H. PAATZ.

WASHING OUT AND REFINING MACHINE.

APPLICATION FILED JAN. 24, 1913.

1,083,128.

Patented Dec. 30, 1913.

3 SHEETS—SHEET 1.

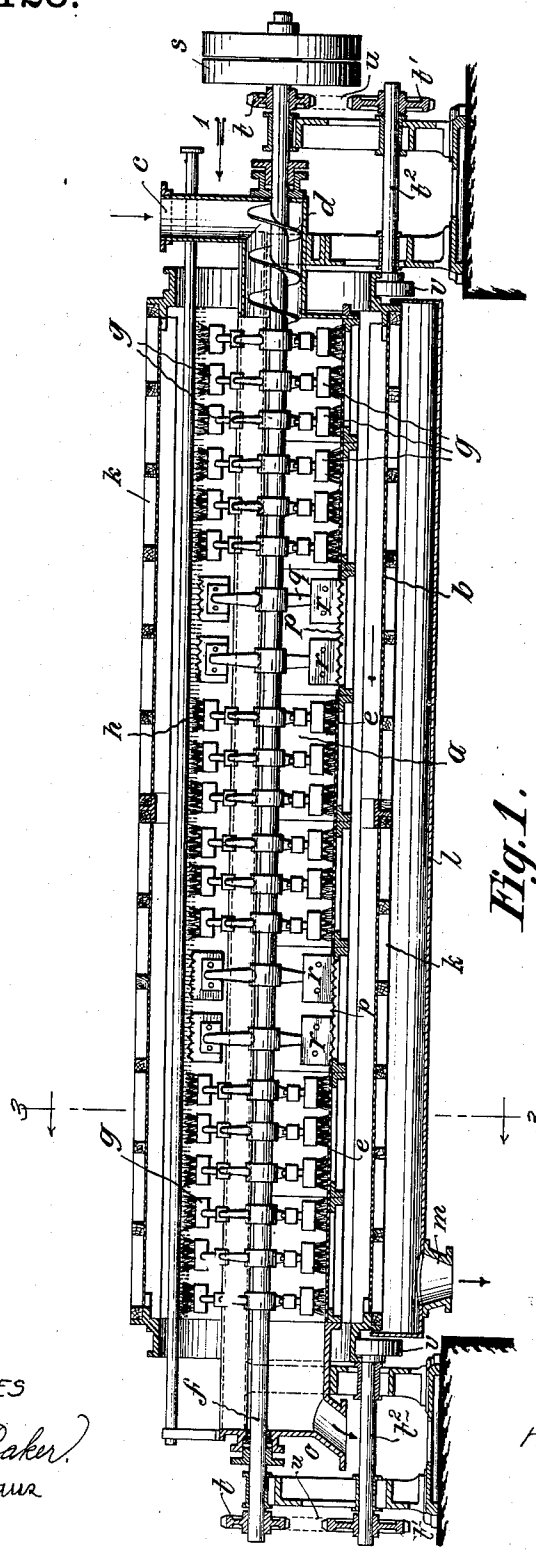


Fig. 1.

WITNESSES

W. C. Baker.

F. L. Ballman

INVENTOR

Hermann Paatz

BY Munn & Co

ATTORNEYS

H. PAATZ.

WASHING OUT AND REFINING MACHINE.

APPLICATION FILED JAN. 24, 1913.

1,083,128.

Patented Dec. 30, 1913.

3 SHEETS—SHEET 2.

Fig. 2.

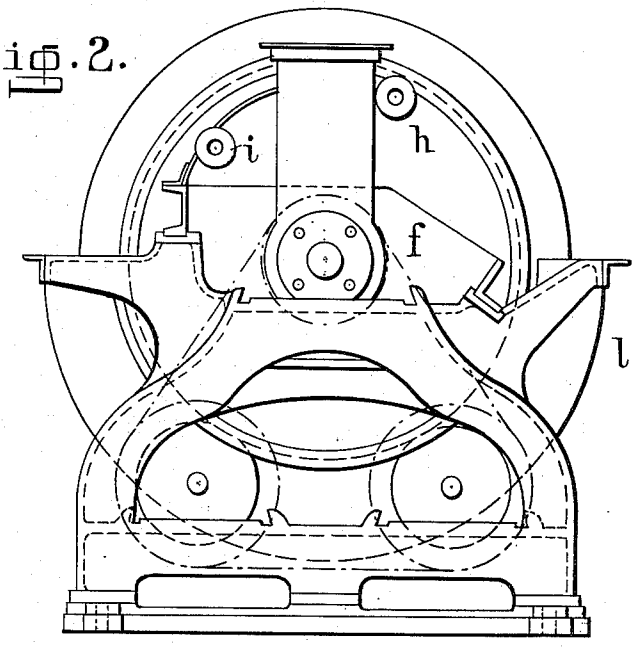
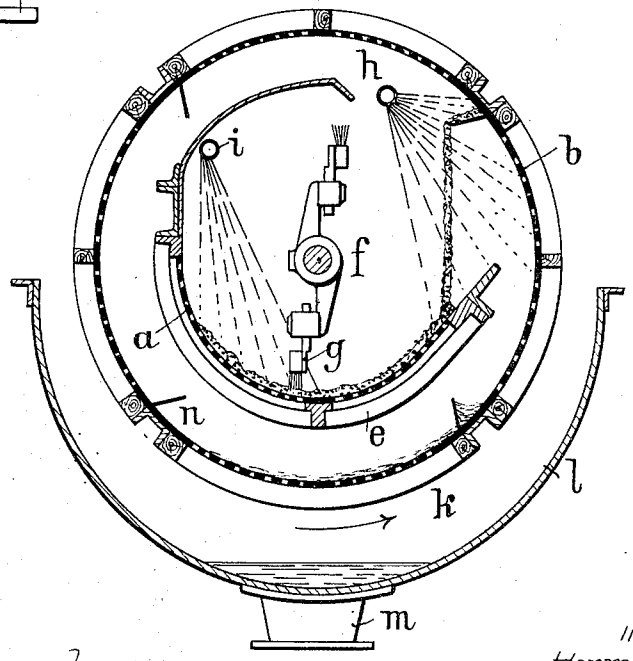


Fig. 3.



WITNESSES

W. C. Baker

P. B. Rollhaus

INVENTOR

Hermann Paatz

BY Munn & Co.

ATTORNEYS

H. PAATZ.

WASHING OUT AND REFINING MACHINE.

APPLICATION FILED JAN. 24, 1913.

1,083,128.

Patented Dec. 30, 1913.

3 SHEETS—SHEET 3.

Fig. 4.

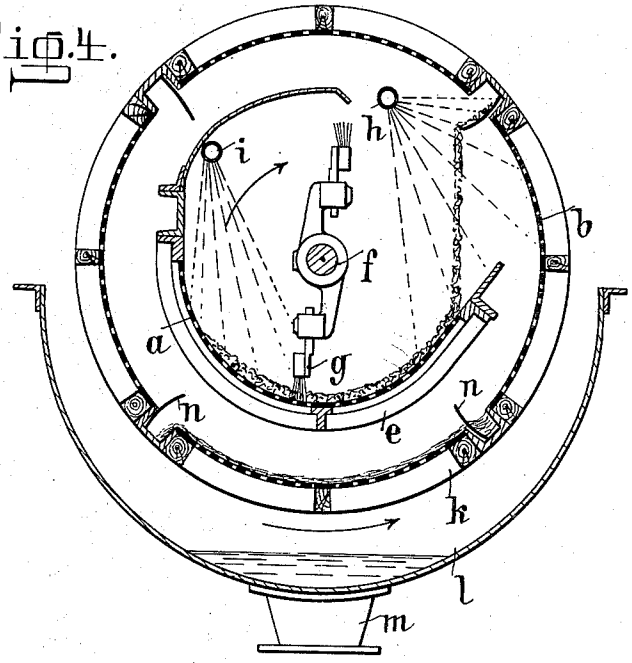
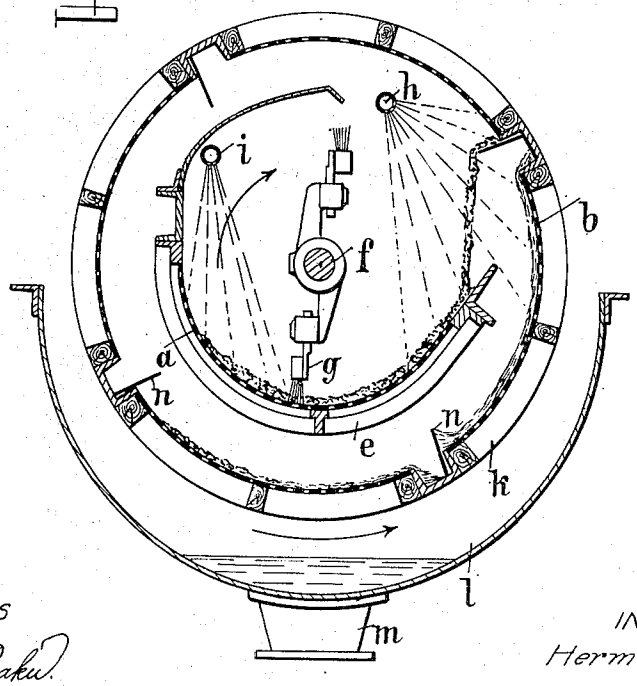


Fig. 5.



WITNESSES

C. C. Baker

F. D. Rollhaus

INVENTOR

Hermann Paatz

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

HERMANN PAATZ, OF BURG, NEAR MAGDEBURG, GERMANY.

WASHING-OUT AND REFINING MACHINE.

1,083,128. Specification of Letters Patent. Patented Dec. 30, 1913.

Application filed January 24, 1913. Serial No. 743,903.

To all whom it may concern:

Be it known that I, HERMANN PAATZ, a subject of the King of Saxony, residing at 2 Vogelgesang, Burg, near Magdeburg, Germany, have invented certain new and useful Improvements in Washing-Out and Refining Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention.

The invention relates to starch-making machinery, and its object is to provide a new and improved washing out and refining machine arranged to effectively separate the starch from the pulp, and to allow of carrying on the washing out and refining operations in a single machine.

For the purpose mentioned use is made of washing out means and refining means, the latter receiving the washed out material from the said washing out means, and returning the coarse material to the washing out means for re-washing out of the material.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal central section of the washing out and refining machine; Fig. 2 is an enlarged end view of the same; Fig. 3 is a cross section of the same on the line 3—3 of Fig. 1; and Figs. 4 and 5 are cross sections of modified forms of the refining drum.

In the manufacture of starch as heretofore practised it has been customary to carry on the washing out and refining operations in separate machines, thus necessitating the transferring of the starch solution from the washing out apparatus either by pumping it or by causing it to flow by its own gravity from one machine to the other. The separate machines used take up considerable space and increase operating expenses. With the machine presently to be described in detail, the washing out and refining operations are carried on simultaneously in one machine.

A fixed washing out screen *a* is arranged within a revoluble refining screen drum *b*, and the material to be treated is fed into one end of the washing out screen *a* by the use of an inlet *c* containing a conveyer screw *d* mounted on a shaft *f* extending centrally through the screen *a*. One outer end of the shaft *f* is provided with pulleys *s* connected by belt with other machinery for imparting a rotary motion to the shaft *f*, which latter is provided with spirally-arranged brushes *g* adapted to brush the material against the screen *a*, which latter is trough-shaped and mounted on a suitable fixed frame *e*. Jets of water are supplied by perforate pipes *i* and *h* extending lengthwise in the machine above the screen *a*, as plainly indicated in the drawings, it being understood that the material is fed forward in the screen *a*, by the use of the brushes *g*, and the starch solution or milk mixed with the minute particles of the material pass through the meshes in the screen *a* and thus pass onto the bottom of the revoluble refining screen drum *b*. The screen drum *b* is provided with a frame *k* carrying a fine mesh screen, and the lower portion of the refining screen drum *b* extends into a tank *l* for receiving the refined starch solution passing through the meshes in the seat of the drum *b*. The tank *l* is provided with an outlet *m* for carrying off the refined solution of starch. The drum *b* is provided interiorly with buckets *n* for lifting the coarse material and for discharging it back into the washing out screen *a*, as plainly indicated in Fig. 3, so that this coarse material is again subjected to the action of the water issuing through the jet pipes *i h*.

By reference to Figs. 3, 4 and 5, it will be seen that the openings in the pipe *h* are so arranged as to act on the coarse material during the time it drops from a bucket of the refining drum *b* back into the washing out screen *a*, while the jets of water from the pipe *i* act more directly on the material contained at the time in the screen *a*. It will be noticed that by the arrangement described the material is thoroughly washed out and the washed out material passes through the meshes in the screen *a* down into the refining drum *b* from which the refined material can pass into the tank *l* to be finally discharged therefrom through an outlet *o*.

In order to permit of reducing the material in its travel through the screen *a* use is made of reducing sections *p* arranged in the screen *a* and preferably formed of sheet metal having punched-up openings to produce upwardly-extending projections against which the material is pressed by the use of rubbing plates *r* held on arms *q* attached to the shaft *f*, as indicated in Fig. 1. It is

understood that when the shaft *f* is rotated the plates *r* press the material against the sharp perforated points in the screen sections *p* to reduce the material during its travel through the screen *a*. It is understood that the reduced particles are readily washed by the water from the jet pipe *i* through the meshes in the screen *a* to pass into the refining drum *b*.

The drum *b* is driven from the shaft *f* and for this purpose use is made of sprocket wheels *t* secured on the shaft *f* and connected by sprocket chains *u* with sprocket wheels *t'* secured on shafts t^2 carrying rollers *v* supporting the drum *b* and revolving the same so that the drum rotates in unison with the shaft *f* of the washing out device.

It will be noticed that by the arrangement described the material is treated over and over again until the starch and fine particles of the material have passed into the tank *l* while the coarse pulp passes out of the fixed screen *a* by way of the outlet *o*. It will further be noticed that by the arrangement described the washing out device and the refining means are combined in one machine and co-act with each other in that the material passes from the washing out apparatus into the refining apparatus, and the coarse portion of the material is returned by the refining apparatus to the washing out apparatus to be re-treated. A machine of this kind takes up much less room than the single driving device and less water is required for carrying out the washing out and the refining operations. It will also be noticed that a very effective washing out takes place as the material is subjected to the action of the brushes on the under surface of the washing out screen *a*, and a more concentrated starch solution is obtained.

The buckets *n* in the refining drum *b* may be arranged in various forms. As shown in Fig. 3, the buckets are formed by angular plates attached to the longitudinal U-shaped members of the frame *k*, and as shown in Figs. 4 and 5 the U-shaped members of the frame *k* are used as parts of the buckets together with the angular plates, which may be fastened to either side of the corresponding U-shaped frame members and may be either straight or curved.

I claim:

1. A washing out and refining machine of the class described, comprising fixed washing out means and revoluble refining means, the said refining means receiving the fine and coarse washed out material from the said washing out means and separating the same, and means whereby the revoluble refining means returns the coarse material to the said washing out means for re-washing out of the material.

2. A washing out and refining machine of the class described, comprising fixed washing out means and revoluble refining means within which the said washing out means are arranged, the fine and coarse washed out material passing directly from the said washing out means into the said refining means and being separated thereby, and means whereby the revoluble refining means directly returns the coarse washed out material therein to the said washing out means.

3. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, and a revoluble refining screen drum within which the said washing out screen is located, the said revoluble refining screen drum being provided interiorly with lifting devices adapted to lift the material and to discharge it into the said washing out screen.

4. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, a revoluble refining screen drum within which the said washing out screen is located, the said revoluble refining screen drum being provided interiorly with lifting devices adapted to lift the material and to discharge it into the said washing out screen, and means for driving the said refining drum from the shaft of the said brush.

5. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, a revoluble refining screen drum within which the said washing out screen is located, the said revoluble refining screen drum being provided interiorly with lifting devices adapted to lift the material and to discharge it into the said washing out screen, a feeding device for feeding the material into one end of the said washing out screen, and an outlet at the other end of the said washing out screen.

6. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, a revoluble refining screen drum within which the said washing out screen is located, the said revoluble refining screen drum being provided interiorly with lifting devices adapted to lift the material and to discharge it into the said washing out screen, and means for discharging water onto the material as the latter passes from the refining drum into the said washing out screen.

7. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, a revoluble refining screen drum within which the said washing out screen is located, the said refining drum being provided in its peripheral face with

reducing sections, and rubbing arms on the said brush and operating in conjunction with the said reducing sections to reduce the material.

8. A washing out and refining machine of the class described, comprising a fixed washing out screen open at the top, a revoluble brush in the said screen, a revoluble refining screen drum within which the said washing out screen is located, the said revoluble refining screen drum being provided interiorly with lifting devices adapted to lift the material and to discharge it into the said washing out screen, and a tank having an outlet and into which extends the bottom portion of the said refining drum.

9. A washing out and refining means of the class described, comprising a fixed washing out screen, a revoluble refining screen drum within which the fixed washing out screen is located, the revoluble screen receiving the washed out material from the washing out screen and retaining the coarse part of the same, and means on the revoluble screen drum for returning the said coarse material to the said washing out screen.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN PAATZ.

Witnesses:
ERNEST L. IVES,
CARL J. SINDE.