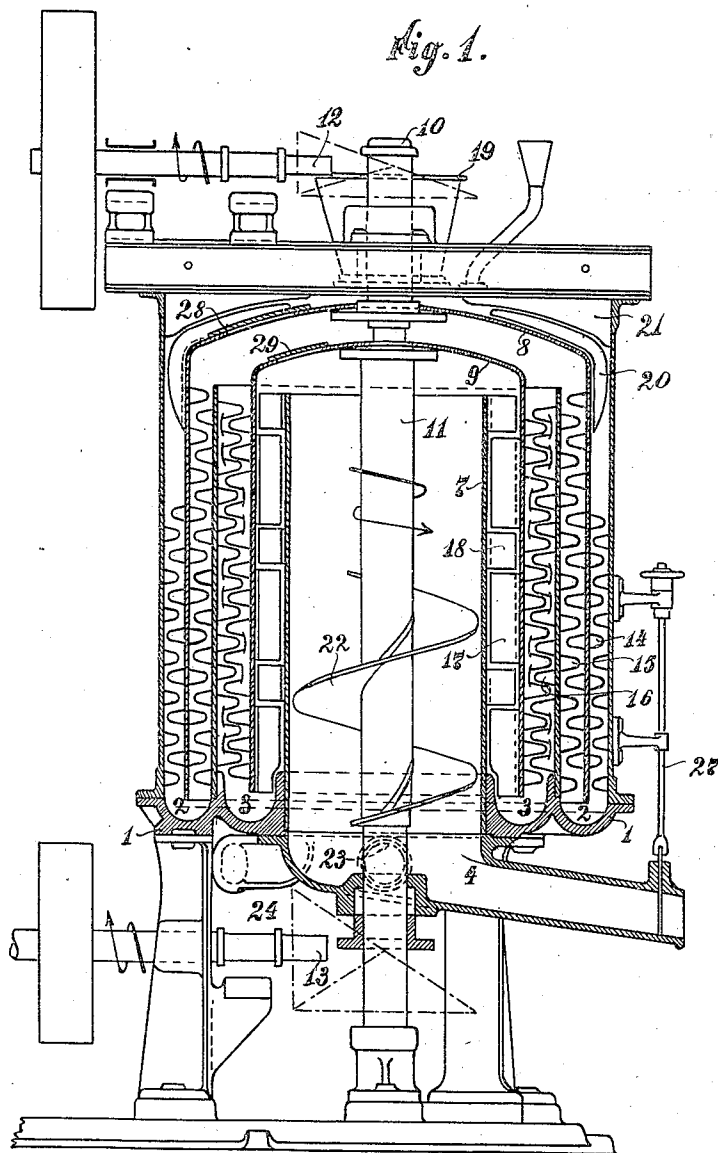


C. KURTZ-HÄHNLE.
FIBER SEPARATING MACHINE FOR PAPER AND PAPER STUFF.
APPLICATION FILED NOV. 5, 1910.

1,050,212.

Patented Jan. 14, 1913.

3 SHEETS-SHEET 1.



ATTEST

R. M. Dilly
C. H. Barlow

INVENTOR

Carl Kurtz-Hähle
By his atty

[Signature]

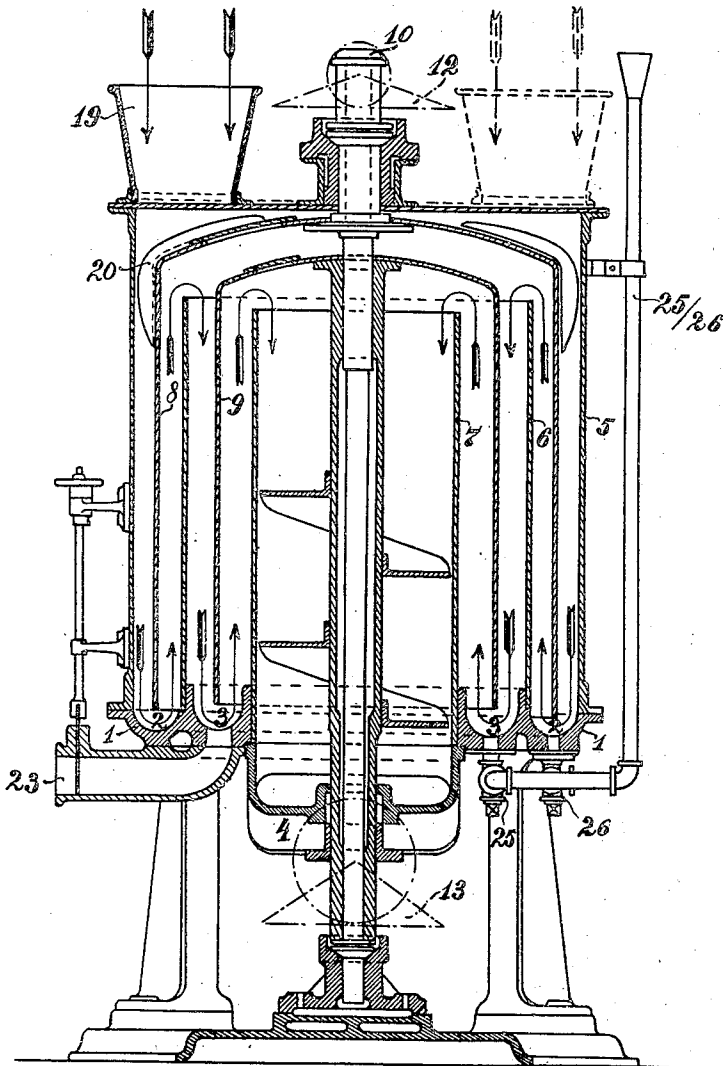
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3 SHEETS-SHEET 2.

Fig. 2.



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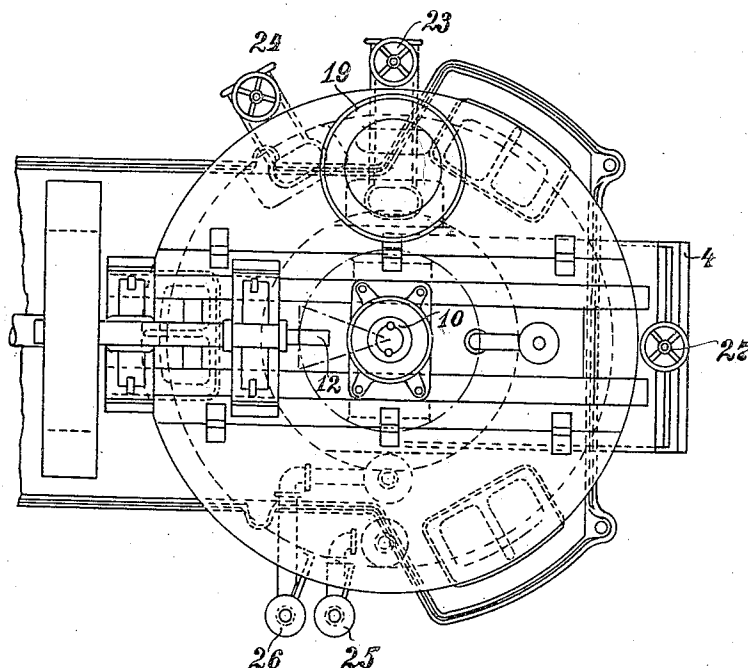
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CARL KURTZ-HÄHNLE, OF REUTLINGEN, GERMANY.

FIBER-SEPARATING MACHINE FOR PAPER AND PAPER STUFF.

1,050,212.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed November 5, 1910. Serial No. 590,776.

To all whom it may concern:

Be it known that I, CARL KURTZ-HÄHNLE, a subject of the King of Wurttemberg, residing at Reutlingen, in the Kingdom of Wurttemberg, German Empire, have invented a new and useful Improved Fiber-Separating Machine for Paper and Paper Stuff of All Kinds, of which the following is a specification.

In the disintegration of paper and similar waste in the manufacture of paper stamping batteries were formerly used which were afterward superseded by mills. As the quantities of such waste used in the manufacture of paper increased such mills were however insufficient to deal with the volume to be treated, because only limited separate charges could be manipulated so that it became necessary to construct continuously working machines for the disintegration of the material so as to separate the fibers from one another.

This invention relates to such a continuously working machine.

Two important points of the disintegrating operation have had attention, first the dissolution of the paper stuff while protecting the fibers as much as possible so as to avoid cutting or grinding, and secondly the absolute uniformity of the separation of the fibers. For the latter purpose a vertical system of operation has been chosen, and also a simultaneous ascent and descent of the material under treatment is insured during the working so that each fiber has to pass with certainty all working surfaces and always in the same path of equal length. With this view this new fiber separating machine has been constructed in such a manner that on a fixedly round bottom with suitably rounded grooves and central exit, cylinders open at the top, are situated fixed and concentrically, between which enter inverted cylindrical bells mounted on an axle situated in the central axis of the whole apparatus which are rotated by such axle by means of gearing. The mantle of the bells and the sides of the cylinder toward the bell mantle are provided with kneading devices of known kind.

The arrangement of the kneading devices on the cylinders is designed so that they are fixed around the cylinder walls at equal distances apart in horizontal planes which are at uniform distances from one another. In a similar manner the kneading devices

are situated between these planes on the bell mantle, so that they pass, at the rotation of the bell, the fixed studs at a uniformly small distance without contact taking place anywhere.

For coarse materials such as boiled cellulose wood, a machine with two cylinders and one bell may be sufficient, but for hard sized paper stuff the fiber separator is preferably provided with at least two bells and three cylinders, as illustrated by way of example in the accompanying drawings.

Figure 1 shows a vertical section through the cylinders and bells to the driving axle. Fig. 2 is a vertical section similar to Fig. 1 but at right angles thereto, and Fig. 3 is a plan of the machine.

The separator consists essentially of a fixed round bottom 1 with suitably rounded grooves 2 and 3 and the central exit 4, on which are fixed concentrically three cylinders 5, 6, 7 open at the top, between which are situated two bells 8 and 9. Of these bells the outer one is situated on a solid axle 10 and the inner one on a hollow axle 11. Each of these bells is driven separately by gearing devices 12 and 13, the inner bell receiving a higher number of revolutions corresponding to its lesser circumference.

The driving of both bells may be effected either from below or from above. The number of bells and cylinders may be suitably increased according to requirement. The bells may also be formed by several cylinders situated on a foundation plate.

The sides of the bells are provided inside and outside with kneading devices, and the sides of the cylinders facing the sides of the bells are also provided in a similar manner. The formation of the kneading elements is designed according to the increasing fineness of the material treated. In the outer sets the separation of the fibers is effected by large kneading devices 14 widely apart, the middle sets 15 and 16 are smaller and less widely apart, and the inner sets for the complete dissolution of the stuff carries scrapers 17 which pass at a small distance from the opposite wall over the stuff moving vertically, and which co-act with other scrapers 18 provided between them in regular succession for the purpose of turning the scraped stuff, so that it is kneaded through from the other side and finally opened up.

The forward movement of material to be separated into fibers and introduced

through a funnel 19 is effected by rotating devices 20 which feed the material to the separating studs. On the cover of the machine are provided fixed devices 21 coacting with the devices 20, of a shape which facilitates the forward movement of the material as much as possible. A transporting spiral or worm 22 situated in the cylinder 7 serves the same purpose and facilitates the discharge of the material to the outlet 4.

At the bottom of the receptacle 1, are provided cleaning pipes 23 and 24 leading from the grooves 3 and 2 respectively, which pipes receive any foreign matter carried by the material falling into them, and also facilitate the quick emptying and cleaning of the apparatus.

In order to prevent the paper pulp becoming too thick in the interior of the separator water admission services 25 and 26 are provided leading to the grooves 3 and 2 respectively, which may be connected to available steam pipes for the more easy opening up of very hard sized paper waste.

The exit opening may be closed by a slide 27 in order to stop the flow and to effect when necessary a slower passage of the material through the separator. In the domes of the bells there are provided peep holes 28 and 29. By the construction of the side and intermediate walls with double walls the apparatus may be adapted to be heated as may be desired.

The working of the new fiber separator is as follows: The material to be separated into fibers is fed, well moistened, through the funnel 19 at the top between the rotary bell 8 and the outer cylinder 5, it then moves downward, reverses on the groove 2 in the bottom plate of the receptacle 1, rises between the bell 8 and the cylinder 6, passes over the rim of the cylinder 6, moves downward between the latter and the bell 9, and after being separated into its fibers under the influence of the studs and the scrapers 17, 18, finally falls into the inner space of the cylinder 7 whence it issues as fiber pulp through the central exit 4 in the bottom.

The forward movement of the material is effected by itself if in sufficiently liquid condition, the inner cylinders are arranged lower than the outer cylinders, or a spiral or worm 20 is provided fixed to the bell and pressing downward, or the oblique position of the flat studs is utilized or suction from the exit orifice is adopted. Preferably the axle rotating in the innermost cylinder is provided with a spiral or worm 22 which facilitates the exit of the material.

I claim:

1. In a fiber separating machine, the combination of a plurality of coacting cylindrical walls arranged concentrically to form between them a plurality of cylindrical spaces closed at the bottom and communi-

cating with one another in series producing a continuous passageway for the fiber, said walls having a relative rotary movement.

2. In a fiber separating machine, the combination of two concentrically arranged stationary walls having a closed connection with one another at the bottom, and a rotary cylindrical wall extending between the stationary walls and forming therewith two cylindrical spaces communicating with one another at the bottom and producing a continuous passageway for the fiber.

3. In a fiber separating machine, the combination of a plurality of concentrically arranged stationary walls having a closed connection with one another at the bottom, and a rotary cylindrical wall extending between each pair of the stationary walls and forming therewith cylindrical spaces communicating with one another at the bottom and producing a continuous passageway for the fiber.

4. In a fiber separating machine, the combination of a plurality of coacting cylindrical walls arranged concentrically to form between them a plurality of cylindrical spaces closed at the bottom and communicating with one another in series producing a continuous passageway for the fiber, said walls having a relative rotary movement and being provided with projections of relatively different degrees of coarseness.

5. In a fiber separating machine, the combination of a plurality of concentrically arranged stationary cylinders having a closed connection with one another at the bottom, a plurality of rotary cylinders arranged one between each pair of adjacent stationary cylinders and forming therewith cylindrical spaces communicating at the bottom and constituting a continuous closed passageway for the fiber, and means to rotate the rotary cylinders independently of one another.

6. In a fiber separating machine, the combination of a base-plate provided with an annular groove, two concentrically arranged stationary cylinders on said base-plate on opposite sides of the groove, and a rotary cylinder extending between said stationary walls but not to the bottom of the groove on the base-plate, so as to form two passageways communicating at the bottom through the annular groove in the base plate and constituting a continuous conduit for the passage of the fiber.

7. In a fiber separating machine, the combination of a series of coacting cylindrical walls arranged concentrically and having a relative rotary movement and forming between their adjacent faces passageways communicating at the bottom and constituting a continuous conduit through which the material passes.

8. In a fiber separating machine, the com-

5 combination of a series of coaxing cylindrical
walls arranged concentrically and having a
relative rotary movement and forming be-
tween their adjacent faces passageways
communicating at the bottom and consti-
tuting a continuous conduit through which
the material passes, an inlet for the material
to the top of the space between the outer
pair of cylindrical walls at one end of the
10 conduit, and an outlet for the treated ma-
terial from the interior of the innermost
cylindrical wall at the other end of the con-
duit.

15 9. In a fiber separating machine, the com-
bination of a series of coaxing cylindrical
walls arranged concentrically and having a
relative rotary movement and forming be-
tween their adjacent faces passageways
communicating at the bottom and constitut-
20 ing a continuous conduit through which the
material passes, an inlet for the material to
the top of the space between the outer pair
of cylindrical walls at one end of the con-
duit, an outlet for the treated material from
25 the interior of the innermost cylindrical wall
at the other end of the conduit, and a con-
veyer for conveying the material through
the interior of the innermost cylindrical
wall to the outlet.

30 10. In a fiber separating machine, the

combination of a series of coaxing cylin-
drical walls arranged concentrically and
having a relative rotary movement and
forming between their adjacent faces
passageways communicating at the bottom 35
and constituting a continuous conduit
through which the material passes, an inlet
for the material to the top of the space be-
tween the outer pair of cylindrical walls at
one end of the conduit, an outlet for the 40
treated material from the interior of the in-
nermost cylindrical wall at the other end of
the conduit, and means between the inlet
and the top of the space between the outer
pair of cylindrical walls to force incoming 45
material into said space.

11. In a fiber separating machine, the
combination of a series of concentrically ar-
ranged cylinders having a relative move-
ment and forming between their adjacent 50
faces passageways communicating at the
bottom and constituting a continuous con-
duit through which the material passes,
and a water pipe to introduce water into
said passageways.

CARL KURTZ-HÄHNLE.

Witnesses:

PAUL AUDRASSEP,
WILHELM ZIFF.