E. COLEMAN.

Muller for Amalgamating-Pans.

No. 219,913. Patented Sept. 23, 1879.

Fig. 1.

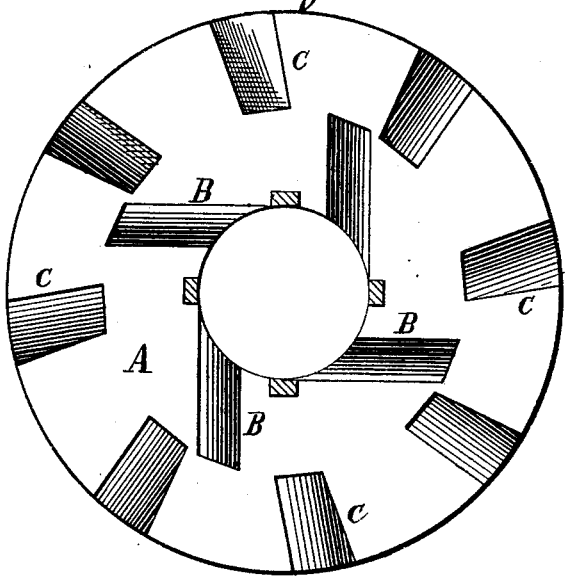
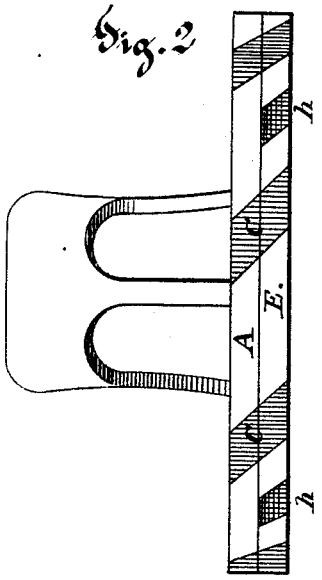


Fig. 2



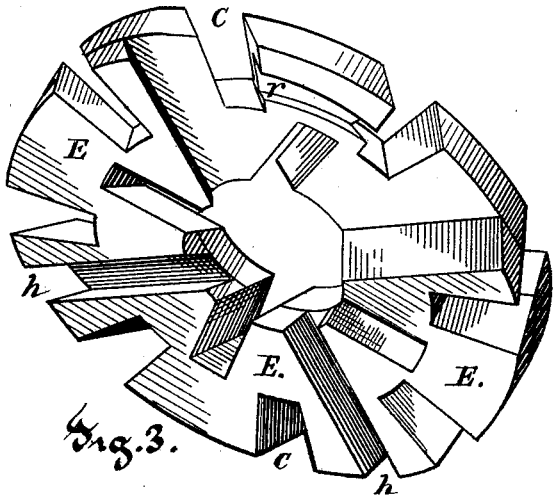


Fig. 3.

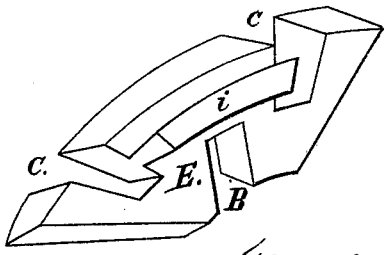


Fig. 4.

Witnesses:
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EZRA COLEMAN, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN MULLERS FOR AMALGAMATING-PANS.

Specification forming part of Letters Patent No. **219,913**, dated September 23, 1879; application filed June 14, 1879.

To all whom it may concern:

Be it known that I, EZRA COLEMAN, of the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Mullers for Grinding and Amalgamating Pans; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

The nature of my invention consists in providing the mullers of grinding and amalgamating-pans, and the shoes attached thereto, with a peculiar arrangement of openings, passages, or holes leading directly through the muller and shoes, from the upper to the under side of the muller, through which passages, openings, or holes the pulp will pass, and be evenly and uniformly distributed to the entire grinding-surface; also, to provide an improved means of attaching the shoes to the under side of the muller, all as hereinafter more fully described.

Referring to the accompanying drawings, Figure 1 is a plan view of the upper surface of the muller. Fig. 2 is an elevation of the muller. Fig. 3 is a perspective, showing the under surface of the muller, with one shoe removed; and Fig. 4 is a detached view of a shoe.

The muller A, I provide with a number of cuts, passages, openings, or holes, with either square or beveled edges, leading directly through it. These cuts, openings, passages, or holes can be variously arranged, either in different lines, so as to fall short or overlap each other, or in rows, so as to alternate with each other, their object being to conduct the pulp from above the muller to the grinding-surface between the muller and bottom of the pan or lower grinding-surface, and feed it evenly and uniformly to all parts of the grinding-surface; but the plan which I have shown in the drawings is the one which I shall usually adopt.

In this arrangement I employ an inner and outer series of elongated openings or passages, which are arranged at intervals apart transversely across the muller in different radial or tangential lines, so that the inner ends of the outer or peripheral openings and the outer ends of the inner openings terminate on the same circle, or they can overlap each other. In practice they may sometimes fall slightly short of being in the same line; but it is better to have them terminate on one circle.

The inner passages or openings, B B, are tangential to the central opening in the muller, while the openings C C in the rim or periphery are more nearly radial; but the angle or direction of the openings can be varied as desired.

I make a larger number of openings in the rim or periphery of the muller than at the center, so as to reduce the area of grinding-surface at the periphery, where the speed is the greatest, and thereby more nearly equalize the amount of grinding capacity at all points of the grinding-surface. These openings are preferably inclined in a direction opposite to that in which the muller rotates, so that the pulp is drawn down through them and forced under the shoes by the rotation of the muller; but they might be made square or beveled, in order to facilitate drawing them from the sand in casting.

The shoes E E are made with corresponding cuts, openings, passages, or holes, and they are secured to the under side of the muller, so that their openings are in line with the openings in the muller, thus forming direct passages down through the muller and shoes, the passages in the shoes being inclined.

The openings or spaces *h* between the shoes, which form the channels for discharging the pulp from underneath the muller, I make nearly radial, so that the pulp will be ejected with but little force, and thus give a steady and uniform circulation of pulp, above, through, and underneath the muller. This arrangement feeds the pulp to the grinding-surface, so that all parts of the grinding-surface, whether it be farther from or nearer to the center, are equally supplied with material. The shoes will then wear evenly and uniformly until they are completely worn out, and will grind equally well all the time.

For attaching the shoes to the under side of the muller, I employ a dovetail rib, *i*, on the upper side of each shoe, which enters and locks into a corresponding dovetail groove on the under side of the muller. This rib is slightly wedge-shaped, and transversely extends across the portion of the shoe between two of the outer

openings, and the dovetail groove *r*, which is also wedge-shaped, extends in a similar manner between two adjoining openings in the muller, so that when the rib has been entered into the groove and crowded tightly into it, it will entirely fill the groove from one opening to the other, and its ends will form a portion of the edge of each groove. This prevents the locking device from being clogged by particles, as the rib fills the entire groove between the openings.

The taper of the rib and grooves is made all in one direction, so that the motion of the muller tends to keep them tight, while a slight blow with a hammer in the opposite direction will loosen the fastening, so that the shoe can be slipped to one side and the rib released. The ribs are quite shallow, so that the grooves will not be deep enough to affect the necessary strength of the material. They do not therefore pass through the muller, as heretofore, thus leaving the top of the muller smooth and free from projections to gather and carry a load of sand or pulp.

The main wear in grinding or amalgamating pans is upon the shoes, and these have to be replaced with new ones as fast as they wear out. The manufacture of shoes for mullers is therefore usually done at the foundry nearest the mine on which the machine is at work, so that, in one sense, the shoes are a separate article of manufacture.

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

1. In a muller for grinding and amalgamating pans, the muller A, provided around its central opening with the inner tangential passages, B B, and with an outer series of peripheral passages, C C, alternating with the passages B B, and with their inner ends touching about the same circle touched by the outer ends of the passages B, substantially as and for the purpose set forth.

2. The combination, with the muller A, provided with concentrically-arranged passages B C and transverse dovetailed groove *r*, of the shoe E, provided with coincident passages, discharging-passages *h*, and a rib, *i*, fitting in the groove *r* of the muller, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal.

EZRA COLEMAN. [L. S.]

Witnesses:
W. FLOYD DUCKETT,
D. B. LAWLER.