No. 735,217. PATENTED AUG. 4, 1903.

J. DE LONG.

PNEUMATIC APPARATUS FOR PRODUCING MATS OR BATS OF FIBROUS MATERIAL.

APPLICATION FILED DEC. 6, 1900.

NO MODEL. 2 SHEETS—SHEET 1.

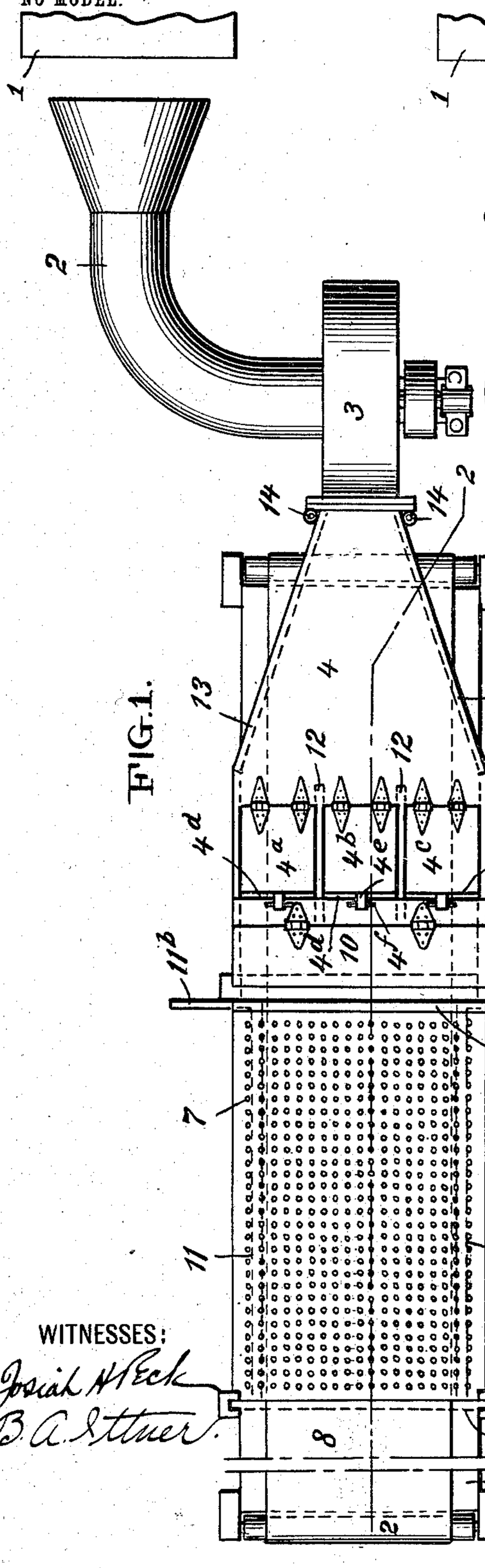

FIG. 1.

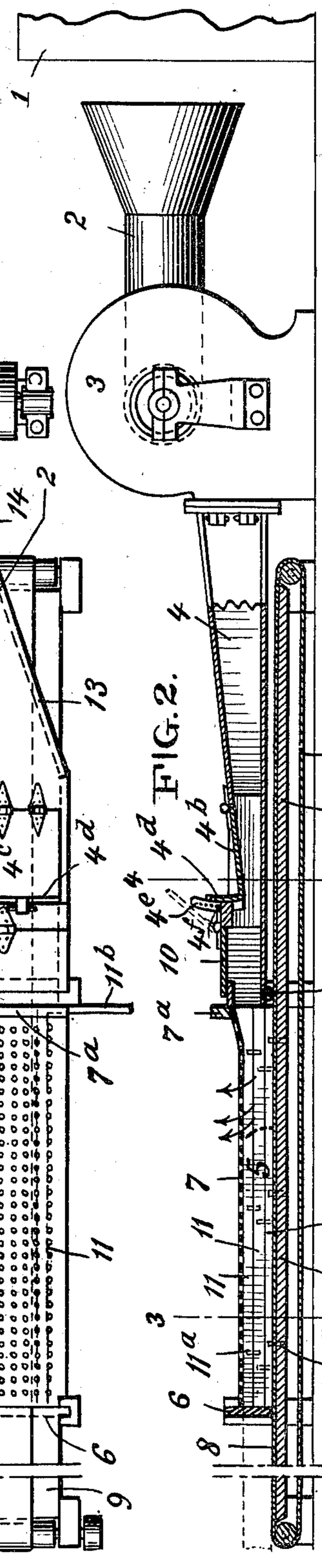

FIG. 2.

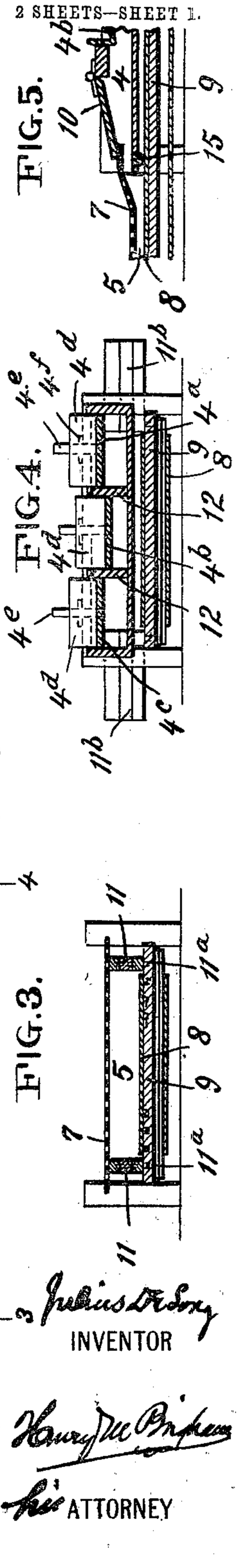

FIG. 5.

FIG. 4.

FIG. 3.

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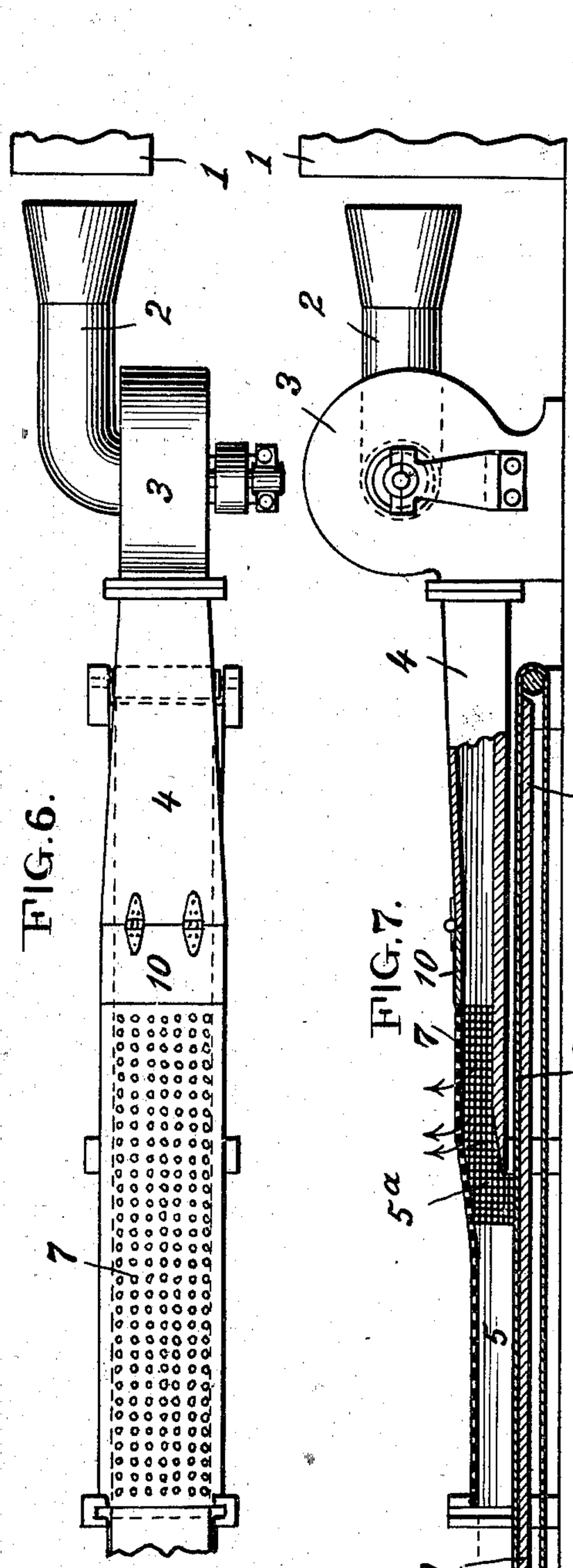

FIG. 6.

FIG. 7.

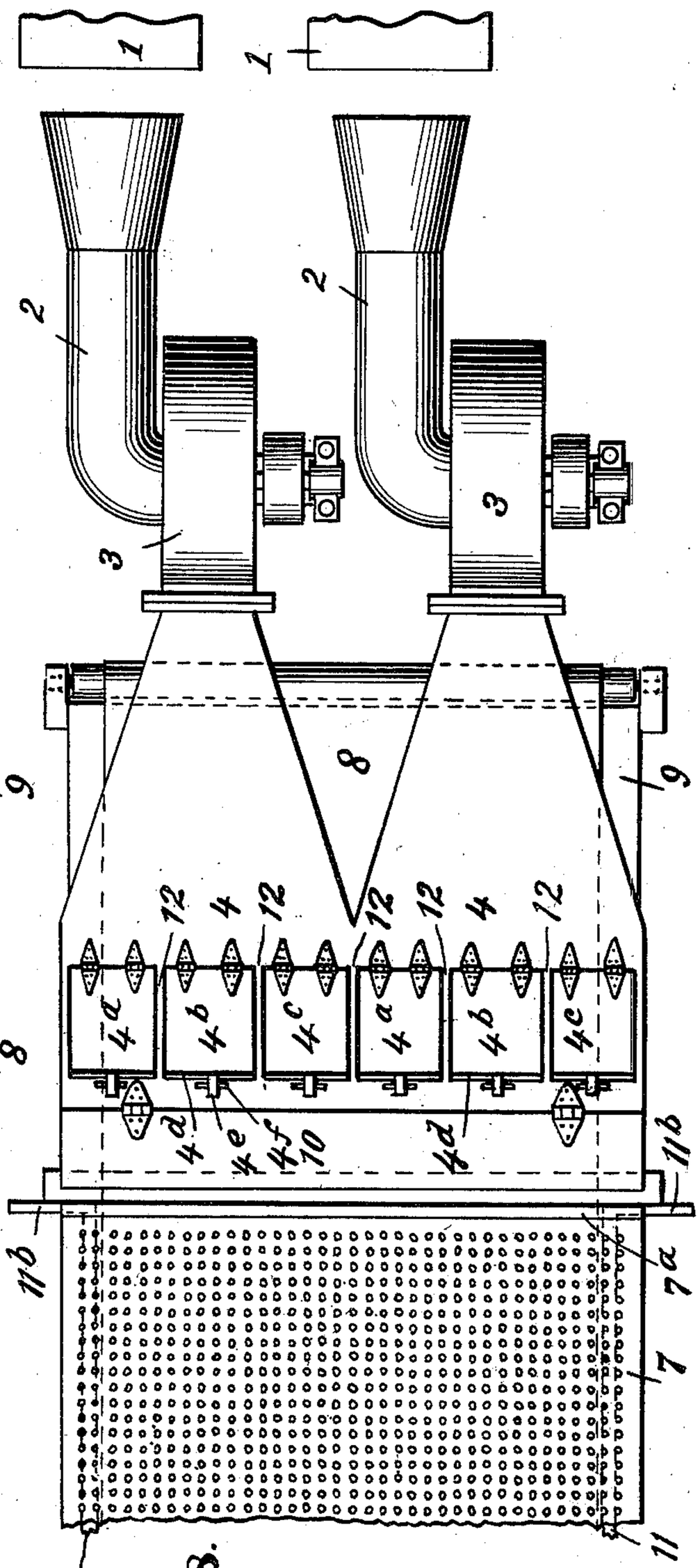

FIG. 8.

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No. 735,217. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

JULIUS DE LONG, OF BROOKLYN, NEW YORK.

PNEUMATIC APPARATUS FOR PRODUCING MATS OR BATS OF FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 735,217, dated August 4, 1903.

Application filed December 6, 1900. Serial No. 38,876. (No model.)

To all whom it may concern:

Be it known that I, JULIUS DE LONG, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Pneumatic Apparatus for Producing Mats or Bats of Fibrous Material, of which the following is a specification.

The object of my invention is to provide an apparatus for producing mats or bats of fibrous material by causing a fiber-laden blast of air to force and pack the fiber into a forming or molding chamber the walls of which are constructed to produce a mat or bat of any desired size, shape, or contour in cross-section and which will permit of the production of a mat or bat of any desired length or width.

With this object in view my invention consists, first, in an apparatus for producing mats or bats of fibrous material which comprises a forming or molding chamber constructed to impart any desired size, shape, or contour to the mat or bat in transverse cross-section, and means for producing a current of air for conveying fiber into said forming or molding chamber and packing and molding it therein.

My invention further consists in certain other features of improvements in an apparatus for producing mats or bats of fibrous material, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of an apparatus illustrating my invention. Fig. 2 is a vertical longitudinal section of the same on the line 2 2, Fig. 1. Fig. 3 is a transverse section on the line 3 3, Fig. 2. Fig. 4 is a transverse section on the line 4 4, Fig. 2. Fig. 5 is a detail longitudinal section illustrating a modification. Fig. 6 is a plan view of an apparatus of more simple form embodying the invention. Fig. 7 is a vertical longitudinal section of the apparatus shown in Fig. 6. Fig. 8 is a plan view of a part of an apparatus, illustrating another modification.

Hair or other fiber is taken from a suitable picker 1 or other source of supply through a feed or conductor pipe 2 by the blower 3 and delivered into a mixing or equalizing chamber 4, and by means of any desirable number of variable dampers 4^a 4^b 4^c is equalized and spread out into a broad flat stream, which is so regulated by such variable dampers that the desired amount of fiber will be delivered with the desired air-pressure to each part of the molding-chamber 5. After reaching the molding-chamber 5 the current of air conducting the fiber passes forward until it reaches the obstruction-plate 6, by which its flow is arrested, the air escaping through the perforations in the plate 7, which are of such size that they permit the air to escape freely and yet retain the fiber within the chamber. As the fiber cannot escape from the molding-chamber, it is packed against the plate 6 until the end of the molding-chamber is completely filled, the fiber being retained in that end of the molding-chamber by the pressure of the air-blast and by the impact of the particles of fiber as they are deposited in the chamber until the end of the molding-chamber is completely filled. As the pressure of the air-blast is uniform and equally distributed throughout the molding-chamber, a uniform and homogeneous bat is formed therein, the thickness and width of which are determined by the depth and width of the molding-chamber and the density of which is easily regulated by increasing or diminishing the air-blast. After the fiber has been deposited in a sufficient quantity, so that it will be retained in the molding-chamber by frictional contact with the sides thereof and form an obstruction to the air-current, the plate 6 may be removed, permitting the bat or fiber deposited in the molding-chamber to be carried forward by the movement of an endless apron 8, passing over the bed 9, forming the bottom wall of the molding-chamber 5, and extending back beneath the chamber 4. In the drawings I have shown the perforations in the top only of the molding-chamber. They may, however, be placed in any or all of the walls of said molding-chamber, their object being to permit the escape of air and yet retain the fiber within the molding-chamber. One or more of the walls of the chamber or a portion of one of such walls may be made of wire or other suitable netting, as shown by 5^a in Fig. 7, which will likewise permit the escape of air and yet retain the fiber.

One or more valve-doors 10 are placed in the chamber 4 to provide for the escape of air under excessive pressure or in case the

movement of the apron 8 or passage of the bat or mat in the chamber 5 has been stopped or if the deposit of fiber in the chamber 5 becomes so great as to check the free passage or flow through the perforations.

The side walls of the molding-chamber 5 are made up of a number of strips 11, provided with pins 11^a, so that the height of the molding-chamber may be adjusted and bats of different thicknesses formed and molded therein. The strips 11 may be placed in different positions on the bed 9 to vary the width of the molding-chamber, so that bats of different widths may be molded or formed therein, and such side walls are provided with right-angled extension-ribs 11^b to close the opening between the strips and the side walls of the chamber 4. Aprons 8 of different widths are introduced to suit the adjusted widths between the strips 11.

The plate 7 is provided with an upward extension 7^a to close the opening between the said plate and the chamber 4 when the plate 7 is raised or lowered for the purpose of varying the height of the batting-chamber.

The chamber 4 is provided with longitudinal partitions 12 to form the side walls, between which the dampers 4^a 4^b 4^c work, and a portion 13 of the side walls of the chamber 4 is hinged at 14, so as to be swung into the partitions 13 when the strips 11 in the molding-chamber 5 are adjusted to a corresponding position. The dampers 4^a 4^b 4^c are also adjustable to regulate the volume of air and fiber. The several dampers 4^a 4^b 4^c are formed with upwardly-projecting wings 4^d to maintain the closure of the joint between them and the top of the casing when they are adjusted downward and with suitable means—such as perforated bars 4^e and pins 4^f—to fix them at any angle of adjustment.

15 represents a roller, preferably of yielding material, mounted on journals in the side walls and between the bed 9 and the bottom of the chamber 4 for the purpose of closing the throat or space between those parts to prevent the escape of air therethrough.

In the modification shown in Fig. 5 the valve-doors 10 are adapted to rest by gravity on the rear end of the perforated plate 7, so that when this plate is adjusted to the lower position to lessen the thickness of the mat the continuity of the top of the chamber is preserved without the upper extensions 7^a from the perforated top 7.

Figs. 6 and 7 represent the apparatus in more simple form for the production of a mat of limited width and without the provisions for extension or contraction of the height or width of the molding-chamber 5 or for the regulation of the relative volume of air-blast at the sides and center by means of dampers 4^a 4^b 4^c, which are desirable to equalize the delivery in forming mats of greater width, as already described with reference to Figs. 1, 2, and 4. Fig. 7 also shows the fixed bottom of the chamber 4 extended some distance beneath the perforated plate 7, so that the accumulated mat or bat of fiber will serve to close the space between the chamber-bottom and the apron 8 while leaving part of the length of the perforated top 7 unobstructed, so as to permit the escape of air.

In Fig. 8 I have illustrated the use of a plurality of feed-tubes 2 and blast-fans 3, with discharge-throats uniting in a common chamber 4 for the purpose of producing bats of still greater width.

My invention is well adapted for producing felt mats of indefinite length from hair, wool, fur, or other animal fiber or for producing a bat of indefinite length from cotton or other fiber.

My invention is also adapted for the construction of mattresses or other similar articles.

I am aware that it is old to employ a room, box, chamber, or receptacle which acts as a settling-chamber into which fiber is introduced by means of an air-blast and made to settle by gravity upon the floor thereof, and I make no claim to any such room, box, chamber, or receptacle, it being characteristic of my invention as hereinbefore described that the mat or bat has its shape and dimensions controlled and determined by the walls of the molding-chamber to the extent and in the manner herein described.

I claim—

1. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired shape, size or contour to the mat or bat in transverse cross-section, of means for producing a current of air for conveying fiber into said molding-chamber and packing and molding it therein, substantially as set forth.

2. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber for imparting form to the bat, of means for producing a current of air for conveying fiber into said molding-chamber, and means for regulating the force of said air-current and thereby varying the density of the bat or mat, substantially as set forth.

3. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired shape, size or contour to the mat or bat in transverse cross-section and to permit of the escape of air therefrom, of means for producing a current of air for conveying fiber into the mold and packing and molding it therein, substantially as set forth.

4. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired shape, size or contour to the mat or bat in transverse cross-section, and which is provided with a removable end wall which serves to start the

formation of the bat or mat, of means for producing a current of air for conveying the fiber into the mold and packing and molding it therein, substantially as set forth.

5. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, and constructed to have open ends when a bat or mat has been formed therein, of means for producing a current of air for conveying the fiber into the mold and forming and molding therein a bat or mat of any desired length, substantially as set forth.

6. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber for imparting form to the bat, of means for producing a current of air for conveying fiber into the mold and packing and molding it therein, and means for equally distributing the air-pressure for imparting uniform density to the mat or bat, substantially as set forth.

7. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section and constructed with air-outlets throughout its length, of means for producing a current of air for carrying fiber into the mold and packing and molding it therein, substantially as set forth.

8. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, of means for producing a current of air for conveying fiber into the mold and packing and molding it therein, and means for continuously discharging the mat or bat from the mold, substantially as set forth.

9. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, said chamber provided with an adjustable wall for varying the thickness of the bat or mat, of means for producing a current of air for conveying fiber into the mold and packing and molding it therein, substantially as set forth.

10. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, said chamber being provided with an adjustable wall or walls for varying the width of the bat or mat, of means for producing a current of air for conveying fiber into the mold and packing and molding it therein, substantially as set forth.

11. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, of means for producing a current of air for conveying fiber into the end of the mold and packing the fiber against the end of the bat or mat already molded therein, substantially as set forth.

12. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, means for producing a current of air for conveying fiber into the mold and packing and molding it therein, and an endless conveyer extending lengthwise through the mold and constituting a movable wall thereof, substantially as set forth.

13. In an apparatus for producing mats or bats of fibrous material, the combination with a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, and having one of the side walls of such chamber which determines one of the dimensions of the bat to be formed therein perforated, of means for producing an air-current for delivering the disintegrated fiber to the bat as it is formed in such chamber, substantially as set forth.

14. In an apparatus for producing mats or bats of fiber, the combination of a molding-chamber the walls of which are constructed to impart any desired size, shape or contour to the mat or bat in transverse cross-section, of means for producing an air-current for conveying fiber into said molding-chamber and packing and molding it therein against the end of the mat or bat as it is formed, substantially as shown and described.

New York, December 4, 1900.

JULIUS DE LONG.

Witnesses:
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JOSIAH H. PECK.