(No Model.)

C. C. MILLER.

APPARATUS FOR MIXING SUGAR OR SIMILAR ARTICLES.

No. 277,319. Patented May 8, 1883.

Fig. 2

Fig. 2a

Fig. 1

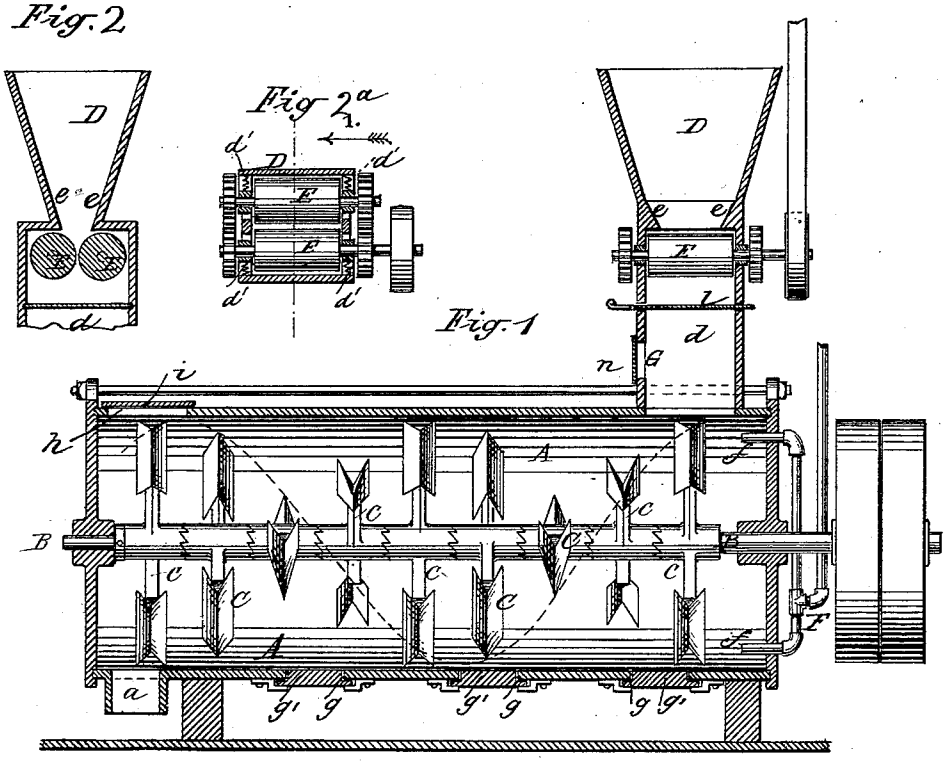


Fig. 3

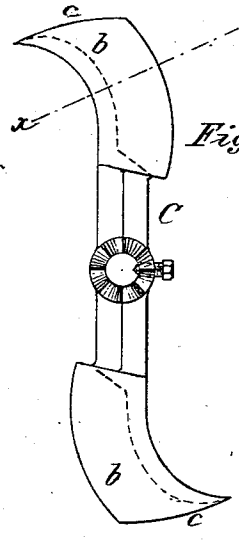


Fig. 4

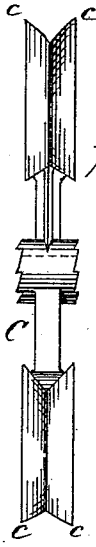


Fig. 5

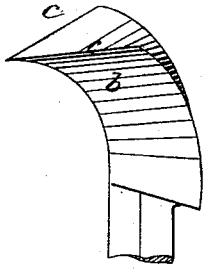
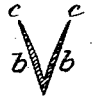


Fig. 6



WITNESSES:

Julius Rehwoldt

Milo. A. Davis

INVENTOR

Charles C. Miller

BY W. T. Dunn

ATTORNEY

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

CHARLES C. MILLER, OF NEW YORK, ASSIGNOR TO JOHN C. BARNES AND THEODORE SCHLOERB, OF BROOKLYN, N. Y.

APPARATUS FOR MIXING SUGAR OR SIMILAR ARTICLES.

SPECIFICATION forming part of Letters Patent No. 277,319, dated May 8, 1883.

Application filed March 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. MILLER, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented a new and useful Apparatus for Mixing Sugars and Similar Materials, of which the following is a specification.

This invention relates to improvements in the construction of that class of mixing-machines in which the materials are conveyed to a cylinder and mixed by the action of rotating arms spirally arranged on a shaft, so as to mix the materials together, and also convey them to the point where they are removed from the cylinder.

One of the objects of this invention is to avoid rubbing the materials, while mixing, against the surface of the cylinder, and thereby forming rolls or lumps, which interfere with a thorough mixture of the materials and render them unmerchantable; and this part of the invention consists in providing those parts of the mixing-arms which are next to the surface of the cylinder with sharp edges, which cut through the materials and prevent their rolling into lumps.

Another object of my invention is to prevent the sugars or other materials from reaching the mixing-cylinder in the form of lumps or hard masses; and it consists in placing in the chute between the hopper and cylinder devices for crushing the masses before reaching the mixing-cylinder.

A third object of my invention is to arrange for cleaning the mixing apparatus of such of the materials as adhere to the cylinder and mixing-arms; and this part of the invention consists in introducing steam into the cylinder to melt the sugars or other materials which adhere to the walls and arms, and providing for the escape of the steam before condensation.

The invention also consists in details of construction which have for their objects to provide for the removal of the sugar, &c., which is cleaned from the walls and arms by the action of the steam, and to prevent the steam let into the cylinder passing up the chute and into the unmixed material in the hopper.

In the accompanying drawings, Figure 1 represents a sectional side elevation of my improved apparatus for mixing sugars. Figs. 2 and 2ª are detailed sectional views of the hopper-chute and crushing-rollers. Fig. 3 is an enlarged view in side elevation, and Fig. 4 in edge elevation, of the mixing-arms. Fig. 5 represents in perspective the end of the mixing-arms; and Fig. 6 is a cross-section of the mixing-arms, taken on line *x x* of Fig. 3.

Referring to the drawings, A represents the cylindrical shell of the mixing-machine, closed at both ends by suitable heads, which are provided with suitable bearings for a rotary shaft, B, carrying at one end suitable fast and loose band-pulleys, as shown. On the shaft B are placed as close together as may be necessary the mixing-arms C, arranged on the shaft spirally, so as to convey the material from the entrance end of the apparatus to the exit or delivery *a*. The mixing-arms C are peculiarly constructed, in order to enable them to cut through the sugar as they revolve, and thereby prevent its packing or forming into lumps or rolls. The construction of these arms is clearly shown in Figs. 3, 4, 5, and 6. The ends *b b*, which come in contact with the material, are V-shaped in cross-section, and are turned in the same direction, so that the sharp edges are carried against the material when revolving. The edges *c c* of the end pieces, *b b*, are curved to the same radius as the cylinder, so that they will revolve at a uniform distance from the surface of the cylinder, and the said edges are reduced to the sharpness of a knife-edge, as clearly shown in Figs. 5 and 6. The object of this construction is to avoid any rubbing between the ends of the arms or mixers and the surface of the cylinder, as any such rubbing-surface causes the material to collect and become compacted into rolls or lumps, and thereby that thorough mixture of the material which is desired cannot be obtained; but by sharpening the edges of the hollow V-shaped ends they cut into and break up any accumulations of the material in masses, and thereby facilitate the thorough mixing of the materials.

D is the hopper into which the sugars to be mixed are placed to be conveyed to the mixing-cylinder. This hopper is connected by a chute with the cylinder.

E E are rolls placed transversely of the chute, just below the hopper, in suitable bearings, which are arranged to yield laterally by connecting them with springs d' d', inserted in the bearing-blocks. The purpose of these rollers is to crush the hard lumps of sugar which pass down from the hopper before reaching the cylinder and mixers, and thereby prevent any of the sugar or other material entering the cylinder in a condition that would interfere with its thorough mixture. By providing the rolls with yielding bearings it will be readily seen that they are adapted to work close together to crush the smaller lumps, and also to separate and thereby receive and crush the larger lumps. The sides *e e* of the hopper are converged toward the center of the rolls in the manner shown in Figs. 2 and 2ª, for the purpose of preventing the sugars, &c., from getting into the bearings of the rolls, and from passing outside of the rolls and accumulating against the sides of the hopper.

In the head of the cylinder are inserted steam-nozzles *f f*, which connect with a T, F, which in turn is connected with a pipe leading to the boiler, and provided with a suitable valve. In the bottom of the cylinder are a number of hand-holes, *g*, closed by traps or doors *g'*, connected with the cylinder-shell by hinges, buttons, or other suitable devices. On the upper side of the cylinder, and adjacent to the end opposite where the steam-nozzles enter, is an opening, *h*, to close which a sliding door, *i*, may be provided. In the hopper-chute, below the rolls, is a sliding cut-off, *l*, and below the said cut-off an opening, G, is made in the side of the chute, and a door, *n*, provided for closing it.

When it becomes necessary to clean the apparatus the operation of the feeding and crushing rolls is stopped, the cut-off *l* is closed to prevent the steam from passing up into the hopper, and the steam is turned into the cylinder through the nozzles *f*. The steam heats the cylinder and dissolves from the sides thereof and from the mixing-arms the sugar which adhered to them during the mixing operation. The mixing-arms should be kept revolving during the cleansing, and the covers over the openings *h* G kept closed. When the sugar is thoroughly dissolved from the cylinder and mixers, and before the steam has opportunity to condense, the openings *h* G are unclosed, and the steam being cut off, that which remained in the cylinder rapidly passes out of the openings, and the cylinder is dried by the heat communicated to it from the steam. The dissolved sugar runs down to the bottom of the cylinder, and is removed by opening the traps *g'*, which allows it to run out through the holes *g*, whence it passes into a suitable receptacle placed to receive it.

I do not claim, broadly, the use of rolls for crushing hard lumps of sugar, &c., as I am aware that they have heretofore been used for that purpose in sugar-mixing machines provided with separating devices. My invention comprehends the employment of such rolls in connection with machines which mix the sugars only, and have no device or devices for effecting a separation of the coarser from the finer particles or lumps after the mixture is made. Neither do I claim, broadly, the use of steam-connections with a cylinder, but only in connection with the cylindrical mixing apparatus herein described, and when provided with devices for insuring a rapid escape of the steam before condensation takes place.

I claim—

1. In apparatus for mixing sugars and similar materials, the hollow V-shaped mixing-arms C, having the edges *c c*, adjacent to the surface of the cylinder, sharpened to form cutting-faces, substantially as specified.

2. The rollers E E, interposed between the hopper D and cylinder A, in combination with said hopper, the cylinder A, provided with exit *a*, and the rotary mixing-arms C, substantially as specified.

3. In combination with the hopper D and mixing apparatus connected therewith, the adjustable rollers E E, for breaking and crushing the lumps of sugar before entering the cylinder of the mixing apparatus, substantially as herein described.

4. In combination with the crushing-rolls E E, the hopper D, having its sides converged toward the center of the rolls, so as to carry the material between the rolls and away from the bearings, for the purpose specified.

5. In combination with the cylinder of a mixing apparatus, having suitable openings for the exit of the steam, the steam-nozzles *f f*, placed in the head of the cylinder to admit steam to the said cylinder, substantially as specified.

6. In combination with the cylinder of a sugar-mixing apparatus and the devices for admitting steam to the interior thereof, the hopper-chute *d*, provided with a sliding cut-off, *l*, and the opening G, for the purpose specified.

7. The steam-supply pipe and nozzles *f f*, in combination with the cylinder of a sugar-mixing machine, provided with the opening *h*, substantially as specified.

8. In a sugar-mixing apparatus, the combination of the cylinder A, having steam-exit *h* and hand-holes *g*, provided with suitable traps or covers, and the steam-nozzles *f*, substantially as described, and for the purpose specified.

CHARLES C. MILLER.

Witnesses:
J. DOUGLAS BROWN,
JULIUS REHWOLDT.