

crank shaft by levers and ratchets so that the rollers worked intermittently to advance the feed when the knife was at its highest point. These machines were small and were mostly driven by hand, a crank being provided for that purpose.

In 1862 we find a machine was patented in England of the rotary pattern, that is the knife or knives were attached to a wheel and cut the fodder as they were passing the feed trough. It also had rollers to feed the fodder to the knives, the top one being adapted to rise and fall so that large or small quantities could be fed into the machine, which greatly increased its capacity. These two principles are still used in almost all the machines in use at the present time.

Feed cutters at that time were principally driven by hand, but with the advent of horse-power, steam, etc., power was substituted and the capacity of the machines greatly increased. The cut feed was taken away from the machines and stored by hand, which as the amount to be cut became greater was laborious work.

We later find that carriers were built to obviate this difficulty. These were what is sometimes called Jacob's Ladder carriers and consist of a trough placed on an incline and long enough to elevate to the height required. A series of slats or scrapers were attached to belts of leather or other material, which were endless; wheels were placed at each end of the trough for the belts, thus the slats or scrapers slid the cut feed up the trough and returned underneath, the feed dropping off the top end into the place to be stored.

To enable carriers to elevate wet and heavy material, such as ensilage, chains running on toothed wheels were substituted for the leather belts, which is the common carrier in use to-day. While possessing some advantages the carrier has many disadvantages, a few of which we will enumerate:

1. *Cost.*—As carriers for high silos are of great length, as the machines had to be set about the same distance from the silo as its height, to enable the carrier to elevate, it will be easily seen that for high silos the elevator was more costly than the cutter.

2. *Loss and waste.*—As ensilage is principally cut outside, in windy weather a great portion of the cut ensilage was blown off the carriers and wasted, this being an entire loss.

3. *Time required to put up and take down.*—This in long carriers is quite an item, each operation often requiring half a day or more.

To obviate these difficulties ensilage cutters are now made with blower attachments by which the use of the carrier is done away with.

The cut ensilage is driven up a pipe and into the silo by pneumatic force. Everything fed into the machine is delivered at once into the silo without waste, regardless of windy weather.

The time consumed in putting up the pipe only amounts to about ten minutes, which is a mere bagatelle. The pipes will wear as long as the machine and there is no lost time in choking or breakdowns. We show here one of these machines known as the Climax, in operation at the Ontario Agricultural College, Guelph, filling their two hundred and fifty-ton silo. The machine is elevating thirty-four feet high. This picture was taken of the machine in operation at the farm on September 20th, 1899. This machine has been in use for a year at the college at the present time, and has done all their

cutting. The college people say it is just what they have been looking for, as it fills a long felt want. This is the fourth year of the manufacture of these cutters, and the public can rest assured that they are not buying an experiment, and that the machine will do their cutting much faster and easier than they ever had it done before. The Climax cutters are fitted with a feeder in the feed-trough bottom, which practically renders them "self-feeders," as all the operator has to do is even the feed in the box and it runs through the machine without any difficulty.



There is one point that is forcing itself upon the attention of municipal councils more than another, it is that of **GOOD ROADS**. The days of the old mud thoroughfare, without even the expense of grading, have long since past, and municipalities have grasped the fact that progress must necessarily be accompanied by road construction and maintenance. With the passage of ill-kept roads, have gone the old-time methods of improving them, and now modern machinery steps in and takes the place of the more expensive hand labor.

The advent of the Sawyer & Massey Co., Limited, into the manufacture of machinery for **GOOD ROADS** was received with satisfaction because of that Company's enormous success in other lines of business, and the large trade that they have already gained shows them to be at the front in their new venture. The municipal rock-crushing plant made by this Company has many points of superior construction over other makes, a strong feature being its **solid cast iron frame**, this particular preventing any trouble from built-up parts becoming loose during operation. This Crusher is attracting special attention throughout the Dominion, supplemented by their reversible road roller and reversible road machine.

During less than three years in this business these machines have been placed in over 300 municipalities in the provinces of Ontario and Quebec, and in 1899, **twenty** of their rock crushers were sold in Ontario alone to **one of any other make**.

St. Catharines, Niagara Falls, Chatham, Bowmanville, Parry Sound, Renfrew, Nottawasaga, Ameliasburgh and Smith townships, and numerous municipal contractors are using this crusher with marked success and give testimonials to its merit. These machines are built from start to finish at Sawyer & Massey works at Hamilton, Ontario, and, while a Canadian product entirely, are the equal in all respects, and the superior in some, of any similar machines in the world.