

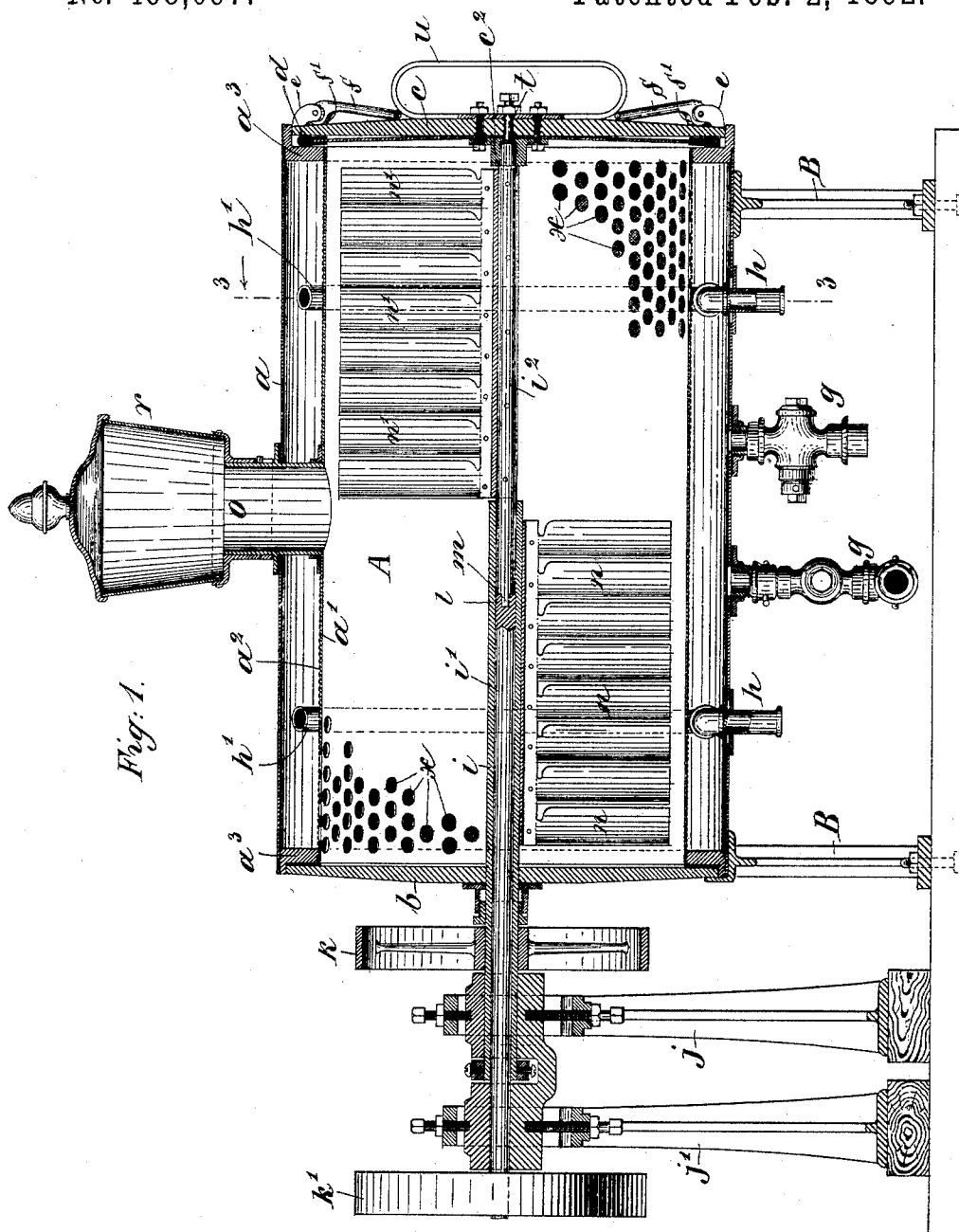
(No Model.)

3 Sheets—Sheet 1.

E. GUNDRUM.  
MACHINE FOR WASHING FIBROUS MATERIALS.

No. 468,097.

Patented Feb. 2, 1892.



INVENTOR:

*Edward Gundrum*

WITNESSES:

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By

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(No Model.)

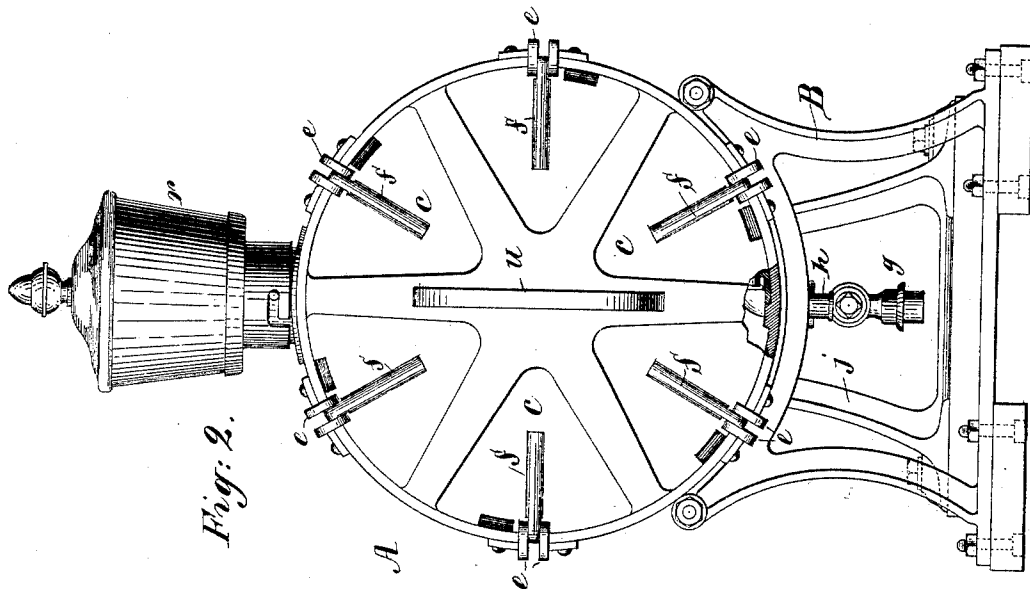
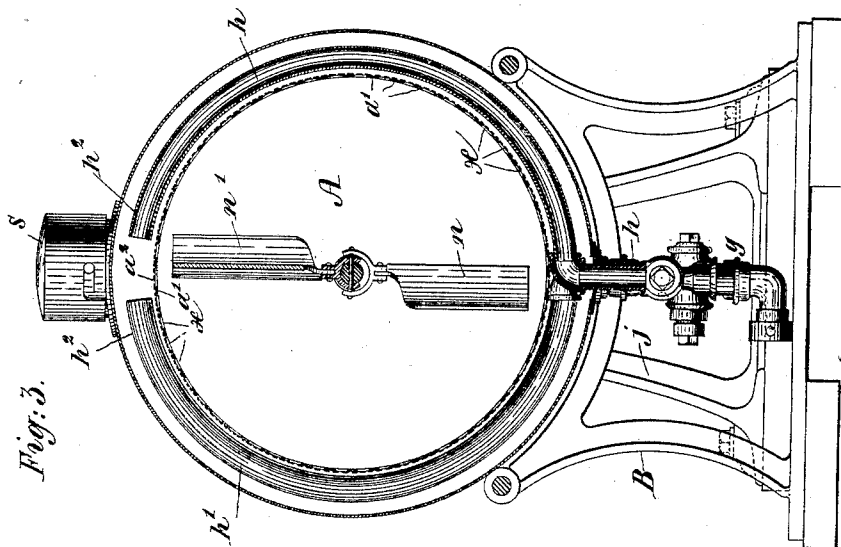
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MACHINE FOR WASHING FIBROUS MATERIALS.

No. 468,097.

Patented Feb. 2, 1892.



WITNESSES:

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(No Model.)

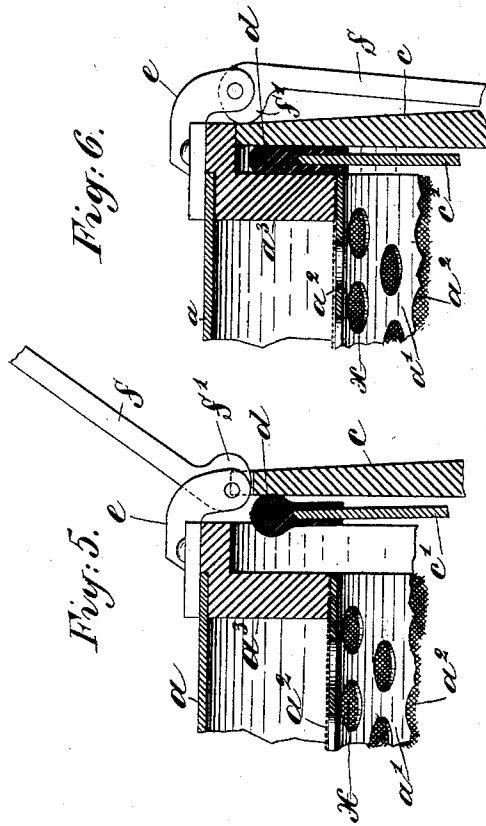
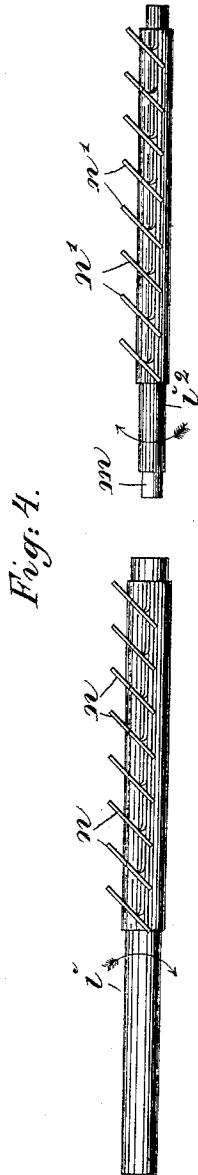
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# MACHINE FOR WASHING FIBROUS MATERIALS.

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WITNESSES:

Chas. A. Walsh

INVENTOR:

Edward Gundrum,

By Henry Bonnett  
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# UNITED STATES PATENT OFFICE.

EDWARD GUNDRUM, OF NEW YORK, N. Y.

## MACHINE FOR WASHING FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 468,097, dated February 2, 1892.

Application filed March 2, 1891. Serial No. 383,439. (No model.)

### *To all whom it may concern:*

Be it known that I, EDWARD GUNDRUM, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Washing Fibrous Materials and the Like, of which the following is a specification.

My invention relates to washing-machines, and particularly to a machine adapted for washing fibrous materials or pulp employed in filters. Some forms of filters employ wood pulp as a filtering material, and this pulp becomes charged with foreign matters and must either be thrown away or cleansed.

My present invention provides a machine for washing and cleansing such filtering material.

The invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the accompanying drawings, serving to illustrate my invention, Figure 1 is a longitudinal vertical section of a machine embodying my improvements. Fig. 2 is an end elevation of the same, and Fig. 3 is a transverse vertical section of the same in the plane indicated by the line 3 3 in Fig. 1. Fig. 4 is a view showing the agitator detached. Figs. 5 and 6 are detached detail views illustrating the means for packing and securing the detachable head of the drum.

The apparatus is in the form of a stationary drum mounted horizontally on a suitable support and provided with a rotating central shaft bearing agitators arranged within the drum.

A represents the drum as a whole, mounted upon suitable supports or stands B. This drum comprises an outer cylinder  $a$ , which may be of galvanized iron, and an inner cylinder  $a'$ , which may be of copper. This inner cylinder has in it apertures or perforations  $x$ , which may be about one-fourth of an inch in diameter. Applied to the outer face of the inner cylinder  $a'$  is a covering  $a^2$  of fine wire-gauze. This gauze is designed to cover the apertures  $x$ , and the simplest way to attain this object is to apply a sheet of gauze closely to the outer face of the aper-

tured cylinder. The ends of the annular space between the cylinders are closed by rabbeted rings  $a^3$ , secured rigidly to the cylinders. One head  $b$  of the drum may be permanently secured thereto, or at least it need not be readily removable. The other head  $c$  will be readily removable. This latter head will fit into the rabbet in the ring  $a^3$  at that end, and it will have a packing-ring  $d$ , the construction of which is best illustrated in the detail views, Figs. 5 and 6. On the inner face of the head  $c$  is secured a disk  $c'$ , which may be of copper, and on the edge of this disk is set a packing-ring  $d$ , which may be of vulcanized rubber. This ring is mounted on the edge of the disk  $c'$  in the manner of a saddle, its cross-section being clearly illustrated in the detail views, one of which shows it under compression and the other normal. It comprises a solid ring having flaps, which embrace the disk  $c'$ . When the head  $c$  is in place, these flaps will be situated one between said head and the disk and the other between the disk and the ring  $a^3$  on the drum.

The head  $c$  will be provided with fastenings, and these will be, by preference, of the construction shown. On the drum are fixed fulcrum-brackets  $e$  and in these are fulcrumed cam-levers, each comprising a lever proper  $f$  and a rounded cam or knuckle  $f'$ , which, when the head  $c$  is in place, may be brought to bear forcibly against the head to press it firmly up to the ring  $a^3$  by pressing the lever down against the head, as seen in Figs. 5 and 6.

In order to allow the head to pass the bracket  $e$  in placing it in the rabbeted ring of the drum, the head has slight notches or recesses in its edge, one for each bracket, and when the head is seated it is rotated, so as to set said recesses to one side of the respective brackets and provide a surface for the cams  $f'$  to bear upon.

Water under pressure is admitted to the annular space between the cylinders of the drum at an inlet  $g$ , provided with a controlling-cock and means for connecting a pipe or hose. I usually provide two of these inlets, one for hot water and one for cold. The water enters the inner cylinder through the screened apertures therein, and when it fills the drum it

overflows at overflow-outlets  $h$ . These outlets may be the extremities of curved pipes  $h'$ , arranged within the annular space between the cylinders, with their receiving ends  $h^2$  placed near the crown of the drum, as clearly seen in Fig. 3.

I will now describe the agitators and the means employed for rotating them. A hollow shaft  $i$  has bearings in the fixed head of the drum and in a frame  $j$ , and another shaft  $i'$ , within the shaft  $i$ , has a bearing in the latter and also in a frame  $j'$ . On the shaft  $i$  is a pulley  $k$  and on the shaft  $i'$  is a pulley  $k'$ . These pulleys enable the two shafts to be driven in opposite directions by means of belts in a well-known way. In the inner end of the shaft  $i'$  is a square or angular socket  $l$ , and mounted in the drum and aligned with shaft  $i'$  is a shaft  $i^2$ , which has a bearing at one end in a socket  $c^2$  on the inner face of the head  $c$  and at the other end in the end of the hollow shaft  $i$ . On the end of the shaft  $i^2$  is a "square" or tenon  $m$ , which fits into the socket  $l$ , thus enabling the shaft  $i'$  to drive the shaft  $i^2$ .

On the shaft  $i$  within the drum are fixed a set of blades  $n$ , which stand with their faces oblique to the axis of the shaft and drum, and on the shaft  $i^2$  is a similar set of blades  $n'$ , as clearly seen in Fig. 4, which represent the shafts and blades detached from the drum and from each other and the blades set in position to clearly show their oblique faces.

In the top of the drum is an inlet  $o$  for the pulp or other material to be washed. This inlet is surmounted by a funnel  $r$ , which is attached by a bayonet-joint or other known fastening, so that it may be readily removed and replaced by a cap  $s$ , as seen in Fig. 3.

The operation may be as follows: The water is turned on so as to enter the drum at the inlet or inlets and a proper quantity of the pulp fed in at the feed-inlet  $o$ . The agitating mechanism is set in motion, the set of blades  $n$  turning in a direction opposite to the blades  $n'$ . The direction of rotation should be such with respect to the obliquity of the blades that each set tends to force or throw the pulp being washed over toward the middle of the drum. The water passes continuously through the drum from bottom to top and carries away all the impurities; but the pulp is kept confined within the drum. The cleansed pulp may be removed by first removing the head  $c$ , when the shaft  $i^2$ , with its set of blades, may be drawn out. This construction also provides access to the interior for other purposes. The machine may be thoroughly cleansed at any time by passing water under pressure through it while the agitating mechanism is in motion. While this is being done the funnel  $r$  may be replaced by the cap  $s$ . I have shown two overflow-outlets; but one will serve if large enough.

In Fig. 1 only a few of the apertures  $x$  in the inner drum are shown; but it will be un-

derstood that they are distributed over the entire surface of said drum.

There may be a set-screw  $t$  in the head  $c$  to bear against the end of the shaft  $i^2$  and keep it pressed up to the shaft  $i'$ , and said head may have a handle  $u$  for convenience in handling it.

There should be at least three levers  $f$  arranged at equal distances about the end of the drum. I have shown six.

I prefer to rotate the shafts bearing the respective sets of radial blades  $n$  and  $n'$  at the same speed, and to arrange these two sets of blades oppositely at starting. This arrangement, I think, produces the best results.

Having thus described my invention, I claim—

1. In a washing-machine, the combination, with a drum having an inlet and outlet for water under pressure, of two axially-aligned shafts rotatively mounted in said drums and capable of rotating in opposite directions, means for rotating said shafts, and two sets of radially-arranged agitating-blades, one set mounted on each of said shafts, the blades of each set having their planes arranged oblique to the shaft-axis, substantially as and for the purpose set forth.

2. In a washing-machine, the combination, with a drum composed of an outer cylinder having an inlet for water under pressure and an outlet for the overflow and an inner perforated cylinder through the wall of which the water passes to the interior of the drum, of an agitator arranged within said drum, substantially as set forth.

3. In a washing-machine, the combination, with the drum comprising an outer cylinder  $a$ , provided with an inlet for the material to be washed and for water under pressure and an outlet for the overflow, the perforated inner cylinder  $a'$ , having its perforations covered with wire-gauze  $a^2$ , and the two heads of the drum, one of which is removable, of a rotating agitator arranged within said drum, substantially as set forth.

4. In a washing-machine, the combination, with a drum having inlets for the material to be washed and the water and an overflow-outlet, of the agitator comprising a hollow shaft  $i$ , rotatively mounted in the drum, the set of radially-arranged oblique blades  $n$ , fixed to said shaft within the drum, the shaft  $i'$ , extending into the hollow of shaft  $i$ , the shaft  $i^2$ , mounted at one end in the head of the drum and at the other end connected detachably with the shaft  $i'$ , means for rotating said shafts, and the set of oblique blades  $n'$  on the said shaft  $i^2$ , substantially as set forth.

5. In a washing-machine, the combination, with a drum composed of two cylinders with an annular space between them, the inner cylinder having in it gauze-covered apertures or perforations, an inlet to said annular space for water under pressure, an outlet from said

annular space at the upper part of the drum  
for the soiled overflow water, an inlet for the  
material to be washed, and a rotary agitator  
within the drum, said agitator having two  
5 sets of blades which rotate in opposite direc-  
tions, said blades having their faces set ob-  
lique to the drum-axis, substantially as set  
forth.

In witness whereof I have hereunto signed  
my name in the presence of two subscribing  
witnesses.

EDWARD GUNDRUM.

Witnesses:

HENRY CONNETT,  
JOHN D. CAPLINGER.