

TWO-CYLINDER[®]

Featuring the Two-Cylinder and New Generation Eras of John Deere

MAY-JUNE 2009



JOHN DEERE TWO-CYLINDER

CRAWLER

TRACTORS

The story of John Deere Crawler Tractors would not be complete without first telling the story of a predecessor to the Waterloo Boy Model "R". In May 1930, L.W. Witry, who can rightly be called the father of the Waterloo Boy "R" and "N" Tractors and the John Deere Model "D", wrote a brief history of the Waterloo Gasoline Engine Company. In this document (contained in its entirety on CD-ROM #1 from 1985, see page 57), Witry describes how the Waterloo Gasoline Engine Company got back into the tractor business, and how the first Waterloo Boy Crawler Tractor came into being. The following is a condensed version of what Mr. Witry wrote:

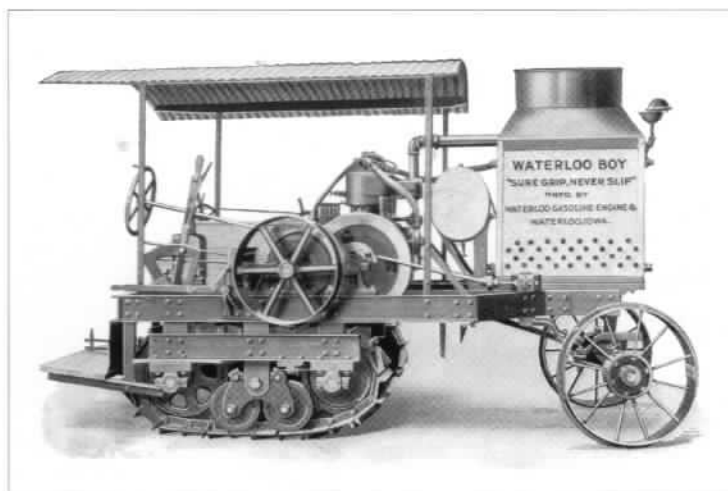
In September 1911, a Mr. A.B. Parkhurst of Moline, Illinois, brought a tractor to Waterloo at the insistence of a Mr. William Galloway (a Waterloo implement manufacturer and head of a farm machinery sales organization) and plowed some land owned by Mr. Galloway. Mr. George B. Miller (president) and L.W. Witry (chief engineer) of the Waterloo Gasoline Engine Company witnessed this demonstration, and interviewed Mr. Parkhurst, who explained that he had failed to connect with Mr. Galloway for manufacturing his tractor. As a consequence, Mr. Parkhurst was hired by the Waterloo Gasoline Engine Company in October 1911, and brought with him three tractors that had been made in Moline. The tractors were of a two-cylinder, two-cycle design. One was sold by the P.J. Downs Company of Minneapolis, Minnesota. The tractor proved to be so unsatisfactory in the field that it was returned, with a recommendation from Downs that the tractor should not be manufactured.

In 1912, Parkhurst was directed to design a four-cylinder engine to put on his chassis, which Witry described as being, "some better, but still very unsatisfactory." Mr. Parkhurst left the employ of the company after about a year.

At this point, the history becomes somewhat muddled.

Witry wrote of several experiments with a three-wheeled tractor, which did not work well and was redesigned into a four-wheel tractor with both rear wheels driving. He states that about twenty of the four-wheeled tractors — which were called the Waterloo Boy Model "L-A" and equipped with a two-cylinder opposed (boxer-style) engine — were built and sold in 1913. At about this time, another tractor designer was hired; Harry W. Leavitt. His job assignment was to design a "caterpillar" tractor and, according to Witry,

his efforts were to be confined to designing and building the caterpillar track system, using the existing Waterloo Boy frame as much as was possible, including the shafts, gears, and "motor". But which motor? The illustration of the Waterloo Boy "Sure Grip, Never Slip" Tractor clearly shows the crawler tracks and a four-cylinder "automobile type" 25-horsepower engine. It was claimed that this tractor could pull a



The first crawler tractor that can be tied to the half-track Waterloo Boy "Sure Grip, Never Slip," as shown in literature from the period. It is believed that only one such tractor was built.

four-or five-bottom plow in "stubble ground" (land that had already been broken and farmed). It is unclear just who actually designed the engine and the rest of the components of this tractor other than the tracks. Regardless, it appears not to have been a sales success, if indeed any were built other than the prototype, as the crawler track system was not continued on any other known model of Waterloo Boy Tractor.

The introduction of the kerosene-burning Model "R" Waterloo Boy in 1914, with the horizontal two-cylinder engine and an expanding line of gasoline/kerosene-fueled "portable" engines, began to take up all of the time of the engineering staff, and no further experiments with crawler tractors are known to have taken place. Continual improvements to the Model "R", and the development of a two-speed version — the Model "N" Tractor introduced in 1918 — kept the engineering department busy.

Once the “N” had been introduced, major engineering work shifted to the design of a successor for both models of tractors; although, of course, ongoing work was done as necessary to keep improving the Model “N”, especially after the purchase of the Waterloo Gasoline Engine Company by Deere & Company on March 14, 1918.

The period from 1920 through most of 1923 was a severe economic depression for farmers and farm machinery manufacturers, and saw the downfall of many tractor companies. However, the financial resources of Deere & Company were able to weather the storm and, beginning in May 1923, a total of 50 pilot-build tractors, known internally as the Model “D” but advertised as the “15-27” (referring to drawbar and belt horsepower, respectively) were built that year. The performance of these tractors in the field exceeded all expectations and, with the farm economy improving, 1000 tractors were scheduled for 1924, with production increasing every year thereafter until the Great Depression of the 1930s. The goal of the engineers and manufacturing personnel was to have every tractor be better than the previous one. As a result, Model “D” production increased by leaps and bounds, as an improving farm economy and the need for the farmer to reduce production costs led many farmers to tractor power.

In September 1927, an increase in the bore and other changes to the Model “D” brought the belt horsepower rating to 36.98, with a corresponding increase in drawbar horsepower. It was felt that at this horsepower level, the then-current Model “D” was at the limit of its strength and stability. To go further would take a complete re-design of the tractor. With sales still on the increase,

John Deere engineers put on their thinking caps and tried to peer into the future — what would the Model “D” need if it was to become a more powerful and more modern tractor? Specifications for a special run of experimental tractors were laid down in May 1928, and the tractors themselves, known as the “Exhibit A” Model “D” Tractors (see the November-December 1989 issue of *Two-Cylinder*, now available on CD-ROM, see page 57), were built between late August and late October 1928 to be put on field test, primarily in locations in Montana and Arizona. The locations chosen were perhaps an effort to escape the prying eyes of competitors, and also so the tractors could be tested in a wide variety of environmental

conditions. Although 100 serial numbers were assigned to be built, only 96 tractors were actually constructed, employing the Model “C” (“GP”) -type of steering, a three-speed transmission, new engine features, an enclosed PTO, and a host of other changes and improvements. With the exception of a few factory test tractors that were eventually called back to Waterloo, these tractors, serial numbered in a range from X67501-X67600, were sold to farmers, though no doubt the factory tracked them to see what the owners thought of them. Generally, they seem to have been quite satisfactory.

After a record sales year in 1929, plans were being made for the introduction of a much-improved Model “D” Tractor for the 1931 model year. However, Deere wished to make absolutely sure that the changes tested in the “Exhibit A” Tractors in 1928 and planned for the 1931 models would stand up in the field, as it has always been true that farmers will find flaws that even the most rigorous tests devised by tractor engineers fail to detect.

Accordingly, a group of 50 experimental tractors designated the “Exhibit B” (featured in the September-October

1990 issue of *Two-Cylinder*, soon to be available on CD-ROM) Model “D” were built from mid-June to mid-July 1930, bearing serial numbers B107001-B107050.

These tractors were almost identical in appearance and specifications to the Model “D” slated for introduction for the 1931 model year, with a few exceptions. The three-speed transmission would not make it into production until 1935, probably due to high tooling costs in the face of a declining economy. In the *Experimental Tractor Register* there are notations from “DX” 1

through “DX” 40, all of which show “Old B” in the “Special Features” column. Of these tractors, details are only given for “DX” 1 through “DX” 5, and “DX” 23 through “DX” 32. Two of the early tractors were rebuilt and given regular production numbers some years later.

It is the latter group that is the most interesting, as there is a bracket for “DX” 23 through “DX” 32 designating them with the notation “crawler type.” Evidently, the John Deere engineers wished to determine whether the Model “D” Tractor could be successfully converted to a half-track type of crawler tractor. At the time, there was a tractor of that type on the market — the “Bates Steel Mule” — which had been moderately successful since its



Ten of the 50 Experimental Exhibit “B” Model “D” Tractors (1930) were converted to half-track crawlers. This photo was taken near Havre, Montana.

The tractor is pulling what appears to be a John Deere No. 5 Deep-Tillage Tractor Cultivator that is in the ground almost to the frame rails. They may have been a great puller but, even with four-inch guide bands on the front wheels, the tractors were very difficult to steer. All of the crawlers, it is believed, were converted back to wheel tractors.



The store front (formerly a Cadillac dealership) of the Lindeman Power Equipment Company in 1927. The firm became dealers for the "Cletrac" line of crawler tractors in 1926. by 1928, the Lindeman Power Equipment Company would also become John Deere dealers, and the Lindeman brothers' experience with crawler tractors would lead them in a new direction. The gent on the left in the doorway is none other than Jesse Lindeman, rightfully credited with being the lead designer and visionary of the family.

introduction in 1915. There were conditions in which the tremendous lugging power of the Model "D" could not be utilized because of inadequate traction, and perhaps the Deere engineers wished to find out if a half-track version of the "D" could solve this problem. As a result, the following ten of the "Exhibit B" Tractors were built as half-track crawlers:

Tractor Number	"Exhibit B" Number	Shipping Date	Shipping Destination
"DX" 23	107039	7/12/30	Havre, Montana
"DX" 24	107042	7/12/30	Havre, Montana
"DX" 25	107043	7/11/30	San Francisco Branch
"DX" 26	107040	7/09/30	San Francisco Branch
"DX" 27	107048	7/10/30	Spokane, Washington
"DX" 28	107041	7/09/30	Spokane, Washington
"DX" 29	107047	7/11/30	Scrapped, 10/16/31*
"DX" 30	107033	7/12/30	Scrapped, 10/16/31*
"DX" 31	107034	7/16/30	San Francisco Branch
"DX" 31	107001	not listed	Engineering Dept.**

*It is possible that this means that the tractor's crawler equipment was replaced with the regular "Exhibit B" rear drive wheels and equipment, and the tractor was then reinstated for sale. Or, perhaps the entire unit was scrapped.

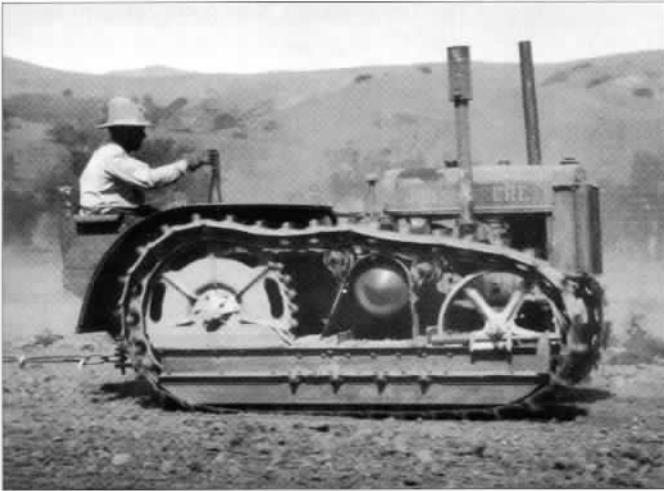
**This tractor was used extensively in various engineering tests, and remained in Engineering Department inventory until Novem-

ber 1, 1952. At that time a notation was entered which states: "Now considered farm equipment by Engineering Department." It may have been later scrapped or sold as used.

Although only two of the experimental "crawler" tractors show a Montana shipping location, a former John Deere dealer in extreme northeast Montana who, when contacted in 1990, had a clear remembrance of at least three of them in his sales area, and recalled that there were additional units at other locations in Montana. He

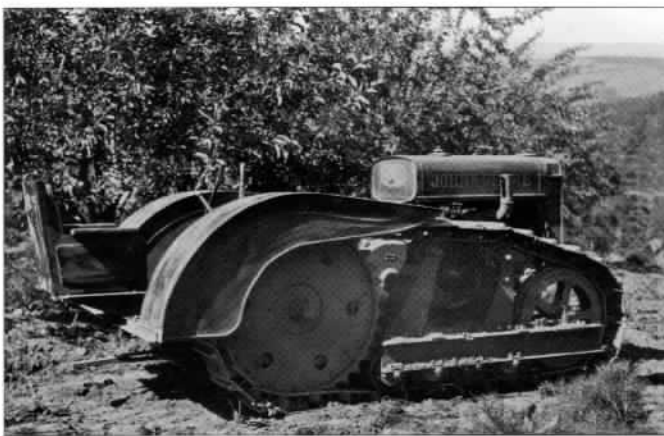


In 1932, the Lindeman Power Equipment Company developed a crawler attachment to be mated to the John Deere Model "D" Tractor. At least three "Ds" were converted by them to crawlers, and one was tested by Deere & Company. Here, a Lindeman-John Deere "D" Crawler is pulling a stone-boat type of land shaper, used to grade land for flood irrigation.



A closer view of the "D" Crawler pulling the stone-boat land shaper shows that the front of the track is not doing its job; a pulling problem Deere discovered during testing. The two top idlers and steel guard kept the track off of the tractor's pulley.

also remembered their field performance. They pulled very well... in a straight line. But, even with the 4-inch guide bands on the front wheels, without differential brakes or track clutches their turning ability was very poor. The top-drive track system (similar to those later used for self-propelled rice crawler combines) plugged up with mud in bad weather, which adversely affected pulling power. He said that the next winter, Waterloo shipped rear wheels, sprockets, drive chains, fenders, and platforms to convert the three crawler tractors known to him back to wheel tractors, which made them more or less the equivalent of a 1931 Model "D", but with more than a few experimental parts. Since the original article on the "Exhibit B" Tractors back in 1990, none of the "DX" Tractors built with crawler tracks have ever been located. It's a pretty sure bet that most if not all were converted back to wheel tractors. However, at least one "Exhibit B" Tractor that had formerly been one of



The Lindemans even tried a "D" Crawler in orchard work, adding fender flares. A number of other changes were made as well, to what appears to be a 1930 tractor. Could this have originally been one of the Exhibit "B" Model "D" Tractors, converted to a half-track by Deere and shipped to Spokane? A lot of questions on the "D" Crawlers will likely never be answered.

the "DX" Crawler Tractors has been recovered and is currently undergoing restoration with an attempt to recreate the crawler tracks of the original. With the discontinuation of the half-track crawler experiments, Deere figured they were done with crawler tractors. The tracks for the crawler tractors had been purchased from an outside vendor, since Waterloo really didn't want to build their own tracks, and did not wish to be in the crawler tractor business anyway.

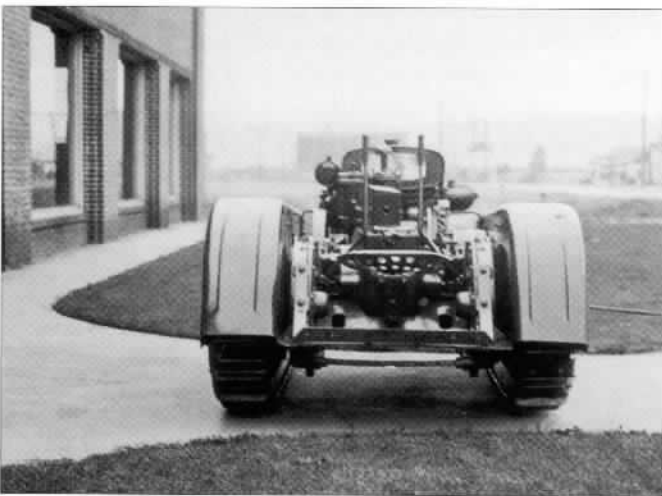
Deere might have been done with building crawler tractors, but in 1932 the Lindeman Brothers of the Lindeman Power Equipment Company contacted Deere & Company about a crawler attachment they had developed for the Model "D" Tractor. Before becoming John Deere dealers in the later 1920s, the brothers had sold the "Best" brand of crawler tractor (the "Best" and "Holt" companies had merged in 1925 to form the Caterpillar Tractor Company), followed by the "Cletrac" brand of crawlers and had some "Best 30" tracks and



Stability, not speed, was the most important factor when pulling a hillside combine. In this photo, a Lindeman "D" Crawler modified with wide and deep grousers for better traction and stability on steep hillsides, is pulling a smaller model Holt hillside combine. The man with his hand on the steering wheel is responsible for keeping the combine level, while the other man fills and sews closed the sacks of grain.

other parts dedicated to crawler tractors on hand. They had utilized these parts, including some of their own design and manufacture, to convert the John Deere Model "D" Tractor to a full-track crawler tractor. At least three — and possibly as many as six — units had been converted using several different approaches, and Lindeman wished to bring their latest creation, mounted on a very late 1931 Model "D", to Deere for testing and hopefully negotiate a deal with Deere to manufacture the tractor. The engineering forces at Waterloo were well acquainted with the Lindeman brothers and had respect for their engineering abilities, as it had been the Lindeman modifications to a "GP" Standard in 1929 that led to the development of Deere's "GPO" Orchard Tractor.

The Lindeman's shipped their latest design, mounted on Model "D" serial number 115509, to Moline in the spring of 1933. Tests were conducted that showed that the Lindeman attachment did not have the proper balance to produce maximum pull. Nearly 500 pounds of weight



Top: A head-on view of a "GPO" Crawler parked in front of the Lindeman Power Equipment Company. The lesson that the Lindemans had learned at the Deere tests in 1933 concerning proper weight distribution were incorporated into the "GPO" Crawler.

Bottom: A rare straight-on rear view of a "GPO" Crawler, shown here with orchard fenders installed. The design of the "GPO" final drives lent themselves well to the crawler conversion.

was added to the front of the tractor to move its center of gravity 6-1/2-inches forward, which made a noticeable difference in traction and pulling power; but, in the final analysis, the crawler version of the Model "D" showed no particular advantage in pulling power in comparison to a wheeled tractor except in low gear, but that was thought to be of little or no advantage since the speed was so slow. Price was also a problem, as the cost of a "D" with Lindeman Crawler Attachment was estimated to be in the range of \$2300, which was near the price of a Cletrac "35" and Caterpillar "35", both of which could outpull the "D" Crawler and had other advantages. Deere's final decision on the Lindeman "D" Crawler was "no", but it was suggested to the Lindemans that the "GPO", with its three-speed transmission, lower initial cost, and low center of gravity would prove to be a better platform for conversion into a crawler. Was the Model "D" tested in 1933 the last "D" converted to a crawler

configuration by the Lindemans? No one is certain, but there is a photo of a "D" crawler that so resembles the Lindeman-John Deere "GPO" Crawlers built by the Lindeman's after the 1933 tests that at first glance most people think it's a "GPO". However, a second look says it's a "D", and close examination of the photograph reveals that the casting number of the main case is D1800R, the same main case used on the "Exhibit B" Tractors, which had shown to be more than strong enough to stand the strains imposed on it by the half-track conversions. Did the Lindeman's get their hands on an "Exhibit B" Tractor and convert it, or did Deere give them a leftover main case and some other parts (or a complete "Exhibit B" Tractor) for their trouble in bringing the "D" Crawler to them for testing? Since the tractor has never surfaced, no one living will probably ever know for sure.

After the Waterloo tests, the Lindeman's turned their talents to building a crawler assembly to convert the "GPO" Tractor. This was a more successful unit, and about two dozen of these crawler tractors were built by the Lindeman's from 1933 through 1935. Deere informed the Lindeman brothers that production of the "GPO" would be discontinued in April 1935. However, at the same time they were advised that a new line of smaller standard-tread tractors that would perhaps be suitable for conversion into a small crawler tractor; one that would be ideal for orchard use. Production of the "BO" Orchard Tractor began in September 1935.

It took awhile before the Lindeman's got their hands on "BO" serial number 326109, the first to be converted into a Lindeman-John Deere "BO" Crawler. Jesse Lindeman stated that the tractor could not have been a more perfect candidate for conversion into a crawler; only 10 holes had to be drilled in order to attach the track frame, steering brakes/clutches, and other parts necessary for the conversion.

Production of the Lindeman-John Deere "BO" Crawler



In the pre-herbicide era, grass and weed growth between the trees had to be controlled mechanically. A "GPO" Crawler and a double-action disk harrow made a good combination for this task which needed to be done several times each season. Note the position of the front idler in relation to the radiator, and that the track is level to the ground, indicating good weight distribution.



A full-fendered "GPO" Crawler doing a fine job of lightly disking a young grove of hops. Available information on the Lindeman-John Deere "GPO" Crawler seems to indicate that right at two dozen were built. Unfortunately, the cumbersome fenders have not survived with the handful-plus of known existing tractors.

was sporadic during the latter half of the 1930's. Economic conditions were not the best in the fruit and orchard areas of the Pacific Northwest, and experimentation with a number of different undercarriage and track configurations was needed in order to engineer the best design for manufacturing economics and ease of installation. Production began to pick up in 1939 due to an improving economy, and an improved "BO" Tractor. For the 1939 model year, the engine in the "BR"/"BO"/"BI" Tractors had been enlarged — both bore and stroke being increased by 1/4-inch — boosting the displacement from 149 to 175 cubic inches. The increased "grunt" made the "BO" a much better candidate for conversion into a crawler tractor, and production of these units slowly began to increase as World War II got under way in Europe. With this in mind, in 1940 Deere sent a Model "BI" Tractor to Lindeman for conversion into a crawler. Deere president C.D. Wiman believed that the tractor would have a multitude of uses



The advantage of the track system is clearly visible here with this Lindeman "GPO" Crawler in an uphill climb. When the "GP" Series was replaced by the "B" series, the Lindemans wasted no time in developing a crawler attachment for the Model "BO".

for the U.S. Armed Forces, and it was light enough to be flown to wherever needed and parachuted to the ground. The fact that its two-cylinder engine could run on nearly any combustible fuel available was also thought to be of great advantage. The tractor was thoroughly evaluated in a wide variety of conditions, but the military decided to not purchase the "BI" Crawlers in quantity; although photos exist of a "BO" Crawler marked "U.S. Navy," bulldozing sand on a beach. Although disappointing to both Wiman and the Lindemans, domestic sales of the "BO" version were beginning to pick up, partially due to higher wartime prices for fruit and other specialty crops grown in the sales area serviced by the Lindeman Power Equipment Company. By 1943, sales had increased to the point that John Deere assigned a special assembly number for "BO" Tractors being shipped to Lindeman. The special package deleted all parts of the tractor not needed when it was to be converted to a crawler configuration.

As time went on, the Lindemans adapted the "BO" Crawler to an ever-wider variety of tasks at customer request. At least two of the crawlers were built as "high-

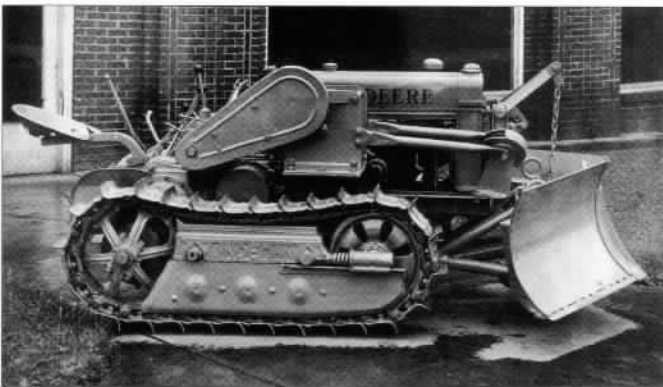


Starting in 1936, a new John Deere with tracks began to be seen in Washington's orchard country; the Lindeman-John Deere "BO" Crawler. Deere insisted that the "Lindeman" name preceded "John Deere." Note that "Lindeman" is not painted yellow on the track frame cover, a detail that most owners do not adhere to.



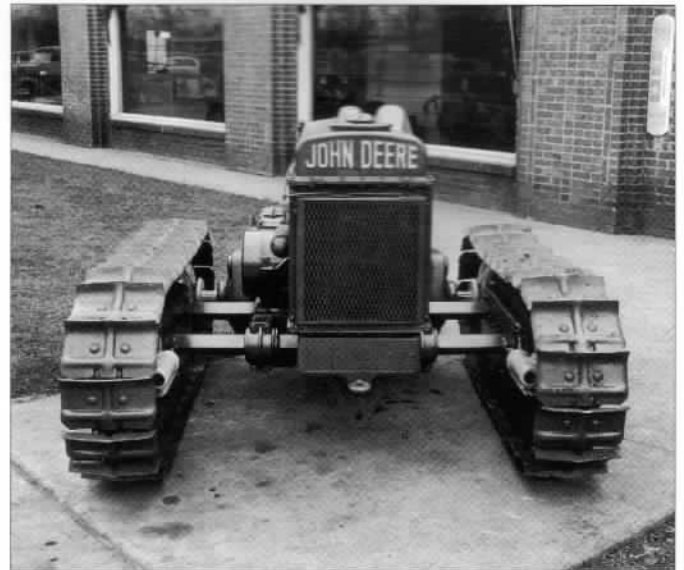
Top: Orchards weren't the only place for the Lindeman-John Deere "BO" Crawler Tractor (most people who know about them refer to the unit as the "Lindeman BO"), as can be attested to by this one loading sugar beets with a Lindeman-designed beet loader.

Above: A Lindeman "BO" Crawler in hops.



A single one of Lindeman's creations was a "BI" Crawler. The company also built 25 — possibly as many as 29 "BR" Crawlers.

crop" versions, with extensions welded to the grousers to increase ground clearance for the cultivation of asparagus. Producers with needs for a wider tread were accommodated, too, with adjustable-tread machines. Smaller logging operations had found that the "BO" Crawler was



Some agricultural applications required a wider-than-normal track gauge. For these uses, the "BO" Crawler was made available with adjustable-tread width. Longer crossbars and splined drive axles made adjusting the tread width of the crawler a fairly simple operation. 1944.

just the right size and power for their needs, so specialty implements such as dozer blades were developed. Lindeman's ties to John Deere engineering meant that the Deere expertise in advanced hydraulic technology was available to the Lindemans, and it wasn't long before several different types of hydraulic units to control bulldozers and/or rear-mounted toolbars were offered on the "BO" Crawlers. Speaking of hydraulics, Jesse Lindeman once recounted a story of how he had developed a better way of producing and installing the connecting link for the track through his friendship with the head of manufacturing at Caterpillar, who showed him how Caterpillar attached the final connecting link. Lindeman asked CAT about hydraulic systems, too. According to Jesse, their answer was, "We don't know anything about hydraulics. Only the John Deere people know anything



After everything was figured out, Lindeman ordered and Deere shipped "BO" chassis without the things not needed to build a crawler. The photo shows them lined up outside of the plant at Yakima, Washington.

Jesse Lindeman (right) with the last of 1675 "BO" Crawlers off the line. Yakima, 1947.



Left and Lower Left: Even before the last Lindeman-John Deere "BO" Crawler clattered off the line, the Lindeman Power Equipment Co. was already working on making the not-yet-introduced Model "M" into a crawler. Experimental "M" No. 17, designated "XM17", was the basic tractor for this one. This quickly attracted the attention of Deere & Company president Charles Deere Wiman and Portland Branch manager Pat Murphy. In the lower photo, Wiman is on the "BO" Crawler. Yakima, Washington. December 1946.



Below: Now thoroughly convinced that the Lindeman Power Equipment Company and its unique products could be an essential asset to Deere & Company, a deal was struck and Deere acquired the Lindeman operation on January 1, 1947. It became the John Deere Yakima Works at that time. The Yakima Morning Herald reported the big news on Friday, December 13, 1946.

YAKIMA MORNING HERALD

Deere & Co. Buys Yakima Plant

Reclamation Educational Need Cited
 Granger Seeks Assessment Hike
 Farm Goals Retained at 1946 Levels
 Views of Major Manufacturing Concerns
 Lindeman Firm Slated For Expansion

Another



Top: Within a year after acquiring the Yakima Works, there had been improvements made to the crawler attachment for the Model "M", and the John Deere Dubuque Tractor Works was creating its own experimental crawlers with the designation "XMC". Shown here is "XMCOR", the first of them, with a five-foot scraper. Note the data recorder (round device) on the right side near the dash. Bottonfield Ranch; Laredo, Texas. March 1948.

Above: Check out "XMCOR" with ten-inch tracks in the narrow setting. Testing at Laredo could be continued on a year-round basis.

about hydraulics." Knowledge about advanced (for the time) hydraulics helped keep the Lindemans in the forefront of small crawler tractor technology.

The bulk of the 1675 (Jesse Lindeman's number) Crawlers were built in the period from 1943 to 1946. During that time, a number of different applications other than orchard or agricultural work were found for the little crawlers. The Lindemans developed a rubber track pad so the crawlers could be used on hard surfaces such as concrete or asphalt. Certainly there were uses for that application. However, to the surprise of many at Linde-

man, the major use for the rubber-tracked crawlers was not work on cement or asphalt; instead, the tractors were being lowered into the hulls of bulk-cargo ships to push material to the overhead cranes with clamshell buckets. The rubber pads gave good traction on the steel surfaces of the cargo compartments, and the small size and ability to turn in less than its length made the "BO" Crawler with rubber tracks the ideal tractor for the job.

Not all of the Lindeman-John Deere Crawlers were "BOs". In addition to the single "BI" Crawler, the *Serial Number Register* shows there were 25 "BR" Tractors shipped to Yakima with the same special crawler package equipment code as the "BO" Tractors. There is no absolute answer as to why these 25 "BR" Tractors were selected for conversion to crawler, but it is thought that they were substituted when regular shipments of "BO" Tractors needed to be rounded out. Regardless of the reason, these tractors are among the rarest of any John Deere crawler ever built.

By 1946, Deere had decided to end production of the "BO" and "BR" Tractors in early 1947. The very last "BO" Tractor that was shipped to Lindeman, serial number 337345, was likely built into a "BO" Crawler. When the Deere/Caterpillar industrial equipment partnership agreements had been signed in 1935, at the time Deere had no desire to build crawler tractors nor did Caterpillar wish to build wheel tractors. Though no formal agreement was made concerning this subject, it was recognized by both parties that, in the future, either company might move into the other's product lines. The Lindeman-John Deere crawlers being produced at Yakima posed no threat to Caterpillar, as they were in a class for which Caterpillar had no competitive model in either size or price. Deere president C.D. Wiman had made up his mind to buy the Lindeman operation and continue small crawler production, but a final test of the Lindeman's engineering abilities would come first. Since the new Model "M" Tractor was set to replace the aging "BO" and "BR" Tractors, Deere wanted to know if the Lindemans could make a crawler out of a Model "M". In 1946, an experimental Model "M" Tractor, designated XM-17, was shipped to Yakima for conversion to a crawler. This was successful, and led Deere to officially purchase the Lindeman Power Equipment Company on January 1, 1947. It became the John Deere Yakima Works at that time. More experimental Model "M" Tractors were shipped to Yakima in order to refine and finalize the design. A little background information on how the "BO" Crawler led to the production of its successor, the "MC", is in order at this juncture. We have to go back in history just a handful of years to bring us back to the events of 1947 and beyond...

In 1942, Willard Nordenson, Chief Engineer of the Moline Tractor Works, along with a team of tractor engineers, began design work on a new tractor to replace the "L" Series ("L", "LA", and "LI") Tractors. The new tractor would be more competitive with the small-trac-



Top: Farmers as well as orchardists liked the "MC". The additional traction enabled the tractor to pull a three-bottom plow, while its wheeled cousins (the "M" and "MT" were limited to two-bottom plows.

In this scene, an "MC" equipped with 12-inch full-grouser tracks at 44-inch tread width, and remote hydraulic control, is hustling a No. 55-H Three-Bottom Plow through sod in third gear.

Below: This 1950 photo illustrates just how Deere & Company entered the industrial tractor business. An "MC" equipped with an "MC-1000" Tool Carrier and a bulldozer blade are doing the "roughing-in" part of the landscaping work for these tract houses. Literally thousands of small contractors got their start with an "MC" on a bulldozer blade. The "orchard" exhaust enabled the "MC" to go where other crawler tractors could not.

tor offerings from Allis Chalmers, IHC, and the "N" Series Ford tractors, among others. The design work moved quickly, and the first running prototype was built in late 1943. Field testing began in the spring of 1944, and more experimental tractors were built. As design work progressed, it became clear that a number of different types of tractors could be built from the basic engine and transmission by applying changes in the type and position of the final drives. As the experimental work progressed, it became clear that the new tractor was going to be a winner; and in 1945/1946, an additional 20 experimental tractors, designated "XM", were built for extensive field tests and to preview the tractor to prospective customers in various parts of the country.

All that remained was to finish construction of the new Dubuque Tractor Works and get the Model "M" into production. By mid-March 1947, production of the new Model "M" Tractor had begun, but it would take some time before production of the Model "M" could be increased enough to meet demand. In addition, the "MT", a two-row tractor that would replace the Model "H" Tractor (which had been canceled along with the "B" Standard-Treads in order for Waterloo to increase production of the popular row-crop Model "A" and "B" Tractors), was also slated for production at Dubuque.

By late December 1948, both the new "MT" Tractor and the "MC" Crawler Tractor began to roll down the assembly lines at Dubuque. The "MC" used Lindeman-designed steering brakes/clutches and the complete





Testing continued even after production was in full swing. Here, "XMC6" is working with an "MC60" Dozer in the John Deere Dubuque Tractor Works foundry dump in November 1950. The abrasive cupola-generated slag and discarded foundry sand was a real test for crawler tracks and undercarriage parts. It appears that the tractor may be fitted with an experimental four-roller track frame.

undercarriage (crossmembers, rails, rollers, and tracks). "MC" Crawlers destined for sale east of the Rocky Mountains were completely assembled at Dubuque with parts furnished by the Yakima Works. "MC" Tractors ordered for shipment west of the Rockies were shipped as basic chassis to the Yakima Works for final assembly, which tended to even out shipping costs.

Although marketed primarily as an agricultural tractor, it soon became clear that, like its "BO" predecessor, a considerable number of "MC" Tractors were being sold for non-agricultural uses. The Yakima Works designed an innovative tool carrier for the "MC" — one of the attachments was a bulldozer, which quickly became a popular item. As sales of the "MC" continued to grow beyond anyone's wildest expectations, it became clear that additional equipment should be developed for it. The Yakima-built "MC-1000" outside-mounted tool carrier with bulldozer attachment was fine as far as it went, but it became obvious that for many users a more versatile bulldozer was needed. Deere responded with the No.61 Bulldozer, an inside-frame unit that was far more adaptable to many kinds of work.

While the three-roller track frames of the "MC" worked well enough in many applications, there were calls for four- and even five-roller track frames to provide better longitudinal stability. With this in mind, experimental "MCs" were built at Dubuque with four- and five-roller track frames. The experiments were successful, and plans were made to offer the larger track frames on the successor to the "MC", the Model "40" Crawler, scheduled to be introduced in November 1952 as a 1953 model.

However, this was not to be. The U.S. was embroiled in the Korean War, and the necessary tooling and machines needed to build four- and five-roller tracks



Throughout the production of the "MC" and the three-roller "40" C Tractors, serial number 60001 through 62263, all of the crawler components: sprockets, idlers, rails, rollers, crossbars, track, and track shoes, were manufactured at the John Deere Yakima Works under the watchful eyes of Jesse Lindeman; the man who had designed them.

The final drives, along with the steering brakes and clutches, were a joint-design effort between the Yakima Works (Jesse Lindeman) and Dubuque Works engineers. These components were built at Dubuque, and carried Dubuque part and assembly numbers. In the photo above, pre-assembled track and undercarriage components are being readied for shipment to the Dubuque Tractor Works from the Yakima Works.

These shipments continued until the Yakima Works was being shut down, and the Dubuque Tractor Works began manufacturing all of the crawler parts beginning at "40" C serial number 62264. Some parts formerly made in Yakima and used on the four- and five-roller crawlers were transferred to Dubuque and assigned new suffixes for the part numbers; the suffix "YT" means that the part or assembly had formerly been built at Yakima.

Collectors need to realize that "40" C serial number 62264 was a major turning point for John Deere Crawler tractors; Dubuque was then in the driver's seat and would lead Deere & Company into the light industrial market; and, in just two years, would be instrumental in forming the John Deere Industrial Division.

was not available in time for the launch of the "40" Crawler, so the new Model "40" C was introduced with the Lindeman-designed three-roller tracks as used on the "MC", and the finish-build of the "40" C continued both at Dubuque and Yakima until the end of the 1953 model year.

By the very end of the 1953 model year, the necessary

Pages 13-36: The 24-page sales literature on the "40" Crawler (published December 1954) is significant for several reasons, but primarily because it presents the first John Deere Crawler tractor that was manufactured entirely at a John Deere Tractor Factory; the John Deere Dubuque Tractor Works (see caption for photo above). Also this was one of the first pieces of tractor literature that dispensed with the word "Model" in conjunction with the numerical designation of the tractor.

While Waterloo product literature of the period was featuring the Models "50", "60", and "70", Dubuque apparently regarded "model" to be redundant. By the "20" Series, most John Deere literature was following that pattern.

MODEL "40" CRAWLER

CAPACITY	2- and 3-bottom plows, 8-foot double-action disk harrow; and similar loads.													
SPEEDS, mph:														
First.....	7/8													
Second.....	2-1/4													
Third.....	3													
Fourth.....	5-1/4													
Reverse.....	1-3/4													
BELT PULLEY	Extra equipment.													
Position.....	Rear mounted.													
Diameter and Face.....	9 in. x 6 in.													
Revolutions per Minute.....	1270 rated speed.													
Belt Speed (Feet per Minute).....	3000													
POWER TAKE-OFF:														
ASAE-SAE Standards.....	Internal mechanism regular, stub shaft extra, 560 rpm.													
High Speed.....	Splined coupling located inside transmission—1850 rpm.													
ENGINE	Two vertical cylinders, cast in block, valves in head.													
Rated Speed (rpm).....	1850													
Bore and Stroke.....	4 in. x 4 in.													
Main Bearings.....	Two main, steel-backed, babbitt-lined, removable.													
Connecting Rod Bearings.....	Steel-backed, babbitt-lined, removable.													
Governor.....	John Deere design—enclosed flyball type.													
Carburetor.....	Natural-draft type with load and idle adjustment.													
Ignition.....	Battery ignition with automatic spark advance.													
Air Cleaner.....	Oil wash type.													
Lubrication.....	Full force-feed pressure system with oil filter.													
Cooling.....	Thermo-siphon.													
FUEL TANK CAPACITY	10-1/2 gallons.													
CRANKCASE OIL CAPACITY	5 quarts.													
WATER CAPACITY	3-1/2 gallons.													
CLUTCH:														
Main.....	10 in. plate—foot operated—automotive type.													
Steering.....	Multiple disk—hand operated.													
BRAKES	Band type—hand operated individually—foot operated simultaneously.													
TRACK AND TRACK FRAME:														
Track Frame.....	4- or 5-roller.													
Track Shoes.....	Choice of 10 in., 12 in., or 14 in. grouser; 12 in. snow, 10 in. rubber, 10- or 12-in. street type.													
Track Treads.....	Sprocket for 36 in. or 46 in. tread; sprocket for 38 in. or 44 in. tread.													
Extra Equipment.....	Oversize idlers (regular on 5-roller frame) sprocket guards and rock guards.													
Length Track on Ground.....	4-roller 56 in.; 5-roller 66-3/8 in.													
Total Ground Contact Area.....	<table border="0" style="margin-left: 40px;"> <thead> <tr> <th></th> <th style="text-align: center;">4-Roller</th> <th style="text-align: center;">5-Roller</th> </tr> </thead> <tbody> <tr> <td>10 in. shoes</td> <td style="text-align: center;">1120 sq. in.</td> <td style="text-align: center;">1328 sq. in.</td> </tr> <tr> <td>12 in. shoes</td> <td style="text-align: center;">1344 sq. in.</td> <td style="text-align: center;">1593 sq. in.</td> </tr> <tr> <td>14 in. shoes</td> <td style="text-align: center;">1568 sq. in.</td> <td style="text-align: center;">1858 sq. in.</td> </tr> </tbody> </table>			4-Roller	5-Roller	10 in. shoes	1120 sq. in.	1328 sq. in.	12 in. shoes	1344 sq. in.	1593 sq. in.	14 in. shoes	1568 sq. in.	1858 sq. in.
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14 in. shoes	1568 sq. in.	1858 sq. in.												
TURNING RADIUS:														
4-Roller Frame.....	7-1/2 feet (Approx.).													
5-Roller Frame.....	8 feet (Approx.).													
DRAWBAR	Swinging type, conforms to ASAE-SAE standards for wheel-type tractors.													
CLEARANCE UNDER CHASSIS	14 in.													
DIMENSIONS:														
Over-All Width.....	67 in.													
Over-All Length.....	102 in.													
Over-All Height.....	54 in. (to breather cap).													
Height to Top of Grille.....	50-1/4 in.													
REGULAR EQUIPMENT	Oil pressure and water temperature gauges; distributor-type ignition with ignition switch; fuel and oil filters; air cleaner; electric starter; battery and generator; coil-spring cushioned adjustable seat; cushioned adjustable back rest; swinging drawbar; fenders; sod pan; provision for ASAE-SAE standard power take-off; also a high-speed power take-off by means of a splined coupling located in the transmission.													
EXTRA EQUIPMENT	Belt pulley; electric lighting with implement warning light plug-in socket and instrument panel light; hour meter, radiator shutter; cigarette lighter; front bumper; grille guard; light guard; heavy-duty full-length sod pan; integral and remote hydraulic systems; orchard muffler; ASAE-SAE standard power take-off stub shaft.													
SHIPPING WEIGHT	4-roller—4,125 pounds (Approx.). 5-roller—4,560 pounds (Approx.).													

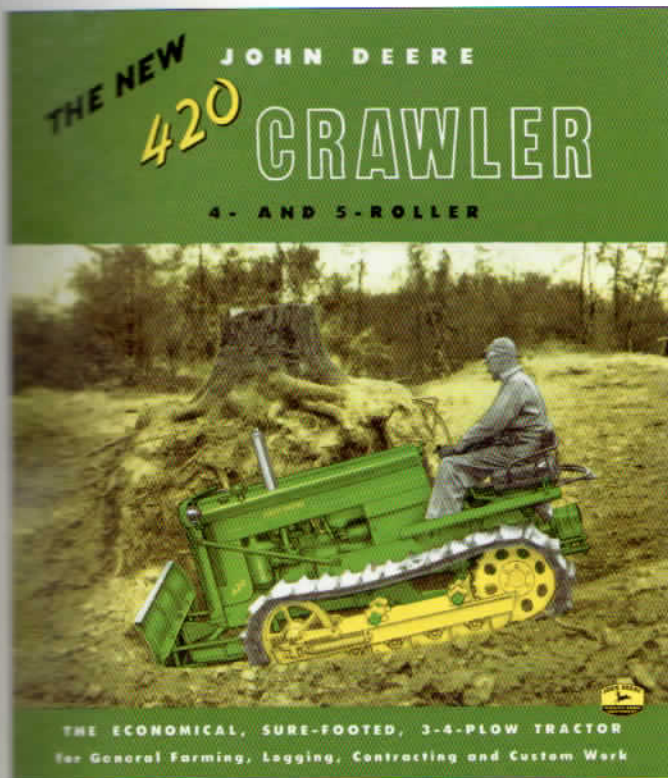
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It's always worth studying the specifications pages of sales literature. Of particular interest here are the dimensions; 4-1/2-feet high, 8-1/2 feet long, etc. The two-cylinder crawlers from Dubuque were truly dinky, but they worked hard then and are a collector's delight today.



tooling, machines, and materials were on hand at Dubuque, and at serial number 62263 the last three-roller "40" C was built. The Yakima Works was in the process of being closed, primarily due to high freight costs. Yakima personnel were offered a transfer to the Dubuque Tractor Works, and a number of crawler track parts were also transferred to Dubuque. These parts can be identified in Parts Catalogs by the prefix "TE" or "ATE", and also by the suffix "YT". That means that the part or assembly was originally built in Yakima, but was transferred to Dubuque, and such parts are an interesting link to the history of John Deere Crawler Tractors. With the closing of the Yakima Works, an era had ended; the Model "40" Crawler Tractors built up to serial number 62263 had the direct touch of Jesse Lindeman in them — the crawler tractors that followed would be wholly designed by Dubuque engineers and manufactured completely in Dubuque, by Dubuque personnel, and a new era had begun. Sadly, many collectors seem not to realize what a momentous change had occurred in John Deere Crawler Tractor history at this time.

Beginning with "40"C serial number 62264, a completely new design of undercarriage with four-and five-roller tracks was introduced. One hundred tractors later, "40"C serial number 62364 was the first five-roller crawler. The final drives and steering brakes and clutches were also redesigned for better performance and durability. The market took notice, and sales of the "40" C began to climb. With the four-and five-roller track frames, the stability of the tractor was much-improved, and outside companies began to develop loaders, forklifts, and other attachments for the "40"C. Such equipment, when approved by Deere, became known as "Allied Equipment." Although agricultural use of the "40"C was still promoted, it was beginning to dawn on Dubuque management that perhaps the majority of the tractors were being purchased by small contractors, log-

Top: The cover of the introductory literature for the "420" Crawler depicts a four-roller model equipped with an inside-mounted bulldozer blade and PTO digging out a large stump. Originally a black and white photograph, it was "colorized" by an advertising department artist. The tracks are not colored (they should be green), leading the restorers of today to believe they were black.

Middle: This 1956 Phase I (all-green) "420" Crawler is all but hidden by the No. 90 Loader and the grille and headlight guards. These guards were part of optional-equipment package Code "E", which also included provisions for the crankshaft-driven hydraulic pump necessary to run a high-capacity loader like the No. 90. The steel tank mounted on the right fender is the hydraulic reservoir.

Although the tracks (in this instance, street shoes) on this restored tractor are painted black — a common practice among restorers — they left the factory painted green.

Left: Here's a Phase I (all-green five-roller) "420" Crawler which is equipped to handle almost any kind of dirt-moving task its Henry Loader and Backhoe. The grille guard appears to be homemade. Although not visible, this tractor is very likely equipped with a crankshaft-driven auxiliary hydraulic pump in order to operate all of the hydraulic functions.



When John Deere advertised the "420" Crawler as having the capacity to pull three- or four-bottom plow, it wasn't an idle boast. A five-roller "420" Crawler equipped with grille and headlight guards is pulling a four-bottom 66-H Plow.

THE JOHN DEERE 420 CRAWLER

AMERICA'S NUMBER ONE
3-4 PLOW CRAWLER

*"It goes where Wheel-type
Tractors Fear to Tread"*

Top: Breaking up is easy to do... if the job is breaking up concrete. The loader mounted on the Phase I "420" Crawler is unidentified, as is the pneumatic battering ram being fed compressed air by a compressor mounted on the truck at right. The 10-inch street shoes indicates that this "420" C spent most of its life on hard surfaces.

Above: New for the 1957 model year (Phase II) "420" Series was yellow graphics on the hood and grille sides, as well as a 3-Point Hitch. Shown on the cover of this sales brochure is a four-roller "420" C equipped with grille and headlight guards, 14-inch grousers, a 3-Point Hitch, and a tool bar with double-coil spring standards.

This is a color photo, but the tracks appear to be dark gray or black. That's only because the paint is worn off; take a look at the back side of the tracks.

ging and lumber companies, and other industrial concerns. In December 1954, an industrial equipment advertising brochure was published extolling the virtues of the "40" Crawler, Utility, and even the Standard Tractors for

use in non-agricultural applications, and advised that all three models could be obtained with Industrial Yellow paint. Today, these are regarded to be the first modern-era John Deere industrial tractors. In 1955, the ERTL Company offered a toy "40" Crawler painted industrial yellow, and these toys are a very scarce item today.

By the end of "40" C production in mid-October 1955, a total of 11,689 of them had been sold. During the production life of the "40" C, several track options had been added: additional types of grousers, rock guards, oversize front idlers (four-roller only), special sprockets for snow, and an upper-idler assembly for five-roller crawlers. Grille and light guards had also been added to the option list.

For the 1956 model year, Dubuque rolled out the "420" Series Tractors. A new engine with the bore increased by 1/4-inch boosted displacement from 101 to 113 cubic inches. An improved cylinder head, along with other changes, increased horsepower slightly over 15 percent as compared to the Model "40" engine. The engine also got a new cooling system. The old thermo-siphon system had run on the ragged edge of reliability in hard service, and laboratory tests had shown that the system was not as effective as previously thought. To deal with the increase in power, a pressurized cooling system with a water pump was adopted for the "420".

The increase in power and other general refinements were welcomed by customers, and "420" Crawler sales took another jump, being the sales leader of the lineup at just over 36 percent of sales of the Phase I (1956) "420" Tractor lineup.

For 1957, the Phase II models of the "420" line were rolled out. Wearing the new two-tone paint jobs (on agricultural tractors) to match the Waterloo-built "520" though "820", the "420" line introduced a number of new engineering advances. For the first time, a long-awaited five-speed transmission became available for all models, including the crawler. A more important development for



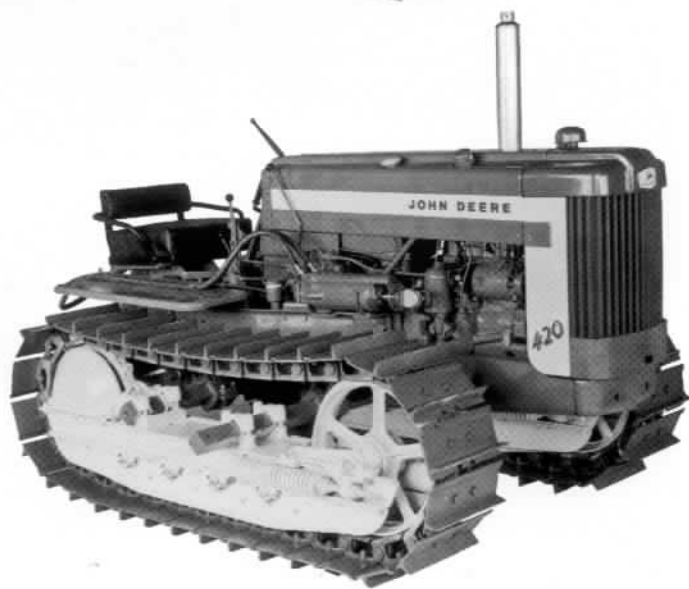
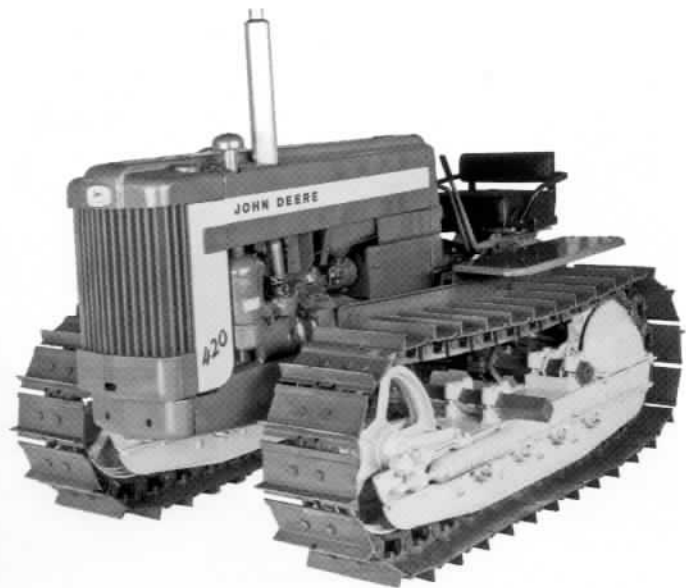
Here: With the combination of a Maine Steel 4DC Bulldozer, a Main Overhead Shovel with 3/3-cubic-yard capacity, and a "420" Crawler with five-roller tracks and an industrial yellow paint job, it was no trick at all to move a lot of dirt in a short time. The street shoes limited dirt work to reasonably dry conditions.

Top Right and Right: A 1957 Phase II "420" Crawler with four-roller track frame, 14-inch steel grousers, a single hydraulic system, direction reverser, and drive sprocket shields. Trying to get a point across, the track shoe assembly is green, not black. Black would show up in the photo the same tone as the seat cushions.

crawler customers was the optional direction reverser. For shuttle operations, the direction reverser was ideal. The proper forward gear was selected and, for reverse moves, all the operator had to do was step on the clutch, move the reverser lever (on the operator's right), and then release the clutch to move backwards at the same speed as the forward speed selected. This speeded up shuttle operations, and was easier on the non-synchronized transmission. The third advance for crawler tractors was the availability of a 3-point hitch, which made crawler tractors even more versatile. A little-known and very rare option was the Heavy-Duty Grille, Light, Engine, and Hood Guard, commonly known today as the "hard nose", which featured the front hood and grille covered with steel plate to protect these areas when a crawler was used in loader service.

With these improvements, 1957 "420" Crawler sales exploded to nearly 9500 units; by far the largest seller in this line of "420s", and accounting for 45 percent of total "420" sales. No doubt this stunning increase in sales was helped along by the active participation of the new John Deere Industrial Division (see the July-August 2006 issue of *Two-Cylinder* for more information concerning the Industrial Division).

For the 1958 model year, John Deere introduced the Phase III "420" Tractors, which introduced a number of advances for the wheel tractors including Power Steering and LP-Gas engines. The Crawler remained mostly unchanged, other than detail improvements here and there, and the availability of an LP-Gas engine.



Studio photo of a five-roller "420" Phase II Crawler that is loaded with options: Three-point hitch, dual hydraulic system, street shoes, and direction reverser (the lever located near the rear of the hood).



Keeping this sawmill in Quebec, Canada, fed was the job of this "420" Crawler equipped with two pieces of allied equipment. The dozer is an LAR Heavy-Duty 1601 Angle Dozer. It had a lift of 30 inches, a digging depth of 15 inches, and could be angled 25 degrees to the right or left.

The Gearmatic Winchdrum was specifically built for logging chores, either in the timber or at the sawmill. Its independent control gave the operator total control of lugging logs out of the timber.

However, the Dubuque Tractor Works and the Industrial Division had a New Year's surprise for industrial customers: the company had listened to the desires, wishes, praises and, of course, complaints about the shortcomings of the "420" Crawlers and their predecessors. In general, customers loved the economy of operation, the low first cost, and the longevity of the tractor even in severe operating conditions. However, many felt that the final drives were somewhat less than adequate, especially when rear-mounted equipment such as backhoes were used; and they wanted a hood built of thicker material to stand the guff of loader and other work, and to provide better protection for the engine and radiator.

The new "440" Series tractors addressed all of these concerns, and then some. Although the basic engine (including an all-fuel version) and regular four-speed transmission (with a five-speed optional) was held over from the "420" Tractors, a new T10474T cylinder block was introduced that moved the dipstick to the right-hand

side of the engine, combined with an easy-access oil filler opening. The final drives and their housings were heavier, and were provided with cast-in mounting bosses so that rear-mounted integral equipment such as backhoes had a sturdy mounting place. The design kept the final drives from "spreading" under heavy rear-mounted loads.

At the front of the tractor a massive cast-iron grille, combined with a grille insert made of 1/4-inch expanded steel, protected the radiator from damage. A new one-piece hood made from 1/8-inch steel was far more able to resist the rigors of industrial service. In keeping with the sleek Henry Dreyfuss design, doors were provided in the hood for fuel-filler cap, radiator cap, and crankcase breather. The air cleaner and its stack were moved to the rear and to the right of the engine, helping to obtain cleaner air and prevent damage to the air cleaner and breather by falling debris from a loader or other front-mounted equipment.

Five-roller tracks were provided as regular equipment,



and either single-point (standard) or hydraulic track tensioners (optional) could be provided. Tread width was set at 48 inches with no optional widths. There were 11 choices of track shoes, ranging from 10- to 14-inches in width, including the 10-inch rubber track shoes pioneered in the Deere crawler line by Jesse Lindeman.

The "440" Crawler also introduced the second-generation Deere direction reverser, changing from the gear type used previously to a clutch-type unit running in oil, specifically Type "A" automotive automatic transmission fluid. The shift lever for the reverser was moved the left-hand side of the tractor. All "420" Crawlers and wheel tractors equipped with reversers also got the new reverser unit a month after the "440" at serial number 131309.

With the ruggedly handsome yet sleek Dreyfuss styling, and time-proven engine and transmission, the new "440" Crawlers were popular and a success from the very start. For industrial users, the \$556.75 difference in cost between comparably-equipped "440" and "420" Crawlers was an easy choice. While both models were more than reasonably priced as compared to much of their competition (at this point Deere's market share of the under-30 horsepower crawler market was about 75 percent), the difference in price between the "440" and "420" was negligible considering the difference in features. However, the "420" Crawler was touted as the "economy" model. As a result, sales of the Phase III "420" Crawlers dropped off considerably as compared to 1957, all of which can be accounted for by the introduction of the "440" Crawler. Still, considering that "420" Crawlers now had an in-house competitor, production of 2998 units of the Phase III versions was still very significant.

The early 440 Crawlers used aluminum-colored mufflers and had script-type decals. Initially, they used the AM3101T Muffler, which clamped to the exhaust manifold below the hood. At serial number 442887, the exhaust system was changed by adding a short pipe and flange that would bolt to the exhaust manifold, and then a muffler could be installed with a clamp above the hoodline.

Top: There's something very appealing about the look of a "430" Crawler in classic John Deere green and yellow. A five-roller model, this "430" Crawler is equipped with a hydraulic system. One circuit is controlling the depth of the four-bottom 555H Plow that it's tugging through some fairly light ground.

Middle: Although there's no forest in sight, this combination of a very early Industrial "430" (note the script-type decals) with five-roller track, grille and headlight guard, and John Deere 101 Fireline Plow could also provide a fire break for a prairie fire. Backing up to clear a clog would be quick and easy, thanks to the clutch-type reverser (black knob on lever near operator's left leg), and depth is easily controlled by the hydraulic cylinder.

Bottom: Another early Industrial Division "430" Crawler with five-roller tracks, with 14-inch steel trackshoes and sprocket covers. The Auburn Trencher mounted on the rear required a special five-speed transmission and other special parts. Once the tractor and trencher had been united, the combination was more or less a dedicated unit not useful for other purposes.



Top: Clearing a path with a "430" Crawler with headlight and grille guard, four-roller tracks (note sag in track, due to the absence of the track-support idler that came with the five-roller setup), and 62 Bulldozer. The special track shoes were for work in snow, and thus were called "snow tracks."

Above: A freshly restored five-roller "430" Crawler sees the light of day for the first time in many months. The optional silencer muffler keeps the tractor very quiet. The rockshaft hanging just above the drawbar is for the 3-point hitch that will be installed later.

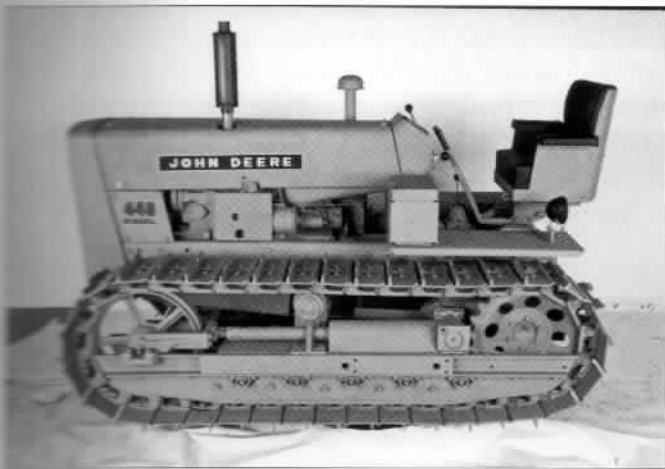
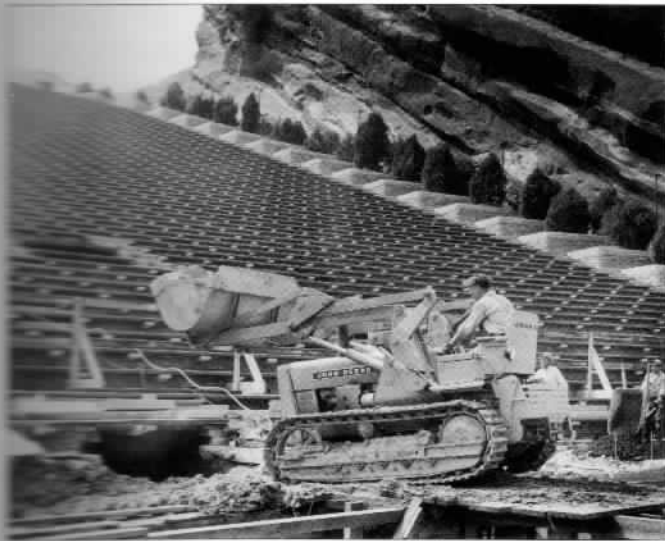
This also allowed the use of a horizontal muffler if lower tractor height was needed. The same change was also made on "420" Crawlers beginning with serial number 135026. There is some doubt about when the color of the mufflers changed. It appears from factory photographs that the aluminum-painted mufflers were used on "440" Crawlers until the beginning of the 1959 model year, which began at serial number 444128. The photographic

record is less sure concerning the paint color on "420" Crawler mufflers built after serial number 135026. There are factory photos that show aluminum-painted mufflers, and photos that show them in black. Therefore, a definitive statement concerning muffler color on the post-serial number 135026 "420" Crawlers simply cannot be made.

The "420" Crawlers were replaced by the mechanically-identical but restyled "430" Crawler in July 1958 for the 1959 model year. Although by this time "440" Crawlers were the choice for most industrial purposes, the "430" Crawler could be equipped for either agricultural or industrial uses. The "hard nose" option introduced for the "420" was retained (see page 10-12 in the "30" Series Sales Information Book), and a special five-speed transmission was available for the installation of an Auburn trencher. Customers of the "430" Crawler could choose from four-or five-roller track frames, four different tread widths, and ten types and sizes of track shoes and grouser, along with industrial yellow paint if desired. Some photos of early-production "430" Crawlers painted industrial yellow show them with script-type model designation decals, and one collector even found a NOS grille for a "430" with the script decals. Perhaps the Industrial Division had some influence on the type of decals used, but later-production "430" Crawlers painted industrial yellow show the block-style model designation decals; there is no known documentation concerning when the change was made.

Little was changed for the "440" Crawlers for the 1959 model year, with the exception of block-type model designation decals which had been adopted for all other John Deere tractors for 1959, although there is some evidence that the change to the block-type decals may have not been carried out on early 1959 models. It appears that the first style of block-type decals were black outlines with a clear or opaque center. Muffler color was black.

As much as customers liked the "440" Crawlers, and as economical as the gasoline engines were, there were customers clamoring for a diesel engine for even more economy of operation. Dubuque had experimented with converting the existing two-cylinder gasoline engines to diesel operation some years earlier, but a succession of broken crankshafts convinced them that such a conversion was impossible without the addition of a center main bearing and other major changes. To be successful, a completely new engine would have to be built from the ground up. Dubuque also could have accelerated development of the four-cylinder engines being developed for the New Generation Tractors and built a two-cylinder version of it (which eventually happened for some tractors built in Europe). But tooling up to build a completely new engine at that time was out of the question, which left but one option open to Dubuque; buy a diesel engine from an existing vendor. To this end, two engines were tested; a General Motors (Detroit Diesel) 2-53 two-cycle, two-cylinder; and a Perkins three-cylinder engine. According to a retired Dubuque engineer, in a series of



Top: Five-roller tracks and a 48-inch tread width were standard equipment on "440" Series Crawlers. Fitted with an 831 Loader designed expressly for the "440" Crawler, the "440" ICD (Industrial Crawler Diesel) is involved in excavation work at Red Rocks Amphitheater, Denver, Colorado. May 1959.

Above: Taken just before Christmas in 1958, this "440" ICD may well be serial number 448086, the first production "440" ICD built; but more likely it's a test tractor spruced up for photo duties.

tests the General Motors engine was smoother than the Perkins engine; and at the end of the tests, the GM engine had shown an advantage. Other factors in favor of the 2-53 were the ability to keep the John Deere two-cylinder tradition, very reasonably priced service parts, and the fact that many industrial concerns had experience with the Detroit Diesel engines, which at the time were the most widely used line of diesel engines in North America and elsewhere. That pretty much settled the matter for domestic customers, although some "440" Tractors assembled in Deere's facility in Mannheim, Germany, were built with the three-cylinder Perkins engine.

The GM 2-53 engine produced about 35 horsepower at the flywheel; so, to keep the gasoline engine used in the "440" in the same horsepower range, some changes to it had to be made. The compression ratio was raised from 7:1 to 7.5:1, a slightly larger carburetor and increased

diameter air-intake tube were adopted, and the engine speed was increased from 1850 to 2000 rpm. These changes put the gasoline engine at more or less even horsepower with the GM diesel engine.

To test these modifications, a group of ten experimental "440" Crawlers and eight experimental "440" Wheel tractors with the new higher-powered gasoline engine were built beginning with serial number 445905 and ending at 445934 (ten production wheel tractors were also built within this serial number range). The experimental tractors were tested extensively, and were eventually rebuilt to the specifications of tractors serial number 448001-up and given new serial numbers in that range.

In order to distinguish the lower-horsepower "440s" from the diesel and the higher-horsepower gasoline versions, the block of serial numbers 445935 through 448000 were not used. With the beginning of the higher-horsepower "440" Series at serial number 448001, the gasoline model was given the designation "440" IC (Industrial Crawler) and the diesel version "440" ICD (Industrial Crawler Diesel). The first "440" ICD was serial number 448086.

The diesel option proved to be popular. During the remaining 15 months of two-cylinder crawler production, 6679 ICDs would be built along with 5062 ICs. Simply put, Deere more or less owned the 35-horsepower class of crawler tractors. Adding the diesel engine to the lineup further strengthened Deere's position.

Aside from detail improvements, and some changes in the GM engine, the "440s" entered the 1960 model year essentially unchanged. It appears from photographic evidence that the model number decals were changed to solid black for the 1960 model year, which appears would have begun at serial number 453873, but no absolute evidence that the decal was changed at that serial number has been discovered. However, it seems logical, since the decals for the agricultural tractors changed at what was the beginning of the 1960 model year. Still, the Industrial Division did things their own way, so perhaps the solid black decals came along a little later. It's another one of those small mysteries we'll likely never be able to solve completely.

Dubuque had one last trick up its sleeve before ending the two-cylinder era, and it was a good one. Beginning in mid-December 1959, the *Pilot-Touch* single-stick control system for controlling the reverser, brakes, and steering clutches with just one lever became available as a \$418.00 option. The first production tractor to have the *Pilot-Touch* option installed was "440" ICD serial number 458175, built on December 17, 1959, and the new system was announced to the trade in January 1960.

The *Pilot-Touch* system took over. With the tractor moving forward, at the end of the run the operator would pull back on the control lever and the following sequence of events would occur almost in the blink of an eye. 1) The main engine clutch would be disengaged, the steering clutches disengaged, and brakes applied. 2) The direction reverser shifted to the reverse position. 3) When the

control lever was moved back to the center position, the brakes would be released, the engine clutch engaged, and the tractor would then be moving backward. Steering the tractor was equally simple — moving the stick to either the left or right steered the tractor in the desired direction. Moving the stick to the forward position simply reversed the process. The single-stick option left one hand free to control dozer blades, loaders, and other hydraulically-actuated equipment.

The *Pilot-Touch* system was a great leap forward in crawler tractor technology, and over 1400 IC and ICD tractors were equipped with it. The operators swore by it, when it worked. The mechanics who had to work on a malfunctioning *Pilot-Touch* system tended to swear at it, as it was complex and rather finicky about adjustment, requiring a deft touch to service correctly. After months of trying to get its problem child to behave on a consistent basis with little success, Dubuque finally issued orders to call them all back to be converted back to regular crawlers and refitted with regular controls. Like the low-radiator Model "G", it is possible that a few "440" Crawlers fitted with the *Pilot-Touch* control escaped the

mandatory recall program. A single-stick "440" Crawler would indeed be a treasure, as no one is ever going to build the parts to re-equip one.

On February 29, 1960, the Dubuque Tractor Works turned out its last two-cylinder agricultural and industrial wheel tractors, and also canceled the "430" Crawler. However, this was not the end of two-cylinder crawler production at Dubuque. Production of the "440" Crawler continued up to the last day in March of 1960 in an effort to fill existing orders, and to keep the pipeline reasonably full to Industrial Division dealers during the shutdown to change over to building the New Generation Tractors. On March 31, 1960, the last "440" ICD, serial number 461925, was built; and four tractors behind it came "440" IC serial number 461929, which was powered, fittingly enough, by a later version of the basic engine design that had powered the first Model "M" tractor to be assembled at Dubuque in March of 1947. From December 28, 1948, until March 31, 1960, Dubuque had built 58,854 crawler tractors with two-cylinder engines. It would only take Dubuque another two months to be ready to begin building New Generation Crawler Tractors, but that's a story for another time. ☺

MODEL COMPARISON

Model	* Bore/Stroke	Displacement	H.P.	Rollers	No. Built	Weight (lbs)
Lindeman/JD "GPO"	6"x6"	339 c.i.	25.36	4	24 (est.)	5650
Lindeman/JD "BO"*	4-1/4" x 5-1/4"	149 c.i.	15.07	3	See Note*	4420
Lindeman/JD "BO"	4-1/2" x 5-1/2"	175 c.i.	18.31	3	1675 (total)	4420
John Deere "MC"	4"x4"	101 c.i.	20.12	3	10,509	3679
John Deere "40" early	4"x4"	101 c.i.	23.64	3	2263 Gas	3825
John Deere "40" early	4"x4"	101 c.i.	19.13	3	29 All-Fuel	3825
John Deere "40" late	4"x4"	101 c.i.	23.64	4/5	9173 Gas	4076/4572
John Deere "40" late	4"x4"	101 c.i.	19.13	4/5	253 All-Fuel	4076/4572
John Deere "420"	4-1/4"x4"	113 c.i.	27.39	4/5	17,648 Gas	4236/4800
John Deere "420"	4-1/4"x4"	113 c.i.	22.73	4/5	234 All-Fuel	4236/4800
John Deere "420"	4-1/4"x4"	113 c.i.	27.39	4/5	4 LP-Gas	4290/4854
John Deere "440" early	4-1/4"x4"	113 c.i.	27.39	5	4783 Gas	6024
John Deere "440" early	4-1/4"x4"	113 c.i.	22.73	5	10 All-Fuel	6024
John Deere "430"	4-1/4"x4"	113 c.i.	27.39	4/5	2214 Gas	4371/4986
John Deere "430"	4-1/4"x4"	113 c.i.	22.73	4/5	33 All-Fuel	4371/4986
John Deere "430"	4-1/4"x4"	113 c.i.	27.73	4/5	4 LP-Gas	4427/5042
John Deere "440" late	4-1/4"x4"	113 c.i.	31.91**	5	5062 Gas	6024
John Deere "440" late	3-7/8"x4-1/2"	106 c.i.	32.88**	5	6679 Diesel	6374

All weights shown are for tractors equipped with regular 10-inch steel track equipment (when available), and are base shipping weights with no options.

*Note: There are no records known to us concerning how many "BO" Tractors with the 149 cubic-inch engine were converted by Lindeman into Lindeman-John Deere "BO" Crawlers. The 149 cubic-inch engine was used in "BO" Crawler Tractors built from 326109 through 328999. All later "BO" Crawlers used the 175 cubic-inch engine that was adopted beginning with serial number 329000.

In regard to Model "40" Tractors, "early" refers to 3-roller tractors serial numbered 60001 through 62263, "late" refers to Model "40" Tractors serial numbers 62264—up with either 4- or 5-roller tracks.

Regarding "440" Tractors, "early" refers to tractors serial numbered 440001 through 445934. These tractors used the same engine, and therefore had the same horsepower ratings, as the "420" Tractors. The "430" Tractors also used the same engines as "420s". The LP-Gas versions were never tested at Nebraska, so figures for the gasoline engines are used. Late "440" Tractors refer to those with serial numbers 448001—up. The engines in these tractors were modified as compared to "420" engines. See text.

**In 1959, beginning with Test No. 684, the Nebraska maximum power tests were taken at the PTO instead of at the belt. The first John Deere crawlers to be tested in this manner were the "440" IC and "440" ICD Tractors. All figures prior to the "440" Tractors reflect maximum belt horsepower.