No. 775,717. PATENTED NOV. 22, 1904.

T. ANDREWS & S. J. LOEWENTHAL.

DRIER.

APPLICATION FILED APR. 23, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

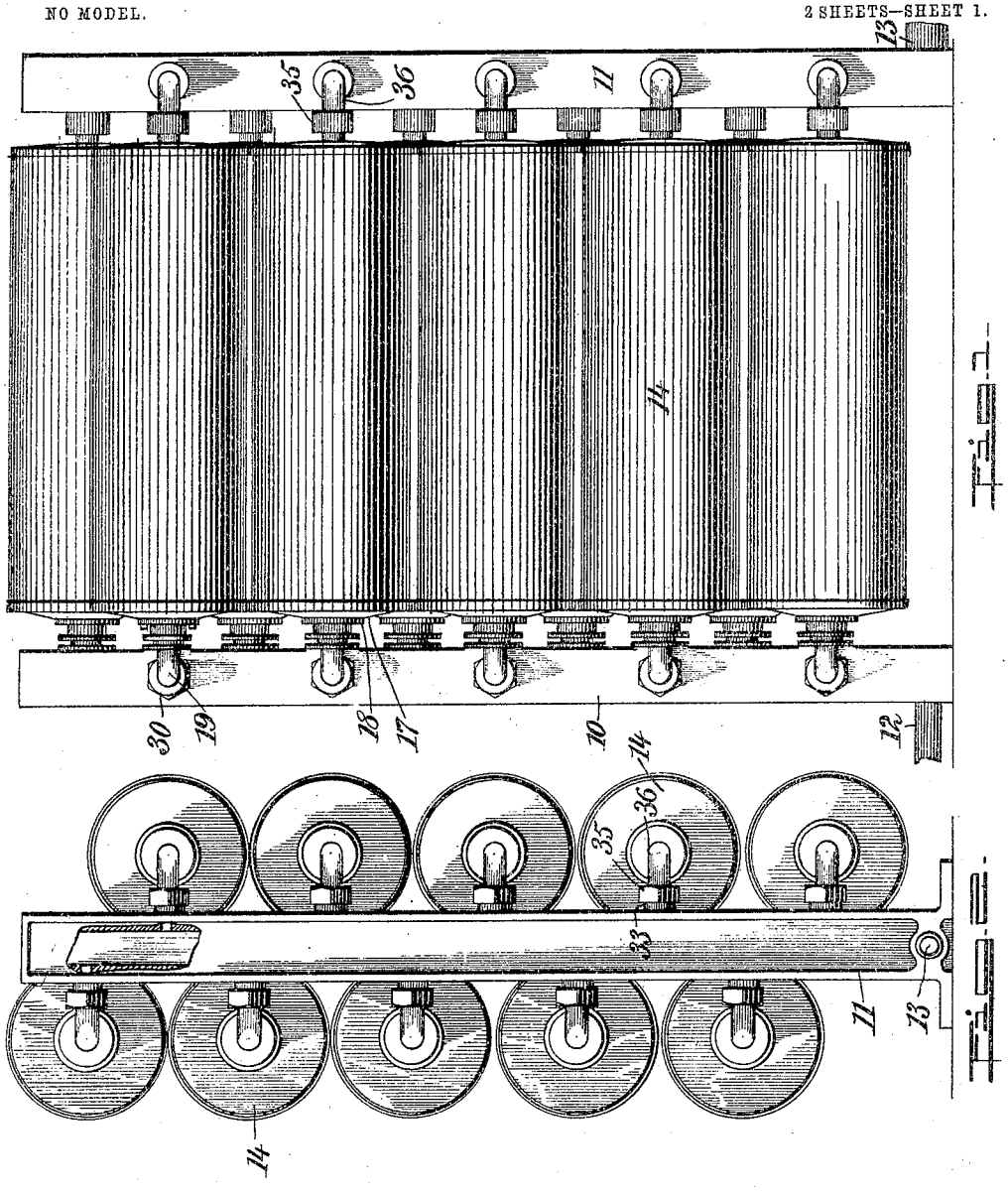


Fig. 1.

Fig. 2.

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NO MODEL. 2 SHEETS—SHEET 2.

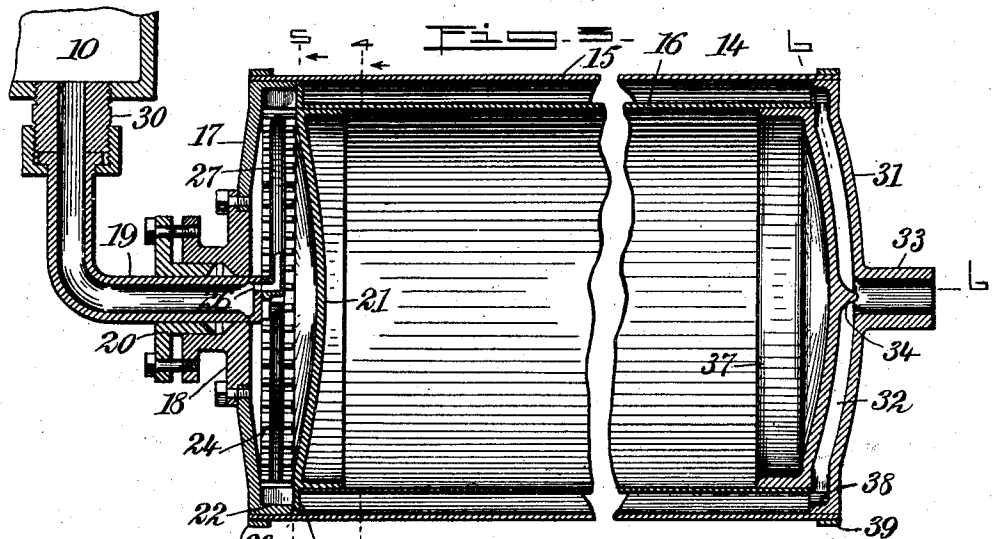


Fig. 4.

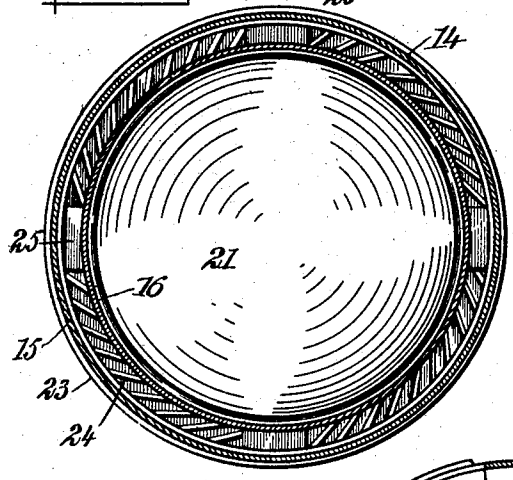


Fig. 5.

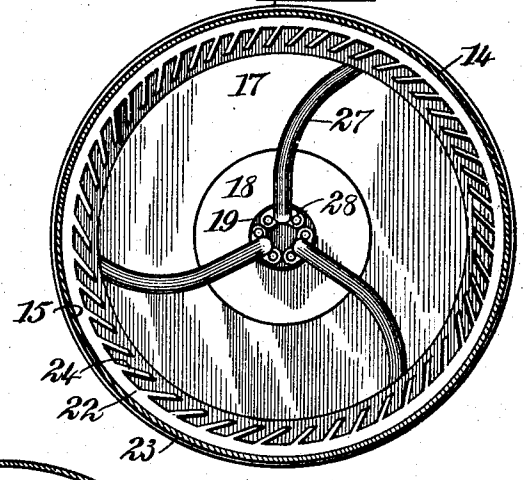


Fig. 6.

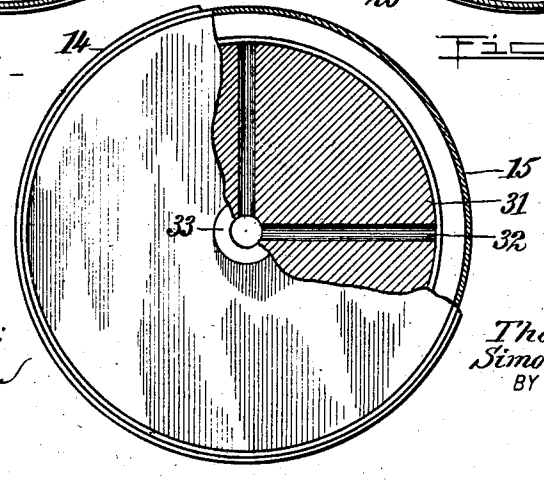
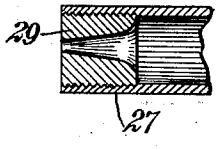


Fig. 7.



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No. 775,717. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

THOMAS ANDREWS AND SIMON J. LOEWENTHAL, OF ROCKAWAY, NEW JERSEY.

DRIER.

SPECIFICATION forming part of Letters Patent No. 775,717, dated November 22, 1904.

Application filed April 23, 1904. Serial No. 204,555. (No model.)

To all whom it may concern:

Be it known that we, THOMAS ANDREWS and SIMON J. LOEWENTHAL, both citizens of the United States, and residents of Rockaway, in the county of Morris and State of New Jersey, have invented a new and Improved Drier, of which the following is a full, clear, and exact description.

This invention relates to improvements in driers particularly designed for drying fabrics and of that class having a series of rotary cylinders through which the heating medium, such as steam, is designed to pass. In certain machines of this character the several cylinders are rotated through gear connections one with another, and therefore, owing to the friction, a very great power and consequent large amount of motive agent is required to operate the machine. Further, in the class of machines above referred to the several cylinders must be filled with steam, which results in waste by employing more steam than is necessary for drying purposes.

The object of our invention is to obviate the above-mentioned objections by providing a drier in which each cylinder is rotated independently with a comparatively small amount of motive agent and using the motive agent as a heating medium, thus resulting in an economical use of steam.

Other objects of the invention will appear in the general description.

We will describe a drier embodying our invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a drying-machine embodying our invention. Fig. 2 is an end elevation thereof. Fig. 3 is a longitudinal section of one of the drying-cylinders employed. Fig. 4 is a section on the line 4 4 of Fig. 3. Fig. 5 is a section on the line 5 5 of Fig. 3. Fig. 6 is an end view, partly in section, on the line 6 6 of Fig. 3; and Fig. 7 is a sectional detail showing one of the ejectors employed.

Referring to the drawings, 10 11 designate two standards which are hollow, the one serving as a steam-supply, while the other—that is, the standard 11—receives the exhaust from the several cylinders, to be hereinafter described. The steam enters the standard 10 at the bottom, as here shown, through a pipe 12, and the exhaust from the standard 11 is through a pipe 13. Supported by the standards at the front and rear are drying-cylinders 14. The cylinders at one side alternate with the cylinders at the opposite side, or, in other words, the cylinders at one side have staggered relation to the other series. Each cylinder comprises an outer shell 15 and an inner shell 16, the two shells being spaced apart to form a steam-passage which extends entirely around the cylinder. At one end the cylinder is provided with a header consisting of a ring 17, to which is removably attached a ring 18, which has bearings on a feed-pipe 19, the ring 18 being provided with a suitable stuffing-box 20. Attached to the inner shell 16 is an inner header 21, which is here shown as concaved at the side adjacent to the inlet of steam, and thus a considerable steam-space is afforded between the outer and inner headers.

The ring 17 has an inwardly-extended flange 22, and the outer shell 15 is secured thereto by any suitable means. As here shown, it is secured by means of a ring 23, which is shrunk in place, and on the interior of this flange 22 are blades 24, which are arranged at a tangent and form the walls of turbine-buckets. The inner head, it will be noted, has at intervals lugs 25, which extend outward and engage with the inner edge of the flange 22. The space between the lugs of course will permit the steam to pass between the inner and outer shells.

The end of the pipe 19 within the cylinder is provided with a series of ports 26, and from each port discharge-pipes 27 lead to the turbine-buckets, these pipes of course being stationary. As here shown, the pipes are connected to the inner end of the pipe 19 by means of bolts or screws passing through lugs 28. The discharge-pipes 27 are curved, and secured in the end of each discharge-pipe, as

shown in Fig. 7, by means of a screw-thread is a discharge-nozzle 29. The inlet-pipe 19 communicates with the standard 10 and, as here shown, is connected thereto by means of a coupling 30. We have shown three discharge-pipes 27; but it is obvious that the number may be changed without departing from the spirit of our invention. The opposite ends of the inner and outer shells are connected to an outwardly-convexed header 31, which is provided with a plurality of ports 32, providing communication from the space between the inner and outer shells to the central tubular hub 33 on the header. The ends of the ports 32 adjacent to the hub 33 have their walls curved outward, as indicated at 34, so as to quickly deflect exhaust into the hub. The hub has a bearing in a coupling 35, attached to a pipe 36, leading into the exhaust-standard 11. The inner side of the header 31 is provided with an annular flange 37, to which the inner shell 16 is connected, and the outer shell 15 is connected to a flange 38 on the header and secured by means of a band 39, shrunk thereon.

In the operation the material to be dried is to be passed over the cylinders in a zigzag fashion, and the steam admitted to the several cylinders will act on the turbines thereof and impart rotary motion, and then the steam will pass between the inner and outer shells to the exhaust, and therefore it will be seen that a comparatively small amount of steam will be required to perform the desired service.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A drier comprising a plurality of rotary cylinders each having double walls spaced to form a steam-chamber, and means for supplying a motive agent to each cylinder to rotate the same, each independently of the other, the said motive agent serving as a heating medium while passing through the steam-chamber.

2. A drier comprising a plurality of cylinders mounted to rotate, each independently of the other, a turbine arranged in one end of each cylinder, and a plurality of fixed pipes in the turbine end of each cylinder to supply the motive agent to the turbine, the said motive agent serving as a heating medium.

3. A drier comprising hollow standards, one serving as an inlet for steam and the other serving for exhaust, a plurality of rotary cylinders having independent connections with said standards, and turbine-buckets in one end of each cylinder for receiving a motive agent which passes from said buckets through the cylinder to the exhaust.

4. A drier-cylinder comprising inner and outer shells spaced apart to form a circumferential steam-chamber, a header at one end of the cylinder, a steam-supply pipe extended through the said header and upon which the header rotates, discharge-pipes leading from the inner end of said supply-pipe, turbine-buckets arranged in the cylinder and receiving steam from said discharge-pipes, and a header at the opposite end of the cylinder provided with means for the exhaust of steam.

5. A drier-cylinder comprising inner and outer shells spaced apart to form an annular passage for steam, a header on one end of the cylinder comprising an outer ring, an inner ring secured to the outer ring, a steam-supply pipe on which the inner ring is rotatably mounted, a header for the inner shell arranged inward of the outer header, the said inner header being concaved, a series of buckets arranged in the cylinder between said headers, discharge-pipes leading radially from the steam-supply pipe and having nozzles for directing steam to said buckets, and a header at the opposite end of the cylinder provided with a tubular hub and exhaust-ports, the said exhaust-ports leading from the space between the shells to the tubular hub.

6. A drier-cylinder comprising inner and outer shells spaced apart, a header at one end to which the outer shell is connected, a header inward of the first-named header and to which the inner shell is connected, an annular row of buckets arranged between the headers, a steam-supply pipe on which the outer header is mounted to rotate, discharge-pipes leading from said supply-pipes to the buckets, and an outwardly-convexed header at the opposite end to which the two shells are connected, the said header having a tubular hub, and a series of ports leading from said hub to the space between the shells.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS ANDREWS.
SIMON J. LOEWENTHAL.

Witnesses:
JAMES H. SANDERS,
WM. F. MOLLER.