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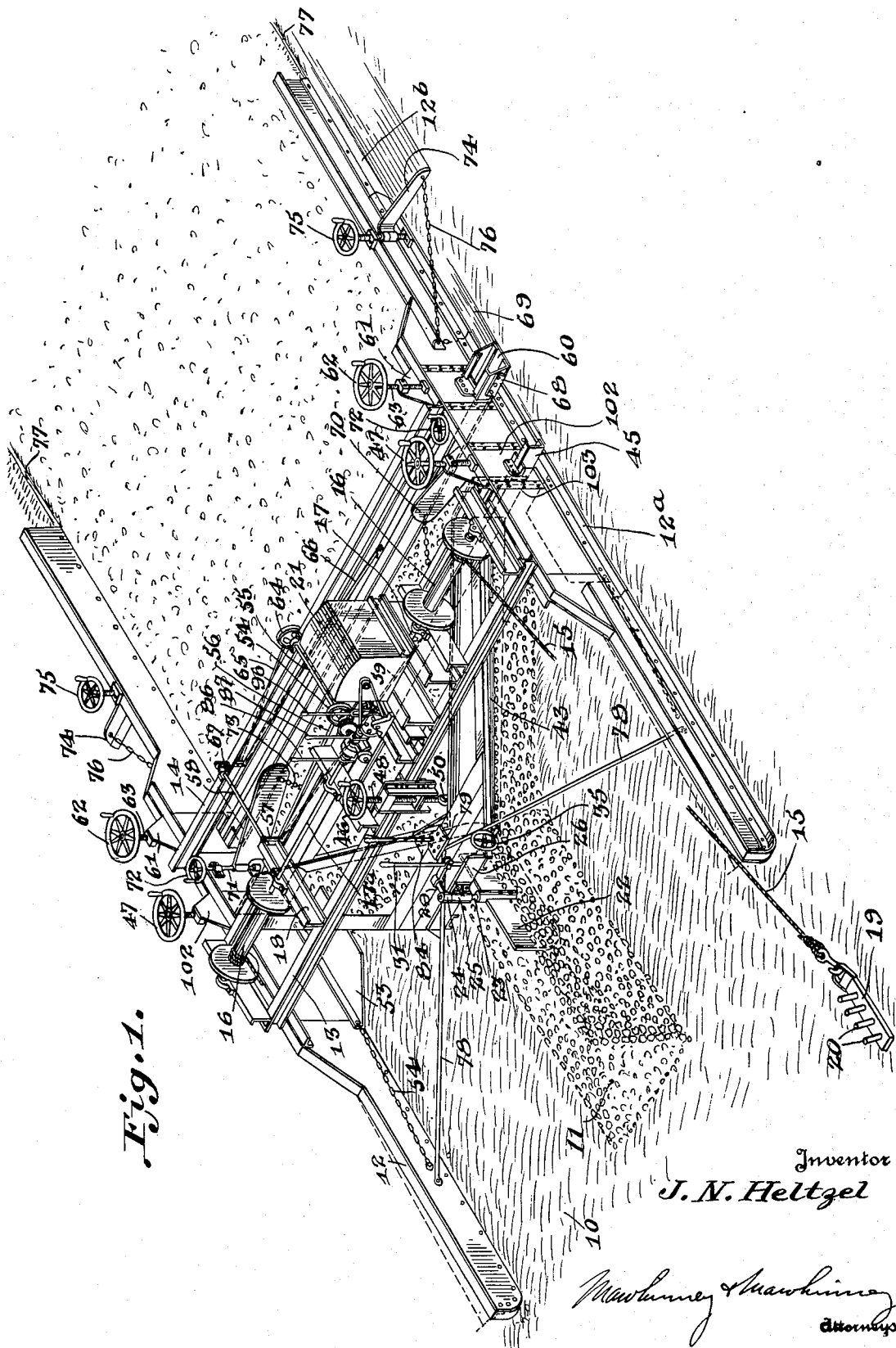
J. N. HELTZEL

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STONE SPREADING MACHINE

Filed Jan. 7, 1932

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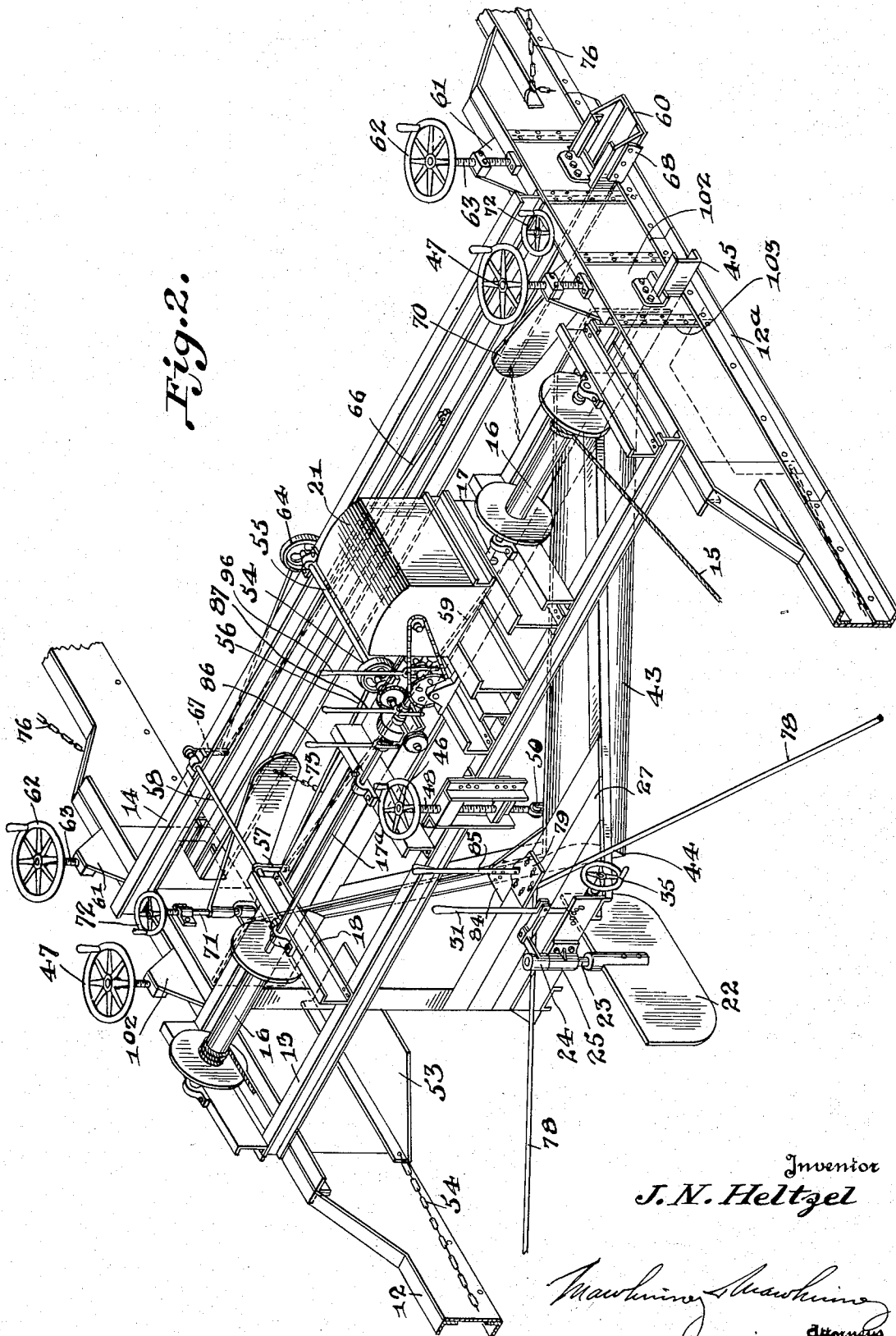
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STONE SPREADING MACHINE

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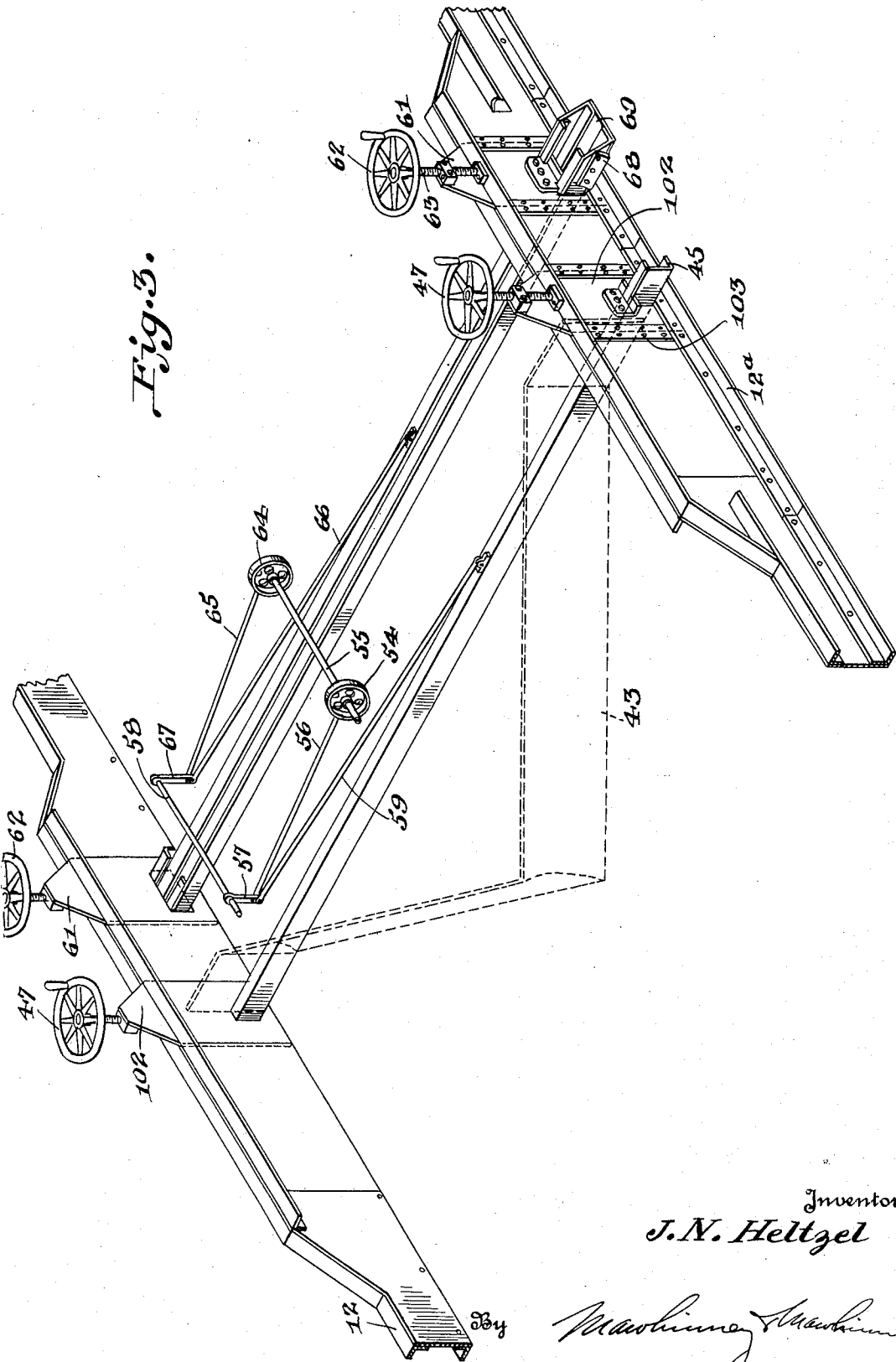
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Fig. 3.



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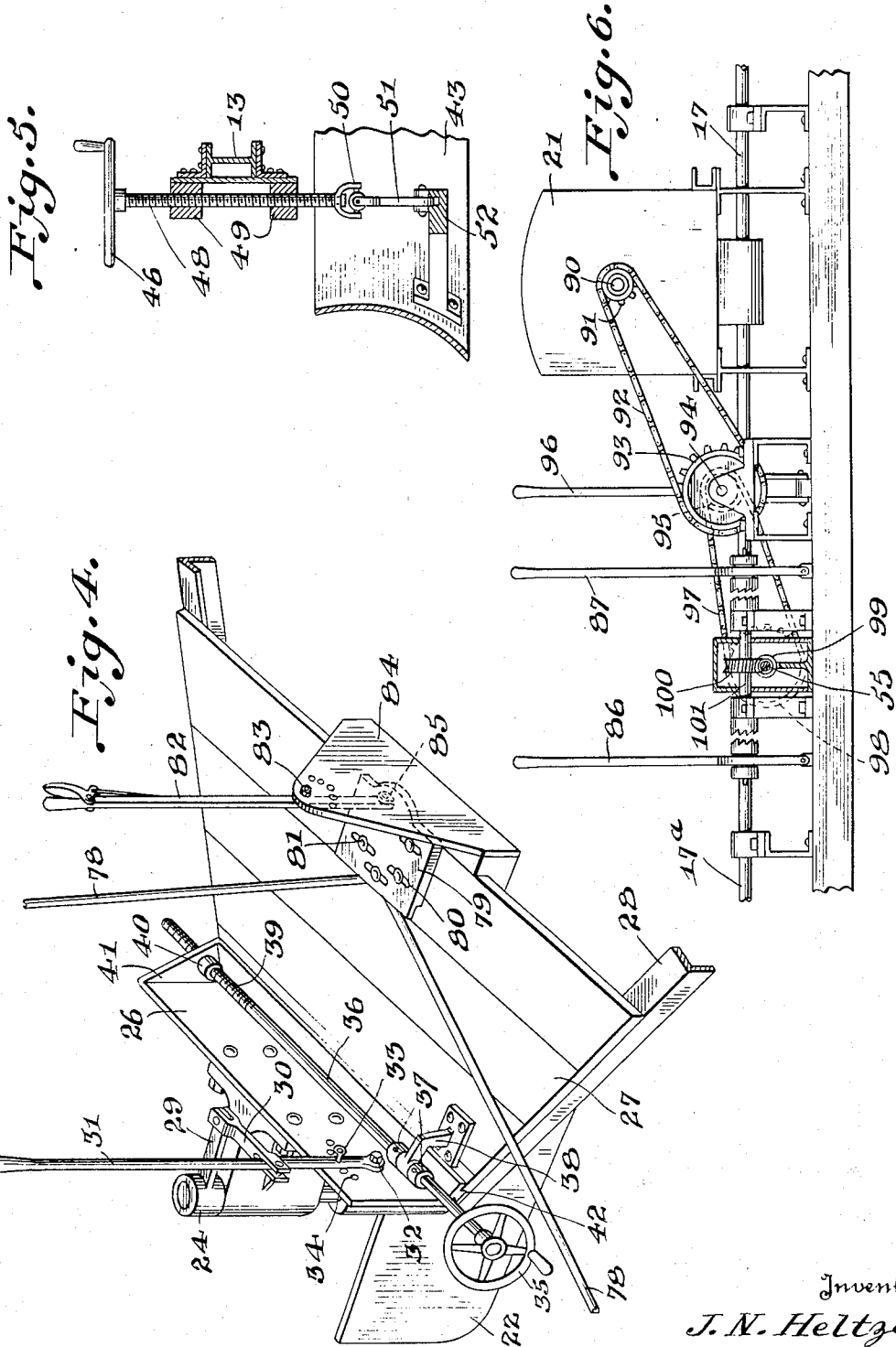
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STONE SPREADING MACHINE

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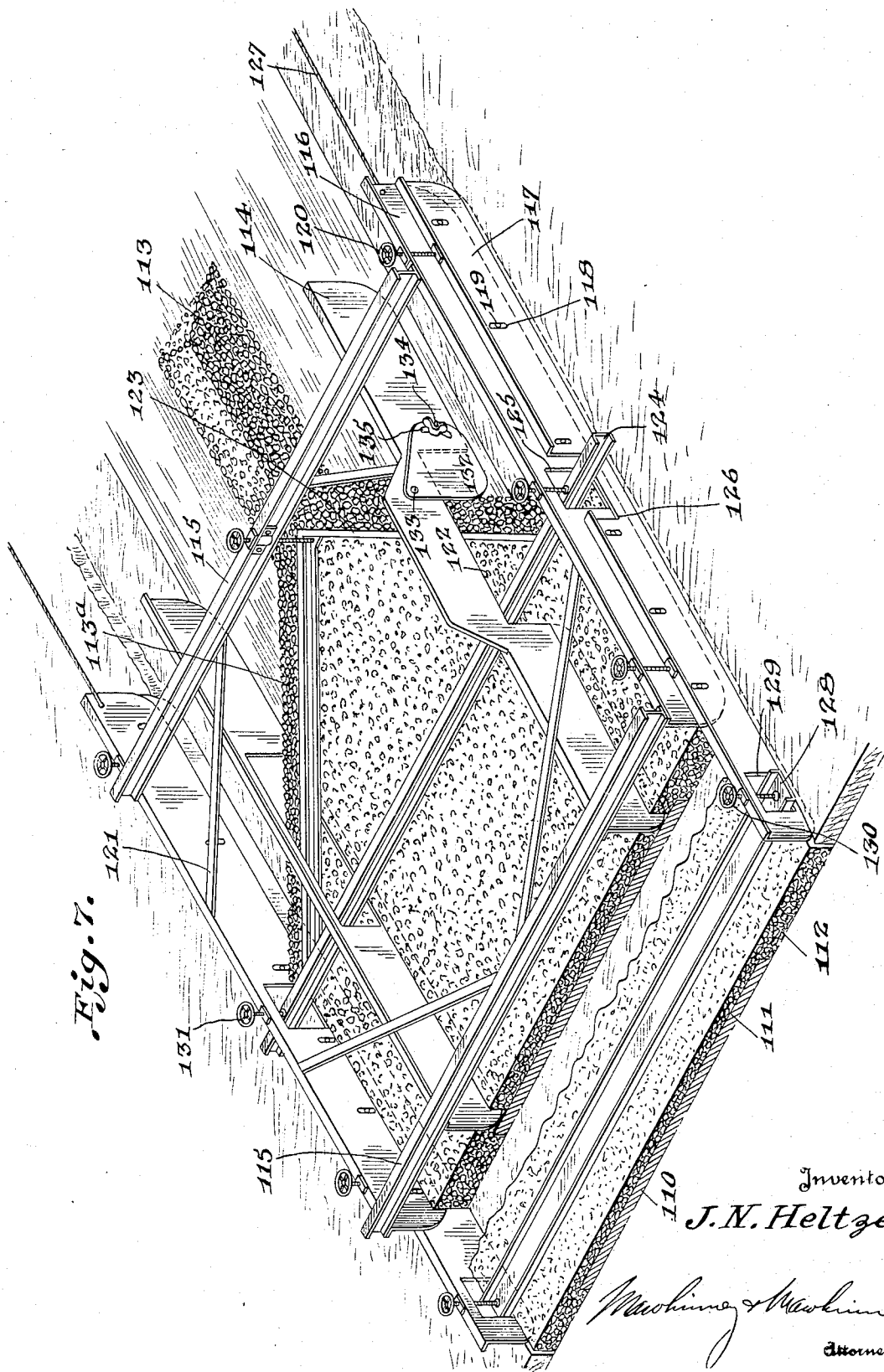
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STONE SPREADING MACHINE

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UNITED STATES PATENT OFFICE

2,065,698

STONE SPREADING MACHINE

John N. Heltzel, Warren, Ohio

Application January 7, 1932, Serial No. 585,347

15 Claims. (Cl. 94-44)

The present invention relates to improvements in stone spreading machine, and has for an object to provide an improved machine for use in the spreading of stone or macadam roads or for the base courses of roads.

The machine will find a wide use in connection with the retreading of old macadam roads where it is required to spread stone coated with tar or asphalt; and such machine is also so designed that it may be used for the building of sand asphalt roads or for the spreading and leveling of materials which are mixed in place.

The invention further aims to provide an improved machine for leveling the berme or dirt shoulder at the sides of the road.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a perspective view of an improved stone spreading machine constructed in accordance with the present invention and shown in a position of use.

Figure 2 is a similar view, with parts broken away and taken on an enlarged scale.

Figure 3 is also a fragmentary perspective view with parts omitted to more clearly show the reciprocating devices.

Figure 4 is a fragmentary perspective view showing the forward portion of the machine.

Figure 5 is a vertical section taken through the central blade supporting device.

Figure 6 is a view in elevation, with parts shown in section and parts broken away of the motor and driving devices, and

Figure 7 is a perspective view showing a modified form of apparatus.

Referring more particularly to the drawings in Figure 1, 10 designates the subgrade or the base of a road, and 11 represents crushed stone, slag or other desired material which is to be spread upon the subgrade 10 by the machine. Such material may be either plain or saturated with tar or asphalt material; and it will preferably be delivered upon the subgrade in a windrow substantially centrally of the road. If preferred such material may be roughly spread over the subgrade when it is first deposited.

The improved machine is supported on side runners or skids 12 which support a desired number of transverse members 13 and 14 by which the runners are tied together to constitute a machine

frame for carrying the various machinery required.

The machine is pulled forward by the use of cables 15 wound about drums 16 carried on the machine and mounted upon the transverse follower shaft 17 which is mounted in appropriate bearings carried upon the short longitudinal beams 18.

The forward ends of the cables 15 are secured to the anchors 19 which anchors are fastened by the stakes 20 to the subgrade 10 in advance of the machine.

The machine carries its own power plant or motor 21 mounted at a convenient position upon the machine frame and having appropriate connections for driving the various mechanical agencies hereinafter referred to as well as the shaft 17 and the drums 16. By rotating the shaft 17 and the drums 16, the cables 15 will be wound upon the drums thus pulling the machine forward. At the same time the various leveling members are reciprocated laterally in order to accomplish the even and uniform distribution of the stone throughout the area of the roadway.

At the front of the machine is carried a rudder or deflecting member 22 supported and rotatably mounted about the pivot 23 on the upper end of which is fixed a collar 24 for supporting the pivot and the member 22 upon the bearing sleeve 25, which bearing sleeve is bolted or otherwise affixed to a front plate 26 fixed upon the machine frame, as upon the forward part of a platform 27 carried upon the convergent angle iron or braces 28 forming part of the frame.

The cap collar 24 is provided with an arm 29 to which is pivoted a link 30 engaging a hand lever 31 pivoted, as indicated at 32 upon the front plate 26, as shown in Figure 4.

A removable pin 33 upon the lever 31 is insertible in a selected perforation 34 of an arcuate series of perforations made in the front plate 26, whereby the lever 31 may be held in the desired angular adjusted position. By moving this lever 31 back and forth about its pivot 32, through the link 30 and arm 29 a rotary movement will be imparted to the pin 23 and the rudder or deflecting member 22 causing the same to assume a desired angular or straight position with respect to the forward movement of the machine, thus deflecting the stone material from the windrow to one side or the other. The pin 33 will lock the lever and the rudder in the adjusted position, whereby there will be an equal distribution of the material on the roadway.

The rudder or deflecting member 22 is also capable of a lateral movement by manipulating the hand wheel 35 which hand wheel, as shown in Figure 4, is mounted upon a transverse shaft 36 having a rotary movement but restrained against longitudinal or axial movement by the collars 37 mounted at opposite sides of the supporting bearing bracket 38 which is carried by the platform 27. A screw threaded portion 39 of the shaft 36 engages a nut part 40 in an end wall 41 of the front plate 26, which front plate is dove-tailed or otherwise slidably mounted for lateral movement across the machine in the forward part of the platform 27, as indicated at 42 in Figure 4.

In rear of the deflecting member 22 are a pair of curved blades 43 converging forwardly and meeting in a central ridge 44. These curved blades are connected together and also to a laterally reciprocating leveling or screed member 45 which projects through the side runners. This leveling unit, consisting of the two blades 43 and screed member 45 is adjusted up and down by means of a central screw threaded adjusting device 46 and side adjusting devices 47 in order to accommodate the device to various thicknesses in the spreading of the stone as might be required.

As shown in Figure 5 the central hand wheel or adjusting device 46 is mounted upon a screw threaded shaft 48 movable up and down by rotation in the supporting nuts 49 carried upon one of the beams 13 of the framework. At its lower end the screw adjusting shaft 48 carries a universal joint 50 connected by a link 51 to a brace 52 secured to the blade 43. The universal joint will permit of the lateral reciprocation of the unit while acting to suspend same and effect vertical adjustment.

The machine is also provided with material conveyors 53, which are trailed on the inside of the machine by the chains 54. These conveyors hold excess stone material, which accumulates forwardly of the spreader 43. Such surplus material will be trailed or moved along or conveyed by the conveyors 53 to be discharged therefrom at points along the roadway where there is insufficient material caused by the unequal depositing of the stone or the material on the sub-grade.

The screed or surfacer 45 is reciprocated laterally by the eccentric 54, which is on the shaft 55 driven from the motor or power plant 21 by appropriate gearing.

The eccentric 54 is connected to a rod 56 as shown in Figure 3 which rod is coupled to the depending arm 57 on a shaft 58. To the arm 57 is also coupled a rod 59 extending over and pivoted to the spreader or screed member 45.

The machine is also provided with a laterally reciprocating member 60 crowned to conform to the top surface of the finished stone surface, which member may consist of a heavy beam roughened more or less at its forward surface so as to engage the particles of stone and agitate the stone and manipulate the various particles of material in such a way as to key the stone in position. While this member will serve as a surfacer, it will also locate or key the stone in position so that the various particles of stone are overlapping, causing the stone to be placed in the keyed position, producing a cross section which will be as free from voids as possible, and securing a homogeneous structure, which, when finally rolled and compacted, will be free from

pockets or depressions as has been the case when the stone material has been loosely laid.

The member 60 projects through the side members of the machine in which are inserted vertically movable plates or slides 61 movable up and down by the hand wheels 62 through the action of the screw adjusting shafts 63. The keying member 60 projects through an opening in the plate 61 whereby the keying member 60 may reciprocate and at the same time be capable of vertical adjustment. The keying member 60 is reciprocated as shown in Figure 3 by the eccentric 64 through the rods 65 and 66 and the arm 67.

The keying member 60 carries one or more grader blades 68 lying outside of the runners of the machine for the purpose of planing down the dirt shoulder on the outside of the runner. The dirt shoulder after being cut down is indicated in Figure 1 at 69.

In order to deflect any surplus stone which might accumulate on the inside of the runners, I have provided the adjustable wings or plates 70 pivoted to the runners or to other appropriate parts as for instance upon the screw adjusting shafts 71 and are adjusted up and down from the hand wheels 72. The free ends of these wings or plates are held in place by chains 73 attached to appropriate parts of the framework.

Additional wings or plates 74 are provided extending outwardly of the runners and mounted upon the screw adjusting shafts 75 by which the same may be raised or lowered. These wings or plates 74 act as additional shoulder scraping devices or they are employed for shoulder building or for leveling. The chains 76 hold the blades 74 to various angular positions. When it is required to move dirt away from the runners, the members 74 will be allowed to swing back in an angular retreating position with respect to the runners deflecting the material away from the runners. When such blades 74 are pulled forwardly by shortening the chains 76, so that such blades assume a forward angular position, the material will be directed toward the runners.

The runners are provided with base portions 12a which are cut away at the points indicated at 12b. This removal will minimize the agitation of the dirt shoulder after it has been thrown against the outside of the runner attended by a reduction in the cleft 77 between the dirt shoulder and the stone to a minimum width, whereby there will be very little or no slumping of the material into the cleft.

To manipulate the machine on curves, provision is made for warping or deflecting the forward reduced portions of the runners 12 as indicated by dotted lines in Figure 1, and to this end radius rods 78 are secured to the runners 12 and to a lateral sliding plate 79, as shown in Figure 4, such plate being provided with slots 80 to receive there-through the fastening means or guide members 81 which confine the plate to permit its lateral sliding movement under the direction and action of the hand lever 82 pivoted at 83 upon the plate 84 and having a pivotal connection to the plate 79 as indicated at 85. The radius rods 79 will be rigid enough to exert pressure against the runners to force the runners out or pull the same in as the case may be in rounding a curve. By manipulating the lever 82 the runners may be curved or warped to a limited extent so as to negotiate the curve in the roadway.

It will also be understood, as shown in Figure 6, that separate clutches 86 and 87 upon the shaft 17 are provided for coupling either end of that

shaft and its entrained cable drum 16 or for operating both drums simultaneously. Either drum may thus be operated independently of the other which arrangement will be additionally desirable in negotiating curves. The drums will be connected for united operation when the machine is driven in a straight path. It is to be understood that the machine is assembled in units that may be easily handled to and from the work.

Referring more particularly to Figures 2 and 4, the power plant 21 is shown as having a shaft 90 carrying a sprocket 91 engaged by a chain 92. This chain 92 is also engaged with a sprocket 93 on a shaft 94. On this same shaft is a sprocket 95. Between the sprockets 93 and 95 is a clutch 96 for throwing the entire mechanism out of operation when desired.

The sprocket 95 is engaged by a chain 97 which runs over a sprocket 98 on the eccentric shaft 55. A worm 99 on the eccentric shaft engages a work wheel 100 on the intermediate section 101 of the drum line shaft. The end portions 17 and 17a of the drum line shaft which are fixed to the drums 16 have clutches 86 and 87 for engaging the same either simultaneously or individually with the center shaft section 101 which is driven by the power plant 21 through the train of gear connections outlined.

The screed 45 in a manner similar to the keying member 60 extends slidably through vertically adjustable plates 102 which are made adjustable by means of the hand wheels 47. These adjustable plates 42 slide in guideways 103 provided upon the side runners of the device.

In operation, the power plant 21 will draw the machine forwardly on the runners 12 by winding the cables 15 upon the drums 16 when the various clutches 86, 87 and 96 are engaged.

The crushed stone or other material is dumped upon the subgrade 10 in a windrow 11 or otherwise. As the machine proceeds, the deflecting rudder 22 will pass through the stone dividing the same and deflecting it to one side or other of the rudder. The rudder may be angularly adjusted about its pivot pin 23 to deflect the stone more to one side than the other if desired, and the rudder may also be adjusted laterally through the action of the hand wheel to bring it to a desirable position with respect to the lateral line of the roadway and machine.

As the machine follows along the spreader members 43 will encounter the stone and will act to spread the same outwardly toward the runners 12, such action being facilitated by the transversely reciprocatory movement given to the spreading blades 43 by the action of the eccentric 54.

The screed 45 which forms a unitary structure with the curved spreading blades 43 will also act to smooth down the stone to the proper surface level which level will be uniform throughout the entire surface of the roadway.

There follows the keying member which will compact and key the various stones into the road in overlapping relation with one another, which action is also considerably enhanced by the reciprocating movement given to this keying member 60.

The conveyors 53 will carry surplus stone along which may be filled in as needed; and the deflecting blades 70 and 74 may be adjusted as required to move the stone on the inside and the earth on the outside either toward or from the runners.

The resultant bed of the roadway will be firmly compacted and keyed together into a homo-

geneous whole and this result will be accomplished quickly and inexpensively with the improved machine.

Referring more particularly to Figure 7, the principal feature involved in this modified construction is the arrangement and location of the supporting runners, which hold the machine to proper elevation, and are slid along on the old road bed rather than on the berm, as will be described later.

The old road bed is represented at 110 and the retreading material is indicated at 111 as having been placed over the old road bed 110 and extending outwardly beyond the sides thereof to build up and widen the old road.

It will be understood that the substance used for the retreading may consist of any suitable material, such as tar or asphalt mixed with stone or any other desired material. It will furthermore be understood that even concrete could be used for this purpose but it is more particularly adaptable for spreading a bituminous type of material. In the forepart of Figure 7 it is clearly brought out how the road has been widened and a thickened edge 112 has been constructed to form a curbing or header beyond the sides of the old road 110.

The operation of the machine is substantially the same as heretofore described. The stone, or other retreading material, being indicated at 113 and being deposited upon the old road 111 in advance of the machine. Spaced apart so as to rest directly upon the old road bed 110 are runners or longitudinal skids 114 which sustain the spreading machine and its operating parts to the proper elevation. In the previous forms of the invention, the skids or runners were operated on the berm or dirt shoulder of the roadway; whereas the runners 114 operate directly on the top surface of the old road bed so that such runners 114 will not cut into the soft subgrade or berm.

Transverse supporting members 115 are mounted on the runners or skids 114 and support the side wings 116 at their outer portions beyond the runners 114. The side wings 116, suspended from the beams 115 will terminate short of the ground but are provided with supplemental adjustable wings 117 which are arranged for vertical adjustment on the wings 116 by the use of slots 118 and bolts 119 or other appropriate fastening means. Such side wings 116 and their supplemental wings 117 do not support the machine and are spaced apart a distance substantially equal to the width required for the resurfaced road. Adjusting screws 120 are mounted through the wings 116 and carry the supplemental wings 117 for the purpose of raising and lowering the same. These adjusting screws 120 may also be used as the suspending means for the supplemental wings 117, the bolts 119 being used as mere guide means. The form is supplied with cross braces 121 to hold the machine in position. In the runners 114 are openings 122 through which the V-shaped spreader 123 and the transverse surfacer 124 project. The wings 116 are provided with similar openings 125 and the supplemental wings 117 are formed with openings or cut-away portions 126 through which the ends of the transverse surfacer member 124 project.

The resurfacing or retreading material is shown at 113 as being deflected by the V-shaped spreader 123. The material is projected by the spreader through the openings 122 in the runners 114, and this spreading or deflection of the material continues until such material comes

into contact with the outside wings 116 and 117, which limit the lateral spread of the material. It will be understood that this spreading operation is done simultaneously as the spreading machine is pulled forward by the cables 127 which are attached to a tractor, truck or other suitable means.

The skids or runners 114 will produce a channel or groove in the material, and in order to close up the groove rearwardly of the runners, the final surfacer 128 operates on the material to take care of the final spreading or surfacing operation. The surfacer 128 projects through the openings 129 in the supplemental wings 117 and is adjusted up and down by the hand screws 130. Hand screws 131 are also provided for adjusting the forward spreader 124 up and down or as to height. The runners 114 may be provided with the gates 132 to regulate or retard the flow of the stone 113^a through the forward portions of the openings 122.

The gate is pivoted at 133 and is adjustable by a wing nut and bolt arrangement 134 projecting through an arcuate slot 135 in the plate 132.

It will be understood that these surfaces may be reciprocated if desired; however, in most cases it will not be necessary to reciprocate the spreaders and particularly inasmuch as the machine described herein is drawn by a truck or tractor, it would not be desirable to reciprocate the spreaders.

It is obvious that various changes and modifications may be made in the detail of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. In a road building machine, a movable machine frame, a laterally movable spreader means carried by said frame, means to impart a lateral vibration to said spreader means, a deflecting rudder pivotally mounted on the frame in advance of said spreader means, and means for angularly adjusting said rudder.

2. In a road building machine, a movable machine frame, a laterally adjustable and pivoted deflector at the forward portion of the frame, a unitary spreader and screed mounted for lateral movement in the frame behind said deflector, and keying means movably mounted in the frame in rear of the screed.

3. In a road building machine, runners having openings therein, vertically adjustable plates in the openings also having openings therein, a screed reciprocating transversely through the openings in said plates and a spreader member carried by said screed.

4. In a road building machine, runners having openings therein, plates vertically adjustable in said openings and having openings therein, a keying beam transversely reciprocating through the openings in said plates, and means for imparting reciprocating movement to said beam.

5. A road building machine of the character described, comprising longitudinal spaced runners supported on the sub-base of a road under construction for longitudinal movement, said runners having a plurality of openings, and a plurality of transversely reciprocating surfacing members, projecting through the openings, to surface road materials positioned between said runners.

6. A road building machine of the character

described, comprising spaced longitudinal runners to operate on the sub-base of a road under construction, each runner having an opening therein, a transverse surfacing member projecting through said openings and extending laterally beyond the extremes of the longitudinal runners so that said surfacing member will surface the road building material positioned between the runners and simultaneously surface the shoulder or berm longitudinally of the roadway outside said longitudinal runners.

7. A road building machine of the character described, comprising spaced longitudinal runners to operate on the sub-base of a road under construction, transversely reciprocating surfacing members to project laterally through openings in said runners, and deflector elements associated with the machine between the runners to deflect the material positioned between the runners to regulate the flow of material forwardly of at least one of the surfacing members.

8. A road building machine, comprising spaced longitudinal runners to operate on the hard road surface at points short of the width of the road, and a second longitudinal runner spaced apart from said first named runners to define the outer edges of the spread material.

9. A road building machine of the character described, comprising a pair of spaced longitudinal runners to operate on the road bed to be surfaced, a second pair of runners spaced from first named runners, transverse members supported by the first named longitudinal runners, and the second named runners being supported by said transverse members for movement longitudinally of the road with the first named longitudinal members and substantially in a suspended position out of contact with the berm of the roadway.

10. A road building machine of the character described, comprising spaced longitudinal inner supporting runners having openings for passage of material therethrough to be spread laterally, second longitudinal members to limit the lateral spread to define the edges of the spread material, and means associated with the lateral members to effect the spreading of materials.

11. A road building machine of the character described, comprising a pair of spaced longitudinal members to be moved longitudinally of a roadway under construction, said members having passages to permit road building material to be projected laterally therethrough, a pair of outer runners spaced from said members to define the lateral spread of said material, and means associated with the machine to surface the material.

12. A road building machine of the character described, comprising inner spaced longitudinal runners to be supported for longitudinal movement over an old road surface, a transverse spacing member supported on said runners, a pair of outside runners supported by said transverse members and so arranged that the first named members will support the weight of the outside members to define the width of the spread of the road building material positioned between the runners, and means for spreading and surfacing said material.

13. A road building machine of the character described, comprising inner spaced longitudinal runners to be supported for longitudinal movement over an old road surface, transverse spacing members supported on said runners, a pair of outside runners supported by said transverse

members and so arranged that the first named runners will support the weight of the outside runners to define the width of the spread of the road building material positioned between the runners, means for spreading and surfacing said material, and means for vertical adjustment of the outside member.

14. In a road building machine, a movable machine frame, pivotal deflecting means carried by the frame, and means for moving said deflecting means bodily transversely of the frame.

15. A material spreading machine for road construction comprising spaced runners to define the lateral spread of road building material, said runners having openings laterally therethrough, laterally-reciprocating surfacing means to slide snugly through said openings preventing discharge of said material therethrough, and means for reciprocating said means progressively as the machine is moved forward.

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