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CASTING APPARATUS.

APPLICATION FILED AUG. 20, 1907.

951,299. Patented Mar. 8, 1910.

Fig. 1.

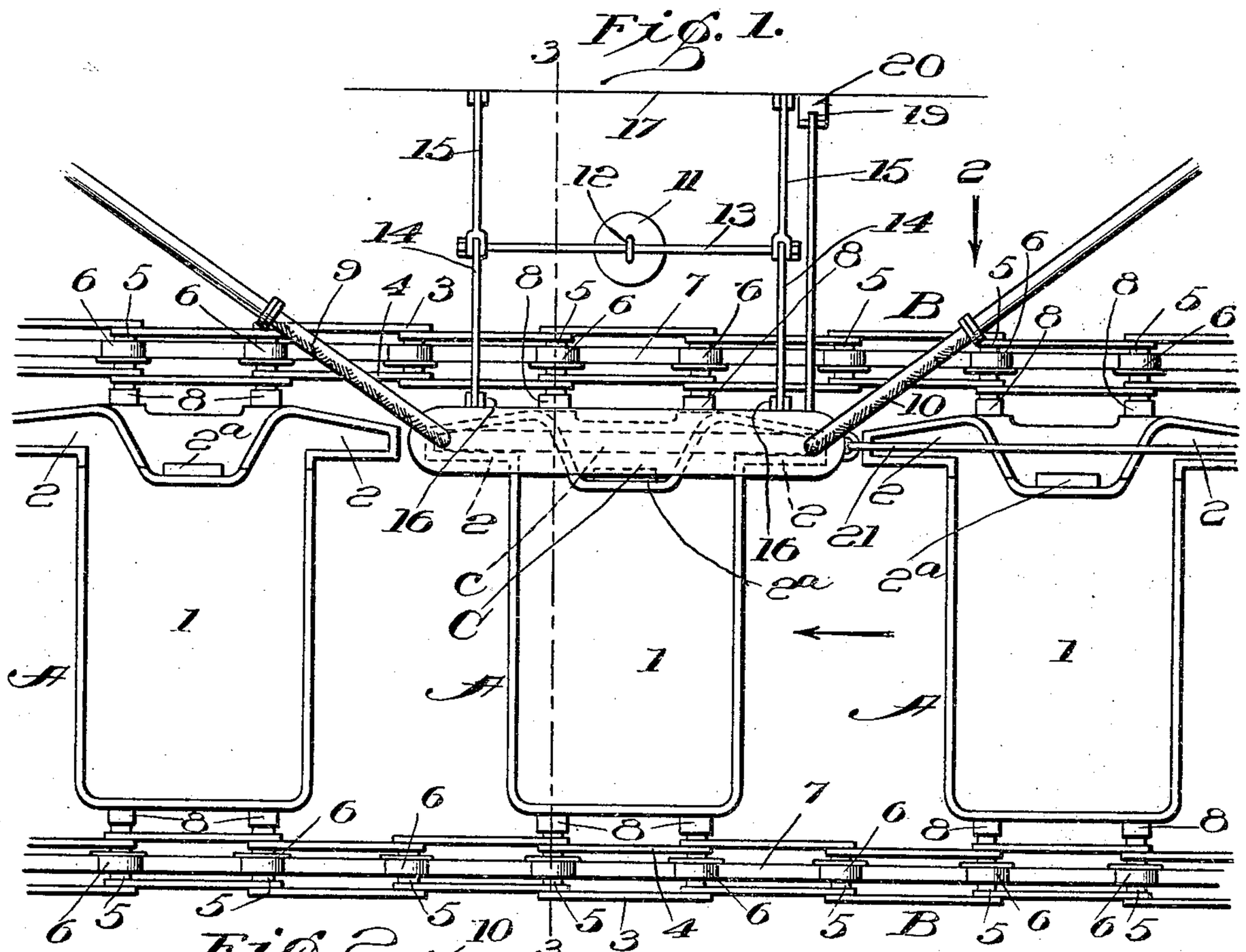

Fig. 2.

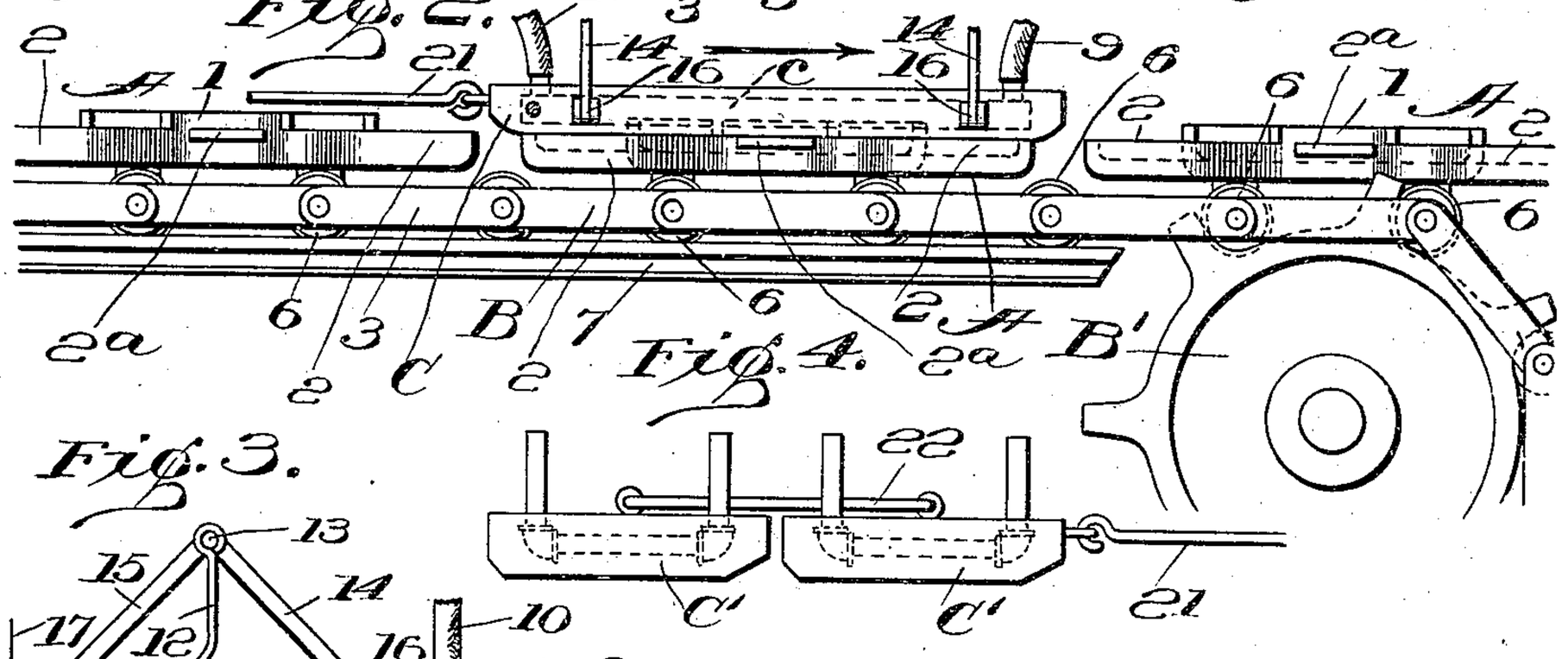

Fig. 4.

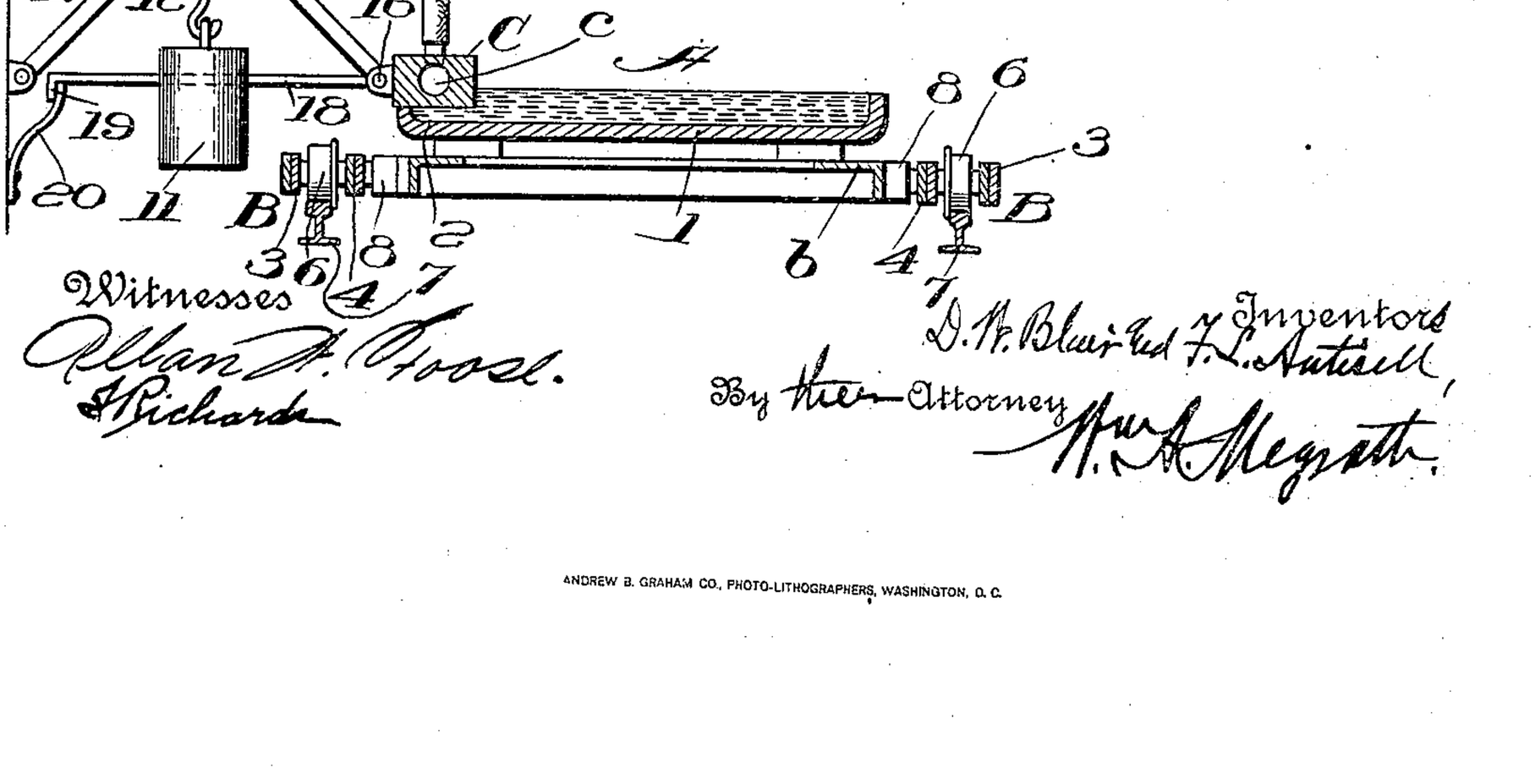

Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## CASTING APPARATUS.

951,299. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed August 20, 1907. Serial No. 389,336.

*To all whom it may concern:*

Be it known that we, DAVID W. BLAIR and FRANK LINDEN ANTISELL, citizens of the United States, and residents, respectively, of Perth Amboy, county of Middlesex, State of New Jersey, and of the city, county, and State of New York, have invented certain new and useful Improvements in Casting Apparatus, of which the following is a specification.

In a general way and in its broadest aspects, the present invention may be said to relate to the shaping of fluid metal or other plastic material and to have for its purpose the most expeditious and economical production of an article of predetermined shape.

In a more particular way, however, the invention relates to a method and means for producing shaped articles from fluid metal or other plastic media in a most expeditious and economical way by subjecting the portions of the same at the place or places where its surface changes from one plane or direction to another, to a cooling action sufficient to chill or set it quickly at such place or places, leaving the remainder of the metal or other medium to cool and set naturally and while it is traveling in a mold to a place provided for its discharge from the mold, for example. Such a process and apparatus is of special advantage in the formation from fluid metal, of plates or bars having grooves or offsets, as for instance, anodes, serving in such case to quickly chill the wall of such groove or offset so that the form of the latter is not destroyed even though the metal is then conveyed away from this cooling means before it has become cooled and set throughout; and permitting one such cooling device to be used for a plurality of molds which travel relatively thereto, and the cooling of the remaining portions of the metal to proceed naturally and while the molds are traveling, as already stated, with the metal to a place of discharge. In such case, moreover, the cooling device may not only serve to cool but also to produce the groove or offset in the metal. While this constitutes, perhaps, the most advantageous use of the present invention, yet its utility is not restricted to such use, for it may be advantageously employed, for example, to cool metal at the corners or other parts of the molds or articles formed in the molds, without itself producing any particular shape, relying upon the mold to give the metal the full shape required. While this cooling device may in any case be considered to be a part of the mold, yet for the sake of convenience it is hereinafter termed a cooling device, and the means which carries the metal is designated a mold.

Having thus in a general way set forth the invention, the preferred embodiment thereof will now be described, but inasmuch as many changes may be made in the detail embodiment herein shown and described, and many apparently widely different variations of the invention may be made without departing from the spirit of the invention, the form of the invention herein shown shall be interpreted as illustrative and not in a limiting sense.

In the drawings, wherein like characters of reference designate like parts in the several views: Figure 1 is a plan view of part of an apparatus exemplifying what is at present regarded as the preferred form of the invention embodied for the production of anodes from fluid metal. Fig. 2 is a side elevation of the same looking in the direction of the arrow 2 of Fig. 1. Fig. 3 is a transverse section on the line 3—3 of Fig. 1. Fig. 4 is a side elevation of a plurality of cooling devices.

A designates a series of open molds, each of which is herein shown as composed of a body part 1 and a transversely widened end portion 2 of less depth than the body part. The interior conformation of the mold is such as to produce, in the part 1 of the mold, a plate having at one end a central depression, and in the part 2 of the mold ears or lugs which project laterally from the sides of one end of the plate. These ears or lugs are to be of less thickness, in the form herein shown, than the main or body part, for which reason, as already stated, the widened end 2 of the mold is of less depth than the remaining part 1 of the same, and the cooling device hereinbefore referred to is arranged immediately over the end 2 and cools the same and also cools the contiguous portion of the metal in the part 1, so as to permit the metal to quickly free itself from the cooling device without liability of flowing from the main portion of the mold or losing the shaped corner or offset produced by the coöperative effect of the mold portion 2 and the cooling device.

These molds are connected with each other and caused to travel by an endless conveyer B having a suitable driving means, comprising for example, the sprocket B′. The preferred construction of this conveyer consists of a double series of links 3 and 4 at each side of the molds, said links pivotally connected with each other by the journals 5 and spaced apart to leave between the pair forming each series, a space in which a series of supporting wheels 6 for the conveyer and molds are mounted upon the journals aforesaid. These wheels travel upon tracks 7. The sides of the conveyer are suitably connected with the molds, the means of connection herein shown consisting in extending certain of the journals 5 into bearings 8 in the ends of suitable trucks or frames *b* which carry the molds. This forms a simple and durable construction of mold conveying means which operates with a minimum of friction and causes the molds accurately to travel the path predetermined for it, the tendency of the conveyer to sag and of the molds or pans thereby to leave the path determined for them to traverse being overcome by the supporting wheels and rails.

C designates the cooling device which, as herein shown, is formed separate from the part A and is adapted as already stated, to extend across the end of the mold immediately over the laterally widened and shallower end part 2 of the latter, resting upon the upper edges of the latter or in the offset formed at the junction of the two parts referred to. This device is internally cooled, being for this purpose formed with an internal chamber *c* which extends longitudinally of it and is adapted to be connected with inlet and outlet pipes 9 and 10 by which water or other cooling medium may be circulated through it. It is held properly in the path of movement of the traveling series of molds preferably under the action of a weight 11, herein shown as suspended from a rod 12, which is hung from an arm 13 arranged to pivotally connect with each other the meeting, pivoted ends of toggle levers 14 and 15. One end of each pair of toggle levers is pivoted to the cooler, as at 16, and the other end of each pair is pivoted to a suitable fixed support afforded, for example, by a wall as indicated at 17. The tendency of this weight is to press the cooler inwardly toward the center of the mold, but its movement in such direction is restrained or limited, preferably by an arm 18 which is suitably attached by a pivot or otherwise, to the cooling device at one end, and has its other end provided with a hook 19 which engages a holding arm or bracket 20 of resilient or rigid material, fixed to a suitable support, as the wall 17. The means described also hold the cooling device in horizontal position.

21 is a rod, one end of which is secured to the cooling device and the other to a fixed support or wall, not shown, to brace the cooling device and hold it steady as the molds pass under it.

In the operation of the apparatus herein shown, the fluid metal is suitably supplied to a mold while the described cooling device is operatively related thereto and the cooling effect of the latter on the metal contiguous to it is such as to permit the mold almost instantly to continue its travel to the place of discharge, cooling in its progress thereto. While in Fig. 1 we have shown only one such cooling device, it is apparent that more than one such may be employed and that may be arranged along the path of travel of the molds, either close together or far apart. In such event, the metal will be subjected to a succession of cooling operations which may be desirable in many cases. It is further apparent that instead of using a continuous cooling device where a plurality of separate parts in a mold are to be cooled, as for example, the ears in the form illustrated, a plurality of such coolers may be used for such mold. Thus, in Fig. 4, there is shown a plurality of cooling devices C′ C′, which may be arbitrarily assumed to illustrate either the idea expressed of embodying in the apparatus a series of cooling devices at different places in the travel of the molds, each adapted to a single mold, or the idea named of embodying a plurality of cooling devices for different parts of the metal in the same mold. To hold the cooling devices C′ C′ together, a rod 22 is provided, one end of which is connected to each of said devices.

It has been found desirable in some constructions to provide the molds between the end portions 2, with a lug $2^a$ in order to steady the two blocks as the gap or depression in the mold between the end portions 2 pass under said cooling devices. In some cases, the same lug may be used to steady the cooling device when only one of such devices is employed.

The operation and advantages of the invention will be readily understood without further description thereof.

It is to be definitely understood not only that the invention is not restricted to the details illustrated, but also that the language used in the following claims is intended to cover all of the generic and specific features herein described and all statements or matter relating to or bearing upon the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having now described the invention what we claim as new and desire to secure by Letters Patent is:

1. In a molding apparatus, a series of traveling molds and cooling means adapted

to cool contiguous portions of the metal in the molds, said cooling means having a wall so arranged with relation to a mold as to be contiguous to a part of the metal therein and adapted to cool the same by absorption or conduction.

2. In a molding apparatus, a series of traveling molds and means for cooling the metal while in the mold, comprising a cooling device arranged to act upon a predetermined part of the exposed surface of the metal which is less than the whole body thereof.

3. In a molding apparatus, a series of traveling molds and a cooling means arranged in the path of travel of the molds and adapted to act only upon a part of the exposed surface of the metal therein.

4. In a molding apparatus, an open mold and a cooling device which covers a part of the open side of the mold for cooling the metal contiguous to it.

5. In a molding apparatus, a series of traveling open molds and a cooling device arranged contiguous to the path of travel thereof, and so related thereto as to cover a part of the open side of the molds successively presented to it and adapted to cool the contiguous metal.

6. In a molding apparatus, a series of traveling molds having portions of less depth than other portions thereof, and a cooling device arranged contiguous to the path of travel of the reduced portions of the molds so as to be received therein.

7. In a molding apparatus, a series of traveling open molds and a cooling device arranged contiguous to the path of travel thereof, and so related thereto as to cover a part of the open sides of the molds successively presented to it, said device having an internal chamber and means for circulating a cooling fluid therethrough.

8. In a molding appartus, a series of traveling molds, a cooling device arranged contiguous to the path of travel thereof, and a weighted connection for holding said device in place.

9. In a molding apparatus, a series of traveling molds, a cooling device arranged contiguous to the path of travel thereof, toggle levers connected therewith and with a fixed support, and a weight connected with said levers.

10. In a molding apparatus, a series of traveling molds, a cooling device arranged contiguous to the path of travel thereof, and means for holding said device in place, comprising means tending to press the device in a predetermined direction, and means for limiting such tendency.

11. In a molding apparatus, a series of traveling molds, a cooling device arranged contiguous to the path of travel thereof, and means for holding said device in place, comprising jointed levers connected therewith, means acting through said levers and tending to cause the same to press the device in a predetermined direction, and means for limiting such tendency.

12. In a molding apparatus, a series of traveling molds, a cooling device arranged contiguous to the path of travel thereof, means for holding said device in place, comprising means tending to press the device in a predetermined direction, and a catch for limiting such tendency.

13. In a molding apparatus, a series of traveling open molds, a cooling device arranged contiguous to the path of travel thereof, and so related thereto as to cover a part of the open sides of the molds successively presented to it, means for holding said device in place, comprising means tending to press the device in a predetermined direction, and means for limiting such tendency.

14. In a molding apparatus, a series of traveling open molds, a cooling device arranged contiguous to the path of travel thereof, and so related thereto as to cover a part of the open sides of the molds successively presented to it, said device having an internal chamber provided with means for circulating a cooling fluid therethrough, and means for holding said device in place, comprising means tending to press the device in a predetermined direction, and means for limiting such tendency.

15. The process herein described of molding metal, which consists in pouring the metal into an open mold and bringing a portion of the exposed surface of the metal into contact with a cooling device, and permitting the remainder of the metal to cool naturally.

16. The process herein described of molding metal consisting in pouring the same into a traveling mold which has an open side, bringing the portion thereof contiguous to such open side into contact with a cooling device until it has given off part of its heat and will retain the shape intended at such place, and then transferring it therefrom and permitting it further to cool in the mold while the process of such transference.

17. In a molding apparatus, a series of traveling molds having a portion of less depth than other portions, a cooling device arranged contiguous to the path of travel of the reduced portions of the molds so as to be received therein, and a lug on each of the molds to steady said cooling devices as the molds travel under the cooling devices.

18. In a molding apparatus, a series of traveling molds having transverse widened end portions of less depth than the body of the mold and a depression between said end portions, a lug secured to the mold at said depression, and a plurality of connected cooling devices arranged contiguous to the

path of travel of the reduced portions of the molds, said cooling devices being steadied by the lug as the molds pass under said cooling devices.

19. A molding apparatus for articles having one portion of different contour from the remainder and cooling means arranged to act upon only said portion while the metal is in the mold.

In witness whereof we have hereunto set our hands at Perth Amboy, county of Middlesex, and State of New Jersey, this 26 day of July, 1907.

DAVID W. BLAIR.
FRANK L. ANTISELL.

In presence of—
WM. P. BRADLEY,
EDGAR REED.