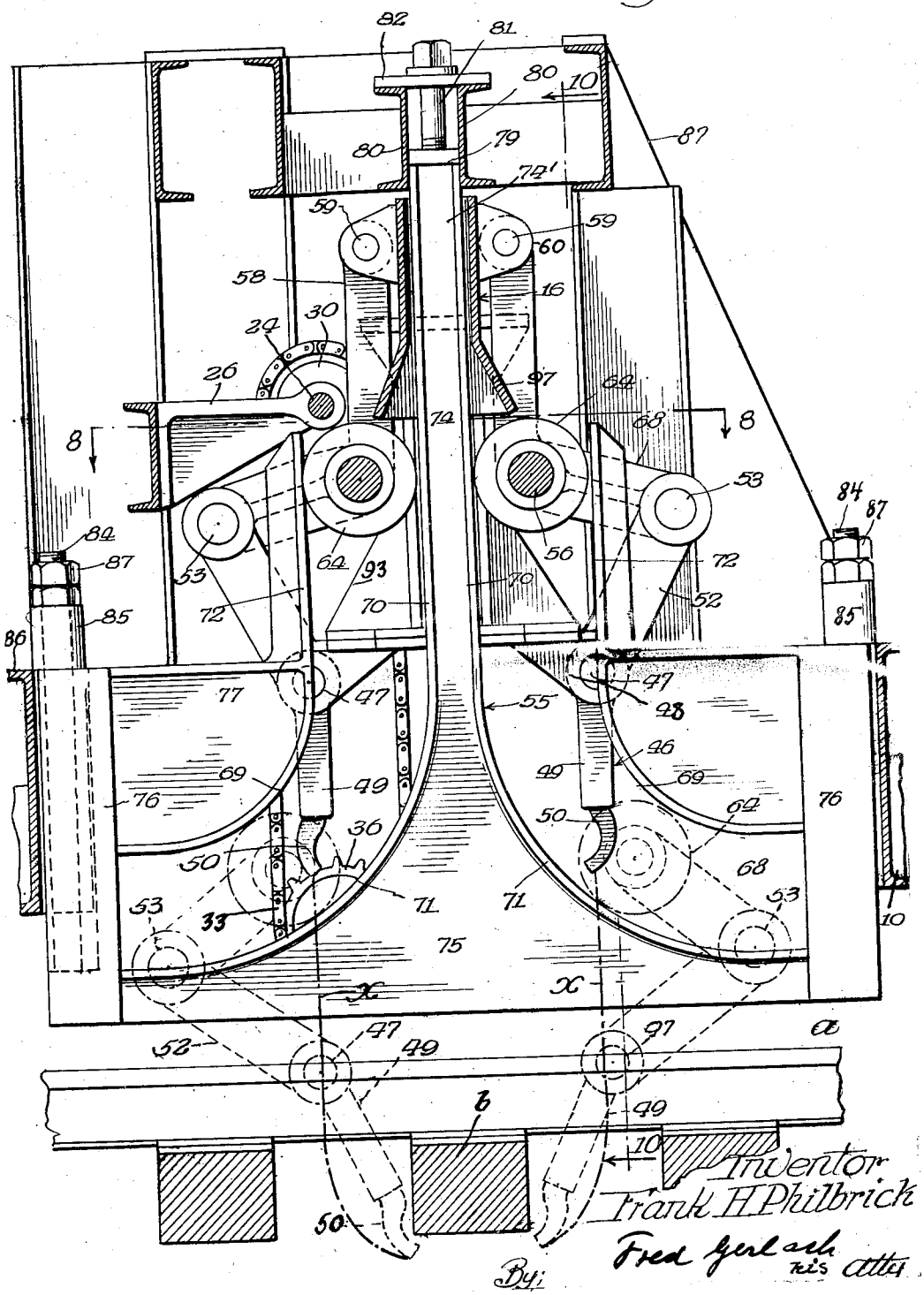
Sept. 20, 1949. F. H. PHILBRICK 2,482,123

MACHINE FOR TAMPING BALLAST

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FIG. 1.



Sept. 20, 1949. F. H. PHILBRICK 2,482,123

MACHINE FOR TAMPING BALLAST

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Fig. 3

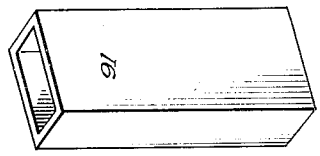


Fig. 6

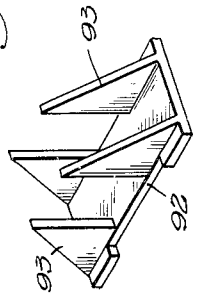


Fig. 2

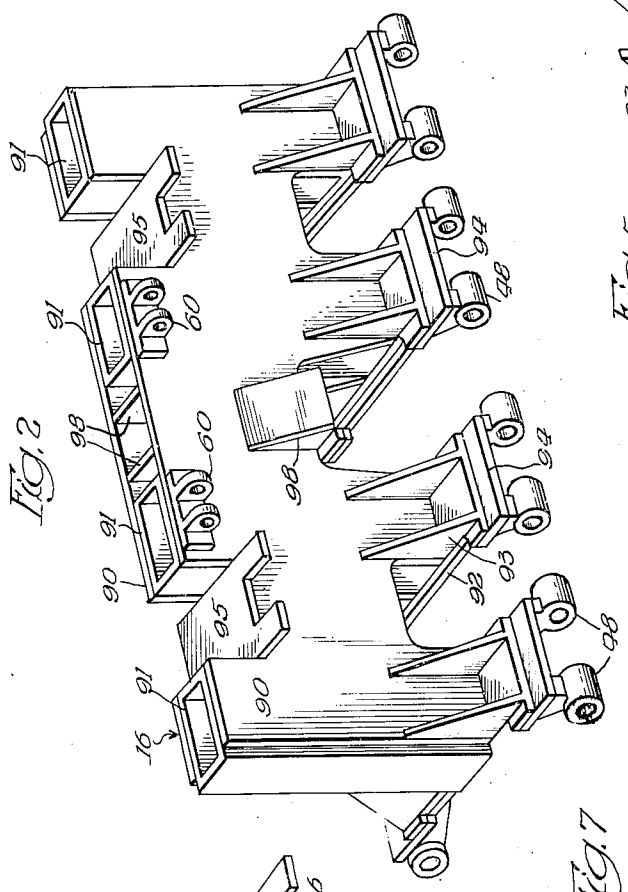


Fig. 5

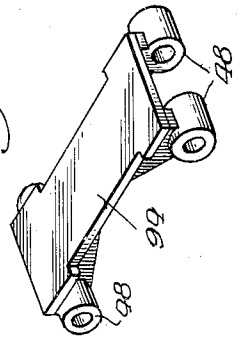


Fig. 7

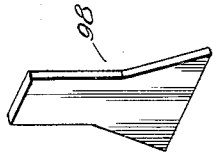
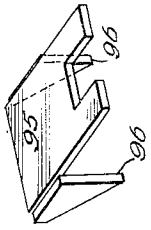


Fig. 4



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MACHINE FOR TAMPING BALLAST

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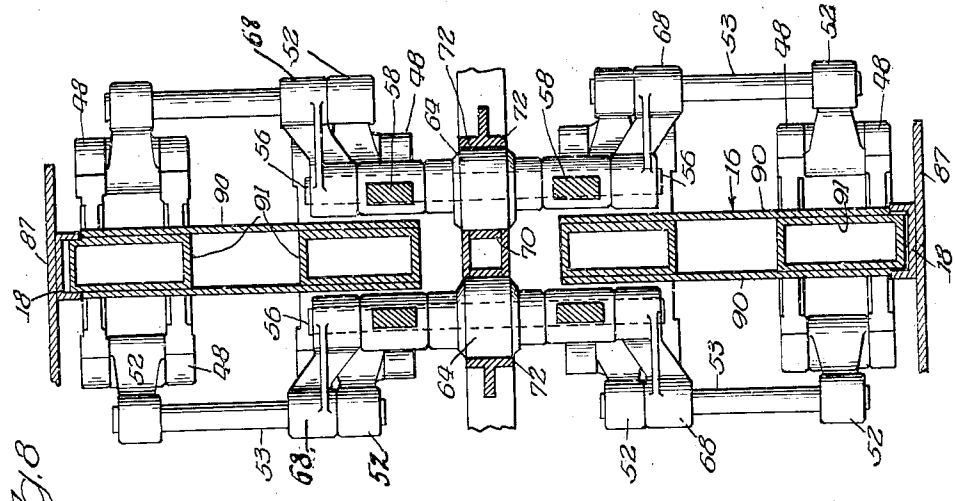


FIG. 8

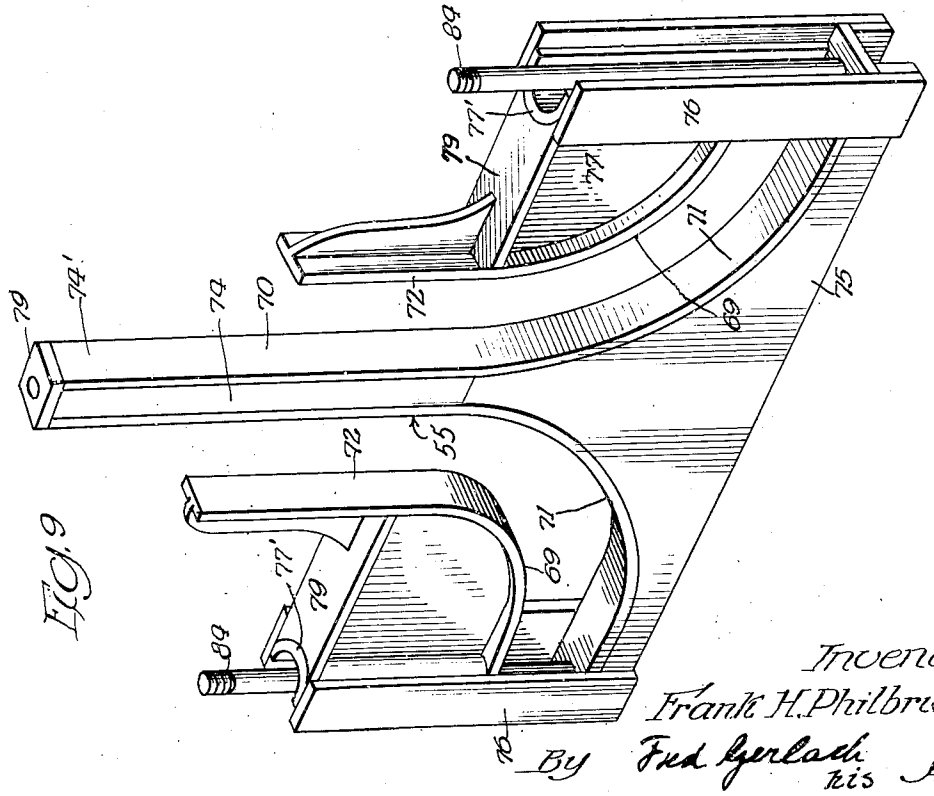


FIG. 9

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MACHINE FOR TAMPING BALLAST

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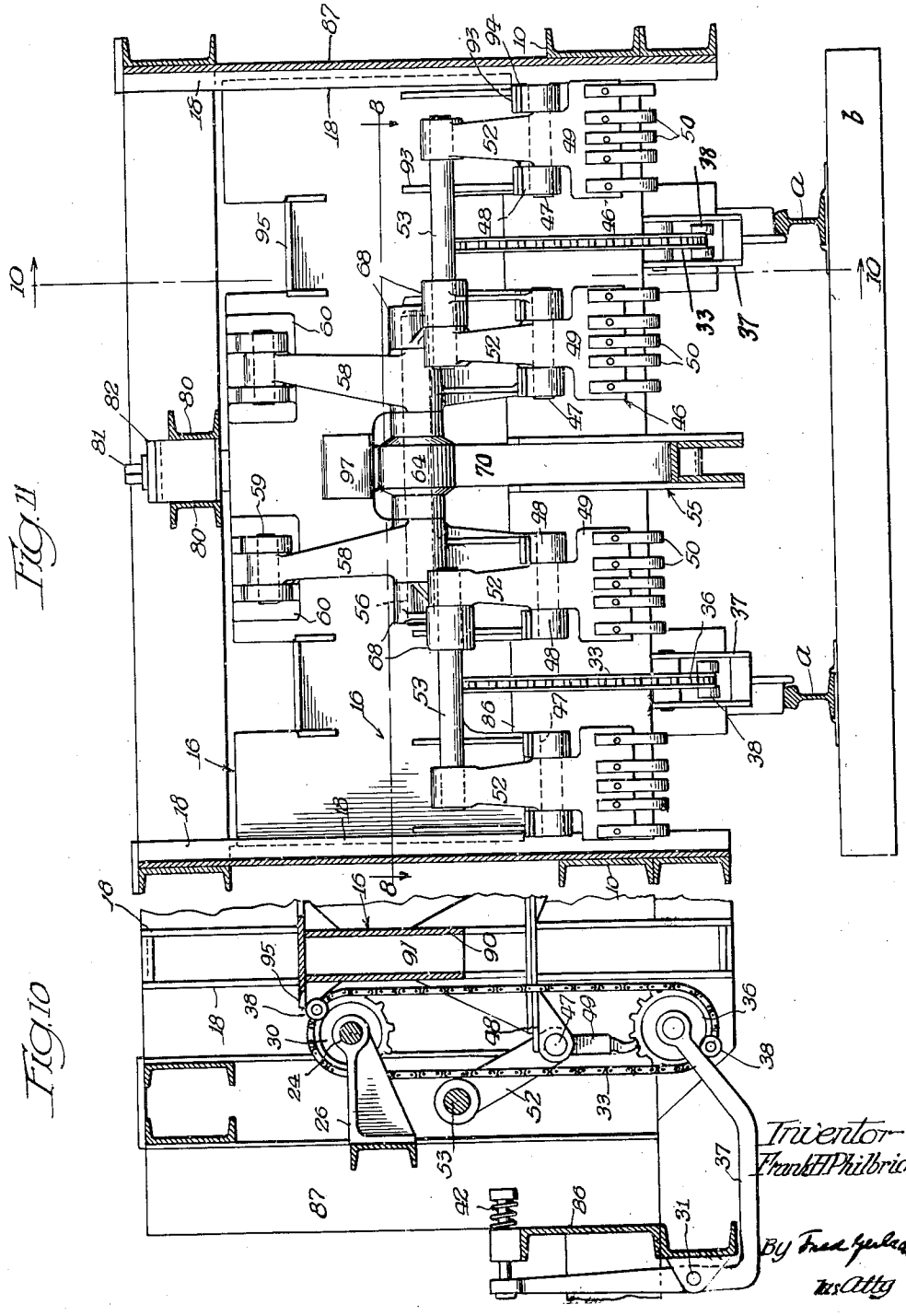


FIG. 11

FIG. 10

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Patented Sept. 20, 1949 2,482,123

UNITED STATES PATENT OFFICE

2,482,123

MACHINE FOR TAMPING BALLAST

Frank H. Philbrick, Evanston, Ill.

Application August 13, 1947, Serial No. 768,301

15 Claims. (Cl. 104—12)

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The invention relates to a machine for tamping ballast between and under railway ties.

One object of the invention is to provide a ballast tamping machine in which the tamping elements are operable by a drop-head and which is provided with simple and efficient means for positively controlling the angular movements of the tampers for packing the ballast under the ties.

Another object of the invention is to provide an improved track structure and co-acting means for positively controlling the angular movements of the tampers.

Another object of the invention is to provide a drop-head which is built up of structural plates and is adapted for heavy duty.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined at the conclusion hereof.

In the drawings:

Figure 1 is a vertical longitudinal section illustrating the ballast tamping mechanism;

Fig. 2 is a perspective of the drop-head;

Fig. 3 is a perspective of one of the box-like spacers between the sideplates of the drop-head;

Fig. 4 is a perspective of one of the lugs which is attached to the drop-head and engaged by the intermittent lifting mechanism for imparting lifting strokes to the drop-head;

Fig. 5 is a perspective of one of the plates of the drop-head on which the journals for the tampers are mounted;

Fig. 6 is a perspective of one of the reinforcing members for the drop-head;

Fig. 7 is a perspective of one of the guide plates in the drop-head;

Fig. 8 is a transverse section taken on line 8—8 of Fig. 1;

Fig. 9 is a perspective of the track structure for controlling the angular movements of the tampers;

Fig. 10 is a section taken on line 10—10 of Fig. 11; and

Fig. 11 is a section taken on line 11—11 of Fig. 1, parts being shown in elevation.

The tamping machine is usually mounted on a truck or car which comprises a frame which includes longitudinal beams 10, cross beams 86 and side plates 87. This frame is supported on wheels for traveling on the rails *a* of a railway track and supporting the machine for movement along said track to successively position the tampers into position to operate between the ties; as exemplified in my application for Letters Patent, filed October 1, 1945, Serial No. 619,585, and in my application No. 768,890, filed August 15, 1947.

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The machine includes a series of tampers for packing ballast at opposite sides of a tie which are carried by a drop-head, generally designated 16, to which lifting strokes are imparted for imparting hammer strokes to the tampers. Head 16 extends transversely across the car and is mounted to slide vertically in channel beams 18 which are fixedly secured on the truck frame.

A gang of tampers, generally designated 46, is carried at each side of head 16. Each gang comprises a pair of tampers operable between the railway rails *a* and a tamper at the outer side of each of said rails. Each tamper comprises a head 49 and a series of teeth 50 for engaging the ballast and packing it under the tie. Each head 49 is pivotally connected to the head 16 by a shaft 47 which is mounted in bearings 48 which are fixed to head 16. Each tamper head 49 is confined between a pair of bearings 48 and supported therein for angular movement longitudinally of the railway track. The tampers in the gang at one side of the head are disposed in opposed relation to those on the gang on the other side of the head for drop strokes at the opposite sides of a railway tie *b*. Each shaft 47 functions as a fulcrum for a tamper and connects the tamper for bodily strokes with the head and for pivotal movement on the axes of said shafts. The angular movements of the tampers of the gangs move the teeth on the opposed tampers toward and from each other for packing the ballast between them and under the tie during successive drop strokes of head 16.

The invention provides improved mechanism for positively controlling the angular movements of each gang of tampers during the full drop and lifting stroke of the head. The head 49 of each tamper is provided with an integral arm 52 which extends upwardly from its fulcrum shaft 47.

The arms 52 of each pair of tampers at one side of the longitudinal center of the track are connected to a shaft 53 so that each shaft 53 is adapted to pivotally shift one of said pairs of tampers.

The mechanism for shifting shafts 53 for controlling the pivotal movement of the tampers comprises a track structure, generally designated 55, two rollers 64 at the transverse center of head 16, each mounted on a shaft 56 at one side of head 16 and links 68 between the ends of roller shafts 56 and the shafts 53 of one gang of tampers respectively. One end of each link 68 is

pivotally connected to one end of a roller shaft 56 and its other end is pivotally connected to one of the shafts 53.

A pair of links 58 are pivotally supported by pivot pins 59 in lugs 60 which are fixedly secured to head 16. The lower ends of each pair of links 58 are pivotally connected to and support one of the roller shafts 56. The links 58 function to impart vertical movement to shafts 56 and rollers 64 and permit lateral movement of rollers 64 for shifting links 68 to angularly shift the tampers.

The track structure for guiding rollers 64 is stationarily supported on the truck frame during the tamping operation. The track structure 55 includes a track at each side of the head for a roller 64 and each track includes an inner rail 70 and an outer rail 72 between which one of the rollers 64 is confined for positively controlling the angular movements of a gang of tampers during the full stroke of head 16. Each roller 64 spans the space between one of the inner and one of the outer rails of the track structure. The lower portions of each pair of rails 70, 72 are curved or offset as at 69 and 71 for shifting rollers 64 laterally for effecting and controlling the angular movements of the tampers. The upper portions of inner rails 70 and outer rails 72 are substantially vertical and parallel for guiding rollers 64 rectilinearly and vertically during the upper portion of each drop stroke and each lifting stroke of head 16, and causing the tampers to move rectilinearly during the upper portion of each lifting and down stroke of the head.

The inner and outer rails 70 and 72 of each track guide a single roller 64 and positively control the angular movements of tampers 46 during the full stroke of head 16.

The track structure is formed mainly of wrought metal or plates and welded together. The inner rails 70 are welded to bars 74 to form a central hollow post which is rectangular is cross section. The track structure also comprises lower sideplates 75 to which are welded the inner rails 70, upright bars 76 at the outer ends of the tracks and a reinforcing structure 77 to which is welded bars 76 and outer rails 72.

The track structure is supported for vertical adjustment for operation of the tampers with railway rails a of different heights. For this purpose, the upper end of post 74' has welded thereto a plate 79 which fits between a pair of beams 80 which are fixedly supported from the truck frame. A screw 81 engages a bridge plate 82 welded to beams 80 and is screw-threaded into plate 79 for vertically adjusting the track structure at its center. The ends of the track structure are also supported for vertical adjustment by screw rods 84, the lower ends of which are welded to the inner rails 70 and extend through sleeves 85 which are welded to beams 86 of the truck frame, and nuts 87 which are screw-threaded to the upper ends of rods 84. By adjusting screw 81 and screw rods 84, the central and end portions of the track structure may be adjusted vertically in the truck frame for the operation of the tampers with railway rails of different heights.

The drop-head 16 is subjected to heavy duty when the tampers are operating in hard ballast and for the purpose of providing a rugged and durable structure, the head is formed of structural or plate metal composed of parts mainly welded together. The head comprises a pair of side-plates 90; box-like spacing members 91 which are formed of plates welded together and welded to the inner faces of the sideplates; reinforcing members 92 which are welded to the lower edge portions of sideplates 90 and lower ends of box members 91 and are provided with upstanding triangular plates 93 which are welded to the outer side faces of sideplates 90; bearing plates 94 which fit under the plates 92 and are welded or riveted thereto; bearings 48 four of which are welded to each bearing plate 94. Forked abutment plates 95 are welded in recesses in the head and angle plates 96 are welded to plates 95 and to the outer sides of sideplates 90. These abutments are for engagement by the lifting mechanism as hereinafter described.

In order to provide clearance between the head 16 and the upper portion of the offset portions 71 of rail 70, the sideplates 90 are provided with outwardly and downwardly flared portions 97 between which insert plates 98 are welded. The post 74' of the track structure extends between plates 98. This exemplifies a drop-head which is formed essentially of plate metal to adapt said head for heavy duty and structural strength.

The head 16 is liftable by power derived from the motor on the truck frame through mechanism which lifts said head and then releases it for a drop hammer stroke. This mechanism comprises a transverse shaft 24 which is continuously and selectively driven from the motor by suitable gearing (not shown) and journalled in bearing brackets 26 which are fixedly secured on the main frame; a pair of sprocket wheels 30 which are fixed to shaft 24, a pair of idler sprockets 36, and sprocket chains 33 between vertically aligned sprockets 30 and 36 respectively. Intermittent lifting strokes are imparted to head 16 by rollers 38 which are carried by link chains 33 and are adapted to intermittently engage abutment plates 95 on head 16. Each idler sprocket 36 is journalled on a bell-crank lever 37 which is fulcrumed at 31 on the truck frame and is urged to keep its chain 33 taut by a spring 42 applied to the upstanding arm on said lever. The transversely aligned rollers 38 of chains 33 during their upward travel will intermittently engage abutments 95 and lift head 16 until rollers pass offset abutments at the end of an up stroke and will then release head 16 for a hammer stroke to the tamping elements carried thereby.

The operation will be as follows:

The car will be spotted on the track so that the tampers will be positioned to straddle the tie with the drop-head positioned centrally above the tie. The power mechanism will then be operated to intermittently lift head 16 by engagement of rollers 38 on chains 33 with abutments 95 on head 16. At the end of the up stroke, head 16 will be released for a drop hammer stroke of the tampers. During the drop stroke, rollers 64 are confined between the inner and outer rails 70—72. During the initial portion of each drop stroke, the vertical portions of rails 70, 72 will cause said rollers to travel vertically and rectilinearly between the upper straight portions of said rails and the tampers will be shifted bodily with head 16 through fulcrum shafts 47 because links 68 and shafts 53 will hold the tampers and arms 52 against angular movement. Toward the end of each drop stroke of head 16, rollers 64 will pass between the offset or cam portions 69, 71 of the roller tracks and be shifted apart so that links 68 will operate shafts 53 and arms 52 to impart angular movement to the tampers on the axes of fulcrum shafts 47. This angular

movement of the tampers will be continued during the progressive packing of the ballast until the teeth **50** thereon pack the ballast under the tie *b*. During the commencement of the lifting stroke of head **16**, the tampers will be positively and angularly shifted in reverse direction by the offset portions **69**, **71** of the rails **70**, **72** until said rollers pass between the upper straight portions of said rails. During the remainder of the up stroke, head **16** and rollers **64** will travel between the straight portions of the rails of the roller tracks and the tampers will be shifted bodily and without angular movement. The path of the teeth **50** is indicated by dotted lines *x* in Fig. 1. In this operation each roller **64** is confined with a slight clearance between inner and outer rails **70**, **72** so that during the downstroke roller **64** will ride on track portions **71** and during the upstroke they will ride on track portions **69**.

The invention exemplifies mechanism for controlling the angular movements of the tampers on a drop-head in which a single roller or equivalent element is engaged by inner and outer rails of a roller track for controlling a gang of tampers.

The invention also exemplifies a ballast tamping machine of the drop-head type in which the drop-head is constructed of parts which may be shaped from plate metal and welded or otherwise secured together.

The invention also exemplifies a machine of this type in which the track structure for the rollers which control the angular movement of the tampers may be formed of wrought or plate metal.

The invention is not to be understood as limited to the details described since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim is new and desire to secure by Letters Patent is:

1. A ballast tamping machine for railways comprising a drop-head, mechanism for imparting lifting strokes to the head, opposed gangs of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and mechanism for controlling the angular movement of the tampers, said head comprising rigidly connected sideplates, box-like spacing members and plates carrying bearings for pivotally supporting the tampers, said sideplates, spacing members, and bearing carrying plates being integralized by welds.

2. A ballast tamping machine for railways comprising a drop-head, mechanism for imparting lifting strokes to the head, opposed gangs of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and mechanism for controlling the angular movement of the tampers, said head comprising rigidly connected sideplates, box-like spacing members, reinforcing members of plate metal, and plates on said reinforcing members carrying bearings for pivotally supporting the tampers, said sideplates, spacing members, reinforcing members, and bearing carrying plates being integralized by welds.

3. A ballast tamping machine for railways comprising a drop-head, mechanism for imparting lifting strokes to the head, opposed gangs of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and mechanism for controlling the angular movement of the tampers,

said head comprising rigidly connected sideplates, box-like spacing members, plates carrying bearings for pivotally supporting the tampers, said sideplates, spacing members, and bearing carrying plates being integralized by welds, and abutments of plate metal for the lifting mechanism, welded to the sideplates.

4. In a ballast tamping machine for railways comprising a drop-head, mechanism for imparting lifting strokes to the head, opposed gangs of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and mechanism for controlling the angular movement of the tampers including a post, said head comprising rigidly connected sideplates, having flared portions around the post, spacing members, plates carrying bearings for pivotally supporting the tampers, and plates fitting between the sideplates and the flared portions.

5. In a ballast tamping machine for railways, the combination with a drop-head, mechanism for imparting lifting strokes to the drop-head, a gang of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and arms fixedly connected to the tampers, of mechanism for controlling the angular movement of the tampers, including a vertically extending track structure provided with inner and outer rails having parallel and cam portions, and means engaging the inner and outer rails of the track structure during the full stroke of the head and operatively connected to the distal end of the arms on the tampers, the track structure including plates welded together to form a post and said cam portions.

6. In a ballast tamping machine for railways, the combination with a drop-head, mechanism for imparting lifting strokes to the drop-head, a gang of tampers for packing ballast under a tie, supported on the head for bodily and pivotal movement during the strokes of the head, and arms fixedly connected to the tampers, of mechanism for controlling the angular movement of the tampers, including a vertically extending track structure provided with inner and outer rails having parallel and cam portions, and an element engaging and spanning the space between the inner and outer rails of the track structure during the full stroke of the head and means operatively connected to said element to the distal end of the arms on the tampers, the track structure including plates welded together to form a post, the inner and outer rails, and closed track ends.

7. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, and an element spanning the space between and guided by the inner and outer rails, connected to the drop-head for travel along said rails and connected to the distal end of said arm, for positively controlling the pivotal

movement of the tampers on the drop-head, the rails of the track structure being extended to guide said element for controlling the pivotal movement during substantially the full stroke of the tampers.

8. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, and a roller spanning the space between and guided by the inner and outer rails, connected to the drop-head for travel along said rails and connected to the distal end of said arm for positively controlling the pivotal movement of the tampers on the drop-head, the rails of the track structure being extended to guide said roller for controlling the pivotal movement of the tampers during substantially the full stroke of the tampers.

9. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, and an element spanning the space between and guided by the inner and outer rails, connected to the drop-head for travel along said rails and connected to the distal end of said arm for positively controlling the pivotal movement of the tampers on the drop-head, the rails of the track structure having portions for guiding said element for rectilinear movement of the tampers during the upper portion of the drop-strokes and angular portions for swinging movement of the tampers during the lower portion of the drop-strokes of the head.

10. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, and a roller spanning the space between and guided by the inner and outer rails, connected to the drop-head for travel along said rails and connected to the distal end of said arm for positively controlling the pivotal movement of the tampers on the drop-head, the rails of the track structure being extended to guide said roller and having portions for guiding said roller for rectilinear movement of the tampers during the upper portion of the drop-strokes of the head and angular portions for swinging movement of the tampers during the lower portion of the drop-strokes of the head.

11. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and a gang of tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, an element spanning the space between and guided by the inner and outer rails, connected to the drop-head for travel along said rails and connected to the distal end of said arm for positively controlling the pivotal movement of the tampers on the drop-head, the rails of the track structure having portions for guiding said element for rectilinear movement of the tampers during the upper portion of the drop-strokes of the head and angular portions for swinging movement of the tampers during the lower portion of the drop-strokes of the head, and means for vertically adjusting the track-structure on the frame.

12. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, an element spanning the space between and guided by the inner and outer rails, and a vertically extending link connecting said element to the drop-head for shifting said element to travel along said rails, said element being connected to the distal end of said arm, the track structure having rail-portions for guiding said element rectilinearly during the upper portion of the drop-strokes and angular portions for swinging said arm to impart swinging movement to the tampers during the lower portion of said drop-strokes.

13. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending

rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, a roller spanning the space between and guided by the inner and outer rails, and a vertically extending link connecting said roller to the drop-head for shifting said roller to travel along said rails, said roller being connected to the distal end of said arm, the rails of the track structure having portions for guiding said roller rectilinearly during the upper portion of the drop-strokes and angular portions for swinging said arm to impart swinging movement to the tampers during the lower portion of said drop-strokes.

14. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, an element spanning the space between and guided by the inner and outer rails, a link connecting said element to the drop-head for shifting said element to travel along said rails, and a link between the distal end of said arm and said element, the rails of the track structure having portions for guiding said element rectilinearly during the upper portion of the drop-strokes and angular portions for swinging said arm to impart swinging movement to the tampers during the lower portion of said drop-strokes.

15. In a machine for tamping ballast in cribs between railway ties, the combination with a portable frame, a drop-head slidably mounted in the frame, mechanism for imparting intermittent lifting strokes to the drop-head and dropping it for hammer strokes, and tampers for packing ballast in the cribs, fulcrumed at a fixed point, on the drop-head for bodily vertical movement therewith and to swing transversely of the ties; of means for controlling the pivotal movement of the tampers comprising: an upwardly extending arm fixed to the tampers, a vertically extending rigid track structure stationarily mounted on the portable frame, having substantially parallel inner and outer rails, a roller spanning the space between and guided by the inner and outer rails, a link connecting said roller to the drop-head for shifting said element to travel along said rails, and a link between the distal end of said arm and said roller, the rails of the track structure having portions for guiding said roller rectilinearly during the upper portion of the drop-strokes and angular portions for swinging said arm to impart swinging movement to the tampers during the lower portion of said drop-strokes.

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