Naturally the loss should be determined for the conditions under which the alloys are made, but when this is impossible an alloy of 25% will not err on the wrong side.

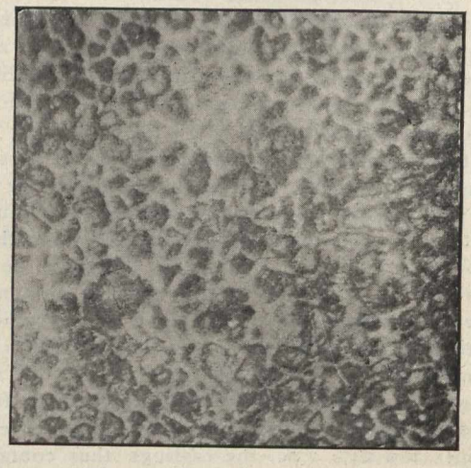


Fig. 3.—Oxygenated Copper.
X. 58.

Decisive oxidation losses occur with phosphorus and manganese in alloys containing these elements as special constituents. These losses are far too variable in character to give a probable loss factor. Under ordinary conditions an allowance of from 30 to 50% should be made, and in many cases 50% will not err on the excessive side. Unlike zinc the loss of manganese is of secondary moment for its chief purpose is that of a deoxidizer. If this purpose is served it is immaterial whether the alloy contains a trace or no manganese. A characteristic feature of manganese bronze is found in the fact that they often contain no manganese, but none the less this metal has been used in their production.

Oxidation has been treated at full length because it is of prime importance in the production of any alloy containing copper as a base. Efficient protection is found in melting under a layer of charcoal, and in the use of a deoxidizing agent. When this agent, as in the case of zinc, enters into the composition of the alloy the oxidation loss should be allowed for in making up the alloy.

Further features are found in the speed of melting and in the casting temperature. The quicker the melting the better the result, and as the author has conclusively shown all alloys must be poured at a suitable temperature in order to obtain the full range of properties. In this connection it is well to note that an alloy containing aluminium gives when fluid a peculiar skin, imparting to what is really a very fluid alloy, a dead or pasty appearance, a feature which must be allowed for when judging temperatures by eye.

With certain bronzes, aluminium, manganese and phosphor, fairly large gates or runners are necessary in order to obtain castings free from pin holes or "draws." If the castings are at all massive these runners should be supplemented by feeding heads placed on the heavy portions. With aluminium and manganese bronzes much cleaner castings are obtained by the use of "plug heads," which consists of a dry sand or loam reservoir with a plug fitted into the runner. The head is filled with metal, the plug then withdrawn, and a constant level maintained by the ladle until the mold is filled. By this precaution no dirt enters the mold and extremely clean castings result.

SAND SIFTING MACHINE.

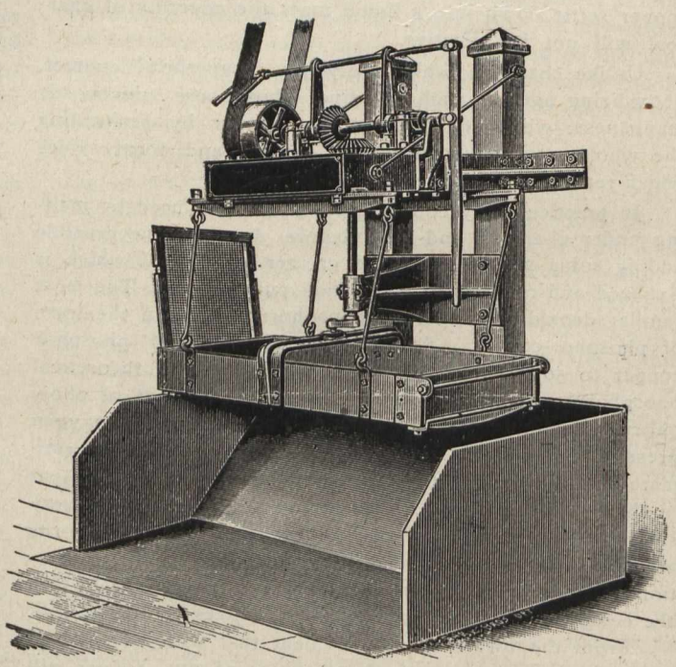
Designed by S. Groves.

The machine illustrated in connection with this article is an adaptation of an "Old World" flour mill device, viz.: a suspended sieve with crank motion, designed strongly and simply, to meet the requirements of a modern foundry. In these days of keen competition, to have each molder mixing his own facing is sheer folly, for no two founders agree as to the right proportions and grading of the sand mixtures to suit different forms and sizes of castings, as many a jobbing shop foreman knows to his sorrow; while the time spent by the skilled molder in riddling is manifestly uneconomical, since a laborer can do it just as well, leaving the molder to utilize his time on work commensurate with his rate of wages. Experience has demonstrated, that with a machine like the above, one laborer can prepare all the facing required by thirty molders, and be done each day by dinner hour, filling in his time in the afternoon helping around the foundry.

It is claimed that for the purposes of a jobbing foundry —where different grades of facing are necessary—a sand sifter is immeasurably superior to the best centrifugal sand mixer, for the latter breaks up and mixes into one grade only, sands, lumps of clay, nails, metal droppings, and, indeed, everything that is shoveled into the throat; while the former not only mixes, but sifts all that is thrown in, leaving behind in the riddle box the lumps of clay, scrap, etc., which are not required in the facing. This sifter is equipped with four sieves of 16, 8, 4, and 2 mesh respectively, which can be interchanged in a few seconds, either for the purpose of sifting the finest facing or cleaning up the floor of the shop, and saving the scrap for the cupola; and is so designed that, when in motion, the riddle box is tilted in all directions, thus embodying the idea of the most perfect hand riddling. Further, the driving mechanism is all above the falling sand, hence the wear of the frictional parts is reduced to a minimum, and when, in operation, is practically noiseless.

The design and construction of this appliance is the result of enforced economy by a foundry subject to keen competition, and has proved a valuable labor and money saving device.

The riddle box is operated at a speed of 130 revolutions per minute, and sifts five cubic yards of moistened sand in a No. 4 mesh riddle in 45 minutes. The whole machine occupies a floor space of about 6 feet 6 inches by 4 feet 6 inches.



Sand Sifting Machine.

Experimental Tests.

Size of Riddle.	Cubic Yards of Sand Sifted.	Time. H. M.	Number of Stops Made for Cleaning Riddle.
No. 2	5	0——25	..
" 4	"	0——45	..
" 6	"	0——55	2
" 8	"	1——15	3
" 12	"	2——40	6