

June 29, 1937.

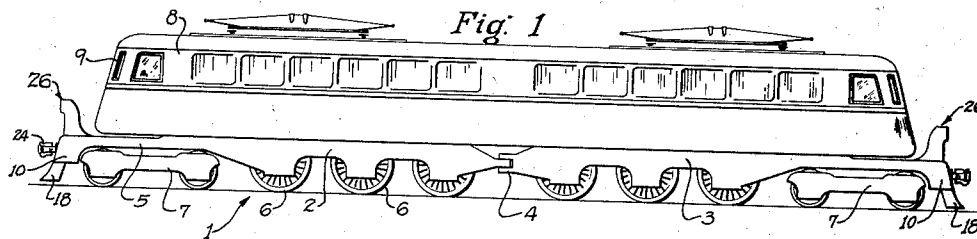
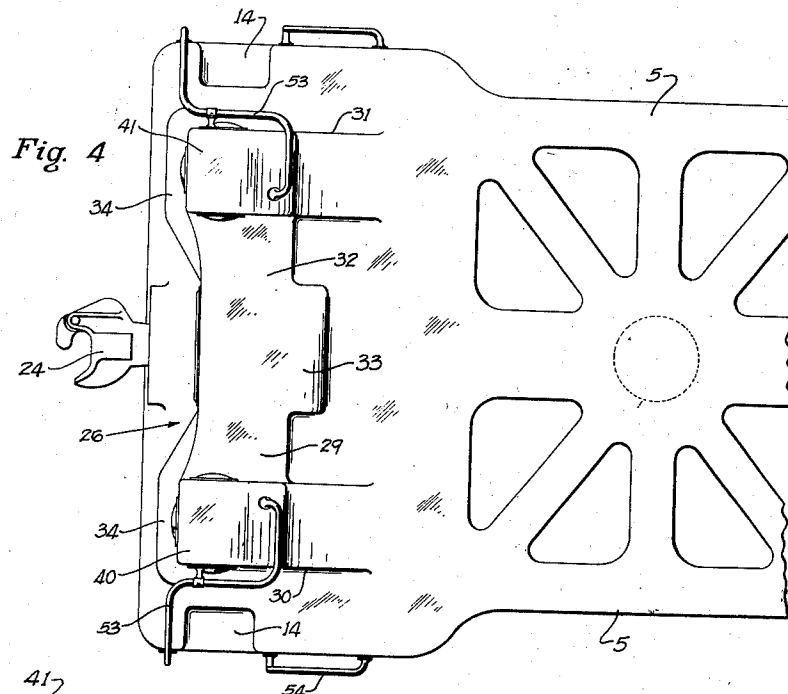
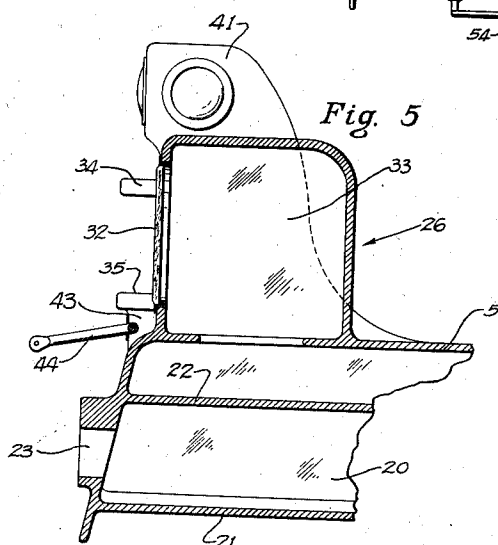
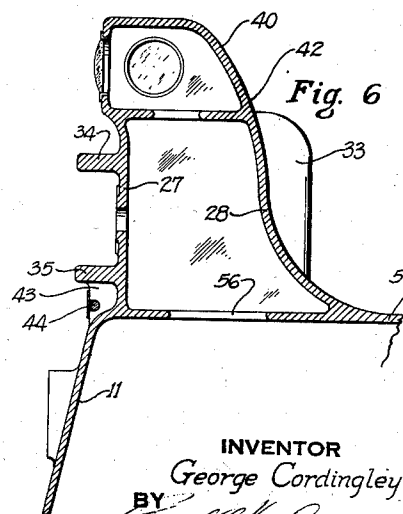
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2,085,694

ELECTRIC LOCOMOTIVE

Filed Feb. 24, 1934

3 Sheets-Sheet 1



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Fig. 2

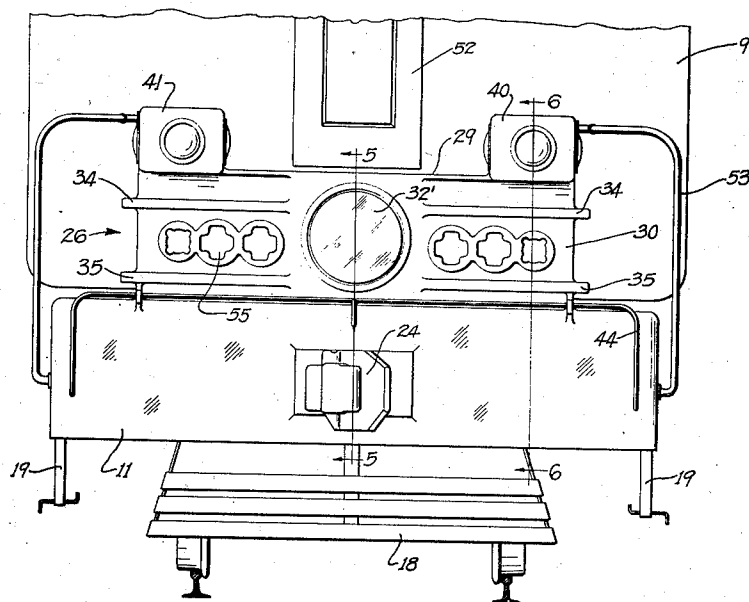
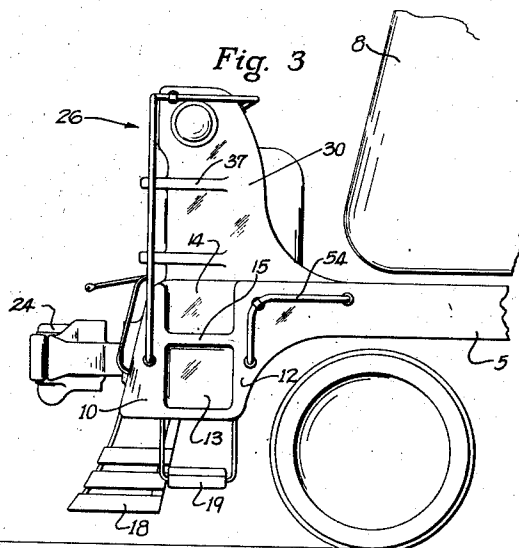


Fig. 3



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Fig. 8

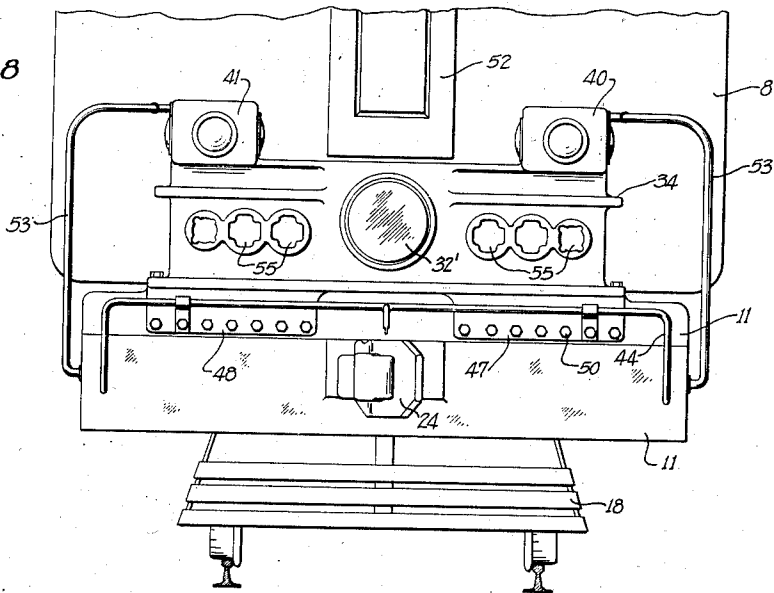
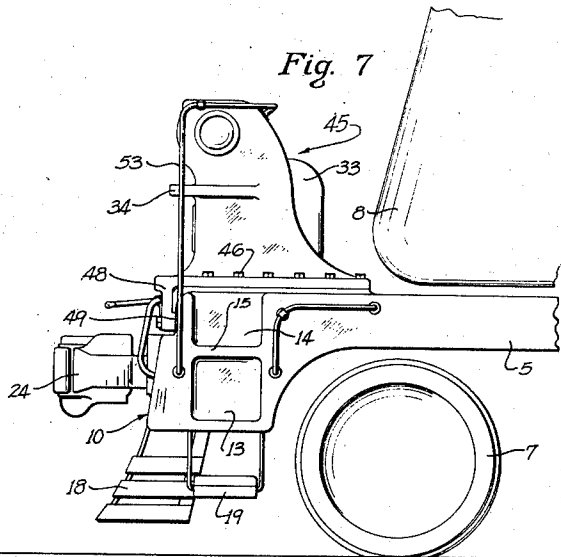


Fig. 7



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UNITED STATES PATENT OFFICE

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ELECTRIC LOCOMOTIVE

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19 Claims. (Cl. 105—173)

This invention relates generally to electric locomotives and more particularly to an improved combination for safeguarding the front end of the locomotive and particularly the cab.

5 In the type of high speed electric locomotive disclosed herein, the controls are at the front end of the cab with the result that the engineer and attendant are ordinarily liable to greater danger in the event of accidents than in the case of steam locomotives. While various devices have been proposed for safeguarding the operatives, yet such devices are believed to be deficient not only in their general functional purposes but also their structural combination of elements is 10 not conducive to resisting unnatural impact forces with minimum strains or damage to the locomotive.

It is one object of my invention to provide an improved combination whereby a locomotive frame is so arranged and integrally formed, preferably as a single casting, that the frame as a whole may resist substantial impact forces at points either above or below the general horizontal plane of the frame.

25 Another object is to accomplish the foregoing desirable results by improved means which in one specific aspect of the invention comprises an electric locomotive frame overhanging the pilot truck and formed with a pilot knee and overhead bumper projecting respectively downwardly and upwardly from the overhanging front end of said frame. In a more specific aspect of the invention the foregoing and other results are accomplished by providing an overhead bumper 30 of substantial horizontal depth and height and also extending for a substantial portion of the width of the locomotive frame and cab.

Another object is to provide a frame having the foregoing elements so arranged and constructed that a mutual supporting function is effected between the three elements whereby high impact forces at any point of the front end of the frame are resisted not only by that part of the front end against which the impact actually 40 occurs but are also resisted by the physical structure of the other elements due to their cooperating relation.

Another object is to provide an improved arrangement of the various elements whereby they are adapted not only for safeguarding functions but also for normal functions such as facilitating climbing on to or off of the locomotive or of gaining access to the locomotive cab or of providing headlight supports or compartments, while 50 in some instances my improved arrangement is

adapted to provide a coupler pocket for the draft rigging without in any way minimizing the effectiveness of my improved front end construction.

Other objects and advantages will be more apparent to those skilled in the art from the following description of the accompanying drawings in which:

Fig. 1 is a side elevation of an electric locomotive disclosing the embodiment of certain features of my invention, although for simplicity other features have been omitted;

Fig. 2 is a front view of the frame and a portion of the locomotive cab;

Fig. 3 is an enlarged fragmentary side elevation of the front end of the locomotive shown in Fig. 1;

Fig. 4 is an enlarged fragmentary plan view of the front end of the locomotive frame embodying the features of my invention;

Fig. 5 is a vertical longitudinal section taken substantially on the line 5—5 of Fig. 2;

Fig. 6 is a similar section taken on the line 6—6 of Fig. 2;

Fig. 7 is a view similar to Fig. 3 but showing a modified arrangement of overhead bumper whereby it is formed separately from the frame but yet is so operatively connected thereto as to form a combination similar to the single piece construction shown in other forms;

Fig. 8 is a front elevation similar to Fig. 2 but embodying the modification of Fig. 7.

In the illustrated embodiments of my invention which are shown herein merely for the purpose of disclosing certain specific forms among possible others that the invention might take, I have shown my invention as applied to an electric locomotive generally indicated at 1. This locomotive may be of various types but herein is shown as having articulated frames 2 and 3 pivotally connected at 4. Each frame projects forwardly at 5 from the driving wheels 6 and overhangs a pilot truck 7. The body 8 of the locomotive has an engineer's cab 9 at each end thereof to permit the locomotive to travel normally in either direction. It will suffice to describe the features of my invention as applied to only one end of the locomotive as both ends are the same.

As is shown in Figs. 1 and 3, the overhanging frame carries a combined pilot knee and step generally indicated at 10. These are formed integrally with frame 5 and project downwardly therefrom in front of truck 7. As shown more clearly in Figs. 2, 5 and 6, this pilot knee has a front panel 11 connected as shown in Fig. 3 by sides 12 to the frame 5. The sides 12 have a pair 55

of recesses 13 and 14 with a partition 15 therebetween. The bottom of recess 13 has a wall to form a step, while partition 15 forms a second step, it being noted in Figs. 3 and 4 that the top of recess 14 is uncovered, thus permitting an engineer or other person to step freely from recess 14 on to the top of frame 5. The partition 15 and the lower wall of recess 13 function not only as steps but also as substantial longitudinal reinforcements to the pilot knee thereby insuring greater resistance to impact forces in case of accident. At the same time the steps formed by these recesses are entirely set within the frame and do not project outwardly therefrom, thus eliminating the possibility of the same being unavoidably hit and damaged by passing objects. A pilot 18 and steps 19 may be secured to the pilot knee in such a manner that they may be readily replaced in case of minor damage thereto.

To strengthen still further the pilot knee while at the same time accomplishing a useful function in a novel manner, I have provided a coupler pocket generally indicated at 29, Fig. 5, whose upper and lower walls 22 and 21 provide very substantial longitudinal reinforcements at the center of the front panel 11. A suitable coupler opening 23 is provided in this panel to receive a usual coupler 24, Fig. 4.

Cooperating with the combined pilot knee and step construction is an improved overhead bumper generally indicated at 26 comprising as shown in Fig. 6 front and rear walls 27 and 28 projecting upwardly from frame 5. These walls are connected at their upper ends by a horizontal wall 29, Fig. 4, so as to provide in effect a box construction which extends from one end wall 30 to another end wall 31, these walls constituting longitudinal reinforcing walls. This hollow box construction permits its central portion 32 to form if desired a headlight compartment 33 with a usual headlight lens 32' disposed in a suitable opening within the front wall or panel 11. The headlight compartment 33 projects slightly rearwardly of the back wall 28, thereby additionally reinforcing the central portion of the overhead bumper. To strengthen the front wall of the bumper on each side of the headlight, there is provided a pair of horizontal ribs 34 and 35, Figs. 2 and 6. These ribs not only function as supports but also serve the further desirable purpose of fending off any upwardly moving object. To insure maximum structural and functional benefit from such ribs, it will be noted in Figs. 3 and 4 that the ribs extend at 37 around the bumper to a point approximately midway between the end walls 30 and 31. While as shown in Fig. 4 the ribs 34 and 35 merge into the front wall 27 adjacent the headlight, yet the enlarged box section 33 amply reinforces the bumper at this central portion. The end walls 30 and 31 of the bumper are disposed inwardly of the step recesses to permit the frame to serve as a convenient landing from the steps.

If desired this overhead bumper may be additionally strengthened by forming integral therewith a pair of reinforcing end portions 40 and 41 having a higher elevation than the intermediate portion 32, these end portions also being adapted to function as signal lamp compartments. These compartments are also arranged to function as part of the bumper due to the same merging along a reinforcing curve with the rear wall 28 as is shown more clearly in Fig. 6.

This curve is generally indicated at 42, and it will be noted that the same merges with the frame 5 and rear wall 28 preferably, but not necessarily, along substantially tangential lines.

The construction as above described permits even further advantage to be taken of its inherent characteristics, such for instance, as the provision of small brackets 43 cast integrally with the overhead bumper between the lower ribs 35 and the frame 5 whereby a coupler release rigging 44 is journaled in these brackets 43.

It is thus seen from all of the foregoing disclosure that I have provided an extremely rugged pilot knee and overhead bumper in combination with the entire locomotive frame, and all of these elements are so arranged that they not only have various advantages of general utility but also effectively cooperate whereby if an object is hit at the upper portion of the overhead bumper 26, the impact will be resisted by the complete cooperation of the entire structural arrangement. This is effected in part by the box-like construction employed throughout in addition to the various horizontal supporting ribs which resist direct horizontal impact by transmitting the resisting forces crosswise of the bumper construction. It is such a mutual cooperating functional and structural relation of parts as herein set forth that permits an exceptionally high degree of safety to the locomotive cab 9 together with minimum weight and consequent lower cost and without in any way sacrificing safeness.

In the modifications of Figs. 7 and 8, I still obtain all of the advantages of the integral modification wherein all of the various parts are preferably cast as a single integral structure. In the modifications of Figs. 7 and 8, the lower pilot knee arrangement is the same as in the other form, while the overhead bumper generally indicated at 45 is also identical to the overhead bumper 26 except that it is bolted as at 46 to the frame 5. To insure maximum cooperation between this overhead bumper, the frame and the pilot knee in the same manner as in the single piece integral construction of the other form, I have provided the bumper 45 with downwardly projecting locking lugs 47 and 48 which extend for a substantial distance across the front panel 11. The lower inner edge of lugs 47 and 48 is provided with a key 49 set back into suitable recesses formed in the front panel 11 while bolts 50 securely hold the lugs 48 in their keyed position. Hence it is seen that this construction insures that any impact forces applied either horizontally or upwardly to any portion of the overhead bumper would be transmitted directly and positively to the frame 5 and to the pilot knee 10, the key being disposed at the point which gives maximum resisting leverage to impact forces.

In either form as shown it will be noted that the top wall 29 of the intermediate section, or headlight section, if the same is used for headlight purposes, is at such an elevation, Figs. 2 and 8, as to provide a convenient step from the frame 5 into the door 52 of the cab 9. Also a front hand rail 53 and a short rear hand rail 54 as shown in Figs. 2, 3 and 4 may be conveniently and easily secured to the frame, pilot knee and bumper. Also the box construction of the overhead bumper may be provided with electrical train connector sockets generally indicated at 55 on each side of the headlight, it being noted in Fig. 6 that the electrical conduits may extend

upwardly within the box construction through suitable bottom openings 55.

The advantages of both forms are believed to be fully set forth in all of the foregoing disclosures, wherein it is seen that various desirable features of my invention result from a relatively simple and yet highly compact and rigid construction that affords all the necessary sturdiness which is essential to equipment of this kind, especially at a time of accident. At the same time the structural arrangement of parts affords not only great strength to the equipment but also permits advantages to be otherwise had, such as the formation of light compartments and means of climbing on or off the locomotive.

It will of course be understood that various changes may be made in the construction and arrangement of parts and details of design without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab and projecting beyond the front end thereof, a pilot knee carried by the forward end of said frame and projecting downwardly therefrom, and an overhead bumper also carried by the forward end of said frame and having end walls extending inwardly from the front end of the bumper structure for transmitting forces therefrom directly to the main frame, said bumper projecting upwardly in front of said cab and in substantially vertical alignment with said pilot knee whereby compensating bumper action is obtainable above and below the horizontal plane of the main frame.

2. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab, a pilot truck, said frame overhanging the front end of said truck and projecting beyond the front of said cab, a pilot knee carried by the forward end of said frame and projecting downwardly in front of said truck, and an overhead bumper also carried by said frame and having end walls extending inwardly from the front end of the bumper structure for transmitting forces therefrom directly to the main frame, said bumper projecting upwardly in front of said cab and in substantially vertical alignment with said pilot knee whereby compensating bumper action is obtainable above and below the horizontal plane of the main frame.

3. The combination set forth in claim 1 further characterized in that said pilot knee and frame are cast as a single integral structure.

4. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly of said cab, and a combined pilot knee and step cast as a single integral structure with said frame whereby said step extending in a horizontal direction reinforces the knee and frame.

5. The combination set forth in claim 4 further characterized in that the step is formed by a recess in the sides of the pilot knee, said recess having a horizontal wall forming the step and constituting a longitudinal reinforcement for the ends of the pilot knee.

6. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly of said cab, a pilot knee cast integral with said frame and having a coupled pocket provided with upper and lower horizontal walls serving as longitudinal reinforcements at the center of said pilot knee, and an overhead bumper extending upwardly from the forward end of said frame,

and having end walls extending inwardly from the front end of the bumper structure for transmitting forces therefrom directly to the main frame, whereby said bumper in cooperation with said knee and frame is adapted to resist impact forces applied to the front end of the locomotive.

7. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab in substantially fixed longitudinal relation to the frame and projecting forwardly of said cab, an overhead bumper extending upwardly from the front end of said frame in front of said cab and longitudinally spaced therefrom at all times, said bumper having a front wall extending across a substantial portion of the width of said frame, and reinforcing walls extending rearwardly from said front wall and cast integral therewith for transmitting forces directly from said bumper to said frame.

8. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab in substantially fixed longitudinal relation to the frame and projecting forwardly beyond the end of said cab, and an overhead bumper extending upwardly from the forward end of said frame and in front of said cab and longitudinally spaced therefrom at all times, said bumper comprising a cast box construction having front and rear walls and a top wall and reinforcing walls extending inwardly from the front end of the bumper structure for transmitting forces directly from the bumper to said frame.

9. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab in substantially fixed longitudinal relation to the frame and projecting forwardly beyond the end of said cab, and an overhead bumper extending upwardly from the forward end of said frame and in front of said cab and longitudinally spaced therefrom at all times, said bumper comprising a cast box construction having front and rear walls and a top wall and said box construction having provision for a headlight compartment internally thereof.

10. The combination set forth in claim 8 further characterized in that the front wall of said box construction has electrical connector openings whereby train connections extend through the interior of the box.

11. An electric locomotive comprising, in combination, a cab, a main frame for supporting said cab in substantially fixed longitudinal relation to the frame and projecting forwardly beyond the end of said cab, and a cast overhead bumper carried by the forward end of said frame and extending upwardly in front of said cab and longitudinally spaced therefrom at all times, said bumper having end walls extending inwardly from the free end of said bumper for transmitting forces directly from the bumper to said frame and also having an intermediate portion and end portions of a higher elevation than said intermediate portion.

12. An electric locomotive comprising, in combination, a cab having a door at the front end thereof, a main frame projecting forwardly beyond the front end of said cab, an overhead bumper carried by the front end of said frame and extending upwardly in front of said cab, said bumper being formed as a cast member having an upper surface adapted to provide a step from the frame to said door.

13. The combination set forth in claim 12 further characterized by the provision of reinforcing end portions for the bumper extending above the

top wall to provide signal lamp compartments thereabove.

14. The combination set forth in claim 12 further characterized by the provision of a pilot knee cast integral with said frame and having recesses forming steps adjacent the ends of said bumper.

15. The combination set forth in claim 12 further characterized by the provision of a pilot knee cast integral with said frame and having recesses forming steps adjacent the ends of said bumper, the ends of said bumper being disposed inwardly of said recesses to permit the frame to serve as a landing for said steps, and a hand rail secured to said pilot knee and bumper.

16. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly thereof, and an overhead bumper carried by the front end of said frame and extending upwardly in front of said cab, said bumper being of cast-box construction and having ribs extending transversely along its front wall.

17. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly thereof, an overhead bumper carried by the front end of said frame and extending upwardly in front of said cab, said bumper being of cast-

box construction and having ribs extending transversely along its front wall, and vertical brackets cast integral with certain of said ribs and bumper to support a coupler release rigging.

18. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly thereof, and an overhead bumper carried by the front end of said frame and extending upwardly in front of said cab, said bumper having a depending flange engageable with the front end of said frame to effect positive cooperation between the bumper and frame to cause said frame to positively resist impact forces on said bumper.

19. An electric locomotive comprising, in combination, a cab, a main frame projecting forwardly thereof, an overhead bumper carried by the front end of said frame and extending upwardly in front of said cab, said bumper having a depending flange engageable with the front end of said frame, and a key and keyway interposed between said flange and the end of said frame crosswise thereof whereby upward forces on said bumper are positively resisted by said frame.

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