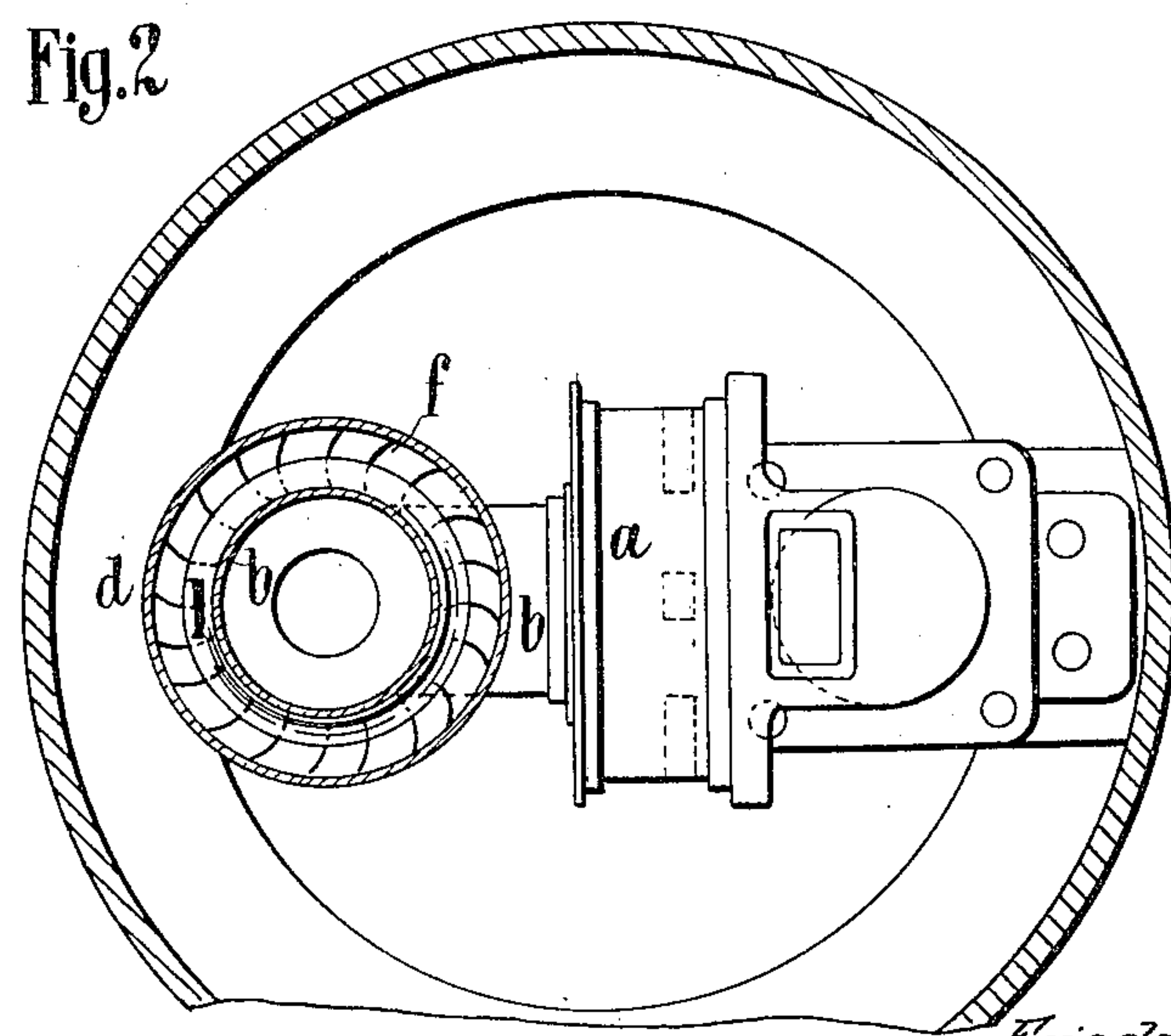
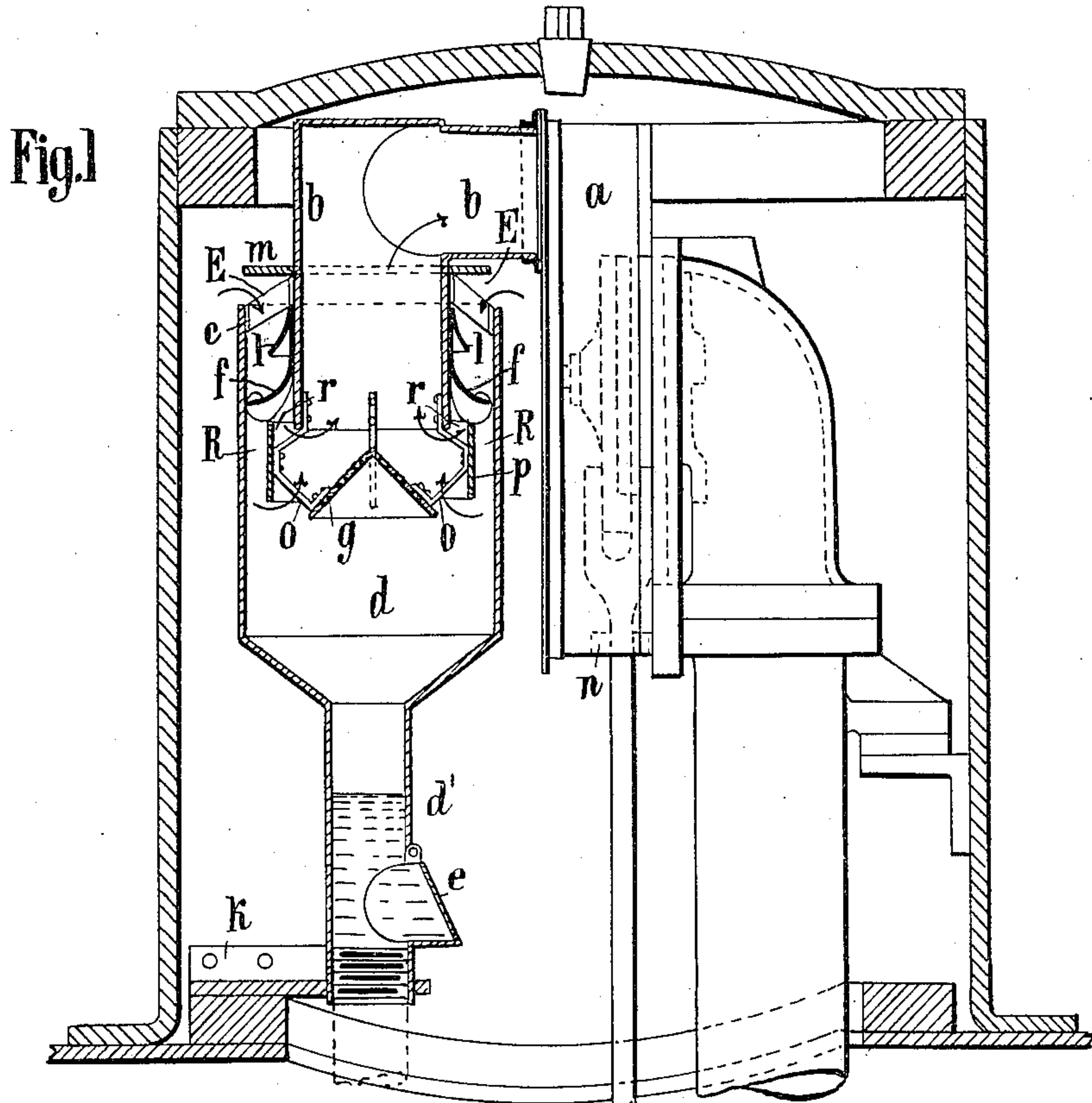


F. W. BORN.  
 STEAM AND WATER SEPARATOR.  
 APPLICATION FILED MAY 4, 1910.

999,481.

Patented Aug. 1, 1911.



Witnesses  
 C. Schallmiger  
 A. Wenzel

Inventor  
 Friedrich W. Born  
 by J. Singer  
 Att'y



# UNITED STATES PATENT OFFICE.

FRIEDRICH WILHELM BORN, OF CHARLOTTENBURG, GERMANY.

## STEAM AND WATER SEPARATOR.

999,481.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed May 4, 1910. Serial No. 559,298.

*To all whom it may concern:*

Be it known that I, FRIEDRICH WILHELM BORN, a subject of the King of Prussia, residing at 143 Kantstrasse, Charlottenburg, Germany, have invented certain new and useful Improvements in Steam and Water Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention.

My invention relates to a device which is to be arranged within the steam chamber of a steam boiler, by means of which the steam is separated from the water in suspension therein before it passes away to be used. In the case of locomotives for instance, the separator is provided in the dome.

The invention consists in arranging within an annular chamber through which the steam has to pass, a ring of blades, which as the steam passes through divide the latter into numerous small streams, the blades being curved so as to impart to the steam a screw-like motion of small pitch. The outer edges of the blades being situated at a suitable distance from the inner wall of the annular chamber.

In the accompanying drawings which illustrate by way of example one form of this invention Figure 1 is a vertical longitudinal section; Fig. 2 is a plan view partly in section.

In carrying my invention into effect, the usual regulator head is surrounded steam tight by a casing *a* into which opens at one side, a steam supply pipe *b*. To the depending end of the pipe *b* is secured by means of angle irons *E*, a pipe *d* of larger diameter and one end of the larger pipe is reduced in size and connected to a water drain pipe *d'*. The latter when arranged above the water level in the boiler has a discharge flap *e* and is closed at its lower end as shown. The lower end may however be left open in which case it dips into the water in the boiler or may in some other manner be adapted to permit the separated water to return to the boiler.

The steam on its way to the regulator is compelled to flow through an annular space between the pipes *b* and *d* whereby it is subjected to centrifugal action owing to the sharp changes of direction caused by a ring of blades *f* splitting it up into many small streams.

At a suitable distance below the pipe *b*

is provided a cone *g* fastened to the pipe by means of brackets *o* which are bent outward to also support a ring *p* the diameter of which is approximately intermediate of those of the pipes *b* and *d*. The ring *p* forms a partition separating two annular spaces *R* and *r*. The inner space *r* serves to lead the separated steam direct to the regulator head, while the steam in the outer space *R* must first pass around the ring and between the brackets *o* before it unites with the steam in the inner space *r*. The separated water flows down into the drain *d'*. The cone *g* may be perforated so as to allow the passage of steam, thrown through the perforations of the cone from below it, while water separating from the steam flows down the cone.

It is essential that the steam should not be permitted to flow vertically from the top between the pipes *b* and *d* but enter between them from a horizontal direction, and for this purpose a guard plate *m* is provided over the entrance *E*. Moreover it is necessary to insure that the wet steam shall advantageously impinge on the outermost blade surfaces bounding against the inner wall of the pipe *d*. For this purpose an exchangeable deflecting ring *l* is fastened to the pipe *b* above the blades *f*. The apparatus is stayed by means of the supporting bracket *k*, and may be inserted completely finished in the dome and connected with the casing *a*. A hole is provided on the lower side of the casing to allow of the passage of the regulator rod, the latter being provided with a sliding member *n*, to prevent the passage of steam.

I claim:

1. A steam and water separator comprising two pipes concentric one in the other to form an annular space, curved blades arranged circumferentially in said space, the transverse section of the blades being curved downwardly in the direction of the outer pipe, a cylindrical ring arranged between said pipes near the lower rim of the inner one and below the blades to divide the steam in two different streams before entering the outlet pipe, and a cone provided below the inner pipe, substantially as and for the purpose set forth.

2. A steam and water separator comprising two pipes concentric one in the other to form an annular space, curved blades ar-

ranged circumferentially in said space, the  
transverse section of the blades being curved  
downwardly in the direction of the outer  
pipe, a cylindrical ring arranged between  
5 said pipes near the lower rim of the inner  
one and below the blades to divide the steam  
in two different streams before entering the  
outlet pipe, a cone provided between the  
inner pipe, and a deflecting ring above the  
10 blades to lead the wet steam on the outer-

most surface of the blades, substantially as  
and for the purpose set forth.

In testimony that I claim the foregoing  
as my invention I have signed my name in  
presence of two subscribing witnesses.

FRIEDRICH WILHELM BORN.

Witnesses:

HENRY HASPER,

WOLDEMAR HAUPT.

---

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

---