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Improved Cider Mill.

In preparing apples to make cider they are usually crushed between corrugated rollers, and ground or mashed up. In this process many large pieces are carried through the rollers unacted upon, thereby wasting the material and reducing the quantity of cider made from a given amount of fruit.

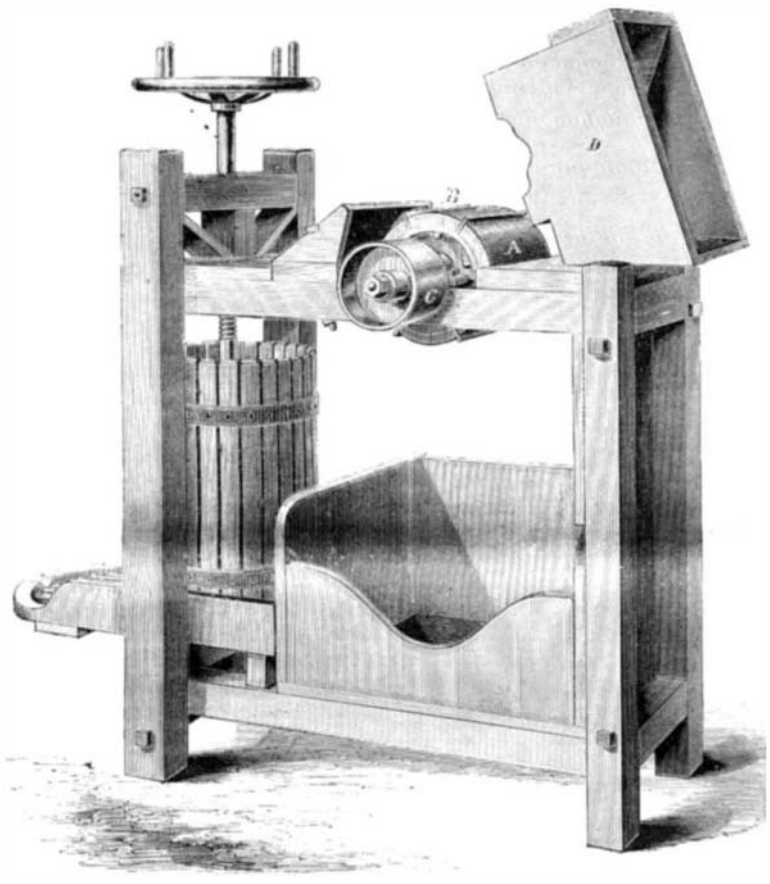
In this engraving a representation of a new mill is given, wherein the apples are not ground but scraped, thus reducing them to a fine pulp, which is the most favorable condition for obtaining all the juice.

The details are as follows:—The cylinder, A, has knives, B, in it, which are driven at a high velocity by a belt on the pulley, C. The hopper, D, which is tipped up in the engraving to show the cylinder, feeds the apples down to the knives, where they are subjected to the action alluded to. From the knives the prepared pulp falls into the box below, after which it is pressed as usual. A press is attached to the mill for that purpose.

In order that the knives may be always efficient, a flap is placed in juxtaposition with the cylinder, cleaning it and the knives as they rotate.

This mill is made portable, or can be, for family use. Very many occasions arise where a glass of cider is sometimes as welcome as a cup of coffee, and by the aid of this mill it can be obtained. For bakers and others, who make large quantities of mince pies, and reduce apples to pulp for various culinary purposes, this mill will be a valuable assistant.

It was patented through the Scientific American Patent Agency, by William and Lewis Clayton, on July 11, 1865. For further information, address them at No. 8 Walnut st., West Philadelphia, Pa.



CLAYTON'S CIDER MILL.

CRYPTOGRAPHY.

This is the art of reading and writing dispatches, messages, etc., in such a way that only those who possess the key can decipher them. It has borne a most important part in all the business of life, from love to war, from mischief to money-making, and is in daily use now for these objects. Dispatches in cipher are often sent by telegraph, and much trouble they are to the operators. A knowledge of cryptography and a faculty of reading secret language is an enviable one. We find in a foreign publication an interesting and explanatory article on this subject, which we reproduce much abridged, to suit our columns.

FRED.	[112·18]	[236·49]	[207·76]	[132·3]	[27·61]
[142·54]	[121·32]	[12·32]	[72·6]	[202·30]	[38·106]
[262·51]	[78·22]	[63·94]	[110·6]	[262·51]	19·33]
[160·60]	[230·92]	[37·51]	[210·29]	[204·79]	[15·67]
[43·61]	[121·32]	[236·54]	[37·101]	[21·17]	[236·54]
[238·78]	[5·1]	[175·75]	[143·61]	[13·7]	[204·79]	[114·2]
[10·102]	[121·32]	[123·15]	[78·112]	[157·62]	[100·58]
[134·19]	[264·30]	[268·66]	[5·1]	[187·71]	[80·45]
[117·75]	[265·62]	[9·101]	[245·62]	[154·55]	[158.46]
[256·41].					

"Well," I said, after looking at it for a few moments, "this cipher does not seem to be of the simplest kind! Before undertaking the task, I should like to know the terms." He mentioned them, and I am bound to say that they were very liberal.

"But, after all," I said, "this may not be J. C.'s advertisement. Yet I shall have the trouble all the same!"

"And the check also, my dear sir," said Waitzen with fervor.

"Very good; on those terms I undertake it. If I cannot succeed in reading the cipher, I agree to lose my pains."

My first step was to get some inkling of the nature of the cipher, of the plan on which it proceeded. Exclusive of the word at the head, I found that the specimen I had consisted of 252 figures, divided by brackets into 55 groups, a dot in every case again separating the figures within each bracket into two parts. The number of figures inclosed in each bracket varied from 2 up to 5; the proportions in which the various combinations were found differing widely, there being only two instances of groups of 2 figures each; 2, of 3 each; 13, of 4 each; and 38, or more than three-fifths of the whole number, of 5 each. Now, the object of these brackets and dots might quite possibly be merely to increase the difficulty of reading the cipher; it was, however, equally possible that they were there to serve their ostensible purpose, the division and subdivision of the figures. Carefully guarding against absolutely assuming the correctness of this latter view, I sought in the cipher itself for something to lead me to its adoption or rejection. I found that the characters used were the numerals from 0 to 9. I looked at this "0" a little more closely, and found that it occurred 19 times. Now, had the division and subdivision of the figures been arbitrary merely, it would require no proof to show that it should have occurred once, at the very least, at the beginning of a group. It did not so occur.

The first step was gained; the division was a necessary part of the cipher.

The fact I had remarked led me on another step. Had the plan of the cipher been to represent certain letters by certain figures, I should have been entitled to expect the "0" at the head of a group; since, in English, the language in which the cipher was probably written, there is no letter of frequent occurrence which is not also an initial letter, a rule which holds good in all the European languages with which I am acquainted.

I should have been already almost justified in concluding that the meaning of the cipher depended on the grouping, but I found other proofs, which at the same time led me still further on. I have already remarked the frequency of groups of 5 figures. Now, this singular predominance of groups of 5 figures would scarcely harmonize with any plan which represented letters by single arbitrary signs, although it would no doubt be possible to compose sentences consisting chiefly of words of 5 letters, retaining or rejecting the vowels. But in the great majority of cases of 5 figures, I found 3 figures before the dot. To these figures before the dot I, for the moment, restricted my attention. I found that (taking all the groups) they ranged, with intervals, from 5 to 268; in 37 cases out of the 55, there were three figures. Discarding repetitions, I found that under 100 there were 15; between 100 and 200, 15; and from 200 to the end, 13; a degree of uniformity higher than I had expected to find, and high enough to establish that it was the result of the grouping being dependent on a plan.

I had thus determined that the divisions were not arbitrary, and that the characters used did not singly represent letters; by inference, therefore, as they must be held to mean something, that in groups they represented letters or words.

I now went over the groups of figures after the dots, and found that they ranged from 1 to 112. Dividing the numbers between these points equally at 56, I found, discarding repetitions, that up to that number there were 27; above it, 22. With the light I had now got, all converging on one point, I should, in a long specimen, have expected a far more exact proportion; it was one of my difficulties that I had to deal with so short a piece of writing. The proportion, however, was, as in the former case, sufficient to prove the existence of a system. The numbers stopped short at 112, whereas, in the other groups, they went as high as 268; the two systems, regulating the groups before and after the dots, were therefore different. It did not absolutely follow that they depended one on the other, but the bracketing rendered it highly probable that they did. I considered myself justified in assuming that each bracketed group represented a letter or a word.

So far, the conclusions at which I had arrived had been almost forced on me. There was now, however, less certainty in my progress. My examination of the cipher had, nevertheless, shown me in what direction the probabilities lay. They pointed to a conclusion which might well have made Chr. Walt-

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