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MACHINE FOR THE CONTINUOUS CASTING OF METAL SHEETS

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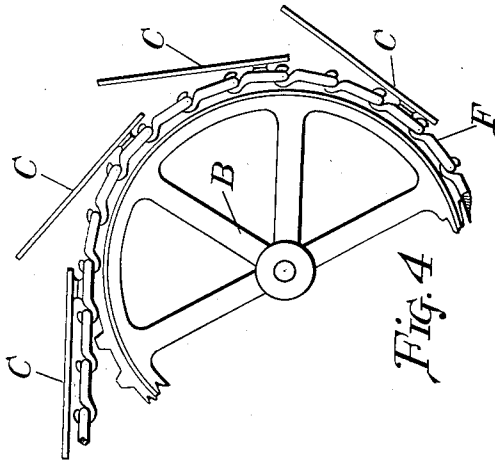


Fig. 4

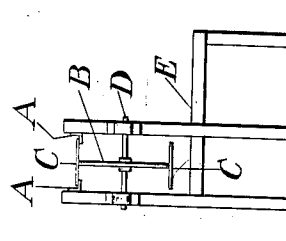


Fig. 3

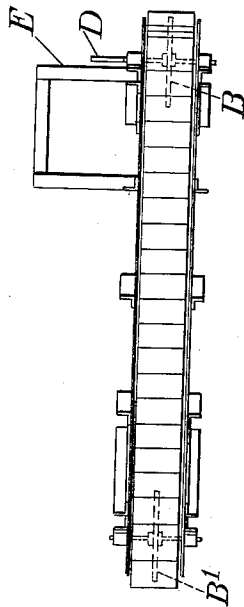


Fig. 2

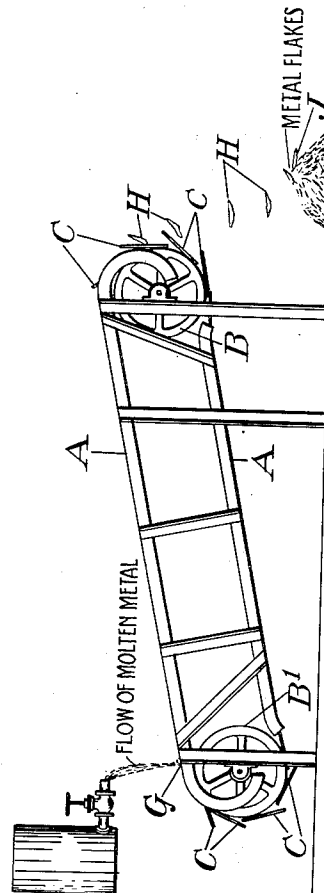


Fig. 1

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UNITED STATES PATENT OFFICE

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MACHINE FOR THE CONTINUOUS CASTING
OF METAL SHEETS

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2 Claims. (Cl. 22—76)

This invention relates to the continuous casting of metal sheets and more particularly to a machine for the casting of thin sheets particularly of various metals and alloys used in the manufacture of so-called bronze or aluminum powders.

In the manufacture of so-called bronze and aluminum powders the metals or alloys used are melted and slowly poured into a large quantity of water. As the molten alloy strikes the water it is cooled and formed into irregularly shaped pieces in which the average ratio of the dimensions is approximately 1 to 1 to 1. These irregularly shaped pieces of alloy are placed in mortars and pounded into small flakes until the proper sized particles are obtained. The pounding of these irregularly shaped pieces of metal or alloy is a tedious operation and produces a large quantity of granular material which is undesirable.

This invention has as an object the provision of a machine for the continuous production of thin sheets of metal. A still further object is the provision of a machine and a process for the more efficient production of bronze or aluminum powders.

These objects are accomplished by the following invention wherein the molten metal or alloy is poured onto a continuous moving belt consisting of overlapping metal plates. The belt being suitably supported and driven is also a part of the invention.

The accompanying drawing shows diagrammatically the machine, the operation of which is illustrated by reference to the drawing.

Figure 1 is a side elevation of the machine;

Figure 2 is a plan view of the machine;

Figure 3 is a vertical end view of the elevated end of the machine; and

Figure 4 is a sectional detailed view showing the sprocket wheel, chain and plates at the elevated end of the machine.

In Figure 1, A is an angle iron channel for supporting the plates in their upward travel, B and B' are sprocket wheels, C the metal plates which form the belt, G the point at which the molten metal or alloy is poured onto the moving belt, and H shows the thin metal sheets being loosened and dropped from the moving belt.

In Figure 2, D is a drive shaft for the metal plate belt, E is a platform for the driving mechanism.

In Figure 4, F indicates the links of the chain to which the plates C are attached.

The machine consists of an inclined frame

(Fig. 1—A), which in a preferred form is about 12 feet long and 14 inches wide. The frame supports a sprocket wheel at each end (Figs. 1—B and 1—B') connected by a chain (Fig. 4—F). To this chain at intervals of approximately 8 inches are suitably attached a series of steel plates (Fig. 1—C) 12 inches long by 12 inches wide. When the plate belt is flat on the top of the frame work the plates lie so that the end of the plate opposite to the riveted end overlaps the plate immediately below it by approximately 2 inches. The sprocket wheel at the elevated end of the machine is driven by a suitable mechanism attached to the drive shaft (Fig. 2—D).

In the operation of the machine the plate belt is run at such a speed that a complete circuit is made in from 6 to 10 seconds. The speed of travel depends, of course, upon the thickness of the metal casting finally desired and can be varied to suit requirements. As the plate belt travels up the inclined frame work, the molten alloy or molten metal is poured in a continuous stream from a ladle or other convenient means onto the plates at a short distance above the lower sprocket wheel (1—B). The continuous stream of molten metal coming into contact with the plates cools and partly solidifies as the plate belt ascends the inclined frame. As the chain, to which the plates are attached, passes over the sprocket wheel at the elevated end of the machine the overlapping plates are lifted, one from the other, quite suddenly and break the continuous strip of partly solidified metal at the point where the overlapping plates have been in contact, thus releasing the thin metal sheets from the plate belt (Figs. 1—H and 1—J).

In the description of the process above given, the cooling of the metal has been effected relying upon air cooling. Arrangements can be made to cool the plate belt on its return journey by applying water in such amount as to cool the plates but to leave them dry. The plates need not be riveted to the chain although such is a preferred embodiment of the invention. They can be affixed more loosely, such as by a hinge arrangement.

The machine and the process above described have been used successfully for the casting of plates of various alloys of copper and zinc in varied proportions, various alloys of copper, zinc, tin, aluminum, magnesium, etc. Alloys, due to their more extended congealing range, are particularly suitable for casting on the machine of the present invention but metals such as aluminum and copper may also be used. The metal

may be further treated and in the preparation of aluminum powder is generally further treated by flaking in stamping machines. In general, the machine and the process are suitable for the casting of thin sheets of any type metal or alloy where such thin sheets are desirable or necessary. The process of the present invention shows a considerable advantage over the process of the prior art in making more efficient transformation of the metal used into a form suitable for flaking.

It is of advantage in increasing the efficiency in the point of time in the pounding operation in producing a bronze powder. The process and apparatus also allow the use of smaller or lighter hammers and produce a powder of more uniform particle size, thus making the subsequent screening operation easier.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. A machine for the continuous casting of thin metal sheets which comprises an endless belt passing around two wheels, and mounted on said belt a series of overlapping plates thereby forming a step between the adjacent plates, and means for integrally supporting each plate on a member of the said belt at one point only, the point being near the end of the plate opposite that which overlaps the succeeding plate.

2. Process of casting metals in thin sheets which comprises pouring a stream of molten metal upon a succession of moving plates which are supported at one end only on an endless belt, arranging the said plates in overlapping relation to form a step as they pass beneath the stream of molten metal, moving the said plates away from the said stream at a speed sufficient to form a thin layer of metal on each surface and after the metal has at least partially solidified changing the direction of the movement of the plates abruptly by passing the belt on which the plate is supported over a wheel whereby the sheet of cast metal is flipped from the surface of the plate.

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