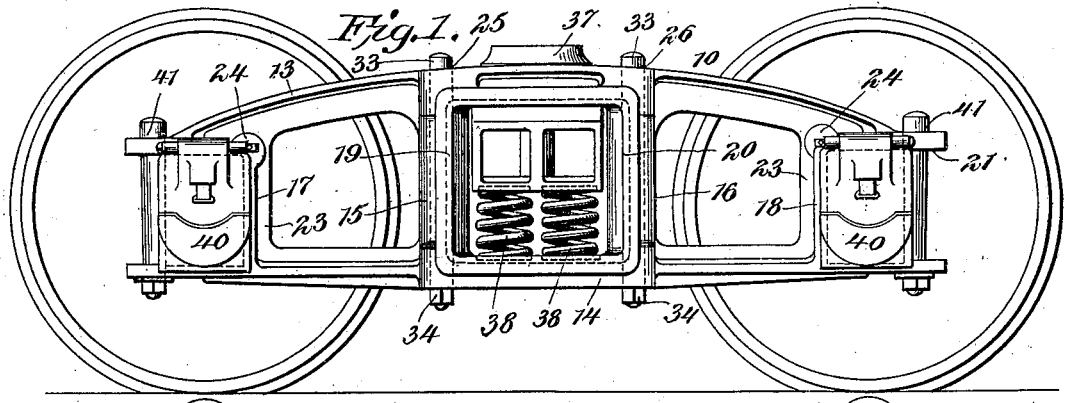

Fig. 2.

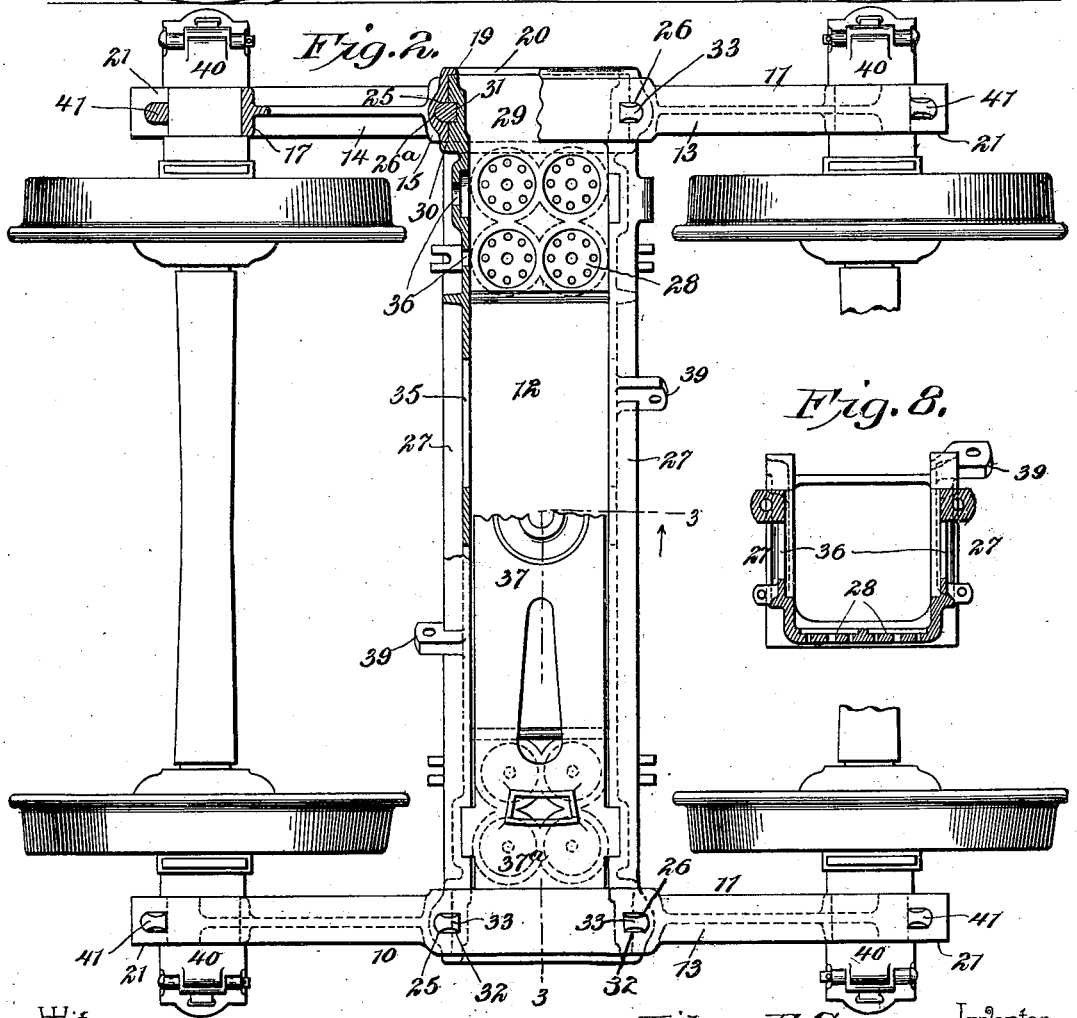

Fig. 8.

Witnesses
Howard P. Orr.
H. J. Berkhorst

Wilson E. Symons, Inventor
By his Attorneys,
C. A. Snow & Co.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

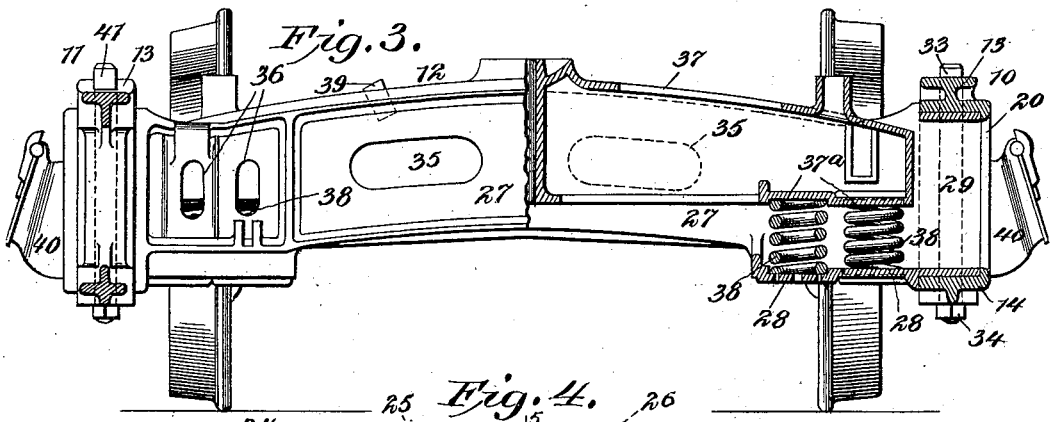


Fig. 4.

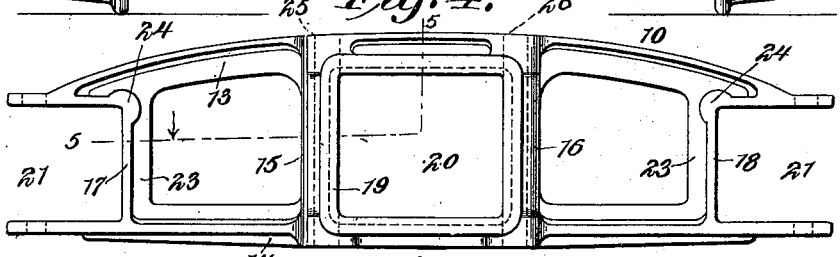


Fig. 5.

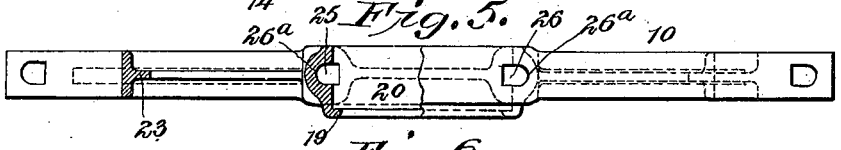


Fig. 6.

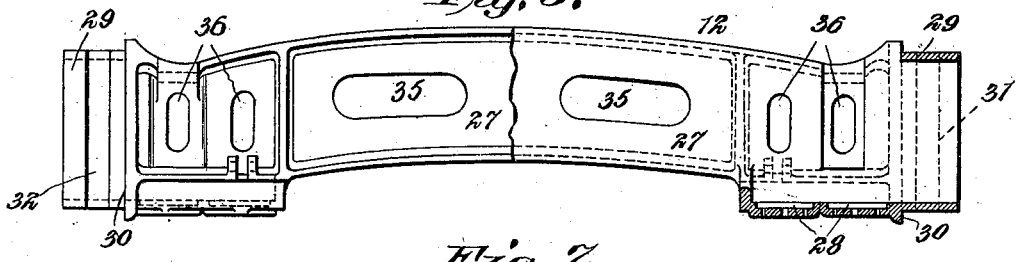
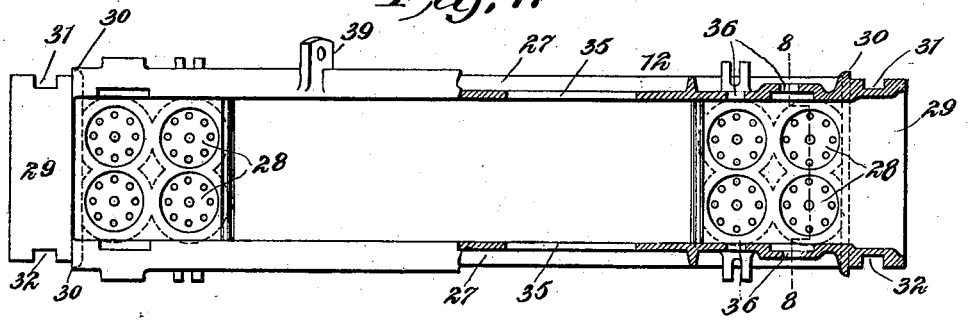


Fig. 7.



Witnesses

Howard P. Orr.

H. H. Benchoff

Wilson E. Symons, Inventor.

By his Attorneys,

Church & Co.

UNITED STATES PATENT OFFICE.

WILSON E. SYMONS, OF SAVANNAH, GEORGIA.

BOLTLESS CAST-STEEL CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 649,183, dated May 8, 1900.

Application filed December 12, 1899. Serial No. 740,074. (No model.)

To all whom it may concern:

Be it known that I, WILSON E. SYMONS, a citizen of the United States, residing at Savannah, in the county of Chatham and State of Georgia, have invented a new and useful Boltless Cast-Steel Car-Truck, of which the following is a specification.

My invention relates to boltless cast-steel car-trucks, which combine to a maximum degree strength, durability, and simplicity of construction with a material reduction in weight as compared with ordinary trucks.

In the service of car-trucks it is found that, owing to the derailment of cars and other causes, it is necessary to replace one or the other, or both, of the side frames or the transom. For the sake of economy in making repairs and in the manufacture of the trucks it is desirable to make the same of three principal parts—to wit, the two side frames and the transom. This requires the parts to be united together in a very substantial manner; and one object of this invention is to provide an improved connection which produces an exceedingly strong joint without the use of bolts.

A further object in view is to construct the transom in a novel way to provide for the entrance and use of a lifting appliance by which the transom may be raised, so that the springs can easily be renewed and replaced at either side of the truck.

To the accomplishment of these ends the invention consists in the novel combination of devices and the construction and arrangement of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings I have represented a car-truck which embodies the several features of my invention in their preferred form, and to these drawings I shall now refer in order to explain more clearly the nature of the invention and the manner in which the same is or may be carried into effect.

Figure 1 is a side elevation of my improved car-truck. Fig. 2 is a plan view with one of the side frames and a part of the transom shown in horizontal section to more clearly illustrate the joint between said parts and the positions of the keys that prevent displacement of the end portions of the transom from the side frames. Fig. 3 is a sectional elevation taken in the plane of the dotted line 3 3 on Fig. 2. Fig. 4 is a detail view, in side elevation, of one of the side frames of the truck. Fig. 5 is a sectional plan view of the side frame, taken in the plane of the dotted line 5 5 on Fig. 4. Fig. 6 is a sectional elevation of the transom, the latter being broken away at one end portion thereof to illustrate its construction. Fig. 7 is a sectional plan view of the transom shown by Fig. 6. Fig. 8 is a vertical cross-section of the transom, taken in the plane of the dotted line 8 8 on Fig. 7.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

The car-truck of my present invention consists, essentially, of three main parts, each of which is cast in a single piece of metal—that is to say, the side frames 10 and 11 and the transom 12. In the manufacture of car-trucks it is necessary to make the parts as strong as possible without involving too much weight in their construction in order that the trucks may successfully withstand the strain of practical service without involving a substantial increase in the rolling-stock of the railroad.

In the construction of the members of my car-truck I have sought to secure great strength with a reduction in the weight by a redistribution of the metal and an arrangement of the parts to the best advantage. Each side frame 10 or 11 is practically interchangeable with other frames in car-trucks manufactured in accordance with my invention, thus facilitating repairs to the truck in the event of the derailment of the car and injury to the trucks thereof.

I will first proceed to describe the construction of the side frame, which is shown more clearly by Figs. 1, 4, and 5 of the drawings. This frame consists of an upper arch-bar 13, a binder 14, the central struts 15 16, and the end struts 17 18. The binder 14 is disposed, essentially, in a horizontal position, and the several struts lie at right angles to the binder, so as to make the binder reinforce or strengthen all the parts of the side frame. The central struts 15 16 are cast in a single piece with the arch-bar and the binder, and these parts are fashioned and arranged in such relation to each other as to form a large cen-

tral opening 20, preferably of square form, at the middle of the side frame. This central opening is bounded on the outside of the side frame by a marginal flange 19, which is integral with the frame and extends inwardly so as to have its edge within the boundary lines of the opening 20. The end struts 17 18 are integral with the arch-bar and the binder, near the ends of the same, and these several parts are arranged and fashioned to provide the open jaws 21 at the ends of the side frame, said jaws serving to accommodate the axle-boxes of the wheel-axles. Each open-ended jaw is bounded on three of its sides with a strengthening flange or rib 23, and this flange is itself strengthened at the upper inner corner thereof by increasing the thickness of the metal, so as to produce the reinforcement 24. The weight and leverage imposed by the side frame upon the axle-box seated in the jaw requires the latter to be of very strong construction in order to minimize the liability of breakage of the parts, and the provision of the rib or flange, with the reinforcement at the point indicated, adds such stiffness to the jaw as to prevent it from breaking at the upper inner corner thereof. The vertical walls at the sides of the opening 20 are provided with key-seats 25 26, each of which extends continuously through the top arch-bar 13, one vertical wall of the opening 20, and the binder 14. The key-seat opens into or communicates with the opening 20, and this key-seat is rounded or curved on the inner edge thereof, as indicated by the reference-numeral 26[a] in Fig. 5.

The transom 12 is a single piece of cast-steel of skeleton construction involving the distribution of the metal to secure great strength with a decrease in the weight of this part of the car-truck. This transom consists of the side members 27 27 and the spring-seats 28. The side members are disposed parallel to each other and provided with suitable reinforcement flanges or ribs substantially as shown by the drawings. The spring-seats are made integral with the side members of the transom, near the ends of the latter, and the complete transom is thus made to present a channeled appearance for the accommodation of the truck-bolster 37.

One important feature of my invention consists in the provision of the imperforate joint-flanges 29 at the respective ends of the transom, each joint-flange being integral with said transom and presenting a continuous surface which conforms in contour to the opening 20 in the side frame. This joint-flange is provided in its vertical faces with key-grooves 31 32, and between the flange and the side members of the transom is a marginal flange 30. The walls of the opening 20 in each pair of side frames and the surfaces of the joint-flanges 29 at the ends of the transom are adapted to each other in a manner to secure snug fitting of the parts when they are assembled into the complete truck. It may be desirable under some circumstances to finish the inner surfaces of the opening 20 of the side frame and to likewise finish the exterior surface of the joint-flange in the transom for the purpose of securing accuracy in the union of the parts; but I do not consider that it is essential to finish these surfaces of the parts under all circumstances.

The operation of assembling the parts of the car-truck requires the joint-flanges 29 of the transom to be fitted snugly or accurately in the openings 20 of the side frames, and the entrance of the flanges in the openings is limited or arrested by the flange 30 abutting against the side frame and the flange 19 abutting against the end portion of the transom, the last-named flange serving to conceal practically the end portion of the transom and imparting a neat finish to the side of the truck. This fitting of the joint-flange of the transom in the opening of the side frame brings the key-grooves 31 32 into coincidence with the key-seats 25 26 in the side frame, and the parts are thus assembled for the reception of the fastening-keys 33, each of which is fitted in the coincident key-seat and the key-groove in the side frame and the transom, respectively. These keys are essentially of tapered construction, and they are inserted with the small end downward, so as to engage with the side frame and the transom, the large end of the key being uppermost. It is my practice to provide a nut 34 on the lower threaded end of the key, but the joint between the transom and the side frame does not depend for its security upon the application of this nut, because the key is in a vertical position, which enables it to work itself downward into the seat and groove of the frame and transom under the jarring or vibration of the truck, thereby effectually retaining the keys in place and firmly connecting the parts with the truck, even though the nuts should work loose and fall off. The insertion of the keys operate to draw the transom and side frames firmly together, so as to attain an exceedingly-strong joint at the places where the different parts of the truck engage mutually with each other, and the keys thus unite the members so strongly together as to impart strength and durability to the sectional truck equal to the strength of a single cast-steel truck. In repairing the truck it is evident that the keys may be displaced or driven out of engagement with the transom and frame for the purpose of separating an injured member or members, thus enabling the broken parts of a truck to be replaced by another part.

My car-truck has its transom constructed for the reception of bars or other implements by which the truck-bolster may be raised with facility for the purpose of taking out an injured or broken spring through the opening 20 at the side of the truck. In order to reduce the weight of this single-piece cast-steel transom, the side members 27 thereof are provided with longitudinal slots 35. Near the

end portions of the transom and within the joint-flanges 29 thereof each side member is provided with one or more vertically-disposed slots or openings 36, the major axis of which is at right angles to the length of the transom. The truck-bolster 37 may be of any suitable construction to fit within the transom 12, and said truck-bolster is provided with spring-seats 37ª, that aline vertically with the springs 28 of the transom. Any suitable car-springs are fitted to the seats of the two, transom 12 and truck-bolster 37, so as to lie adjacent to the openings 20 in the side frame. The end portions of the truck-bolster are opposite to and below the upper edges of the vertical slots in the ends of the transom, whereby one or more lifting-bars may be thrust through the slots for the purpose of raising the truck-bolster, so as to permit an injured or broken spring to be taken out through the opening 20 in the side frame.

It will be observed by reference to the drawings that the vertically-disposed slotted openings 36 in the transom, near the ends thereof, are disposed substantially in alinement with the springs 38. The said openings 36 permit the insertion of crowbars or other levers or tools to enable the springs to be removed, replaced, or readjusted in making repairs.

The transom 12 of the truck is provided with any suitable fittings, as at 39, for the attachment of means for suspending the brake-beams or other appliances.

In car-trucks of existing types the thrusts or movements of the bolsters caused by the endwise movements of the car-body on the trucks, especially when the brakes are applied, are borne by the central portions of the sides or bars of the transom, and this stress exerted by the bolster on the sides or cross-bars of the transom is so great that the latter frequently become bowed outward in opposite directions at the centers of the transoms, in some instances to an extent of several inches, thus greatly injuring the transoms besides tending to destroy parallelism of the side members.

An important feature of my invention is to provide means for transferring the thrusts of the bolsters from the centers of the transoms to obviate the objection above stated, and to this end I provide the bolster on its sides, near its ends, with lateral ribs or offsets *a*, which are vertical on the sides of the bolster and project beyond the sides thereof, as shown particularly in Fig. 2 of the drawings, and I further provide the side walls of the transom, on the inner side and near the ends thereof, with vertical recesses or grooves *b*, which constitute seats and guides for the said ribs or offsets *a* of the bolster. It will be observed by reference to Fig. 2 that the width of the bolster is something less than the distance between the contiguous sides of the transom, and hence that the bolster is at all times out of contact with the sides of the transom excepting near the ends thereof where the offsets *a* are disposed in the seats *b*, and hence the side thrusts of the bolster are applied to the sides of the transom near the ends thereof, where the transom is braced and strengthened by being jointed to the side members of the truck-frame and where the thrusts of the bolster are sustained by the transom and the walls of the latter are prevented from being bowed or laterally displaced. It will furthermore appear from the drawings and the above description that the offsets and seats or grooves whereby the bolster is connected to the transom serve to prevent longitudinal movement of the bolster in the transom, an arrangement and construction which is highly advantageous, in that it counteracts any tendency to unseat the springs which support the ends of the bolster and arrest endwise movements of the bolster in the transom, hence preventing the side members of the car-truck frame from being battered and injured by the bolster.

The axle-boxes 40, of any suitable type, are fitted in the open-ended jaws of the side frames for the accommodation of the usual wheel-axles, and these boxes are held in place by the keys 41 in the manner disclosed by my prior application, filed August 19, 1899, Serial No. 727,845.

The car-truck of the present invention is of the general type disclosed in the prior application, to which reference has been made, from the fact that the side frames are provided at their end portions thereof with open-ended jaws or seats which permit the axle-boxes or either of them to be removed from the frames without "jacking up" the truck, as is necessary in trucks of the pedestal type. My truck is furthermore advantageous over trucks of the pedestal type from the fact that the seats for the axle-boxes are united by the horizontal binder on each side frame, and said side frames of the truck structure are joined together by the truck-bolster, which serves as a stay to the arch-bar and to the binder of the side frames, thereby materially strengthening the truck at the points where it is exposed to the greatest leverage and strain.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. In a car-truck frame, the combination with side members having central transverse openings, extending through said side members and flanged at their outer sides, said flanges overhanging said openings, of a transom having open ends adapted to enter said transverse openings and to bear against the

outer flanges thereof, the contacting sides of said ends of said transom and of said transverse openings having vertical coinciding key-bolt seats, said key-bolt seats extending through the upper and lower sides of said side members, above and below said transverse openings and by bolts in said seats, substantially as described.

2. In a car-truck frame, the combination with side members having central transverse openings extending through said side members, of a transom having open ends adapted to enter said transverse openings, the contacting sides of said ends of said transom and of said transverse openings having vertical coinciding key-bolt seats, said key-bolt seats extending through the upper and lower sides of said side members, above and below said transverse openings and key-bolts in said seats, substantially as described.

3. In a car-truck frame, the combination of side members having transverse openings, vertical grooves in the vertical sides of said transverse openings, and openings at the upper and lower ends of said grooves, and extending through the upper and lower sides of the side members; a transom having its ends adapted to be seated in said transverse openings, and provided with vertical grooves in the sides of its seated end portions, said grooves coinciding with those of the said transverse openings and forming seats for vertical locking key-bolts to secure said transom and side members together, substantially as described.

4. In a car-truck, a cast-steel transom, comprising vertical side walls with projecting joint-flanges at the ends thereof connecting the upper and lower sides of said side walls, said joint-flanges having the flanges 30 at their inner sides and provided in their vertical side with vertical key-seat grooves, the side walls of said transom being further connected at their ends on their lower sides by the spring-seats and said side walls being further provided with openings 36 coincident with said spring-seats and vertical grooves *b* near their ends in connection with the cast-steel members having central transverse openings in which the joint-flanges at the ends of the transom are fitted, the vertical sides of said transverse openings of said side members having key-seat grooves coincident with those of the transom, key-bolts in said key-seat grooves, thereby locking said side members on the ends of the transom, the cast-steel bolster between and out of contact with the side walls of the transom, said bolster having the integral vertical ribs or offsets *a* near its ends engaging said grooves *b* in the sides of the transom, and the springs in the spring-seats and bearing under the ends of the bolster, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILSON E. SYMONS.

Witnesses:
H. T. BERNHARD,
M. PERRY HAHN.