

No. 662,398.

Patented Nov. 27, 1900.

J. F. DORNFELD.  
MALTING DRUM.

(Application filed Oct. 11, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

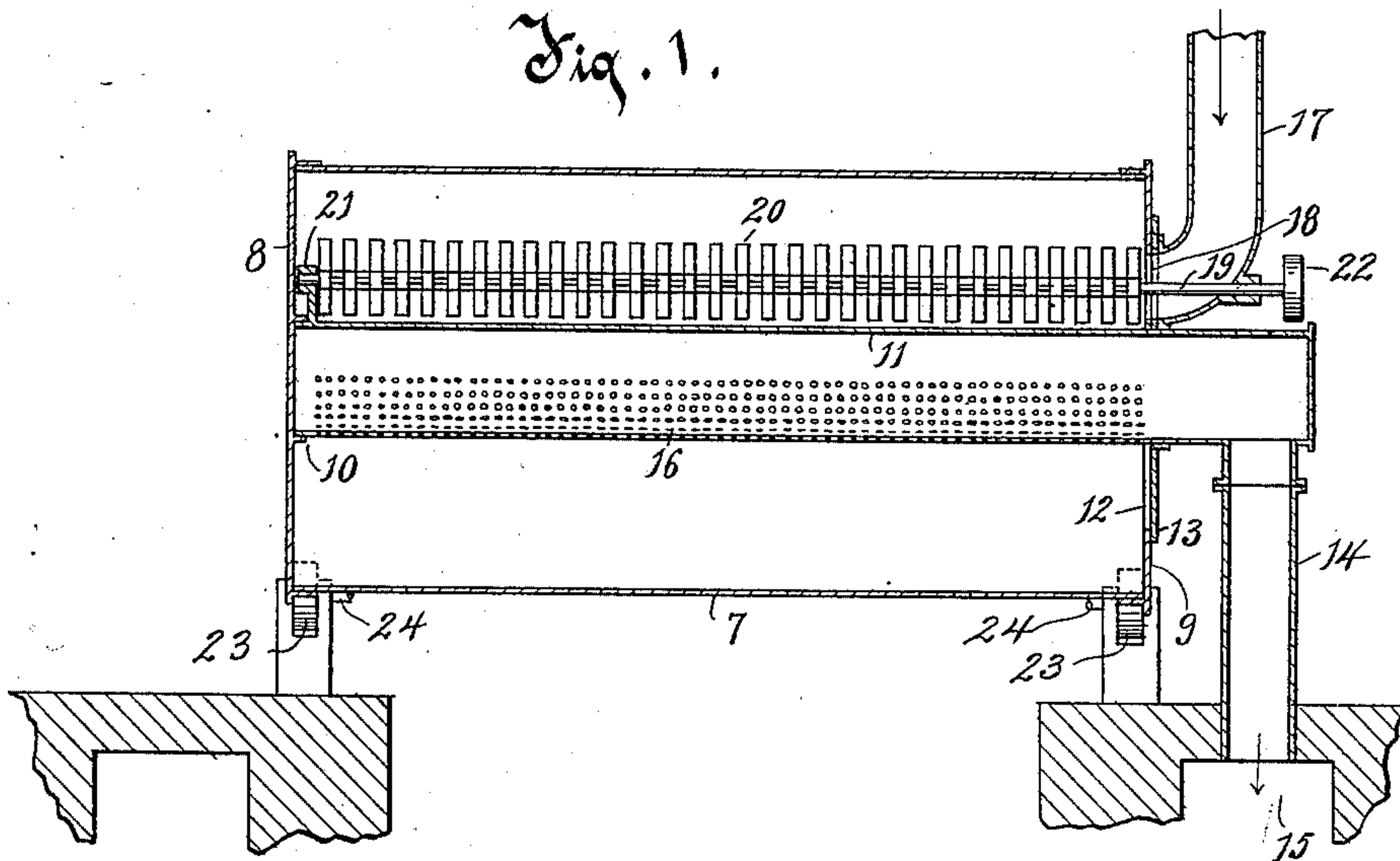


Fig. 2.

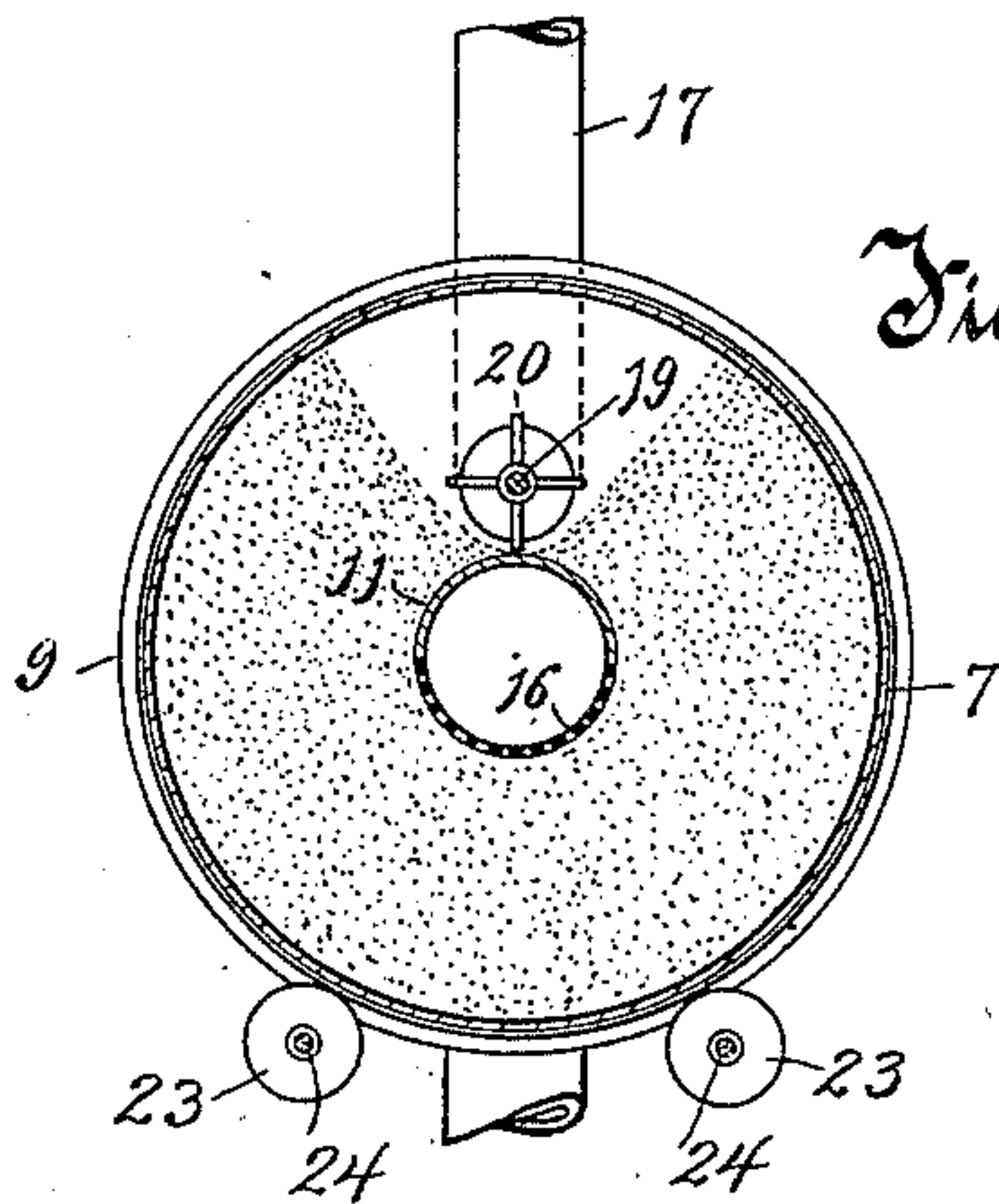
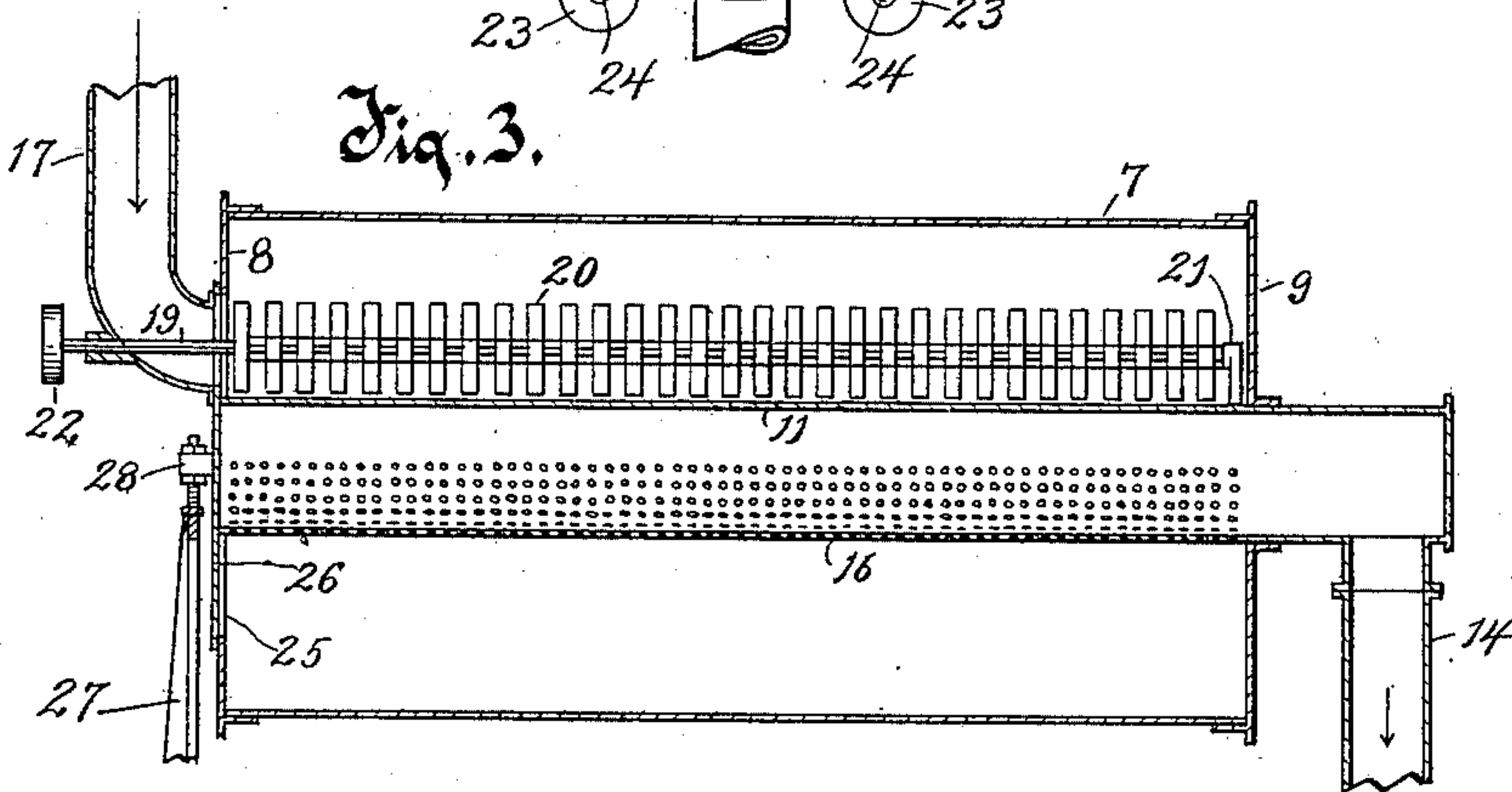


Fig. 3.



Witnesses.

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2 Sheets—Sheet 2.

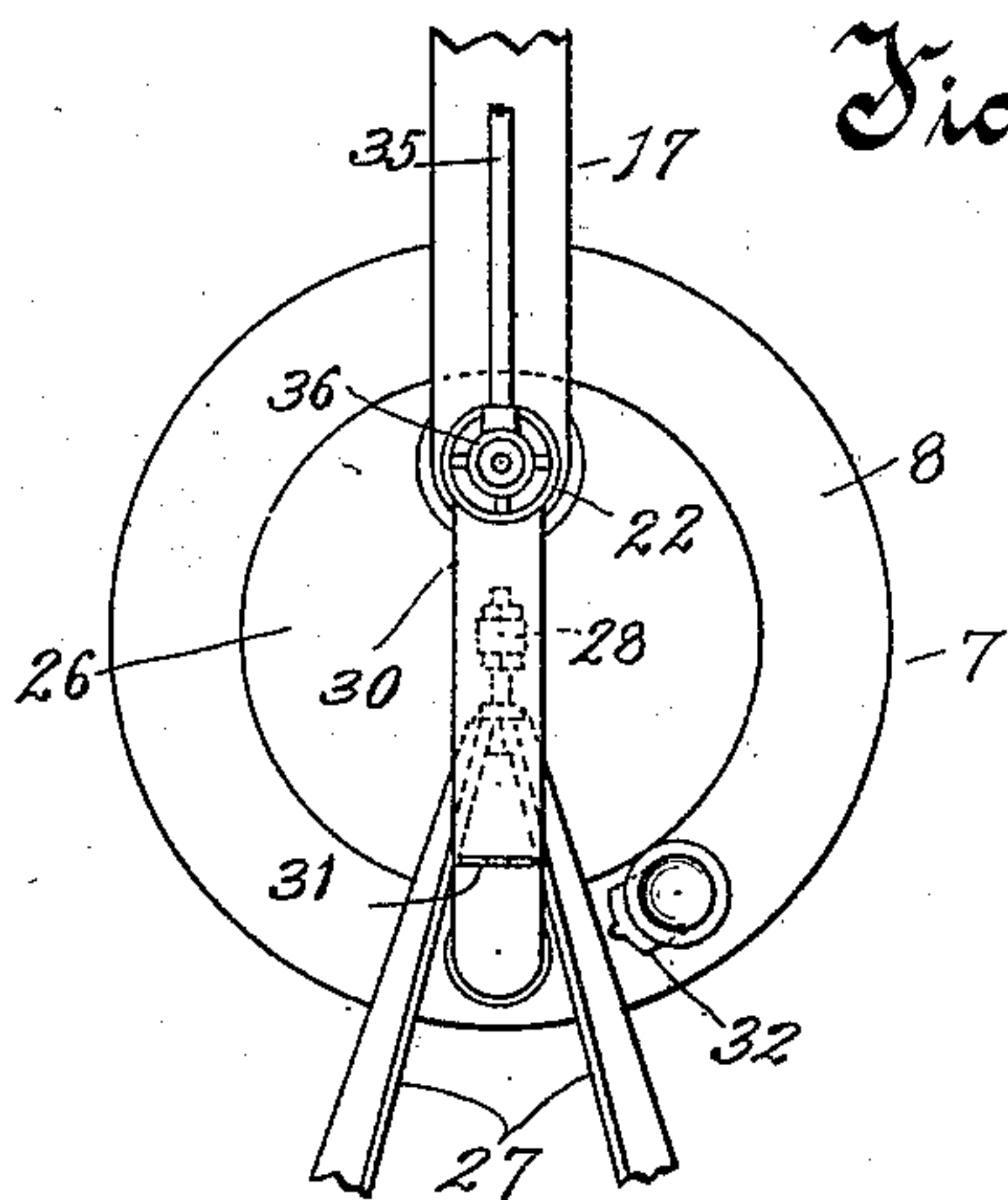
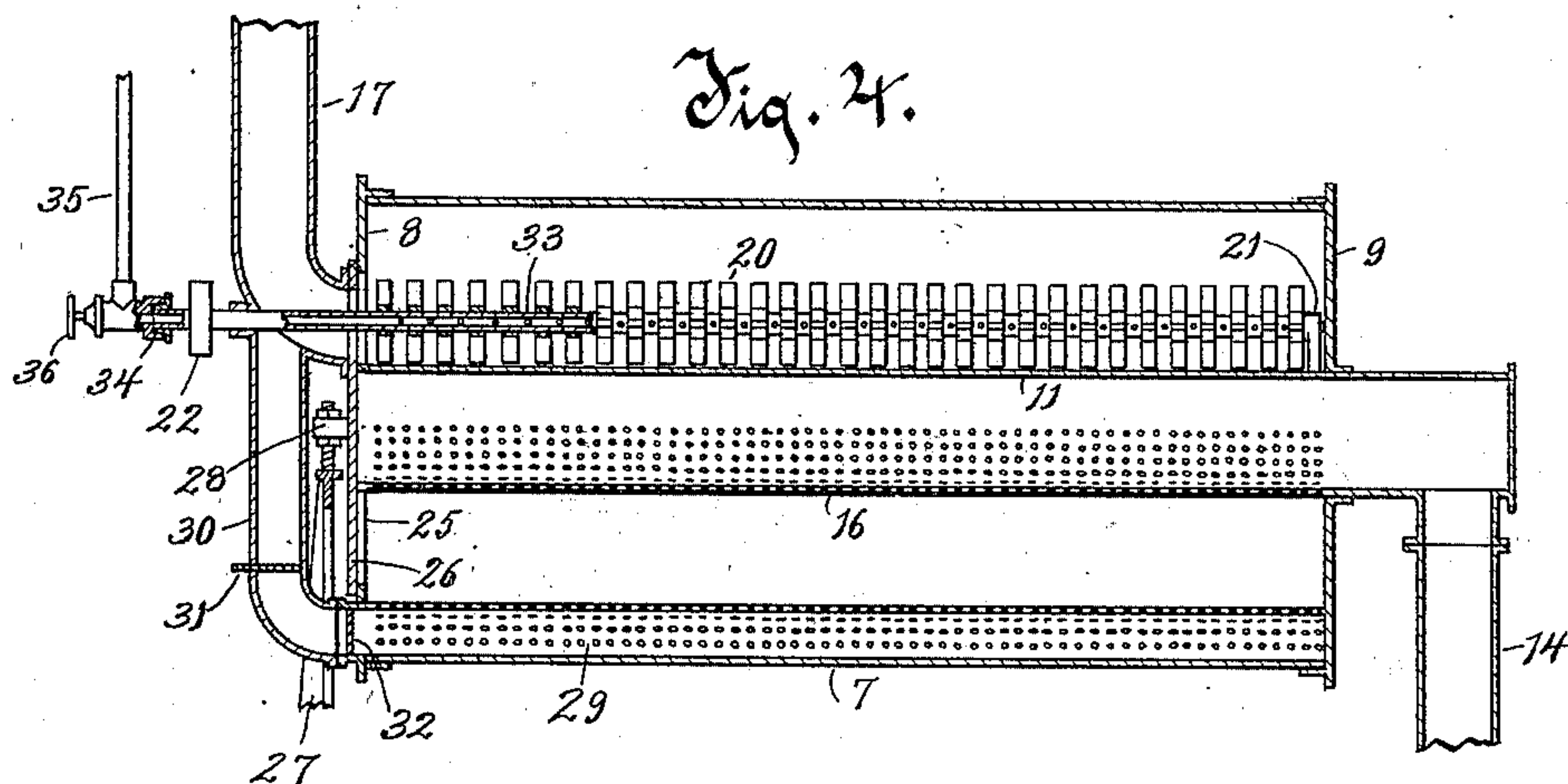
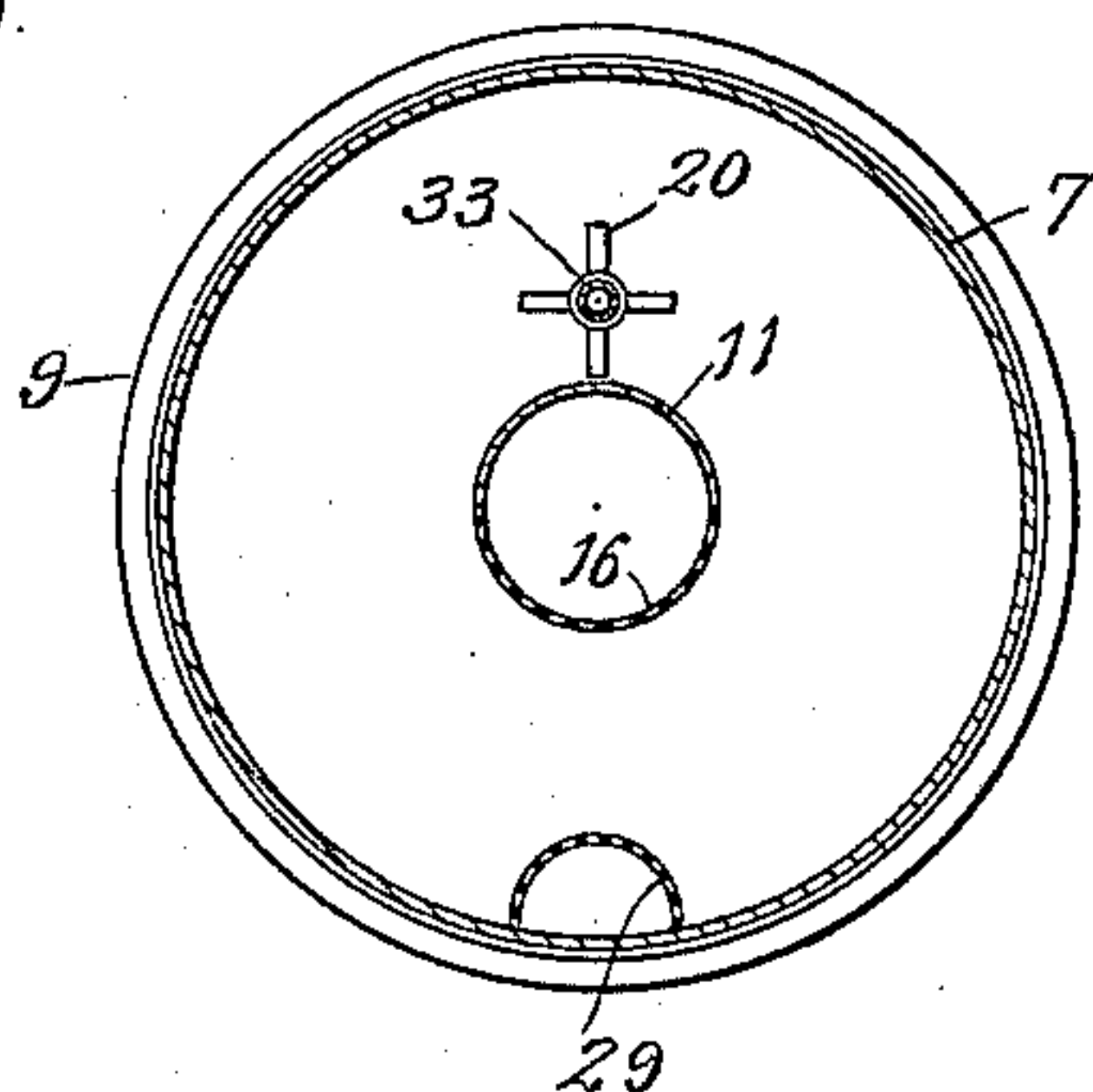


Fig. 6.



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# UNITED STATES PATENT OFFICE.

JOHN F. DORNFELD, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF  
TO FRANKLIN B. GIESLER, OF SAME PLACE.

## MALTING-DRUM.

SPECIFICATION forming part of Letters Patent No. 662,398, dated November 27, 1900.

Application filed October 11, 1899. Serial No. 733,249. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. DORNFELD, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and  
5 useful Improvement in Malting-Drums, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements  
10 in malting-drums.

One object of the invention is to provide an improved form of malting-drum wherein simplicity of construction and inexpensiveness of production are predominant features.

15 A further object is to provide a construction wherein a perfect and unobstructed ventilation of the germinating barley within the drum is secured.

20 A further object consists in the provision of means for thoroughly ventilating when the stirring operation is stopped and the drum is not rotating.

25 With the above primary and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter set forth.

30 In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view through a malting-drum constructed in accordance with my invention. Fig. 2 is a transverse sectional view of the form of drum illustrated in Fig. 1, said drum being shown as partially filled with barley. Fig. 3 is a longitudinal vertical sectional view of a modified form of  
35 construction. Fig. 4 is a similar view of another modified form of construction. Fig. 5 is a view of one end of Fig. 4, and Fig. 6 is a transverse section of the form of construction shown in Figs. 4 and 5.

40 In all the forms of construction the malting-drum is composed of the usual elongated cylindrical casing 7 and the connecting end or head pieces 8 and 9.

45 In the form of construction shown in Figs. 1 and 2 the end piece 8 is provided on its inner side with an annular flange 10, and in this flange fits freely one end of an inner cylinder 11. The opposite end of this cylinder extends through a large opening 12 in the end piece 9,  
50 the cylinder extending outwardly beyond said

end piece for a desired distance. The end of this outward extension is closed, as clearly shown. Just outside of the end piece 9 the extension is provided with a flange or plate 13, fitting against the outer side of the end piece 9  
55 and of sufficient area to close the opening 12. A pipe or passage 14 extends from this outer extension of the inner cylinder 11 and communicates with a tunnel, duct, or passage 15. The portion of the cylinder 11 within the cy-  
60 lindrical casing is provided on its under side, and preferably for substantially one-half of its circumference, with a series of perforations 16.

The numeral 17 indicates a ventilating  
65 shaft, which is shown as consisting of a pipe of sufficient diameter to provide for the flow of an adequate volume of moist air into the casing, the said pipe communicating with an opening 18 in the flange or plate 13. As the  
70 opening 18 is in register with the opening 12 in the end piece 9, the moist purified air has a free and unobstructed passage into the interior of the drum.

The stirring mechanism is located within  
75 the drum and extends longitudinally thereof and in the space between the interior cylinder 11 and the inner wall of the outer cylindrical casing, advisably in the upper portion of said space. This stirring mechanism may  
80 be of any approved form of construction, so long as projections, fingers, or blades are provided in connection with means for rotating or moving the same. I prefer, however, to employ the form of stirring mechanism clearly  
85 shown in the drawings, which consists of a shaft 19 extending longitudinally in the drum and having a series of stirring fingers or blades 20 radiating therefrom. At one end this shaft is mounted in a bearing 21, ex-  
90 tending upwardly from the interior cylinder. The other end of this shaft passes through the openings 12 and 18 and through the pipe 17, and its outer end, which is exterior of said pipe, may be provided with a pulley 22 or  
95 other drive-wheel for the purpose of rotating the shaft. By providing the large opening 12 in the end piece 9 the stirring-shaft is permitted to pass freely therethrough, so as to adapt the outer end thereof to be connected  
100



with mechanism for rotating the shaft, and at the same time the rotation of the drum is not interfered with, which would be the case if the stirrer-shaft passed directly through the end of the parts rotating with the drum.

The drum may be rotated by any desired means, and in Figs. 1 and 2 I have shown for that purpose rolls 23, mounted on suitable shafts 24, said rolls bearing against the periphery of the drum and adapted to rotate said drum by friction. The shafts 24 may be rotated positively by any desired means.

In the operation of the form of construction shown in Figs. 1 and 2 the drum is rotated and the moist purified air is passed through the shaft or pipe 17, (suitable forcing means may, if desired, be provided for that purpose,) and this air flows freely and unobstructedly into the drum. The drum is filled with barley with the exception of the space in the upper portion of the drum, where the stirring mechanism is located, as clearly shown in Fig. 2. A suction-fan (not shown) is advisably arranged in connection with the tunnel 15, and this fan is operated so as to draw the air through the germinating barley, said air first circulating through said barley in the upper portion of the drum, thence around and through the barley surrounding the sides of the inner cylinder, and thence below and through the barley beneath the inner cylinder, said air being then drawn upwardly by the suction through the perforations of the inner cylinder, thence along said cylinder, and finally down the pipe 14 into the tunnel 15.

The purpose of having the upper portion of the inner cylinder imperforate is to guard against the air when it is first forced into the drum from passing directly into said cylinder, which would be the case if perforations were provided in the upper portion of said cylinder, and this of course would result in the air passing directly to the tunnel 15 without having first circulated through the germinating barley. It will be seen that by my improved arrangement a most thorough ventilation is insured, as a full volume of air is permitted to pass into the drum without first passing into small tubes or pipes and being thereby more or less obstructed, as is the case in some forms of malting-drums.

As previously stated, a small space is left in the upper portion of the drum, which is not filled with barley. In this space the stirring mechanism works, and consequently always keeps said space clear of the germinating barley, so as to leave a free chamber or space within which the moist purified air may enter. While the drum is rotating, as described, it will be understood that the stirrer-shaft is also rotated by the described means.

While in the foregoing description I have described the moist air as entering the pipe 17 and thence following the course pointed out, finally being drawn into the tunnel 15 by suction, yet I do not wish to be understood

as limiting myself specifically thereto, inasmuch as, if preferred, the moist air may be forced or otherwise caused to flow from the tunnel 15 into pipe 14, thence into cylinder 11, thence through the perforations of said cylinder into the drum, and thence through the germinating barley contained in the drum; and finally out through the pipe 17, a suction-fan, if desired, being connected with said pipe 17 in order to create a suction. It will be understood that supply and exhaust pipes could be arranged at both ends of the drum, if desired, and as will be readily appreciated by reference to Fig. 1.

The modified form illustrated in Fig. 3 of the drawings shows a construction wherein the pipe 17 instead of entering the same end of the drum from which the inner cylinder projects enters the opposite end of the drum. In order to provide for this arrangement, the end 8 of the drum is provided with a large opening 25, and the end of the cylinder 11 is provided with a flange 26, which covers the opening 25. It is necessary that this end of the cylinder 11 should be supported, and for this purpose I provide a divergent standard or legs 27, the upper end thereof being provided with a threaded stem, which passes through a lug 28, extending from the end of the cylinder, locking-nuts being turned on the threaded stem above and below the lug. It will be evident that the operation of this form of the device is similar in all respects to the operation of the preceding form, excepting that the air enters the opposite end of the drum.

In the form of construction illustrated on Sheet 2 of the drawings the ventilating while the drum is rotating is effected in exactly the same manner as in the preceding forms of construction; but in addition to this provision is also made for thoroughly ventilating while the drum is not rotating and while the stirring mechanism is not in operation. All stirring of germinating barley has the effect of checking the growth of the roots. In the case of barley which is well developed the checking of the growth of the roots is not damaging. In the case, however, of a feeble or poor grade of barley the checking of the growth of the roots will frequently check the growth of the acrospires, which is quite detrimental to good malting, inasmuch as the best result in malting is dependent on the full growth and development of the acrospires. For these reasons it is frequently desirable that the stirring of the germinating barley be discontinued for a certain length of time and the ventilating process carried on while the barley is lying dormant. I have therefore in the Sheet 2 form of construction shown an arrangement wherein provision is also made for ventilating while the drum is not rotating and while the stirring mechanism is not operating. The form of drum shown on Sheet 2 is similar to the Fig. 3 form of construction. The cylin-



drical casing 7, however, is provided with a perforated tube 29, extending longitudinally throughout the length of the casing and through the end 8 of said casing for a slight distance. From the pipe 17 is extended another pipe 30, the lower end of which is turned inwardly, so as to be in position to register with the projecting end of the tube 29 when the cylindrical casing 7 is turned to a certain position and held at such position. Figs. 4 and 5 of the drawings show the cylindrical casing turned so as to produce this registration. It is obvious that, if desired, a plurality of the tubes 29 may be provided.

Arranged within the pipe 30 is a slide 31, and a similar slide 32 is arranged in the tube 29. When the drum is rotated and the stirring mechanism is operating, these slides are pushed inwardly, so as to close the pipe 30 and the tube 29, and thereby allow the air to take its usual course through the pipe 17 directly into the drum. When, however, the drum is turned around to a position to bring the tube 29 into register with the pipe 30 and the drum held at this position against rotation and the operation of the stirring mechanism stopped, the slides are pulled outwardly. Some of the moistened and purified air will then pass directly from the pipe 17 into the drum and circulate through the top portion of the germinating barley and thence downwardly through the germinating barley, while another portion of the air will pass downwardly into the pipe 30, thence into the tube 29, out of the perforations of said tube, and thence through the lower layers or portions of the germinating barley, the air finally passing through the perforations of the cylinder 11, thence through said cylinder into the pipe 14, and to the tunnel 15.

In the drawings I have shown the slides 31 and 32 as projecting outwardly slightly, so as to be capable of being manipulated by hand. It will be understood, however, that, if preferred, automatic slides may be provided adapted to slide outwardly to open position when the drum is held stationary at a position to bring the tube 29 into register with the pipe 30 and to be slid inwardly to closed position when the drum is rotating. Although this construction is not shown in the drawings, still it is within the range of ordinary mechanical skill and as such fully within the province of my invention.

In the form of construction illustrated on Sheet 2 I also show in connection with the stirring mechanism means for watering the germinating barley. This means consists in forming the shaft of the stirring mechanism of a hollow perforated tube 33, the perforations adapting the water which is fed to the tube to be discharged therethrough into and through the germinating barley contained in the drum. In order to provide for feeding water into the hollow stirrer-shaft, I connect the outer extended end of said shaft to a coupling 34, a stuffing-box being fitted onto

the end of the shaft and to the coupling in order to provide a water-tight joint. A water-supply pipe 35 leads to this coupling, and a cock 36 is provided for regulating the supply of water passing into the stirrer-shaft.

While I have herein described my invention as particularly designed as a malting-drum, yet I do not wish to be understood as limiting myself to this application, inasmuch as the invention can be used to advantage for drying all kinds of grains or cereals. In this application of the invention the exterior of the drum could be heated by hot air in the room where the drum is located, or the drum could be provided with a surrounding jacket or mantle for the purpose of heating and retaining heat. In this application also instead of forcing moist air through the drum hot air is forced through either the pipe 14 or 17 and through the grain or cereals in the drum.

What I claim as my invention is—

1. The combination, of a drum, an interior cylinder extending longitudinally of the drum at or near the center of said drum, and communicating with an opening or pipe through the end or head of the drum, an air pipe or opening leading directly into the drum through the end or head and communicating with the space between the center of the drum and the outer shell thereof, and in the upper portion of the drum, one of the pipes or openings adapted to serve as a medium for supplying air to the drum, and the other of said pipes or openings as an air-discharge.

2. The combination, of a drum, an interior cylinder extending longitudinally in the drum, said cylinder having a series of perforations on its under side only, an air shaft or pipe leading into the upper portion of the drum, and an air shaft or pipe leading from the interior cylinder, one of said shafts or pipes adapted to serve as a medium for supplying air to the drum, and the other of said shafts or pipes as an air-exhaust.

3. The combination, of a revoluble drum, an interior perforated cylinder extending longitudinally in the drum, an air shaft or pipe leading directly into the drum and independent of and non-revoluble with the drum, and an air shaft or pipe leading from the interior cylinder, one of said shafts or pipes adapted to serve as a medium for conducting air into the drum, and the other of said shafts or pipes as an air-exhaust.

4. The combination, of a revoluble drum, a stationary interior cylinder extending longitudinally in the drum, said cylinder having a series of perforations on its under side, stirring mechanism located in the upper portion of the drum, and adapted by its stirring operation to keep a clear space in said upper portion of the drum, an air shaft or pipe leading directly into the upper portion of the drum to the space which is maintained clear by the stirring mechanism, and an air shaft or pipe leading from the interior cylinder, one of said shafts or pipes adapted to serve



as a medium for conducting air into the drum, and the other of said shafts or pipes as an air-exhaust.

5 The combination, of a revoluble drum, an  
interior perforated cylinder extending longi-  
tudinally in the drum, stirring mechanism lo-  
cated in the space between the interior cyl-  
inder and the outer shell of the drum, said  
stirring mechanism being mounted in bear-  
ings, which bearings are independent of and  
non-revoluble with the drum, an air shaft or  
pipe leading directly into the drum, and an  
air shaft or pipe leading from the interior cyl-  
inder, one of said shafts or pipes adapted to  
serve as a medium for conducting air into the  
drum, and the other of said shafts or pipes  
as an air-exhaust.

6 The combination, of a revoluble drum,  
one of the end pieces thereof having an open-  
ing therethrough, an interior perforated cyl-  
inder extending longitudinally in the drum  
and provided with a flange which covers the  
opening in the end of the drum, and said  
flange having an opening registering with the  
opening in the end of the drum, an air shaft  
or pipe leading to the opening in the flange,  
and an air shaft or pipe leading from the in-  
terior cylinder, one of said shafts or pipes  
adapted to serve as a medium for conducting  
air into the drum, and the other of said shafts  
or pipes as an air-exhaust.

7 The combination, of a drum, having a  
perforated tube arranged longitudinally in  
its interior, an interior perforated cylinder  
extending longitudinally in the drum, an air  
shaft or pipe leading directly into the drum  
and having a branch pipe extending there-  
from and adapted to be brought into register  
with the perforated tube, and an air shaft or  
pipe leading from the interior cylinder, one

of the shafts or pipes adapted to serve as a  
medium for supplying air to the drum, and  
the other of the shafts or pipes as an air-dis-  
charge.

8 The combination, of a drum, a perfo-  
rated interior cylinder at or near the center  
of the drum and extending longitudinally to  
a pipe or chamber for supply or discharge of  
air, a perforated tube at or near the outer  
shell of the drum and extending longitudi-  
nally within the body of the drum, and hav-  
ing an air-inlet from a pipe or chamber;  
and another pipe or chamber for the supply  
or discharge of air and having communica-  
tion with a direct opening in the end of the  
drum, and communicating with the space  
above the center of the drum, and between  
said center and the outer shell of the drum.

9 The combination of a drum, stirring  
mechanism within the drum, an interior per-  
forated cylinder at or near the center of the  
drum, and extending longitudinally to a pipe  
or chamber for supply or discharge of air, a  
perforated tube at or near the outer shell of  
the drum and extending longitudinally with-  
in the body of the drum, and having an air-  
inlet from a pipe or chamber, and another  
pipe or chamber for the supply or discharge  
of air and having communication with a di-  
rect opening in the end of the drum, said  
opening communicating with the space above  
the center of the drum and between said cen-  
ter and the outer shell of the drum.

In testimony whereof I affix my signature  
in presence of two witnesses.

JOHN F. DORNFELD.

Witnesses:

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