

(No Model.)

2 Sheets—Sheet 1.

A. MUNZINGER.

DRIER.

No. 317,172.

Patented May 5, 1885.

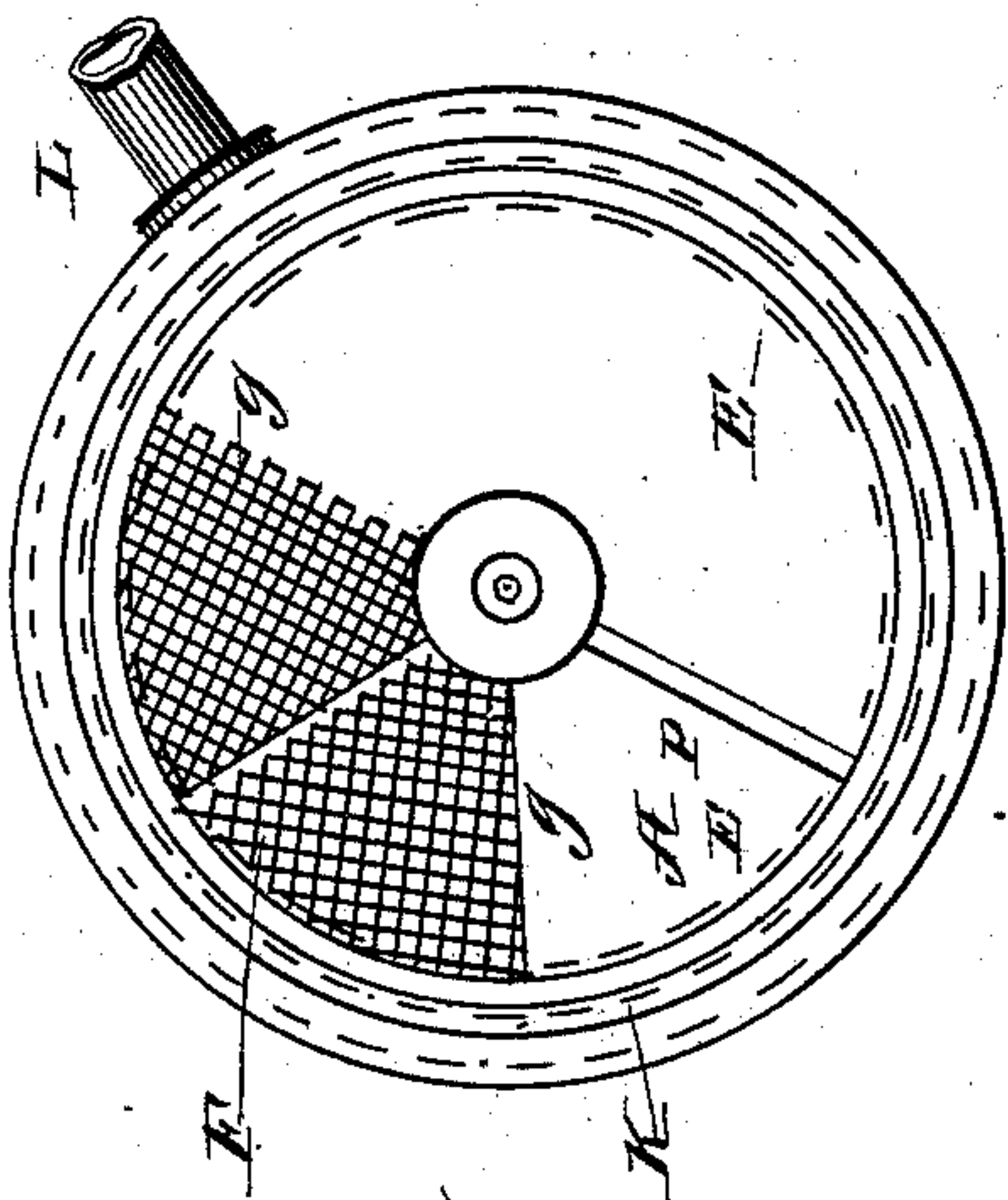


Fig. 2.

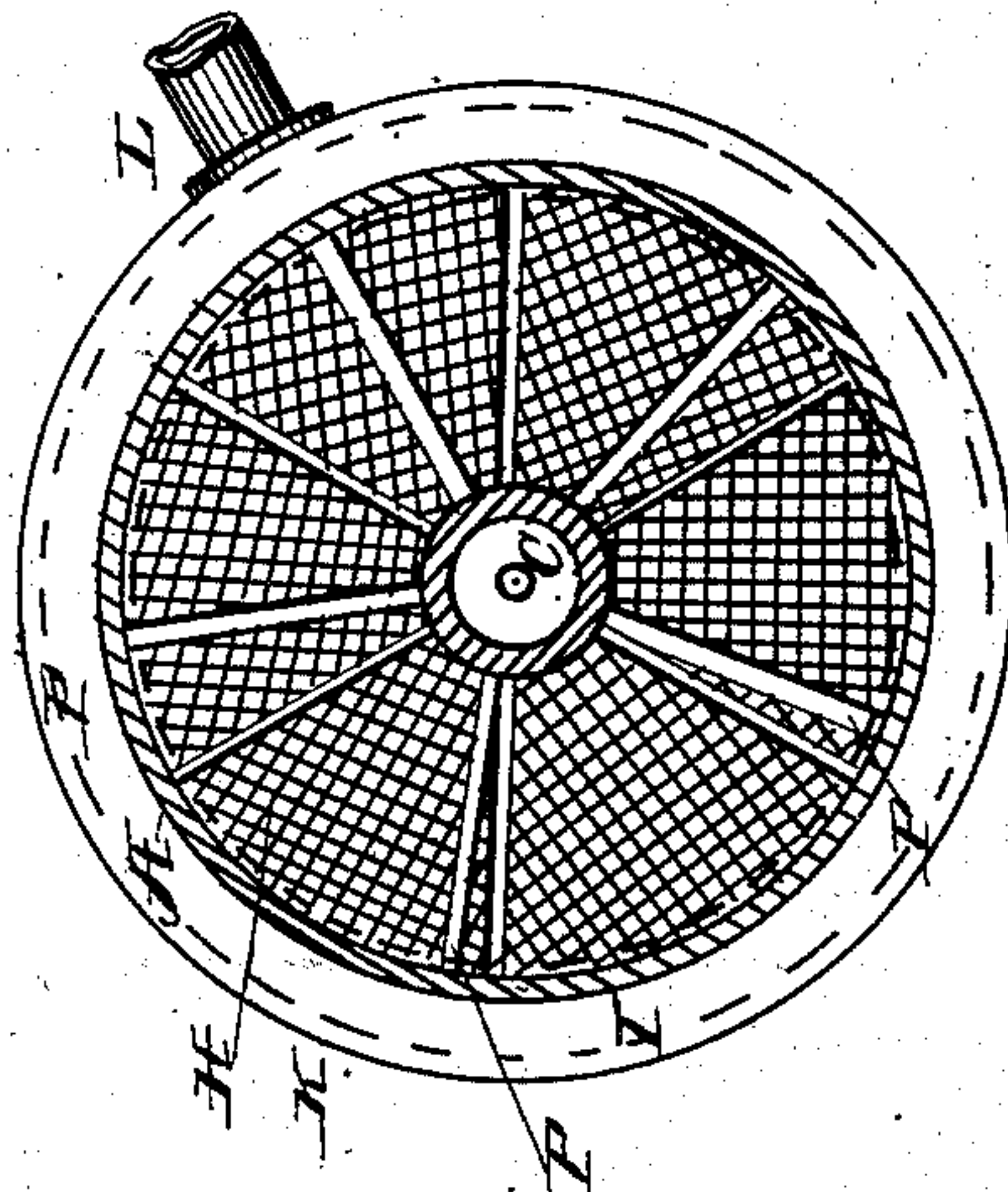


Fig. 3.

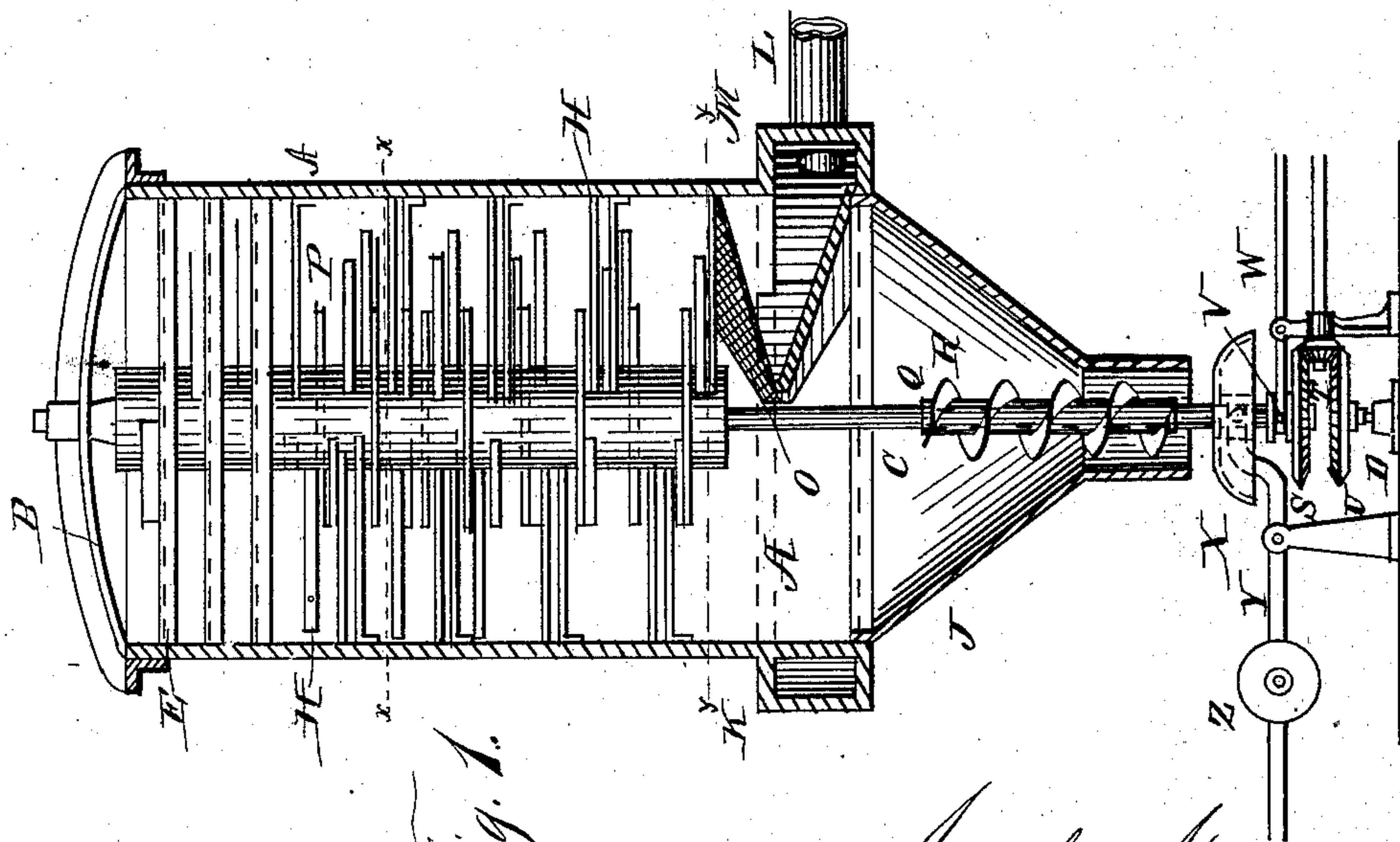


Fig. 1.

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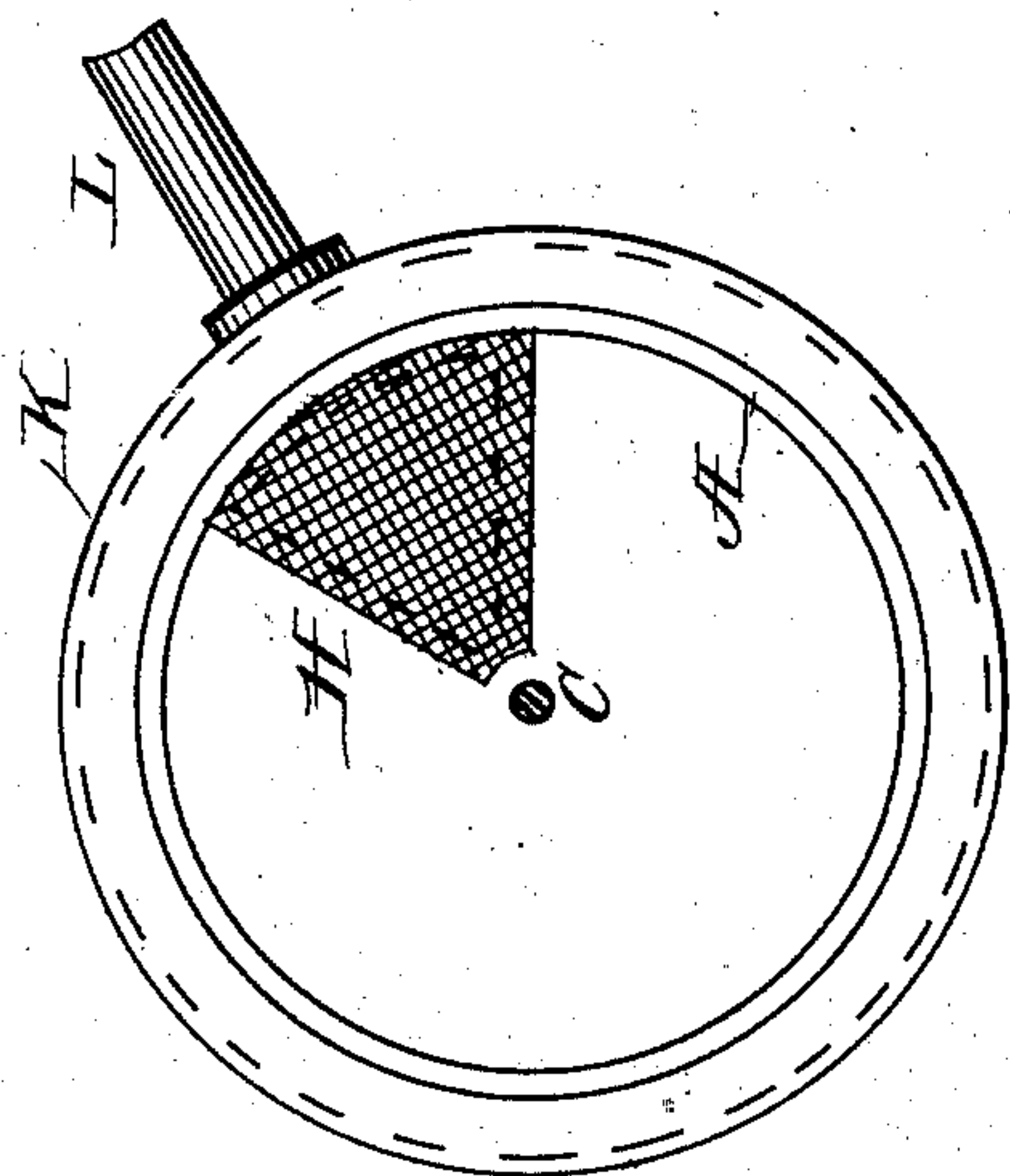


Fig. 4.

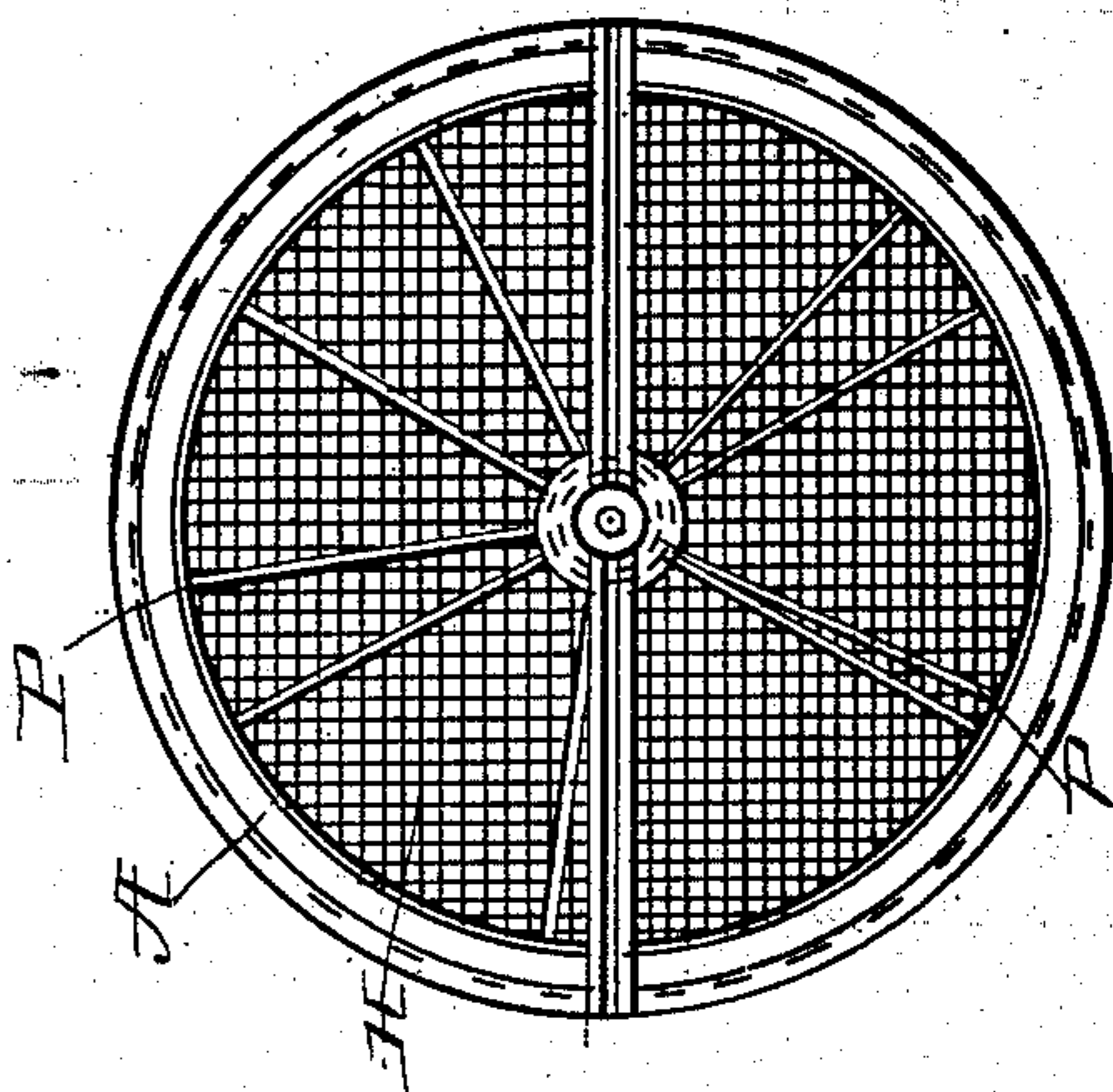


Fig. 6.

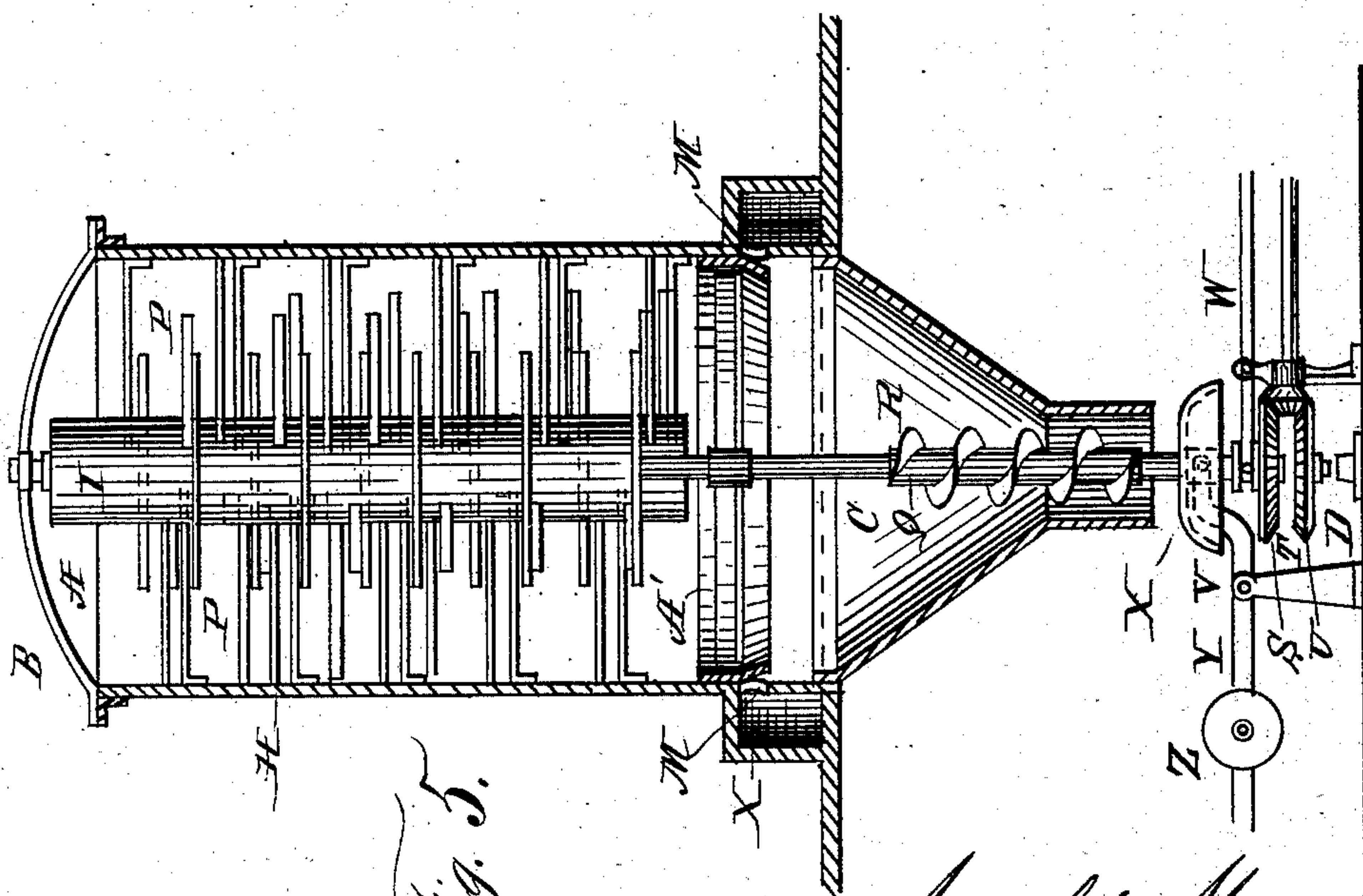


Fig. 5.

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UNITED STATES PATENT OFFICE.

ARNOLD MUNZINGER, OF OLTEN, SOLOTHURN, SWITZERLAND.

DRIER.

SPECIFICATION forming part of Letters Patent No. 317,172, dated May 5, 1885.

Application filed September 22, 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, of Solothurn, Switzerland, have invented certain new and useful Improvements in a new Apparatus for Drying Wool, Cotton, Cellulose, Wood Pulp, and Similar Materials, of which the following is a specification.

Figure 1 is a vertical transverse sectional view of my improved drying apparatus. Fig. 2 is a plan view of the same with the top yoke removed, so as to expose the interior construction more fully. Fig. 3 is a horizontal sectional view taken on the line *x x* in Fig. 1. Fig. 4 is a horizontal sectional view taken on the line *y y* in Fig. 1. Fig. 5 is a vertical sectional view illustrating a modification in the construction of my invention, and Fig. 6 is a plan view of the same.

The same letters refer to the same parts in all the figures.

This invention relates to an improved device or apparatus for drying materials of all kinds by subjecting the same, within a suitable casing, to a current of heated air; and it has for its object to provide a device in which the material to be dried shall be automatically and intermittently conveyed from the upper to the lower portion of such casing while continually exposed to the drying influences of a heated-air current, which is admitted at the bottom of the casing.

With these ends in view the invention consists in the improved construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, A designates the casing of my improved drying apparatus, which is preferably cylindrical in shape, and provided at its upper end with a yoke, B, having one of the bearings for a vertical shaft, C, the lower end of which is journaled in a step, D, below the casing. The latter is provided at its upper end with a series of disks, E E, each of which has a segmental opening, F, comprising about one-sixth (more or less) of the circumference of the disks in which the said openings are successively spirally arranged, and each of the said disks is provided, as clearly shown in

Fig. 2 of the drawings, with a perforated section, G, coinciding or registering with the opening in the disk next above.

Secured to the inner wall of the casing below the disks E E is a spiral series of segmental perforated plates or steps, H H, which may, if preferred, be formed of wire-netting. These steps extend inwardly to the shaft or axle of the machine, which is provided with a cylindrical body or enlargement, I.

The lower end of the casing has a cylindrical or hopper-shaped extension, J, above which is formed an annular casing, K, having a pipe, L, through which a current of heated air may be admitted. The casing K has an opening, M, through which the air may pass into the main casing A, and under the said opening is arranged a deflector, N, over which is placed an inverted-V-shaped shield of perforated metal or wire-gauze, as shown at O, by which the material to be dried is prevented from clogging the air opening or entrance.

The body or enlargement I of the shaft C is provided with a series of radial arms or scrapers, P P, registering with the disks E and plates or shelves H, and adapted to scrape or push the contents of the same onto the plate or shelf next below, or from the lowermost shelf into the funnel-shaped bottom of the casing. These scrapers are so arranged with relation to the shelves H and to the openings in the disks E that each scraper shall always be somewhat in rear of the one next below, and not begin its work until the one next below has fully completed its work. This is easily accomplished by properly regulating the distance between the scrapers upon the periphery of the shaft.

The lower end of the shaft is provided with a vertically-sliding sleeve, Q, having a screw, R, and provided at its extreme lower end with a bevel-wheel, S, receiving motion from the driving-pinion T. The latter also communicates motion to a bevel-wheel, U, upon the shaft C, which is thus operated. The sleeve Q has an annularly-grooved collar, V, engaging a forked lever, W, whereby the said sleeve may be raised so as to throw the bevel-wheel S out of engagement with the pinion T and stop the operation of the screw, which latter serves to remove or exhaust the dried material from the main casing or hopper. The

sleeve Q is also provided with a bell-shaped diaphragm, X, which, when the said sleeve is raised, serves to close the opening at the lower end of the casing. The sleeve Q is connected
5 with a lever, Y, having at its outer end a weight, Z, which serves to counterbalance the weight of the said sleeve and its attachments.

From the foregoing description, taken in connection with the drawings hereto annexed,
10 the operation and advantages of this invention will be readily understood. The material which is to be dried is conveyed in any suitable manner into the upper end of the casing, whence the scrapers convey it from
15 step to step to the bottom, where it is collected, the opening at the bottom of the casing being normally closed by the diaphragm X. By operating the lever W the sleeve Q may be lowered, thus opening the bottom of the
20 casing and throwing the bevel-wheel S into engagement with the pinion T. The sleeve Q, with its screw R, is thus caused to revolve, thereby removing the contents of dried material at the bottom of the casing and making
25 room for that which follows.

The modification of my invention (shown in Figs. 5 and 6 of the drawings) consists in omitting the disks E at the top of the casing and the guards N O of the air-entrance at the
30 bottom of the same, and substituting for the latter an annular beveled ring or deflector, A', which serves practically the same purpose. I would have it understood that other changes of construction may be made—thus, for in-
35 stance, the disks and steps might be secured upon the axle and the arms or scrapers upon the casing; or the latter might be made to revolve and the axle suffered to remain stationary, or caused to revolve in an opposite di-
40 rection or at a different rate of speed; and I reserve to myself the right to these and other modifications, which may be resorted to without departing from the spirit of my invention.

I am aware that it is not broadly new to have a series of spirally-arranged steps se- 45 cured one above the other in a drying-cylinder having an axial shaft provided with laterally-projecting arms traveling over the faces of the said steps, and I do not wish to claim such construction, broadly; but 50

I claim—

1. In a drying apparatus, the combination of a cylindrical casing provided at its upper end with disks having segmental openings, and perforated sections adjoining the said 55 openings, and a spirally-arranged series of perforated steps or shelves arranged below the said disks, with the revolving arms or scrapers, substantially as and for the purpose herein set forth. 60

2. In a drying apparatus, the combination of a cylindrical casing, a spirally-arranged series of perforated steps or shelves, revolving arms or scrapers, an air-entrance at the bottom of said casing, a V-shaped deflector, and 65 an inverted-V-shaped perforated shield or guard for the same, substantially as and for the purpose set forth.

3. The combination of a cylindrical casing having an open hopper-shaped bottom, a spi- 70 rally-arranged series of steps within the said casing, a revolving shaft having radial arms or scrapers, a sleeve sliding upon the lower end of the said shaft and having a screw and a bell-shaped diaphragm, mechanism for ad- 75 justing the said sleeve, and suitable operating mechanism, substantially as and for the purpose set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing wit- 80 nesses, this 9th day of August, 1884.

ARNOLD MUNZINGER.

Witnesses:

ED. EGLI,
EMIL BLUM.