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January 1928

Allis-Chalmers 20-35 Test 151

Tractor Museum

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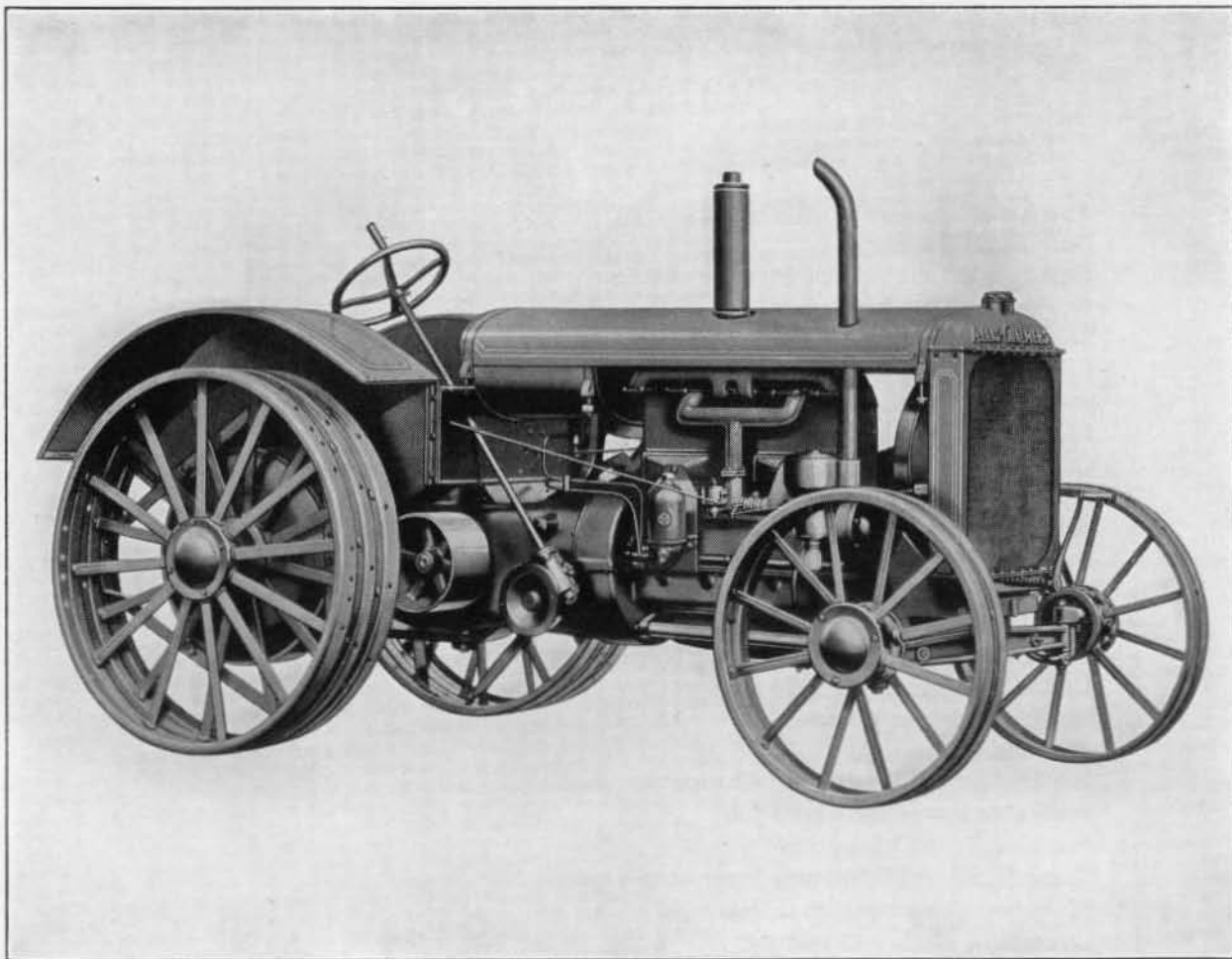
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Exhibit - C



Allis-Chalmers
20 ~ 35 TRACTORS



The Allis-Chalmers 20-35 Tractor

Here is the best tractor Allis-Chalmers has ever built, a powerful 4-plow machine, with a rated horsepower of 20-35, selling as the lowest priced 4-plow tractor in the world.

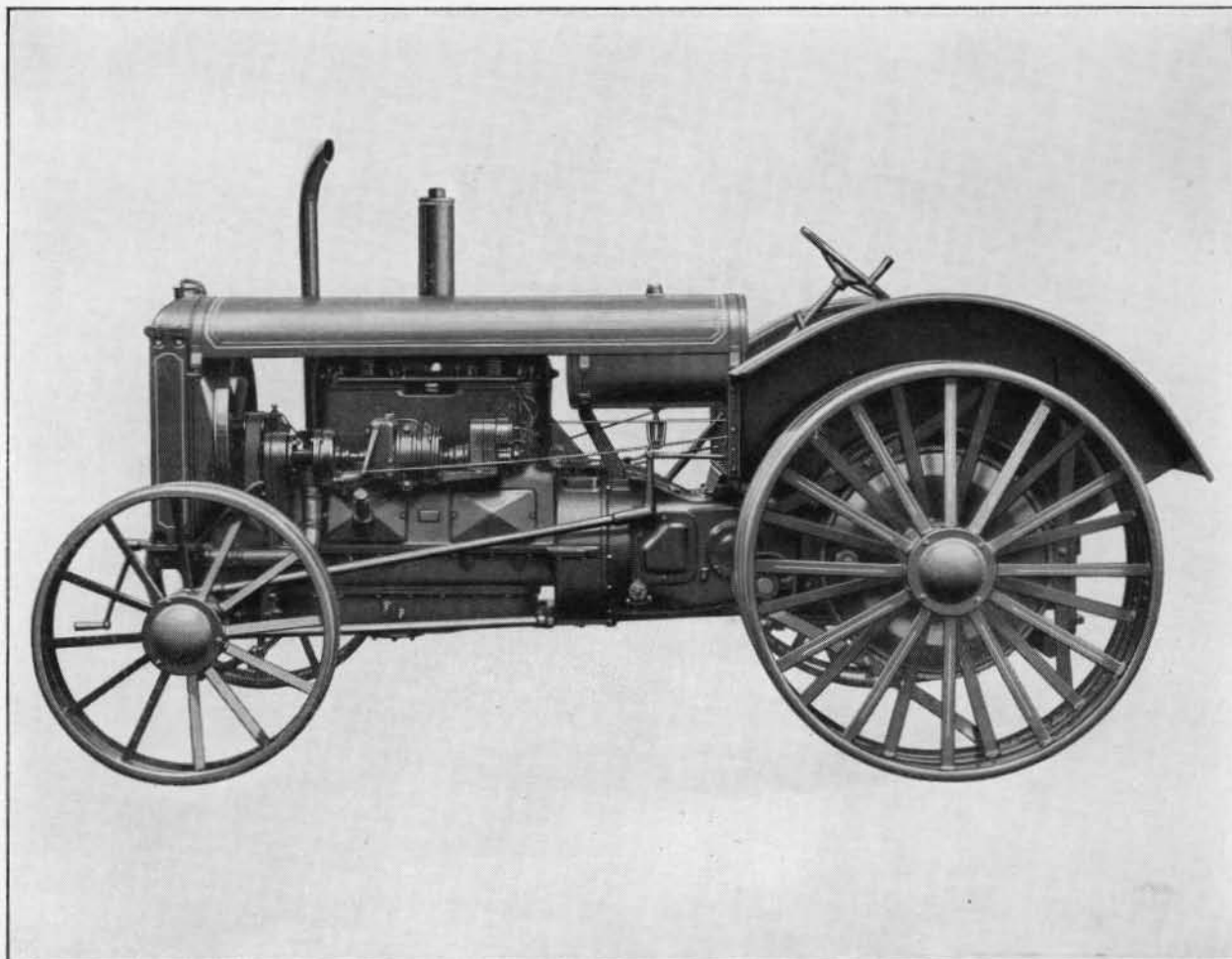
This tractor has been developed and perfected until it is the outstanding unit on the market today. Many new accessories have been adopted as standard equipment and many refinements were made to add to its life and increase its efficiency.

Not a single detail has been overlooked in consideration of the work it must perform. Take, for example, the muffler and spark arrester which will prevent many grain fires.

The operator's seat has been brought forward and raised, so he has a clear, unobstructed view of the furrow wheel.

The tractor has more drop-forgings by far than it has ever had before. These mean added strength and longer life. The motor is fully sealed against dirt getting in through the air, the fuel or the oil.

For the major jobs on a farm—plowing, threshing or the exceedingly heavy work of combining there is not a tractor in its power class which can compare with the tractor for power, handling ease and ability to stand-up under hard service.



Built for Hard Work

From wheel to pulley the tractor is designed and developed to use its tremendous power without overloading. The crankshaft, the gears, the valves, the pistons — everything is built to take the full load without overstraining and weakening any part.

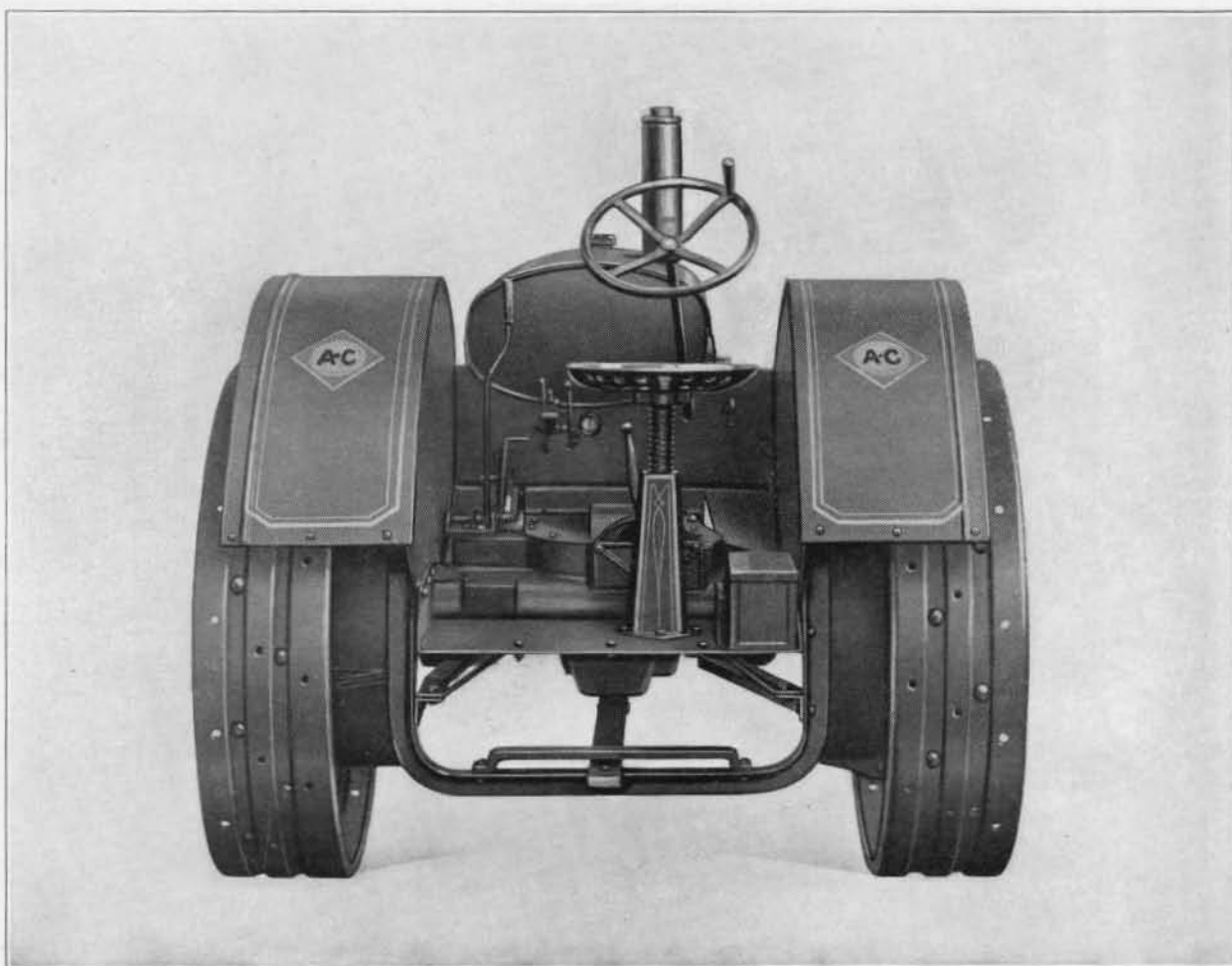
There is power to plow with four 14" moldboard plows, to pull a 32-inch separator with all attachments, to operate a 16-foot combine, a 10-foot one-way disc plow or a 4-row lister.

The Allis-Chalmers 20-35 tractor is complete, with nothing extra to buy. Every tractor has the fuel strainer, the oil PurO-

lator, a double-action air cleaner, a spark-arrester muffler and many other accessories as standard equipment.

We recommend that, with proper care and cleaning of the Oil PurOlator, you can run the tractor for 100 hours without changing oil. At the present cost of oil the saving here alone, compared with other tractors, will pay for an Allis-Chalmers 20-35 in five years.

The length of the life of every wearing part has been more than doubled by improving the design, the method of lubricating and the materials used.



Roomy and Comfortable Platform for Operator

The Allis-Chalmers 20-35 Tractor has a platform which is especially designed to make operation of the tractor easy and convenient. A big, spring-mounted seat is so located that the operator has a clear view of the furrow wheel and is also close to the control levers.

There are only two levers — one for gear shifting, the other for the clutch. As an added safety factor a foot brake is provided. This is so sensitive and positive that a slight touch holds the tractor on the steepest grades.

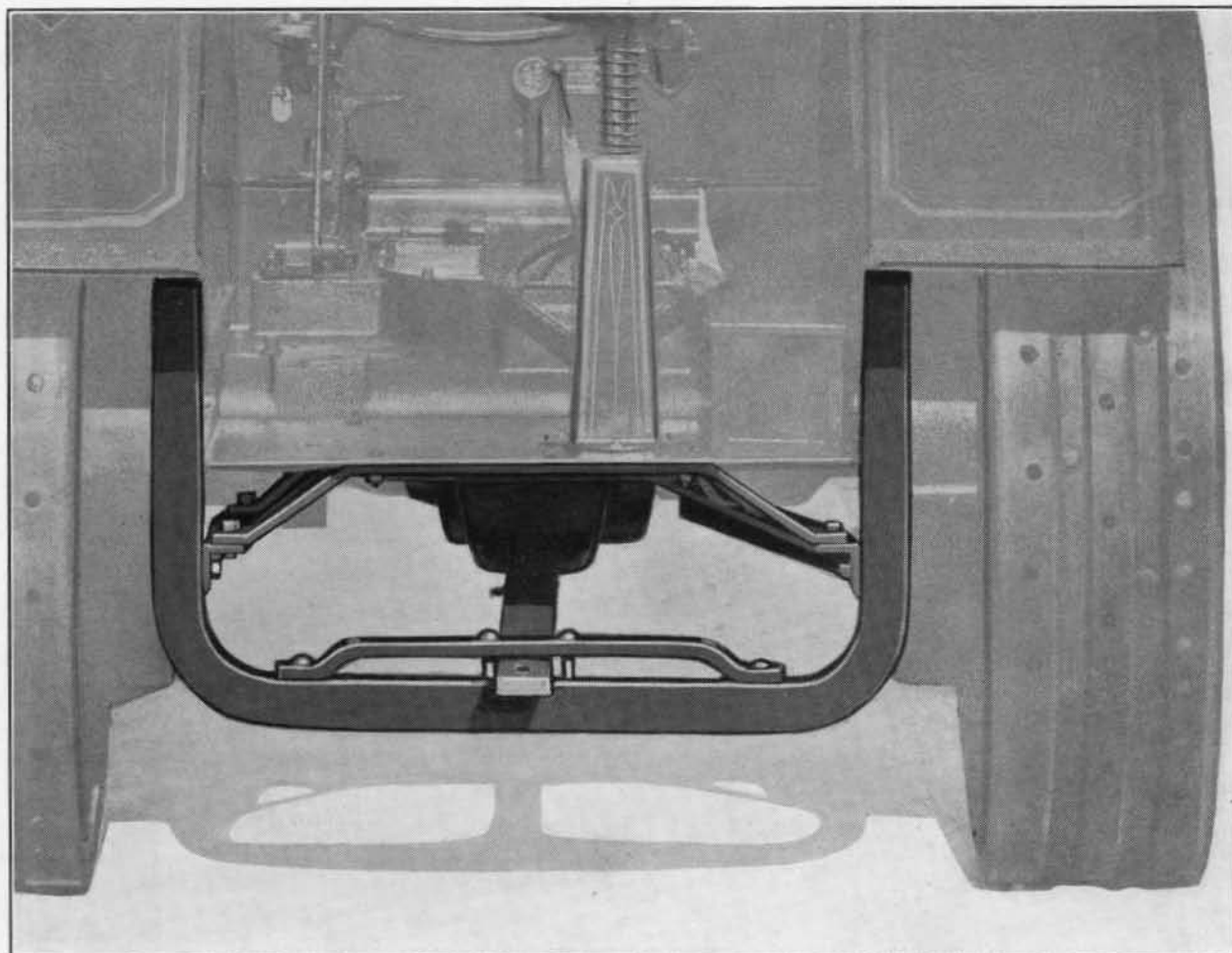
The operator has plenty of leg-room. He

can stand or sit as he desires, always with the control at his finger tips.

On the dash ahead of the operator the controls for the governor and magneto are mounted. A gauge for registering the oil-pressure is also placed here, so the operator can keep close check on the pressure lubricating system.

A steel tool box is provided on the platform. This is waterproof and can be locked.

Everything is simple and handy. To operate an Allis-Chalmers 20-35 Tractor from this platform is fun — not work!



Husky Drawbar for Heavy Loads

The full power of the Allis-Chalmers 20-35 Tractor is carried through the drawbar to the plow, combine or other implement which is being used. Therefore, it is essential that the drawbar be strong, well-built and so designed that it can be readily reached and attached.

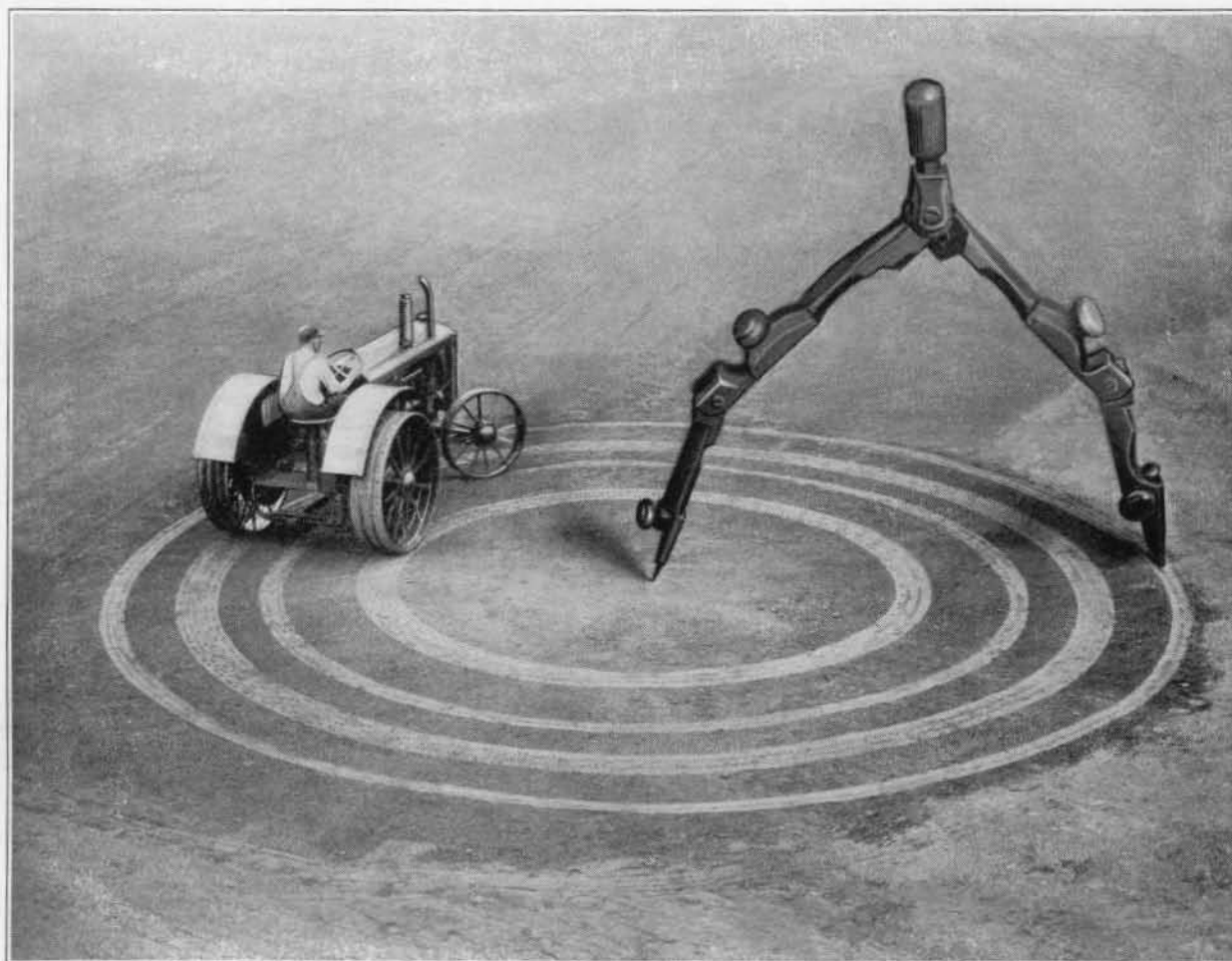
A heavy 1" x 3" steel bar is securely pivoted on the tractor frame and it is so located that the full power of the tractor is transmitted through it without loss.

Supporting the drawbar and taking all of the upward or downward thrusts is a 2½" steel angle, with a ¾" x 2½" bar

serving as a guide for the sidewise movement of the drawbar, when necessary.

The drawbar on the Allis-Chalmers 20-35 is simple in design and construction, but exceedingly strong and efficient. The loads are transmitted equally over a big surface and there is no one particular spot which carries the brunt of the burden. Longer life is therefore assured for all of the parts, and also for the tractor itself.

Many tests were made before this design and construction was adopted and since then it has proven its worth in practical service.



Short Turning Radius

With a short turning radius the Allis-Chalmers 20-35 Tractor can be used almost anywhere. The extreme outside radius is 15 feet 5 inches and the inside radius is 7 feet 3½ inches when making a short turn.

The drawbar is so constructed that it can swing in back of the tractor to carry the implement on an extremely short radius, when necessary. This is particularly valuable when operating a disc-harrow, a combine or a similar clumsy, hard-turning implement. There is no extra length or width than is necessary to make a well-balanced powerful tractor which should turn in as small a circle as possible.

The steering wheel is big and conveniently located, so the operator can steer with a minimum amount of effort. This ease of handling, the speed with which the tractor responds to a touch on the lever, and its ability to maneuver in narrow places makes it ideal for any job, whether on the belt or drawbar.

This feature of the Allis-Chalmers 20-35 Tractor is worth special consideration when determining the qualifications of the machine for your farm. It enables you to use more land for actual farming and this, of course, is profitable for you.



Clear, Unobstructed View of Furrow Wheel from Operator's Seat

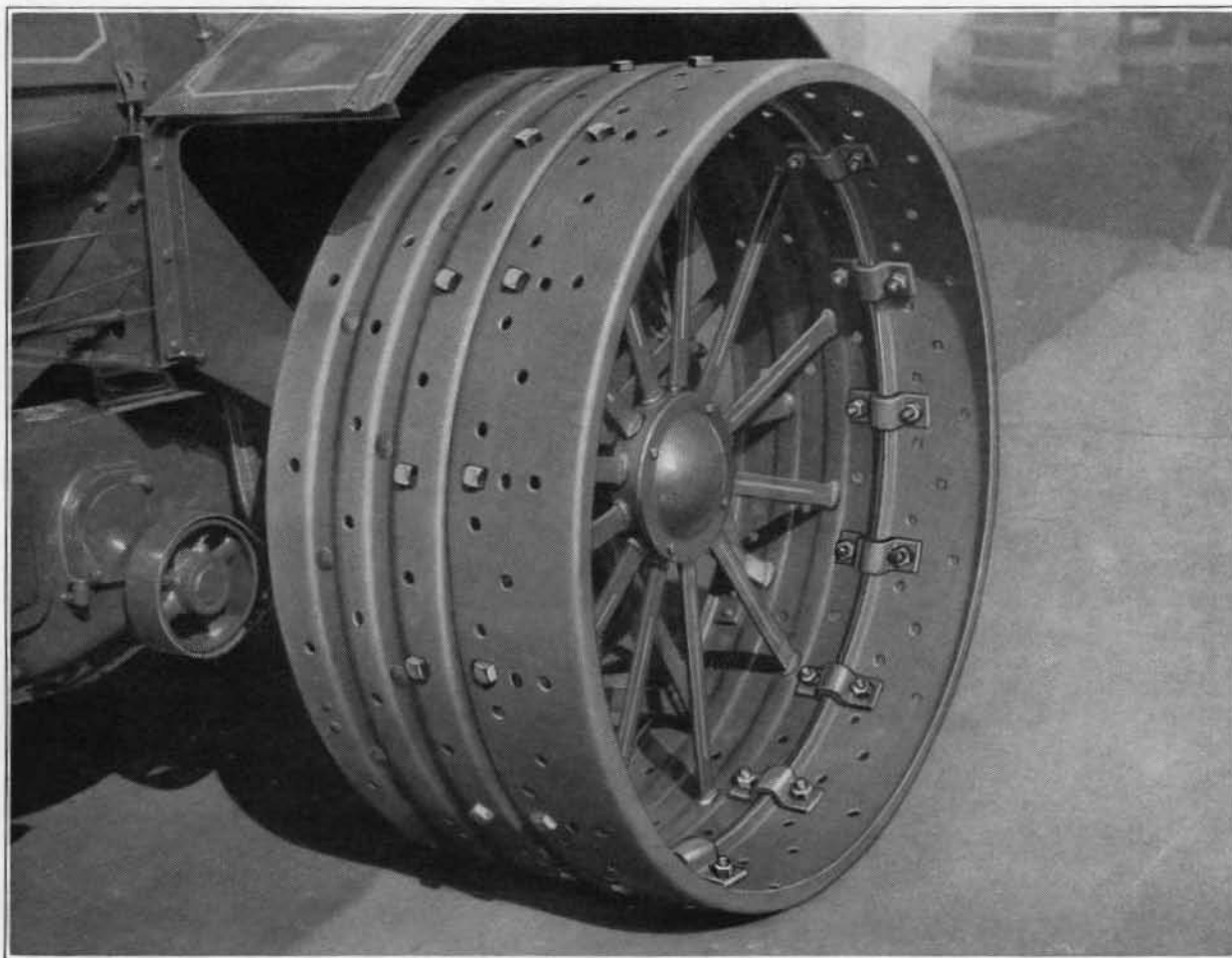
From the operator's seat on the Allis-Chalmers 20-35 Tractor, he commands a clear view of the furrow-wheel. He can more accurately control the tractor and a clean, even job of plowing is sure to result.

The seat has been set up high to give the operator this advantage and he also has a clean, well-proportioned hood ahead of him to sight along. These things can't help but affect the quality of workmanship which is turned out, and they explain why the work done with the Allis-Chalmers 20-35 Tractor is uniformly much better than the average.

Most important, perhaps, is the fact that when the operator has this accurate control and can see exactly where he is going the speed is usually increased. It's safe to go faster when there is full visibility.

Less room is required for turning with this construction and so more land is available for straight plowing, instead of a big head-land being necessary.

These are all benefits which result because of the features offered in the Allis-Chalmers 20-35 Tractor. They are all given as standard equipment. No extra charge for any of them.



Steel Wheel Equipment

The steel wheels on the Allis-Chalmers 20-35 Tractor are built by nationally known manufacturers of industrial wheel equipment. They represent the result of years of development in the attempt to secure exactly the right wheel for tractor construction.

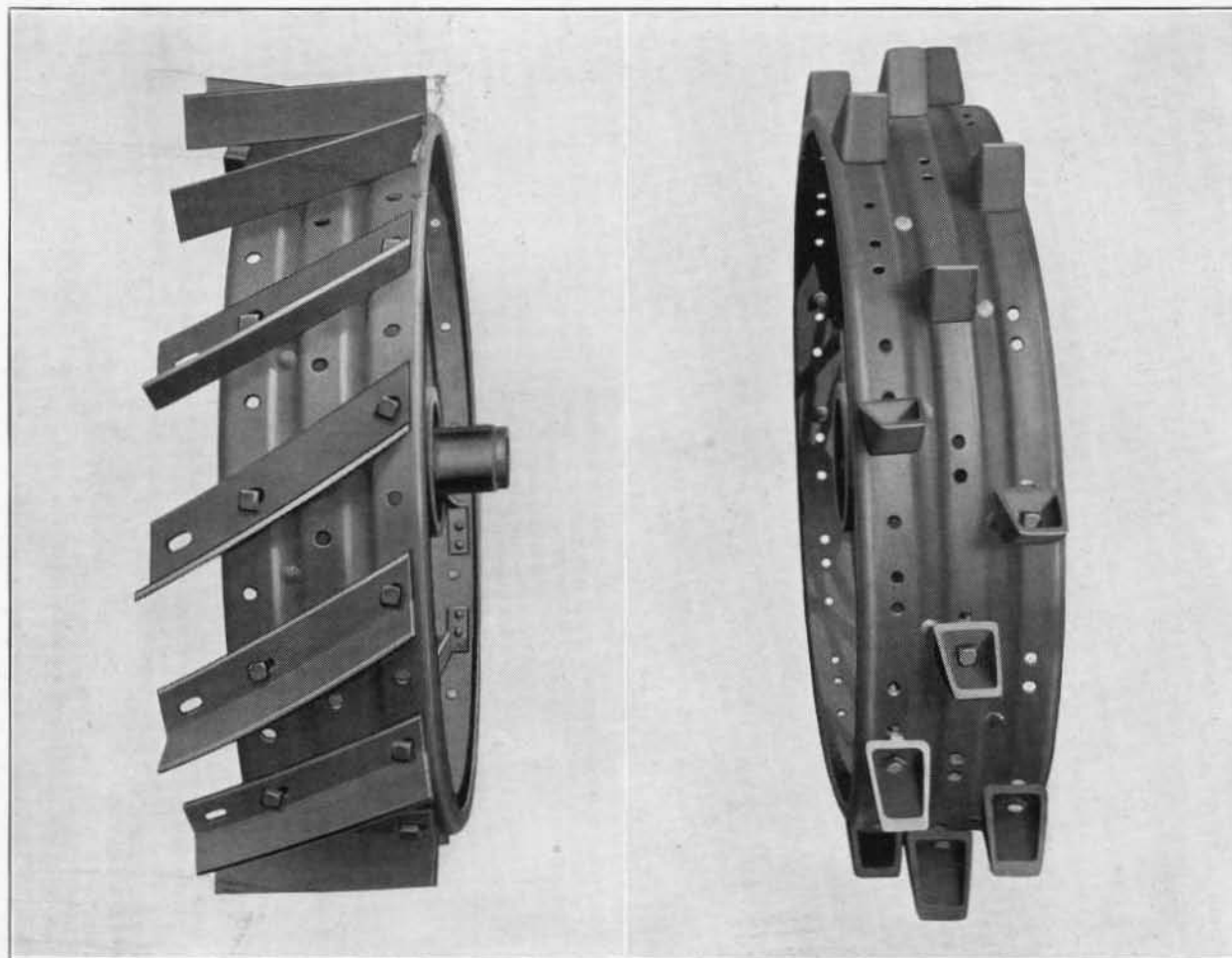
These wheels are exceptionally strong and yet light, so their weight will not pack the soil. The spokes are hot riveted to the tires and hubs so that a very powerful joint is made which will not be loosened by strains and jars.

A heavy protecting and reinforcing rim is

formed by bending the tire. With this rim the wheels cannot cut into the soil and leave deep tracks. Holes are spaced on the rear wheels to fit any desired lug or cleat equipment.

When wider wheels are required, extension rims are furnished as shown in the picture. These are quickly attached and have hole spacing for any desired equipment.

The front wheels are 36" diameter by 6" wide, and the rear wheels are 50" diameter by 12" wide. The wheels are good-looking, substantial and add a finished appearance to the Allis-Chalmers 20-35 Tractor.



Maximum Traction in Any Soil

As standard equipment every Allis-Chalmers 20-35 Tractor is supplied with a complete set of front-wheel guide rims and either angle-cleats or spade lugs for the rear wheels.

The angle cleats are $3\frac{1}{2}$ " x $3\frac{1}{2}$ " x 18" in size and trimmed to fit on the wheels so that the greatest efficiency in traction will result.

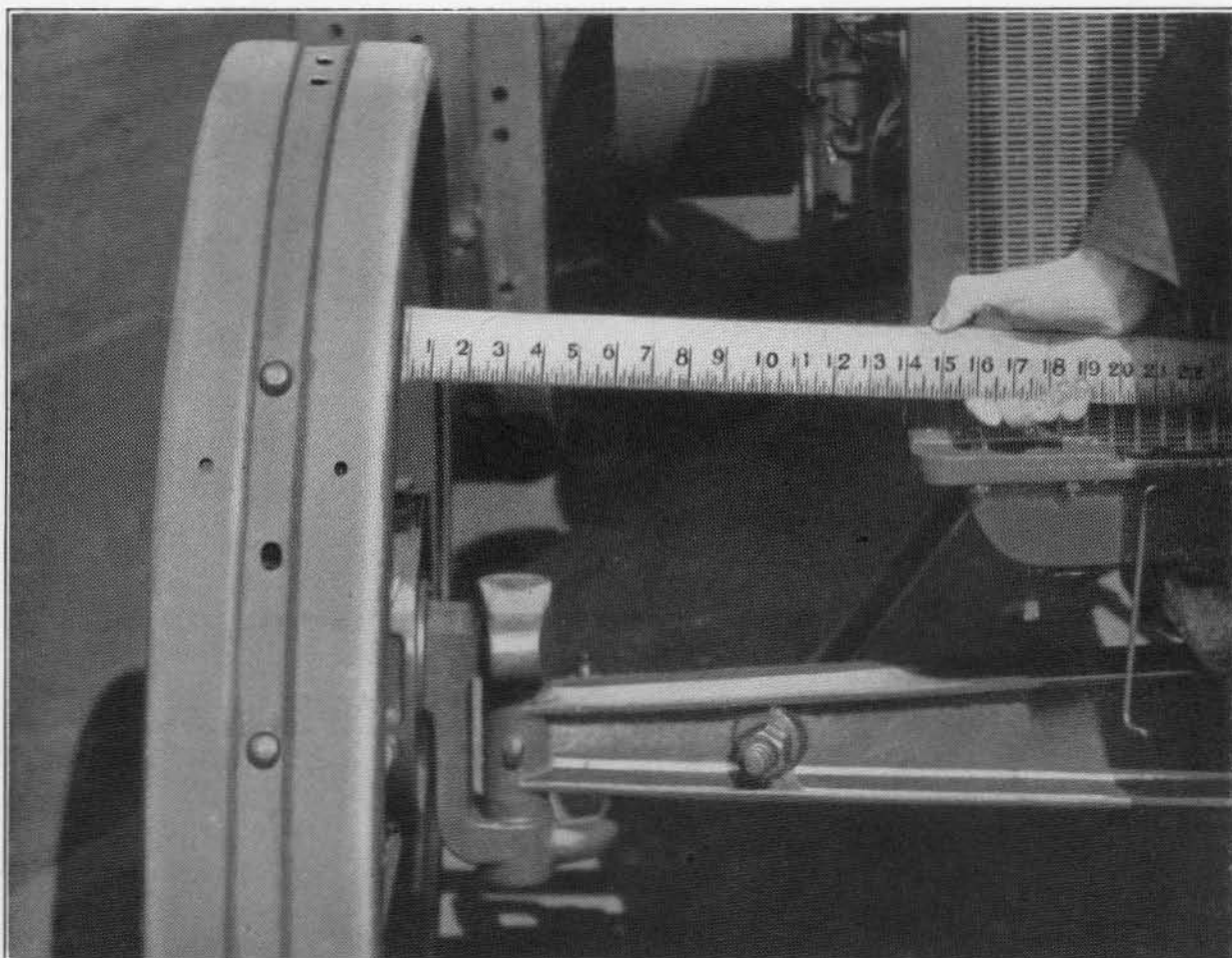
If angle cleats are not desired we supply a complete set of spade lugs. These lugs are drop-forged, making the strongest lug on the market. There is no argument about the superior strength and longer-life of a forging over a casting.

The lugs are scientifically designed to fit on the wheels and get the maximum traction efficiency. Each lug has a forged knob which fits into a hole on the wheel and prevents it from turning or twisting loose.



Forged
Steel Spade Lug.

These Allis-Chalmers lugs are shaped and pitched so the wheel will not clog readily. A special spacing arrangement on the wheels assures the desired results for any kind of soil.



Comfortable Clearance for All Jobs

One of the noticeable characteristics of the Allis-Chalmers 20-35 Tractor is the ample room which has been allowed for work on the tractor and with it.

Everything is accessible, easy-to-reach, with plenty of room to spare. When threshing, or doing any other belt work, for instance, there should be lots of room for the belt, both around the pulley and between the front wheel and radiator.

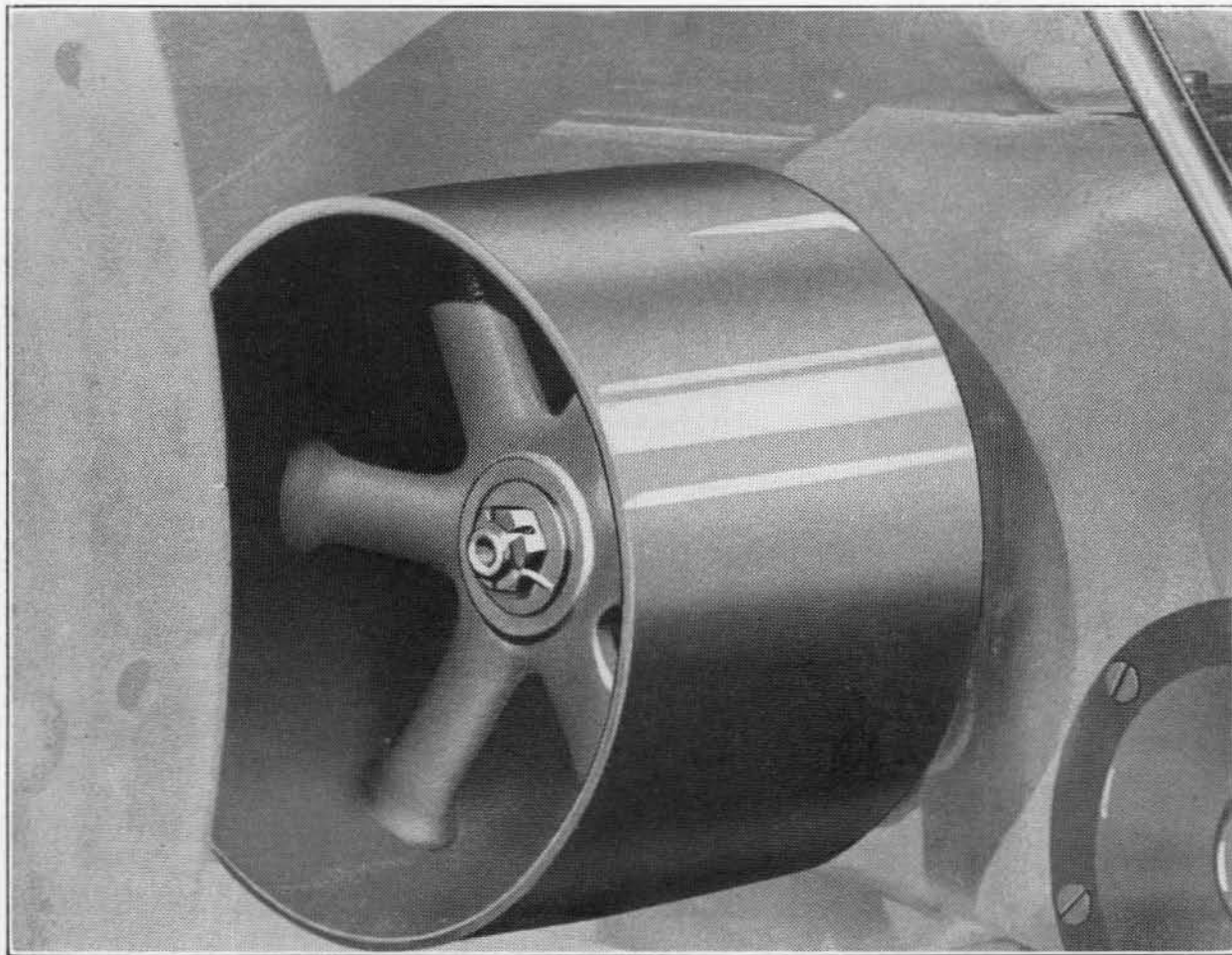
You will see from the picture that there is a liberal 14 inches of space between the wheel rim and the radiator. Plenty for any belt!

This idea of easy-to-reach has been carried out in the motor construction. Big, roomy

inspection plates have been provided to reach the clutch, the connecting rods, main bearings and other parts which need an occasional once-over.

The tractor is fitted with Alemite-Zerk fittings for pressure greasing and all of them have been so arranged and placed that they can be reached easily and conveniently.

This is a feature of the Allis-Chalmers 20-35 Tractor which is worth a great deal in the saving of time and temper. A machine which makes it as easy as possible usually receives better care and attention. This, at any rate, has been the experience of hundreds of Allis-Chalmers Tractor owners.



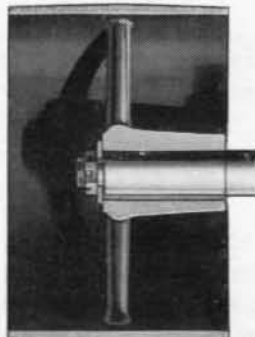
Substantial, Easy-To-Reach Belt Pulley

For the innumerable jobs where belt power is required, more especially for threshing, some means of getting the power from the tractor is necessary. On the Allis-Chalmers 20-35 Tractor this problem has been met with the present, very satisfactory installation of the belt-pulley.

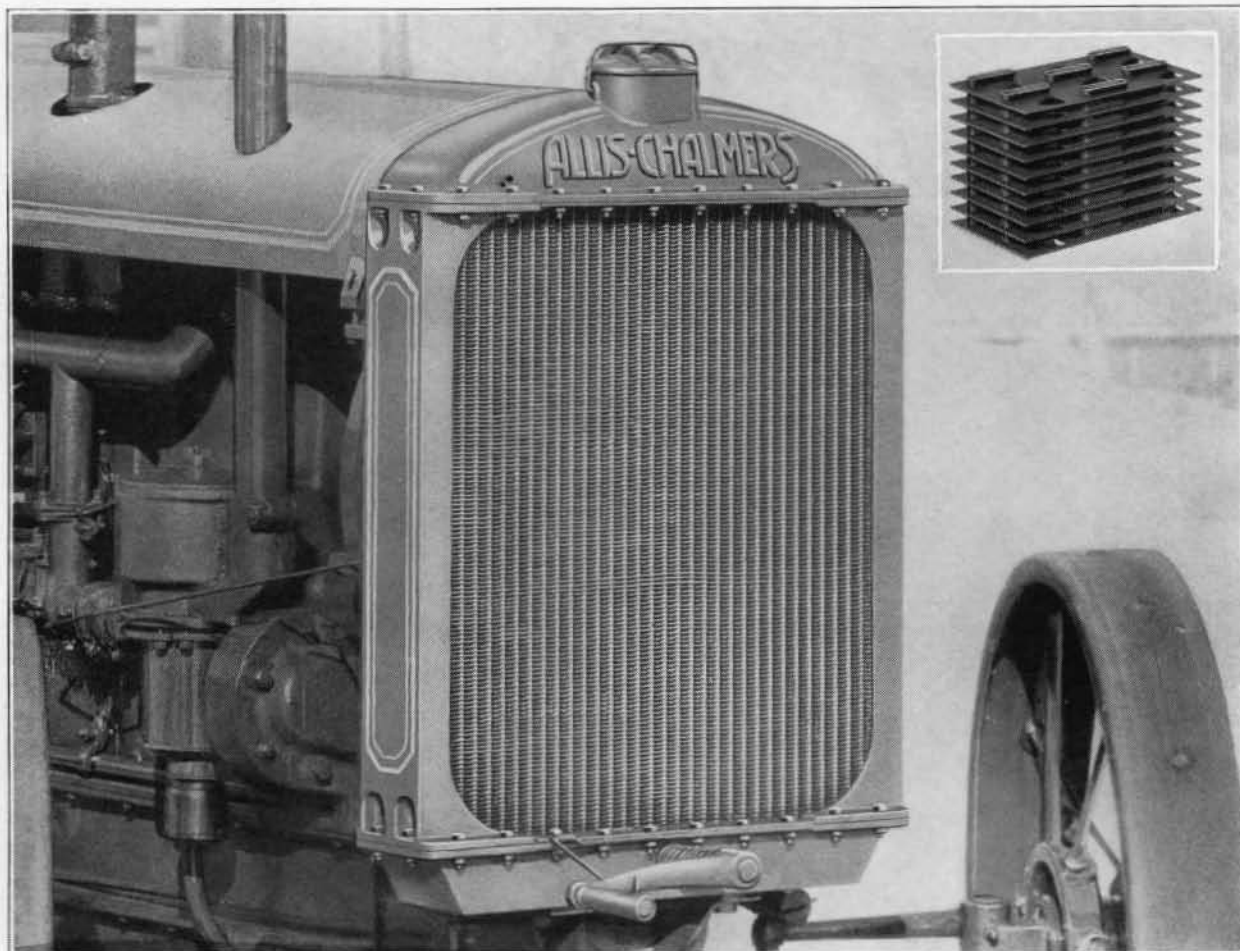
From the operator's seat, he can easily line-up the belt, due to the location of the pulley. There is plenty of room all around the pulley, for slipping on or off the belt.

There is no danger of a wobbling, out-of-true pulley on this tractor, because of the secure manner in which it is fastened on the shaft. The pulley is keyed and bolted, with

the nut safely locked by a cotter, to the belt pulley shaft.



The material used in making the pulley is high-grade cast iron. It is carefully machined to a 13" diameter, and has an 8½" wide crowned face. The speed of the belt pulley is 930 r.p.m., the same as the motor speed under full load.



A Perfected Cooling System

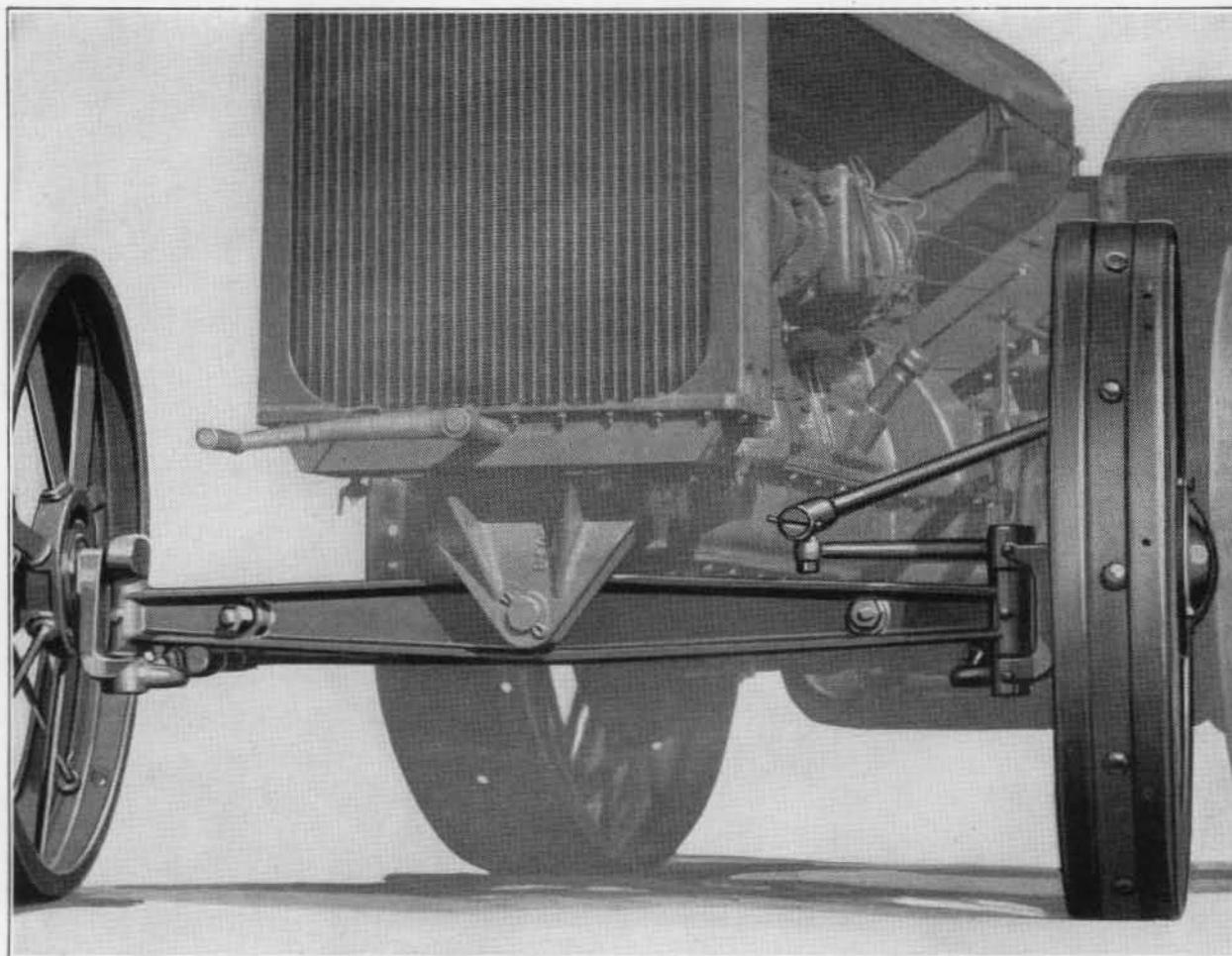
If we ever cared to boast about any particular detail of this tractor's performance it would be the cooling system. Never, to our knowledge, has there ever been a bit of trouble with an Allis-Chalmers 20-35 Tractor overheating, or consuming too much water. In fact, it is commonly said that a man can drink more water than his A-C will use all day.

A pump circulates the water freely through the radiator and around the motor. The water jacket thoroughly encircles the cylinders providing a large cooling area. The capacity of the system is 10 gallons.

The radiator is the fin-and-tube type, especially designed with long oval tubes which prevent any danger of a broken radiator should the water ever freeze.

The radiator shell is of high quality cast iron, very durable. It gives the tractor the touch of a well-built, modern machine, with its curved lines and finished appearance.

Even the little things haven't been forgotten, for the radiator opening is large and oval shaped. Water can be poured directly from the pail without slopping over, it's not necessary to use a funnel.



Powerful Front-End Construction

The three-point suspension as used on the Allis-Chalmers 20-35 Tractor, together with the construction shown above, constitute one of the strongest and best balanced front axle designs on the tractor market today.

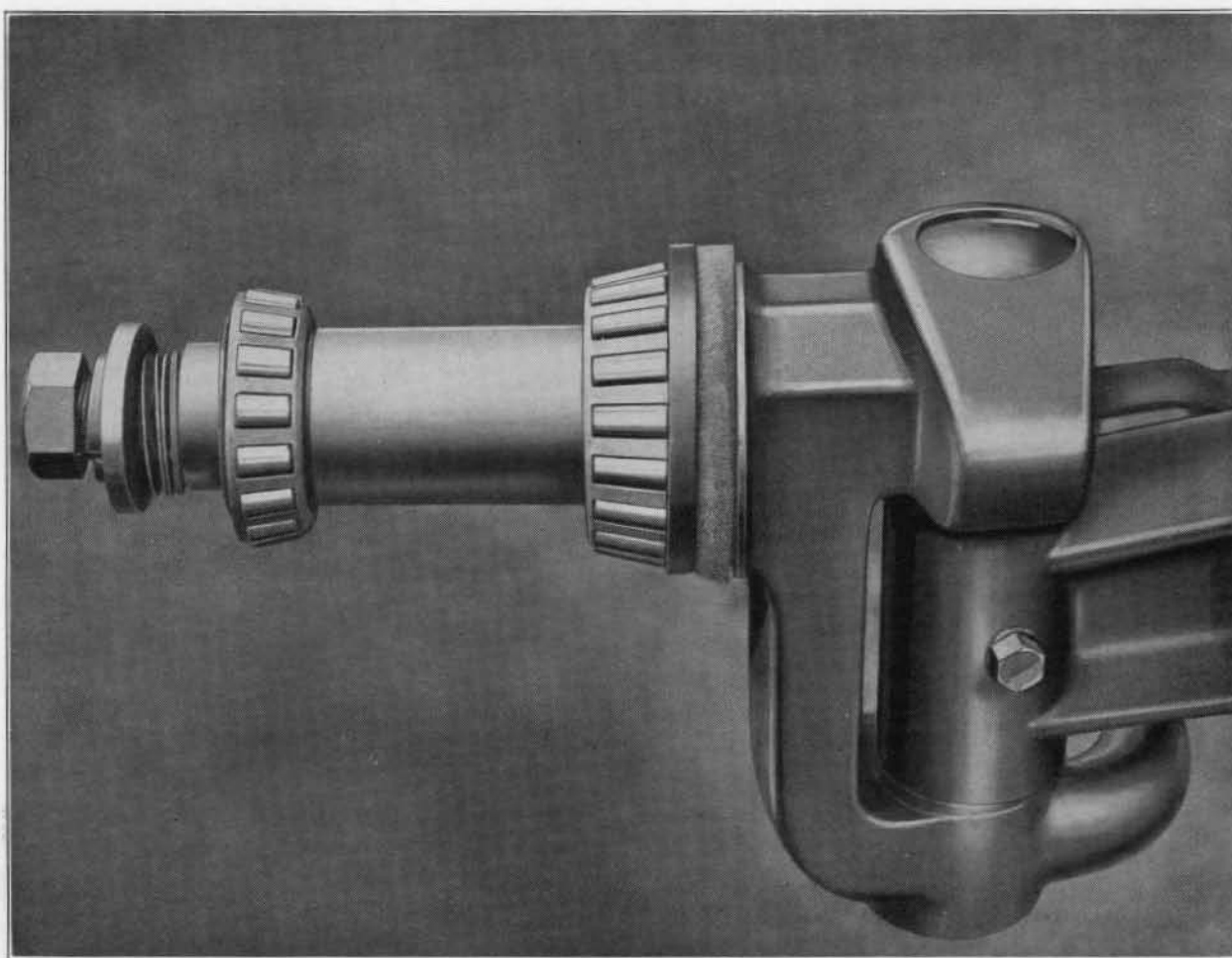
The axle is a drop-forging. Everybody is familiar with the tremendous strength of forgings and this should be a big deciding factor in favor of Allis-Chalmers.

The front wheel spindles, on which the wheels are fastened, are also drop-forgings. Perhaps nowhere on a tractor is there so much strain, twisting and effort as on these

spindles, and these forgings are necessary to stand up under the severe work.

The front wheels turn on Timken Roller Bearings which mean easy turning and smooth running. Ample means have been provided for greasing the wheels and spindles through grease gun fittings. Dust and dirt are sealed out of the moving parts by a felt retainer.

This front-wheel and axle construction is fool-proof. The average farmer who greases and oils regularly can just forget about his spindles and front-end as far as trouble is concerned.



Drop-Forged Front Wheel Spindles

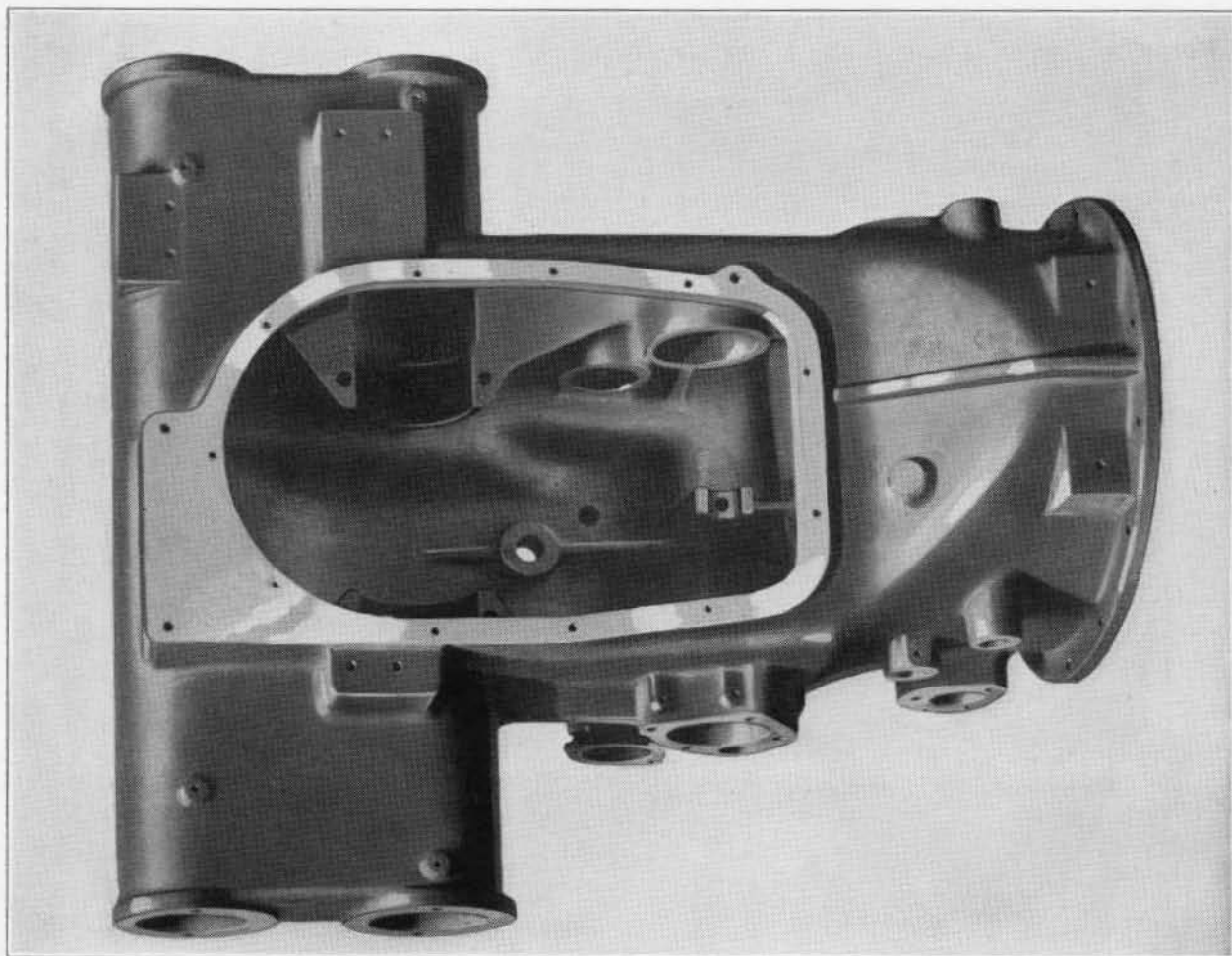
To emphasize the strength and heavy-duty construction of the front wheel spindles used on the Allis-Chalmers 20-35 Tractor this picture is shown with the wheel removed. Notice, particularly, the liberal dimensions of this spindle — how strong and well-built it appears.

The spindles are pounded and shaped from one piece of steel under the tremendous blows of a steam hammer. After forging they are carefully machined and ground to the required size.

The front wheels on the Allis-Chalmers

20-35 Tractor turn on Timken tapered roller bearings, with adjustment provided to take up any possible wear. A felt retainer ring prevents any grease from splashing out and a nut with shims takes care of the take-up if necessary.

The front wheels have an Alemite-Zerk fitting on the hub in a very accessible place, so lubrication is easy. This type of spindle construction is the result of careful design and testing in the laboratories and in the field. Just another reason for the long-life of the Allis-Chalmers 20-35 Tractor.



The Backbone of the Tractor

A tractor, like a house, is only as good as its foundation and this "master-casting" for the Allis-Chalmers 20-35 Tractor serves that purpose. It makes this tractor a single unit instead of being built-up as the ordinary bolted, channel-frame type of construction.

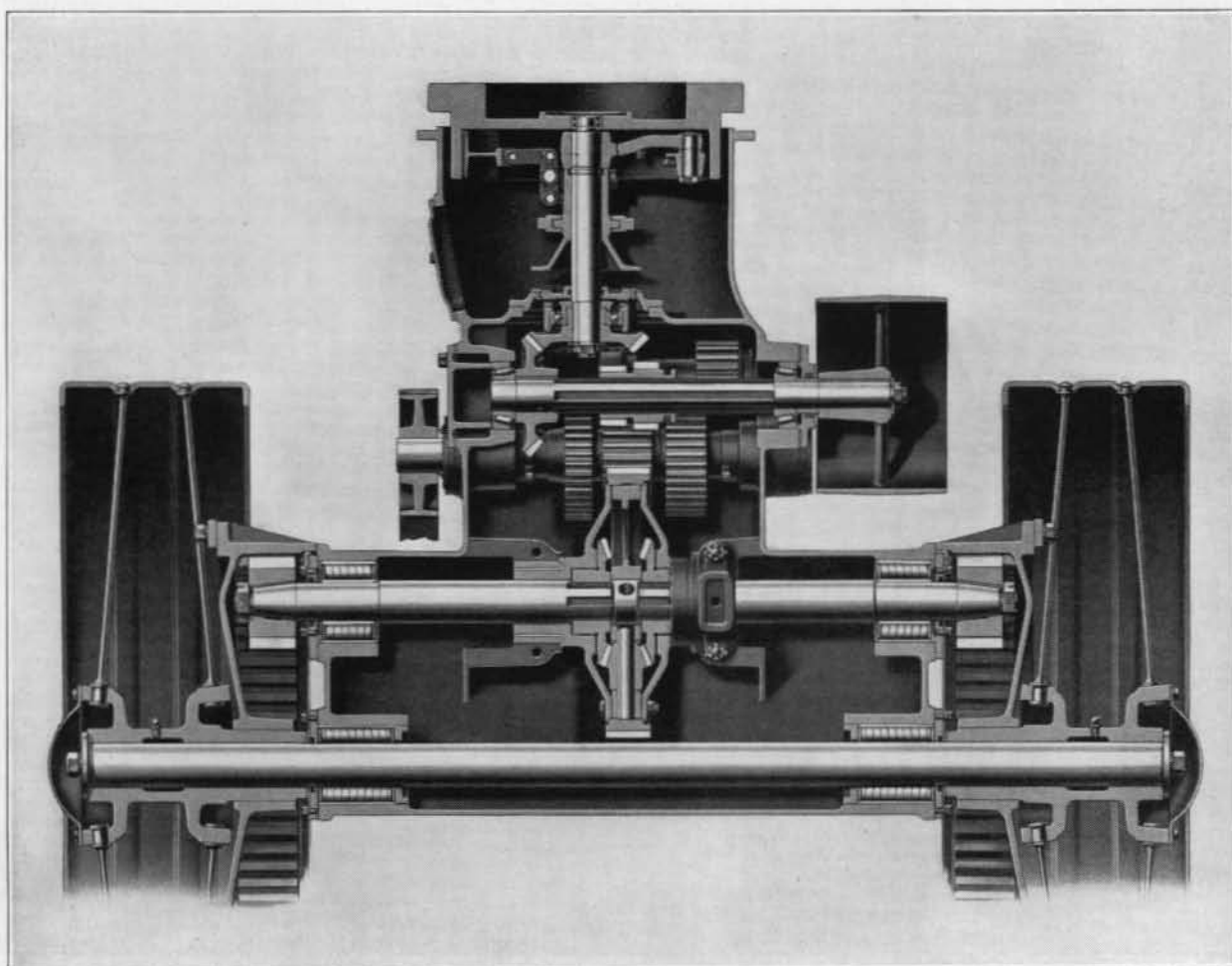
More than any other feature of the Allis-Chalmers 20-35 Tractor, this particular one is mainly responsible for its long, trouble-free life.

Every gear must line up exactly right, every bearing must have a perfect fit and

there is no danger of twists and strains to throw them out of alignment.

The transmission assembly is all contained in this "master-casting" and it is well protected by the heavy walls. The clutch is also contained here.

The wheels are assembled to this "master-casting" and it also holds the fuel tank and serves as a platform. The material used in the construction of the "master-casting" is a very high-grade gray iron, cast in our own foundry and carefully sand-blasted. Machining is done on automatic machines. Every one is perfect and uniform.



Section View of Transmission and Main Drive

To give a clear picture of the substantial construction of the transmission and main drive of the Allis-Chalmers 20-35 Tractor we have here taken a horizontal section directly through the center of the wheels.

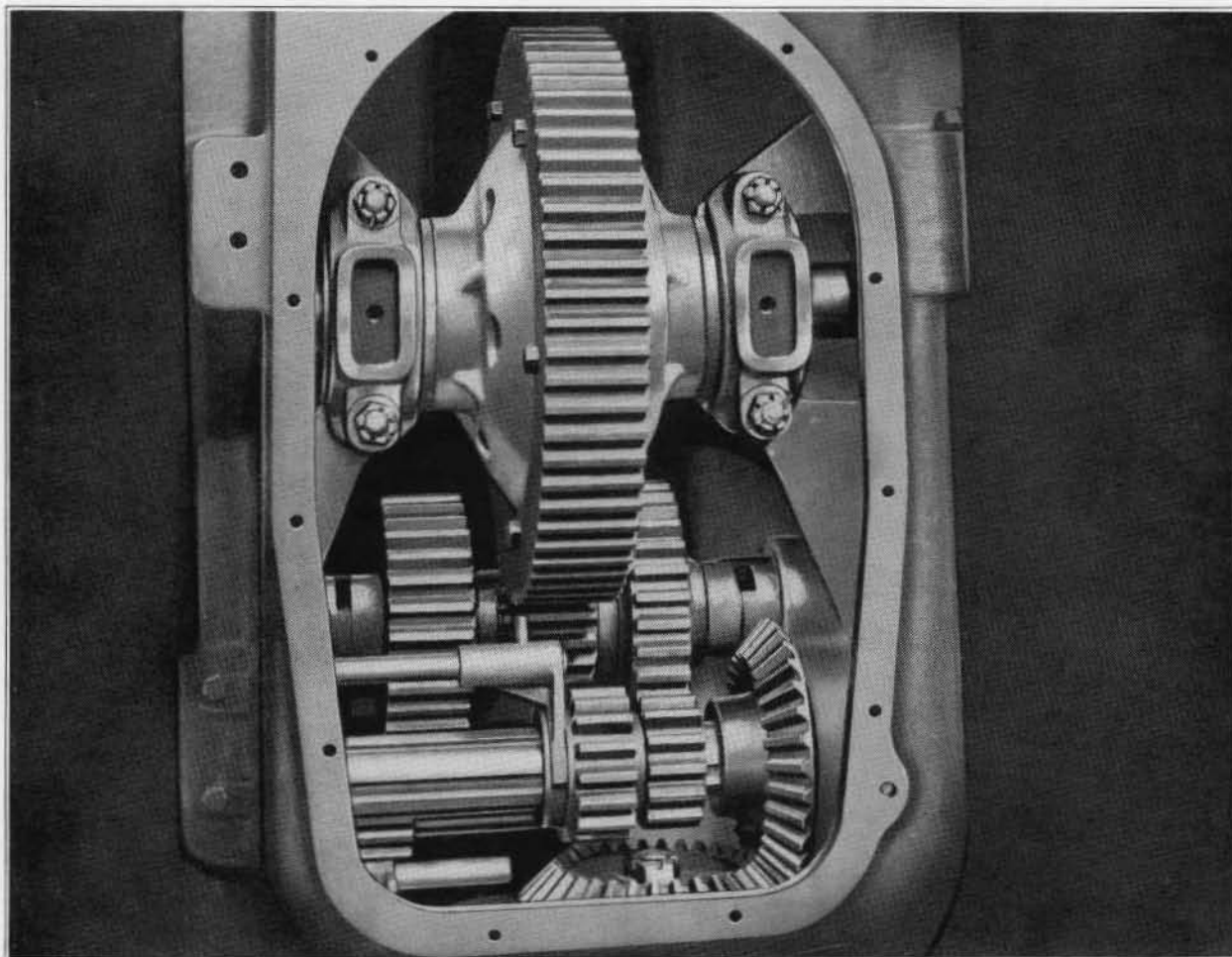
You will notice, particularly, the roller bearing supports for the shafts. The clutch shaft is mounted on ball-bearings, which experience has shown are better fitted for that particular job. Timken Roller Bearings are used for the spline shaft, the better to take care of end thrust.

Every moving part in the transmission and drive is easy to reach. Big, roomy in-

spection plates are easily removed and there is lots of space for adjustment or inspection.

Cork gaskets and packing rings are used so oil leakage will not occur. All of the transmission gears, the differential, and the drive gears run in a continuous bath of oil. Seven gallons of oil are used to fill transmission case.

The operation of the transmission and drive on the Allis-Chalmers 20-35 Tractor is positive and quiet. There is very little friction and the moving parts have long life as a result.



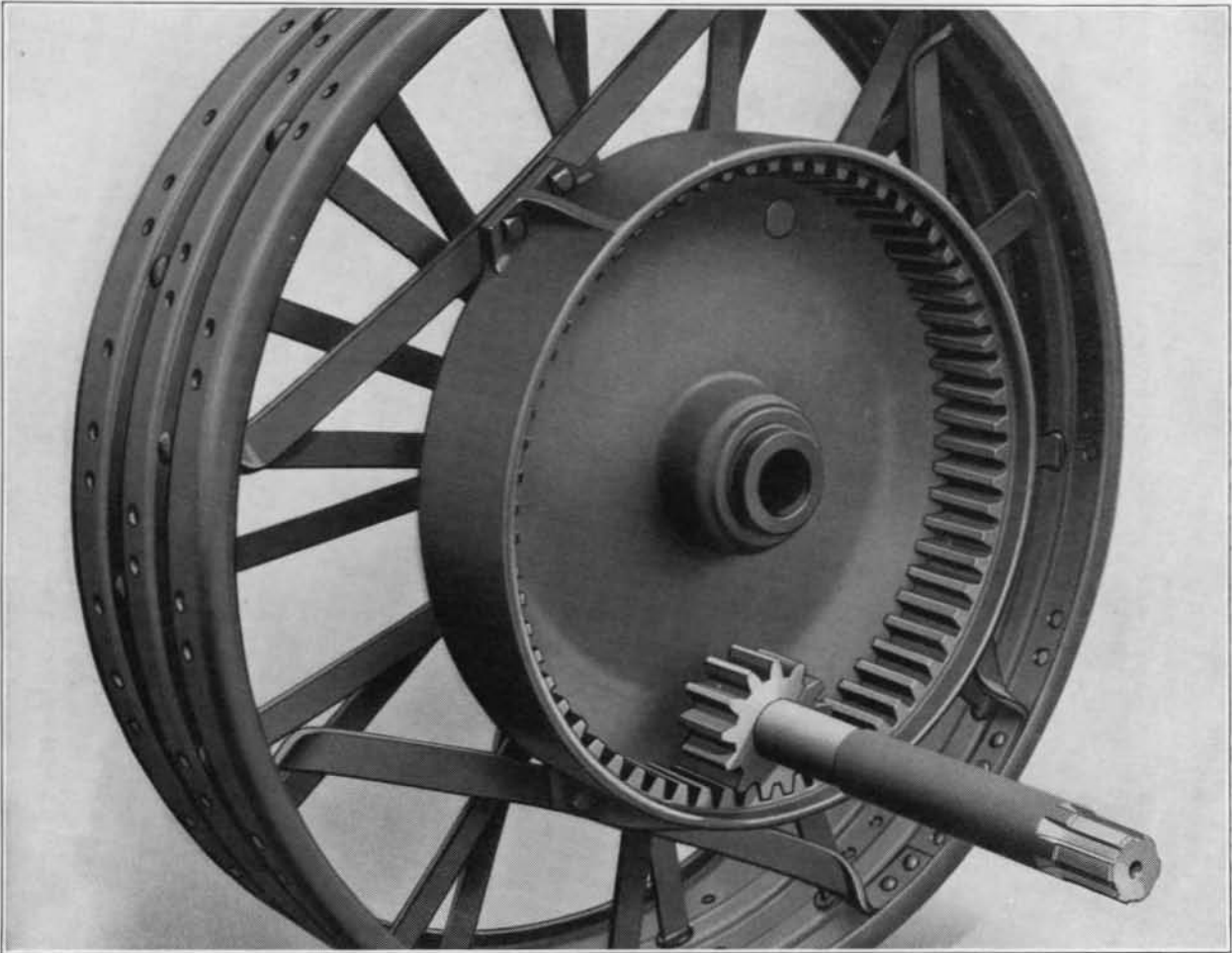
Under the Transmission Cover

The transmission of the Allis-Chalmers 20-35 Tractor is similar to that of an automobile. The sliding gear type is used with two speeds forward and one reverse. Shifting is easy and quiet. There is no clashing of gears.

The gears in the transmission are all forged steel with machine cut teeth. After machining, they are heat-treated to give them the greatest possible strength. Then, they are hardened to the point where a file will not scratch them. All extra margins of safety and strength!

A big advantage of the transmission on the Allis-Chalmers 20-35 Tractor is the fact that it is easy to get at. A large cover is quickly removed and the gearing is completely exposed. If necessary, all gears can be removed through the opening without disturbing the remainder of the tractor.

Roller Bearings are used for the main bearings in the transmission. All gears are constantly running in grease and the transmission is naturally very quiet and free from friction and wear.



Driving the Rear Wheels

The full power of the motor is transmitted to the drive wheels of the Allis-Chalmers 20-35 Tractor through gears which are constantly running in a bath of oil. All are fully enclosed.

The power is directly applied to the rear wheels through a forged pinion, with machine-cut teeth, which drives an internal gear securely bolted to the wheel.

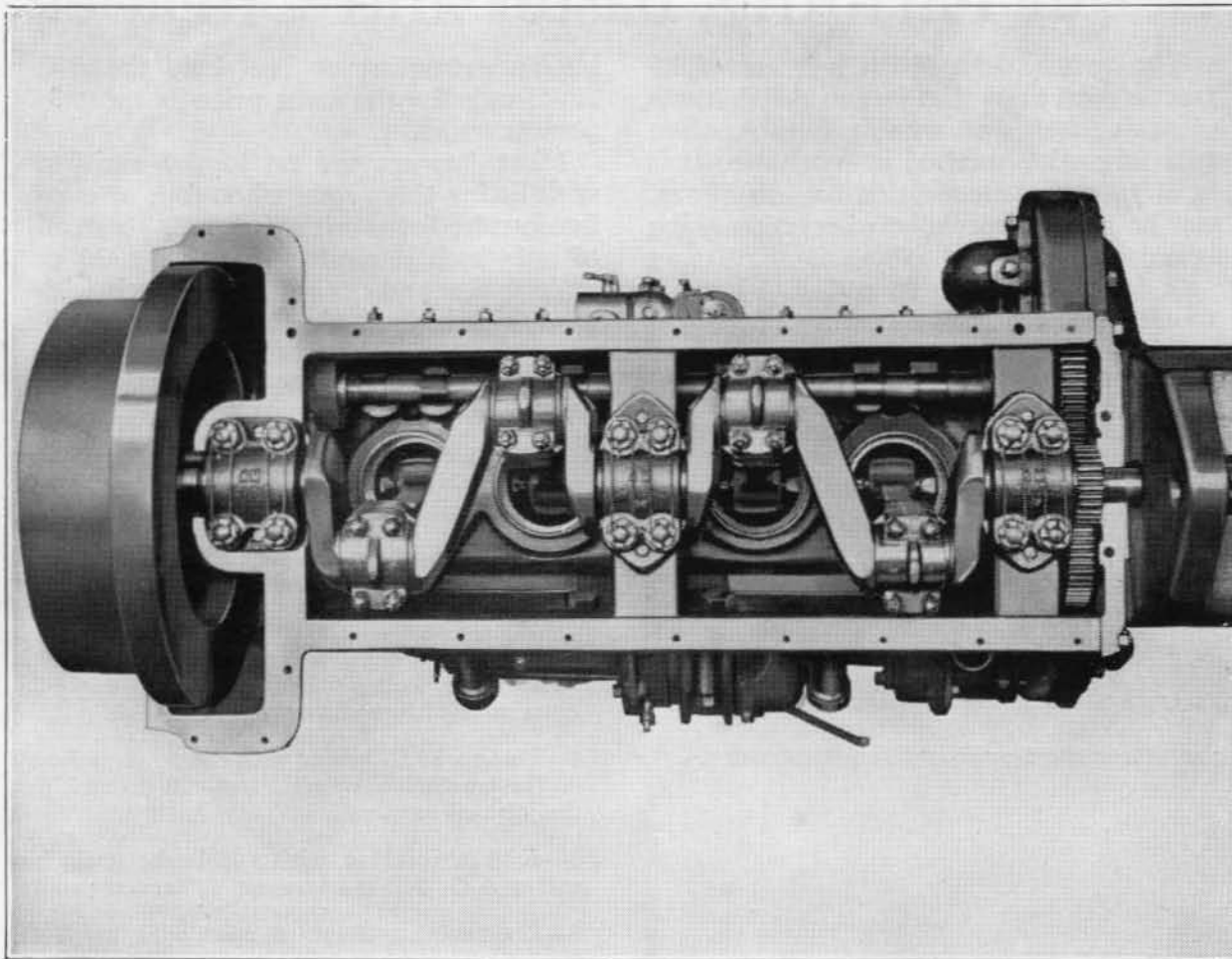
This gearing is kept constantly lubricated in the oil-tight case. A felt retainer prevents oil or grease from splashing out over the rear wheels.

This drive has several advantages over

any other, chiefly in the fact that a "live" axle is not used. The axle serves one function only, that of carrying the load of the tractor.

The material used for the bull-gear on the wheels is of the highest grade of iron. It is continually being analyzed and tested after each ladle of iron is poured, so that no inferior grade will ever be used in this construction.

The design has been tried and tested thoroughly for many years and thousands of Allis-Chalmers Tractor owners heartily endorse it.



Three Main Bearings

Three big, oversize main-bearings support the crankshaft in the Allis-Chalmers Tractor. Each of these bearings is provided with four big studs, making the strongest main-bearing construction that can be built in a tractor.

On the A-C Tractor the main-bearings are bronze-backed. This is the same material that is used in the bearings of well-known automobiles which have been tried and tested for years and years.

The crankshaft on the A-C Tractor is $2\frac{1}{2}$ " in diameter. It is a drop-forging, carefully machined and balanced, so that it runs absolutely true and even. The rear

main-bearing is $4\frac{3}{4}$ " long and the center and front main-bearings are each 4" long, making a total of $12\frac{3}{4}$ " of main bearing surface. Connecting rod bearings are $3\frac{1}{4}$ " long.

In order to increase the long-life of the bearings a gear-driven pump provides fresh oil continuously at a pressure of 20 to 35 pounds to the square inch on all bearings.

This crankshaft and bearing construction is the most important part of any tractor. Too much stress cannot be laid on the powerful, heavy-duty construction which is built into this vital part of every Allis-Chalmers Tractor.

Better Farming, Faster and Cheaper

The owner of an Allis-Chalmers 20-35 tractor soon finds that he can do all kinds of work faster and more profitably than with any other method or machine. It is built to suit the condition for any farm, soil or work, especially where the going is heavy.

It is just as easy to pull a 4-bottom moldboard plow as a 3-bottom plow, giving

an extra furrow free since the A-C 20-35 sells for the same price as most 3-plow tractors.

Most farmers are no longer satisfied with listing three rows when four or even five can be listed with the A-C. Instead of a 24-inch separator they use a 30 or 32-inch size and cut a 16 foot swath with a combine instead of a 10 or 12 foot swath.



1

1—Here's an extra furrow free. Plowing with a 4-bottom 14" moldboard plow at a depth of 8" in heavy soil.



2

2—Pulling a 10 ft. one-way disc plow in hard gumbo soil. Doing twice the work in half the time.



3

3—One more than we recommend, but this 5-row lister, being pulled with an A-C 20-35, gives an additional furrow.



4

4—Using a 10 ft. binder with the power take-off on the tractor. Wet grain and soft ground, yet the job was easy.

5—A 16 ft. combine, with a 75 bushel grain bin and an A-C 20-35 is a sure way to harvest profits.



5

6—Constructing a gravel road with an 8 ft. grader. This work takes power — lots of it.



6

Profitable Power for Every Job

Figure the time that can be saved when it is possible to hitch several implements in tandem and do the work of many hours in one hour.

There is profit in doing all kinds of other work, after the field work has been finished. Many dollars of additional profit can be earned by building or grading roads by sawing wood, stacking hay, pumping

water or doing other jobs where plenty of belt power is needed.

The Allis-Chalmers 20-35 tractor is an economical tractor to run and maintain. Accurate governor control while operating assures economy in the use of fuel. The design, construction and careful testing are all aimed to give more than double the service of the average tractor.

7—The cost of the harvest determines the profit. The A-C 20-35 cooperates with smooth power for a big 32" separator, working to full capacity.

8—Not to fly, but to make flying easier, this A-C 20-35 is used for maintenance work on an airport.

9—Doing the work of a dozen horses with this combination of drag-harrows.

10—Stacking 300 tons of hay and never using over 10 gallons of fuel per day as this A-C 20-35 is doing, is worthy of mention.

11—Sawing is a profitable part-time business if you have the saw and the power. The A-C 20-35 is pulling a 50-inch saw thru thick and thin here.

12—Road maintenance work in your township is going to pay somebody a profit. The power of an A-C 20-35 is needed to pull this grader.



9



10



7



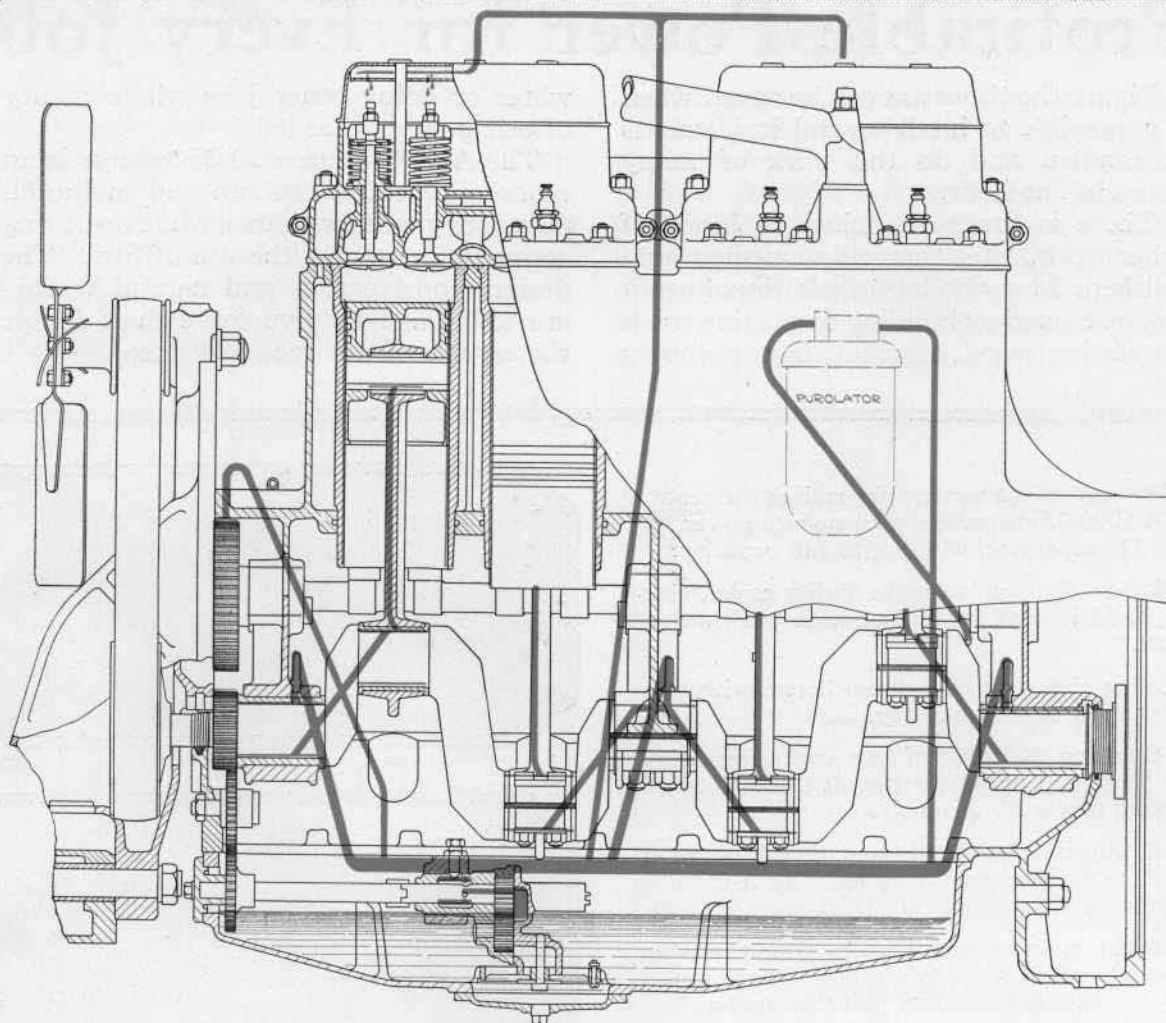
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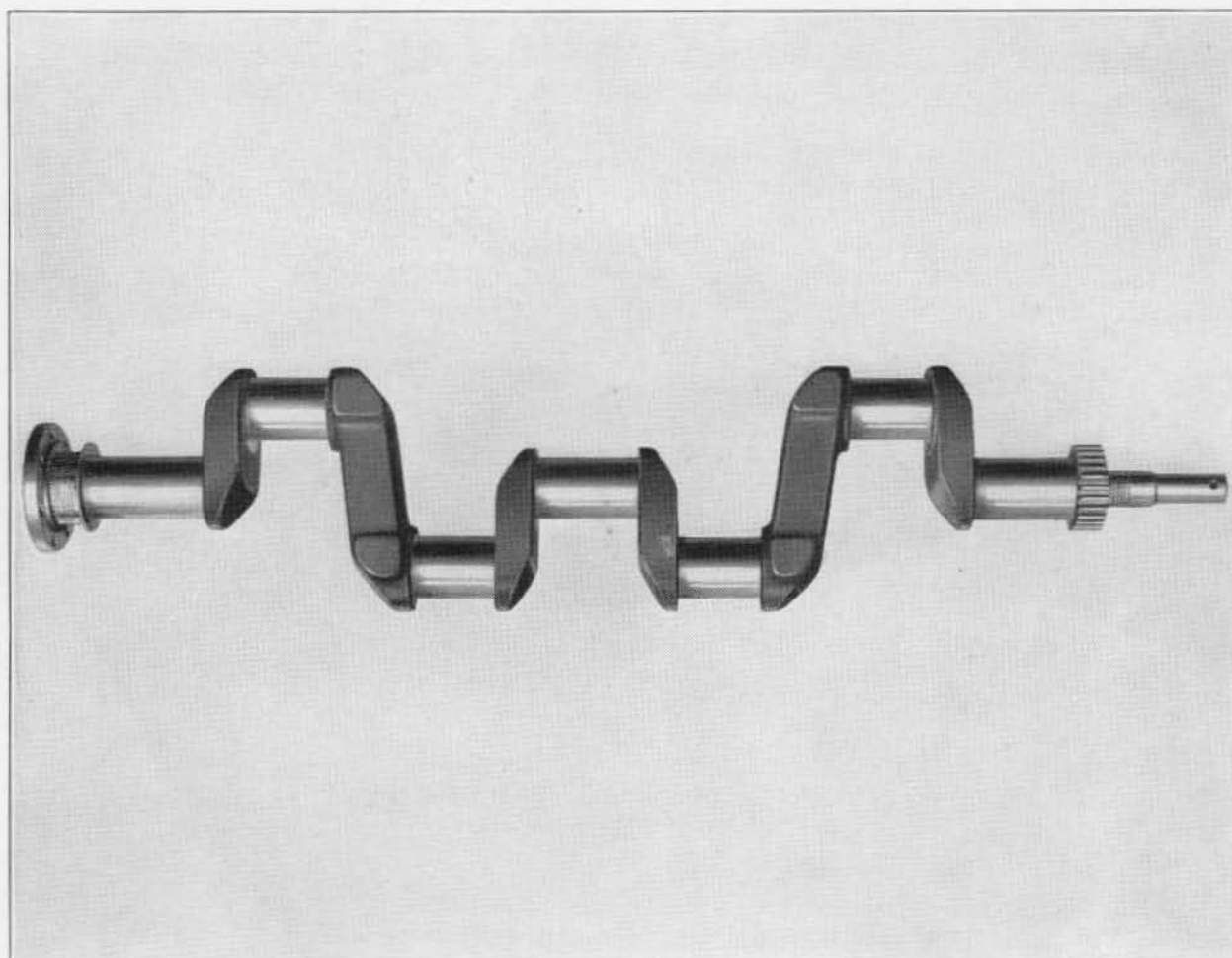
Pressure Type Lubrication System

Lubrication of the Allis-Chalmers 20-35 Tractor motor is done automatically by the pressure type lubrication system. It is only necessary to put oil in the crankcase. A gear-driven pump forces the oil from the reservoir in the crankcase under pressure to all main bearings, connecting rod bearings and piston pins.

Every moving part in the motor is thoroughly lubricated with this system. One of the noteworthy features of this tractor is the fact that even the rocker arms are lubricated by a lead from the pressure system, supplying enough oil to keep these parts running smooth and requiring no attention.

The oil is lead to the main bearings, and then through a drilled hole in the crankshaft to the connecting rod bearings, up the connecting rods and along the piston pins, down the cylinder walls. The oil is completely cleaned once every 4 minutes, or 15 times an hour by the Oil PurOlator. With proper care we recommend the oil for 100 hours of operation, without change.

Any other type of lubrication, other than the pressure system, for a modern tractor motor is out-of-date and inefficient. The modern farmer will never be satisfied with anything less while Allis-Chalmers offers it as standard equipment.



Three-Bearing, High-Grade Steel Crankshaft

A motor without a good crankshaft is worse than useless. To design and build a crankshaft that would be stronger than the strongest part of the motor has always been the aim of Allis-Chalmers engineers.

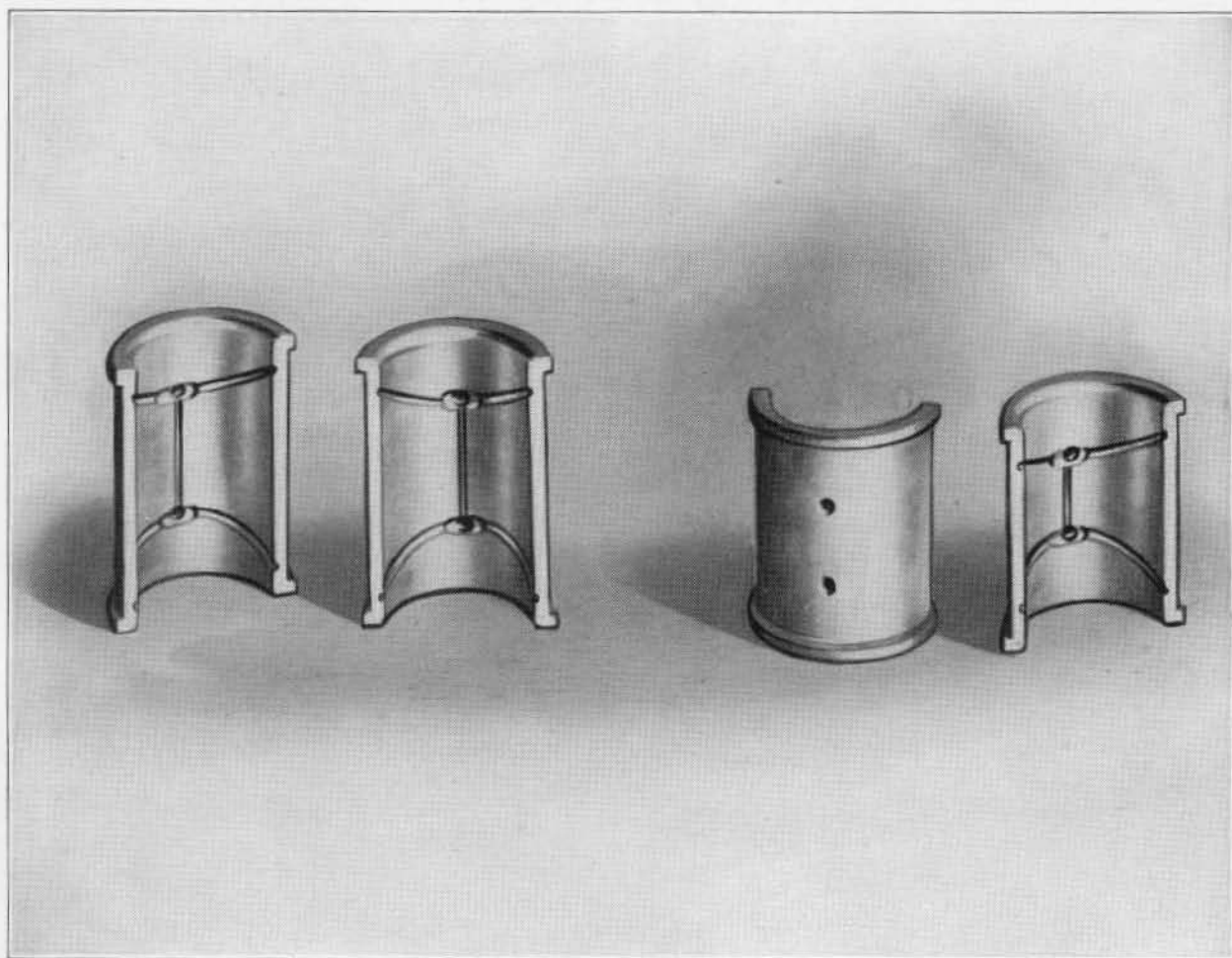
This crankshaft is a drop-forging made of high-grade steel. The strongest kind of metal has been combined with the strongest possible way of manufacture.

Besides strength, Allis-Chalmers engineers had to figure on balance, on smoothness in operation. Therefore, every Allis-Chalmers crankshaft is carefully balanced, so it will turn absolutely uniformly in the bearings.

The three-bearing type of crankshaft support is used because of the greater smoothness and strength. A total of $12\frac{3}{4}$ " of main-bearing surface supports this shaft and there is no possibility of bending or warping under heavy loads.

The bearing surfaces on the shaft are carefully ground. Oil is supplied to these surfaces under pressure through a drilled hole in the crankshaft.

On each end of the crankshaft special grooves are turned. These turn in felt retainers in the crankcase and prevent oil from splashing out.



Main and Connecting Rod Bearings

Bearings are to a motor what wings are to a bird. Of utmost importance, because they so vitally affect smooth, economical operation, every effort was spent on their design and construction.

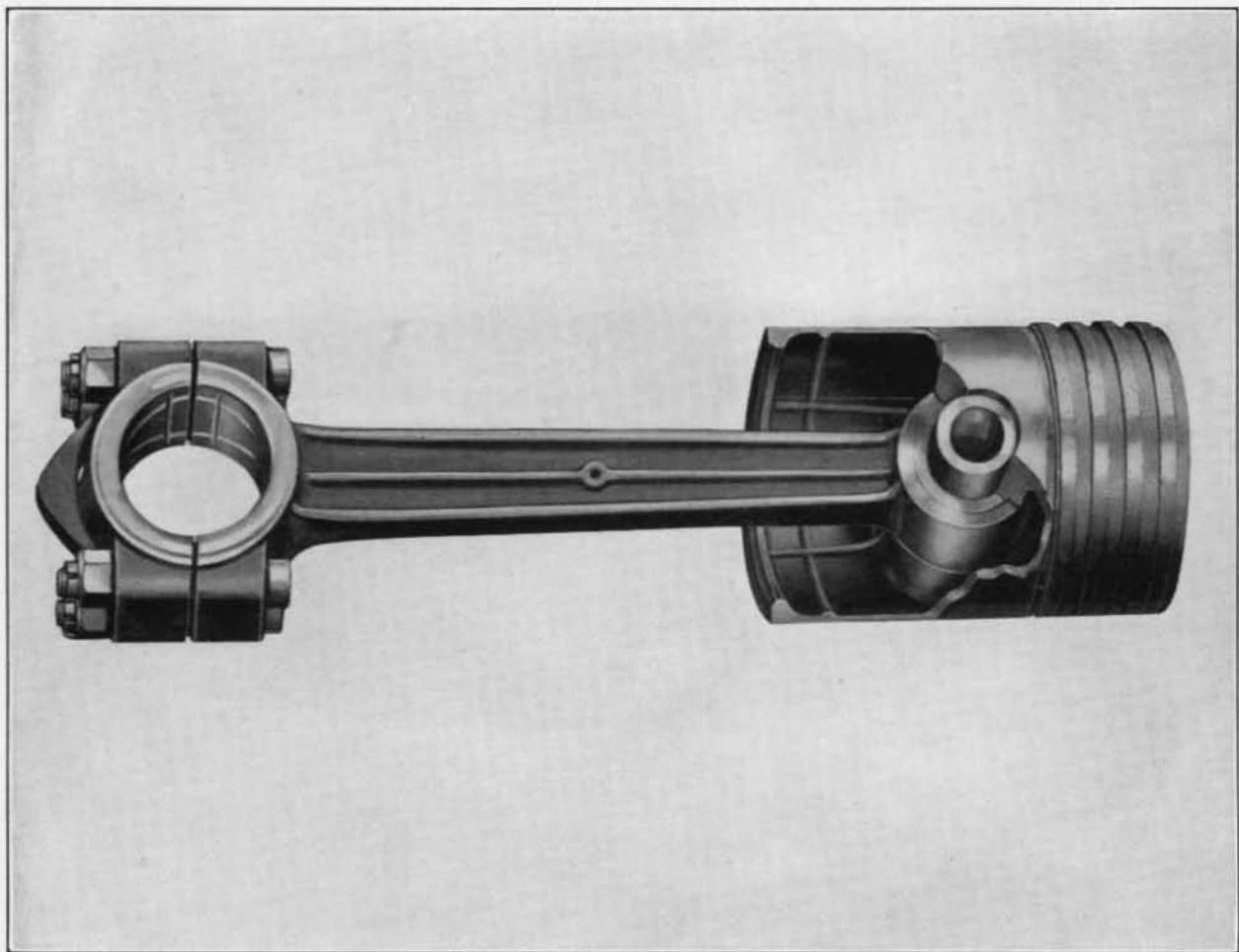
On the Allis-Chalmers 20-35 Tractor the main and connecting rod bearings are bronze backed. Each bearing is lined with high-grade babbitt, carefully finished.

The bearings are grooved, so the oil from the pressure system can thoroughly cover and penetrate every part of the bearing surface.

In designing these bearings the proportions were made very liberal and there is an extra margin of safety in every one.

If it is ever necessary to reline or scrape the bearings, the shell-type of construction makes them easily removable.

The rear main-bearing is $4\frac{3}{4}$ " long, and the center and front main-bearings are each 4" long, making a total of $12\frac{3}{4}$ " of main bearing surface. Connecting rod bearings are $3\frac{1}{4}$ " long.



Connecting Rods and Pistons

The connecting rods used on the Allis-Chalmers 20-35 Tractor are exceedingly strong and well-constructed to handle the heavy loads of tractor operation.

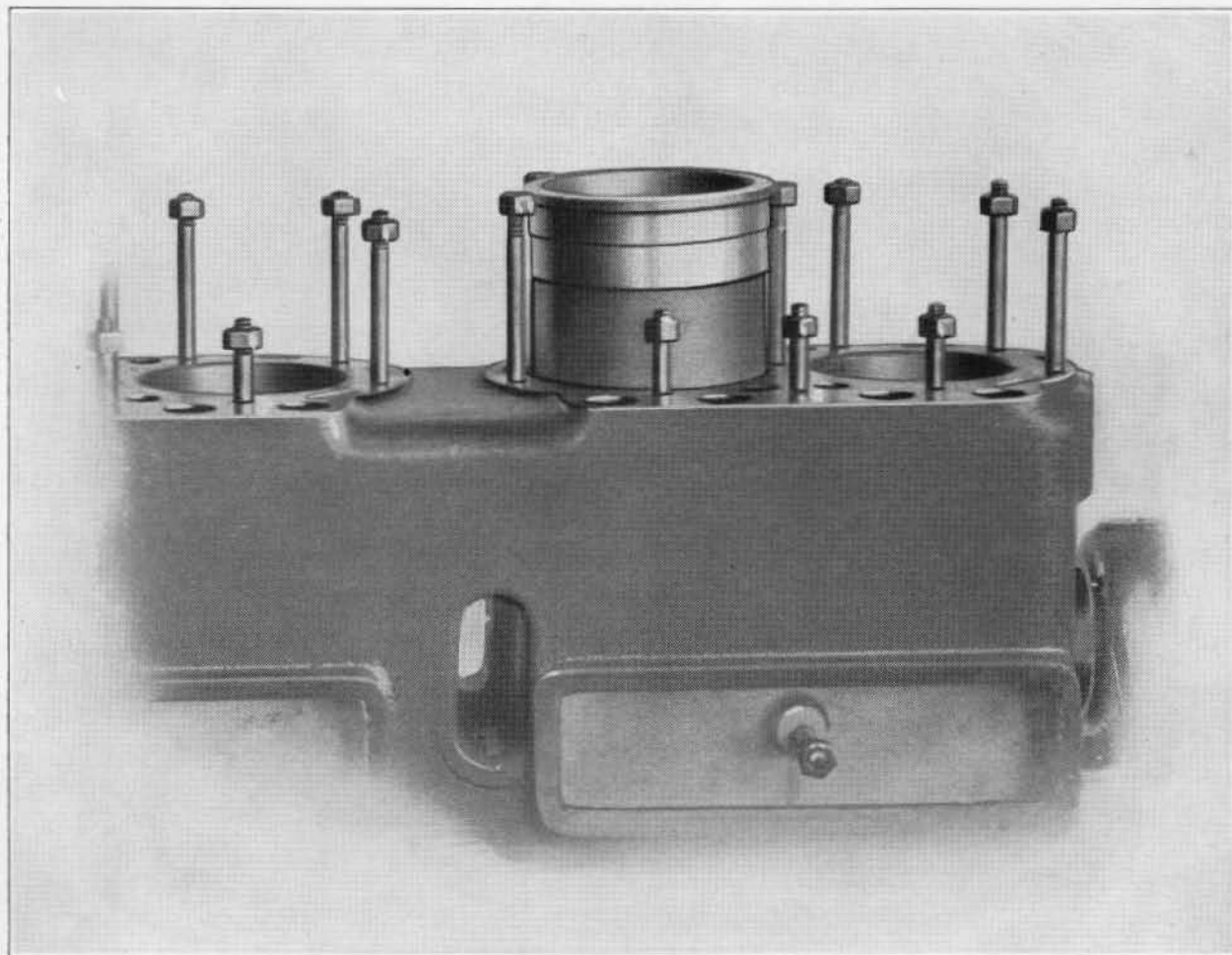
The connecting rods are drop-forged with I-beam sections, the strongest sections which can be used for that work. Each rod is heat-treated to further strengthen it.

The upper end of the rod is bored for the piston pin bushing. The connecting rod bearings at the lower end are bronze-backed, babbitt-lined and can be easily replaced. They are adjustable by means of laminated

shims. These bearings are lubricated by pressure, the oil being brought through the drilled crankshaft.

Quality Pistons

A light cast iron piston is used, so designed that it has great strength. Four $\frac{1}{4}$ " cast iron rings are on each piston. The piston pin is tight in the piston and moves in the bronze bushing in the connecting rod. A hollow steel tube carries the oil to the piston pin, providing full lubrication to all the moving parts.



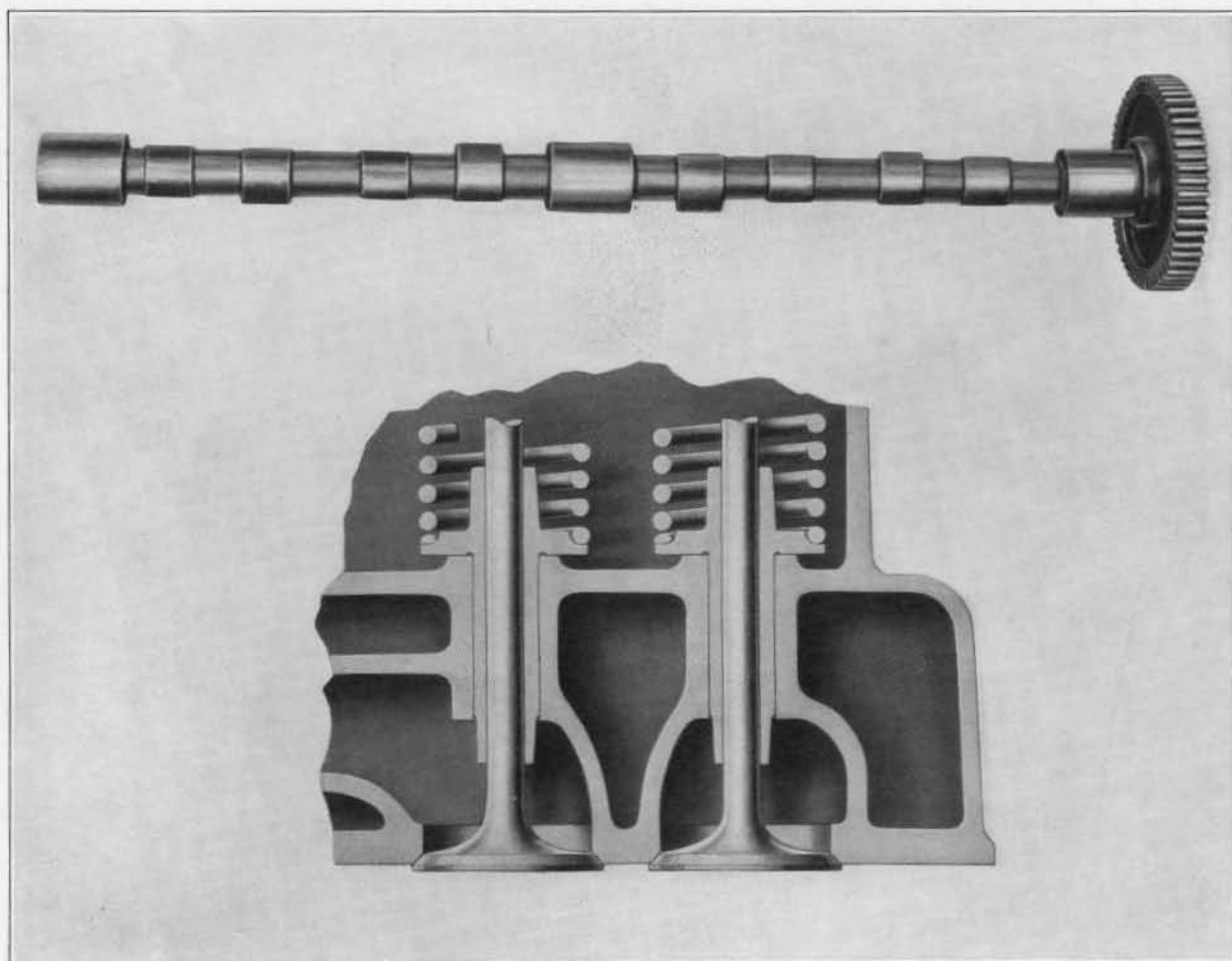
Removable Cylinder Sleeves

Allis-Chalmers first designed a motor that ranks with the best in modern construction practice. As an added, final precaution against trouble every 20-35 Tractor motor is equipped with removable cylinder sleeves.

These sleeves are set in the block and should any cylinder wall be damaged through accident or neglect it is not necessary to take the motor to a cylinder-grinding shop—simply replace the worn sleeves with new ones. The motor is renewed, at a very nominal charge.

The cylinder sleeves are made of a special cylinder iron with a percentage of nickel, twice as hard as ordinary iron. This is the same material which Allis-Chalmers has been using for cylinder walls in big Corliss engines for years and years. The surface of the cylinders is absolutely smooth and flawless, like a mirror.

With the pressure lubricating system the cylinder walls are always supplied with plenty of clean oil, so there is no danger of scored cylinders or damaged walls from this source.



Camshaft and Valves

Upon the efficient operation of the camshaft and the valves there is a great deal dependent and Allis-Chalmers engineers have given much thought and work to their development.

Low-carbon steel drop-forging is used for the camshaft, with the cams machined as integral parts of the shaft. The camshaft is case-hardened and ground, so the surfaces are smooth and exceedingly hard.

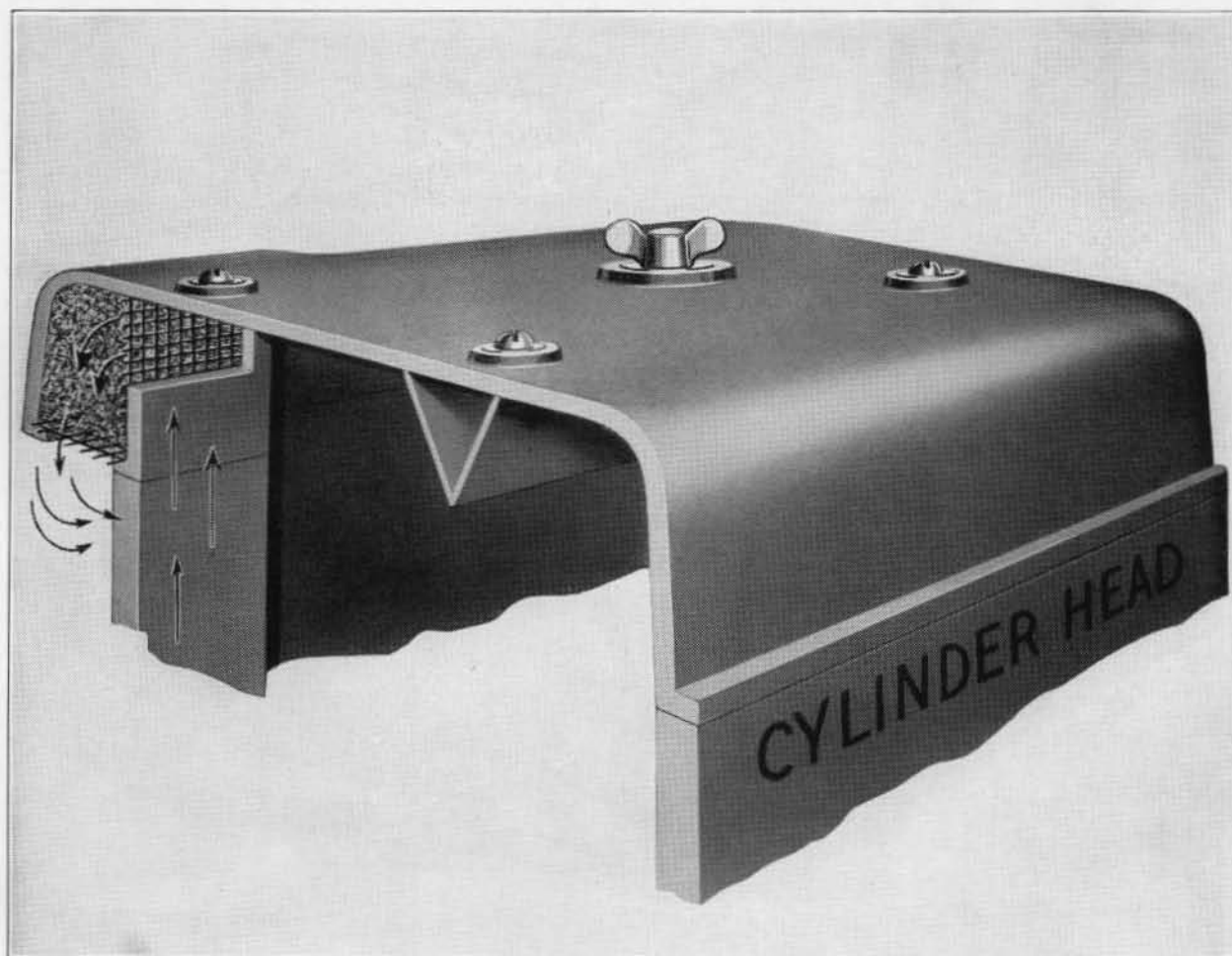
The bearings supporting the camshaft are automatically lubricated and the operation of this phase of the motor is very quiet.

Valves are subject to much heat and the

section through the cylinder head shown above will clearly indicate that Allis-Chalmers gets extremely close to the head with the cooling water. This water jacket completely encircles each valve head, absolutely preventing a hot-spot.

Allis-Chalmers uses a special silchrome metal for the valves. The overhead valve system is standard on the 20-35 tractor. The valves are 2" diameter, readily accessible for grinding by removing the head.

Mushroom type tappets are used, of ample size to suit the exacting conditions which are imposed upon tractor motors.



Taking Out the Dangerous Vapors

With the development and design of a new type valve cover, Allis-Chalmers has made a valuable contribution toward the solution of a problem with which every motor manufacturer has had to contend.

When gasoline is burned in an engine, water is produced in the form of steam. This, together with other vapors must be taken out of the crankcase, or dilution of the motor oil when the vapor condenses will occur.

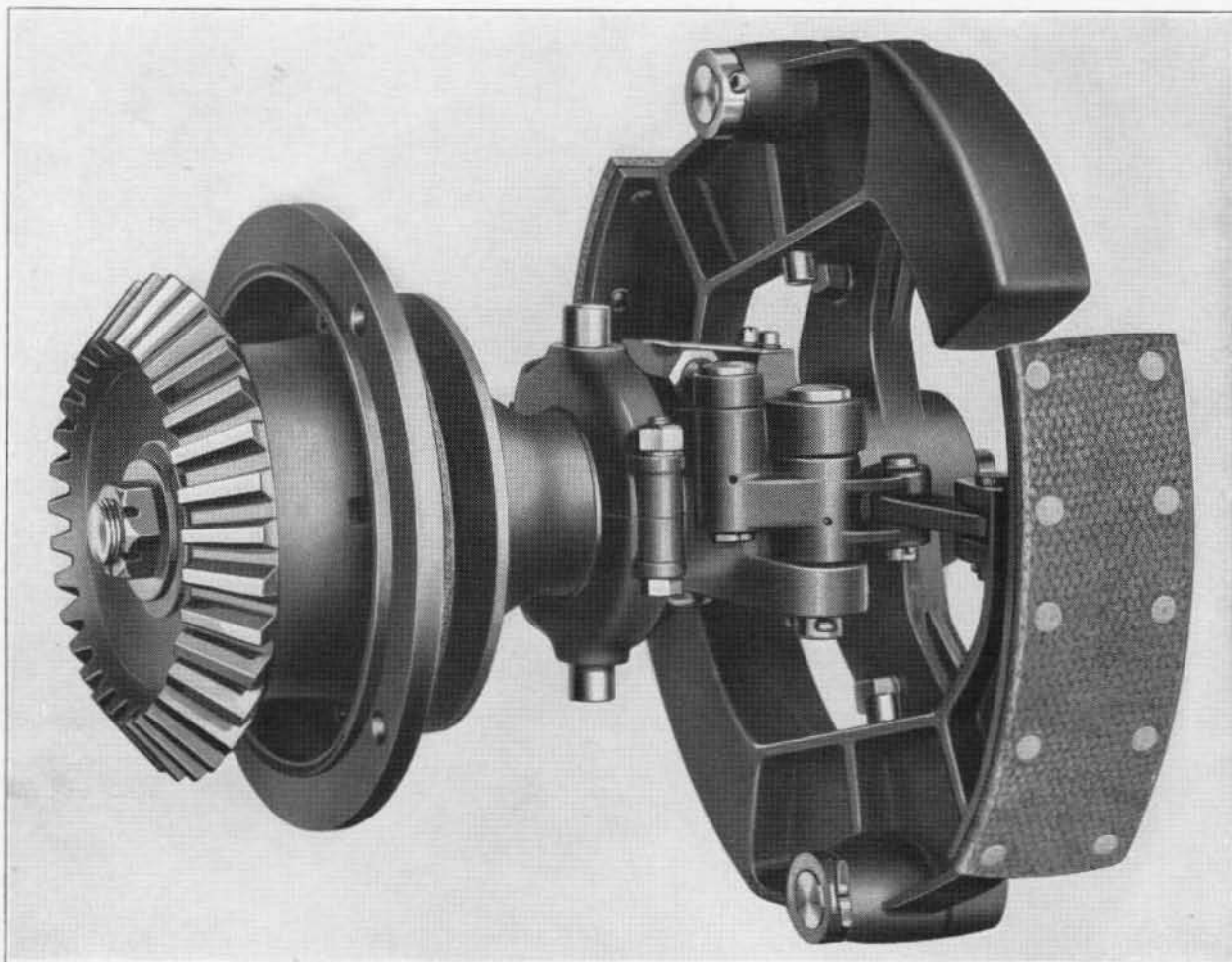
Here on the Allis-Chalmers 20-35 Tractor a special breather has been developed, so that vapors arising from the crankcase must pass through a space filled with hair. This breather is so located that a direct flow of air from the fan forms a suction which carries

vapors away, as shown by the arrows.

It had formerly been the common practice to have the breather in a pipe on the crankcase. This pipe was filled with hair and it was found that the condensation from the vapors would cling to the walls of the pipe and be washed into the crankcase.

This danger is now entirely eliminated, for there is no possibility of anything being washed downward with this type of breather construction.

This view of the valve cover also shows the trough which carries the oil to the rocker arms. You will note that the cover is easily removed by loosening the wing nuts which bolt it to the cylinder head.



Expanding Shoe Type Clutch

Here is a simple clutch, made very durable and designed to be free from trouble. This Allis-Chalmers Clutch is in daily use on thousands of tractors and there is never a word of complaint from owners.

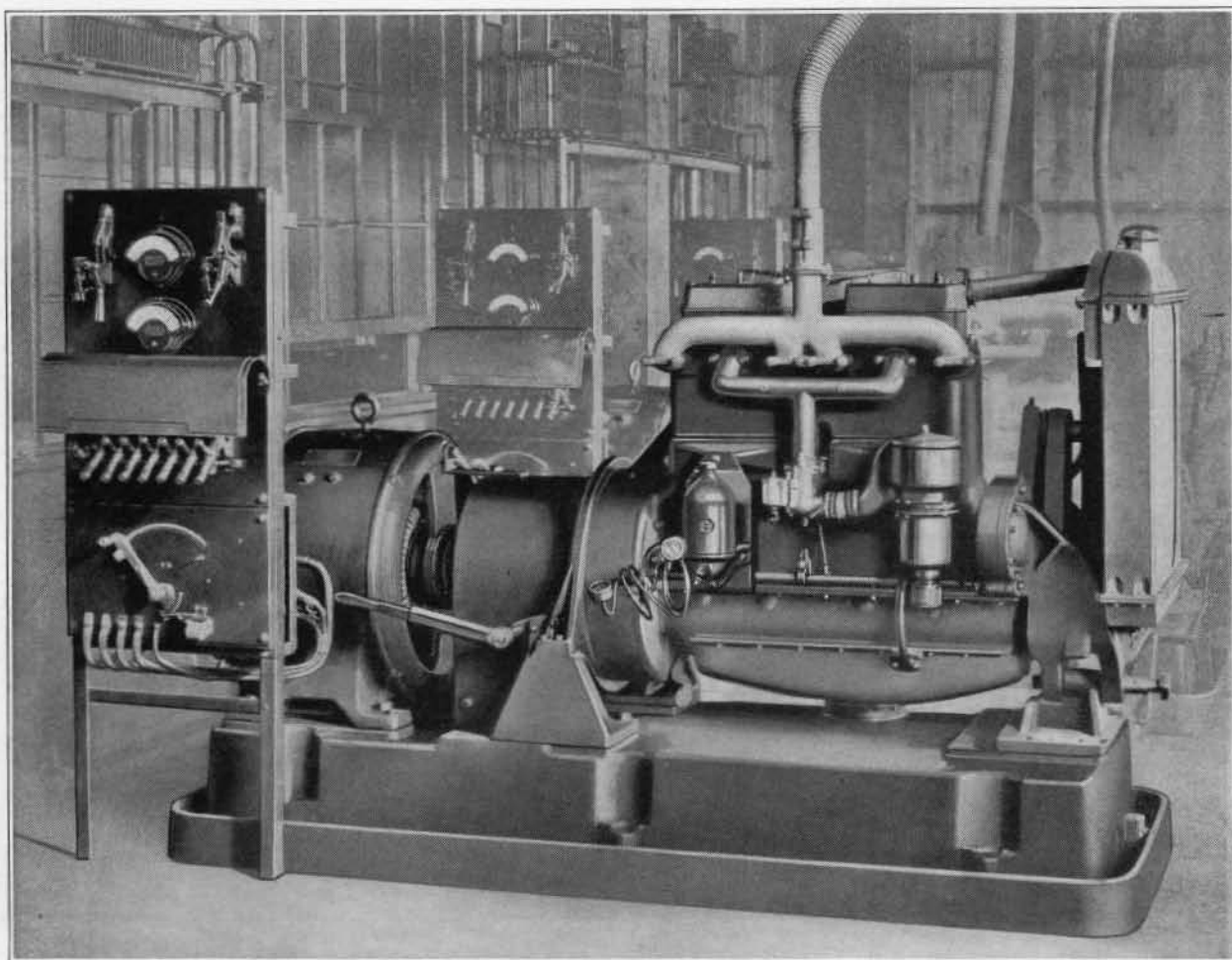
The clutch is housed in the "master-casting," where it is free from dust and dirt. Convenient inspection plates make it easy to reach and inspect. The shoes can be removed for relining in fifteen minutes.

Lubrication for the moving parts is provided by a grease-gun connection, which is easily reached through the inspection hole.

If slippage ever occurs, a slight adjustment on the turn-buckle brings both shoes out to the correct position for smooth, yet gripping contact.

Only the highest-grade materials are used in the manufacture of this clutch. Linings are made of woven Raybestos, which tests and long use have shown to be without an equal for tractor operation.

The Allis-Chalmers clutch is sensitive and positive in its operation. A slight touch on the shifting lever engages or disengages the clutch.



Every Tractor on a Triple Test

Before the Allis-Chalmers 20-35 Tractor is sold it must successfully pass three severe tests. These tests are made by three different men at different times.

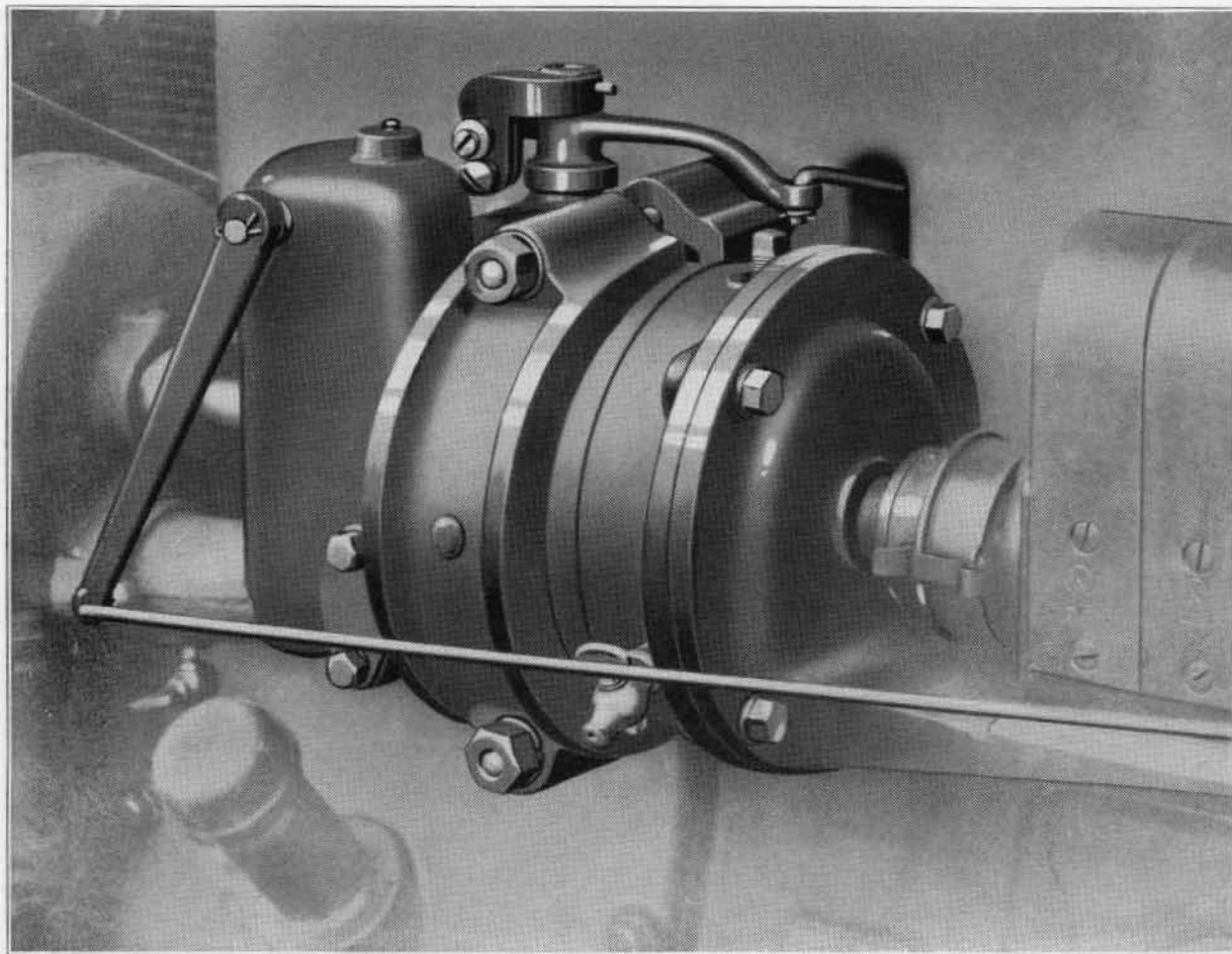
Here is a picture of the tractor motor on an electrical testing machine, where it stays over four hours. The horsepower is accurately measured and recorded. It must develop at least 43 horsepower, a reserve of 8 horsepower over the rated 35 on the belt. These extra margins of power protect us and protect the customer.

Besides the motor tests shown in the picture Allis-Chalmers maintains special

laboratories and test rooms where new devices and methods are constantly being tried out. Every metal used in the construction of an Allis-Chalmers 20-35 Tractor is analyzed and tested frequently to guard against flaws and weaknesses.

Field tests are made with finished tractors under conditions far more severe than the average tractor will ever meet. Weakness in design or construction is overcome here, before it goes on the market.

These tests are your protection against grief and breakdowns. They insure your success with the Allis-Chalmers 20-35 Tractor.



The Allis-Chalmers Governor

The function of a governor is primarily that of giving positive control of the motor. On a tractor it is necessary that a uniform and constant speed be maintained for drawbar and belt work.

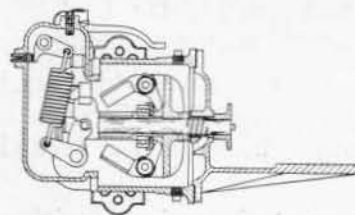
This governor was specially designed by our engineers for the Allis-Chalmers 20-35 Tractor to meet the problems of a constant speed at all times. The range of the governor had to be great enough to insure this, whether operating under full load or running idle.

The Allis-Chalmers governor is simple in design. There are few moving parts, and it is figured of ample size for extreme conditions.

The governor is fully enclosed and is

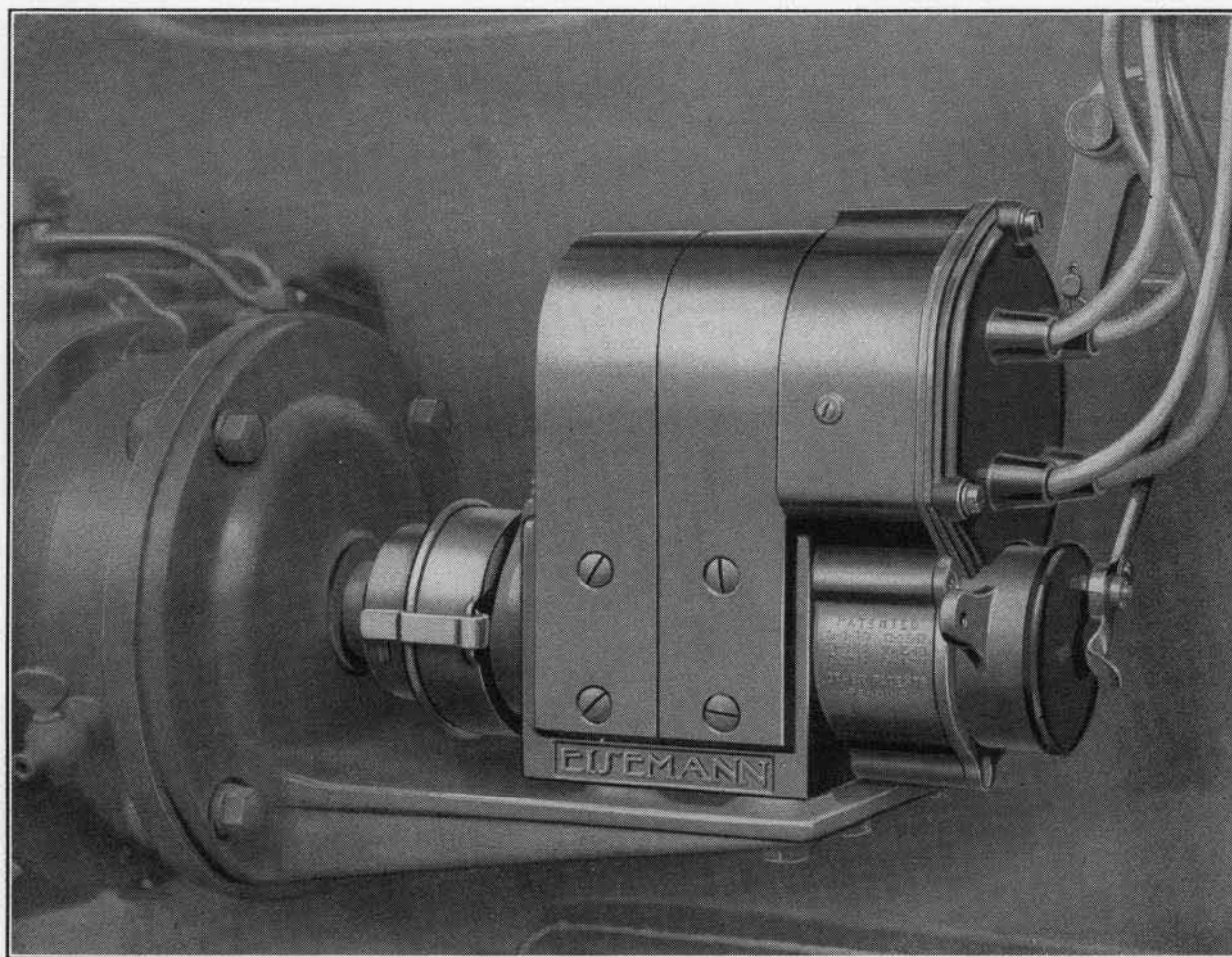
running in oil, so there is no danger of wear in the moving parts.

A particular advantage of this type of governor construction is the fact that



Section Through Governor Showing Mechanism.

variable speeds are controlled from the dash. This permits a wide range of speed for the full load, yet it does it safely under governor control constantly.



High Tension Type Magneto

The Eisemann Magneto has acquired a world-wide reputation for being a quality product and some of the best-known automotive manufacturers are using it exclusively.

It was adopted as standard equipment on the Allis-Chalmers 20-35 Tractor after practically every other type had been thoroughly tested.

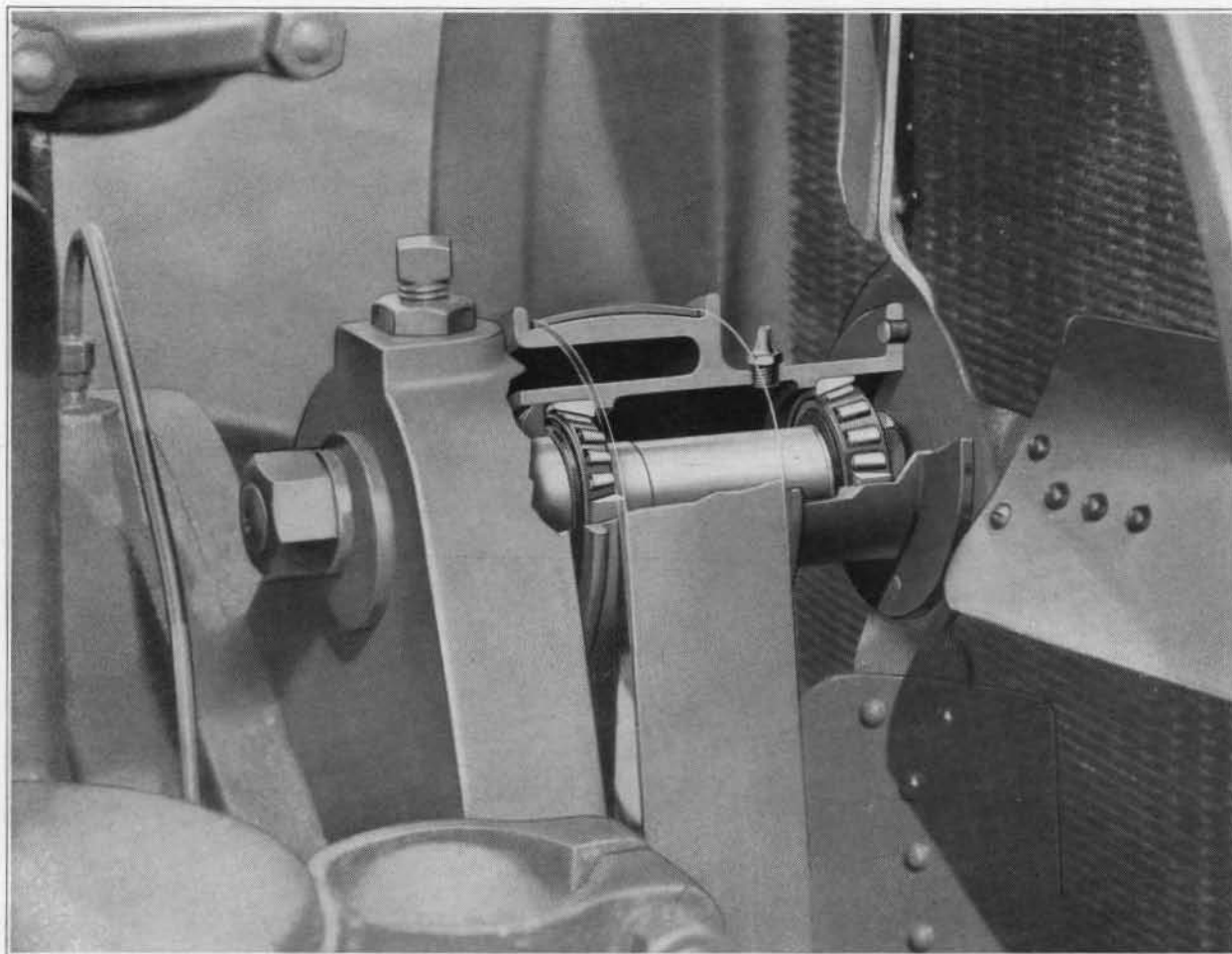
This magneto is equipped with an impulse starter in a dust-proof housing. Starting is easy and there is no danger of back-firing with this unit.

Another desirable feature of the Eisemann

Magneto is the fact that it has a variable spark control. The ignition is cut out by simply moving the timing lever to the extreme retard position.

With this arrangement a great deal of unnecessary wiring is eliminated, and the tractor has a neat, clean-cut appearance, instead of the usual mess of wires and rods found around the magneto.

The Eisemann Magneto is entirely water-proof and weather cannot short-circuit or damage it. Magneto trouble is unknown with the Allis-Chalmers 20-35 Tractor.



Adjustable Roller-Bearing Fan

As important as any other detail of the Allis-Chalmers 20-35 Tractor is the fan. It has a big part in the job of keeping this tractor from overheating.

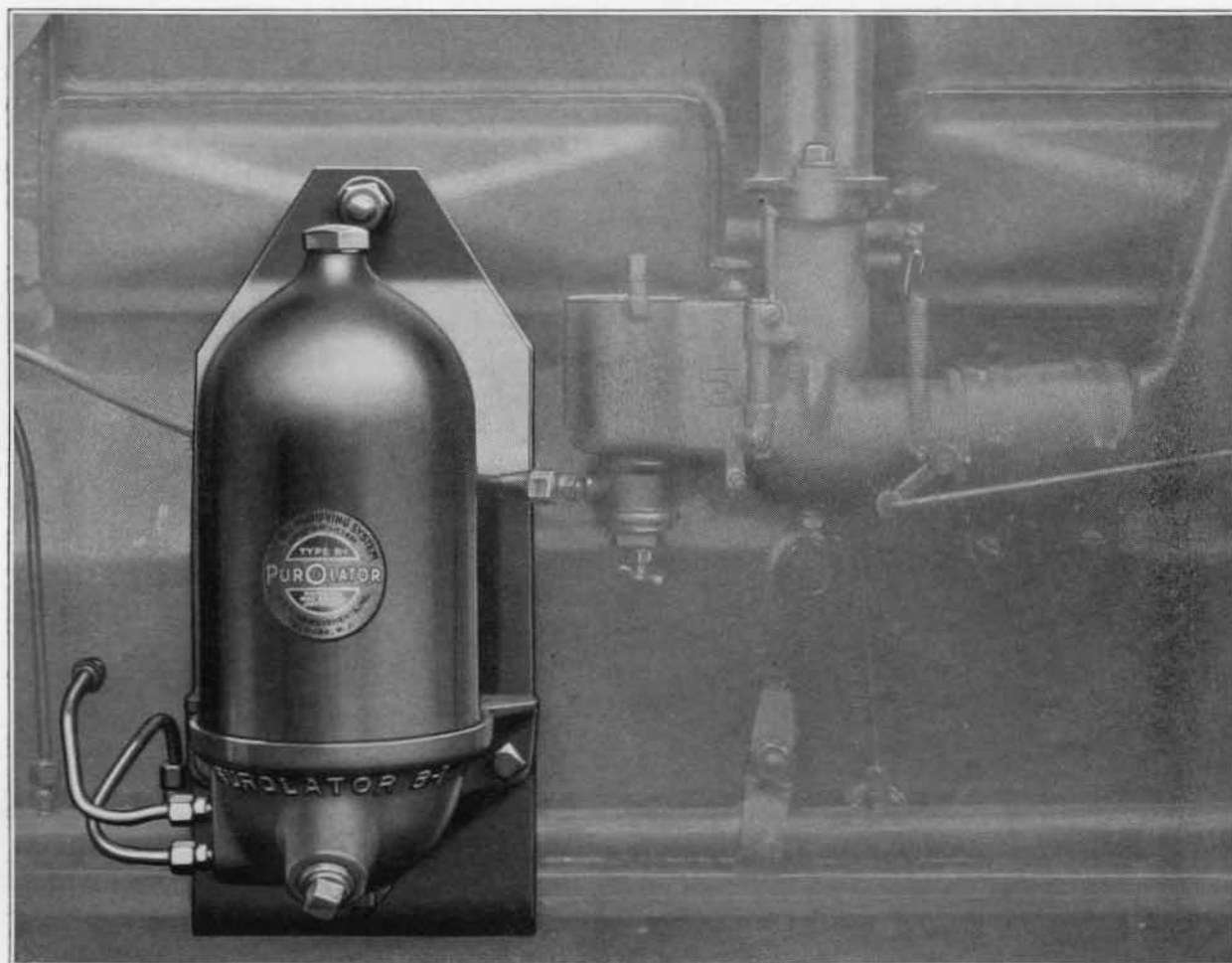
During the hot days of harvest, when threshing or pulling a combine, the demands on a tractor are heavy and it is a big tribute to the design and construction of this fan that on hundreds and hundreds of tractors there has never been a bit of worry or trouble with it.

The Allis-Chalmers fan has four blades, with a 22-inch diameter. The blades are removable and can be easily replaced. The

fan turns on Timken Roller Bearings, which assures smooth, noiseless and efficient operation. Provision is made to lubricate these bearings and a take-up is provided for wear.

The fan is adjustable for any stretch that may take place in the belt. This adjustment is very easily made by loosening a set-screw and turning the eccentric on which the fan is mounted.

The belt used on the Allis-Chalmers 20-35 Tractor is of cord rubber, made by exactly the same process as a cord tire. The strength and long life of this material is too well known to stress here.



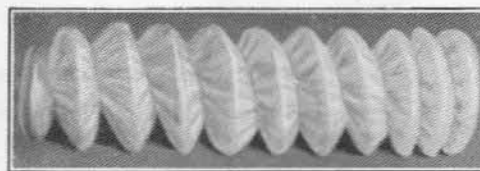
Watchman No. 1—The Oil PurOlator

A tractor must work under conditions that are generally dusty and the dust finds its way into the oil, where it becomes a grinding compound that soon shortens the tractor's life.

The Allis-Chalmers 20-35 is the first tractor to use the Oil PurOlator as standard equipment. It thoroughly cleans *all the oil*, in the lubricating system, once every 4 minutes.

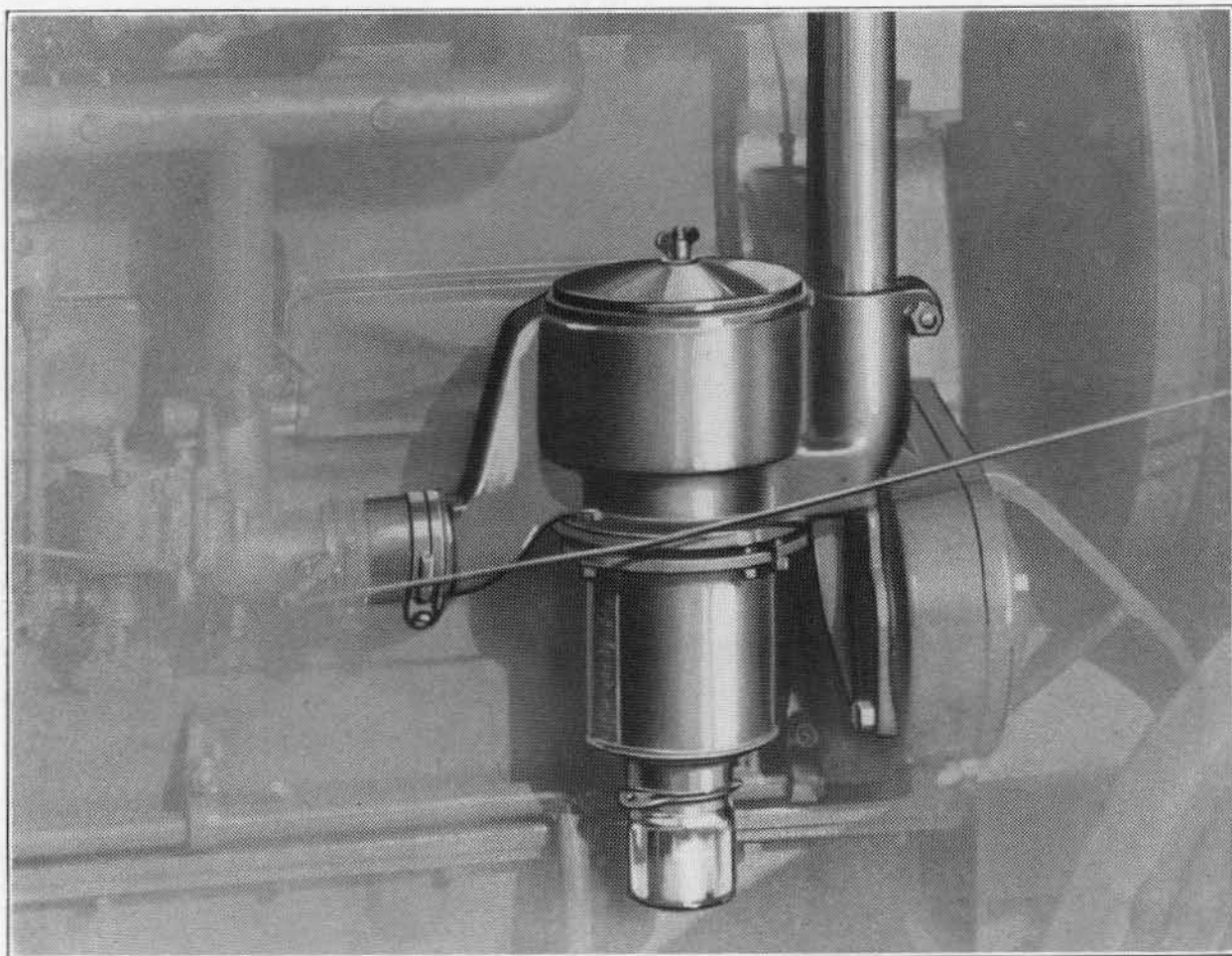
The Oil PurOlator is really very simple but remarkably efficient in its operation. A filter element is arranged on a spring so that all dirt, carbon and metal is deposited

on the outside, while the clean oil passes from the inside of the filter element to the outlet in the head.



The Simple Filter Element Which So Thoroughly Cleans the Oil.

This Watchman is an amazing lengthener of tractor life. Engineers say it should more than double the life of every Allis-Chalmers 20-35 Tractor.



Watchman No. 2—The Air Cleaner

Here is a double-duty watchman with the very important job of keeping the air that goes into an Allis-Chalmers 20-35 Tractor clean and free from dirt, dust and grit.

It takes the air before it goes into the carburetor and gives it a double cleaning. The first process is by centrifugal force, where the air is whirled around violently, and the dirt is sucked into a removable glass jar, from where it can be emptied.

The second cleaning process takes place when the air is sucked through an oil-soaked, hair mattress through which it is impossible to get even very fine specks of dust.

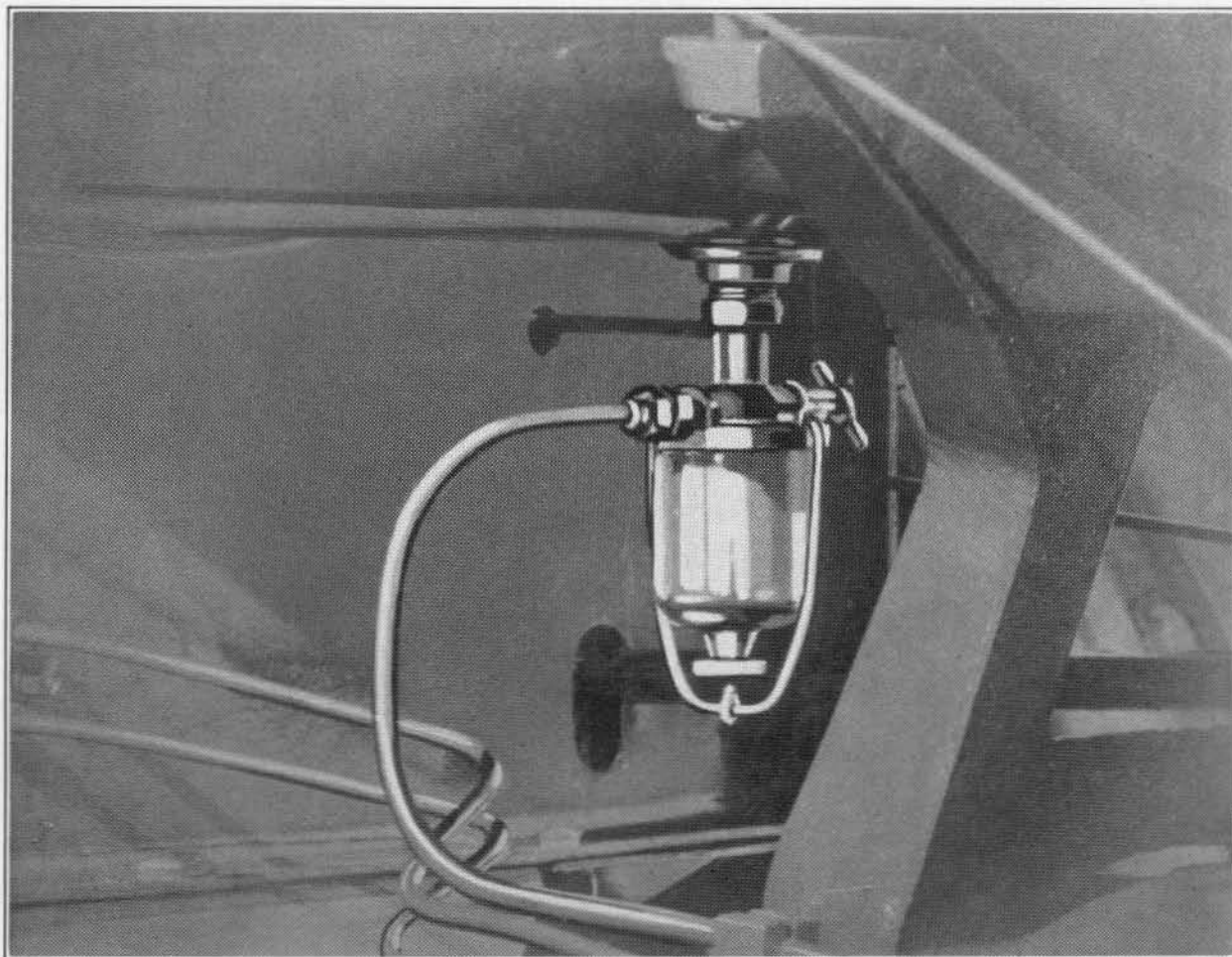
This oil-soaked, hair mattress is in a

sieve-like metal container. It is easy to clean, merely dousing it up and down in kerosene or gasoline about once a week does the trick.



Removable Metal Container for Hair Mattress.

This double-action air cleaner is, without a doubt, the most effective and thorough cleaning device on any tractor today. It has been thoroughly tried, tested and found to be the best of any ever used on the tractor before.



Watchman No. 3—The Fuel Filter

In keeping with the Allis-Chalmers policy of constantly improving even the smallest part of the tractor, your attention is drawn to the fuel filter which is standard equipment on every Allis-Chalmers 20-35 Tractor.

The value of this watchman has been proved by thorough tests by Allis-Chalmers tractor owners under all conditions.

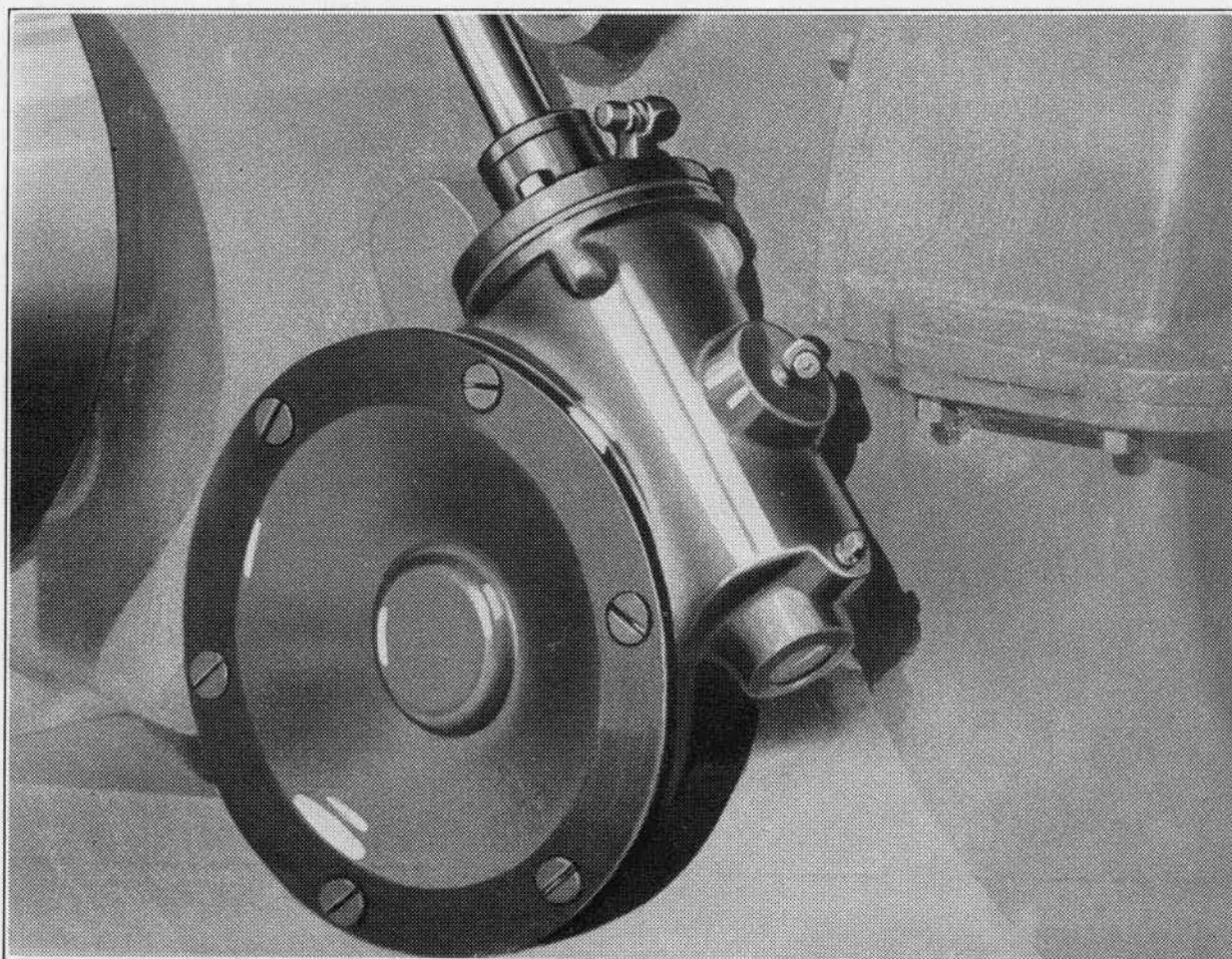
Any dirt that may be in the fuel itself, or in the fuel tanks, is collected in this filter. It cannot reach the carburetor, where it might interfere with the efficient operation of the needle valve. The Allis-Chalmers motor is securely sealed against

dirt and grit which could enter it at this point.

This filter is directly below the fuel tank, at a place where it is easy to reach. A glass container is held firmly in place with a wire loop. This container can be taken off and cleaned in a minute's time.

There is no possibility of any leakage occurring on this container, as there is no opening in the bottom.

A valve is provided so the fuel line can be closed while the container is being removed.

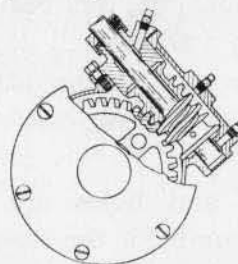


Worm Gear Type Steering Mechanism

The worm gear type was chosen for the steering mechanism on the Allis-Chalmers 20-35 Tractor because it is the strongest, most positive, easiest to operate and the safest type yet designed. Every man who has been in back of the wheel for 8 or 10 hours at a stretch will appreciate this.

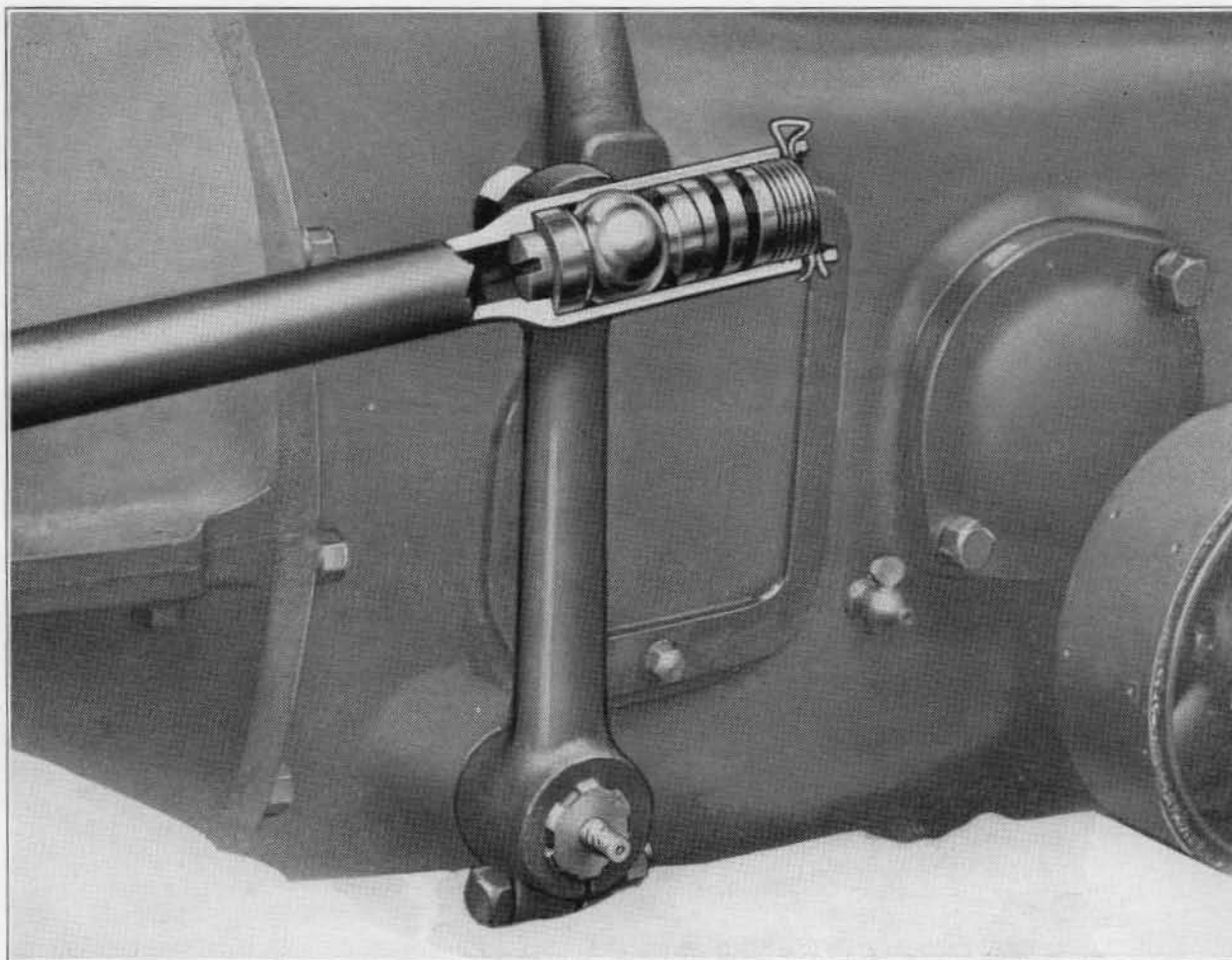
The material used in the construction of this important part of the tractor's operation is the strongest it is possible to secure. The worm gear is a drop-forging with machine cut and hardened teeth. The worm which meshes with this is also made of the same material and has machine-cut teeth. The

worm and gear set is enclosed in an oil-filled case, with plenty of lubrication provided for the thrust bearings on the worm by grease gun connections.



Adjustments can also be easily made on the worm thrust bearing.

Six adjustments are provided for the worm gear, so that it can be turned around and used equally on all the teeth. This will prevent slack in the steering wheel.



Ball-Jointed Connection for Easy Steering

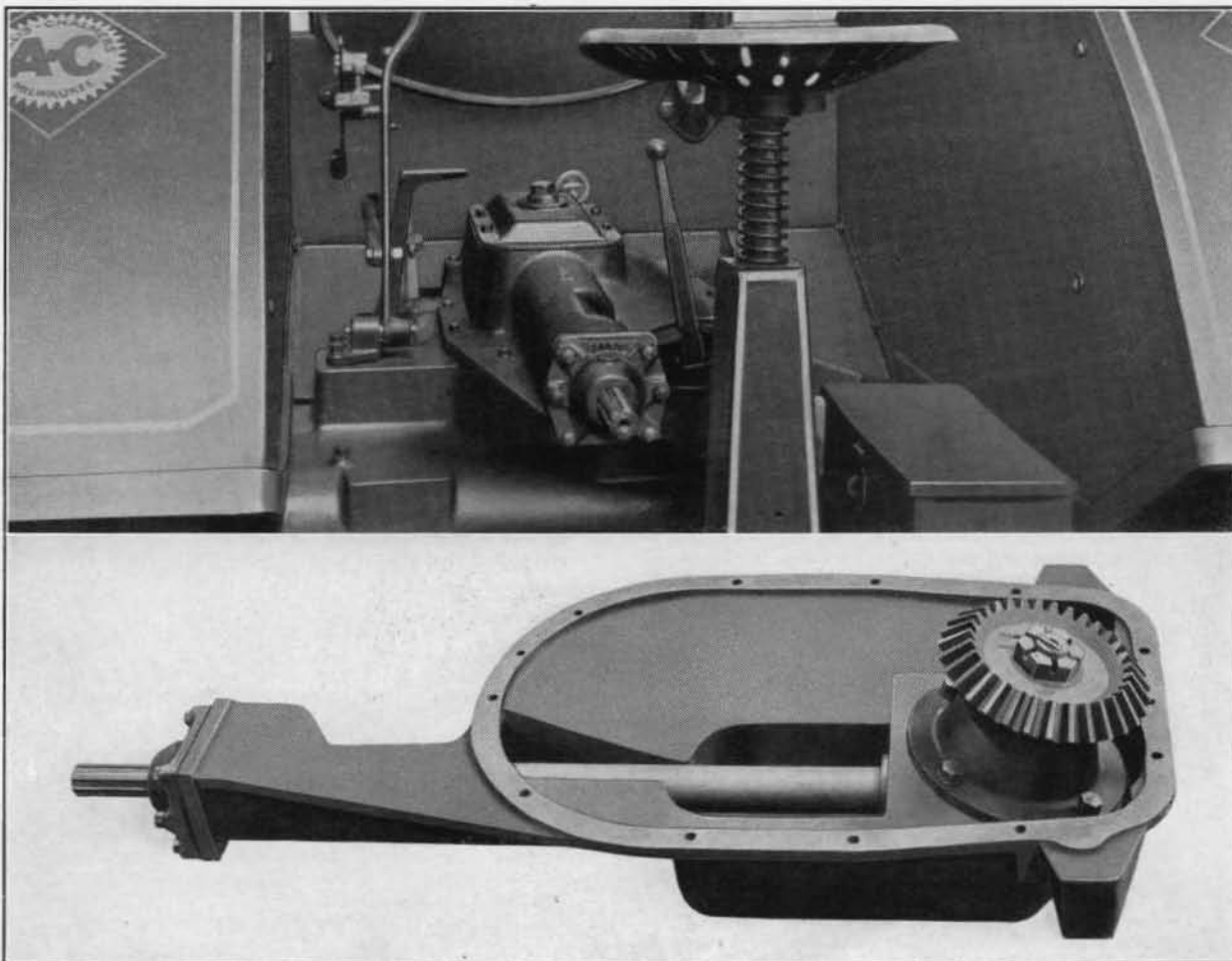
Every possible feature which could be used to provide easier and more accurate steering has been utilized on the Allis-Chalmers 20-35 Tractor. It was realized that the job of driving a tractor all day is, at best, not an easy one and the operator is entitled to anything which will make him more comfortable.

When ruts, stones and holes are encountered in the average field, the steering mechanism is subject to severe shocks and strains. These are particularly felt on the jointed connections of the drag link and,

consequently, this receives more wear than the other parts.

The ball-jointed connection as used on the Allis-Chalmers 20-35 Tractor reduces wear to a minimum and automatically adjusts itself to take care of wear. The spring exerts a constant, uniform pressure against the "ball" and this tends to make the steering apparatus very sensitive and positive.

This is standard design, as used on high-grade automobiles and in adopting it Allis-Chalmers maintains the policy of consistent improvement which has always marked their efforts.



Power Take-off on Transmission

A special power take-off has been designed to fit on the Allis-Chalmers 20-35 Tractor for use with the binder, combine, corn binder and other implements requiring power for their operation. This is an unit fitting on the transmission case, taking the place of the regular cover, and becoming an integral part of the tractor.

Power is secured from transmission gears and transmitted through hardened steel bevel gears. The unit is self-oiling, using the oil from the transmission. The shafts turn on ball and roller bearings making a very quiet and smooth-running take-off. The unit it-

self is supported in a heavy cast-iron frame.

The normal speed of the take-off shaft is 542 R.P.M. Provisions are made to provide either $1\frac{1}{8}$ " or $1\frac{3}{8}$ " diameter splines, depending on the requirements of the implements to be drawn. The take-off shaft end has S.A.E. standard $1\frac{3}{8}$ " — 6B spline which is provided with an extension having a $1\frac{1}{8}$ " — 6B spline, when required.

The take-off shaft is $34\frac{1}{2}$ " from ground, $21\frac{1}{2}$ " to the left of center of tractor. $1\frac{3}{8}$ " spline extends $25\frac{1}{2}$ " back of tractor rear wheel center and $1\frac{1}{8}$ " spline extends $30\frac{1}{2}$ " back of tractor rear wheel center.



Detailed Specifications of the Allis-Chalmers 20-35 Tractor

Capacities—

The Allis-Chalmers 20-35 Tractor will handle 4 - 14" plows, a 32" separator, a 16' combine, with grain, a 10' one-way disc plow, a 4 row lister or smaller implements in tandem.

Drawbar Pull—

In low gear this tractor is guaranteed to pull 3750 pounds and in high gear it will pull 2875 pounds.

Tractor Speed—

2½ to 3¼ miles per hour. Speed is easily controlled and regulated.

Weight—

The net weight of the tractor is 6,000 pounds.

Motor—

Own design and make, four-cylinder, water-cooled by pump circulation. Bore, 4¾", Stroke 6½". Displacement 461 cubic inches.

Motor Speed—

Under full load the motor speed is 930 R.P.M. and is under governor control.

Cylinders—

Removable cylinder sleeves set in the block. Made of cylinder iron, twice as hard as ordinary iron. Cylinders have a glass-like finish, smooth and flawless as a mirror.

Crankshaft—

Three-bearing type, accurately made and carefully balanced. Made of high grade steel. Front bearing 2½" diameter x 4"; center 2½" diameter x 4"; rear 2½" diameter x 4¾". Bronze-backed, babbitt lined, interchangeable main bearings.

Camshaft—

Drop-forged steel, integral cams, case hardened and ground.

Pistons—

Light cast iron, 6⅞" long with 4-¼" cast iron rings. Piston pin 1½" diameter, tight in piston.

Connecting Rods—

Drop-forged, heat treated I-beam section 13" long; piston pin bushing 1½" diameter x 2⅜", bronze. Connecting rod bearings, bronze-backed, babbitt-lined, adjustable by means of laminated shims.

Valves—

Special silchrome metal. Accessible for grinding by removing head. Diameter 2". Overhead valve system. Ample size mushroom type tappets.

Lubrication System—

Pressure lubricating system from gear-driven pump to all main bearings, connecting rod bearings and piston pins. Rocker arms for valves lubricated by lead from pressure system. Pressure gauge conveniently located on instrument board. All wheels,

steering mechanism and moving parts fitted with Alemite-Zerk fittings for pressure greasing. Grease gun provided.

Fuel Supply System—

Tank with 32-gallon capacity, gravity feed, provided with sediment trap.

Carburetor—

Carburetor of special design, 1½". Controlled by governor.

Cooling System—

Water, impeller pump; fin-and-tube type radiator of high cooling efficiency. Four-blade fan, 22" in diameter. Capacity 10 gallons.

Air Cleaner—

Special make, centrifugal and oil filter type, direct connected to carburetor.

Ignition—

Eisemann magneto with impulse starter.

Governor—

Our own design and make. Very sensitive and positive in action. Centrifugal type. Variable speed.

Control—

All necessary controls mounted on instrument board within easy reach of the operator.

Transmission—

Unit power plant type, selective sliding; 2 speeds forward, 1 reverse. Gears of forged steel accurately cut and shaped. Roller bearings used for main bearings in transmission.

Steering Gear—

Semi-reversible type, 18" diameter hand wheel. Very easy steering. Take-up provided against wear.

Front Axle—

Own make, forged steel. I-beam section. Timken Roller Bearings on wheel spindles.

Rear Axle—

Full floating type. Mounted on roller bearings.

Wheels—

Steel wheels. Front wheels 36" diameter x 6" wide; rear wheels 50" diameter x 12" wide.

Turning Radius—

15'-5" extreme outside turning radius — 7'-3½" inside radius.

Wheelbase—

90½ inches.

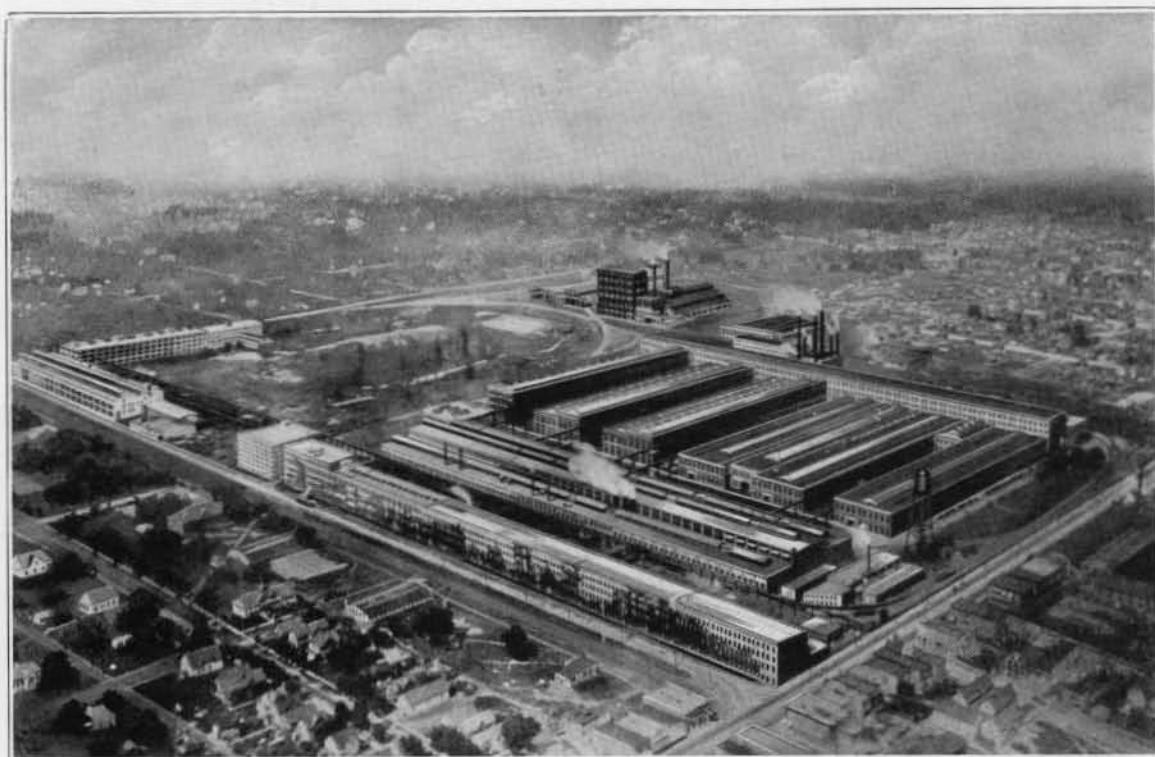
Belt Pulley—

13" diameter x 8½" wide.

Wheel Equipment—

Standard equipment provides each tractor with front-wheel guide rims and either angle-cleats or spade lugs for the rear wheels.

The Allis-Chalmers Manufacturing Company reserves the right to make changes in prices and specifications or add improvements at any time without being obliged to install same on tractors previously sold.



Builders of Power

The Allis-Chalmers 20-35 Tractor is built in a factory where every machine and every operation is concentrated on the job of building power machinery.

Some 70 years ago when Allis-Chalmers started in business a definite policy of always making every product the best it could be made was adopted. From that time till now the policy has been rigidly practiced and followed.

Allis-Chalmers has built some of the largest power machinery ever made in the world. They number among their satisfied customers many concerns who are known the world over.

The factory shown above was not built in a day, nor even a year. It required many

years of rendering service to customers before the plant became its present size.

Allis-Chalmers has over 170 acres of ground space, most of which is covered by buildings. There are 18 miles of railway track around the plant.

There is probably no other factory in the world better tooled and equipped to build a good tractor than Allis-Chalmers. Scores of skilled engineers are employed, with experience as designers of power machinery.

The greatest and most satisfactory thing that the purchaser of an Allis-Chalmers 20-35 Tractor gets is the knowledge that he is buying the best tractor that money, brains and machinery can produce and that it is backed by the reputation of a Company which couldn't *dare* build it otherwise.