

No. 615,382.

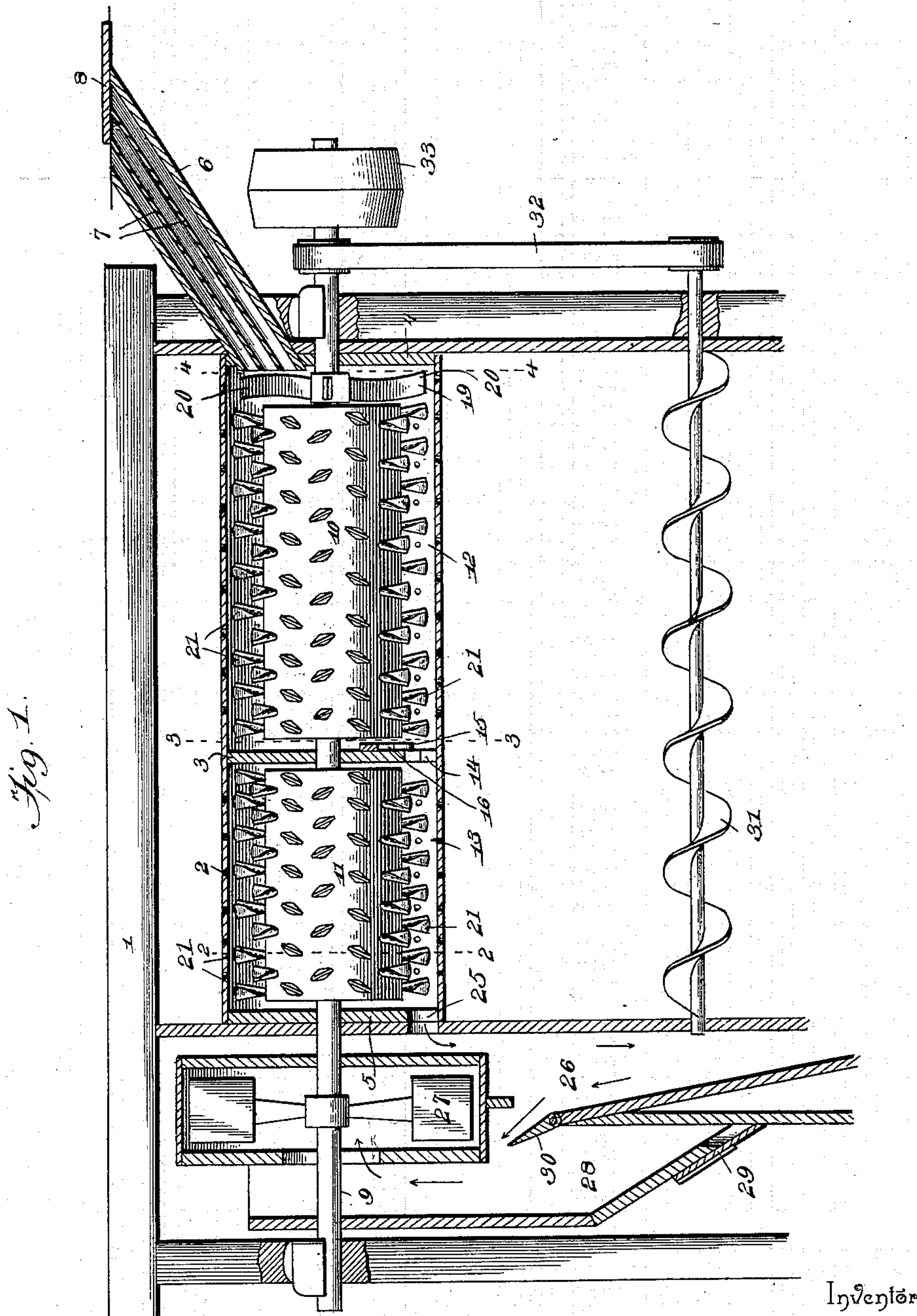
Patented Dec. 6, 1898.

L. D. BRUEMMER.
WHEAT CLEANER AND HEATER.

(Application filed Feb. 2, 1895.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

John C. Shaw
[Signature]

Louis D. Brummer,
By his Attorneys.

C. A. Shaw & Co.

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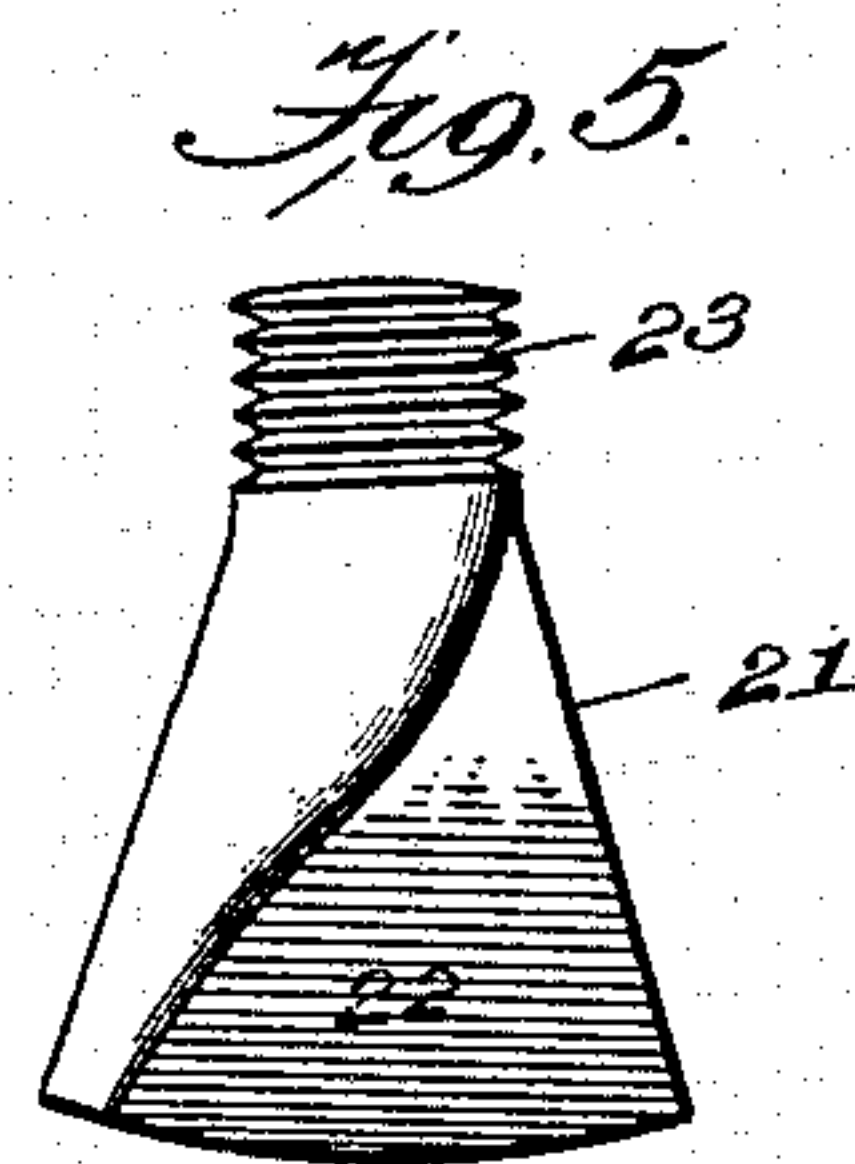
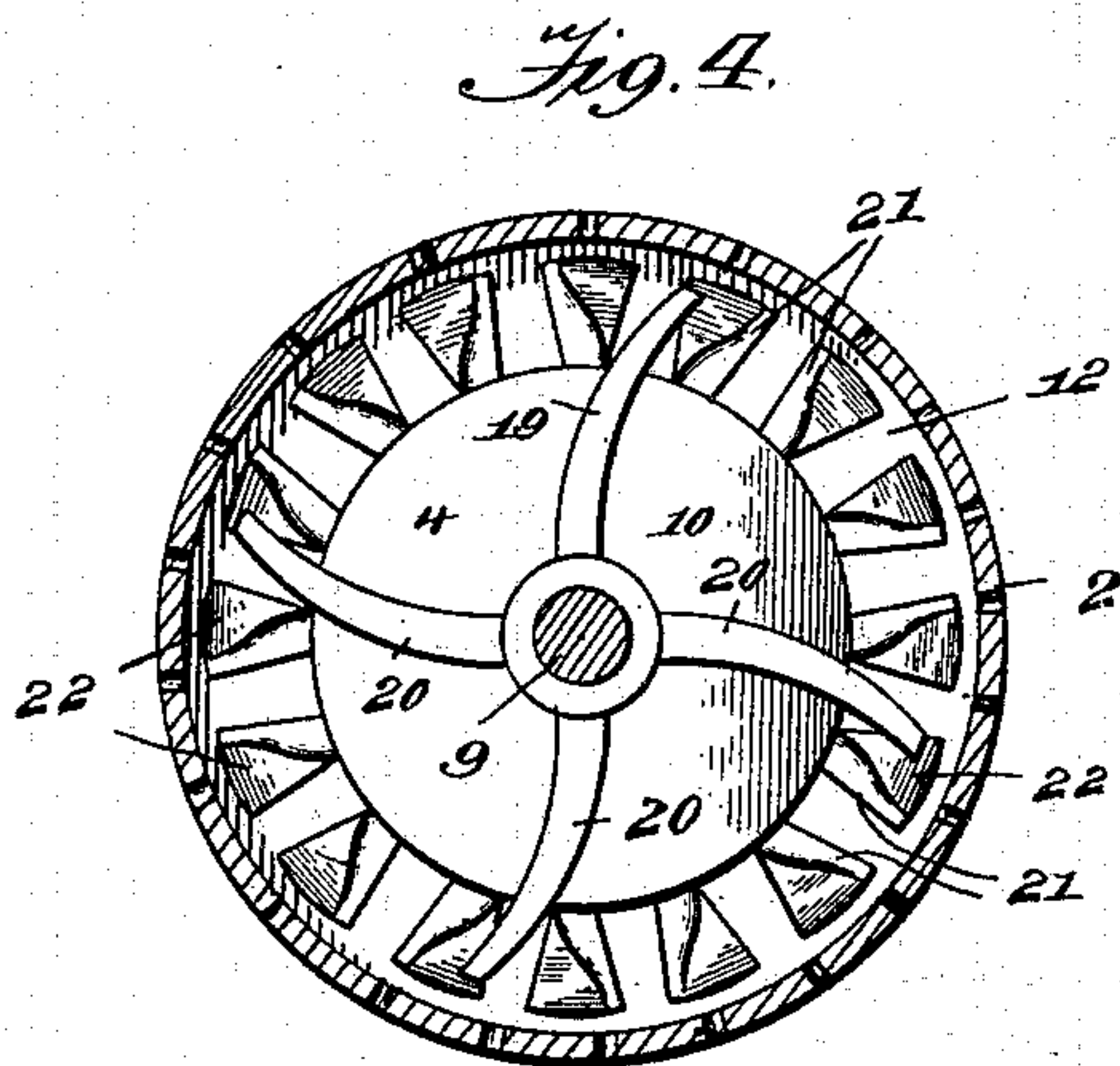
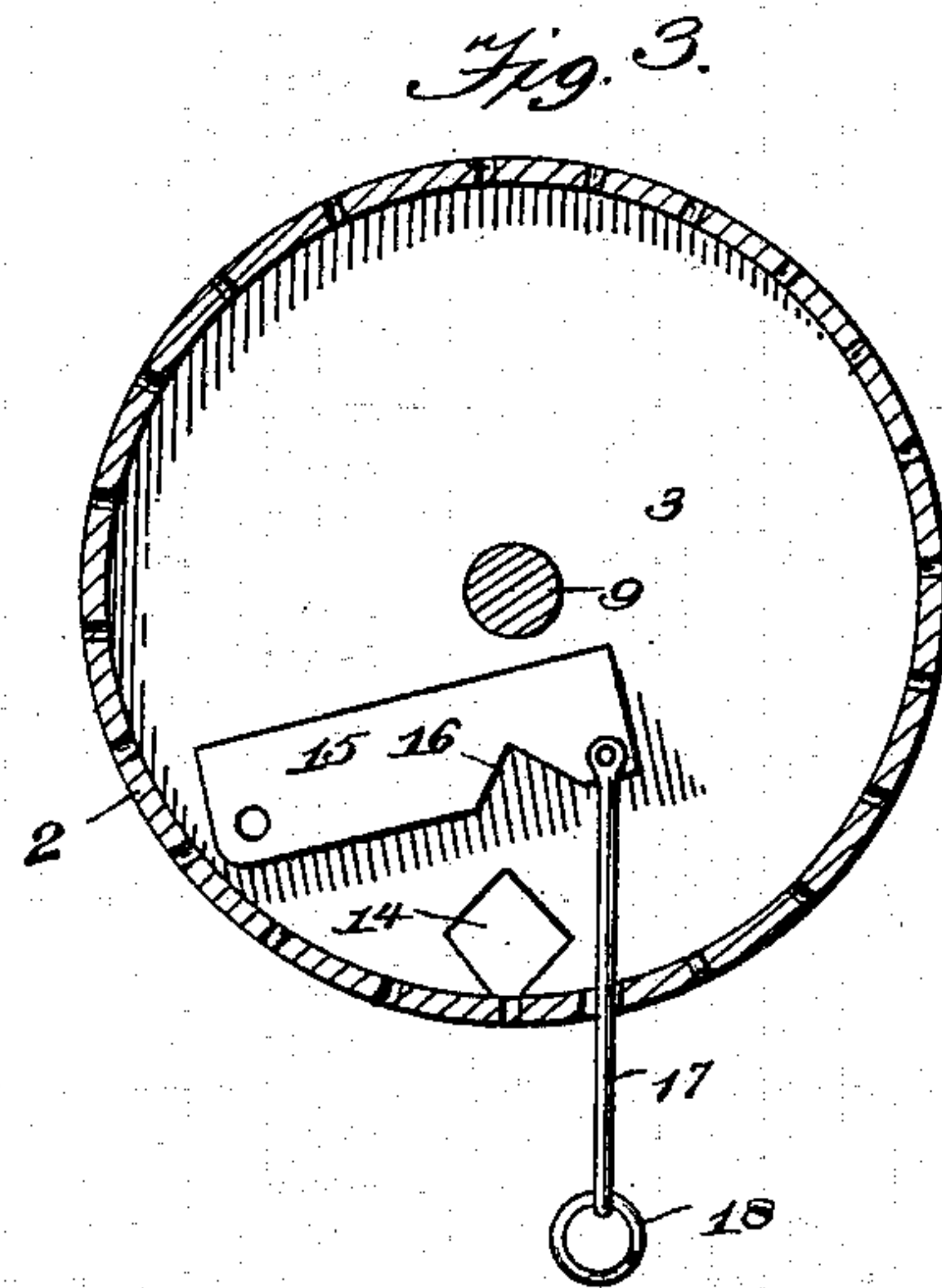
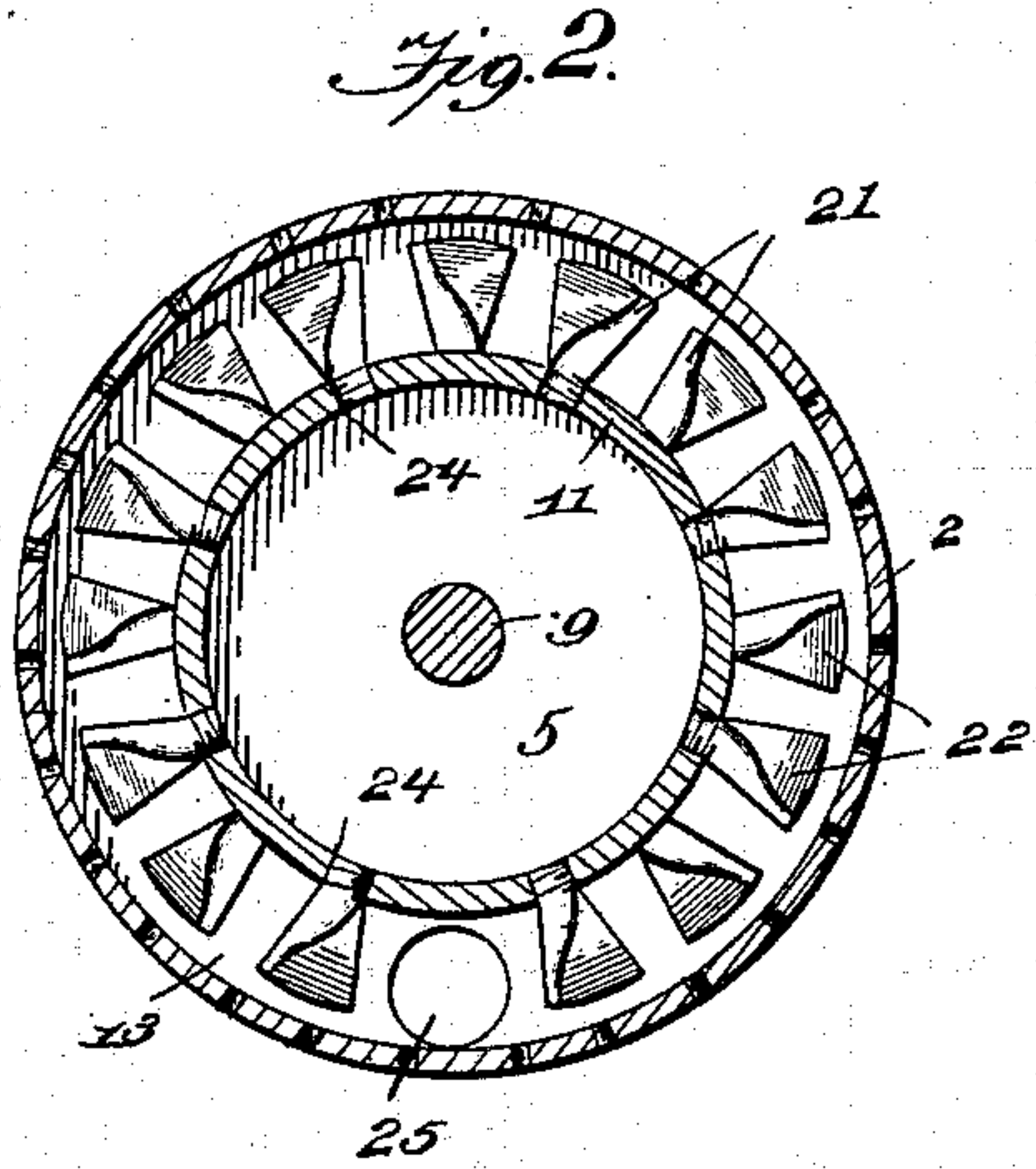
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2 Sheets—Sheet 2.



Inventor

Louis D. Bruemmer,

By his Attorneys,

Witnesses

John C. Shaw
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UNITED STATES PATENT OFFICE.

LOUIS D. BRUEMMER, OF AHNAPPEE, WISCONSIN.

WHEAT CLEANER AND HEATER.

SPECIFICATION forming part of Letters Patent No. 615,382, dated December 6, 1898.

Application filed February 2, 1895. Serial No. 537,107. (No model.)

To all whom it may concern:

Be it known that I, LOUIS D. BRUEMMER, a citizen of the United States, residing at Ahna-
pee, in the county of Kewaunee and State of
5 Wisconsin, have invented a new and useful
Wheat Cleaner and Heater, of which the fol-
lowing is a specification.

This invention relates to an improved wheat
cleaning and heating machine; and it has for
10 its object to provide a simple and practical
machine of this character in which the grain
is cleaned and polished without breaking and
wherein the heating is accomplished by fric-
tion. In carrying out this object the inven-
15 tion essentially consists in a casing provided,
respectively, at its opposite closed ends with
inlet and outlet openings, a partition divid-
ing the interior of the casing into two com-
partments of different lengths and having a
20 single-valved retarding-opening, which open-
ing is of a smaller area than one or more of
the feed or supply passages for the grain and
is also of a smaller area than the outlet-open-
ing. In combination with this construction
25 of casing the invention contemplates the use
of a sectional drum having separate long and
short portions arranged, respectively, within
the separate compartments of the casing and
carrying a peripheral series of flat-faced
30 flights which operate against the material
within the narrow uniformal working spaces
between the peripheries of the drum-sections
and the casing. The invention further con-
templated, as essential parts of the combina-
35 tion described, an exhaust-fan which has a
draft communication with the smaller com-
partment of the casing through the outlet-
opening for the grain and the force-feed spider
arranged directly adjacent to the inlet for
40 the grain and constructed so as to throw the
material out into the uniformal working space
surrounding the periphery of the longer drum-
section, all of said parts combining to provide
for the practical and efficient operation of the
45 machine.

Further objects and advantages of the in-
vention will appear in the following descrip-
tion, and the preferred manner of embodying
the different parts of the machine is shown
50 in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of
the machine constructed in accordance with

this invention. Fig. 2 is a transverse sec-
tional view on the line 2 2 of Fig. 1. Fig. 3
is a transverse sectional view on the line 3 3 55
of Fig. 1. Fig. 4 is a transverse sectional
view on the line 4 4 of Fig. 1. Fig. 5 is a de-
tail view in perspective of one of the flights
or plates of the rotary drum.

Similar numerals of reference indicate cor- 60
responding parts in all the figures of the draw-
ings.

1 designates a framework which supports
a horizontally-disposed perforated cylindrical
casing 2, provided at an intermediate point 65
with a transverse partition 3 and having ter-
minal heads 4 and 5 at its inlet and outlet ex-
tremities. Communicating with the inlet end
of the casing is a feed-spout 6, provided with
a series of longitudinal partitions 7. One or 70
more of the compartments thus formed may
be closed by means of a slide-valve 8, whereby
the desired number of compartments or chutes
may be employed to supply the grain at the
desired rapidity. 75

Mounted axially in the casing is a shaft 9,
which carries a rotary cylinder or drum 10
and 11, the longer portion 10 being arranged
in the compartment 12 of the casing and the
shorter portion 11 in the compartment 13 of 80
the same or upon opposite sides of the parti-
tion 3, communication being established be-
tween said compartments of the casing
through a diamond-shaped opening 14. This
opening may be partly closed by means of a 85
valve 15, having in its lower edge a notch 16,
a ring 18 being connected, by means of an ad-
justing connection 17, with the free end of
said valve. The notch 16 is of an inverted-V
shape, and the opening 14 is diamond shape, 90
whereby as the valve 15 descends the shape
of the opening 14 remains the same even when
partly closed. Arranged upon this shaft 9,
at the inlet end of the casing and contiguous
to the adjacent end of the rotary cylinder, is 95
a force or feed spider 19, provided with ra-
dial forwardly-convexed wings or arms 20,
which are adapted to receive the grain as it
is discharged from the spout and force it cen-
trifugally into the space between the cylinder 100
and the casing. Secured in longitudinal se-
ries to the surface of the rotary cylinder are
the flights or studs 21, flattened upon oppo-
site sides, as shown at 22, and increasing in

width toward their extremities. These flights are preferably provided with threaded stems 23 to engage suitable threaded sockets 24 in the cylinder, and the blades of the flights are arranged at an inclination to the axis of the cylinder in order to cause an impulse longitudinally to the grain during the rotation of the cylinder. The outer extremities of these flights are arranged close to the surface of the casing, so as to come in contact with all of the grain contained in the latter, and the flights in adjacent parallel series are inclined in opposite directions, as shown clearly in Fig. 1, whereby the impulse which is given to the grain is in opposite directions by the adjacent series of flights, thus causing a violent agitation of the same. This agitation and the frictional contact of the flights with the grain cause the heating of the latter in the compartment 12; but after passing through the opening 14 the grain is freely and quickly carried by the short drum-section 11 toward the outlet-opening 25 in the head 5 and during this travel becomes cooled gradually.

In order to allow the grain to cool in the compartment 13 of the casing, the outlet 25 therefrom is made larger than the opening 14, and in order to provide for crowding and heating the grain in the compartment 12 the grain must be admitted more freely through the chute or spout 6 than it can escape through the opening 14. The partitions 7 in the chute or spout provide for gaging the amount of grain which is allowed to enter therethrough, one or more of the compartments of the chute or spout being opened, as required, by the position of the slide or valve 8.

The outlet-opening 25 communicates with an air-trunk 26, into which the grain is discharged, and an upward current of air is induced through this trunk by means of a fan 27, which is located in a fan-casing communicating therewith, a dust-pocket 28 being interposed between the air-trunk and the fan-casing in order to receive heavy particles of dust which may be discharged by means of a slide-valve 29. A valve 30 is interposed between the dust-pocket and the trunk 26 to vary the force of the draft which is caused in the trunk. 31 represents a screw-conveyer of the ordinary construction, which is shown in connection with the improved mechanism, the same receiving motion by means of a belt 32 from the shaft 9, the latter receiving motion in the ordinary way through a belt-pulley 33. This conveyer is designed to receive dust discharged through the perforations of the casing during the securing of the grain and carry it to the exterior of the machine, as in the ordinary construction.

This being the construction of the improved apparatus it will be understood that the heating of the grain in the casing is accomplished by frictional contact and rapid agitation, resulting from the small passage between the exterior surface of the cylinder and the inte-

rior surface of the casing, which conforms cross-sectionally with the cylinder and the peculiar disposition of the flights and their arrangement at opposite inclinations. Obviously this heating of the grain is due in a great measure to the contact thereof with the perforated wall of the casing, and in order to increase this effect I apply outward or centrifugal pressure to the grain by reason of the outward reduction in thickness of the flights, whereby the side surfaces of the blades are beveled, and by combining with this centrifugal pressure the alternate inclination or diagonal disposition of the flights I obtain a scouring action, which insures the efficient removal of dust and other foreign matter from the surface of the grain. The equal longitudinal pressure in opposite directions, by reason of the alternate inclination in opposite directions of the flights, prevents the flights from accomplishing the forward feeding movement of the grain through the cylinder, and hence in order to accomplish the said feeding movement I employ the above-described force-feed device 19, having radial blades, which extend terminally beyond the surface of the rotary cylinder and preferably to a point as near to the wall of the exterior cylinder or casing as the extremities of the flights, said blades being curved or bowed toward their extremities, whereby they press the grain laterally or radially toward the wall of the outer cylinder and then forwardly to induce the longitudinal movement thereof through the machine.

It should be understood that the grain is fed at such a rapidity through the chute as to cause sufficient compression in the cylinder to produce scouring and heating. This heating or tempering of the grain is thus caused by friction, and after passing the opening 14 in the partition 3 the grain is partially cooled in order to prevent the flour from sticking to the bran and produce a more granular flour and middlings. Furthermore, the middlings are thus in a condition to be more easily produced to make a clearer and less low grade of flour.

As soon as the wheat is discharged from the air-trunk it should be reduced into flour before time has elapsed to allow it to cool entirely, the object of the air-trunk being to remove the dampness or sweating on the grain, and thus prevent sweating in the rolls, spouts, and flour-bolts.

I attach especial importance in my apparatus to the cylindrical casing divided into compartments by a partition having a single valve-controlled opening at the bottom thereof to establish and regulate the communication between the compartments, a single axial shaft extending entirely through the casing and serving as the means for actuating the feed mechanism, the two cylinders, and the exhaust-fan, the two cylinders attached to the shaft within the respective compartments of the casing and each carrying a plu-

5 reality of beaters in which the beaters of one series are arranged in reversely-inclined positions in relation to the beaters of the other series and all of said beaters arranged to sweep close to the annular surface of the casing, a rotary feeder situated directly within the first or primary scouring-compartment of the casing between the feed-inlet and the drum 10 therein, and a suction-fan carried by the distant end of the shaft and arranged within a fan-casing separate from the drum and communicating with a wind-trunk to which the grain from the cylindrical casing delivers the grain after it has been scoured 15 and partially cooled within the casing. In my machine the scouring of the grain is necessarily attended by more or less heating due to the friction which exists between the beaters, the casing, and the grain in the primary scouring-compartment. Hence it is important that the grain shall be cooled in its travel through the secondary chamber of the casing; and as the final step of treatment the grain is aerated and the impurities eliminated 20 by the suction-blast of air in the wind-trunk into which the grain and refuse are deposited directly from the casing, all of these operations being performed successively and continuously in a single machine.

30 In my machine the grain is admitted to the primary scouring-chamber in regulated volumes from the valve-controlled divided spout to be delivered directly upon the armed feeder, which throws the grain radially by centrifugal force directly outward against the cylindrical casing to force the same into the narrow uniformal working space between the drum and casing, and the chambered casing is thus designed to be filled with the grain 35 between its wall and the drum for the beaters to properly act upon the grain, so as to remove the hulls and dirt therefrom by friction. The passage of the grain through the primary scouring-compartment is retarded by twofold devices—i. e., the contracted 40 valve-controlled port 14 between the compartments and the reverse angular arrangement of the beater-blades on the drum, said beater-blades serving to retard the passage of the grain and act on the grain by attrition to clean the same, while the movement of the grain is effected by the mechanical action of the feeder, which constantly accumulates the grain in the case and by increasing the bulk 50 or quantity of grain causes its expulsion through the secondary compartment, from which it is free to escape more readily through the port 25 than through the port 14, and

hence the grain in said secondary compartment is not subjected to as much friction 60 from the beaters of the drum 11, so that the grain is in a measure cooled as it travels through said secondary compartment.

The grain and refuse from the casing are deposited directly in the air-trunk, which is 65 divided into two chambers, with the fan-casing in a plane between said chambers, as shown by Fig. 1, and the port or opening between such chambers of the trunk may be opened more or less by the valve 30, adapted 70 to find a seat against the fan-casing, thus regulating the strength of the suction-current from the wind-trunk to the fan-casing.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is— 75

In a machine of the class described, the combination of a horizontal cylindrical casing provided respectively at its opposite 80 closed ends with inlet and outlet openings for the grain, a partition dividing the interior of the casing into separate heating and cooling compartments of different lengths, and provided at its bottom edge with a single-valved retarding-opening of a smaller area 85 than the inlet for the grain, and also of a smaller area than the outlet-opening, the relative size of said openings providing for a crowding of the material within the longer or heating compartment of the casing, and a 90 freer passage through the shorter or cooling compartment to the outlet-opening, a sectional rotary drum having separate long and short portions arranged respectively within the heating and cooling compartments and 95 carrying a peripheral series of flights which operate against the material within the narrow uniformal working spaces between the peripheries of the drum-sections and the casing, a fan having a draft communication with 100 the shorter or cooling compartment through the outlet-opening, and the force-feed spider arranged between one end of the long drum-section and the inlet-opening and having its extremities projecting beyond the periphery 105 of the drum-section to direct the material into said uniformal working space, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 110 the presence of two witnesses.

LOUIS D. BRUEMMER.

Witnesses:

MATTS MELCHIOR,
 MICHAEL MELCHIOR.