Aug. 22, 1967 L. E. SCHOENWALD 3,336,735

SELF-PROPELLED SWATHER

Filed April 1, 1964

3 Sheets-Sheet 1

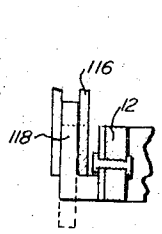

FIG. 8

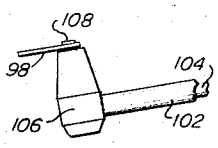

FIG. 9

FIG. 1

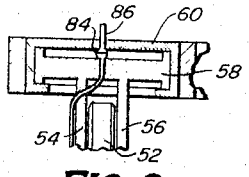

FIG. 2

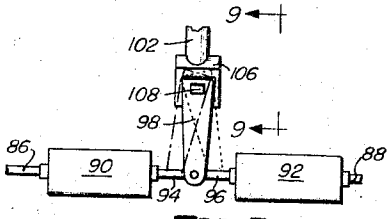

FIG. 3

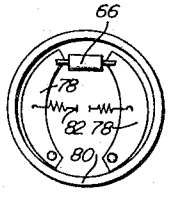

FIG. 4

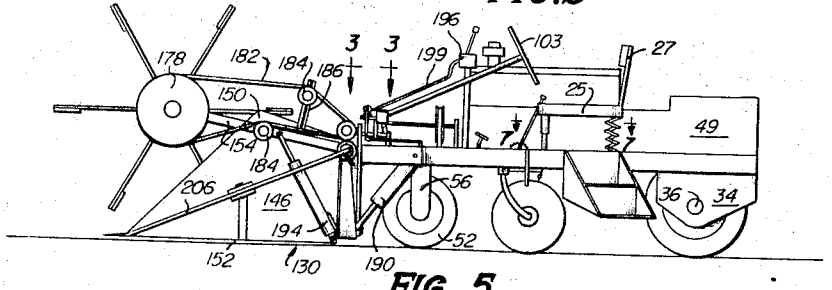

FIG. 5

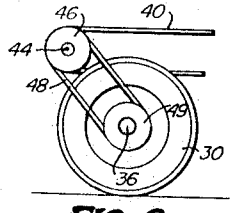

FIG. 6

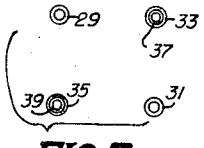

FIG. 7

INVENTOR.
LEONARD E. SCHOENWALD
BY
William F. Woods
ATTORNEY

Aug. 22, 1967 L. E. SCHOENWALD 3,336,735

SELF-PROPELLED SWATHER

Filed April 1, 1964 3 Sheets-Sheet 2

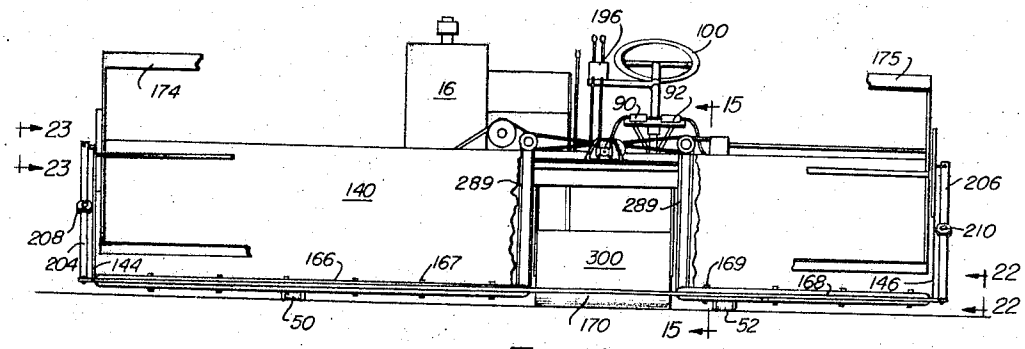

FIG. 10

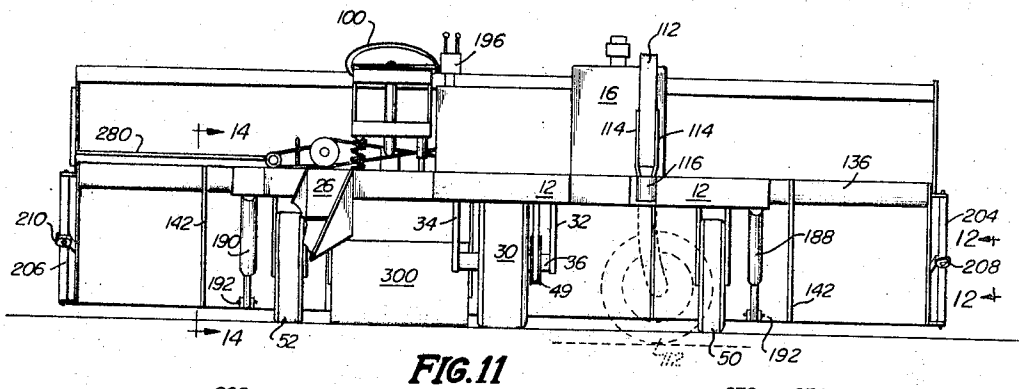

FIG. 11

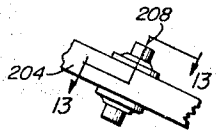

FIG. 12

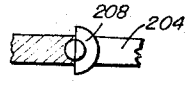

FIG. 13

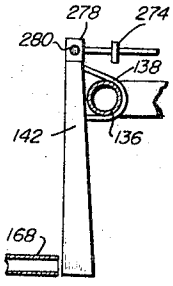

FIG. 14

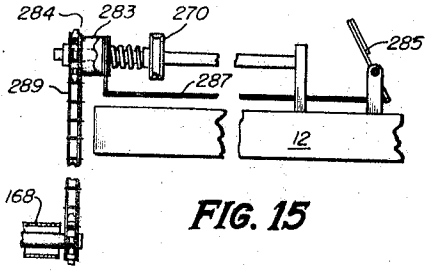

FIG. 15

INVENTOR.
LEONARD E. SCHOENWALD
BY
William F. Woods
ATTORNEY

Aug. 22, 1967 L. E. SCHOENWALD 3,336,735

SELF-PROPELLED SWATHER

Filed April 1, 1964 3 Sheets-Sheet 3

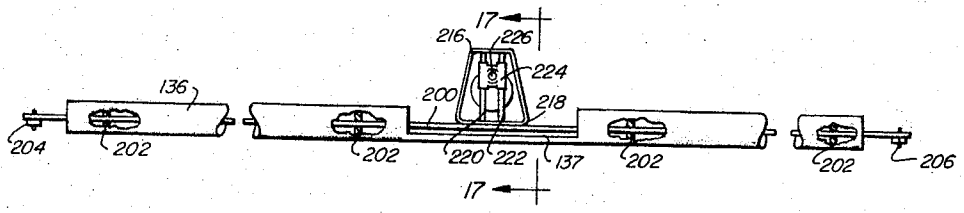

FIG. 16

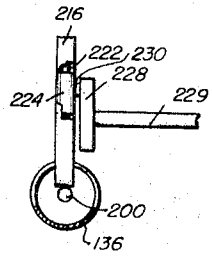

FIG. 17

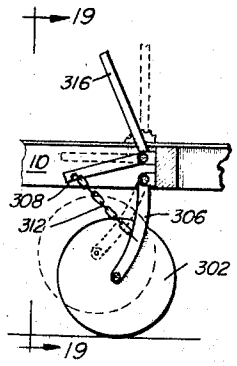

FIG. 18

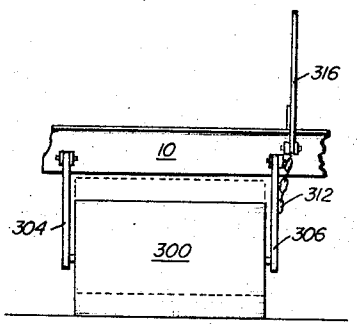

FIG. 19

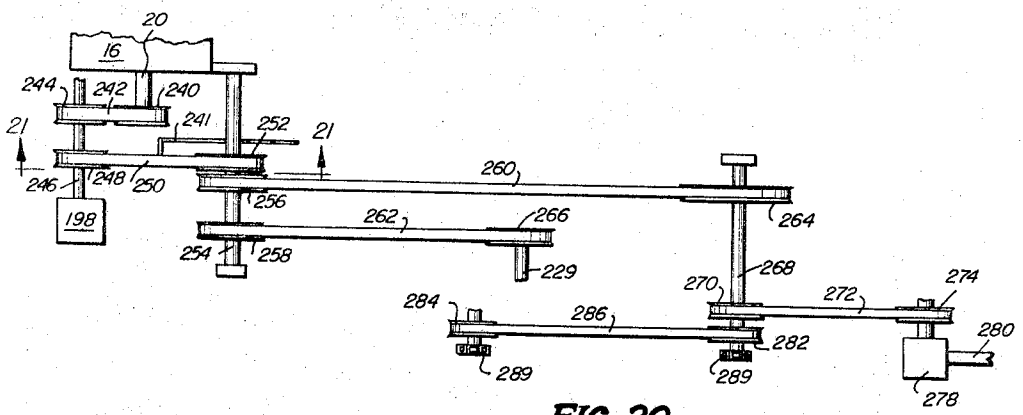

FIG. 20

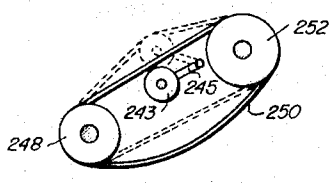

FIG. 21

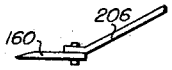

FIG. 22

FIG. 23

INVENTOR.
LEONARD E. SCHOENWALD
BY
William F. Woods
ATTORNEY

United States Patent Office 3,336,735
Patented Aug. 22, 1967

3,336,735

SELF-PROPELLED SWATHER

Leonard E. Schoenwald, Sawyer, N. Dak. 58781

Filed Apr. 1, 1964, Ser. No. 356,562
8 Claims. (Cl. 56—23)

This invention relates to an improved machine for harvesting crops, and more particularly, but not necessarily exclusively, to an improved swather of this type including means for manipulating the direction of the machine as it goes through a harvesting sequence in a field.

The general object of the invention is to provide an improved grain swather. Other objects of the invention are: to provide an improved grain swather including novel means for steering the machine; to provide in a machine of this type novel and improved means for propelling the same; to provide an improved self-propelled grain swather including novel means for adapting the machine for easy towing behind a tractor; to provide in a grain swather of the self-propelled type novel and improved means for mounting the wheels to provide a simple and effective way to steer and control the movement of the machine; to provide in a grain swather or harvesting machine novel and improved means for operating the cutter bar; to provide in a machine of this type novel linkage and control mechanism adapted to support and operate the cutter bar in an improved manner; to provide in a grain swather novel and improved means for clutching the grain conveyors; to provide in a grain swather or harvesting machine novel structure adapted to press the swath after it has been cut and laid down by the machine; to provide a machine of this type including a swath pressing roller positioned in the path of the swath; to provide a machine of this type including novel means for mounting a swath pressing roller; to provide vertical adjustment of the same from an elevated inoperative position to a lowered swath pressing position; to provide in a farm implement novel and improved seat construction adapted to afford maximum operator comfort and efficiency; and in general, to provide an improved grain swather or harvester which is highly versatile and dependable in operation, simple and inexpensive to construct, and rugged and long wearing in service.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in conjunction with the accompanying drawings wherein a preferred embodiment of the invention is shown by way of illustration and not by way of limitation.

In the drawings:

FIGURE 1 is a top view of the invention, with portions broken away;

FIGURE 2 is a fragmentary enlarged view, partially in section, taken on the line **2—2** of FIGURE 1;

FIGURE 3 is a fragmentary enlarged view taken on the line **3—3** of FIGURE 5;

FIGURE 4 is an elevation view of the inside of one of the caster wheels;

FIGURE 5 is a side view of the invention;

FIGURE 6 is a fragmentary view taken on the line **6—6** of FIGURE 1;

FIGURE 7 is a view taken on line **7—7** of FIGURE 5;

FIGURE 8 is an enlarged fragmentary view, partially in section, taken on the line **8—8** of FIGURE 1;

FIGURE 9 is a fragmentary side view taken on the line **9—9** of FIGURE 3;

FIGURE 10 is a front view of the invention with parts broken away;

FIGURE 11 is a rear view of the invention with parts broken away;

FIGURE 12 is an enlarged fragmentary view taken on the line **12—12** of FIGURE 11;

FIGURE 13 is a view, partially in section, taken on the line **13—13** of FIGURE 12;

FIGURE 14 is an enlarged fragmentary view, partially in section, taken on the line **14—14** of FIGURE 11;

FIGURE 15 is an enlarged fragmentary side view taken on the line **15—15** of FIGURE 10 showing part of the machine;

FIGURE 16 is an enlarged fragmentary front view showing part of the machine;

FIGURE 17 is a fragmentary view taken on the line **17—17** of FIGURE 16;

FIGURE 18 is a fragmentary side view, partially in section, showing a feature of the machine;

FIGURE 19 is a view taken on the line **19—19** of FIGURE 18;

FIGURE 20 is a top view showing the power transmitting system forming part of the invention;

FIGURE 21 is a view taken on the line **21—21** of FIGURE 20;

FIGURE 22 is an enlarged fragmentary view taken on the line **22—22** of FIGURE 10; and

FIGURE 23 is an enlarged fragmentary view taken on the line **23—23** of FIGURE 10.

Self-propelled swathers found in common use today incorporate a variety of features designed primarily to facilitate the cutting of grain crops and depositing the same in a swath behind the machine for curing and subsequent harvesting. Briefly stated, I provide a self-propelled swather having a number of features which according to my knowledge are not presently available on machines of this type. For example, I provide an adjustable roller located in the path of the swath for pressing the swath down in order to keep the grain from blowing away, steering means incorporating a conventional steering wheel but operating to actuate a braking system on swivel type wheels whereby to turn the machine, a novel combination for imparting reciprocating movements to the cutter bar with improved efficiency and less wear, a novel drive system designed to provide efficient propulsion and adapted to permit the easy towing of the machine, and means for tilting and elevating the harvesting frame and reel with respect to the frame. In addition, my invention includes a novel seat construction adapted to provide maximum comfort and resistant to fatigue.

Turning now to the drawings, the invention, indicated in its entirety by the reference character A, includes a generally triangular shaped supporting frame **10** having sill members **12** and a top plate member **14**. The frame **10** has structure adjacent one side thereof for mounting a conventional prime mover **16**, preferably of the internal combustion engine type. Engine **16** includes a clutch **18**, a transmission **19** and front and rear power takeoff shafts **20** and **21**. Laterally spaced from engine **16** I provide a seat **24** and a set of steps **26** located adjacent thereto on one of the side sill members **12**. The drive means for the machine includes a ground engaging rear drive wheel **30** carried by frame **10** rearwardly of engine **16** and seat **24** by means of downwardly extending hanger members **32**, **34** which rotatably carry a laterally extending drive axle **36** upon which wheel **30** is mounted for driving engagement with the ground. Power from engine **16** is transmitted through sheaves **22**, **23** and belt **25** to transmission **19** which allows a selected gear ratio to be used during the operation of the machine. A sheave **38** on the output side of transmission **19** is connected by means of belt **40** to a driven sheave **42** rotatably mounted on a laterally positioned idler shaft **44** above and to one side of drive wheel **30**. At the opposite end of shaft **44** a sheave **46** is mounted which is drivingly connected by belt **48** to sheave **49**

which is keyed to axle **36**. A housing **47** is provided for the area overlying the drive system.

Supporting frame **10** is equipped adjacent its front end with a pair of caster wheels **50, 52**, mounted for swiveling movements about vertical axes in spaced lateral alignment with each other and longitudinally spaced forwardly of drive wheel **30**. As shown in FIGURES 1 and 2, each caster wheel **50, 52** is secured to frame **10** by a pair of vertical hangers **54, 56** depending from an inner generally circular turntable **58** rotatably mounted within a fixed horizontal annular support **60** that is carried by supporting struts **62, 64** fastened to sill members **12**. Each caster wheel **50, 52** is equipped with an automotive type hydraulic braking system including a brake cylinder **66** adapted to expand a pair of brake shoes **78** against a brake drum **80** against the pressure of a spring **82**. See FIGURE 4. A swivel type hydraulic fitting **84**, FIGURE 2, connects the brake cylinder **66** in each wheel **50, 52** to hydraulic lines **86, 88**, respectively. Hydraulic lines **86, 88** are connected to master cylinders **90, 92**, which are mounted in laterally spaced longitudinally aligned relationship to each other adjacent the forward edge of frame **10** in front of seat **24**. Each master cylinder **90, 92** is equipped with an internal piston (not shown) adapted to exert fluid pressure upon the individual brake cylinders of caster wheels **50, 52** according to their position within cylinders **90, 92**. As shown in FIGURE 3, cylinders **90, 92** are equipped with external laterally inwardly extending rod members **94, 96**, operable to actuate their respective pistons toward and away from a pressure position. Connecting the free ends of rod members **94, 96** is a pivotal link **98** which is rotatable about its rear end whereby to move the pistons in cylinders **90, 92** from a position of supplying fluid under pressure either through line **86** or line **88** to the respective brake cylinder in caster wheels **50, 52**. Operator control of link **98** is accomplished by an automotive type steering mechanism **100** having an upwardly and rearwardly inclined elongated housing **102**, a steering wheel **103** coupled to a shaft **104**, FIGURE 9, carried within housing **102**, and a gear reduction unit **106** connected to the shaft at its lower end. It will be understood that turning movements on steering wheel **103** results in the rotation of the output shaft **108** (to which the rear end of link **98** is secured) of reduction unit **106** and consequently the rotation of link **98** in the manner described.

Further provided on frame **10** is a rear towing caster wheel **112** that is attached to sill member **12** in outwardly laterally spaced relation to drive wheel **30**. Towing caster wheel **112** is mounted between a pair of hangers **114** of greater length than the distance between the ground engaging surface of wheel **30** and frame **10**. Hangers **114** converge into a hollow sleeve **116** that is pivotally mounted for swiveling movement about a vertical axis upon a post **118**. Post **118** is pivotally secured to sill member **12** for rotation about a horizontal axis so that towing caster wheel **112** may be swung up out of contact with the ground when the machine is being used in the field. When it is desired to tow the machine, the rear of frame **10** is jacked up to raise wheel **30** free of the ground. Then towing caster wheel **112** is swung about its horizontal pivot axis into the ground engaging position shown by the dotted lines in FIGURE 11. Steering wheel **103** is manipulated to bring link **98** into a neutral position between cylinders **90, 92** to release any braking pressure upon the forward caster wheels **50, 52** and the machine is towed in a direction perpendicular to its normal axis (see FIGURE 1) by means of a laterally extending removable towing tongue structure **120** that is secured to sill member **12** adjacent the front of frame **10** by means of brackets **122, 124**.

Turning now to a consideration of the grain cutting and swath creating part of the machine, I provide a forwardly extending harvesting frame **130** pivotally carried on the front end of support frame **10** for rocking movement about a laterally disposed generally horizontal pivot axis. A pair of laterally spaced hollow brackets **132, 134** receive a rigid

elongated laterally extending horizontal rear tubular harvesting frame support **136**. Rotatably mounted for limited rocking movement upon support **136** by means of a series of spaced forwardly extending clamps **138**, FIGURE 14, is the harvesting frame **130**. Harvesting frame **130** includes a rear panel **140** having vertical stiffeners **142** in register with clamps **138** and a pair of side panels **144, 146** extending forwardly therefrom. Side panels **144, 146** incline downwardly and forwardly from a point, as at **150**, forwardly of frame **10** to define with rear panel **140** a forwardly open grain receiving structure. On each side of panels **144, 146** a lower rigid forwardly extending structural support **152** is provided. A pair of forwardly extending reel arms **154** are rockably mounted on support **136** for limited pivoting movements in a vertical plane about their rear ends. Carried on the forward end of supports **152** is a cutter bar **160** provided with knives **162** operable to cut the grain as the machine moves in a forward direction. A pair of endless belt conveyors **166, 168** having flights **167, 169** are mounted in the harvesting frame **130** for grain delivering movements laterally inwardly toward an inner portion of the harvesting frame **130**. The inner delivery ends of the conveyors **166, 168** define the opposite sides of a discharge opening **170** through which the cut grain falls to the ground in a windrow from the conveyors. Discharge opening **170** is laterally offset from the drive wheel **30** and swivel wheels **50, 52**. Further provided within harvesting frame **130** is a laterally extending reel **174** of the conventional type having bats **175** and mounted upon a shaft **176** which is rotatably carried on the ends of arms **154**. A reel driven sheave **178** on one end of shaft **176** is connected by belt **182** to a reel driving sheave **180** located on frame support **136**. Adjustment of the tension in belt **182** is provided by a pair of idler sheaves **184**, adjustably mounted upon an arm **186** and one arm **154**, as shown in FIGURE 5.

Means for elevating and lowering harvesting frame **130** about its rear pivot axis is provided by a pair of hydraulic cylinders **188, 190**, FIGURE 11, connected at one end to frame **10** and at the other end to appropriate brackets **192** on the lower rear edge of frame **130**. In addition, means for elevating and lowering the reel **174** about the rear pivot axis of supports **154** is provided by hydraulic cylinder means **194** connected at one end to the lower rear part of frame **130** and at the other end to arms **154** intermediate its length, as shown in FIGURE 5. The hydraulic cylinders **188, 190** and **194** are in an hydraulic circuit and under the control of an operator control **196** operatively connected to a source of fluid pressure (pump **198** driven by engine **16**) by fluid pressure lines **199**. The circuit in known manner permits the introduction of pressure fluid to one of the ends of the cylinders while exhausting from the other end and also permits the retention of fluid in both ends of the cylinders to hold their pistons in any desired set position. Thus through the action of cylinders **188, 190** and **194** frame **130** or reel **174** can be raised or lowered or held in any intermediate position.

Means for imparting reciprocating movement to the cutter bar **160** includes a laterally extending pitman rod **200** that is slidably mounted for lateral reciprocating movements within tubular support **136**. As shown in FIGURE 16, pitman rod **200** is slidably supported intermediate its length within support **136** by a series of spaced bearing members **202**. The outer ends of pitman rod **200** are connected to a pair of longitudinally extending and downwardly and forwardly inclined sway bars **204, 206**, which are pivotally supported intermediate their ends by bearings **208, 210** secured to posts **212, 214** extending upwardly from supports **152**. The lower ends of sway bars **204, 206** are pivotally secured to each end of the cutter bar **160**. The mechanism for driving the pitman rod back and forth includes a generally trapezoidal shaped reticular frame member **216** secured along its bottom horizontally extending edge **218** to the top of

the pitman rod **200** intermediate its ends. Support **136** is cut out, as at **137**, to accommodate frame member **216**. A pair of closely spaced vertical guides **220, 222** are carried within frame member **216** and support a slidable follower **224** having a central opening **226**. A driving disk member **228**, FIGURE 17, rotatably secured to a longitudinal shaft **229** behind frame member **216** is equipped with a forwardly protruding eccentrically placed extension **230** which is rotatably received within the opening **226** of follower **224**. It is apparent that the rotation of disk member **228** about its axis results in the simultaneous reciprocation of pitman rod **200** in a lateral direction thereby causing sway bars **204, 206** to operate cutter bar **160**.

Power is supplied from engine **16** to the belt conveyors **166, 168**, the reel **174** and to the pitman rod assembly by the system of sheaves, shafts, and belts disclosed more particularly in FIGURE 20. As shown therein, a sheave **240** mounted on the output shaft **20** of engine **16** is connected by belt **242** to sheave **244** mounted on a shaft **246** extending in parallel spaced relation to shaft **20**. Shaft **246**, connected at its front end to pump **198**, is provided with another sheave **248** between pump **198** and sheave **244**. Sheave **248** is connected by belt **250** to sheave **252** which is mounted on shaft **254** which extends longitudinally in inwardly spaced lateral relation to engine **16**. Power from shaft **246** is operator controlled by a foot operated lever and control means **241** which operates to tighten or loosen the tension in belt **250** by means of an idler sheave **243** carried upon a pivotal bracket **245** between sheaves **248** and **252**. See FIGURE 21. Shaft **254** operates to drive sheaves **256** and **258** which are connected by belts **260** and **262** to sheaves **264** and **266**, respectively. Sheave **266** is connected to shaft **229** to operate the pitman rod assembly previously described. Sheave **264** is mounted on shaft **268**, which is carried on frame **10** in laterally spaced relation to shafts **229, 246** and **254**. Forward of sheave **264** another sheave **270** is mounted on shaft **268** and connected by belt **272** to sheave **274** which is connected to a right angle drive **278**. A laterally extending shaft **280** connected to right angle drive **278** provides power for the reel driving sheave **180** previously described. Forward of sheave **270** a sheave **282** is provided on shaft **268** to drive the belt conveyors **166, 168**. A spring clutch **283** (see FIGURE 15) is provided between sheaves **270** and **282** to allow operator control of the conveyor belts **166, 168** by virtue of a foot pedal **285** and associated linkage means **287**. Sheave **282** is connected to a laterally spaced sheave **284** by means of a crossed belt **286** and a roller chain combination **289** extends downwardly from sheaves **282** and **284** to actuate the belt conveyors **166, 168** in inwardly opposed directions.

Another feature of my machine is a swath pressing roller **300** that is mounted for swath pressing action upon frame **10** in lateral registration with the discharge opening **170** between conveyor belts **166, 168**. As shown in FIGURES 18 and 19, roller **300** includes a cylindrical body **302** having a length slightly longer than the width of opening **170**. Roller **300** is mounted upon frame **10** by means of a pair of laterally spaced downwardly extending arms **304, 306** that are pivotally mounted at their upper ends to frame **10** adjacent of seat **24**. A lever **308** is pivotally carried by frame **10** above arms **304**, and is connected by chain **312** to arm **306**. A hand lift **316**, connected to lever **308** is operable to swing roller about its axis from a lowered swath pressing position to a raised inoperative position. Thus when grain such as flax is being windrowed by the machine, the roller **300** may be lowered to the solid line position of FIGURE 8 to press the swath down against the ground and prevent it from blowing away. If it is not desired to use the roller for pressing down the swath, it can be raised by means of hand lever **316** to the dotted line position of FIGURE 18 up out of the way of the swath.

Seat **24** is also unique to my knowledge. As shown in in FIGURES 5 and 7, seat **24** includes a conventional horizontal platform **25** and vertical back rest **27**. Platform **25** is supported upon diagonally opposite compression spring members **29, 31** and posts **33, 35** which receive a pair of downwardly open sleeves **37, 39** situated at opposite corners from springs **29, 31**. This construction permits limited vertical oscillation of the platform **25** without affecting the longitudinal or lateral stability of the seat.

The invention has been thoroughly tested and found to be entirely satisfactory for the uses intended. It is believed that the invention, its mode of construction and assembly and operation, as well as its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of the invention as defined in the appended claims.

I claim:

1. In a self-propelled swather including a supporting frame, motor means carried on said frame, grain harvesting means provided on the forward end of said frame, said harvesting means including a pair of belt conveyors having top flights moving laterally inwardly of said frame, said conveyors being spaced apart at their adjacent ends to provide a space for discharge of cut grain, the combination of:

a drive wheel operatively connected to said motor and located in laterally spaced relation to the space between said conveyors;

a pair of caster wheels pivotally mounted for rotation about vertical axes laterally spaced outwardly of said drive wheel and the space between said conveyors and longitudinally spaced from said drive wheel, and

means for selectively braking one of said caster wheels whereby to turn said swather in a desired direction.

2. The machine described in claim **1** wherein said caster wheels are positioned forwardly of said drive wheel in substantial lateral alignment with each other.

3. The machine described in claim **1** wherein said selective braking means includes:

hydraulically actuated brake cylinder means on each caster wheel,

a pair of master brake cylinders on said frame operable to supply fluid pressure to each of said brake cylinders,

fluid pressure lines connecting each of said master brake cylinders to one of said brake cylinders,

linkage means connected to and operable to actuate a selected one of said master brake cylinders, and

steering mechanism including a steering wheel for permitting operator control of said linkage means.

4. The machine described in claim **1** wherein a vertically adjustable towing caster wheel is carried on said frame,

said towing caster wheel being pivotally mounted for rotation about a vertical axis positioned in longitudinally spaced relation to the axes of said pair of caster wheels,

and wherein a laterally outwardly extending towing tongue is secured to said frame.

5. In a self-propelled swather including a self propelled body having a motor, a harvesting frame pivotally mounted on the front end of said body for rotation about a lateral pivot axis, a pair of belt conveyors operatively connected to said motor and having top flights moving laterally inwardly of said frame, said conveyors being spaced apart at their adjacent ends to provide a space for discharge of cut grain, a cutter bar supported by said frame substantially parallel to and forward of said conveyors, the combination of:

a pair of longitudinal sway bars pivotally mounted intermediate their respective ends on opposite sides of said frame and connected at their front ends to opposite ends of said cutter bar,

a pitman rod mounted rearwardly of said frame for lateral reciprocal movements and connected at its opposite ends to the rearward ends of said longitudinal sway bars, and

means connecting said pitman rod with said motor to reciprocate said pitman rod to impart reciprocating cutting movements to said cutter bar; and

wherein said means connecting said pitman rod to said motor includes a reticular frame secured to the top of said pitman rod intermediate its ends, a pair of laterally spaced guides within said reticular frame, a follower slidably carried within said guides, a rotatable member secured to said follower, and means operatively connecting said rotatable member with said motor.

6. In a self-propelled swather including a self propelled body having a motor, a harvesting frame pivotally mounted on the front end of said body for rotation about a lateral pivot axis, a pair of belt conveyors operatively connected to said motor and having top flights moving laterally inwardly of said frame, said conveyors being spaced apart at their adjacent ends to provide a space for discharge of cut grain, a cutter bar supported by said frame substantially parallel to and forward of said conveyors, the combination of:

a pair of longitudinal sway bars pivotally mounted intermediate their respective ends on opposite sides of said frame and connected at their front ends to opposite ends of said cutter bar,

a pitman rod mounted rearwardly of said frame for lateral reciprocal movements and connected at its opposite ends to the rearward ends of said longitudinal sway bars, and

means connecting said pitman rod with said motor to reciprocate said pitman rod to impart reciprocating cutting movements to said cutter bar; and

wherein the pivotal mounting connection between said harvester frame and said body includes a hollow laterally extending support member and wherein said pitman rod is carried within and extends from each end of said hollow support member.

7. In a self-propelled swather including a supporting frame, motor means carried on said frame, grain harvesting means provided on the forward end of said frame, said harvesting means including a pair of belt conveyors having top flights moving laterally inwardly of said frame, said conveyors being spaced apart at their adjacent ends to provide a space for discharge of cut grain, the combination of:

a laterally extending roller mounted on said supporting frame in the path defined by the space between said conveyors and rearwardly thereof, and

means for swingably mounting said roller on said supporting frame for vertical movement from a position above the swath laid down by the machine to a lower position in which said roller bears against the swath to press the swath down against the ground.

8. The machine as defined in claim 7, wherein said roller is slightly longer than the width of said discharge space, said roller mounting means comprising a pair of laterally spaced arms each mounted at one of its ends to said supporting frame for pivotal movement about a transverse horizontal axis, and means for pivoting said arms about said axis to move said roller between its said position above the swath to its said lower swath pressing position.

References Cited

UNITED STATES PATENTS

2,063,168	12/1936	Kinkead	56—26.5
2,395,672	2/1946	Kranick et al.	56—23
2,620,612	12/1952	De Eugenio	180—25 X
2,818,929	1/1958	Kucera	180—25
2,833,105	5/1958	Naery	56—23 X
2,906,078	9/1959	Toffin	56—23
2,989,829	6/1961	Heth et al.	56—23 X

ABRAHAM G. STONE, *Primary Examiner.*

ANTONIO F. GUIDA, *Examiner.*