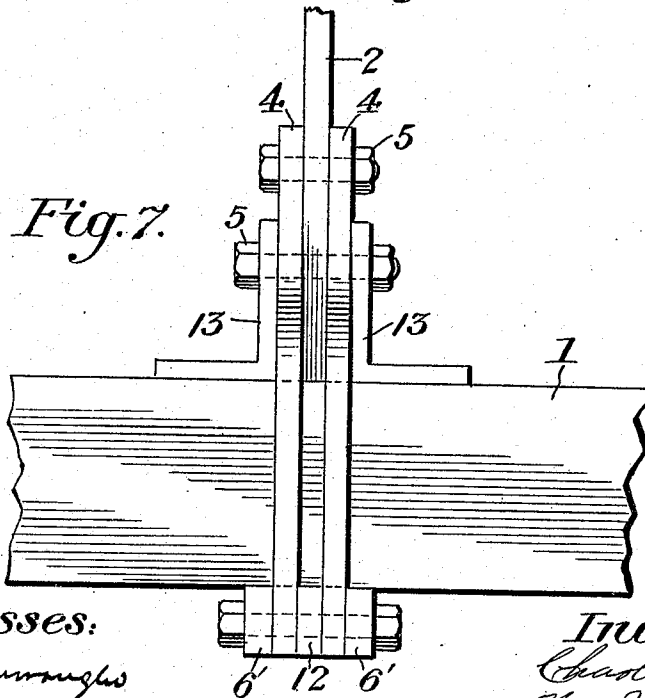
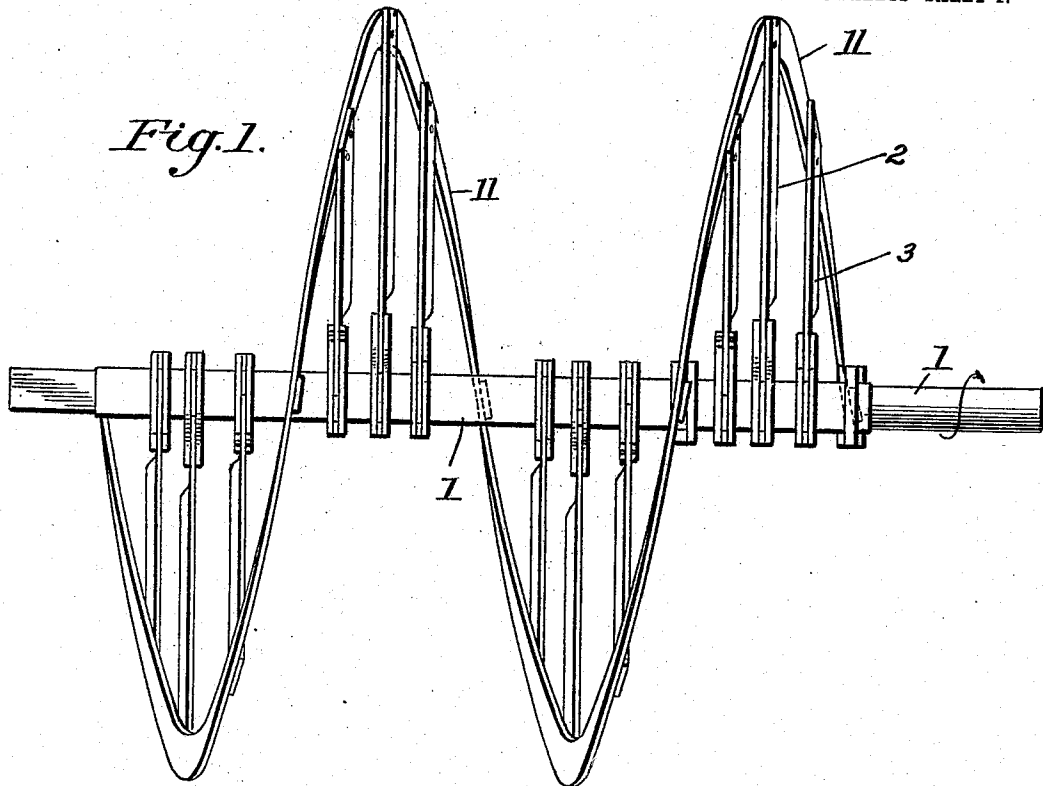


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 STIRRER FOR CRYSTALLIZERS.
 APPLICATION FILED AUG. 27, 1908.

936,608.

Patented Oct. 12, 1909.
 3 SHEETS—SHEET 1.



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 W. M. Down.

Inventors:
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 by F. M. Goldsmith & Co. Attys.

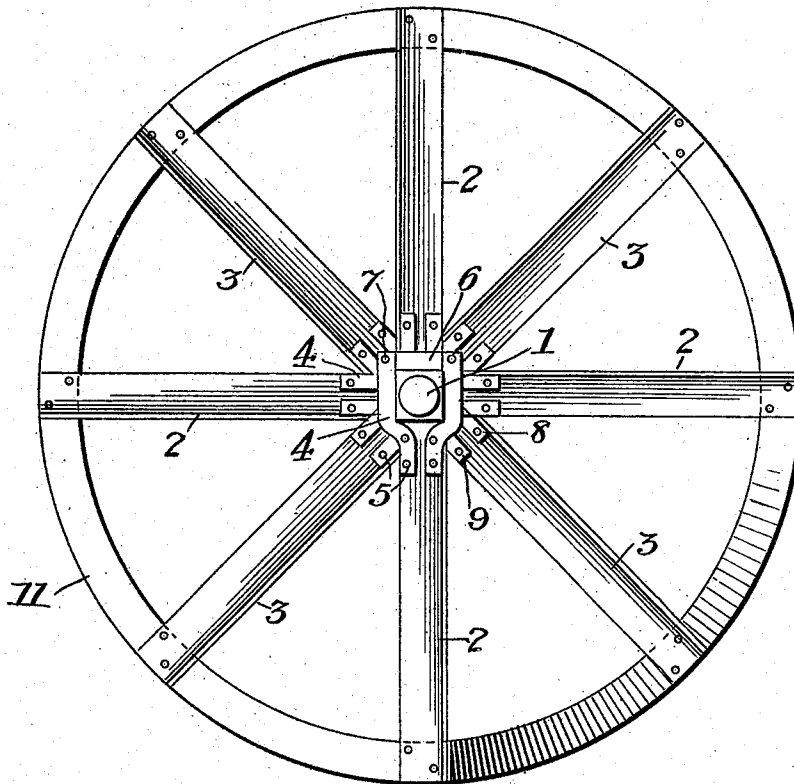
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Fig. 2.



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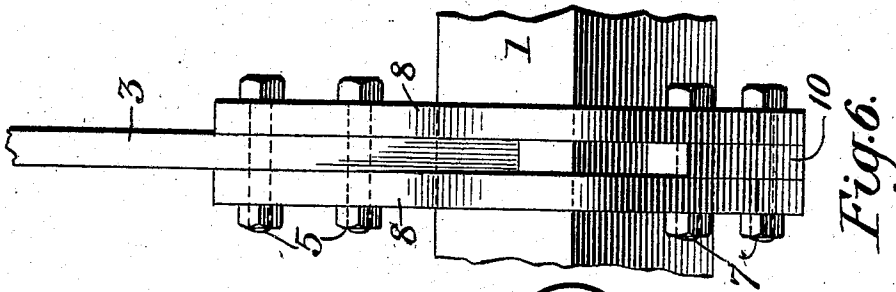


Fig. 6.

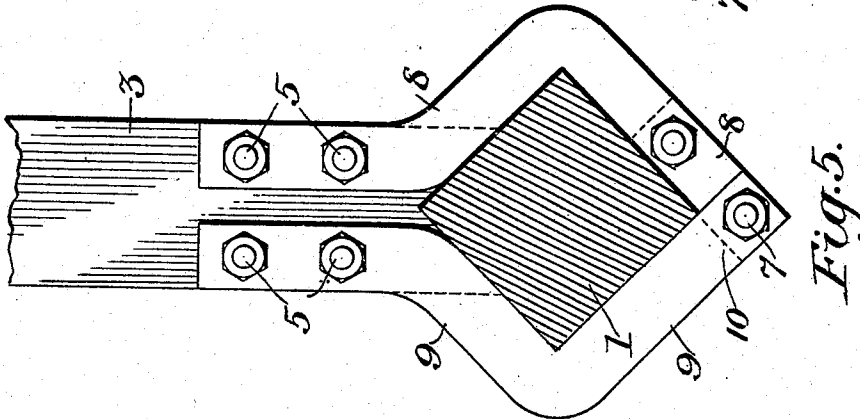


Fig. 5.

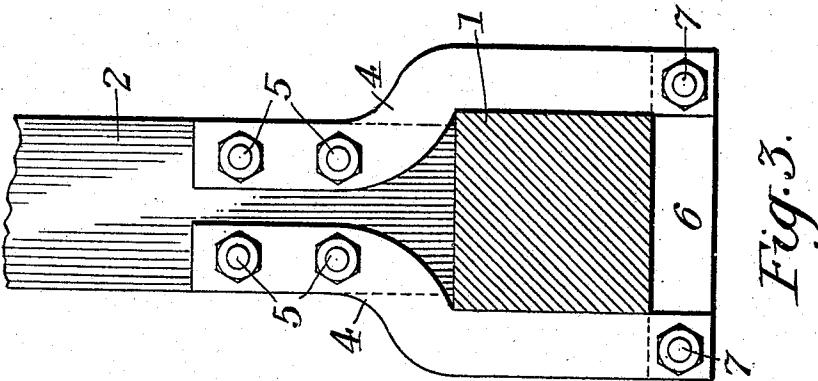


Fig. 3.

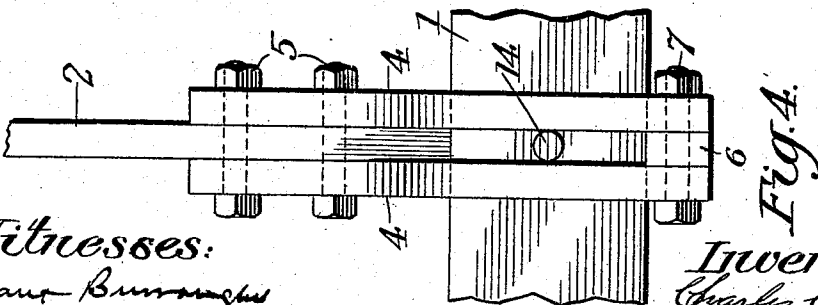


Fig. 4.

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UNITED STATES PATENT OFFICE.

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STIRRER FOR CRYSTALLIZERS.

936,608.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed August 27, 1908. Serial No. 450,432.

To all whom it may concern:

Be it known that we, CHARLES CROZIER and WILLIAM JOHN DYER, citizens of the United States, residing at Honolulu, county of Oahu, Territory of Hawaii, have invented certain new and useful Improvements in Stirrers for Crystallizers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to apparatus used in the process of sugar-making known as crystallizers, and particularly to the stirrers employed therein to keep the masse-cuite in constant motion while crystallization is effected.

The invention consists in the novel and efficient construction and the manner of attaching the stirring-blades to the shaft which is rotated in the crystallizer. This construction also permits of the easy removal and replacement of any blade which may become damaged, as will hereinafter more fully appear.

In the accompanying drawings, Figure 1 represents a longitudinal view of a stirrer embodying our invention. Fig. 2 represents an end view of the same. Figs. 3 and 4 represent, on a larger scale, the end of one of the blades attached to a flat face of the square shaft, the views being taken at right angles to each other. Figs. 5 and 6 represent similar views of the end of one of the blades attached to the corner of the square shaft. Fig. 7 represents a modification of Fig. 4.

Similar characters of reference indicate corresponding parts in all the views.

The shaft 1, which is of a square cross-section and upon which the stirrer is mounted, is journaled and revolved in the usual manner. Every alternate blade 2 directly abuts a flat side of the shaft 1, while each intermediate blade 3 is notched to fit against a corner of said shaft at 45° to the blades 2. The blades 2 are secured to the shaft 1 in the following manner: Four straps 4 are bolted by the bolts 5 to the blade 2, two at each face of same. These straps 4 are bent to fit against the sides or faces of the shaft 1, two on each side adjacent to the side of the shaft against which the blade 2 abuts. The bar 6 is bolted by the bolts 7 between the

projecting ends of the straps 4 and tightly against that side of the shaft opposite the blade 2, Figs. 3 and 4. The blades 3 are similarly secured to the shaft 1; in this case however, each strap is bent to fit over two flat faces of the shaft. The ends of the straps 8 are made to abut against the projecting ends of the straps 9, and a filler 10 is used instead of the bar 6, Figs. 5 and 6. The ends of the blades to which the straps are bolted are in planes at right angles to the axis of the shaft, while the outer portions of the blades are not in these planes but are slightly twisted. A flat bar 11, bent in a helicoidal line, is attached to the outer ends of said blades.

Two bars 6', with a filler 12 between the straps 4, may be used if desired, Fig. 7. An angle piece 13 may be bolted to the strap 4 with one leg along the shaft 1 to abut the adjacent blade and thereby prevent any possible sliding of the blades along the shaft, Fig. 7; or a tap bolt 14 may be screwed into the shaft between the straps 4 for the same purpose, Fig. 4.

We claim:

1. In a stirrer for crystallizers, the combination of a square shaft, alternate blades directly abutting at their ends against the flat faces of the shaft, intermediate blades directly abutting at their ends against the corners of the shaft, and straps for securing said blades to the shaft.

2. In a stirrer for crystallizers, the combination of a square shaft, alternate blades directly abutting at their ends against the flat faces of the shaft, intermediate blades directly abutting at their ends against the corners of the shaft, straps for securing said blades to the shaft, and means in connection with each blade for preventing the straps thereof from sliding on the shaft.

3. In a stirrer for crystallizers, the combination of a square shaft, alternate blades directly abutting at their ends against the flat faces of the shaft, intermediate blades directly abutting at their ends against the corners of the shaft, said ends of the blades being located in a plane at right angles to the axis of the shaft, and means for securing said blades to the shaft.

4. In a stirrer for crystallizers, a square shaft, a blade abutting at one end directly against a flat face of said shaft and having

said end in a plane at right angles to the axis of the shaft, and straps to secure said blade to the shaft.

5 In a stirrer for crystallizers, a square shaft, a blade abutting at one end directly against a flat face of said shaft and having said end in a plane at right angles to the axis of the shaft, straps bolted to the blade at each of its opposite faces and extending
10 over opposite faces of the shaft, and means extending across the remaining face of the shaft and connecting the ends of said straps.

6. In a stirrer for crystallizers, a square shaft, a blade abutting at one end directly
15 against a flat face of said shaft and having said end in a plane at right angles to the axis of the shaft, straps bolted to the blade at each of its opposite faces and extending over opposite flat faces of the shaft, and a
20 bar extending across the remaining face of the shaft and bolted at its ends to said straps.

7. In a stirrer for crystallizers, a square shaft, a blade having its end portion located
25 in a plane at right angles to the axis of the

shaft and abutting at said end against the corner of the shaft, and means to secure said blade to the shaft.

8. In a stirrer for crystallizers, a square shaft, a blade 3 notched at its end to fit over 30 a corner of the shaft, and straps 8 and 9 each fitting over two flat faces of said shaft and bolted to said blade and to each other.

9. In a stirrer for crystallizers, the combination of a shaft, a blade extending from the
35 shaft and having its end adjacent the shaft located in a plane at right angles to the axis of the latter, straps bolted to the blade at opposite faces and embracing the shaft, and a tap bolt screwed into the shaft between 40 the straps to prevent the movement of the blade along the shaft, as described.

In testimony whereof we affix our signatures, in presence of two witnesses.

CHARLES CROZIER.
WILLIAM JOHN DYER.

Witnesses:

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P. H. BURNETTE.