

No. 685,154.

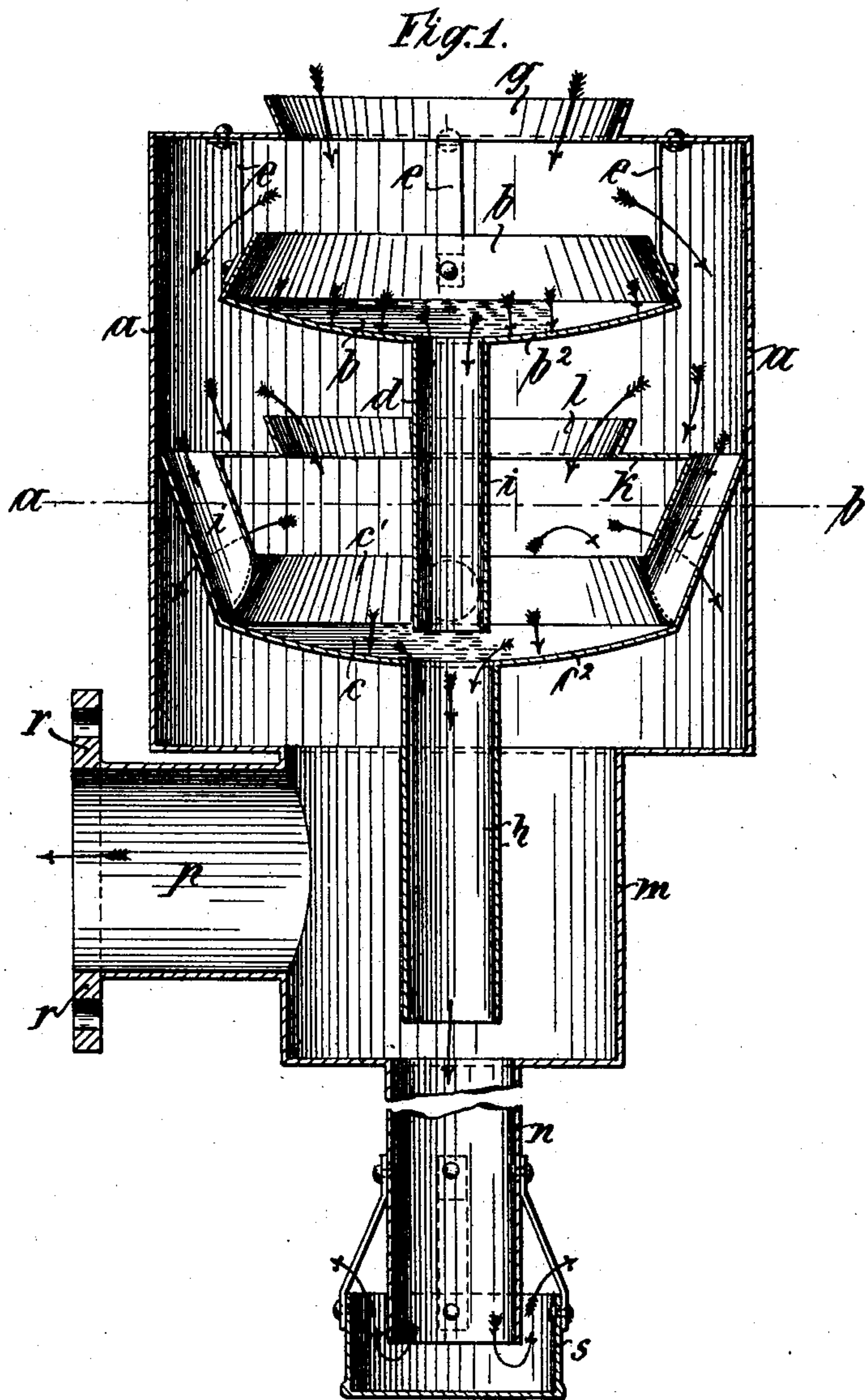
Patented Oct. 22, 1901.

W. LEWY.  
STEAM DRIER.

(Application filed Dec. 24, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses  
G. Russell  
H. Clancy

Inventor  
Wilhelm Lewy  
by  
Benjamin Price  
Attorney

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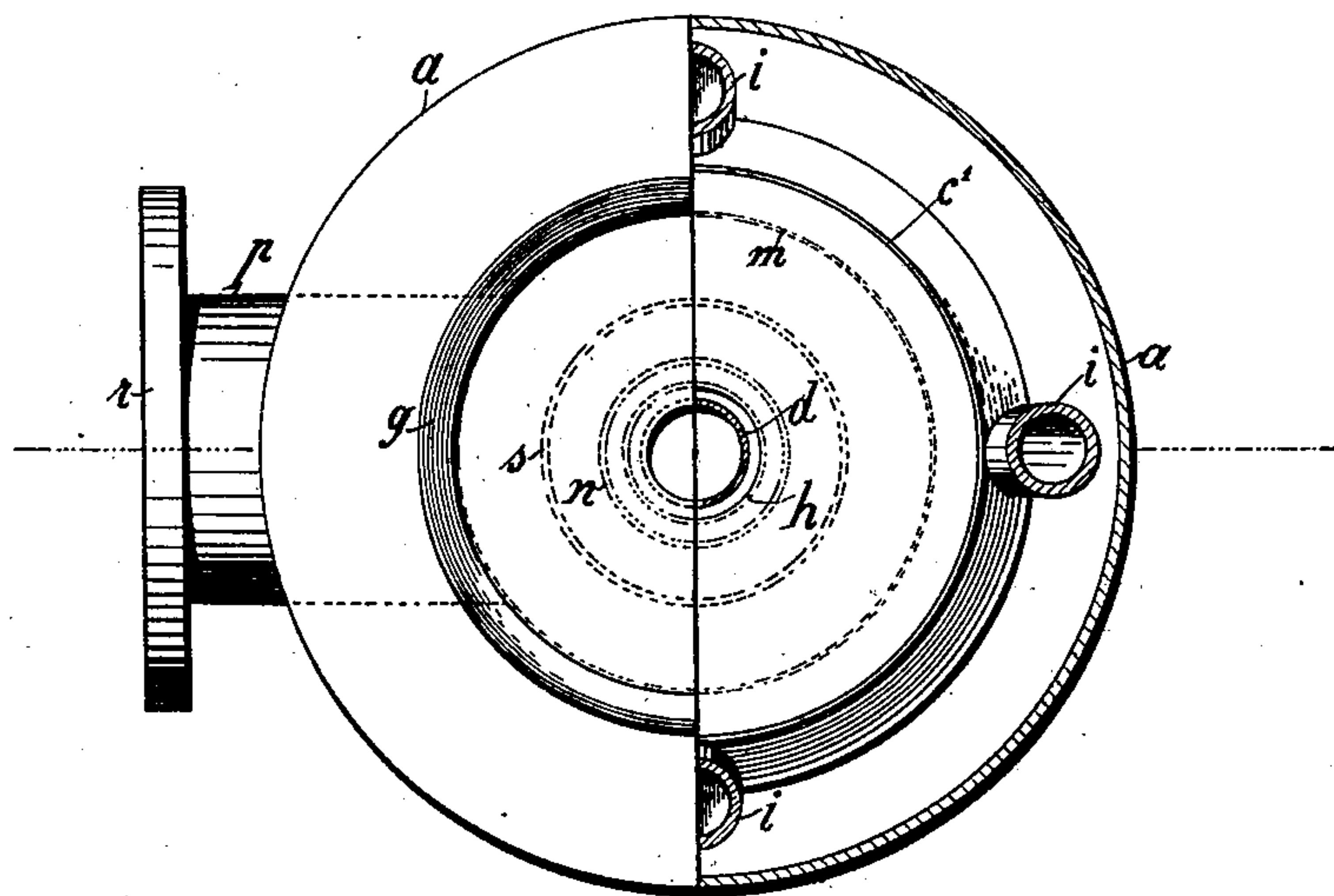
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Fig. 2.



Witnesses

G. Russo  
N. Cherry

Inventor:

Wilhelm Lewy  
by

Benjamin Price  
Attorney

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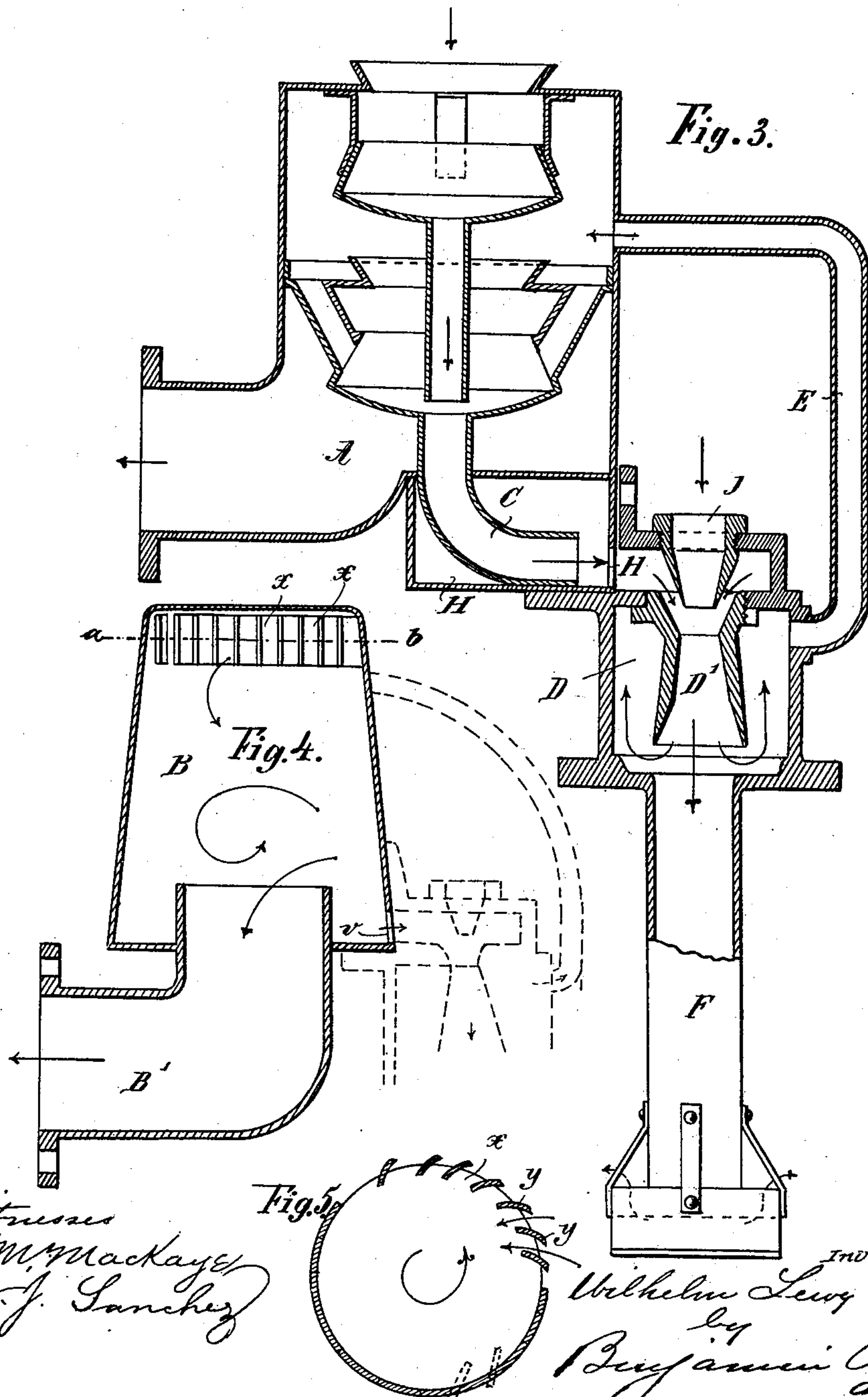
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3 Sheets—Sheet 3.



Witnesses  
D. W. Mackay  
M. J. Sanchez

Inventor.  
Wilhelm Lewy  
by  
Benjamin Price  
att'y



# UNITED STATES PATENT OFFICE.

WILHELM LEWY, OF WARSAW, RUSSIA.

## STEAM-DRIER.

SPECIFICATION forming part of Letters Patent No. 685,154, dated October 22, 1901.

Application filed December 24, 1897. Serial No. 663,439. (No model.)

*To all whom it may concern:*

Be it known that I, WILHELM LEWY, manufacturer, of Warsaw, Poland, Russia, have invented a Steam-Drier, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of the following invention is an apparatus for extracting the portion or particle of water from the boiler caused by the development of the steam and is effected by means of the arrangement of a case or receptacle suitable for the interior of the boiler, in which one or more plate-shaped disks are arranged containing a center waste-pipe. The steam entering into the case or receptacle is compelled to strike against the disks, whereby the particles of water contained in the steam are extracted as the same in striking are forcibly whirled up. By means of the centrally-arranged waste-pipe the extracted water flows back to the water in the boiler, while the dry steam is conducted to its required position by means of a suitable conductor.

In the accompanying drawings, Figure 1 shows the steam-extracting apparatus in sectional elevation, while Fig. 2 shows it in plan, part in section, in the line *a b* of Fig. 1. Figs. 3, 4, and 5 are modifications of the apparatus in section intended for use upon moving vehicles or when the device is subject to vibration.

In the cylindrically-formed case or receptacle, according to Fig. 1, the two plate-shaped disks *a* and *c* are accommodated. The disk *b* consists of a conical part *b'*, to which the arched bow *b<sup>2</sup>* applies. To the bow *b<sup>2</sup>* is fastened the central waste-pipe *d*, which extends downward in the disk *c*. The disk *b* is, by means of the lever-piece *e*, suspended in the case or receptacle. The steam-entrance into the case or receptacle is effected through the funnel-shaped opening *g* in the covering *r*. Below the disk *b* is shown the disk *c*, this consisting of the portion *c'*, corresponding to portion *b'*, and bow *c<sup>2</sup>*, corresponding to bow *b<sup>2</sup>*, and, furthermore, of a center waste-pipe *h*. By means of the four waste-pipes *i*, which extend downward from the partitions *k* of the case or receptacle, the disk *c* is held in its position. In the partition *k* is shown another funnel-shaped opening *l* besides the

opening *g*. On the ground or base of the case or receptacle *a* rests the cylinder portion *m*, in which the pipe or tube *h* extends to the ground. On the latter (inclosed) is fastened the waste-pipe *n*, the length of which is so determined that a certain portion extends into the water in the boiler. To the portion *m*, furthermore, is attached the steam-conducting pipes or tubes *p*, (represented with a flange *r*.) The water-conducting pipe or tube *n*, furthermore, carries a cap *s* at its lower end, which by the eventual sinking of the water-level guards against all escape, so that the steam can enter into the pipe or tube.

The mode of operation of the whole apparatus is as follows: Through the inlet or opening *g* the steam enters the apparatus and strikes against the plate-formed arched bows *b<sup>2</sup>* of the disk *b*, is here whirled upward, and drawn in the direction indicated by the arrow over the conical portion *b'* away downward. The particles of water hereupon become separated and flow off through the central pipe downward. The steam itself is forced downward, partly through the tube *i* and partly through funnel-shaped opening *l*, and comes into contact with the bows *c<sup>2</sup>* of the disks *c*, is here whirled upward, and travels in the direction of the arrows over the conical portion *c'* downward, while the extracted water flows downward through the tube *h*. The water from the tube *d* as the same passes a narrow transverse cutting flows over into the tube *h* in order to enter into the water in the boiler through the pipe *n*. The steam which is now comparatively free from the molecules of water draws off through the tube *p*.

Correspondingly the whole apparatus is so suspended in the boiler that the space between the steam-extracting pipe and the underneath water-play is five hundred millimeters. The apparatus itself can receive a befittingly-depressed form and can be applied to any desired boiler without fearing that an abatement of pressure can cause an entering of water from below through the tube *a*. The latter can therefore not enter. Because the pipes *d*, *h*, and *n* communicate with one another the pressure on the water in the tubes *n g* is exactly the same as the exterior. The water in the tube *n* entering into the case or recepta-



cle if the pressure is momentarily abated is not in the position to reach high up in the tube *n*.

A modification of this apparatus is shown in Figs. 3, 4, and 5, which is especially characterized by the fact that by the combination of this apparatus with a steam-injector when the boiler is subject to vibrations—as, for instance, with locomotive-boilers—an ascension of the water in the tube *F*, which projects into the boiler, is avoided and the penetration into the drying apparatus proper cannot take place. The drying apparatus *A* corresponds, essentially, to that in the first-described form. The tube *c*, corresponding to the tube *h* in the former construction, projects into a chamber *H*, arranged in the apparatus. The steam-injector apparatus adjoins this chamber *H*. The steam enters the injector through the cone *J* and leaves it in the direction of the arrow through the tube *E*, which in the present form opens out between the upper and lower disks. In the steam-drier apparatus the steam enters in the usual well-known manner from above, so that the water collects on the plate-shaped disks, and in the present case flows through the tube *c* into the box *H*. As the steam entering through the cone *J* produces a rarefaction of the air in the space between this cone *J* and the lower cone *D'* the water which collects in the box *H* will flow downward and reënter the boiler through the tube *F*. The steam passing through the cone *D'* will exert a certain pressure upon the tube *F* and prevent the water from rising in the boiler into the box *H*.

In Figs. 4 and 5 a further modification is shown which differs essentially from known arrangements by the fact that the steam-drying apparatus proper is not provided with plate-shaped disks, but consists only of a conical chamber *B'*, to which the injector apparatus is suitably connected, as shown in dotted lines in Fig. 4. The steam enters the chamber *B* through openings *x* at the upper end. The openings are formed by tangential wings *y*, as shown in Fig. 5, which represents a section on line *a b*. The steam entering through the openings *x* passes spirally down-

ward in the chamber *B* into the tube *B'*. In consequence of the centrifugal force arising the particles of water are thrown outwardly and settle down in the bottom of the chamber, from whence they pass into the injector through the openings *v*.

Instead of a common injector the known “Körting” injector can be used, which, in combination with the before-described apparatus, will produce the same effect.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for drying steam a case or receptacle provided with one or more plate-shaped disks *b, c*, in combination with an outlet-pipe for the water, and an ejector arranged between said outlet-pipe and the drying apparatus, whereby a rapid exhaust of the water from the injector is obtained and the water prevented from rising in the outlet-pipe.

2. In an apparatus for drying steam a case or receptacle provided with one or more plate-shaped disks *b, c*, and suitable waste-pipes, in combination with the tangential blades *y*, arranged above the openings in the cover of the device, whereby the steam is forced downward in spirals, thereby giving centrifugal motion to the steam to thereby separate more effectually the water from the steam.

3. In an apparatus for drying steam a case or receptacle, provided with a plate-shaped disk and a waste-pipe, in combination with an injector located between the waste-pipe and the drying apparatus.

4. In an apparatus for drying steam, a case or receptacle provided with one or more plate-shaped disks *b, c*, and suitable waste-pipes, in combination with the tangential blades *y* arranged about the openings on the cover of the device, whereby the steam is forced downward in spirals, thereby giving centrifugal motion to said steam to thereby separate more effectually the water from the steam.

In witness whereof I hereunto set my hand in presence of two witnesses.

WILHELM LEWY. [L. S.]

Witnesses:

DAVID FRANCKL,  
A. METZLICH.