(No Model.) 2 Sheets—Sheet 1.

E. BALTZLEY.

EGG BEATER.

No. 389,631. Patented Sept. 18, 1888.

Fig. 1.

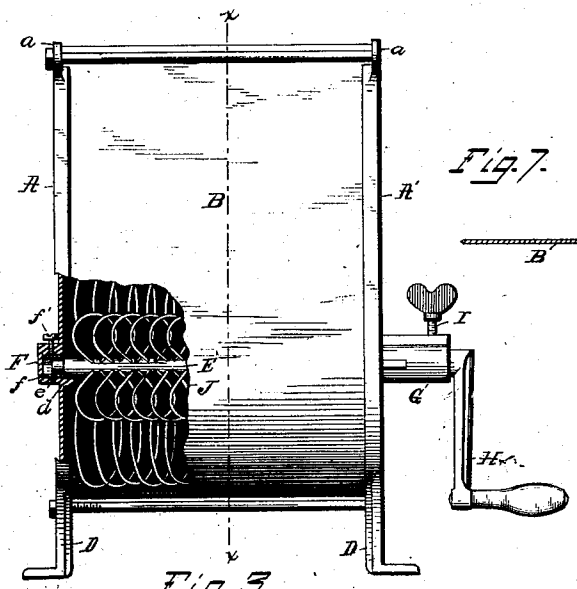


Fig. 7.

Fig. 2.

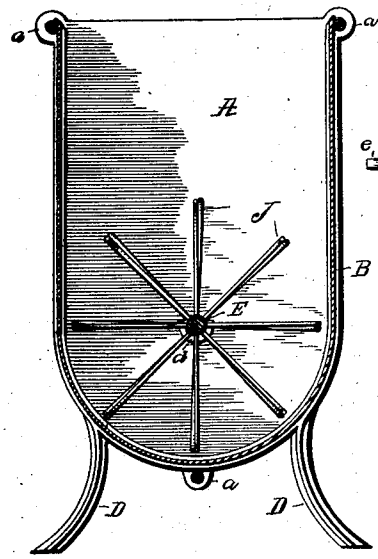


Fig. 3.

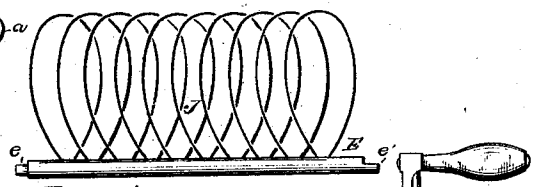


Fig. 4.

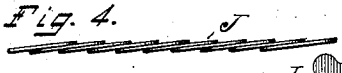


Fig. 5.

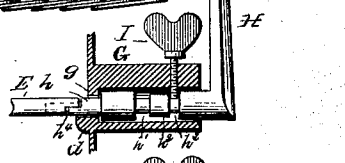
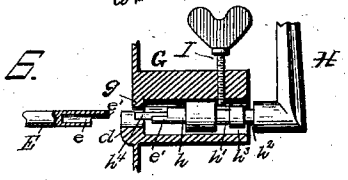


Fig. 6.



Witnesses.
M. A. Barnes.
Van Buren Hillyard.

Inventor.
Edwin Baltzley
By R. S. & A. P. Lacey
Attys.

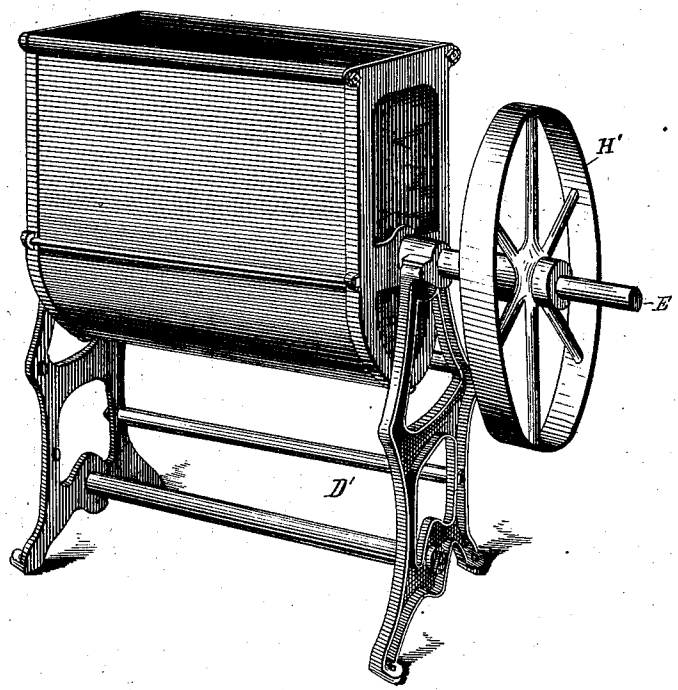
(No Model.) 2 Sheets—Sheet 2.

E. BALTZLEY.

EGG BEATER.

No. 389,631. Patented Sept. 18, 1888.

Fig. 1.



Witnesses.
W. A. Barnes.
Van Buren Hillyard.

Inventor.
Edwin Baltzley
By R. S. & A. P. Lacey
Attys.

UNITED STATES PATENT OFFICE.

EDWIN BALTZLEY, OF PHILADELPHIA, PENNSYLVANIA.

EGG-BEATER.

SPECIFICATION forming part of Letters Patent No. 389,631, dated September 18, 1888.

Application filed November 3, 1887. Serial No. 254,173. (No model.)

To all whom it may concern:

Be it known that I, EDWIN BALTZLEY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Egg-Beaters; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to egg-beaters, which have the beater-shaft journaled horizontally in a vessel, and has for its object to provide a simple, cheap, and efficient beater that can be conveniently handled and readily cleaned.

The improvement consists of the peculiar construction and combination of the parts, which hereinafter will be more fully set forth, and particularly pointed out in the claim, and shown in the annexed drawings, in which—

Figure 1 is a side view, parts being broken away, of an egg-beater embodying my invention; Fig. 2, a cross-section on the line X X of Fig. 1; Fig. 3, a front view of the shaft, showing a single row of whips or beaters; Fig. 4, a top plan view of a row of beaters; Fig. 5, a detail view showing the bearings and the manner of connecting the crank with the shaft; Fig. 6, a detail view showing the bearing and the manner of holding the crank in the bearing when detached from the shaft; Fig. 7, a detail view of one end of the vessel, showing the groove and the side seated in the groove; and Fig. 8, a perspective view of a modification, showing the beater designed to be run by machinery.

The vessel is composed of the ends A and A′, preferably of cast metal, having a groove close to their edges, and the body B, of sheet metal bent into desired form and having its edges fitted into the grooves in the end pieces, which are clamped to the edges of the body by the bolts passing through ears *a*, cast at each upper corner and at the bottom of the end pieces. The lower edges of the ends curve on a circle which has the shaft for its center, and the bottom of the body is correspondingly curved, so that the ends of the whips or beaters may touch or approach close to the bottom of the vessel and operate on the mass or substance without leaving any of it in the vessel untouched. The feet D, extending from the lower edges of the end pieces, form a support for the machine and extend outward to give a broad purchase, so that the machine will not readily topple over. The semicircular flanges *d* on the inner sides of the end pieces form a support for the ends of the shaft E when placing it in the vessel. The end A has a housing, F, opposite the semicircular flange, in which is placed the bearing *f*, being held therein by the set-screw *f′* to receive the reduced end *e* of the shaft. The end A′ has a tubular bearing, G, for the crank H.

The bore of the bearing is contracted at its inner end, *g*, to receive the reduced end *h* of the crank, which, near its outer end, is provided with two annular grooves, *h′* and h^2, and the annular rib or flange h^3, separating the two grooves *h′* and h^2. The groove h^2 is much narrower than the groove *h′*, so that when the set-screw I is projected therein the crank will not have any sliding movement in its bearing G, whereas when projected into groove *h′* the crank is free to move in and out in its bearing a limited distance to engage its end with the end of the shaft. The surface of the rib or flange h^3 is not flush with the surface of the crank on each side of the grooves *h′* and h^2, so that when the set-screw I is turned out to free it of the groove h^2 the crank can be slipped out longitudinally in its bearings to disengage it from the shaft, but cannot be entirely withdrawn, because the end of the set-screw will engage with the inner wall of the groove *h′*. Thus it will be seen that the crank cannot be accidentally displaced and lost, and will always be in position to be coupled with the shaft. The pintle h^4 at the end of the crank is adapted to enter an opening, *e*, in the end of the shaft to hold the shaft down on the flange *d*, and the end of *h* is cut away to receive a corresponding projection, *e′*, on the end of shaft E for coupling the crank and shaft together.

The whips or beaters J, composed of fine wire, are loop-shaped, and are secured at their inner ends to the shaft E in rows. The whips of a row crossing and recrossing mutually brace each other and form a web-beater composed

of a series of fine wires arranged in such close relationship that they cut through the mass very readily and leave a number of openings or narrow channels, into which the air rushes and is caught by the substance quickly over it. The beaters are arranged in rows of more than four, preferably eight, which, after a series of practical experiments, has been found to give the best results. It is not absolutely necessary to arrange the whips in rows, as will be readily appreciated; but for strength and purposes of cleaning this arrangement is preferred. In operation the whips, being composed of elastic wire, have a variety of movement in their passage through the mass, yielding and springing in all and every direction, greatly facilitating rapid aeration.

Fig. 8 shows a large-sized machine constructed in all respects like that shown in Figs. 1 to 7, inclusive, and hereinbefore described, save that the crank H and the legs D are dispensed with, and are replaced by the band-wheel H′ and the supporting-frame D′, respectively.

The tenacious character of albumen renders it comparatively easy to beat the whites of an egg stiff. This tenacity is reduced when the yelk is added, and still more when sugar is joined with it, thus making the aeration of eggs and sugar up to the high standard required by good baking very difficult. In beating the white of an egg the action should be comparatively slow in the beginning and increase as the albumen expands; but the opposite of this must be observed in beating the yelks and whites, or the yelks, whites, and sugar, else, after a certain consistency is reached, the air-cells will be broken as fast as they are formed. In my invention this slowing down of the mechanical action takes place automatically without changing the speed of the machine. In the beginning of a beating operation the web-whips, acting as a fan, create a forward draft of air into the mixture as they pass down into it. There is therefore a pressure of air upon the forward body of the mixture as the fine whips pass into it, leaving in their wake channels, into which the air rushes and is quickly inclosed in fine cells, which are not easily broken down. Added to this, after the first revolution of the whips, they carry with them some of the egg, which first distributes itself over their vertical length practically in sheets, and thus not only adds to the fan character of the whips, but as it is carried down on the mixture in the bottom of the vessel folds over and imprisons the air driven before them. On the opposite side of the vessel the upward movement of the whips, by reason of this number and distribution, gently lifts the egg and carries it upward and forward. At first it partially drops as it proceeds toward the vertical, but in so doing it is caught on the numerous meshed wires or whips, each of which, being tremulous, gently agitates and stretches it out, and thereby continues to form air-cells, for it must be remembered that this is taking place around the center of movement in the vessel toward which the air is driven. As the mixture thickens, it gradually clings more and more to the outer ends of the whips or periphery of movement, the first effect of which is to decrease the violence of agitation. The egg apparently becomes a solid rim around the ends of the whips, but continues to aerate, though slower and more gently, in conformity to the requirements of its greater sensitiveness. At this stage a change in the process of aeration has taken place. The egg is stretched upon the outer ends of the whips, forming a circular thin sheet around them, the movement of which forces the air down and on its interior sides, to which it has the freest access by reason of the whips being composed of fine wires, and forming no body of obstruction at any point. The air circulates and expands its penetrative force upon the whole interior of the sheet of egg, while a similar process is taking place in a lesser degree on the outside. Air-cells are more readily formed therefrom by the even shifting of the body of the egg on the whips by reason of relation and the force of gravity, the independence of the whips, and their elasticity, all of which form openings in the egg, into which the air rushes and is inclosed in minute cells.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination, with the vessel having a bearing at each end and having the half-round lips *d*, projecting inward from the ends of the vessel in line with the lower half of the said bearings, of the beater-shaft adapted to be supported at its ends on the said lips *d*, and having one end reduced and journaled in one of the bearings and having its other end provided with an opening and a projection, the crank journaled in the other bearing, having its inner end reduced to fit in the opening in the beater-shaft, and having a corresponding projection to engage with the projection of the said shaft, and provided with two annular grooves, the portion between the grooves being reduced, and the set-screw I, passing through the bearing and adapted to engage with the said grooves, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN BALTZLEY.

Witnesses:
JAS. B. KILSHEIMER,
P. TENNEY GATES.