Sept. 27, 1949. F. H. PHILBRICK 2,482,796

BALLAST TAMPING MACHINE FOR RAILWAYS

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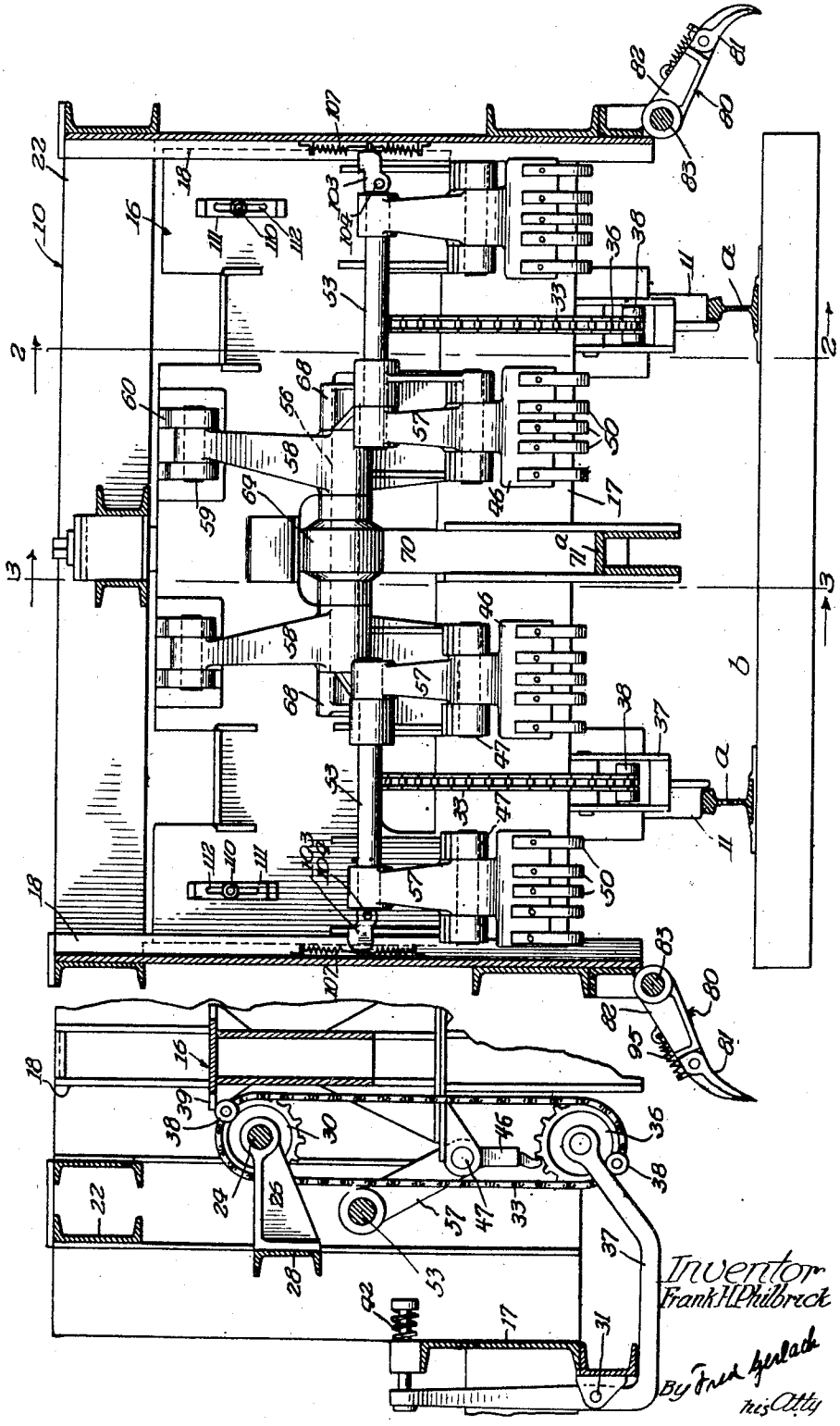


FIG. 1

FIG. 2

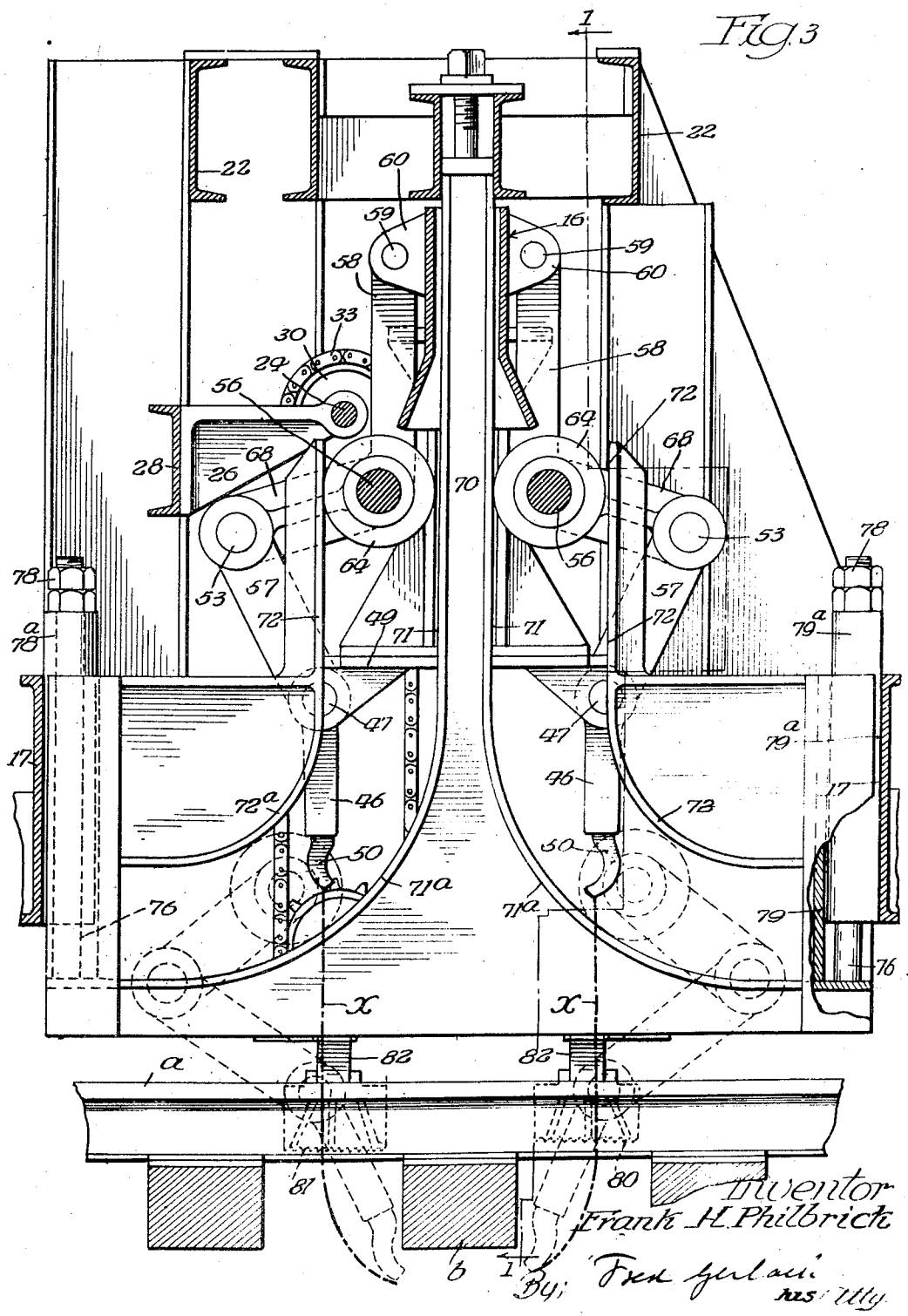
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Fig. 3

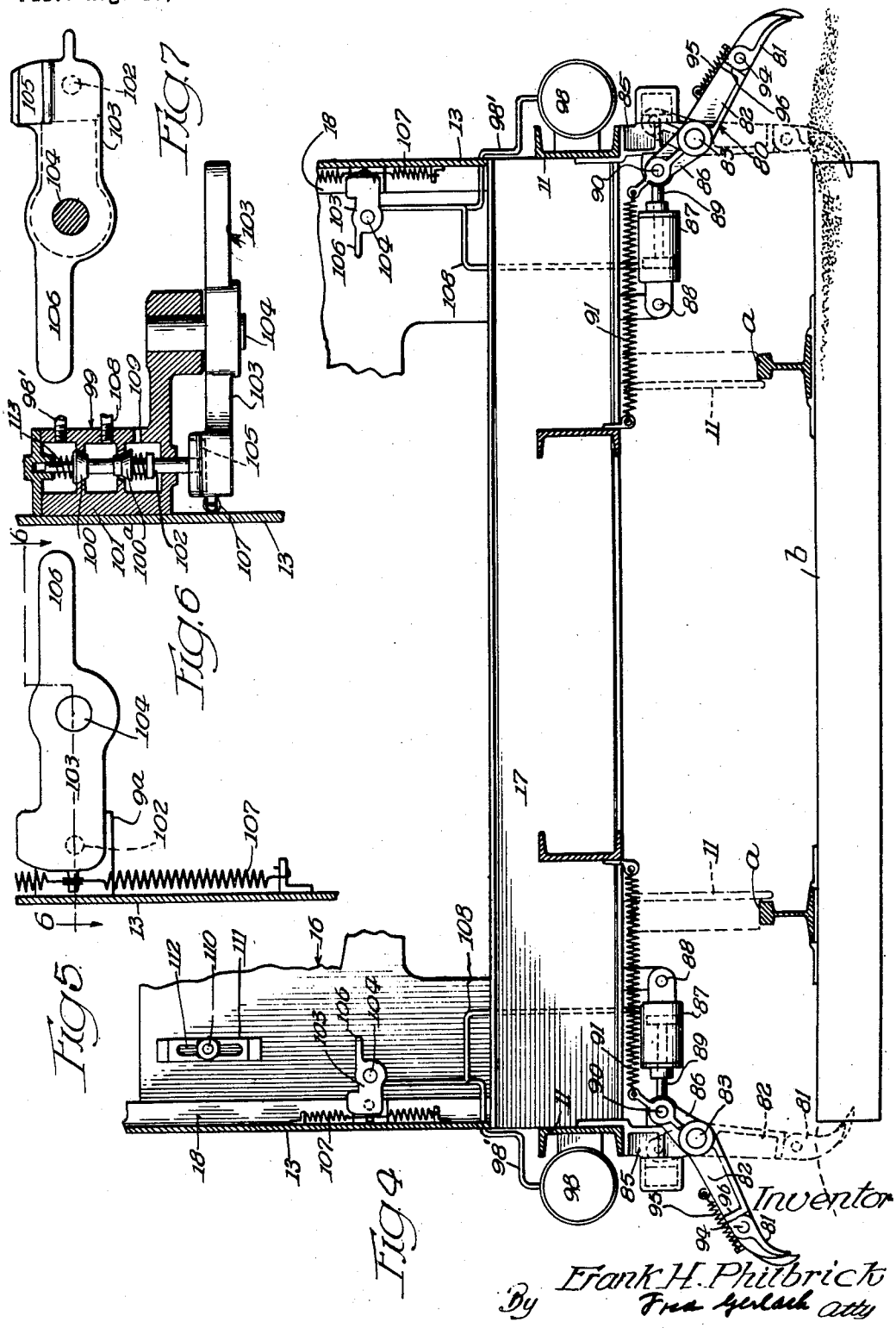


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BALLAST TAMPING MACHINE FOR RAILWAYS

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Fig. 9

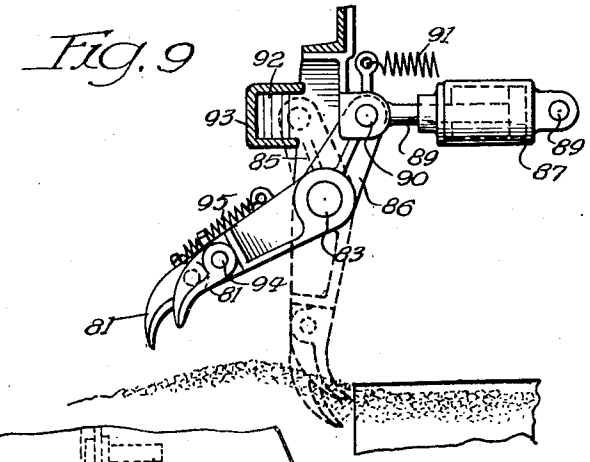
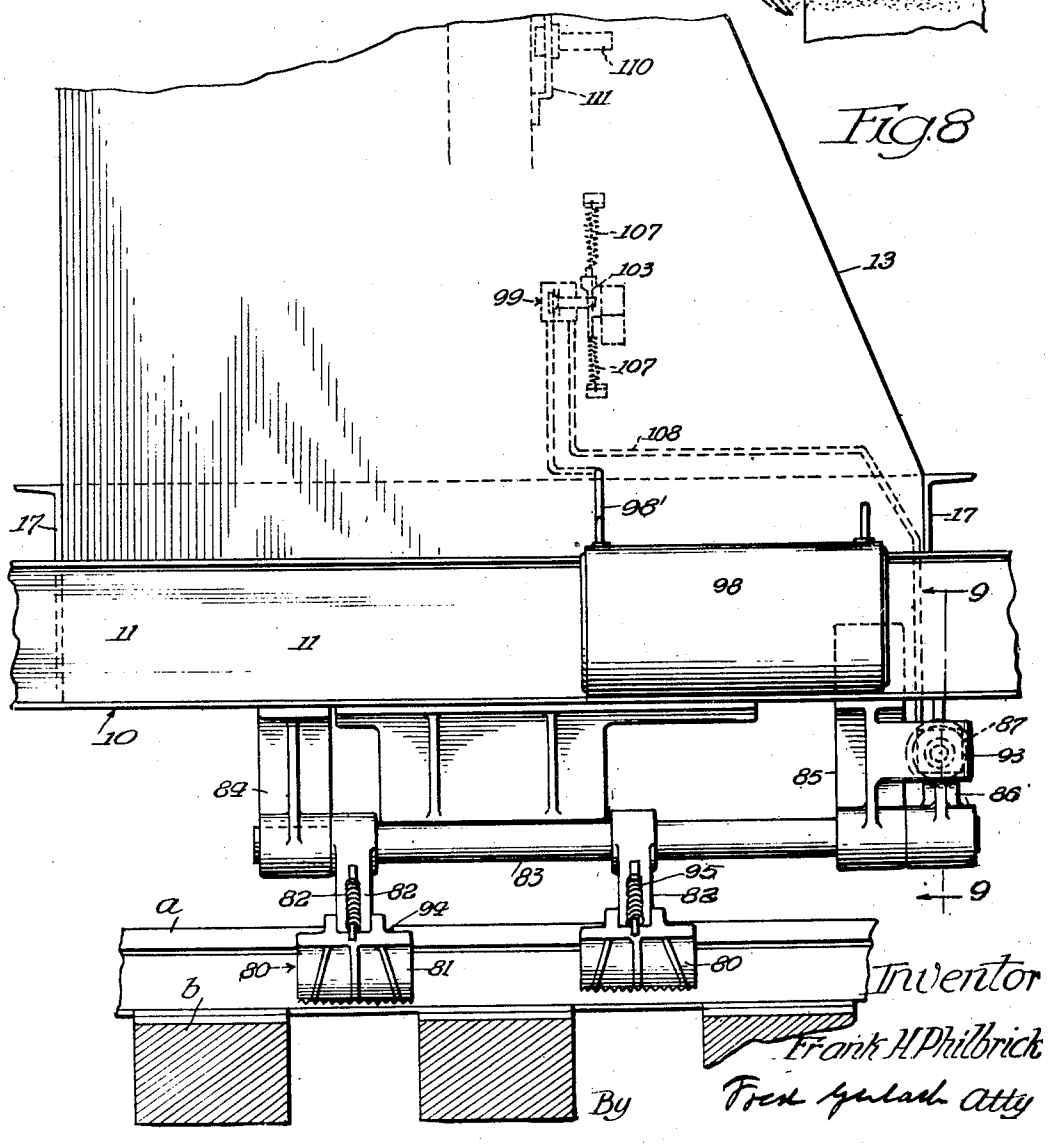


Fig. 8



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UNITED STATES PATENT OFFICE

2,482,796

BALLAST TAMPING MACHINE FOR RAILWAYS

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Application August 15, 1947, Serial No. 768,890

18 Claims. (Cl. 104—12)

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The invention relates to machines for tamping or packing ballast under and between railway ties and more particularly to mechanism for automatically feeding the ballast deposited at the outer sides of the rails into the cribs between the ties.

Heretofore in the operation of ballast tamping machines of the type in which the tamping elements for packing the ballast under and between the ties are mounted on a drop-head for imparting hammer strokes to the elements, it has been necessary to provide operators for manually shoveling the ballast into the path of the tamping elements between the cribs after the ballast dumped into the cribs has been packed.

The primary object of the present invention is to provide apparatus for automatically feeding or shoveling ballast deposited at the outer sides of the rails, or adjacent the outer ends of the ties, transversely into the cribs where the tamping elements will pack the ballast under and between the ties. By thus automatically feeding the ballast the tamping operations are expedited and labor involved in manually shoveling the ballast is saved.

Another object of the invention is to provide improved mechanism for automatically feeding ballast from the outer sides of the rails into the cribs and to the tamping elements which is adapted for operation with a tamping machine of the drop hammer type.

Another object of the invention is to provide improved mechanism for shoveling ballast from the road bed adjacent the outer ends of the rails into the cribs between the ties after ballast delivered into the cribs has been packed around the ties, for supplying the additional ballast necessary for filling the cribs.

A still further object of the invention is to provide automatic feeding mechanism of this type which is simple in construction and efficient in operation.

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 by claims at the conclusion hereof.

In the drawings:

Figure 1 is a transverse section taken on line 1—1 of Fig. 3 of a ballast tamping machine equipped with the apparatus for automatically feeding ballast into the cribs, parts being shown in elevation;

Fig. 2 is a section taken on line 2—2 of Fig. 1;

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Fig. 3 is a longitudinal section taken on line 3—3 of Fig. 1;

Fig. 4 is a transverse section illustrating the ballast shoveling apparatus and a portion of the drop-head;

Fig. 5 is a side elevation of one of the devices for controlling the pneumatic operation of the shovels for feeding ballast into the cribs, the frame plates on which the devices are mounted being shown in section;

Fig. 6 is a section taken on line 6—6 of Fig. 5, parts being shown in elevation;

Fig. 7 is a detail of the cam lever for shifting the air valve for controlling the operation of the shovels;

Fig. 8 is a side elevation of the machine illustrating the shoveling devices at one side of the machine; and

Fig. 9 is a detail illustrating one pair of shovels and its shifting mechanism, parts being shown in section.

The invention is exemplified on a truck or car which comprises a truck-frame generally designated 10 which is supported on traction-wheels 11 which are adapted to travel on the rails *a* of a railway track. The truck is equipped with an internal combustion motor, a transmission for driving the truck wheels, and gearing for operating the drop-head on which the tamping elements are mounted as will be understood in the art and as exemplified in my application filed October 1, 1945, Serial No. 619,585, and in my application No. 768,301, filed August 13, 1947.

The tamping elements are mounted on a drop-head, generally designated 16, which extends transversely of the truck and is mounted to slide vertically in channels 18 which are fixedly supported on side-plates 13 of frame 10. Head 16 functions as a drop hammer for operating the tamping elements for packing the ballast under the ties *b* on which the rails *a* are laid. The upper portions of frame 10 are rigidly connected by channel beams 22. The frame 10 includes longitudinal side beams 11 and transverse beams 17 which are spaced apart for the operation between them of the head 16 and the tamping elements carried thereby. Head 16 is liftable by power derived from the motor on the truck 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 driven from the motor by suitable gearing (not shown) and journalled in bearing brackets 26 which are supported on a cross beam 28 of the frame structure, 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. Intermittent lifting strokes are imparted to head 16 from shaft 24 by rollers 38 which are mounted at the outer sides of link chains 33 and are adapted to intermittently engage abutments 39 which are fixed to and project from one side of drop-head 16. Each idler sprocket 36 is journalled on a forked 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 39 and lift head 16 until said rollers pass off said abutments at the end of an up-stroke and will then release head 16 for a hammer stroke to the tamping elements carried thereby. This exemplifies power mechanism for intermittently imparting lifting strokes to head 16 and the tamping elements and dropping them to impart hammer strokes to the tamping elements.

A gang of tamping elements or tools is provided at each side of head 16. Two elements of each gang operate between the track-rails and the other two operate outwardly of said rails. These elements are exemplified by heads 46 which are provided with depending teeth 50. The elements of each gang are co-axially fulcrumed on pins 47 each of which is supported in a pair of ears on the outer end of a plate 49 which is on and integral with the lower end of head 16. The tamping elements of the gangs on opposite sides of head 16 are disposed in opposed relation of one another and descend on opposite sides of a tie *b* to swing toward each other for packing the ballast in the cribs and under the ties. Each tamping element is provided with an integral arm 57 which extends upwardly from its fulcrum pin 47. The arms 57 of each pair of elements disposed transversely of the transverse center of the track are rigidly connected by a shaft 53.

The pivotal or angular movements of each gang of tampers are controlled during the full drop and lifting strokes by mechanism which comprises a single track structure and a roller 64 engaging said structure. Each roller 64 is carried by a shaft 56 which is mounted and supported in the lower end of a pair of links 58, the upper ends of which are connected by pivot pins 59 to lugs 60 which are integral with head 16. Each roller shaft 56 is connected by links 68 to the inner ends of the shafts 53 of one gang of tampers. The inner end of each link 68 is pivotally connected to a roller-shaft 56 and its outer end is pivotally connected on one of the shafts 53. Rollers 64 and the track structure are disposed at the transverse center of head 16 and each roller is positively guided during the full stroke of head 16 for controlling the angular movement of the tampers. This track structure, generally designated 66, includes inner and outer rails for each roller 64 at opposite sides of head 16. This track structure includes a central post 70, the opposite faces of which form inner rails 71 for rollers 64 respectively, and outer rails 72. Each roller 64 is confined between an inner rail 71 and an outer rail 72 for positively controlling the angular movements of the tamping elements during the full stroke of head 16.

The upper portions of each inner rail 71 and outer rail 72 are substantially vertical and parallel for guiding rollers 64 rectilinearly and vertically during the upper portion of each stroke of head 16. The lower portions of each pair of rails 71 and 72 are curved or offset as at 71*a* and 72*a* for causing the rollers 64 on opposite sides of head 16 to spread apart during the lower portion of each stroke of the head for operating the links 68 and shafts 53 to simultaneously rock the arms 57 outwardly to swing the lower ends of the tampers inwardly and angularly as the head approaches the lower end of its stroke and so as to rock the tampers in the opposite direction during the initial portion of each up-stroke of the head. The track structure is formed of plate metal or bars. A screw 80 engages a bridge plate 81 for adjustably supporting the track structure for vertical adjustment of the track structure for the operation of the tampers with railway rails of different heights. The sides of the track structure are adjustably supported on frame 10 by vertical rods 76 the lower ends of which are welded to the track structure, and nuts 78 which are screw threaded to the upper ends of rods 76 and engage the upper ends of channel bars 79 which are welded to the track structure and sleeves 79*a* which are welded to cross-beams of the truck frame. By adjusting nuts 78 the entire track structure may be adjusted vertically to vary the angular movements of the tampers relatively to rails *a* of different heights.

The operation of the tamping mechanism will be as follows: The truck or car is moved on the railway track so that the gangs of tampers will be positioned to straddle the tie with the head 16 positioned centrally above a tie. The power mechanism will then be operated to intermittently lift head 16 and then release it for drop hammer strokes. Rollers 64 and their link connections with shafts 53 will control the angular movements of the tamping elements. During the initial portion of each drop-stroke the vertical portion of track 72 will cause the rollers 64 to travel vertically and rectilinearly between the upper straight portions of the tracks and the tampers will be shifted bodily with head 16 through fulcrum shafts 47. Toward the end of each drop stroke of the head 16, rollers 64 will engage the offset or cam portions 71ª of the track structure and shift 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 until the teeth 50 thereon have packed the ballast under the tie and into the cribs. The path of the teeth is indicated by dotted lines *x* in Fig. 3. During the commencement of the lifting stroke of head 16, the tampers will be positively angularly shifted in reverse directions by rollers 64 and the offset or cam portions 72*a* of the track structure until said rollers pass between the straight upper portions of said tracks. During the remainder of the up-stroke of head 16, roller 64 will travel rectilinearly and the tampers will be shifted bodily without angular movement. The ballast will be progressively delivered into the crib until the tampers pack sufficient ballast under and between the ties to fill the crib.

The mechanism for automatically feeding or shoveling ballast into the path of movement of the tamping elements during the progressive packing of the ballast into the cribs comprises a pair of shovels or tools, generally designated 80, which are transversely aligned with the cribs and positioned beyond the ends of the tie when the tamping elements are positioned to pack ballast at the sides of a tie. A pair of shovels

is provided at each side of the truck frame for simultaneously shoveling or feeding ballast deposited near both ends of a tie transversely into the cribs.

Each shovel 80 comprises a curved shoe 81, an arm 82 fixed to a shaft 83 which is journalled in a pair of hangers 84, 85 which are secured to one of the frame-beams 11. The pair of shovels at each side of the machine are fixed to a common shaft 83 for conjoint swinging movement. The mechanism for operating each pair of shoes 81 comprises an arm 86 fixedly secured to one end of shaft 83 and a fluid pressure operated device which includes a cylinder 87 which is pivotally supported at 88, and a stem 89 on a piston which is slidable in cylinder 87 and is pivotally connected at 90 to the distal end of arm 86. When fluid, for example, air under pressure, is admitted to cylinder 87, the piston will be operated to shift stem 89 and rock arm 86, shaft 83, arms 82 and shoes 81 to shovel a batch of ballast from the supply at the ends of the ties into the cribs at the opposite sides of one tie. A spring 91 is connected to stem 89 and the frame structure for retracting the piston in cylinder 87 and shovels operable thereby. An elastic bumper 92 is confined in a bracket 93 on a hanger 85 for arresting stem 89 at the end of its outward stroke. Each shoe 81 is pivotally connected by a pin 94 to its arm 82 and a spring 95 is applied between said shoe and arm 82 to normally hold the shoe against an abutment 96 on arm 82 during the in-strokes of the shovels and to permit the shoes to swing inwardly during the out-strokes of the shoe. This exemplifies fluid pressure operable devices for operating the shovels for feeding ballast intc the cribs where it will be packed by the tamping elements.

The lead shovel 80 of each connected pair has, as illustrated in Fig. 10, a somewhat shorter effective radius, than its trailing shovel so that the lead shovel will displace a portion of the ballast from the pile at one side of the road bed into the crib at the lead side of the tie and the trailing shovel will displace the remainder of the pile into the crib at the trailing side of the tie.

The operation of shovels 80 is automatically controlled to impart thereto an in-stroke during an up-stroke of the drop-head 16 and the tamping elements. The fluid operable device for each pair of shovels at one side of the machine is operable by compressed air from a reservoir 98 which is mounted on the truck frame. Each pair of shovels is controlled by a valve, generally designated 99, and secured on the frame structure and periodically operated by means on the drop-head 16, for controlling the flow of compressed air to each cylinder 87 and the exhaust of air therefrom. Each valve 99 includes a valve-member 100 in valve casing 101, a stem 102 for valve-member 100, a lever 103 which is fulcrumed at 104 on casing 101 and provided with a cam 105 for shifting stem 102 and an arm 106. A pair of opposed springs 107 are connected to one end of each lever 103 and to the frame structure for normally holding the lever in its centralized position and permitting valve member 100 to cut off the delivery of air to the cylinder 87. A pipe 98' supplies air from reservoir 98 to a chamber in casing 101 which is normally closed by valve member 100. A pipe 108 communicatively connects a chamber in casing 101 and a cylinder 87. A normally open valve member 100^a on stem 102 controls the exhaust of air from pipe 108 and cylinder 87 through a port 109 to atmosphere.

Arm 106 of lever 103 is operable by a stud 110 which is adjustably connected to a bar 111 which is fixedly secured to one face of drop-head 16. A slot 112 in bar 111 permits vertical adjustment of the stud 110. During the down-stroke of head 16, stud 110 will engage arm 106 and rock lever 103 in one direction to move cam 105 away from valve stem 102 so that spring 113 will hold valve member 100 closed. After stud 110 passes below arm 106, lever 103 will be returned to its centralized position by one of the springs 107. During the up-stroke of drop-head 16, stud 110 will engage arm 106 and rock lever 103 to open valve member 100 and close valve member 100^a, which will cause compressed air to flow from reservoir 98 via pipe 98' past valve member 100 and through pipe 108 to cylinder 87 and simultaneously close valve member 100^a to cut off the exhaust port 109. The compressed air in cylinder 87 will operate stem 89 to impart an in-stroke to the shovel 80 connected thereto. When the stud 110 passes off arm 106 during the up-stroke of drop-head 16, one of the springs 107 will restore lever 103 to its normal position which will shift cam 105 to release valve stem 102 to simultaneously close valve member 100 and cut off the supply of air to pipe 108 and simultaneously open valve member 100^a to exhaust air from cylinder 87 and pipe 108 through port 109 to atmosphere. This exemplifies means for automatically controlling the fluid pressure means for imparting operative strokes to shovels 80.

In tamping ballast between and under railway ties, sufficient loose ballast is dumped into the cribs to approximately fill them. As drop strokes are imparted to the tamping elements, the ballast is packed in the cribs and its level is lowered. It is then necessary to add ballast to the cribs for filling them during the succeeding strokes of the tamping elements. During the initial strokes of the tamping elements while the ballast deposited in the cribs is being packed, the shovels 80 will remain idle. The studs 110 on the drop-head 16 are located so that they will not pass under levers 103, until the tamping elements drop below a predetermined level and the ballast has been packed to a level between the ties which permits the head 16 to drop sufficiently to pass under arm 106 of lever 103. When that occurs, studs 110 during the succeeding up-stroke will operate levers 103 to control valves 99 for the operation of shovels 80. In practice, a single stroke of the shovels is usually sufficient to displace the additional ballast necessary to complete the filling of the cribs. This control mechanism for the operation of the shovels exemplifies means controlled by the depth of movement of the drop-head 16 and the tamping elements, which varies as the ballast dumped into the cribs becomes packed therein. In other words, the shovels 80 remain idle until the ballast in the cribs has been packed sufficiently to require additional ballast for and tamping it in the cribs until they are filled to the desired height.

The operation of the apparatus for shoveling ballast into the cribs will be as follows: The machine is spotted on the track for the operation of the tamping elements on opposite sides of the tie and the shovels 80 at the opposite sides of the truck frame will then be positioned to transversely displace ballast from the road bed adjacent the ends of the tie into the cribs. The cribs are loaded with loose ballast which is usually dumped into them. Piles or windrows of ballast are deposited on the road bed at the outer ends of

the ties. During the initial strokes of drop-head 16, the loose ballast in the cribs will be packed therein and the down-strokes of the tamping elements will be retarded by the ballast so that studs 110 will not pass below arms 106 of levers 103 and the shovels 80 will remain idle. As loosely deposited ballast in the cribs in progressively packed by the tamping elements, the down strokes of head 16 and said elements will be lengthened sufficiently to cause valves 99 to deliver compressed air into cylinders 87 for imparting operative in-strokes to shovels 80 and displacing ballast from the piles at the sides of the track into position in the cribs to be packed by succeeding strokes of the tamping elements until the crib is filled with packed ballast. During each operative stroke of shovels 80, the short lead shovel of each connected pair will displace a portion of the pile of ballast from one side of the road bed into one crib and the following shovel will displace the remainder of the pile into the following crib. Normally valves 99 cut off the supply of air to cylinders 87 and exhaust air therefrom. During each down-stroke of head 16 which is sufficient for studs 110 to pass under arms 106, the studs during the succeeding lifting stroke will swing levers 103 so that cams 105 will shift valve stems 102 to open valve members 100 for delivering compressed air to cylinders 87. As head 16 continues to the end of its lifting stroke, studs 110 will release levers 103 and permit springs 107 to restore said levers to their normal centralized position to cut off the supply of air to cylinders 87 and to exhaust air therefrom. During the initial tamping operation of the ballast dumped into the cribs, the shovels will remain idle until the ballast has been packed sufficiently to require additional ballast from the piles at the sides of the road bed for filling the cribs.

During the operation of the shovels 80 the lead shovel at each side of the track, having a shorter radial length, will displace only a portion of the ballast deposited in wind-rows of piles adjacent the ends of the ties, and the trailing shovels, having greater length, will displace the remainder of said ballast into a crib.

The invention exemplifies a ballasting tamping machine of the drop hammer type with apparatus for shoveling and feeding ballast deposited along the ends of the ties into the cribs so that it is not necessary to use manual labor for this purpose. This shoveling apparatus expedites the tamping operation because it feeds ballast into the cribs for tamping during the operation of the tamping elements.

The invention exemplifies means for shoveling ballast into the cribs which is controlled through the drop-head and tamping elements by the level of the packed ballast in the cribs and which remains idle until the ballast in the cribs is to be supplemented by additional ballast for filling them.

The fluid pressure devices impart quick strokes to the shovels for projecting the ballast into the cribs so that it will be distributed between the transverse center and the ends of the cribs.

The invention is not to be understood as restricted 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 as new and desire to secure by Letters Patent is:

1. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of shovels mounted on the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer side of the track into position to be tamped in a crib by said elements, and means controlled by said mechanism for intermittently operating the shovels.

2. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of shovels pivotally mounted on each side of the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer sides of the track into position to be tamped in a crib by said elements, and means controlled by said mechanism for intermittently operating the shovels.

3. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of a pair of shovels mounted on each side of the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer side of the track into position to be tamped by said elements in cribs at the sides of a tie, and means controlled by said mechanism for intermittently operating the shovels.

4. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of a pair of shovels mounted on each side of the frame, each pair being connected for conjoint pivotal movement for operating transversely of the railway track for displacing ballast from the road bed along the outer sides of the track into position to be tamped by said elements in the cribs, at the sides of a tie, and means controlled by said mechanism for intermittently operating the shovels.

5. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of shovels mounted on the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer side of the track into position to be tamped by said elements in the cribs between ties, mechanism carried by the frame for intermittently operating the shovels, and means controlled by the depth of the strokes of said elements in the cribs for controlling the operation of the shovels.

6. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of shovels pivotally mounted on the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer sides of the track into position to be tamped by said elements in the cribs between the ties, mechanism carried by the frame for intermittently operating the shovels, and means controlled by the depth of the strokes of said elements in the cribs for controlling the operation of the shovels.

7. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties, of shovels mounted on the frame to operate transversely of the railway track for displacing ballast from the roadbed along the outside of the track into position to be tamped by said elements in the cribs between the sides, and means controlled by the operation of the mechanism for operating the tamping elements for controlling the shovel operating mechanism to render the shovels inoperative when the cribs have been filled with ballast.

8. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism carried by the frame for operating the elements to tamp the ballast in the cribs between the ties; of shovels mounted on the frame to operate transversely of the railway track for displacing ballast from the road bed along the outer side of the track into position to be tamped by said elements in the cribs between the ties, fluid pressure operable mechanism carried by the frame for intermittently operating the shovels, and means controlled by the length of the strokes of the tamping elements for controlling the operation of said mechanism.

9. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of shovels mounted on the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by the elements in the cribs, mechanism carried by said frame for intermittently operating the shovels, and means for automatically controlling the operation of the shovel operating means to render the shovels operative during the up-strokes of the drop-head.

10. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of shovels mounted on the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by said elements in the cribs, mechanism for intermittently operating the shovels, and means controlled by the length of the strokes of the drop-head for controlling the operation of the shovel operating means.

11. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of shovels mounted on the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by said elements in the cribs, mechanism carried by the frame for intermittently operating the shovels, and means controlled by the length of the strokes of the drop-head for controlling the shovel operating means to operate the shovels to displace the ballast during the lifting strokes of said head.

12. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and

mechanism for imparting lifting strokes to the drop-head; of shovels mounted on the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by said elements in the cribs, mechanism carried by the frame for intermittently operating the shovels, and means controlled by the length of the strokes of the drop-head for controlling the shovel operating means to operate the shovels during the lifting strokes of said head when said head drops below a predetermined height and to render the shovel operating means inoperative when the ballast in the cribs has been packed.

13. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of shovels operatively mounted on the frame, for displacing ballast on the road bed at the side of the railway track into position to be tamped by said elements in the cribs, fluid pressure operable mechanism for intermittently operating the shovels, valve-means for controlling the operation of the fluid pressure operable means; and means on the drop-head for controlling the valve-means to operate the shovels.

14. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of shovels operatively mounted on the frame for displacing ballast on the road bed at the side of the railway track into position to be tamped by said elements in the cribs, fluid pressure operable mechanism carried by the frame for intermittently operating the shovels, valve-means for controlling the operation of the fluid pressure operable means; and means on the drop-head for controlling the valve-means to operate the shovels during the lifting strokes of the drop-head.

15. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; a pair of shovels pivotally mounted on each side of the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by said elements in the cribs, fluid pressure operable mechanism mounted on the frame for intermittently operating the shovels, valve-means for controlling the operation of the fluid pressure operable means; and means on the drop-head for controlling the valve-means to operate the shovels.

16. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, a drop-head carried by the frame and on which the tamping elements are mounted, and mechanism for imparting lifting strokes to the drop-head; of a pair of shovels operatively mounted on each side of the frame for displacing ballast on the road bed at the sides of the railway track transversely into position to be tamped by said elements in the cribs, spring-retracted fluid pressure operable mechanism carried by said frame for intermittently operating the shovels, valve-means for controlling the operation of the fluid pressure operable means; and adjustable means on the drop-head for controlling the valve-

means for operating the shovels during the lifting strokes of the drop-head.

17. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism for imparting lifting strokes to said elements; of a pair of shovels mounted at one side of the frame, longitudinally of one another and transversely of the cribs at the sides of a tie, for displacing ballast on the road bed at the sides of the railway track into position to be tamped by said elements in the cribs, the shovels being operative and extended to successively displace into the cribs ballast at relatively different distances above the roadbed, and means controlled by the lifting mechanism for conjointly operating the shovels.

18. In a ballast tamping machine for railways, the combination with a portable frame, tamping elements, and mechanism for imparting lifting strokes to the said elements; of a pair of pivotally and co-axially supported shovels mounted at one side of the frame, longitudinally of one another and transversely of the cribs at the sides of a tie for displacing ballast on the road bed at the sides of the railway track into position to be tamped by said elements in the cribs, the shovels being operative at different distances above the roadbed to successively displace ballast of different heights into the cribs, and means controlled by the lifting mechanism for conjointly operating the shovels.

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