

(No Model.)

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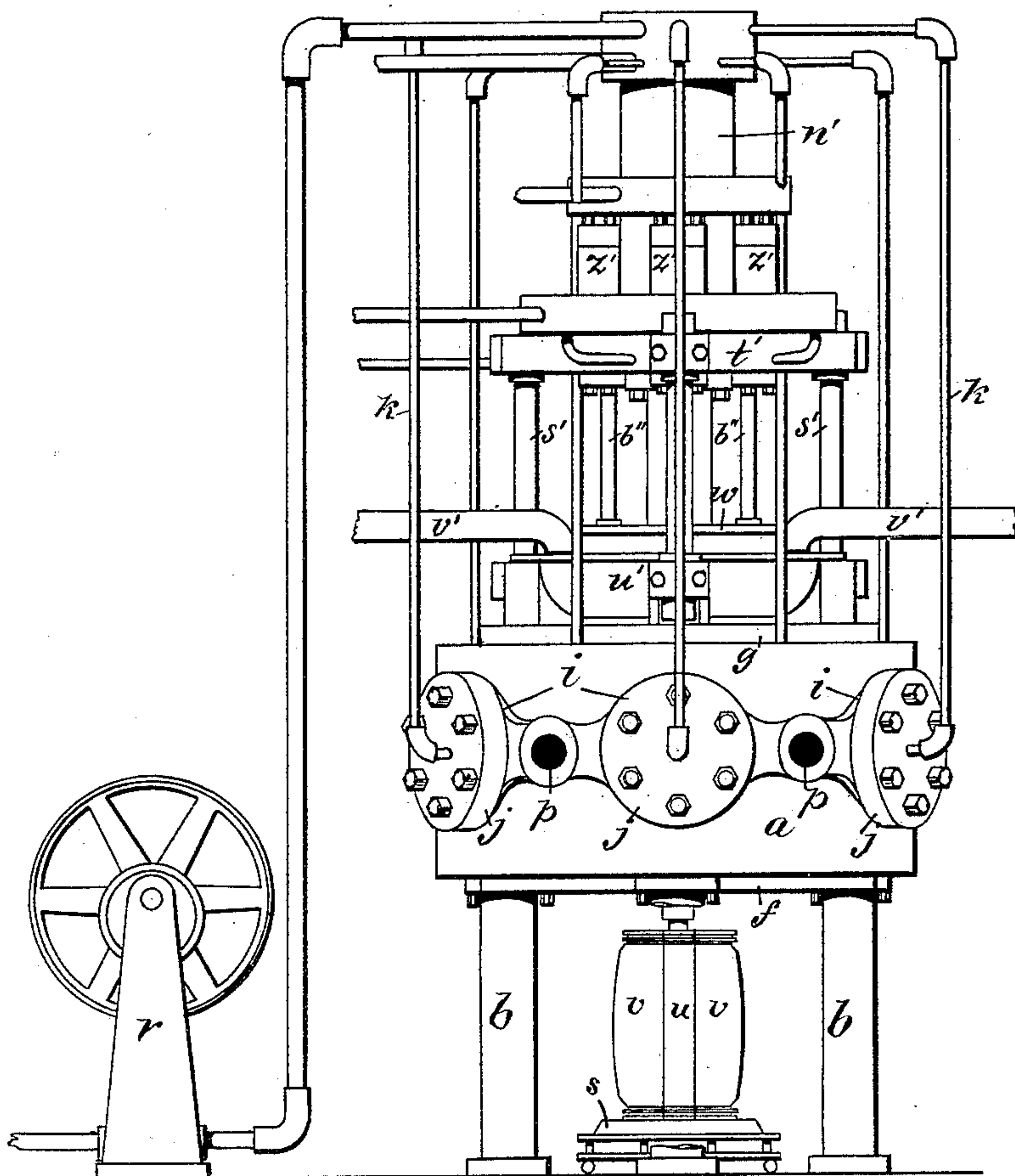
S. M. HOTCHKISS.

MANUFACTURE OF BARREL BODIES FROM PULP.

No. 318,737.

Patented May 26, 1885.

Fig. 1



Witnesses
W. M. Perkins.
H. R. Williams.

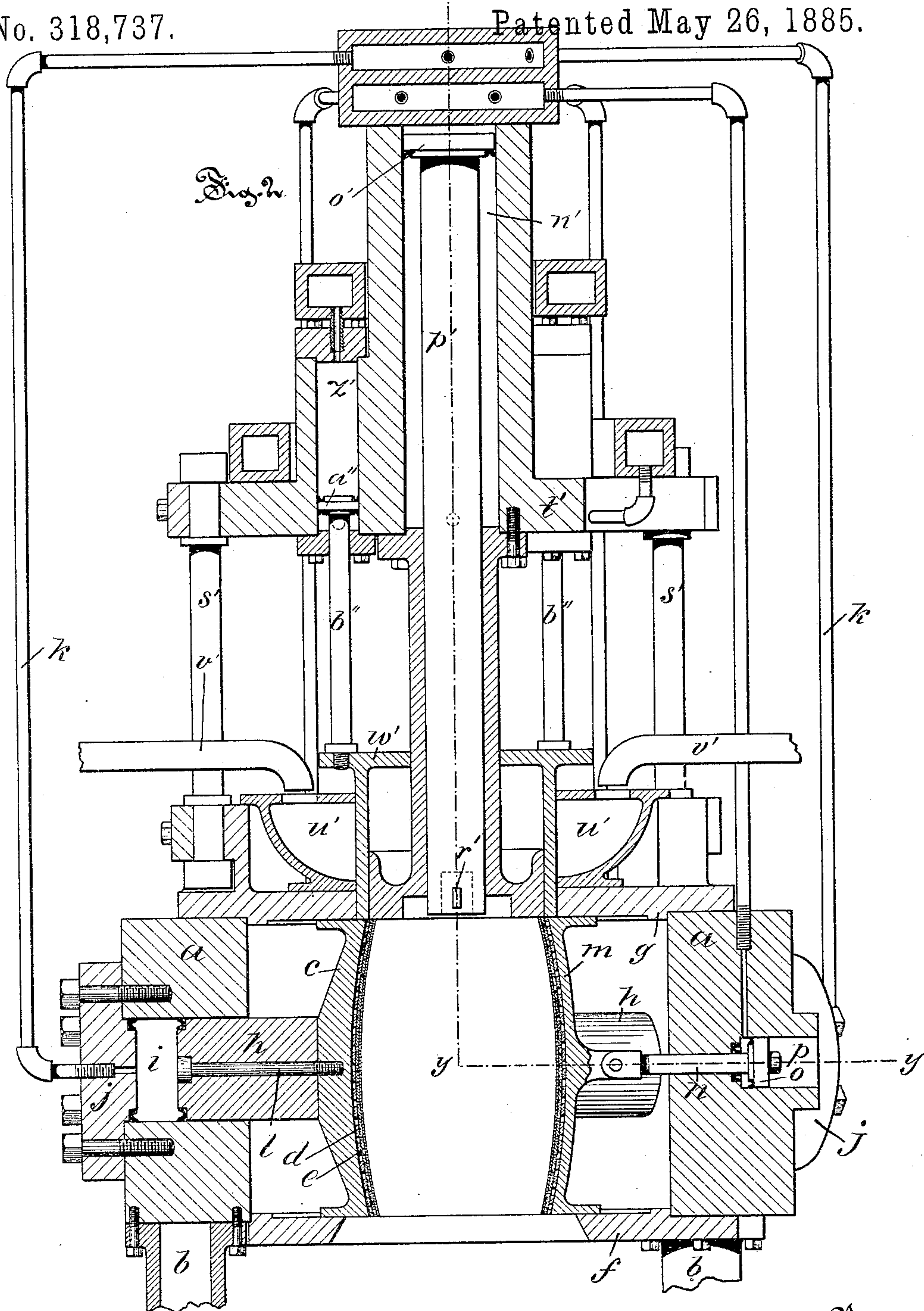
Inventor
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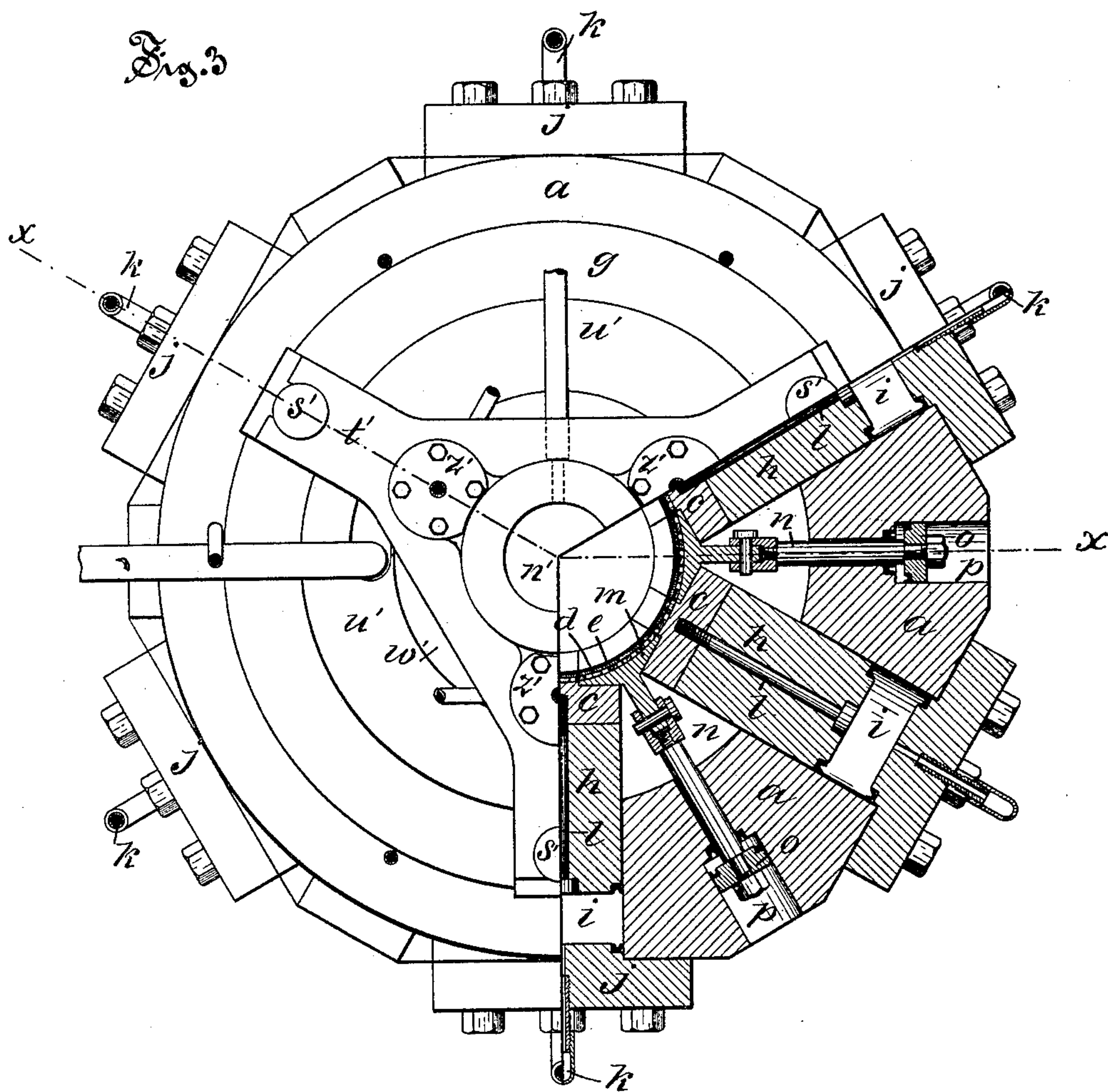
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Witnesses
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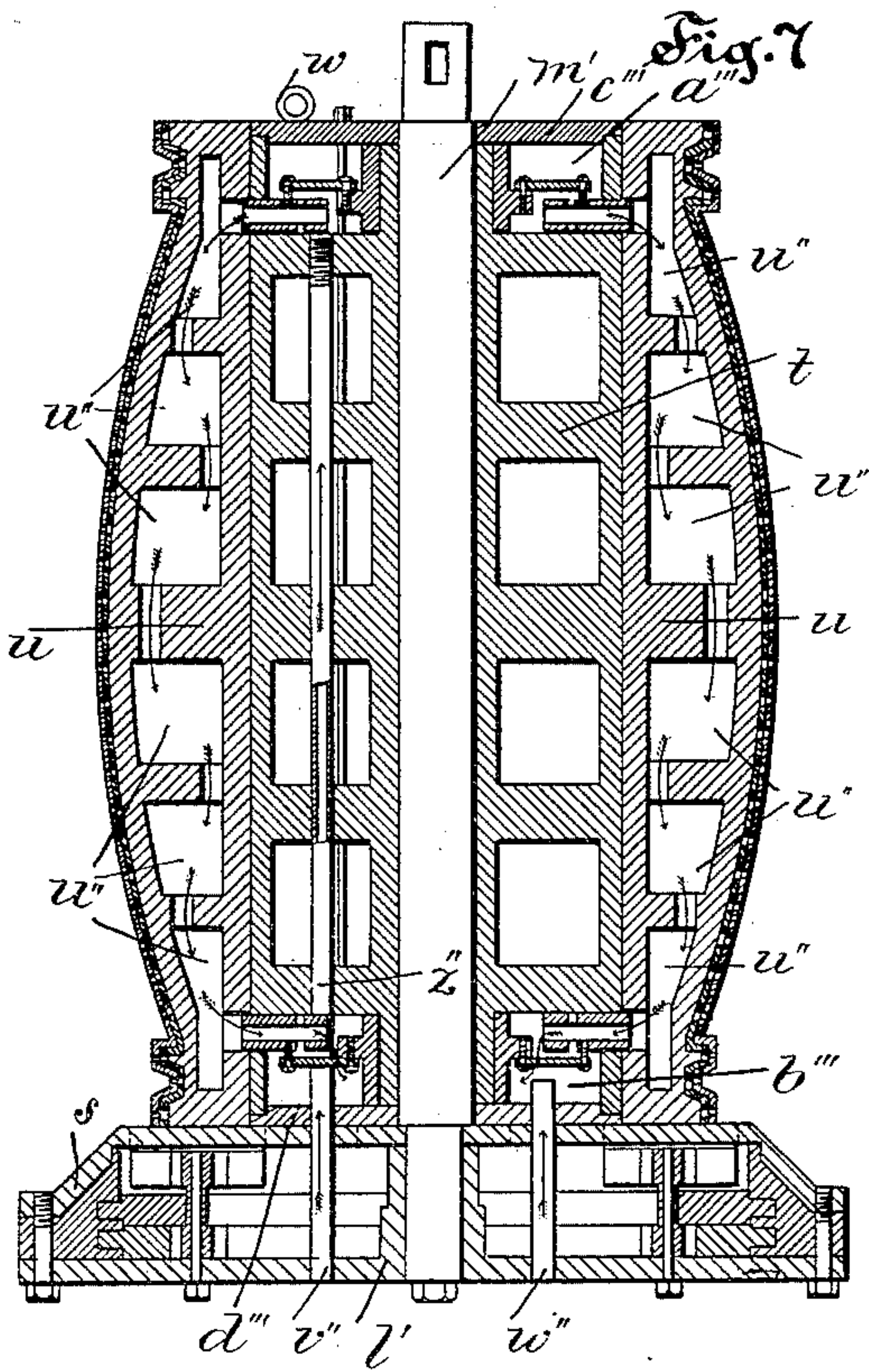
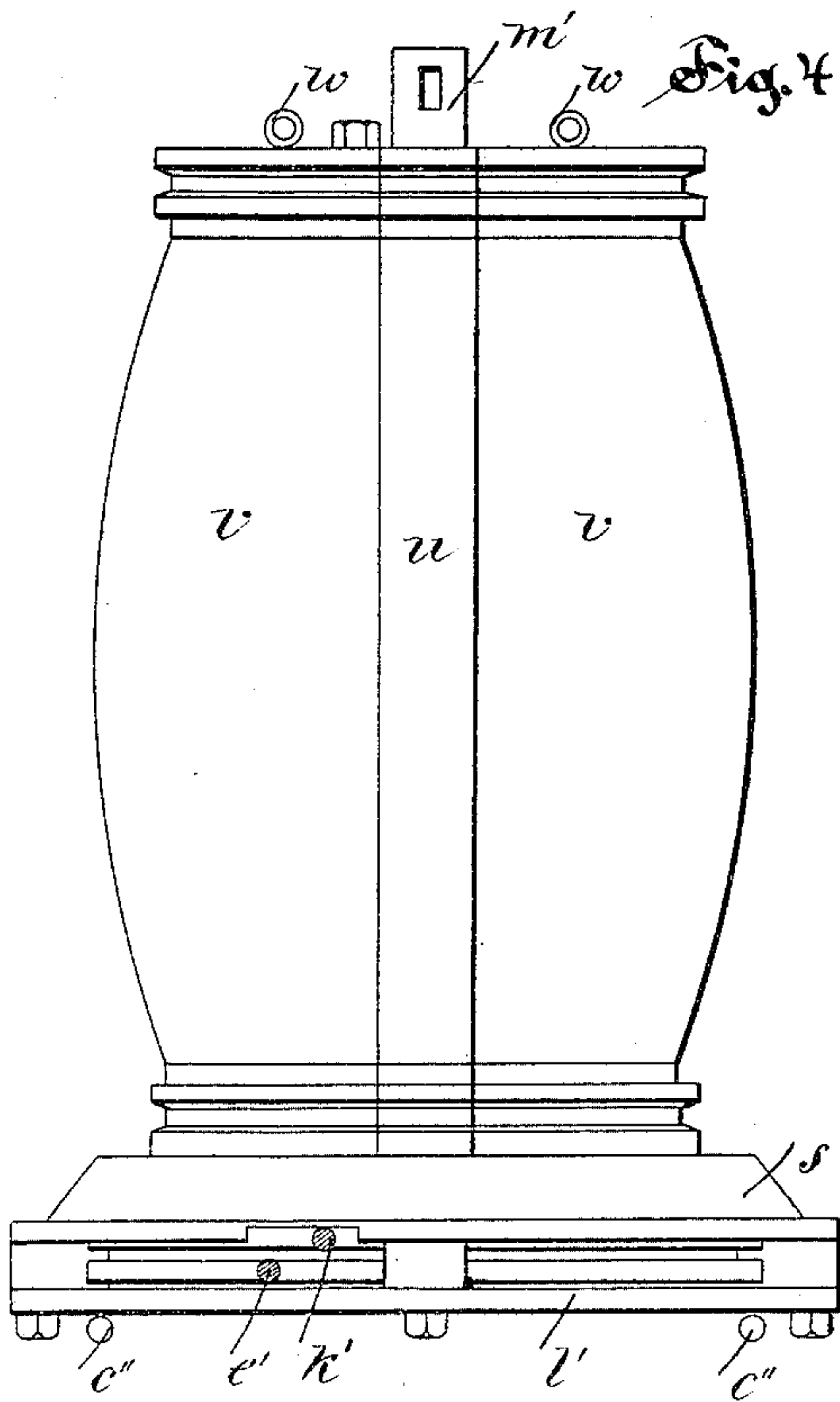
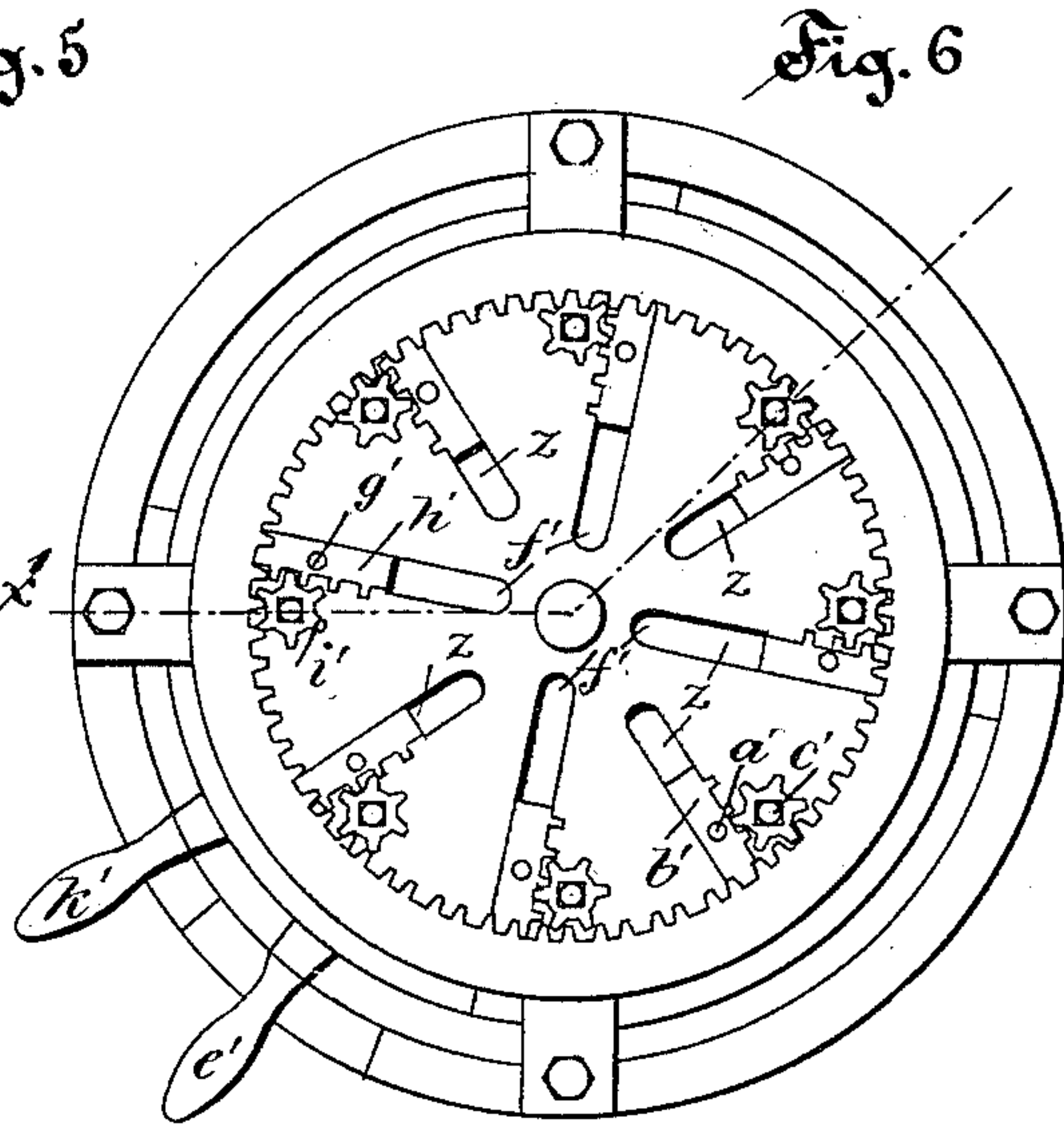
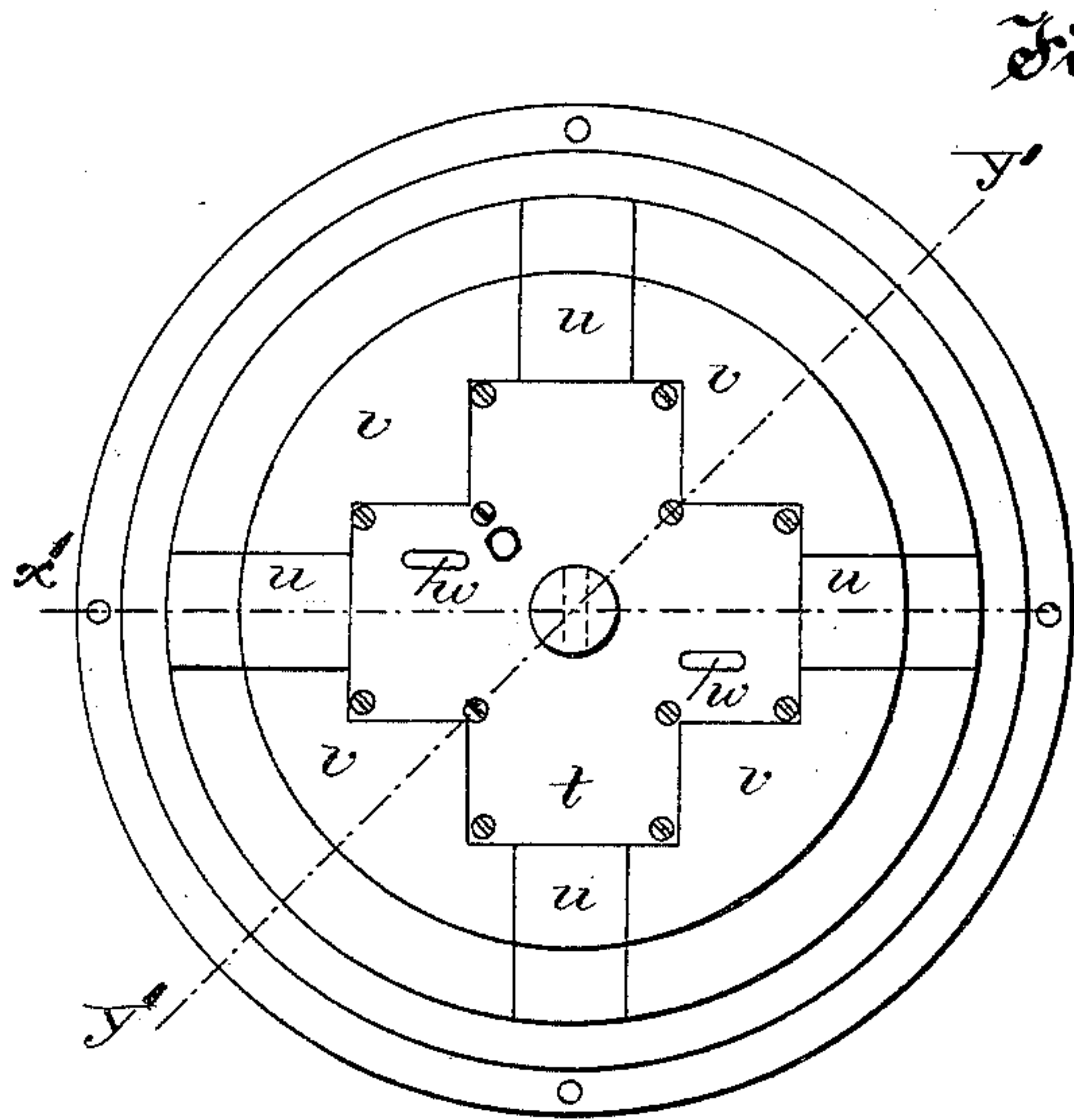
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5 Sheets—Sheet 5.

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MANUFACTURE OF BARREL BODIES FROM PULP.

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Fig. 9

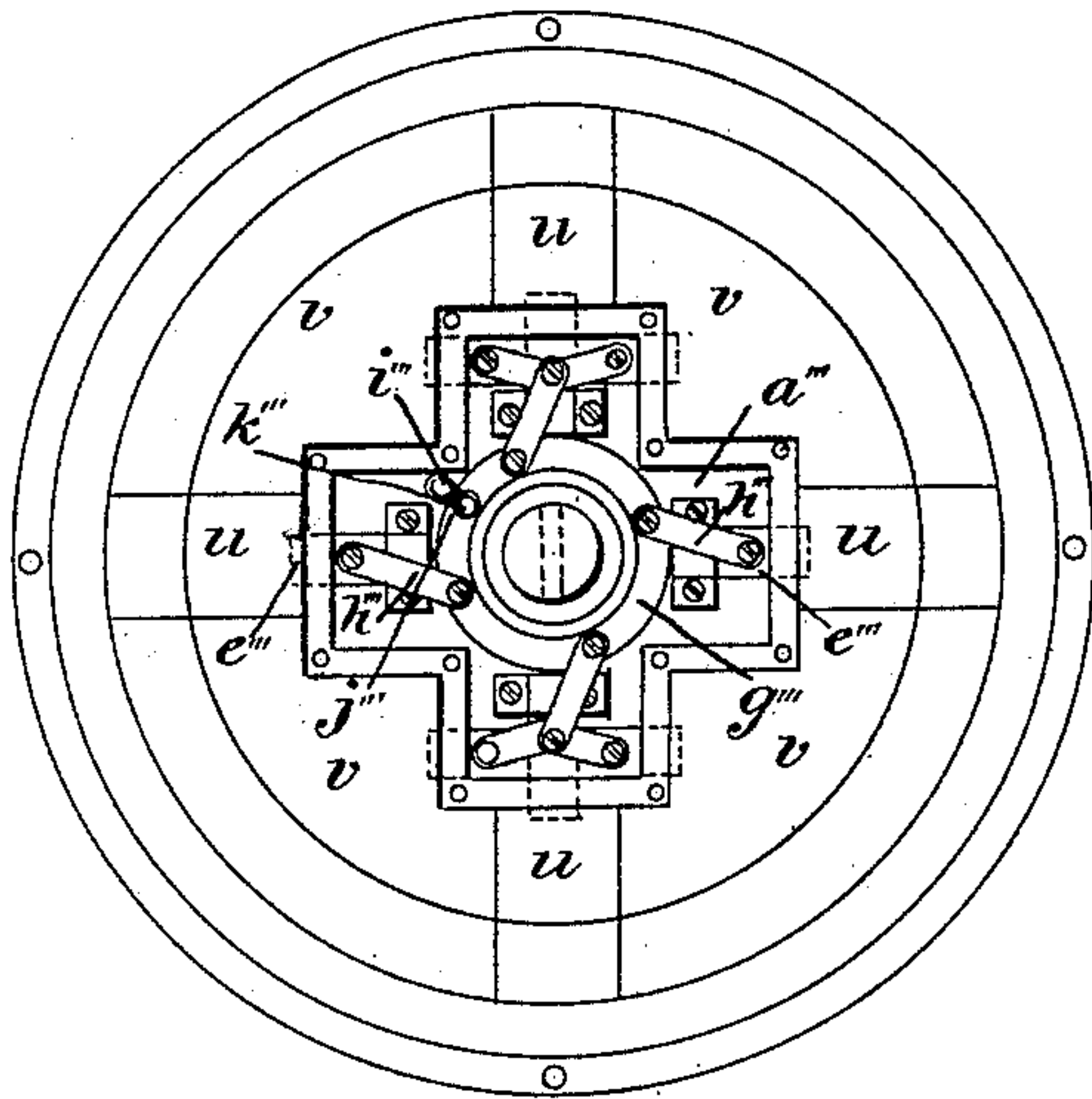
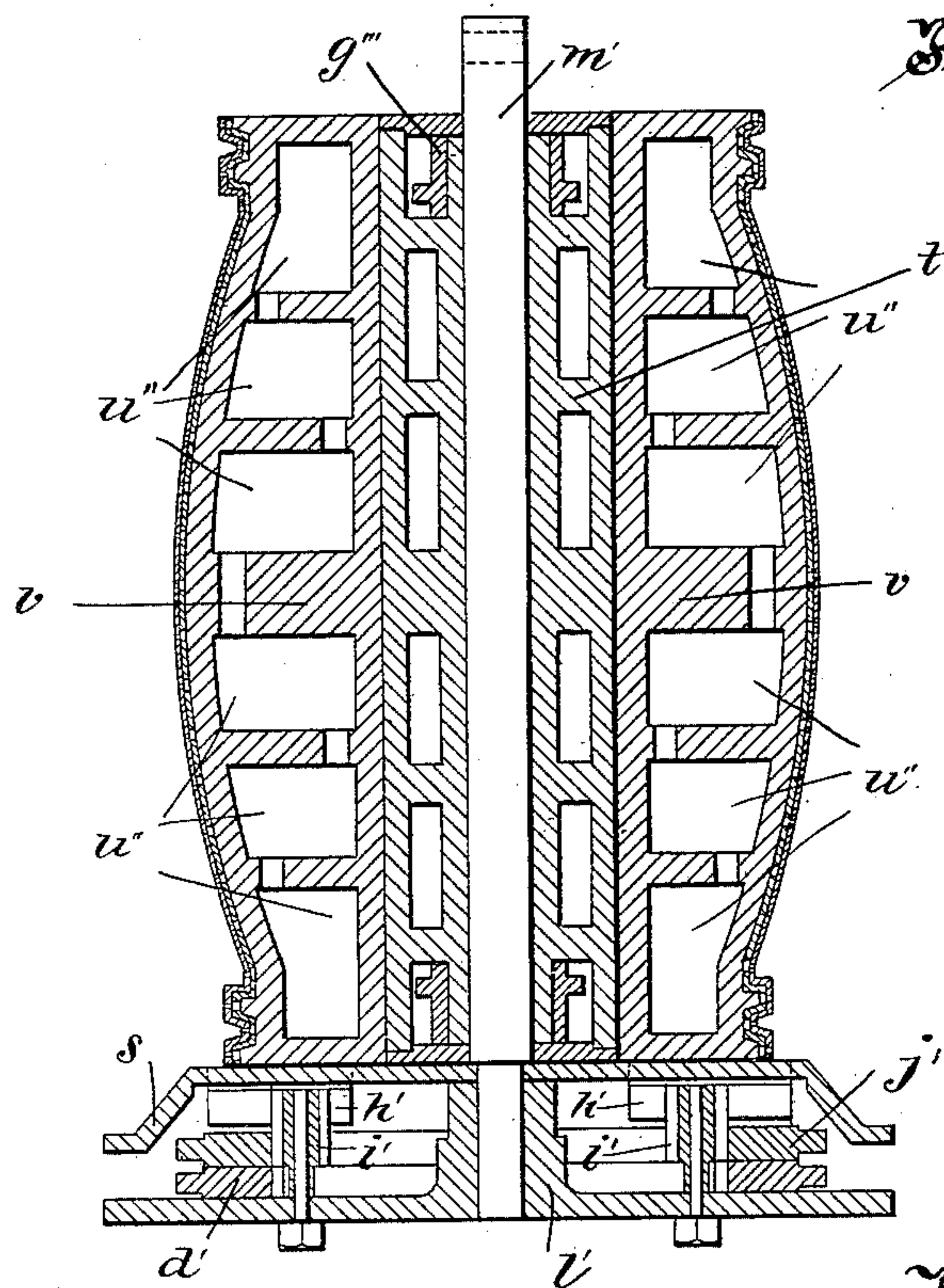


Fig. 8



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UNITED STATES PATENT OFFICE.

SAMUEL M. HOTCHKISS, OF HARTFORD, CONNECTICUT.

MANUFACTURE OF BARREL-BODIES FROM PULP.

SPECIFICATION forming part of Letters Patent No. 318,737, dated May 26, 1885.

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

To all whom it may concern:

Be it known that I, SAMUEL M. HOTCHKISS, of Hartford, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement pertaining to the Manufacture of Barrel-Bodies and the Like from Pulp, of which the following is a description, reference being had to the accompanying drawings, where—

10 Figure 1 is an elevation view of the machine with the core underneath attached to its lifting-rod and ready to be raised. Fig. 2 is a sectional elevation of the machine shown in Fig. 1, scale enlarged, the planes of the section 15 being indicated by the dotted line xx seen in Fig. 3. The section is on two different planes which meet at the (vertical) center of the machine. The core is omitted from this view. Fig. 3 is a top or plan view of the machine 20 shown in Fig. 1, scale enlarged, with a part in horizontal section on the plane indicated by the dotted line yy seen in Fig. 2. The core is omitted from this view. Fig. 4 is an elevation view of the core, scale enlarged as 25 compared with Fig. 1. Fig. 5 is a top or plan view of the core shown in Fig. 4. Fig. 6 is a view of the bottom of the core shown in Fig. 4, with the covering-plate, which is at the extreme lower end, removed. Fig. 7 is a view 30 of the core shown in Fig. 4 in vertical section on plane denoted by the dotted line $x'x'$ seen in Fig. 5. The plane $x'x'$ cuts the core-sections. Fig. 8 is a view of the core shown in Fig. 4 in vertical section on the plane denoted 35 by the dotted line $y'y'$ seen in Fig. 5. The sectional plane cuts the core-blocks. Fig. 9 is a view of the top of the top of the core, with the plate which covers the steam-chest removed.

40 The practical application of this improvement is illustrated and described herein as applied to the manufacture of a barrel-body from pulp; but the improvement is applicable to the manufacture of other articles than barrels. 45 The pulp referred to herein may be the pulp for paper-stock or pulp of any other material adapted to the purpose in hand.

50 In one and that a preferable way of making a barrel in accordance with the improvement forming the subject-matter of these Let-

ters Patent, the barrel-body is first formed in one machine which compresses the pulp, forming it into the desired shape and largely expressing the water, which barrel-body is then transferred to another machine, where, under 55 pressure, heat is applied. The heads of the barrel are formed in a machine which compresses the pulp, forms it to the desired shape, and largely expresses the water, after which the head is transferred to another machine, 60 where it, in company with other heads like it, is subjected to further pressure and also to heat. These general observations are made here that the general plan of the description herein contained may be understood at the be- 65 ginning. The machine herein described is designed for forming a barrel-body from pulp, which barrel-body is afterward dried under heat and pressure in another machine.

Perhaps the heaviest and most conspicuous 70 single feature in the machine for forming barrel-bodies herein described is the frame-ring a —an iron casting—which of course might be made in a plurality of pieces, but is better made as one solid casting. A special utility 75 arising from making this ring in one piece is that the hydraulic cylinders i , hereinafter described, are all formed in this frame-ring, and are all kept rigidly in line with each other. This frame-ring is or may be supported on 80 pillars b . The machinery for forming the barrel-body may be said, in general terms, to be inside of this general frame-work.

The more important features in the forming of the barrel-body are a collapsible core which 85 forms the interior of the barrel-body and external side compressors, radially movable, which form the exterior of the barrel-body.

The letters c denote the external side compressors, which are preferably, but not neces- 90 sarily, six in number. They have a movement toward and from the axis of the barrel-body, and this is what is meant by saying that they are "radially movable." These external side compressors are grooved upon their faces for 95 the escape of water as it is expressed from the pulp. These external side compressors are overlaid by the face-plates d , which are preferably of boiler-plate. These face-plates are perforated laterally from front to rear for the 100

escape of water expressed from the pulp. These face-plates are overlaid with a finely-perforated mold-face, *e*. When the external side compressors move toward the axis of the barrel-body for the purpose of compressing the pulp and forming it, water which is expressed from the pulp passes through the finely-perforated mold-face *e*, thence through the lateral perforations in the face-plate *d*, and escapes and runs off through the grooves which are in the external side compressors.

The letter *f* denotes a table, a cast-iron plate supported on the pillars *b* and underneath the frame-ring. The letter *g* denotes a somewhat similar table, which is immediately over the frame-ring. For convenience sake the table *f* is called the "lower" table and the table *g* the "upper" table. The external side compressors already mentioned are situated between these upper and lower tables, and they, as well as the interspace compressors, hereinafter mentioned, practically rest and have their radial movement upon the lower table, *f*. There is a raised ring on the upper side of the lower table *f* and upon the lower side of the table *g*, radially mortised at appropriate places, in which the ends of the external side compressors and the interspace compressors rest, such mortises forming guides for all these compressors in their radial movement.

The external side compressors are solidly backed by and attached to the pistons *h*, which lie and move in cylinders *i*, formed and bored in the frame-ring *a*.

The letters *j* denote cylinder-heads strongly fastened to the frame-ring. These pistons *h* and cylinders *i* form what are commonly known as powerful "hydraulic rams," and their office is to force the external side compressors forward in their radial movement with great power for expressing the water from the pulp and giving it its shape.

The letter *k* denotes the ducts through which water is introduced into the cylinders *i* at appropriate times by a strong hydraulic pump, *r*, in the manner well known for similar purposes.

The letter *l* denotes the screw or bolt which fastens the pistons *h* to the side compressors.

It will be understood that the hydraulic rams mentioned herein are packed and otherwise fitted in the ways and manners that hydraulic rams are usually packed and fitted. The various ducts *k* lead from a common reservoir appurtenant to a pump, *r*, so that the pressure may be simultaneous and equal in each one of the hydraulic cylinders *i*, insuring simultaneous and equal pressure on all parts of the barrel-body.

In order to attain a substantially round or circular outline for the barrel-body, there are used, in addition to the external side compressors, *c*, other and subsidiary compressors, *m*, which, for convenience sake, are termed "interspace compressors," which are carried

forward when the pulp is being compressed and formed by the compressors *c*. These interspace compressors have their radial movement guided in the same way that the compressors *c* are guided. These interspace compressors have a finely-perforated mold-face, the same as the compressors *c*. They are perforated radially from front to rear, the same as the compressors *c*, and they are grooved or ribbed upon the back to facilitate the escape of the expressed water. These interspace compressors are attached on the back to the piston-rods *n*, which have on their outer ends the piston-heads *o*, moving in cylinders *p*, bored and formed in the frame-ring *a*, which cylinders, piston-heads, and piston-rods are packed and fitted in the common ways and manners. Each one of the cylinders *p* is furnished with a duct communicating with an accumulator or other suitable pressure-generator, which avails to retract the interspace compressors as well, when permitted so to do—that is, when the water-pressure is taken off the piston *h*. The constant pressure from the accumulator not only avails to retract all the external side compressors in the manner described, but it keeps the interspace compressors always properly in contact with the external side compressors. It is suggested that the piston *h* may be made to have piston-heads, and water-pressure be applied upon the inside thereof, as well as on the other side, in order to retract the external side compressors.

Having in substance described the compressors for forming and compressing the exterior of the barrel-body, attention is now directed to the collapsible core which forms the interior of the barrel-body. This core is spoken of as "collapsible." Evidently the core for a bilged barrel must be collapsible, in order that it may be extricated from the barrel-body after such barrel-body is formed thereon.

The letter *s* denotes what is called the "core-plate." On this core-plate the parts which may be said to form the core proper rest. These parts are nine in number—the part *t*, called the "core-spine," shaped in section substantially like a Maltese cross; the parts *u*, four in number, called the "core-sections;" the parts *v*, four in number, called the "core-blocks."

It will be observed that the core-spine forms a central lateral support for the core-sections and core-blocks, and that the whole construction is a very strong one, to the end that the core, as a whole, may safely withstand the great lateral pressure to which it is subjected when the external side compressors act in the compressing and forming of the barrel-body.

It may be remarked at this point that the core, as a whole, is introduced into the central space formed by the external side compressors and interspace compressors from below, and that it retreats therefrom downward

after the barrel-body is formed upon it, bearing that barrel-body with it in the same direction, and at the proper time the core is collapsed by first raising out and withdrawing the core-spine and then moving the core-sections and core-blocks radially inward, after which, of course, the barrel-body is free to be removed.

The core-spine has upon its top or upper end two or more eyebolts, *w*, into which hooks may take, and the core spine by proper attachments be lifted.

In the core-plate *s* there are four radial mortises, *z*, one for each of the core-blocks, through which runs a bolt, *a'*, connecting each core-block with its rack *b'*, underneath the core-plate, which racks rest and radially move in radial mortises made for that purpose in the under side of the core-plate. The two pinions *c'* and the rotary shaft which carries them are really and practically one piece. The upper of these pinions meshes into the rack *b'* and the lower meshes into the ring-gear *d'*, which ring-gear is provided with a socket into which the operator may insert one end of a lever, *e'*. By means of this lever he partially rotates the ring-gear *d'* and moves all of the core-blocks radially inward.

In the core-plate are four other radial mortises, *f'*, through which run the bolts *g'*, serving to connect the core-sections with their racks *h'*, lying and moving radially in radial mortises made for that purpose in the under side of the core-plate. The pinion *i'* meshes into the rack *h'*, and also into the ring-gear *j'*. It is provided with a socket, into which the operator may insert one end of the lever *k'*, and taking hold of the other end of the lever he may partially rotate the ring-gear *j'*, and thereby move radially inward all four of the core-sections. When the core is thus collapsed, as already said, the barrel-body is readily removable therefrom.

The plate *l'* is attached on the bottom of the core-plate by studs, as shown. To this plate *l'* there is permanently attached the core-shaft *m'*, on and around which the core-spine rests when the parts of the core are assembled for use.

The letter *n'* denotes a cylinder in which reciprocates the piston *o'*, having attached thereto a piston-rod, *p'*, which is used in effecting the raising and lowering of the core. One mode of coupling this piston-rod last mentioned to the core is to have the upper end of the core-shaft *m'* socketed in the lower end of the piston-rod *p'*, and the two locked together by a key, *r'*, which can be knocked out when it is desired to disengage the core. The piston *o'* is operated by water let into and out of its cylinder at appropriate times.

The table *g* is suitably bolted to the framing. From this table *g* rises a series of pillars, *s'*, supporting the cap-plate *t'*, which is practically a casting in which are formed the hydraulic cylinder *n'* and also certain other

hydraulic cylinders, shortly to be described hereinafter.

On the table *g* rests a pulp-reservoir, *u'*, fed with pulp from an elevated tank through a pipe or pipes, *v'*, thus serving to maintain the pulp-reservoir always full of pulp and under pressure, and it is from this pulp-reservoir that the pulp is fed into the matrix which exists between the core and the external compressors; and for this purpose the ring-gate *w'* operates at the proper time. Its rising opens a way for such matrix, and its falling closes such way. This ring-gate is operated by means of the hydraulic cylinders *z'*, in which reciprocate the pistons *a''*, attached to the piston-rods *b''*, which are in turn attached to the ring-gate. It is not deemed necessary to describe the details of these last-mentioned hydraulic cylinders further.

It will be understood from the foregoing description of this machine for forming and compressing barrel-bodies what its operation is. That operation is, in short, that the external side compressors and the interspace compressors are in the position of being retracted, and the core is in its place in the central space formed by these external side compressors and interspace compressors. Then the ring-gate is raised and pulp allowed to flow into the matrix until it is full, after which the ring-gate is lowered and closed. The power is applied to the external side compressors, which move forward radially, expressing the water from the pulp to a great degree and giving it the shape of a barrel-body, after which the external side compressors and the interspace compressors are retracted or withdrawn. Then the core, bearing upon it the barrel-body, is lowered and detached from the piston-rod *p'*, another core is attached and lifted into place, and the machine is then ready to repeat the operation already described of forming and compressing another barrel-body.

The plate *l*, which forms the bottom part of the core-plate, is provided with small wheels *e''*, which permit the core bearing its barrel-body to be rolled, preferably on tracks, to another press, wherein the barrel-body is dried by heat and pressure.

The improvement claimed herein is—

1. The combination of the external side compressors, the hydraulic rams operating the same, and the hydraulic pump operating all the rams, substantially as described, and for the purpose set forth.

2. The combination of the external side compressors, the rams operating the same, the interspace compressors, and the rams operating the interspace compressors, substantially as described, and for the purpose set forth.

3. The combination of core and external side compressors with the annular pulp-reservoir *u'*, located over the same, and the ring-gate *w'*, substantially as described, and for the purpose set forth.

4. The combination of the external side

compressors with a core raised and lowered by a water-ram, and the ring-gate operated by water-rams, substantially as described, and for the purpose set forth.

- 5 5. In combination, the frame-ring *a*, made in one piece, the cylinders *i p* formed therein, the external side compressors and interspace compressors, and the pistons, substantially as described, and for the purpose set forth.
- 10 6. The interspace compressors, combined

with the external side compressors, and held backward thereagainst by a fluid-pressure applied to the piston-heads appurtenant to the interspace compressors, substantially as described, and for the purpose set forth.

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