

May 10, 1938.

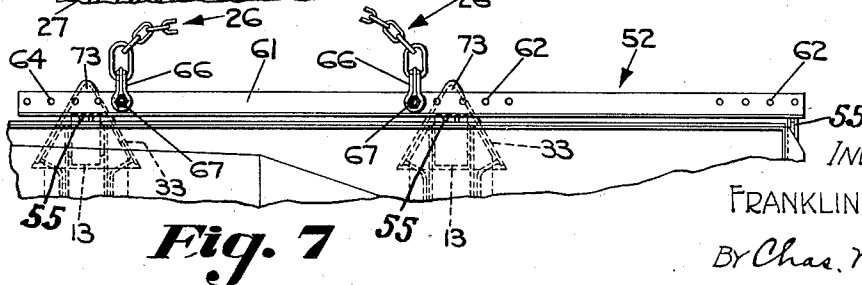
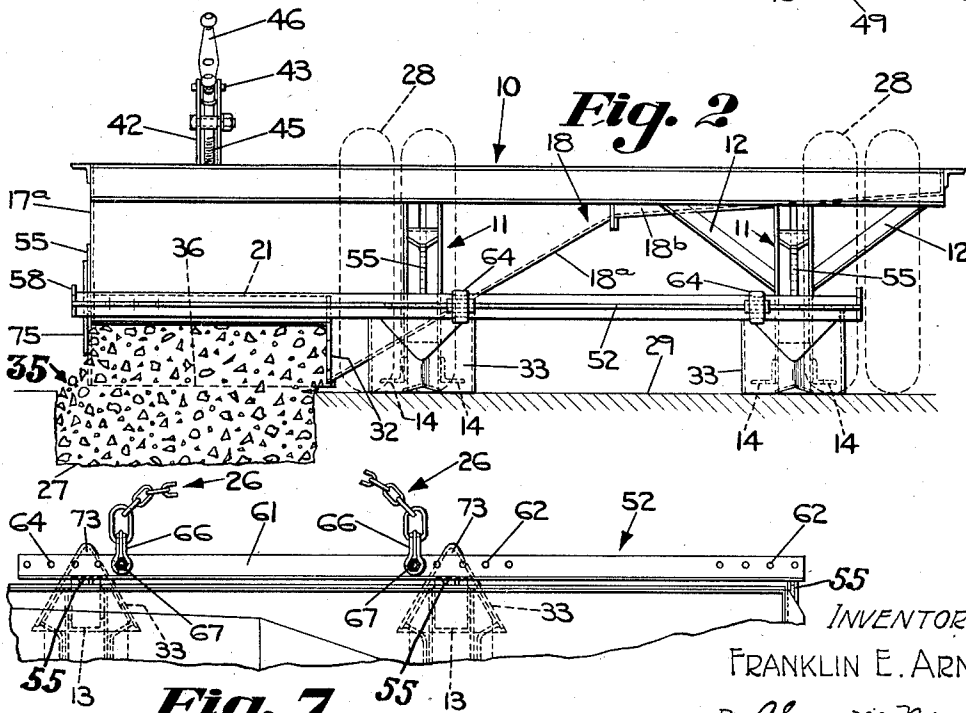
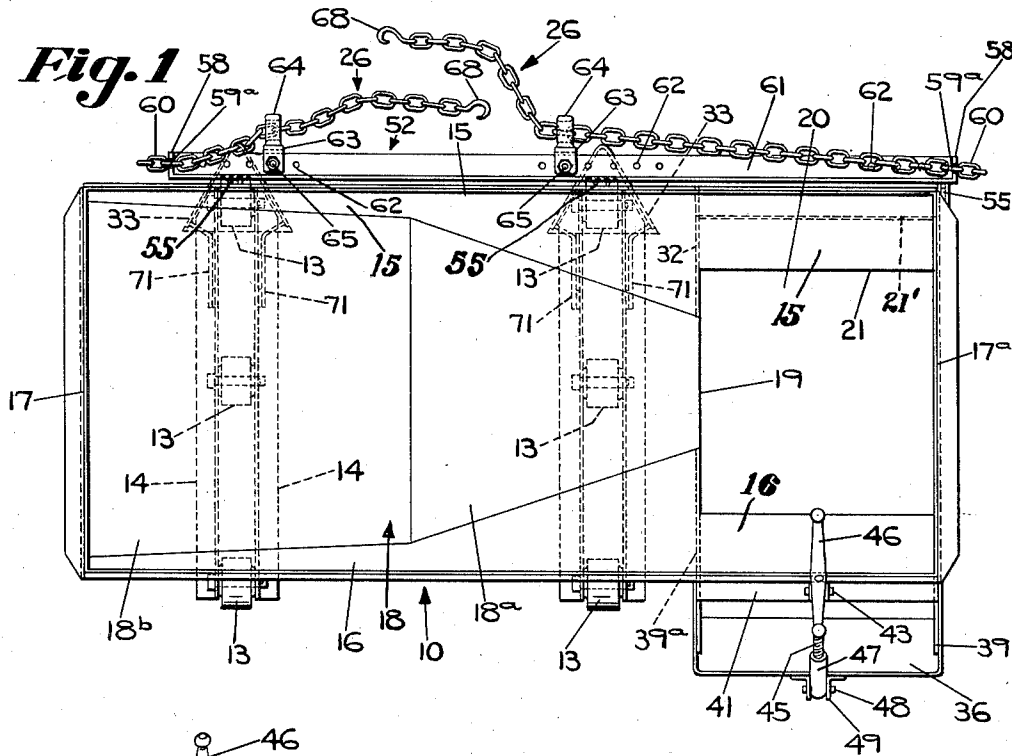
F. E. ARNDT

2,116,504

MATERIAL DISTRIBUTOR AND SPREADER

Filed July 5, 1933

3 Sheets-Sheet 1



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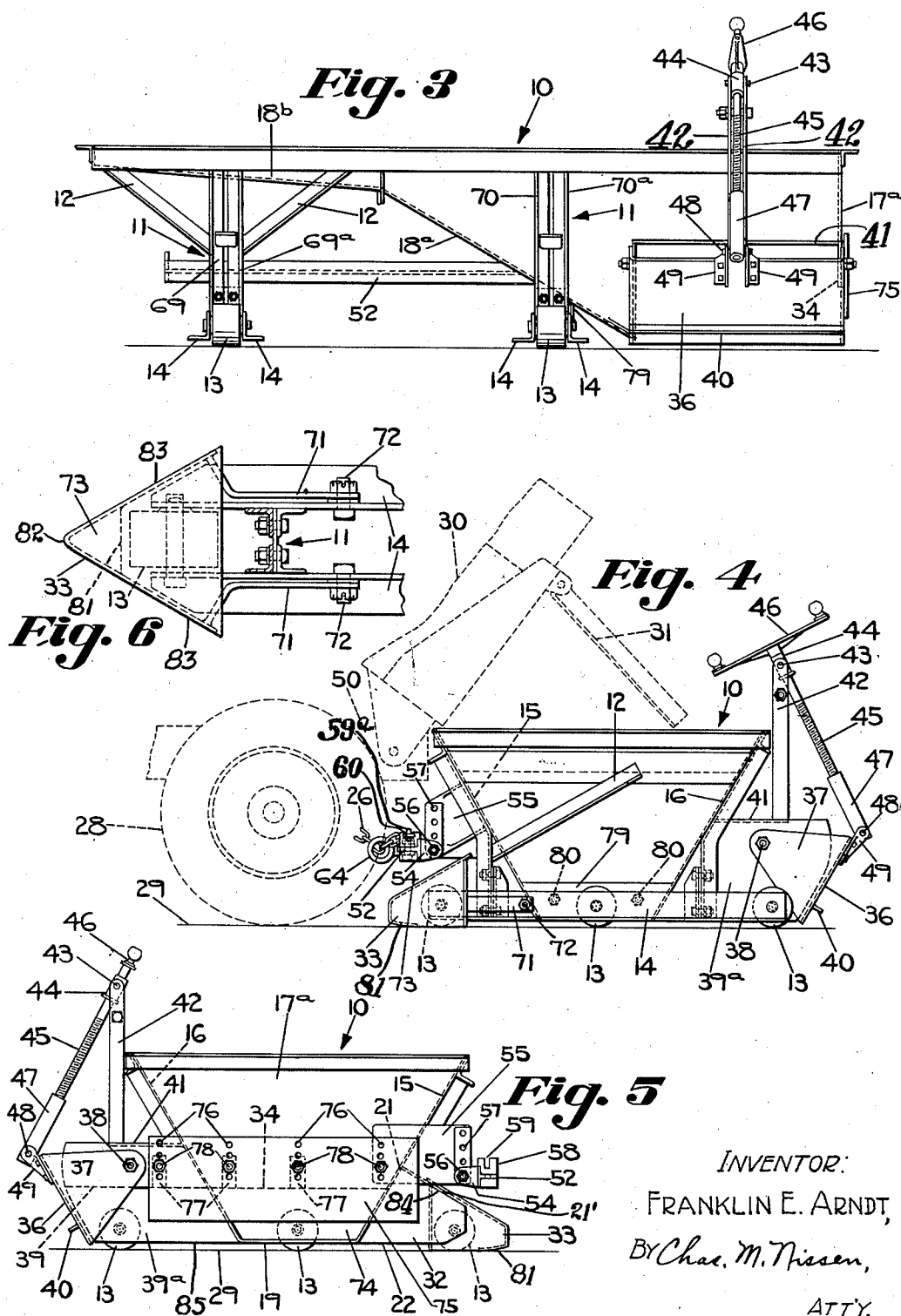
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Fig. 8

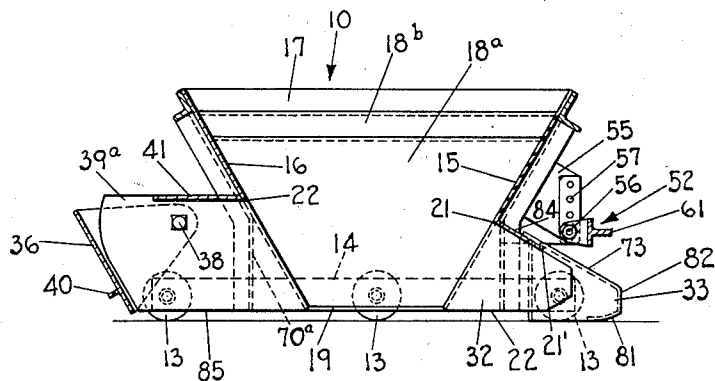
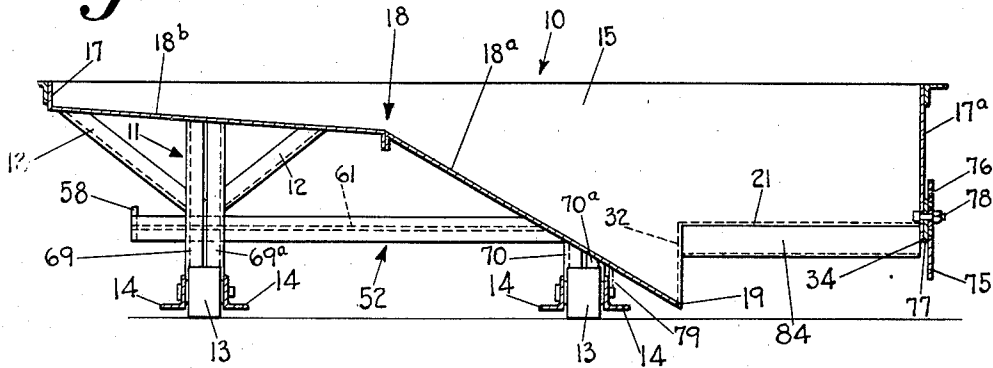


Fig. 9

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UNITED STATES PATENT OFFICE

2,116,504

MATERIAL DISTRIBUTOR AND SPREADER

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Application July 5, 1933, Serial No. 679,019

34 Claims. (Cl. 94-44)

In the road building art, it is common practice to distribute or spread road building materials such as gravel, crushed or broken stone, asphalt or the like, from machines embracing a hopper mounted on a supporting framework including skids or rollers for travel along the prepared road surface, the hopper receiving the road materials from a truck or similar vehicle to which the spreading machine is attached by suitable draft devices, the machine being towed by the vehicle as the latter travels along the roadway. The hopper of the spreading machine usually has an open bottom and suitable discharge openings through the walls of the hopper through which openings the road materials are adapted to be discharged, the discharge of materials being controlled by adjustable gates adapted to vary the area of the discharge openings. The road materials are levelled by suitable leveling instrumentalities on the machine in order to provide a level layer of material as it is spread from the hopper.

The present invention relates to a material distributor or spreader of this general type.

One of the objects of the invention is the provision of an improved and efficient broken stone distributor for roadways which is adapted to be hauled by and behind a dumping truck to receive the broken stone or other material from the truck and discharge it to one side of the roadway while the truck remains for support and travel on such roadway.

Another object of the invention is the provision of an improved stone spreader for directing material into a trench extending longitudinally along one side of a roadway.

More particularly it is the object of the present invention to provide a stone spreader adapted to be hauled by and behind a truck and to receive broken stone or other material from the truck and discharge it to one side of the roadway in a layer preparatory to widening a previously built roadway while the truck remains on the roadway for support and travel therealong.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

Generally speaking, the machine of the present invention embraces a hopper adapted to be detachably connected to and hauled by and behind a dumping truck. The hopper has front and rear walls symmetrical with respect to each other, and has an open bottom between the walls and offset to one side of the path of travel of the truck. A suitable frame supports the hopper for

movement along the path of travel of the truck, with the open bottom in position to discharge material along a path parallel to the first mentioned path of travel and at one side thereof. For service, the machine is provided with suitable haulage means, and when it is operated, the hopper is connected thereby to the truck in position to receive material from the rear end of the truck during travel of the truck along the roadway.

The hopper of the machine is provided with a front discharge opening, an end discharge opening controlled by an adjustable gate, and an adjustable strike-off blade at the rear of the open bottom. The discharge openings are offset to one side of the path of travel of the machine, in order that the materials in the hopper may be distributed along one side of the roadway and a layer having uniform depth and uniform width.

The hopper and frame are provided with traction devices for supporting the machine and enabling it to be drawn along the roadway. These traction devices comprise rollers for use when the machine is traveling along a hard surface, and skids or traction shoes for use when the machine is traveling over a soft surface where the rollers alone would not be sufficient to properly support the edges of the open bottom at desired elevations. The rollers are mounted on the shoes or skids and normally carry them slightly above the level of the surface over which the machine is traveling.

The details of the above, together with other details of the constructions, will become apparent as the description proceeds, when taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a material distributing or spreading machine illustrating the attachment and locking of the draft or haulage devices;

Fig. 2 is a front view thereof, the dotted lines indicating the position of the rear wheels of a truck relative to the machine when the machine is connected to the truck;

Fig. 3 is a rear elevation of the machine;

Fig. 4 is a view of one end of the machine, showing in dotted lines the position of the truck emptying the materials into the machine, and showing the machine in coupling position with the truck, with the frame of the machine in close engagement with the truck frame;

Fig. 5 is an elevation of the opposite end of the machine from that shown in Fig. 4, the coupling devices being removed;

Fig. 6 is a fragmentary plan view showing a

portion of the skid traction devices and the structure of a guard for the wheels or rollers supporting the machine;

Fig. 7 is a fragmentary plan view showing a different form of drawbar and mounting for the draft or haulage devices from the showing of Fig. 1.

Fig. 8 is a sectional elevational view taken through the center of the hopper shown in plan in Fig. 1, and looking from the rear toward the front hitching end; and

Fig. 9 is a sectional elevational view taken through the center of the off-set open bottom, and looking from the right toward the left as viewed in Fig. 1.

Referring more particularly to the drawings, a hopper 10 of metal plates and reinforcing angle irons is shown supported on framework comprising the supports 11, 11 and diagonal braces 12, 12. This framework in turn is normally carried on spaced-apart rollers 13 arranged in pairs associated with pairs of oppositely extending spaced-apart shoes 14, 14 which are adapted to extend longitudinally of the roadway, and project a substantial distance forwardly and rearwardly of the hopper to render the spreader self-supporting on the roadway both when connected to a hauling vehicle and when disconnected therefrom.

The hopper 10 has a front wall 15 which is inclined downwardly and rearwardly. The rear wall 16 of the hopper 10 is inclined downwardly and forwardly. The front and rear walls are symmetrical with each other. At one end of the hopper 10, a vertical wall 17 extends between the walls 15 and 16.

Connecting the lower edges of the walls 15, 16 and 17 is the closed bottom wall 18, which inclines downwardly from the vertical wall 17 to the edge 19 of the opening 20 in the bottom of the hopper 10 at that end thereof opposite the wall 17, said edge 19 being located closely adjacent to the hard surface of the roadway as shown in Fig. 5. The lower portion 18a of the bottom slopes at a greater angle than upper portion 18b. The lower right-hand rear portion of the front wall 15, as viewed in Fig. 1 is cut away to form the edges 21 and 22, the latter being in continuation of the edge 19 closely adjacent to the surface of the roadway as shown in Fig. 5. The discharge opening 20 is off to one side of the roadway on which the stone spreader is adapted to travel.

It should be particularly understood that the hopper is adapted to be hauled by and behind a dumping wagon or truck to which the spreader is detachably connected. For this purpose a pair of chains 26 is provided, the forward ends of which are connected to the frame of the truck and the rear ends to a drawbar mounted on the hopper. The details of the connection and manipulation of the chains for coupling will be brought out hereinafter.

It should also be understood that the present improved stone spreader is particularly useful in connection with the widening of previously built or old roadways having hard surfaces such as those having crushed stone foundations and finished on top with asphalt. At the edge of the hard surfaced portion of the roadway a trench 27 may be dug longitudinally and filled with crushed stone, as shown in Fig. 2, by means of the spreader shown in the accompanying drawings.

The spreader is connected to the dumping truck by means of the chains 26 so that at all times the wheels of the truck and the wheels of the spreader, together with the runners or shoes thereof, will remain on the previously built hard surfaced roadway. As shown by the dotted lines 28, 28 in Fig. 2, the wheels of the truck may occupy positions on the roadway 29 approximately the same as the paths of the wheels or rollers 13 and the runners or shoes 14. In other words, during operation of the spreader the runners approximately track the wheels of the hauling vehicle.

While the crushed stone container or box 30 of the dumping truck is in the position shown in Fig. 4, and the rear gate 31 thereof is in open position, the truck wheels may be supported on the hard surfaced roadway 29 while the open bottom 20 in its laterally offset position is in position to deliver the material to the trench 27 which extends longitudinally of the roadway as shown in Fig. 2.

In order to prevent crushed stone from rolling onto the surface of the roadway 29, a forwardly extending guard or cut-off plate 32 is provided. Whatever stone tends to roll under the hopper and forwardly of the edges 19, 22 of the discharge opening 20, will be deflected into the trench 27 and consequently there will be no interference with the smooth travel of the spreader along the roadway 29. That is to say, notwithstanding the elevation of the forward lower edge 21 of the open bottom, material discharged forwardly under such edge will be prevented by the guard plate 32, whose lower edge is closely adjacent the hard surface of the roadway, from moving onto such hard surface and therefore no discharged material will interfere with the front roller 13 located near the open bottom.

As an assurance that the wheels and runners will have free paths of travel, the forward wheels and forward ends of the runners are enclosed in V-shaped guards 33, 33, each having a downwardly and forwardly closed top plate 73 and each having a bottom road engaging sole plate 31 with a vertical nosing wedge 32 extending upwardly therefrom.

The lower edge 34 of the end wall 17a is spaced above the road surface 29 so as to permit the stone to spread freely to the outermost limits of the trench as shown at 35 in Fig. 2.

In order to regulate the depth of crushed stone laid down in the trench, a strike-off plate 36 is provided at the rear of the open end of the hopper 10. Wing end plates 37 are pivoted at 38 to the rearwardly extending vertical supporting plates 39, 39a which are rigidly secured to the hopper 10. A reinforcing bar 40 is secured to the lower rear portion of the strike-off plate 36, as shown in Figs. 4 and 5.

Standards 42, 42 are mounted on the horizontal plate 41 at the rear wall of the hopper, to the upper ends of which standards is pivoted at 43 a tubular bearing 44 for the screw rod 45. Crank arms 46 are connected to the rod 45 to manually rotate the latter so as to advance or retract the screw rod 45 through the tubular nut 47. The latter is pivoted at 48 to the brackets 49 which are secured to the rear side of the strike-off plate 36. By turning the crank arms 46 the elevation of the strike-off plate 36 may be adjusted and consequently the crushed stone emerging from the discharge opening 20 may be stroked to secure

the filling of the trench 26 to a predetermined depth.

It will be seen from the drawings that the outer supporting bracket 39 has its lower edge located at a predetermined spaced distance above a horizontal plane extending through the surface on which the rollers 13 run, while the inner supporting bracket 39a is extended down into proximity to such surface so as to act as a guard plate to prevent crushed stone from spreading onto the hard surface of the roadway. In other words, by providing the plate 39a at the inner edge of the trench 26 approximately in the plane of the cut-off plate 32, with the lower edge 85 in alinement with the inner edge 19 of the open bottom of the hopper, a vertical wall is formed for the inner end of the strike-off plate 36. Furthermore, the lower edge 22 of the forward guard plate is also in alinement with the edge 19. The three lower edges 19, 85 and 22 co-operate to cut off both forwardly and rearwardly of the open bottom, as well as under the same, the spreading of material onto the hard surface of the roadway.

Secured to the lower edge of wall 16 and to the upper edges of the vertical plates 39 and 39a is a horizontal cross plate 41 to which are secured the lower ends of the standards 42. The plate 41 extends rearwardly from the rear edge 22 of the open bottom and acts as a reinforcing plate for the vertical plates 39 and 39a while also serving as a support for the lower ends of the standards 42. Preferably the standards 42 are welded to the plates 41.

The crushed stone is dumped from the truck when the latter is in dumping position shown in Fig. 4; such stone slides along the closed bottom 18 to the discharge opening 20, where it may spread outwardly under the edge 34 to fill the trench beyond as shown at 35. The stone also spreads forwardly under the edge 21 but is prevented by the cut-off plate 32 from spreading onto the hard surface 29 of the roadway where the stone might interfere with the rollers 13 near the open bottom. The stone also spreads rearwardly under the plate 41 into the confined space bounded on the inner side by the guard plate 39a, on the outer side by the plate 39 and at the rear by the strike-off plate 36. The lower edge of the plate 39a is close to the hard surface of the roadway 29 and therefore prevents spreading of the stone onto the latter. The plate 41 forms a sufficient cover between the plates 39 and 39a to prevent crowding of the material over the top of the strike-off plate as the spreader moves along the roadway.

The flaring of the interior of the hopper is preferably so proportioned with respect to the positions of the runners that the machine is always well balanced. That is to say, sufficient weight is maintained during operation on the left-hand rollers 13, Fig. 3, to keep it at all times on the road 29. Tendency of the hopper to tilt towards the trench is therefore obviated. The runners 14 are sufficiently elongated to extend substantially beyond the front and rear walls of the hopper to enable rollers 13 to be positioned so as to maintain the hopper at all times in stable equilibrium against forward or rearward tilting.

It should also be noted that while the accompanying drawings show a right-handed trench filler, the latter may be left-handed and in some cases such left-handed trench filler may be preferred because enabling the driver of the truck to better assist in moving the truck and trench

filler more accurately along the road edge of the trench.

While mention has been made of crushed stone for filling a trench dug alongside an old roadway, it should be understood that the structure shown is also adapted to receive and distribute various mixtures such as stone dust, water and crushed stone, which mixture after being directed into the trench can be rolled into a compact trench to a predetermined depth filler and then covered with molten tar or asphalt and rolled flush with the surface of the previously built roadway and thereby provide a widening of the hard surfaced roadway. It will also be evident that brick, concrete, or other previously built roads may be widened by having trenches dug along one side or the other or on both sides and concrete poured from a truck or mixer into the hopper 10 while the latter is being hauled along the inner edge of the trench with the opening 20 in the position shown in Fig. 2.

As the truck moves along while dragging the stone spreader by means of the chains 26, the hopper is held tightly against the frame 50 of the truck. Two ways of attaching the chains 26 to hopper 10 are illustrated in Figs. 1 and 4. From either figure it will be seen that a drawbar 52 extends along the front of the hopper. This drawbar 52 is T-shaped and has its head welded to clevises 54 secured to vertical bracket plates 55, 55 at each end of the hopper, through bolts 56, 56 passing through the respective plates 55. Inasmuch as the heights of the connections of the chains 26 to the dumping trucks may vary, it is desirable to have a series of perforations 57 in the plates 55. The plates 55 may be welded to the hopper ends, or secured thereto in any other suitable manner. The perforations 57 enable a vertical adjustment of the drawbar 52. To each end of the drawbar is secured a bracket 58 having, as shown in Fig. 5, a notch 59 therein, the notch being vertically elongated to accommodate a vertical link 59a of the chains 26, while preventing passage of a horizontal link 60 there-through.

The T-shaped drawbar 52 comprises a horizontally extending flange 61 having several series of holes 62 therethrough. As illustrated, a series of these holes is adjacent each end of the flange 61 and there is a third series about the middle of the flange. Suitably positioned relative to the drawbar in Fig. 1 are clevises 63, 63, which carry rings 64, 64 and which are bolted to the flange 61 by bolts 65, 65 extending through selected holes 62. Rings 64 may thus be positioned as desired along the drawbar 61, and the chains 26 are passed through these rings, thus distributing the force of the pull of the truck between the bolts 65 and brackets 58. Or, as in Fig. 4, the chains 26 may be connected at their rear ends to clevises 66, 66 (Fig. 7) held in position by bolts 67, 67 extending through selected holes 62. The extra series of holes illustrated in the flange 61 in Figs. 1 and 7 may be used for the attachment of a third chain, if desired. The embodiment of Fig. 1 is preferred, owing to the fact that the strain of the pull exerted by the truck is distributed between two points on each chain, whereas in Fig. 7, the bolts 67 receive the entire strain and there is, accordingly, greater possibility of the bolts 67 shearing off during operation of the machine. Chains 26 are provided with hooks 68 for attachment to the truck. By securing the hopper tightly against the truck frame, tendency of the hopper to sway or swerve laterally as it is pulled

along a roadway is overcome, while the contact points between the forward upper edge of the hopper and the truck frame may serve as pivot points to permit limited tilting of the hopper as the rollers or runners move over irregularities in the hard surfaced roadway.

It will also be observed that the standards 11 comprise cooperating angles 69, 69a, 70 and 70a each pair of which cooperates to form a channel. These standards are provided on the front and rear walls of the hopper and form supports for the shoes or runners 14, as will be obvious from the drawings. Rollers 13 are mounted between these runners adjacent each end thereof and also between the runners below the bottom 18 of the hopper, as will be apparent from Figs. 3 and 4, thus supporting the hopper and runners up from the surface of the roadway when the latter is hard enough to sustain the weight of the hopper and load. When the surface is too soft therefor, the rollers sink in and the hopper is supported by both the rollers and the runners 14 but mainly by the latter. The rollers, reducing friction, materially reduce the power required to pull the machine along the roadway when acting to support the hopper. As has been previously mentioned, forward and rear tilting of the hopper relative to the supporting surface is prevented by the extension of the runners forwardly and rearwardly of the hopper sufficiently to produce stable equilibrium.

The V-shaped devices 33 each having vertical side plates 83, 83 connected by a sharp vertical nose 82 act as plows to deflect loose material on the surface of the road, away from the rollers, preventing such material from interfering with the travel of the rollers along the roadway. These devices 33 have rearwardly extending arms 71, 71, pivoted at 72 to the runners 14, enabling limited up and down movement of the devices as the triangular sole plates 81 slide over the hard surface of the roadway. The covers 73 prevent loose material from falling between the devices and the foremost rollers.

The trench end plate 17a of the hopper has an opening 74 therethrough, communicating with the open bottom of the hopper under the outer edge 34, allowing material to be discharged through the outer end of the hopper as well as through the bottom and front wall. The area of this opening is controlled by a gate 75, generally rectangular in form and extending beyond the front and rear walls 15, 16, of the hopper, as will be apparent from Fig. 5. For controlling the amount of material passing through the opening 74, the gate 75 is provided with a plurality of vertical series of holes 76, each adapted to register successively with a corresponding opening in plates 77 welded to the hopper 13 and plate 39, and in the plate 55, as gate 75 is vertically moved. Bolts 78 inserted in these openings hold gate 75 in predetermined adjustment with the lower edge of the plate 75 at adjusted elevation. Plates 77 serve as fillers in the space between the end plate 17a and the gate 75, caused by the interposition therebetween of a plate 55.

It should be particularly noted that the bottom 18 of the hopper slopes gradually from one side of the roadway to the lower edge 19 closely adjacent to the hard surfaced roadway near the trench as shown in Fig. 2. It is obvious by reference to the dotted lines in Fig. 2 that the position of the hauling vehicle is such that material may be dumped therefrom throughout the entire width thereof, but when desired the maximum

amount of material may be directed from the truck to that portion 18a of the bottom 18. The slope of the bottom portion 18a is greater than the angle of repose of the material so that gravity will move such material into the trench, although such movement is retarded by friction. Since the material is free to spread outwardly under the lower edge of the plate 75 and forwardly under the edges 21, 21', of the downwardly and forwardly inclined plate 84, to properly fill the trench for stroking by the strike-off blade 36, forward movement of the towing truck is required while the material is being discharged from the inclined bottom portion 18a to the discharge orifice or open bottom. However, if the towing vehicle should stop while material is in the hopper, and such material should continue to flow out from the open bottom of the hopper, such flow would be limited by the lower edge of the outer plate 75 and by the edge 21' which when engaged by the material will automatically lock the latter against any further flow until the towing vehicle is started up again. But in any event, whether the hopper is being towed along the roadway or whether it is standing still, no material would be spread onto the hard surfaced roadway because of the close proximity of the lower edge 19 of the inclined bottom portion 18a to such hard surfaced roadway and because of the close proximity of the lower edges 85 and 22 of the guard plates 39a and 32 (Figs. 5 and 9) to the hard surfaced roadway. Fig. 1 shows clearly that the guard plates 32, 39a are in longitudinal alinement with the lower edge 19 of the inclined bottom portion 18a.

A plate 79 is welded to the underside of the bottom plate 18a of the hopper to reinforce such bottom plate. Plate 79 is bolted by bolts 80 to a runner 14, as shown in Fig. 4, to effect support of the inner edge 19 of the open bottom closely adjacent the surface of the roadway.

When coupling the machine to the truck, the truck is stopped with a clearance between the truck and machine for the operator to hook the chains to the truck axle, or any convenient place on the truck. The operator stands to one side and draws the slack chain through the respective rings or loops 64 until the truck is backed tightly against the drawbar 52. The operator then slips the chain into the respective notches 59 of the blocks, or brackets, 58, to effect holding of the forward upper edge of the hopper against the rear end of the frame of the truck.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended, and I wish therefore not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

1. A road widening spreader comprising a hopper having an open top extending transversely of a roadway and an open bottom at one side of the roadway, spaced-apart elongated runners extending longitudinally of the roadway, a plurality of spaced-apart rollers for each of said runners, said rollers being both laterally and longitudinally spaced to support the runners above a relatively hard surface on which the spreader travels, and means for securing said runners to said hopper in position to prevent tilting of said hopper while receiving material through said

open top and discharging material through said open bottom.

2. A road widening spreader comprising a hopper having a free and unobstructed open bottom surrounded by the hopper walls extending upwardly from such open bottom, said open bottom being in position to move along a path at one side of a roadway and parallel thereto, while road material fills the hopper and is moving by gravity out of such bottom, self-supporting means comprising a plurality of spaced-apart rollers for enabling said hopper to travel along said roadway with its open bottom serving to discharge by gravity the material downwardly in a predetermined course, and means for regulating the depth of the course of material laid down by such movement by gravity through and out from said free and unobstructed bottom.

3. A road widening spreader for filling a trench at one side of a roadway, comprising a hopper having an open bottom offset to one side of the roadway, means for supporting said hopper for travel along such roadway while said offset open bottom occupies a position above said trench, a vertical plate, and means for adjustably securing said plate to the outer side of said hopper with the lower edge of said plate spaced above said trench an adjusted distance to form the outer edge of said open bottom.

4. A road widening spreader comprising a hopper having an offset open bottom and a discharge opening in the rear wall of the hopper at the rear edge of said open bottom, spaced-apart parallel plates extending rearwardly from said hopper, a rear connecting plate at the rear ends of said parallel plates, and a guard plate extending rearwardly from the outer end of said hopper and adjustably secured to the outer parallel plate.

5. A road material spreader comprising a hopper having an offset open bottom and a discharge opening in the rear wall of the hopper at the rear edge of said open bottom, parallel spaced-apart vertical plates projecting rearwardly from said open bottom, a cross-plate connected to said parallel plates and extending rearwardly from said hopper, an adjustable strike-off plate associated with said cross-plate, and an adjustable spreader plate associated with the outer parallel vertical plate.

6. A material spreader comprising a hopper having an open bottom and a discharge opening in the rear wall of the hopper, strike-off mechanism in position to regulate the depth of material after discharge from said opening, an adjustable plate at the outer end of the hopper with its lower edge forming the outer edge of said bottom, and means for securing said plate to said hopper at adjusted elevation to permit adjustment of elevation of the outer edge of said bottom.

7. A road material spreader comprising a hopper having an open bottom and including an outer end wall, an adjustable vertical plate having a length greater than the length of said open bottom, and means for securing said plate to said end wall at adjusted elevation with the lower edge of said plate forming the outer edge of said open bottom and extending forwardly and rearwardly of said open bottom.

8. A road material spreader comprising a hopper having an open bottom with its inner edge adjacent to the surface on which the spreader is supported, a vertical guard plate extending rearwardly from the hopper in alinement with said inner edge, the lower edge of said vertical

guard plate being also adjacent to the surface on which the spreader is supported, a vertical plate forming the outer end wall of said hopper with its lower edge in elevated position, a vertical supporting plate projecting rearwardly from said hopper in alinement with said end wall and with its lower edge in alinement with the lower edge of said end wall, a cross-plate connecting the vertical guard and supporting plates projecting rearwardly from said hopper, a strike-off plate associated with the rear ends of said rearwardly projecting plates, means for adjusting said strike-off plate and holding the same in adjusted position, a rectangular vertical plate at the outer end of the hopper to regulate the spreading of material outwardly from said open bottom, and means for securing said rectangular regulating plate at adjusted elevation to the said end wall with the lower edge of said rectangular regulating plate forming the outer edge of said open bottom and projecting forwardly and rearwardly of said open bottom.

9. A road material spreader comprising a hopper, a frame for supporting said hopper including spaced runners adapted to slide upon a surface, spaced rollers on said frame in close association with said runners and adapted normally to support said runners above the surface when on a hard surface but capable of sinking into a soft surface to allow contacting of said runners and said soft surface.

10. A road material spreader comprising a hopper, a frame for supporting said hopper including a runner extending both forwardly and rearwardly of the bottom of said hopper, spaced rollers on said frame positioned both forwardly and rearwardly of said bottom and adapted normally to support the hopper independently of the runner with said runner above the surface when on a hard surface but capable of sinking into a soft surface to allow contacting of said runner and said soft surface so that the rollers and runners then co-act to support the hopper.

11. A road material spreader comprising a hopper, a frame for supporting said hopper including a runner adapted to slide upon a surface, spaced rollers on said runner adapted normally to support said runner above the surface when on a hard surface but capable of sinking into a soft surface to allow contacting of said runner and said soft surface.

12. A machine of the character described comprising the combination with a supporting frame, of a hopper carried by the frame, the hopper having an open bottom, the said hopper laterally increasing in depth to provide road clearance less at one end than at the other, discharge of road materials being effected through the portion of the hopper having the least road clearance, an adjustable end gate for controlling lateral discharge of materials from the hopper, and an adjustable strike-off plate for regulating the depth of the material discharged from the hopper.

13. A road material spreader comprising a hopper having an open bottom and including an outer end wall, an adjustable vertical plate, means for securing said plate to said end wall at adjusted elevation with the lower edge of said plate forming the outer edge of said open bottom, frame-work for supporting said hopper for movement along the roadway with the inner edge of said open bottom closely adjacent to the level of the road surface, and haulage mechanism extending from said frame-work for connection to a truck traveling on the roadway.

14. A road widening spreader comprising frame-work for self-support on a hard surfaced roadway while connected to and hauled by and behind a dumping truck traveling on such hard surfaced roadway, an open bottomed hopper secured to said frame-work to form a rigid unit therewith with the open bottom of the hopper offset relative to said frame-work to occupy a position above a shoulder at one side of the hard surfaced roadway, the inner edge of the open bottom being closely adjacent to the level of the roadway to cut off spreading of material on to said hard surfaced roadway by confining the spreading to said shoulder, and adjustable mechanism for regulating the spreading of the material from said open bottom both outwardly and rearwardly and thereby securing the laying down on the shoulder of a course of material of predetermined width and depth while the towing truck remains on the hard surfaced roadway traveling along the said roadway to tow the spreader and effect discharge of the material from the open bottom thereof on to said shoulder along one side of the roadway.

15. A road widening spreader comprising a hopper having an open top extending transversely of the roadway in position to receive material from a dumping truck, said hopper also having an open bottom offset to occupy a discharging position along one side of the roadway, means for supporting said hopper in the aforesaid position comprising a plurality of rollers distributed both laterally and longitudinally relative to the hopper to prevent tilting of the latter either longitudinally or transversely of the roadway during spreading operations along one side of the roadway as aforesaid, and haulage connections between the hopper and said truck for towing the spreader while in the aforesaid position relative to said truck.

16. In a material spreader, the combination with an open top and a discharge opening below said open top, of means comprising two series of rollers for supporting said spreader on a hard-surfaced roadway, and two V-shaped devices one in advance of each series of rollers for deflecting sidewise loose material on the roadway so as to assure smooth paths of travel for said rollers.

17. A road material spreader comprising a hopper having a bottom sloping downwardly from one side to the other, means providing a discharge opening adjacent the lowermost side of the said hopper with the inner walls of the hopper extending upwardly from the lower edges of said opening, said sloping bottom being adapted to direct material from the hopper into said opening and thence directly onto the roadway by gravity, a frame for supporting said hopper, and a plurality of rollers under said frame in position to give both lateral and longitudinal stability to the spreader and support the hopper on the roadway where the lower edges of said opening shall be spaced above the roadway.

18. A road material spreader comprising a hopper having a bottom sloping downwardly to an open bottom having its inner edge closely adjacent the surface of the roadway, a frame for supporting said hopper, spaced-apart elongated runners rigidly connected to said frame and spaced from said open bottom so as to occupy positions above the road surface while said open bottom overhangs the shoulder of the roadway, said hopper and frame and runners being rigidly connected together in a single unit, a plu-

rality of rollers distributed along each of said runners and connected thereto to support the runners up off the roadway when the surface of the latter is relatively high, said rollers being adapted to sink into relatively soft roadway surfaces to permit said runners to engage such relatively soft surfaces and co-operate with said rollers to support the frame and hopper on the roadway, and haulage mechanism extending from said rigid unit for connection to a draft vehicle.

19. A road material spreader comprising a hopper having a bottom sloping downwardly from one side to the other, means for providing a discharge opening adjacent the lowermost side of said hopper, a frame for supporting said hopper, spaced-apart elongated runners rigidly connected to said frame and said hopper in one rigid unit, rollers closely associated with said runners to support the latter up off the road surface when the latter is relatively hard, the spaces adjacent said runners on both sides thereof under the hopper being free and unobstructed, and V-shaped deflectors at the front ends of said runners in position to deflect laterally loose material on the roadway to assure smooth passage-ways for said rollers.

20. A road material spreader comprising a hopper with an offset open bottom with its lower edges adapted to be located closely adjacent the upper surface of the shoulder of the roadway, a frame for supporting said hopper for towing by a draft vehicle, haulage connections extending from said frame and adapted to be secured to such draft vehicle, and a plurality of rollers under said frame having paths of travel on the roadway and spaced laterally from the path of travel of the open bottom overhanging the shoulder of the roadway, the lower edges of said open bottom extending upwardly along the inner walls of the hopper to afford a free and unobstructed passageway for material in the hopper directly therefrom to said shoulder while such material is being delivered from said hopper and spread onto such shoulder by the draft vehicle towing the spreader along the roadway while supported by said rollers as aforesaid.

21. A road material spreader comprising a hopper, mechanism affording a discharge opening operable by movement of the spreader along the roadway to deliver and spread material, a frame for supporting said hopper, a plurality of elongated runners rigidly connected to said frame and said hopper to form a single rigid unit, said runners extending forwardly and rearwardly sufficient distances to prevent tilting when the spreader is towed by a draft vehicle, and a plurality of rollers closely associated with said runners both forwardly and rearwardly thereof to enable said spreader to have a high degree of both lateral and longitudinal stability although the hopper may be unevenly loaded.

22. A road material spreader comprising a hopper having an open top and an offset open bottom adapted to overhang the shoulder of a roadway with the lower edges of said hopper at said open bottom located adjacent such shoulder, a frame for supporting said hopper, and a plurality of rollers under said frame for supporting the hopper on the hard surface of the roadway while such open bottom overhangs said shoulder as aforesaid, some rollers being located under the forward and rear edges of the hopper and other rollers being located under the central portion of said hopper spaced laterally from the path of travel of said open bottom, the distribution of

the rollers being such as to support the hopper and frame on the hard surface of the roadway with a high degree of both lateral and longitudinal stability when the hopper is variously loaded and when the spreading of the material on the shoulder offers variable resistance to a rectilinear path of travel for the spreader as a unit.

23. An apparatus for depositing road material along a roadway, comprising a hopper for material and having a discharge orifice for discharging material onto the road, a support for the hopper including a pair of runners each having a roller at the front end thereof, a deflector plate extending forwardly from the inner edge of the orifice longitudinally of the roadway, and deflectors in advance of the runners and said front rollers for moving loose material on the road out of the path of the rollers and the runners.

24. An apparatus for depositing road material along a roadway, comprising a hopper for material and having a discharge orifice for discharging material onto the road, the inner edge of said orifice being closely adjacent the surface of the road, mechanism comprising a runner spaced inwardly from said inner edge for supporting the hopper on the road, a deflector pivoted to the front end of said runner in scraping contact with the roadway for moving to one side loose material on the road to assure a smooth passageway for said runner, and a vertical deflector plate extending forwardly from said inner edge of the orifice in position to prevent loose material acted on by said deflector from moving into the path of said orifice.

25. In a material spreader, the combination with a hopper, of supporting mechanism therefor comprising spaced-apart runners with rollers at the front ends of the runners, V-shaped deflectors at the front ends of said runners adjacent to said rollers in position to deflect loose material on the roadway out of the paths of said rollers and said runners.

26. In a material spreader, the combination with a hopper, of mechanism for supporting the same comprising spaced runners, and deflectors pivotally connected to said runners to act in advance thereof to scrape loose material on the roadway to one side out of the paths of said runners.

27. In a material spreader, the combination with a hopper, of mechanism for supporting said hopper comprising spaced runners, V-shaped deflectors mounted at the front ends of said runners and each having a downwardly and forwardly inclined closed top, and means connecting said deflectors to said runners to be pushed forward along the roadway thereby.

28. In a spreader, the combination with a hopper, mechanism for supporting said hopper comprising road engaging rollers at the front ends of said runners, V-shaped deflectors at the

front ends of said runners and each having a closed top, and means connecting said deflectors to said runners in position to cover said rollers.

29. In a material spreader, the combination with a hopper, of mechanism for supporting the same comprising spaced runners with road engaging rollers at the front ends thereof, V-shaped deflectors each having a closed top, and means pivoting said deflectors to said runners in positions to cover said rollers and rest by gravity in scraping positions on the roadway to deflect loose material out of the paths of said rollers and runners.

30. A road widening spreader comprising a hopper having an offset open bottom and a discharge opening below the rear edge of the open bottom, spaced-apart parallel plates extending rearwardly from said hopper, a strike-off plate mounted in position to act on the material passing through said discharge opening, and a guard plate mounted on said hopper for adjustment in elevation relative thereto and extending rearwardly from the outer end of said hopper.

31. A road material spreader comprising a hopper having an open bottom and a discharge opening under the rear edge of the open bottom, parallel spaced-apart vertical plates projecting rearwardly from said hopper, a cross-plate connecting said parallel plates, strike-off mechanism associated with said parallel plates, and a spreader plate secured to said hopper with its lower edge in position to form the outer edge of said open bottom.

32. A road material spreader comprising a hopper having an open bottom and including an outer end wall, a guard plate extending rearwardly from the inner edge of the open bottom, and a vertical plate having a length greater than the distance between the front and rear walls of the hopper near said open bottom and secured to said hopper to extend rearwardly for occupying a position opposite said guard plate and spaced therefrom.

33. A road material spreader comprising a hopper having an open bottom and including an outer end wall, a guard plate extending forwardly from the inner edge of the open bottom, and a vertical plate having a length greater than the distance between the front and rear walls of the hopper near said open bottom and secured to said hopper to extend forwardly for occupying a position opposite said guard plate and spaced therefrom.

34. A road widening spreader comprising a hopper having an open top and an offset open bottom, the bottom wall of the hopper being downwardly inclined to said open bottom, and a plate downwardly and forwardly inclined from the lower edge of the front wall of said hopper at said open bottom.

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