No. 608,385. Patented Aug. 2, 1898.

G. STONE.

WOOL DRYING APPARATUS.

(Application filed June 1, 1897.)

(No Model.) 5 Sheets—Sheet 1.

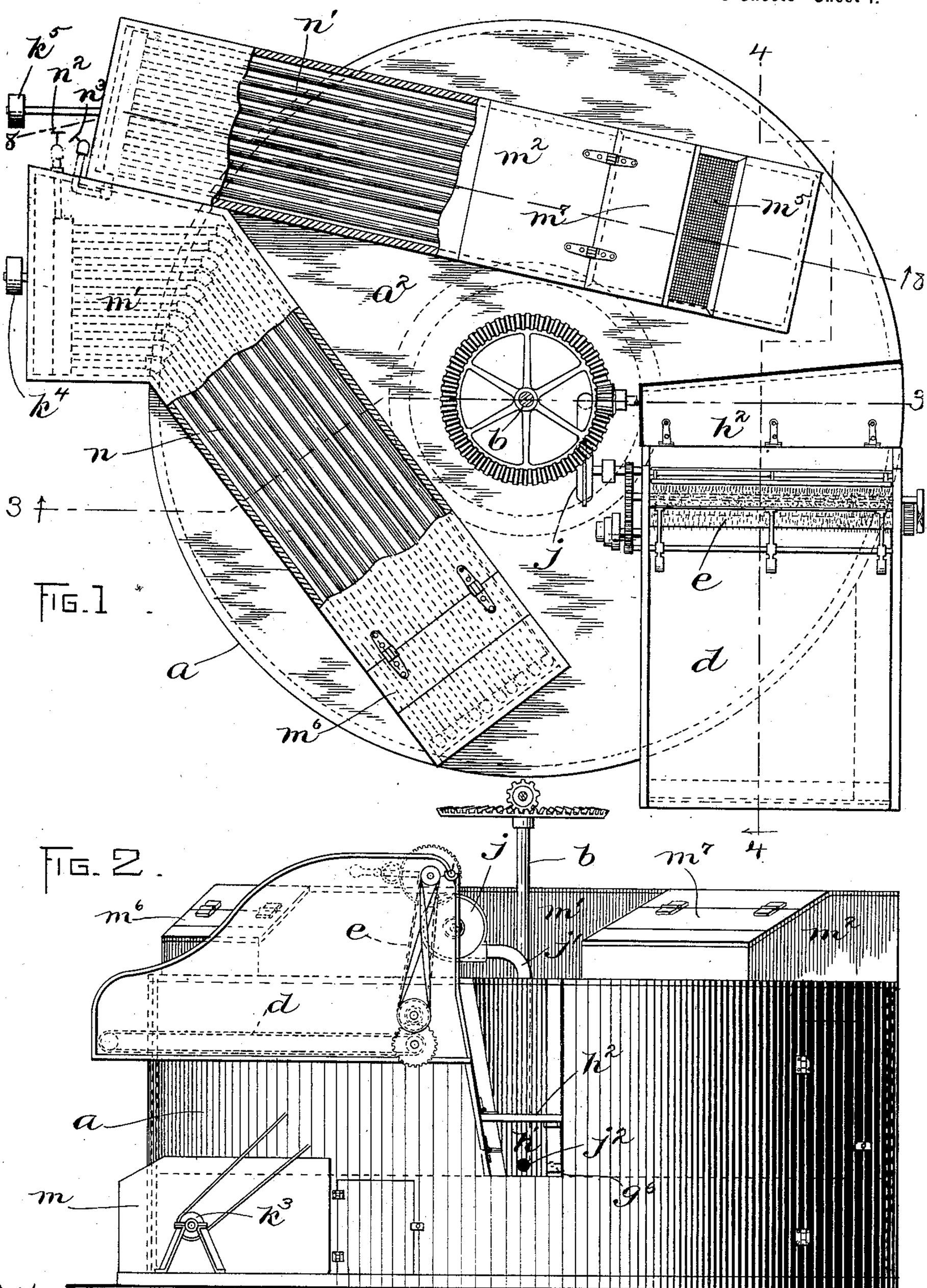

FIG. 1.

FIG. 2.

WITNESSES.
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E. Batchelder

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FIG. 3.

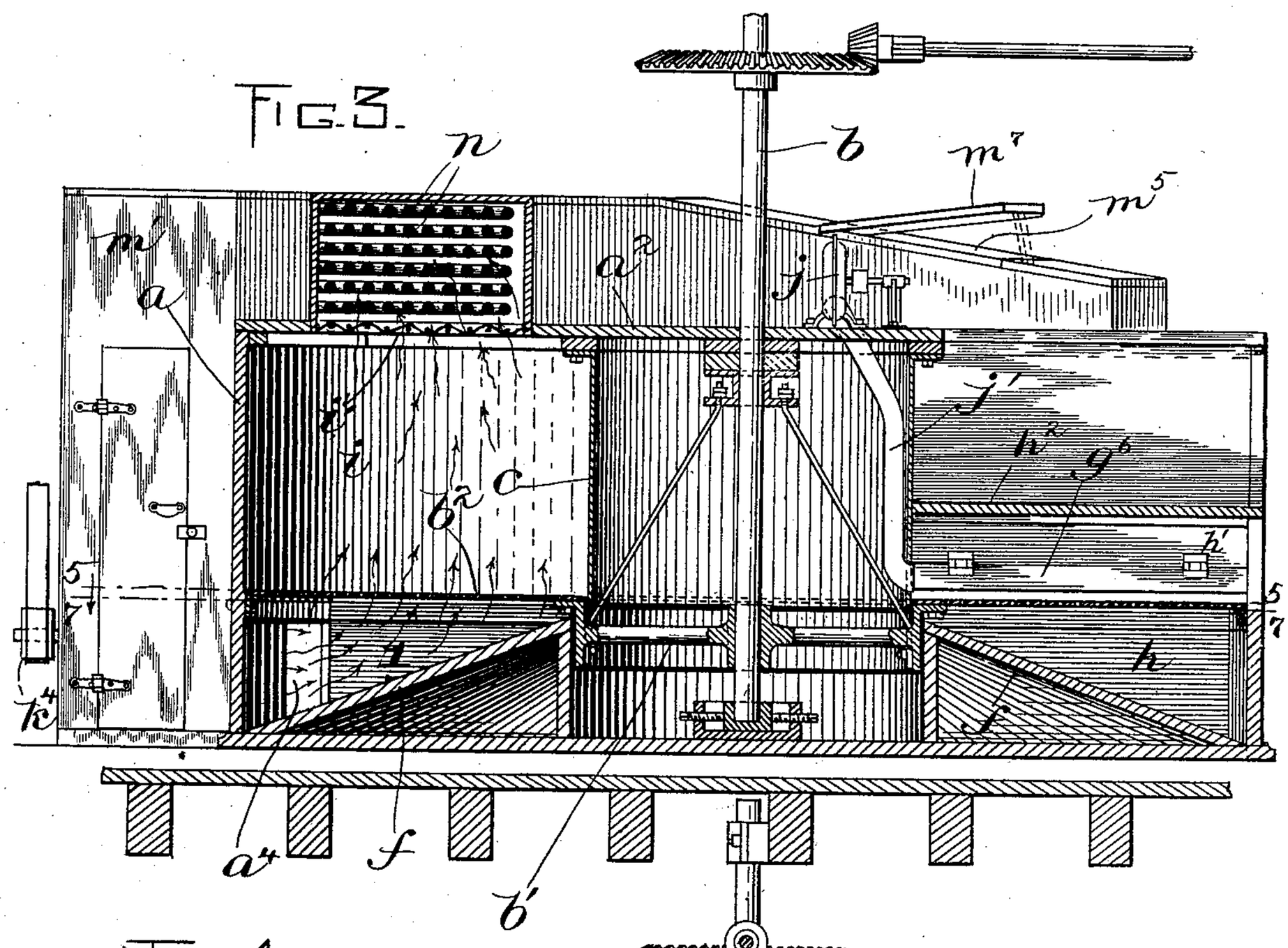

FIG. 4.

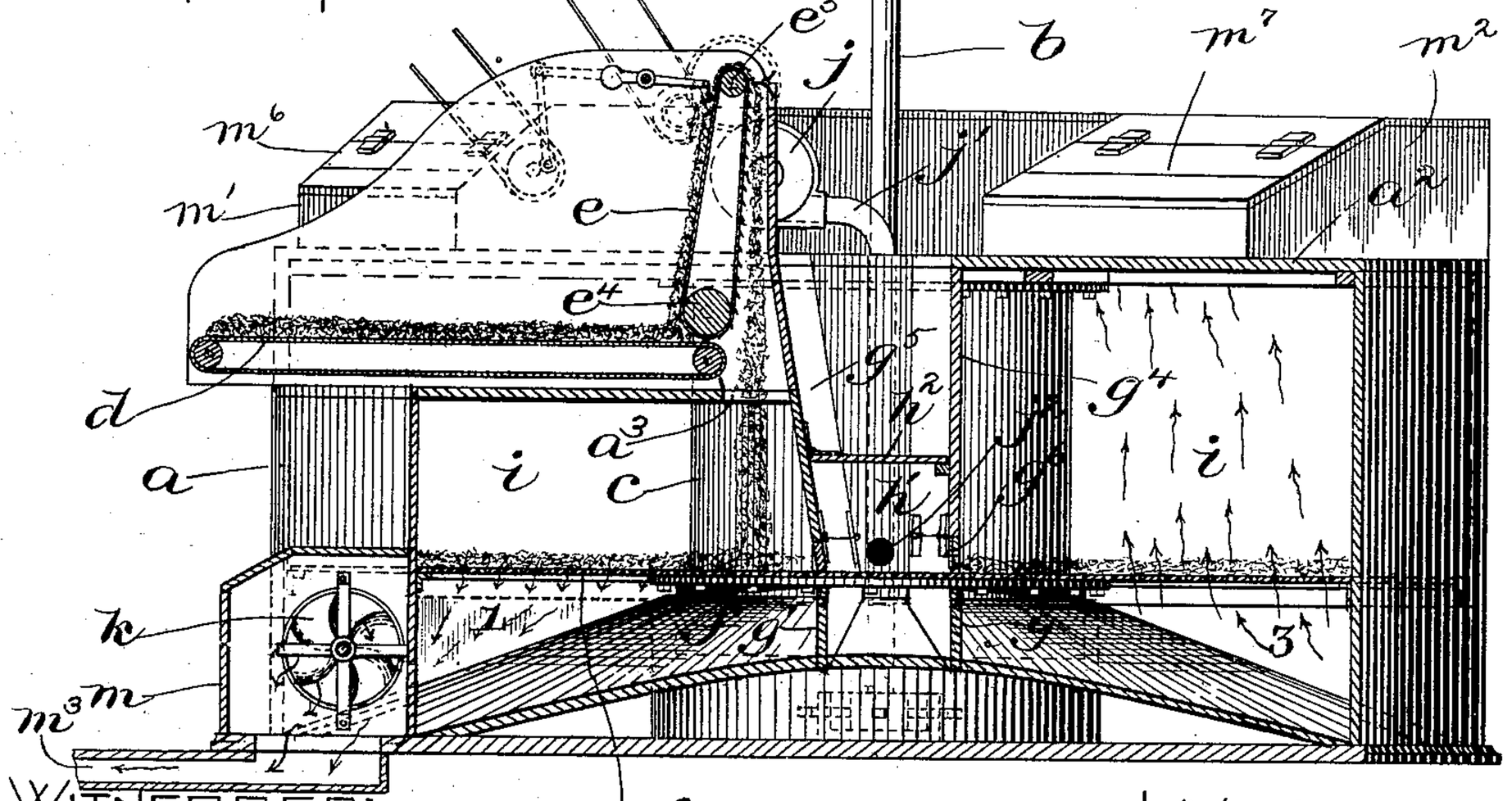

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FIG. 5.

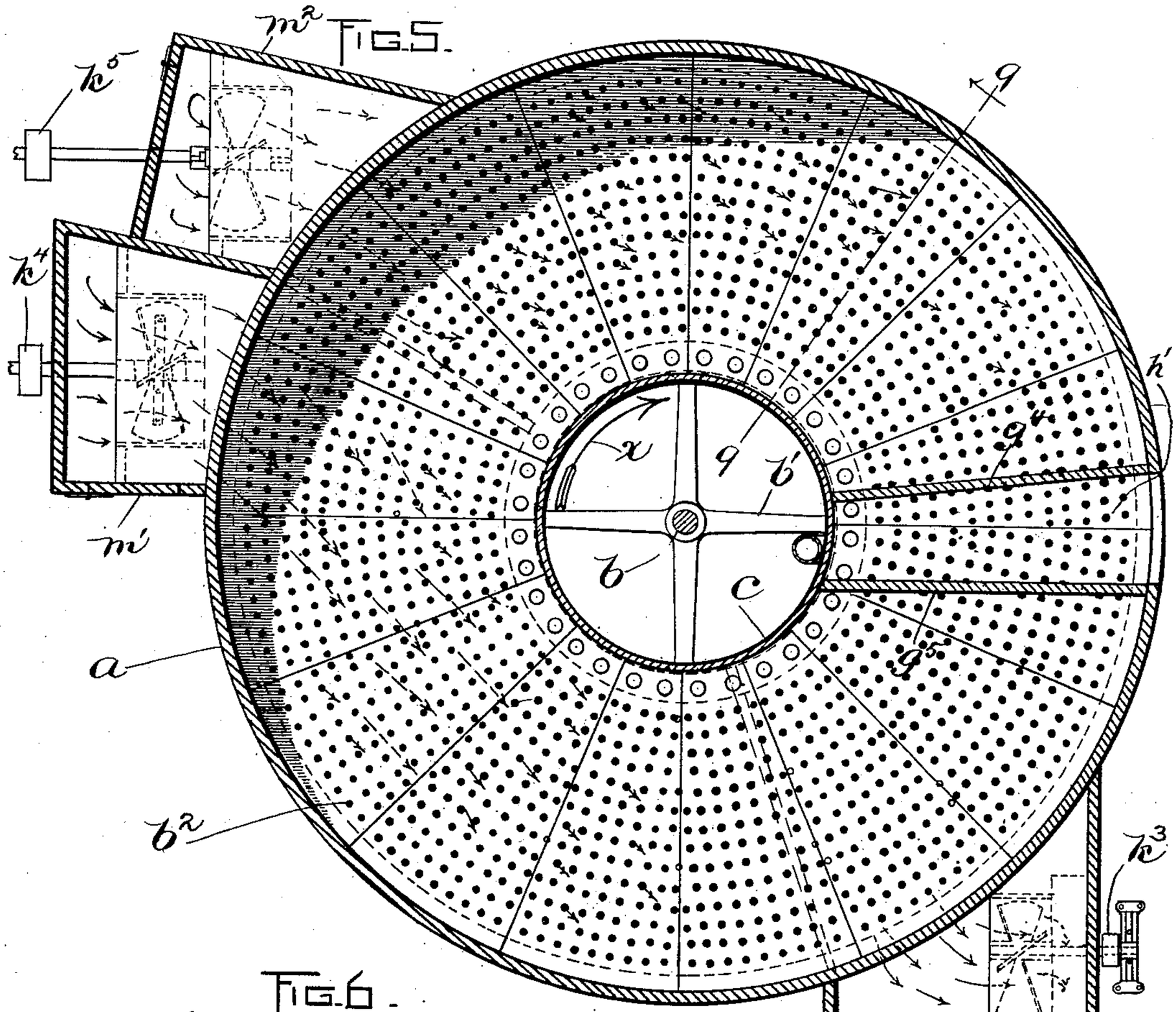
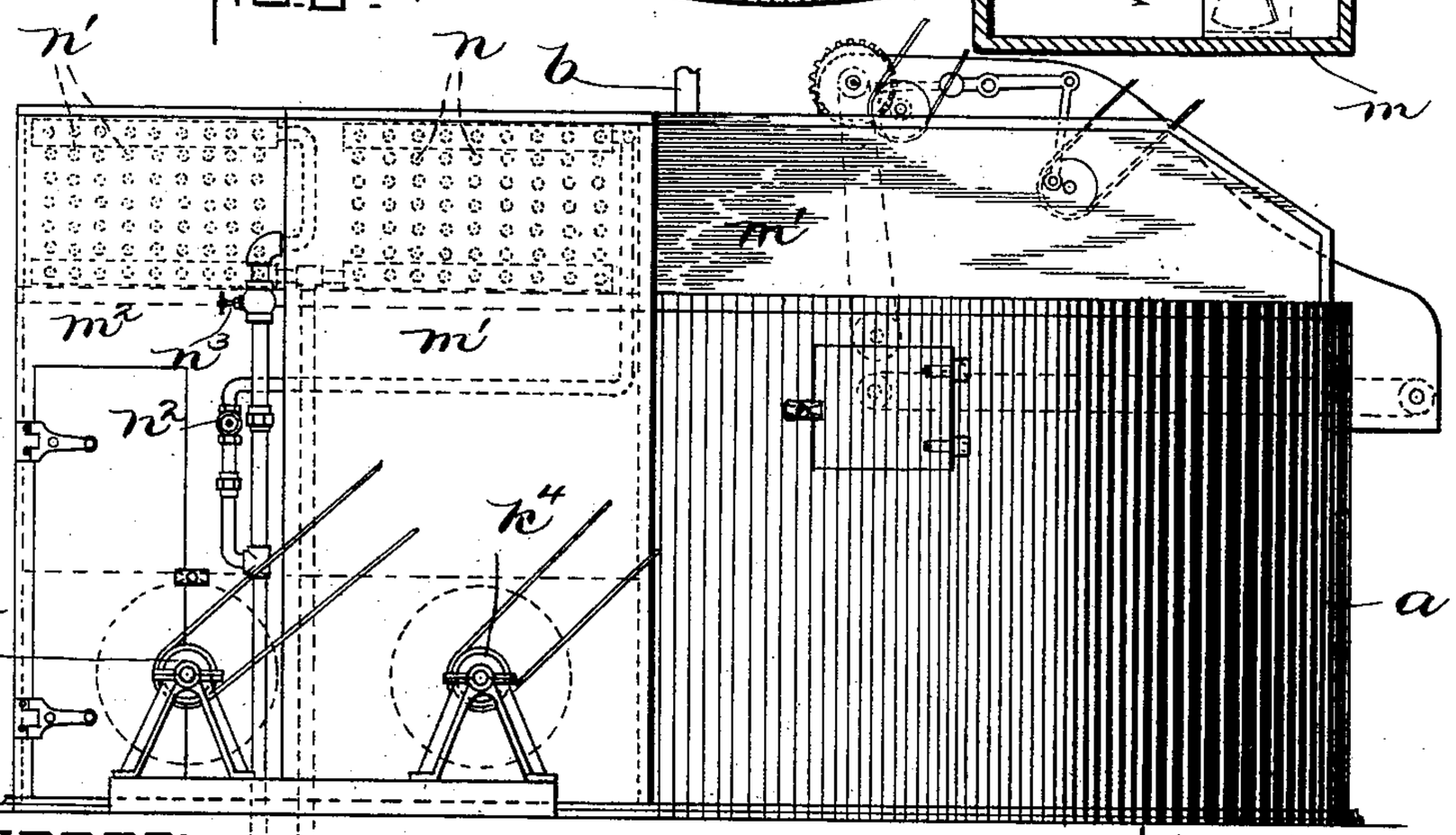


FIG. 6.



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(No Model.) 5 Sheets—Sheet 4.

FIG. 7.

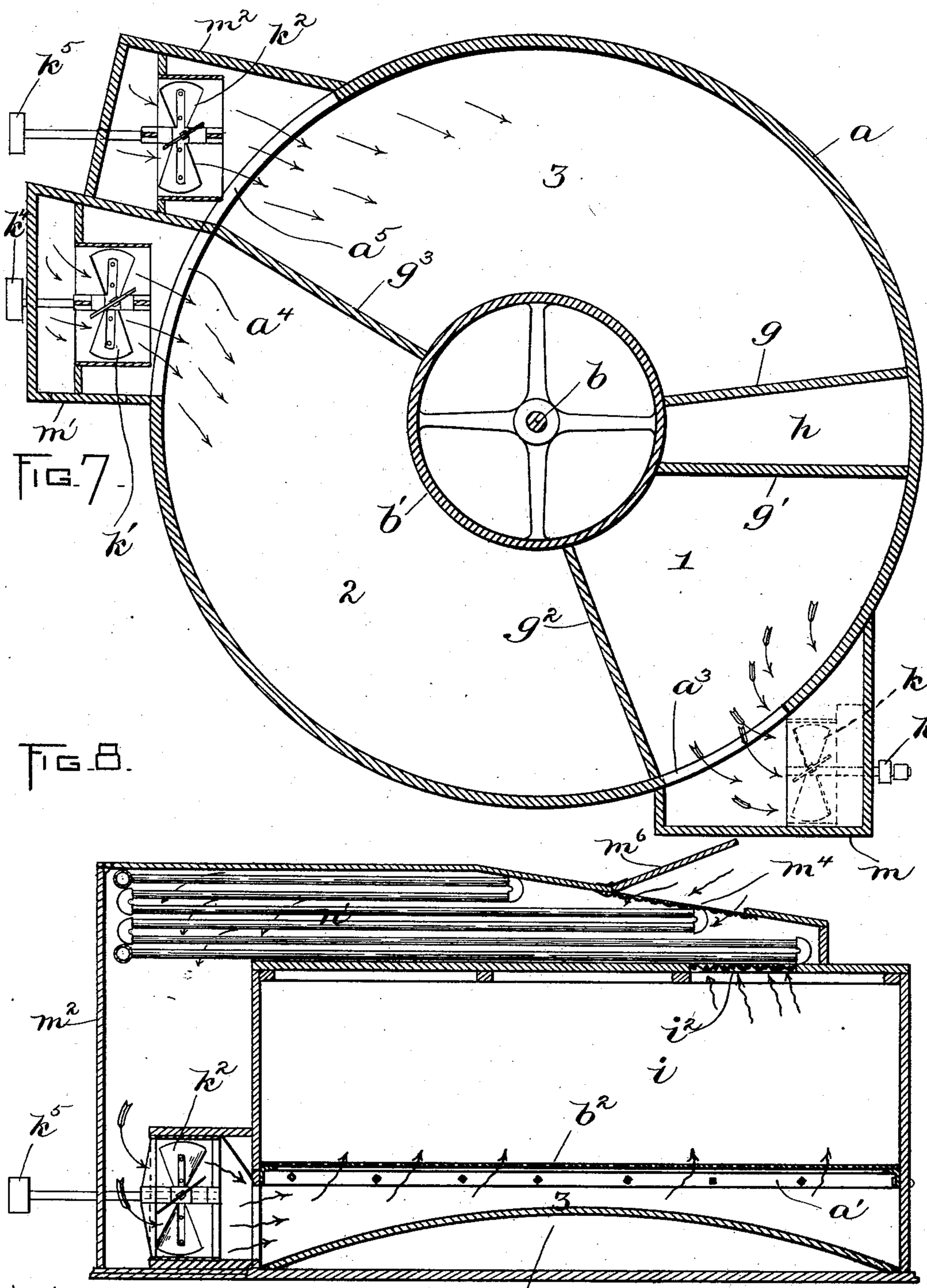

FIG. 8.

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No. 608,385. Patented Aug. 2, 1898.

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WOOL DRYING APPARATUS.

(Application filed June 1, 1897.)

(No Model.) 5 Sheets—Sheet 5.

FIG. 9.

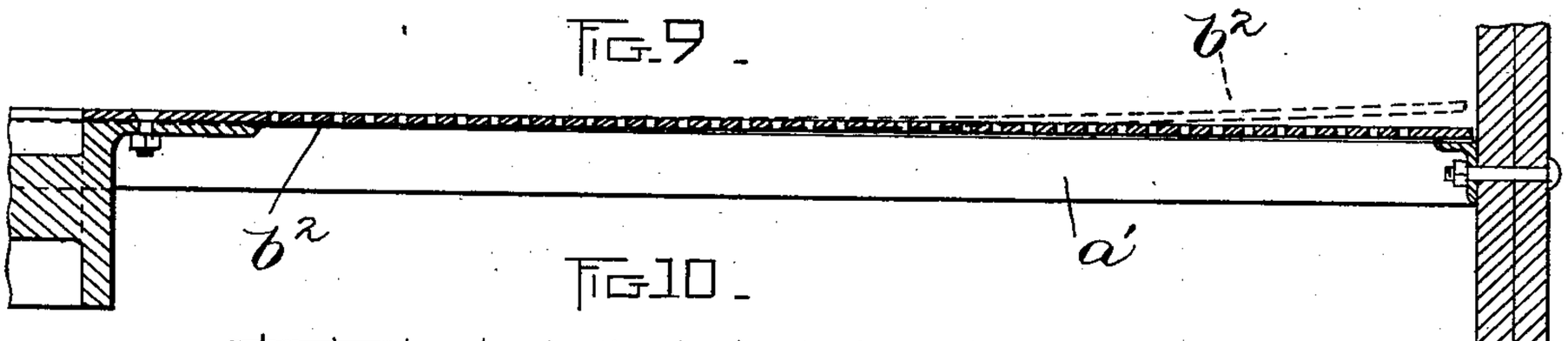


FIG. 10.

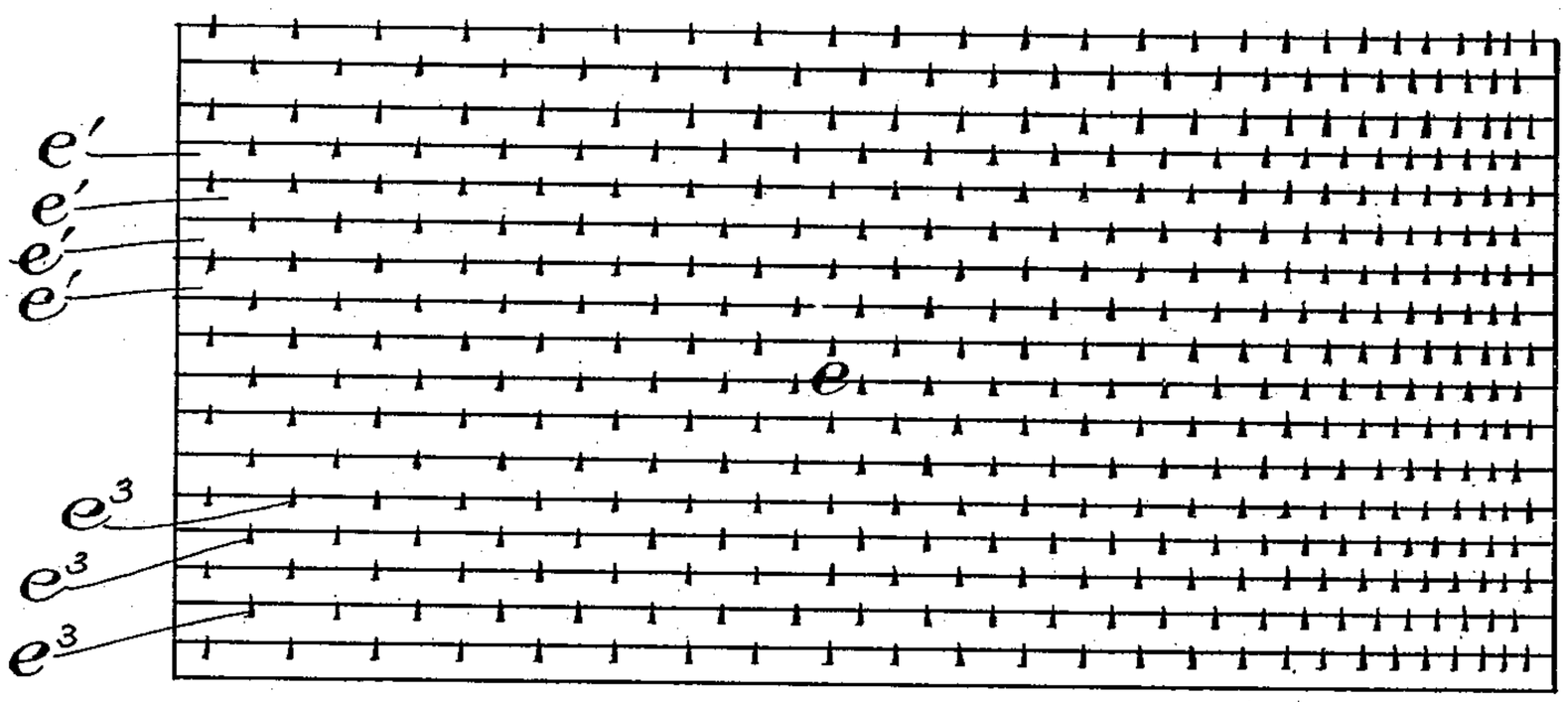


FIG. 11.

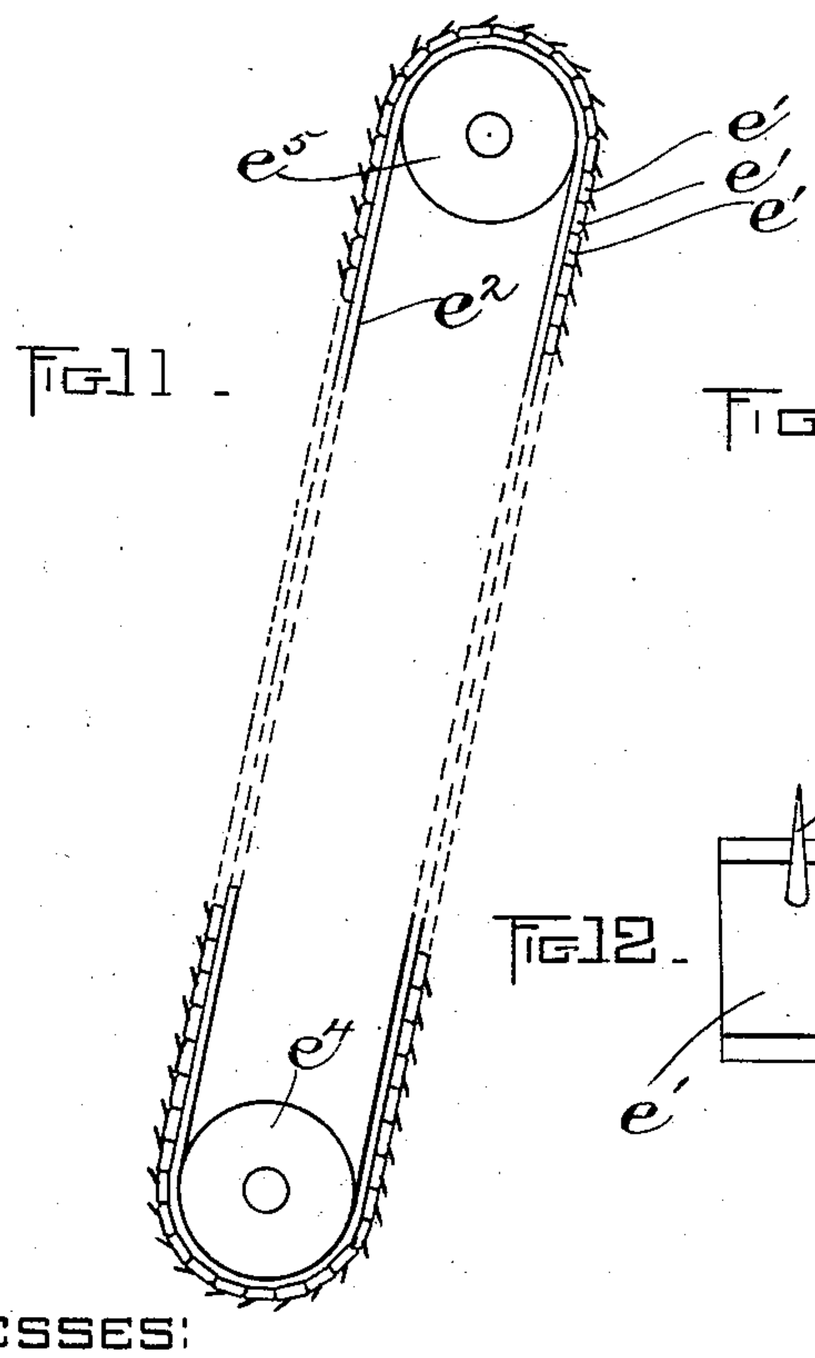


FIG. 13.

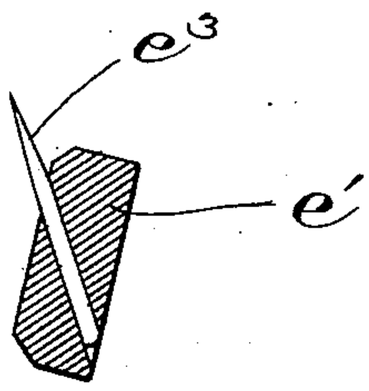
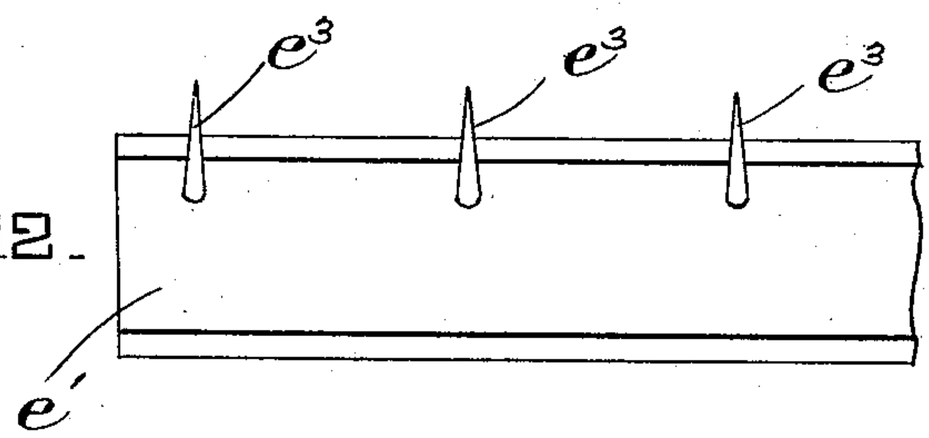


FIG. 12.



WITNESSES:
P. W. Pezzetti.
E. Batchelder

INVENTOR:
George Stone.
by Wright, Brown & Quinby
Attys.

UNITED STATES PATENT OFFICE.

GEORGE STONE, OF NORTH ANDOVER, MASSACHUSETTS, ASSIGNOR TO M. T. STEVENS & SONS, OF SAME PLACE.

WOOL-DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 608,385, dated August 2, 1898.

Application filed June 1, 1897. Serial No. 638,987. (No model.)

To all whom it may concern:

Be it known that I, GEORGE STONE, of North Andover, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Wool-Drying Apparatus, of which the following is a specification.

This invention relates to an improved apparatus for drying wool and other textile materials or fabrics, such as yarn, cotton, silk, cloth, &c.

The object is to provide a more compact, durable, efficient, and quickly-operable apparatus of this character than those in common use at present; and to these ends the invention consists in certain novel features of construction and relative arrangement of parts, which I shall now proceed to describe and claim, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 represents a top plan view, with parts broken away, of a wool-drying apparatus constructed in accordance with my invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents a section on the line 3 3 of Fig. 1. Fig. 4 represents a section on line 4 4 of Fig. 1. Fig. 5 represents a section on line 5 5 of Fig. 3. Fig. 6 represents a view similar to Fig. 2, looking from the other side. Fig. 7 represents a section on line 7 7 of Fig. 3. Fig. 8 represents a section on line 8 8 of Fig. 1. Fig. 9 represents a section on line 9 9 of Fig. 5. Fig. 10 represents a portion in front elevation of the spiked apron employed in the apparatus. Fig. 11 represents an end view of the same. Figs. 12 and 13 represent detail views of portions of the same on a larger scale.

The same reference characters indicate the same parts in all the figures.

In carrying out my invention I employ a casing in which is mounted a rotary perforated annular table upon which the material to be dried is placed. This table is continuously rotated and the material is fed from a receiver thereto and is carried around by the table through substantially a complete rotation of the latter, at the end of which the material is ejected from the table by means of a blast of air from a fan-blower. During this revolution the material is subjected to contact with currents of air, preferably of successively-increasing temperature, which carry off the moisture and, if desired, the disintegrated vegetable impurities which may be present.

Referring to the drawings, which illustrate an embodiment of my invention selected for the purpose of setting forth its essential features, the letter a designates a cylindrical casing, in the center of which is stepped a shaft b, adapted to be rotated by suitable gearing and carrying near its lower end a spider b', to the rim of which are secured radiating perforated plates, forming together a perforated table or carrier b^2. These plates are adapted to normally spring up at their outer ends, as indicated by the dotted lines in Fig. 9. An angle-flange a' is bolted to the inside of the casing under the edge of the table b^2, so as to support the same against an overload of material, the flange under such conditions constituting a track for the outer edge of the table. The tendency of the perforated plates to spring upward at their outer ends enables the table to rotate with less frictional resistance than would be involved if the outer ends of the plate normally rested on the flange or track a'. A cylindrical shell c forms an inner casing or wall for the closed space above the table b^2, and said space is roofed over by a cover a^2, extending to the edges of the outside casing.

When the material to be dried is loose wool or other material in a loose condition, it is first received on an endless traveling carrier d, Fig. 4, and is fed forward thereby against a traveling spiked apron e, by means of which it is carried upwardly and then dropped through an opening a^3, Fig. 4, onto the table b^2, assisted by suction of the fan k. The apron e is mounted on a lower roller e^4, near one end of the carrier d, and an upper roller e^5, the said rollers being power-driven and acting to drive the apron continuously in one direction. Said apron, as shown in Figs. 10 to 13, is composed of a number of cross-slats e' e', fixed to a canvas or other flexible backing e^2, and each provided with slanted spikes e^3. On the carrying-face of the apron these spikes slant upwardly, as shown, and by ref-

erence to Fig. 10 it will be seen that the spikes are more closely placed on the right-hand portion of the apron or that corresponding to the outer edge of the perforated table than on the left-hand portion or that corresponding to the inner edge of said table, the density of the spikes increasing uniformly across the face of the apron. This construction is adopted for the purpose of distributing the wool in an even layer on the table b^2, for since the outer portions of said table travel at a faster rate than the inner portions more wool must be deposited upon said outer portions to keep an even distribution, and by reason of the larger number of spikes on the outer portion of the apron e more wool will be picked up and deposited by this portion than by the inner portion.

The space below the table b^2 is provided with a conical floor or deflector f and is divided by vertical partitions g g' g^2 g^3, Fig. 7, into four compartments or sections h 1 2 3. The space above the table is divided by partitions g^1 and g^5, Fig. 4, into a large segmental compartment i, covering sections 1, 2, and 3, and a narrow discharge-passage h' over the section h. The passage h', which is located between the ends of the segmental compartment i, is open at its outer end through the casing a, as shown in Fig. 2, and is roofed over by a hinged flap or cover h^2, below which, at the back of the compartment, is the discharge end j^2, Fig. 4, of a pipe j', extending from a fan-blower j, Figs. 1 and 3.

The loose wool is deposited on the table b^2 at one side of the partition g^5 (see Fig. 4) and is carried around by the table in the direction of the arrow x, Fig. 5, to the partition g^1, at the lower edge of which is a hinged flap g^6. The wool passes by this flap into the discharge-passage h' and is blown therefrom by the blast of air from the pipe j' onto the floor of the room or into a suitable receptacle.

The table is revolved at a relatively slow rate, and during its revolution the wool thereon is subjected to the drying action of currents of heated air.

The three sections or compartments 1 2 3 are provided with openings a^3 a^4 a^5, Fig. 7, in the casing a, and outside of these openings are located power-driven fans k k' k^2, provided with belt-pulleys k^3 k^4 k^5 and inclosed in air boxes or conduits m m' m^2. The first fan k is rotated so as to create a downward draft through the table to give the wool a preliminary drying, the moisture-laden air being discharged through a suitable outlet m^3, provided below the conduit m. The conduits m' and m^2 are extended up and over the top of the casing, and each is provided with a coil or nest of steam or hot-water piping n n', the temperature of which may be regulated by valves n^2 n^3 in the supply-pipes. The said conduits communicate with the compartment i by means of openings i', Fig. 3, and i^2, Fig. 8, in the top of the casing, the openings being provided with metallic screens or gratings, as shown. In the tops of the conduits m' m^2 are openings m^1 m^5, similarly screened and provided with flaps or covers m^6 m^7.

The fans k' and k^2 are rotated so as to cause an upward draft of air through the table, which air is heated by contact with the steam-pipes to a greater or less degree, as desired, by regulating the valves n^2 n^3 and is drawn again into the conduits m' m^2 to be again forced through the table. The temperature of the air may be varied by opening or closing the covers m^6 m^7. When said covers are opened, cold air is admitted into the circulation from the outside, and when they are closed the air circulates through the table and the steam-pipes again and again without being cooled by outside air, so that the temperature of the air may thus be raised substantially to that of the pipes.

When it is desired to simply dry wool without carbonizing vegetable matter therein, the air is passed through the table over sections 2 and 3 at a relatively low temperature, the covers m^6 m^7 being preferably opened more or less, according to the prevailing conditions.

When it is desired to carbonize the burs and other vegetable matter in the wool, (the said matter having been previously disintegrated by acid,) the moisture is removed from the wool while it is passing through the section 2 by drawing air at a relatively low temperature through said section. At the same time air at a much higher temperature is drawn through the section 3, the cover of the air-inlet of the conduit m^2 being closed, so that the wool passing over the section 3 is subjected to a higher temperature. The speed of the table is reduced during this operation by a suitable variable-speed driving mechanism employed for that purpose. The wool is therefore subjected, after being dried, to the action of air-currents at a relatively high temperature, sufficient to complete the carbonizing process and render the foreign matter so brittle that it can be readily separated from the wool.

Suitable doors, covers, &c., are arranged in convenient locations in order to give access to the interior of the apparatus.

It will be understood that I do not confine myself to the particular details of construction described above. The steam-piping may be arranged at any convenient place or places, not necessarily in proximity to the apparatus, although the arrangement shown is desirable, because heat is economized thereby. It is further optional to vary the number of heating and drying compartments.

When the apparatus is used for drying woven fabrics that would be injured by the spiked apron, some other feeding device should be employed, or the material may be placed upon the table by hand. It may also be removed by hand or by some suitable mechanism in case it is too heavy to be blown out by the air-blast.

It will be seen that the casing a is subdi-

vided below the perforated table into a plurality of lower air chambers or sections and has a single upper air-chamber above the table, the plurality of lower air-chambers and the accompanying air boxes and fans enabling different degrees of heat to be applied to the material at different points, as above described. It is obvious, however, that my invention may be embodied in a structure having but one lower air-chamber in case it is not desirable to make the air-currents hotter at one point than at another. It is also obvious that the single chamber may be below the table and the plurality of chambers above it, the direction of movement of the heated air through the table being reversed.

The wool or other material to be dried may be supplied to the table at any suitable point and not necessarily through the opening a^3. The casing may be provided with an opening at any other desired location for this purpose, and such opening may be covered by a suitable door.

I claim—

1. The combination with a body or frame and a chamber therein of general circular form, of a circular endless conveyer constantly traveling in the chamber, fans for circulating and forcing air downwardly through the conveyer, and means for heating the air during each complete circuit.

2. An apparatus of the character specified, comprising a horizontal rotary foraminous annular table, means for rotating it, a casing having two air-chambers, one located above and the other below the table, the upper chamber being segmental and having ends extending across the table at one side of its axis, and forming a discharge passage or outlet above and extending across the table, means for forcing air from one chamber to another through the table, and means for feeding the material to be dried into one end of the segmental chamber, the other end of said chamber having provision for permitting the exit of the dried material from the chamber into the discharge-passage.

3. An apparatus of the character specified, comprising a horizontal rotary foraminous annular table, means for rotating it, a casing having two air-chambers, one located above and the other below the table, the upper chamber being segmental and having ends extending across the table at one side of its axis, and forming a discharge passage or outlet above and extending across the table, means for forcing air from one chamber to another through the table, means for feeding the material to be dried into one end of the segmental chamber, the other end of said chamber having provision for permitting the exit of the dried material from the chamber into the discharge-passage, and means for forcing the dried material across the table through said passage.

4. An apparatus of the character specified, comprising an annular rotary foraminous table, means for rotating it, an annular casing having two air-chambers, one located above and the other below said table, means for forcing air from one chamber to another through said table, an air box or conduit communicating with both chambers and extending across one edge of the table, means for forcing air through said conduit, the chambers, and the table, an air-heater located in said conduit, the conduit having an air-inlet adjacent to said heater, and a movable valve or cover adapted to open or close said inlet and thereby regulate the temperature of the circulated air.

5. An apparatus of the character specified, comprising a horizontal rotary foraminous table, means for rotating it, a casing having a plurality of air-chambers at one side of the table, and a single air-chamber at the opposite side of the table, a plurality of conduits connecting the chambers at one side of the table independently with the single chamber, air-heaters in said conduits, air-forcing devices to maintain currents of heated air through said conduits, chambers, and table and means for independently regulating the temperature of the said currents.

6. An apparatus of the character specified, comprising a horizontal rotary foraminous table, means for rotating it, a casing inclosing said table and having an inclosed upper air-chamber above the table and a discharge passage or outlet between the ends of said upper chamber, means for maintaining a circulation of air through said chamber and table, and a blower arranged to discharge a blast of air through said discharge-passage.

7. An apparatus of the character specified, comprising a horizontal rotary foraminous table, means for rotating it, a casing inclosing said table and having an inclosed upper air-chamber above the table and a discharge passage or outlet between the ends of said upper chamber, means for maintaining a circulation of air through said chamber and table, and a feeding device arranged to deposit material to be dried on the table at one end of said chamber.

8. An apparatus of the character specified, comprising a circular casing having a circular track or flange on its inner surface, a vertical shaft within said casing, a spider affixed to said shaft, a series of perforated plates affixed at their inner ends to said spider and radiating therefrom to form an annular perforated table the outer edge of which is above said track, and means for forcing air through the table, said plates being elastic and adapted to normally spring upwardly from said track at their outer ends.

9. An apparatus of the character specified, comprising a casing, a horizontal foraminous table in said casing, means for rotating the table, means for forcing air through the ta-

ble, and a feeding device having provisions for depositing the material to be dried in greater quantity upon the outer than upon the inner portion of the table.

10. An apparatus of the character specified, comprising a casing, a rotary perforated table therein, means for depositing the material upon said table to be dried, and a blower for ejecting the material after it has been dried.

11. An apparatus of the character specified, comprising a rotary perforated table, and a traveling spiked apron for delivering the material to said table, the apron being arranged transversely of the table and having spikes on its carrying-face for taking up the material, the said spikes being arranged in increasing density toward the outer edge of the table, so as to take up and deliver more material at the outer portions of said table than at the inner portions thereof.

12. An apparatus of the character specified, comprising a casing, a horizontal rotary perforated table or carrier, means for depositing the material upon said table, means for causing a heated current or currents of air to pass through the table and the material thereon, and means for ejecting the material from the table and the casing.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of May, A. D. 1897.

GEORGE STONE.

Witnesses:
THOMAS P. SAWYER,
WALTER L. BURNHAM.