(No Model.)

E. F. BRAGG.

ROLL FOR RUBBER MIXING OR OTHER MILLS.

No. 544,782. Patented Aug. 20, 1895.

Fig: 1.

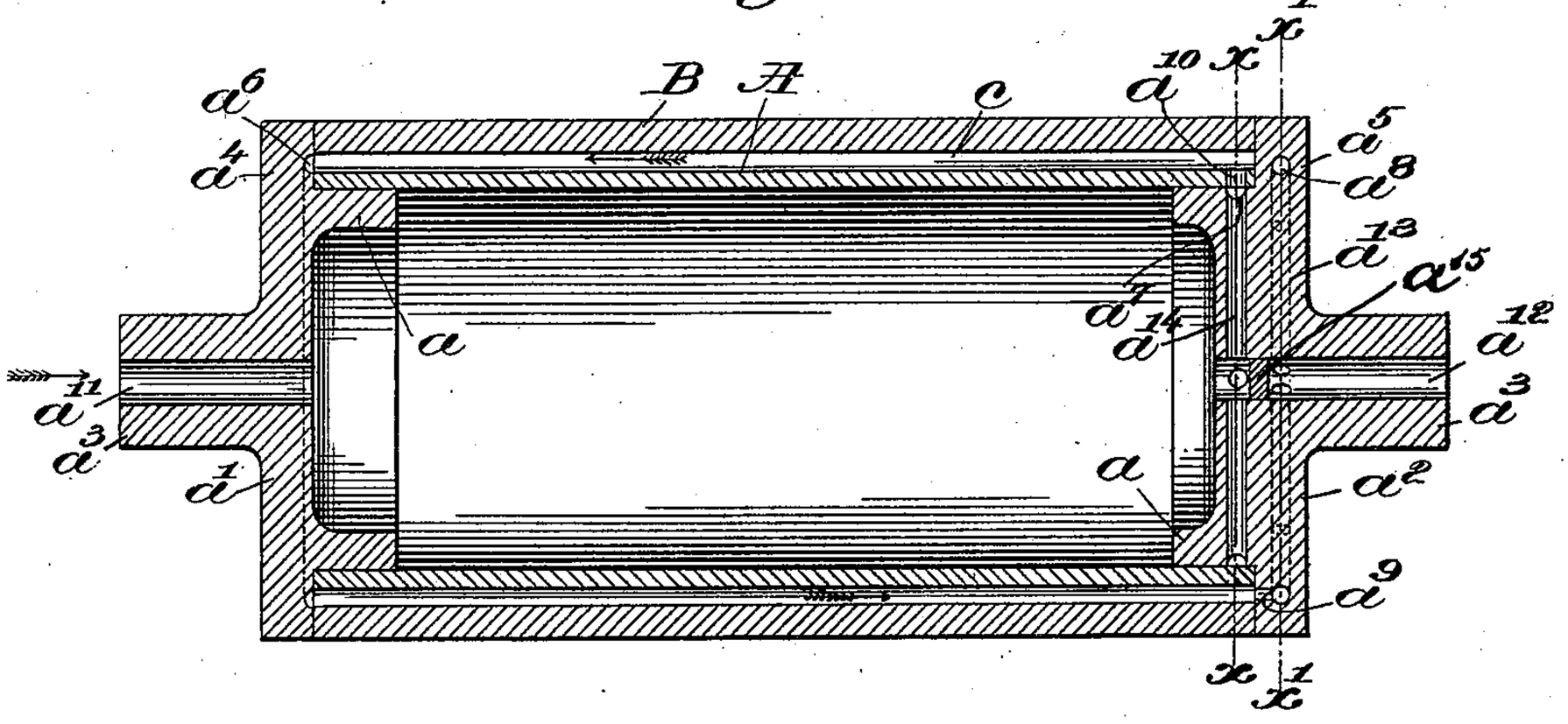


Fig: 4.

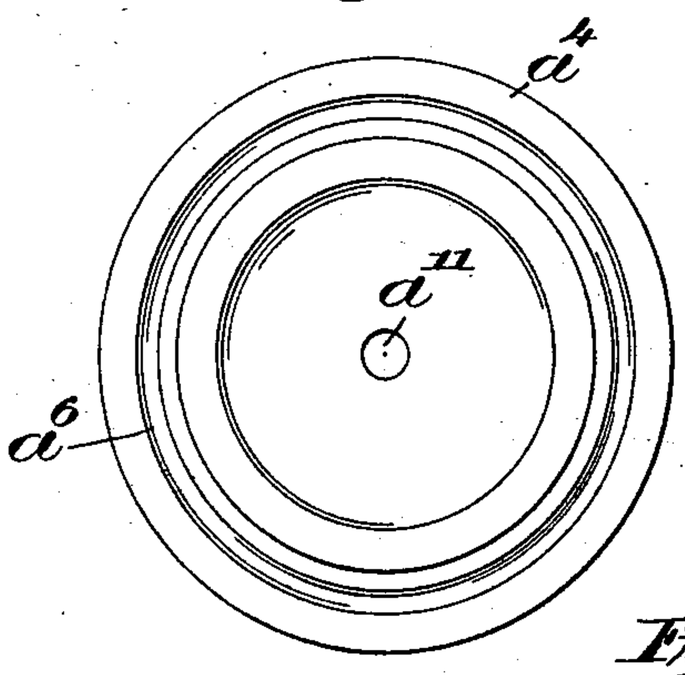


Fig: 2.

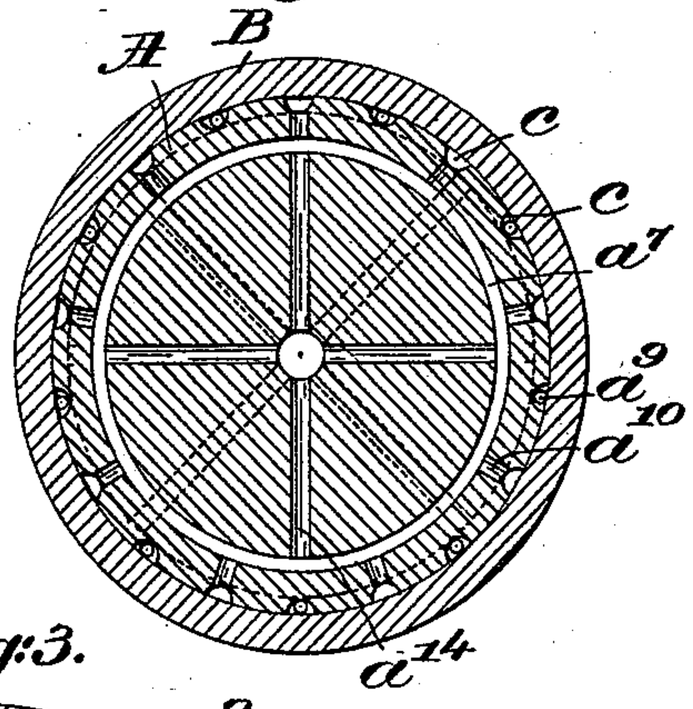
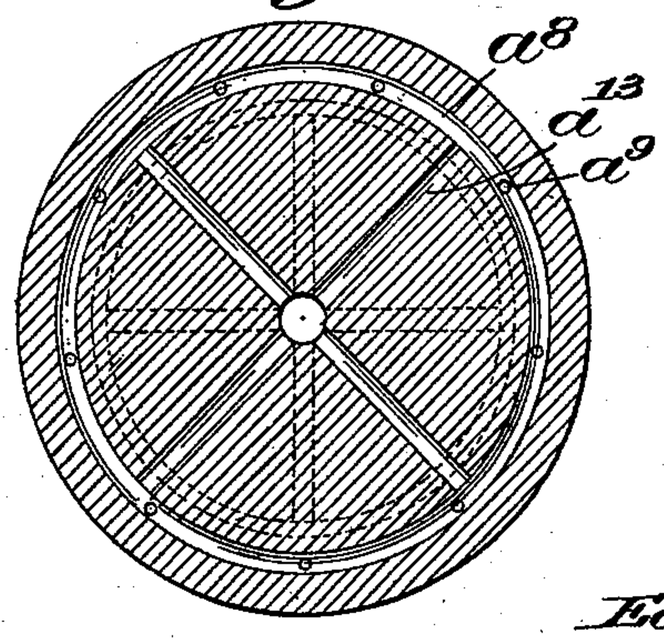


Fig: 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWARD F. BRAGG, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AUTOMATIC RUBBER-MIXER COMPANY, OF SAME PLACE.

ROLL FOR RUBBER-MIXING OR OTHER MILLS.

SPECIFICATION forming part of Letters Patent No. 544,782, dated August 20, 1895.

Application filed December 10, 1894. Serial No. 531,342. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. BRAGG, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Rolls for Rubber-Mixing and other Mills, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a novel and improved roll for india-rubber and other mixing mills.

My invention has particular reference to rolls wherein a series of water-circulating passages are arranged under the periphery, through which water is caused to flow for the purpose of cooling the roll while in use.

Prior to this invention rolls for this purpose provided with cooling-passages, as described, have, I believe, invariably been made solid, with the exception of a single axial water-passage extending from end to end of the rolls.

In the operation of rubber and other like mixing mills the mixing-rolls must withstand great pressure; hence the customary use of solid rolls. Further, much heat is generated at the bight of the rolls; hence the necessity of the passage of a cooling fluid under the periphery, the rolls being subjected to great stresses during the continual heating and cooling of large masses of metal, which stresses not infrequently result in the breakage of one or more of the rolls of the mill. In the formation of a solid metal roll provided with water-circulating passages under the periphery, as described, much skill is required and the operation of casting the same is expensive, and it is difficult to obtain castings of such large weight free from internal defects and weaknesses. In my efforts to improve rolls of this class I have found that the internal stresses resulting from the first cooling of the mass of iron after casting and from the subsequent operation of the roll under great heat and pressure are much less and the consequent strength and life of the roll much increased if the roll be built up in composite form with a central core or body portion encircled by an independent outer or peripheral sleeve of greater or less thickness, as required. The use of such an outer sleeve also furnishes a different means for forming the peripheral cooling-passages under the surface.

The above, with other features of my invention, will be hereinafter more particulary described, and pointed out in the claims.

In the drawings, Figure 1 represents in vertical longitudinal section one embodiment of my present invention; Fig. 2, a vertical cross-section on the dotted line $x\ x$, Fig. 1; Fig. 3, a vertical cross-section on the dotted line $x'\ x'$, Fig. 1; and Fig. 4 a right-hand face view of the roll-header shown at the left in Fig. 1.

Referring to the drawings illustrating the preferred embodiment of my invention, A is the roll-body, shown as a cylinder, with walls sufficiently thick to withstand the heavy pressure under which the roll is operated. This cylindrical body A is mounted at its ends upon the cylindrical flanges $a\ a$ of two headers $a'\ a^2$, each provided with a journal a^3, by which it may be mounted in suitable bearings in the mixing-mill. The body A may be turned to fit and driven or shrunk upon the flanges a, or it may be otherwise suitably secured thereupon.

B represents the independent outer or peripheral cylindrical sleeve, formed and turned to such diameter that it may be shrunk upon the cylindrical body A, the two fitting so tightly that they are in effect a single member so far as the rolling operation is concerned, yet because of the outer independent sleeve the stresses to which it is subjected during the operation of the mill are not communicated to the inner body portion to the extent that they would be were the roll made solid or integral. Hence the roll is better enabled to withstand these stresses and does not cripple so quickly when in use.

With a roll constructed as above described I prefer to form the water-circulating passages under the periphery in the following manner: The outer peripheral surface of the cylindrical body A before receiving the sleeve B is provided with a plurality of longitudinal grooves $c\ c$, the same being preferably parallel with the axis of the roll. The headers $a'\ a^2$ are provided with circumferential lips or flanges $a^4\ a^5$, against which the ends of the body A and outer sleeve B abut, and, referring to Fig. 4, the circumferential flange a^4 is

provided at its inner face with a circular groove a^6, into which adjacent ends of all the longitudinal grooves *c c* open. The header a^2 has its flange *a* provided with a peripheral groove a^7, and the said header is also provided, as shown, with the circumferential flange a^5, with a ring-like passage a^8. The ring-like passage a^8 is connected with alternate grooves *c* in the body portion by short connecting-passages a^9, (see Figs. 1 and 3,) while the remaining or intermediate grooves *c* are connected with the peripheral groove a^7 of the flange *a* by radial connecting-passages a^{10}. The journal a^3 of the header *a'* is provided, as shown, with an axial passage a^{11}, opening into the interior of the body A, and the journal a^3 in the header a^2 is provided with a similar passage a^{12}. Within the header a^2 are formed radial passages a^{13}, connecting the ring-like passage a^8 with the axial passage a^{12}, and the said header is also provided with radial passages a^{14}, which connect the peripheral groove a^7 also with the axial passage a^{12}, the entrances to the radial grooves a^{13} and a^{14} within the passage a^{12} being separated sufficiently to enable a dam a^{15} to be driven between the two, as shown in Fig. 1.

In practice the course of the water will be as indicated by arrows, the same entering through passages a^{11} in the journal of the header *a'*, filling the roll and having its exit through the inner end of the passage a^{12} at the opposite end of the roll, thence by the radial passages a^{14} to one-half of the longitudinal peripheral grooves *c*, through the latter to the end of the roll at which it entered, and through the circular groove a^6 into and back through the intervening grooves *c* to the ring-like passage a^8, and thence by the radial passages a^{13} to and out through the passage a^{12} in the journal of the header a^2. The flow of water through alternate passages *c* is thus in opposite directions, giving to the roll a mean temperature between the hottest and coolest water. The body A may be made thicker, if desired or necessary; but with the composite construction herein shown better castings may be obtained, and therefore the roll may be made correspondingly lighter in order to withstand the heavy pressures under which it is operated.

While I have found the construction herein shown a convenient and economical one, yet my invention is not restricted to such a construction alone, for it is evident that the same may be altered without departing from the spirit and scope of my invention.

I claim—

1. The herein described composite roll, for rubber mixing and other machines, the same consisting of a body portion, and an outer imperforate sleeve, fitting the same tightly, to relieve the said body portion from stresses resulting from great pressure and changes in temperature, water circulating passages incorporated in the said roll under the periphery, an inlet and an outlet located at or near the axis of said roll, and connecting passages joining said peripheral circulating passages with said inlet and outlet, substantially as described.

2. The herein described roll for rubber mixing and other machines, the same consisting of a body portion, journals upon which the same is mounted, an inlet and an outlet at or near the axis of said journals, an enveloping outer sleeve fitting the said body portion tightly, circulating grooves or passages between the said body portion and outer sleeve and formed wholly in one of the same, and connecting passages joining said circulating passages with said inlet and outlet, substantially as described.

3. The herein described roll for rubber mixing and other machines, the same consisting of two headers, provided respectively with journals and inlet and outlet passages within the same, a body portion held by said headers, an outer sleeve fitting the said body tightly, circulating passages formed under the periphery of said roll, and radial passages connecting the same, with the inlet and outlet passages referred to, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD F. BRAGG.

Witnesses:
FREDERICK L. EMERY,
AUGUSTA E. DEAN.