Jan. 4, 1927. 1,613,420

H. G. WARR

BALLAST SCREENING MACHINE

Filed Oct. 8, 1923 5 Sheets-Sheet 1

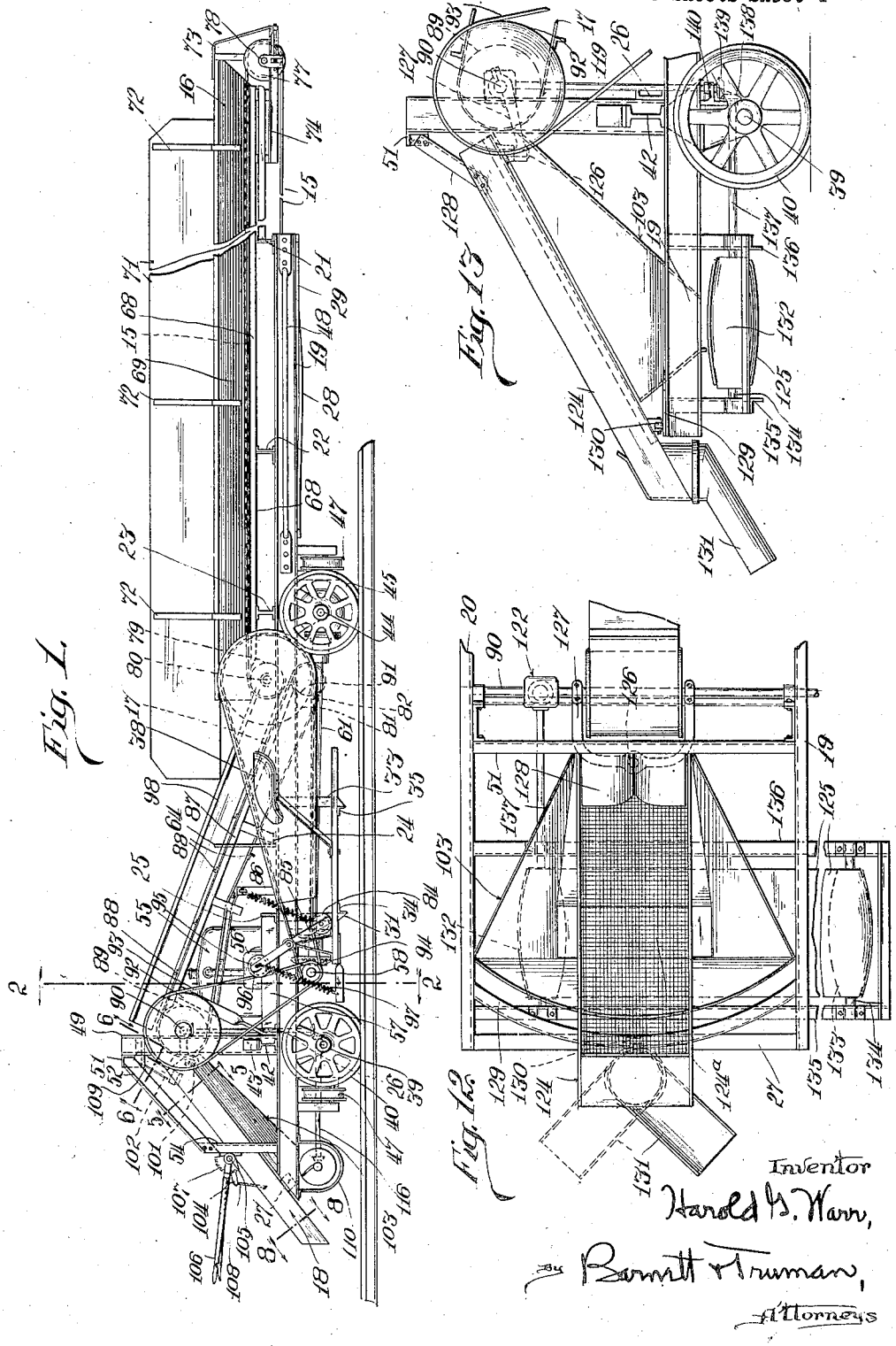


Fig. 1.



Fig. 1a



Fig. 1b

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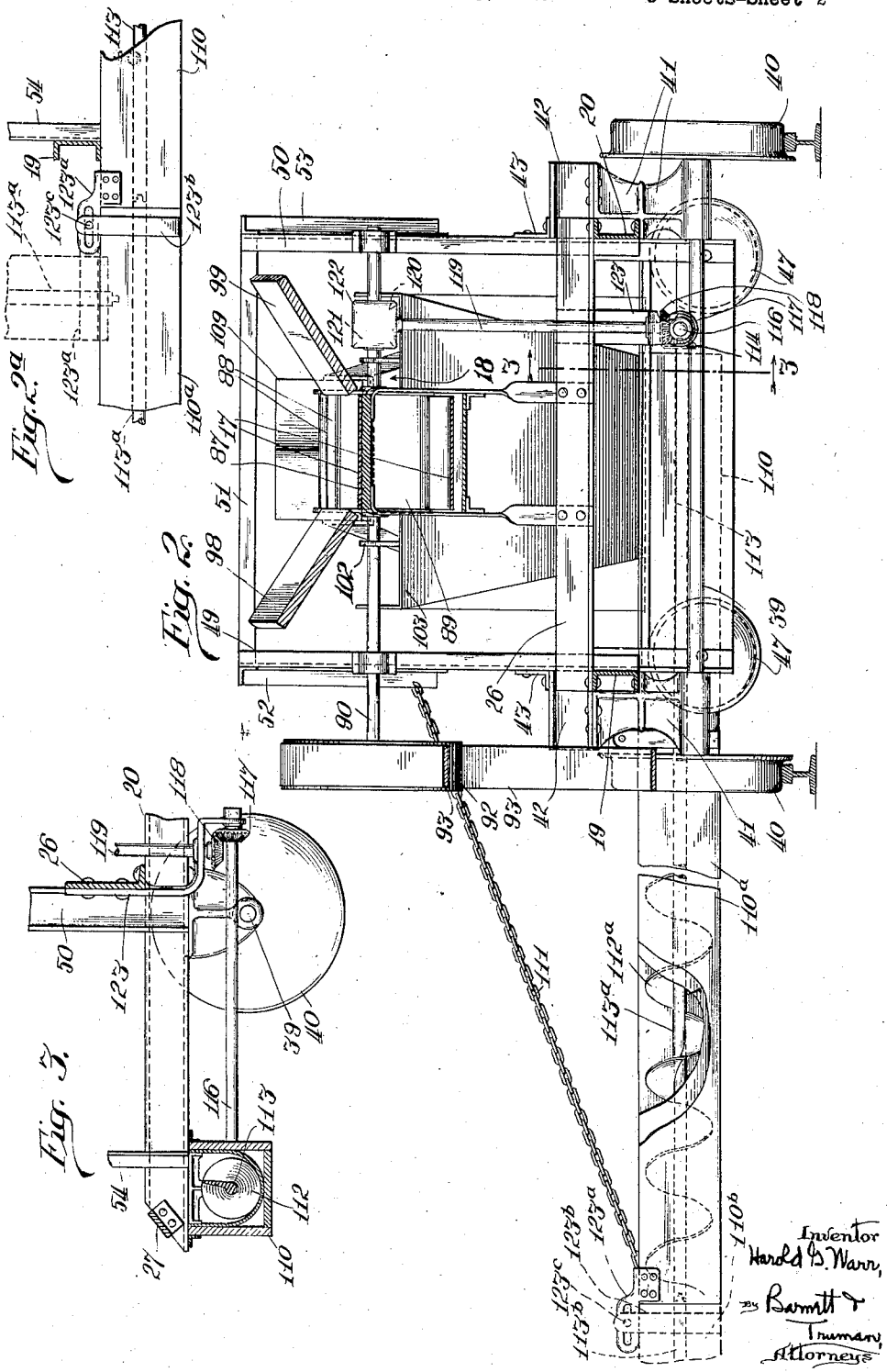


Fig. 2a

Fig. 2

Fig. 3

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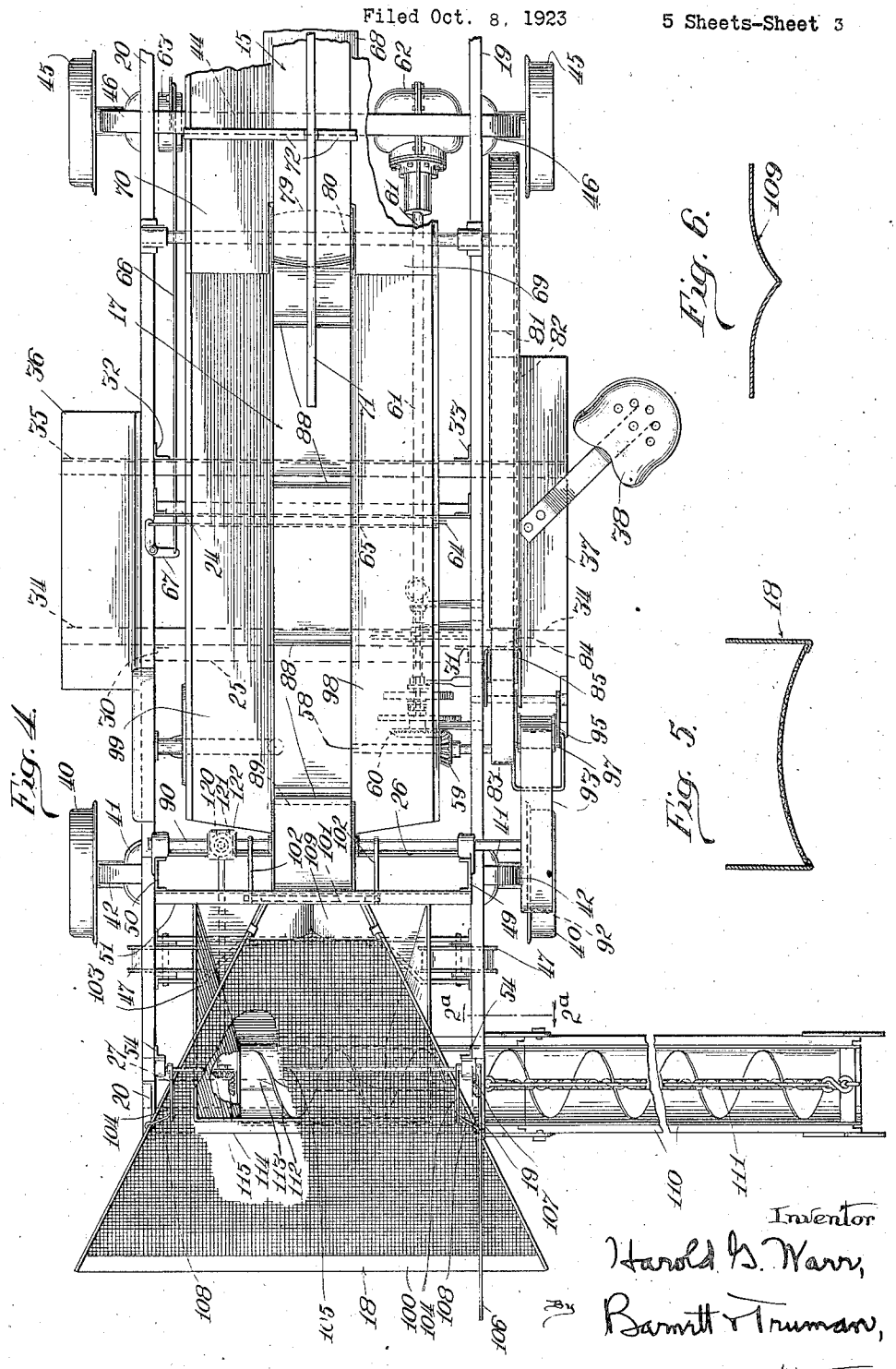


Fig. 4.



Fig. 6.



Fig. 5.

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BALLAST SCREENING MACHINE

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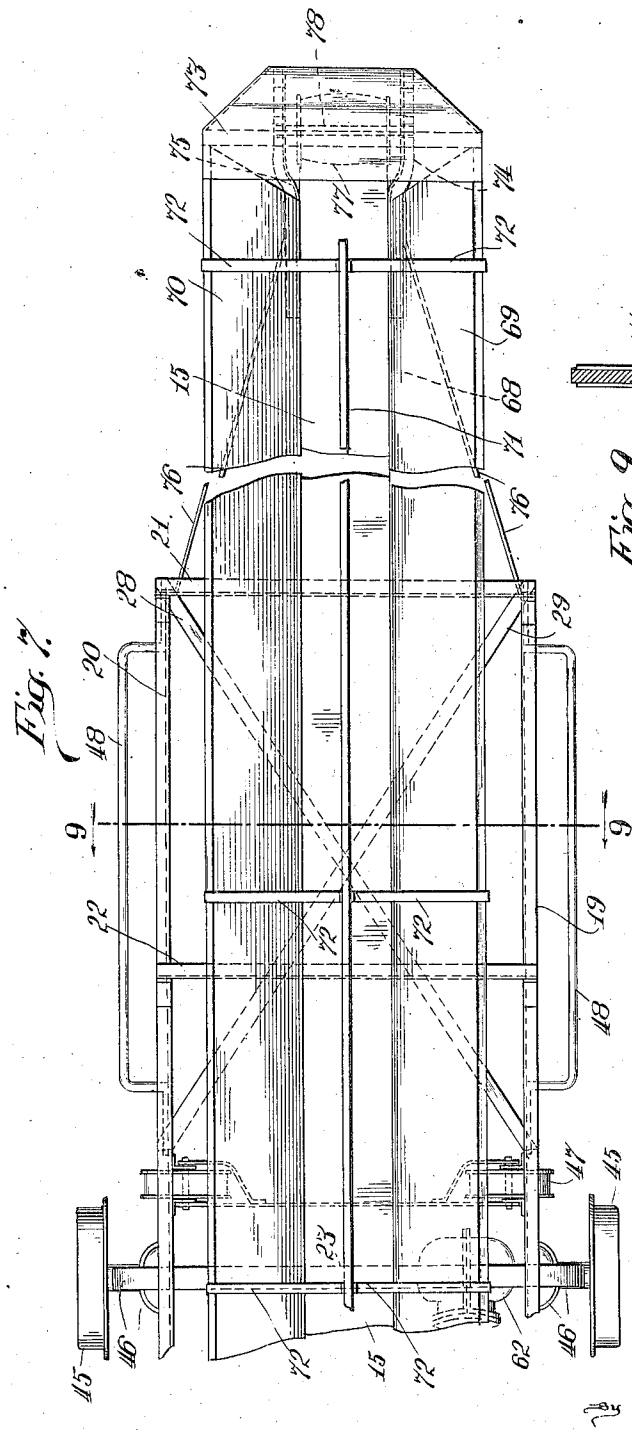


Fig. 7.

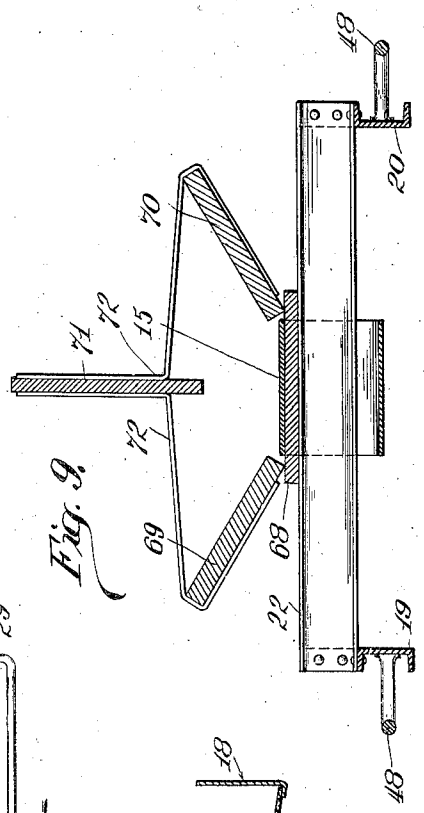


Fig. 9.



Fig. 8.

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BALLAST SCREENING MACHINE

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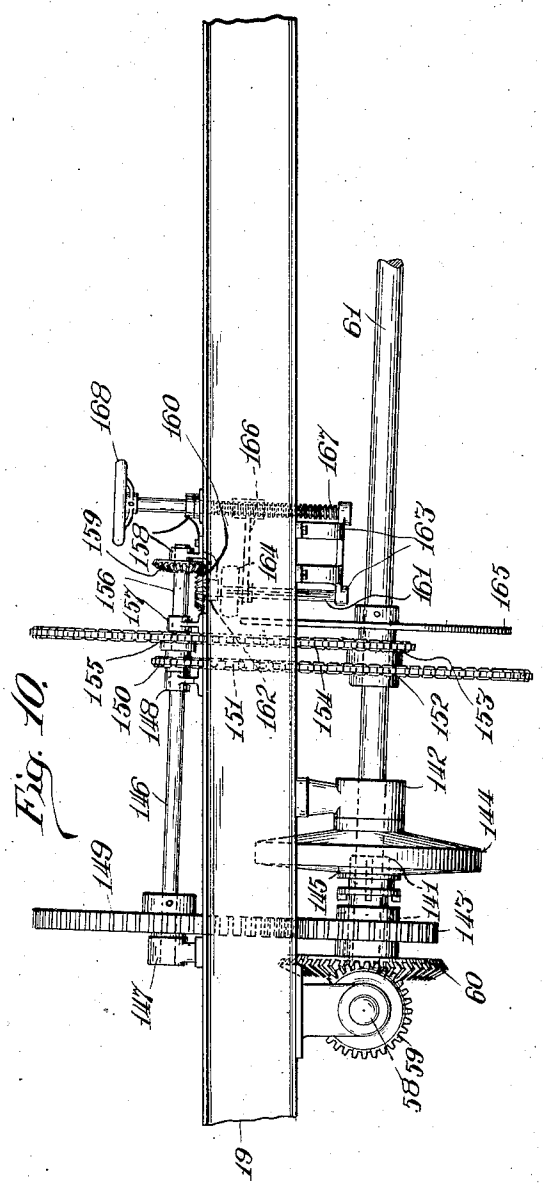


Fig. 10.

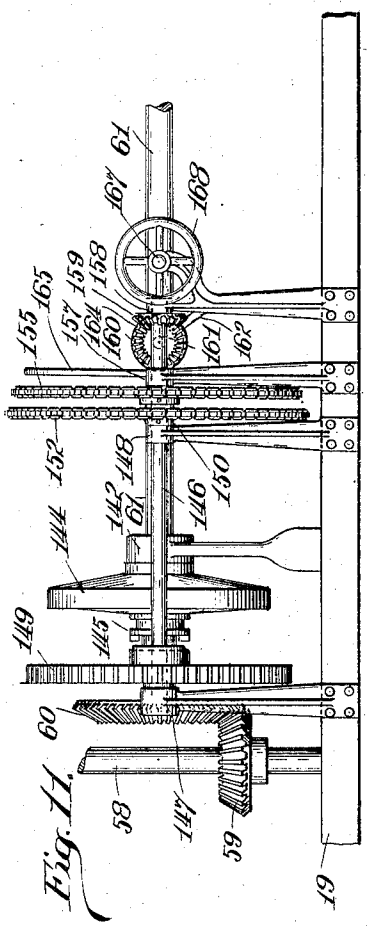


Fig. 11.

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Patented Jan. 4, 1927. 1,613,420

# UNITED STATES PATENT OFFICE.

HAROLD G. WARR, OF PARK RIDGE, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MAINTENANCE EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## BALLAST-SCREENING MACHINE.

Application filed October 8, 1923. Serial No. 667,347.

My invention relates to track ballast screening machines of the type adapted to be moved along the rails of a track to receive the mixed ballast, cinders, dirt, and other loose material to be shoveled into a suitable hopper in one end for separating the ballast from the foreign matter, so as to deliver the screened ballast to the track at the opposite end of the machine. It is one of the objects of my invention to improve machines of this type so as to increase to the maximum the cleaning effect of the treatment of the ballast as it is dashed or thrown into contact with the several parts of the mechanism in succession as the ballast moves through the machine.

It is another object of my invention to provide a construction and arrangement by reason of which a large gang of men can be employed to advantage for shoveling the ballast into the machine; to improve the construction and arrangement of the means for depositing the cleaned ballast again upon the track in the desired position; to improve the arrangement of the screen by which the desired adjustment may be effected for suiting the requirements for different kinds and different conditions of ballast; to provide for the advancement of the machine along the track at the desired rate to keep pace with the gang of workmen; and for otherwise improving machines of this type in sundry details, hereinafter pointed out.

While I prefer to employ the forms and arrangements of parts as illustrated in the drawings and hereinafter described, it will be understood that I do not wish to be restricted to the detailed forms shown, except so far as such detailed construction is hereinafter claimed, inasmuch as it is evident that many changes may be made in the mechanism without departing from the spirit of my invention.

What I believe to be new and desire to cover by Letters Patent is set forth in the claims.

In the drawings—

Fig. 1 is a side view of my improved machine in position upon a track;

Fig. 2 is a transverse vertical sectional view, taken on the line 2—2 of Fig. 1, upon an enlarged scale and partly broken away;

Fig. 2ª is a vertical section taken on line 2ª—2ª of Fig. 4;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a top plan view of the rear end portion of the machine, partially broken away for convenience of illustration;

Figs. 5 and 6 are enlarged detail views, being sections taken respectively at lines 5—5 and 6—6 of Fig. 1;

Fig. 7 is a top plan view of the forward end of my improved machine, being partially broken away for convenience of illustration;

Fig. 8 is an enlarged detail view, being a section taken on line 8—8 of Fig. 1;

Fig. 9 is a transverse vertical section taken on line 9—9 of Fig. 7;

Fig. 10 is a side view of the train of reduction gearing between the engine and the driven axle;

Fig. 11 is a plan view of the parts shown in Fig 10;

Fig. 12 is a top plan view of the rear end of the machine, showing a modified form of construction, being partly broken away; and

Fig. 13 is a side view, partly in section, of the parts shown in Fig. 12.

Referring now to Figs. 1 to 11 inclusive, in which corresponding parts are indicated by the same reference characters, 15 indicates a horizontally disposed conveyor which forms the bottom for a forwardly extending hopper 16 into which a gang of workmen are able to shovel ballast to be cleaned, the hopper being located at such a level that a considerable number of men can work to advantage without any necessity for any of them to throw the ballast to a high level. The ballast is carried by the conveyor 15 rearwardly and dumped upon the lower end of an elevator conveyor 17 by which it is carried upwardly and thrown upon the upper end of a screening device 18 by which the loose dirt is separated from the stones for delivery of the cleaned ballast again to the track by gravity at the rear end of the machine.

The main frame of the machine comprises side bars 19 and 20 in the form of channels, as best shown in Figs. 2 and 9. These side bars are connected together by means of cross-bars 21, 22, 23, 24, 25, 26 and 27, and by diagonally disposed brace bars 28 and 29. Angle bars 30, 31, 32 and 33 depend

from the side bars 19 and 20, carrying at their lower ends cross-bars 34 and 35, upon the outer ends of which are mounted platforms 36 and 37. A seat 38 is mounted upon the platform 37 as shown in Fig. 4.

An axle 39, having wheels 40 fixedly mounted thereon, is journaled in position transversely of the main frame by the use of brackets 41 of any approved type, which brackets are braced in position by means of short I-beams 42 which in turn are reinforced by corner angles 43, as best shown in Fig. 2. A second axle 44 having wheels 45 fixedly mounted thereon is journaled in position by means of brackets 46 similar to the brackets 41. For use for removing the machine from the track, transversely disposed wheels 47 are mounted on the frame in position to support the machine upon beams to be placed transversely of the track, handles 48 being provided on the sides of the main frame for convenience in handling the machine in the operation of lifting the ends thereof alternately for placing the beams (not shown) in position.

The framework of the machine comprises further vertical bars 49 and 50, rising from the main frame above the axle 39, such bars being in the form of channels and being connected at their upper ends by a cross-bar 51 in the form of an angle bar. Diagonally disposed angle bars 52 and 53 are connected at their upper ends with the upright bars 49 and 50 respectively, and are connected at their lower ends with angle-bars 54 rising from the main frame adjacent to the cross-bar 27 at the rear end of the machine.

Mounted on the main frame, just in advance of the axle 39, there is a motor, shown in the form of an internal combustion engine, having a radiator 55 and a cylinder block 56 supported by a heavy plate 57 from the cross-bars 25 and 26. The motor shaft 58 is connected by means of bevel gears 59 and 60 and a train of tranmission mechanism as hereinafter described with a longitudinally extending driving shaft 61 which is connected by suitable gearing (not shown) with the axle 44 within the housing 62, serving to drive the machine in either direction. A brake 63 of any suitable type is mounted upon the axle 44 for assisting in the control of the machine, such brake being operated by means of a lever 64, connected with the brake by links 65 and 66 and an interposed bell crank lever 67.

Coming now to a description of the horizontally disposed conveyor 15 and the hopper 16, 68 indicates a base board for the hopper, being supported by the cross-bars 21, 22 and 23 and being fixedly connected therewith, and being extended to some little distance ahead of the cross-bar 21 at the end of the main frame. Laterally inclined side boards 69 and 70 are secured in position above the base board 68 so as to form an elongated hopper, as above described, into which the ballast to be cleaned can be shoveled to advantage by a large gang of men as the machine is moved from point to point along the track, such movement of the machine being preferably continuous at the rate at which the work is progressing. A centrally located baffle board 71 is held in position with respect to the side boards 69 and 70 by means of straps 72 located at intervals therealong, such straps 72 serving the additional function of bracing the side boards 69 and 70 with respect to each other. The forward ends of the side boards 69 and 70 are further braced with respect to each other by means of a cross bar 73, as is shown in Fig. 7.

At its forward end, the hopper 16 is provided with forwardly extending angle bars 74 and 75, which are braced in position by means of diagonally disposed brace bars 76, as is best shown in Fig. 7. A roller 77 mounted upon a shaft 78 is held in position upon the forwardly extending bars 74 and 75, so as to be adjustable therealong, such adjustment being effected by the use of any suitable means. A roller 79 is mounted in position opposite the roller 77, but at the opposite end of the hopper 16, being held in position by a shaft 80 secured in position upon the main frame of the machine, as is best shown in Fig. 4. In the construction shown, the horizontally disposed conveyor 15 above referred to is in the form of an endless belt mounted upon the rollers 77 and 79, such belt being capable of being tightened by an adjustment of the shaft 78 toward the right in Fig. 1, as will be readily understood.

The means for driving the endless belt 15 comprises a driving pulley 81 mounted upon the shaft 80, so as to rotate with the roller 79, such driving pulley 81 being connected by means of a belt 82 with a driving pulley 83, keyed upon the motor shaft 58 as is shown in Fig. 4. For tightening the belt 82, I have provided a roller 84 revolubly mounted upon a pivoted arm 85 which is acted upon by a spring 86 for tightening the belt. With the motor shaft 58 running in counterclockwise direction in Fig. 1, the horizontally disposed conveyor 15 will be driven at comparatively high speed in the direction for carrying the ballast rearwardly (towards the left in said Fig. 1).

As is best shown in Fig. 1, the elevator conveyor 17 is also in the form of an endless belt, the upper ply of which is supported by a base-board 87. The endless belt 17 is provided with cleats 88 extending across at intervals therealong, upon its outer face, as is best shown in Fig. 4. The upper end of the inclined conveyor belt 17 is supported by a roller 89 which is carried by a

driving shaft 90 journaled upon the upright frame bars 49 and 50. The lower end of the conveyor belt 15 is held in position below the rear end of the conveyor 16 by means of a roller 91 (see Fig. 1), which is preferably mounted in position so as to be readily adjustable toward and from the roller 89, such adjustment to be effected by the use of any suitable mechanism.

The shaft 90 is driven in counterclockwise direction in Fig. 1, for driving the conveyor belt 17 so as to carry the upper ply of such belt upwardly. To this end, the shaft 90 is provided with a driving pulley 92 adapted to rotate with the roller 89, the pulley 92 being driven by means of an endless belt 93 which is actuated by a driving pulley 94 mounted upon the motor shaft 57. A roller 95 revolubly mounted upon an arm 96 is held by a spring 97 yieldingly in contact with the belt 93 for holding the belt in properly tightened condition.

As is best shown in Fig. 2, diagonally disposed side bars 98 and 99 are provided at opposite sides of the belt 17 for preventing the material from falling from the belt.

The screening device 18, in the construction shown, is in the form of a chute, the bottom 100 of which is in the form of a screen of any suitable type. The screening device 18 is pivotally mounted upon a horizontally disposed pivot pin 101, which is held in position by arms 102 which are connected at one end with the shaft 90 and at their lower ends with a stationary chute 103 secured in position upon the framework below the screen. The lower end of the screening device 18 is supported adjustably in position by means of arms 104 mounted upon a rock shaft 105, journaled upon the upright bars 54 and held in adjusted position thereon by means of a lever 106 cooperating with a segment 107. The arms 104 are connected with the chute 18 by means of links 108.

At the upper end of the screening device 18 I have provided a baffle plate 109 opposite the end of the elevator conveyor 17, the side portions of the baffle plate 109 being diagonally disposed so as to have a tendency to deflect the ballast laterally towards the edge portions of the screening device 18 as the ballast comes into contact with such plate from the conveyor 17. In the construction shown, the baffle plate 109 is made of metal in the form of a wide V, as is seen in Fig. 6. The baffle plate 109 is preferably mounted directly upon the upper end of the screening device 18.

As is best shown in Figs. 5 and 8, the screen 100 forming the bottom of the screening device, is buckled upwardly at its middle portion so that the screen inclines laterally from the center toward the diverging outer edge portions. The degree of lateral inclination of the screen decreases toward the discharge end so as to spread the ballast delivered to the upper end of the chute as the ballast moves downwardly along the chute.

As will be readily understood, as the ballast and the loose material shoveled into the hopper 16 with the ballast slide gradually down the screening device 18, the greater portion of the loose material will find its way through the meshes of the screen 100 and fall into the chute 103 below the screen. For carrying such loose material to one side of the machine and dumping it at some little distance from the track, I have provided a laterally disposed trough 110 underneath the lower end of the chute 103, the outer end of the trough 110 being supported in position by a diagonally disposed chain or link 111 connected at its upper end with the diagonal bar 52. Within the trough 110 I have mounted a screw conveyor 112 carried by a shaft 113. The shaft 113 is driven by the use of bevel gears 114 and 115, the latter of which is mounted upon a longitudinally exterding shaft 116 (see Fig. 4), the shaft 116 in turn being driven by means of bevel gears 117 and 118, the latter of which is fixed upon a vertically disposed shaft 119 (see Fig. 3), which shaft 119 is driven by bevel gears 120 and 121, the latter of which is mounted upon the shaft 90. It will be understood that the train of gearing between the shaft 116 and the shaft 90 is such as to drive the screw device 112 in the direction for carrying the dirt outwardly along the trough 110, so as to be dumped from the outer end of the trough. The shafts 119 and 90 are connected at their adjacent ends by means of a suitable bracket 122, while the shafts 113 and 119 are connected by a bracket 123 which is mounted upon the cross-bar 26, as is best shown in Fig. 3.

In the construction shown, I have made the trough in sections, Fig. 2 of the drawings showing three such sections, and Fig. $2^a$ showing in dotted lines a changed position of one of the outer sections. In Fig. 2, the first outer section is indicated by $110^a$, and the second outer section shown by dotted lines is indicated by $110^b$. In each instance, the outer section is supported with reference to the next inner section by means of brackets $123^a$ and $123^b$, the bracket $123^b$ being provided with a pin $123^c$ extending through a horizontally disposed slot in the bracket $123^a$. The parts of the several sections of the conveyor are indicated by the same reference characters, except for the addition of exponent "a" in connection with the section $110^a$ and of exponent "b" in connection with the section $110^b$. As is clearly shown in Figs. 2 and $2^a$, the adjacent ends of the shafts 113, $113^a$ and $113^b$ are joined

together by tongues and grooves so as to be rotated together but so as to be detachable from each other.

With the machine upon a track with the section $110^a$ extending over an adjacent track, the adjacent track can be cleared by giving the section $110^a$ a slight movement outwardy (toward the left in Fig. $2^a$) carrying the pin $123^c$ to the outer end of the slot in the bracket $123^a$, and then swinging the section $110^a$ upwardly about the pin $123^c$ as a pivot. As will be readily understood, other sections in addition to the section $110^b$ might be used if desired, each adjacent section being detachably connected with the adjacent inner section.

In operation, with the machine upon a track as shown in Fig. 1, the machine is moved to the desired point along the track by power from the motor through the gears 59 and 60 and the transmission mechanism as hereinafter described. When the machine as a whole is to be moved along a track without operating the conveyors 15 and 17, the rollers 94 and 95 are to be retracted from operative position against the action of the springs 86 and 87, so as to loosen the driving belts 82 and 93, such retraction of the rollers being effected by the use of any suitable mechanism as may be desired, operating preferably upon the arms 85 and 96.

When the machine has reached the desired position, the desired number of workmen are employed for shoveling the ballast from the track into the hopper 16, the belts 82 and 93 having in the meantime been tightened by the release of the rollers 84 and 95. The ballast thrown by the workmen on either side of the track strikes first against the baffle board 71, where there is a tendency to loosen the dirt and other fine particles from the stones. A second loosening effect is produced when the ballast falls from the baffle board 71 into contact with the conveyor 15. As is above explained, the conveyor 15 is preferably driven at such a speed as to cause the ballast to be thrown with some little force from the end of the conveyor into contact with the conveyor 17, the lower end of which underlies the rear end of the conveyor 15. The contact of the ballast with the conveyor 17 is thus seen to produce a third loosening effect upon the dirt carried by the stones. It will be understood that the conveyor 17 is also driven at comparatively high speed,—that is to say, at substantially the same speed as that of the conveyor 16. The result is that the ballast upon reaching the upper end of the conveyor 17 is thrown with some little force against the baffle plate 109, which is interposed in the path of the ballast as it passes the conveyor 17 to the screening device 18. Inasmuch as the baffle plate 109 is inclined forwardly, it directs the material downwardly into forcible contact with the screening device. It is thus seen that the arrangement as above described provides a fourth and a fifth loosening effect upon the dirt carried by the stones as the material is thrown from the conveyor 17 into contact with the baffle plate 109, and then from the plate 109 to the screening device 18.

The screening device 18 is designed to be adjusted to such an inclination as will insure the ballast sliding down the same without piling up thereon. When the ballast is wet, the screen must be held at a steeper angle than when the ballast is dry. Moreover, some types of ballast require a steeper slant than others. It is desirable that the inclination be kept as low as possible consistent with the proper movement of the ballast, the screening effect being thereby maintained at a maximum. By providing the baffle plate 109 in a form comprising diagonally disposed portions which have a tendency to spread the ballast with respect to the screening device, and by providing the screening device itself in such form that there is a tendency to direct the material towards the side portions of the screen, and by making the sides of the screening device in divergent position, as is shown in Fig. 4, I have provided a construction by which the ballast is very evenly distributed over the track as it leaves the lower end of the screening device.

Coming now to Figs. 12 and 13, in which a modified form of construction is shown, the parts are indicated by the same reference numerals as in the other figures so far as they correspond with the construction heretofore described.

In the construction shown in Figs. 12 and 13, a screening device 124 is substituted in place of the screening device 18, formerly described, and an endless belt conveyor 125 is substituted in place of the screw conveyor 112 above described.

The screening device 124 is in the form of a chute having a screen $124^a$ forming its bottom portion, the device 124 being mounted upon a vertical pivot pin 126 carried by the chute, such pin 126 having a bearing in a yoke 127 journaled upon the shaft 90 at one end and fixedly secured to the chute 103 at its other end. In this construction the baffle plate 128 is preferably mounted upon the cross-bar 51 in lieu of being mounted upon the screening device 124. For supporting the lower end of the screening device 124, I have provided an arc-shaped member 129 in concentric position about the pin 126, a roller 130 being mounted upon the lower face of the screening device 124 in position to run upon the member 129. At its lower end the screening device 124 is provided

with a nozzle 131 which is capable of being swung about a vertical axis with respect to the screening device 124.

As will be readily understood, by swinging the screening device 124 from side to side of the machine, the ballast may be directed to one side or the other to meet the conditions at any point, such distribution of the ballast being further facilitated by the swinging of the nozzle member 131.

As is clearly shown in Fig. 12, the endless belt conveyor 125 is supported by rollers 132 and 133 at its ends, the roller 133 being mounted by means of a shaft 134 upon a laterally extending framework comprising transversely extending bars 135 and 136. The shaft 134 is preferably adjustable longitudinally of the bars 135 and 136 to provide for tightening the belt 125. The roller 132 is mounted upon a longitudinally extending shaft 137 substituted in place of the shaft 116 of the construction heretofore described. The shaft 137 is driven from the shaft 119 by means of bevel gears 138 and 139 connecting said two shafts, as is shown in Fig. 13, a bracket 140 being provided for holding the shafts in suitable position with respect to each other, said bracket 140 being supported from the crossbar 26. The arrangement of the gearing between the shaft 90 and the shaft 137 is such as to cause the upper ply of the endless belt 125 to move outwardly with respect to the body of the machine for carrying the dirt from the hopper 103 and dumping it at the side of the track.

The train of transmission mechanism between the motor shaft 58 and the axle 44 is preferably arranged as illustrated in Figs. 10 and 11, whether the form of device illustrated in Figs. 1 to 9 be employed, or the form illustrated in Figs. 11 and 12. As here illustrated, the gear 60 is keyed upon a sleeve 141 which is revolubly mounted upon the rear end of the shaft 61, such shaft being supported near its rear end by a bearing 142. Revolubly mounted upon the sleeve 141 there is a gear 143, and mounted in fixed position upon the shaft 61 in spaced relation to the gear 143 there is a clutch member 144. Mounted upon the sleeve 141 there is a shiftable clutch member 145 feathered or otherwise suitably secured upon the sleeve 141, so as to move longitudinally thereof, but to rotate therewith. The movable clutch member 145 is adapted to stand in neutral position between the clutch member 144 and the hub of the gear 143, or is adapted to be moved into clutching engagement with either of said members, as may be desired. By this construction, the gear 60 can be disconnected from both the gear 143 and the shaft 61, or it can be employed for driving either of such parts alternatively.

Directly above the shaft 61 there is mounted a counter-shaft 146 between bearings 147 and 148. At one end the shaft 146 is provided with a gear 149 which meshes with the gear 143. Upon its opposite end, the shaft 146 is provided with a sprocket pinion 150 which is connected by means of a chain 151 with a sprocket gear 152 which is revolubly mounted upon the shaft 61. The gear 149 and the pinion 150 are fixedly mounted upon the shaft 146 so as to rotate in unison. Connected with the sprocket gear 152 there is a sprocket pinion 153 which is connected by a chain 154 with a sprocket gear 155 fixedly mounted upon the end of a short shaft 156 revolubly mounted in bearings 157 and 158 in alignment with the shaft 146. Upon the forward end of the shaft 156 there is mounted a beveled gear 159 which meshes with a beveled gear 160 keyed upon a vertically disposed shaft 161 supported by bearings 162 and 163. Feathered upon the shaft 161 or otherwise mounted so as to rotate with the shaft, while being movable longitudinally of the shaft, there is a friction pinion 164 which is adapted to engage a friction disc 165 fixedly mounted on the shaft 61. As will be readily understood, the friction pinion 164 is designed to be adjusted to any desired point on the face of the disc 165 or to be moved entirely out of contact with the disc as is shown in the upper position in Fig. 10.

By the use of the mechanism above described, the power from the gear 60 can be applied directly to the shaft 61 by the use of the clutch members 145 and 144. As an alternative, the power can be applied through the clutch member 145 to the hub of the gear 143 which is adapted to have clutching engagement therewith for driving the gear 143. The gear 143 in turn drives the gear 149, the shaft 146, the pinion 150, the sprocket gear 152, the pinion 153, the sprocket gear 155, the shaft 156, the gears 159 and 160, the shaft 161, the friction pinion 164, the friction disc 165, and the shaft 61. As will be readily understood, when the shaft 61 is driven through the clutch members 144 and 145, the friction pinion is to be moved out of contact with the friction disc 165 so that the slow speed mechanism may be permitted to remain at rest.

By the use of the slow speed mechanism as above described, the rotation of the shaft 61 is cut down from approximately 400 revolutions it is given per minute by the direct drive, to a very small fraction of that number of revolutions, depending upon the position of the friction pinion 164. The slow speed drive is designed to produce from about one to four revolutions per minute. If the power then be applied without multiplication or reduction from the shaft 61 to the wheels 45, there would be produced a speed of approximately 250 ft. to 1000 ft. per hour. It is designed that a reversing gear be employed within the housing 62 be-

tween the shaft 61 and the axle 44 so that the machine can be driven in either direction, either at the traveling speed or at the working speed, as may be desired.

By the provision of the speed reduction means of very wide scope from the standpoint of the reduction effected, and with the change of speed available through the use of the variable friction drive, I am enabled to propel the machine toward the right in Fig. 1, to keep pace with the progress of the work, so that the gang of workmen shovel into the chute at the forward end of the machine and the ballast is deposited on the track in cleaned condition at the rear with a minimum expenditure of time and labor.

In the construction shown, the means provided for controlling the position of the friction pinion 164 for varying the speed of the drive comprises an arm 166 engaging the hub of the pinion, such arm being adjustable vertically by means of a screw-threaded rod 167 having a hand wheel 168 on its upper end for turning it.

I claim:

1. A ballast screening machine, comprising a frame, a screening device on said frame, a conveyor for elevating the material to be cleaned to said screening device, a horizontally disposed conveyor overhanging the lower end of the elevating conveyor, and means for driving the overhanging conveyor at such a speed as to throw the material downwardly and longitudinally of the conveyor with considerable force from the end of the overhanging conveyor upon the elevating conveyor.

2. A ballast screening machine, comprising a frame, a screening device on said frame, a conveyor for elevating the material to be cleaned to said screening device, a horizontally disposed hopper leading to said conveyor and overhanging the lower end thereof, a baffle in said hopper against which the ballast to be cleaned may be shoveled for loosening the dirt therefrom, and a second conveyor upon which the material to be cleaned falls after contact with the baffle for carrying the material along the hopper for delivery upon the elevating conveyor.

3. A ballast screening machine comprising a frame, a screening device on said frame, a conveyor for elevating the material to be cleaned to said screening device, a horizontally disposed hopper leading to said conveyor and overhanging the lower end thereof, a centrally located baffle board in said hopper against which the ballast to be cleaned may be shoveled from either side of the machine for loosening the dirt therefrom, an endless belt conveyor in said hopper below said baffle board upon which said material to be cleaned falls after contact with the baffle board, and means for driving the endless belt conveyor at such a speed as to throw the material forcibly therefrom upon the elevating conveyor.

4. A ballast screening machine, comprising a frame, a screening device on said frame, a conveyor for elevating the material to be cleaned to said screening device, a horizontally disposed conveyor overhanging the lower end of the elevating conveyor, and means for driving said conveyors at comparatively high speed, so as to throw the material with considerable force from the ends of the conveyors, serving to throw the material downwardly and longitudinally of the overhanging conveyor upon the elevating conveyor and in turn to throw the material upwardly and longitudinally of the elevating conveyor upon the screening device.

5. A ballast screening machine, comprising a frame, a screening device on said frame, an endless belt conveyor on said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and a baffle plate interposed in the path of the material from the conveyor to the screening device.

6. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and means for spreading the material laterally over the screening device in its movement from the conveyor.

7. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and a diagonally disposed baffle board interposed in the path of the material from the conveyor to the screening device, serving to deflect the material laterally over the screening device.

8. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and a baffle plate comprising two diagonally disposed portions interposed in the path of the material from the conveyor to the cleaning device, serving to deflect the material laterally in both directions over the screening device.

9. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on

said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and a baffle plate in the form of a wide V interposed in the path of the material from the conveyor to the screening device serving to spread the material laterally over the screening device.

10. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on said frame leading to said screening device, means for driving said conveyor at such a speed as to throw the material forcibly therefrom upon the screening device, and a baffle plate inclined both forwardly and laterally and interposed in the path of the material from the conveyor to the screening device, serving to throw the material downwardly and laterally.

11. A ballast screening machine comprising a frame, a screening device on said frame, an endless belt conveyor in inclined position on said frame leading to said screening device, a baffle plate inclined forwardly above the upper end of the conveyor, and means for driving said conveyor at such a speed as to throw the material therefrom forcibly into contact with the baffle plate.

12. A ballast screening machine comprising a frame, an elevating conveyor on said frame for lifting the material to be cleaned into elevated position thereon, an inclined screening device adjustable angularly in a vertical direction in position to receive the material from the conveyor, and a baffle plate interposed between said screening device and said conveyor and adjustable with the screening device for directing the material to the desired position on the screening device.

13. A ballast screening machine comprising a frame, an elevating conveyor on said frame for lifting the material to be cleaned into elevated position thereon, an inclined screening device adjustable angularly in a vertical direction in position to receive the material from the conveyor, and a baffle plate mounted on the screening device in the path of the material from the conveyor to the screening device serving to spread the material over the screening device.

14. A ballast screening machine comprising a frame, an elevating conveyor on said frame for lifting the material to be cleaned into elevated position thereon, an inclined screening device adjustable angularly in a vertical direction in position to receive the material from the conveyor, and a forwardly inclined baffle plate mounted on the screening device above the upper end of the conveyor in the path of the material from the conveyor to the screening device serving to spread the material over the screening device.

15. A ballast screening machine comprising a frame, a chute supported in inclined position longitudinally of the frame and having downwardly diverging sides, and means for delivering material to be cleaned to the chute at its upper end portion, the longitudinally inclined bottom wall of the chute comprising screen portions inclined laterally, the lateral inclination of which decreases toward the discharge end of the chute.

16. A ballast screening machine comprising a frame, a chute extending downwardly and rearwardly on said frame and extending substantially across the frame at its rear end portion, a screening device supported in inclined position on said frame above said chute and adjustable horizontally about a vertical axis into different positions above said chute, and means for delivering material to be cleaned to the upper end portion of said screening device.

17. A ballast screening machine comprising a frame, an elevating conveyor on said frame for lifting the material to be cleaned into elevated position thereon, a screening device angularly adjustable about a vertical axis on said frame in position to receive the material from the conveyor, and a nozzle device adjustable laterally about a vertical axis upon the lower end of the screening device for controlling the delivery of the ballast upon the track.

18. A ballast screening machine comprising a frame, a conveyor on said frame for carrying the material to be cleaned, a screening device in position on said frame to receive the material from the conveyor, a second conveyor swingingly mounted on the frame in transverse position thereon for carrying away the material passing through the screen, and means for driving said two conveyors.

19. A ballast screening machine comprising a frame, a conveyor on said frame for carrying the material to be cleaned, a screening device in position on said frame to receive the material from the conveyor, and a screw conveyor pivotally mounted on said frame on an axis extending longitudinally of the frame so as to be capable of being swung upwardly to clear an adjacent track, said screw conveyor being normally in position to carry away the material passing through the screen.

20. A ballast screening machine comprising a frame, a conveyor on said frame for carrying the material to be cleaned, a screening device in position on said frame to receive the material from the conveyor, and a second conveyor extending transversely of the frame and comprising a plurality of sec-

tions pivotally connected together so as to enable each section to swing upwardly with respect to the next adjacent inner section.

21. A ballast screening machine comprising a frame, a conveyor on said frame for carrying the material to be cleaned, a screening device in position on said frame to receive the material from the conveyor, and a screw conveyor extending transversely of the frame and comprising a plurality of sections pivotally connected together so as to enable each section to swing upwardly with respect to the next adjacent inner section, each of the sections comprising a shaft having detachable connection with the shaft of the next adjacent inner section.

22. A ballast screening machine comprising a frame, a conveyor on said frame for carrying the material to be cleaned, a screening device in position on said frame to receive the material from the conveyor, a second conveyor arranged transversely of the machine and extending laterally therefrom at one side, said conveyor being formed of detachable sections to provide for varying its effective length, and means for driving one section from the adjacent section.

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