

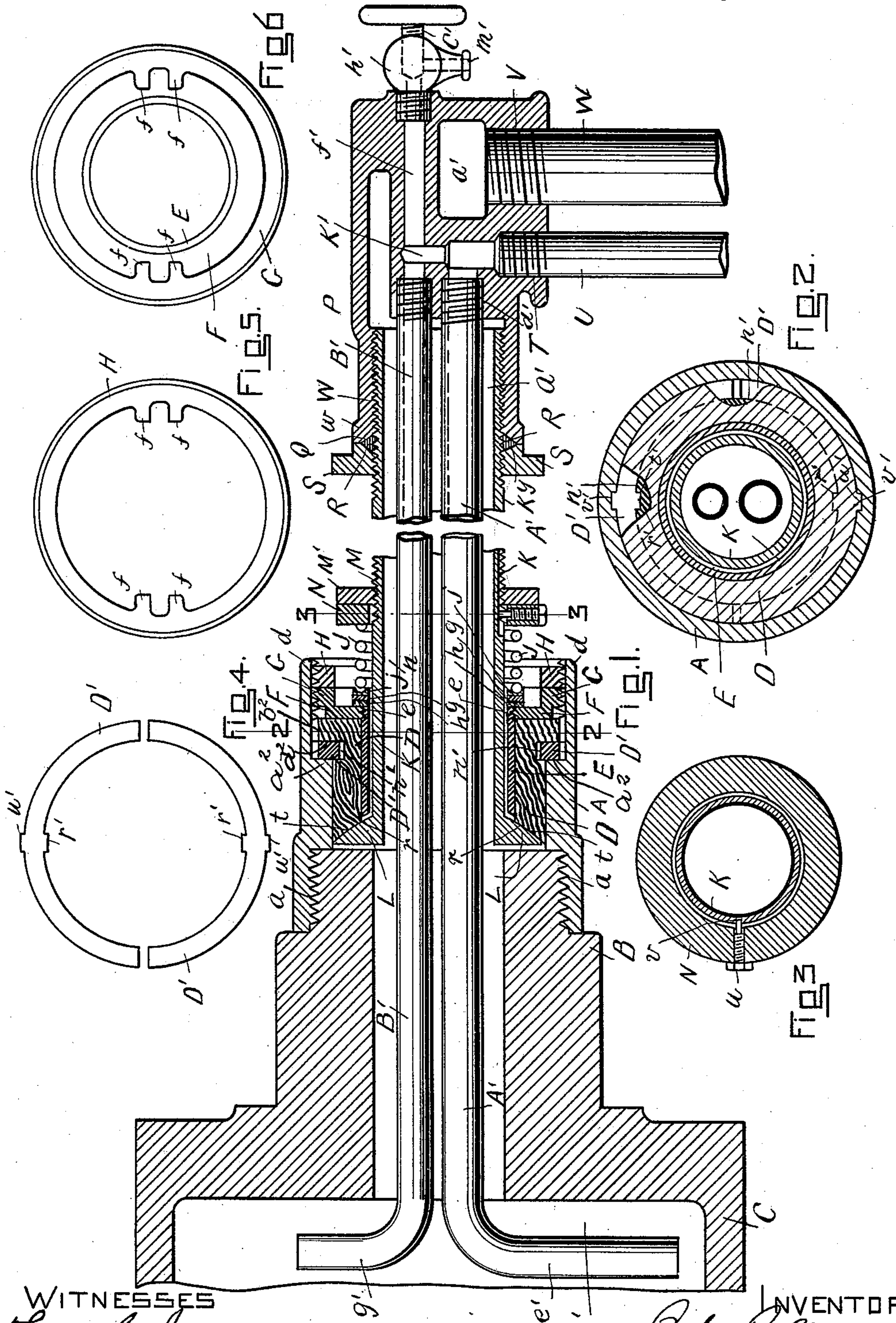
(No Model.)

2 Sheets—Sheet 1.

J. B. MORGAN.
ROTARY STEAM JOINT.

No. 543,045.

Patented July 23, 1895.



WITNESSES

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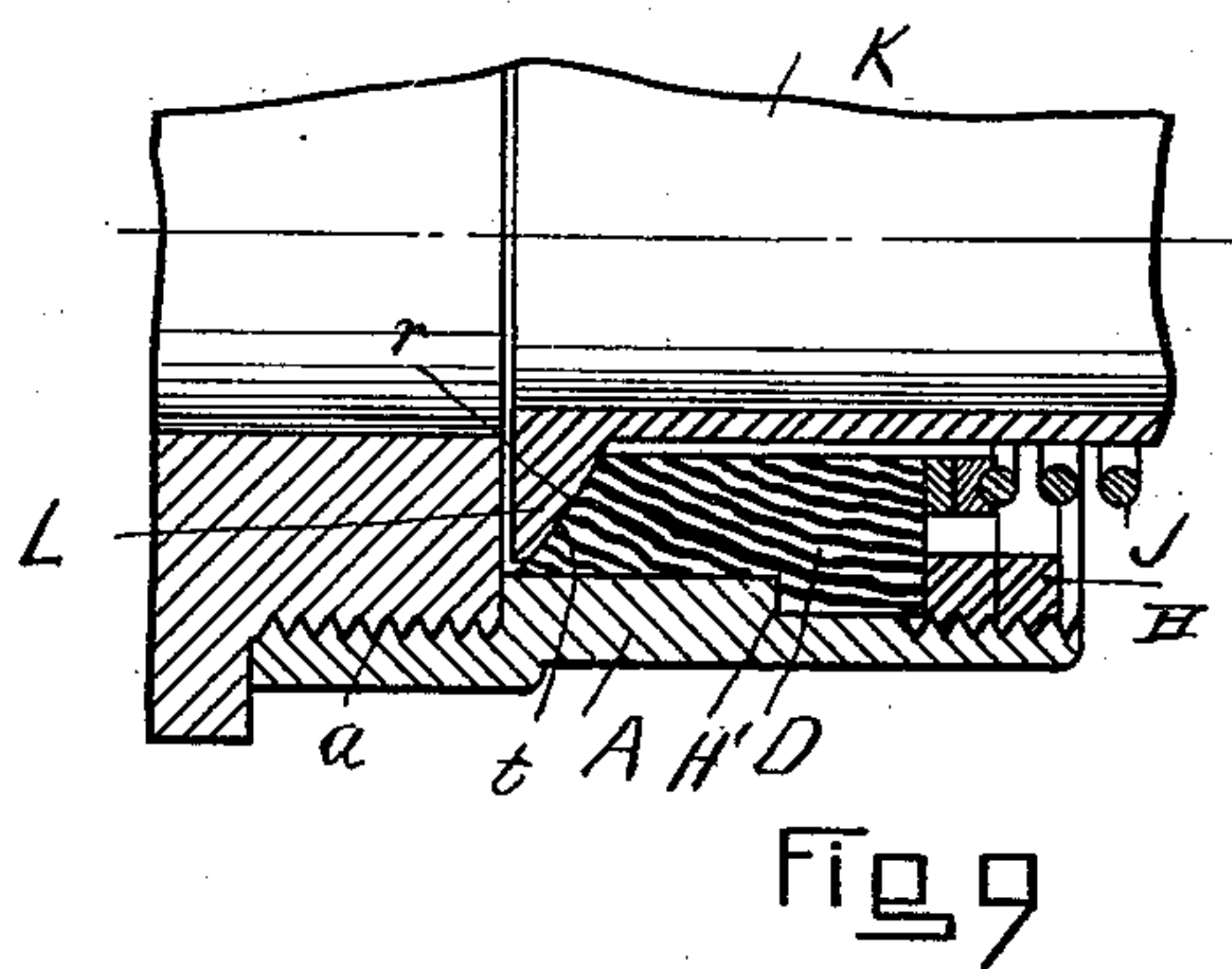
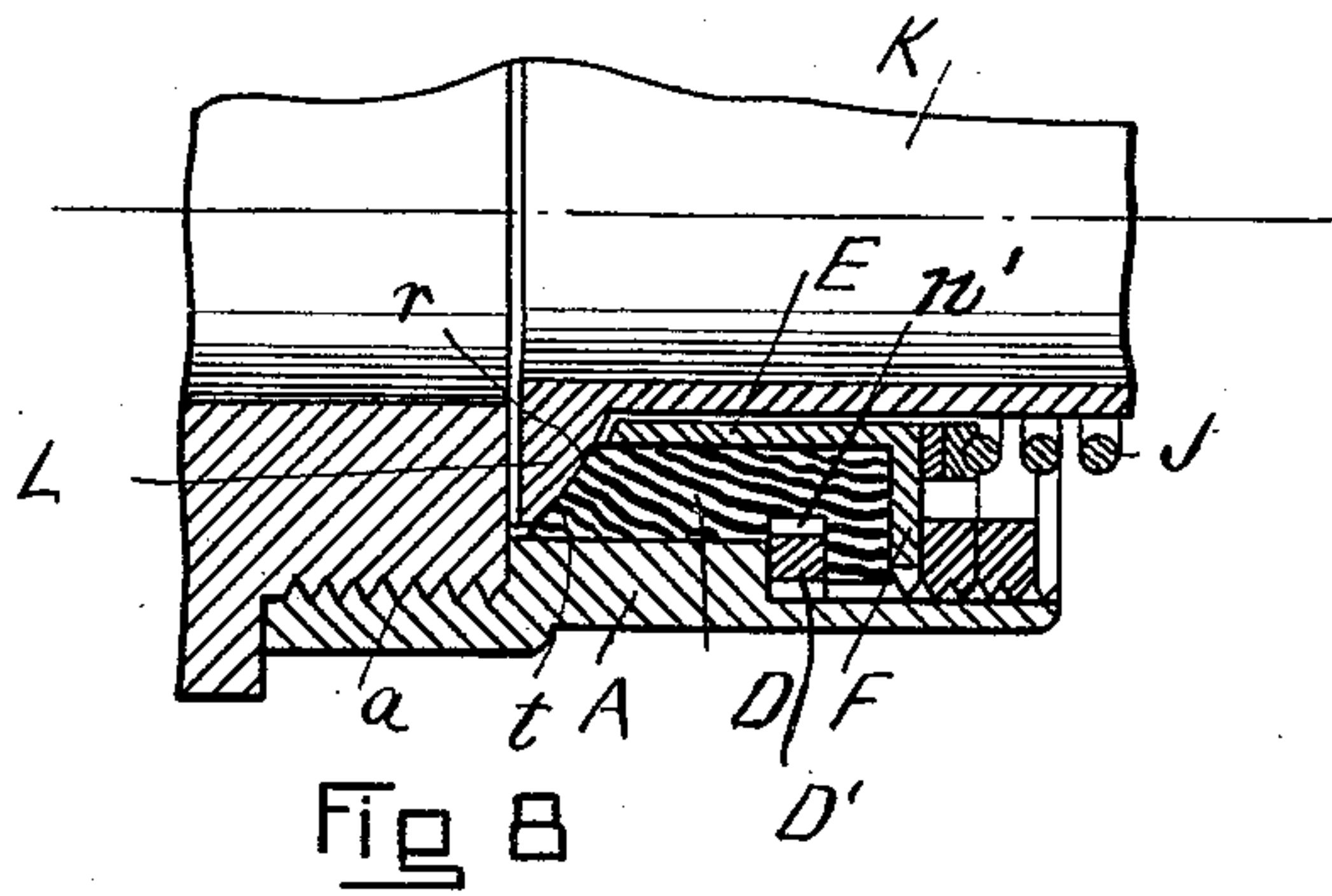
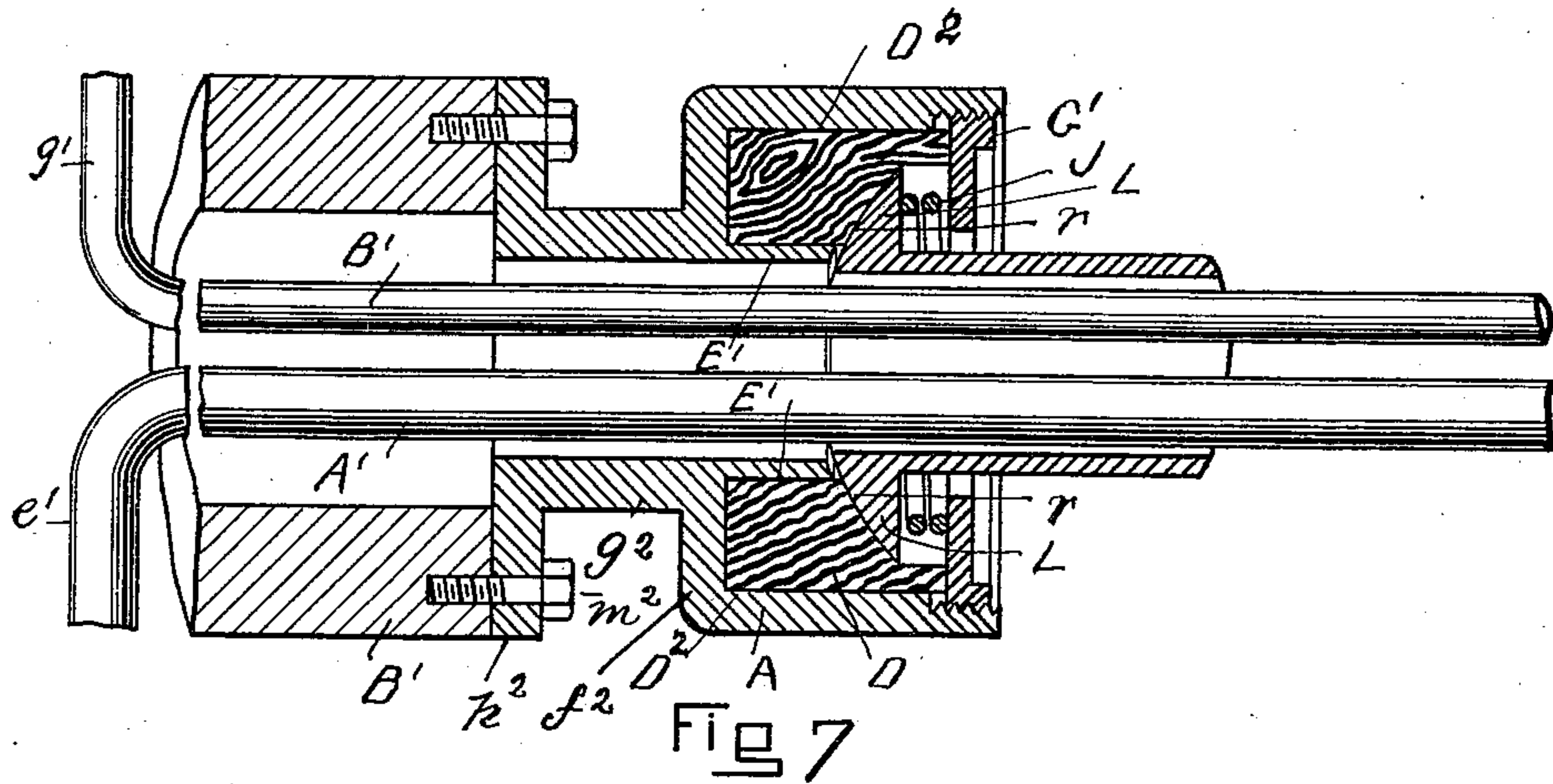
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2 Sheets—Sheet 2.

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ROTARY STEAM JOINT.

No. 543,045.

Patented July 23, 1895.



WITNESSES
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UNITED STATES PATENT OFFICE.

JOHN B. MORGAN, OF ROCKLAND, ASSIGNOR TO THE MORGAN AIR SYSTEM COMPANY, OF BOSTON, MASSACHUSETTS.

ROTARY STEAM-JOINT.

SPECIFICATION forming part of Letters Patent No. 543,045, dated July 23, 1895.

Application filed August 2, 1894. Serial No. 519,281. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. MORGAN, of Rockland, in the county of Plymouth and State of Massachusetts, have invented certain
5 new and useful Improvements in Rotary Steam-Joints, of which the following is a full, clear, and exact description.

The object of this invention is to provide a
10 steam-joint between a stationary steam-supply and a steam-cylinder or other machine using steam—such, for instance, as steam-driers for paper-mills—which cylinders or machines are arranged and adapted to rotate and also oscillate; and the invention consists of a
15 steam-joint for connection between a stationary supply for the steam and a steam-cylinder or other machine to which the steam is to be applied, which is arranged to be rotated or oscillated, constructed, and arranged for operation, all substantially as hereinafter fully described.

In the accompanying sheets of drawings is illustrated a steam-joint constructed in accordance with this invention, in connection
25 with a rotating steam-cylinder drier.

Figure 1 is a longitudinal central section of the joint as connected to the end of a steam-cylinder drier. Fig. 2 is a cross-section on line 2 2, Fig. 1. Fig. 3 is a cross-section on
30 line 3 3, Fig. 1. Figs. 4, 5, and 6 are detail plan views of some of the parts. Fig. 7 is a detail central longitudinal section showing a modification. Figs. 8 and 9 are detail sections showing modifications.

35 In the drawings, A represents a cylindrical shell or casing adapted by an internal screw-thread a on one end to screw onto the end or head B of a steam drying-cylinder C. This shell has an internal shoulder a^2 , and in the
40 shell is an annular ring D, of wood, concentric with the shell, closely fitting within the same, and within this ring of wood, concentric therewith, is another ring or gland E, of metal, which fits the inner side of the wood
45 ring and has a flange or plug F, which extends over the end of the wood ring and has a right-angular extension G thereof to make the gland flange or plug somewhat thicker on its outer edge or periphery, on which is cut
50 a screw-thread by which it is screwed into the end d of the shell to set it close upon the

wood ring E, and when screwed down sufficiently upon the wood ring it is secured by an annular ring or screw-nut H, screwing into the shell above and to bear upon the plug or gland-
55 flange F. This ring or gland E, with its plug or flange F, is shown as in two parts screwed together, as at e ; but as is obvious they can be made integral with each other, as shown in detail section in Fig. 8. The screw-nut H and
60 the flange or plug F each have on their inner sides opposite to each other two projecting lugs f , as shown in plan in Figs. 5 and 6, between which a spanner can be applied to screw them in or out of the shell. Resting
65 on the inner side of this metal or gland ring E are two washers g h , on one g of which rests or bears another washer or flat ring j , having in its outer surface a groove m , extending around the ring, in which is disposed the end
70 of a spiral spring J. Extending freely through the metal or gland-ring E is a tube K, leaving an annular space n between the two, and on the end of this tube is an external rim or flange L, its inner side being curved or in the line of a
75 segment of a circle in cross-section, as at r , and extending over and arranged to bear upon the end of the wood ring, which at such end is correspondingly hollowed, as at t , to fit the curve
80 or bearing-surface of the tube-flange. The tube K extends freely through the wood and metal rings out beyond the shell, the spiral spring J being around about it, and a ring N about the tube bears on the spiral spring,
85 which ring has a screw u screwing through it on one side, the end of which extends into a longitudinal slot v in the thickness of the side of the tube, so the ring can freely move back and forth longitudinally thereon, but which prevents it moving around it. The tube has
90 an external screw-thread M, on which screws an annular ring screw-nut M', which screws down upon the ring N and spring J.

On the outer end of the tube K is a screw-thread over which screws a joint or connection P, its end w having a recess Q concentric
95 with the tube, in which is placed any suitable steam-packing R, over which screws an annular screw-nut S, screwing on the thread M, having on its adjacent side a recess y coincident with the recess Q, in which is dis-
100 posed, when the screw-nut S is turned down

upon the end of the connection, the steam-packing R, which makes a close steam-joint. On one side, near the other end of this connection P, is an opening T, into which screws
 5 a pipe U, which is the pipe for the return of the water or steam to the cylinder, and beyond this opening and pipe is another side opening V, into which screws a pipe W, which is the steam-pipe, and is connected to any suitable
 10 steam-supply.

The steam-pipe W communicates directly with the chamber a' of the tube, which in turn communicates with the chamber y of the drier-cylinder, so that steam let into the pipe W will
 15 pass through the tube into the drier-cylinder. Within the tube is a small pipe A' , one end screwing into the connection at d' and there communicating with the water-pipe U, its other end extending into the drier-chamber
 20 and there being bent outward toward the side of the cylinder, as shown at e' , Fig. 1. In the outer end of the connection is another opening f' , into which is screwed by one end a small pipe B' , which is located in the tube and
 25 extends down through the tube into the drier-chamber, its inner end being bent upward and toward the side of the cylinder, as at g' , Fig. 1. Screwing into the opening f' is a head h' , having a passage through it, a valve C' , and
 30 outlet m' , which valve closes the opening f' to escape of air from the pipe B' , and which when opened allows air to escape from the drier-chamber through the pipe out at the outlet m' .

The outer end of the wood ring D is enlarged, making a ring or flange b^2 , forming a shoulder d^2 , and at such place in the wood ring D is a circumferential groove n' , in which
 35 loosely fits a metal ring D' made in two parts, Fig. 4, each part having on its inner side a projection or lug r' , which projects into a hole or aperture t' in the wood ring, and on its periphery an outward projection or lug u' , which when the ring is in place lies in a longitudinal groove v' in the inner side of the
 40 shell, so that the ring can move back and forth therein, but not turn around independent of the shell.

The ring D' is in two parts, as shown more particularly in Fig. 4, so it can be placed in the groove n' in the wood ring, it being placed therein before the wood ring is put in the shell, and when the wood ring is put in position in the shell the outer lugs u' of the ring
 50 D' freely slip into the longitudinal grooves v' .

In operation, as the cylinder-drier is revolved it carries with it the shell A, wood ring D, two-part ring D' , flanged gland or metal ring E, annular screw-nut H, washers g h , and spiral
 55 spring J; but the flanged tube K, its outer connections, inner pipes, the ring N, and set nut M' are stationary, and in such movement the wood ring is moved around on the curved seat of the tube-flange, which makes the joint preventing steam from escaping from the
 60 drier. This joint must be sufficiently tight at all times to prevent the escape of the steam

from the cylinder. If it should become worn, so that it does not prevent the escape of steam therethrough, it can be tightened by unloosening the annular set-screw nut S and taking
 70 hold of the tube K screw it into the connection a sufficient distance, which moves the flange-surface L up to the wood surface and closes the joint, when the annular screw-nut
 75 is screwed tightly against the end of the connection, securing all parts in position. Thus can be maintained at all times during the rotation and oscillation of the cylinder a close and proper connection between the steam
 80 drying-cylinder and the stationary steam-supply pipe. The steam and water pipes have suitable valves for closing and opening the pipes, as is usual in such pipes.

In Fig. 7 is shown the flange L of the tube
 85 as having its bearing-surface r reversed—that is, on the outer side—and in this case the wood ring also has its bearing-seat for the flange reversed to correspond therewith, and in this figure the wood ring is disposed in an
 90 annular chamber D^2 of the shell formed by the outside wall and inner ring E' , and the spiral spring J bears upon the opposite side of the flange and has a ring screw-nut G' , which screws into the end of the shell and
 95 holds the spiral spring against the flange L.

The wood ring D is prepared by turning a piece of suitable wood in a lathe to fit the shell and have its bearing-surface correspond with the bearing-surface of the tube-flange.
 100

In the operation of this invention as steam is first let into the drying-cylinder through the steam-pipe the air-valve is opened to allow the air in the cylinder and connection to
 105 pass out, and when steam passes out at the air-valve the valve is closed. The joint can be also tightened by screwing up the ring screw-nut M' , compressing the spring, consequently holding the joint closer, the spring allowing the joint to be sufficiently yielding.
 110 The pressure of the steam forces the distilled water through the pores of the wood and between the two bearing-surfaces of the joint, fully lubricating the joint.

The two-part ring D' can be dispensed with
 115 if desired, the wood ring filling out the space in the shell, as shown in Fig. 9 in section, where the wood fits a shoulder H' of the shell.

The wood ring can be held or secured in the shell in other ways than as herein particularly shown. The washers g h can be dispensed with and the spring arranged to bear
 120 directly upon the gland-flange, although it is preferable to use the washers; also, the air-pipe can be used in connection with the steam-drier cylinder or other machine without the steam-joint herein described.
 125

The air-pipe is arranged to communicate with the water return-pipe U by means of the passage K' in the connection, although it can
 130 be arranged to connect in any other suitable manner.

The joint herein described, having its two bearing-surfaces curved, as shown, allows the

drier not only to revolve but to have more or less oscillation, thus accommodating itself to all movements of the drier while in operation.

This rotary steam-joint is simple in its construction, its cost of manufacture is small, it is easily applied and taken care of, and it is efficient and satisfactory in practical operation. When the air-pipe becomes filled with steam the steam from the air-pipe passes through the opening K' in the connection and connects with the siphon return-pipe, creating a vacuum in the siphon.

The shell or casing is made sufficiently large to receive the packing, flanged tube, and other parts, having a seat or shoulder f^2 , a reduced portion or neck g^2 , and having on its outer end a flange or rim h^2 , by which it is secured by screws m^2 to the drier C, the reduced portion or neck enabling the shell to be conveniently secured to the drier, as shown more particularly in Fig. 7.

The washers g h , between the grooved ring j and the gland, can be dispensed with, if desired, although it is preferable to use them, or at least one washer.

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

1. In a rotary steam joint, the combination with a rotatable shell or casing of a ring of wood within the casing provided with a curved bearing, a stationary flanged tube having a bearing corresponding to and engaging the curved bearing on the wood ring and arranged to be secured together.

2. In a rotary steam joint, in combination, a shell or casing, a ring of wood within the casing, a bearing on one end of said wood ring, a metal ring adapted to be secured in said shell or casing, a tube or pipe extending through the metal ring, and a flange on its inner end having a bearing to fit the bearing of the wood ring.

3. In a rotary steam joint, in combination, a shell or casing, a ring of wood within the casing, a bearing on one end of said wood ring, a metal ring adapted to be secured in said shell or casing, a tube or pipe extending through the metal ring, a flange on its inner end having a bearing to fit the bearing of the wood ring, a ring on said tube, an annular screw nut next said ring and a spring between said tube ring and the ring in the casing.

4. In a rotary steam joint, in combination, a shell or casing, a ring of wood within the casing, a circumferential groove in said wood ring, a metal ring in two parts loosely fitting in said wood ring provided with internal and external lugs or projections to engage with said wood ring and the shell or casing, a bearing on one end, a tube or pipe extending through the wood ring and flange on its inner end having a bearing to fit the bearing on the wood ring adapted to be secured together.

5. In a rotary steam joint, in combination,

a shell or casing, a ring of wood within the casing, a circumferential groove in said wood ring, a metal ring in two parts loosely fitting in said wood ring provided with internal and external lugs or projections, a socket in said wood ring and a socket in the shell or casing open on one side to the end for said inner and outer projections respectively of the wood and metal rings.

6. In a rotary steam joint, the combination with a rotatable shell or casing having a shoulder a^2 of a ring of wood within the casing provided with a corresponding shoulder d^2 , a gland securing the wood ring in place and a stationary flanged tube engaging said ring of wood.

7. In a joint for rotary shafting or pipe, the cylindrical body having the interiorly screw threaded mouth in combination with the flanged gland, a packing disposed against a shoulder a^2 , in said body, a screw nut turned into said mouth against said packing.

8. In a joint for rotary steam shafting or pipe, the cylindrical body having the interiorly screw threaded mouth in combination with the flanged gland, a packing disposed against a shoulder a^2 , of said body, a screw plug turned into said mouth against said gland, a spring pushed washer on said gland, and a flanged tube extending through said gland, a screw nut on said tube, and a friction washer interposed between said screw nut and spring.

9. In a rotary steam joint, in combination, a shell or casing, a ring D within the casing, having a bearing surface thereon, a ring D' adapted to be secured in said shell or casing, a tube or pipe extending through the rings, a flange on its inner end to fit the bearing of the former ring, a ring N on said tube, an annular screw nut M' next said ring N and a spring between said ring N and the ring D.

10. In a joint for rotary steam mechanism, in combination, a ring abutting the end of the joint, a groove in said ring, a stationary tube with a flange, a nut on the tube, a ring next said nut, a spring between the rings, and a packing interposed between said tube flange and the end of the joint.

11. In a joint for rotary steam mechanism, in combination, an annular washer or washers abutting the end of the joint, a ring next said washer, a groove in said ring, a stationary tube with a flange, a nut on the tube, a ring next said nut, a spring between the rings, and a packing interposed between said tube flange and the end of the joint.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN B. MORGAN.

Witnesses:

EDWIN W. BROWN,
LEONA C. ARNO.