PORTABLE DISMOUNTABLE RAMP

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

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This invention relates to portable dismountable ramps and, more particularly, to such a ramp for use in loading and unloading railway track maintenance vehicles which are to be transported by a car movable along the railway track. Various types of ramps for this purpose have been proposed heretofore, but so far as I am aware, all such ramps require time consuming erection and disassembly, employ heavy and massive parts resulting in laborious work, and frequently entail the services of a large crew of workers. It is a purpose of the present invention to overcome the disadvantages found in the employment of such conventional equipment.

An object of the invention is to provide an improved ramp which may be assembled and disassembled by two men in a relatively short time and without requiring excessive exertion by the workers.

Another object is to provide a ramp which is rigid upon being assembled and which has a capacity suitable for relatively heavy maintenance of way machines.

A further object is to provide a ramp having an adjustable gradient and along which a self-propelled maintenance of way machine may move under its own power.

A still further object is to provide a portable dismountable ramp which is safe to employ and which is relatively inexpensive and capable of frequent reuse.

Other objects and advantages of the invention will become more apparent as the description proceeds and when considered in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevation of the upper portion of the assembled ramp;

FIG. 1A is a side elevation of the lower portion of the assembled ramp;

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is an elevation view taken on line 3—3 of FIG. 1A with the ramp rails removed;

FIG. 4 is an elevation view taken on line 4—4 of FIG. 1A with the ramp rails removed;

FIG. 5 is a side elevation view of adjacent ends of two ramp rail sections disconnected from each other;

FIG. 6 is a sectional view of one leg of an adjustable pier structure taken on line 6—6 of FIG. 2;

FIG. 7 is a sectional view of the starter tips and stationary track rails taken on line 7—7 of FIG. 1A;

FIG. 8 is a sectional view to a larger scale, of one form of prefabricated ramp rail taken on line 8—8 of FIG. 5; and

FIG. 9 is a sectional view of a pier structure taken on line 9—9 of FIG. 3.

In accordance with the invention, the dismountable ramp includes two ramp rails supported at their upper ends upon a car resting upon the stationary rails of a railway track and attached adjacent their lower ends to the stationary rails of that track. Each ramp rail has a plurality of separate sections which are joined in end to end relation to form ramp rail joints, the ramp rails being supported intermediate their ends by pier structures which have a lower pedestal portion engageable with the stationary rails and an upper cradle portion engageable with the ramp rails beneath a pair of corresponding rail joints. Each pier structure is braced against transverse movement with respect to the stationary rails and is constructed to remain stabilized against tipping longitudinally of those stationary rails. Successive pier structures serve to mount successive joints of the ramp rails at graduated heights above the railway track, certain of the pier structures being capable of telescoping adjustment to serve this purpose. In addition, the ramp rail sections are restrained against transverse movement on their supporting pier structures and are capable of self-adjusting movement in vertical planes upon their pier structures thus to accommodate insertion or removal of a ramp section as when an adjustment in gradient of the ramp is desired.

Referring now to FIGS. 1 and 1A, the stationary rails 10 and 11 of a conventional railway track serve to support a conventional car, such as a flat car, having a bed portion 12. A pair of rails, one being shown at 13, are rigidly affixed to the bed of the car to receive a wheeled maintenance-of-way vehicle which is to be transported by the car. The ends of these rails terminate inboard of the edge 14 of the car and are adapted to be detachably connected to the upper ends of a pair of angle rails, one being shown at 15, forming the uppermost portion of the ramp. Extending downwardly from the lower end of the angle rail 15 is a plurality of separate ramp rail sections, as seen at 16, 17, 18 and 19, joined in end-to-end relation and forming one of the elongated ramp rails, it being understood that an equal number of similar separate ramp rail sections are connected to the lower end of the other angle rail. Detachably joined in end-to-end relation with the lowermost ramp rail section 19 is a conventional starter tip or mitre rail 20 later to be described, and cooperating with track rail 10, a similar starter tip 21 (FIG. 7) being provided for the lowermost ramp rail section in the ramp rail cooperating with the other track rail 11.

At the junctions of the respective angle rails, ramp rail sections, and starter tips, a series of rail joints, indicated generally at 22, 23, 24, 25 and 26 for the ramp rail cooperating with track rail 10, are formed; it being understood that the same number and type of rail joints are formed in the other ramp rail. One such joint arrangement is best seen in FIG. 5 wherein the adjacent rail sections 16 and 17 are shown as being separated for purposes of clarity. As further illustrated in FIG. 8, the respective rail sections preferably, but not necessarily, are built in a rectangular cross section form including a central bearing 30 having flat side gusset plates 31 and 32 co-extensive therewith and welded thereto. At one end the I-beam has affixed thereto, before welding of the side plates in place, a pair of coupling plates 33 and 34, one end of which is welded to the I-beam, and the other end of which, containing an aperture 35, projects beyond the end of the rail section. At the juxtaposed end of the adjacent rail section 17 a plurality of corresponding apertures 36 is provided in the side gusset plates and I-beam so that a locking pin 37 attached by a chain 38 fastened at one end to the cooperating rail section 16 may be passed through the respective apertures 33 and 36 when the rail joint is assembled with the projecting ends of the plates 33 and 34 being in encompassing relation to the sides of the I-beam in the rail section 17.

As an important feature of the invention, a floor plate 37 is welded at one end to the underside of the I-beam of the rail section and projects outwardly as far as the coupling plates, and with the upper projecting surface of this plate providing a shelf upon which the upper end of the next lower rail section rests. Welded to the underside of this floor plate and extending beyond the side edges of that plate is a sleeve 40 having a downwardly facing arcuate bearing surface. This sleeve has a circumferential dimension adequate to give a substantial reaction surface at all gradients through which the ramp may be employed, its angular dimension being not more
than 180° and preferably not less than 120°. In addition, the sleeve has a length substantially greater than the width of the rail section 16 and serving to stabilize that rail section from tipping sideways.

Referring now to FIGS. 2, 3, and 4, the invention comprehends the use of pier structures supporting the above-described ramp rails. The pier structures generally shown at 41, 42 and 43 are preferably adjustable and interchangeable and include a pair of pedestal portions having elongated channel shaped shoes 44 and 45 engageable with the upper part of the stationary rails. A cross brace 46 is welded at its ends to these shoes and serves to brace the pier structure adjacent to the crane. Welded to the upper surface of the shoes is a pair of tubular guides 47 and 48 each having reinforcing gussets 49, 50 and 51 extending from the upright guides to the shoes and to the brace. Detachably mounted in the hollow guides is a pair of tubular supports 52 and 53 carrying at their upper ends a tubular cradle member 72 at the ends of which extend outboard of the junctions of that member with those supports. This cradle member has an arcuate outer surface corresponding to the curvature of the lower surface of the sleeves 40. Gussets 54 and 55 serve to brace the cradle member and the tubular supports transversely of the track, as now to be described. A portion of the upper surfaces of the cradle member two pairs of spaced abutments engageable with the ends of the respective curved sleeves 40 are provided, as seen at 56, 57 and 58, 59, thus restraining the ramp rails from shifting axially of the cradle member. It will be noted that these abutments are so located that the centers of the ramp rails (FIG. 2) lie in the same vertical plane as the axes of the tubular supports and tubular guides and the tops of the stationary rails.

Each of the tubular supports and the tubular guides are provided with a series of vertically spaced apertures as best seen in FIG. 6 and a manually adjustable pin 60, which may conveniently be attached to the guide by a chain 61, is used to secure the support to the guide at the appropriate height with respect to the track by being passed through the appropriate apertures in those tubular guides and tubular supports. While the telescopic type of pier structure is described, it is especially useful in that the structure may be separated into two parts for carrying, such a structure is inappropriate for pier purposes near the lower end of the ramp. Accordingly, while still retaining the same general features, the pier structure shown generally at 70 and 71 for use with rail joints 25 and 26 are modified, as to be described.

As seen in FIGS. 3 and 9, pier structure 70 includes the shoes 44 and 45 and the cross brace 46, but with the cradle member 72 being affixed directly to the tops of the tubular guides 47 and 48 which in turn are reinforced by the described gussets and may be shortened in height. As a means of further backing the ramp as an entirety, the shoes may have threaded apertures in their outer sides through which threaded lock bolts 73 extend. The inner ends of these bolts bear against the side surfaces of the tops of the stationary rails and give additional rigidity to the structure in the region where shocks are transmitted thereto by the wheeled vehicle entering upon or departing from the ramp.

As seen in FIG. 4, the lowermost pier structure may be further reduced in height by having the cradle member 72 attached directly to the upper surfaces of the shoes 44 and 45, similar lock bolts 73 being employed. In each of the pier structures it will now be observed that the length of shoes in contact with the corresponding stationary rails extends a greater axial length thereon than does the contact of the upper cradle portions of that pier along the axial length of the corresponding ramp rail sections. This arrangement has been found to stabilize the track against any tendency to tip axially of the railway track.

With the foregoing in mind, the advantages of the invention will now become more evident when considered in connection with the method of assembling the structure for use. With a car in position upon the track and assuming a wheeled vehicle to be resting upon the rails 13 on that car, the brakes of the car are set and the assembly of the ramp beginning at its upper end, is started. The pair of angle rails as seen at 15, are first emplaced and connected transversely of the track and each, of the angle rails includes an abutment 75 engageable against the end 14 of the car and may also have an anchor pad 76 on the lower side of the rail which may be removably attachable to the bed 12 of that car. Depending upon the height of the bed above the track, the size, weight and capabilities of vehicle to be moved, and other factors, the optimum gradient of the ramp may not at all times be the same, and the present invention is intended to provide for adjustments in this gradient by using more or less of the ramp rail sections and by employing different lengths of starter tip rails.

Having emplaced the angle rails, the operators then position the pedestals of pier 41 upon the track rails and adjust the height of cradle member 72 thereof into engagement with the arcuate surface of the sleeves 40 at the ends of the angle rails. The next pier 42 is then positioned approximately at its intended location on the track and determined the gradient with the ramp rail sections 16 are brought into place with their upper ends resting upon the floor plate extensions of the angle rails. If a gradient departing from the gradient indicated by the angle rails is now dictated, the height of pier structure 43 may be adjusted with assurance that the engagement of the sleeves attached to the lower ends of the rail sections 16 and resting upon the cradle member of that pier, will accommodate such an adjustment of gradient. This self-seating action of the arcuate sleeve upon the arcuate cradle forms a significant feature of the invention and as will be observed, the sleeve can readily be laid upon the tubular cradle since the sleeve does not exceed 180° in periphery. Moreover, the horizontal components of force derived from the movement of the vehicle along the ramp will at all times be resisted by the cradle member of the pier since the sleeve envelopes that member to such an extent that the sleeve will not slip over the cradle member in the direction of such a component of force. Adequate bearing surface also is provided by reason of the length of the sleeves transversely of the ramp and which length acts to prevent sideslip tipping of the ramp rail sections. Having determined the gradient required and thus the number of ramp rail sections to be employed, the operators pin the upper end of the ramp rail sections 16 to the lower ends of the angle rails and position the pier structure 42 on the railway track at the position at which the sleeves of those rail sections 16 are in snug engagement with the cradle member of pier structure 42, thus completing the assembly of the first section of the ramp at the desired gradient. At this time, the upper end of the rail sections 16 rest securely upon the upper portion of plate 37. In similar manner, each of the descending sections of the ramp are assembled seriatim until the next to last section 19 is assembled. In this connection, the lock bolts 73 of the lower sections will also be tightened against the track rails as each such section is assembled.

Upon assembling section 19, the starter tips or mitre rails 20 and 21 are then attached as above explained, but at their lower ends, the rails which only upon the upper surface of the track rails as seen in FIG. 14. The length of these starter tips may vary, longer tips being normally employed when vehicles having low clearance or long overhang, are being transported. Starter tip lengths of eight feet for example, have been found to be satisfactory for most vehicles, but lengths of twelve feet are more suitable when such vehicles are to be handled. With each length, however, the starter tip itself is provided with a shoe 75, 78 (FIG. 7) intermediate its ends, this shoe being equipped with the locking
bonds 73 as above described. Upon completion of this assembly, the ramp is ready for use and the vehicle may then descend from the car to the railway track. Self-propelled vehicles, for example, having a weight of 45,000 pounds, have been moved under their own power over the described ramp which in turn had been assembled by two men working for only thirty minutes. Moreover, by reason of the mutual cooperation of the parts as above disclosed, no part of the ramp handling this particular vehicle weighted more than 165 pounds. Disassembly of the ramp takes place from the lower to the upper end thereof, as will be apparent.

Having thus described the invention and having listed certain examples of the advantages thereof, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the true spirit and scope thereof. It, therefore, is intended to cover such modifications and changes within the following claims, and to consider the invention as limited only by the scope of those claims.

What is claimed is:

1. In a dismountable ramp adapted for assembly with varying gradients, a ramp rail comprising a plurality of separate rail sections, at least one of said rail sections having a plate projecting axially beyond the end thereof, said plate having attached to the upper surface thereof a downwardly facing arcuate sleeve with a periphery of not more than 180°, an adjacent rail section having an end resting upon said plate, means for removable attaching the juxtaposed ends of said sections to each other to form a ramp rail joint, a pier structure disposed beneath said ramp rail in supporting relation thereto, said pier structure having a cradle member extending transversely of said ramp rail and presenting an arcuate upper surface to said sleeve, and a pair of spaced abutments located axially of said cradle member and receiving therebetween with a close fit the ends of said sleeve, whereby said one of said rail sections is supported upon said pier structure by engagement of said sleeve with said cradle member and is free to adjust itself thereto at differing positions in a vertical plane while being restrained against movements axially of said cradle member.

2. A ramp as defined in claim 1 wherein said sleeve has a length substantially greater than the width of said ramp rail sections thereby to stabilize said ramp rail section against sidewise tipping.

3. A ramp as defined in claim 1 wherein said pier structure has a pedestal portion engageable with a rail of a railway track cooperating with said ramp, said pedestal portion including an elongated concave shoe section resting upon said track rail with the concave surface thereof in enveloping contact with said track rail.

4. In a dismountable ramp adapted for assembly with varying gradients, a ramp rail comprising a plurality of separate rail sections, at least two of said rail sections having a plate projecting axially beyond the lower ends of the respective rail sections, said plate having attached to the under surface thereof a downwardly facing arcuate sleeve with a periphery of not more than 180°, each of said two rail sections having an upper end resting upon the plate attached to the adjacent upper rail section, means for attaching the juxtaposed ends of said rail sections to each other to form rail joints, a pier structure disposed beneath said ramp rail at each of said rail joints in supporting relation thereto, one of said pier structures being vertically adjustable in height and one of said pier structures being fixed in height, each of said pier structures having a cradle member extending transversely of said ramp rail, and presenting an arcuate upper surface to said sleeve, a pair of spaced abutments located axially of said cradle member and receiving therebetween with a close fit the ends of said sleeve, and each of said pier structures having a lower pedestal portion engageable with the rail of a railway track cooperating with said ramp, said pedestal portion having means extending along said railway track rail and stabilizing said pier structure against tipping axially of said railway track rail.

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