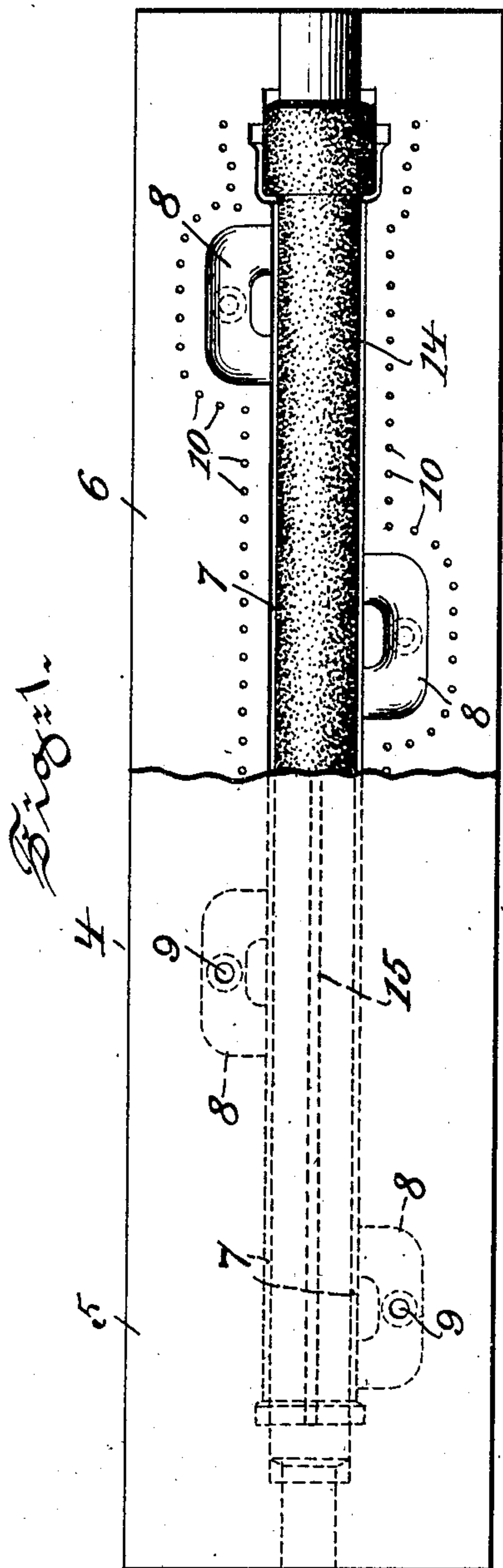


No. 870,868.

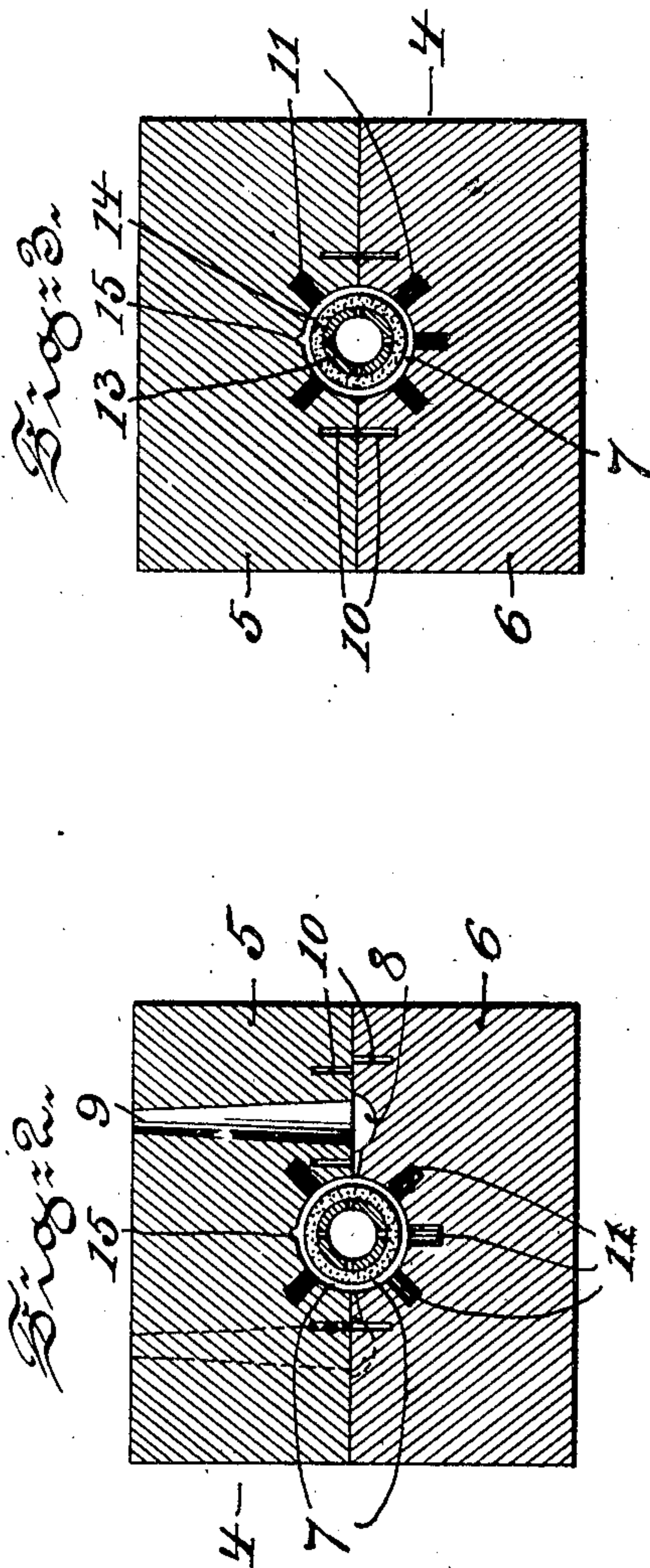
PATENTED NOV. 12, 1907

E. A. CUSTER.  
MOLD FOR CASTING PIPES.  
APPLICATION FILED APR. 22, 1907.



**WITNESSES:**

Wilhelm Vogt  
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# UNITED STATES PATENT OFFICE.

EDGAR A. CUSTER, OF PHILADELPHIA, PENNSYLVANIA.

## MOLD FOR CASTING PIPES.

No. 870,868.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed April 22, 1907. Serial No. 369,490.

*To all whom it may concern:*

Be it known that I, EDGAR A. CUSTER, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Molds for Casting Pipes, of which the following is a specification.

My invention has relation to a mold for producing cast water, soil and other pipes therein, from molten metal; and in such connection it relates particularly to the constructive arrangement thereof, wherein a cast metal pipe can be produced ready for use, without further finishing, and without blow holes and other imperfections such as shot formations thereon, to be removed and of the character described and claimed in an application for a patent filed by me, Serial No. 369489, under date of April 22nd A. D. 1907.

The nature and scope of my present invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which

Figure 1 is a top or plan view, partly in broken section of a permanent mold, embracing cope and drag, and with a core, embodying main features of my invention; and Figs. 2 and 3 are vertical cross-sectional views of the mold.

Referring to the drawings 4, is a mold preferably of rectangular oblong form, consisting of unyielding material such as metal. The mold, consists of a cope 5 and drag 6 and each provided with a semi-circular depression 7, when the cope is placed on the drag and forming when so combined, an annular chamber of the contour or outline of a pipe.

The surface of the chamber being of an unyielding material and smooth, will impart to the metal introduced into the mold, a smooth or even surface throughout and thus the structure cast will not require finishing, when removed from the mold. The drag on opposite sides of the depression thereof, is provided with gates 8, of substantially U-shape outline and which gates are located at determinate points thereof. The cope 5, is provided with pour-holes 9, extending through the same and registering with the series of gates 8, of the drag.

In order to provide for expansion of the metal of the mold, due to differences in temperature of the molten metal with respect to that of the drag and cope, adjacent to the respective depressions 7, thereof, are arranged small openings 10, extending certain distances into the bodies of the drag and cope. These openings 10, provide the means, whereby any cracking of the metal of the mold, about the same, will be limited, upon reaching such openings and hence retarding the extent thereof. In addition to the openings 10, in the

cope 5, and drag 6, are provided grooves 11, extending radially from the depressions 7, thereof. These grooves 11, preferably extend lengthwise of the drag and cope and serve as pockets, for the reception of an inert material, such as mica, which material as has been found is not affected by the molten metal, and which also tends to impart a smooth surface to the molten metal, brought into contact therewith during the casting operation.

The mica or other similar material permits of a certain compression, by the expanding metal, and thus serves to counteract any cracking of the mold throughout the entire body of the same, which otherwise would take place through sudden expansions of the metal at and adjacent to the depressions 7, of the mold. Such expansions it has been found are greater in proximity to the depressions 7, than they are at more remote portions of the mold from such depressions.

The core employed in conjunction with a mold as explained preferably consists of a perforated hollow body 13, similar in outline to the depressions 7, of the cope 5 and the drag 6, but of less diameter than the same. The perforated hollow tube 13, serves as a support for a coating preferably, consisting of finely divided gritty material, which may be sand. This coating is adapted to be brought into contact with the molten metal and in conjunction with the depressions 7, of the cope and drag, forming an annular space, into which the metal is introduced, to form the cast structure such as a soil, water or similar pipe. Before, however, the metal is poured into the mold the depressions 7, of the cope and drag thereof, may be coated with a semi-liquid composition to permit the molten metal to lie close to the depressions of the mold proper during the casting and thus to obviate any receding of the metal from the mold. As shown in Fig. 1, the gates 8, of the drag 6, are arranged at certain distances apart and thus permit the molten metal introduced through the pour-holes 9, into the mold 4, to flow in opposite directions for predetermined distances, after reaching the end of which, the metal will encounter other portions of the metal introduced through other gates, thereby uniting quickly the various portions of the introduced metal into a unitary body of metal and in a period of time which does not lower the temperature of the meeting portions of such metal, within the mold. In order to permit of the concentration of the gases arising from the flowing metal, the cope 5, is provided with a recess or channel 15, extending lengthwise thereof. The gases liberated during the pouring of the molten metal will accumulate in the channel or recess 15, located at the highest portion of the depressions 7, of the cope, and thus is prevented the formation of a depression or depressions in the surface of the pipe cast.



The formation of such, as is well understood not only gives a pipe of inferior character, but being weakened, is rendered unfit for use.

The main portion of the gases present in the casting of the pipe are liberated into the interior of the hollow core 13, by passing through the covering or coating 14, and perforations of the core. The drag and cope are preferably formed of a body of metal, and thus the weight of the cope 5, will hold the same securely in position upon the drag 6, without the aid of any mechanical means employed, to lock the cope and drag together. Moreover, these heavy metal bodies of both cope and drag, will retain the heat for longer periods of time than a mold formed in the usual manner, with shallow walls or bodies as to both cope and drag. The pipe thus cast in such a formed mold will be perfect in formation, owing to the absence of any undue chilling of the molten metal during the pouring and setting of the same in the mold, and thus aiding in the avoidance of imperfections in the cast pipe structure both as to body as well as surface thereof. The cast pipe produced in such a mold defined when removed therefrom and after natural cooling, is ready for use, without further finishing.

Having thus described the nature and objects of my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material and each having a depression and a series of openings arranged adjacent to the depressions of both cope and drag, said openings adapted to permit of the expansion of the metal adjacent to said depressions.

2. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material, and each having a depression and a series of openings arranged adjacent to the depressions of both cope and drag and said cope provided with a channel.

3. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material and each having a depression, a series of openings and pockets, inert matter introduced into said pockets to permit in conjunction with the openings of said cope and drag of the free expansion of the metal adjacent to said depressions, during the casting of an article in said mold.

4. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material and each having a depression, a series of openings arranged adjacent to said depression and pockets radiating therefrom, inert material mounted in said pockets, and said cope provided with a channel arranged in the depression thereof.

5. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material and each having a depression, a series of openings arranged adjacent to said

depression and pockets radiating therefrom, inert material mounted in said pockets, and said cope provided with a channel arranged in the depression thereof, and pour-holes extending through said cope.

6. A mold, consisting of a cope and a drag, each composed of a permanent unyielding material and each having a depression, a series of openings arranged adjacent to said depression and pockets radiating therefrom, inert material mounted in said pockets, and said cope provided with a channel arranged in the depression thereof, pour-holes extending through said cope and said drag provided with gates registering with the pour-holes of said cope.

7. The combination, in a mold, consisting of a cope, and a drag, each composed of a permanent unyielding material and each having a semi-circular depression, a core, consisting of a perforated hollow unyielding body having a coating composed of a gritty material, said cope provided with pour holes at determinate distances apart, and said drag provided with gates adapted to register with the pour-holes of said cope.

8. The combination, in a mold, consisting of a cope and a drag, each consisting of a permanent unyielding material and each having a semi-circular depression, said cope provided with a channel located in the highest portion of the depression thereof, and forming a harbor for liberated gases, a core, consisting of a perforated hollow unyielding body adapted to form a receiving chamber for gases, said core, provided with an exterior coating of gritty material, said cope provided with pour-holes and said drag provided with gates adapted to register with the pour-holes of said cope.

9. The combination, in a mold, consisting of a cope and a drag, each consisting of a permanent unyielding material and each having a semi-circular depression and a series of openings located adjacent thereto, said cope provided with a channel and pour-holes and said drag provided with gates adapted to register with the pour-holes of said cope, and a core, consisting of a perforated hollow unyielding body having a coating of a gritty substance surrounding the same, and said hollow perforated core forming a receiving chamber for liberated gases.

10. The combination, in a mold, consisting of a cope and a drag, each consisting of a permanent unyielding material and each having a semi-circular depression, a series of openings located adjacent thereto, and pockets adapted to contain inert material, both the openings and inert material adapted to compensate for expansion of the metal of the cope and drag of said mold, said cope provided with a channel and pour-holes, and said drag provided with gates adapted to register with the pour-holes of said cope, and a core, consisting of a perforated hollow unyielding body having a coating of a gritty substance surrounding the same, and said hollow perforated core forming a receiving chamber for liberated gases.

In witness whereof, I have hereunto set my signature in the presence of two subscribing witnesses.

EDGAR A. CUSTER.

Witnesses:

EMMA D. CHAPPELL,  
THOMAS M. SMITH.