Dec. 31, 1935. H. E. McCRERY 2,026,241

SPREADING APPARATUS

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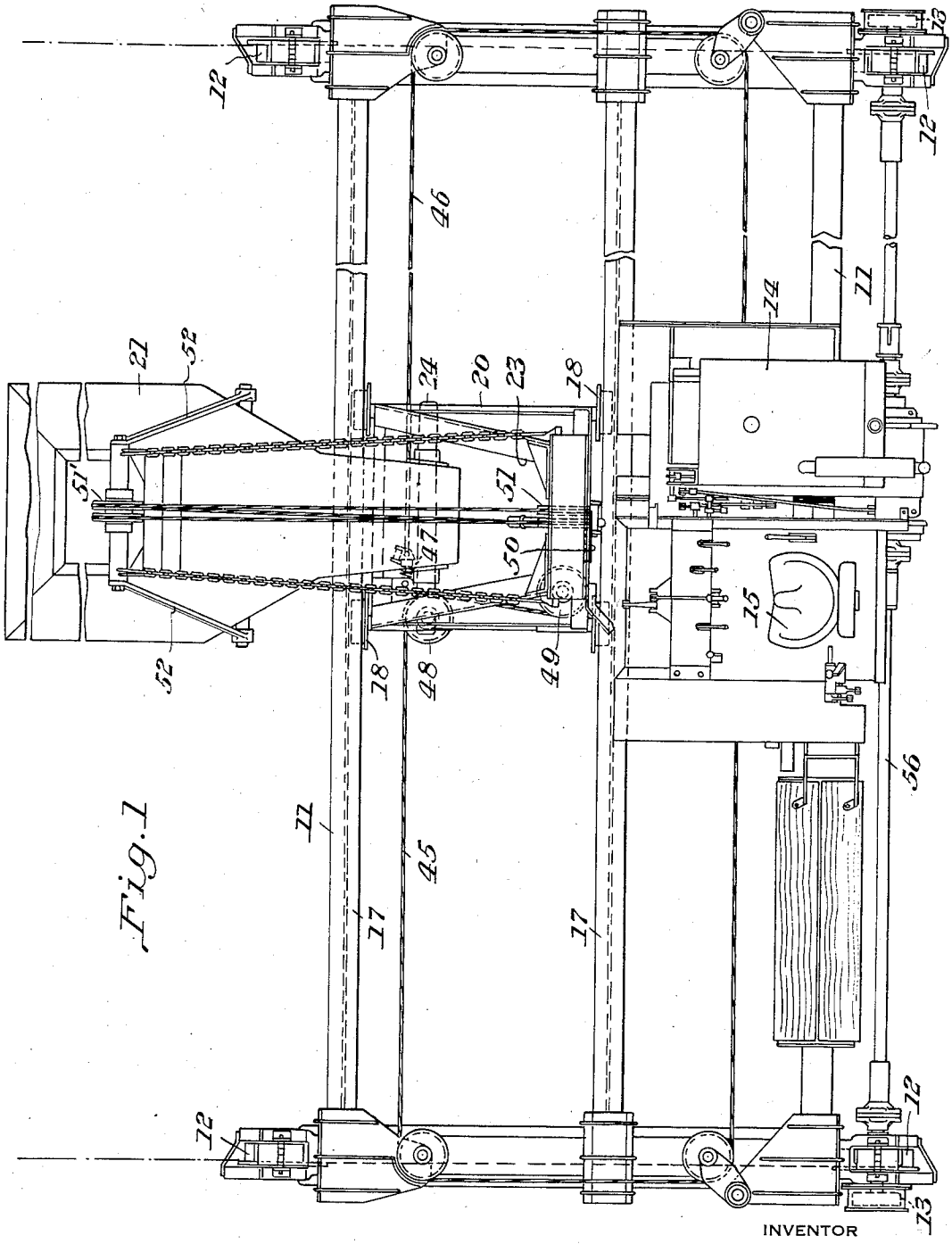


Fig. 1

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Fig. 2.

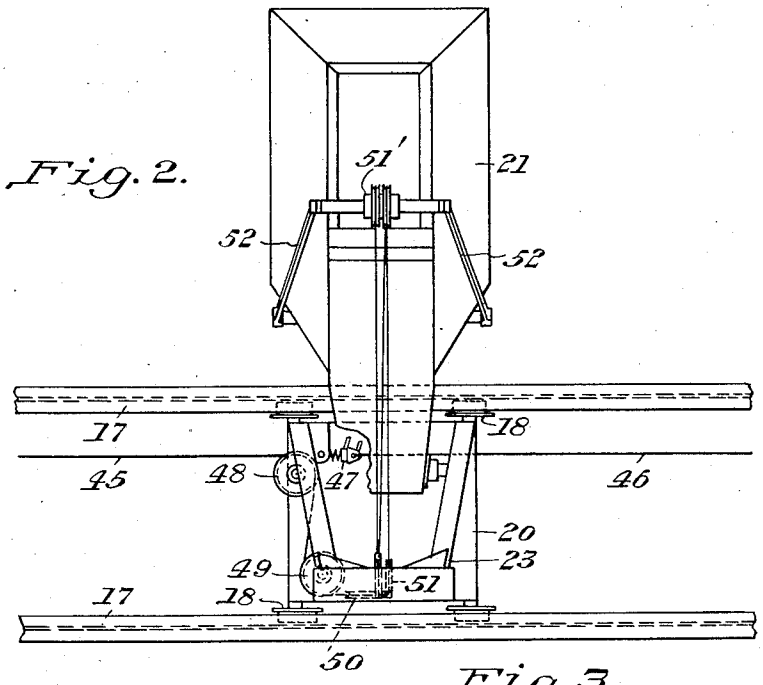


Fig. 3.

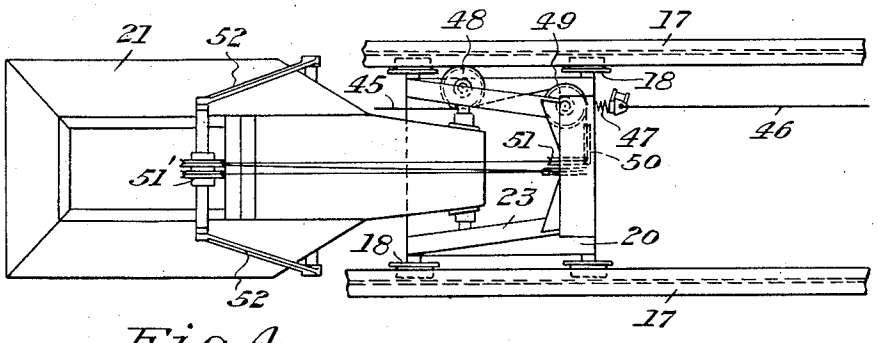
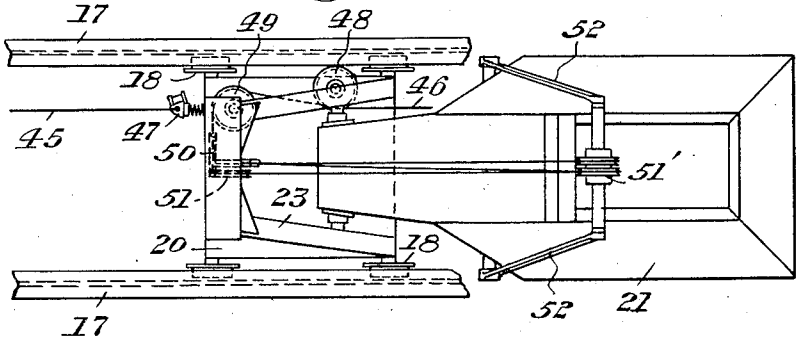


Fig. 4.



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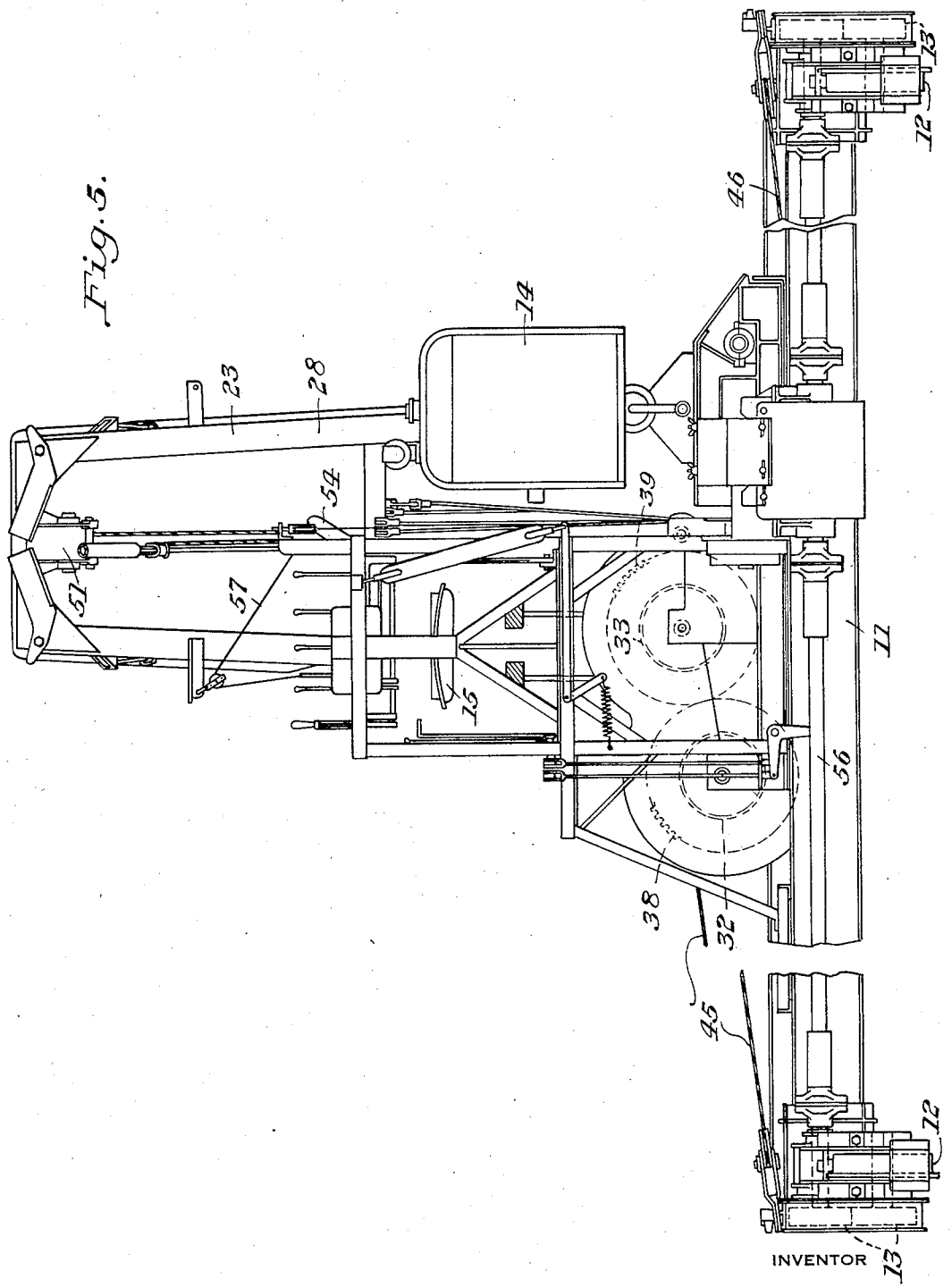
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Fig. 5.



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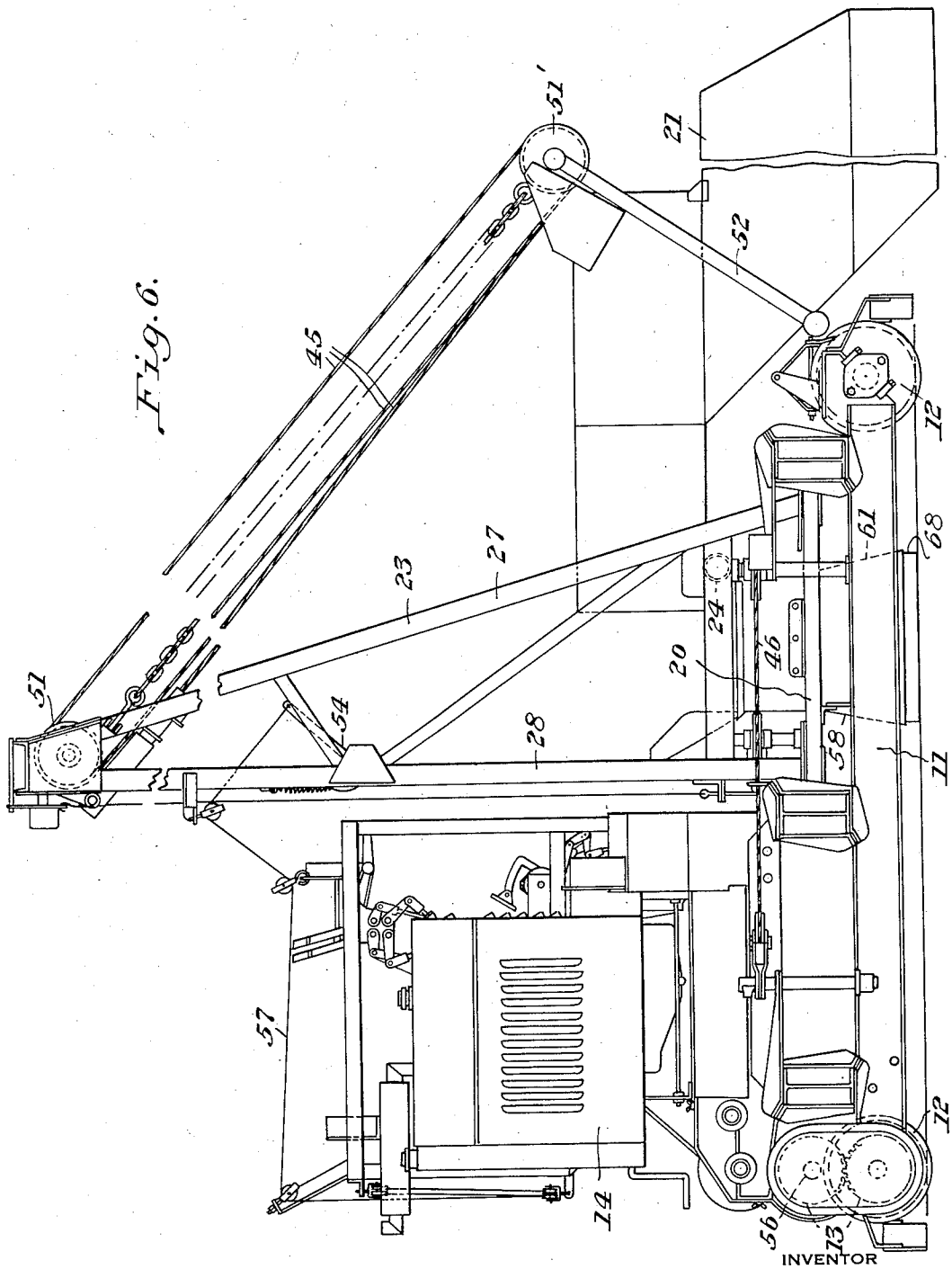
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Fig. 6.



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Dec. 31, 1935. H. E. McCRERY 2,026,241

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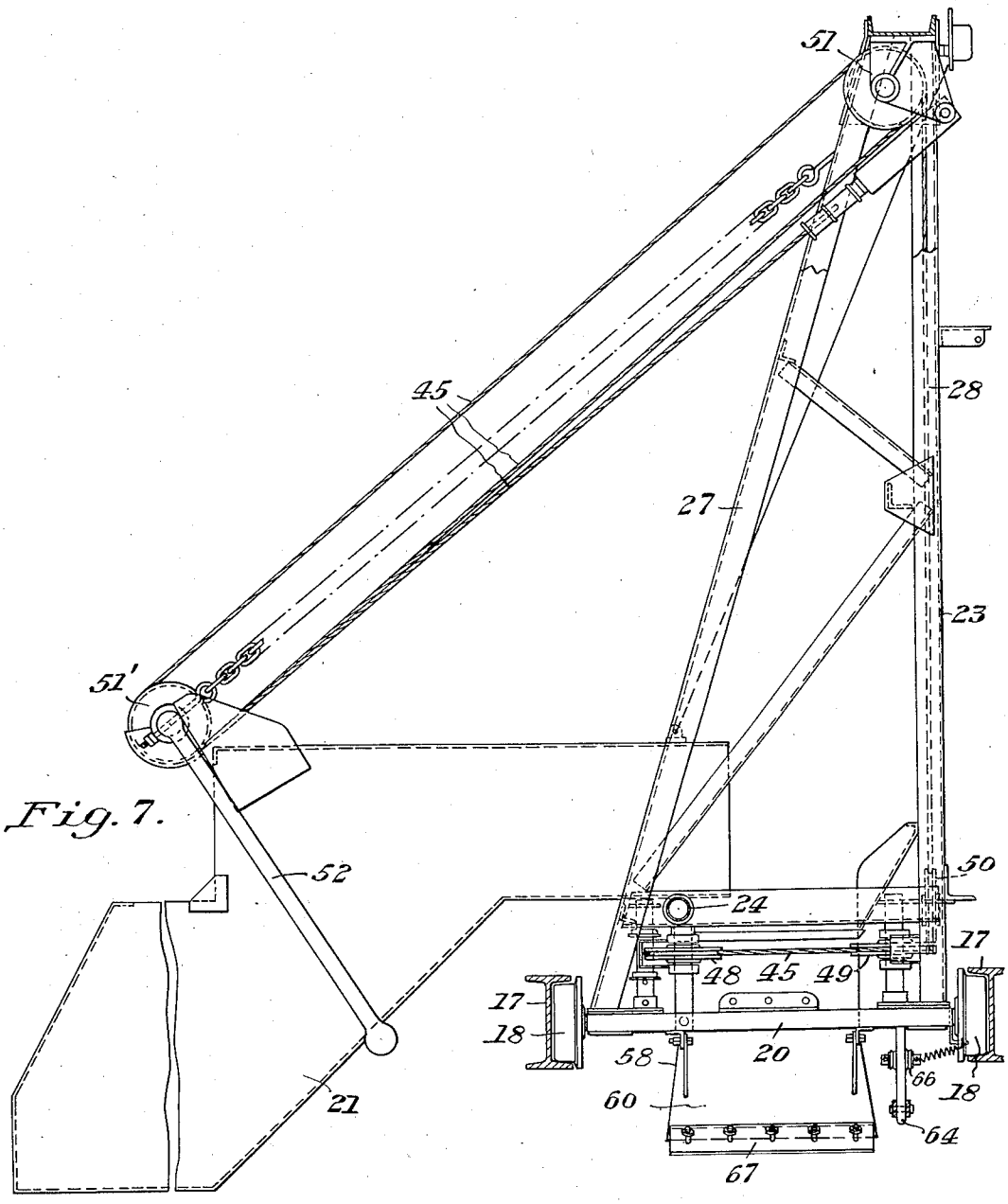


Fig. 7.

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Fig. 8.

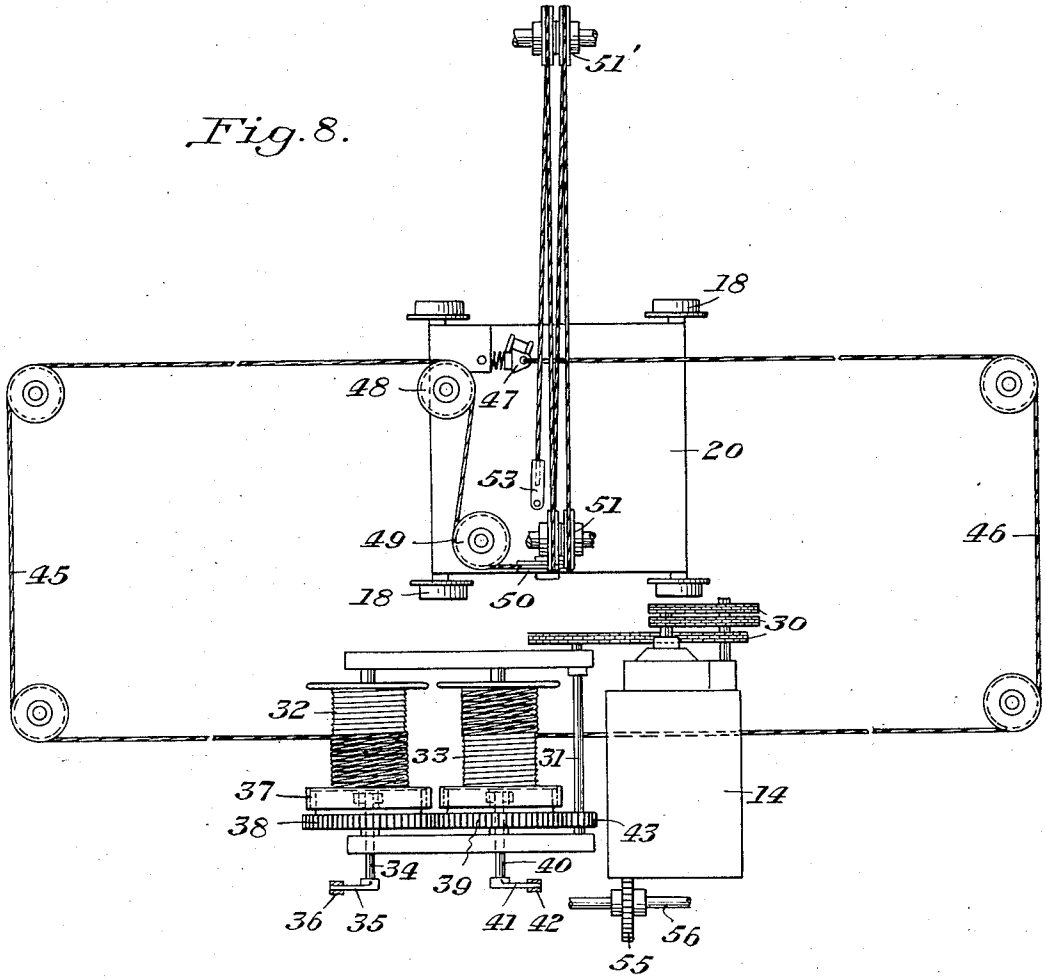
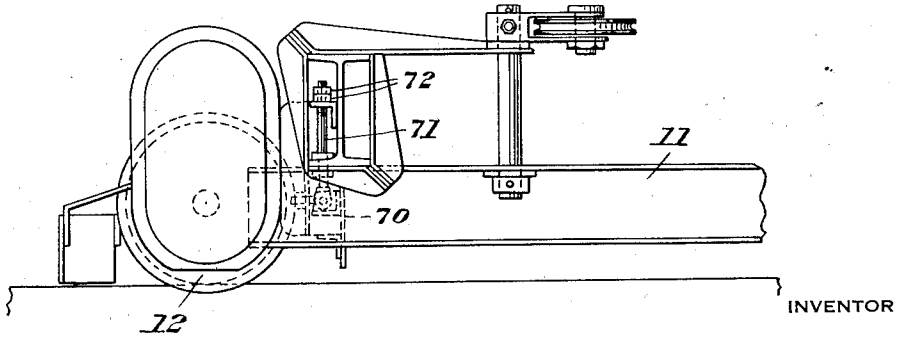


Fig. 9.



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Fig. 10.

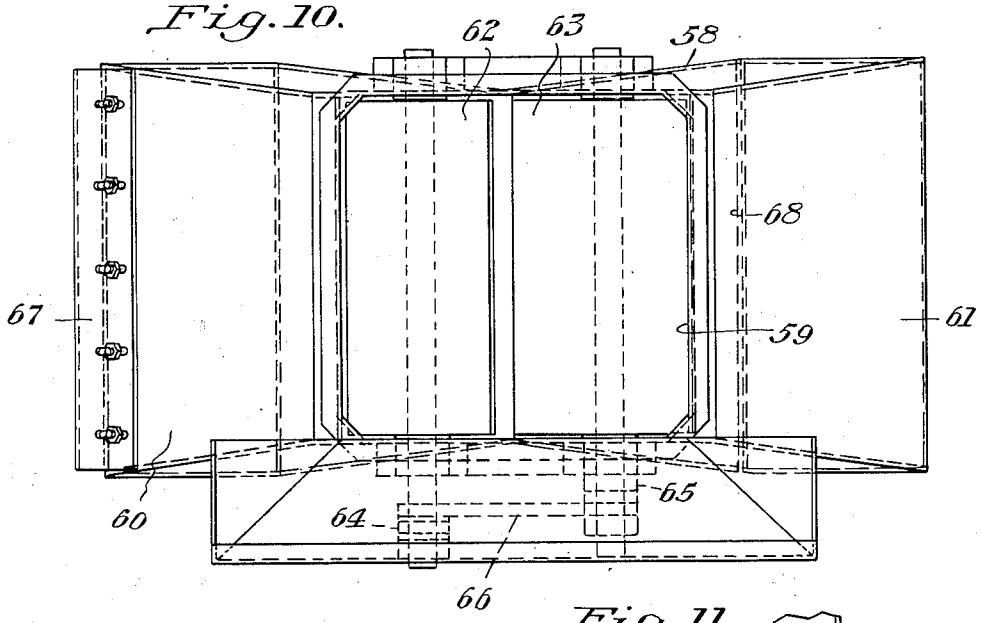
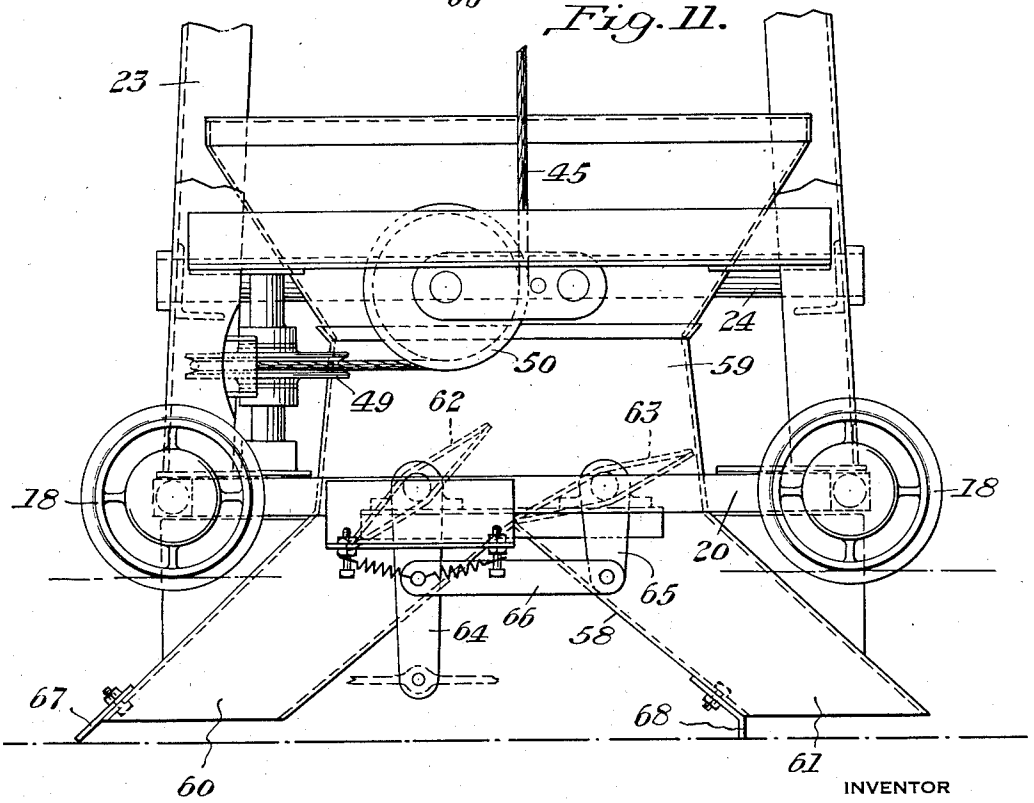


Fig. 11.



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Patented Dec. 31, 1935

2,026,241

UNITED STATES PATENT OFFICE

2,026,241

SPREADING APPARATUS

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Application August 15, 1932, Serial No. 628,880

6 Claims. (Cl. 94—46)

This invention relates to apparatus for spreading a mix on the sub-grade or other foundation selected to receive the same. More particularly, the apparatus which forms the subject of my invention is adapted to spread a mix for the building of a road.

In accordance with my invention, the spreading of a mix, whether for the building of a road or for other purposes, is facilitated by making it possible to deposit the mix in a hopper, tilt the hopper so that the mix is poured or dumped onto the sub-grade or other foundation selected to receive the mix, and move the apparatus so as to uniformly spread the mix. In accordance with my invention, the movement of the apparatus may be carried on simultaneously or separately from the tilting of the hopper. In addition, I provide devices for spreading the mix to give an even upper surface for the road or the like.

In the accompanying drawings in which not as limiting my invention, but as illustrating the same, I have shown one embodiment which the invention may assume,

Fig. 1 is a plan view of apparatus constructed in accordance with my invention for spreading concrete mix or the like;

Figs. 2, 3, and 4 are diagrammatic plan views illustrating various arrangements of the tilting hopper on the structure provided for depositing and spreading the mix over the subgrade or other foundation selected to receive the mix;

Fig. 5 is a rear view in elevation of the apparatus shown in Fig. 1;

Fig. 6 is an end view in elevation, the view being taken from the right end of Fig. 1;

Fig. 7 is a detail view of the tower and hopper carried thereby with mechanism for tilting the hopper to pouring or dumping position;

Fig. 8 is a diagram illustrating the reeving of the ropes;

Fig. 9 is a detail view of a portion of the bridge structure;

Fig. 10 is a plan view of the distributing chute; and

Fig. 11 is a view in elevation of the distributing chute in position in the tower, a fragment of the tower being shown. The view is taken from the opposite side of the tower from the hopper.

In the construction of roads, various road materials may be employed, such as asphalt, bitumen, tar or the like, mixed with gravel or crushed stone, as well as the well known mixes of aggregate and Portland cement. Such mixes must be evenly spread over the subgrade or other foundation, and my apparatus is adapted to expeditiously and evenly spread such road material to the desired level.

In the building of roads from a mixture of tar or asphalt with gravel, crushed stone or other aggregate, it is not customary to use forms at the sides of the road limiting the spread of the road material. Accordingly, for such road materials, I propose to provide apparatus equipped with wheels on which the apparatus may be moved along the strip of sub-grade or other foundation on which the road is to be built. Where a concrete road is in process of being built, road rails are fixed at the sides of the sub-grade to limit the spread of the mix; and it is customary to form the tops of these rails so that road machinery can move longitudinally of the sub-grade. When concrete mix is to be spread over the sub-grade or the like, I provide apparatus having wheels adapted to cooperate with the road rails, so that the apparatus may move longitudinally of the sub-grade on the road rails.

As shown in Figs. 1, 5, and 6, I have provided a bridge structure 11 suitable for traveling longitudinally on road rails fixed at the sides of the sub-grade or the like. Wheels 12 are journaled in antifriction bearings at the ends of the bridge structure, and are driven through gearing 13 from a motor 14 on the bridge structure 11. By controls conveniently located adjacent the operator's seat 15, the bridge structure may be driven through wheels 12, either in the forward or the backward direction and at high or low speed.

The bridge structure 11 is provided with guideways along which a support or trolley is movable, so as to traverse the strip of sub-grade from side to side. As shown in the detailed view, Fig. 7, these guideways take the form of I-beams 17 along which the wheels 18 of the support, herein a car 20, are movable. The car 20 is drawn along the guideways by ropes in a manner later to be described. It is sufficient to note, at this point, that with these ropes cooperate winding drums mounted adjacent the motor 14 and driven therefrom in a manner shown more particularly in Fig. 8.

The car 20 carries a tilting hopper 21; and in order to provide for swinging the hopper 21 to pouring or dumping position, I support a pulley at a substantial elevation above the car 20. About this pulley passes one of the ropes above referred to; and the power for swinging the hopper 21 is derived from the motor 14.

In order that the hopper 21 may be tilted, even when loaded with a heavy mass of concrete mix, I mounted on the car 20 a tower 23. The hopper 21 I pivotally mount on this tower at 24 so as to tilt to pouring or dumping position. If the trucks hauling the mix are to travel along the subgrade and approach the apparatus from the front, I mount the tower on the car 20 in the manner illustrated in Figs. 1, 2, and 7 so that the hopper 21 is at the front. This is generally the necessary arrangement where the entire road is being built at the same time. Often, however, half of the road is built at a time; and accordingly, the trucks hauling the mix travel over half of the road and dump into the hopper 21 from the side of the apparatus. In order that apparatus which has been in use on a job of the first type may be readily transposed for use on a job where the material is to be dumped into the hopper at the side of the apparatus, I specially arrange the connections between the tower and the car 20 for mounting the tower 23 either in the relation shown in Fig. 3 or in the relation shown in Fig. 4. The mounting for the tower 23 on the car 20 is symmetrical, the mounting consisting of three, four, or more points of engagement which are symmetrically arranged. The points of engagement are capable of being transposed, so that in the new relation registry is effected. In the preferred embodiment disclosed in the drawings of the present application, there are four points of engagement between the tower and the car, and these four points of engagement are symmetrically arranged, so that when the tower is transposed from the position shown in Fig. 2 to the position shown in Fig. 3, the four points of engagement register. It is thus an easy matter to arrange the apparatus for receiving the mix either from in front, as in Fig. 2, or from the side, as shown in Figs. 3 and 4.

The pulley previously referred to, which cooperates with one of the ropes for swinging the hopper 21 to dumping or pouring position, is mounted in the upper portion of the tower 23. The rope extends to the tower from the side of the apparatus, being directed about a pulley mounted on the bridge structure 11. Accordingly, movement of the car 20 along the guideways on the bridge structure 11 does not interfere with the operating connection with the motor 14, it being merely necessary to lengthen or shorten the rope.

In describing broadly the principles of my invention, I have referred to a pulley mounted in the tower 23 for tilting the hopper 21. Where a heavy mass of cement mix or the like is to be handled, I prefer to decrease the tension of the rope by employing a block with a plurality of pulleys instead of a single pulley; and this modification of the broad principle of my invention is illustrated in Figs. 1, 7, and 8 of the drawings.

The ropes which extend laterally in both directions from the car 20 enter both into the tilting of the hopper and into the moving of the car 20 laterally. The arrangement of the tackle for performing these two functions will be more readily understood in connection with Fig. 8. Operative driving connections 30 are provided between the motor 14 and a jack shaft 31 arranged parallel to the winding drums 32 and 33 which have been previously referred to. Through these connections, the motor 14 may drive the shaft 31 in either direction at the will of the operator. A control shaft 34 provided with a rocker arm 35 is operated from the driver seat by a link 36. When the rocker arm 35 is rocked in one direction, brake mechanism 37 is applied for holding the winding drum 32 stationary. When the rocker arm 35 is rocked in the opposite direction, a clutch connects the drum 32 to a driving gear 38. This gear 38 meshes with a corresponding gear 39 which is adapted to drive the drum 33 in the opposite direction under the control of a shaft 40. This shaft is supplied with a rocker arm 41 and link 42 corresponding to similar parts 35 and 36. The gear 39 is driven from the jack shaft 31 by a pinion 43. Accordingly, the operator may drive both drums simultaneously (but in the opposite directions); or he may hold drum 32 stationary while rotating the drum 33. On the other hand, he may hold the drum 33 stationary and rotate drum 32. With the drum 32 cooperates a rope 45, and with the drum 33 cooperates a rope 46. The rope 46 (when the tackle is arranged for tilting a hopper mounted either at the front or at one side, as shown in Figs. 2 and 3) is connected to the car 20 by a resilient connection 47. With such arrangements of the tackle, the rope 45 extends about guide sheaves 48, 49, and 50 to a block 51 adjacent the upper portion of the tower 23. A second block 51' is carried by the bail 52 of the hopper 21 and the rope 45 is strung about the pulleys of these two blocks and anchored to the car at 53. In the arrangement of the tackle shown in Fig. 4, rope 45 is resiliently connected to the car 20, while the rope 46 extends about guide sheaves 48, 49, and 50 to the blocks 51 and 51'.

In maneuvering the apparatus, the operator may drive the bridge structure 11 along the rails, a driving gear 55 being provided for this purpose on the shaft 56 which extends in opposite directions to the gearing 13 at the two sides of the bridge structure 11. If the operator desires to cause the car 20 to traverse the bridge structure 11, he causes the two drums 32 and 33 to rotate simultaneously. The rope is paid out from one drum, and rope is simultaneously wound on the other drum. It will be noted that the winding surfaces of the two drums move at the same peripheral speed; and accordingly, the blocks 51 and 52 are not brought into operation. The only result of the rotation of the two drums is to cause the car 20 to move laterally along the guideways of the bridge structure 11. The two drums may be reversed, so as to cause the car 20 to move in the opposite direction across the bridge structure 11. If, with the arrangements of the tackle shown in Figs. 2 and 3, the drum 33 be held stationary, while the drum 32 is rotated to wind in the rope 45, the car 20 is held stationary and accordingly, the rope 45 which is being wound up on the drum 32 cooperates with the blocks 51 and 52 to swing the hopper 21 to pouring or dumping position. If, while the drum 33 is held stationary, the rope 45 is paid out from the drum 32, the hopper 21 is lowered. If the drum 32 is held stationary while the drum 33 is rotated to wind in the rope 46, the car is moved along the guideways of the bridge structure 11, and the hopper 21 is simultaneously tilted. If the gear 55 is driven during any of the operations above mentioned, the manner of spreading the mix is still further modified by the introduction of a longitudinal component of movement. With the arrangement of the tackle shown in Fig. 4, the rope 46 is the one

which cooperates with the blocks 51 and 51' to do the hoisting, and accordingly, the above description should be thus modified as applied to Fig. 4.

But slight changes are necessary to transpose the tower and hopper from the arrangement shown in one of Figs. 2, 3, and 4 to another of these arrangements. As the tower is transposed through 90° from the arrangement of Fig. 2 to the arrangement of Fig. 4 the sheaves 48 and 49 maintain their same location on the tower relative the the hopper; but rope 46 is reeved about sheaves 48, 49, and 50 in the manner shown. To arrange the tackle as shown in Fig. 3, the sheaves 48, 49, and 50 are mounted on the other side of the tower as indicated diagrammatically in this figure.

If the hopper 21 has been hoisted to its most elevated position, a latch 54 may be used for holding the hopper thus elevated while the car 20 is moved along the guideways, or while the bridge structure 11 is moved along the roadway, or both simultaneously. This latch 54 may be released by pulling on a trip line 57, if the operator desires to lower the hopper 21.

From the hopper 21, the material is dumped or poured onto the subgrade or the like through a distributing chute 58 (illustrated more in detail in Figs. 10 and 11). This chute receives the material from the hopper 21 through a neck 59. Branches 60 and 61 may alternatively or simultaneously receive the material through the neck 59 so as to spread the same in one or two streams. Flap valves 62 and 63 control the branches 60 and 61 respectively, these flap valves being operated by the levers 64 and 65 respectively. A link 66 connects the levers 64 and 65 so that the flap valves are rocked simultaneously. This distributing chute 58 is of particular importance where it is desired to flow the road material close to one edge of the mold space, as, for instance, the edge of a road adjacent the road rail. By closing the proper flap valve, the material may be caused to flow through the other branch of the chute, thus directing the material to the extreme side of the subgrade or other foundation.

The size of the outlets from the bottom of the distributing chute 58 is not the only factor which determines the rapidity with which the road material is poured or dumped. Strike-off plates 67 and 68 are adjustably mounted on the upper and lower edges of branches 60 and 61 respectively, so as to spread the concrete to the height desired. These plates are slotted so that the road material may be restricted to the desired height above the subgrade or other foundation. A long transverse strike-off plate 70 is adjustably mounted by means of bolts 71 on the framework of the bridge structure 11 for spreading the road material longitudinally of the road. The strike-off plate 70 extends from wheel 12 to wheel 12; and may be adjusted to various heights by rotating the nuts 72 on the supporting bolts 71. As the wheels 12 are driven so as to move the bridge structure along the road, the strike-off plate 70 gives a uniform top surface to the road material being poured.

Concrete roads are generally designed to include reinforcing steel, this reinforcing steel being placed a few inches beneath the surface of the road. It is usual to spread the mix approximately level for receiving the reinforcing steel. The top layer of the mix is then spread on top of the reinforcing steel. It will thus be apparent that it is desirable to spread the mix to a height a few inches below the top of the finished road, to lay the reinforcing steel on the material so spread, and to then pour another layer of mix over the top of the steel. When the bridge structure 11 is moved along the road rails, the strike-off plate 70 gives the correct height and contour to the top surface.

With the assistance of apparatus constructed in accordance with the principles of my invention, road material may be rapidly spread upon the sub-grade or other foundation prepared to receive the same. Simultaneously with the movement of the car 20 transversely of the bridge structure, the road material is leveled to uniform height. As the spreading of the material progresses, the bridge structure moves longitudinally of the road rails; and by such movement, the desired height and contour is imparted to the top surface.

The operator is able, by means of the controls provided, to maneuver the distributing chute and hopper with considerable facility. The hopper may be tilted during movement of the bridge structure longitudinally of the road rails and also during movement of the car transversely of the roadway. Moreover, the hopper may be tilted to any desired angle for pouring, and the car may then be moved transversely of the roadway with the hopper still tilted to the desired angle. It is apparent, therefore, that apparatus constructed in accordance with the teachings of my invention facilities rapid spreading of the road material with simultaneous leveling of the materials deposited to the desired level.

In order to more succinctly claim my invention, I have employed in certain of the claims the term "trolley", the same being used in its broadest sense as any support which is adapted to move over a bridge structure with a device or devices suitably mounted thereon.

While I have illustrated and described a preferred embodiment which my invention may assume, it will be understood that the invention is not restricted to the particular construction and arrangement shown, but may be variously modified within the contemplation of the invention and under the scope of the following claims.

I claim:

1. Apparatus for spreading concrete mix or the like comprising a bridge structure, a trolley movable over the bridge structure, a frame mounted on the trolley, a hopper pivotally mounted on the frame for tilting to discharge material, and means for tilting the hopper, said trolley providing a symmetrical mounting for the frame permitting transposing of the frame, whereby the hopper may be oriented for filling from the front or side of the apparatus selectively.

2. Apparatus for spreading concrete mix or the like comprising a bridge structure having wheel supports adapted to move along the strip of sub-grade or other foundation selected to receive the mix with the bridge structure spanning said strip, a trolley movable over the bridge structure laterally relative to said strip, a hopper pivotally mounted on the trolley for swinging from receiving position to pouring or dumping position, means for tilting the hopper, means for moving the trolley relative to the bridge structure while the hopper is in tilted position, and strike-off means carried by the trolley and effective during movement of the trolley over the bridge structure for spreading the mix poured from the hopper.

3. Apparatus for spreading concrete mix or

the like comprising a bridge structure having wheel supports adapted to move along the strip of sub-grade or other foundation selected to receive the mix with the bridge structure spanning the strip, a trolley movable over the bridge structure laterally relative to said strip, a hopper pivotally mounted on said trolley for tilting from receiving position to pouring or dumping position, and strike-off devices carried one by said bridge structure and one by said trolley for striking off the mix.

4. Apparatus for spreading concrete mix or the like comprising a wheel mounted bridge structure adapted to span the strip of sub-grade or other foundation selected to receive the mix, a trolley movable over the bridge structure laterally relative to said strip, a hopper pivotally mounted on said trolley, and means carried by said trolley for spreading the mix poured from said hopper, said spreading means including a branched distributing chute, one branch extending toward each side of the bridge structure, a strike-off plate mounted on the upper edge of one of said branches, and a strike-off plate mounted on the lower edge of the other of said branches.

5. Apparatus for spreading concrete mix or the like including a wheel mounted bridge structure adapted to span the strip of sub-grade or other foundation selected to receive the mix, a trolley movable over the bridge structure laterally relative to said strip, a hopper pivotally mounted on the trolley, and tackle for moving the trolley and tilting the hopper comprising a pair of ropes extending along the bridge structure in opposite directions from the trolley, a pulley on the trolley cooperating with one of said ropes to tilt the hopper, a pair of winding drums one cooperating with each rope, and actuating means for causing said drums to simultaneously wind in one rope while paying out the other to cause the trolley to traverse the bridge structure or selectively to maintain one rope stationary while winding in or paying out the other.

6. Spreading apparatus including a bridge structure adapted to span the strip of sub-grade or other foundation selected to receive the mix, a trolley movable over the bridge structure, a frame mounted on the trolley, a hopper pivotally mounted on the frame, and tackle for moving the trolley and tilting the hopper comprising a pair of ropes extending along the bridge structure in opposite directions from the trolley, guiding means on the frame for one of said ropes and cooperating therewith to produce tilting of the hopper and winding means cooperating with each rope, said trolley providing a symmetrical mounting for the frame adapted to receive the frame in a plurality of different relations whereby the hopper may be oriented for filling from the front or side of the apparatus selectively.

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