

A Self-Propelled Forage Plot Harvester¹

THE labor and time required for harvesting plots have been factors limiting the amount of forage research that workers could accomplish. In the past, the size of forage research programs has been geared to the number of plots that could be harvested by mowing with a hand sickle or small plot mower, followed by hand-raking or other collection procedure in preparation for weighing. To increase the amount of forage research that could be done with available manpower, self-propelled machine was needed that could easily be transported and would in one operation mow test strips from the central area of forage plots, collect the forage, and deposit it in a receptacle for weighing.

The Agricultural Engineering Department of the Oregon Agricultural Experiment Station designed and built a forage plot harvester to meet the following requirements set forth by the Soils Department: (1) The harvester should in one continuous operation mow, collect, and deliver to a weighing pan the forage from a definite area in the central portion of experimental plots. (2) The machine should be self-propelled and easily transported along the highways on a trailer drawn by an automobile, or pickup truck. (3) The power unit should travel behind the cutting bar, with the wheels running inside the harvested swath. (4) The harvester should have a weighing pan with a capacity of about 75 pounds of green forage. (5) The machine should be equipped with a spring balance, supported above the weighing pan and provided with a lifting mechanism, to expedite the weighing of the harvested forage samples.

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(6) The power unit should be easily removable and avail-

able for other uses when not required for operation of the harvester.

The harvester was built around the power unit of an Allis-Chalmers Model G tractor. Successful features of commercial forage harvesters were incorporated in the design. The conventional front end of the tractor, including wheels, steering gear, and implement support, was removed by loosening four bolts. A new front end, consisting of a modified Ford automobile front axle, cable-control steering gear, and channel iron frame, was built as an integral part of the forage harvester. The harvester consists, in principle, of a cutting, collecting, and elevating mechanism, mounted on the new front end of the tractor and powered by the belt pulley. The arrangement of the component parts of the machine is evident in figure 1.

The Model G tractor was selected because of its narrow tread and the ease of removing the conventional front end and mounting the harvester unit, and because the Soils Department had other plot equipment built for use with this tractor.²

The harvester cuts a swath 45 inches wide, which allows free passage of the tractor wheels within the harvested swath, when the wheels are set to minimum tread width. The sickle drive from a John Deere No. 55 self-propelled combine is used because of its compact design; a shoe width of only 7 inches is required to protect the drive from uncut forage. A Love double-sickle cutter bar is employed because of its ability to easily cut through dense, wet, fine grasses and heavy clover without clogging. A pickup reel from an Allis-Chalmers forage harvester is mounted on modified reel supports from an Allis-Chalmers Model 60 combine. A rubberized draper, mounted on rollers and bearings from a Massey-Harris Model 21 combine, carries the cut forage to the rear and deposits it in a sheet-steel weighing pan. The cutting and elevating mechanisms are raised

² Hunter, A. S. A versatile fertilizing and seeding machine for experimental plots. *Agron. Jour.* 43:575-579. 1951.

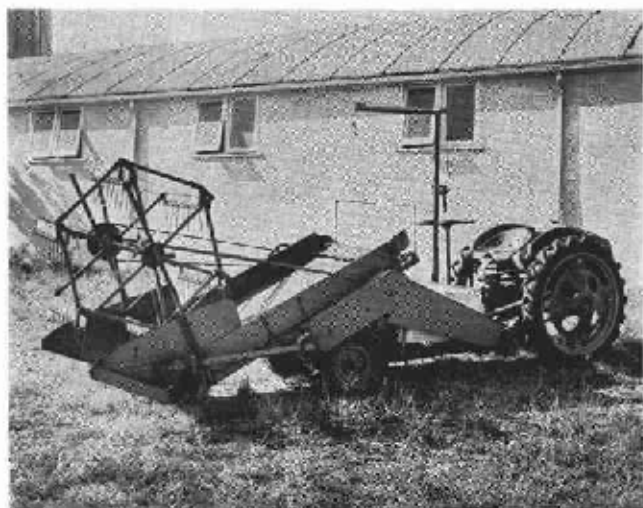


FIG. 1.—This self-propelled harvester cuts a swath 45 inches wide.

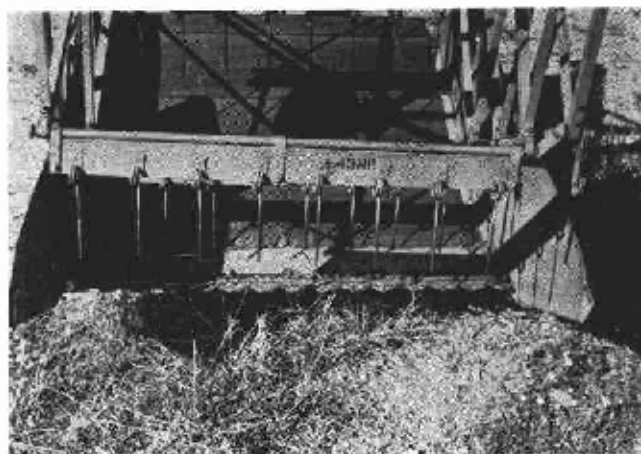


FIG. 2.—A double-sickle cutter bar cuts easily through fine grasses and heavy clover without clogging.

and lowered by means of a hydraulic cylinder operated from the hydraulic system of the tractor.

This harvester was used during 1955 for the harvest of several hundred forage plots on farms scattered about the Willamette Valley. No difficulties were experienced in harvesting heavy crops of subterranean clover or 3-foot tall mixtures of alfalfa and grass.

The time requirements of plot harvesting are affected by the plot yields. At one location forage averaging a ton of dry matter per acre was harvested and weighed from 45 plots by a three-man crew in an hour. The area harvested from each plot was 30 feet long and 45 inches

wide. The harvester was also used to cut headlands and clip the plots to a uniform length before harvest.

The cost of parts and materials used in this harvester, exclusive of the tractor was \$460. Approximately 250 man-hours of labor were used in construction.

Detailed drawings and plans for the forage harvester are available for \$4.10 from Agricultural Engineering Extension, Oregon State College, Corvallis, Oregon.—G. E. PAGE, *Assistant Agricultural Engineer*, T. L. JACKSON, *Associate Soil Scientist Conservationist and* ALBERT S. HUNTER, *Soil Scientist, Oregon Agricultural Experiment Station and U.S.D.A. Cooperating.*