(No Model.)

F. G. STONE.

MOLD FOR CASTING METAL AROUND INTERNAL CORES.

No. 484,124. Patented Oct. 11, 1892.

Fig. 1.

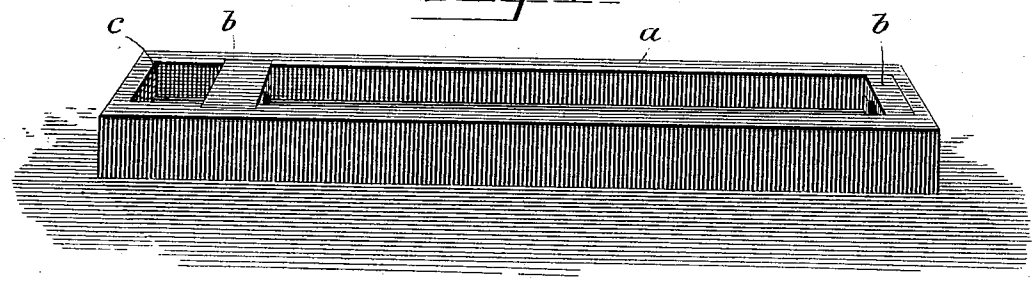


Fig. 2.

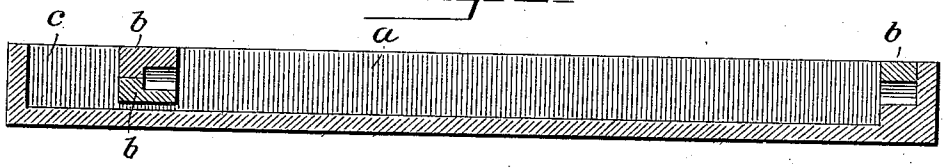


Fig. 3.

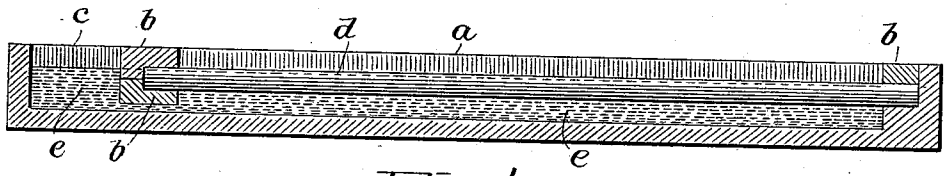
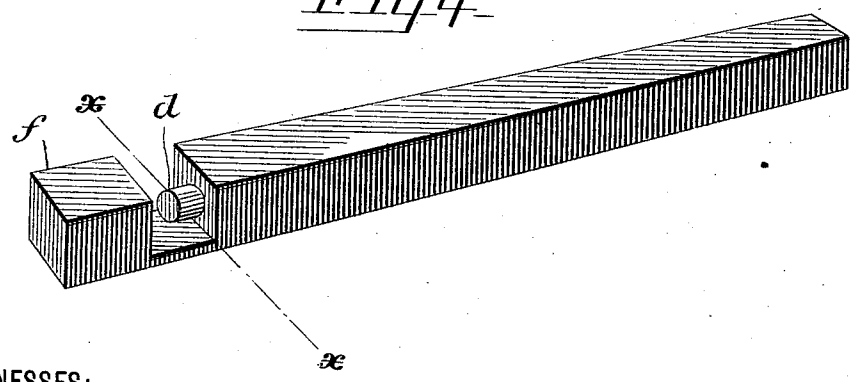


Fig. 4.



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MOLD FOR CASTING METAL AROUND INTERNAL CORES.

SPECIFICATION forming part of Letters Patent No. 484,124, dated October 11, 1892.

Application filed February 8, 1892. Serial No. 420,777. (No model.)

To all whom it may concern:

Be it known that I, FRANK G. STONE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Molds for Casting Metal around Internal Cores; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in molds for casting metal around internal cores, and has for its object to prevent the melting of the core to any appreciable degree, to preserve the purity of the metal which surrounds the core, to prevent the formation of blow-holes and shrink-holes, and in the instance of an electrical conductor comprising a permanent core of silicon bronze or other tough metal and a surrounding body of copper or other metal of good electrical conductivity to preserve unimpaired the strength of the core and the purity and consequent conductivity of the surrounding body.

There are two closely-analogous arts which may be practiced in accordance with my invention—namely, the art of casting around a removable core for the purpose of forming a tube and the art of casting around a permanent core, whereby a compound ingot is produced. It is with this last-mentioned art that my invention is particularly identified, although it will be obvious from the following description that my invention is a decided improvement whether practiced in casting around a permanent or a removable core.

The accompanying drawings illustrate my invention in connection with the casting of compound ingots which are to be drawn into wires or cables for electrical purposes.

Figure 1 is a perspective of my improved mold; Fig. 2, a sectional elevation thereof; Fig. 3, a sectional elevation showing the core properly supported within the mold, the latter being partially filled with molten metal; and Fig. 4, a detail perspective of the ingot as it appears after removal from the mold.

Similar letters of reference denote like parts in the several figures of the drawings.

In the manufacture of cables and wire for electrical purposes the maximum of strength with the highest degree of conductivity is desired, but hitherto has not been obtained to any great extent for the following reasons: The ingot from which the wire is drawn is cast in a close mold standing in a vertical or substantially a vertical position, the core around which the metal is to be poured being supported in the center of said mold. The molten metal striking this core necessarily more or less melts the same irregularly, thereby diminishing the tensile strength of the core and rendering less pure the surrounding metal, and thus diminishing the conductivity of the latter. Again, when the copper is poured into the vertical mold the core is immediately surrounded at the lowermost end by the molten copper, the latter rising around the core throughout its length. The core is thus attacked by the molten copper on all sides at once and, ventilation being prevented by the closed mold and the pressure of the column of molten copper being so great, bubbles of air and gas, commonly called "blow-holes," are formed. Again, the copper hardens first upon the exterior, and, the natural contraction of the metal not being able to draw in such hardened exterior, the metal is either compelled to shrink away from the core or vacuums are formed, commonly called "shrink-holes," in said metal when cool.

In practicing my invention I provide an open mold *a*, substantially horizontal, with sectional core-supports *b*, within which the core is supported, as will be presently set forth. The mold has a gate *c* at one end, which leads beneath the adjacent core-support *b*, so that it will be readily understood that metal poured into the gate will enter the mold at the bottom and gradually rise in a horizontal plane throughout the length of the mold. *d* is a permanent core, preferably of silicon bronze, supported in a horizontal plane within the core-supports *b*, as shown at Fig. 3. As the molten copper rises within the mold it gradually surrounds the core; but it will be clear that some area of the core throughout its entire length will be untouched by the copper until the core is entirely surrounded. In other words, the molten metal rises around the core in substantially-horizontal planes that are parallel with the axis of said core. It

will thus be seen that the core throughout its entire length is exposed to the air during the operation of casting, thereby affording good ventilation to the core and preventing the same from melting, and also preventing the formation of blow-holes. Furthermore, the heat and pressure of the molten copper are uniform throughout the length of the core, and the surrounding body of copper having an opportunity to shrink all that is necessary from the top, by reason of casting in an open mold, there can be no blow-holes or imperfect crystallization.

By the use of this mold all the well-known advantages which have been found to arise from the casting of copper in an open mold are retained, while the disadvantages arising from pouring molten metal directly upon the core are avoided, since in this mold the molten copper rises up and surrounds the core gradually in horizontal lines throughout its length. In Fig. 3 the core is shown nearly surrounded by the molten copper *e*, and in Fig. 4 the finished ingot is shown, it being merely necessary to cut off the end designated by *f* at the line *x x*. The ingot thus made is admirably adapted for electrical purposes when drawn into cables or wires, since the internal core and the surrounding body of copper afford, respectively, maximum strength and conductivity.

I claim—

1. The herein-described mold for casting metal around a core, the same comprising a substantially-horizontally-disposed mold provided at one end with a core-support and adjacent to and at some distance from the other end with a bridge for supporting a core, there being an inlet for the molten metal under said bridge.

2. The herein-described open mold for casting metal around a core, the same comprising a horizontally-disposed mold-box, a core-support at one end, and a bridge near the other end, each recessed for receiving the core and each provided with a removable cap for holding the core in position, there being an inlet at the bridge end of the mold for the molten material and a passage under the bridge connecting the inlet and the main portion of the box.

3. The herein-described mold for casting metal around a core, the same comprising a substantially-horizontally-disposed mold open at the top and provided at the ends with supports for the core and having at one end a gate and an inlet leading from said gate under a core-support into the mold below the core, as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK G. STONE.

Witnesses:

CLARA B. RICE,

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