June 13, 1939. W. J. RESCH 2,162,122

METHOD OF TAKING SAMPLES

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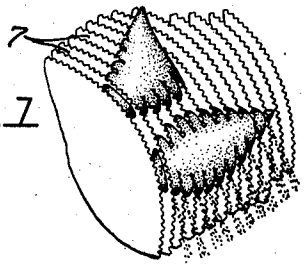


Fig. 1

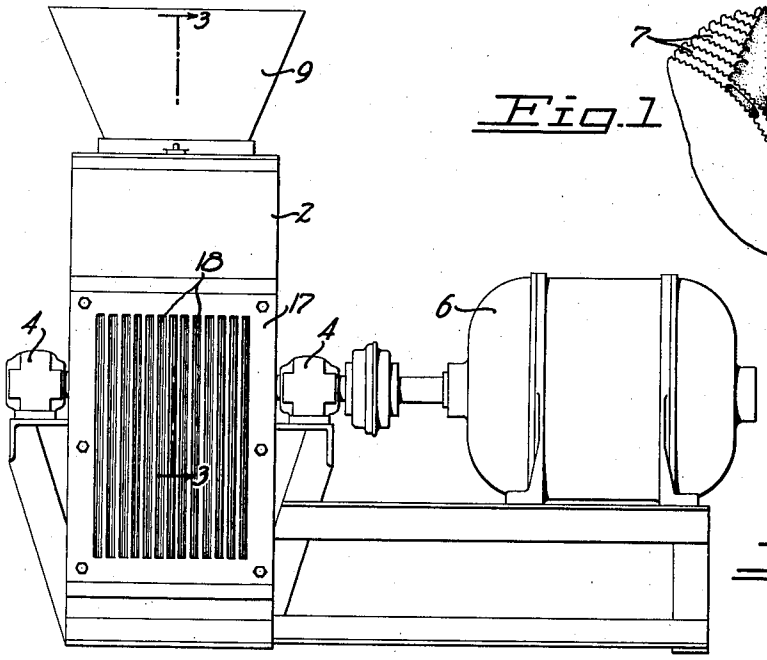


Fig. 2

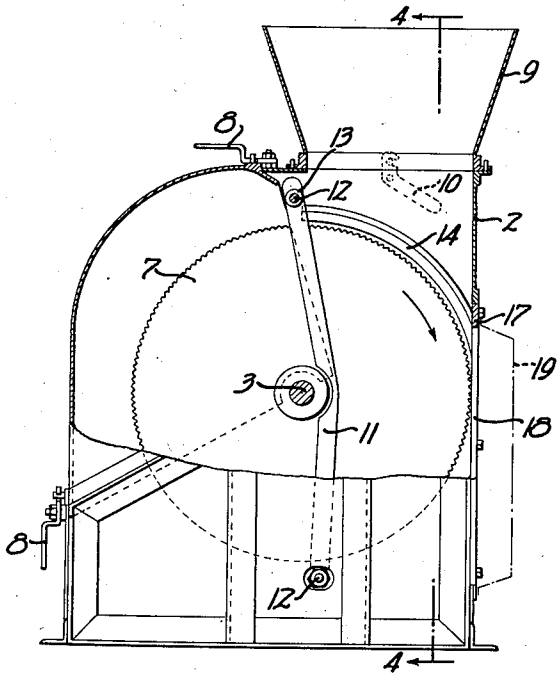


Fig. 3

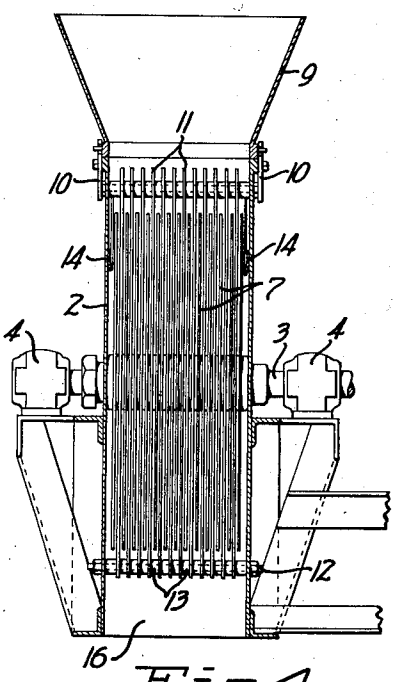


Fig. 4

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METHOD OF TAKING SAMPLES

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Application September 7, 1937, Serial No. 162,825

1 Claim. (Cl. 146—219)

My invention relates to the taking of samples for testing a property of a product, such as the sugar content of beets; and the broad object of the invention is to provide an improved method and apparatus for taking samples, by which articles to be sampled are merely dumped whole and allowed to pass at random through a machine which rapidly and automatically takes an accurate sample.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claim.

Referring to the drawing:

Figure 1 is a perspective view showing my method of cutting samples from sugar beets.

Figure 2 is an elevation view of a machine embodying my invention; and

Figure 3 is a sectional view of the same, taken in a plane indicated by the line 3—3 of Figure 2.

Figure 4 is a transverse sectional view of the machine, taken in a plane indicated by the line 4—4 of Figure 3.

The problem of taking an accurate test sample of a product, such as sugar beets, is a very real one. Raw beets are purchased on the basis of their sugar content, and the correctness of the price paid therefore depends directly upon the accuracy of the test sample in reflecting the true sugar content. In one plant with which I am familiar, the capacity is about 1,000,000 tons of beets per season, and with this large volume it is apparent that even a small error in the test samples will involve a large amount of money in the cost of the beets per season. The beets are purchased in large quantities, and the problem is to get the true sugar content of the whole from a relatively small test batch of the beets.

In a sugar beet the sugar is held by the juice which lies in zones. These zones are in layers encircling the axis of the beet, and when a beet is cut transversely these zones appear as concentric rings about the axis. The sugar content varies in different zones, and a true sample from a test batch must include a proper proportion of beet material from each of the zones in each of the beets. In the past, sampling has been done by first splitting a beet in half along its axis, and then cutting out a segment section from one of the halves for purposes of sampling. This meant that each individual beet of the test batch had to be split by hand, which at best is a dangerous, time-taking and inaccurate procedure.

With my improved method and apparatus a whole batch of test beets is merely dumped into a machine, and an accurate sample given instantly, thereby eliminating all the undesirable features of the old process.

In terms of broad inclusion, the method embodying my invention comprises cutting at random a series of spaced parallel sections from the article to be sampled. This is accomplished by passing the article through a plurality of spaced parallel saws, and collecting the sawdust for the sample. By this method a whole test batch of the articles may be passed through the saws at one time, without regard to the position of the articles relative to the saws, and a very accurate sample of the articles secured.

In greater detail, and referring to the drawing, the apparatus for taking samples of sugar beets embodying my invention comprises a housing 2, through which extends a mandrel or shaft 3, journaled in bearings 4 mounted at each side of the housing. The mandrel is rotated by any suitable means, such as a directly coupled motor 6.

A plurality of vertically disposed circular saws 7 are spaced along the mandrel, across the full width of the housing. These saws are substantially equally spaced, and are of substantially equal diameter; and are arranged with their peripheries substantially tangent to an end wall of the housing, as shown in Figure 3. In a unit having a housing 10¼ inches wide I prefer to use a gang of thirteen saws, spaced on ¾ inch centers. In such a unit, ordinary 12 guage 24-inch cross cut circular saws are employed, having 600 peg teeth of approximately ⅛ inch pitch. As shown in Figure 3, the upper rear section of the housing is removably mounted to permit removal of the saws and mandrel; suitable latches 8 being provided to hold this section in place.

An inlet is provided at the top of the housing and a hopper or chute 9 is arranged over the inlet opening to direct the beets to be sampled onto the saws. This hopper may be removably mounted, as shown, and is fastened by suitable latches 10. As the beets are fed into the machine through this hopper, the beets fall upon and are cut through by the saws. Since the saws are spaced, they operate to cut a series of spaced, parallel sections from beets; the sections cut out being in the form of sawdust. This sawdust provides the sample taken by my machine.

As shown in Figure 1, the beets fall upon the

saws in different positions, but this does not matter. Some of the beets will be cut longitudinally, some transversely, and others diagonally, but in each beet the sections cut out will all lie in parallel planes. As already pointed out, the sugar in beets lies in different zones and the sugar content varies in these different zones. The cutting along parallel planes cuts through these different zones, and gives an accurate sample for determining the sugar content of the beets, irrespective of how the cutting planes are taken with respect to the axis of a given beet. As a result an accurate test sample is secured without individual handling of the beets, since the beets are merely dumped into the machine and allowed to pass through in whatever position they happen to fall on the saws. The saws are rotated at a high rate of speed, say about 1750 R. P. M., and the beets pass through almost instantaneously.

The chute 9 and walls of the housing direct the beets down through the saws. Means are also provided between the saws to guide the beets down through the forward portion of the saws, and to prevent pieces of beet from being carried back around with the saws. This guide means comprises a series of bars 11 interposed between the saws and extending down ahead of the mandrel from a point behind the chute 9 to a point below the saws. These bars are supported at each end on cross rods 12 and are held between spacers 13. To prevent pieces of beet from passing down between the end saws and the side walls of the housing, suitable deflector plates 14 are provided on the walls above the saws.

In order to discharge the pieces of beet, an outlet 16 is provided in the bottom of the housing below the forward half of the saws, through which the beet pieces may pass down into a suitable container below the unit.

Means are also provided for separating the sawdust from the remaining portions of the beets. This is accomplished by a plate 17 mounted over an opening in the end wall of the housing and positioned substantially tangent to the periphery of the saws. The plate is provided with a plurality of vertical slots 18, equal in number to the number of saws, and each slot positioned directly in front of a saw. By this arrangement the sawdust thrown forwardly from the teeth of the saws is thrown through the slots of the plate.

The sawdust is collected by any suitable means, such as by a pan 19 positioned over the face of the slotted plate. After a test batch of beets have been passed through the unit, the pan 19 is removed and the sawdust tested to determine its sugar content. This sugar content reflects accurately the sugar in the beets of the test batch.

I claim:

The method of determining the quantity of a constituent such as sugar in a beet, which comprises sawing entirely through the entire body portion of the beet simultaneously along a multiplicity of spaced, parallel planes only and thereby producing beet sawdust and relatively thin slices, collecting the beet sawdust separately from the slices and determining the sugar content of said collected beet sawdust by testing the same.

WILLIAM J. RESCH.