

(No Model.)

2 Sheets—Sheet 1.

J. Y. FAIRMAN.
ICE CRUSHING MACHINE.

No. 291,999.

Patented Jan. 15, 1884.

Fig. 1.

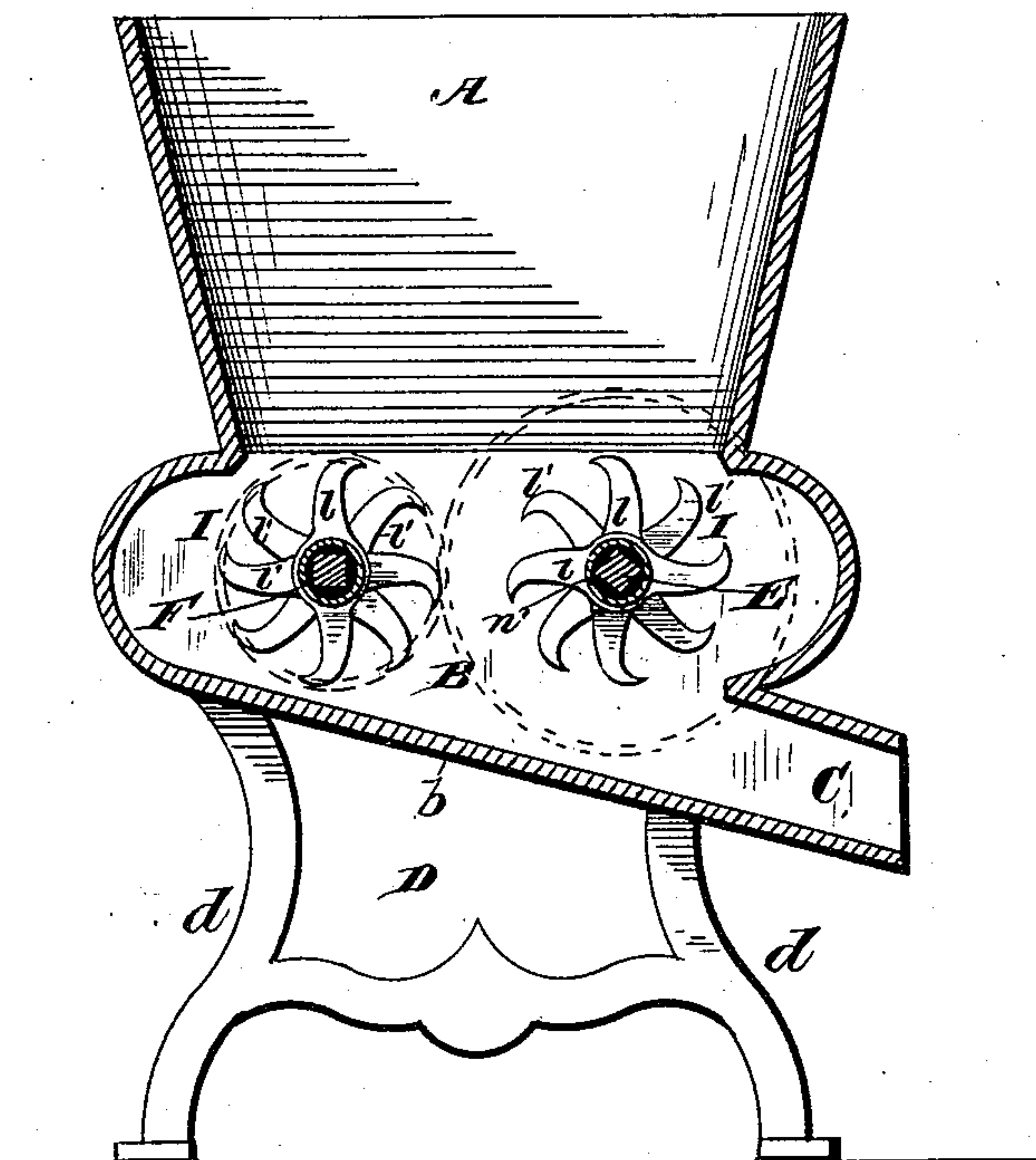
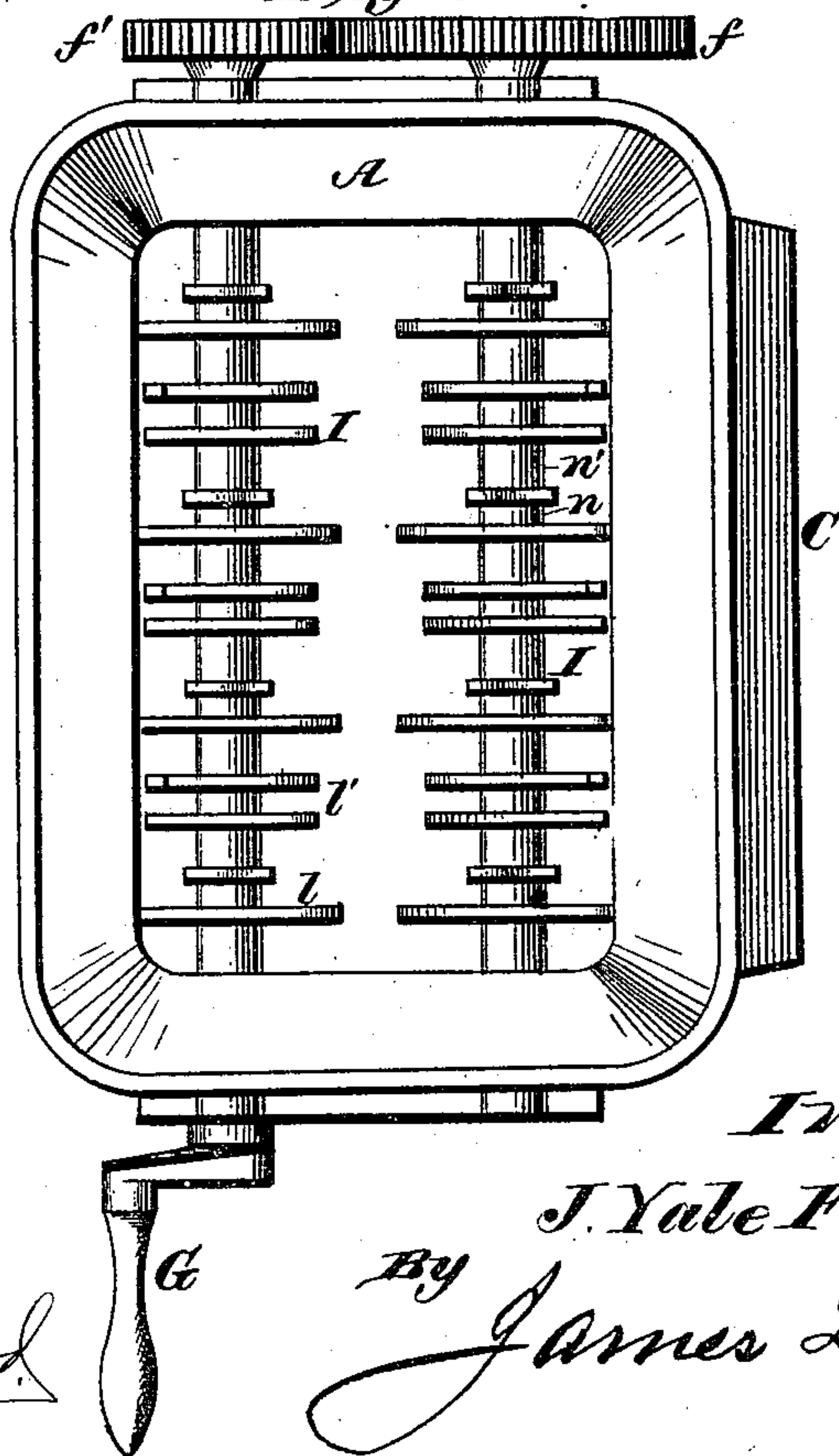


Fig. 2.



Witnesses.

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J. A. Rutherford.

Inventor.

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By

James L. Norris.

Atty

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ICE CRUSHING MACHINE.

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Fig. 3.

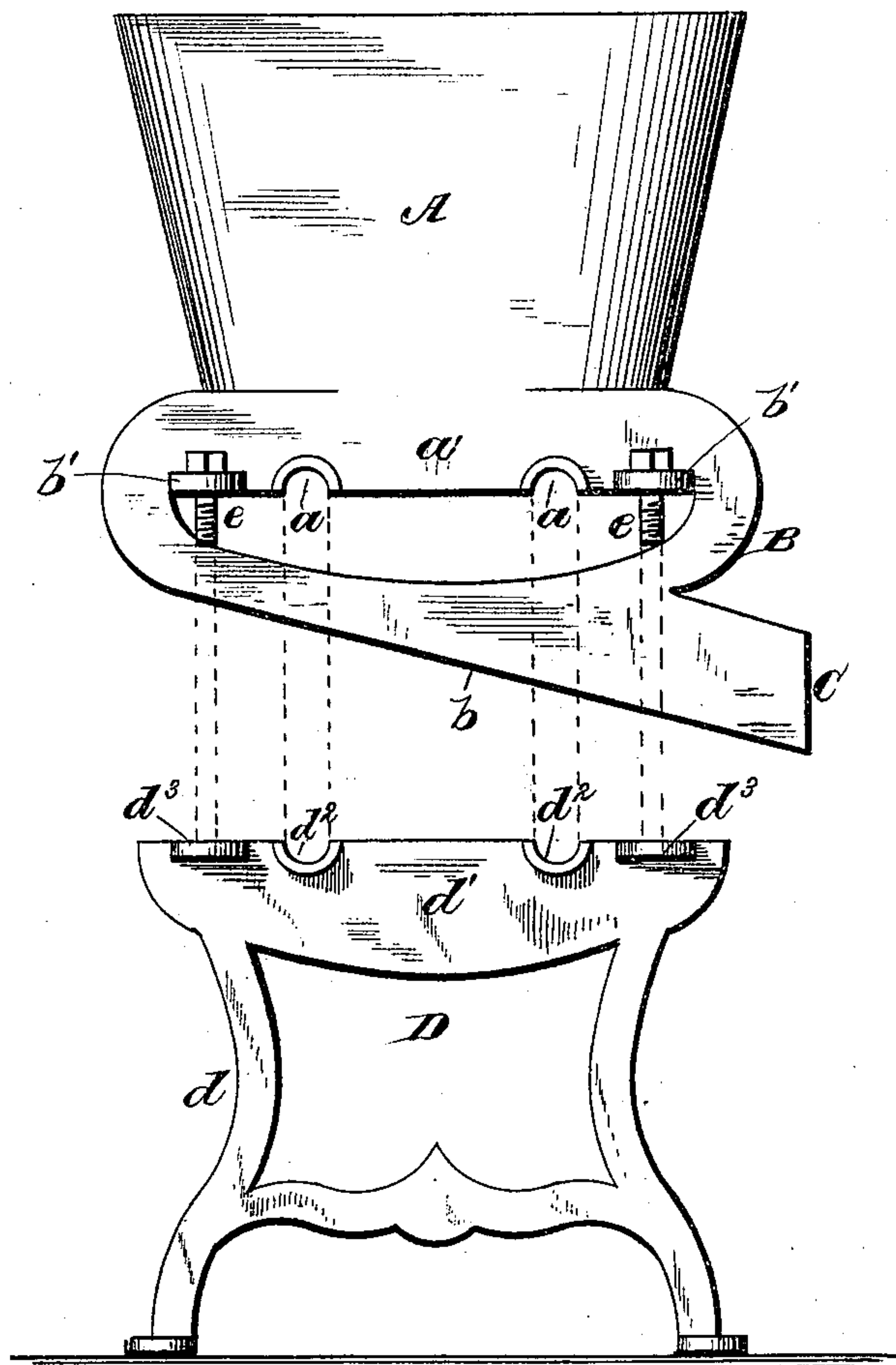


Fig. 4.

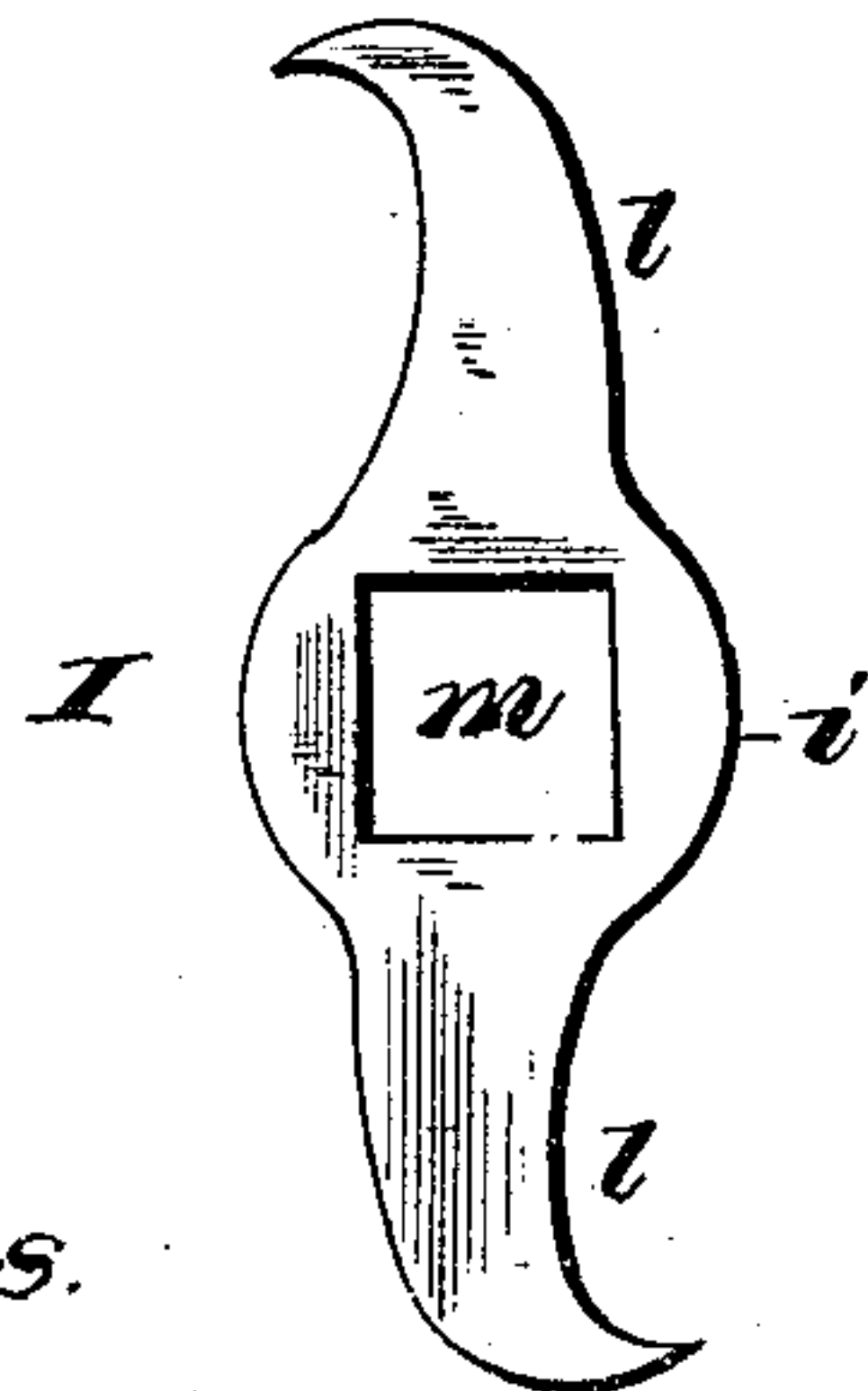
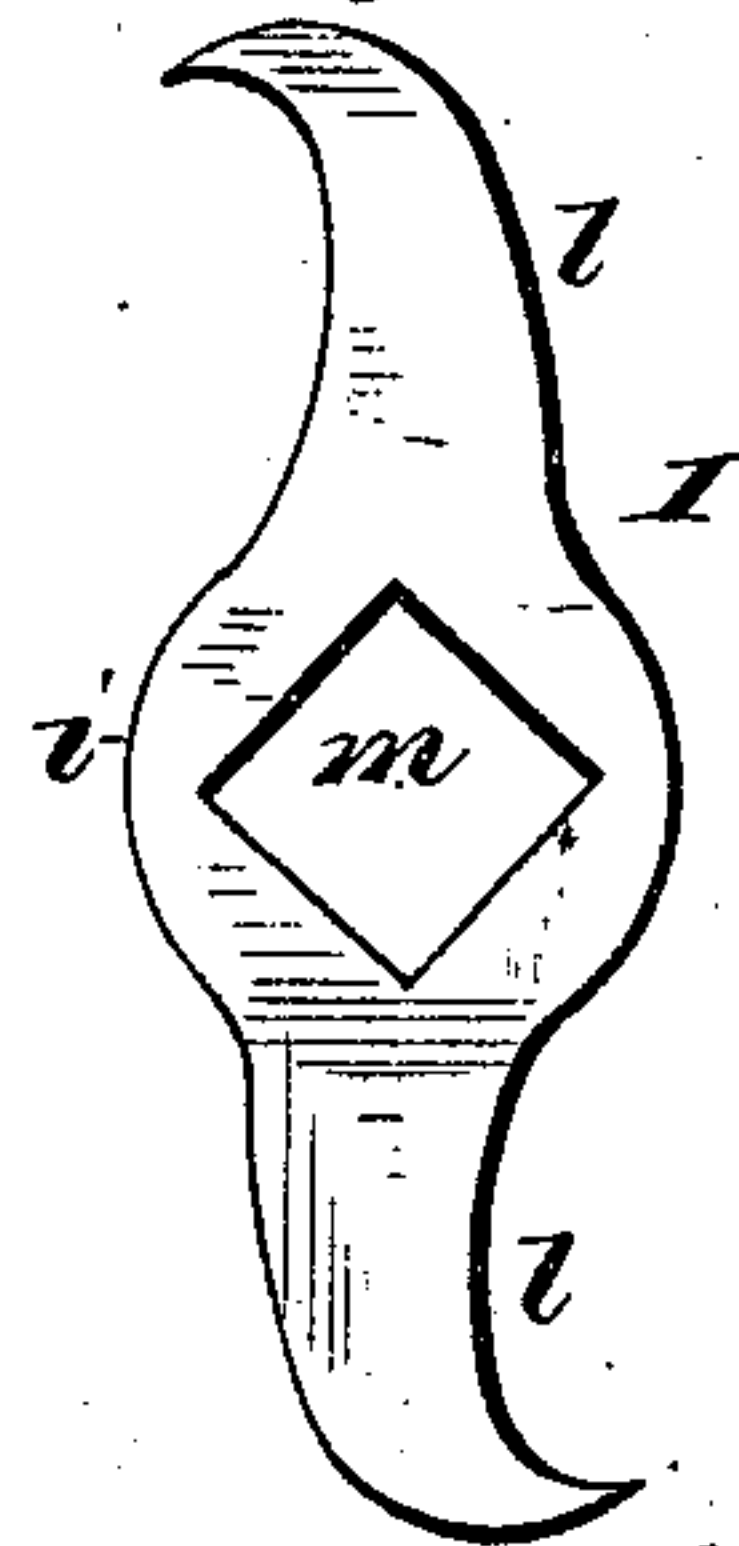


Fig. 5.



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James L. Norris.
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UNITED STATES PATENT OFFICE.

J. YALE FAIRMAN, OF MIDDLETOWN, CONNECTICUT.

ICE-CRUSHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 291,999, dated January 15, 1884.

Application filed September 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, J. YALE FAIRMAN, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented new and useful Improvements in Ice-Crushing Machines, of which the following is a specification.

This invention relates to ice-crushing machines, and especially to that class of machines in which a pair of toothed cylinders or shafts having radial cutters are rotated in opposite directions and at a different speed.

Heretofore machines of this class have been used, the shafts being provided with notched or toothed disks, the points upon each disk being set alternately to one side and the other, somewhat similar to the construction of common saw-teeth. Rotary cutters or breakers have also been used, having toothed plates set upon an arbor and separated by washers; and it has been customary, also, to provide a species of delivery-opening below the breakers for the exit of the water and the crushed ice.

The object of the present invention is to provide a simple, cheap, and efficient mechanism for comminuting ice, to provide a secure and permanent attachment of the cutters or breakers to their arbors, and to combine with the crushing mechanism a novel form of chute or delivery for the crushed ice; and my invention consists in the several features of construction and combinations of parts hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a transverse vertical section taken not far from the center of the machine. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is an end elevation of the frame, the crushing mechanism being removed and the leg being separated from the body to illustrate the construction. Figs. 4 and 5 are detail views of two of the breakers or cutters detached from the arbor.

In said drawings, the letter A designates the hopper of the machine, which is preferably formed of cast-iron. At the lower end of the hopper is located a crushing-chamber, B, having an inclined bottom, *b*, which forms part of a chute or delivering-opening, C, arranged to discharge at the front of the machine. These parts—viz., the hopper, the crushing-chamber, and the chute—are all cast in one piece, as

shown in Fig. 3, the ends of the ice-chamber B being left partly open, and having half-bearings *a a* formed in that portion, *a'*, of the end wall which is cast with this portion of the machine. Lugs *b' b'* are also formed upon the wall *a'*, for a purpose presently to be described.

The letter D designates one-half of the lower or supporting portion of the frame. It consists of the legs *d d*, united at their upper ends by a vertical plate, *d'*, of such shape and dimension that it will close the opening left in the end wall of the crushing-chamber B, and provided with half-bearings *d² d²*, which register with the similar bearings, *a a*, in the wall *a'*. Lugs *d³ d³* are also cast upon the plate *d'*, so as to register with the lugs *b'*, and bolts *e* being passed through both, the two portions of the frame are securely fastened together by turning nuts upon the ends of said bolts. The half-bearings formed in the upper and lower parts of the frame receive arbors E and F, upon which the cutters are mounted. At one end the latter project beyond their bearings and carry gears *f* and *f'*, the former being a large gear and mounted upon the arbor E, which lies nearest the chute C, and the latter a small gear, which is keyed upon the crank-shaft F. Rotation in opposite directions and at different speeds is given by means of the crank G.

The letter I designates the cutters or breakers, which are shown detached in Figs. 4 and 5. Each cutter consists of a central disk, *i*, having teeth *ll* projecting from opposite sides, with their points curved in opposite directions, but in the same plane with the body of the tooth. Through the central disk, *i*, is cut a rectangular opening, *m*, to receive the arbor. The cutters I are arranged upon the arbors E and F in pairs, the members of each pair being separated from each other by a narrow ring or washer, *n*, and the several pairs being separated by a thimble, *n'*. The members of each pair are placed upon the arbor at right angles to each other, and each pair alternates in arrangement with the adjacent pair. This arrangement is shown in Fig. 1, wherein the letter *e* indicates the teeth of one pair of cutters, and *l'* those of the adjacent pair, the latter being arranged at an angle of forty-five degrees with the former, or thereabout. In order to effect this arrangement, I form the opening *m* for the arbor of such size as to fit

snugly thereon, and in the one pair of cutters the said openings are so arranged that a line drawn longitudinally through the teeth *l* will be parallel with two opposite sides of the opening *m*, while in the other pair said line will pass diagonally through opposite angles of said opening. When these teeth so formed are placed upon the arbor in the manner described, their points will alternate, as shown in Fig. 1, and a line drawn through the points of those teeth having successive action will wind spirally around the arbor upon which said teeth are mounted. When the cutters are mounted, they may be secured by turning a nut upon one end of the arbor, by which the washers *n* and thimbles *n'* are drawn closely against the cutters, a collar being formed upon the other end of the shaft. Torsional displacement is prevented by the rectangular openings *m*. The teeth are mounted by introducing the end of the shaft or arbor into the ice-chamber and slipping them successively thereon.

By arranging the chute *C* to discharge at the front, I secure increased convenience, as the crushed ice may be discharged into a pail or other vessel of any size.

Having thus described my invention, what I claim is—

1. In an ice-crushing machine, a hopper, ice-chamber, and chute, all cast in a single piece, part of the end walls of the ice-chamber being formed integral therewith, and having half-bearings for the shafts of the crushing mechanism, substantially as described.

2. In an ice-crushing machine, the combination, with the hopper, the ice-chamber, and chute, cast in a single piece, and having part

of the end walls of the ice-chamber formed therewith, of a supporting-frame having a plate which closes the end of said chamber, half-bearings being formed in the upper and lower portions to receive the journals of the crushing mechanism, substantially as described.

3. In an ice-crushing machine, the combination, with the rectangular arbors, of cutting-teeth arranged thereon in the manner described, said teeth being formed in pairs projecting in opposite directions, with a central disk having a rectangular opening to receive the arbor, said openings being arranged in adjacent pairs to give alternate arrangement of the teeth, substantially as described.

4. The combination, with the hopper *A* and ice-chamber *B*, of the arbors *E* and *F*, having cutters *I*, arranged thereon as described, and the chute *C*, opening in front of the machine, substantially as described.

5. The combination, with the hopper *A*, ice-chamber *B*, and chute *C*, cast in a single piece, with a portion of the end walls, *a'*, formed therewith, and having half-bearings *a a* and lugs *b'*, of the supporting-frame *D*, having plate *d'*, with half-bearings *d²* and lugs *d³*, registering with the like parts upon the upper portion of the structure, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

J. YALE FAIRMAN.

Witnesses:

GEO. N. WARD,
FRED B. CHAFFEE.