ABSTRACT: A spreader-compacter assembly 21 of an aggregate spreader is attachable to arms 46 of a circle of an existing grader, and is driven by a drive assembly 40 attachable to rigid arms 42 fixed to the circle. The spreader-compacter assembly has independently and reversibly driven augers 26 and 28, a striker blade and a vibrated screed. Shoes 34 and side plate extensions 32 bracket the augers and the striker, and the shoes engage the subgrade.
This invention relates to an auger type aggregate spreader, and more particularly to a spreader-compactor attachment which can be substituted for a blade of an existing grader.

An object of the invention is to provide a new and improved auger type aggregate spreader.

A further object of the invention is to provide a spreader-compactor attachment which can be substituted for a blade of an existing grader.

A further object of the invention is to provide an aggregate spreader which applies to a subgrade a compacted layer of aggregate of a precise thickness and a precise width.

Another object of the invention is to provide an auger type of aggregate spreader which can be easily substituted for a blade of an existing grader.

Another object of the invention is to provide a spreader having a pair of sidewalls and a pair of sidewall extensions which bracket augers and a striker blade.

A further object of the invention is to provide a spreader having auger means, a striker and a screed mounted in tandem.

The invention provides an auger type aggregate spreader including a pair of augers positioned ahead of a striker and a pair of sidewall means extending to the subbase bracketing at least the augers and preferably bracketing both the augers and the striker a screed is supported by a frame mounting the augers and the striker. The augers, the striker, the sidewalls and the frame preferably are mounted on cylinder adjusted arms carried by a circle of a grader, and a drive assembly including a motor and a pair of transmissions, one for each of the augers, preferably mounted on fixed arms of the circle. The screed may be driven by the drive assembly and preferably is supported by resilient mounts on arms projecting rearwardly from and fixed to the striker.

In the drawings:

FIG. 1 is a fragmentary side elevation view of a spreader forming one embodiment thereof mounted on a grader;

FIG. 2 is an enlarged, fragmentary, vertical sectional view of a portion of the spreader of FIG. 1;

FIG. 3 is an enlarged isometric view of the spreader of FIG. 1; and

FIG. 4 is an enlarged, fragmentary, isometric view of the spreader of FIG. 1.

Referring now in detail to the drawings, there is shown therein an aggregate spreader 20 quickly attachable to and detachable from a frame 22 of a known, commercially available grader 24 including a frame 23, steering and driving wheels 25 and driving engine housed in a compartment 27. The circle is carried by a subframe 27a having its front end connected to the frame 23 by a ball joint (not shown). The subframe and circle can be raised and lowered and can be tilted sidewise by a pair of geared hydraulic motors 28a, one on each side of the frame 23 and connected to the subframe through shafts in tubular housings 29, crank arms 29a, and link 29b to any desired angle. The spreader includes a spreader-compactor assembly 31 having aligned spreading augers 26 and 28 of opposite pitch, each of which is independently and reversibly driven. The spreader spreads or levels the aggregate to produce approximately the desired level on side plates 30 forming part of the spreader-compactor assembly 31 and carrying adjustable drop plates or side plate extensions 32 having ground-engaging sledlike shoes 34. The spreader-compactor assembly also includes a striker blade 36 which finishes leveling the material and vibrating screed 38 which thereafter compacts the material.

The spreader also includes a drive assembly 40 mounted rigidly on the circle by rigid arms 42 as hereinafter described, the drive assembly being drivenly connected to the augers by flexible drives 44. The spreader-compactor assembly 31 is mounted on pivotal arms 46 pivoted on the rigid arms 42, and as such is adjustable to elevation and side slope by adjustment of the circle by the motors 28a, and as to forward tilt by pivoting of the arms 46 on the rigid arms 42 by double-acting hydraulic cylinder units 48 connected between the rigid arms 42 and the pivotal arms 46. The rigid arms 42, the pivotal arms 46 and the cylinder units 48 are standard components of the grader 24. A motor generator set 50 is mounted on a framework 52 at the rear of the grader 24, to provide electrical power for the drive assembly 40.

The spreader-compactor assembly 31 provides a rigid structure 60 including the blade 36 and the side plates 30 which are welded to the blade to form a generally U-shaped member. This rigid structure also includes gussets 62 welded to the blade and the side plates and parallel, rearwardly extending, rectangular bearing mounting tubes 64, a screed-mounting forked bracket 66 and rigid, parallel, rearwardly extending, screed-mounting arms 68, all welded to the back of the blade. The screed-mounting arms 68 and the bracket 66 support the screed 38 through flexible connections 70 and 71, respectively, each including a rubber element 73. The rigid structure 60 also includes coupling blocks 72 welded to the back of the blade each having a pair of T-bars 74 which fit closely and slidably into a pair of T-slots 76 in one of the pivotal arms 46 as shown in FIG. 2. Retainer plates (not shown) bolted to the sides of the arms 46 overlap opposite ends of the T-bars to lock the T-bars in the T-slots 76 and hold the structure 60 against movement relative to the arms 46.

The side plates 30 include inner plate members 80 and outer plate members 81 having top, bottom and vertical longitudinal arcuate differences 82, 84 and 86 welded to the inner faces of the plates 80 and 81. Bearings 88 are bolted through the side plates 30 and bearings 90 are supported by a rigid plate 92 welded to the forward face of the blade 36 and braced by gussets 94. The bearings 88 and 90 receive shafts 96 of the augers 26 and 28 with each shaft 96 carrying at its outer end a sprocket 98 driven by a chain 100 driven by a sprocket 102.

The side drop plates 32 include vertical plate members 110 carrying the shoes 34 and slidably abutting in overlapping relationship the outer faces of the plate members 81 of the side plates 30. The side drop plates extend below the lower edge of the striker blade 36 and the lower edges of the side plates which are above the grade to which the aggregate is to be formed. Vertical slides 112 bracket vertical guides 114 extending downwardly over the outer faces of the plate members 110 and mounted on spacer blocks 116 rigidly secured to the side plates 30. The guides hold the plate members 110 against the side plates 30 and, with the slides 112, guide the drop plates 32 for vertical movement. Double-acting hydraulic cylinder units 120 pivoted to brackets 123 rigidly fixed to the side plates 30 and also pivoted at their lower ends to the frame 23 adjust the drop plates vertically relative to the side plates and hold the drop plates in adjusted positions in which the shoes 34 engage the subgrade.

The plate members 110 have clearance notches 130 for the bearings 88, the notches 130 being braced by U-shaped plates 132 and tabular spacers 134 welded to the shoes and the plate members 110.

The drive assembly 40 has a cradle or mount 140 including end plates 142 detachably bolted to the rigid arms 42 and a bed 144 on which a motor 146 is supported. An electric motor is shown although a hydraulic motor or a mechanical drive from a power takeoff from the scraper motor can be employed. The motor drives reversible transmissions 148 supported in notches 150 in the end plates by mounting angles 152 and locked therein by keeper rods 152 secured to the end plates. The transmissions 148 are connected to the flexible driver 44, each of which includes a universal joint 154, a slip joint 156 and a shaft 158 keyed to the sprocket 102. The shafts 158 are mounted in self-aligning bearings 160 carried by the arms 46.

The screw 38 includes a top plate 170 carried by the flexible connections 70 and 71 and having a U-shaped spreaded plate 172 fixed rigidly thereto, the screw plate having rounded front and rear edges 174. End plates 176 are welded to the screed plate and the top plate. A vibrator shaft 178 modeled
in bearings 180 on the top plate is driven by a motor 182 mounted on a bracket 183 on the top plate. Eccentric weights 184 having split clamp portions 186 are keyed to the shaft by keys positioned in keyways 188.

As shown in FIG. 4, gussets 190 brace the rear ends of the shoes 34 of the side plate extensions 32 and, as shown in FIG. 3, a pair of gauge arms 192 slidable in guides 194 and fixed pivotally to the shoes indicate adjustment of the shoes both as to the distance the shoes extend below the lower edge of the striker blade 36 and the longitudinal inclination of the shoes with respect to the side plates 30.

The above-described aggregate spreader spreads and compacts material in a layer of a precise, uniform thickness and of a precise, uniform width. The spreader is easily attached to an existing grader merely by removing the blade and attaching the spreader and the engine generator set 50. The spreader is simple, rugged and easily and precisely adjustable. It is particularly useful as a base rock spreader but is also useful for spreading and compacting other forms of aggregate.

I claim:

1. In a spreader:
   a pair of sidewalls;
   auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   mounting means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   the mounting means being adjustable for adjusting the sidewall extensions vertically relative to the sidewalls; and
   vehicle means means mounting the sidewalls, the sidewall extensions, the auger means and the striker means for vertical adjustment to position the sidewall extensions at a sub-grade.

2. The spreader of claim 1 including means attached to the striker means for attaching the striker means to arms pivotally mounted on rigid arms of a grader.

3. The spreader of claim 2 including a drive frame attachable to rigid arms of the grader, drive means mounted on the drive frame, and coupling means connecting the auger means to the drive means.

4. The spreader of claim 1 including indicating means for indicating the positions of the sidewall extensions relative to the sidewalls.

5. The spreader of claim 4 wherein the indicating means includes calibrated stick members on the sidewall extensions and guide means on the sidewalls adapted to expose predetermined portions of the stick members.

6. In a spreader:
   a pair of sidewalls;
   auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   mounting means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   vehicle means means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   the auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   a plurality of resilient mounts suspending the vibrating means from the arms and the striker means.

7. In a spreader:
   a pair of sidewalls;
   auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   mounting means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   vehicle means means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   the auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   a plurality of resilient mounts suspending the vibrating means from the arms and the striker means.

8. In a spreader:
   a pair of sidewalls;
   auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   mounting means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   vehicle means means mounting the sidewall extensions on the sidewalls in positions extending below the sidewalls;
   the auger means extending between the sidewalls for spreading material therebetween;
   striker means positioned to the rear of the auger means;
   a pair of sidewall extensions;
   a plurality of resilient mounts suspending the vibrating means from the arms and the striker means.

9. In combination with a grader vehicle including a circle, rigid arms fixed to the circle, pivotal arms pivotally mounted on the rigid arms and means for adjustably holding the pivotal arms relative to the rigid arms,
   a drive frame mounted on the rigid arms;
   a spreader frame mounted on the pivotal arms and including a striker blade, a pair of sidewalls extending forwardly and bracket means extending rearwardly;
   a screw;
   vibrating means mounted on the screw;
   means mounting the screw behind the striker blade and resiliently on the bracket means;
   auger means;
   means mounting the auger means on the sidewalls forwardly of the striker blade;
   drive means mounted on the drive frame; and
   flexible drive train means coupling the drive means to the auger means.

10. The combination of claim 9 including a pair of sidewall extensions mounted on the sidewalls, and means for adjusting the extensions vertically on the sidewalls.