FOCUS
Harrisburg Area Museum
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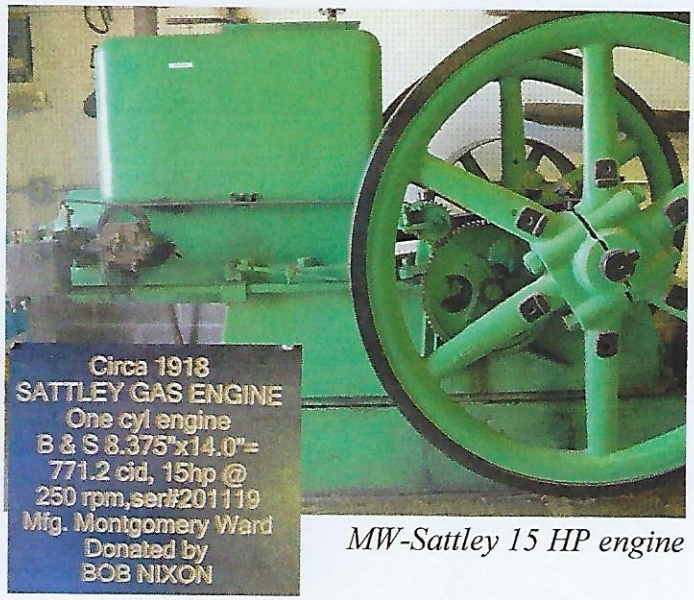
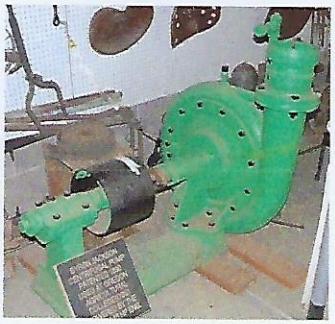
SATTLEY ENGINE, AVERY TRACTOR & WARDS

Do you know that Montgomery Ward once sold farm tractors and equipment and also industrial gas engines? Well...we have one of the gas engines. It is a 1918 one cylinder monster that Oregon Agricultural College bought from MW to drive an irrigation pump to flood irrigate their pasture.



MW-Sattley 15 HP engine

This engine was belted to centrifugal pump shown at right.



The engine differs from the Fairbanks Morse engine featured in the last Focus in several significant ways.

It is NOT a 'hit & miss' governed engine but has a throttle valve to do that function. See below. The hand is pointing to the control for the butterfly throttle valve which is situated between the carburetor and the head. (Carburetor on the right, head on the left). The control arm is operated from the flyball governor mounted on the crankshaft. As the speed reaches 250 RPM the balls fly out and close the throttle valve just enough to keep the speed at 250 RPM.

Another difference is in the ignition system. The F-M had a set of points that would make/break a battery powered voltage and cause a small spark to ignite the fuel/air mix. This engine uses a rather unique magneto.(Shown at right) The magneto is driven by the exhaust valve 'push rod'. The push rod is operated by two cams. One high lift opens the exhaust valve. The other a low lift cam cranks the magneto maybe a quarter turn and then trips it. As the rotor whirls back to neutral (powered by the two springs) it passes the magnet through the windings and creates a voltage. This voltage is short circuited through points in the ignitor. At the max voltage/current the points are opened and the resulting spark ignites the charge in the cylinder. The ignitor is same/similar to the one on the FM motor. An interesting concept.

Magneto

It is remarkable that the crankshaft end of the connecting rod is lubricated with a grease cup! The crankshaft, connecting rod and bottom end of the piston are all open to view, as well as the camshaft gears and the governor...no shields to keep hands away!

It is water cooled. Notice the large reservoir setting on top of the cylinder. This is full of water

Sattley One Cylinder Engine

This engine is 15 horsepower, weighs 3800 pounds and has a 8 3/8" bore. It was built in the early 1900's and was used by Oregon State College for flood irrigation of their pastures. It was moved to the Long Tom River then to the Belchamber's house where students at Monroe High School could hear it running in 1940. It was restored by Bob Nixon who traded 10 tons of hay for it in 1950. It has been running every year since.

DONATED BY BOB NIXON

which circulates via convection and cools by evaporation and radiation. A common system for the day.

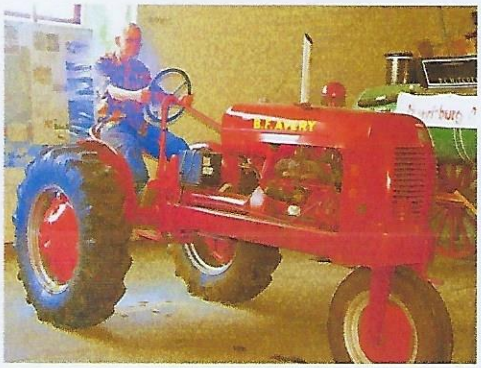
A bit of a side comment:! Aaron Montgomery Ward was a rural traveling salesman in the 1870's, working mostly out of Chicago. He observed that his rural customers wanted 'big city' goods but they were not available in the small, rural towns. So he found two partners and between them they raised $1600.00 and issued, in August 1872, their first catalog. It was one whole page! In 1883 the catalog had grown to 10,000 items and 240 pages. In 1904 it mailed out 3,000,000 catalogs! It was the "Amazon" of the early 20th Century.

My bike was a Wards as was my .22 rifle and many other things. My first refrigerator was a Wards and lasted "forever!"

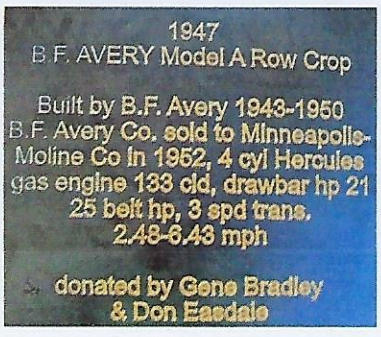
In 1926 MW started its first retail store and by the end of the 1930's it was the largest retailer in the US.

Sewell Avery was MW's president and after the WW II he was pessimistic, expecting a severe recession. Thus little or no modernization. Bad move and in 2001 MW collapsed. It has been sorta re-instituted in a 'Wards' operation but nothing like its past glory.

B. F. Avery started building moldboard plows about 1820. By the early 1900's they were recognized as the worlds largest plow manufacturer. They started building tractors about 1870 when they installed a gas engine on a steam tractor chassis. In 1914 they built a self propelled plow! It was a three wheeled rig with only one drive wheel. The plow could be either a moldboard or a disc.



Our 1947 Avery



By the early 1930's they were building more conventional tractors. I have found little about when Montgomery Ward started selling the Avery Tractors. One reference implied it was in the 1930's while another suggests 1950's! I think Wards may not have ever been a major distributer for Avery. The later models used Chrysler engines and one or two models used a Chryslers 'torque convertor' as a sort of automatic transmission. I doubt that was very successful...too much slippage!

I don't know that our Avery was sold by Wards. But it has Wards rear tires! See at right. It is a Wards Riverside tire with the unique Riverside tread design. Wards also sold a "knobby" tread tire. In the late 1930's, as rubber rear tractor tires became popular, there were several tread designs by other companies. The Museum has examples of most.

#1

#2

#3

#4

#5

#6

#7

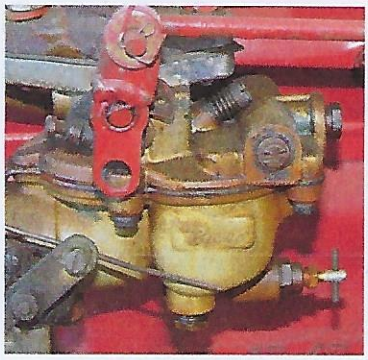
#1 is Wards Bar Tread
#2 is Wards Knobby
#3 is Later Firestone. At first the bars were straight
#4 is BF Goodrich
#5 is Armstrong
#6 is also an Armstrong
#7 is the classic Goodyear tread that eventually prevailed. There are a fair number other tread designs that are very similar but just enough difference to avoid patent infringement Most of our

tires are now made in Europe or the Orient. Cooper is, I think, about the only US owned tire manufacturer left in the USA! They make a good auto tire but if 'push comes to shove' some day we may be in a world of hurt for tires. (We may have some production facilities that are foreign owned. That would help if 'push comes to shove'.)

In 1952 the Avery Company was sold to Minneapolis Moline which then was soon taken over by Oliver and is now defunct. I guess nothing man makes lasts forever...

Our Avery has a Hercules 4 cylinder engine. It uses a Delco Remy distributor. The blank plate behind the governor on the lower right is likely where one would mount a hydraulic pump.

The Hercules Engine



Zenith Carburetor

The "T" handle at the lower right of the carburetor is the load mixture adjustment. With this adjustment one could 'richen' the air/fuel mixture a bit and gain a couple horse power. This might be just enough to be able to run in one gear higher and thus justify the lower efficiency. If the outlet at the end of the exhaust pipe was almost black, it meant that the mixture was over rich. If it was a very light grey it meant the mixture was over lean and this tended to burn the exhaust valves. The carburetor also had an 'idle' mixture adjustment. It is the small, knurled screw on top of the carburetor just to the right of the throttle body. That adjustment worked on the air...turn the screw down and the air at idle was restricted. After things are well warmed up and running at idle speed, screw that adjustment in/out till it runs well. Today most everything is controlled by a computer. And probably is fuel injected instead of a carburetor. More efficient...so long as it works! But a *pain* when it doesn't work! And, of course, today most tractors are diesel and don't use any of that stuff...

COME AND SEE IT ALL! ASK THE DOCENT ABOUT WHAT YOU SEE. THE AVERY TRACTOR IS 72 YEARS OLD!