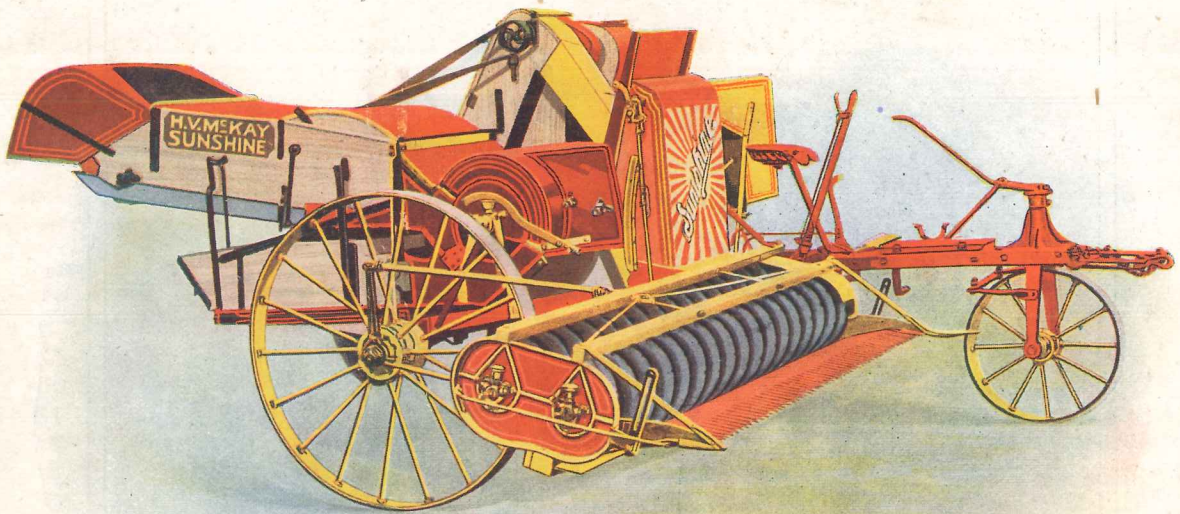


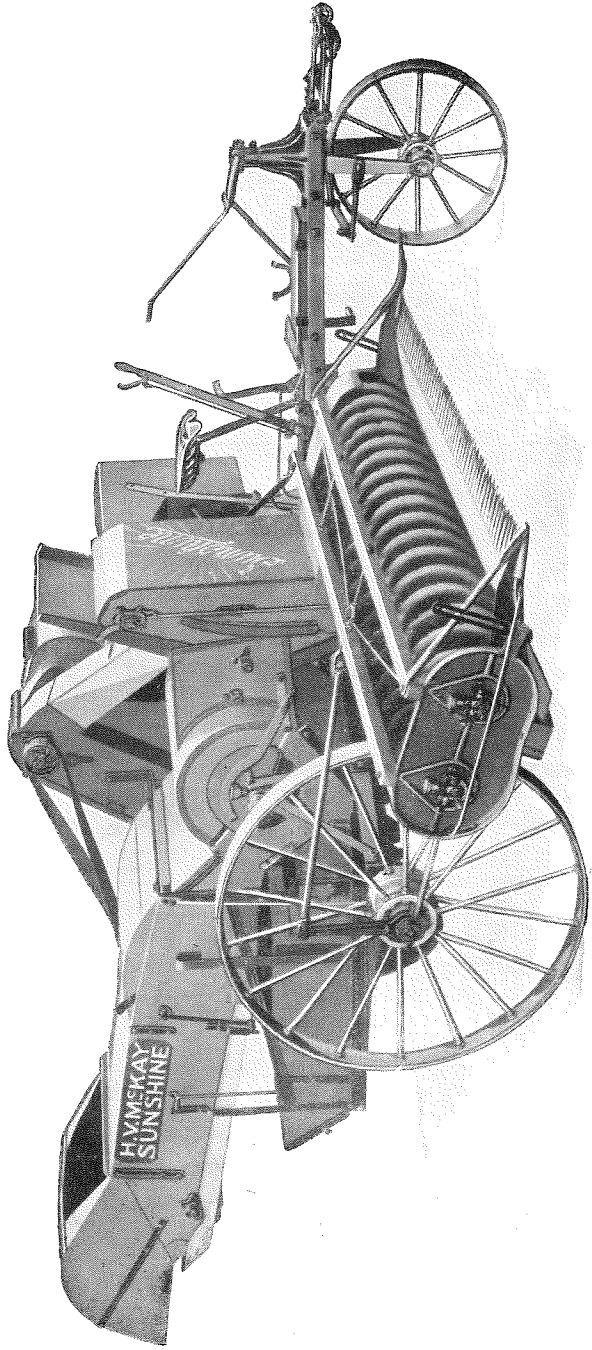
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6/15/02  
Series A



The **SUNSHINE**  
Header Harvester

A decorative border surrounds the title, featuring ornate scrollwork and floral motifs. At the bottom center, there is a small illustration of a bouquet of flowers and wheat stalks, with a ribbon-like banner extending horizontally across it.



The Sunshine Header Harvester or Reaper Thrasher.

# H. V. McKAY PTY. LTD.

**Sunshine Harvester Works, Sunshine**  
near Melbourne, Australia.

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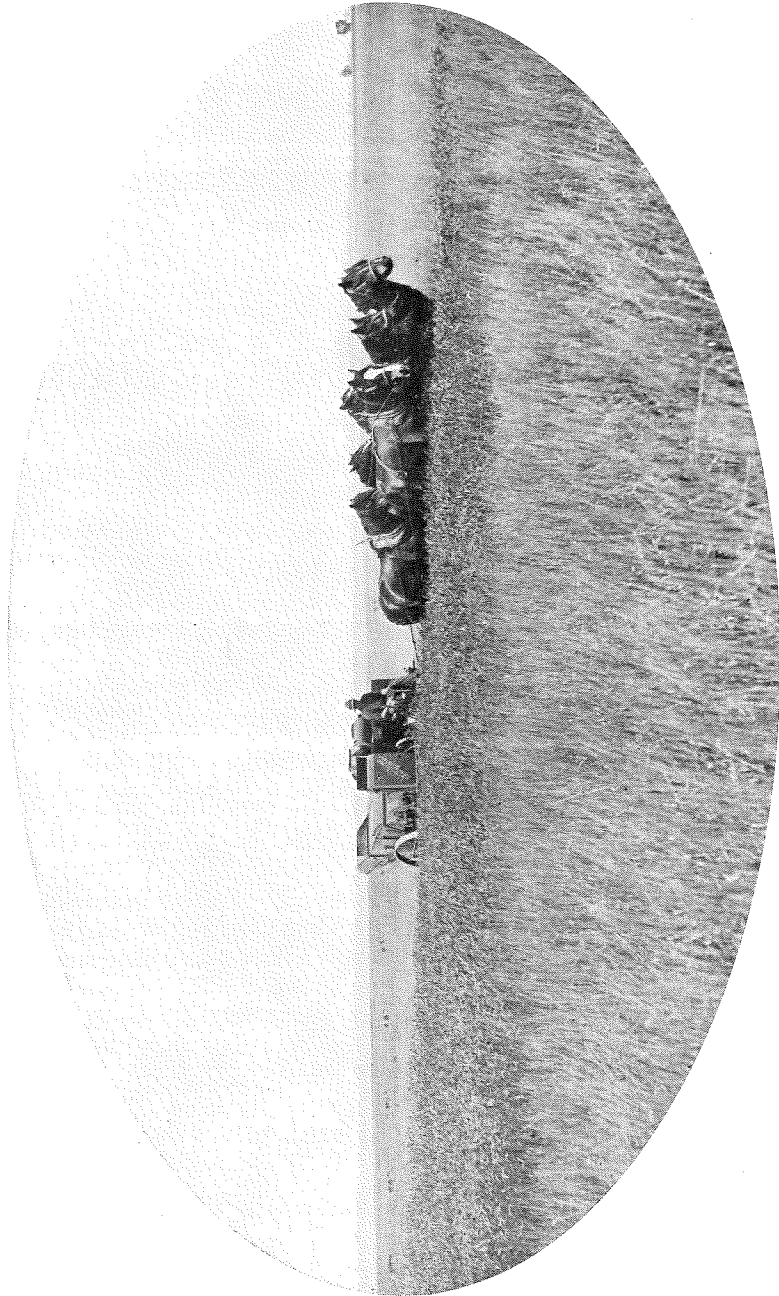
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The Sunshine Harvester Works occupy 25 acres of buildings, replete with the most modern plant obtainable for the manufacture of Agricultural Implements and Engines. Illustrated catalogues are sent free and post free to any address on request. The Works are reached in 20 minutes by electric train from Flinders Street or Spencer Street, Melbourne, and farmers visiting this City are cordially invited to inspect the plant at work.

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The Sunshine Header Harvester at Work.

# The Sunshine Header Harvester or Reaper Thrasher

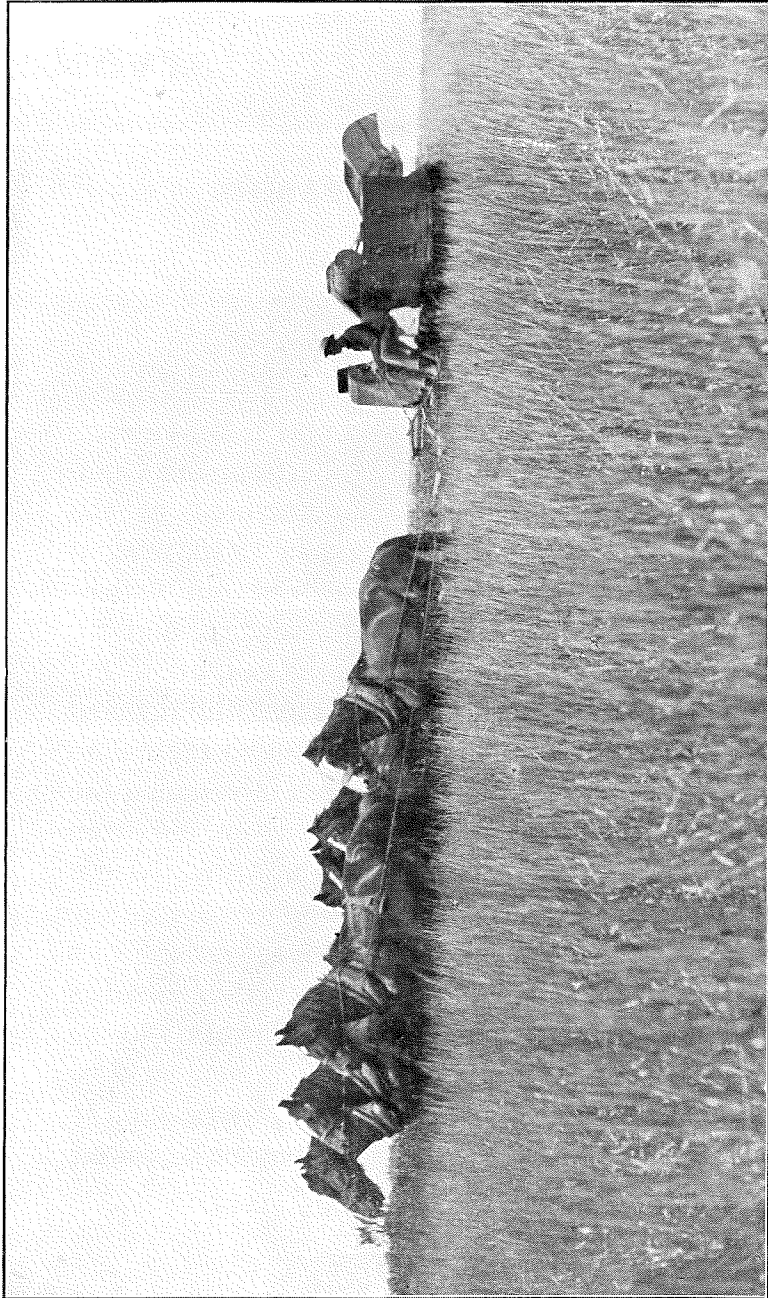
PATENTED

## FOREWORD

THIS machine is based on H. S. Taylor's Patents, now the property of this Company. It was first manufactured at the Sunshine Harvester Works in 1916, when a very few machines were sent out experimentally. These proved a success, and for several subsequent years the output of the factory was insufficient to meet the demand which arose owing to the splendid reputation they achieved for their work in rescuing the grain from down and tangled crops, also from crops in which thistles and other weeds abounded.

In more recent years it was realised that this machine had become firmly established in favour with Australian grain growers, and the Sunshine factory was thereupon equipped for mass production, and is now in a position to supply whatever quantities may be required.

H. V. MCKAY PTY. LTD.



In a Heavy Crop.

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**THE**

# Sunshine Header Harvester

OR

## Reaper Thrasher

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PATENTED

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### METHOD OF WORKING

**T**HE Header Harvester or Reaper Thrasher is a travelling machine which is drawn through the standing crop by horses or other traction animals (or by a motor tractor), and in one continuous operation completes the work of gathering, cutting, thrashing, winnowing, and cleaning the grain—making it ready for bagging and marketing.

The Comb first engages the crop and guides it to the reciprocating knives, which cut off the heads and a portion of the straw. The heads and straw are then seized by the revolving spiral steel Conveyors, which carry them to a short Floating Elevator, which delivers them to the Thrashing Drum. The Comb, with the Knives and Conveyors, is quickly adjustable up or down to suit high or low crop.

From the Thrashing Drum the mass of grain and straw is delivered on to the Straw Walker, which conveys the straw to the rear of the machine and ejects it. The grain and chaff pass through the Straw Walker to the Grain Tray and thence fall to the Riddles, but in so doing they meet with a strong blast from the Fans, which blows all the chaff away. Any imperfectly thrashed grains reaching the Riddles are delivered to the Seconds Elevator, which returns them to the Thrashing Drum for further treatment. The Riddles deliver all the clean grain into the Grain Elevator, which, in turn, delivers into a Revolving Screen, which rejects all small or broken grains and drops them into the Seconds Box, while the good grain passes to the large Grain Box and is ready for bagging.

Full and illustrated details of all these processes are given in the following pages.

The machine cuts an 8-ft. swathe at each passage. It requires from five to six horses, according to the nature of the soil and the condition of the crop. The acreage per day naturally varies very greatly for the same reasons, but records of 26 acres per day are not infrequent, and numerous users have harvested as many as 240 bags (3 bushels each) in one working day.

In clean, standing crops the machine harvests almost every grain. When crops are lying down, or are storm tangled, or are full of weed growths, it rescues such a large proportion of the grain as to make its use a vital necessity in such circumstances.

When crops are not standing straight, the use of the Crop Lifter attachment is recommended. This is described in a later page of this book.

The economy of this system of harvesting is beyond debate. Without it Australia could not raise wheat at a profit for sale in the European market. The Director of the State Experimental Farm, Werribee, Victoria, kept careful account in a recent harvest, and states that the labour cost by the system of cutting, stacking, and thrashing was 14d. per bushel, whereas with the Sunshine Header Harvester the labour cost was only 4d. per bushel.

The machine is guaranteed to work well in wheat, oats, or barley. It is not guaranteed for any other crops, but, nevertheless, it is often reported by users to have worked well in millet, peas, canary seed, rye grass, etc.

It will work wherever grain will ripen on the stalk, and hence there are very few places in the world where it may not be used with success.

### **ADVANTAGES.**

In comparison with other systems of harvesting, its advantages are numerous and of great importance. It makes the small grain grower independent of paid labour. One man with one team can harvest over 20 acres per day. On large areas the labour required is reduced to a fraction in comparison with what is needed for cutting, binding, stooking, carting, stacking, and thrashing.

It commences and completes the work in one continuous operation. Every few minutes a portion of the yield is finally harvested. Every night the result of the day's work forms a negotiable security in the shape of grain bagged and ready for market.

It performs no unnecessary labour. It cuts off the ears, and misses none. It leaves the bulk of the straw standing. Under other systems the principal labour cost arises from the handling of the straw. This expenditure is entirely saved in the Sunshine system. Any straw needed for thatching, bedding, etc., can be cut with a binder or mower after the grain is taken off by the Header.

Grain ripened in the field is the best grain, and sells at the highest price. It produces more and better flour than grain which is cut before maturity.

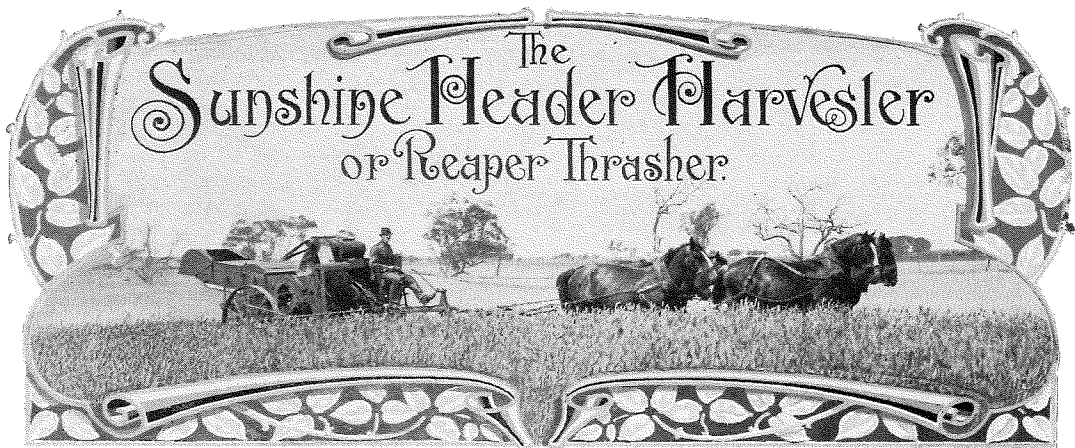
The loss of grain with the Sunshine Header is less than by any other process. With the old-style harvesting some grain is lost when cutting, some at the stooks, some at each of the operations of carting, stacking, and thrashing. With the Sunshine machine there is only one operation, and the loss, if any, is quite trifling.

The risk of damage in the stook by tempest and rain is removed, also the risk by fire when in the stack. There is no wearisome waiting for the thrashing machine; and the farmer's wife spends no arduous days over a hot oven cooking meals for the small army of men who work the thrasher.

Sunshine wheat is the finest wheat. It catches the earliest market, and obtains the highest price. It turns the crop into cash weeks (sometimes months) before stacked grain is ready for sale.

And the cost per acre is but a fraction of the cost by the old method.





(PATENTED)

## Detailed Description of Construction and Working.

THE strength and durability of a harvesting machine depend to a very great extent upon the strength and solidity of its wheels. In this respect the Sunshine machine is outstanding. The main wheel has a steel tyre 12 inches wide and  $\frac{3}{8}$ -inch thick, and the joint is secured by a heavy joint plate with ten rivets of  $\frac{1}{2}$ -inch diameter. It is built on the suspension principle. There are eighteen spokes of  $\frac{3}{4}$ -inch diameter steel. Each spoke has a countersunk head engaging in a countersunk hole in the rim, and is secured with a lock nut at the rim, and with main and lock nuts at the hub. The construction is such that in the event of a spoke being broken, any person without special experience can replace it quickly. The construction also permits of the truing up of the wheel by tensioning the spokes with the nuts provided.

The wheel centre is a casting of very ample strength, and with simple provision for lubrication.

The crown wheel or segment is mounted on six stout wrought iron lugs, which are riveted to the tyre. To these the crown wheel is attached by means of bolts and spring washers, making a very solid job, and ensuring the rigidity of the crown wheel under the roughest conditions of working.

The offside wheel is constructed on the same principles as the main wheel, and its tyre is 4 inches wide by  $\frac{3}{8}$ -inch thick.

The front wheel also is of the suspension type, and its tyre is of the same strength as that of the offside wheel, but has a half-round face, which gives ease in steering. Attention is drawn to the wide bearing surface on the axle of the front wheel, viz., 9 inches; and a  $2\frac{1}{2}$ -inch oil chamber is provided so that its lubrication does not require attention more than twice per day.



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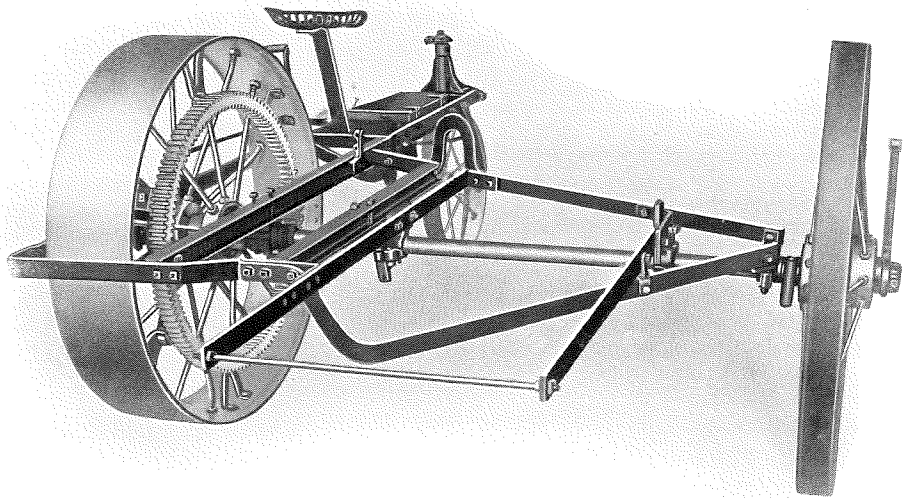




## FRAME.

The main frame on which the machine is erected is of great strength and rigidity, having four longitudinal and two diagonal members, which, in addition to the stiffness given by the axle, make up a frame such as will stand all the stresses to which a machine of its description is subjected in rough country. It is to be noted that the two main longitudinal members of the frame are of H section steel. These form the foundation for the main bearings of the gearing, and have very ample strength for this function.

The drum, the straw walkers, and the riddle box are mounted on the two offside members of the frame, which are of spring steel, and provide ample and rigid support for this purpose.

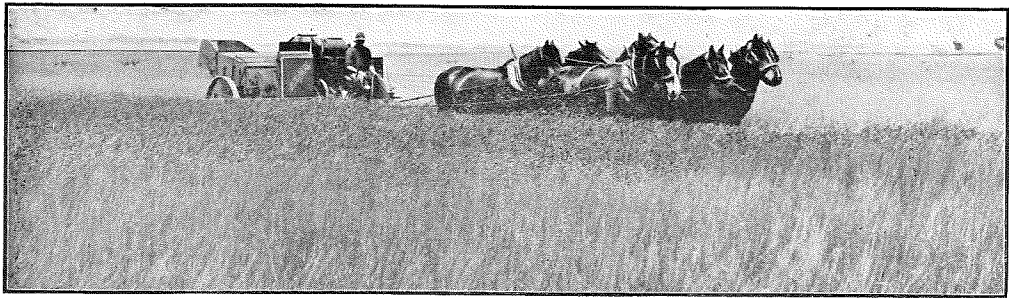


Showing Strength and Rigidity of Main Frame.



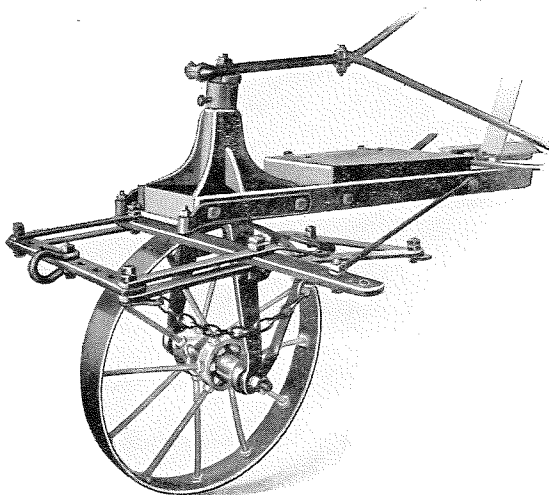
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## FORECARRIAGE.

The prolongation of the nearside member of the frame forms the nearside support of the forecarriage, while the offside strap of the forecarriage is bolted directly on to the H bar of the gear rail. The forecarriage is further strengthened by the use of a strong cast iron platform, in the front end of which a convenient tool box is formed. A heavy nose piece is bolted to the front of the forecarriage,



Forecarriage with Team-steering Gear,  
also Hand and Foot Control.

and provides the bearing for the vertical of the front wheel fork, to which it is neatly fitted. This fork is forged from a solid steel billet, and is of a construction excelling in strength for its work. The steering bridle is attached to the fork, and is connected to the pulling gear, which also embodies an ingenious automatic steering device, which is designed to give a quick turn to the wheel when the horses are taking the machine around a corner. The pulling device is adjustable so that the best point of pull may be obtained, according to whether a small or large team is being used to draw machine.

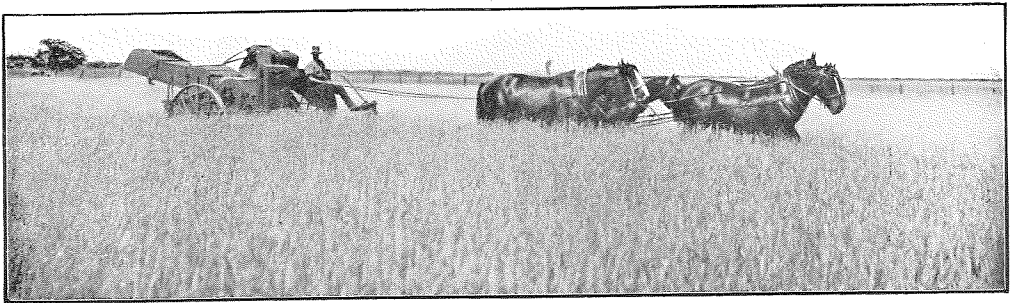
## THE COMB.

Many experiments have been conducted with a view to deciding the best type of comb to be used on these machines. It is found that a machine with no comb, or with a comb consisting of very short fingers, is apt to lose many of the heads in light crops, as also in crops that are leaning. The comb of the Sunshine Header has the teeth of such length as to cause the crop to arrive at the knives as nearly as possible in the vertical position. Further, it is only with a comb of reasonable length that it is possible to get underneath a fallen crop to bring it up to the cutting and collecting devices. In such crops it is sometimes necessary



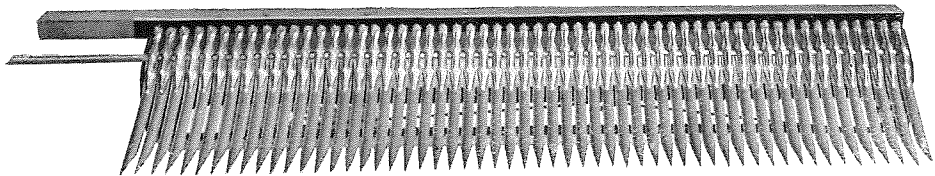
**Sunshine Harvester Works, Sunshine**





to use a special crop lifter, as described further on in this book, and these crop lifters cannot be successfully used in a machine which makes use of short fingers and a reel to bring the grain up to the knives.

The teeth of the comb are made of hard steel riveted to a malleable iron back. To the central recess of each back a steel ledger plate is riveted, and the knife sections work on these ledger plates, and are held down by the rear ends of the comb fingers. This gives a more perfect guide slot for the knife sections than is found on any other harvesting machine.



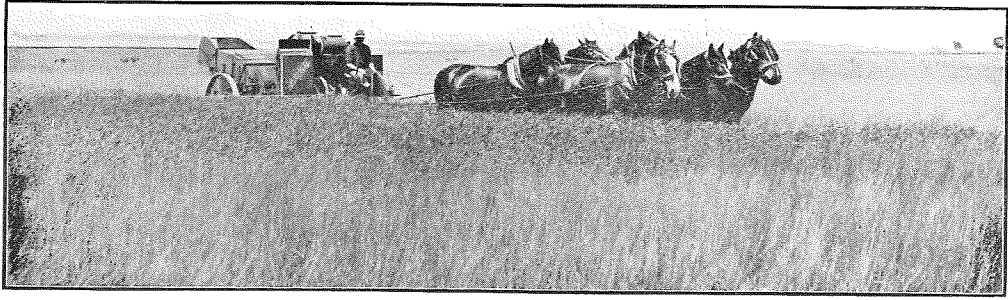
Under Side of Comb, showing Knife Head.

Another feature of great utility is the complete adjustability of the comb teeth. Normally they are placed only 3-16 of an inch apart to provide for the admittance of a crop of ordinary weight, but in very heavy crops, or in crops that are badly infested with thistles or other weeds, the teeth may be spaced farther apart to whatever extent is found desirable. To do this a number of teeth may be removed altogether, and the remaining teeth are then spaced out to the desired gauge, and the bolts which hold them retightened. The method of holding the teeth in position is simple and effective. The bolts have a tapered head, which engages in a slot formed between the machined edge of the comb bar and the bevel on the rear ends of the teeth themselves. The tightening of the bolt jams the teeth into position, and holds them most securely. Should a damaged tooth require to be replaced, this can be done in a moment by merely undoing one bolt and replacing.



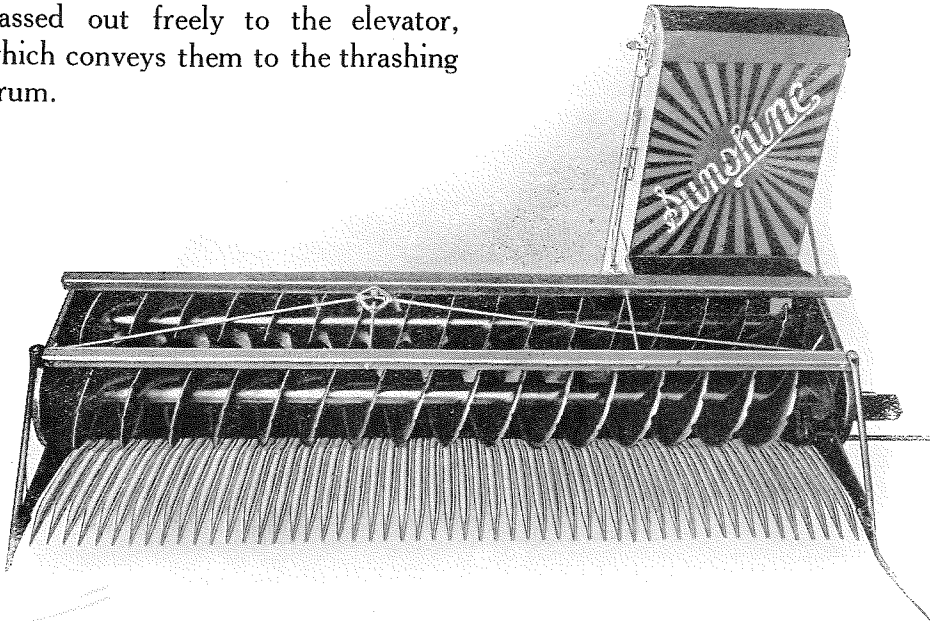
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## THE SPIRALS.

The comb is the first portion of the machine to engage the crop, which, as it reaches the inner portion of the comb, is seized by the front spiral, which acts as a grabber and conveyor. With a single spiral only, repeating would take place, but this machine is provided with dual spirals revolving in the same direction. The sucking action between and under these spirals forms the most positive conveying device yet invented. To further check any tendency to repetition, a check strip is inserted under the rear spiral, and a checking action is also obtained by the provision of a recess at the bottom rear of the casing in which the spirals work. Towards the nearside end of the spiral case its depth increases, and this causes the heads and straw to be passed out freely to the elevator, which conveys them to the thrashing drum.

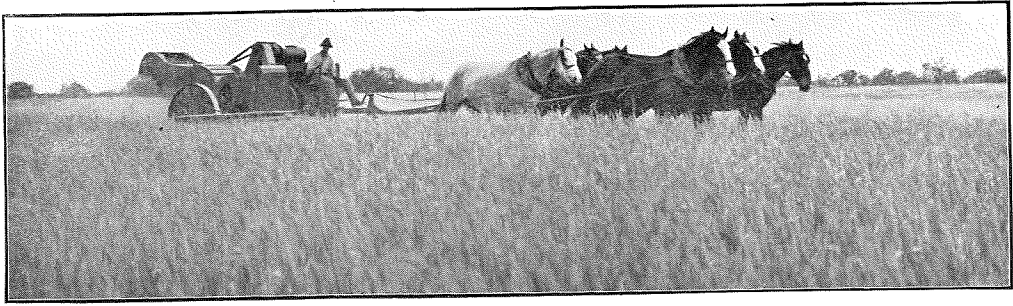


Comb and Spirals.



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## THE FRONT ELEVATOR.

The heads and straw are elevated from the conveyor spirals to the thrashing drum by a floating elevator. It is so called because both its top and bottom spindles are arranged to rise and fall so as to automatically adjust according to the amount of straw being handled. The adjustment provides for an up and down movement of  $1\frac{1}{4}$  inches both in the top and bottom spindles, this giving all the variation necessary to suit different conditions of crop. The maximum distance which the heads and straw have to be elevated is 26 inches. This is when the comb is set at its lowest point for taking very short crops. When the machine is working in a tall crop, the amount of elevation required is only some 12 inches.

The elevator itself is sprocket driven, and is composed of link chain belting, to which flanged angle steel slats of great stiffness are riveted. The elevator casing is of heavy sheet metal, and is made in two parts, one of which slides inside the other to form a tight joint and stop any escape of grain when the front part of the machine is raised or lowered to accommodate the height of the crop. A sheet iron cover is applied over the top portion of the elevator, which entirely precludes any escape of heads or grain that may be knocked upwards by the feed roller.

## RAISING AND LOWERING GEAR.

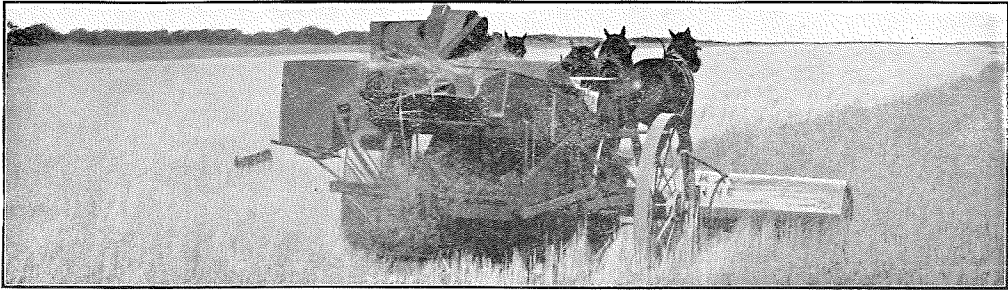
The front portion of the machine containing the knives and spiral conveyors is pivotally mounted from the main axle, so that it may be raised or lowered to bring the comb to the desired height for treating tall or short crops. It has always been the desire of the designers of a machine of this character to be able to raise and lower the comb so that it remains level both in short and long crops. In no machine has this been so successfully achieved as in the Sunshine Header Harvester. By an arrangement of the positioning bars a parallel lift is obtained, and the comb remains level, as it should do, no matter at what height it is being used.

The raising and lowering is effected by operating a lever placed handily for the driver's use. This lever works in a toothed quadrant, to which is attached a strong adjustable spiral helper spring located under the forecarriage frame.



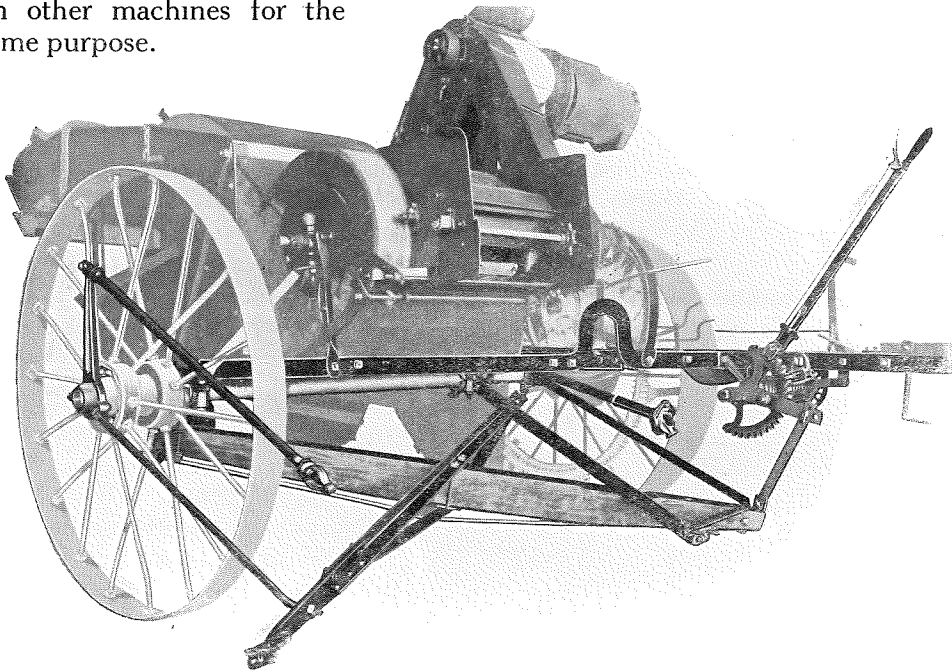
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With the adjustments provided, this spring may be tensioned to exactly counter-balance the weight to be moved, and the effort required on the part of the driver is very slight.

By making use of the notches in the quadrant, he can raise or lower a few inches at a time, or, when necessary, he can move the comb from low-crop position to that needed for the tallest crop in a few seconds. The lever is direct and positive, and its use involves much less labour than the rotary devices used on other machines for the same purpose.



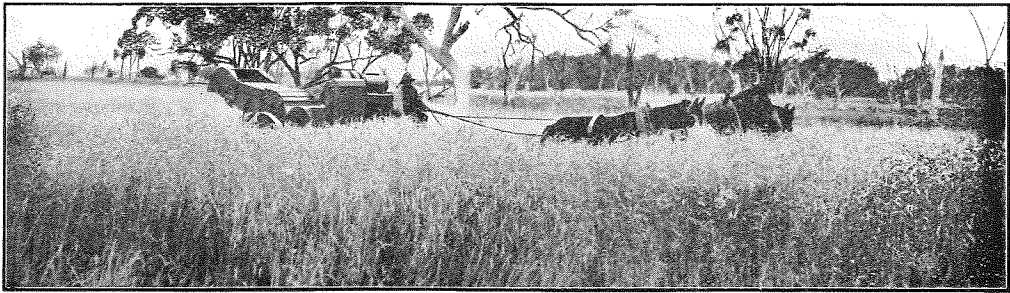
Showing Frame which carries the Front Portion of Machine, also Raising and Lowering Gear.

Keeping the comb always level avoids waste. It prevents the grain trickling off the comb, as will happen in the case of a comb slanting downwards in a low crop. Indeed, it is always a very notable feature of the Sunshine Header Harvester that no loose grains are to be found lying around the machine as the result of splashing.



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## FEED ROLLER.

The elevators bring the ears to the feed roller, which is placed immediately above the throat admitting to the drum. The feed roller is made of steel, and is fan-shaped. It is driven at a fairly high speed, and its function is to turn the ears from the elevator into the drum as they are brought up by the elevator. Any tendency towards splashing by the drum is checked by this feed roller. A hinged sheet metal cover is fitted over the feed roller, preventing any possible escape of grain, as it joins up with the cover which encloses the rear portion of the elevator.

## THRASHING DRUM.

The illustration shows clearly the construction of this drum, which is built on the principle of the drums used in the famous English threshing machines. The drum *ends* are made of steel plates pressed to shape and ribbed to give greater strength. They are riveted to a strong cast boss, which takes the strain at the spindle. Besides these strong ends the drum has *two centres*, also made of heavy steel, and the beater bars are bolted to the flanges formed on these drum centres and ends.

The drum spindle is of  $1\frac{3}{8}$ -inch diameter, and is mounted with self-aligning bearings, giving  $4\frac{3}{4}$  inches of bearing surface on the offside and  $5\frac{3}{4}$  inches on the nearside. Each beater bar is embedded in a steel plate, which is carried forward of the beater itself, and has the effect of increasing the "draw" of the drum. This device also improves the "lead" or entrance as each beater comes into operation, and its action also prevents any grain or straw from entering the centre of the drum.

The number of beaters is ten, being a larger number than is used on any other harvesting machine. Greater capacity and greater efficiency are secured by this large number of beaters, as the treatment is more uniform, and consequently more effective.

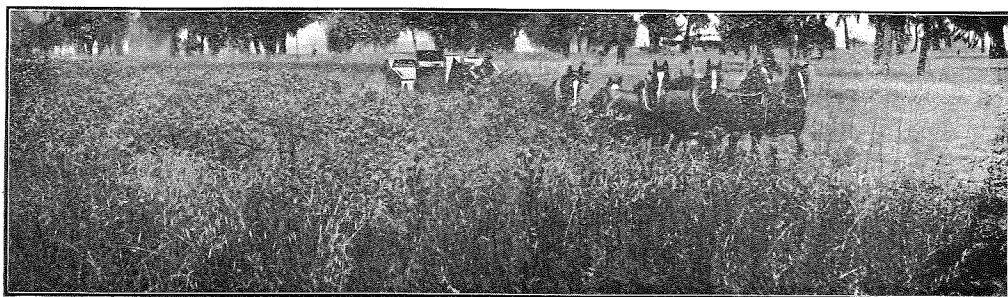
The shape of the beater bars themselves is of great importance. Those used on the Sunshine machine are rolled out of solid steel, the surface of the ribbings forming a tapering curve, which dies away at the front. This shape gives that "lead" which is so necessary to allow a number of the beaters to treat the ears



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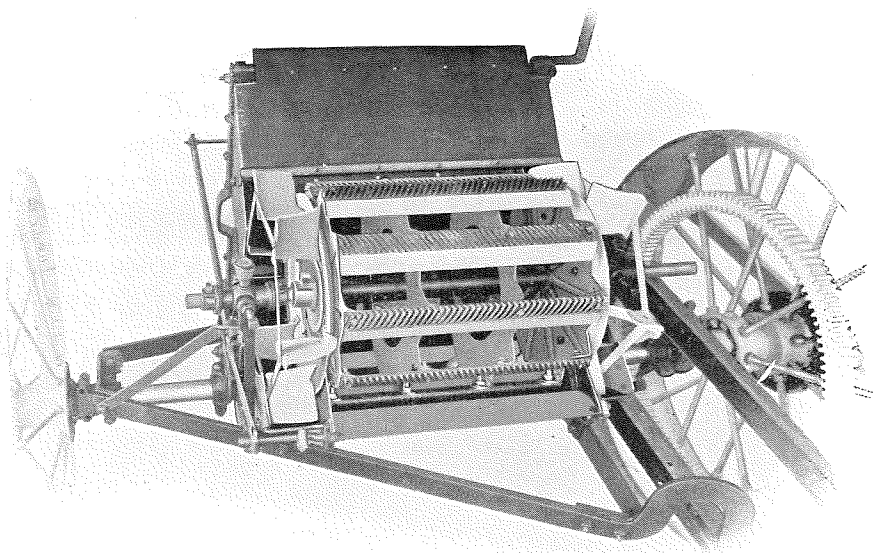






while the concave is checking the speed of the mass passing over it. This speed can be varied by adjusting the concave closer to the beaters, and so prolonging the rubbing effect.

The beater bars require to be holed to permit of the use of a stout bolt to hold them to the centres and ends. The continuity of the ribbings on the bars is not interfered with by this bolt, which has a ribbed head matching the rib of the beater bar itself. A heavy spring washer is used under the nut of this bolt to prevent any possibility of loosening.



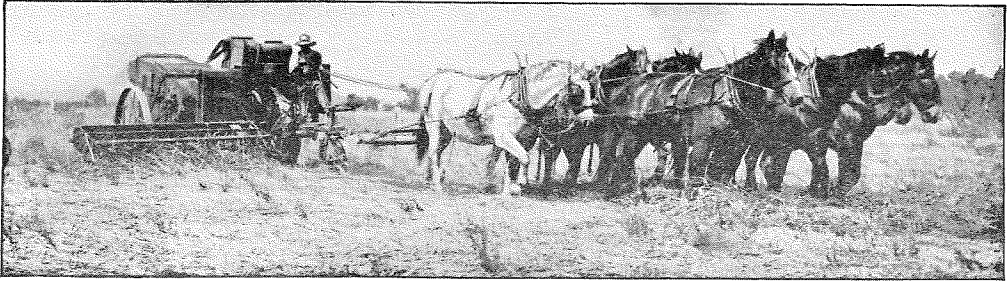
Thrashing Drum and Fans combined.

The whole thrashing drum is of such sturdy construction, and of such high-class material, as to make it amply strong for the severe usage which it is subjected to in heavy crops or under rough conditions. Its capacity is enormous, and even in badly weed-infested crops it will receive and successfully treat almost any crop grown.



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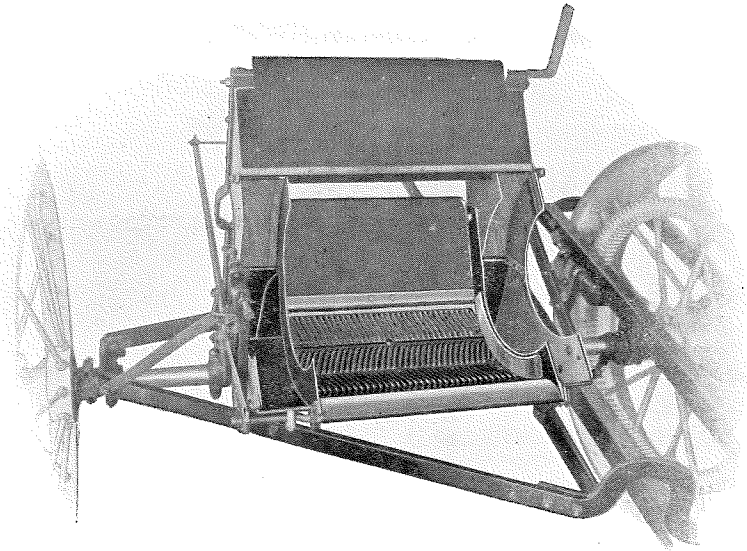


## THE CONCAVE.

The concave is formed of four ribbed plates mounted in a steel frame, the plates being bolted to flanges formed on the under sides of the frame. It is also strengthened by steel cross ties, and further reinforced by a steel band on the under side centre bolted to the concave plates, and to the cross ties, and to the body plate which forms its back.

Lugs are attached at the front end, which engage with the adjusting device. This consists of a cranked cross shaft operated by a lever placed on the offside of the machine, and working in a notched quadrant. By this means very fine adjustment is obtained for bringing the concave closer to the drum, or farther from the drum, as may be desired, to regulate the thrashing respectively in dry or moist conditions.

On the concave plates the ribbings are set alternately right and left, and are designed with a "lead" on the same principle as with the beater bars. The

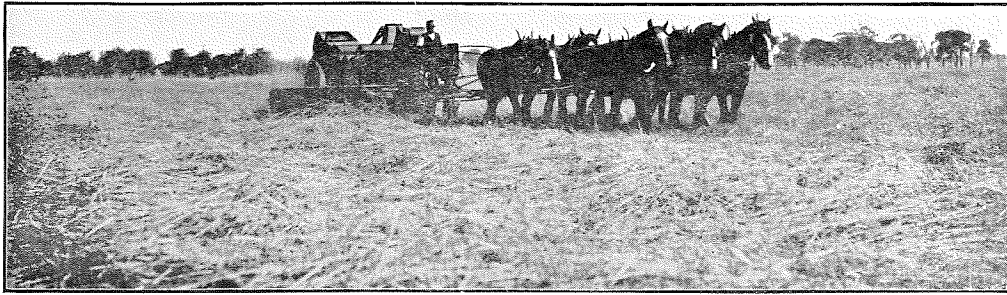


Concave with Lever Adjustment.



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concave is most carefully constructed, so that when the adjustment is made use of the spacing between the drum and the concave is still uniform at front and rear. The strength and solidity of this concave are such as to resist all strains, and to last for a great many years without renewal.

## THE BLAST.

One of the unique patented features of the Sunshine Header Harvester is the derivation of the blast, which is obtained without the addition of an extra drive on the machine. This is a great simplification, and also a considerable improvement on any other method of blast production. There are two fans, which are attached to the two ends of the thrashing drum itself, one on each side. The body and blades consist of stout sheet steel riveted together and bolted to the drum ends. To give greater strength to the blades, they are flanged at both edges, and they are further reinforced by connecting straps riveted to the outer flange of each blade. There are six blades in each fan, made to a special design to throw the blast towards the centre of the outlet. The whole design is such as to produce with two fans of only 4-inch width as great a blast as is obtained in other machines with a fan of many times these dimensions.

The method of adjusting the blast is by varying the size of the air inlet. To reduce the blast this inlet is partly closed by a sheet steel shutter, which is operated by a lever placed close to the driver's hand. The more this shutter is opened the greater the blast, and *vice versa*.

A further blast control is provided by an adjustable plate at the top of the outlet throat. This provides a cut-off for the fans, and gives an uninterrupted current leading to the air chamber. The nearer it is brought to the outer edge of the blades the greater the current, and the blast is consequently increased in proportion.

## BLAST CONTROL CHAMBER.

The two streams of air from the two fans are concentrated in this chamber, and their outlet from same to the riddles is controlled by vanes and baffles. The two horizontal vanes adjust the blast upwards or downwards, or concentrate it in one direction. They are also assisted by another adjustable deflector or baffle



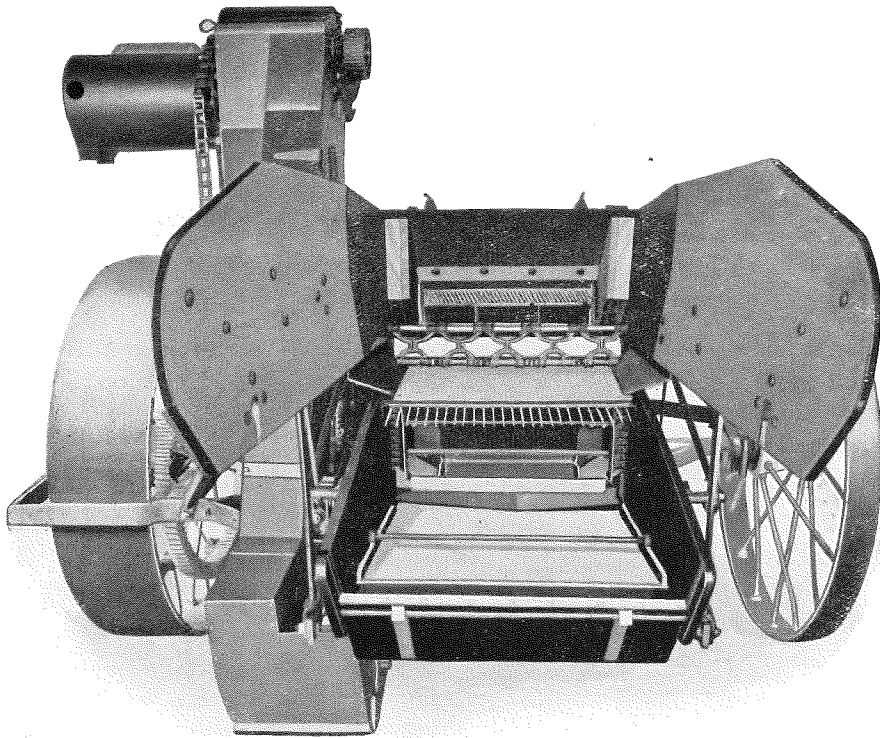
**Sunshine Harvester Works, Sunshine**





placed in the bottom of the throat of the chamber, the special purpose of same being to concentrate the blast on the front portion of the riddles when so desired.

The two vertical vanes are set so as to ensure sufficient blast reaching the sides of the riddle box, so that the whole riddling area is swept by the blast. The horizontal deflectors are regulated by levers set in notched racks on the offside of the chamber. The vertical deflector is regulated by thumb screw and lock nut underneath the chamber, but readily accessible.



Rear view, internal. Straw Walkers and Riddles removed.



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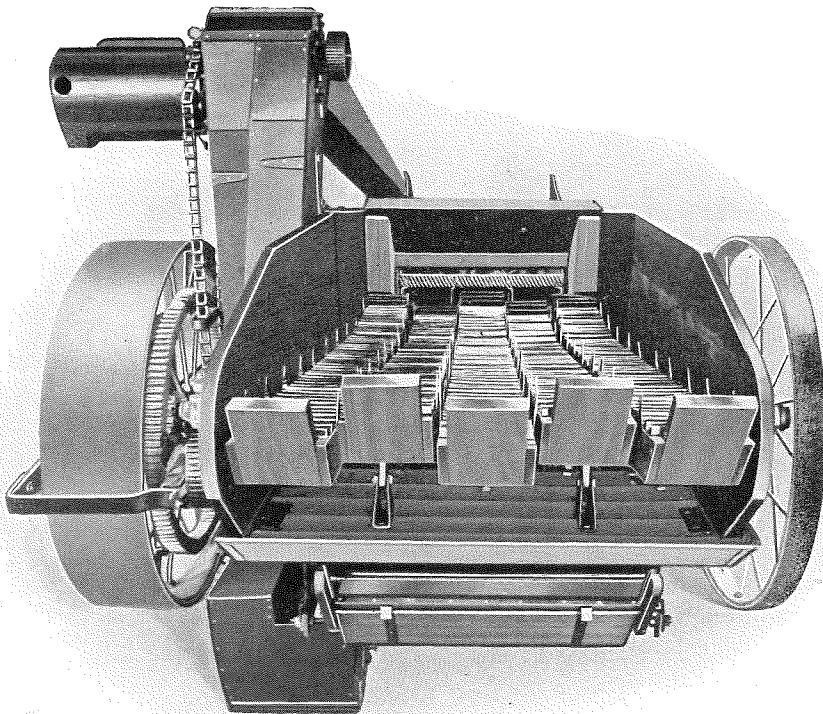




## STRAW WALKERS.

As the thrashed mass leaves the thrashing drum it passes through a short throat leading to the straw walkers. At the entrance to this throat is placed a sliding adjustable plate designed to prevent any repeating by the drum. This is effected by setting it as close to the beater bars on the drum as may be necessary.

In the door which forms the front portion of the cover of the straw walker case there is placed a fixed baffle. Same is adjustable by a sliding piece to increase or decrease its depth. Its function is to prevent the mass being thrown too far back on the straw walkers.

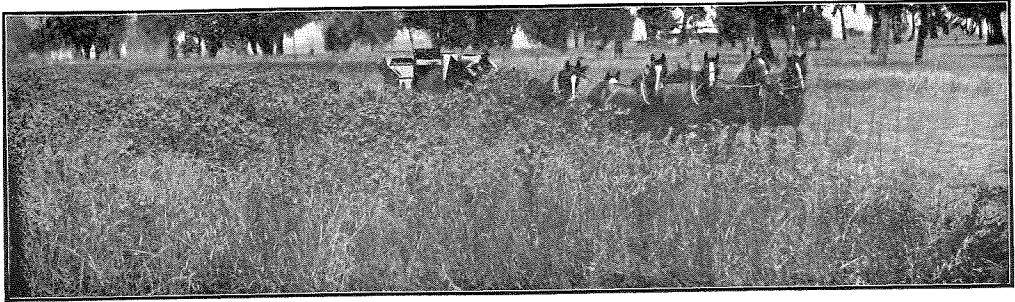


Straw Walkers—  
Rear view.



Sunshine Harvester Works, Sunshine





A second hanging baffle, placed towards the middle of the straw walker case, is provided to prevent any grain from being shot out at the rear of the machine before reaching the straw walkers.

The case for the straw walkers is composed of well-seasoned selected timber, firmly braced with angle and flat steel straps. It is supported at the rear end on steel uprights bolted to the members of the main frame. At the front it is firmly anchored to the drum frame, and is also supported by a heavy upright attached to the main frame of the machine. Diagonal stays from the offside axle bracket are also used to give extra strength and rigidity, and on the nearside there is a heavy steel diagonal stay connecting to the H section gear rail and the rear straps, which gives side support to the rear portion of the straw walker case.

The straw walkers themselves, five in number, are constructed of very specially-selected long-seasoned timber, which forms the two sides of each walker.

Each walker is  $6\frac{1}{2}$  feet long, giving most ample shaking area, sufficient to treat and separate a larger quantity of straw than can be handled successfully by other machines, and wasting no grain in the process. Each walker has no fewer than 46 louvres, making a total of 230 louvres in all. These louvres are composed of sheet steel, pressed into a special shape, with a lip which prevents the passage of long straws, and thereby relieves the riddles of any necessity for handling long straw. The great length of the walkers, and the great number of grain traps in each, preclude the possibility of any thrashed grain reaching the rear end.

The positive travel of the mass of straw is regulated by a series of saw teeth projecting above the louvres, and ensuring a constant movement rearwards.

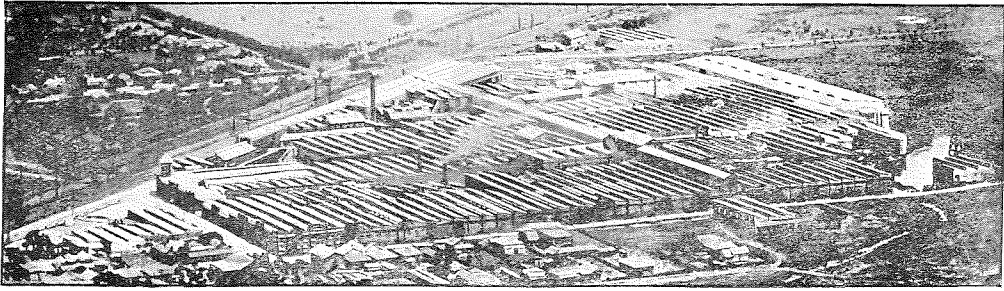
Attached to each walker at the inner end is a rake which works in the throat near to the thrashing drum, and is a further assistance in bringing the mass clear of the drum at times when the drum is revolving slowly, as when starting or stopping the machine.

To make sure that no grain escapes from the rear of the straw walkers, an adjustable tail piece of sheet metal is provided. Any grain getting so far back (a rare occurrence) is collected by this tail piece and directed into the tray.



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## **STRAW WALKER DRIVE.**

At the rear end the walkers are mounted on a driven crank shaft, which imparts the motion to them. They are suspended on a straight spindle at the front end, the attachment being by reciprocating hangers, which impart upward and downward as well as backward and forward motion to each walker independently. The whole construction of the walkers is such as to give a continuous bumping and pitching motion to the mass, which travels along them at a uniform pace until it is ejected over the tail end. The amount of straw that can be treated in this way by these walkers greatly exceeds the capacity of any other machine in this respect.

## **GRAIN TRAY.**

Under the walkers is a galvanised steel tray suspended at the rear end from the bearings of the crank shaft, and oscillated by same. At the front end it is attached by hinged hangers. All grain passing through the centre or rear portion of the straw walkers falls into this tray, which is set at a slope, and also has a stepped bottom to facilitate the return of such grain to the inner end of the riddles. This is the most perfect delivery to the riddles yet devised, as is proved by the perfect cleaning accomplished by the Sunshine Header Harvester without losing grain.

## **RIDDLE BOX.**

This is framed in special timber, and has a galvanised steel bottom. It is suspended from the straw walker case by spring steel straps at the forward end, and at the rear by steel hangers set in bearings. Diagonal spring steel stays are provided on each side to control the lateral movement of the box. In the construction of the box provision is made for placing the riddles lower or higher, also at varying slopes to suit different crops. This is effected by a series of holes for the holding bolts of the riddles at the rear, and by a rack at the front. A change in position of the riddles can be effected with very little delay.

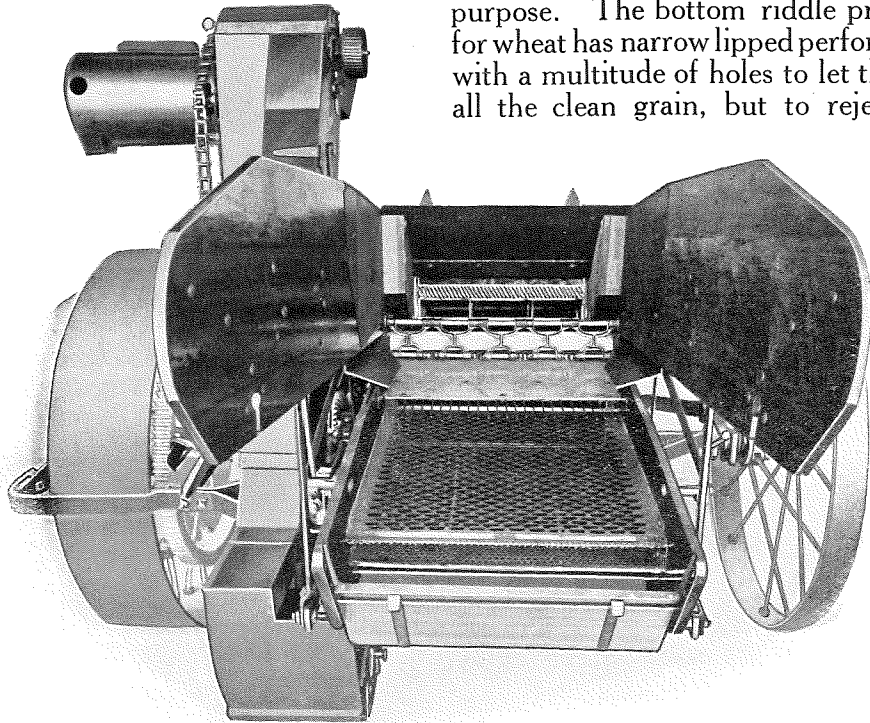
At the forward end, on top of the box, a sloping table of sheet steel is attached, having a toothed rake at its rear extremity. The riddles are composed of steel sheets, perforated to various patterns according to the grain that is being treated. They have stout steel frames of angle steel, and also longitudinal braces of





5/16-inch diameter steel, which give great support to the perforated sheets. The whole construction provides a riddle that is unsurpassed for durability, and will not need to be replaced during the life of the machine under ordinary treatment.

For harvesting wheat two riddles are provided, the top one having wide lip perforations, and this riddle is also fitted with a steel finger rake at its rear end. The purpose of the rake is to prevent any short straw which may have reached the riddle from getting into the seconds chute. Note that this same rake may be attached to the oat or other riddle when necessary by the bolts provided for the purpose. The bottom riddle provided for wheat has narrow lipped perforations, with a multitude of holes to let through all the clean grain, but to reject any



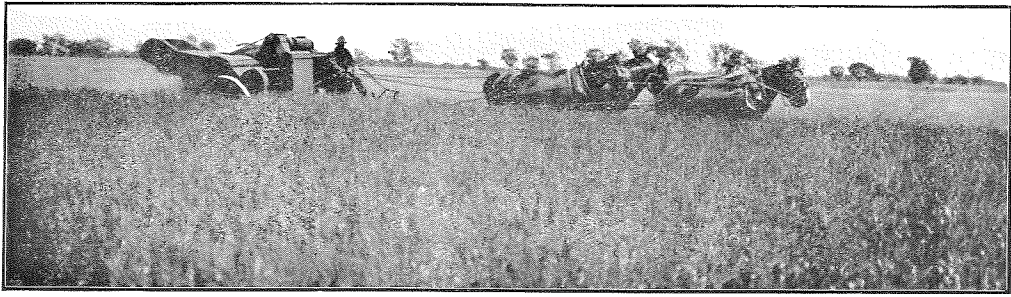
View from rear, showing Riddles.



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imperfectly thrashed grains. All clean grain passed through the bottom riddle reaches the sloping bottom of the box, and the oscillating movement gravitates it through a chute to the base of the clean grain elevator.

At the rear of the box another oscillating chute is provided, and any grains, etc., which need retreatment are passed by this chute to the seconds elevator.

As the mass of grain, straw, and chaff is thrown from the drum on to the front portion of the straw walkers, a very large proportion of the grain falls immediately through the straw walkers on to the shaking table of the riddle box. In falling from the table it comes under the influence of the blast, which blows the chaff rearwards, but permits the grain (being heavier) to fall directly to the riddle. In passing from the shaking table the rake guides the lighter particles rearwards, but permits the grain to drop directly, so that nothing but clean grain reaches the front portion of the riddle. The clean grain therefore passes quickly through the riddle and into the chute.

## HEADINGS ELEVATOR.

The body of this elevator is constructed of seasoned timber framing, with conveniently-placed inspection doors of very ample size. At the bottom is a sheet steel hopper, made to very large dimensions, in order to fit it to cope with the large quantities of broken-up foreign matter which reach it when handling crops badly infested with thistles and other weeds.

A neat device revolving with the lower spindle makes positive the feed to the elevator cups. The cups are of stamped steel, with the lip serrated to grab straw and other light stuff. These cups are attached to a stout leather belt,  $4\frac{1}{2}$  inches wide, driven by a pulley on the top spindle.

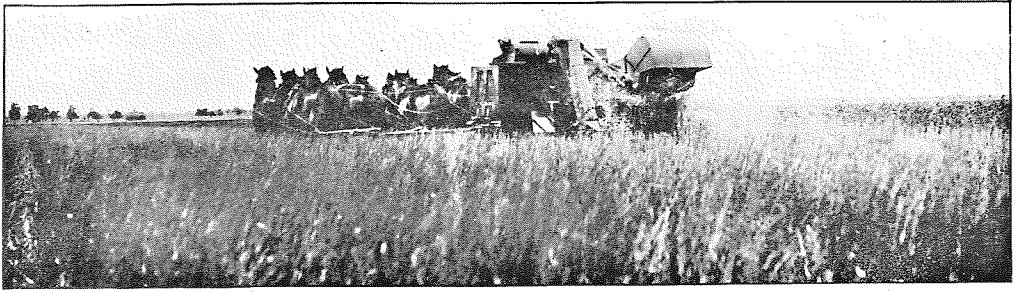
On reaching the top of the elevator the seconds are directed through a steel spout to a hopper on the nearside front of the thrashing drum cover, and thence they are wormed to the feed roller, which passes them on to the thrashing drum for retreatment.

The elevator belt is coupled by buckles, and extra holes are provided for taking up. In addition, an ingenious method of tensioning is provided by mounting the bearings of the lower spindle in a sliding case and adjusting by screws. This device also provides an easy method for truing the run of the belt in its casing.



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## **CLEAN GRAIN ELEVATOR.**

The clean grain falls through the riddles to the bottom of the riddle box, and is shaken down the sloping bottom to a chute at the front end, which delivers it by vibration and gravitation to the hopper at the bottom of the clean grain elevator. This hopper, made of sheet steel, is of very large capacity, and contains a rotary agitator which ensures a positive feed to the elevator cups. This elevator has the same type of tightening and truing device at its bottom spindle bearings as is described in connection with the seconds elevator. The elevator case has large-sized inspection doors. The elevator itself is composed of stout  $4\frac{1}{2}$ -inch leather belting, with steel cups placed only  $4\frac{1}{2}$  inches apart. This gives a huge carrying capacity that is equal to handling the grain from the heaviest crop. Its drive is by a pulley on the top spindle, which is the same spindle that drives the headings elevator, and also the straw walker belt. At the top the cups deliver into a sheet steel chute, which leads to the centre of the screen.

## **THE SCREEN.**

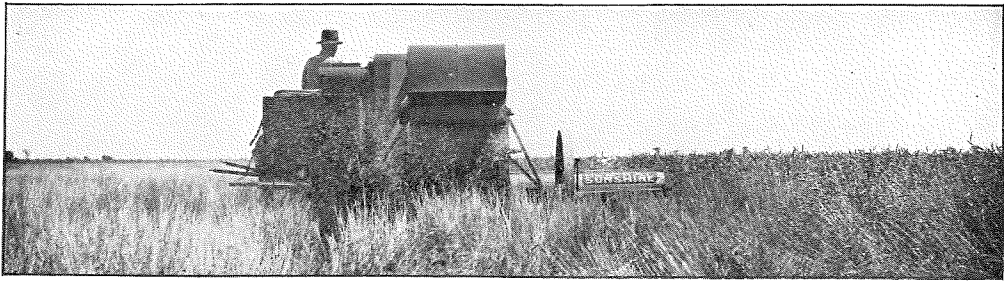
The rotary screen is made of sheet steel, with perforations gauged to pass through all small or broken grain and small weed seeds. In order to ensure that all of these are screened out, a double start worm is fitted, which causes the grain to travel around over the perforated surface many times, ensuring a perfect screening. This worm also acts as a conveyor for the normal-sized grain which is conveyed to the outer end, whence it falls direct into a large grain box. To prevent any loss of grain, the rotating screen is enclosed in a stationary sheet steel casing attached at the top of the elevator. The outer end of this casing forms a chute to lead the grain into the grain box. On the top of this casing is mounted an adjustable brush, which comes into contact with the top of the screen, and keeps its perforations clear.

The rotating screen is riveted direct to its driven sprocket, which has its bearing on a flanged casing bolted to a stout bearing plate attached to the elevator.



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## **GRAIN BOX.**

This is a stout sheet steel receptacle, provided with convenient chutes for emptying. Attached at the bottom of the chute is a bag bow provided with a neat device for the quick attachment of the empty bag, and its quick detachment when filled. The long handle of the bag bow provides a lever for "jumping" the bags so as to fill same fully ready for sewing up. A lever operates the shutter to open the chute, and also to close it tightly to prevent any escape of grain while the machine is travelling. The weight of the grain box is taken on stout bearers and stays attached to the main frame of the machine.

## **WHEEL BRAKE.**

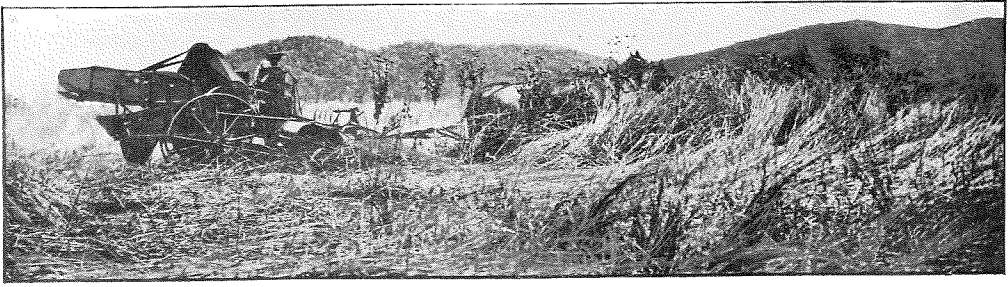
This is formed of a steel band, shod with renewable wooden blocks, operating on a broad flanged extension of the main wheel hub. It is controlled by a foot lever placed handy to the operator, and it is quite efficient even on the steepest grades.

## **DRIVING MECHANISM.**

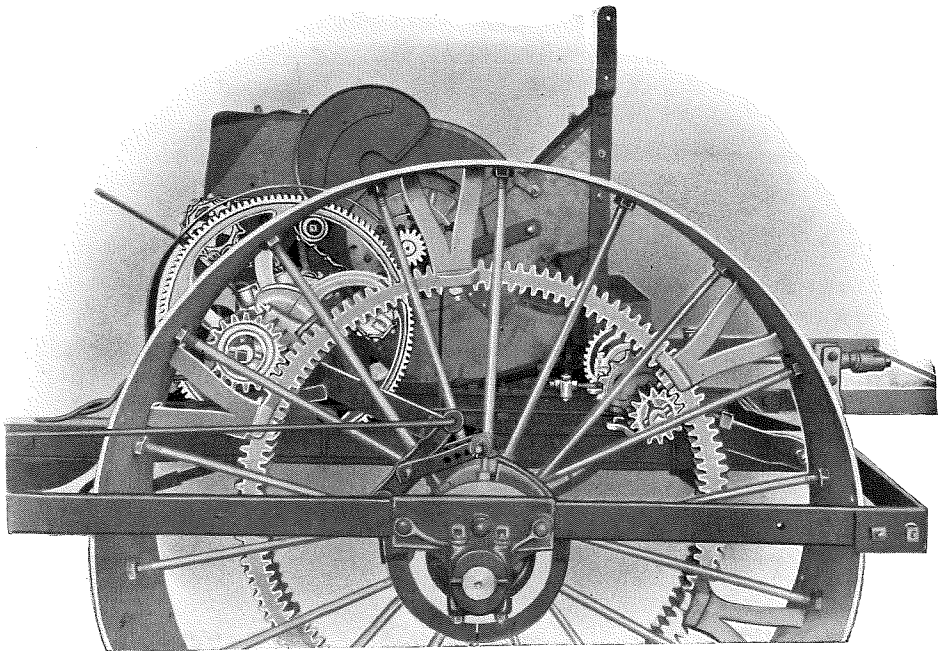
The first motion is from the crown wheel or segment, which is mounted on the main wheel. This differs from that used on other harvesting machines, in respect of having both internal and external cogs, both of which are used to impart motion to the mechanism. The external cogs drive one spindle at the front, while the internal cogs drive another at the rear. This gives a balancing effect, so that the strains on the wheel centre are to an extent equalised. This feature also makes for the true running of the main wheel, and tends to neutralize side draught.

The front spindle above mentioned is driven by a large diameter pinion (eighteen cogs). On the nearside of this pinion a clutch is formed, which engages a pin driven through the end of the spindle. A clutch fork and spring are provided to slide the clutch into engagement with the pin, and a lever placed handy to the operator enables him to disengage the clutch instantly. It should





be noted that the clutch must never be put into gear while the machine is moving. From the front spindle are driven the drum and fans, the front elevator, and the feed roller. An automatic clutch is provided on this spindle to allow the drum and fans to run free while the rest of the machine is stationary. This provides a means of maintaining the blast, and so keeping the riddles clean, while the machine is turning at the corners of the crop, or when going from the crop to the bag dump. During a momentary stop the drum continues to revolve, and hence there is less strain on the machine and the horses when restarting.



Main Driving Gear—Side view.



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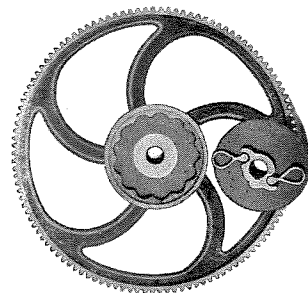




The drum spindle is driven by direct gearing from the front gear spindle, the relation of the gear wheels being such as to give the necessary speed to the drum.

The drive for the front elevator is by sprocket and chain, the driving sprocket being placed at the offside end of the front gear spindle. The same chain also engages a sprocket on the end of the feed roller spindle to drive same. A wheel is provided to bring the chain into position to ensure the positive drive of the feed roller. A tension sprocket is also provided at the rear to take up any slack in the chain.

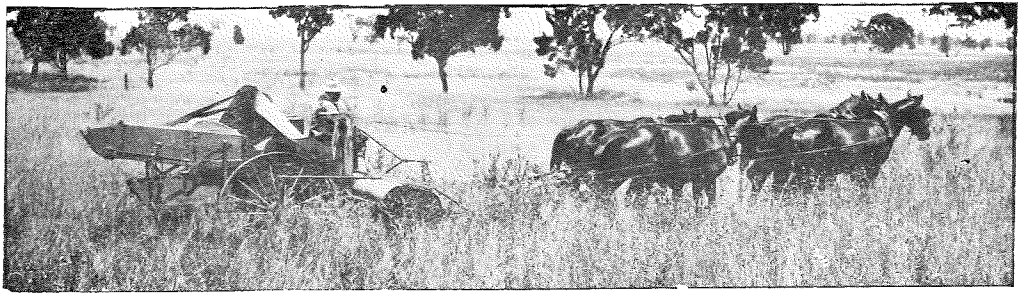
Special attention is directed to the design of the plummer blocks, on which the front gear spindle is mounted. It is necessary to provide for the use of differing sizes of gear wheels on the drum spindle, and, to obviate the necessity of using idler gear, provision is made for the necessary range for change of position in the gear spindle itself. This is effected by the use of radius plummer blocks, the radius corresponding to the radius of the crown wheel. This arrangement permits of the necessary shifting of the gear spindle and its pinion without altering its relation to the crown wheel, and it ensures correct meshing with the drum pinion.



Gear Wheel for Drum Drive, showing Free Wheel Clutch.

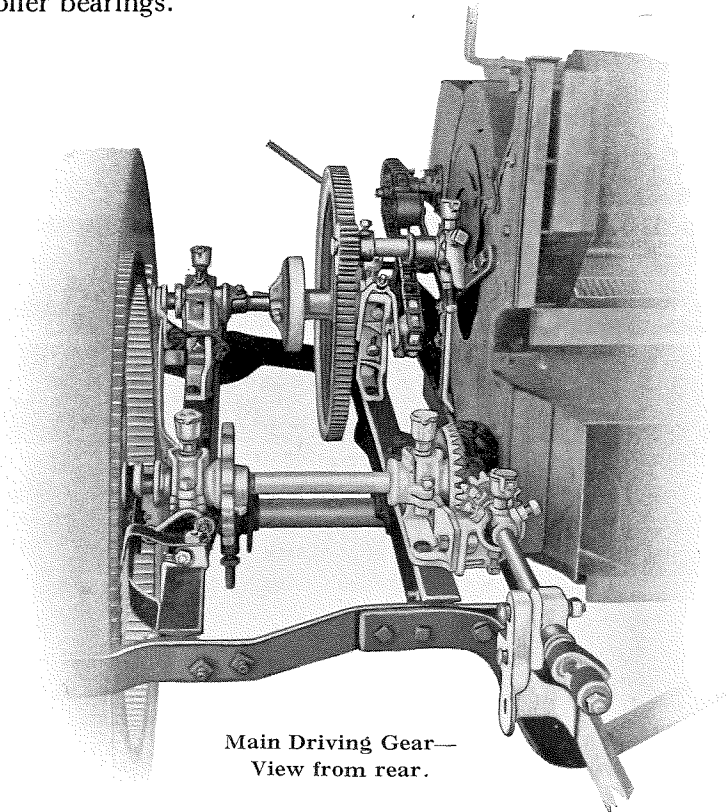
This adjustment is effected by adjusting bolts at the top of the plummer blocks. A further adjustment is provided at the base of the plummer blocks by means of slots and bolts, so that the correct meshing with the crown wheel can be obtained by using the adjusting screws at the forward end.

The front gear spindle is mounted on self-aligning roller bearings, ensuring almost frictionless running.



### **REAR OR INTERNAL GEAR SPINDLE.**

This is driven by a fourteen-tooth pinion engaging the internal cogs of the crown wheel. The pinion is provided with a clutch, clutch spring, and in-and-out-of gear lever, the same as that used on the front gear pinion. The spindle is mounted on plummer blocks, which are adjustable back and forth on the gear rails to provide for correct meshing, and it is also mounted on self-aligning roller bearings.



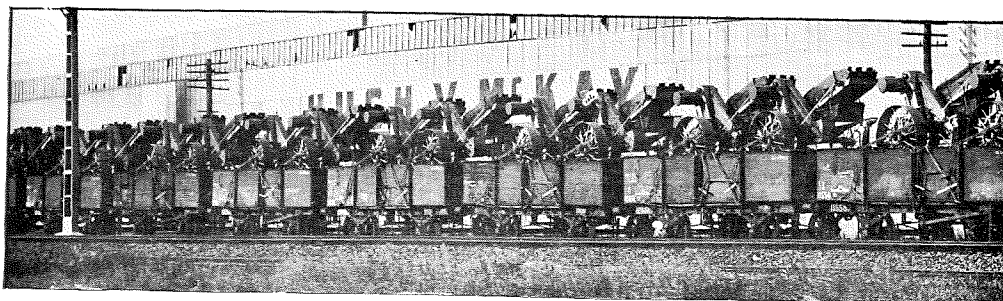
Main Driving Gear—  
View from rear.

The function of the rear gear spindle is to provide motion for the grain and headings elevators, the screen, the straw walkers, the riddle box, and the knives and spirals.



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## **ELEVATOR AND SHAKER DRIVE.**

The two elevators are driven by sprocket and chain from the nearside of the rear gear spindle, and the same chain also engages the sprocket which drives the rotary screen. A tightener sprocket for the chain is supplied, as also a positioning sprocket, placed below the screen sprocket to hold the chain in the correct position for this drive.

The spindle which drives the two elevators is also utilised to drive the straw walker crank by means of a belt pulley placed at its offside end. This pulley has a serrated face to prevent belt-slip. A similar pulley is mounted on the nearside end of the straw walker crank, and the drive between these pulleys is by crossed belt, in order to drive the walker crank in the correct direction.

On the offside end of the rear gear spindle a heavy bevel cog is mounted, the attachment to the spindle being by lathe-cut thread. This drives a bevel pinion attached to the shaker shaft, on the end of which a crank is mounted (also attached by machine-cut thread). A slot is formed in this crank to which the shaker roller is bolted. A castellated nut and cotter pin is used on this bolt, which prevents the nut from working loose with the revolutions of the crank. By means of serrations in the crank itself, and corresponding serrations on the washer under the head of the bolt, it is possible to adjust the throw to the extent of  $1\frac{1}{2}$  inches, thus providing for a variation of the shake from a maximum of 3 inches to the smallest amount of tremble that may be required. The shaker roller itself, and also the bush on which it revolves, are case hardened, and a case-hardened plate is provided in the bracket mounted on the riddle box, which forms the roller housing.

## **KNIFE AND SPIRAL DRIVE.**

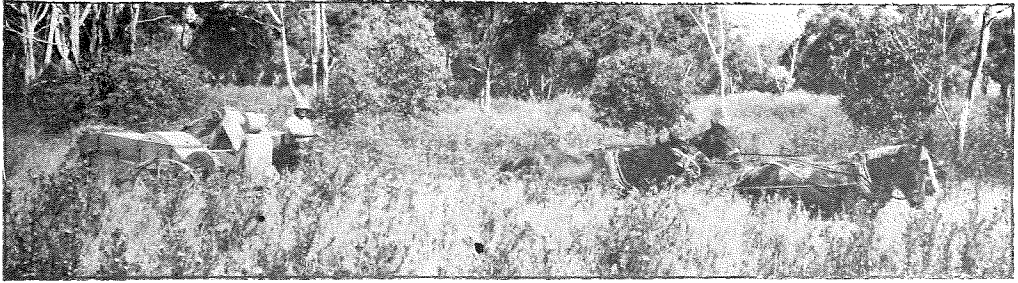
The same bevel gear which drives the shaker shaft also drives a square shaft, through which motion is imparted to the knife and the spirals. It is fitted with two universal joints, one at the rear and one at the front, the purpose of these being to allow the shaft to drive the gearing at any angle, so that there is no interruption of the drive while the comb is being moved up or down.

At the rear of the front universal joint there is a square sleeve which the square shaft engages, and in which the shaft may slide to elongate or shorten, so as to accommodate itself to the highest or lowest position of the comb.



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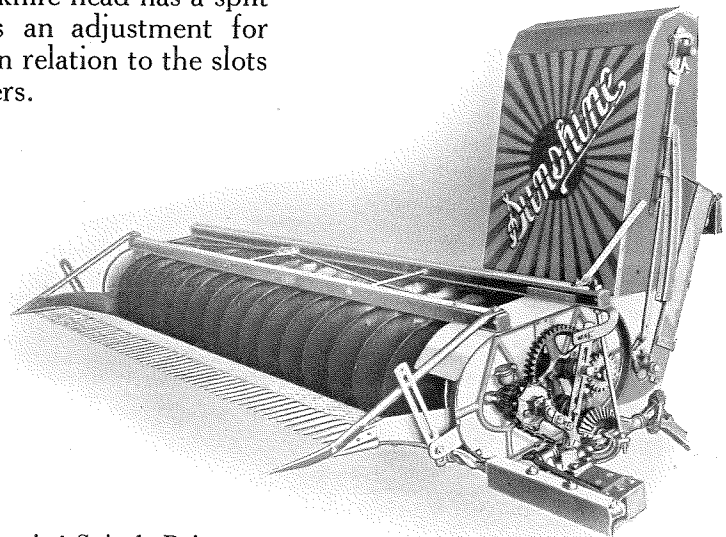




## KNIFE DRIVE.

The front universal joint is screwed to a spindle with lathe-cut thread, at the other end of which a crank is placed (also attached by lathe-cut thread). This crank engages the pitman, which drives the reciprocating knife. The bearing for the pitman on the knife head has a split sleeve, which provides an adjustment for positioning the knives in relation to the slots between the comb fingers.

Special attention is directed to the knife head, which is of round steel, sliding in a long bearing. This construction permits the knife to take its own position, and gets rid of those strains which are often noticeable in other styles of knife head slides.



Showing Spirals Drive and Knife Drive.

## SPIRAL DRIVE.

The same spindle as drives the knife is also utilised for driving the spirals. This spindle has its bearings on a strong housing bolted to the end of the spiral case, and also bolted to an extension of the comb support. It is further adjustably stayed to the top rail of the spirals case, and thus provides a very solid support for the drives.

Between the bearings of the spindle is pinned a bevel pinion in mesh with a bevel wheel, which is cast in one piece, with a sprocket from which a chain belt drives a sprocket on the spindle of the front spiral. A roller tension is provided on this chain. A gear wheel on the front spiral spindle imparts motion in the same direction to the rear spiral by driving a gear wheel on rear spiral spindle.



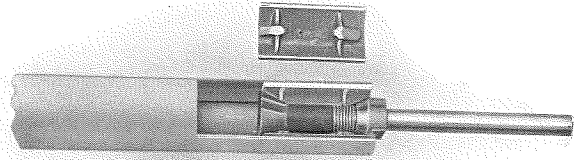
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through an idler wheel. The latter is adjustably mounted on a slot in the centre of the spiral case end, and its bearing is eccentrically mounted. This permits the idler to be brought into mesh to suit any necessary adjustments of the spirals. The sprocket and pinion on the front spiral are very securely attached, being fitted to the spindle by key-way and double-tapered key, and also firmly locked together by two bolts. An adjustable steadier bearing is provided for the end of the front spiral spindle, its purpose being to avoid over hang, and to give extra resistance at times of special stress.



Attachment of Spindle to Spiral Centre.

## CONTROLS.

The following controls are worked by the driver without moving from his seat :—Foot brake lever, hand and foot steering lever, raising and lowering lever and foot trip for same, internal pinion clutch lever, external pinion clutch lever, blast shutter lever, crop lifter adjusting lever, and chokecutter handle.

## LUBRICATION.

On account of the compactness and lack of complication of the mechanical devices of this machine, the points at which lubrication is necessary are reduced to a minimum, and are much less in number than on any other harvesting machine of this type. Altogether, oiling is necessary at only forty-six places.

Simple oil holes are not used at any important bearing ; instead, ample oil recesses are provided, and in most cases economical syphon feed is used with large supplementary oil chambers. For this reason the work of lubricating is safely reduced to twice per day, except in the case of a few of the fast-running parts which need more frequent attention, as set out in the book of instructions.

To exclude dust, the important oilers have hinged covers.

The use of heavy, good-quality oil is most desirable, and most profitable in the long run. Sunshine Harvester Oil is strongly recommended, being specially selected to suit this machine.



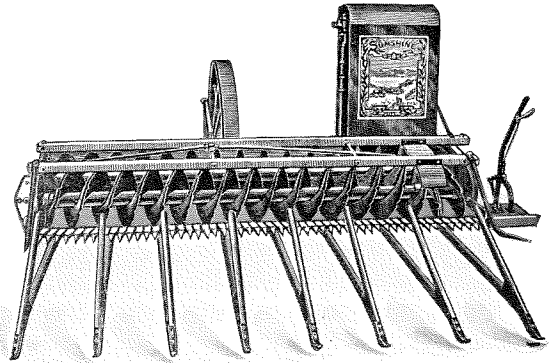
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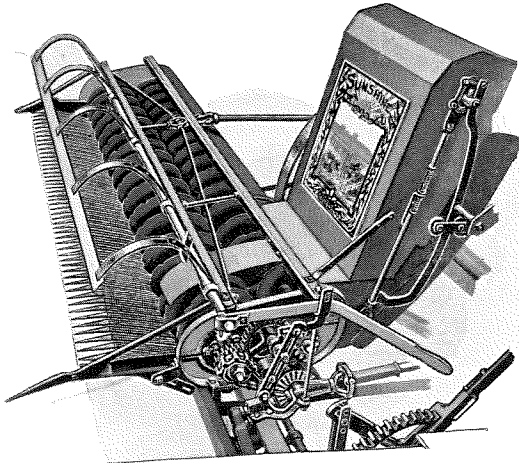


## THE CROP LIFTER.

In fallen and tangled crops it is often necessary to have special means of bringing the heads of grain up to the comb, so that the machine may not have to handle an unnecessary amount of straw. This duty is well performed by the crop lifter. The eight fingers may be set to any desired height by the lever and rack. The individual fingers are also adjustable so that the top member may be set at varying angles. (Each finger will also rise independently in case of striking any obstruction.) The lever is handy to the driver, who may adjust the height of the fingers while the machine is in motion. It is strongly recommended for use in all heavy crops which are down or in tangled masses. It is supplied as an extra.



## THE CHOKECUTTER.

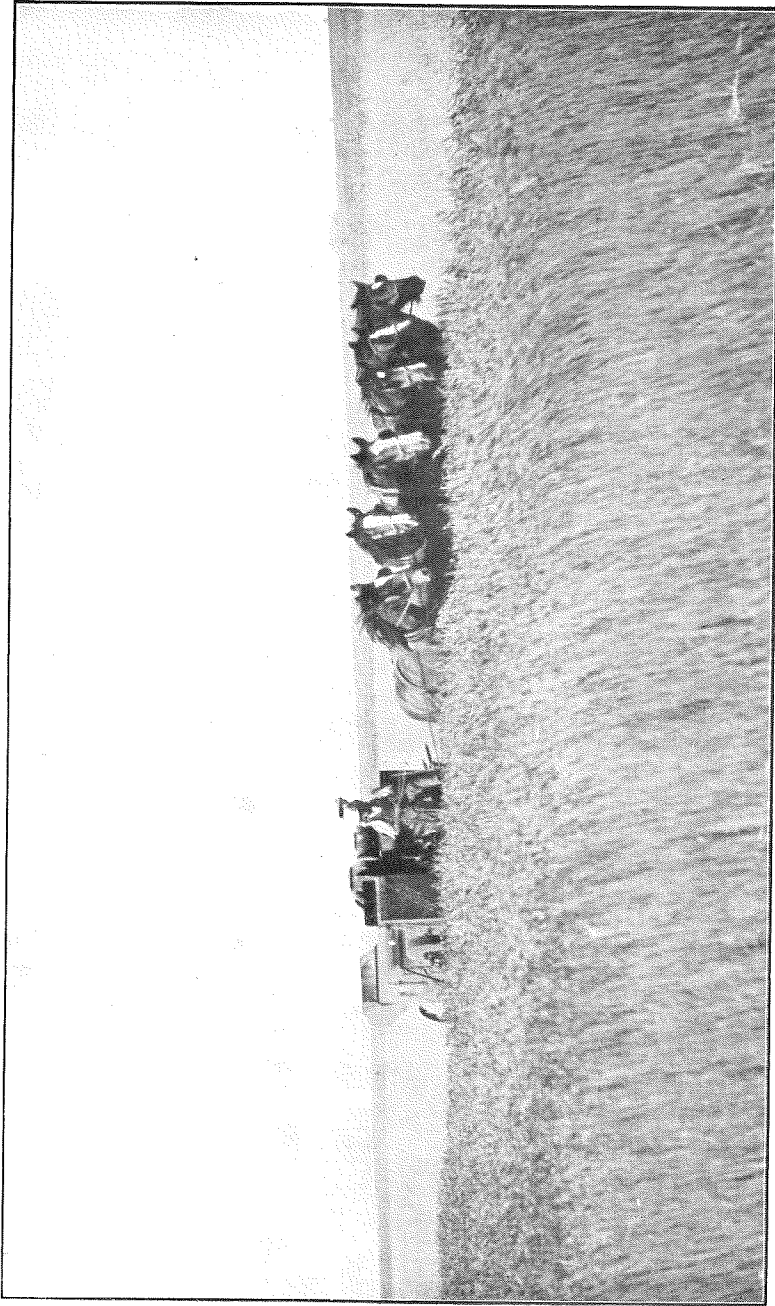


This is provided with lever-handle placed conveniently for use by the driver. It is invaluable for knocking back chokes in the comb, caused by thistles or other foreign growths in the crop. The blade has a scraping action on the comb teeth from 10 inches in front of the knives, and a few blows will always drive back the most difficult choke. Every Header which has to work in weed-infested crops should be provided with this chokecutter. It is supplied as an extra.



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A Heavy Crop and an Eager Team.

