

## Fitting Self-Starters to Tractor Engines

ASSUMING the carburetion (mixture of fuel and air) to be correct, the one chief remaining factor which militates for or against easy starting is the ignition. The great majority of tractor engines rely upon magneto ignition, the drawback of which is that the rotary parts of the magneto must be moving at a comparatively high speed before a sufficiently intense spark is produced.

In the case of motor car engines electric self-starters have been adopted very largely in order to overcome the difficulty of hand turning the crank-shaft at the necessary speed. This difficulty is no small one when the engine has been standing all night in a cold garage and the oil has gummed up the cylinders and pistons. Motor tractors suffer more severely in this respect as most frequently they stand out in the open field all night at times when the temperature drops to freezing point or lower. Owing to the large engines used I have known it to be necessary for two men to exert their full strength to turn even slowly the crank-shaft of the engines of certain makes of tractors. Owing to such difficulties and to remove the necessity for the attendance of two men to start the machine, electric self-starters such as are used on cars have been suggested by many people, and electric self-starters, in fact, have been adopted already by a few manufacturers in America.

Personally I do not regard electric self-starters with favour, as they add another complication to the machine and involve the carrying of heavy batteries which are an expense in the initial outlay and are very liable to be damaged by inexperienced men. To supply the power necessary to turn quickly a cold, big tractor

engine a very substantial and weighty electric outfit, including generator, batteries and motor, would be necessary and would be detrimental in three direct ways; undesirable weight, expense and complication, to which might be added unreliability in inexperienced hands under the severe conditions which attend tractors in their regular work. In the case of tractors fitted with small engines of the high speed type these disadvantages would not be quite so apparent, but, on the other hand, neither are the advantages of a self-starter so much called for.

If there were no alternative way of starting big engines than either electric self-starters or quick hand turning of the crank-shaft, I would certainly advocate self-starters; but fortunately there is a compromise which answers all the necessary requirements and is exceedingly simple, if not absolutely fool proof, viz., the trip-starter or impulse-starter, as it is generally known. This device is now fitted to a large proportion of the tractor engines and creates a very intense spark in the cylinder no matter how slowly the engine crankshaft turns. In the ordinary form of construction the magneto machine which causes the spark is driven by a rigid coupling from the engine crankshaft or from the cam-shaft, consequently the speed of the magneto is exactly in proportion to the speed of the engine. When a trip-starter is used the magneto is in principle driven through an intermediary spring, and a trip ratchet is so arranged on the magneto spindle that it can be set by hand to prevent the spindle turning until the spring has been compressed by the turning of the engine crank-shaft. The ratchet is then automatically released,



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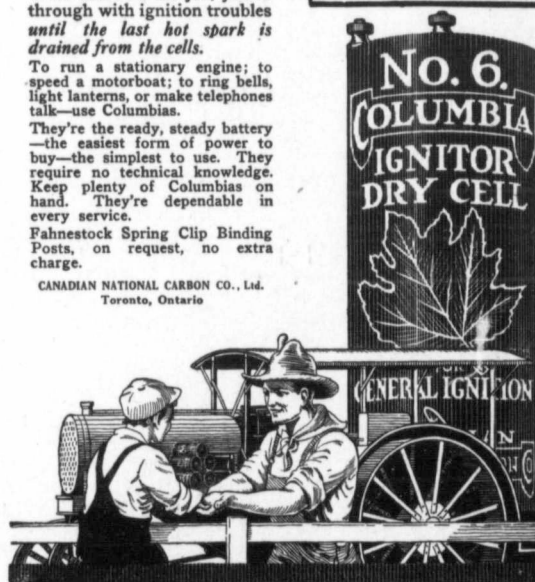
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