(No Model.)

3 Sheets—Sheet 1.

A. MUNZINGER.

DRIER.

No. 309,485. Patented Dec. 16, 1884.

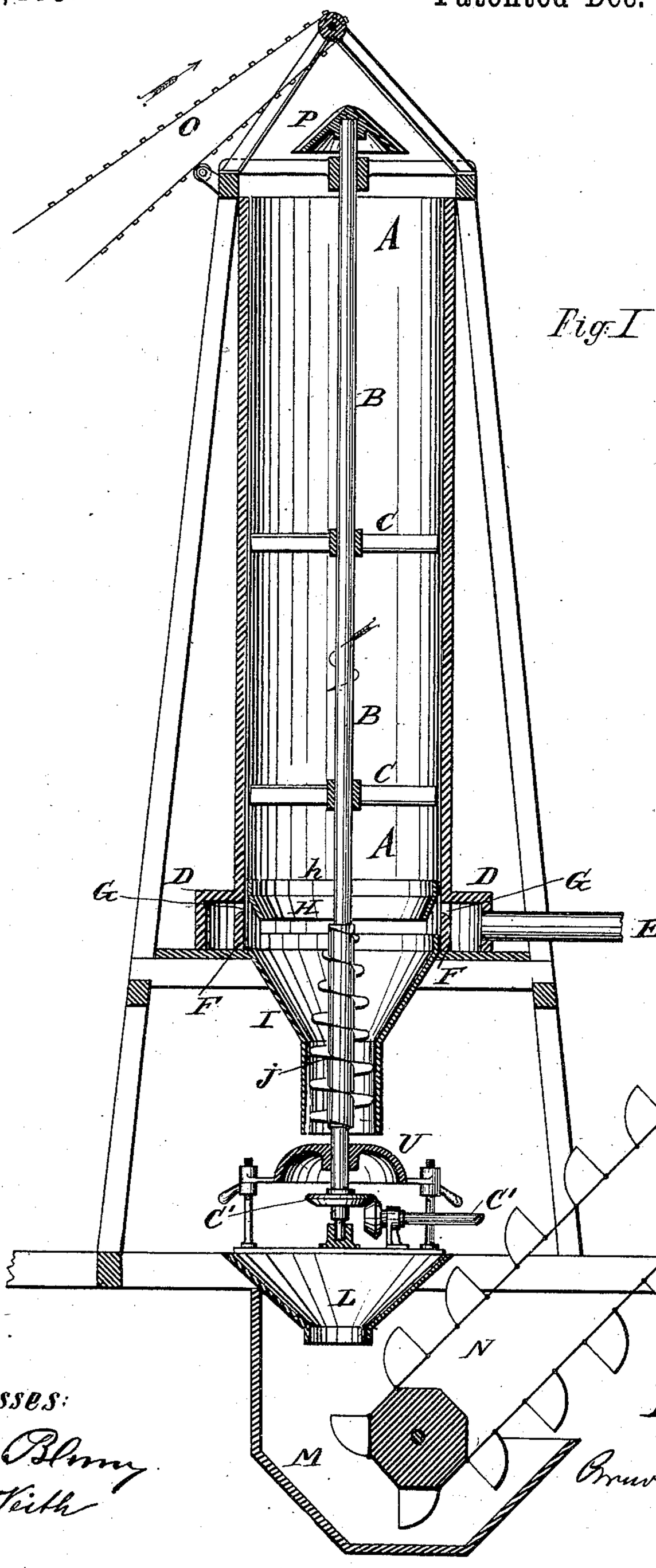

Fig. I

Witnesses:
Emil Blum
Moritz Veith

Inventor:
Arnold Münzinger

(No Model.) 3 Sheets—Sheet 2.

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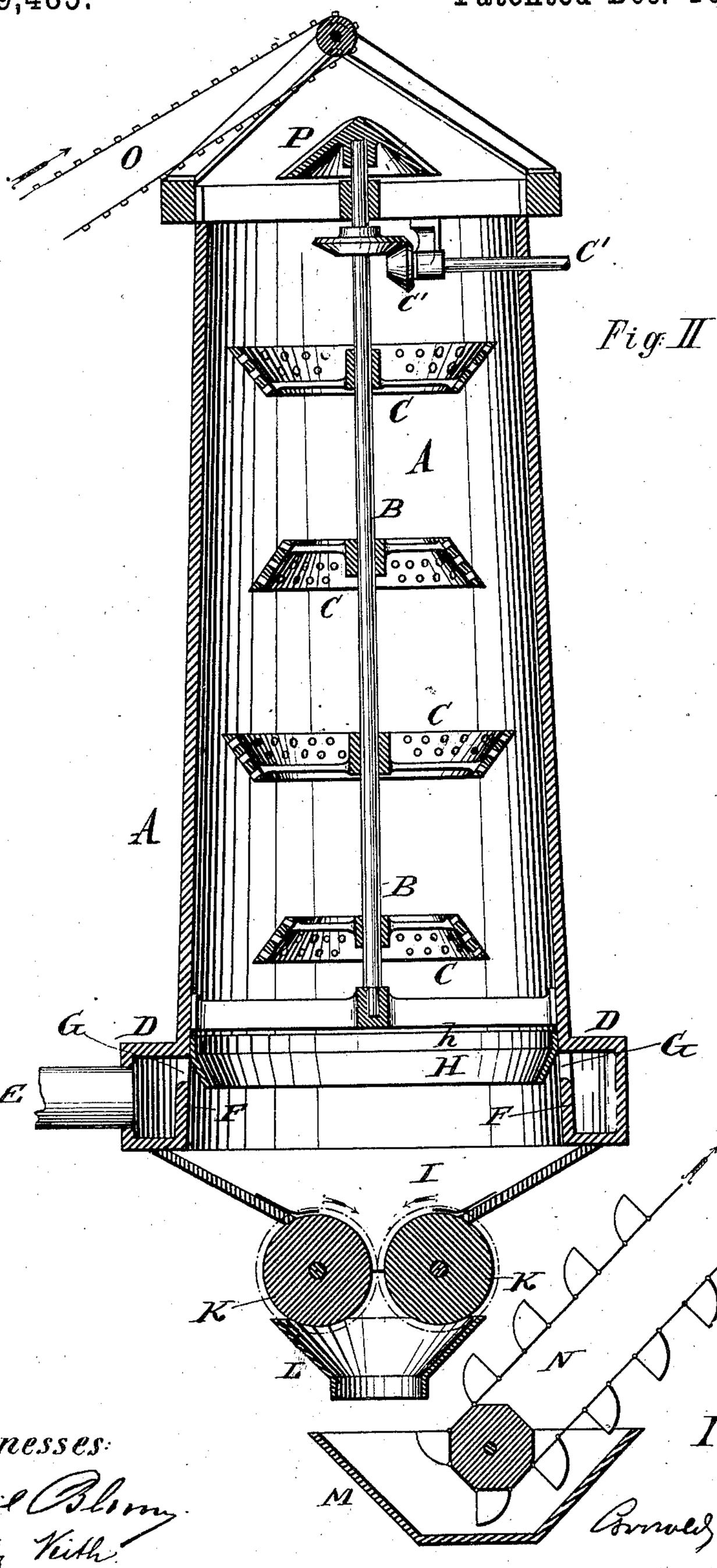


Fig. II

Witnesses:
Emil Blum.
Moritz Veith.

Inventor:
Conrad Munzinger.

(No Model.)

3 Sheets—Sheet 3.

A. MUNZINGER.

DRIER.

No. 309,485. Patented Dec. 16, 1884.

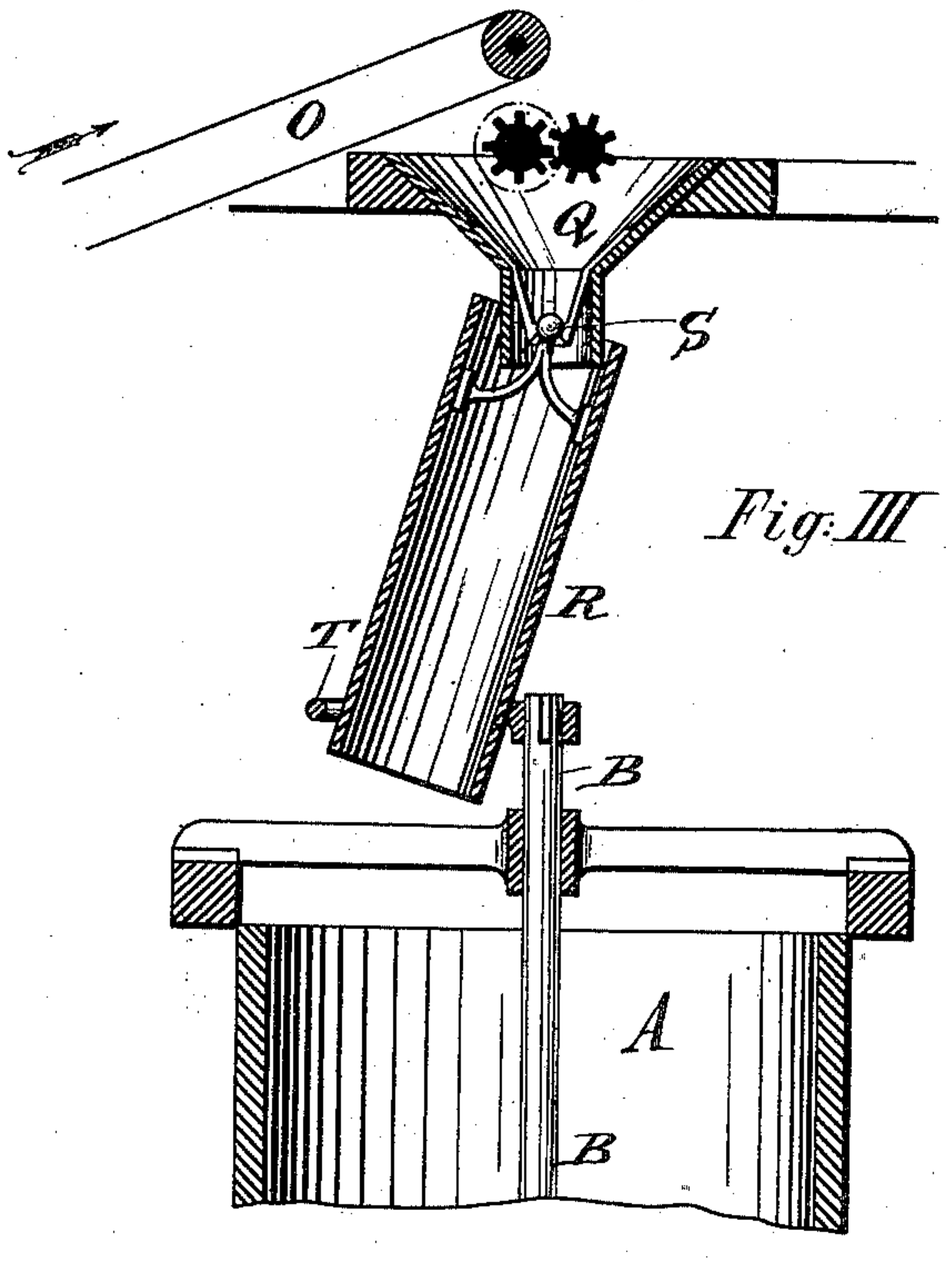
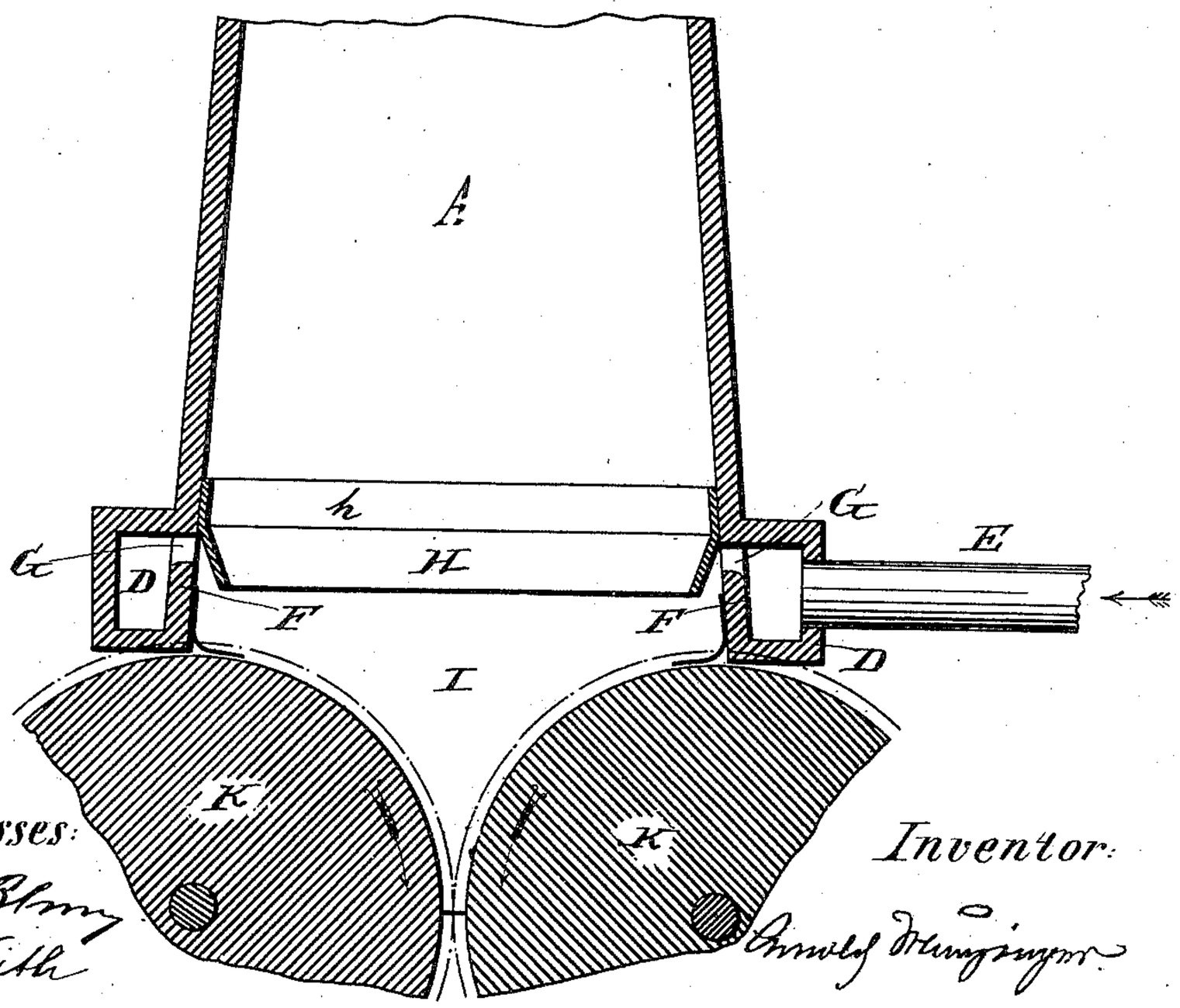


Fig. III



Witnesses:
Emil Blum
Moritz Veith

Inventor:
Arnold Munzinger

UNITED STATES PATENT OFFICE.

ARNOLD MUNZINGER, OF OLTEN, SOLOTHURN, SWITZERLAND.

DRIER.

SPECIFICATION forming part of Letters Patent No. 309,485, dated December 16, 1884.

Application filed April 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, ARNOLD MUNZINGER, a citizen of the Republic of Switzerland, residing at Olten, in the State of Solothurn, Switzerland, have invented a certain new and useful Improvement in Apparatus for Drying Wood Pulp, Cellulose, Cotton, Wool, and Similar Materials; and I do hereby declare that the following is a clear and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has relation to that class of devices for drying materials of comminuted or textile nature in which a current of heated or dry air is conducted into a casing having means for stirring the material, said air entering from the lower end of the casing from an annular casing or duct; and it consists in the improved construction and combination of parts of the same, as hereinafter more fully described and claimed. This apparatus, therefore, is intended to be used for drying by the means of hot air at a comparatively low temperature, and has for its object to thoroughly subject every particle of the material to be dried to the action of the hot air.

There are several ways of constructing the apparatus in detail without deviating from the spirit of my invention; and in the accompanying three sheets of drawings I have shown three different modifications of the apparatus, all of which, however, involve the same general principle of construction, so that one may be considered merely as a modification of the other.

Figure I represents a longitudinal vertical section of the apparatus as constructed with a screw-feed at its lower end for discharging the dried material. Fig. II is a similar view of the apparatus as constructed with a roller-feed for the same purpose, and Fig. III represents the apparatus in longitudinal vertical section as constructed with a rotary feed-chute and a roller discharge-feed.

Similar letters of reference indicate corresponding parts in all the figures.

A denotes a vertical chamber or casing, which may either be cylindrical, as in Fig. I, tapering, as in Fig. II, or in part cylindrical and in part tapering, as in Fig. III. This upright casing may be mounted in a suitable frame, as represented in Fig. I, and is provided with a central vertical shaft, B, having a suitable mechanism (shown at C') for imparting to it a rotary motion.

Upon the shaft B are arranged suitable wings or beaters, C, which may be of any approved construction. In Fig. I, I have shown these beaters as consisting, simply, of short straight arms or bars disposed upon the shaft at right angles to each other, while in Fig. II these beaters are shown in the nature of hollow disks or pans with perforated sides, and having their bottoms removed. The lower end of cylinder A is supported upon an annular air-tight chamber, D, which is connected with a pipe, E, through which the hot air is fed into chamber D. In the lower part of this chamber is an annular vertical wall, F, which extends in a line with and up to within a short distance of the lower end of the cylinder or casing A, so as to leave a narrow annular space or inlet, G, from the air-chamber D into the casing A. Inside of the latter, and in a line with the annular opening G, is fixed the annular deflector H, which is in the nature of a metallic ring, fastened by its flange *h* to the lower end of the casing, and having its lower part turned inwardly, as clearly shown in the drawings, so as to deflect the heated air as it enters through the annular aperture or inlet G in a downward direction before it enters the body of the cylinder or casing A from the under side through the center of the annular deflector H. The lower end of the casing A, below its annular air-chamber D, has a hopper, I, which is provided with any suitable feed mechanism for discharging the material from the casing. In Fig. I, I have shown shaft B extended down through the hopper, and provided with a spiral or screw feed, J, while in Figs. II and III the material as it drops down into the hopper is caught between drums or rollers K K, revolving toward each other and discharging down into a funnel, L, placed below, from which in turn the material is fed down into a box or receptacle, M, from which it is removed and carried to its destination by means of the elevator N.

The material to be dried is carried to the top of the apparatus by an endless apron or elevator, O, from which it is discharged down into the casing A, whose shaft B may be provided with a conical corrugated cap, P, which, as it revolves with the central shaft, scatters the material which drops upon it down into the casing, the top of which is open; or the apparatus shown in Fig. III may be employed, the same consisting of a hopper, Q, which feeds into a tube, R, connected to the lower end of the hopper by a universal-joint or ball coupling, S. The lower end of this tubular chute R is inserted into a ring or hollow arm, T, which extends from one side of the central shaft and revolves with it, so that it will be seen that the material fed into the hopper Q and chute R is scattered all around the central shaft upon or between the beaters arranged below. The choice between these several methods of feeding the material to the machine and discharging it therefrom after it has been dried will depend upon the nature of the material which is to be treated. Where the central shaft is rotated by mechanism at the bottom or lower end of the same, as in Fig. I, this mechanism is protected by an overlapping cap or hood, U, which also serves as a deflector for discharging the material from the screw-feed down into the hopper L.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the drying-chamber A, central rotary shaft, B, having wings or beaters C of suitable construction, conical flanged or corrugated cap P, fixed upon the upper end of the shaft, screw-feed J, fixed upon the lower end of the shaft, discharge-hopper I, and annular air-chamber D, provided with the annular inlet G, substantially as and for the purpose herein shown and set forth.

2. The combination of the drying-chamber A, central rotary shaft, B, having wings or beaters C of suitable construction, a suitable feed mechanism at the upper end of the machine, adapted to scatter the material to be dried into the drying-chamber around its central rotary shaft, a suitable discharge mechanism arranged at the lower end of the drying-chamber and operating in conjunction with the feed mechanism and rotary shaft, the annular air-chamber D, having inlet-pipe E, annular wall F, forming, with the chamber D, the annular inlet G, and annular deflector H, having flange *h*, arranged inside of the drying-chamber, opposite to the annular air-inlet G, the whole constructed and combined to operate substantially in the manner and for the purpose shown and specified.

In testimony that I claim the foregoing as my own I have hereunto signed my name and affixed my signature, in the presence of two subscribing witnesses, this 19th day of March, 1884.

ARNOLD MUNZINGER.

Witnesses:
MORITZ VEITH,
EMIL BLUNG.