

How to
THRESH

DIRECTIONS
for Operating
RED RIVER SPECIAL
Separators and Attachments



Built by
NICHOLS & SHEPARD COMPANY
BATTLE CREEK, MICHIGAN

Carefully Read This Book of Directions

No matter how long you have threshed or how many makes of separators you have now.



Set your machine level.

Use good oil.

Keep your belts tight.

Keep all bolts drawn up tight.

Never let belts get wet.

If you run your machine too fast, you will surely waste grain.

You can't save grain unless you thresh it out of the head.

If you follow these directions, you can do the best of work in separating and cleaning all kinds of grain and seeds.

DIRECTIONS

for Operating

Red River Special

Separators and Attachments



BUILT BY

NICHOLS & SHEPARD COMPANY

Battle Creek, Michigan

TO PURCHASERS AND USERS OF "RED RIVER SPECIAL" SEPARATORS

As a thresherman you now have the responsibility of directing and performing one of the most important operations in the production of grain—that of removing the grain from the straw, thoroughly cleaning it and safely storing it in sacks, wagons or granary without wastage. This can be done only by a competent machine skilfully operated.

After the many months expended in preparing the ground, planting, growing, harvesting and hauling the crop, the grain is taken in the bundle by the modern thresher and in less than one minute is threshed, cleaned and delivered into the possession of the owner, the straw deposited into a stack or mow, and without waste.

While the modern grain thresher is a wonderfully efficient machine and nearly perfect in its operation, the experience and skill of the thresherman is manifested in results attained, and for that reason you are requested to give close heed to and master the following directions.

There is back of this separator the seventy-seven years of Nichols & Shepard in the business, besides the combined experience of thousands and thousands of threshermen.

The Red River Special is simple to operate and requires less engineering to get the best results than any other kind, yet there is a right way and a wrong way to do everything.

Your reputation as a thresherman depends not alone on having a good machine, but on your management and adjustment, together with a full knowledge of the following directions.

SETTING THE SEPARATOR

The art of properly setting a threshing outfit for operation is an accomplishment not to be overlooked. The machine should be set as level as it can. Usually the wheels are such that the machine will set at a perfect level on a barn floor or level ground just as it is built and is made the right pitch to work off the straw and get good results. There might be extreme cases where it is advantageous to lower the rear wheels by setting them in the ground or placing a plank under the front wheels when the separator sets on a barn floor. Some threshermen use a spirit level, while the majority set it level by their eye. It may be necessary on uneven surfaces to let some of the wheels in the ground. A machine should always be set level sideways. To do this raise or lower one of the rear wheels until the cross-girts between the sills are level. Never jack up one side of a front sill to do this, as it places the separator on a twisting strain when running.

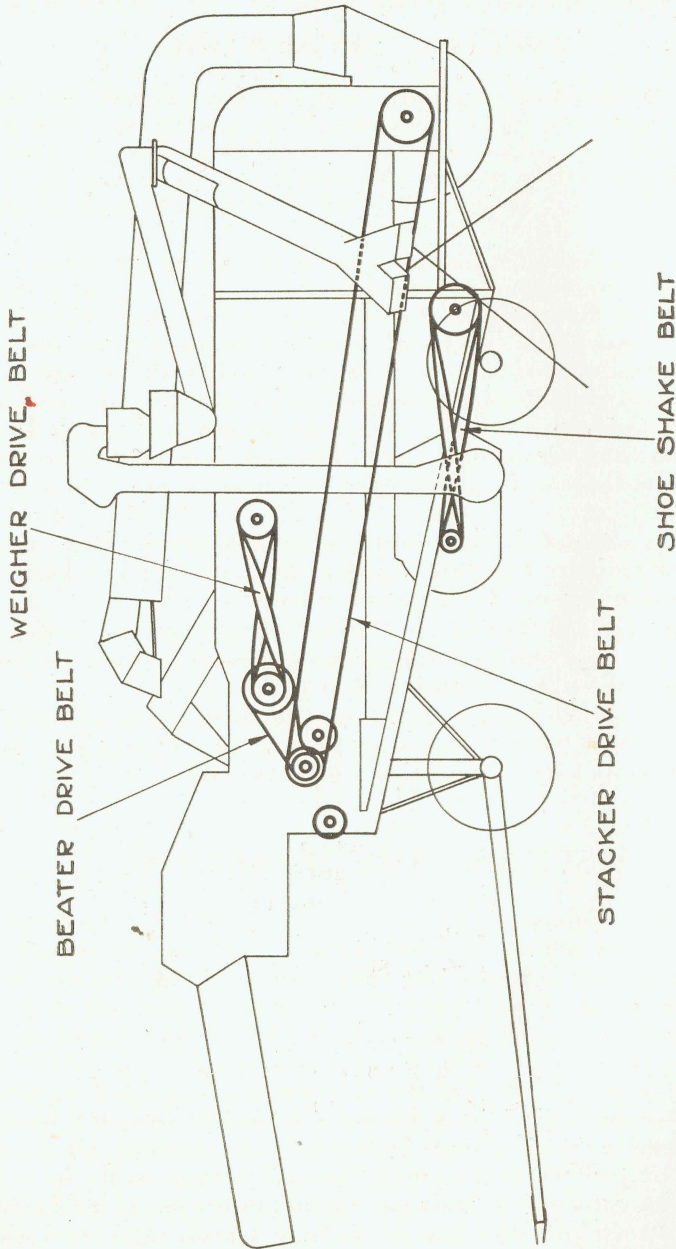


Diagram of 12-Bar Cylinder Red River Special—Drive-Belt Side, Belted

Always level by the rear wheels. The separator is so nearly balanced that it requires no staking down; block in front of the wheels to keep the drive belt from pulling it forward.

Before starting your machine look it over carefully and see that all boxes are firmly secured in place and that all belts are tight enough so that each part of the machine works at the proper speed in comparison with other parts, which it will not do if a belt runs too loose. See that all belts are tight enough so they will not slip on pulleys; at the same time they should not be too tight, as it will interfere with the easy running of the machine. Before starting see that the machine is thoroughly lubricated. All bearings should be oiled so the boxes run cool.

A new separator should be run some considerable time, perhaps an hour, before using, in order that it gets in shape where every part runs properly. See that belt tighteners and belt guides are properly adjusted, not only to keep the belts tight in the instance of belt tighteners, but with the belt guide see that the main drive belt runs midway on the cylinder drive pulley so that it does not run with the edge against the small upright rollers. Set the guide pulley by turning the thumbscrew in or out until it guides the drive belt true on the drive pulley. The drive belt runs over on top of the belt guide pulley around the cylinder drive pulley, and the belt guide can be set so as to guide the belt when the engine is a trifle out of line with the separator. The belts should be just tight enough to run without slipping on the pulleys. See that the pulleys are all set in line. If a belt is run too tight it will soon pull to pieces and the extra strain is very apt to make the machine run hard and possibly cause boxes to heat. If a belt is run loose enough to slip on pulleys it is liable to burn the belt and clog and do poor work. It is easy to ruin a belt, and they are not warranted. All leather belts should be run with the smooth side to the pulleys and the soft side out. New belts may continue to stretch for a day or two and should be looked over carefully at least once a day to see that they are of the right length and well laced. This should be done before starting up the machine, so that there will be no delay in lacing belts when threshing.

The belts on the Red River Special run as follows:—

The shaker beater belt runs open from cylinder pulley to larger pulley on crank-shaft, over beater and under tightener pulley.

The fan belt must be crossed between cylinder and fan.

If raddle stacker is used, the raddle stacker belt must be crossed between beater and stacker shaft.

The short conveyor belt runs open on elevator side from fan to conveyor to convey the grain out on opposite side of separator into the weigher. The long conveyor belt runs crossed on opposite side from elevator from fan to conveyor, to convey the grain out on elevator side of separator when the machine is used with hand measures.

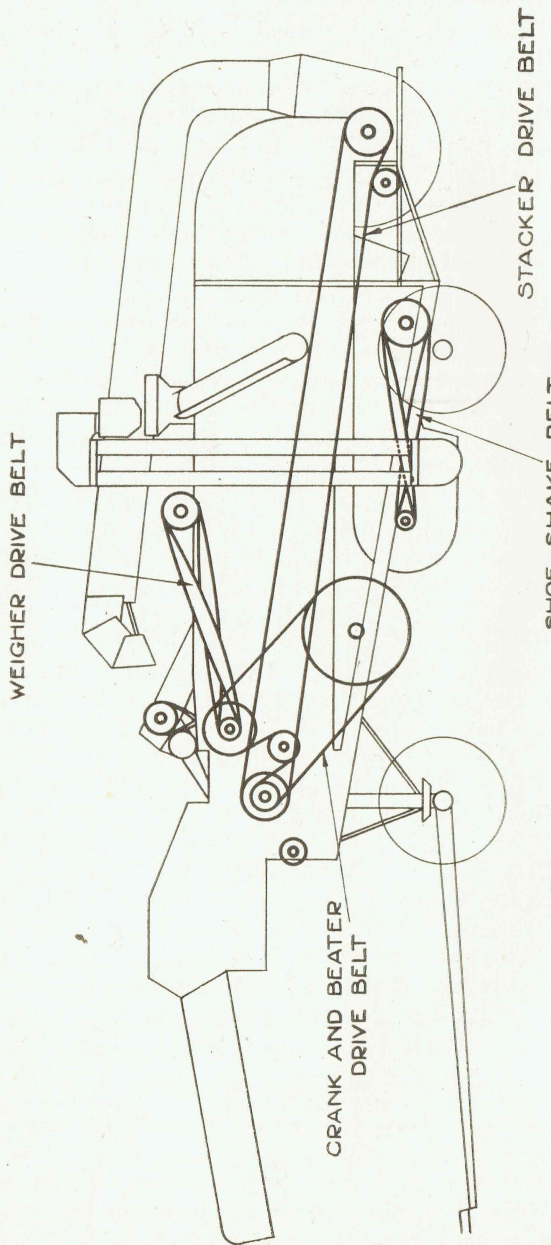


Diagram Showing Red River Special Large Cylinder Belted—Drive-Belt Side

This does away with the conveyor pulley on the end of conveyor shaft where grain is coming out.

The shoe shake belt runs crossed from fan to shoe crank-shaft pulley.

The elevator belt runs crossed from beater to top of elevator. The wind stacker belt runs open on gearless wind stacker.

The main drive belt from engine to separator should be crossed.

The Universal feeder drive belt runs open from cylinder to belt tightener over rotary knives, 13" pulley around 29" governor pulley. It must be long enough to allow belt tightener pulleys to hang low down to get any benefit of the spring of belt tightener.

The raddle belt runs open from crank-shaft to gear pulley under belt tightener and is long enough so when belt tightener is thrown off, the raddle will stop.

The feeding pan belt runs open or crossed from feeding pan 10" pulley to 18" rotary knife pulley.

See diagram drawings herewith (pages 3, 5 and 7), showing how machine should be belted.

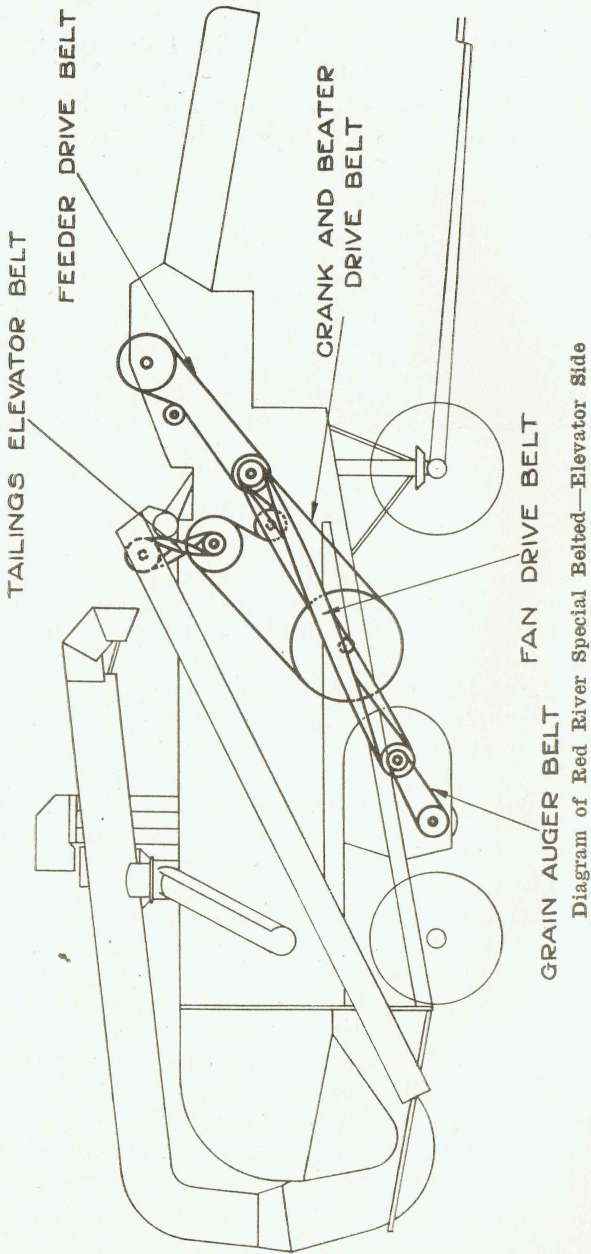
Keep a new machine around a few days in order to get acquainted with it. The operator should thoroughly familiarize himself with its construction and operation. He should study the book of directions thoroughly and be in shape so that he can set his machine right and adjust it for threshing that particular grain which he has in hand. Sometimes a machine is robbed or damaged in transit, and such parts must be located and replaced before it is possible to use the machine. The first thing to do is to clean out all bearings and oil holes of cinders and dirt that may have collected during shipment and any paint that may be found in them. Remove such substances and thoroughly oil and lubricate the machine. All grease cups should be filled and turned down until the lubricant is noticed at both ends of the bearing. Belt the thresher with the engine and run it slowly for a while in order to see that everything is there. When all parts of the separator are in motion, the bearings should be carefully watched to detect any tendency to heat; this can best be done when the machine is running idle, for the operator can then give it his entire attention. The machine has been thoroughly tested before it left the factory and is sent out in good running order, but dirt and grit of shipment by rail is liable to cause trouble and it is important to make sure that all the bearings are oiled. Adjust the concaves, sieves, wind-boards and -blinds to suit the kind and condition of grain according to directions given elsewhere in this book, then grain may be run through the machine.

There are three distinct and separate features in threshing:—

First is threshing, getting the grain out of the head.

Second, Separating it from the straw and chaff.

Third, Cleaning it from dirt, chaff, weed seeds and foul stuff of all kinds.



THRESHING

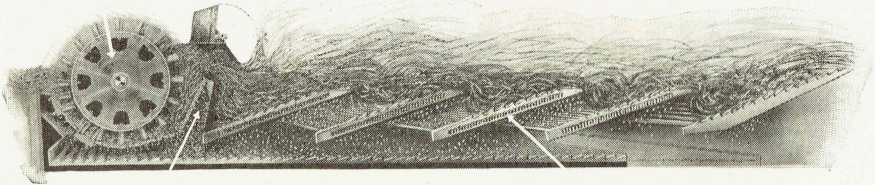
Threshing, the first operation, is loosening and getting the grain out of the heads and free from hulls.

This is done by the cylinder concaves and teeth.

The cylinder teeth strike the grain with sufficient force to tear the kernels from the heads.

The Big Cylinder

The Steel Winged Beater



The Man Behind The Gun

The Beating Shakers

The Four Threshermen of the Red River Special

This is assisted by the concave teeth, which project between the rows of cylinder teeth in such a way that the grain heads are driven against these stationary teeth with sufficient force to loosen and strip the kernels loose.

The 22 x 36 and 28 x 46 Red River Specials have twelve double-bar cylinders, diameter, including teeth, 22 inches. The 30 x 52 and larger machines have sixteen double-bar cylinders, diameter 28 inches, including teeth.

The teeth used in the cylinders and concaves are drop forged steel carefully tempered. The points and faces are hardened to resist the wear that this part of the tooth is subjected to, while the body of the tooth is tough, to eliminate breakage.

Each cylinder tooth is provided with a heavy groove upon each side, which gives it nearly double its threshing effectiveness. This is a feature peculiar to the Red River Special cylinder tooth.

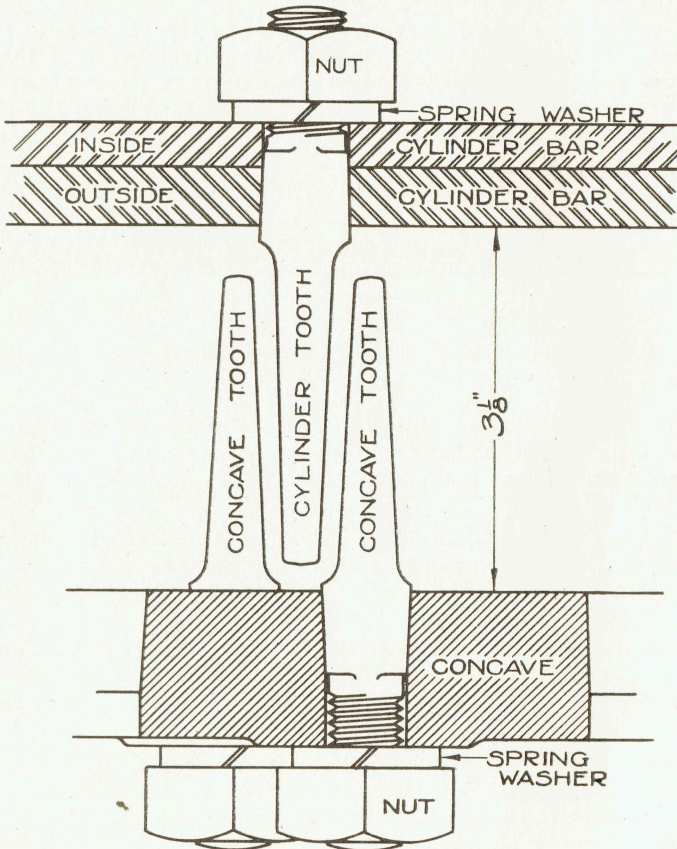
The speed of 16-bar cylinder should be from 775 to 875 per minute; 12-bar cylinder, 1000 to 1125 per minute.

Strips of belting for a cushion should be under each box so that jar cannot work cylinder box out of place.

Cylinders should be set so that cylinder bars are $3\frac{1}{8}$ " from concaves on both sides when concaves are raised as high as they will go, as shown in illustration on page 9.

In filling cylinders always oil the shank of teeth before driving them and use a good heavy hammer. Go over the cylinder occasionally and drive the teeth in with hammer and tighten the nuts. If teeth have any play in the holes in bar, they will pound out the holes too large, making it necessary to put in new bars.

To put in a new cylinder-shaft remove one head and take out old shaft. Put the new shaft in its place and put the head back, then insert keys. If the holes in bars and heads are not in line they must be chipped out. Never place the band and teeth in head and then key the head on shaft, as the key is liable to spring the shaft.



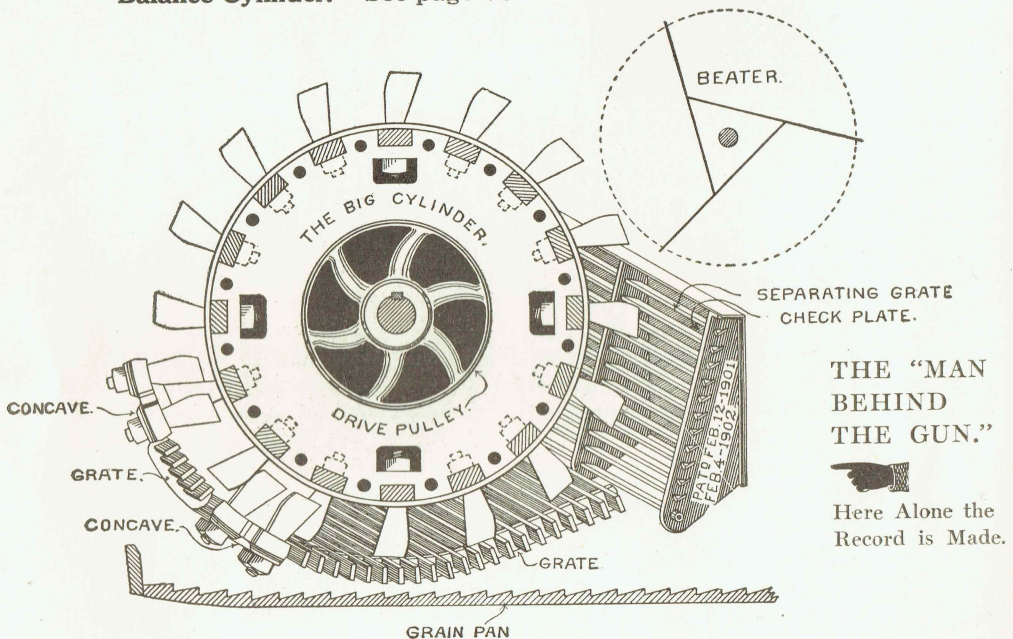
Cylinder Drive Pulley.—Page 18. All new machines have Rock-wood Paper Drive Pulleys.

Clean Threshing.—If the cylinder does not thresh clean out of the head, put in more concave teeth. If smooth teeth will not thresh clean out of the head, put in two rows or more of corrugated teeth back of the smooth teeth, raising the concaves. It is sometimes necessary to increase the speed of the cylinder. If the engine has not power enough and does not keep up the necessary regular speed, additional teeth will not be of any benefit. If the teeth in cylinder or concaves are worn, they must be replaced with new teeth. Clean threshing cannot be expected with worn-out teeth. Be careful in

putting new teeth in cylinder; do not put too many teeth on one side, but put them on all sides alike, or you may get your cylinder "out of balance." Oil the shank of each tooth before driving. You cannot thresh clean if one end of the concave slides further in than the other end, throwing the teeth a little crossways or cylinder over to one side so the cylinder teeth have more clearance on one side of concave teeth than on the other side.

You cannot do clean threshing unless the cylinder is kept full and evenly fed. Parties who buy large-cylinder machines and then feed the cylinder only about half full must not expect to do as clean threshing as those running smaller cylinders or those who keep the cylinder full of grain. See Sieves and Wind for cleaning grain and seeds.

Balance Cylinder.—See page 18.



SEPARATING

After the kernels have been removed from the heads by the cylinder and concaves they must be separated from the straw, and this is performed by the Man Behind the Gun, the separating grate and check-plate, the beater and the beating shakers.

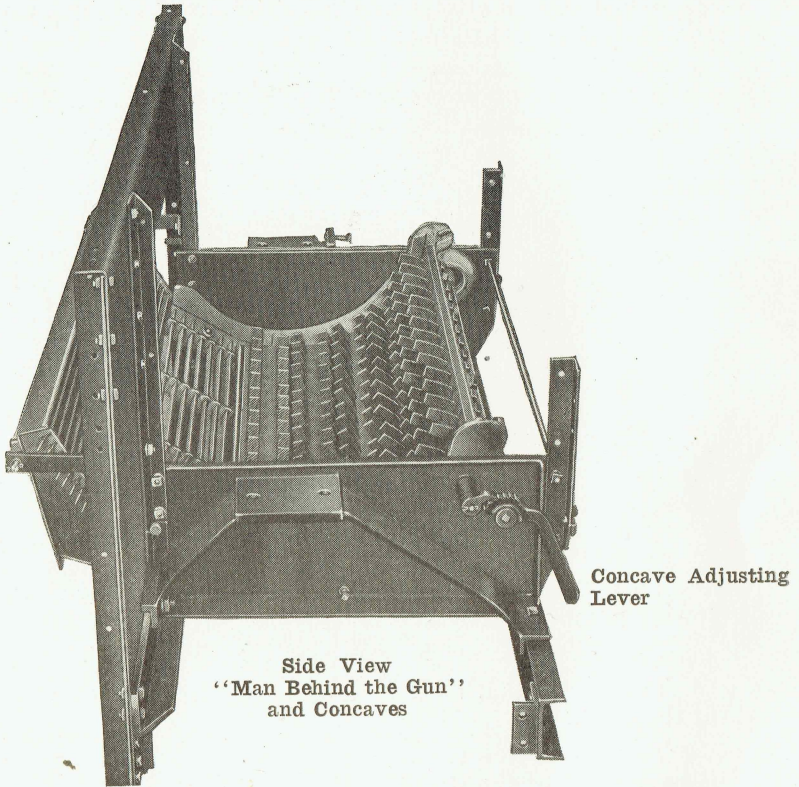
The cylinder and beater drive the intermingled straw, chaff and grain against the separating grate of the Man Behind the Gun. Tests have proved that ninety per cent of the grain is driven through where it strikes the check-plate, which deflects it to the grain pan, along which it passes to the cleaning mill.

The straw, with the grain remaining, passes over the Man Behind

the Gun onto the Beating Shakers, which continually beat it as long as it is in the machine until the grain is all beaten out.

The Man Behind the Gun in all new Red River Specials is made adjustable so that when occasion requires, more room between it and the beater wings can be obtained; it will offer less resistance and permit more straw to go through.

The Man Behind the Gun is stationary, and when once set for particular work, requires no further attention.



Side View
"Man Behind the Gun"
and Concaves

Concave Adjusting
Lever

The beating shakers toss the grain up to the deck of the machine and as it falls strike it underneath with a severe blow, which beats it continually until all the grain is beaten out. This insures separation by force. It does not wait for the grain to drop out because it is heavier, as do other machines.

The Red River Special handles the straw just as a man would do by hand with a pitchfork,—tosses it up and as it falls beats all the grain out of the straw.

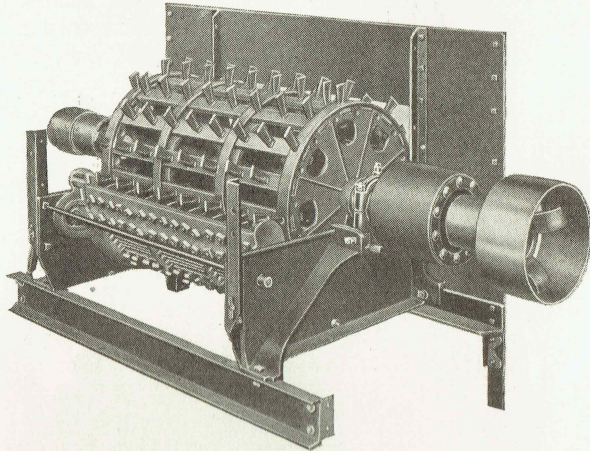
This is why the machine should be driven at the right speed.

If it runs too slow the straw rides up and down upon the shakers without getting that agitation necessary to get the grain out of it; if it

runs too fast it throws the straw up close to the deck of the machine and it does not have time to fall before it is struck again and is carried out of the machine without falling and getting that beating necessary to beat the grain out, so that it goes out with the straw.

Run at just that speed where it gets the most beating: about 155 revolutions of the grain pan crank-shaft for wheat ordinarily; faster where the straw is heavy, and slower for light straw like oats and most seeds, because the straw does not fall so quickly.

Watch this matter of speed carefully, because good separation depends upon the right speed.



Cylinder Assembly Complete with Rockwood Paper Drive Pulley

To insure separation with the Red River Special watch the following points very closely:—

ONE.—Set the machine as nearly level as possible.

TWO.—See that all belts are tight so that each part does its share of the work.

THREE.—Drive the machine at the right speed so that the grain is **beaten** out of the straw.

FOUR.—Keep the cylinder full and feed it evenly.

The Red River Special gives the best results in separation when the machine is fed to its natural capacity.

Poor results will follow when fed to half its capacity, or when so fed that the straw goes through it in bunches.

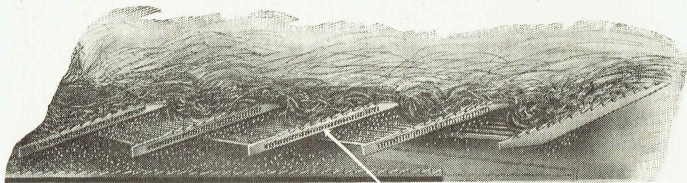
Do not use any more concave teeth than necessary to take the grain out of the head. The finer the straw is cut up the more difficult to separate.

One of the most important things required to do good separating is the proper speed. It is very easy to find the speed of the N. & S. Separator by holding your hand so the shaker or grain pan will touch it every time it comes forward. Then take your watch and count the

number of strokes in a minute. The following strokes per minute of shakers and grain pan give average best results:—

Alfalfa and Clover	160	Timothy	150
Barley	160	Wheat, heavy straw	160
Flax and Millet.....	150	Wheat, medium straw.....	155
Oats	150	Wheat, light straw	150

Too high speed will jump over grain, and will not work out the straw as fast as regular speed, and is just as detrimental to doing good separating as too low speed. A great deal depends upon condition and kind of grain. The speed of shakers should be as fast as the straw has time to fall on the shakers before their return throw. If the shakers run so fast the straw does not have time to fall, the shakers cannot



The Beating Shakers

beat it out. The heavy straw should have more speed than the light straw, to effectually shake the grain out of the straw. Nine out of ten cases of poor separating are caused by too high speed. Never mind how fast some other make of machine was run or how it was adjusted, but follow these directions and you will get the best results.

It is a mistaken idea some threshermen have that the faster they run the separator, the more work they can do. Such threshermen do poor work and injure their reputation as threshermen. There is no excuse for a man running this machine too fast or at too slow a speed.

A belt slipping on a pulley will do poor separating and waste grain. Care should be taken to see that the belts are tight enough so they will not slip, and that they are not too tight, to cause the boxes to heat and run hard.

It is important that the machine has a steady, regular motion. No machine can do good work with the shakers running 150 strokes one minute and 185 the next minute. Nor can it do good work when the cylinder is slugged and the motion run down; nor when the straw comes out in bunches, caused by poor feeding. If the engine has not sufficient power or the motion is irregular or too slow, don't condemn the separator, for the fault is in the engine.

If wind stacker is used and the cylinder does not thresh the grain out of the head, the wind stacker fan will knock it out of the head and loose grain will go on the stack. Don't lay this to poor separation, but adjust the concaves and thresh clean out of the head in the cylinder.

We know of no other machine that has such large grate surface or gives so much shake to the straw as the "Red River Special," and with

proper management it will do the most thorough separating in all kinds and conditions of grain and seeds of any machine we know.

No machine can save every kernel of grain, and the lighter it is, the more will be found in the straw, for it must have weight enough to fall out when shaken. A kernel of grain is never so valuable to some men as when found going over in the straw from a threshing machine. Any amount may be wasted by the harvester in hauling without a kick. Unreasonable men never stop to think that it takes 600,000 kernels of oats to make a bushel, and 970,000 kernels of wheat to make a bushel. If they should catch in their hands ten kernels in half a minute at the back end of the machine, it would take them three months to catch a bushel of wheat. In order for a separator to waste a bushel of wheat in a day, 1600 kernels must be carried over with the straw every minute. It is very deceiving when the quantity of grain comes to be measured by the kernel.

CLEANING THE GRAIN FROM THE CHAFF AND DIRT

After the grain is separated from the straw it is mixed with chaff and refuse which has passed through the grates and shakers with the kernels and passed along the grain pan.

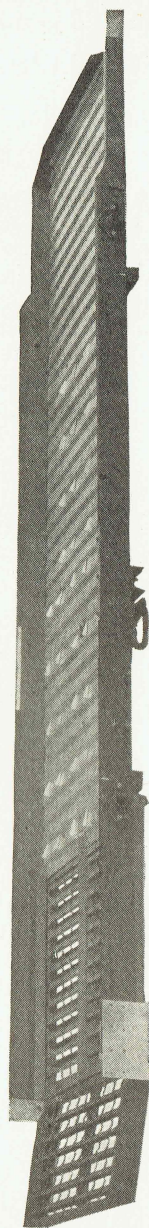
To the rear end of the grain pan is attached a coarse, adjustable sieve called the adjustable chaffer. This is fastened securely to the sides of and forms a continuation of the grain pan.

It should be opened just wide enough so that it catches sufficient blast from the mill fan to loosen up the mass of chaff and dirt so that the grain can easily drop through to the sieves underneath.

The balance of the cleaning is done by the grain passing over and through the sieves through a blast from the mill fan which blows out coarse straw and chaff to the stacker.

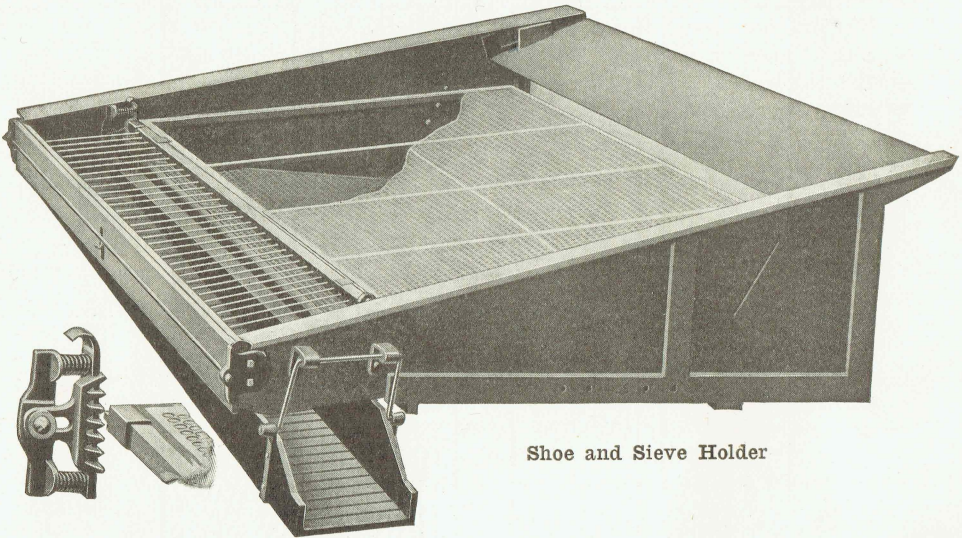
Any unthreshed heads should pass over the sieves to the tailings spout, thence to the elevator, where they are carried back to the cylinder and threshed again.

Sieves should be designed and set according to the kind of grain or seed threshed.



Handle for Adjusting Chaffer
The Grain Pan and Adjustable Chaffer

The list of sieves used for the various grains and seeds is to be found upon page 26. Often operators use two sieves, depending upon



Shoe and Sieve Holder

the kind or condition of the grain. The upper one should be set as near level as possible ordinarily, the mill end on the top pegs. When using two sieves this should be a sheet metal oat sieve or an adjustable sieve.

Use an ordinary perforated sheet-metal sieve for the lower one. Put the mill end of it on the bottom pegs, leaving about five-eighths of an inch opening between the rear end of these sieves.

Many operators use only one sieve in threshing wheat, oats or other coarse grains, and with very satisfactory results.

The wind-board should be set so that as much of the blast from the fan as necessary goes under the upper sieve, so that the blast of air strikes it opposite where the grain falls upon it from above.

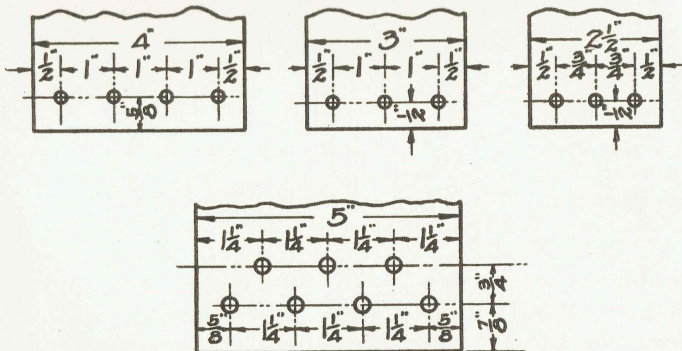
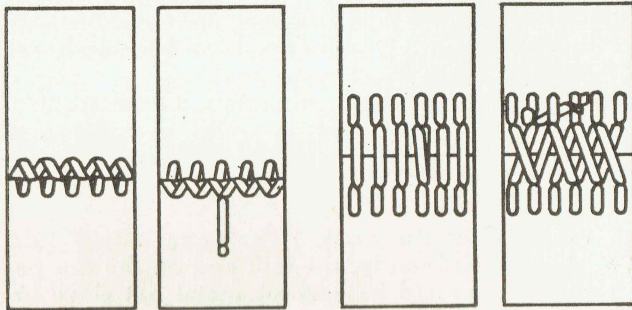
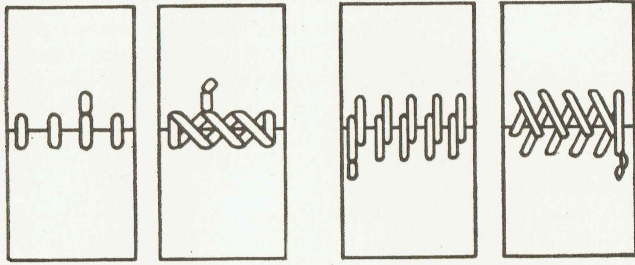
The upper wind-blinds, those above the sill, should be opened from one-half to three-fourths of an inch, and the lower blinds just enough to clean the grain without blowing it over.

ADJUSTABLE CHAFFER

On rear end of grain pan it should be set about $\frac{7}{8}$ " opening for oats, $\frac{5}{8}$ " opening for wheat and $\frac{1}{4}$ " opening for seeds and buckwheat. Have it adjusted to give an even delivery of grain over the sieves and to catch sufficient wind from the mill to loosen up chaff at rear end of grain pan so the grain can fall through to the sieves.

Alfalfa.—From six to eight rows of common, smooth concave teeth and two rows of corrugated teeth are generally used. If the seed

is damp or tough, more corrugated concave teeth should be placed back of the smooth teeth. Use as few concave teeth as you can to



Diagrams Showing How to Properly Lace Belts

do good hulling. The number of teeth depends largely on the condition of the seed. It should be threshed when dry; if wet or damp the seed is so light that some of it will stick to the straw and be carried over. Run the shakers and grain pan not over 160 strokes per minute. See adjustable chaffer, sieves and wind for adjusting these parts.

Belts.—Try on the belts and see if they are sufficiently tight. Belts should be just tight enough to run without slipping on the pulleys when at work. See that the pulleys are set in line. If a belt is run too tight it will soon pull to pieces and the extra strain is very apt to make the machine run hard and cause the boxes to heat. If belt is run loose enough to slip on pulley it is liable to burn the belt and clog and do poor work. It is easy to ruin a belt and we do not warrant them and they are not warranted by other manufacturers. Leather belts should be run with the smooth side to the pulley. New belts are liable to stretch for a day or two, and they should be looked over carefully at least once a day to see that they are of the right length and well laced. This should be done before starting up the machine each morning so there will be no delay in lacing belts when threshing.

The belts run as shown by diagrams and text on pages 3, 4, 5, 6 and 7.

Belt Guide.—The drive belt runs over on top of the belt guide pulley around the cylinder drive pulley, and the belt guide can be set to guide the belt even when the engine is slightly out of line with the separator, so as to keep the belt running on the center of the separator drive pulley. The guide pulley is set by turning the thumbscrew in or out until it guides the drive belt true on the cylinder drive pulley.

Belt Tightener.—Must be adjusted so that it runs the belt true on the other pulleys. The bracket to belt tightener should have enough packing under it to line up the belt tightener pulley both ways, horizontal as well as perpendicular, so that it will not run the belt out of line and partly off the pulleys. Care must be taken that it runs the belt with the right tension. If the belt is too loose, the separator will do poor work, and the belt will slip and burn; and if too tight it will cause boxes to heat, and the belt may be badly stretched and ruined.

Bolts.—Before starting, examine all bolts and nuts in the separator to see that they are screwed tight. Machines are often racked, and breakages result, by neglecting to keep bolts tight. Poor work usually results from loose joints because of neglected bolts.

There is a general lack of appreciation among threshermen of the importance of keeping all bolts tight. Go over your whole machine often, see that every bolt is tight, especially the bolts to the woodwork. See that boxes are adjusted so they will turn easily, not too loose and yet will not bind and heat; as boxes wear, the shims in them should be made thinner and in time taken out so as to leave but little play around the journals.

Be sure that boxes on end of pitmans are properly set and firmly held in place by the setscrew and jam nut. If allowed to run loose they are liable to pound and break the grain pan, shaker shaft, or do other damage.

To take end play out of cylinder, set one box so the teeth clear the concave teeth about $5/32$ inch, then drive a cold chisel in between cylinder head and frame and set the other box up tight against the cylinder head and draw up nuts tight.

ROLLER BEARINGS

Roller bearings will not need such frequent lubrication as babbitt boxes. At the same time they must have proper lubrication and careful attention and they will give no trouble.

Beater.—Speed from 350 to 375 revolutions per minute with the broad side of the wings striking the straw and grain. The slower a beater runs, the less grain it throws. See that the belt does not slip, as it must have speed enough to drive the straw down and back from the cylinder to prevent winding and clogging feeder and cylinder.

Barley.—Use six rows of smooth concave teeth, and if this does not do a good job of bearding, put in a concave filled with corrugated teeth back of the smooth teeth.

The shakers and grain pan should make not more than 160 strokes per minute. See Adjustable Chaffer, Sieves and Wind for adjusting these parts.

Beans.—See Pea Attachment, page 22.

Buckwheat.—Take out all concave teeth.

If the buckwheat cracks, it is generally caused by slow feeding and not keeping the cylinder full, elevating too much, or by too high speed.

The shaker and grain pan should make about 150 strokes per minute. See Sieves and Wind for adjusting these parts.

Balance Cylinder.—Take off separator belts and double pulleys from cylinder shaft and run cylinder with belt from engine, full speed. Hold a piece of chalk lightly against cylinder shaft at each side of separator, so that the chalk will mark the heavy side of the cylinder.

Take out lead from heavy side of cylinder or put in lead in light side of cylinder. Both ends of cylinder must be balanced. Continue to mark cylinder shaft and take out and put in lead until it is balanced.

Cylinder.—Speed 16-bar cylinder from 775 to 875 revolutions per minute; 12-bar cylinder, 1000 to 1125, according to the kind of grain.

See pages 10, 11 and 12.

Cylinder Drive Pulleys.—We can furnish from 9½" to 18½" diameter cylinder drive pulleys with our 16-bar cylinder separator and from 6½" to 15½" with 12-bar cylinder separator.

Any smaller pulley is liable to slip in belts and there is not room to use larger pulleys than above stated. We furnish 8½" pulleys on 12-bar cylinder and 11½" drive pulleys on 16-bar cylinders, which match the Nichols & Shepard engines and tractors. If the separator is to be run with some other make of engine, be sure you have the right size cylinder drive pulley to match the engine. This is figured as follows: Diameter of engine belt pulley in inches multiplied by speed and divided by the average speed of cylinder — 1065 for

22 x 36, 28 x 46; 850 for 30 x 52 and larger—will give the diameter of cylinder drive pulley wanted.

Concaves.—The front concave is generally set in front as high as it will go. The lower under the cylinder it is set the more suction there will be to the straw. Be careful to see that the concave teeth are in line with one another. The lug on end of concave can be partly chipped off to allow concaves to slip in the holders without end play. Clip off the right end to bring the concave teeth in line with one another so the cylinder teeth will pass the concave teeth with the same clearance each side of tooth. Keep the teeth tight by occasionally driving them with hammer and tightening nuts.

In filling concave the teeth must slope back the way the arrow points, which shows the edge of concave that goes in cylinder first.

In changing concaves, always turn the cylinder by hand, and if any of the teeth strike or do not space right, bend the teeth so they will clear one another the right distance apart. The concaves may be lowered by moving the adjusting lever. See illustration, page 11. If the two setscrews which go through the slides of the machine under cylinder to concave holders are tight, they must be loosened enough to allow the concaves to raise and still be tight enough to take end play out of the concaves.

Use as few concave teeth as possible and set the concaves as low as you can and thresh clean. The fewer the concave teeth and the lower the concaves, the easier the machine runs, the easier the straw passes through and the faster it can be fed, and the better it will separate, but the less it shells out grain. Be careful not to get them so low as not to thresh clean.

We generally put in the cylinder the necessary concaves, each filled with two rows of teeth. In the tool-box we pack extra concaves, some filled, and also extra teeth.

When threshing clover, corrugated teeth should be used in concaves. They are often needed in bearding barley and in threshing alfalfa, flax and turkey wheat. One row of corrugated teeth is equal to two rows of smooth teeth, and only enough should be used to take the grain out of the head.

Cracking Grain.—Set the cylinder boxes so the cylinder will have no end play and the cylinder teeth clear the concave equidistant between the rows or approximately $5/32$ ". If the teeth have more clearance on one side than the other, it is liable to crack the grain on one side and not thresh clean on the other. Too high speed, irregular speed, loose teeth, concaves too high, or concave not in parallel line with cylinder bars, or not keeping cylinder full of grain causes grain to crack. Cracking grain is occasioned in many instances by using too much wind and blowing the clean grain into the elevator, thus passing it through the cylinder again. Too many concave teeth, not keeping the cylinder full of grain, or too high speed of cylinder is the most general cause of cracking grain and should be avoided.

Clean Threshing.—See pages 9-14.

You cannot do clean threshing unless the cylinder is kept full and evenly fed. See Sieves and Wind for cleaning grain and seeds.

Curtain Back of Beater should be set low enough to prevent the beater from throwing grain past it, but not so low as to prevent the straw from passing out under it freely.

Clover.—To hull clover you should have our clover attachment, which consists of the following concaves filled with corrugated teeth No. 26:—

3 Concaves, No. 3339, 1 No. 3206	for 22-in. cylinder
3 Concaves, No. 3234, 1 No. 3251	for 28-in. cylinder
5 Concaves, No. 2601,	for 30-in. cylinder
5 Concaves, No. 2602,	for 32-in. cylinder
5 Concaves, No. 2603,	for 36-in. cylinder

The 22- and 28-inch cylinder concaves are filled with 9 rows of corrugated teeth. The concaves with 3 rows of teeth go in place of the 7-inch grate, and must be bolted to concave holder the same as the grate; the concaves with 2 rows of teeth go in place of the 5-inch grate. The 30-, 32-, and 36-inch are filled with 10 rows of corrugated teeth.

One upper adjustable or perforated steel sieve, $5/32$ " holes; one lower sieve, $1/12$ " hole; one screen, $1/16$ " hole; and one perforated tail rake for shoe are used.

In fitting concaves be careful to chip the lugs on the end of concaves so that the concave teeth are directly in line with each other and with no end play. Turn the cylinder slowly by hand and adjust the teeth of the cylinder so that none of them will strike the concave teeth. This is done by slightly bending the cylinder teeth one way or the other, as found necessary. The shakers and grain pan should make 160 strokes per minute. Clover should be threshed when dry. If wet or green it is difficult to thresh out of the head and some will stick to the straw and be carried over. The best of work can be done if there is any seed in the clover and it is in condition to hull.

See Adjustable Chaffer, Sieve and Wind for adjusting these parts.

Fan.—Speed in 22 x 36 and 28 x 46 sizes, 617; and in larger sizes, 680 revolutions per minute. The wings should be set straight without a twist to one side, with equal space between end of wings and both sides of separator.

Flax.—Use as few concave teeth as you can and thresh clean. If the seed is green or tough, more concave teeth should be used, and in some conditions it is necessary to use four rows of smooth teeth with two rows of corrugated teeth back of the smooth teeth. But in most conditions six rows of smooth concave teeth will do good work.

The speed of separator must be steady, and care must be taken to see that the engine governor gives even speed. Too high a speed

will jump over and blow over seed. The shakers and grain pan should make 150 strokes per minute in flax threshing.

If the straw is very dry and cuts up fine enough to nearly all shake through the slats, or the straw is very light and feathery, use as few concave teeth as you can. Raise the sheet-iron curtain back of beater to allow the straw to pass out more freely, and not hold it back until it is shaken through into the grain pan. Lower the separator at the back end. With new Red River Specials the Man Behind the Gun is adjustable and can be let down if needed in flax threshing.

Fast speed of shakers will not work light, feathery straw and fine stuff out of separator as fast as slow speed. Be careful not to run at too fast a speed, as the light straw must have time to fall. See Adjustable Chaffer, Sieves and Wind for adjusting these parts.

Heavy Draft proceeds from any one of several causes, or all of them combined, and is always directly or indirectly the fault of the men about the machine. It may come from tight boxes, which create extra friction; it may come from irregular, "chunky" feeding, which is frequent; it may come from feeding in grain when the motion is down or it may come from getting up too high a motion, obtained only at the expense of power. The more concave teeth you use, the more power it takes to run your cylinder.

Heating Boxes.—The most common source of heating is tight belts, neglecting to oil, or from using poor oil; or the oil tube or hole in the box may be stopped up by dirt so that the oil will not reach the journal; or a box may be set so that one end only is "in bearing," and is not parallel with the journal, or the pressure of the shaft is working so close and hard against the box where the oil hole is that the oil can't get into the box. If this occurs, remove the half of the box the oil hole is in and cut a V-shaped crease in the babbitt from the oil hole out each way to within $\frac{1}{2}$ " of both ends of the box, so the oil can run the full length of the box. When a box once gets to heating, its interior surface and the journal gets "roughed up" so that it continues heating, even after properly set; see that the box is so set as to come in contact with the shaft the whole length; keep the oil holes open; keep the boxes as snug as may be, and admit oil freely. To remedy heating, take off and clean the box and journal; carefully smooth off the roughness. If you file the journal, it must be smoothed up with emery and oil and all file marks taken out; carefully reset the box parallel with the journal so they come in contact the whole length, both on the side and on the bottom, and adjust the packing so that the box will not be either too tight or too loose on the shaft. After the bolts are tightened, turn the shaft by hand and see that it is free and does not bind the journals.

Kaffir Corn or Milo Maize.—Use as few concave teeth as you can and thresh the corn clean off the stalk. Keep the cylinder full. If an upper sieve is used in conjunction with the regular lower sieve, use for the upper sieve $\frac{1}{2} \times 1\frac{1}{4}$ " perforated sieve; for lower sieve use the adjustable sieve or $\frac{1}{4}$ " hole sheet metal. See Sieves.

Millet.—Use the same sieves as for flax and set the sieves the same as for flax. Use as few concave teeth as possible and thresh clean. The shakers and grain pan should make about 150 strokes per minute.

Oil.—The life of the separator and its parts depend a great deal on its being thoroughly oiled with good oil or grease. Go over the whole separator at least twice a day and oil every journal and place where there is need of oil.

Liquid oil boxes can be partly filled with cotton waste to keep out the dirt and hold oil. Use a piece of wire to clean the dirt out of oil holes.

See that the hard-oil cups are filled with a good grade of hard oil. Don't try to use axle grease or poor hard oil, or you will have hot boxes or boxes soon worn out. Screw the covers down so that the hard oil is pushed throughout the entire bearing.

Oats.—Two to four rows of concave teeth are generally used. The shakers and grain pan should make about 150 strokes per minute. See Adjustable Chaffer, Sieves and Wind for adjusting these parts.

PEA AND BEAN ATTACHMENT

Peas and Beans.—The cylinder should run about half the speed for grain. To do this it is necessary to place larger diameter pulleys on the cylinder shaft and speed the engine down so the shakers and grain pan make 150 strokes per minute.

PARTS FURNISHED

For 22" and 28" 12-bar Cylinders, 1925 and Later

Cylinder drive pulley (size determined by engine speed and diameter of belt pulley) :—

$8\frac{1}{2}$ " x 11" Cyl. Double Pulley.....	No. 3492
12" Cyl. Pulley (drives Universal Feeder)	No. 3493
$8\frac{1}{2}$ " x $18\frac{1}{2}$ " Cyl. Pulley (drives Wind Stacker and Shakers)	Nos. 3490 and 3491
14" Cyl. Pulley (drives Hart Feeder).....	No. 6988
T Wrench for setscrews in pulleys.....	No. 3223
	No. 6989
Two Holders to check grate, $\frac{3}{8}$ " x $1\frac{1}{2}$ " x 11".....	No. 6990
1 Screen, $\frac{3}{16}$ x 1" holes.	
1 Screen, $\frac{1}{4}$ " round holes	
1 Pea and Bean Sieve, $\frac{3}{8}$ " round holes	
Pieces Belting for splicing feeder and fan beater and shaker belts	
Four Strings Lace Leather	

FOR ALL BIG CYLINDER SEPARATORS 1925 and Later

Cylinder drive pulley (size determined by engine speed and diameter of belt pulley) :—

12 x 12" Cylinder Double Pulley.....	No. 3150
12 x 18½" Cyl. Pulley (drives W. S. and Shakers)	Nos. 3151 and 3152
15" Cyl. Pulley (drives Universal Feeder).....	No. 3231
16½" Cyl. Pulley (drives Hart Feeder).....	No. 6994
10" Wind Stacker Fan Pulley.....	No. 6993
7½" Mill Fan Pulley.....	No. 3494
T Wrench for setscrews in pulley.....	No. 3223
2 Holders to lower check grate ¾ x 1½ x 13.....	No. 6992
1 Screen, 3/16 x 1" holes	
1 Screen, ¼" round holes	
1 Pea and Bean Sieve, ⅜" round holes	
4 Strings Lace Leather	
Pieces of Belting for Splicing Belts	

Notice.—When ordering, give number of separator, whether equipped with Feeder, Hand-Feed, Wind or Raddle Stacker. Also give diameter of engine belt pulley and speed of engine.

Lace pieces of belt in Shaker, Beater, Fan and Feeder belts to make them long enough to go around larger pulleys. These pieces can be taken out when changing back to grain or seeds.

In changing pulleys on cylinder shaft, do not drive keys home snugly, but set them with setscrews furnished in hubs. Pulleys can then be easily removed when changing back to grain.

One concave with two rows of teeth placed in front is generally used, although more or less teeth can be used. If you do not get beans or peas threshed out of pods, put in more concave teeth. Do not speed up your engine or you will crack beans and peas excessively. Use as few concave teeth as you can, in order to crack as few beans and peas as possible.

Some kinds of peas you can thresh with the grates all in, but with others, like cow peas and all beans, it is necessary to lower the "Man Behind the Gun" and remove all grates and concaves except the front concave, and fit soft-wood boards in their place, and the slower the cylinder runs and works off the stuff, the fewer will be cracked. Keep the cylinder full or you will crack both peas and beans. Don't forget to put the "Man Behind the Gun" back in its original position when changing to thresh grain.

Sieves.—Use your oats sieve as an upper sieve, and the ⅜" round hole sieve as a lower sieve. Don't use the adjustable sieve, as it is liable to clog up with pieces of pea and bean vines. If you are threshing for seed, use the 3/16 x 1 screen in bottom of shoe. If threshing for feed, use the ¼" round hole screen and you will save the cracked and small seeds. Be sure to have cheat door in bottom of shoe open. See additional instructions under Adjustable Chaffer, Sieves and Wind.

Peas and beans thresh better when first pulled or when a little green or damp than after they are dried out. The one essential thing

is to keep the speed down and not run too fast. About one-half the speed at which you thresh grain is the correct speed for the cylinder to run. Your grain pan should run about 150 strokes per minute.

Rice.—The cylinder should run about three-fourths the speed for grain, and the balance of separator regular speed. To do this it is necessary to place on the cylinder larger diameter pulleys.

RICE ATTACHMENT

For Junior Cylinders, 1925 and Later

	22"	28"
12" Cylinder Drive Pulley.....	No. 3405	3405
6 $\frac{3}{4}$ x 6 $\frac{3}{4}$ " Cyl. Double Pulley.....	3407	3407
6 $\frac{3}{4}$ x 10" Cyl. Drives Wind Stacker.....	3417	3417
9" Cyl. Drives Feeder.....	3408	3408
10" Wind Stacker Fan Pulley.....	6999	6999
T Wrench for Setscrews.....	3223	3223
Pieces Belting for Splicing Belts		
4 Strings Lace Leather		

For Cylinders 30, 32 and 36, 1925 and Later

	No. 2480
15" Cylinder Drive Pulley.....	2480
8 $\frac{1}{2}$ x 9 $\frac{1}{2}$ " Cylinder Double Pulley.....	2466
8 $\frac{1}{2}$ x 13" Cylinder Drives Wind Stacker.....	2839
12" Cylinder Drives Feeder.....	3152
10" Wind Stacker Fan Pulley.....	6993
Pieces Belting for Splicing Belts	
4 Strings Lace Leather	

When ordering, give number of separator and if it has Feeder, Hand-Feed, Wind or Raddle Stacker.

Speed the engine so the shakers and grain pan make about 160 strokes per minute.

The concaves are generally set with every other tooth removed in the front concave; next to this are one grate and then one concave with two full rows of teeth.

Place the adjustable sieve on upper pin with the back end down low.

Adjust the adjustable chaffer on grain pan about half way open. Direct the blast from the mill well under the upper sieve. Raise the tail board in shoe as high as it will go and put on plenty of wind.

To thresh grain and seeds it is necessary to have a set of smaller cylinder pulleys. A piece of belt can be cut out of the shaker, fan, feeder or wind stacker belts to make these belts fit the smaller pulleys or these pieces can be laced in these belts to go around the large rice pulleys when changing from grain to rice.

Rye.—Adjust and run the same as for wheat.

Sweet Clover.—Speed the grain pan up to about 160 strokes per minute.

Use from one to four concaves filled with corrugated teeth, with one or more concaves filled with smooth teeth in front of them.

Place lower sieve 7/64" hole or adjustable sieve on middle front pin with back end about 1 inch above the bottom of shoe.

Place chaffer upper sieve $\frac{1}{2} \times 1\frac{1}{4}$ " hole or adjustable sieve on upper pin or on delivery board on front end of shoe with the back end in second or third notch down from top with perforated sheet-iron tail rake even with top of sieve. Raise or lower back end of perforated tail rake by raising or lowering tail on back end of upper sieve. Set the wind boards the same as for other seeds.

Speed.—See Cylinder and Separation.

Separation.—When grain is carried over in the straw stack, the first thing to find out is where it is carried over from. If from sieves, adjust the wind and set the sieves as directed in this book. If carried over from grain pan, open the adjustable chaffer and adjust wind board to guide more wind through chaffer to break up the fine stuff so grain can fall through on sieve. If carried over from the wind stacker, adjust concaves to thresh it out of the head in cylinder instead of in wind stacker fan.

Keep the cylinder full. You must not expect a large machine fed to only half its capacity to do as good work as one fed to its full capacity.

If carried over from the last shaker, see that the shakers run the right speed for the grain or seeds you are threshing, and the cylinder concaves and grates are properly adjusted in their original position in shape to catch the flying grain and direct it down away from the straw in grain pan.

The sheet-iron apron back of beater should be set low enough to prevent beater from throwing grain past it, and not so low as to hold back the straw and bunch it.

See that the cylinder is fed even and that the straw goes out of the separator even, and not in bunches. The finer the straw is cut up the more difficult to separate, and no more concave teeth should be used than is necessary to thresh it clean out of the head.

One of the most important things required to do good separating is the proper speed.

Nine out of ten cases of poor separation are caused by too high speed.

See Separation, pages 10, 11, 12 and 13.

Shoe.—Speed, in 36- and 46" separators, 258 strokes per minute, and in larger separators, 292. If the grain loads on one side of the shoe, it is caused by one side of the sieve or separator being lower than the other, or by wings to fan in a twist or to one side of mill, or by more opening above one side of the sieve than the other. This can generally be avoided by raising the upper blind on the other side and closing the one on the side that loads, or by raising or lowering one side of sheet-iron delivery board over sieve.

The tail board can be raised or lowered to prevent the wind from blowing over and to allow coarse stuff to work off.

Sieves should be set according to the kind and condition of the grain, which varies on different jobs, and no two seasons are alike. The sieves alone must not only be set right, but the adjustable chaffer

on grain pan, the fan blinds and the wind boards must be properly adjusted to do good cleaning.

Set the sieves by these directions, not as they are set in some other makes of separator. In short straw or straw that cuts up fine and in seeds, use two sieves, with the following-size holes for cleaning the different kinds of grain and seeds:—

For	Upper Sieve	Lower Sieve	Screen
Alfalfa	Adjustable or $\frac{5}{8}$	1-12	$\frac{1}{8}$
Beans	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{3}{8}$	$\frac{1}{8} \times 1$
Barley	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{3}{8}$	$\frac{1}{2} \times 1-14$
Buckwheat	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{3}{8}$	$\frac{1}{2} \times 1-14$
Clover	Adjustable or $\frac{5}{8}$	1-12	$\frac{1}{8}$
Cane	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{1}{4}$	1-12
Flax	Adjustable	$\frac{5}{8}$	$\frac{1}{8}$
Hungarian	Adjustable	$\frac{5}{8}$	$\frac{1}{2} \times 1-14$
Kaffir Corn	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{1}{4}$	$\frac{1}{2} \times 1-14$
Lucerne	Adjustable or $\frac{5}{8}$	1-12	$\frac{1}{8}$
Millet	Adjustable	$\frac{5}{8}$	1-12
Orchard Grass	Adjustable	$\frac{5}{8} \times \frac{1}{2}$	1-12
Oats	$\frac{1}{2} \times 1\frac{1}{4}$	Adjust. or $\frac{1}{2} \times 1\frac{1}{4}$	$\frac{1}{2} \times 1-14$
Peas	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{3}{8}$	$\frac{1}{8} \times 1$
Rice	No Choke	Adjustable or $\frac{3}{8}$	$\frac{1}{2} \times 1-14$
Rye	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{1}{4}$	$\frac{1}{2} \times 1-14$
Red Top	Adjustable or $\frac{5}{8}$	1-14
Spelt	$\frac{1}{2} \times 1\frac{1}{4}$	Adjustable or $\frac{3}{8}$	$\frac{1}{2} \times 1-14$
Sweet Clover	Adjustable	$\frac{7}{8}$	$\frac{1}{8}$
Timothy	Adjustable	1-14
Wheat	Adjustable or $\frac{3}{8}$	Adjustable or $\frac{1}{4}$	$\frac{1}{2} \times 1-14$

SET THE SEPARATOR LEVEL

For Wheat, Oats, Barley, Rye and Spelt in good condition with ordinary long straw, one adjustable sieve is generally used; the inner end set on middle pin, and the outer end set one inch above bottom of shoe or screen. Care must be taken to adjust the lips to the right-size opening for the kind of grain you are threshing.

For short straw and straw that cuts up fine, two sieves are used—the lower adjustable sieve set as above, and the chaffer upper sieve $\frac{1}{2} \times 1\frac{1}{4}$ " hole of No-Choke chaffer $\frac{5}{8} \times 2\frac{1}{2}$ " hole, set with the inner end on upper pin and the rear end on wire tail rake in second or third notch down from top of sieve holder. Use the wire tail rake.

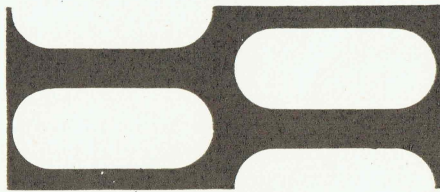
For whitecaps, rosebuds, heavy joints of straw and weeds and in some other conditions, the inner end of upper sieve is set on top of delivery board.

For Buckwheat use two sieves,—the lower adjustable sieve with front end on middle pin, and the back end one or two inches above the bottom of shoe. Set the upper sieve $\frac{1}{2} \times 1\frac{1}{4}$ " hole with the inner end on upper pin or on top of delivery board, with the back end in first notch at top of sieve holder, with tail board to shoe low, to work the coarse stuff over the shoe. Use perforated tail rake.

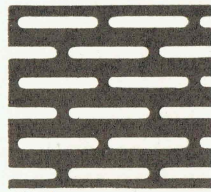
For Flax, Timothy and All Seeds, two sieves are used,—the lower one of perforated steel or zinc the right-size hole for the kind of seed you are threshing. Set the inner end on middle pin and the back end 1 inch above the bottom of shoe or screen. Use the adjustable sieve

closed to small opening or steel perforated sieve for upper sieve set with front end on upper pin with the back end on PERFORATED tail rake (the wire tail rake will not work in seeds) over tailing spout, which should be set in third notch down from top of sieve holder. Raise or lower the back end of perforated tail rake by the tail board to shoe so as to hold the fine stuff back and allow about 18 inches of back end of upper sieve to load. In some conditions of heavy stuff the front end of upper sieve is raised on top of delivery board.

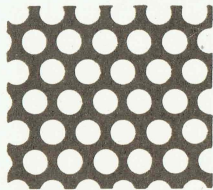
Adjustable Chaffer on grain pan should be set about $\frac{7}{8}$ " opening for oats, $\frac{5}{8}$ " opening for wheat and $1\frac{1}{4}$ " opening for seeds and buckwheat, or adjusted to give an even delivery of grain over the sieve and to catch the wind and blow back the chaff so the grain can fall through the chaffer.



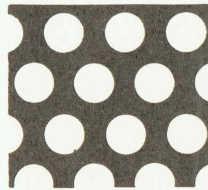
$\frac{1}{2} \times 1\frac{1}{2}$ " OBLONG HOLE



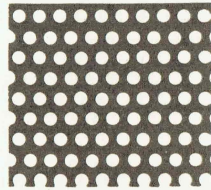
$\frac{1}{14} \times \frac{1}{2}$ " OBLONG HOLE



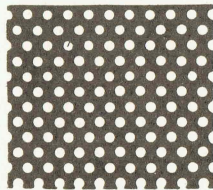
$\frac{5}{32}$ " ROUND HOLE



$\frac{1}{4}$ " ROUND HOLE



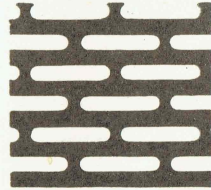
$\frac{1}{12}$ " ROUND HOLE



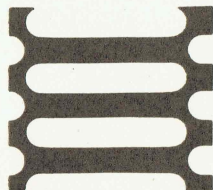
$\frac{1}{16}$ " ROUND HOLE



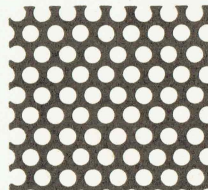
$\frac{3}{8}$ " ROUND HOLE



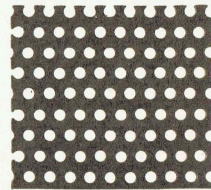
$\frac{3}{32} \times \frac{1}{2}$ " OBLONG HOLE



$\frac{3}{16} \times 1$ " OBLONG HOLE



$\frac{7}{64}$ " ROUND HOLE



$\frac{1}{14}$ " ROUND HOLE

Sieves and Screens — Full-Size Drawing

Screen, if used, must be placed flat on bottom of shoe, with the little door in bottom of shoe open to let the cheat, dirt and foul seeds fall out from under the screen on the ground.

Shakers and Pitmans.—The box on crank-shaft end of pitmans is adjusted with shims on steel separators, and must be kept properly adjusted and oiled. If the pitmans are allowed to run with lost motion in bearing, or are too long or too short, they will pound the shaker, grain pan or shoe to pieces. If the lost motion cannot be taken up, the pitman or pin, or both, must be immediately replaced with new ones. Don't let machine run until the parts strike and pound the grain pan or other parts to pieces, and then blame the machine.

Shakers.—The following speed or strokes per minute of shakers and grain pan give average best results:—

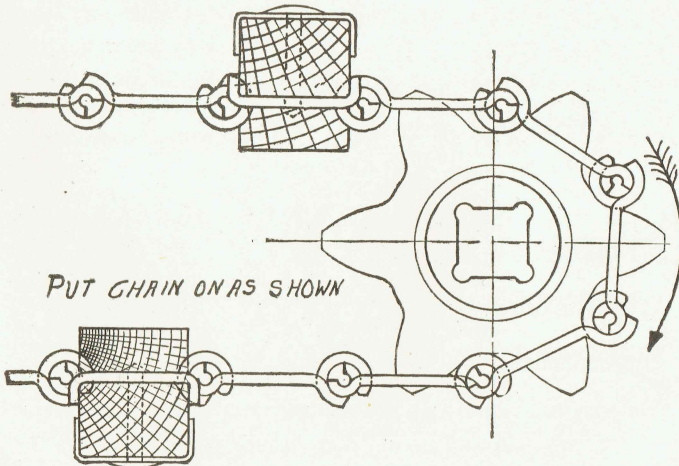
Alfalfa and Clover.....	160	Wheat, medium straw	155
Barley	160	Wheat, light straw	150
Timothy	150	Flax and Millet.....	150
Wheat, heavy straw	160	Oats	150

Too high speed will jump over grain and will not work out the straw as fast as regular speed, and is more detrimental to doing good separating than is too slow speed. A great deal depends upon the weight of straw and kind of grain. The speed of shakers should be as fast as the grain has time to fall on the shakers before their return throw. If the shakers run so fast the straw doesn't have time to fall, the shakers cannot beat out the grain. The heavy straw should have more speed than the light straw.

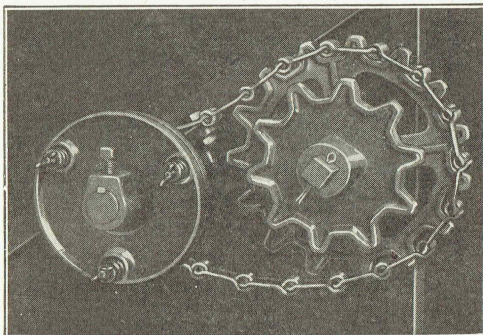
Teeth.—Worn teeth do not do good threshing and make your machine run hard.

HART NEW-MODEL SELF-FEEDER

The No. 55 steel chain running from 5-tooth sprocket on governor shaft to Differential sprocket on lower crank-shaft should run **bar forward** and is tightened by moving chain tightener sprocket stud.



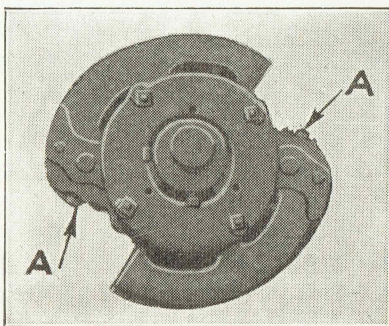
Main Drive Chain.—The Main Drive Chain running from Y-1683, 7-tooth sprocket on governor shaft to 13-tooth sprocket Y-1682 on upper crank-shaft, should run fairly tight, and is tightened by moving



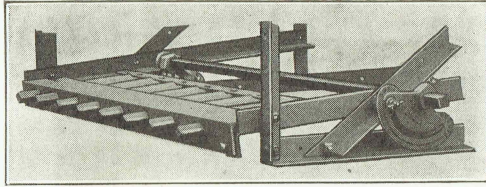
governor shaft backward by means of U bolts and slots provided in main upper angle rail. Be sure that governor shaft is kept parallel and that it is moved the same amount on both sides. Both sprockets and chain should be kept well oiled. Oil daily with good oil. Keep the 7-tooth sprocket tight and snug against bearing to prevent side play to governor.

Raddle Chain.—The raddle drive shaft is square and the inner sprockets are not fastened rigidly to shaft, thus permitting alignment with raddle chains. Care should be exercised to see that sprocket teeth are perfectly parallel or run in time so as to draw raddle slats evenly. The raddle chain is tightened by means of an adjusting screw on each side of outer end of carrier, permitting an adjustment of several inches. The raddle chain should be run **bar first**. (See sketch.) Be sure that there is an equal tension on each strand. **Important:** Raddle chains will run crooked and climb sprockets unless there are the same number of links on each side.

Friction Safety Device.—This Friction Drive is provided to prevent breakage in case anything should get caught in the feeder raddle.

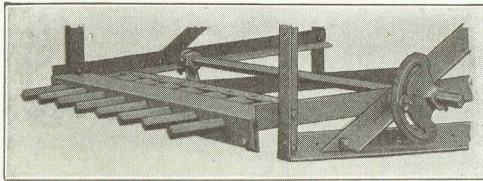


The friction is adjusted by means of the three thumb nuts. Adjust so that raddle will convey the ordinary load without slipping, yet may be stopped by holding onto one of the raddle sticks.



Retarder Open

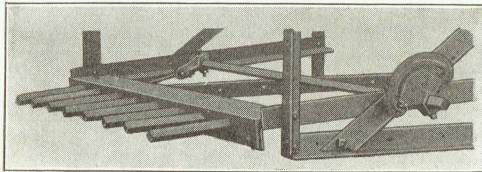
Ten- and 15-tooth sprockets (Y-1203 and Y-1200) are provided for changing speed of raddle. Both are on shaft when feeder is shipped. A cotter permits ready removal of outside sprocket and substitution for the other.



Half Open

Speed Governor — To Adjust Speed Governor. — The speed at which the governor will start the feeder web is regulated with the bolts "A." To start the web earlier, loosen the bolts; to start later, tighten. Be sure to tighten or loosen both bolts the same amount so as to keep the same tension on both springs.

Keep speed governor well lubricated with a good grade of machine oil at oil holes provided. Use a light grade of transmission grease in oil cup in end of shaft.



Retarder Closed

Speed.—The main crank-shaft should run about 213 R. P. M.; governor shaft, about 425 to 450 R. P. M.

Retarder Finger Adjustment. — When correctly located the retarder plate will be about 7 inches from the cylinder teeth. The retarder fingers projecting through this plate are adjustable to and from the cylinder.

Adjustment is made by loosening wing nut and moving to desired position by placing wrench on square shaft on side of feeder. Retarder fingers are nearest to the cylinder teeth when the word "closed"

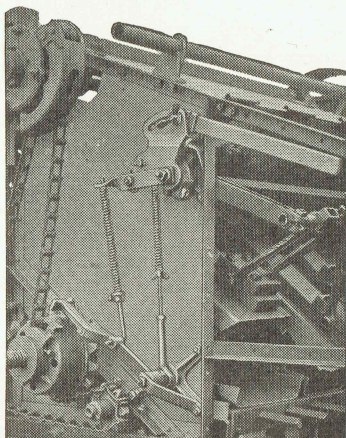


Illustration No. 1.—Upper Feed Pan Lowered

on the quadrant is opposite the bolt, and farthest from the cylinder teeth when the word "open" is opposite the bolt. The average location is at $1\frac{1}{2}$. See illustration.

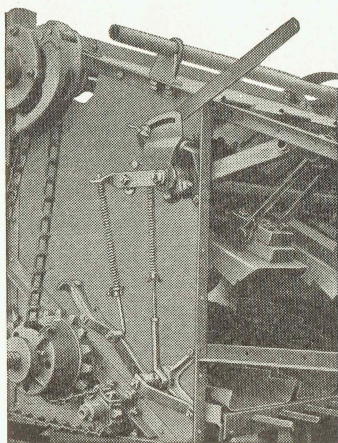


Illustration No. 2.—Upper Feed Pan Raised

To Adjust Upper Feed Pans.—Loosen wing nut on adjusting rod for pan relief spring until all tension is released, and tighten friction shoe on upper feed pan support arm until the upper pans when raised by hand will slowly drop back of their own weight. Then tighten wing nut on pan relief spring until it requires about 60 pounds of pressure to lift upper pans. This adjustment will suit all normal

conditions. When tough straw is being handled, increase the tension on the upper pans so that pressure will be greater on the straw and the combing-off action made stronger.

To feed a larger volume, loosen thumb nut on bolt through castings Y-1676 and Y-1677 and raise pans by means of wrought pan adjusting lever. Be sure to tighten thumb nut after desired adjustment is made. Illustration No. 1 shows upper feed pans dropped down to lowest position. The throat opening is very small and trip lever is set close to variable speed control so it will operate quickly. Illustration No. 2 shows upper pans and trip lever in highest position with throat wide open. Notice position of wrought adjusting lever in each case. Trip lever adjustment is independent from pan adjustment and may be set to operate quickly or slowly as desired.

To Adjust Spring Belt Tightener.—Put bracket on pipe shaft with spring and set collar between arms. The spring should force the tightener idler pulley toward main drive pulley, hence prongs of spring will grip cross bar of bracket and set collar will be between the coils with loop of spring partly around boss of set collar. See that pipe ferrules are inside of spring coils so that they will work freely.

Adjust by releasing all tension on spring, then moving bracket forward to within two inches of main drive pulley. Grip set collar and force backward against spring until tension will sustain pulley in position first mentioned. Tighten set collar securely. **Important:** If tension on spring is too great and belt comes off suddenly, it may bang idler pulley against main drive pulley with possible breakage. A very strong tension is not required.

Keep idler pulley and main drive pulley in line. Belt may be made to run to center of main drive pulley by slightly loosening bolt that holds one of the idler pulley bearings and driving same up or down until belt centers on pulley. Be sure to tighten bolt after adjusting. **Keep well oiled.**

Keep Everything Tight—All Working Parts Well Oiled.—Use a good grade of oil liberally in all bearings and wearing surfaces. All bolts have lock washers to keep nuts tight. It is time well spent that is consumed in an occasional inspection of the entire machine, involving the tightening of all loose nuts and bolts and the correction of any misalignments or adjustments.

Timothy.—Six rows of concave teeth are generally used and the shaker and grain pan run about 150 strokes per minute. See Adjustable Chaffer, Sieves and Wind to adjust these parts.

For Taking Timothy Seed Out of Wheat.—Use what we call a Dirt Screen with 1/12" holes on the bottom of shoe in place of Cheat Screen.

Set the wheat sieves in the regular way for threshing wheat.

Open the door in bottom of shoe and place a box or canvas under it to catch the timothy seed.

The Wind Board is generally set half way up the slot. By changing it up and down, more or less blast can be given under the sieve and the blast directed to allow more or less of the back end of sieve to load.

Wind or Blast.—The upper wind blinds at end of fan control the over blast and should be open about $\frac{3}{4}$ " for grain and about $\frac{1}{2}$ " for seeds. If given too much opening it will blow over the grain or seed.

Open the lower wind blinds to the amount of blast wanted to clean the grain and seeds without blowing too much into tailing spout to shoe.

A steady, regular motion must be maintained. You cannot do good cleaning with the fan running 600 revolutions one minute and 500 the next minute.

There are so many kinds and conditions of grain and seeds that these directions may be varied a little to meet some conditions, but remember that a slight change in position of sieves, wind board and blast produces different results, and with proper adjustment you can do good cleaning.

Wheat.—Four rows of concave teeth are generally used; more should be used if necessary to thresh it clean out of the head. The fewer concave teeth you can use, the easier the separator will run and the better it will separate, as the finer you cut up the straw, the more difficult it is to shake the grain out.

Turkey wheat some seasons is very difficult to thresh clean out of the head. Corrugated concave teeth are sometimes used back of the smooth teeth. If these don't thresh it clean, put in more teeth.

The shakers and grain pan should make 150 strokes in light-weight, fine straw, 155 strokes in medium and 160 strokes in heavy straw. See Adjustable Chaffer, Sieves and Wind for adjusting these parts.

Wasting Grain.—Follow the directions given under the head of Separation, and you will do the best separating. If you don't, you overlooked or failed to follow some part of the directions.

In Nine Cases Out of Ten Where a Red River Special Wastes Grain, it is Because the Motion of the Machine is Too Fast.

Wind Stacker.—In starting the wind stacker, see that it is properly oiled.

If chute clogs, it is caused by straw piling up on stack too close to end of chute or drive belt slipping and not running fast enough. We can furnish a smaller fan pulley to run the fan faster, which gives more blast.

The pulley sent with the stacker gives the average speed used by ninety-nine out of one hundred threshermen. In running out of barns to other places with chute extended, be careful that separator wheels do not drop down from barn-door sill, as the long chute in such a

fall acts as a lever, and is liable to throw something out of order or break the holder.

Instruct the man who handles the stacker to make his foundation a little smaller than if stacking by hand, otherwise your stacks will be too flat, and not properly filled out.

If you want to make a very large stack, lower the chute to a horizontal position and extend the chute to its fullest extent, raising the hood very slightly; you will thus start the rear of your stack, which you will continue to keep the highest at all times, allowing the top of the stack to slope toward the separator.

After the outward circle is completed, draw the chute in as near the separator as you wish the stack to come, and make the inner foundation, being careful to keep it lower than the outer circle.

Repeat the operation; namely, raise the chute as required by the increased height of the straw, and extend and withdraw it as occasion requires, until the stack is as high as the chute can control it in that way; then raise the hood a little at a time, filling out the top, allowing the straw to strike the inside and glance over. When you have reached a level, you will thus fill the middle and have it higher than any other part of the stack.

To oscillate by hand, slip the worm at lower end of inclined shaft out and let slide down out of gear and set the lever to trip clutch in notch.

The trip is set and adjusted by the stand which holds the trip fork. Move the end of the stand in or out so the end of trip with spring throws the same distance each side of the spring post on stand with the other end of trip half way between the clutch gears when spring is straight with trip arm. Shim under the stand to make trip arm clear trip circle and sliding clutch. If it rubs on clutch or trip circle, it will not trip.

In placing a new elbow on chute it must be pushed on or out far enough so when you raise and lower the chute it will telescope over the elbow on master wheel without binding, then rivet in place; or the cast-iron chute holder can be moved forward or backward on the chute until the same circle as the elbow on master wheel is obtained and then riveted in place. If the holder is not in the right place, the elbow will bind and give out.

The wind stacker will not make a good straw stack without assistance.

WEIGHER, HART-PEORIA

The dump is regulated by the trip dog in gear wheel and the rest under scale beam. These should be set so that trip catches the stop arm on the weighing hopper about $3/16$ ". If this does not catch deep enough, the jar of separator will shake it loose and the hopper will dump with less than one-half bushel.

To set the scale correctly, weigh 30 pounds of wheat, dump it in the hopper, set the Pea on 30 notch on scale beam, loosen nuts

on end of scale beam and slide the scale beam in or out until the 30 pounds of wheat just lift the scale beam high enough to dump.

The valve or hinged plate to top of elevator is closed by spring in casting No. 2700, and spring must be strong enough to close quickly. The valve is opened by a turnbuckle, Nos. 15 and 487, which is adjusted by screwing the turnbuckle to the right or left.

The valve or hinged plate to weighing hopper is closed or opened by shaft and arm No. 813, connected to crank No. 340 on sprocket that drives tally and is adjusted by jam-nut on casting No. 351. If bent out of position the arm can be straightened or moved on shaft. These two arms must be set parallel with each other.

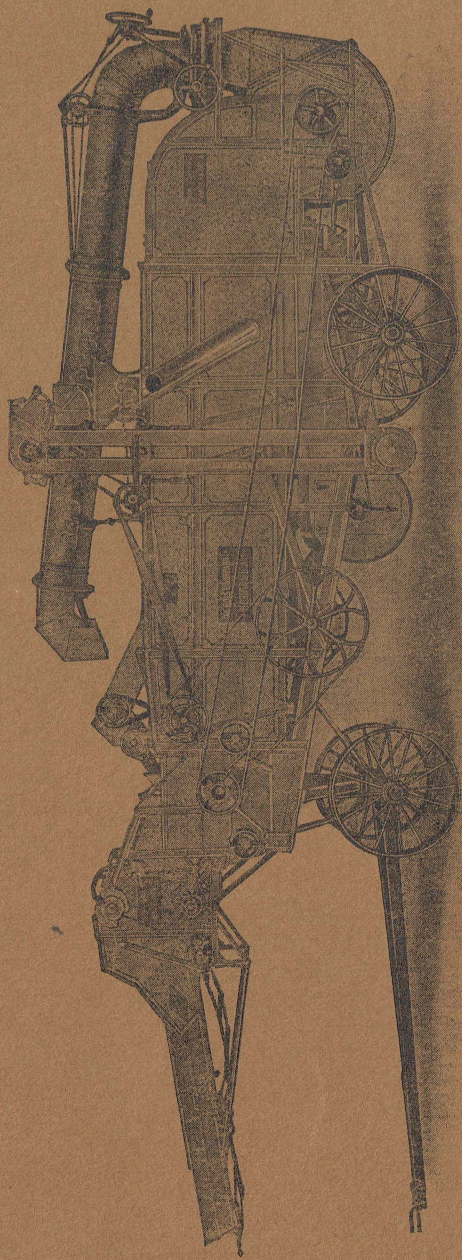
The bearings should be oiled and all parts adjusted to work free and the bands and nuts kept tight.

The elevator raddle of sprocket chain with cups or belting with cups should be kept reasonably tight, so cups will not drag at bottom of elevator, or elevator will run hard, wear out the cups and break something.

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