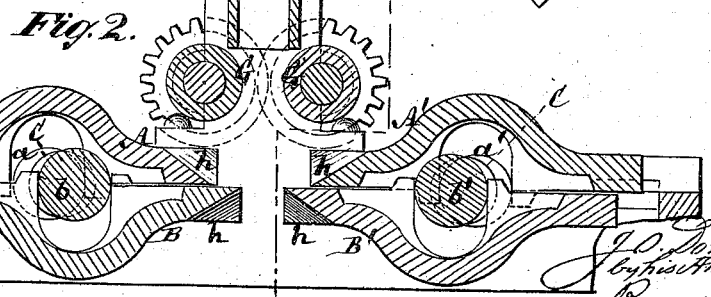
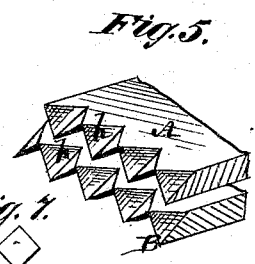
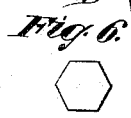
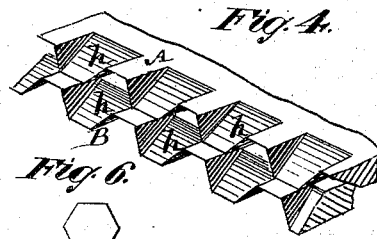
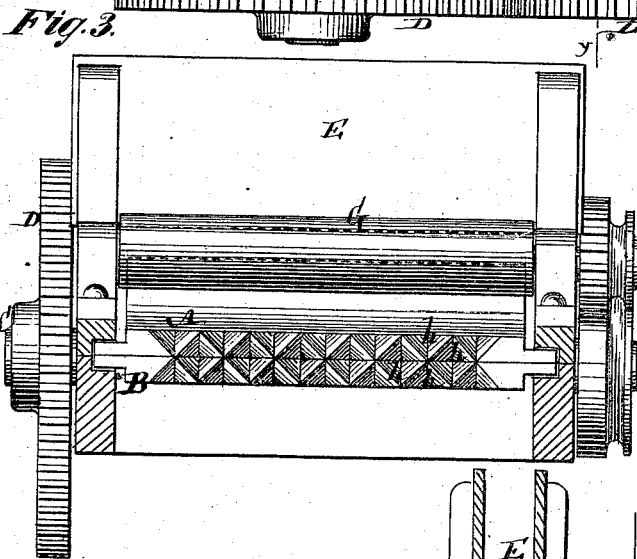
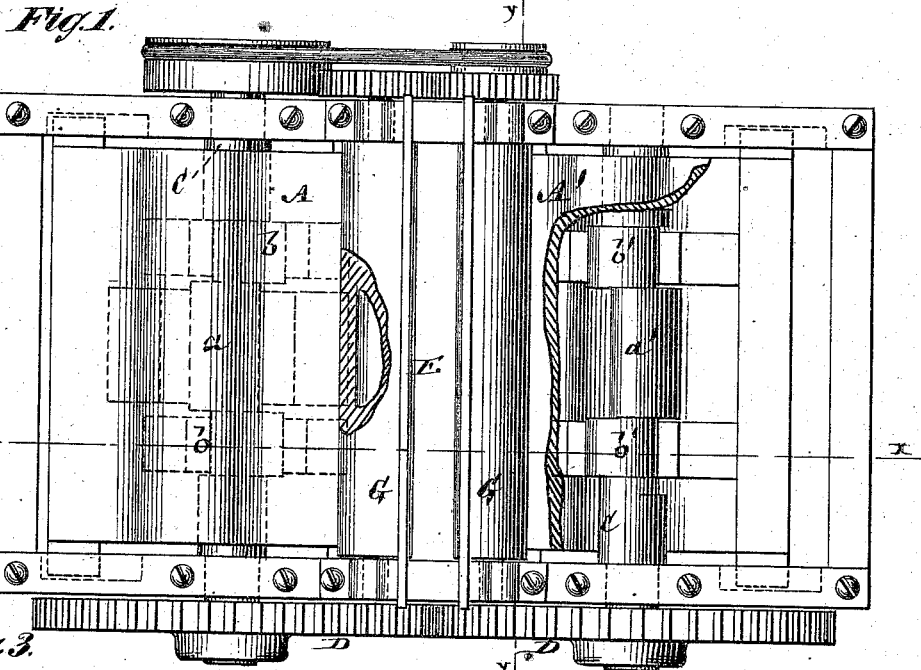


J. O. DONNER.
Sugar-Cutting Machine.

No. 160,657.

Patented March 9, 1875.



Witnesses
John Becker
Fred. Haynes

J. O. Donner
By his Attorneys
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UNITED STATES PATENT OFFICE.

JOHN O. DONNER, OF NEW YORK, N. Y.

IMPROVEMENT IN SUGAR-CUTTING MACHINES.

Specification forming part of Letters Patent No. **160,657**, dated March 9, 1875; application filed October 9, 1874.

To all whom it may concern:

Be it known that I, JOHN OTTO DONNER, of the city, county, and State of New York, have invented certain Improvements in Machines for Cutting Sugar, of which the following is a specification:

This invention relates to machines for cutting, nipping, or breaking hard or loaf sugar into cubes or blocks from slabs or plates into which sugar loaf or brick has previously been divided by saws or otherwise. The invention relates to or includes a construction of knife or knives for such purpose, whereby the same readily free themselves of the pieces of sugar which they cut, and the division of the slab into cubes or blocks may be accomplished in a smooth and rapid manner without injury or breakage of the corners or sides of the cut pieces. To this end the knives, which move transversely to their length against the slab, are of a corrugated form in directions transversely to their planes of motion, with their cutting-edges formed by the corrugations, which have angular or sloping sides, and which are constructed to correspond with the shape of the pieces or blocks to be cut. The invention consists in a combination of such knives in duplicate pairs, the one pair above the other, and each pair operating in alternate relation with each other, substantially as hereinafter described.

Figure 1 is a partly broken plan of a sugar-cutting machine, having my invention applied; Fig. 2, a longitudinal vertical section on the line *x x*; Fig. 3, a transverse vertical section on the irregular line *y y*. Figs. 4 and 5 are views in perspective of the knives, or certain of them, of modified constructions as regards their cutting-surfaces, to cut either cubes or hexagonal blocks, as shown in Figs. 6 and 7.

A A' and B B' are the knives in duplicate pairs, arranged the one pair above the other, and operated by means of revolving shafts C C, geared by wheels D D, to work in unison, and said shafts being provided with eccentrics or cams *a a'* and *b b'*, which are so pitched relatively with each other and work in recesses or chambered portions of the knives that the two knives of either upper or lower pair simultaneously approach and recede from each other,

and said upper and lower pairs move simultaneously in reverse directions with each other.

By such combination, first the one set or pair of knives in a like horizontal plane approach each other to act upon opposite sides of the slab of sugar as it is fed down between them by a spout or guide, E, and rubber or other feed-rolls G G, and then as said one pair of knives recede the other pair of knives, in a parallel horizontal plane to the former knives, advance to act upon or nip the slab, and so on alternately as regards the upper and lower pairs or sets of knives. Motion is communicated to the parallel shafts C C, which operate the cutters, and to the feed-rolls G G, by belts and pulleys or gearing in any suitable manner.

The knives A A' or B B' are each of a corrugated construction in directions transversely to their planes of motion—that is, at their forward or cutting portions, with depressions *h* formed by the cutting-edges as produced by the corrugations, which have external sloping or diverging sides, and which correspond with the shape of the pieces or blocks to be cut, or rather of half of said pieces or blocks, so far as each single cutter is concerned, the other half being formed in the adjacent cutter. The corrugations may either be shaped to cut cubes, as in Figs. 3, 5, and 7, or to cut hexagonal-shaped blocks, as in Figs. 4 and 6.

Applying the invention to cutting cubes, for instance, while the several knives are all of the same pattern, the upper ones are set in such a manner as to bring two diagonal points of the cubes or squares, which are formed by a respective pair of lower and upper knives, in line above one another, and each opposite pair of lower or upper knives cut at each forward stroke only two adjoining sides of the cube.

In the operation, first the two lower knives move toward each other, whereby they cut, in a zigzag manner, one whole row of cubical blocks, which, on account of the self-cleaning shape of the knives, immediately drop out from underneath, after which the two upper knives move toward each other and cut off a second row of cubes, both pair of knives retreating in alternate relation, as hereinbefore

described. The same principle of action applies to cutting hexagonal prisms or blocks, excepting that each upper and lower pair of knives cut, in their advance stroke, three adjacent sides of the block or piece.

The clearance established by the shape of the knives, and the rapid cutting of the cubes or blocks at one operation without waste or marring of the corners or sides of the blocks, are features of special importance in this improvement.

The knives have a sliding action within or along suitable guides in the main frame, the upper and lower ones lying face to face.

I claim—

The combination of duplicate sets or pairs of knives, arranged the one pair above the other for alternate operation on the sugar slab, as described, and with the cutting-edges of the knives formed by corrugations, having sloping sides and shaped to correspond with the cubes or block to be cut, essentially as herein set forth.

J. O. DONNER.

Witnesses:

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