

May 16, 1950

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2,508,080

GRADING AND EXCAVATING MACHINE

Filed March 21, 1947

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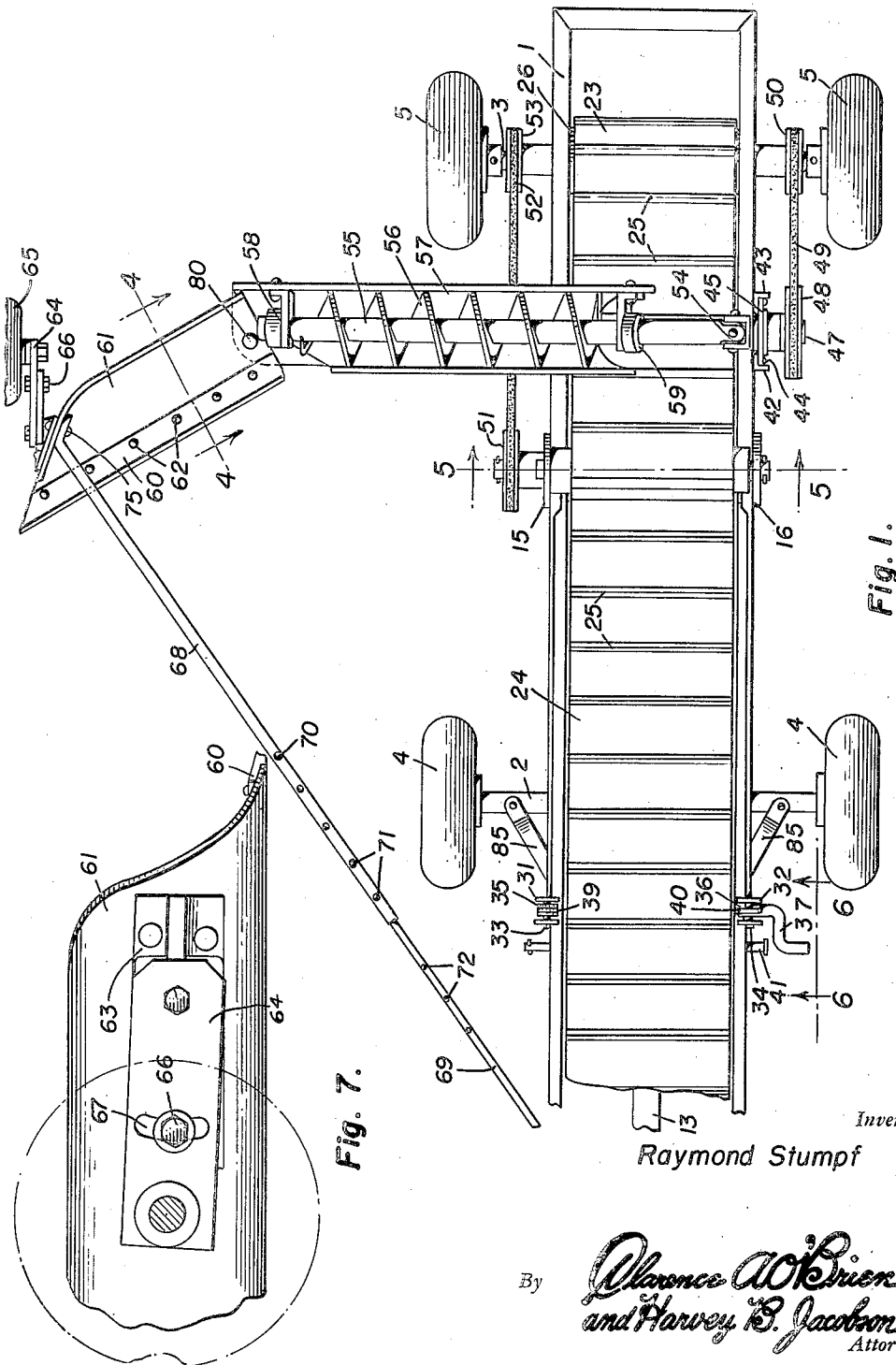


Fig. 1.

Fig. 7.

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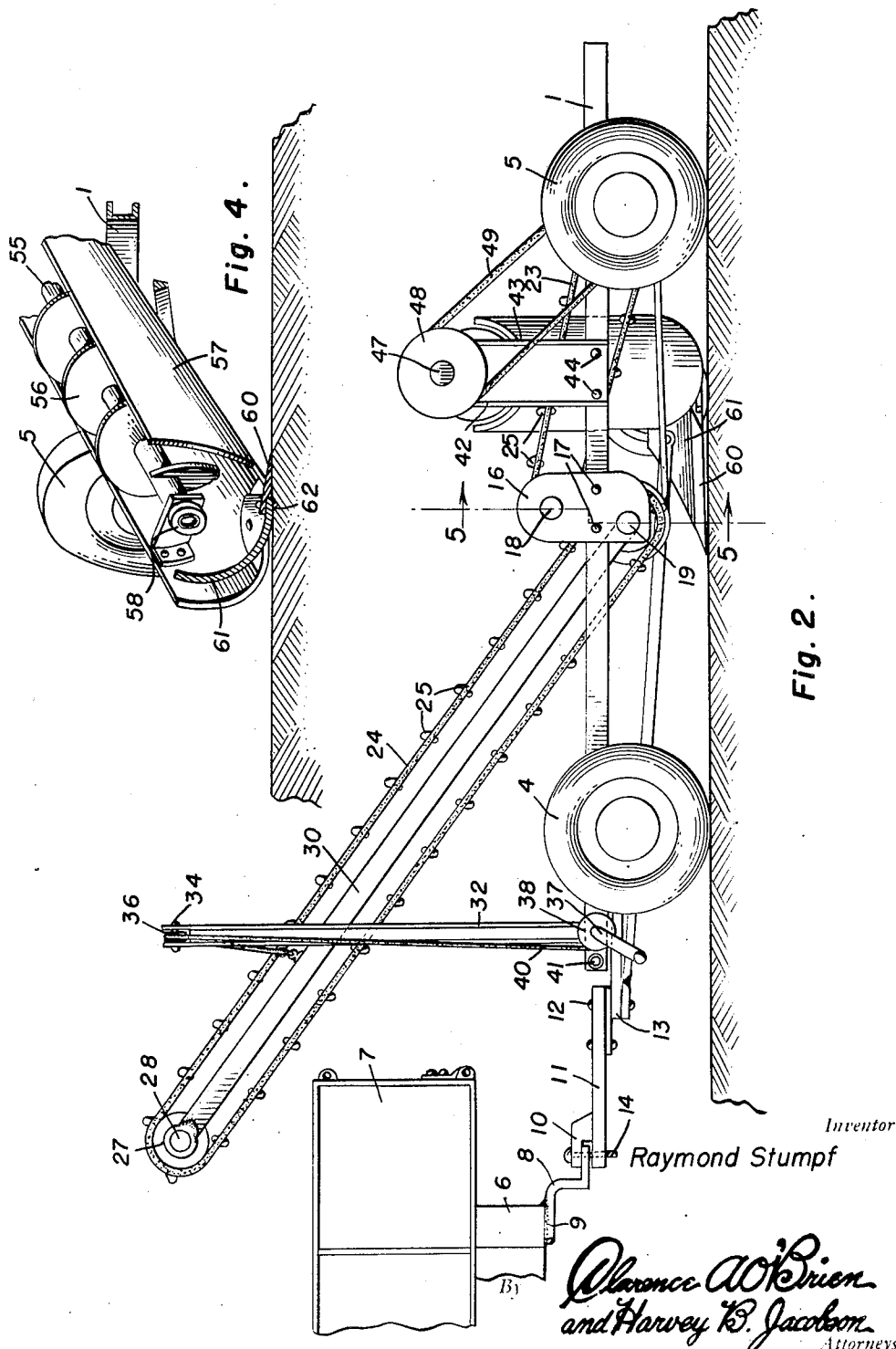
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Fig. 5.

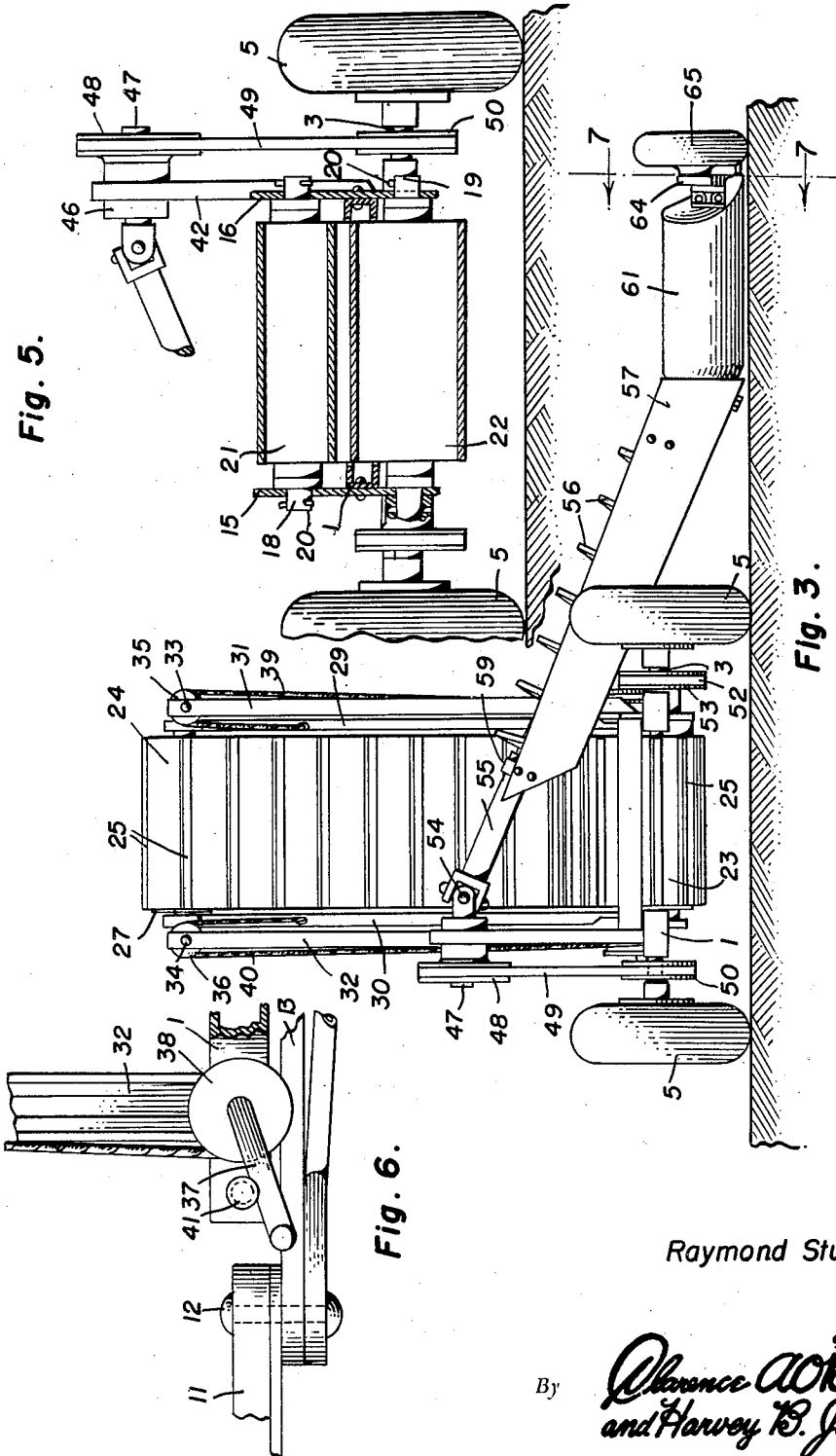


Fig. 3.

Fig. 6.

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2,508,080

GRADING AND EXCAVATING MACHINE

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Application March 21, 1947, Serial No. 736,203

12 Claims. (Cl. 37—108)

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This invention relates to improvements in grading and excavating machines.

An object of the invention is to provide an improved grading and excavating machine which will be wheel supported and drawn by a truck, including a gravel cutting blade and a screw and endless conveyor associated therewith for conveying the gravel as it is cut by the blade to the truck as said truck and grading and excavating machine are moved along the ground.

Another object of the invention is to provide an improved grading and excavating machine which will be wheel supported and drawn by a truck, including an adjustable gravel cutting blade supported by said machine, and a screw and endless conveyor associated therewith being driven by said machine as it and the truck to which it is attached are driven along the ground to be graded.

A further object of the invention is to provide an improved wheel supported grading and excavating machine which will be detachably connected to a truck and pulled thereby, said machine including a vertically and angularly adjustable wheel supported cutter blade and a power driven gravel feed screw associated therewith, together with a pair of overlapping endless conveyors also driven by the machine, and one of said endless conveyors being vertically adjustable for elevating the gravel and discharging the same into said truck.

Another object of the invention is to provide an improved grading and excavating machine which will be highly efficient in operation, and relatively inexpensive to manufacture and produce.

Other objects will appear as the description proceeds.

In the accompanying drawings which form a part of this application:

Figure 1 is a plan view of the improved grading and excavating machine;

Figure 2 is a side elevation of the improved grading and excavating machine;

Figure 3 is a rear end view of the improved grading and excavating machine;

Figure 4 is a partial sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a partial sectional view taken on the line 5—5 of Figure 1;

Figure 6 is view taken on the line 6—6 of Figure 1, and

Figure 7 is a partial sectional view taken on the line 7—7 of Figure 3.

Like characters of reference are used through-

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out the following specification and the accompanying drawings to designate corresponding parts.

In carrying out the invention, there is provided an improved grading and excavating machine comprising a substantially rectangular shaped frame or chassis generally designated by the reference numeral 1, being preferably formed of channel iron, and having a front axle 2 and a rear axle 3 attached thereto, with the wheels 4 and 5 being rotatably mounted upon the respective axles.

The improved machine will be associated with a truck having a frame 6 and a body 7. An attaching bracket or arm 8 will be welded at 9 to the truck frame 6, and will have its rearwardly extending portion vertically apertured to extend between the U-shaped clevis 10 at the forward end of the arm 11 secured by the bolt 12 to the forward end of the tongue 13 attached to the front axle 2 and braces 15. The U-shaped clevis 13 will be formed with vertically aligned apertures which will be aligned with the aperture in the bracket or arm 8, and a headed locking pin 25 or bolt 14 will be extended therethrough for coupling the machine to said truck.

A pair of upwardly extending oppositely disposed bearing plates or brackets 15 and 16 are secured by the bolts or fasteners 17 to the opposite sides of the frame 1, extending above and below the same.

Upper and lower cross shafts 18 and 19 are rotatably mounted between the plates or brackets 15 and 16, being held in place by the cotter pins 20 and respectively support the drums or pulleys 21 and 22 upon which the endless conveyor belts 23 and 24 are mounted with the transversely extending cross cleats 25 suitably attached thereto.

The rear end of the endless conveyor 23 extends about the drum or pulley 26 mounted upon the rear axle 3 of the machine, while the front end of the front endless conveyor 24 is disposed about the drum or pulley 27 mounted upon the shaft 28 connected between the forward ends of the parallel extending conveyor supporting frame arms 29 and 30, which are pivotally mounted at their rear ends upon the shaft 19.

A pair of parallel extending vertical channel iron standards 31 and 32 are suitably secured to the opposite sides of the frame 1 at the front end thereof, and support the cross bearing shafts 33 and 34 upon which the pulleys 35 and 36 are rotatably mounted.

A combined shaft and crank 37 will be sup-

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ported transversely of the frame 1 adjacent the lower end of the standards 31 and 32, and will support the pulleys 38 to which the cables 39 and 40 are secured, then to extend upwardly over the pulleys 35 and 36, and then downwardly to be attached to the conveyor frame arms 29 and 30, whereby rotation of the crank 37 in one direction will elevate the endless conveyor 24, and rotation of said crank 37 in the opposite direction will lower said conveyor. A stop bar or member 41 will be mounted transversely of the frame 1 adjacent the crank 37, whereby the bar 41 may be pulled outwardly or laterally of the frame 1 to be engaged by said crank 37 for holding the endless conveyor 24 in the desired elevated position, or said stop bar may be pushed inwardly when the crank is to be operated in either direction.

A pair of spaced vertically extending angle irons 42 and 43 will be secured to the frame 1 by means of the bolts 44, and will be connected by means of the vertical plate 45.

A bearing 46 and stub shaft 47 mounted therein will be supported through the upper end of the plate 45, and a pulley 48 secured to the shaft 47 will support a belt 49 whose opposite or lower end is disposed about the pulley 50 mounted upon the rear axle 3, to be driven thereby as the machine is moved along the ground.

A pulley 51 is supported upon the end of the shaft 19, and is connected by means of the belt 52 with the pulley 53 secured upon the rear axle 3, to be driven by the movement of the machine along the ground for operating the angularly adjustable endless conveyor 24.

The inner end of the shaft 47 is formed to provide a universal joint 54 with the adjacent end of the shaft 55 upon which the screw 56 is formed or secured to provide a screw conveyor. An elongated gravel carrying trough 57 is disposed below the screw 56, and supports the bearings 58 and 59 at its opposite ends, through which the shaft 55 and screw 56 are rotatably mounted.

Scoop means, such as a gravel engaging and cutting blade 60 will be detachably secured to the front edge of the annular gravel directing skirt 61 by means of the fasteners or bolts 62, the outer end of said skirt being cut off on an angle, while the inner end thereof overlaps the conveyor trough 57 and is pivotally connected thereto by the bolt 80.

A bracket 63 is secured to the outer rear surface of the blade skirt 61, and supports the vertically adjustable arm 64 upon which the guide and supporting wheel 65 are mounted. A bolt 66 and arcuate slot 67 in the bracket cooperate with the skirt 61 to permit the same to be tilted to vary the angle of attack of the cutting blade 60.

An elongatable and adjustable bracing means is provided for the outer end of the cutting blade and skirt, and comprises the tubular pipe or member 68 connected at its rear end to the skirt 61 by means of the bolt 75, and the forwardly extending rod 69 telescopically received within the tube 68, being held in the desired adjustment by means of the pin 70 which is selectively received in the alignable openings 71 and 72 formed respectively through the tube 68 and through the rod 69. The forward end of the rod 69 will be attached to the tongue 13, being supported in fixed position by means of the bolt 12 extending through said tongue 13 and the arm 11.

From the foregoing description, it will be apparent that the mode of operation of the improved grading and excavating machine will be

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as follows: the grading and excavating machine will be attached to the bracket 8 supported by the chassis 6 of the truck by means of the clevis 10 and locking pin or bolt 14. The truck and grading and excavating machine will then be operated where the grading is to be done, and the angularly disposed blade 60 will cut into the gravel and will force the same up into the screw conveyor where it will be carried along and dumped upon the endless conveyor 23 which will be rotating in a forward direction as the truck and machine move forwardly. The conveyor 24 will be elevated by means of the crank 35 and the attached cables which are secured to the conveyor frame members 29 and 30 until the conveyor is in the correct position to carry the gravel which is discharged on its lower end by the endless conveyor 23, in an upwardly inclined direction and into the truck body 7.

The driving means for the two conveyors 23 and 24 will comprise the several pulleys and belts connected between the endless conveyors and the rear axle of the machine.

The use of the universal joint 54 and the adjustable bracing means secured between the tongue 13 and the outer end of the blade skirt provides for the operation of the cutter blade in any desired angle, and the bolt 66 and cooperating slot 67 provide for the angular inclination of the blade with respect to the gravel which is to be scooped up thereby.

From the foregoing description, it will be apparent that there has been devised and provided a highly efficient form of grading and excavating machine which will be positive in action and relatively inexpensive to manufacture and produce.

While the preferred embodiment of the instant invention has been illustrated and described, it will be understood that it is not intended to limit the scope of the invention thereto, as many minor changes in detail of construction may be resorted to without departure from the scope of the invention.

Having thus described my invention what I claim as new and desire to secure by letters patent of the United States is:

1. A grading and excavating machine including a wheeled chassis frame, an angularly adjustable endless conveyor on the front portion of said frame, a fixed endless conveyor on the rear of said frame having its forward end overlapping the rear end of said first mentioned conveyor, a conveyor mounted transversely of said frame, a combined gravel cutting knife and skirt adjustably associated with the outer end of said transversely disposed conveyor, and means for operating said conveyors.

2. A grading and excavating machine including a wheeled chassis frame, having means for detachably connecting said frame to a power unit, an angularly adjustable endless conveyor on the front portion of said frame, a fixed endless conveyor on the rear of said frame having its forward end overlapping the rear end of said first mentioned conveyor, a screw conveyor mounted transversely of said frame, a combined blade and skirt pivoted at the outer end of said screw conveyor, means for operating said conveyors responsive to movement of the frame, and a supporting and guiding wheel mounted at the outer end of said combined blade and skirt.

3. The subject matter as claimed in claim 2, and extensible and adjustable means between

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said combined gravel cutting knife and skirt and said power unit connecting means.

4. The subject matter as claimed in claim 2, an extensible and adjustable brace between said combined blade and skirt and said power unit connecting means, and means for adjusting and locking said blade in ground engagement.

5. The subject matter as claimed in claim 1, and means for varying the angular inclination of said adjustable endless conveyor.

6. A grader comprising a wheeled chassis frame, an angularly adjustable conveyor disposed on one end of said frame, a fixed conveyor disposed on the other end of the frame and having one end cooperatively disposed adjacent one end of the adjustable conveyor, a conveyor adjustably extended transversely of the frame and having its inner end communicated with the fixed conveyor, a scoop pivotally and tiltably carried by the outer end of said transversely disposed conveyor and means for operating said conveyors responsive to movement of the frame.

7. A grader comprising a wheeled chassis frame, a first conveyor adjustably disposed on one end of said frame and having one end pivoted to the frame, a second conveyor disposed on the other end of the frame and having one end thereof overlapping the pivoted end of said first conveyor and in longitudinal alignment therewith, a conveyor extending transversely above and beyond one side of the frame, a combined blade and skirt pivotally mounted on the extending end of the last-mentioned conveyor, means for operating said conveyors responsive to movement of the frame, and means for positioning and locking said combined blade and skirt in selected angular relation with the frame.

8. The combination of claim 7, and means for tilting said blade and skirt on a horizontal axis and locking said blade in adjusted ground relation.

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9. The combination of claim 7, wherein means is provided for moving said first conveyor about a horizontal axis and comprises a hoist unit vertically disposed on said frame and operatively associated with said conveyor adjacent its unattached end.

10. The combination of claim 7, wherein means is provided for moving said combined blade and skirt about a pivot point and includes an extensible and adjustable brace connected between the outer end of said skirt and said frame and means for locking said combined blade and skirt in angular relation with the frame.

11. The combination of claim 7, wherein said combined blade and skirt is supported and guided by a wheel connected to the outer end of the skirt, means carried by the connection between the wheel and skirt for locking said blade in selected ground engaging positions.

12. The combination of claim 11, wherein said last-mentioned means includes a pivotally mounted bracket assembly connected between said wheel and skirt and a universal connection at the inner end of the transversely disposed conveyor.

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