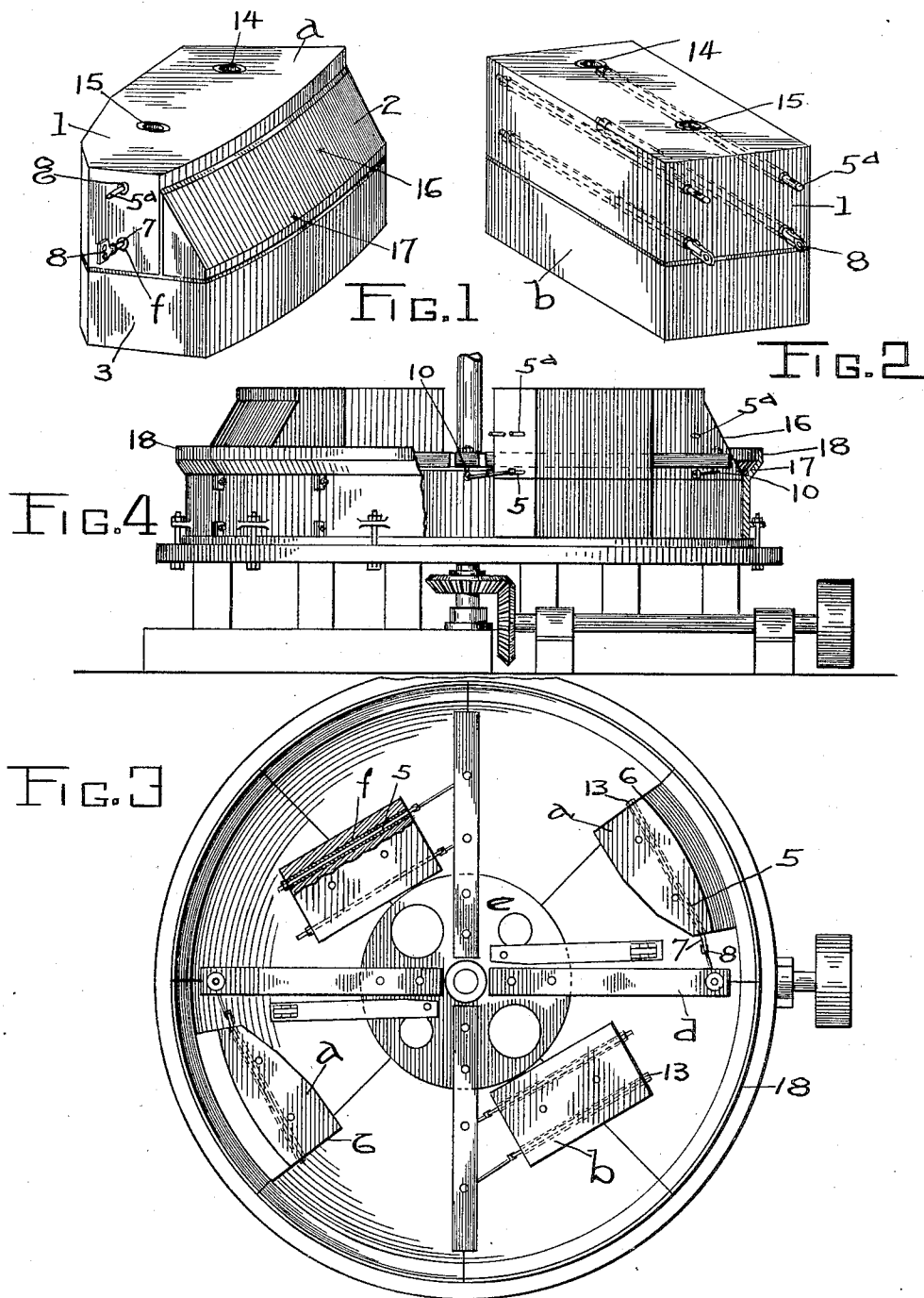


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 STONE MULLER FOR AMALGAMATING PANS.
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Patented Apr. 1, 1913.



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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUSTAVE A. GELIEN, a citizen of the United States, and a resident of the city and county of San Francisco and State of California, have invented new and useful Improvements in Stone Mullers for Amalgamating-Pans, of which the following is a specification.

The object of this invention is the production of a muller for an ore amalgamating pan, having several advantages over the ordinary stone muller, especially with regard to durability and in the provision for repairing or renewing its grinding faces as the same wear away.

A further object of the invention is the production of a muller of artificial stone or plastic compositions molded to shape under pressure, and having its grinding faces, or the surfaces that come in contact with the sides and bottom of the pan composed of slabs or blocks separately formed under pressure and cemented or otherwise united to the body of the muller, whereby such surfaces can be removed as often as they wear away and the body or main part of the stone in which are fixed the coupling or connecting means can be used indefinitely.

A stone muller of my invention consists of the parts and combination of parts as hereinafter described and pointed out in the claim at the end of this specification.

In the accompanying drawings to which reference is had in this description, Figure 1 represents in perspective a muller of my invention shaped to conform to the sides of the pan and adapted to work on the material at and in proximity to the standing rim. Fig. 2 is a perspective view of a muller with straight and rectangular sides for working in the central part of the pan and out of contact with the standing rim. Fig. 3 is a plan or top-view of an amalgamating pan showing the two forms or styles of mullers of my invention, one having a curved grinding face on the outer standing side conforming to the curvature of the rim of the pan, and the other style of muller which operates in the central portion of the pan bottom having straight sides and ends. Fig. 4 is an elevation of Fig. 3 showing one half of the standing rim of the pan broken away to expose the mullers within.

A novel feature in the muller of my invention consists in forming the main body portion of the same out of artificial stone or like

plastic compositions having the required hardness and density for weight and to furnish the necessary character of grinding surface, by molding the block 1 and the sides 2 and bottom 3 separately under pressure, and uniting the parts by cementing or otherwise fixing the sides and bottom in place on the body. The body 1 to which the side slab 2 and the bottom slab 3 are cemented, is provided with sockets or apertures formed in and through it at the time of molding, for the purpose of fixing in the body the clevises, couplings or connections through the medium of which the muller is harnessed or attached to the arms that drive or give circular motion to it in the bottom of the pan. And a novel feature in connection with this part of the muller consists in embedding or placing in the concrete or mixture composing the body part a number of tubes or sections of pipe with their open ends setting flush with the face of the block, and in such position extending through the block from end to end or from face to face as the particular mode or manner of connecting the driving means to the muller may require.

In the present embodiment of my invention the outer muller *a* is attached to the arm *d* of the rotary driver *e* by a draft-rod 5 extending longitudinally through the body from the heel or back 6 to the nose or leading end 7, at which end a clevis 8 is formed or provided on the rod for making connection with an eye or loop 10 on the driving arm. A second or auxiliary draft rod 5^a is sometimes provided in the body 1 directly over or at a different level with relation to the bottom face of the muller, as a means of applying the line of draft at a different angle; and provision is usually made for changing or shifting the line of draft by fixing a pipe or tubing *f* and an additional one *g* in the body at the time of molding into either of which the same draft-rod 5 may be inserted and held by means of a nut 13 or other fastening means on the tail end of the rod; or by fastening a similar draft-rod 5^a in the other tube. Such additional pipes or tubes are also placed and permanently secured in the body 1 as are found necessary or convenient for attaching the driving or controlling means by which the muller is driven and guided.

In the present construction both the outer muller *a* and the inner muller *b* are provided with sockets or apertures 14—15 ex-

tending through the top face downward into the body part or member of the muller, in which pins or other devices can be fixed for attaching or holding in place on the top of the muller one or more weights, for the purpose of adding to the ultimate weight of the muller as it wears down.

In proceeding to form or construct a muller of my invention I prefer to mold the body 1 and the grinding faces 2—3 separately and afterward fix the latter in place by cementing them on the bottom and the sides of the body. But it will be obvious that instead of molding the grinding faces in the form of a slab separately of the body, they can be made at first integral parts and be molded directly on the body; and afterward as the faces become worn down in the grinding operation, the muller can be refaced by cementing the slabs to the worn faces.

My invention provides therefore for renewing the grinding surfaces of the muller by fixing to the muller new grinding faces in the form of slabs molded to the dimensions of the muller body. These slabs are preferably formed of greater density and hardness than the body of the muller and of suitable grain or texture to form efficient grinding surfaces, and an additional advantage in forming the slabs and the body separate is that the latter need not be molded under so great a pressure as the slabs, and is also made serviceable for an indefinite length of time by renewing the grinding surfaces.

The sockets or apertures for the coupling or connecting means being formed in the body at the time of molding, it will be obvious also that the expense and labor involved in fixing the coupling or attaching means in the muller is considerably less than in a stone muller of the kind in which the stone is no longer serviceable when its grinding surfaces have become worn. A further feature in connection with this

muller consists in beveling the outer perpendicular face, or replacing the upper corner by a slanting face, as seen at 16 Fig. 4 from a point 17 about on a line with the top of the perpendicular side of the pan to the middle of the top face and also flaring the rim of the pan outwardly from about the line. The effect of this construction of the muller and the pan-rim is that while the outer grinding face of the muller and the inner face of the standing rim of the pan are in working or grinding contact with each other, their coacting surfaces slant away from each other above the top of the standing rim 18 with the effect to leave or form a V-shape channel between the traveling muller and the rim, having for one side the beveled face of the muller, and for the other side the flaring rim of the pan.

With a muller of this form working in a pan with a flaring top rim the material being ground is not liable to creep up between the perpendicular grinding faces and spill over the rim of the pan, and the height of the muller may be greater than the pan without having any such effect or action on the material with the advantage of permitting a much thicker bottom grinding surface on the muller than in a muller having a perpendicular outer grinding surface working against a perpendicular standing rim.

I claim:—

A stone muller for a grinding pan having a rim flaring at the top, composed of a body having separately formed grinding portions attached thereto at the bottom and side, the side face of the muller being curved to conform to the inner periphery of the pan and the side grinding portion being formed substantially triangular in shape and arranged to form a V-shaped groove with the flare on the rim.

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