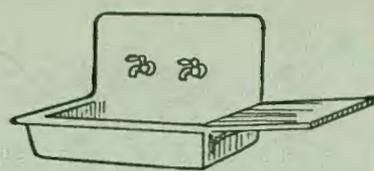
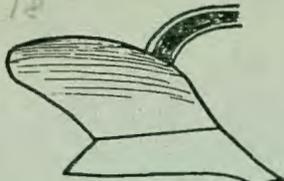
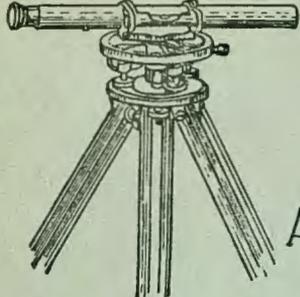


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## MAKING HAY WITH THE WINDROW BALER

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The question of curing hay in the field in such a manner as to obtain a product of high quality at a low cost is one of vital interest to the operator of every farm on which hay is produced.

### THE WINDROW BALER

A method of handling, that has been tried by some, consists of baling the hay as it is picked up from the windrow. A machine used for this purpose known as the windrow baler consists essentially of a stationary baler with an attachment for picking up the windrow and automatically feeding the hay into the baler. The machine, which is drawn by a tractor, is designed so that the baler is operated thru the power take-off shaft from the tractor engine. From three to four men are needed to run the outfit. Besides the tractor operator, one man is required to handle the blocks and the wires and a third man is needed for tying the wires. An automatic feeding device controls the movement of hay into the baler. When the hay is heavy, however, it is necessary that some attention be given the feeding operation. If the help is available, a fourth man can be used to good advantage.

On most farms the bales are dropped on the ground by the baler, and are picked up later and loaded on wagons. Some operators draw a low wagon or trailer with a flat rack behind the baler. The bales are put in place on the rack as they come from the machine and thus considerable handling and heavy work is eliminated.

Hay that is baled from the windrow is handled very little after it is dry. As a result the loss of leaves and breakage of stems is considerably less than is the case with unbaled hay.

Observations were made and data obtained on the farm of Mark M. Purfeerst in Rice County, Minnesota, where a windrow baler was used for handling alfalfa, clover, timothy, and other hay during the seasons of 1932 and 1933.

### MOISTURE CONTENT OF HAY WHEN BALED

Second crop alfalfa which was cut with a moisture content of 72 per cent was windrowed shortly after cutting and

baled from the windrow when the hay contained from 13 per cent to 15 per cent moisture. This is about as dry as hay is ordinarily allowed to get for bulk storage in a mow. Sometimes hay is stored with slightly more than 15 per cent moisture.

With this amount of moisture in the hay at time of baling there apparently is no difficulty in storage. The bales were stored in a barn where they were laid about 10 feet high. A thermometer was inserted in the middle of a bale that was located some distance from the outside of the pile and temperatures were observed for a period of 8 days. At no time did the temperature go above 99 degrees Fahrenheit, which was very near the outside temperature, and it fluctuated only with the outside temperature. The experiences of users of the windrow baler indicate that it is safe to place in storage hay that has been baled when it is dry enough to be considered well cured for storing in bulk.

### RATE OF BALING

The average tractor travels in low or intermediate speed when drawing the windrow baler at work. Several observations were made of the rate at which the outfit travelled from one end of the windrow to the other. The average was found to be slightly less than 2 miles per hour. This included the necessary occasional stops.

Bales were made at the rate of 70 per hour. The average weight per bale was 76.5 pounds. This makes a capacity of 2 2/3 tons per hour. While work was being done at this rate very few stops were made, hence this represents about the maximum that a crew of three men will do continuously.

### SIZE AND WEIGHT OF BALES

The bales were 14 inches wide, 18 inches high, and varied somewhat in length. The average length of 16 bales that were selected at random was 43 inches; the shortest was 39 inches and the longest 50 inches.

On any particular field a fairly even weight of bale may be obtained. With dry hay the bales will be lighter than they would be if there were more moisture

in the hay. This is illustrated on a field of alfalfa where baling was done in the forenoon and also in the afternoon. The weather was warm and the atmosphere was dry. A sample of hay taken from the field at about 11 o'clock in the forenoon contained 15.4 per cent moisture and another sample taken about 2:30 o'clock in the afternoon contained only 13.3 per cent. During the forenoon the bales averaged 80.7 pounds each and there were 11.18 pounds of hay per cubic foot in the bales. Early in the afternoon the bales averaged only 69.5 pounds each with 9.93 pounds per cubic foot of baled hay. The operator may maintain bales of nearly uniform weight by adjusting the size of the opening on the baler from time to time during the day in accordance with the dryness of the hay.

### BALING HAY AFFECTS STORAGE

The average of all bales that were weighed and measured indicated 10.72 pounds of baled hay per cubic foot. Hay that is stored in the mow or stack loose will occupy much more space. After it has been allowed to settle, that near the bottom of the mow will weigh about 5 or 6 pounds per cubic foot. It is possible, then, to store very nearly twice as many tons of hay in a given storage space when it is baled as is possible in loose form.

Mr. A. J. Lind of Winthrop, Minnesota, who baled some red clover from the windrow in 1933, points out that with limited barn room, baling the hay makes it possible to put it all in the barn. Because the weight per unit volume of baled hay is about twice that of loose hay, it is necessary to make sure that the structure will carry the additional weight if the hay is stored overhead in the barn. It is suggested that a hay shed in which the bales may be stored on the ground and piled high is quite suitable and need not be expensive or very large. Such an arrangement does away with the necessity of providing for the weight of the hay in the design and construction of the building, which serves only as a shelter. It is practical also for feeding baled hay because hay in that form is much more easily and readily handled than loose hay.