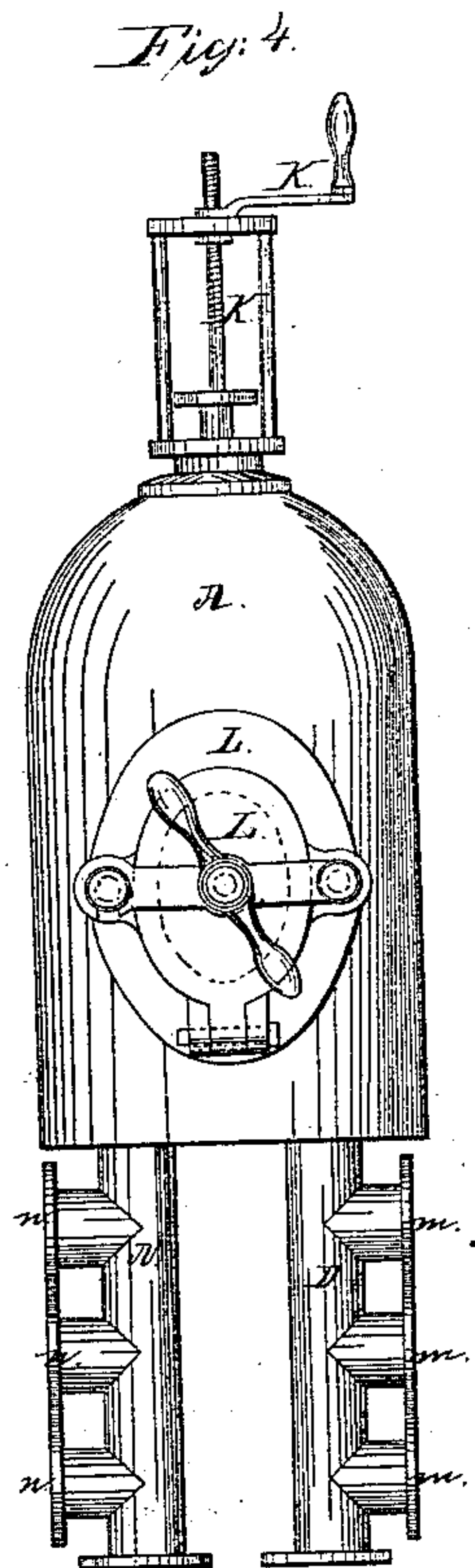
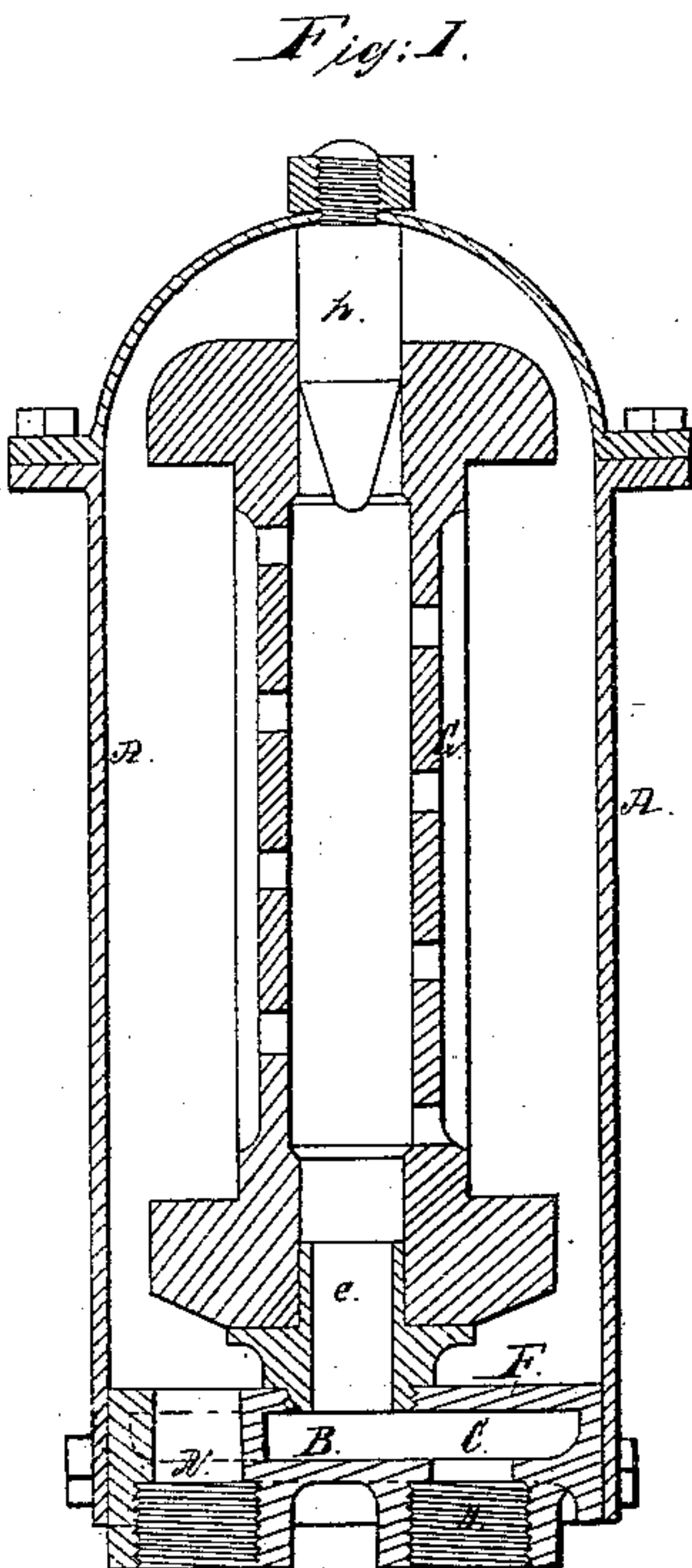
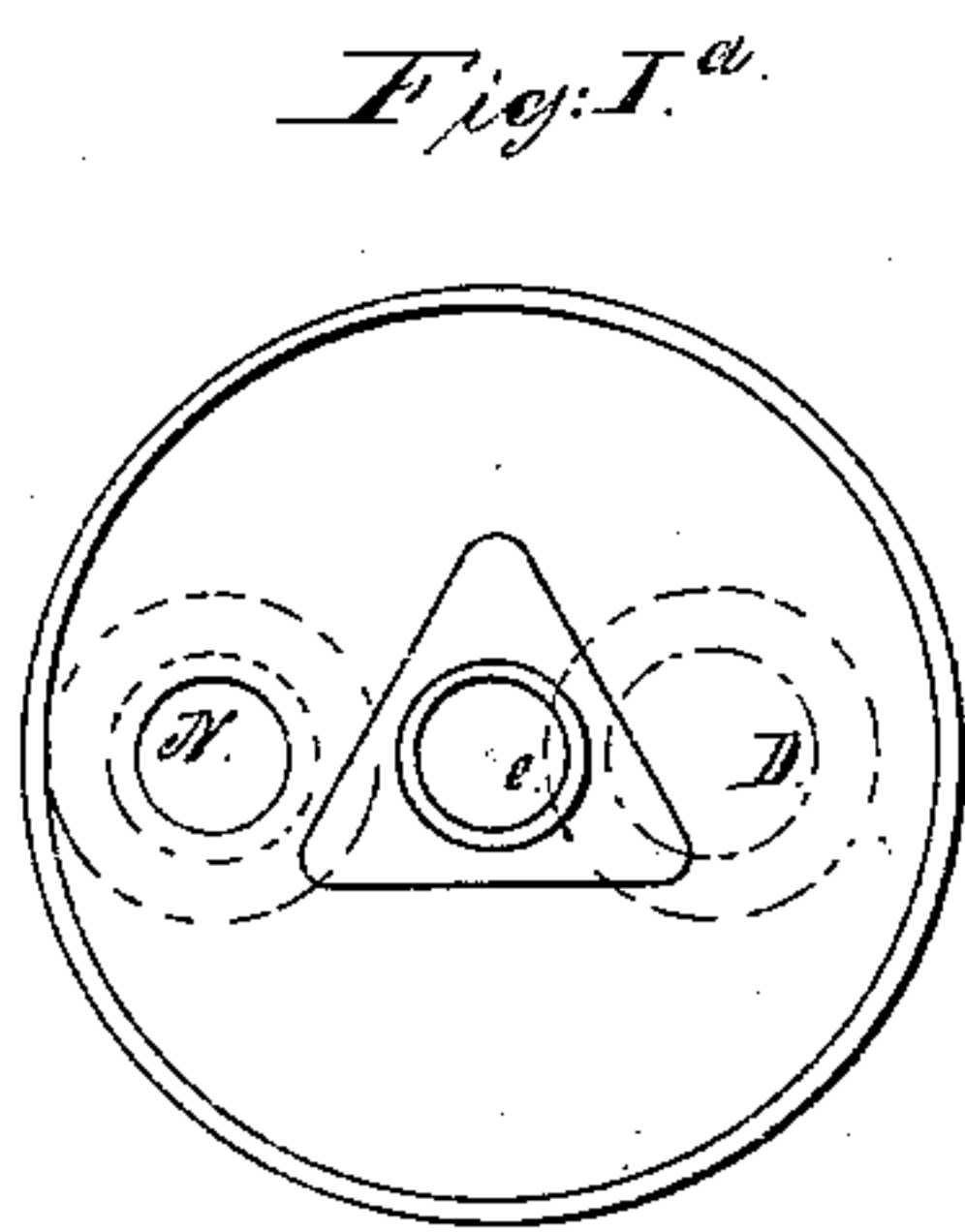
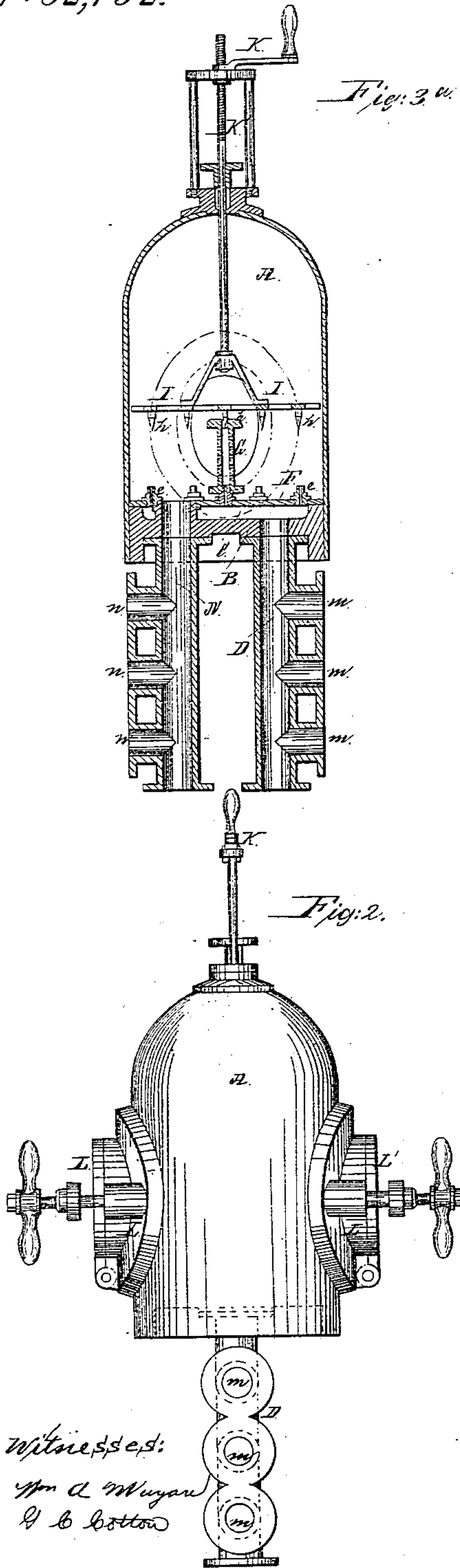


J. G. Marshall,

Bleaching Apparatus.

N^o 82,732.

Patented Oct. 6, 1868.



Inventor:
 J. G. Marshall
 per Mearns &
 Attorneys

J. G. Marshall.

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Fig. 3^a

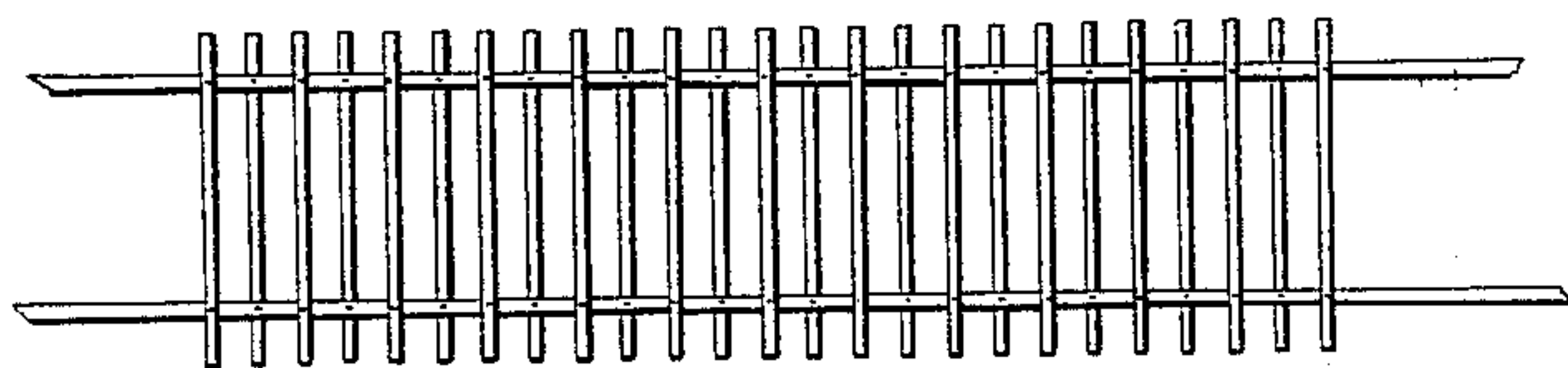


Fig. 4^a

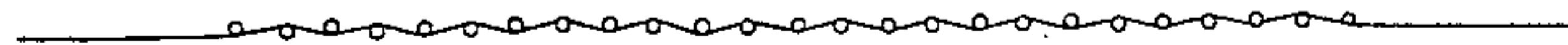


Fig. 2^a

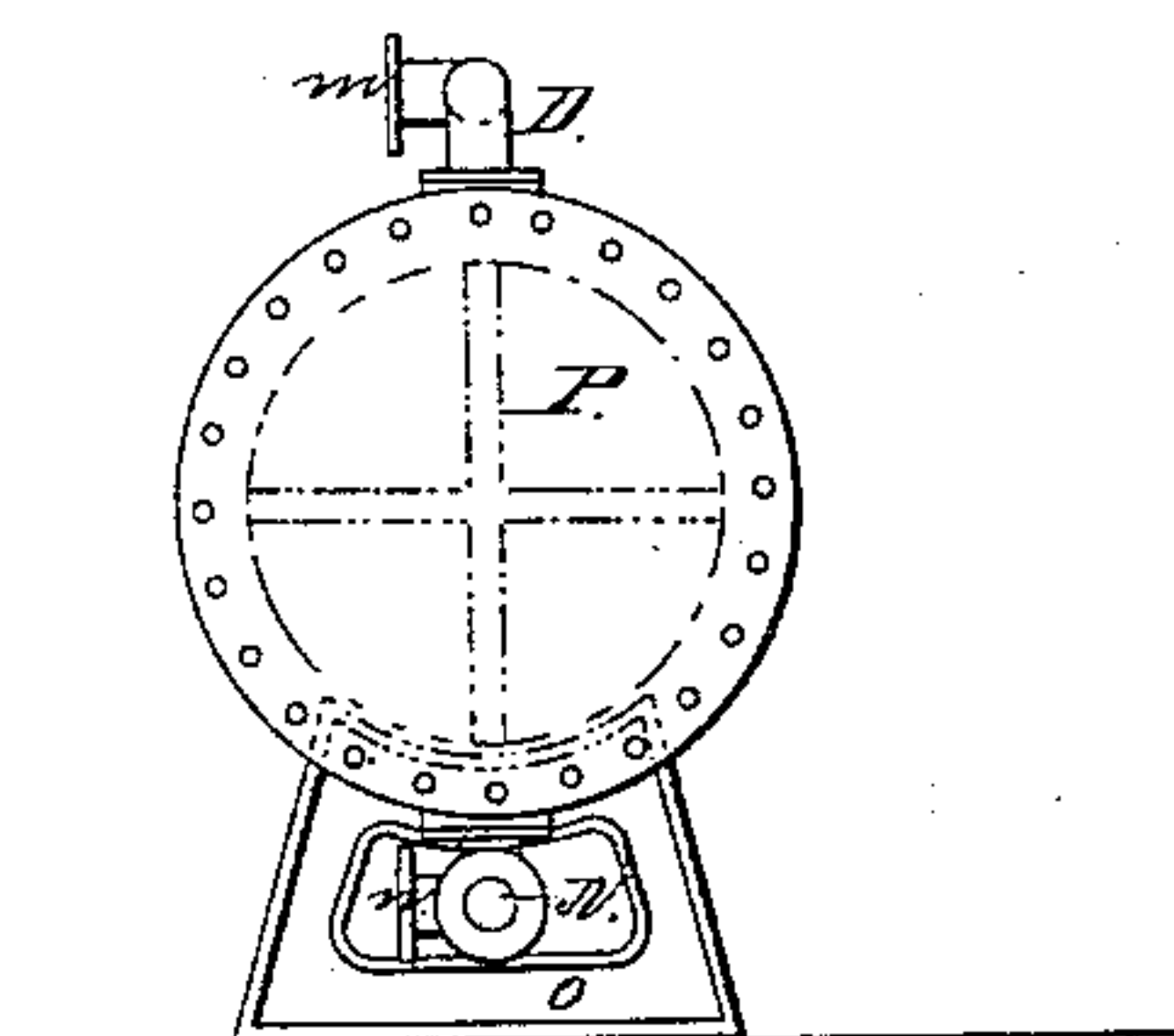


Fig. 1^a

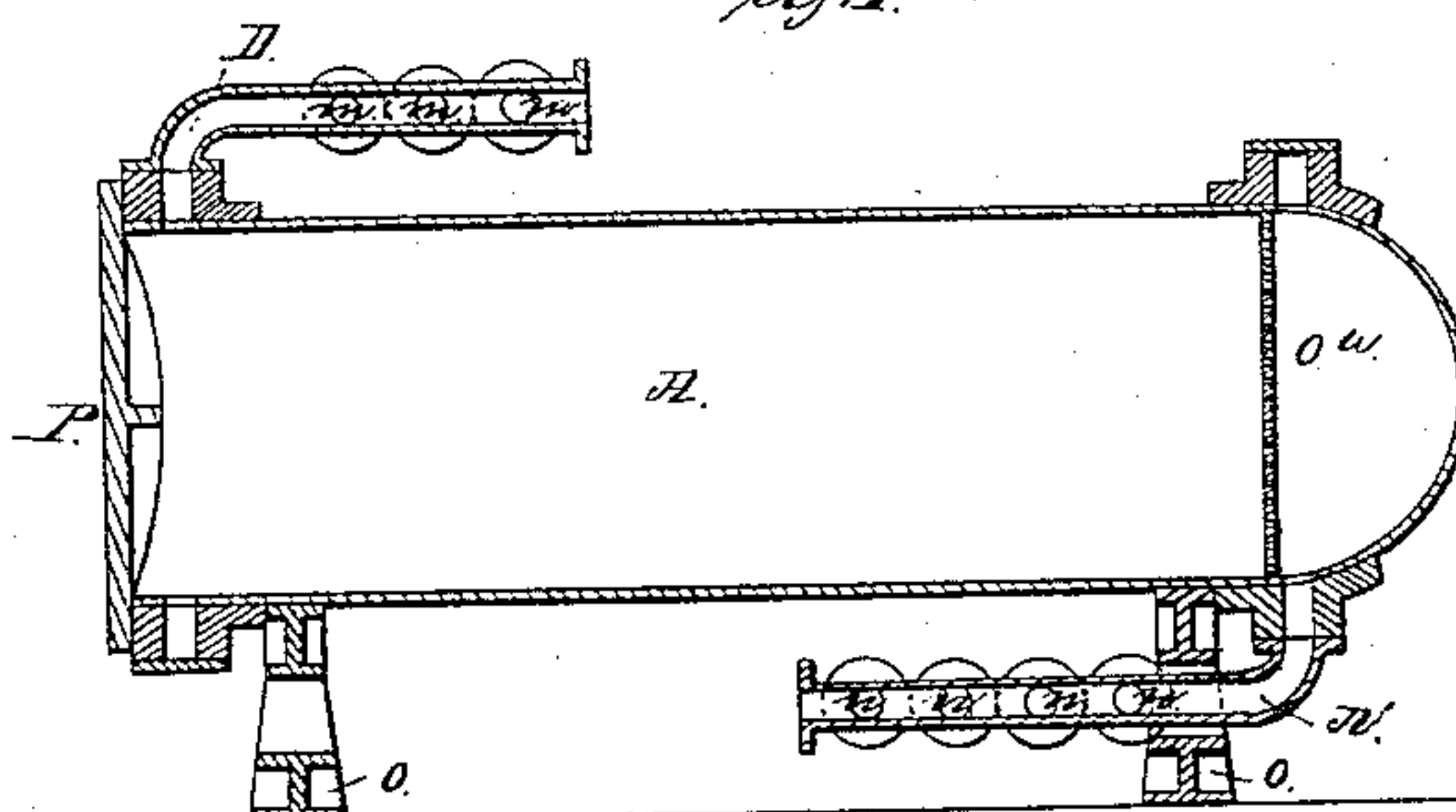


Fig. 5.

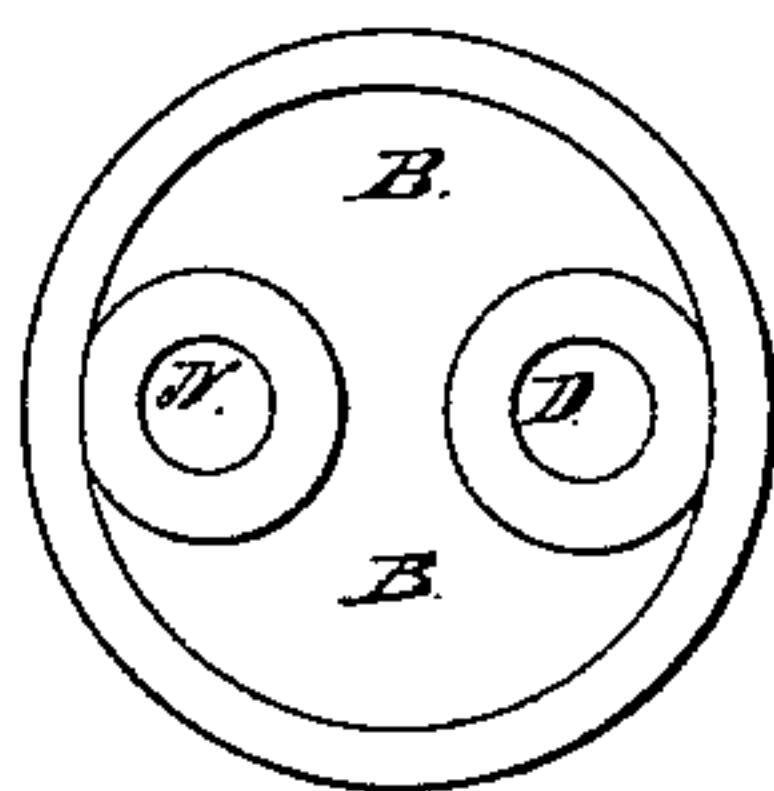


Fig. 3.

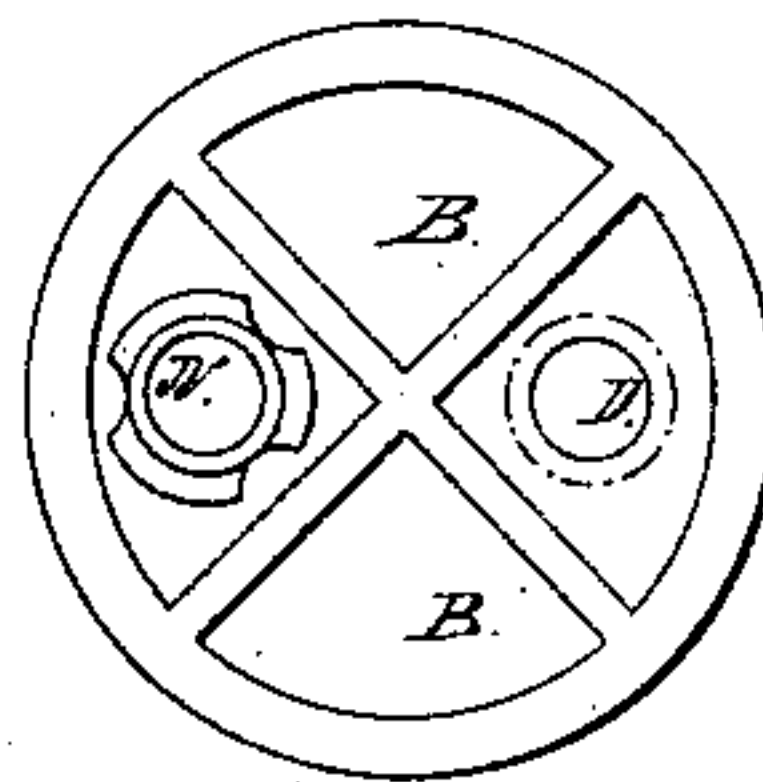
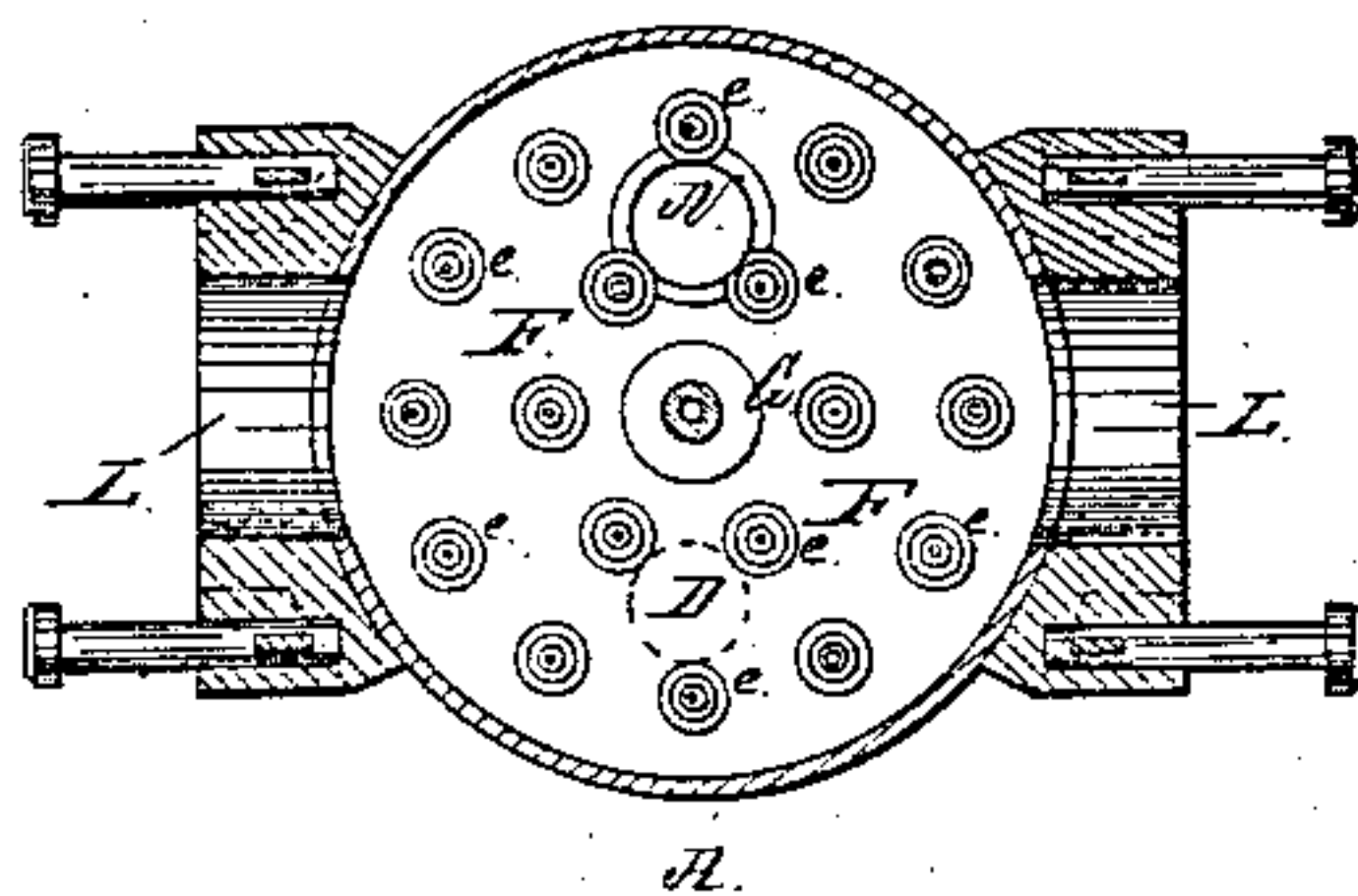


Fig. 6.

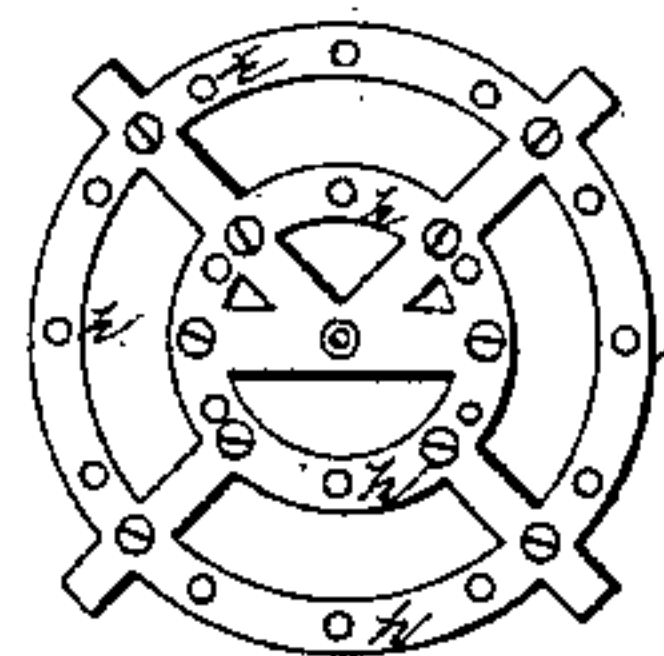


Fig. 7.

Witnesses:

J. A. Morgan
J. C. Cotton

Inventor:

J. G. Marshall
per Wm. W. L.
Attorneys

United States Patent Office.

JAMES GARTH MARSHALL, OF LEEDS, ENGLAND.

Letters Patent No. 82,732, dated October 6, 1868.

IMPROVED APPARATUS FOR WASHING, BLEACHING, AND CLEANSING YARNS, BOBBINS, AND OTHER MATERIALS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES GARTH MARSHALL, of Leeds, in the county of York, England, have invented certain new and useful Improvements in Solvent or Detergent Processes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to improvements in devices for combining the influences of high temperature and great pressure in solvent or detergent processes, to be applied to dissolving the gummy or resinous matters adhering to the fibres of various fibre-yielding plants, or for cleaning fibrous material of animal origin, such as wool or silk, from some of the extraneous matters that may be adherent thereto; and the invention consists in the construction and combination of parts, as will be hereinafter more fully described.

The solvent or detergent liquid employed is to be forced, by means of steam at high pressure, or other suitable mechanical agent, through the material, fibre, or fabric, the liquid to be used having previously been heated to a high temperature.

This operation of forcing the liquid through the goods is to be repeated until the solvent, detergent, or cleansing process shall have been fully completed.

In Sheet I of the accompanying drawings—

Figure 1 is a vertical section of the apparatus which I employ for the purpose of carrying out my invention, and adapting it to operate upon rovings or slivers of any fibrous material which may be wound upon bobbins. This figure represents one bobbin as mounted in place on the centre nozzle or short tube, through which the detergent liquid is forced from below.

Figure 1^a is a horizontal section of the same.

Figure 2, Sheet II, is an elevation of an apparatus constructed upon precisely the same principle as that shown at fig. 1, Sheet I, but arranged to operate upon several bobbins at once.

Figure 3 is a horizontal section or sectional plan of the apparatus, showing nineteen nozzles, with the inlet and outlet-pipes, and the hand-holes or openings for obtaining access to the interior of the apparatus.

Figure 3^a, Sheet III, is a vertical section, showing the mode of letting the liquor in and out of the chamber.

Figure 4, Sheet IV, is a side elevation, showing the mode of fastening the covers of the hand-hole or openings whereby access may be obtained to the interior of the vessel.

Figure 5 represents the under side of the cast-iron bottom B.

Figure 6, Sheet III, is a top view of the same.

Figure 7 is a plan view of the plug-frame I, containing the nineteen plugs, which serve to keep the bobbins in a vertical position.

Figure 1^a, Sheet V, is a longitudinal vertical section of an apparatus adapted to operate upon flax, straw, wool, silk, or other material in bulk.

Figure 2^a, Sheet V, is an end-view of the same.

Figure 3^a shows an open web, to be used for folding cloth or other woollen fabric to be submitted to the same operation; and

Figure 4^a represents a section of the same.

Similar letters of reference indicate corresponding parts.

The vertical section, fig. 2, represents a form of apparatus adapted for operating upon rovings, or similar materials, one bobbin being represented in place, but any number may be mounted in the same manner, as shown in figs. 3 and 3^a.

The vessel A, in which the rovings are placed, is cylindrical, and has a dome-shaped top, made of malleable iron, or other suitable material, strong enough to resist a pressure of two hundred pounds on the square inch, or more where desirable.

B is a cast-iron plate, forming the bottom of the vessel. This plate B contains a cavity, C, and is separated from the open part of the vessel A by the tube-plate F.

The detergent or solvent liquor is introduced from the outside into the cavity C, through the pipe or tube screwed into the junction D.

Into the tube-plate F is screwed or otherwise fixed the nozzle or short tube *e*, of which, however, there may be any number, according to the number of bobbins intended to be acted upon at one time, as shown in figs. 3 and 3^a.

The form of the bobbin is shown at G. Its sides, (which may be fluted,) are perforated transversely, for the purpose of allowing the detergent liquid to flow out.

The bobbin is tubular, and is open at the bottom where the nozzle *e* enters it. This open central tube of the bobbin is closed at the top by the plug *h*, which is screwed into the dome.

In fig. 3^a, the plugs *h* for all the bobbins are carried by a disk or plate, I, the form of which is shown in the detached plan view, fig. 7. This disk or plate is capable of being raised and lowered by the winch K, on the screwed shaft K', for the purpose of removing the bobbins, and introducing others in their place.

In figs. 2 and 3, L L are apertures in the sides of the vessel A, through which the bobbins are introduced and removed.

These apertures are closed by a strong iron lid or cover, I', figs. 2 and 4.

Below the plate B, in fig. 3^a, the pipe or tube D is continued downwards, and contains several lateral branch tubes or openings *m m m*, which are opened and closed by valves, (not shown in the drawing,) for the introduction or exit of the various liquids required in the process. Another pipe or tube, N, extends from the interior of the vessel A through the plate B, and is likewise continued below it.

This pipe or tube also has several lateral branch tubes or openings *n n n*, which are opened and closed by valves, (not shown in the drawing,) for the introduction or exit of the various liquids required in the process.

At the bottom of the pipes or tubes D and N, waste or exit-valves are to be placed, for drawing off the liquid and emptying the apparatus altogether when required.

When heated liquor is required, it is to be heated in a closed boiler or vessel, strong enough to withstand the pressure of two hundred pounds or more to the square inch, and which boiler is connected by a pipe with one or more of the lateral branches or openings *m m* or *n n*.

The return of the liquor to the boiler, after circulating through the apparatus, is secured by a forcing-pump fixed between the boiler and apparatus, and attached to one or more of the lateral branches or openings *m m* or *n n*.

The liquor in the boiler being heated, and steam produced to the required pressure and temperature, the liquor will be forced by the pressure of the steam through one of the lateral branches or openings, (say *m m*,) for injecting from the inside to the outside of the bobbin. The liquor will then be forced up the tube D into the cavity C, and through the nozzle *e* into the centre of the bobbin, and from thence through the apertures at the sides of the bobbin, and through the substance of the roving or other material which is wound upon the bobbin.

The liquor is thus made to pass under pressure from the inside to the outside of the bobbin, (and through the roving wound thereon,) into the space of the vessel A, between the plates F and I, from whence it is drawn off by a forcing or suction-pump through the pipe N, and one or more of the apertures *n n*, and is conducted again into the boiler, from whence it may be passed a second, third, and more times, through the apparatus.

By reversing the operation, the liquor may in a similar manner be forced through the roving or other material on the bobbin from the outside to the inside, into the cavity C, and be again returned to the boiler, through the tubes D and the branch tubes *m m*.

After the material on the bobbins has thus been saturated with hot liquor, the rovings may, when required, be washed with water by a similar action of the apparatus, the water being drawn from a reservoir or other source, at a sufficient height, and of sufficient size to afford pressure enough to drive the water through the apparatus.

The water may be passed through once or oftener, as shall be found desirable, and in either direction.

Other solutions not requiring heat and high pressure, such as the acids used in bleaching, may also be passed through the apparatus in like manner as the water.

Raw materials, such as the straw of flax, hemp, wool, silk, or similar substances, may also be placed in the vessel A, and operated upon in a similar manner.

Yarns and manufactured articles, to which washing or bleaching processes are or may be applied, may also be placed in the vessel A, and similarly treated. And a similar application of the apparatus may be made to any ordinary process of washing or cleansing various other substances and fabrics.

In each of these cases some modification of the mode of entrance and exit of the liquor, and the mode of placing or holding the substance or material to be operated upon, to suit the character of such substance or material, would be required, the action of the apparatus remaining substantially the same. Of course when fabrics or fibrous substances in the bulk, are to be operated upon, the hollow bobbins G are dispensed with.

In Sheet V of the drawings, I have shown an arrangement of apparatus which will be found convenient for operating upon flax, straw, wool, silk, or other material in bulk, or when made up into a fabric.

The flax, straw, wool, silk, or other material should be made up in bundles of suitable and convenient size, and placed horizontally in the vessel A, fig. 1^a. This vessel A should be completely filled by the bundles, and this may be conveniently done by packing the bundles in an open wicker basket or frame, made to fit the vessel A, and closed at the end, placed next the movable end or cover P of the vessel A.

This end of the basket or frame may be closed by a perforated disk or plate, similar to that shown at *d*, at the other end of the vessel A.

For operating upon woven fabrics in this apparatus, they may be conveniently wound into rolls, with an open web of rods of wood or wire introduced between the folds of cloth, so as to keep them separate, and allow of the passage to the liquor through the folds of the fabric. This open web is shown in plan at S, fig. 3^a, and in section at fig. 4^a.

These rolls are then placed horizontally in the vessel A, and the liquor or liquors are then to be forced through the supply-pipe D, and thence through the material to be operated upon, and conveyed out by the exit-pipe N, as in the former instance.

The motion or passage of the liquid may then be reversed, if desired, and the material may be washed with water, as before described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the vessel A, of the supply-pipe D, opening into a chamber, C, one or more sets of spool-holding studs *e* and *h*, and an exhaust-pipe, N, substantially as and for the purpose described.
2. The employment of the open web S, in combination with a closed vessel, A, substantially as and for the purpose described.

The above specification of my invention signed by me, this 16th day of June, 1868.

JAMES GARTH MARSHALL.

Witnesses:

J. W. MOFFATT,
FRED. WALKDEN, } 66 Chancery Lane, London.