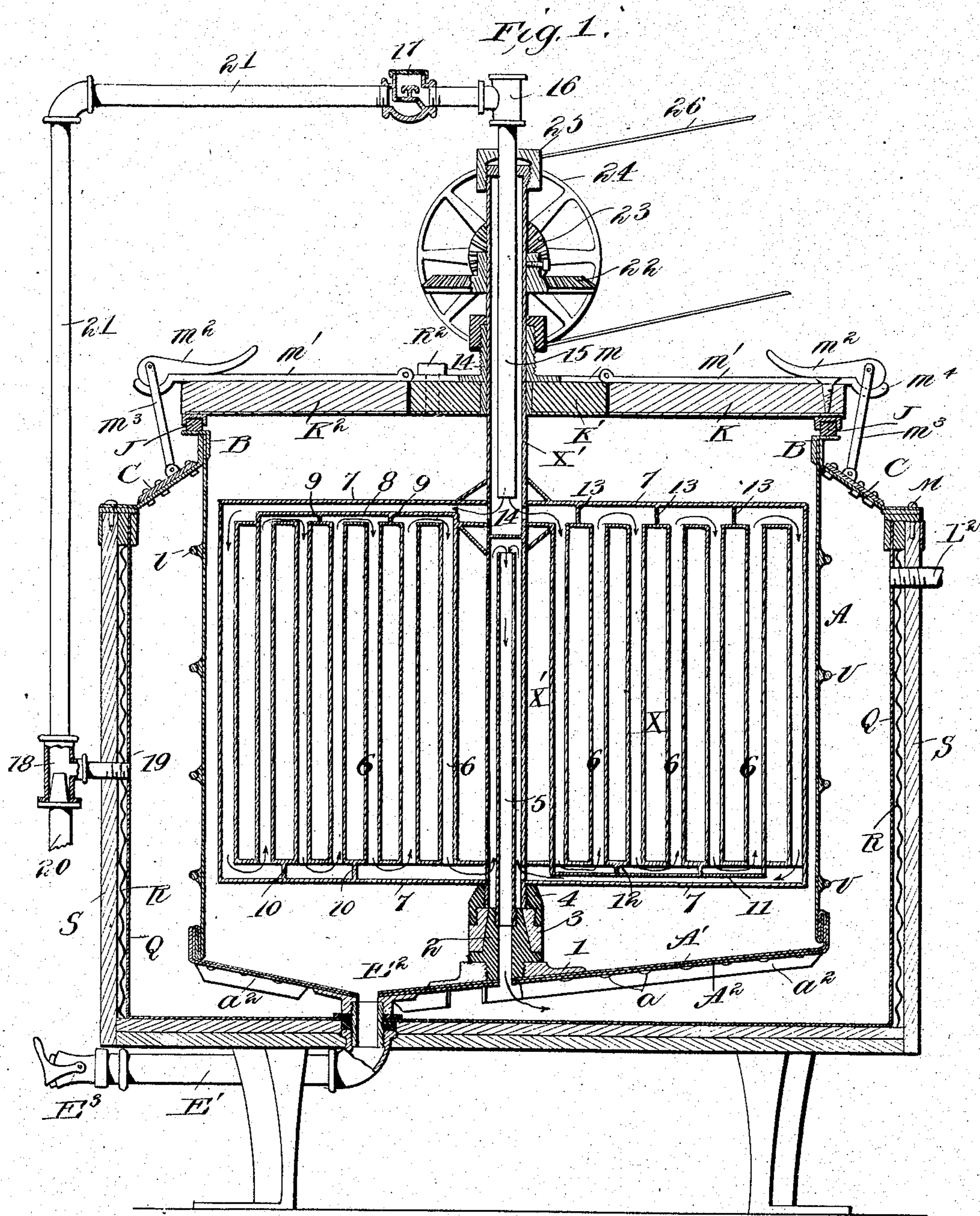


No. 781,529.

PATENTED JAN. 31, 1905.

A. JENSEN.
LIQUID RIPENER.
APPLICATION FILED MAY 17, 1904.

4 SHEETS—SHEET 1.



WITNESSES:
Jos. A. Ryan
Edw. W. Ryan.

INVENTOR
Aage Jensen.
BY *Munn & Co.*
ATTORNEYS

No. 781,529.

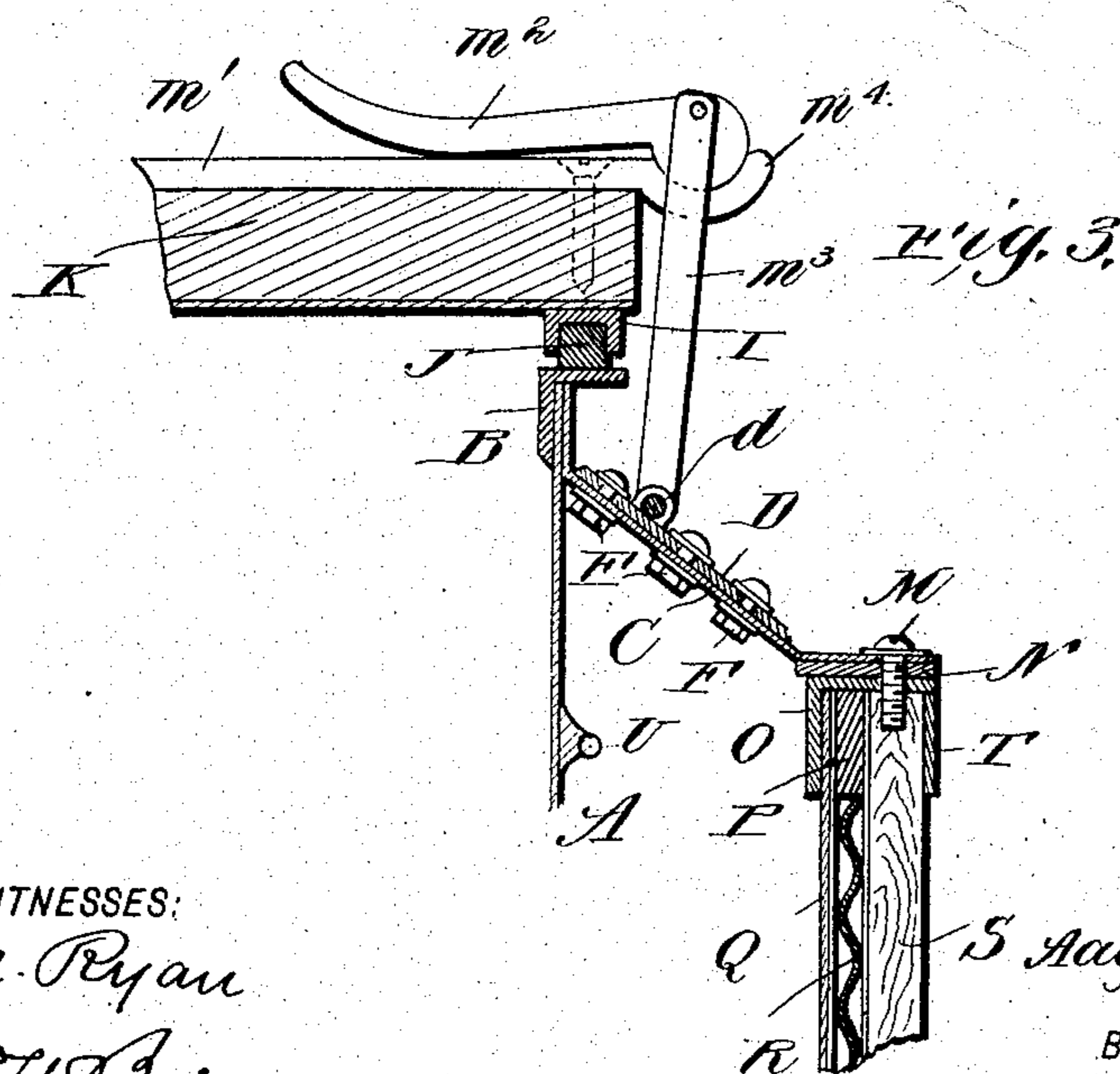
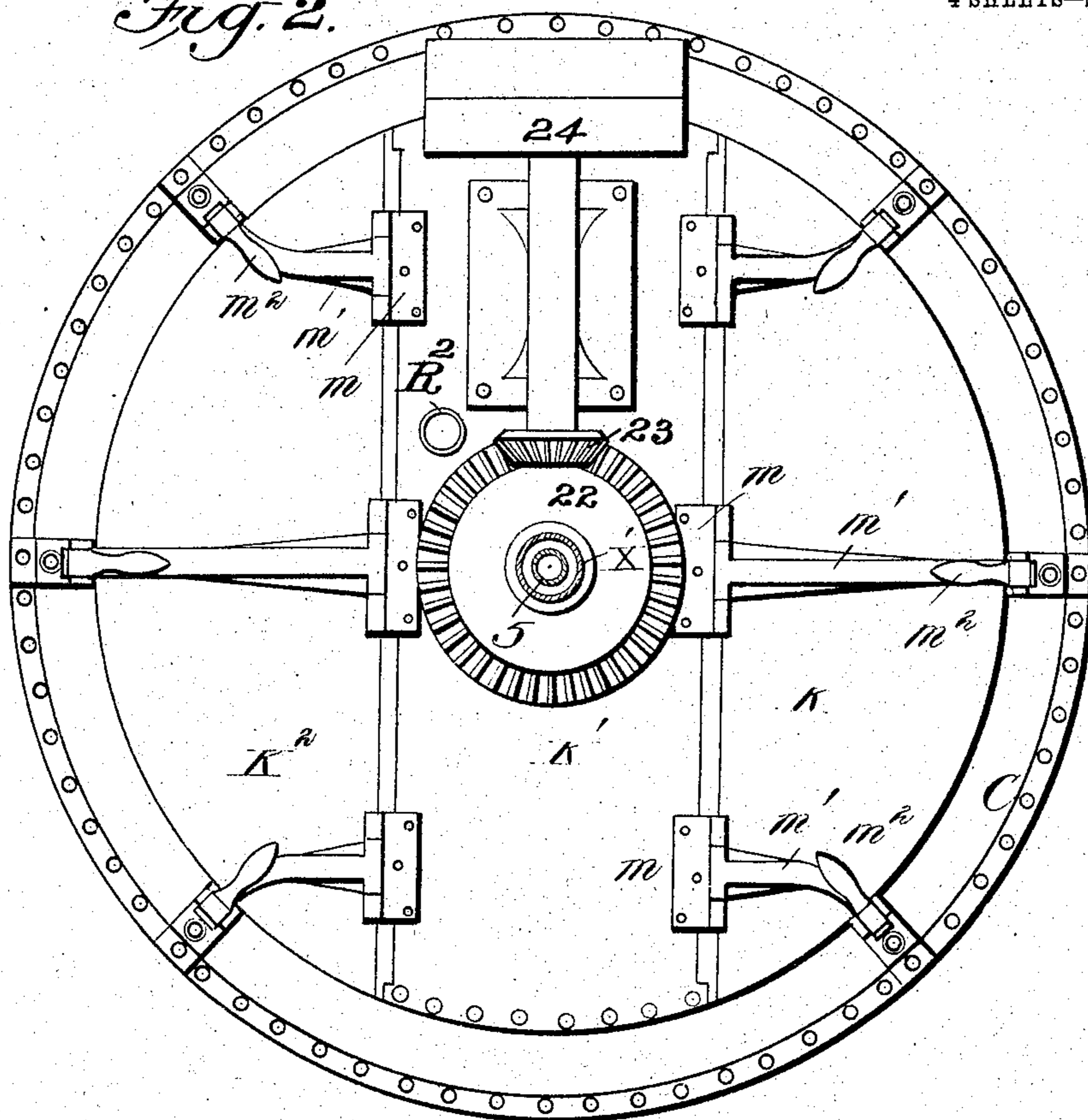
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4 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Jos. A. Ryan
Edw. W. Ryan

INVENTOR

INVENTOR
S. Aage Jensen.

BY *Munn & Co*

ATTORNEYS

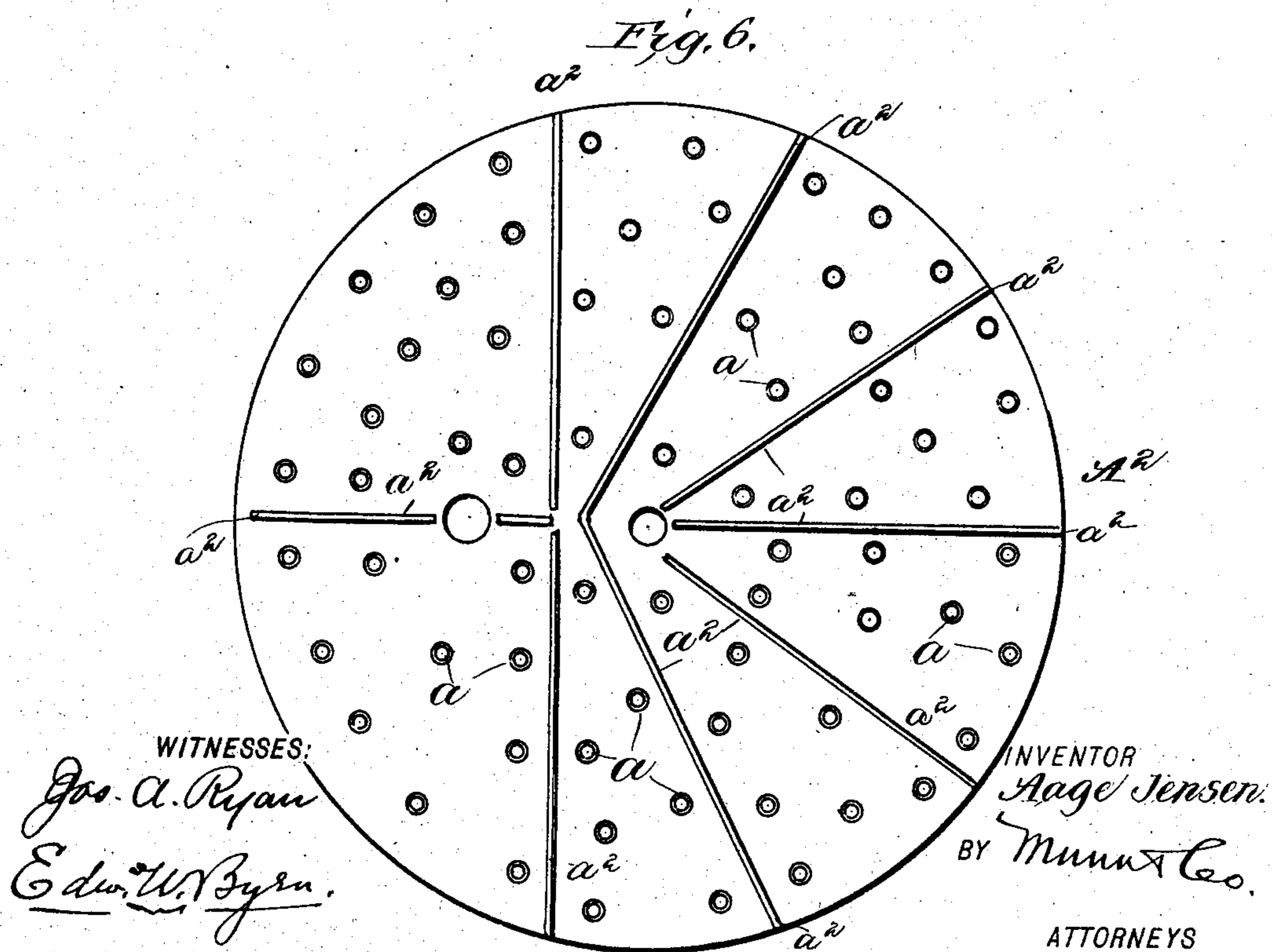
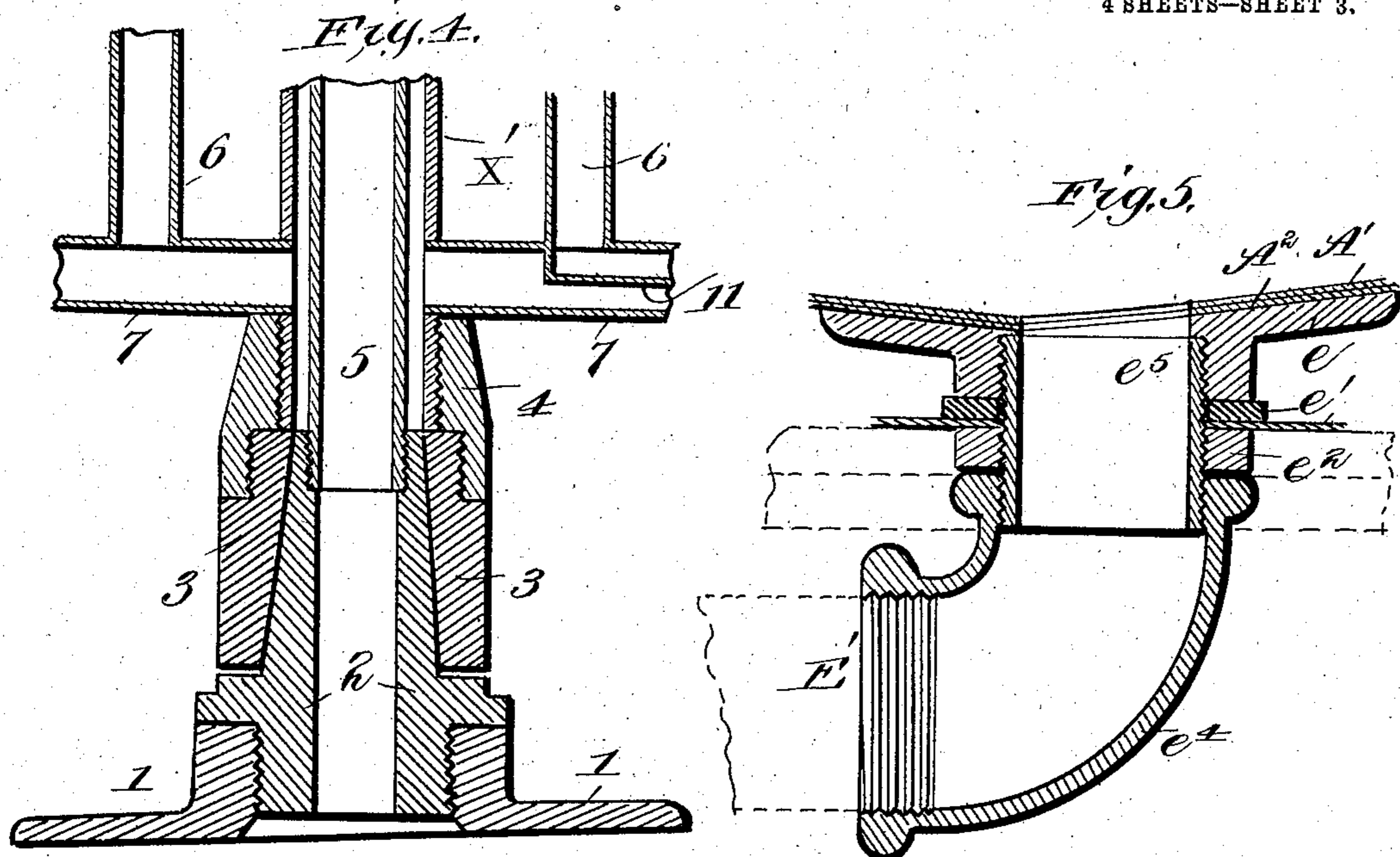
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4 SHEETS—SHEET 3.

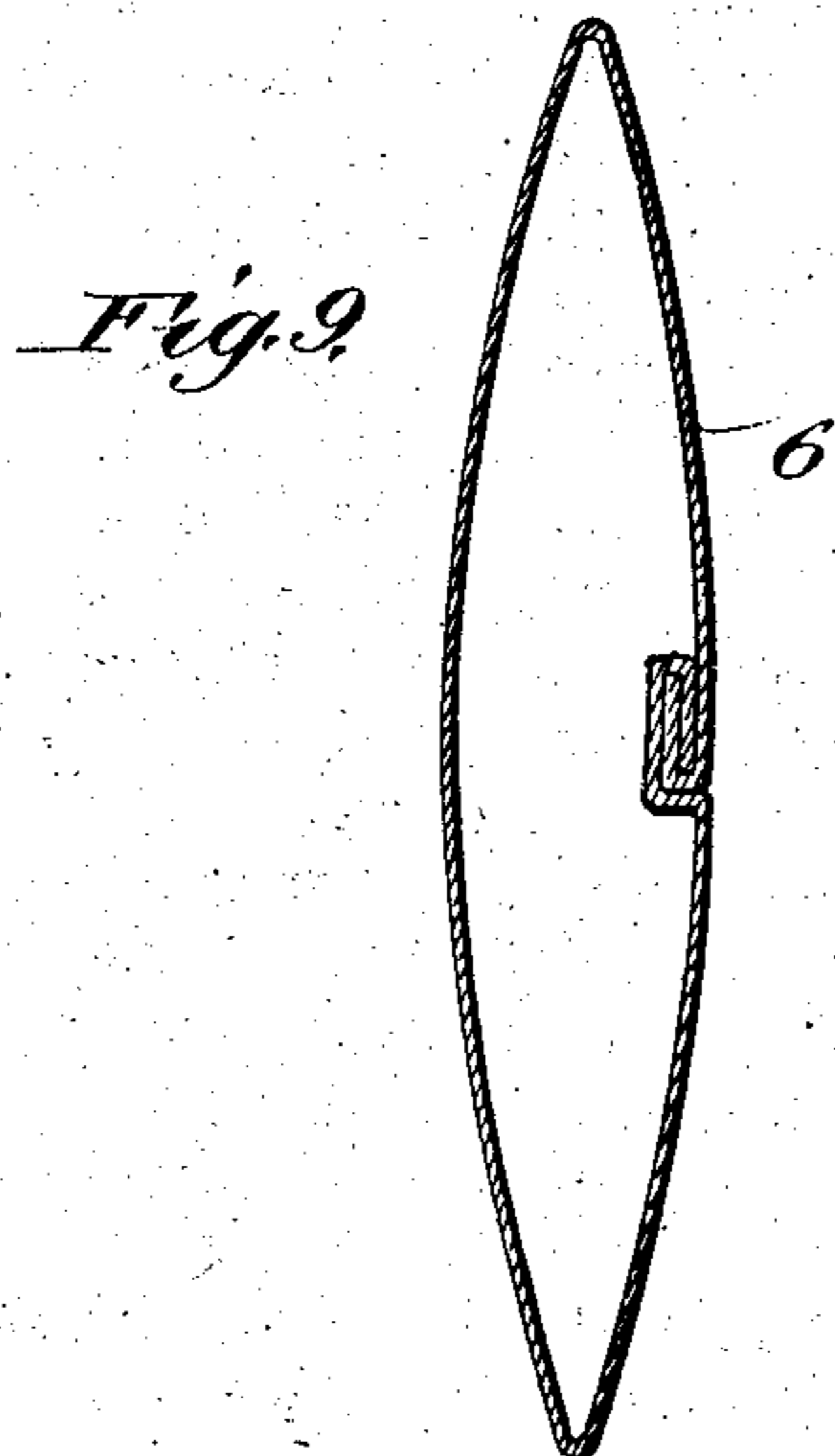
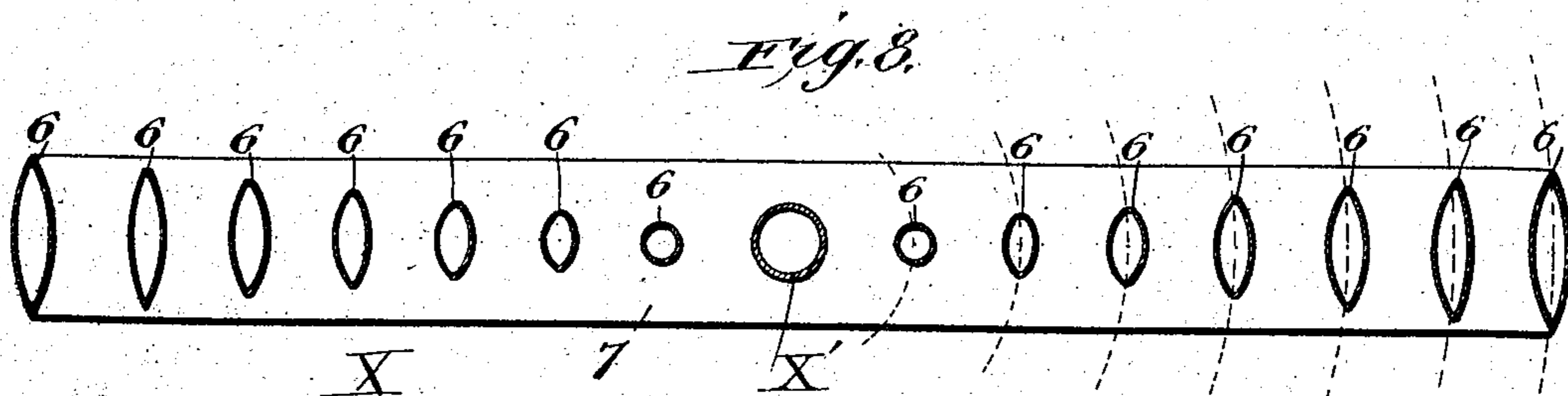
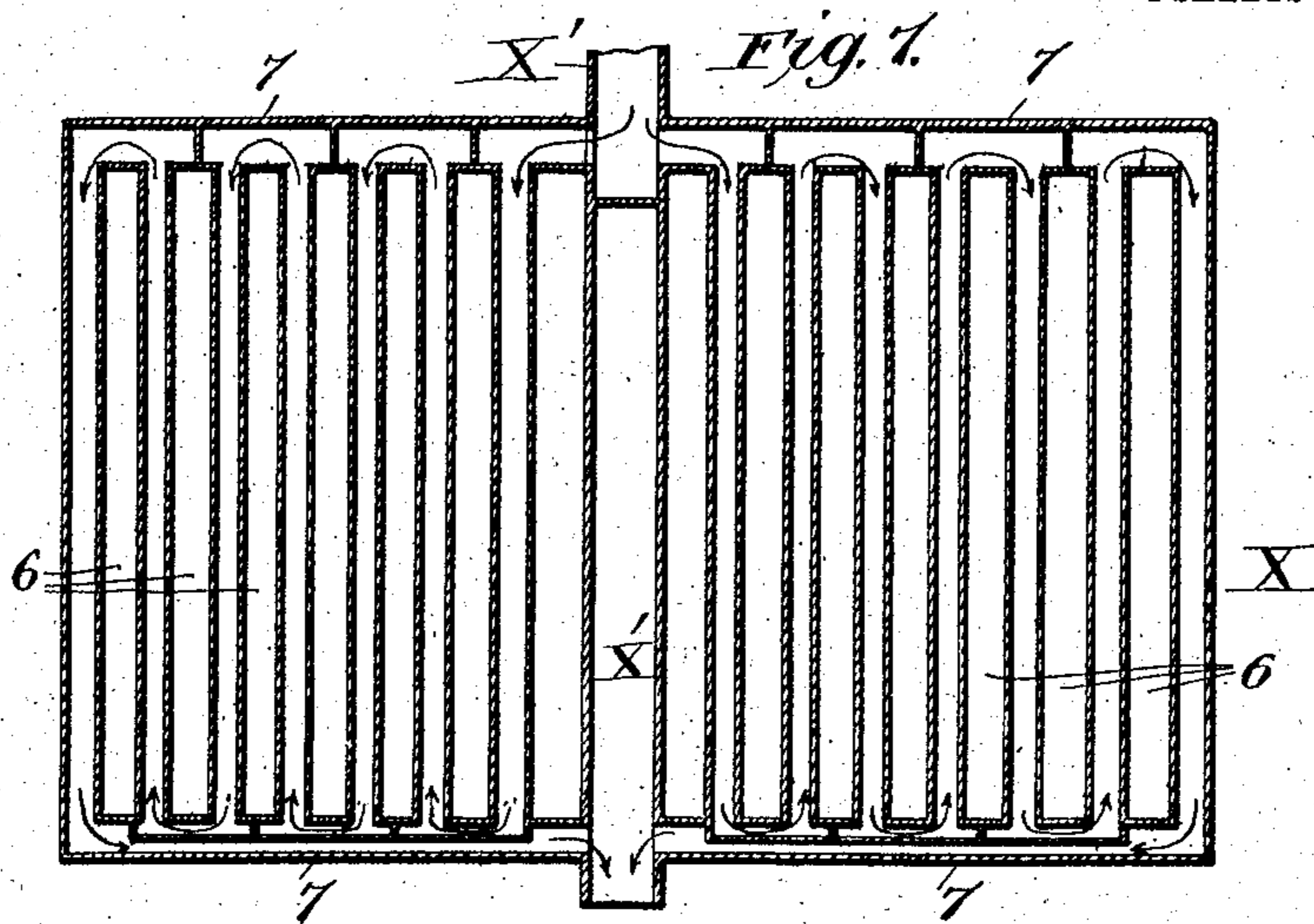


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4 SHEETS—SHEET 4.



WITNESSES:
Jos. A. Ryan
Edw. W. Byrnes

INVENTOR
Aage Jensen
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

AAGE JENSEN, OF TOPEKA, KANSAS.

LIQUID-RIPENER.

SPECIFICATION forming part of Letters Patent No. 781,529, dated January 31, 1905.

Application filed May 17, 1904. Serial No. 208,388.

To all whom it may concern:

Be it known that I, AAGE JENSEN, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have
 5 invented a new and useful Improvement in Liquid-Ripeners, of which the following is a specification.

My invention is in the nature of a device for cooling or heating and simultaneously
 10 agitating liquids—as, for instance, in ripening cream preparatory to churning it; and it consists in the novel construction and arrangement of receptacle with means for cooling or heating the cream, as may be desired, and at
 15 the same time agitating it, as will be hereinafter more fully described with reference to the drawings, in which—

Figure 1 is a vertical central section. Fig. 2 is a plan view. Fig. 3 is an enlarged vertical
 20 cal section through the breast of the tank; Figs. 4 and 5, enlarged detail sectional views showing the step-bearing and cream-outlet. Fig. 6 is a bottom plan view of the cream-receptacle. Fig. 7 is a vertical section, and Fig.
 25 8 an enlarged horizontal section, of one of the gangs of pipes or tubes, and Fig. 9 is an enlarged cross-section of one of the tubes of the same.

In the drawings (see Figs. 1 and 3) the tank
 30 or outer casing is constructed as a vertical cylinder having its outer wall composed of wood staves S, with a lining of galvanized sheet-steel Q and a layer of corrugated sheet-asbestos R between the said lining and the
 35 staves. This corrugated sheet forms air-cells and has a layer of paper on each side of it, as seen in Fig. 3. The inner wall A of the receptacle is made of tinned copper of cylindrical shape and with a conical bottom, the low-
 40 est point of the bottom being offset laterally from the center and communicating at E² with a discharge-pipe E', having a cut-off gate E³.

Around the receptacle A is arranged a num-
 45 ber of steel wire hoops U to reinforce or brace the said receptacle. At the top of the receptacle A is a circular angle-iron B, riveted and soldered to A.

C is an annular inclined breast fastened per-
 50 manently to ring B at the top and fastened at

the bottom edge to the upper edge of the outer casing by screws M, which (see Fig. 3) are threaded into an angle-iron rim O, with a rubber gasket N between.

T is a steel hoop arranged outside the upper
 55 ends of the wooden staves to hold them in place, and P is a wooden hoop arranged inside the staves and above the air-cells to prevent crushing the same. The horizontal flange of the angle-iron O covers the tops of
 60 the staves and the hoops T and P, and between the vertical flange of the angle-iron and the wooden hoop P is clamped the steel lining Q.

On top of the flanged ring B rests a cork
 65 packing-ring J, held in the groove of a channeled ring I, secured to the lower side of the hinged lid K.

The cover of the inner receptacle A is lined with tinned copper and is made in three sec-
 70 tions K K' K², of which the middle section, K', is stationary and K and K² are lids or doors, connected by hinges m m' to the stationary portion. The sections m' of the hinges are
 75 extended to the circular edge of the hinged lids and are formed with curved seats m⁴, that receive the cam-heads of short levers m². These levers are connected by links m³ with the annular breast C, as follows, (see Fig. 3):
 80 D is a brass casting fastened by screws F to the annular breast and having a loop d, in which is secured the pivot-pin of the links m³. When the levers m² are thrown out of the
 85 seats m⁴, the hinged side may be opened; but when the levers are in the position shown in Fig. 3 the cam-heads draw the lids tightly
 90 down, so that the cork packing J makes an air-tight joint.

The bottom of the receptacle A (see Fig. 1) is made of double thickness, the inner layer A' being tinned copper and the outer layer A²
 90 of galvanized iron fastened together throughout the entire surface by numerous closely-placed rivets a, (see Fig. 6,) and the outer layer of galvanized iron is formed into vertical
 95 flanges a², radiating as shown. These ribs or flanges a² impart stiffness to the bottom, so as to enable it to properly sustain the central shaft and rotating gangs of tubes without vi-
 100 bration.

X represents the gang of tubes which are con-

nected to a central hollow shaft X', which shaft
 is provided with a special step-bearing at its
 lower end and at its upper end extends through
 a stuffing-box 14 in the middle stationary part
 5 K' of the cover. The step-bearing (see Figs.
 1 and 4) consists of a circular plate 1, having
 an inclined bottom surface and a screw-
 threaded central hole. The inclined bottom
 10 surface is to fit the incline of the conical bot-
 tom of the cream-receptacle, since the lowest
 point of the conical bottom is eccentric to the
 shaft. Into the screw-threaded hole in the
 plate 1 is turned the lower screw-threaded
 15 end of a step-bearing 2. This step-bearing
 is made conical on its exterior surface and
 has a central hole through it to form a pass-
 age-way for liquids. Surrounding the exte-
 rior conical surface of bearing 2 is a swivel-
 ing sleeve 3, connected by a screw-thread
 20 with a sleeve 4, screwed onto the lower end
 of the hollow shaft X', so that this hollow
 shaft and its gang of tubes X and the sleeves
 3 and 4 rotate together. The conical inner
 surface of sleeve 3 fits with a water-tight
 25 ground joint onto the conical exterior of step
 2 and always wears to a water-tight fit. Into
 the upper end of the step-bearing 2 is screwed
 a stationary stand-pipe 5, which extends up
 to nearly the top of the rotary gang of tubes
 30 X. The gangs of tubes communicate with the
 top of the hollow shaft at 14 and communi-
 cate also at the bottom with the hollow shaft;
 but there is no passage-way through the hol-
 low shaft from its upper end to its lower end;
 35 but fluids passing through have to pass
 through the gangs of tubes on each side of
 the hollow shaft.

The rotating gangs of tubes 6 are arranged
 vertically and parallel to each other and com-
 40 municate at top and bottom with the horizon-
 tal pipes 7 7, which connect them with the
 hollow central shaft. The vertical tubes 6
 are in cross-section of a sharpened elliptical
 shape, as seen in Fig. 9, with the major axis
 45 of the ellipse set tangential to the circle of
 rotation, as in Fig. 8, so that these thin tubes
 cut edgewise through the cream with the least
 resistance and also afford the largest super-
 ficial area for a given cross-section. These
 50 tubes also get continually larger from the
 center outward, as seen in Fig. 8. This is to
 give a larger volume of cooling or heating me-
 dium within in proportion to the larger quan-
 tity of cream which these outer tubes pass
 55 through in revolving through larger circles
 of cream. In this way I get a better distribu-
 tion of heating or cooling effect from the gang
 of tubes throughout the body of cream in re-
 ceptacle A.

60 The circulation of the heating or cooling
 medium through the gang of tubes X is di-
 rected through them in various ways. To
 cause the circulation to take place first through
 the outer tubes and then successively through
 65 the inner tubes, I construct the tubes as shown

on the left-hand side of Fig. 1—that is to say,
 I locate in the upper horizontal pipe 7 a lon-
 gitudinal partition 8 with short transverse
 partitions 9 9 in the lower half of this pipe,
 while in the bottom pipe 7 on the left-hand 70
 side the transverse partitions 10 extend all the
 way across the pipes. In this case the liquid
 passes from the space 14 in the hollow shaft
 horizontally over the top of longitudinal par- 75
 tition 8 to the outer tube, then descending it is
 turned up by the first partition 10 of the lower
 pipe and rises through the second tube from
 the outer one and after passing therethrough
 is turned down by the transverse partition 9 80
 into the next inner parallel tube, and so on it
 continues to the bottom part of the central
 hollow shaft. On the right-hand side a lon-
 gitudinal partition 11 is arranged in the lower
 pipe 7 with short transverse partitions 12
 above it, while the top pipe 7 on this side is 85
 provided with transverse partitions 13, like the
 partitions 10 on the left-hand side. In this
 case the cooling or heating liquid passes down
 first through the inner tube and then up
 through the next outer tube until it reaches 90
 the outermost one, and then it returns beneath
 the longitudinal partition 11 to the bottom
 part of the hollow shaft X'. If desired, both
 sides of the gang of pipes may be made like
 the right-hand side of Fig. 1, as shown in Fig. 95
 7, or both sides may be made like the left-
 hand side of Fig. 1. As the heating or cool-
 ing liquid passes into the lower end of hollow
 shaft X' it rises therein outside of stand-pipe
 5 and overflowing into the upper end passes 100
 down through stand-pipe 5 and hollow step-
 bearing 2 and through the bottom A' A² of
 the cream-receptacle to the space outside the
 cream-receptacle and between it and the outer 105
 casing. The object of this stand-pipe 5 is to
 prevent the cream from passing out of the re-
 ceptacle A in case the bottom bearings should
 become leaky, as the stand-pipe 5 rises to a
 point above the level of the cream in the re-
 ceptacle A. 110

The cream-outlet E² from receptacle A, Fig.
 1, is provided with a special connection (shown
 in detail in Fig. 5) in which a flanged plate *e*
 is secured to the conical bottom A' A² and is 115
 clamped to the sheet-metal lining of the bot-
 tom of the casing by a nut *e*² and rubber gas-
 ket *e*'. The socket of the plate *e* is drilled
 out and screw-threaded interiorly to receive
 a screw-nipple *e*⁵, which has a screw connec-
 tion with the plate *e*, the nut *e*², and also an 120
 elbow *e*⁴, connecting with the discharge-pipe
 E'. The inner wall of the nipple *e*⁵ is flush
 with the opening in plate *e*, which makes a
 smooth passage-way for the discharge of
 cream with no angles or crevices for the col- 125
 lection and retention of sour cream, thereby
 making a sanitary construction. This cream-
 outlet forms the only support for the bottom
 of the cream-receptacle, as seen in Fig. 1,
 and as the hollow conical step-bearing has no 130

support beneath it the value of the special construction of the bottom of the cream-receptacle will now be understood, the double bottom with stiffening-ribs preventing the vibration of the bottom from the action of the moving parts.

Where the hollow shaft X' passes through the middle section of the cover, said shaft is provided above the stuffing-box 14 with a bevel-wheel 22, which is engaged by a bevel-pinion 23 on a short horizontal shaft, bearing at its outer end a driving-pulley 24. By this means the hollow shaft and gang of tubes are rotated. Above the bevel-gear the hollow rotary shaft X' is connected to a stationary pipe 15 by means of a stuffing-box 25. This pipe is open at its upper end for the reception of cold water.

About midway the height of the receptacle on one side there is a noiseless steam-injection nozzle 18, which receives steam through the pipe 20 and through pipe connection 19 draws water from the space between the outer casing and the walls of the cream-receptacle. This steam-nozzle heats the water and sends it up the pipe 21 and through check-valve 17 into the top of pipe 15, which is connected by a T-coupling 16.

The hinged sections K K² of the cover when raised allow the cream to be introduced.

In the side of the outer wall of the casing near the top there is an overflow-pipe L² for water.

R² is an air-inlet, through which compressed air may be introduced on top of the cream to force the same through the outlet-pipe E' and up through a connecting-pipe to any vessel located higher than the ripener.

The operation of my ripener is as follows: The cream-gate E³ being closed, the cream is introduced into the space within the receptacle H through the covers K K² until the receptacle is filled and the cream surrounds exteriorly and completely immerses the gang of tubes X. Cold brine or ice water is now introduced through the top of pipe 15 and passes down the hollow shaft X' to the point 14 and then traverses the interior of the gang of tubes X and passing out at the bottom rises to the top of stand-pipe 5 and descending through the same and through the hollow bearing 2 gains the space below the bottom of the receptacle A and rises between the same and the outer casing, escapes at the overflow L², carrying away the absorbed heat of the cream. As the water passes through the gang of tubes X the latter is slowly revolved, which causes every portion of the cream to be reached by the cooling stream of water in the tubes, and which tubes also act as an agitator to thoroughly stir the cream and render it of uniform consistency and temperature. When the cream has been sufficiently treated it is drawn off through the gates E³. If instead of cooling the cream it is

desired to warm it, steam is supplied through pipe 20, and this draws the water from around the receptacle A through pipe 19 and after heating it sends it through pipe 21 into the hollow shaft and the rotating gang of tubes, where it raises the temperature of the cream. This closed circulation of warm water from the annular space between the walls of the ripener into the steam-nozzle and through the hollow shaft and tubes to the annular space again may be continued until the proper temperature and ripening effect is secured.

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

1. A liquid-ripeners comprising an outer vertical and cylindrical casing and an inner cylindrical receptacle, a hollow vertical shaft within the receptacle bearing a gang of tubes the upper end of which gang of tubes communicates with the upper end of the hollow shaft, and the lower end of which gang communicates with the lower end of said hollow shaft, the upper and lower ends of said hollow shaft having no communication with each other except through the gang of tubes, a hollow step-bearing for the lower end of the shaft effecting communication between the same and the annular space between the receptacle and casing and means for rotating the shaft and gang of tubes substantially as shown and described.

2. In a liquid-ripeners, an outer casing, an inner receptacle, a revolving shaft with a gang of tubes arranged in the inner receptacle, said shaft having on its lower end a sleeve-bearing having a conical bore, and a step-plate with a hollow upright stem mounted on and projecting above the floor of the inner receptacle and having a conical exterior to fit the conical bore of the sleeve, so as to wear constantly to a liquid-tight fit and give passage to the water through the cream from the gang of tubes to the space between the outer casing and inner receptacle substantially as described.

3. A liquid-ripeners having an inner and outer wall, a hollow shaft, a central hollow step-bearing for the shaft mounted concentrically on the bottom of the inner wall and opening therethrough, said bottom being made conical with its lowest point eccentric to or on one side of the shaft and having from said point an outlet-discharge for the cream substantially as described.

4. A liquid-ripeners, comprising a double-walled receptacle, a vertical hollow rotary shaft carrying a gang of tubes communicating with the upper and lower ends of the shaft, a cover for the receptacle, a stuffing-box between the shaft and the cover, driving-gears connected to the hollow shaft above the cover, a stuffing-box at the top of the rotary shaft, a stationary pipe entering said stuffing-box, a branch pipe with check-valve connected with said stationary pipe, and a steam-injection nozzle con-

nected to said branch pipe and to the space between the two walls of the receptacle substantially as described.

5 5. A liquid-ripenner comprising a receptacle and a hollow rotary shaft bearing a series of revolving circulation-tubes arranged vertically, the tubes having a gradually-increased cross-section from the center outwardly substantially as and for the purpose described.

10 6. A liquid-ripenner comprising a receptacle, a hollow shaft bearing a series of circulation-tubes communicating with the hollow shaft at top and bottom and a stand-pipe rising through the hollow shaft and opening into the same at its upper end and opening at its lower end through the floor of the receptacle substantially as and for the purpose described.

15 7. In a liquid-ripenner, a rotary gang of tubes comprising a hollow central shaft, a series of vertical parallel tubes, horizontal pipes connecting the tops and bottoms of the tubes to the hollow shaft, the horizontal pipes having at one end of the tubes, a longitudinal partition with transverse partitions on one side of
25 said longitudinal partition and the horizontal pipes at the other ends of the tubes having transverse partitions extending all the way across, whereby the cooling or heating liquid is made to circulate through the tubes from
30 the outermost one inward, or from the innermost one outward substantially as described and for the purpose set forth.

8. In a liquid-ripenner, a receptacle having a revolving gang of circulation-tubes with central hollow shaft, and a vertical step-bearing

supporting the same and comprising a perforated plate 1, a hollow step-bearing 2 screwed into the same and having a conical exterior, a sleeve 3 having a conical bore fitting the conical step, a stand-pipe 5 connected to the hollow step and extending up the hollow shaft to the upper end of the gang of tubes, and a sleeve 4 screwed to both sleeve 3 and the hollow shaft substantially as described.

9. A liquid-ripenner having an inner receptacle with its bottom made of two layers of sheet metal united throughout their surfaces by rivets, the outer or lower layer of sheet metal being formed into ribs or flanges and the inner layer being smooth; in combination
50 with a central step-bearing mounted on said bottom and an inclosing tank having a discharge-outlet communicating with and supporting the inner receptacle at an eccentric point substantially as and for the purpose described.

10. A liquid-ripenner comprising a receptacle having a revolving gang of tubes and a vertical hollow shaft with central hollow step-bearing, the bottom of the receptacle being made
60 lowest at an eccentric point and provided at such point with an outlet-pipe and said bottom being provided with stiffening ribs or flanges extending under the step-bearing to stiffen the floor against vibration substantially as described.

AAGE JENSEN.

Witnesses:

JAS. SMITH,
R. A. SIMPSON.