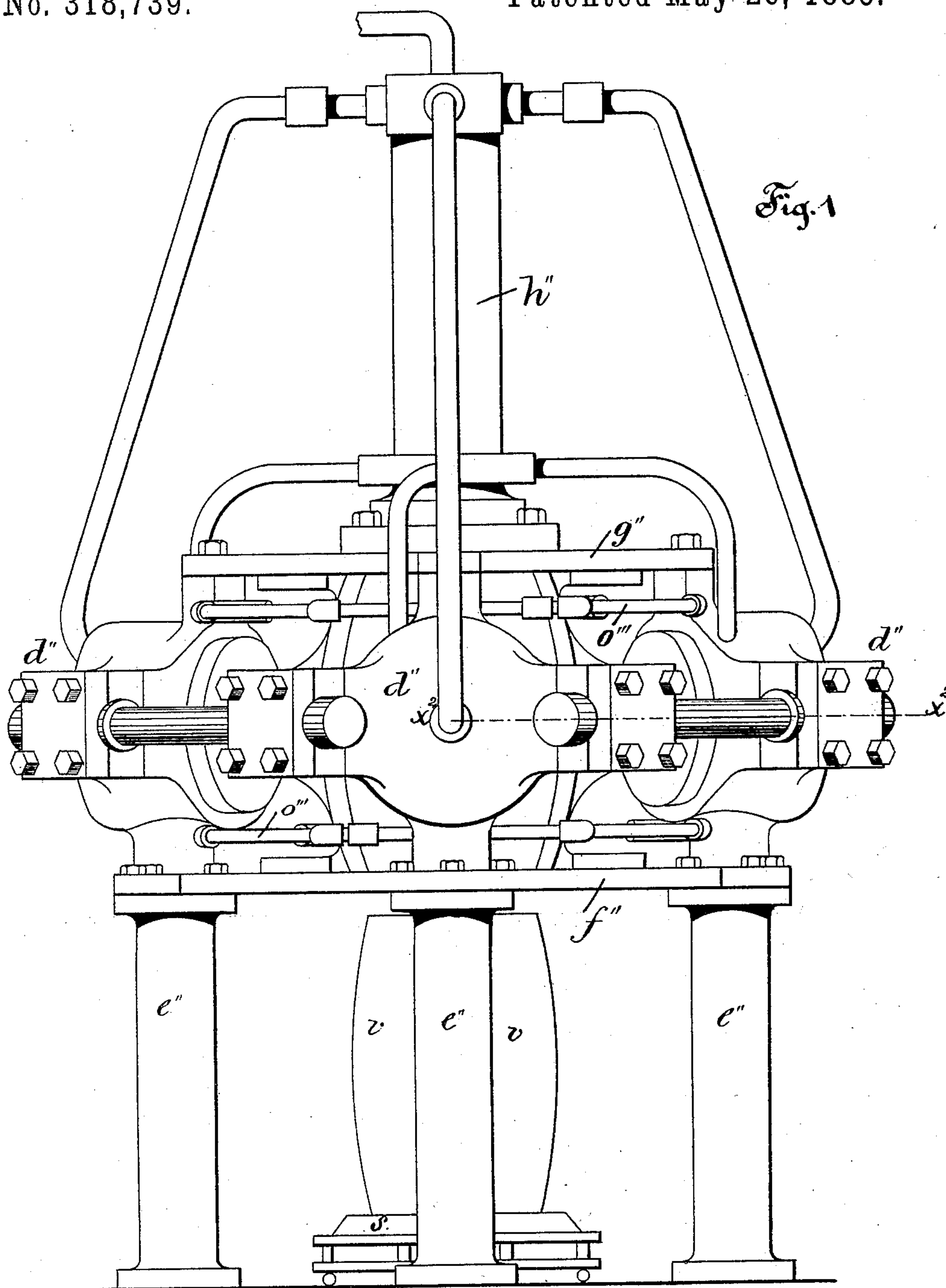


6 Sheets—Sheet 1.

MACHINE FOR DRYING AND PRESSING PULP BARREL BODIES.

Patented May 26, 1885.



Witnesses
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Inventor
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Attys

(No Model.)

6 Sheets—Sheet 2.

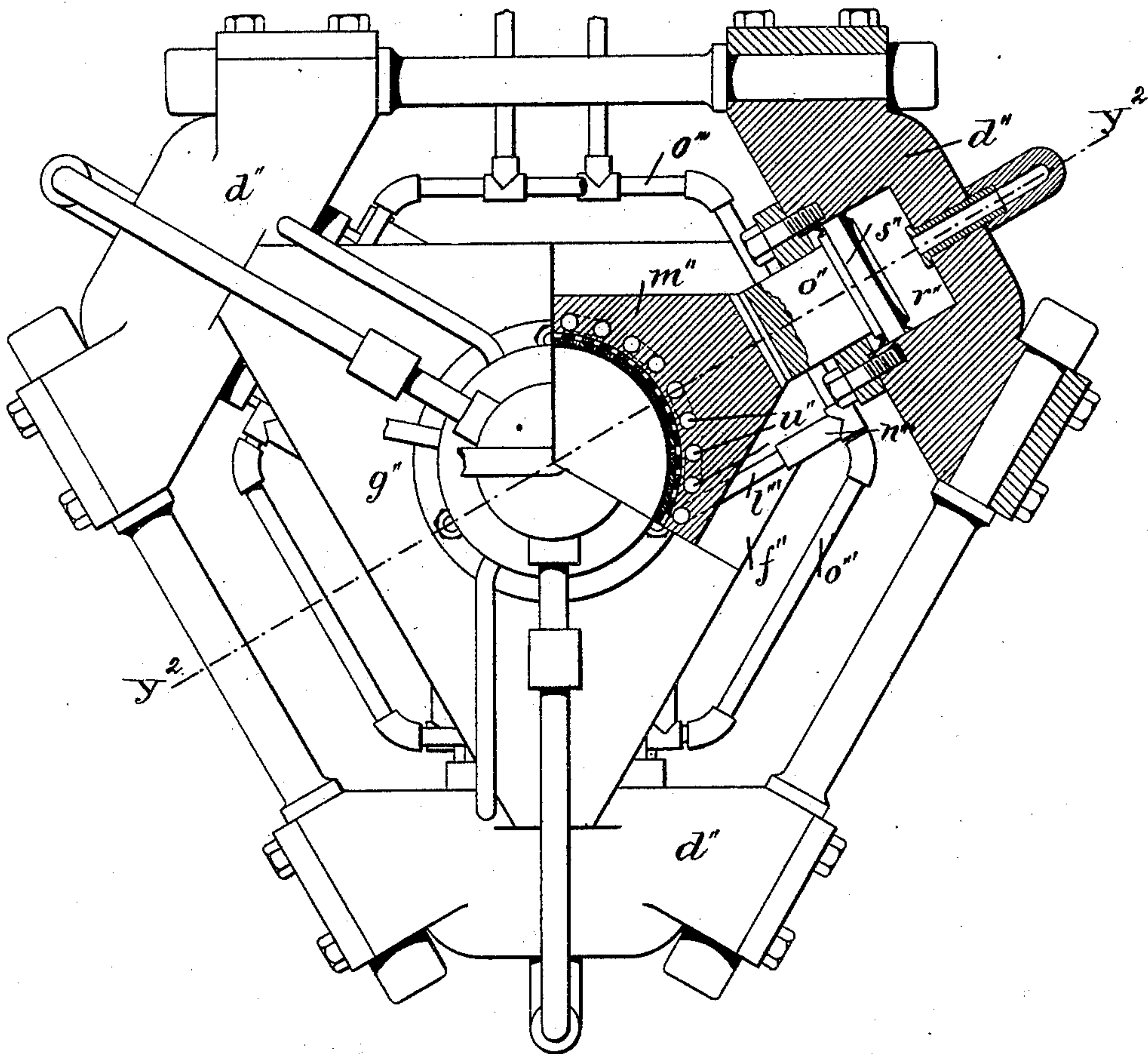
S. M. HOTCHKISS & B. A. MASON.

MACHINE FOR DRYING AND PRESSING PULP BARREL BODIES.

No. 318,739.

Patented May 26, 1885.

Fig. 2.



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(No Model.)

6 Sheets—Sheet 3.

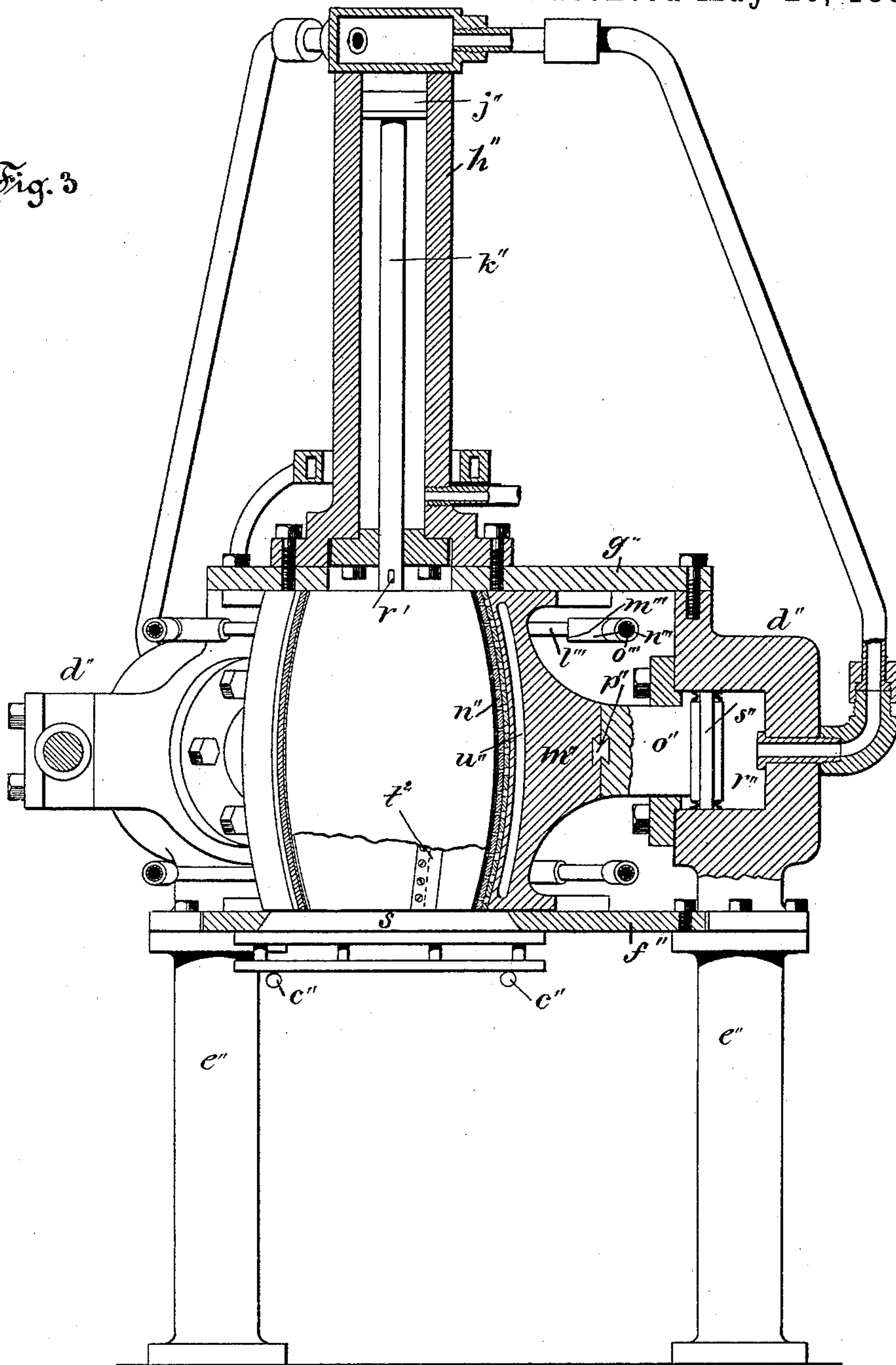
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Patented May 26, 1885.

Fig. 3



Witnesses

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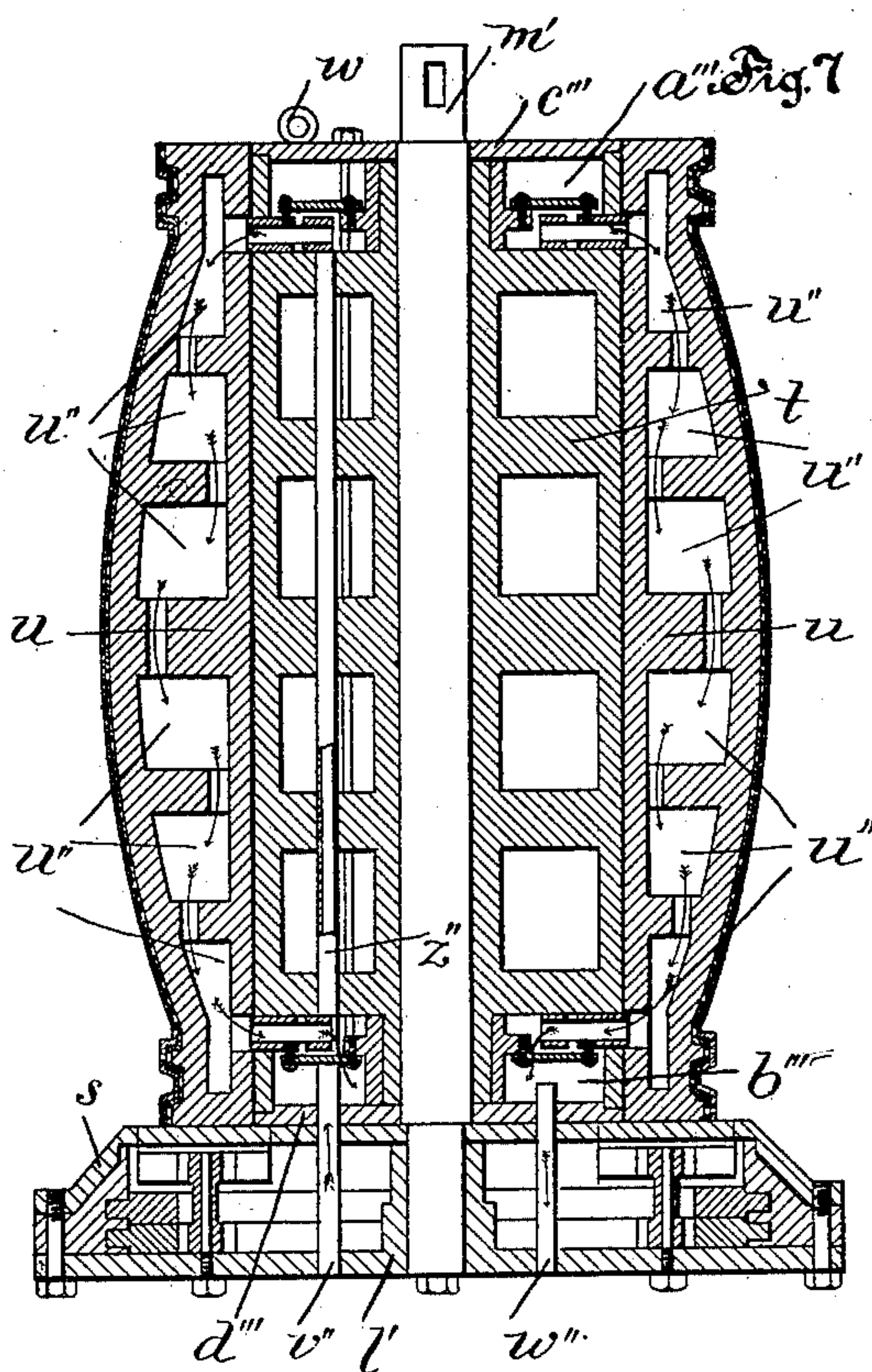
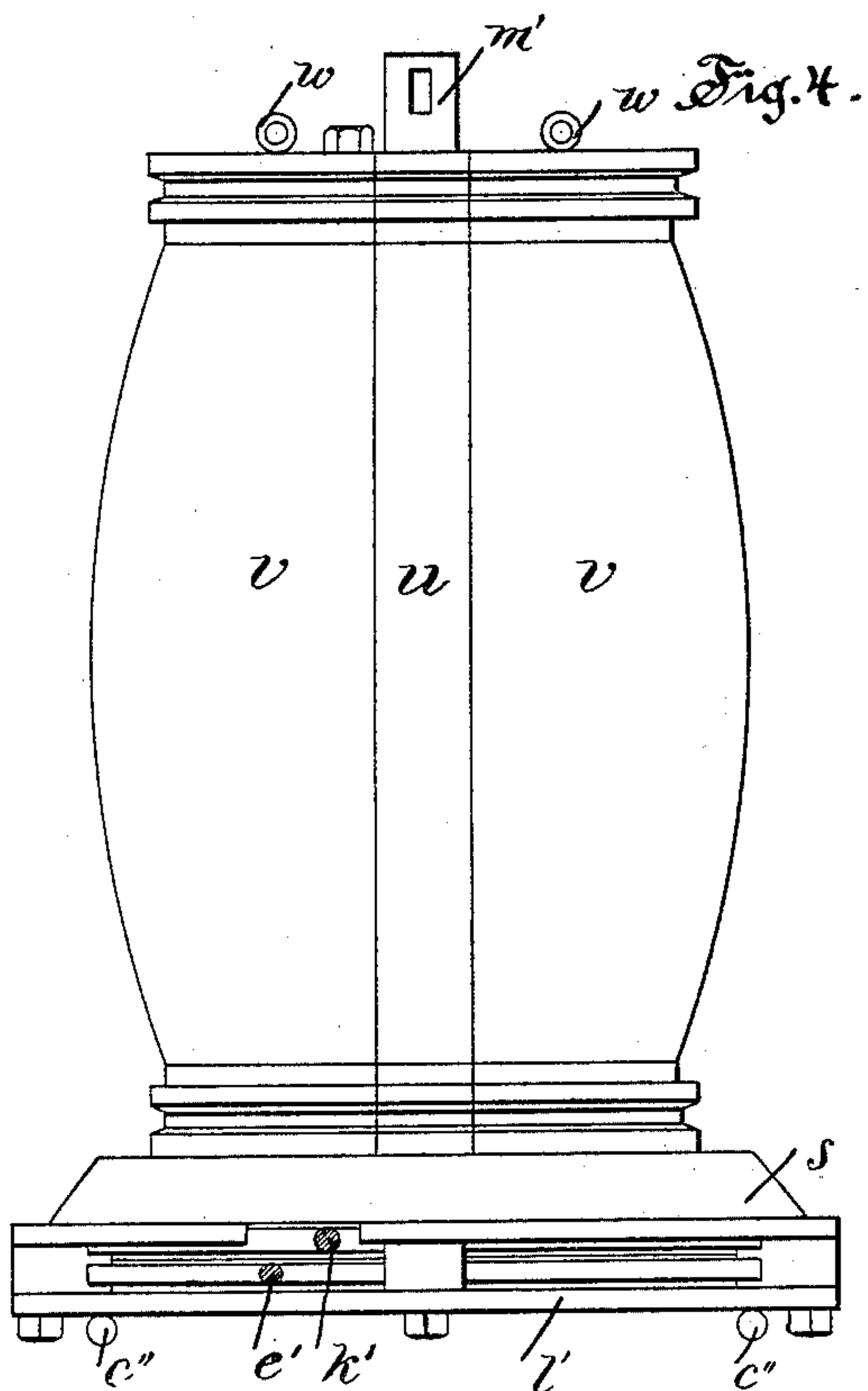
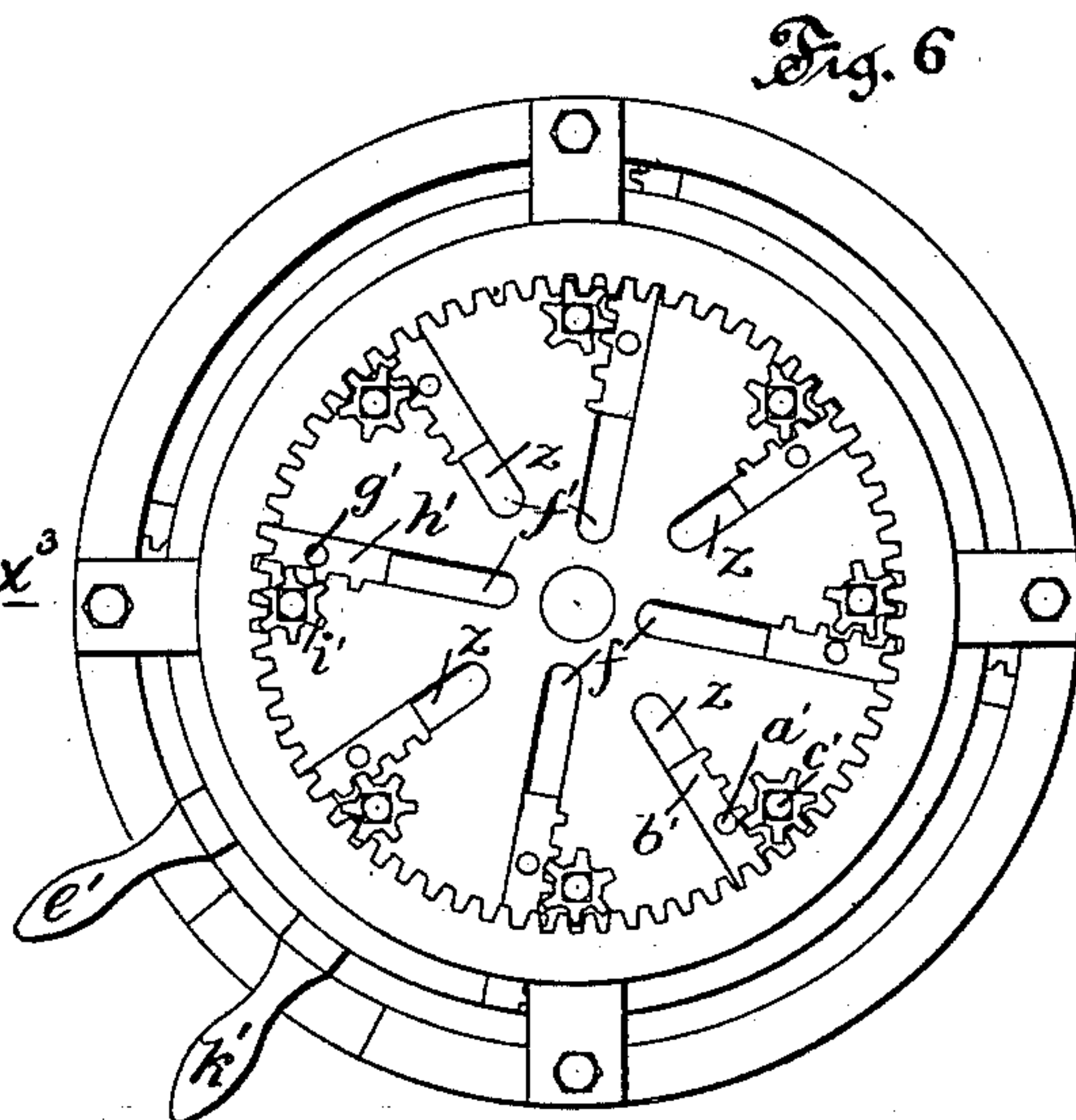
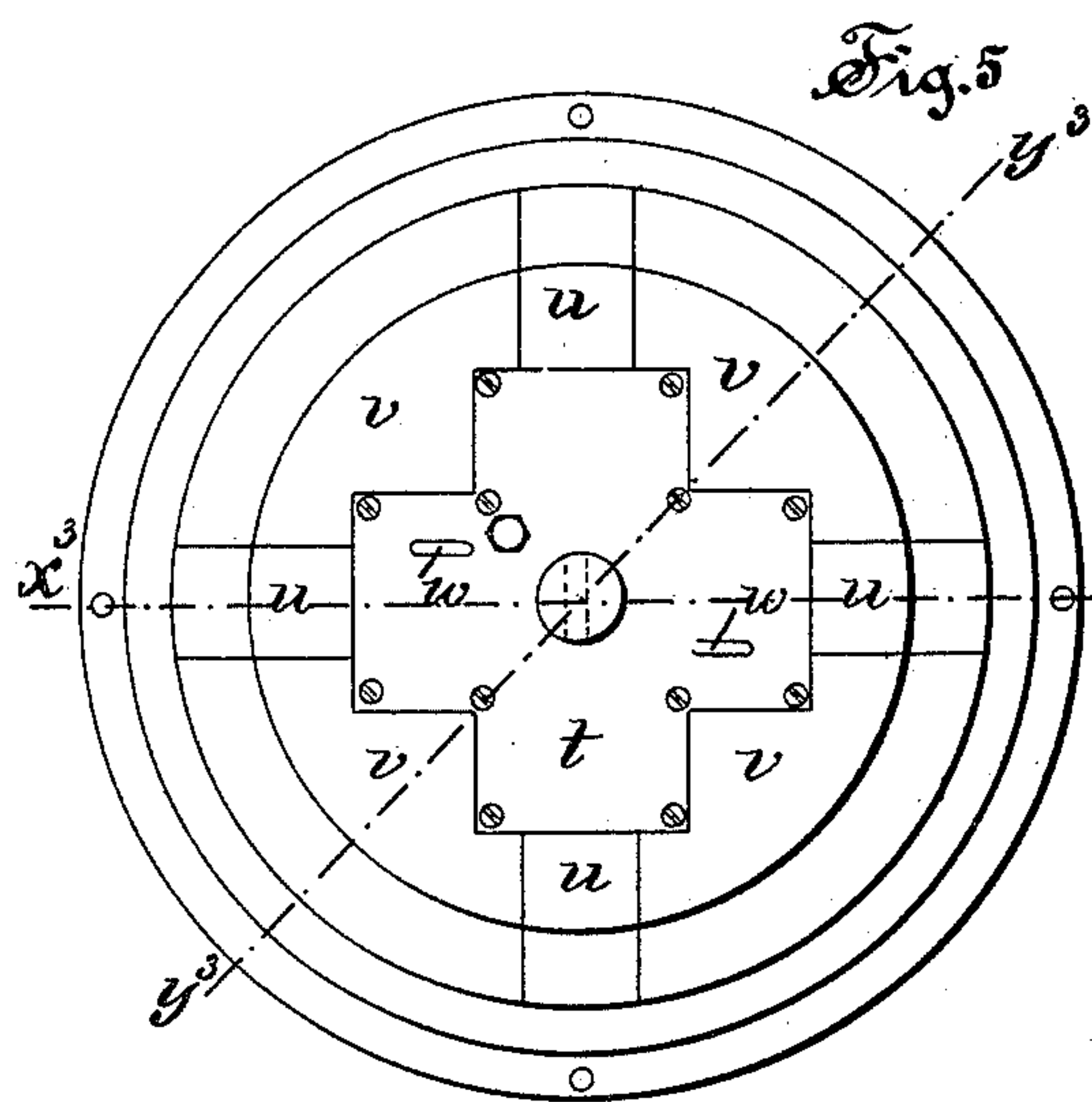
6 Sheets—Sheet 4.

S. M. HOTCHKISS & B. A. MASON.

MACHINE FOR DRYING AND PRESSING PULP BARREL BODIES.

No. 318,739.

Patented May 26, 1885.



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MACHINE FOR DRYING AND PRESSING PULP BARREL BODIES.

No. 318,739.

Patented May 26, 1885.

Fig. 9

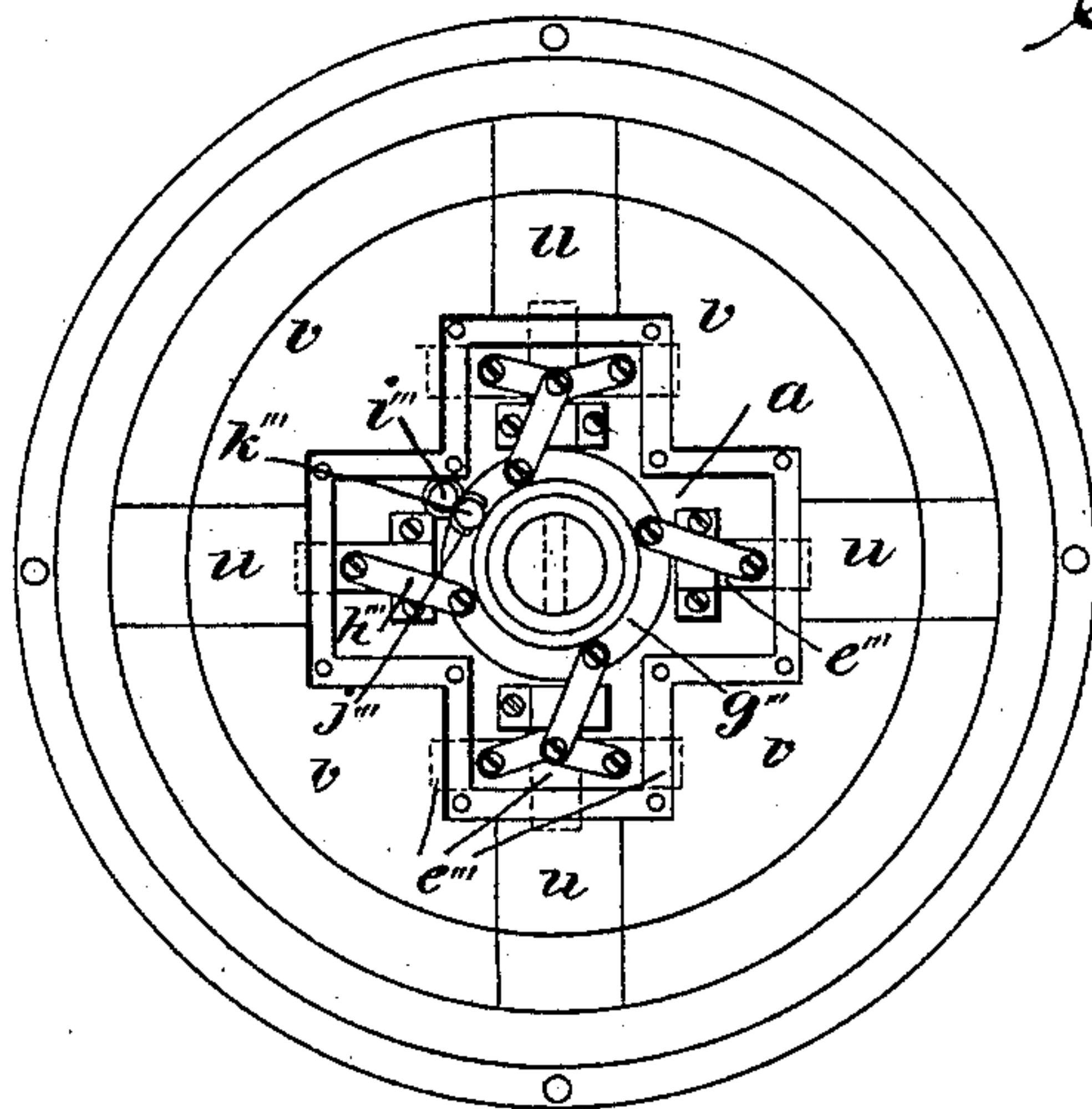
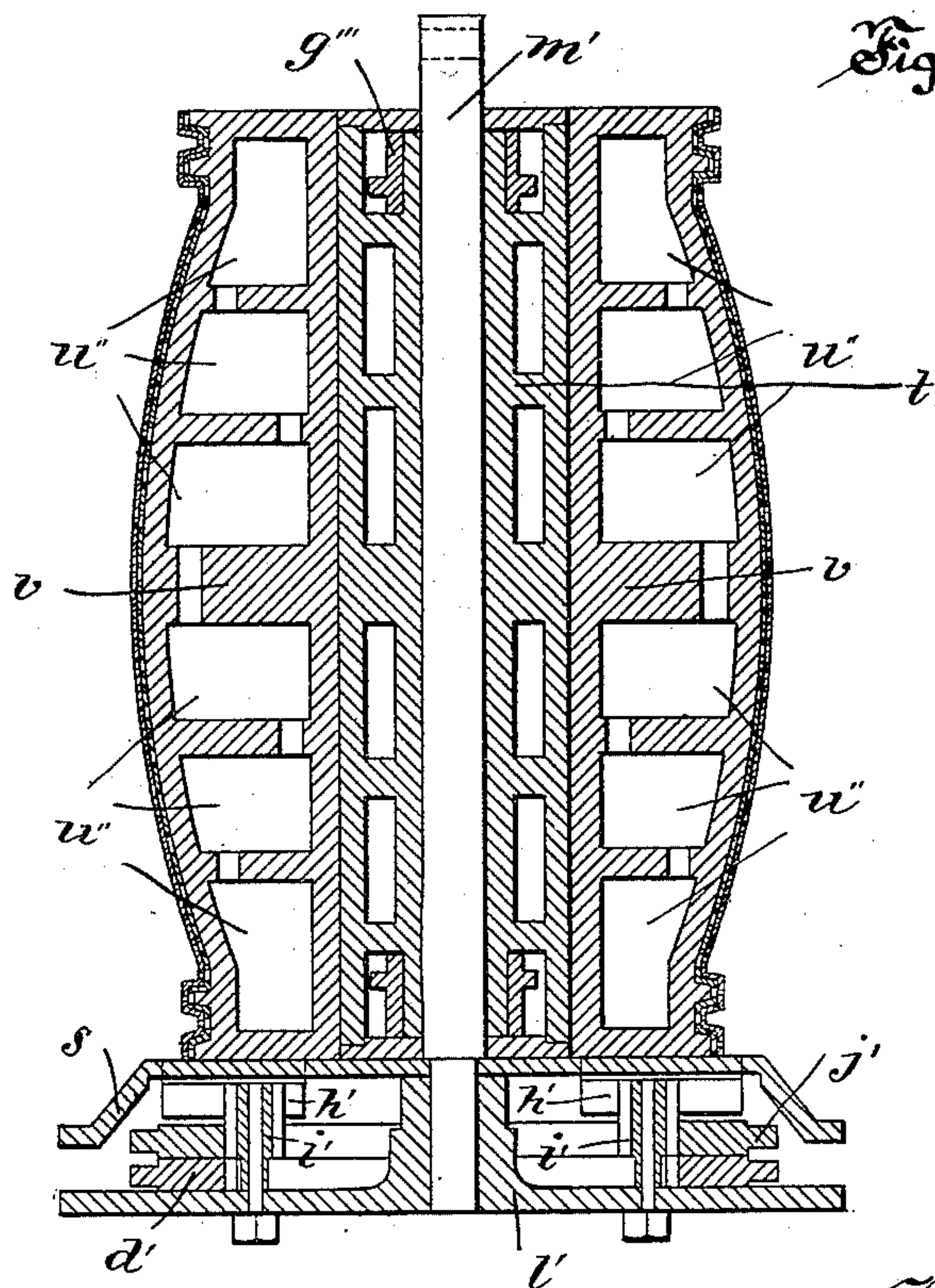


Fig. 8



Witnesses
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(No Model.)

6 Sheets—Sheet 6.

S. M. HOTCHKISS & B. A. MASON.

MACHINE FOR DRYING AND PRESSING PULP BARREL BODIES.

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Fig. 10

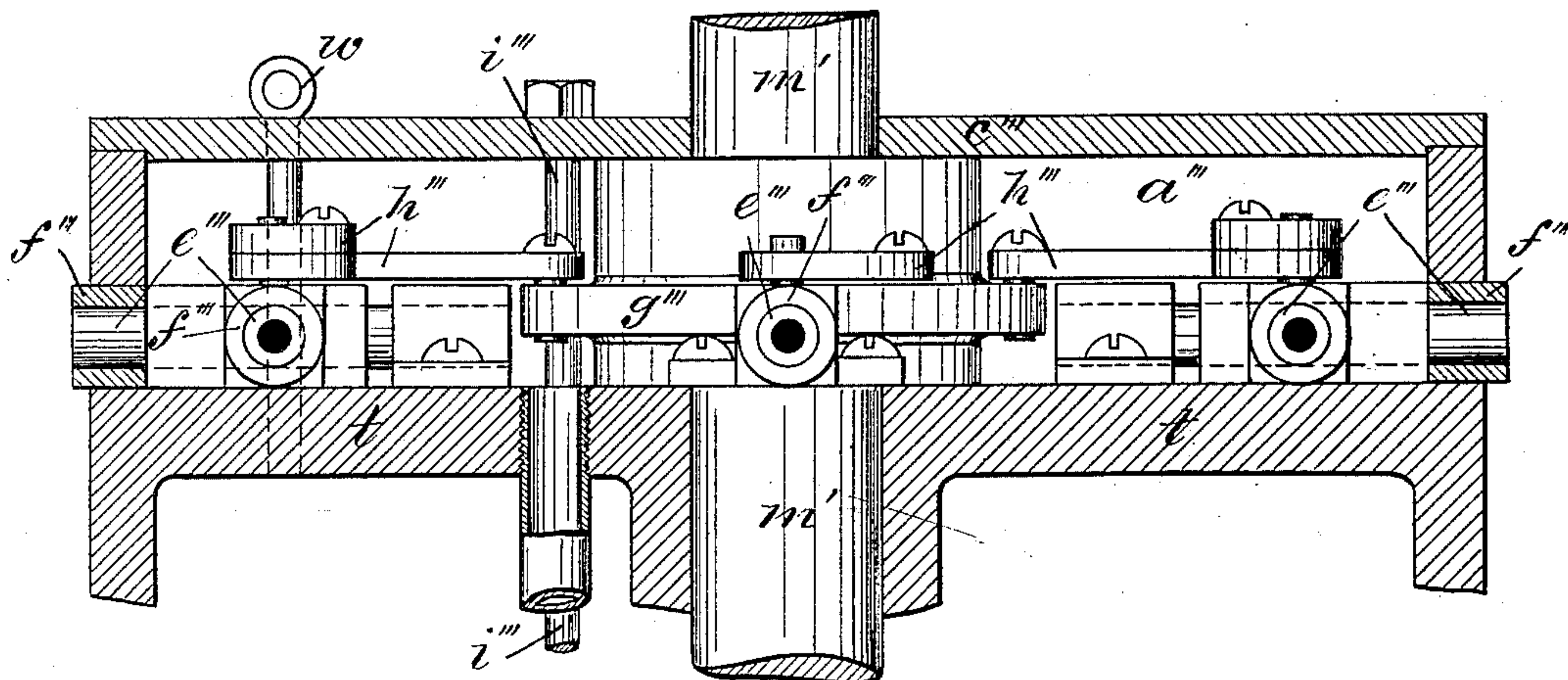
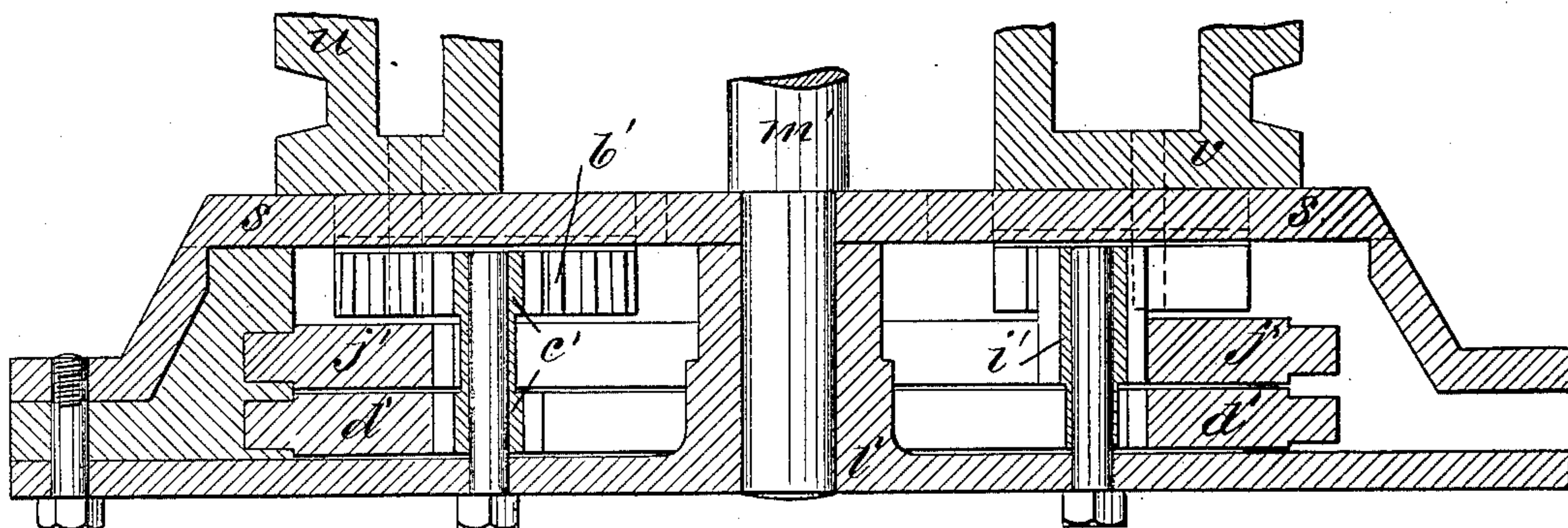


Fig. 11



Witnesses.

Wm. J. Perkins

H. R. Williams

Inventor.

*Samuel M. Hotchkiss
& Benjamin A. Mason
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Atty.*

UNITED STATES PATENT OFFICE.

SAMUEL M. HOTCHKISS AND BENJAMIN A. MASON, OF HARTFORD, CONN.

MACHINE FOR DRYING AND PRESSING PULP BARREL-BODIES.

SPECIFICATION forming part of Letters Patent No. 318,739, dated May 26, 1885.

Application filed January 24, 1885. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL M. HOTCHKISS and BENJAMIN A. MASON, of Hartford, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement Pertaining to Machines for Drying and Pressing Pulp Barrel-Bodies and the Like, of which the following is a description, reference being had to the accompanying

drawings, where—

Figure 1 is an elevation view of the machine with the core underneath carrying a barrel-body previously formed thereon in another machine. Fig. 2 is a plan view of the machine shown in Fig. 1, with one-third thereof shown in horizontal section on the plane denoted by the dotted line $x'' x''$ seen on Fig. 1. Fig. 3 is a view of the machine shown in Fig. 1, in vertical section on the plane denoted by the dotted line $y'' y''$ seen in Fig. 2. The core and barrel-body it carries are not sectioned. Fig. 4 is an elevation view of the core, scale enlarged. Fig. 5 is a top or plan view of the core, scale enlarged. Fig. 6 is a view of the bottom of the core with the covering-plate, which is on the extreme lower end, removed. Fig. 7 is a view of the core in vertical section on the plane denoted by the dotted line $x''' x'''$ in Fig. 5. The section cuts the core-sections. Fig. 8 is a view of the core in vertical section on the plane denoted by the dotted line $y''' y'''$ seen in Fig. 5. The section cuts the core-blocks. Fig. 9 is a view of the top of the core with the plate which covers the steam-chest removed. Fig. 10 is an enlarged detail view of the steam-chest in the upper end of the core. The view is in central vertical section so far as the steam-chest itself is concerned; but is a side view of the machinery inside the steam-chest. Fig. 11 is an enlarged detail view of the parts at the lower end of the core. It is a view in vertical section on two different planes meeting at the vertical center of the core. These two planes are denoted by the dotted line $x''' x'''$ seen in Fig. 6.

This machine is intended for drying, by heat under pressure, a barrel-body of pulp previously formed and shaped in another machine and brought to this machine upon the core on which it was originally formed.

The letter d''' denotes what may be termed the "frame-ring" of this machine, although

it is practically, in the present instance, made of three different castings connected by strong rods. This frame-ring is supported upon the pillars e''' .

The letter f'' denotes what may be called the "lower table," secured beneath the frame-ring, and the letter g'' denotes what may be called the "upper table," attached on the top of the frame-ring. On the top of the upper table there is secured a hydraulic lifting-cylinder, h'' , carrying the reciprocating piston-head j'' , from which depends the piston-rod k'' , which engages with the core-shaft m' , when the core, bearing upon it a barrel-body, is brought underneath, the connection being made by having the lower end of the rod k'' socketed and shut over and upon the upper end of the core-shaft, the key r' completing the engagement. Then water being forced into the lifting-cylinder the piston-head j'' rises, lifting the core, and the barrel-body it carries, into the central space between the external side compressors of this machine. These external side compressors are preferably three in number, but of course the number may be varied. The lower table, f'' , has a raised ring on its upper surface, and the upper table, g'' , has a similar ring on its lower surface, both of which rings are radially slotted or mortised, which mortises act as guides for the external side compressors as they move toward or from the axis of the barrel-body, a movement conveniently termed their "radial movement." Each of the external side compressors bears a face-plate, n'' , of brass or the like, faced with a finely perforated mold-face. These face-plates are bored laterally through and through from front to rear, and grooved in the rear for the escape of steam from the drying barrel-body. The external side compressors are made, practically, one with the piston-rods o'' by a doweled key, p'' . These piston-rods o'' enter the cylinders r'' , and are there provided with the piston-heads s'' . These piston-heads are intended to be operated in both directions by water forced into the cylinders r'' upon one or the other side of the piston-heads—that is, these pistons are made use of for putting the pressure upon the barrel-body, and also for withdrawing the external side compressors.

It will be readily understood that after the core, bearing upon it the barrel-body, has been

lifted into the central space between the external side compressors, these external side compressors are moved forward under considerable power, so as to put and keep the barrel-body during the operation which is to follow, of drying by heat, under a very considerable pressure. There are joint-flaps t'' attached on the one side to the face-plate u'' and lapping over the neighboring face-plate, such neighboring face-plate being properly recessed or rabbeted for that purpose.

The external side compressors have formed within them ducts or spaces for the circulation of steam or other heating agent, which may well be termed "heat-ducts," which are denoted, so far as these external side compressors are concerned, by the letter u'' , and the same letter denotes heat-ducts for the same purpose in the parts composing the core. Now, with the barrel-body under a very considerable pressure, as already described, the steam or other heating agent is caused to circulate through all these heat-ducts, both in the core and in the external side compressors, until the moisture is dried out from the barrel-body to any desired degree, after which the external side compressors are withdrawn or retracted, the core is let down or dropped underneath, the core collapsed, and the barrel-body removed. The steam is admitted to the core through a flexible tube, v'' , or the like, and taken away through a flexible tube, w'' , or the like, the connections thereof being made after the core and its barrel-body are put under pressure in the machine, and the disconnection thereof being made before the core and its barrel-body are removed from the machine. The tube v'' connects with a pipe, z'' , carried permanently by the core-spine, which pipe conducts the steam to a steam-chest, a''' , at the top of the core-spine, whence it is distributed to the ducts or chambers u'' , (in the core-sections and core-blocks,) whence it comes into a steam-chest, b''' , at the bottom of the core-spine, and thence escapes through the tube w'' . The plate c''' covers the steam-chest a''' , and the plate d''' covers the steam-chest b''' .

Inside the steam-chest a''' there are horizontally-reciprocating pipes e''' . Those which reciprocate radially of the core carry the live steam into the heat-ducts of the core-blocks, and others—reciprocating at right angles to radii of the core—carry the live steam into the heat-ducts of the core-sections. When retracted, these pipes e''' do not project beyond the sides of the core-spine; but when projected or thrust forward they project slightly beyond the sides of the core-spine and into the sockets or pipe-holes made for them in the sides of the core-blocks and core-sections, making them closely communicate with the heat-ducts in such core-blocks and core-sections.

The letters f''' denote rubber packing (pieces of rubber tube) around the pipes e''' , which, when the pipes e''' are thrown out or forward, shut into recesses made for them in the sides

of the core-blocks and core-sections, and they are so compressed in this operation as to make the joint steam-tight. These pipes e''' are reciprocated by rotating the disk g''' , communicating with the pipes through the medium of the jointed connecting-rods h''' . The disk g''' is operated from the exterior and below the core by means of the rotary shaft i''' , many sided at the lower end for the application of a wrench or the like, the forked arm j''' fast on shaft i''' , and the stud k''' on disk g''' . An apparatus precisely like pipes e''' , disk g''' , and rods h''' , is contained in the lower steam-chest, b''' , and it is operated simultaneously with said apparatus in the upper steam-chest by means of the shaft i''' , carrying a duplicate of forked arm j''' , operated on a duplicate of stud k''' . It will be readily understood that the pipes e''' and the duplicates in the lower steam-chest are connected with the heat-ducts in the core-blocks and core-sections preparatory to having the live steam circulate in such core-blocks and core-sections, and that these pipes are disconnected before removing the core from the machine.

It will be observed that in using this drying-machine the article which is being made from pulp is under pressure while heat is applied to both sides of the stock, the practical result of which is of very great importance, the article produced being practically of a material differing very widely from ordinary compressed pulp, so widely as to seem to be a substantially other and different thing.

In practicing the ordinary modes of drying pulp articles in kilns or drying-rooms the shrinking of the stock is unequal in various respects. Different lots of pulp not reduced to the same degree of fineness in the beater show a corresponding variation in drying. An article of long coarse pulp does not dry to as small a size as short fine pulp.

When the article is compressed into shape by different degrees of pressure, leaving corresponding differences in the amount of moisture in the stock, a variation of shrinkage is caused in the drying. If from any cause one portion of the stock is left denser than another, then in the drying the denser portion shrinks less than the moister portion, resulting in warping the article.

In drying such an article as a pulp barrel set up on end, as is natural, on a rack or floor in a kiln or drying-room, the upper end dries faster and contracts more than the lower end, and this trouble is not cured when in drying the barrel is reversed end for end, with the result that the barrel is left larger at one end than at the other. The same conditions which affect the shrinkage, warping, and variation in the size in the drying of such articles as pulp barrel-bodies similarly, and to even a greater degree, affect the drying of such articles as barrel-heads, and as a result heads dried in the manner heretofore in vogue must each be fitted specially to the particular barrel-body to which it is applied by some dis-

5 tinct process or manipulation involving ex-
 pense, and requiring that each head be used
 only for the particular end of the particular
 barrel to which it has been fitted. Again,
 when the pulp article in question is a barrel-
 body the varying sizes of barrels, as hereto-
 fore dried, have required that each hoop used
 in finishing be fitted separately to its place.
 While drying articles of pulp in drying-rooms
 10 and the like is not positively impracticable,
 it yet involves great expense in fitting up,
 heating, and otherwise utilizing the large area
 for drying which large mills require, which
 has been found to be practically a very great
 15 obstacle in interesting manufactures in the
 business.

In the modes of drying pulp articles here-
 tofore in use by artificial heat the rapid ex-
 pulsion of moisture in the form of vapor has
 20 caused the article to puff or swell, making it
 thicker, less dense, and less strong than it
 otherwise would be, and than it is desirable to
 have it.

In practicing the mode of drying herein set
 25 forth the barrel-body or other pulp article is
 in a few minutes rendered, in a practical sense,
 perfectly dry by the use of the press having
 heated exterior and interior walls, while every
 defect, trouble, and disadvantage hereinbefore
 30 enumerated as pertaining to the old modes of
 drying, as well as others not so enumerated,
 are entirely obviated or cured.

Barrels and barrel-heads come out of the
 drying-press all of precisely the same size, so
 35 that any head will fit any chine, and all labor
 of fitting which would otherwise be required
 is dispensed with.

As the barrel-heads are precisely alike, hoops
 may be made of regular sizes by machinery
 40 or otherwise in large quantities, each of which
 will always fit the barrel-bodies at precisely
 the place designed for it.

The application of heat to both sides of a
 barrel-body while the same is under pressure
 45 has the effect of taking up laterally all shrink-
 age caused by expelling the moisture, entirely
 avoiding all endwise shrinkage, leaving the
 barrels at the end of the process all of pre-
 cisely the same length—a thing heretofore im-
 50 practicable—and there is no drawing apart of
 the fibers endwise or in anywise, as would
 otherwise be the case.

In drying pulp articles in the modes here-

tofore practiced the surface has been left in
 such a condition as to require further prepa- 55
 ration and finishing before it can be said to
 be fit for market, while one important practi-
 cal advantage which appertains to the mode
 of drying by heat under pressure herein de-
 scribed is that the surface of the article is 60
 left completely finished as it comes from the
 drying-press, requiring no further work or
 preparation in that regard. In the practice
 of this process such an article as a barrel-
 body may be pressed from free pulp, dried, and 65
 finished ready to be put to use in a space of
 time measured by minutes, where before days
 have been required. Each of the external
 side compressors carries a pipe, l''' , which
 moves back and forth as the compressor moves 70
 in a properly-packed sleeve, m''' , which is on
 the end of a pipe, n''' , rising from a circular
 pipe, o''' . This pipe o''' carries live steam
 through pipes n''' and l''' into the heat-ducts of
 all the external side compressors. The pipes 75
 l''' each have an orifice for the entrance of
 steam coming from pipes n''' , such orifices be-
 ing brought into proper relation for that pur-
 pose with the pipes n''' when the external side
 compressors have moved forward. 80

The improvement claimed herein is—

1. In combination, the core-blocks and core-
 sections chambered by heat-ducts, the core-
 spine provided with a steam-chest, and the re-
 ciprocating pipes which connect said steam- 85
 chest and said ducts, substantially as described,
 and for the purpose set forth.

2. In combination, the core-blocks and core-
 sections chambered by heat-ducts, the core-
 spine provided with steam-chests at top and 90
 bottom, and the two sets of reciprocating
 pipes which connect said steam-chests with
 said heat-ducts, substantially as described,
 and for the purpose set forth.

3. In combination, the core-blocks and core- 95
 sections chambered by heat-ducts, the core-
 spine provided with steam-chest a''' , the re-
 ciprocating pipes e''' , disk g''' , and rods h''' , all
 substantially as described, and for the purpose
 set forth.

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