(No Model.) 4 Sheets—Sheet 1.

R. BERGREEN.

SLICING MACHINE FOR BEET ROOTS, &c.

No. 490,223. Patented Jan. 17, 1893.

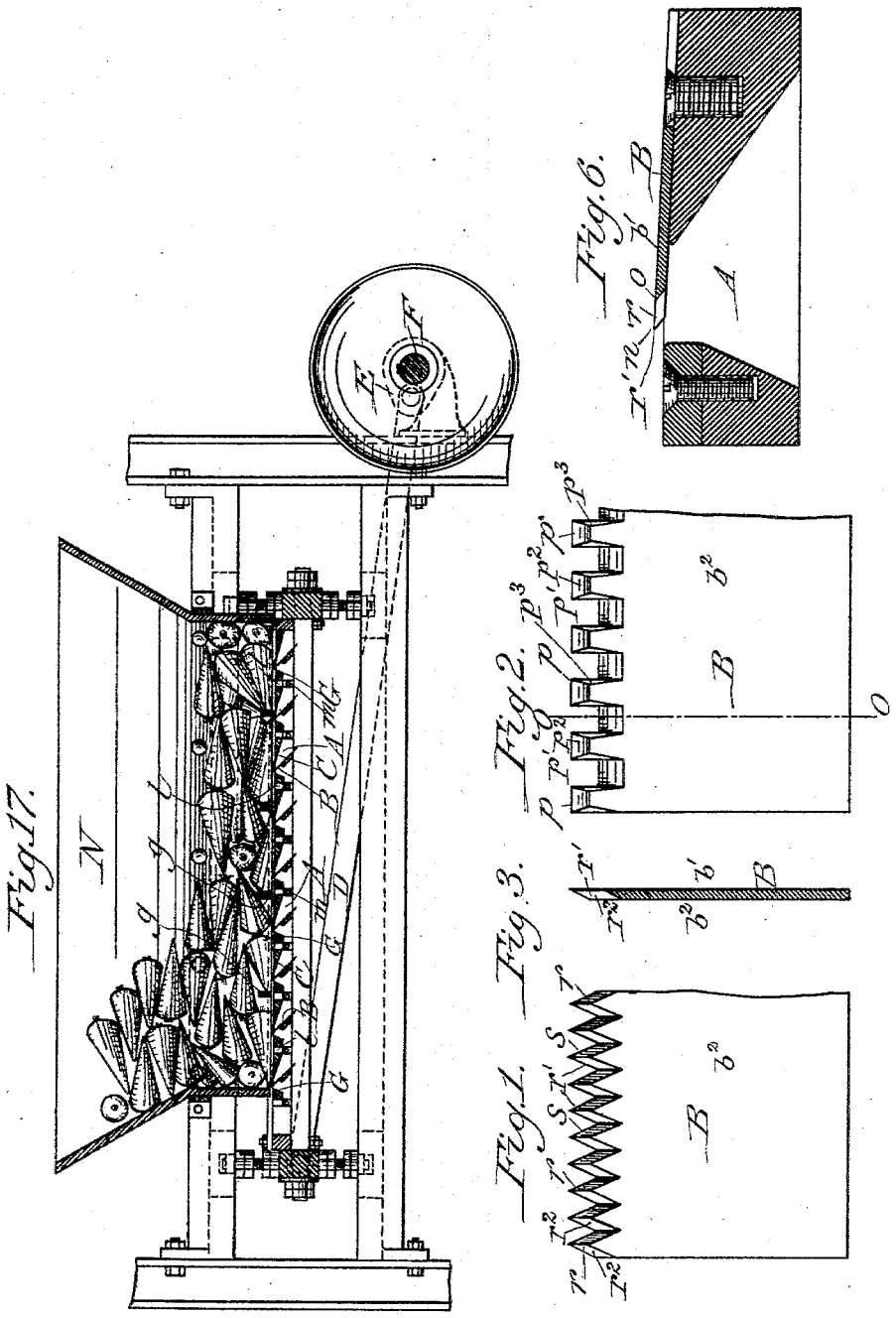

Fig. 17.

Fig. 6.

Fig. 2.

Fig. 3.

Fig. 1.

Attest:

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Robt. Neal.

Inventor

Rudolph Bergreen,

by Max Herzog

His Atty.

(No Model.) 4 Sheets—Sheet 2.

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Fig. 4.

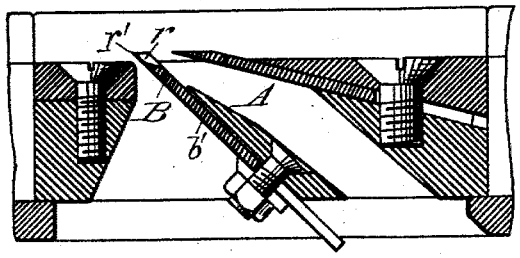


Fig. 5.

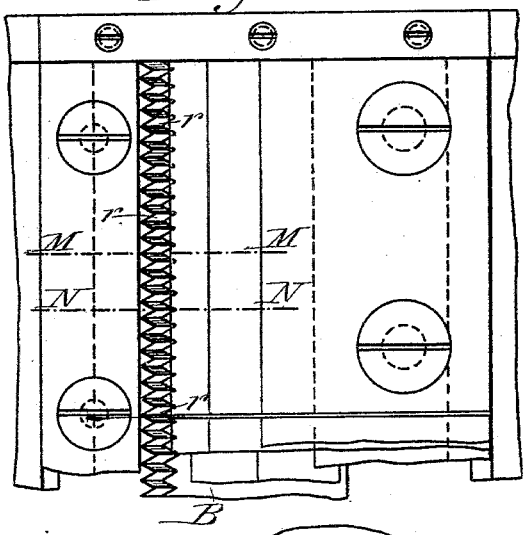


Fig. 7.

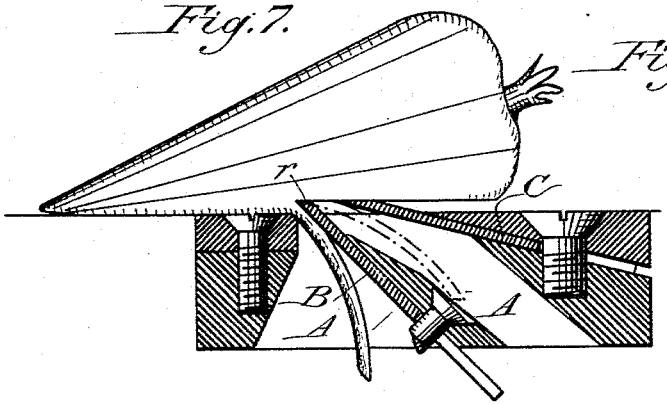


Fig. 8.

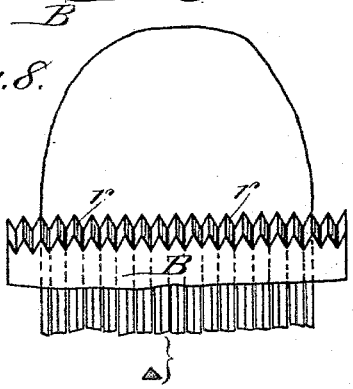


Fig. 9.

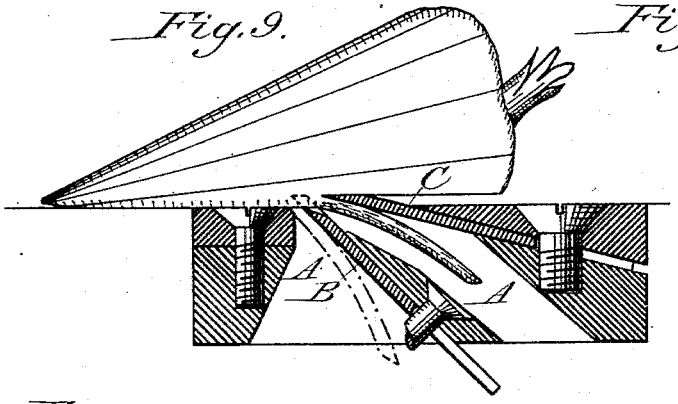
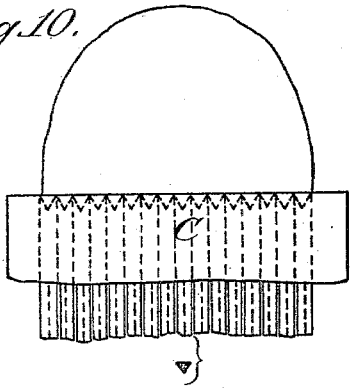


Fig. 10.



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(No Model.) 4 Sheets—Sheet 3.

R. BERGREEN.

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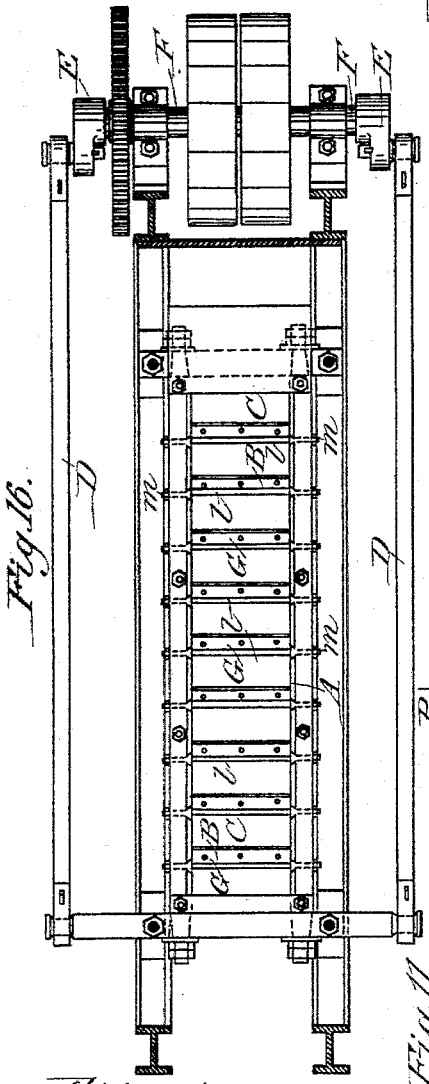

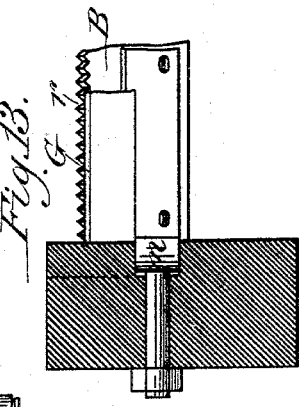

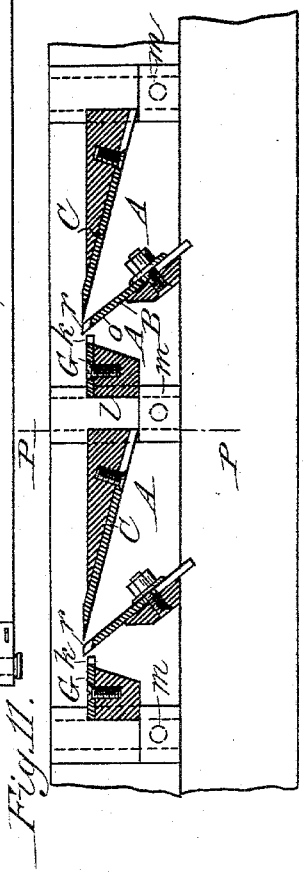

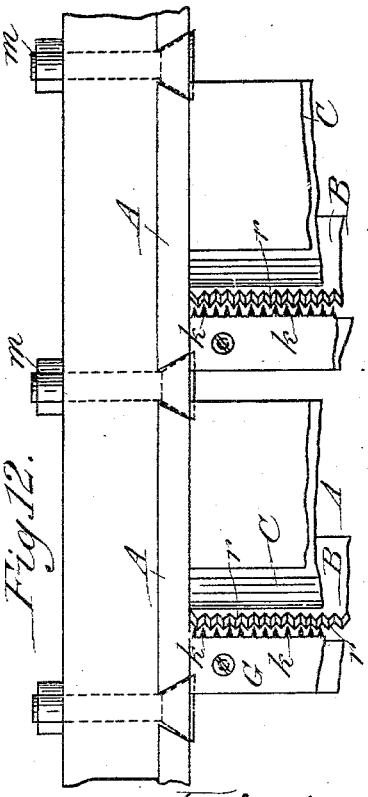

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(No Model.) 4 Sheets—Sheet 4.

R. BERGREEN.

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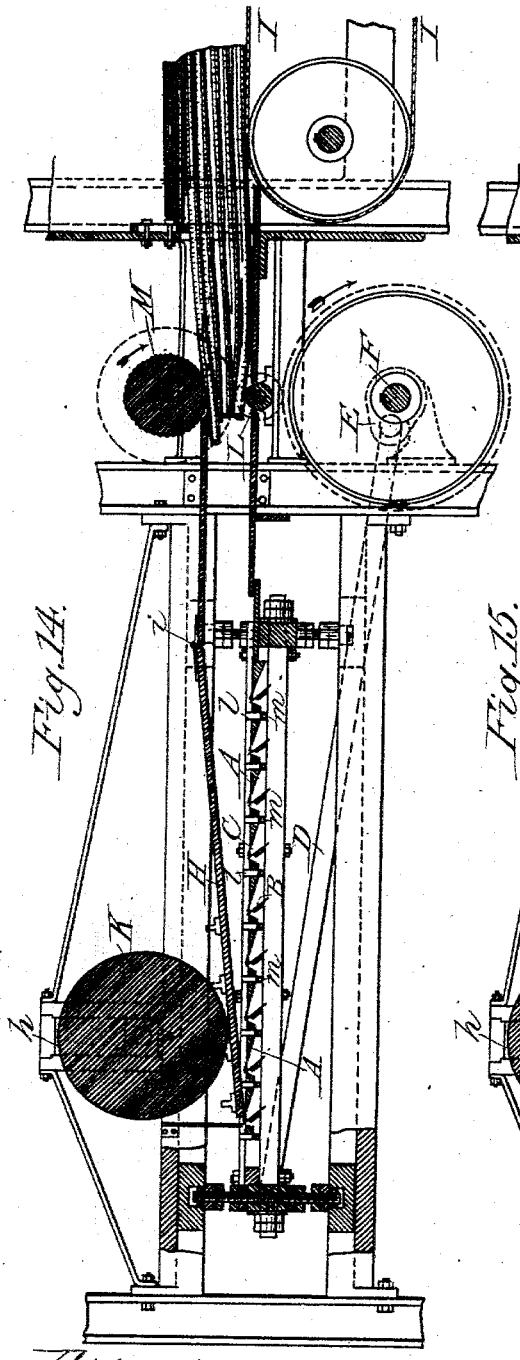

Fig. 14.

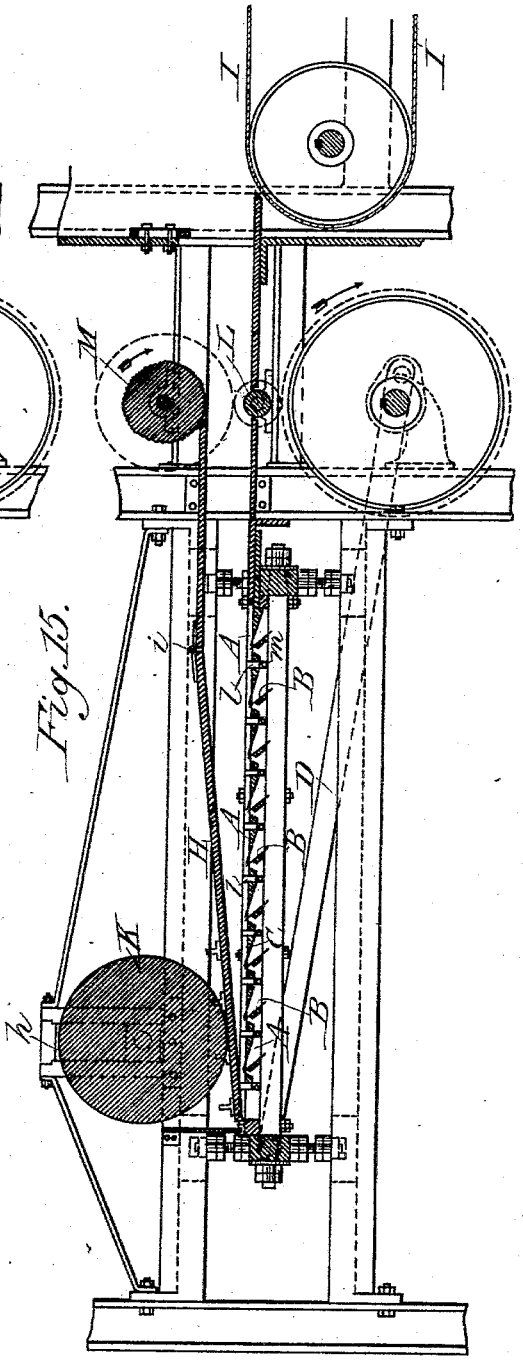

Fig. 15.

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UNITED STATES PATENT OFFICE.

RUDOLPH BERGREEN, OF ROITZSCH, GERMANY.

SLICING-MACHINE FOR BEET-ROOTS, &c.

SPECIFICATION forming part of Letters Patent No. 490,223, dated January 17, 1893.

Application filed December 13, 1889. Serial No. 333,576. (No model.) Patented in England December 21, 1889, No. 20,573, and in Germany January 11, 1890, No. 50,067, June 1, 1891, No. 56,557, and March 10, 1892, No. 61,261.

To all whom it may concern:

Be it known that I, RUDOLPH BERGREEN, a subject of the German Emperor, and a resident of Roitzsch, near Bitterfeld, in Germany, have invented a new and useful Improvement in Slicing-Machines for Beet-Roots, &c., (for which I have obtained patents in England, No. 20,573, dated December 21, 1889, and in Germany, No. 50,067, dated January 11, 1890, No. 56,557, dated June 1, 1891, and No. 61,261, dated March 10, 1892,) of which the following is a specification.

This invention is directed to a novel construction of cutters for slicing beet-roots, sugar-cane and similar materials, and it consists in a construction comprising a knife or cutter which is adapted to a variety of uses in the cutting or slicing machine. This manifold use of the knife as well as its effect in the production of equalized slices will be readily understood from the following description, reference being had to the accompanying drawings, and my invention, moreover, consists in such further features and combinations of parts as will be hereinafter set forth and covered in the claims.

Figure 1—represents a face view of the cutter, B, with triangular serrations, *v*, for the production of equal sized triangular slices. In place of the triangular serrations, serrations of the form shown in Figs. 2 and 3 may be employed. These serrations will produce rectangular slices. Figs. 4 and 5 show the knife having the triangular serrations in position in the cutter at a steep inclination, whereas Fig. 6 shows an arrangement whereby the knife is almost horizontal in the cutter case and the bevels of the said knife face downward. Figs. 7 to 10 are representations of the knife in operation, conjointly with a second supplementary cutter, C. Figs. 11 to 17, Sheets I, III, and IV show the application of the slicing cutter to a specially arranged slicing-machine, wherein a reciprocating motion in a right line is imparted to the cutters and which is adapted to cut not only sugar-cane (Figs. 14 and 15) but also beet roots (Fig. 17). Fig. 14, Sheet IV shows a longitudinal section through the machine with the knife-carrier in its most advanced position. Fig. 15, same sheet, shows a similar view with the knife-carrier in the innermost position, Fig. 16, Sheet III, shows a plan of the machine or cutting mechanism, Figs. 11 to 13 exhibit the arrangement and construction of the cutting-tools, Fig. 17, Sheet I, shows the machine arranged to operate on beet-roots.

The particular construction of the cutter or knife, B, is the following. It consists of a massive plate of steel (see Figs. 1, and 11 to 13) whose upper end is provided with a serrated cutting edge consisting preferably of series of adjoining triangular teeth, *r*, in such a manner that the points and the entire cutting-edge *r'* of the cutters are in a plane with one surface *b'* (which I will call the front surface or side) of the body of the cutter. The bevels r^2 between these teeth extend obliquely downward and backward to the rear surface b^2, of the knife blade, B. Another form of serrated edge (which, however I do not consider as useful as the one shown in Fig. 1) is that shown in Fig. 2, where the serrated edge consists of rectangular teeth, *p*, alternating with rectangular recesses, *p'*. The crenelated cutting edge so formed is also in the plane of the upper or front face *b'* of the cutting-blade, and has bevels, p^3, p^3, running backward and downward from the cutting-edge to the lower or rear surface or side, b^2, of the blade.

A knife constructed as in Fig. 1 possesses great durability. In the position indicated in Fig. 11, it cuts in such a manner that the points of the teeth first penetrate into the beet roots or pith of the sugar cane and the cutting edges are gradually called into play. The slicing is also peformed in such a manner that no pressure is exerted on the body of the beet-root or the cane or on the slice that is detached. The smooth forward surface of the cutter, B, also serves to prevent the breaking or bending of the slice, a slice perfect in shape is thus produced. The same result may be obtained, however, when the cutter is arranged in an approximately horizontal position the bevels lying downward as shown in Fig. 6. In this case also the points, *n*, of the cutters penetrate into the beet-root and the slice is not started until later on, when the cutting edges have entered the material. Under this arrangement of the cutter smooth slices are obtained. This ar-

rangement of the cutter—however—is not the one preferred by the inventor and is only adverted to to show the different modes of arrangement of the cutter. Another result is obtained when the cutter is arranged in conjunction with a flat or straight edged supplementary knife, C, as shown in Figs. 7 to 10 and 11. Under this arrangement the cutter, B, having the triangular teeth is placed at a somewhat steep inclination in the cutter-head in order that the triangular slices indicated in cross section at the bottom of Figs. 8 and 10 cut from the root by the triangular teeth may easily glide off from the smooth cutter-surface. It will also be noted that the bevels, r^2, are set rearwardly so that the serrated cutting edge r', will extend to the front to engage the material to be sliced. At the same time the ribs or triangular projections left on the root are separated by the straight supplementary cutter, C, and glide from under the same and over the back of the main cutter, B, without encountering any edge that might cause breakage and without undergoing any pressure. The cutter, B, therefore, is susceptible of being arranged in different positions, not only alone, but conjointly with other cutters. Its massive shape imparts great firmness to the same. Thus the liability to breakage of the cutting edge, a fruitful source of delay is entirely avoided, and the accidental admission of foreign bodies into the machine is not apt to produce any injurious effects on the action of the machine. Moreover the machine will act perfectly on the introduction of hard-fibered sugar cane and beet root. The production of pulp is avoided because neither the cane, the root, nor the slices undergo any pressure.

In order to explain the application of these cutters to slicing machines for the treatment of sugar cane and beet roots, a slicing machine is represented on Sheets III, IV, and I, Figs. 14 to 17, embodying also some other essential arrangements. This machine is specially adapted to the treatment of sugar cane and embraces any desired number of cutter heads, A, arranged in a gang one behind the other. These cutter-heads are set into a frame to which a reciprocating motion is imparted from the shaft, F, by means of a crank, E, and pitmen, D. This frame thus slides back and forth under the stationary beet roots or the slowly advancing sugar canes, and thus carries out the slicing process by means of the knives, B and C. The formation of the slices is peculiar in this that slices of a given length are produced for the reason that the cutter of one cutter head is caused to move to the initial point of the preceding one the distance between the cutting edges of the knives being slightly less than the throw of the cutter frame, that is to say, just so great that the edge of one knife will just cut off the kerf produced by the inclined downward cut of the next knife in advance. The sugar cane is thus converted into slices of equal length. The cutter-heads are secured to the cutter-frame in any proper way, the drawings showing the application of screws, m, having beveled heads for this purpose. Openings or slots, l, are provided between the cutter-heads for the purpose of allowing any fragments, that might have adhered to the cutters, to drop out, on the return of the cutter-heads. The oblique triangular-toothed cutters, B, are moreover arranged in proximity to guards, G, having the sharp edges, k, which are placed close to or in contact with the said cutters, B, as shown in Fig. 11. The edges are sharpened toward the top and have the purpose of separating any slices that might adhere on their passage along the knife, B.

In the treatment of sugar-cane it is important that the stems are equally pressed against the cutters. For this purpose a special presser-plate, H, Figs. 14 and 15 is provided. This presser-plate is hinged at, i, and is free to oscillate vertically. In order to exert the necessary pressure through presser-plate, H, upon the sugar cane, lying over the cutters, the pressure roller, K, whose journals are capable of sliding up and down in the slots, h, is provided. In place of this pressure-roller, however, simple weights may be laid on the presser plate. The feeding of the cane is performed by an endless apron, I, and two feed-rollers, L and M. The extent of feed is governed by the rapidity of the cutting operation.

Fig. 17, Sheet I, shows the slicing machine in the form adapted to slice beet-roots. A hopper, N, here takes the place of the feeding device in the cane-cutter. This hopper is provided with the transverse partitions, g, to prevent a reciprocating, rolling motion of the roots.

What I claim and desire to secure by Letters Patent is:

1. In a slicing-machine a cutter-head provided with an oblique serrated cutting-blade having bevels extending rearwardly from the serrated cutting-edge, substantially as and for the purpose set forth.

2. In a slicing-machine a cutter-head provided with an oblique serrated cutting-blade in combination with a horizontal guard-plate, as G, in advance of the serrated cutting blade, and having sharp edges, as k, arranged in a horizontal plane, all substantially as described.

3. In a slicing-machine a reciprocating cutter-frame, provided with a gang of cutters, substantially as and for the purposes set forth.

4. In a slicing-machine for sugar-cane, the combination of feeding devices, substantially as described, with a reciprocating cutter-frame and a hinged and weighted presser plate, and a yielding pressure-roller bearing upon the same, substantially as and for the purposes set forth.

5. In a slicing-machine the combination of a reciprocating cutter-frame, a hinged presser-plate and a presser roller journaled in sliding

bearings above the presser plate, all substantially as and for the purposes set forth.

6. In a slicing-machine a cutter-frame provided with a gang of cutters the distance between whose cutting edges is slightly less than the throw of the cutter-frame and a series of slots between the cutters, substantially as and for the purposes described.

7. In a slicing-machine a reciprocating cutter-frame provided with a gang of cutters the distance between whose cutting-edges is slightly less than the throw of the cutter-frame, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RUDOLPH BERGREEN.

Witnesses:
MAX MATTHAI,
CARL BORNGRAEBER.