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ALLOY

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My invention relates to alloys, and more particularly to brasses which may be hot rolled and drawn and which may be freely cut and machined.

It has been found that the addition of small amounts of lead to brasses increases the facility with which they may be cut and machined, but that such brasses, inasmuch as the presence of lead causes them to crack and break when it is attempted to roll or draw them hot, particularly when their copper content is high, can be successfully fabricated into sheets, tubes, and the like only by expensive methods involving cold rolling or drawing. The present invention aims to produce a brass alloy which possesses free cutting and machining properties and yet can be rolled or drawn hot by usual mill processes.

It has been found that the addition of requisite amounts of both silicon and lead to brasses renders them capable of being hot rolled or drawn, and produces an alloy having improved physical properties with respect to the facility with which they may be cut and machined, and with respect to resistance to corrosion, ductility, and mechanical strength. Lead, it has been found, alloys with brass with difficulty if at all, and the addition of lead alone to brasses, it has been found, results in the presence of free lead in the form of minute globules more or less imperfectly distributed throughout the mass, which free lead in itself is objectionable in that it acts to decrease the ductility and mechanical strength of the alloy. The presence of silicon however, in brasses produced according to the present invention, materially increases the dispersion of the lead, and thus acts materially to decrease the amount of lead necessary to secure the desired free cutting and machining properties, and also to decrease the adverse effects with respect to the presence of lead globules; the alloys produced when silicon is employed having a high mechanical strength and ductility, and being much superior in these latter respects to the leaded brasses without silicon.

Great economic savings may be effected in producing many articles from the improved alloy according to the present invention as, for example, when drawn pipes or tubes are to be produced, the improved alloy can be cast as a solid billet and hot pierced preparatory to the drawing operation, which latter may be done with the material hot; whereas according to prior practices of producing drawn pipes and tubes with use of prior brass alloys it has been necessary first to cast a tubular shell and to draw the same by a cold process down into pipe or tubing.

According to the present invention the copper content of the improved alloys may be from 60 to 70%, and the silicon and lead contents from very small fractions of a percent up to 2 and 3% respectively, with the balance zinc. Very small amounts of silicon and lead appear to give improved results, but ordinarily best results will be secured with from 0.1 to 2% silicon and from 1 to 3% lead. A specific alloy according to the invention, particularly suitable for use in fabricating brass pipe for water service, consists of copper 70%, lead 1%, silicon 1¼%, and zinc the balance. Another specific alloy particularly useful for fabricating pipe or tubing or free cutting sheet brass consists of copper 65%, silicon 1%, lead 1%, and zinc the balance.

The improved alloy conveniently may be produced by melting a charge of scrap brass of known composition, and then adding the silicon in the form of a rich silicon alloy, say a copper alloy containing 10% silicon. The lead may then be added to the melt as metallic lead, and, after the latter is incorporated, the copper and zinc may be added to give the desired composition of the alloy. Satisfactory results will be secured when the melt is cast at a temperature of about 2000° F.

It will be understood that the invention is not limited to the exact compositions of alloys herein specified, but that small amounts of other metals and metalloids commonly employed in connection with brasses may be included when suitable for giving the alloy special properties without materially affecting the desirable properties above mentioned.

Claims:

1. Free cutting leaded brasses capable of hot rolling and drawing containing approxi-

mately from 60 to 70% copper, substantial amounts of lead up to 3%, substantial amounts of silicon up to 2%, and the balance approximately all zinc.

2. Free cutting leaded brasses capable of hot rolling and drawing containing from 60 to 70% copper, 1 to 3% lead, 1 to 2% silicon, and the balance approximately all zinc.

3. A free cutting leaded brass capable of hot rolling and drawing containing approximately 70% copper, 1% lead, 1¼% silicon, and the balance approximately all zinc.

4. A free cutting leaded brass capable of hot rolling and drawing containing approximately 65% copper, 1% lead, 1% silicon, and the balance approximately all zinc.

In testimony whereof, I have signed my name to this specification.

RICHARD A. WILKINS.

DISCLAIMER

1,851,928.—*Richard A. Wilkins*, Rome, N. Y. ALLOY. Patent dated March 29, 1932. Disclaimer filed March 21, 1934, by the assignee, *Revere Copper and Brass Incorporated.*

Enters the following disclaimer, to wit:

From claim 1 of said Letters Patent any amount of lead except amounts between 0.5 and 3 percent.

[*Official Gazette April 10, 1934.*]

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2. Free cutting leaded brasses capable of hot rolling and drawing containing from 60 to 70% copper, 1 to 3% lead, 1 to 2% silicon, and the balance approximately all zinc.

3. A free cutting leaded brass capable of hot rolling and drawing containing approximately 70% copper, 1% lead, 1¼% silicon, and the balance approximately all zinc.

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