

REMOTE CONTROLLED SOLAR POWERED WHEEL LINE MOVER

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ABSTRACT

The engine used to power a standard forward roll wheel line can be difficult to maintain and keep properly serviced during the busy summer months. The short running time of the engine while moving the line from set to set is not conducive to reliable operation and extended life. Replacing the engine with a DC electric motor has proven to be an effective means of powering a wheel line. Batteries charged by solar panels provide the power source for the motor. This combination provides a reliable drive system requiring a minimum of maintenance.

This drive system can be fitted with a radio remote control to allow operation of the wheel line within a 900 feet radius of the driver. Remote control allows the irrigator to move a wheel line from the end without traveling to the driver and the harvest or tillage equipment operator to move a wheel line out of the way without leaving the machine.

Key Words: solar, remote control, wheel lines, DC electric motor, time, money

INTRODUCTION

During the growing season it is essential that irrigation water be moved in a timely manner. Any time lost in repairs or unplanned maintenance to the irrigation system is not only lost watering time but time lost by the owner when other work must be done. The gasoline engine used to power wheel lines can be a significant source of problems and down time. The limited running time, usually less than 1½ minutes per move, tends to foul the spark plug making starting difficult. Further, it does not allow the engine oil to warm up for proper lubrication, resulting in shorter engine life.

A significant amount of time can be spent moving an end fed wheel line from set to set. An irrigator must first unhook the hose from the feed end then go to the driver, start the engine, move the line to the next set, and return to the end and reconnect the feed hose. Additionally, during harvest and tillage operations time is lost while the operator shuts the machine down in order to move the wheel line out of the way, this time can add up if there are several wheel lines.

A solution to these problems would constitute a significant improvement to the operation and maintenance of forward roll wheel lines. After careful evaluation it was concluded that a small electric motor powered by batteries charged by solar panels would be sufficient to replace the 7 hp engine currently used on most wheel lines. In addition this all-electric drive system could be remotely controlled. The first prototype with remote control was placed into service for the 1996 growing season. Over the next two years many improvements were made and proven by field-testing.

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EASY MOVE DRIVE SYSTEM

The ***EASY MOVE*** drive system was originally designed around a standard Western type hydraulic mover with a horizontal shaft pump/engine combination on an industry standard forward roll wheel line. The drive system consists of a 1 ½ hp DC electric motor, 2 commercially available deep cycle batteries and a small solar panel array affixed to a sheet metal cover that replaces the original driver cover. Similar designs are currently being evaluated for the vertical shaft pump/engine-type mover and the hydrostatic-type mover.

A remote control feature can be added to the drive system. The remote control consists of a radio signal receiver and a switch control unit mounted on a panel under the driver cover, a hydraulic valve conversion from manual to electric operation, an external antenna mounted to the driver frame and a hand held transmitter. A single transmitter can control up to 8 separate wheel lines at a distance of up to 900 feet from the driver.

The rate of travel of the wheel line with this system is slightly slower than an engine drive. The reduced travel rate allows easier positioning of the line at each set and allows the line to track better on set to set moves as well as on roll-backs.

The ***EASY MOVE*** will be sold as a kit that can be installed on existing drivers in the field or on new drivers as they are put into service. Common hand tools are all that is necessary for installation.

ADVANTAGES OF THE *EASY MOVE* DRIVE SYSTEM

The ***EASY MOVE*** system replaces the gasoline engine with an electric motor, which is much better suited to the type of short duration operation encountered with moving a wheel line. The only maintenance required is a periodic check of the battery water level and solar panel surfaces to be sure they are clear of hard water scale or anything else that would reduce the efficiency of the panel.

The remote control offers several advantages:

Used with an end fed irrigation wheel line, the line can be operated from the end, therefore considerably reducing the time necessary to move the line from set to set. While the line is traveling the irrigator can be moving the valve opener, swing line, and hose to the next set so that it is ready to hook up when the line has arrived. This time savings means that either there is less water down time when making sets for a given number of lines or that one irrigator can move more lines in a designated water down time.

2. Roll backs of wheel lines where an end pipe must be added or dropped can be done in less time with one person since the line can be stopped and restarted from the end where necessary. In some cases this feature could eliminate an extra man stationed at the driver during roll-backs.

3. Remote operation also eliminates ATV tracks or foot tracks in the crop that would otherwise be made getting to the driver.
4. Harvest and tillage operations are made easier because the wheel line can be moved from the tractor seat on the go. No machine down-time is incurred while the operator moves a line out of the way.

CONCLUSION

The *EASY MOVE* with remote control provides a reliable, labor saving alternative power source for conventional forward roll wheel lines. Initially the *EASY MOVE* will be available for the Western-type horizontal shaft pump/engine mover on wheel lines up to 3/8 mile in length. Designs will soon be finalized for vertical shaft pump/engine movers and hydrostatic type movers.

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