

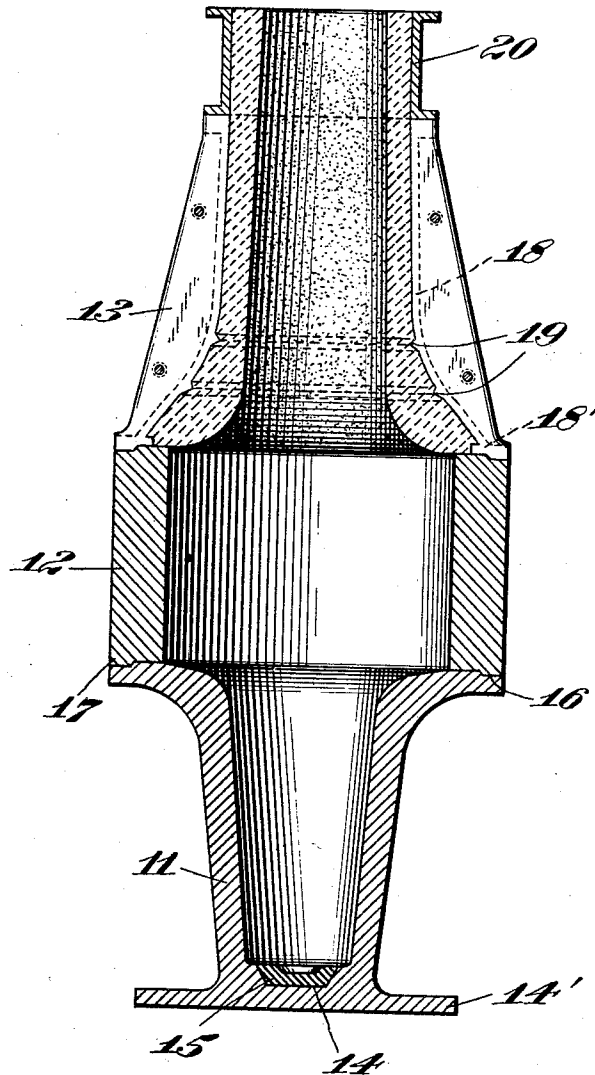
March 8, 1932.

F. C. T. DANIELS

1,848,244

APPARATUS AND PROCESS FOR PRODUCING ROLLS

Filed Sept. 21, 1929



INVENTOR

Fred C. T. Daniels.

BY

R. S. C. Wougherty.

ATTORNEY

UNITED STATES PATENT OFFICE

FRED C. T. DANIELS, OF BEAVER, PENNSYLVANIA, ASSIGNOR TO BETHLEHEM STEEL COMPANY, A CORPORATION OF PENNSYLVANIA

APPARATUS AND PROCESS FOR PRODUCING ROLLS

Application filed September 21, 1929. Serial No. 394,294.

My invention relates to rolls, adapted to be used in rolling mills and also to an apparatus and process for producing same.

My primary intention is to cast metal rolls which will be more efficient in use and yet which can be produced more quickly and economically.

The fundamental idea of my invention is to cast a roll in such a manner as to quickly chill one neck while allowing the other neck to cool comparatively slowly.

The invention can probably best be presented by first describing an illustrative embodiment thereof. Accordingly reference is made to the accompanying drawing which shows a mold for carrying out my invention.

This mold comprises a drag 11, a body portion 12, and a cope 13, corresponding in form to the necks and body of the roll. The drag and the body portions are composed of cast-iron, say, for example, containing carbon 3.65, manganese .65 and silicon 1.70%. The drag is provided exteriorly with a supporting base 14' and interiorly with a recessed portion 14 adapted to contain a basin 15.

The upper portion of drag 11 is formed to provide a seat for the lower edge of the body portion. The circumferential recess 16 of the drag is adapted to receive the circumferential projecting portion 17 of the body portion.

The cope flask 13 comprises a metal casing 18 provided with a lower circumferential ring portion 18' adapted to seat upon the upper edge of the body portion 12. Casing 18 is provided with interior circumferential ribs 19 and is provided with a sand lining. Obviously ribs 19 assist in holding the sand lining in position.

When the body portion is of considerable size an addition 20 may be applied to the upper end of cope 13 to extend the effective length thereof.

After the cope has been provided with its sand lining and the parts are placed in the relative positions indicated in the drawing, the metal which is to constitute the substance of the roll is cast through the upper opening of the cope. The metal which is received in the chill drag 11 will be cooled with relative

rapidity. The same is true of the metal received in body portion 12. That metal, however, which is received in the cope flask 13 will cool relatively slowly. It will be seen that the cooling of the roll starts with the bottom end and proceeds toward the top. As the cooling material in the drag and body portions shrinks or contracts the still highly fluid metal of the sand lined cope and sinkhead will feed the other portions to compensate for such contraction. When the body portion is of relatively great volume, the feeding capacity of the cope may be increased by means of addition 20.

My invention possesses several distinct utilities. A chilled cast neck in a roll is of substantial utility as this chilled neck may be the one to which are secured the various working instrumentalities, that is the means whereby the roll is to be operated.

The more important utilities of my invention, however, is in the economy effected in the process and apparatus used during the casting operation and in the fact that a superior casting is secured. A much smaller amount of sinkhead allowance must be made than with the ordinary practice. By casting from the top of the mold the ordinary gate and runner are eliminated. The fact that the drag and the body portions are of metal and are not sand lined, as is usual, greatly reduces the time of cooling and permits a quicker removal of the casting from the molds. For example, it is possible, for the same sized mold, to remove the casting in twelve hours as against forty-eight hours with the former method.

The rolls produced by this method are much cleaner than those ordinarily produced as, for one thing, there is much less exposure to sand linings, the only exposure being in the cope. The rapid cooling of the drag and body combined with the slow cooling of the cope results in the casting being substantially sounder and closer grained.

Having described my invention what I desire to secure protection upon is set forth in the following claims:

1. A casting device for casting metal rolls, comprising a body portion, a chilled drag cor-

55

60

65

70

75

80

85

90

95

100

responding to one of the necks of the roll, and a cope flask of poor heat conductivity corresponding to the other neck of the roll.

2. A mold for casting metal rolls, comprising a metal body, a metal drag, and a cope of poor heat conductivity, the body, cope and drag corresponding respectively to the body and necks of the roll.

3. A mold for casting metal rolls, comprising a metal body, a metal drag, and a sand lined cope, the body, cope and drag corresponding respectively to the body and necks of the roll.

4. In a process for casting metal rolls, the steps of preparing a mold having a drag and a cope corresponding respectively to the necks of the roll, pouring the metal to compose the roll through the upper end of the cope hastening the solidification of the metal in the drag, and delaying the solidification of the metal in the cope.

In testimony whereof I hereunto affix my signature.

FRED C. T. DANIELS.