

What Should an Engine Weigh?

Abraham Lincoln was asked how long a man's legs should be and he replied, "they should be long enough to reach the ground—and no longer." An engine should weigh enough to do its work—and no more. Years ago it was necessary to cast engine parts very large and heavy, with heavy base and fly-wheel, or the violent explosions and fast and slow speeds of the old style engine would tear it to pieces.

Six years ago the Cushman Motor Works designed a new type of farm engine weighing about one-fifth as much per H. P. as other farm engines, but so well built, balanced and governed that it ran more steadily and quietly than a farm engine was ever known to run. Some people laughed, and said that an engine weighing only 190 lbs. must be a toy, but when they saw the Cushman at work beside heavy engines weighing five or six times as much, they realized that weight does not mean power, and that the Cushman is a giant in power for its size.

Cushman Light Weight Engines

40 to 60 Pounds per Horse Power

4 H. P. Weighs Only 190 lbs. 15 H. P. Weighs Only 780 lbs.
8 H. P. Weighs Only 320 lbs. 20 H. P. Weighs Only 1200 lbs.

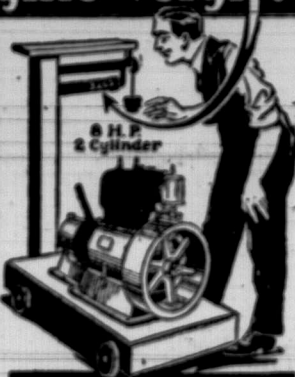
Cushman Engines have Throttle Governor and Schebler Carburetor, insuring regular speed even on jobs of irregular loads, like sawing. Their perfect balance also helps to make them steady, insuring unusual durability and freedom from engine trouble.

The 4 H. P. and the 8 H. P. are mounted on trucks, if desired, and may be pulled around by hand. These are very useful engines, as besides doing all work heavy engines do, they may be attached to machines in the field, as 4 H. P. on grain and corn binders and 8 H. P. on hay balers. All engines over 4 H. P. are double cylinder, which means steadier power.

The Cushman is not a cheap engine, but it is cheap in the long run. Engine Book free.

Cushman Motor Works

Dept. D., Winn peg, Man.



Before Buying Any Engine Ask These Questions

How much does it weigh? If it weighs more than 60 lbs. per horsepower, why? Is it throttle governed? A throttle governor insures steady, quiet economical power.

Tendencies in Tractor Design

Two-Plow Machines—Maximum Speed—Round and Crawler Wheels—Motor Types.

In times of peace the tractor made slow progress. But now that war is upon us progress is swift. The man-and-team basis upon which agriculture has been organized for centuries has broken down. The only remedy is to adopt the methods employed in manufacturing, that is employ machinery that will enable one man to do what several were required to do under the old system. It is this realization that has turned all eyes toward the tractor. Consequently the tractor industry is enjoying great prosperity. Every factory is over-sold and new ones are springing up almost every day. Men who openly sneered at the tractor two years ago are now its staunchest supporters.

The one event which has done more than any other to settle people's convictions with respect to power farming has been the heavy orders given by the Allied governments for American tractors. England, France, Italy and Russia have all placed large orders for tractors, in the hopes that, by so doing, they could cultivate enough land to protect themselves against starvation, even though the submarine war should reduce food importation from this country to practically nothing.

The cry from all quarters is for more food and bigger crops. The prices paid were never so high for everything the farmer has to sell, but he was handicapped with shortage of labor even before we began to raise a great army. He now sees his own boys and the hired men drafted and he realizes he must turn to power farming to save himself

This article from "Motor" of New York, by Philip S. Rose, Editor of the Gas Review, and one of the foremost authorities in America on tractor design, is enlightening and interesting. It contains much straightforward but constructive criticism.

During the last three years the ambition of most manufacturers has been to turn out a two-plow machine. That is the size farmers thought they wanted. It could be made and sold

at comparatively low cost and a low selling price seemed to be necessary to get the machines established among the farmers. But we are now laboring under a new set of conditions, the conditions brought about by the war, and neither the low cost machine nor the problem of placing tractors are the paramount issues. What is demanded now are machines that will enable one man to perform the greatest possible amount of useful work.

Labor Conservation and Two-Plow Tractors.

It is perfectly obvious to any man who knows anything about farming that a two-plow tractor does not conserve man power. A two-plow gang drawn by a team of four or five horses has been the favorite one-man unit for a great many years. It is capable of turning over about four and a half acres in an ordinary working day. The two-plow tractor may do a little better because it is not affected by heat, it will not become ill, it is tireless and it may average a little higher speed. But it will not do enough more to materially save human labor or human time. That being the case, it does not require a college course in economics to appreciate the present necessity for more powerful tractors. Man power is the scarcest commodity in the world today and the drain upon it is tremendous. Our agricultural machines must enable one man to do the work of several to offset the wastage of war and the labor requirements of other industries. There was a time when the tractor problem,



This is the general form of farm tractor toward which the new machines seem to be turning. Notice the complete enclosure of most of moving parts.

as well as to help his country. That is why he has become such a heavy buyer of tractors.

The great interest that has arisen in tractors has had the inevitable effect of attracting the attention of both automobile engineers and manufacturers. They are all studying tractors now and it is rumored several of the large automobile manufacturers will soon engage in the business. The Society of Automobile Engineers has absorbed the tractor engineers and is giving the tractor the same careful attention that was given the automobile. Some progress has been made in standardization and there is much to be done, for it is the lack of standardization more than anything else that restricts production. What the industry needs now more than anything else is to settle on a few fundamental types of machines and make them in quantity. The new manufacturer will not make any mistake in working out a simple, sturdy design, using four round wheels with two drive wheels in the rear. This is too serious a time to consider freak designs or to exploit queer ideas. The country needs thousands of tractors. Moreover, it needs tractors of the right size to conserve man power to the utmost. In this connection I feel that I have a right to criticize a number of the new machines.

as it affected the farm owner, was decided in most cases by comparing the general efficiency of the tractor with horses. This phase of the problem is still just as prominent as ever, more prominent in fact, because of the high cost of feeds, but it is transcended by the human labor situation which bids fair to be alarming in the extreme.

There is talk of speeding the two-plow machine up to three miles an hour, some say to five or six, but the men who make these suggestions never walked between the handles of a plow. They do not understand the soil or its cultivation. Personally I am convinced a speed of around three miles an hour is as high as can be safely used because, if we go above that speed, the draft increases at a rapid rate, probably in proportion to the square of the speed. Between two and three miles an hour there appears to be no change in the draft. This has been determined by a number of experimenters working independently and their results check. The limit of speed in plowing according to calculations, is therefore three miles an hour and to obtain that it will be necessary to change the shape of existing mold-boards. I saw tractors at Fremont, at the big tractor demonstration this fall, working at about that speed and the plows were not doing acceptable work; they were throwing the

"Economy" All Cast Iron Tank Heaters

Do Not Give Your Stock Cold Water

The most important thing

in connection with feeding and properly caring for stock, especially in the cold winter months, is to see that the stock is given water warmed to a medium temperature.

Our "Economy" All-Cast Iron Tank Heaters are made for this purpose and are Guaranteed not to Leak.

Will last a life-time.

The body is all cast in one piece. No soldered or riveted joints to get leaky.

They are self-sinking and will remain in the water where placed without anchor rods or weights to hold them down.

Each heater shipped complete as shown in cut, with heavy basket grate, ash pan, poker, cover and smoke pipe.

Made in two sizes, 12-inch and 14-inch.

If your dealer does not carry them in stock, send to us direct.

But Insist on an "ECONOMY"

Write us for Catalogue and prices on

"Economy" Roller Grain Crushers

Our machines Grind as well as Crush the Grain, and do the work more thoroughly than any other machines made.

Economy Foundry Co. Limited Portage la Prairie, Man.

Ewe Lambs for Breeding Purposes

The Sheep Breeders' Association in Quebec are offering several hundred choice ewe lambs for breeding purposes. Shropshire, Oxford, Hampshire, Leicester and Cheviot grades. Prices: \$12.00 to \$18.00 each. Orders also received for pure bred rams of the above breeds at \$26.00 to \$40.00 each. Apply—

A. A. MacMILLAN

In charge of Sheep Husbandry, Macdonald College, Que.

Cardiff KING

Highest heat values at lowest cost. Gives a steady, long-lasting heat that chases the most intense cold. A full, generous weight to every ton and prompt delivery if you order right now.

THE CARDIFF COLLIERIES, LTD.
EDMONTON, ALTA.