

## Ronnings Win Patent Race

In reference to patent protection mentioned by Mr. Mixer, it developed that in 1925 Ronning & Ronning were granted the basic patent on the conception of a motor cultivator in which steering the tractor and laterally swinging the cultivator rigs were one and the same function. Their patent application was dated March 6, 1916; Joseph Dain's, June 6, 1916; Theo Brown's, July 10, 1916, and Ed Johnston's, October 25, 1916.

It is of interest to note that Ronning's patent was issued in 1925, the same year that International Harvester sold their first 250 Farmall tractors. The Farmall tractor equipped with cultivator was held to infringe the Ronning patent, so International Harvester paid handsomely for its use -- \$1.00 for every tractor, whether or not equipped with cultivator.

Six patents were issued to Deere on its 1916-1917 motor cultivator efforts, Nos. 1,441,476, 1,426,544, 1,441,480, 1,451,672, 1,476,687, and 1,667,843.

## More Powerful Engine

It was found necessary to provide an engine for the motor cultivator with more power than that of the New Way air-cooled engine used on the first experimental outfit. The Associated Manufacturers Co. of Iowa was contacted and their engineer, Theodore Menges, designed a new engine for the job which when built did not prove a success.

The next step was to retain McVicker, a consulting engineer, of Minneapolis to design a twin-cylinder, hopper-cooled engine. This engine was built for Deere & Co. by the Associated Manufacturers Co. At the same time the Plow Works was working on a complete re-design of the whole tractor outfit to make it suitable for manufacture.

During this period of development the possibility of using other implements with the tractor was advanced to the point of actual field work. Removing the cultivator rigs and running the tractor backwards made a general purpose tractor of the job. How this was accomplished can best be seen in Figures 57 through 60.

These various implements worked with some measure of success. On September 12, 1916, W. R. Morgan, Manager of the Harvester Works, reported to the Board of Directors that "the original tractor cultivator has been taken to the Harvester plant, and that he had attached the machine to a mower and tried it out quite successfully."

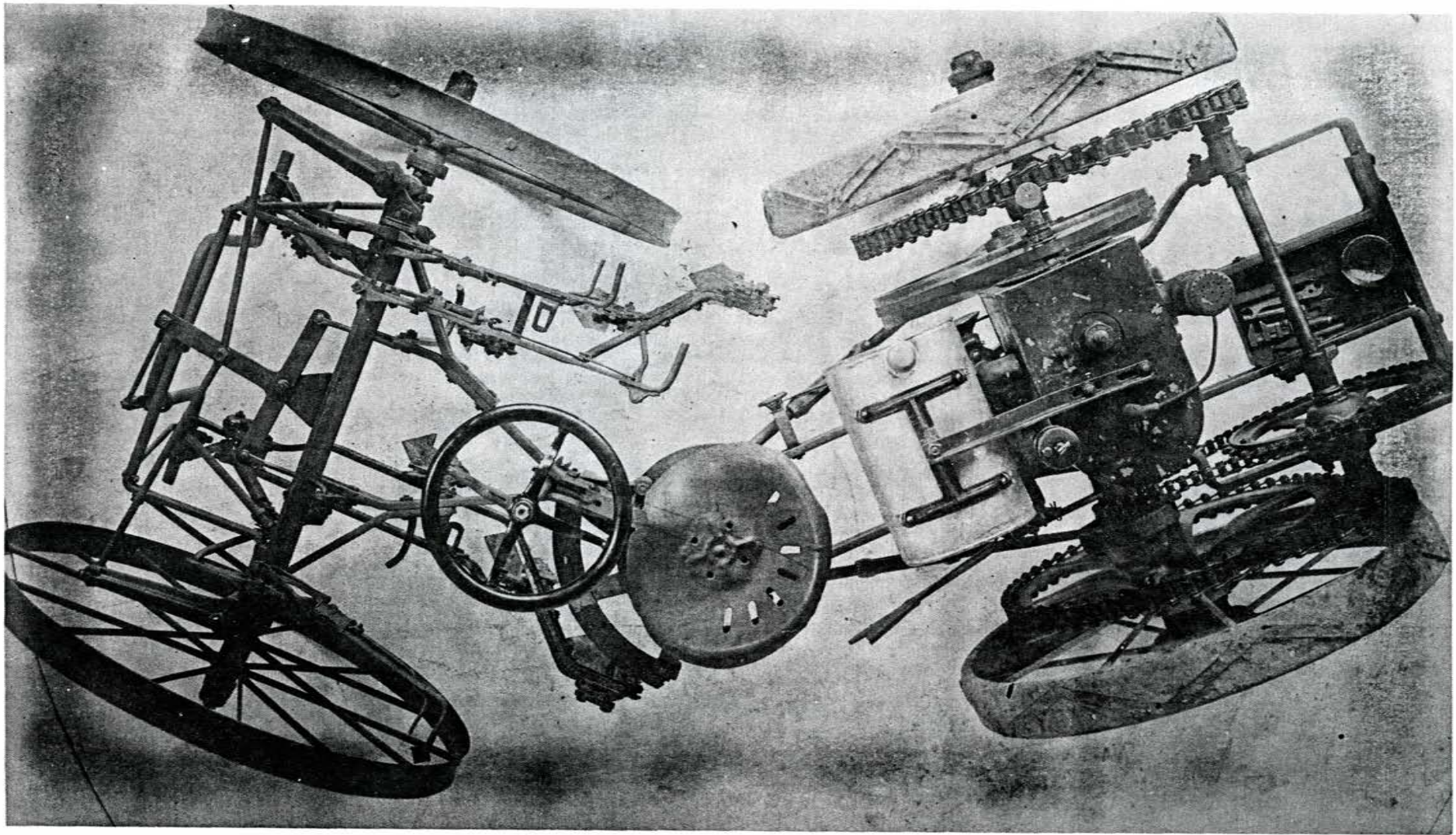


Figure 48

FIGURE 48 -- An overhead view of the Brown one-row cultivator. The operator steered the rig in the field by dodging the rigs, which also pivoted the front wheels; the steering wheel, which controlled the pivot joint between front and rear trucks, was used for turning at row ends.

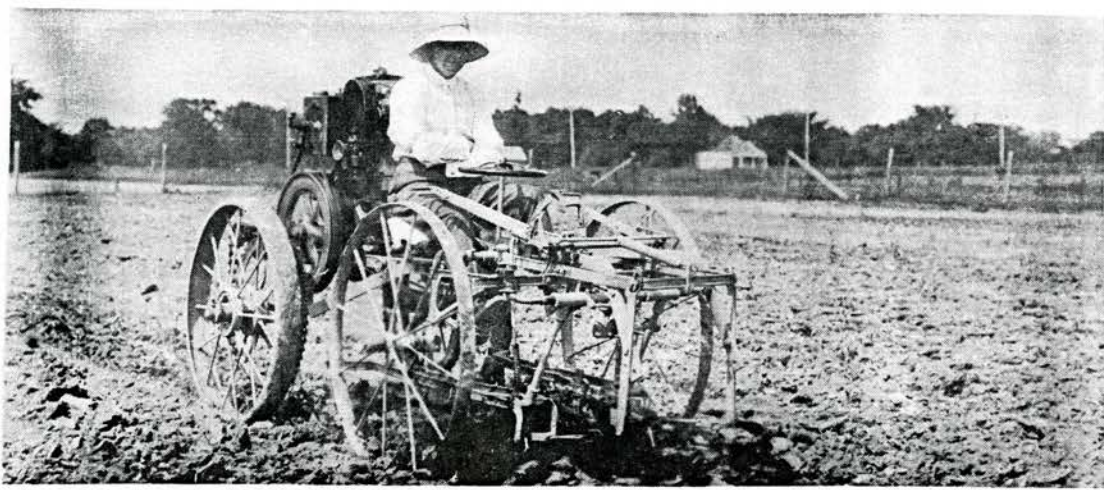


Figure 49



Figure 50

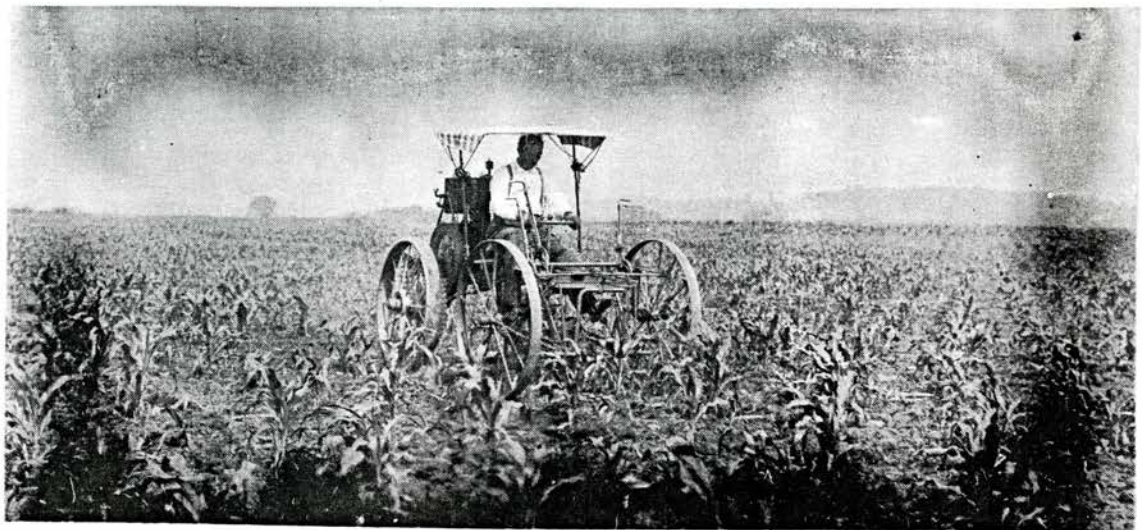


Figure 51

FIGURES 49, 50, and 51 -- The Brown cultivator at work. Field performance of this cultivator was good, and demonstrated that the principle of cultivating in this manner was practical and sound.



Figure 52



Figure 53

FIGURES 52 and 53 -- Gus Bischoff operating the Brown cultivator in July, 1916. This outfit was used throughout the 1916 cultivating season with a considerable measure of success.



Figure 54

FIGURE 54 -- This photograph was taken early in July, 1916, when the Deere & Co. Washington, D. C., patent attorney, H. H. Bliss, came to Moline to get first-hand information about patentable features of the Brown motor cultivator. Left to right are Dr. W. E. Taylor, Theo Brown, Mr. Bliss, Gus Bischoff, George W. Mixter, Floyd R. Todd, Joseph Dain, Sr., and Harold B. Dinneen.

## Dinneen Reports Progress

A complete redesign of tractor and engine was completed in December, 1916. On January 16, 1917, H. B. Dinneen, manager of the Plow Department, reported to the Board of Directors on the progress of the tractor cultivator to date as follows:

- "1. The machine other than the engine had been carefully worked over and is apparently ready to manufacture subject to Texas trials.
- "2. A two-cylinder hopper-cooled engine designed by McVicker has been built by the Associated Manufacturers of Waterloo.
- "3. Tests of the engine as well as suitability and design were satisfactory, except:
- "4. That the water consumption at 3 gallons per hour at steady full load when running continuously in the shop, seemed excessive.
- "5. That the time available did not permit further major changes in engine design for machine to be furnished the spring trade. After reviewing the matter at length it seemed probable to the Board that the engine would be satisfactory for cultivating, and that the water consumption would be rather less under field conditions than during the shop trials."

### Board Orders 25 Tractor Cultivators

The Board passed the following resolution:

"That the recommendation of Mr. Dinneen that material for fifty machines with the two-cylinder engine be provided and that twenty-five machines be built as rapidly as possible, it being understood that two machines are to be tried in Texas at the earliest possible date, and the continuance of work on the twenty-five machines and the possible completion of fifty machines, be again considered after the Texas trials."

Work on the twenty-five machines was carried on at the Marseilles plant. (NOTE: In those days there was not the engineering knowledge nor the accuracy in manufacture that exists today, so as a result the troubles and difficulties in building the twenty-five outfits were many and the finished product would in no respect meet today's standards.)

On February 17, 1917, the first tractor was completed, and photographs were taken on February 22 (Figures 55 and 56).

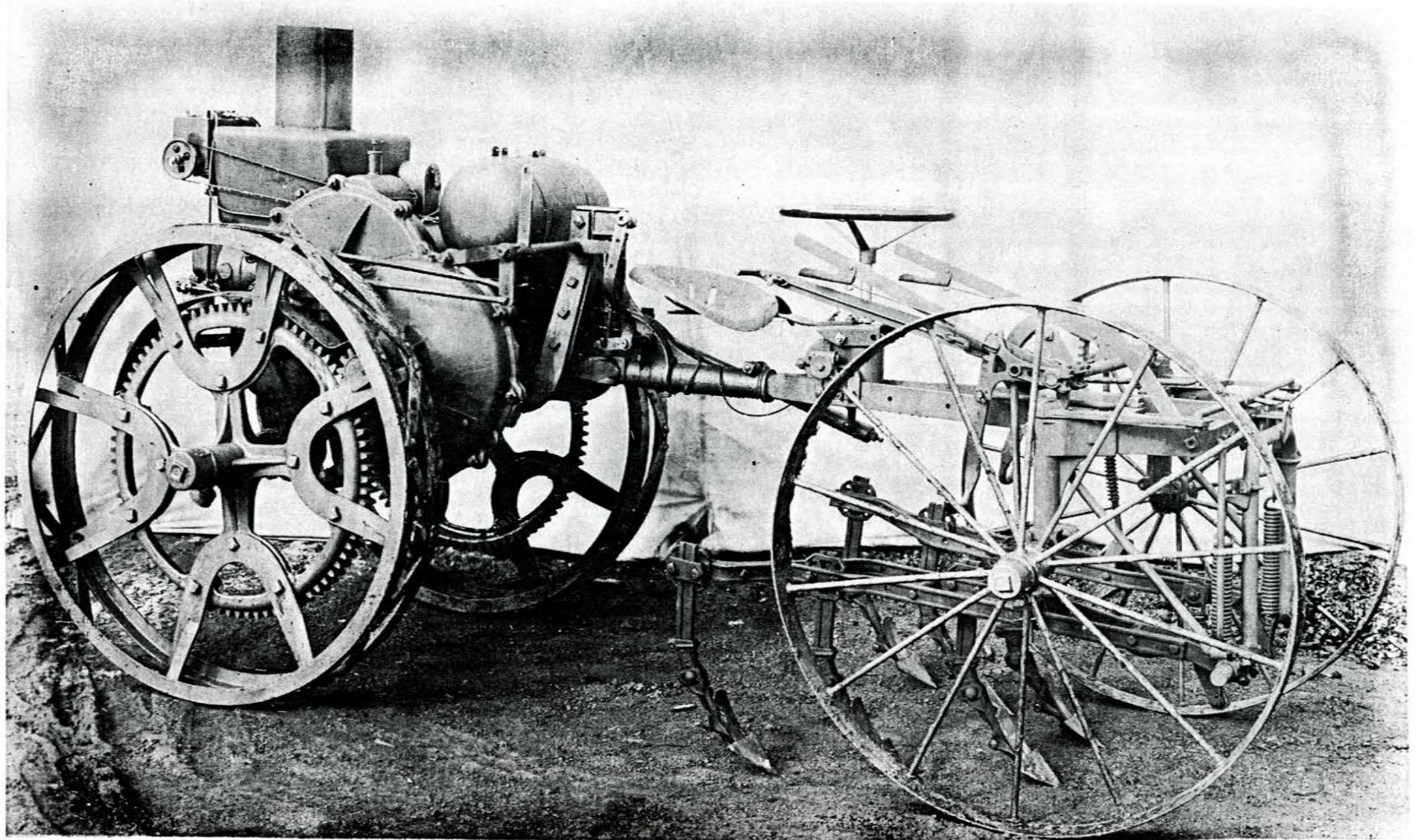


Figure 55

FIGURE 55 -- One of the twenty-five one-row "Tractivators," equipped with McVicker two-cylinder hopper-cooled engines, built at the Marseilles plant (now John Deere Spreader Works) in East Moline in 1917. Tested throughout the middlewest, they did good work and were easy to operate, but unfortunately did only about as much work in a day as a man with a team and horsedrawn cultivator.

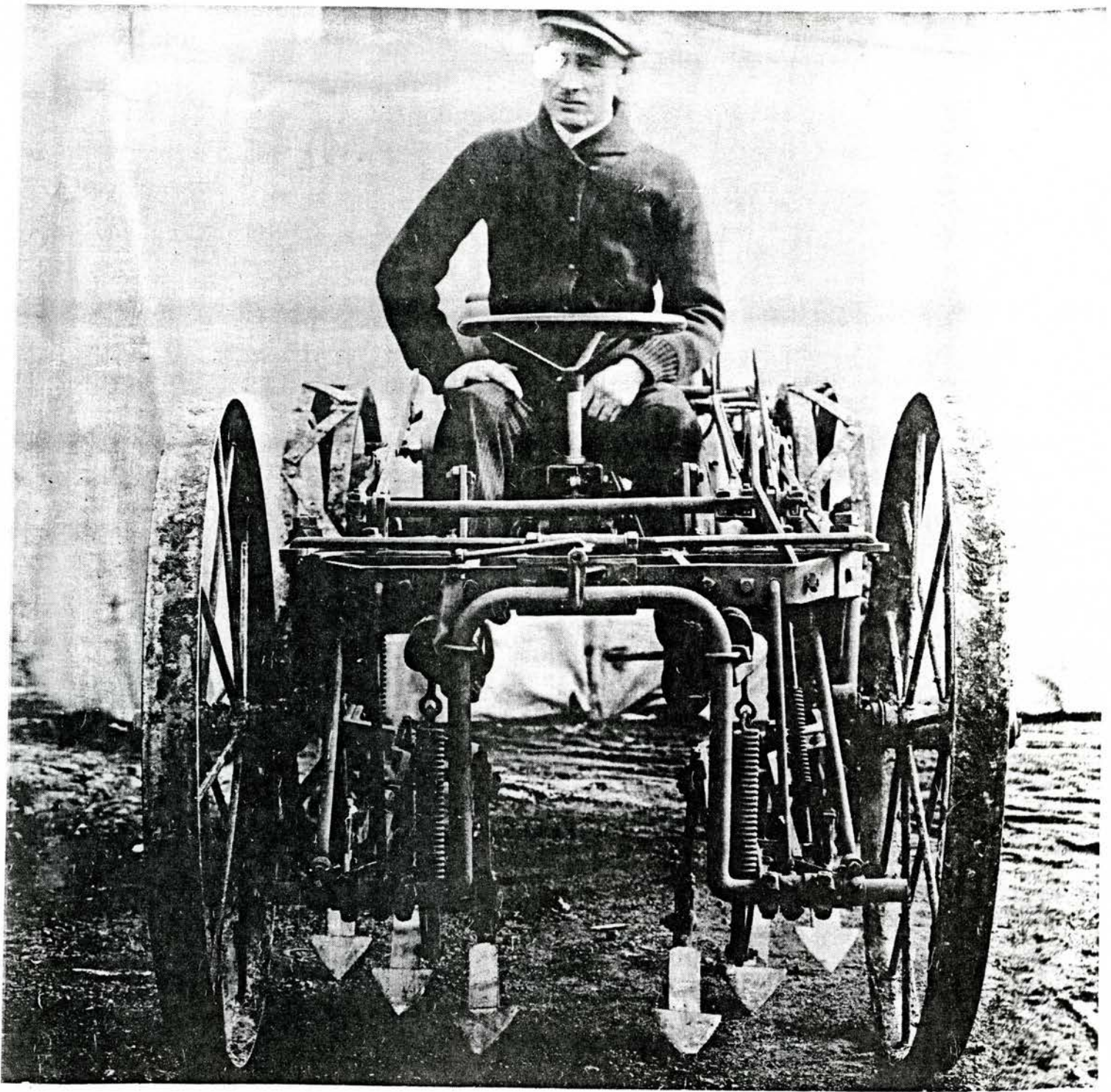


Figure 56

FIGURE 56 -- Front view of the "Tractivator" with Mr. Silver on the driver's seat. These implements proved the soundness of the basic principle of dodging and steering by a single operation.



## Stone-Boat Endurance Test

On March 10 two motor cultivator outfits were started on an endurance test, dragging stone-boats in the muddy field behind the Marseilles plant. Conditions made it possible to conduct the tests there instead of going to San Antonio.

On March 14, George Mixter reported to the Deere & Co. Board of Directors:

"We expect to have 25 machines available by the 15th of April. There have been two machines in the field here and they have shown some pretty good characteristics. The engine pulls to a degree he did not think was possible, and the proposition is looking better right along. He said that on the basis of costs recently made up the tractor would probably have to be sold to the farmer for \$475.00. He said that the work of getting out 25 machines is being pushed very vigorously, and if we come through with the proposition as well as we hope, we are going to have a problem immediately in front of us for the production of these machines for sale a year from this spring."

On March 7, 1917, letters had been sent to the following Branch Houses: Moline, Omaha, Minneapolis, Kansas City, St. Louis and Indianapolis which said in substance, "The motor cultivator has now reached a stage of development where we want to put out twenty-five machines to work continuously cultivating corn during the spring and summer; and after the corn is cultivated, cutting hay." Each Branch House listed was assigned a definite number of tractors.

### New Machine Named "Tractivator"

On April 10, L. R. Clausen was put in charge of the motor cultivator (now called Tractivator) program.

The twenty-five Tractivators were built at the Marseilles plant and sent to the Branch Houses as designated. All of these outfits were used for cultivating corn, and some were later used for cutting hay. Special factory men followed these Tractivators and made daily reports. A complete set of the reports is in the Patent Department files, and a careful study of these reports gives a rather complete picture of the field performance of these 25 Tractivators and the reactions of the men who used them.

The reports clearly indicate that the Tractivator as a cultivating outfit performed satisfactorily both as to quality of work and ease of

operation. Thus, the basic idea of shifting the cultivator rigs in dodging corn and steering the tractor with one and the same operation was proved to be sound.

However, the reports revealed that a man with the Tractivator did not accomplish any more work in a day than he could with a pair of horses, and for that reason he could not afford to buy the Tractivator. A study of the reports gave the answer as to why the outfit failed. The reasons listed were as follows:

1. Lack of sufficient power to work on hilly ground.
2. With a one-speed transmission, the tractor ran too slow for most conditions, and this was aggravated by the lack of engine power.
3. Excessive evaporation of water in the hopper-cooled engine, amounting to as much as two gallons an hour. It required time and effort to replace the water.
4. Leaky carburetors gave a low efficiency engine.
5. Excessive consumption of lubricating oil, due partially to poor workmanship, was both expensive and annoying.
6. Added to the above complaints was the fact that many of the Tractivator users had heard of, and some had seen, the new International Harvester motor cultivator (Figures 61, 62 and 63) which was a two-row cultivating outfit enabling a man to do twice the work of a one-row. This International Motor Cultivator was brought out in 1917, but was subject to upsetting due to the power plant being mounted above the rear drive wheels. It was not commercially successful. The small-diameter drive wheels left deep and objectionable tracks which the front-mounted rigs could not smooth out.

#### Single-Row Idea Dropped

In view of all the reports on the Tractivator, the 25 outfits were returned to the factory and all activity on the single-row idea was dropped. In 1916 it was thought a motor cultivator should be of implement construction, rather than of automotive design and precision manufacture. Had the Tractivator been as well-engineered and as well-built as present day one-row cultivating tractors the one-row idea in 1916 would have found a more ready acceptance.

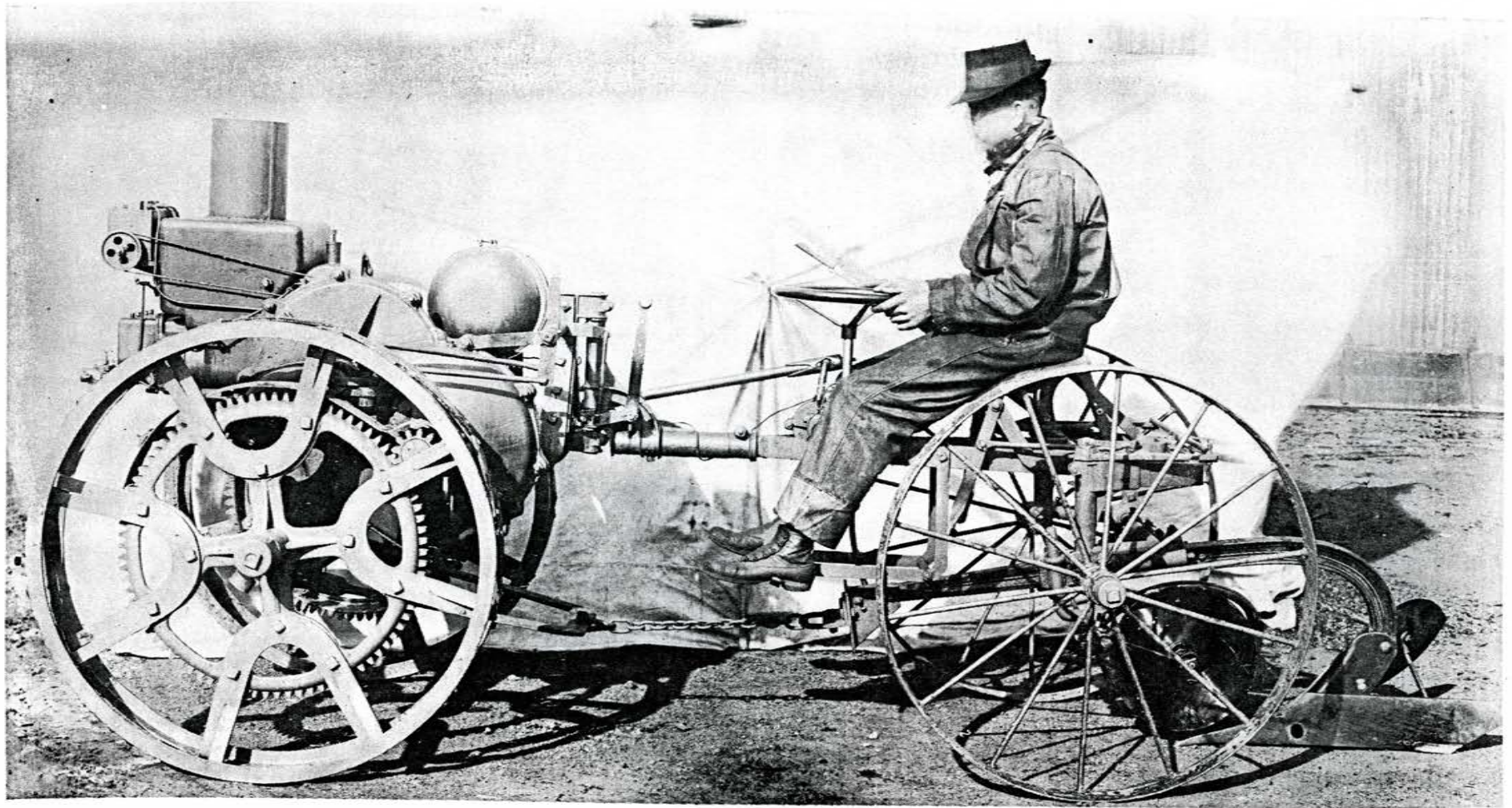


Figure 57

FIGURE 57 -- While McVicker was designing a new engine for the "Tractivator," the John Deere Plow Works was redesigning the tractor frame to simplify manufacture, and also with the idea of removing cultivating rigs and running the tractor "backward" for other work, such as plowing.

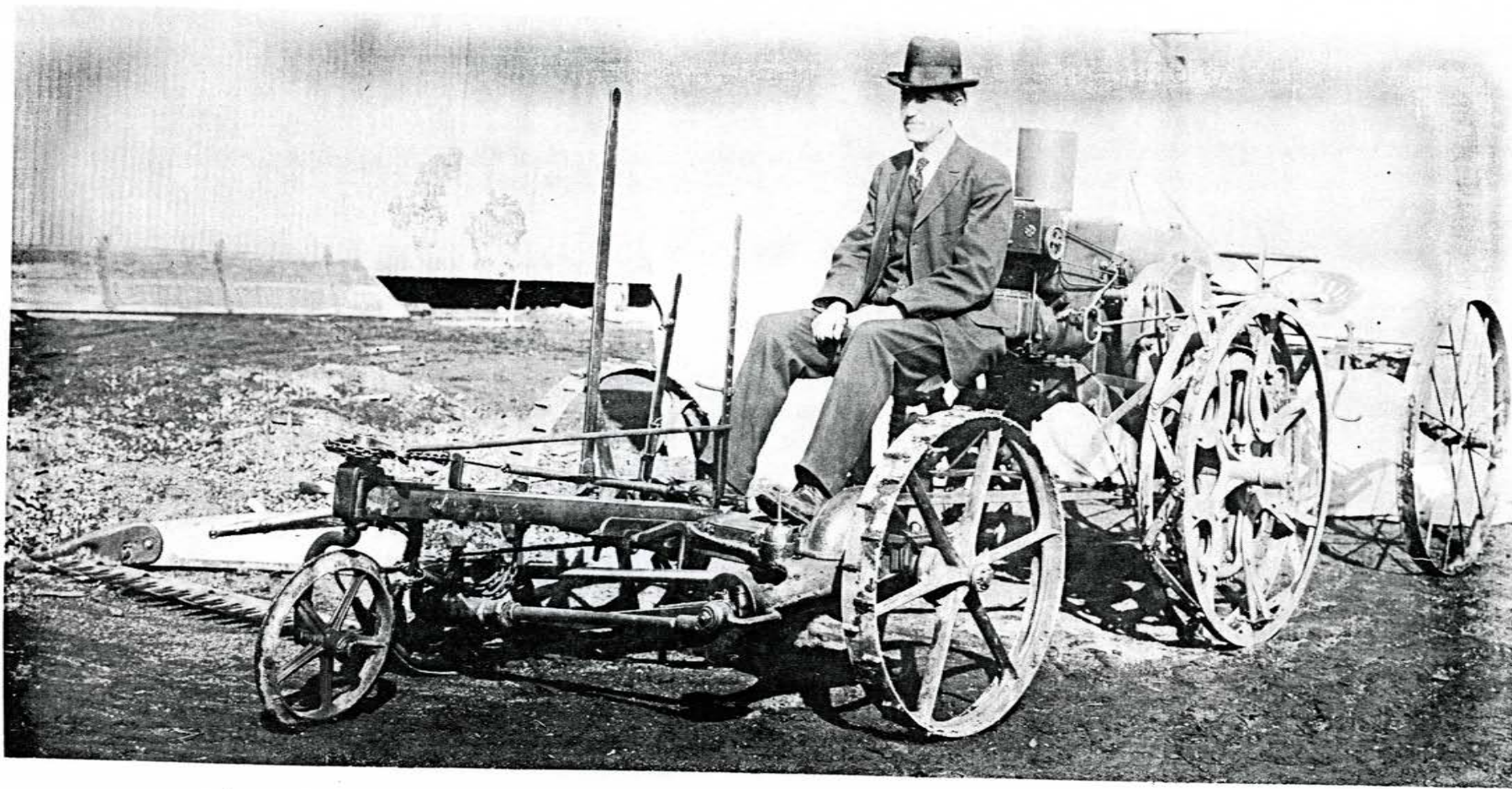


Figure 58

FIGURE 58 -- Here the reversed "Tractivator" is shown pushing a horsedrawn mower equipped with a tongue truck. R. C. Livesay, shown on the "Tractivator," was a member of the John Deere Harvester Works Experimental Department, and developed the idea of pushing the mower in front of the tractor.

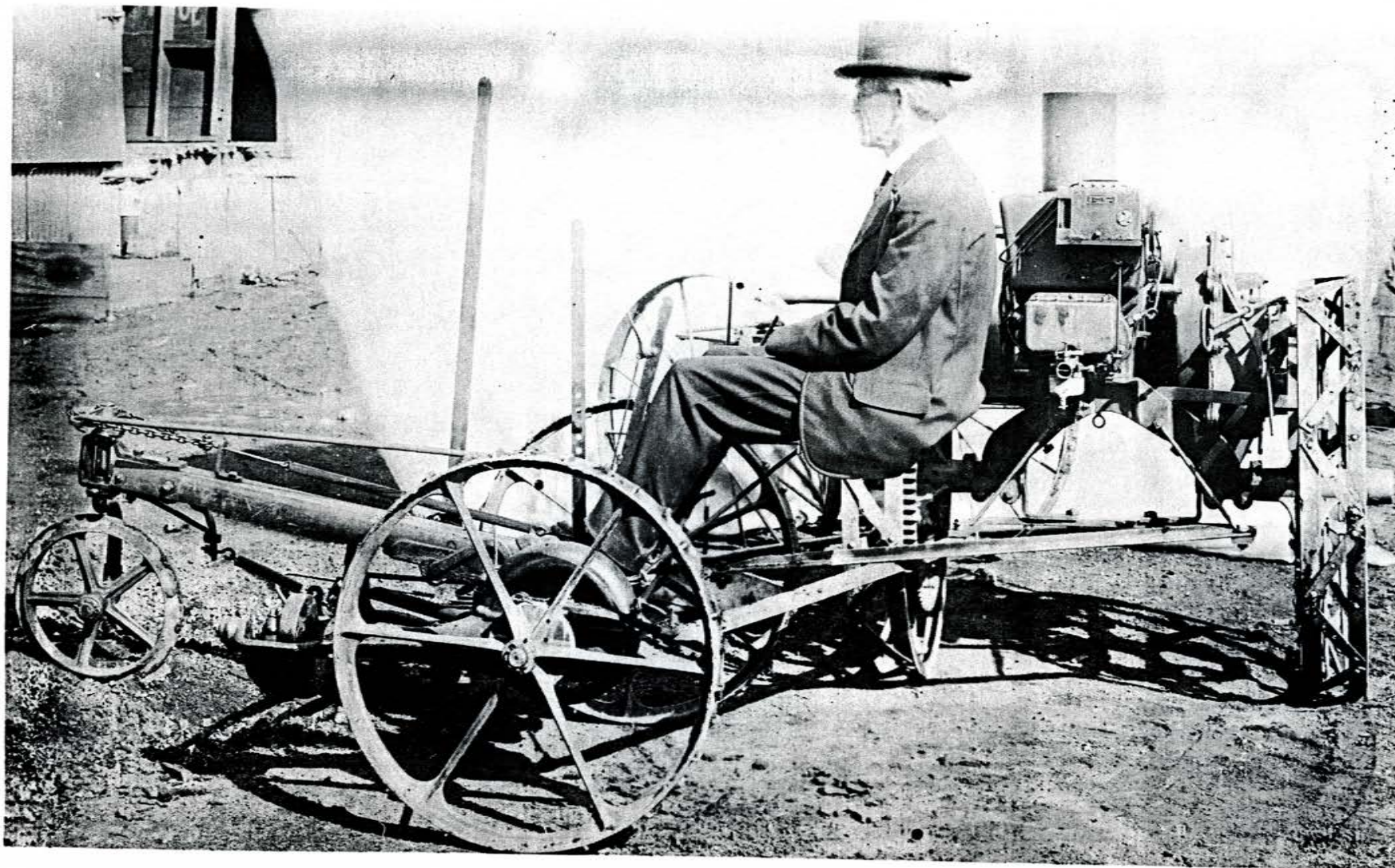


Figure 59

FIGURE 59 -- The "Tractivator" had a very short turning radius when used for mowing. A pivoted dirigible wheel was attached to the stub tongue of the mower, and controlled by the operator to steer the outfit, by means of a lever.

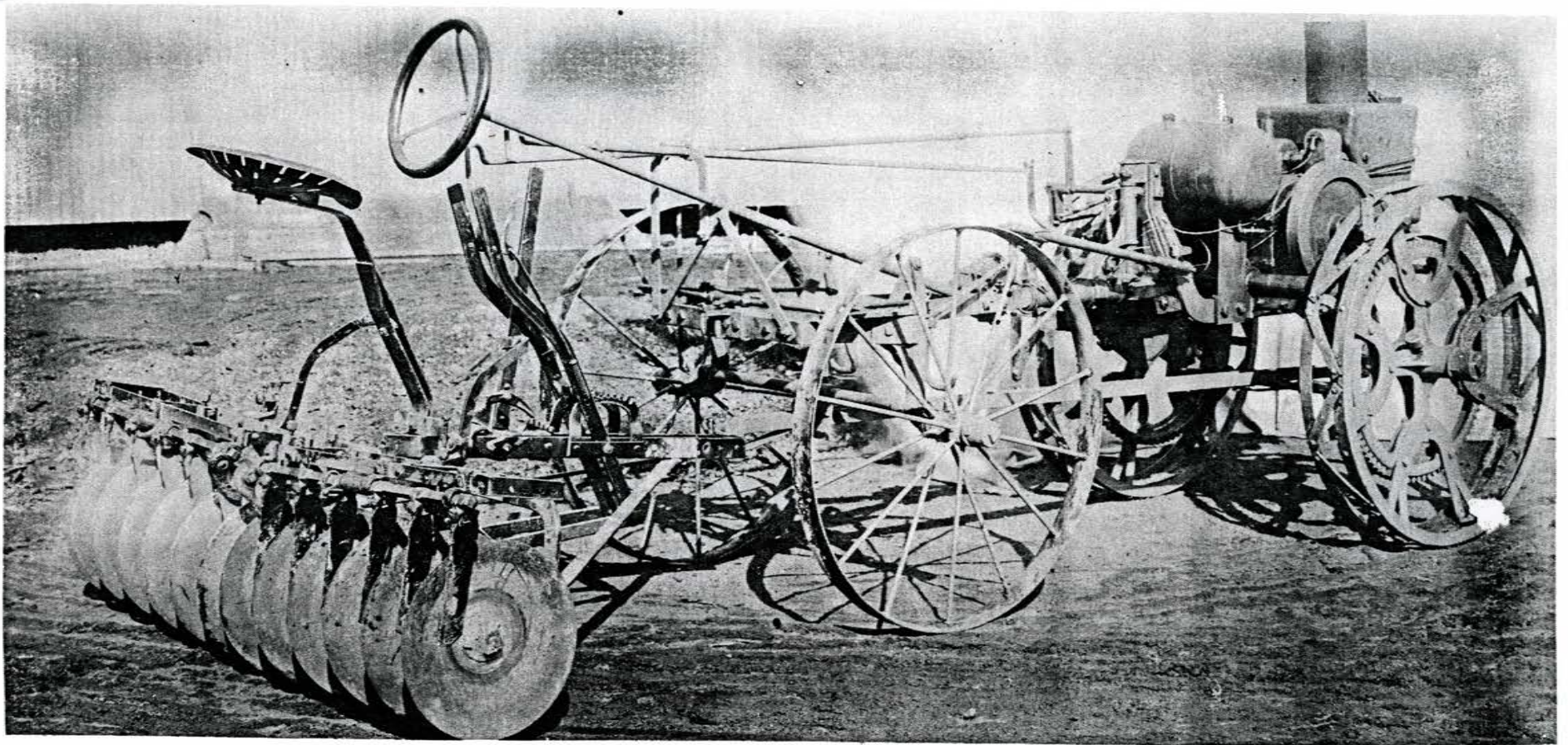


Figure 60

FIGURE 60 -- Here one of the twenty-five 1917 "Tractivators" has been modified for disking, with extensions on the tractor controls for one-man operation.

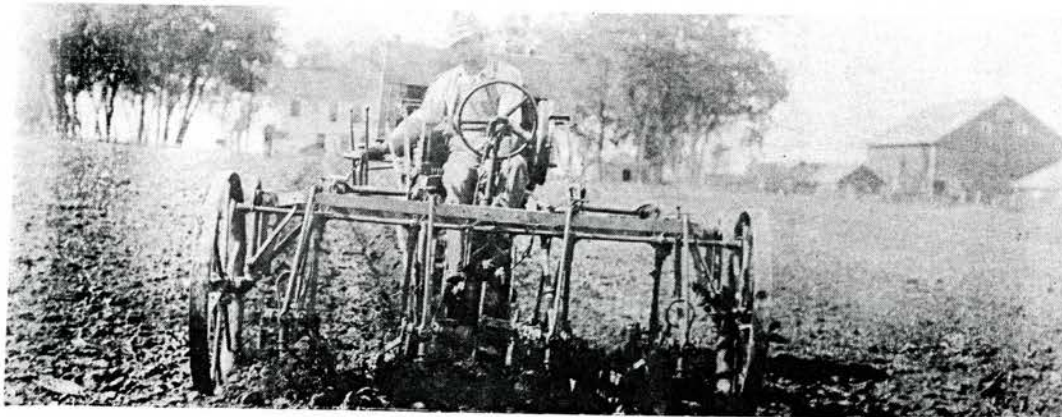


Figure 61

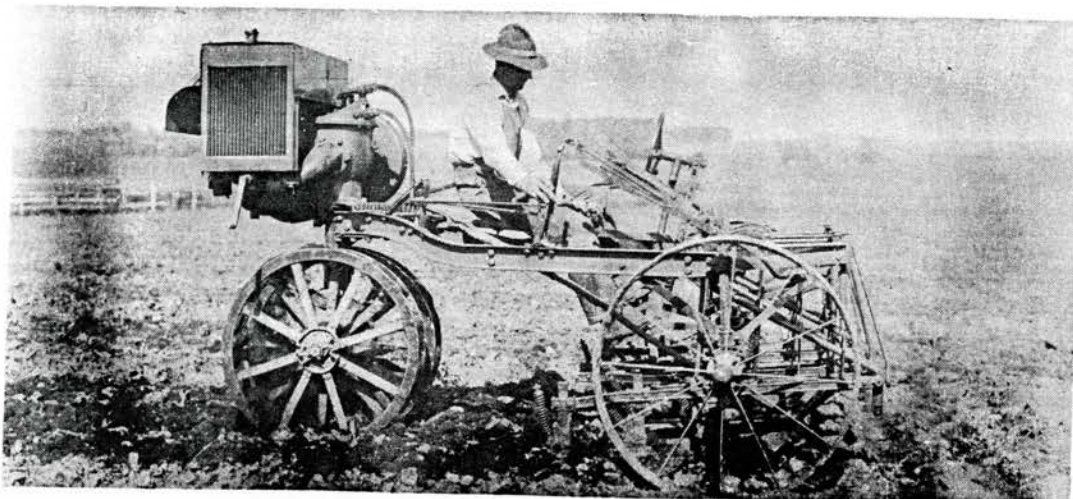


Figure 62

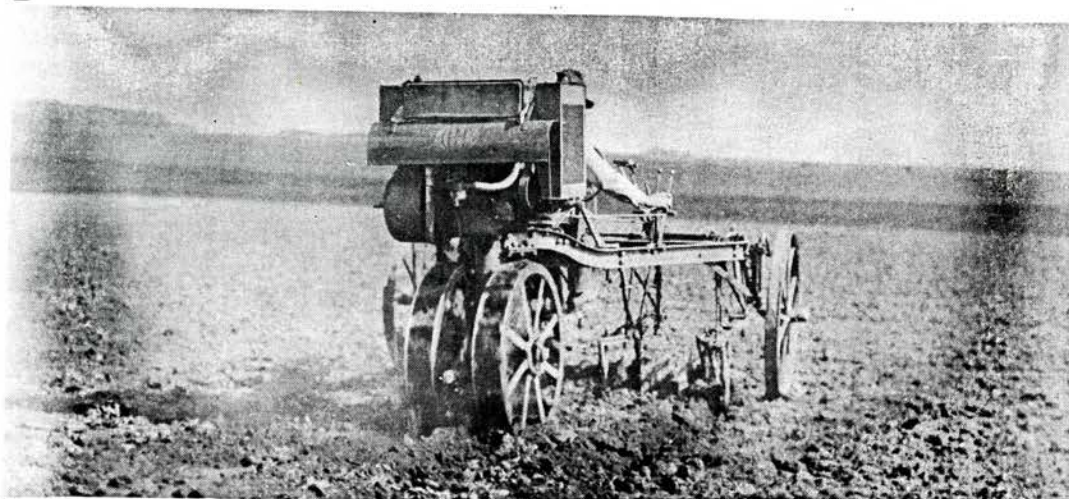


Figure 63

FIGURES 61, 62, and 63 -- This International Harvester 1917 motor cultivator had the advantage of two-row capacity, but the power unit had such a high center of gravity that the outfit was subject to upsetting, and the small driving wheels cut into the cultivated ground, making too much of a ditch or furrow. These pictures were taken June 23, 1917, on the farm of Ben Sechler at Olin, Ia.