(No Model.)

G. W. CUMMINS.

PROCESS OF AND APPARATUS FOR PRODUCING HOT ROLLED COPPER FREE FROM OXIDATION.

No. 445,691. Patented Feb. 3, 1891.

FIG. 1.

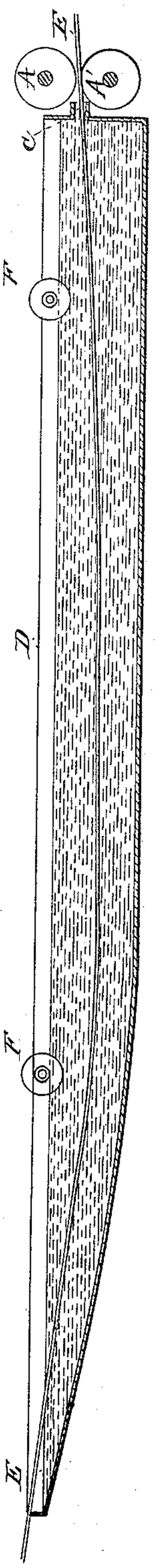
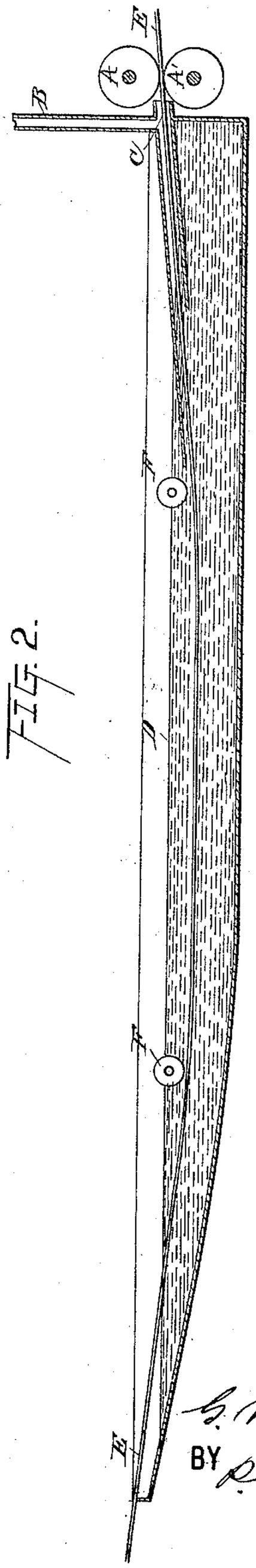


FIG. 2.



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PROCESS OF AND APPARATUS FOR PRODUCING HOT-ROLLED COPPER FREE FROM OXIDATION.

SPECIFICATION forming part of Letters Patent No. 445,691, dated February 3, 1891.

Application filed June 9, 1890. Serial No. 354,753. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WYCKOFF CUMMINS, of Vienna, in the county of Warren and State of New Jersey, have invented a new and useful Process and Apparatus for Producing Hot-Rolled Copper, or Alloys of Copper, Free from Oxidation, of which the following is a specification.

The object of this invention is sufficiently indicated by its title above given; but in particular it is to prevent the formation of the last coat of scale ordinarily formed upon hot-rolled copper in passing through the air from the finishing-rolls and by such prevention to secure a finished product free from oxidation, clean, and of a bright appearance.

The invention will first be described in detail, and then particularly set forth in the claims.

In the accompanying drawings means are shown suitable for carrying out this invention, in which—

Figure 1 shows an end view of a pair of rolls having a trough, tank, or open pipe, shown in sectional side elevation, set or placed in close relation, so that a piece or sheet of rolled copper may pass from said rolls directly into and through said trough. Fig. 2 is a similar view of the same parts having the addition of a feed and guide tube.

In said figures the several parts are indicated by reference-letters as follows: The apparatus therein shown consists of ordinary rolls A A′, suitable for rolling hot copper, a tube or chamber C, closely placed or set as near as may be to the line of the meeting surfaces of the rolls and leading to and opening under water in a trough, tank, or pipe D, containing water. A vertical inlet-pipe B, opening into the tube C, is also provided, if desired, for conveying water or steam or other gas of such character that it will not oxidize copper. The receptacle D is of such size, shape, and length as to allow the copper to become so cool, while passing through the contents of said receptacle, that it would no longer oxidize when issuing from its farther end. The rolled copper, whether in the form of rod or sheet, is indicated by the letter E. (Shown bent or curved under the rollers F by its own weight as it leaves the rolls.) The rollers F serve conveniently to prevent the body of the copper from rising above the surface of the water in the tank when the copper is drawn out of the tank after it has left the rolls.

The object of the process and the operation of the apparatus may be now the more readily understood by recalling the following considerations;

It is well known that hot-rolled copper comes from the rolls covered with copper-scale; but the scale formed after the copper has passed the first pair of rolls is removed by the action of the second pair, and, finally, the last pair or finishing rolls remove the scale present on the rod or sheet while passing through them. So far, therefore, the copper comes from the rolls practically free from scale; but as soon as the copper comes in contact with the air beyond the rolls a new coat of scale is formed; and it is the formation of this last coat of scale which is prevented by this process. By this process, therefore, the following advantages are obtained: a direct saving of metal and a more pleasing product; and the necessity of cleaning by "pickling" before further working is also entirely obviated. All these advantages are accomplished by passing the copper instantly and directly on leaving the last pair of rolls into the body of water through a guide-passage or tube C, dipping below the surface of the water and filled through the pipe B, if desired, with water, steam, or nitrogen, or with any suitable gas incapable of oxidizing copper. As before said, the volume or body of water in the tank D is sufficiently great to cause the copper to cool down below its oxidizing-point in air before it is permitted to come in contact therewith. If considered desirable, some or all of the rolls may also be inclosed in an atmosphere of non-oxidizing gas, provided the rolls are automatic in action.

Having thus fully described my said invention, I claim—

1. The process of obtaining bright hot-rolled copper, consisting in passing the copper, while still hot, from the last rolls into a body of water, so as to exclude the copper from con-

tact with atmospheric air until sufficiently cooled by the water, substantially as set forth.

2. In combination with a pair of rolls adapted to hot-roll copper, a water-tank located in relation to said rolls so that a rod, bar, or sheet of hot copper may pass from said rolls into said tank below the surface of the water until cooled below its oxidizing-point in atmospheric air, substantially as set forth.

3. In combination with a pair of rolls adapted to hot-roll copper, a water-tank provided with a passage-way between the same and said rolls, whereby a stream of water is led to and between the rolls as a covering or protecting medium for preventing the oxidation of the copper by atmospheric air, substantially as set forth.

4. In combination with a pair of rolls adapted to hot-roll copper, a water-tank provided with a passage-way between the same and said rolls and having a feed-pipe leading to said passage-way, whereby a stream of water is led to and between the rolls as a covering or protecting medium for the hot copper, substantially as and for the purposes set forth.

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Witnesses:
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