July 16, 1968 J. E. KESSEL 3,392,641

CONCRETE SPREADING MACHINES

Filed June 17, 1966 2 Sheets-Sheet 1

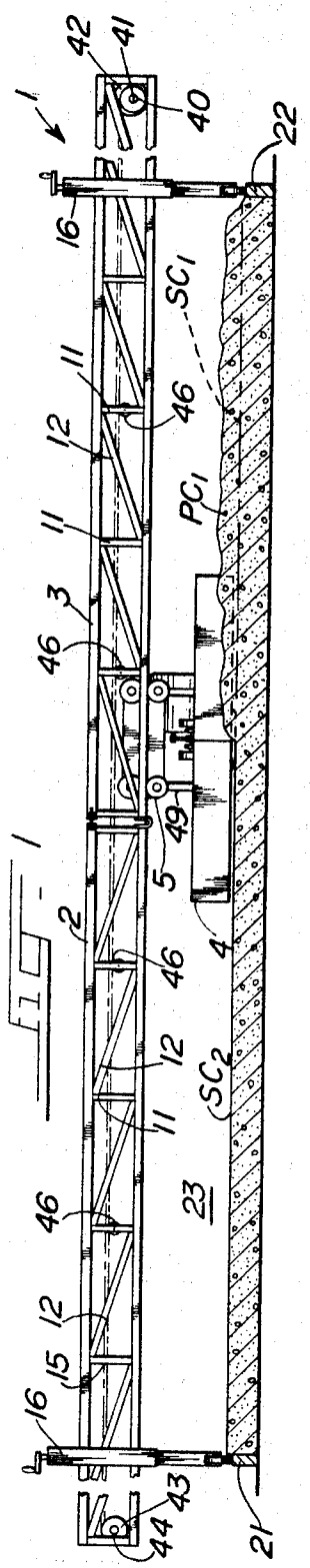


FIG - 1

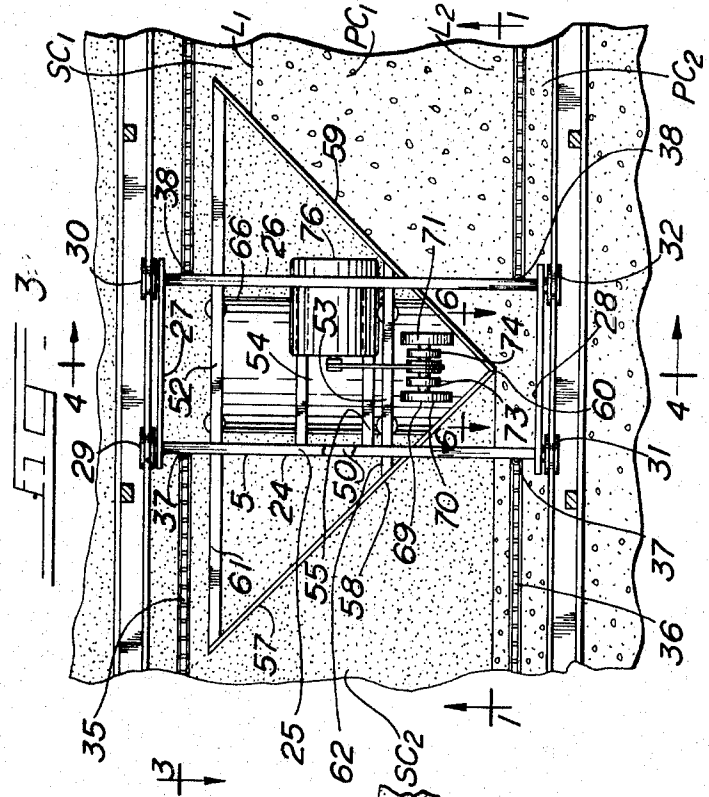


FIG - 3

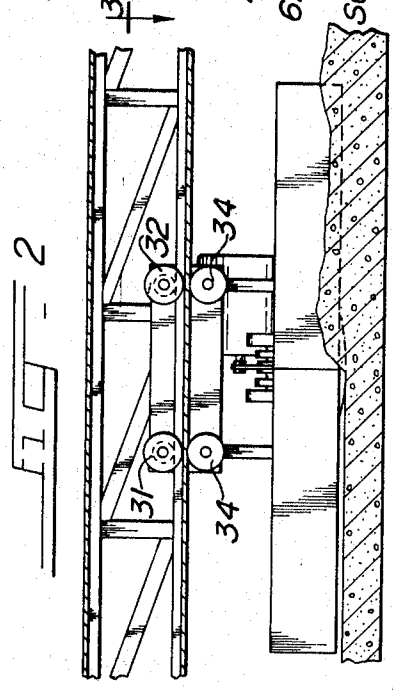


FIG - 2

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CONCRETE SPREADING MACHINES

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FIG. 5

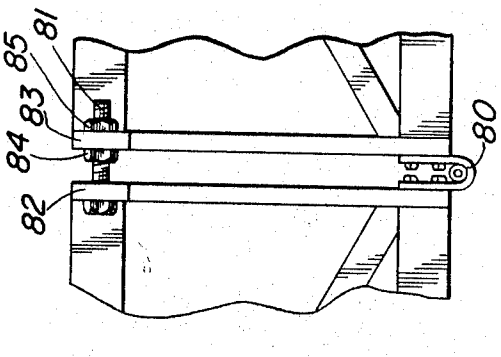


FIG. 4

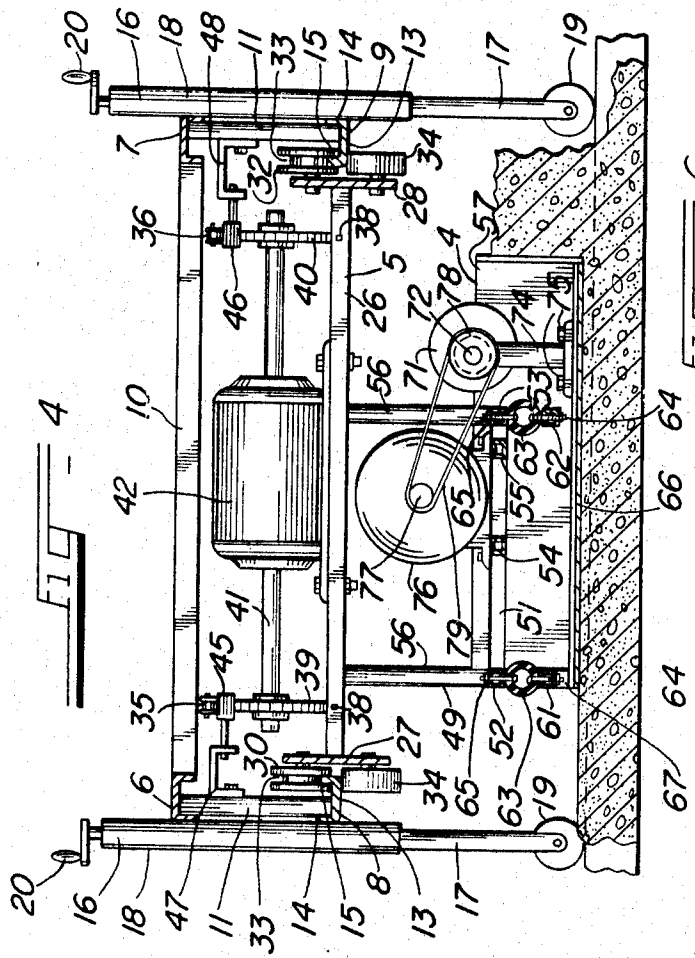
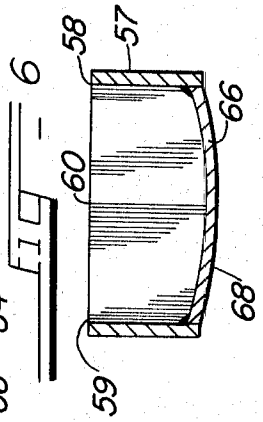


FIG. 6



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3,392,641

CONCRETE SPREADING MACHINES

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9 Claims. (Cl. 94—44)

ABSTRACT OF THE DISCLOSURE

A concrete spreading machine embodying a transversely movable spreader having a bottom pan, with means afforded for vibrating the pan vertically.

This invention relates to concrete spreading machines.

It is a primary object of the present invention to afford a novel concrete spreading machine.

In the construction of concrete highways, concrete runways and other relatively large expanses of concrete, the concrete is commonly dumped in piles or heaps on the highway, or the like, from trucks, dump buckets, conveyor belts, or the like. Thereafter, it is spread and finished.

Heretofore, the initial spreading of such concrete from the piles or heaps has been accomplished by hand or by machines in a relatively rough manner. With such a mode of operation, the roughly spread concrete must then be finally spread into a smooth surface and finished and struck off either by hand or by a special finishing machine, or by a combination of both.

Machines heretofore known in the art for initially spreading concrete from such piles or heaps, and the like, have commonly had several inherent disadvantages, such as, for example, not being capable of smoothly spreading the concrete; not affording a finished concrete surface; being supported on the surface of the pathway on which the concrete is to be spread; being slow in operation; being difficult to operate; or being inefficient and unreliable in operation, and the like. It is an important object of the present invention to overcome such disadvantages.

Another object of the present invention is to afford a novel concrete spreading machine which will smoothly spread concrete on highways, or the like.

Heretofore, the consolidation of spread concrete has been commonly performed in a special operation such as by means of stick vibrators inserted into the wet concrete. It is an important object of the present invention to afford a novel concrete spreading machine, which will not only spread the concrete in the aforementioned manner, but which will compact and consolidate the concrete in a novel and expeditious manner.

Yet another object of the present invention is to afford a novel concrete spreading machine of the aforementioned type which is capable of striking off the concrete which it has spread from the aforementioned heaps or piles, and the like.

A further object of the present invention is to afford a novel concrete spreading machine which is relatively small and compact in size, and which may be readily transported from one job site to another.

Another object is to afford a novel concrete spreading machine which may be effectively operated by relatively unskilled persons.

Another object of the present invention is to afford a novel concrete spreading machine of the aforementioned type which is practical and efficient in operation and which may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and

are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a front elevational, somewhat diagrammatic view of a machine embodying the principles of the present invention, showing the machine mounted in operative position on a pathway, such as a roadway;

FIG. 2 is a fragmentary, enlarged front elevational view of a portion of the machine shown in FIG. 1, with certain parts broken away to show underlying parts;

FIG. 3 is a detail sectional view taken substantially along the line 3—3 in FIG. 2;

FIG. 4 is an enlarged, detailed sectional view taken substantially along the line 4—4 in FIG. 3;

FIG. 5 is an enlarged, fragmentary elevational view of a portion of the machine shown in FIG. 1; and

FIG. 6 is an enlarged, detail sectional view taken substantially along the line 6—6 in FIG. 3.

A concrete spreading machine 1, embodying the principles of the present invention, is shown in the drawings to illustrate the presently preferred embodiment of the present invention.

The machine 1 embodies, in general, two elongated trusses 2 and 3 hingedly connected together in end-to-end relation to each other, with a concrete spreader unit 4 supported by a carriage 5 from the trusses 2 and 3 for reciprocation longitudinally of the trusses 2 and 3, FIG. 1.

The trusses 2 and 3 embodied in the preferred form of the machine 1 shown in the drawings are of a square, box truss design. However, as will be appreciated by those skilled in the art, this is merely by way of illustration, and not by way of limitation, and other truss constructions may be used without departing from the purview of the present invention.

Each of the trusses 2 and 3 embodies two horizontally spaced, substantially parallel upper side rails 6 and 7 and two horizontally spaced, substantially parallel lower side rails 8 and 9. The side rails 6–9 are preferably channel-shaped in transverse cross-section with the side rails 8 and 9 disposed vertically below, and in parallel relation to the side rails 6 and 7, respectively. Horizontally extending transverse cross braces 10 are spaced along each of the trusses 2 and 3 and extend between the top rails 6 and 7 thereof. Vertically extending transverse cross braces 11 are also spaced along each of the truesses 2 and 3 and extend between the side rails 6 and 8 and the side rails 7 and 9, respectively, FIGS. 1 and 4. Diagonally extending transverse cross braces 12 extend between each pair of adjacent transverse cross braces 11 on each side of the trusses 2 and 3. The braces 10–12 may be secured in position relative to the side rails 6–9 by any suitable means such as, for example, welding.

The channel-shaped, lower side rails 8 and 9 are preferably disposed in the trusses 2 and 3 in such position that the webs 13 thereof afford a bottom wall therefor, and the two flanges thereof project substantially vertically upwardly from the respective webs 13 to afford an outer flange 14 and an inner flange 15 on each of the side rails 8 and 9, FIG. 4. The inner flanges 15 of the side rails 8 and 9 afford a track for the carriage 5, as will be discussed in greater detail presently.

Each of the trusses 2 and 3 has two legs 16, FIGS. 1 and 4, secured to the outer free end portions of the side rails 6 and 8 and the side rails 7 and 9, respectively.

Each leg 16 embodies a lower housing 17 telescopingly mounted in an upper housing 18. A wheel 19 is rotatably mounted on the lower end of each of the lower housings 17, and the lower housings 17 are vertically adjustable relative to the upper housing 18 by suitable means such as handcranks 20 to thereby raise and lower the lower housings 17 and the wheels 19 relative to the upper housings 18. The upper housings 18 are secured to the outer side walls of the respective pairs of side rails 6 and 8 and 7 and 9 by suitable means, such as welding, so that movement of the lower housing 17 and the wheels 19 upwardly and downwardly relative to the upper housing 18 is effective to adjust the height of the trusses 2 and 3 relative to the surface on which the wheels 19 rest.

In the drawings, the wheels 19 on the trusses 2 and 3 are shown mounted on the upper edges of two side rails 21 and 22, respectively, disposed at opposite sides of a pathway 23 such as a roadway. The side rails 21 and 22 shown in the drawings comprise the sides of the form between which the concrete to be poured on the pathway 23 is to be confined. As will be appreciated by those skilled in the art, the side rails 21 and 22 may be special side rails disposed outwardly of such a form if this is desired.

The carriage 5, FIGS. 1–4, includes an elongated, substantially rectangular-shaped frame 24 having two substantially parallel longitudinal side members 25 and 26, and two substantially parallel end members 27 and 28. A pair of wheels 29 and 30 are rotatably mounted on the end member 27, in outwardly projecting relation thereto, and a pair of wheels 31 and 32 are similarly mounted on the end member 28. Each of the wheels 29–32 has a groove extending around the periphery thereof. The wheels 29 and 30, in the assembled machine 1, are mounted on the side rail 8 of the truss structure 2–3 in such position that the inner flange 15 of the latter is disposed in the grooves 33 therein. Similarly, the wheels 31 and 32 are mounted on the side rail 9 in such position that the inner flange 15 of the latter is disposed in the grooves 33 in the wheels 31 and 32.

Four hold-down wheels 34 are mounted on the carriage 5 for holding the wheels 29–32 in engagement with their respective side rails 8 and 9. Two of the hold-down wheels 34 are rotatably mounted on the end member 27 of the frame 24 directly below the wheels 29 and 30, respectively, in position to engage the lower face of the web 13 of the side rail 8. The other two hold-down wheels 34 are rotatably mounted on the end member 28 of the frame 24 directly below the wheels 31 and 32, respectively, in position to engage the lower face of the web 13 of the rail 9. With this construction, the carriage 5 may be readily moved longitudinally of the trusses 2 and 3 between the outer ends thereof, the wheels 29–32 rolling freely along the rails 8 and 9 of the trusses 2 and 3, and the hold-down wheels 34 insuring that the carriage 5 is retained on the rails 8 and 9.

Two chains 35 and 36 are secured to respective ends of the frame 24 of the carriage 5. As may be seen in FIG. 3, one end of each of the chains 35 and 36 is secured to the side member 25 of the frame 24 by suitable means such as bolts 37, and the other ends of the chains 35 and 36 are secured to the side members 26 of the frame 25 by suitable means such as bolts 38.

At the right end of the machine 1, as viewed in FIG. 1, the chains 35 and 36 are trained over two sprocket wheels 39 and 40, respectively, which are mounted on opposite ends of a drive shaft 41 having a suitable drive unit 42 mounted on the outer end of the truss 3. In the drawings, the drive unit 42 is shown as being a motor, with the drive shaft 41 being the drive shaft of the motor. However, as will be appreciated by those skilled in the art, if desired a suitable reduction gear unit may be interposed between the motor 42 and the drive shaft 41.

At the other end of the machine 1, the chains 35 and 36 are trained over a sprocket wheel unit 43, which embodies two sprocket wheels rotatably mounted on a shaft 44 in radial alignment with the sprocket wheels 39 and 40, one of the sprocket wheels being shown in FIG. 1. The sprocket wheel unit 43 comprises an idler unit around which the chains 35 and 36 are driven by the motor 42. If desired, the sprocket wheel unit 43 and the motor 42 may be adjustably mounted on the trusses 2 and 3 for movement toward and away from each other by suitable means, not shown, which are well known in the art, for adjusting the tension of the chains 35 and 36. Additional idler sprocket wheels 45 and 46 are preferably mounted on the side rails 8 and 9, respectively, FIGS. 1 and 4, by suitable mounting brackets 47 and 48 in position to support the upper passes of the chains 35 and 36 in upwardly spaced relation to the carriage 5 between the drive unit 42 and the sprocket wheel unit 43.

With the machine 1 constructed in the aforementioned manner, reversal of the operation of the motor 41 is effective to pull the carriage 5 in opposite directions along the trusses 2 and 3, so that the carriage 5 may be readily reciprocated across a roadway, or the like, such as the pathway 23, FIG. 1.

The spreader unit 4 for spreading and consolidating concrete on a road, or the like, such as the pathway 23, is supported by a supporting frame 49 from the carriage 5, FIGS. 1 and 4. The supporting frame 49 is rectangular in shape and embodies two parallel side rails 50 and 51, FIGS. 3 and 4, disposed vertically below the side members 25 and 26, respectively, of the side frame 24, the rail 50 being visible through the cut-out portion of the rail 25 in FIG. 3. It also embodies two end rails 52 and 53 extending between respective opposite ends of the side rails 50 and 51, and two parallel spaced cross braces 54 and 55 extending between the side rails 50 and 51 in parallel relation to the end rails 52 and 53. The supporting frame 49 is supported from the frame 24 of the carriage 5, in depending relation thereto, by four legs 56 which project upwardly from each of the corners of the supporting frame 49 and are secured to the frame 24 by suitable means such as welding.

The spreader unit 4 includes a plow 57 having two elongated, transversely-upstanding side walls 58 and 59. The plow 57 is preferably substantially V-shaped in horizontal transverse cross section, with the side walls 58 and 59 projecting rearwardly and outwardly away from each other from a front apex 60.

Two crossbars 61 and 62 extend between the side walls 58 and 59 of the plow 57 and are secured thereto by suitable means such as welding. The crossbars 61 and 62 are disposed in substantial parallel relation to each other, with the crossbar 61 extending across the rear end of the plow 57 directly below the end member 52 of the frame 49. The other crossbar 62 extends across the front end portion of the plow 57 directly below the other end member 53 of the frame 49. The crossbars 61 and 62 are secured to the frame 49 in position to suspend the spreader unit 4 therefrom.

Preferably, the connection of the spreader unit 4 to the frame 49 is effected through resilient connecting mechanism which is effective to isolate vibrations of the spreader unit 4 from the supporting frame 49, for a purpose which will be discussed in greater detail presently. In the machine 1 shown in the drawings, such connection of the spreader unit 4 to the supporting frame 49 is effected through suitable resilient cushions or mounts in the form of rubber tubular members 63, FIG. 4, spaced along the crossbars 61 and 62 and secured thereto by suitable means such as bolts 64. The upper sides of the tubular members 63 mounted on the cross-bars 61 and 62 are secured to the end members 52 and 53, respectively, of the supporting frame 49 by suitable means such as bolts 65. With this construction, the spreader unit 4 is yieldingly sus-

pended from the supporting frame 49 through the rubber tubular members 63.

A pan 66, which is substantially rectangular in shape, is mounted on the lower end of the plow 57 in position to afford a bottom wall therefor which extends from the apex 60 of the plow 57 to the rear edge thereof. At its front end the pan 66 is of the same width as the front end of the plow 57, FIGS. 3 and 6, and is secured to the lower edges of the side walls 58 and 59 by suitable means such as welding, Preferably, the pan 66 is narrower in width than the plow 57, being narrower in width than the carriage 5 in the machine 1 shown in the drawings, FIG. 3. At its rear end, the pan 66 is secured to suitable supporting members, such as spacer blocks 67 suitably secured to the crossbars 61 of the spreader unit 4 and to the rear end portion of the pan 66 by suitable means such as welding.

The pan 66 is preferably arcuate-shaped in transverse cross section so as to afford a convex downwardly lower face 68, FIG. 6. The arc of the pan 66 is such that the longitudinal central portion thereof projects downwardly below the bottom edges of the side walls 58 and 59 of the plow 57 throughout the length of the pan 66, for a purpose which will be discussed in greater detail presently.

A vibrator unit 69 is mounted on the pan 66 for vibrating the latter. The vibrator unit 69 embodied in the machine 1 includes two eccentric wheels 70 and 71 eccentrically mounted on a shaft 72 journaled in two pedestals 73 and 74, FIGS. 3 and 4. The wheels 70 and 71 are secured to the shaft 72 for rotation therewith, and the pedestals 73 and 74 are secured to the front end portion of the pan 66 by suitable means such as bolts 75. Rotation of the shaft 72 is effective to rotate the eccentric wheels 70 and 71 thereon and thereby vibrate the pan 66.

A motor 76, FIGS. 3 and 4, is mounted on the cross braces 54 and 55 of the supporting frame 94. The motor 76 has a pulley 77 mounted on the drive shaft thereof. A pulley 78 is mounted on the shaft 72 for rotation therewith, and the motor 76 is operatively connected to the shaft 72 by a belt 79 trained over the pulleys 77 and 78 so that operation of the motor 76 is effective to rotate the shaft 72 and the eccentric wheels 70 and 71 and vibrate the pan 66.

It will be remembered that the pan 66 is connected to the plow 57 through only a small portion of its length. With this construction the pan is free to vibrate, and only a small portion of the vibrations thereof is transmitted to the plow 57. Also, with the plow 57 connected to the supporting frame 49 through the rubber cushions 63, the vibrations of the pan 66 and plow 57 are effectively isolated from the carriage 5 and the trusses 2 and 3.

In the operation of the machine 1, the form sides or side rails 21 and 22, defining the longitudinal edges of the pathway 23 on which concrete is to be spread, first would be placed in position. Thereafter, the machine 1 may be moved into operative position wherein the wheels 19 on the legs 16 thereof rest on the rails 21 and 22 in position to support the machine 1 in spanning relation to the pathway 23. Thereafter, the cranks 20 on the leg 16 may be manipulated to level the machine 1 and raise it to the desired elevation above the pathway 23.

The machine 1 shown in the drawings also embodies an adjustable connection between the inner ends of the trusses 2 and 3, whereby the slope and contour of the trusses 2 and 3 above the pathway 23 may be adjusted. This adjustable connection between the trusses 2 and 3 embodies a hinge structure 80 connected between the lower edge portions of the inner ends of the trusses 2 and 3, and bolts 81 extending through flanges 82 and 83 on the upper edge portions of the inner ends of trusses 2 and 3, respectively. Nuts 84 and 85 are mounted on the bolts 81 on opposite sides of one of the flanges, such as, for example, flange 83, FIG. 5, in position to move the upper edges of the inner end portion of the trusses 2 and 3 toward and away from each other and thereby pivot the trusses 2 and 3 around the hinge 80. With this construction, the position of the trusses 2 and 3 may be varied relative to the pathway 23 to thereby adjust the crown of the pathway 23. If desired, additional adjustable connections, not shown, may be spaced along each of the trusses 2 and 3 to thereby afford further adjustment of the contour of the trusses 2 and 3 relative to the pathway 23.

It will be remembered that concrete to be spread on a roadway, or the like, such as the pathway 23, is normally initially dumped thereon in piles or heaps. In the operation of the machine 1, after concrete has thus been dumped on the pathway 23, the machine 1 may be advanced forwardly along the rails 21 and 22 in the direction of the apex 60 of the plow 57 into position wherein the plow 57 advances forwardly into such a pile of concrete for a portion of the length of the plow 57 from front to rear.

Thereafter, the motor 41 may be energized to thereby move the carriage 5 and the spreader unit 4 either to the left or right, as viewed in FIG. 1. As the spreader unit 4 is thus moved longitudinally of the trusses 2 and 3, it is effective to displace that portion of the pile of concrete against which it moves, and which is disposed above the lower edge of the side walls 58 and 59 forwardly around the front end of the plow 57, while it spreads and smooths off the concrete in the aforementioned pile disposed below the lower edges of the side walls 58 and 59. During such movement of the spreader unit 4, the pan 66 also engages the concrete which has been initially spread and smoothed off by the plow 57, the pan 66 moving laterally into engagement with this concrete. because of the convex-downwardly shape of the lower face 68 of the pan 66, the pan 66 applies a further smoothing action to the concrete originally spread by the plow 57 and also tends to compact the latter. With the eccentric wheels 70 and 71 being driven by the motor 76 during such movement of the spreader unit 4, the pan 66 is vibrated in a vertical direction to thereby afford a further compacting and consolidating action on the concrete across which the pan 66 passes.

With this construction and mode of operation of the spreader unit 4, the plow 57 is effective to initially spread and smooth the concrete across which it passes, and the pan 66 is effective to afford a troweling and floating action, on the concrete across which it passes, as well as a vibration thereof, so that the concrete thus spread by the spreader unit 4 is effectively consolidated and smoothed thereby.

At the end of each stroke of the reciprocation of the spreader unit 4 along the trusses 2 and 3, the spreader unit 4 moves outwardly between the front and rear legs 16 of the machine 1 to a position wherein the apex 60 of the plow 57 moves outwardly past the outer longitudinal edge of the pathway 23. For this purpose, the rails 21 and 22 defining the longitudinal sides of the pathway 23 are of such height relative thereto, that the bottom of the spreader unit 4 will just clear the top of the rails 21 and 22.

At the end of each full stroke in the reciprocation of the spreader unit 4 longitudinally of the trusses 2 and 3, the motor 42 may be de-energized, and the machine 1 may be advanced forwardly along the rails 21 and 22 into position wherein the plow 57 extends forwardly of the front edge of the previously smoothed concrete the major portion of the length of the plow 57 from front to back. Such forward movement of the machine 1 may be effected by any suitable means, such as, manually, or by a suitable power source, not shown. This forward movement of the machine 1 is effective to commence spreading the pile of concrete in the opposite direction, and the motor 41 may then be energized in a reverse direction to move the spreader unit 4 through the other stroke of its reciprocation longitudinally of the trusses 2 and 3. During this

stroke of the spreader unit 4, the excess concrete engaged by the plow 57 is pushed thereby forwardly around the front end 60 thereof, and the concrete disposed at a level below the plow 57 along the path of travel thereof is again spread, smoothed and consolidated by the spreader unit 4.

Referring now to FIGS. 1 and 3, it will be seen that with the machine 1 constructed and operating in the aforementioned manner, and, for example, with the spreader unit 4 making a return stroke from the side rail 21 toward the side rail 22, the spreader unit 4 first may have been moved forwardly to a position wherein it projects the major portion of its length forwardly of the line L_1, FIG. 3, along which the apex 60 of the plow 57 passed during the previous stroke of the spreader unit 4 from the side rail 22 to the side rail 21. During this return stroke of the spreader unit 4, all of the concrete SC_1 behind the line L_1 has been previously smoothed and compacted by the machine 1. The concrete PC_1 which is disposed to the right of the spreader unit 4, as viewed in FIGS. 1 and 3, between the line L_1 and the line L_2, along which the apex 60 of the plow 57 is traveling, is piled or heaped concrete, and the spreader 4 will move into engagement with this concrete PC_1 during this stroke of the spreader 4. At this same time, the concrete PC_2 disposed forwardly of the spreader unit 4 will be piled or heaped concrete which has not as yet been engaged by the spreader unit 4, or which, if it has been previously engaged by the spreader unit 4, has been pushed forwardly around the front end of the plow 57 thereof. The concrete SC_2 to the left of the spreader unit 4, and disposed between the lines L_1 and L_2 is concrete which has been engaged by the spreader unit 4 and has been spread, smoothed and consolidated thereby during this return stroke.

The vertical vibration of the pan 66 is preferably relatively rapid, such as, for example, at the rate of 4000 vibrations per minute. Normally, such vibrations should not have an amplitude of more than one fourth of an inch or less than one thirty-second of an inch and preferably should have an amplitude of between one sixteenth of an inch and one eighteenth of an inch. With the pan 66 vibrating in such a manner, the concrete SC_2 spread by the machine 1 may be smoothed and compacted to a thickness well within the tolerances normally set for roads, runways, and the like.

From the foregoing it will be seen that the present invention affords a novel concrete spreading machine which is effective to initially spread concrete from relatively rough piles, and the like, in a manner wherein the concrete spread thereby is effectively smoothed and consolidated.

Also, it will be seen that the present invention affords a novel concrete spreading machine of the aforementioned type which is capable of effectively striking off such concrete.

Also, the present invention affords a novel concrete spreading machine of the aforementioned type which may be readily operated by relatively inexperienced personnel, and with a minimum number of personnel required for the operation thereof.

In addition, it will be seen that the present invention affords a novel concrete spreading machine which is practical and efficient in operation, and which may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A concrete spreading machine for spreading concrete on an elongated pathway disposed between two longitudinally extending rails, said machine comprising

(a) elongated truss means adapted to extend across said pathway transversely to the length thereof,

(b) wheels on said truss means for supporting said truss means on said rails for movement longitudinally of said pathway, and

(c) means supported by said truss means for spreading concrete transversely across said pathway,

(d) said concrete spreading means comprising

(1) a carriage mounted on said truss means for movement longitudinally thereof,

(2) spreader means suspended from said carriage for spreading heaped concrete transversely across said pathway into a substantially smooth layer of concrete during said movement of said carriage longitudinally of said truss means, and

(3) means for moving said carriage longitudinally of said truss means,

(e) said spreader means comprising

(1) a plow which is substantially V-shaped in horizontal cross section, with the apex of said V-shape being disposed in position to face in the direction of the travel of said truss means along said rails, and

(2) a pan mounted on the bottom of said plow in substantially horizontally extending position, said pan having a bottom which is convex downwardly transversely to the angle of said V-shape.

2. A concrete spreading machine for spreading concrete on an elongated pathway disposed between two longitudinally extending rails, said machine comprising

(a) elongated truss means adapted to extend across said pathway transversely to the length thereof,

(b) wheels on said truss means for supporting said truss means on said rails for movement longitudinally of said pathway,

(c) means supported by said truss means for spreading concrete transversely across said pathway,

(d) said concrete spreading means comprising

(1) a carriage mounted on said truss means for movement longitudinally thereof,

(2) spreader means suspended from said carriage for spreading heaped concrete transversely across said pathway into a substantially smooth layer of concrete during said movement of said carriage longitudinally of said truss means, and

(3) means for moving said carriage longitudinally of said truss means,

(e) said spreader means comprising

(1) a plow which is substantially V-shaped in horizontal cross section, with the apex of said V-shape being disposed in position to face in the direction of the travel of said truss means along said rails, and

(2) a pan mounted on the bottom of said plow in substantially horizontally extending position, and

(f) means operatively connected to said pan for vibrating said pan vertically.

3. A concrete spreading machine as defined in claim 2, and in which

(a) said means for vibrating said pan comprises

(1) eccentrically mounted, rotatable wheel means operatively connected to said pan for so vibrating said pan upon rotation of said wheel means, and

(2) drive means operatively connected to said wheel means for rotating the latter.

4. A concrete spreading machine for spreading concrete on an elongated pathway disposed between two longitudinally extending rails, said machine comprising

(a) elongated truss means adapted to extend across said pathway transversely to the length thereof,

(b) wheels on said truss means for supporting said truss means on said rails for movement longitudinally of said pathway, and

(c) means supported by said truss means for spreading concrete transversely across said pathway,

(d) said concrete spreading means comprising

(1) a carriage mounted on said truss means for movement longitudinally thereof,

(2) spreader means suspended from said carriage for spreading heaped concrete transversely across said pathway into a substantially smooth layer of concrete during said movement of said carriage longitudinally of said truss means, and

(3) means for moving said carriage longitudinally of said truss means,

(e) said spreader means comprising

(1) a plow having two elongated side walls slanting horizontally away from each other in a direction substantially opposite to the direction of said movement of said truss means along said rails,

(2) a substantially horizontally extending pan mounted on said plow in position to afford a bottom wall therefor, and

(3) means operatively connected to said plow and pan for vibrating them and thereby consolidating such a layer of concrete during said spreading thereof.

5. A concrete spreading machine as defined in claim 4, and in which

(a) the bottom of said pan

(1) is substantially convex-downwardly in shape transversely to said movement of said truss means along said rails, and

(2) projects downwardly below said plow.

6. A concrete spreading machine as defined in claim 5, and in which

(a) said vibrating means and pan having a vertical amplitude of vibration of not substantially more than one fourth of one inch and not substantially less than one thirty-second of an inch.

7. A concrete spreading machine as defined in claim 5, and in which

(a) said vibrating means and pan having a vertical amplitude of vibration of not substantially more than one eighth of an inch and not substantially less than one sixteenth of an inch.

8. A concrete spreading machine for spreading concrete on an elongated pathway disposed between two longitudinally extending rails, said machine comprising

(a) elongated truss means adapted to extend across said pathway transversely to the length thereof,

(b) wheels on said truss means for supporting said truss means on said rails for movement longitudinally of said pathway, and

(c) means supported by said truss means for spreading concrete transversely across said pathway,

(d) said concrete spreading means comprising

(1) a carriage mounted on said truss means for movement longitudinally thereof,

(2) spreader means suspended from said carriage for spreading heaped concrete transversely across said pathway into a substantially smooth layer of concrete during said movement of said carriage longitudinally of said truss means, and

(3) means for moving said carriage longitudinally of said truss means,

(e) said spreader means comprising

(1) a plow having two elongated, substantially horizontally extending side walls slanting horizontally away from each other in a direction substantially opposite to the direction of said movement of said truss means along said rails,

(2) a substantially horizontally extending pan mounted on said plow in position to afford a bottom wall therefor, and

(3) means operatively connected to said plow and pan for vibrating them and thereby compacting such a layer of concrete during said spreading thereof,

(f) the bottom of said pan

(1) being substantially convex-downwardly in shape transversely to said movement of said truss means along said rails,

(g) said truss means including two horizontally spaced, substantially parallel side rails extending longitudinally thereof, and

(h) said carriage including

(1) wheels operatively mounted on said side rails for moving said carriage therealong, and

(2) other wheels engaged with said side rails in position to hold said first mentioned wheels on said side rails.

9. A concrete spreading machine for spreading concrete on an elongated pathway disposed between two longitudinally extending rails, said machine comprising

(a) elongated truss means adapted to extend across said pathway transversely to the length thereof,

(b) wheels on said truss means for supporting said truss means on said rails for movement longitudinally of said pathway, and

(c) means supported by said truss means for spreading concrete transversely across said pathway,

(d) said concrete spreading means comprising

(1) a carriage mounted on said truss means for movement longitudinally thereof,

(2) spreader means suspended from said carriage for spreading heaped concrete transversely across said pathway into a substantially smooth layer of concrete during said movement of said carriage longitudinally of said truss means, and

(3) means for moving said carriage longitudinally of said truss means,

(e) said spreader means comprising

(1) a plow having two elongated, horizontally extending, transversely upstanding side walls slanting horizontally away from each other in a direction substantially opposite to the direction of said movement of said truss means along said rails,

(2) a substantially extending pan mounted on said plow in position to afford a bottom wall therefor, and

(3) means operatively connected to said pan for vibrating it and thereby consolidating such a layer of concrete during said spreading thereof

(f) the bottom of said pan

(1) being substantially convex-downwardly in shape transversely to said movement of said truss means along said rails, and

(2) projecting downwardly below said plow

(g) said means for vibrating said pan comprising

(1) supporting means mounted on said pan

(2) a pair of wheels eccentrically rotatably mounted on said supporting means in position to vibrate said supporting means and said pan upon rotation of said wheels, and

(3) drive means mounted on said carriage and operatively connected to said wheels for rotating the latter, and

(h) said plow and pan being yieldingly supported from said carriage by resilient means operatively connected between said carriage and said plow and pan for isolating such vibrating of said pan from said carriage.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,392,641 July 16, 1968

John E. Kessel

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 10, line 44, after "substantially" insert -- horizontally --.

Signed and sealed this 16th day of December 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents