means at our disposal to further the interests of all concerned, hence we presume to give a brief outline of the history and advancement of this branch of agriculture. The old adage, that "necessity is the mother of invention" is equally true in this department as in any other industry. We have arrived



Fig. 1.

at a period of the world's history in which labor-saving machinery is the order of the day, and has done more to lessen the cost of production in all branches of industry than any other thing, in fact it has been the chief factor in the case, and, with that of systemizing, has placed its most vigilant and devoted patrons to the front in all the manufacturing world. The same thing will equally apply to the agriculturists who are in the front rank at this date.

In going back to the pioneer days of this country when the farmer was battling with the huge forests and agriculture was struggling for an existence, such an implement as we are writing about had not then been thought of, but as we advanced along, and when large clearings were taking the place of the forest, it became necessary to raise roots for the successful feeding of stock, and in many cases it became imperative to cut the turnips for young animals, and some old ones which had lost their teeth. This being the case the only available means at hand to do this work was an axe or a spade, which did the work very imperfectly, and, as "necessity is the parent of invention," the inventors were not long in producing something better as far as the quality of the work was concerned, in the form of a bench with four legs, of homespun manufacture, with a knife hinged at one end of the bench and a handle at the other which the operator took in the right hand and held the turnip in the other hand, slicing away until it was cut.

This process proving rather slow and tedious and also the danger of losing a finger or a portion of one occasionally was very objectionable, which called or gave rise to something more safe and speedy and also much more expensive, consisting of the first style of side wheel slicer, having two knives in wheel, these extending from the centre to the circumference of the wheel on opposite sides and set to cut a slice three eighths of an inch thick. This wheel was set in a wooden frame with a large wooden hopper on the face side of wheel which was operated by a crank as per the accompanying sketch. (Fig. 1.)

Some of these slicers were made at first with wooden wheels with an iron tire to keep it snugly together. Then came the iron wheel with the next improvement of having a number of small stripper knives set in the wheel so as to cut the slices into strips about three quarters of an inch wide. This was especially called for in the feeding of These machines although sheep. heavy to turn from their construction were a great improvement in the quality and especially the quantity of the work done which was very important where a farmer had considerable feeding to do. They served their term for several years when more modern machines came into use, such as the



one shown in Fig. 2, known as the Double Action Gardner Root Cutter. This as you will observe is a combined double action machine of the cylinder type used by turning crank one way for slicing and the other way for stripping. This machine, from the construction of the cylinder, was rather expensive, although it performed its functions admirably and was an up-tcdate machine at that time, well suited for the large stockmen; and while the stripping of the roots suited well for feeding sheep, something finer was required in the mixing of food for cat-This called for the introduction tle. of pulpers, but before dealing with them it is worthy of mention that other forms of combined or double action strippers and slicers were used of a cheaper style, viz., the side wheel and also one having the face of wheel placed horizontally with the hopper the full size of wheel. The roots were dumped in on the top of the wheel, stripping or slicing them according to which way it was turned, but the full weight of roots resting on the wheel made it hard for the operator to turn

when the hopper was full. However, these machines having served their time, we now come to the first introduction of the pulper which for hand use was of the side-wheel type with four knives placed in the wheel and later six knives in wheel to do the work. A fair representation of this is seen in Fig. 3.



Fig. 3.

This pulper being very simple and reasonable in price, placed it within the reach of every farmer, and was the prevailing one for years, with the exceptions of where a power one with greater capacity was required, in which case a cylinder pulper, with teeth in cylinder and heavy fly-wheel on shaft, was used.

Then came the hand cylinder pulper, having knives instead of teeth placed in cylinder or drum, for doing the work. A fair representation of this machine is seen in Fig. 4. This machine was first made with a view of both pulping and slicing, but, unlike the cylinder slicer, as such it did not prove a success. The pulping knives projecting beyond slicer knives kept



the roots continually on the jostle, and thus prevented it from doing the work in either capacity as fast as it should. This being a very serious fault, this style of pulper was, like the side-wheel pulper, practically confined to the single function of pulping, although