J. NUTTALL.

ROTARY STEAM JOINT.

APPLICATION FILED JAN. 21, 1910.

955,097.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

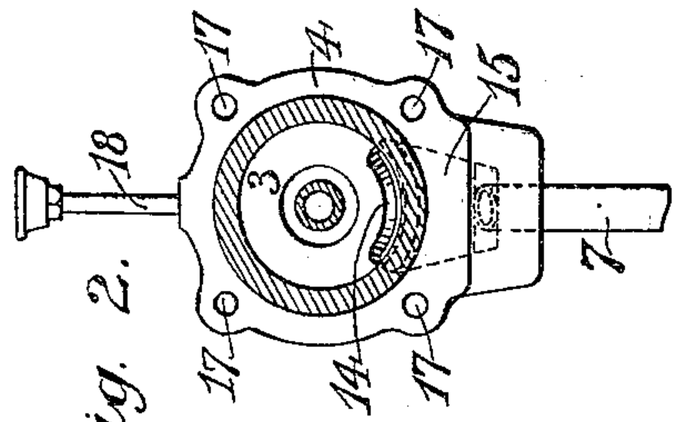

Fig. 2.

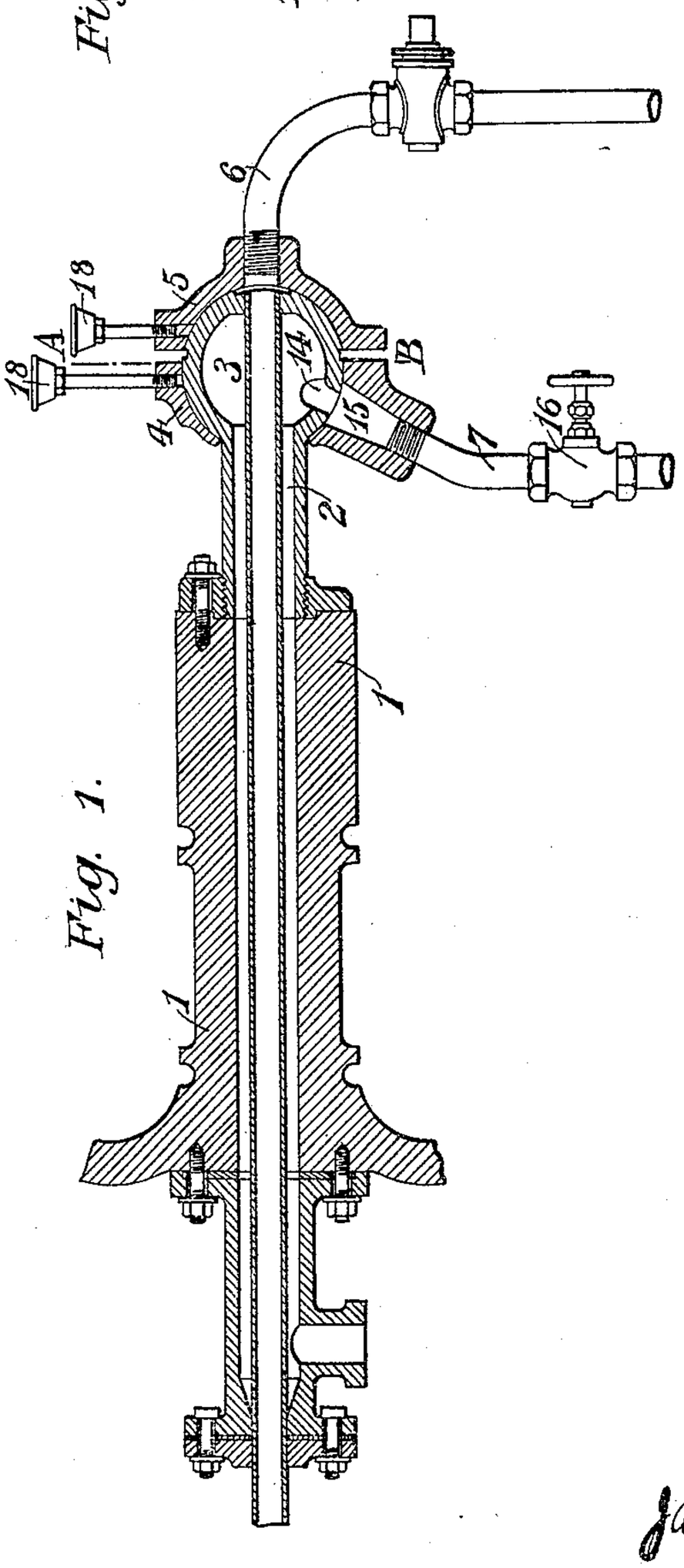

Fig. 1.

WITNESSES

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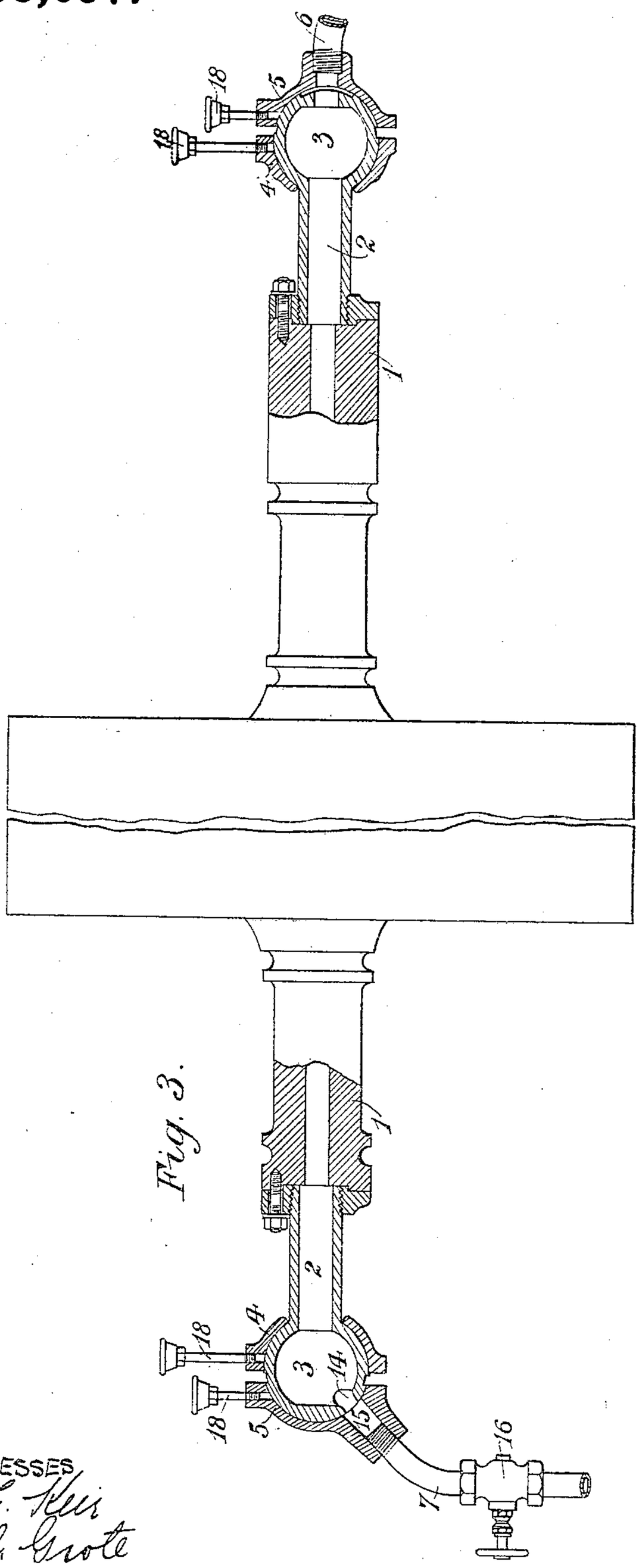

Fig. 3.

WITNESSES

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3 SHEETS—SHEET 3.

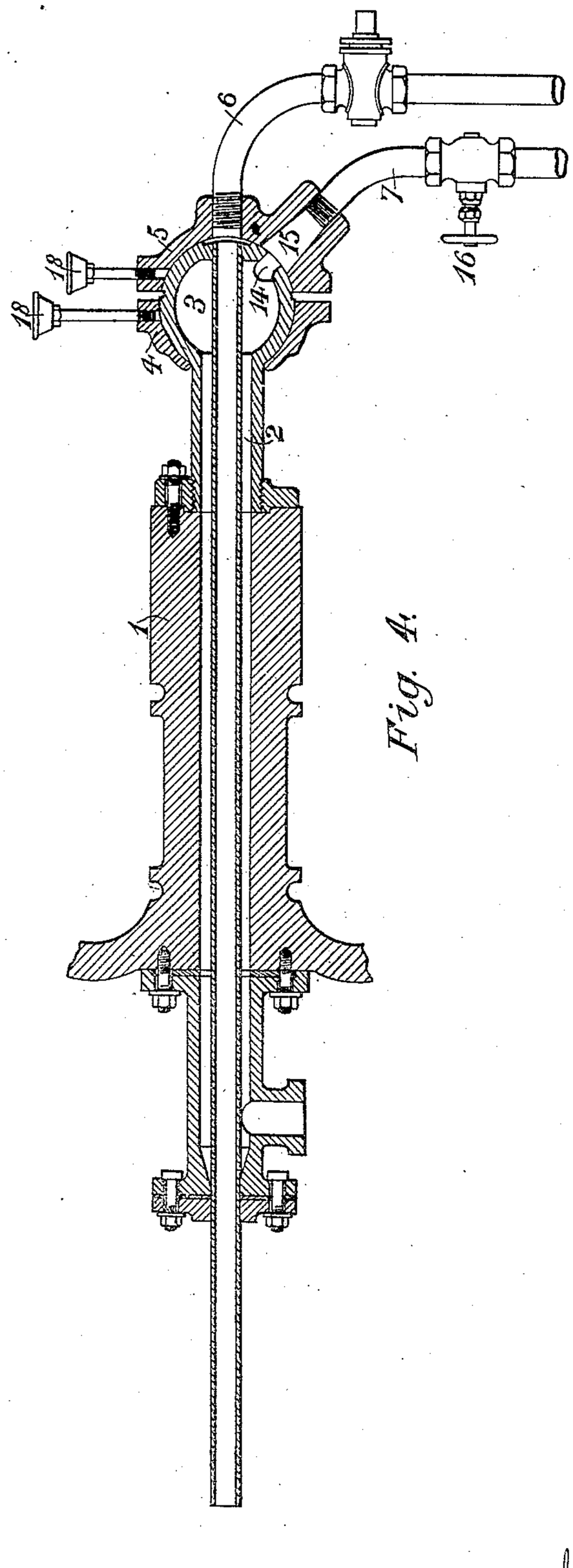

Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES NUTTALL, OF BURY, ENGLAND.

ROTARY STEAM-JOINT.

955,097. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed January 21, 1910. Serial No. 539,255.

To all whom it may concern:

Be it known that I, JAMES NUTTALL, a subject of the King of Great Britain, of Park View, Walmersley Road, Bury, in the county of Lancaster, England, have invented a new and useful Improved Rotary Steam-Joint, of which the following is a specification.

My invention relates to apparatus wherein cylinders, or the like, are heated by means of steam admitted into the cylinder, or the like, and the water of condensation passes out through a hollow journal, or hollow journals, and through a port, or ports, in a head, or heads, which is, or are, hollow and carried by, and in communication with, the said hollow journal, or journals, and controlled by covers acting as bearing pieces for the said head, or heads, and having the inlet and outlet passages connected therewith.

The principal object of my present invention is to so arrange such apparatus that it acts as a steam trap, preventing waste of steam and insuring a very efficient discharge of the water of condensation, as well as presenting the advantages of external bearings which at once show any leakage of steam which may occur and being capable of being tightened up while the apparatus is in operation and also of acting as a safety valve as in the case of the devices described in the aforesaid specifications of my prior applications for Letters Patent.

According to my present invention I arrange the port, or ports, in the rotatable head, or heads, for the outlet of water of condensation so that the said port, or ports, is, or are, in communication with the water outlet passages only at intervals. During the periods between such intervals the said port is, or ports are, closed by coming opposite a solid part of the cover, or covers, and the steam will thus be trapped. I provide a receiver of ample capacity to hold the water ejected at each revolution, the outlet pipe (or pipes) leading from this receiver being preferably made of small diameter to check the flow of water to the main exhaust pipe, or passage, so that the water outlet port, or ports, in the hollow head, or heads, will pass onto the solid portion of the cover, or covers, before the whole of the water has passed from the said receiver and thus prevent undue rush of steam from the cylinder, or the like.

The accompanying drawing illustrates arrangements in accordance with this invention.

Figure 1 shows the device in longitudinal section with the inlet and outlet in the respective covers at one end of the cylinder, or the like, (parts only of the ends of which are shown). Fig. 2 is a transverse section, on the line A, B, Fig. 1. Fig. 3 shows one of the covers at one end provided with the water outlet arrangement, the steam inlet being through one of the covers at the other end of the cylinder, or the like. Fig. 4 shows the steam inlet and the water outlet arrangements both in connection with one of the covers at one end of the cylinder, or the like.

At one end of the cylinder, or the like, is (in the arrangement Fig. 1) a hollow journal 1 and fixed to this is the hollow stem 2 carrying the hollow head 3. The covers 4 and 5 act as bearing pieces for the said head 3. The steam inlet pipe 6, passes through the cover 5. The water outlet port 14 in the hollow head 3 extends only for a short distance around the hollow head so that communication between the interior of the cylinder, or the like, and the outlet pipe 7, is established only at intervals as hereinbefore explained. The chamber 15 in the cover 4 constitutes the aforesaid receiver for retaining a body of escaping water as aforesaid. The outlet pipe 7, may be provided with a tap 16 to regulate the speed of outflow. I do not limit myself to the precise length of the port 14, but in the drawing I have shown it as extending around about one quarter of the circumference of the hollow head 3, so that, in this case, during each half rotation, the port 14 will be entirely closed, and during the other half rotation, it will be gradually opening and closing as the water is being passed into the receiver 15.

Fig. 3 shows the arrangement applied so that steam enters at one end of the cylinder, or the like, and the water leaves at the other end. The parts which correspond with those shown in Figs. 1 and 2 are marked with the same reference numerals, the steam entering by the pipe 6, and the cover 5 at one end and the water leaving by the port 14 and receiver 15 in, and pipe 7 attached to, the cover 5 at the other end.

Fig. 4 shows an arrangement in which the steam inlet, and water outlet, are both

in connection with one of the covers at one end of the cylinder, the other cover acting simply as a support to enable the first named cover to be held in proper position to make a good joint. The parts are marked with the same reference numerals as are used to denote corresponding parts in the other figures. The steam inlet and water outlet arrangements are in connection with the cover 5 and the cover 4 simply acts as a support.

If desired, the arrangements Figs. 1 and 4 may be used at each end of the cylinder, or the like, and the water be taken up and expelled toward each end from the mid part of the cylinder, or the like.

The covers 4 and 5, in all the modifications illustrated, are connected by bolts and nuts (preferably with the intervention of springs) the holes shown at 17 Fig. 2 being for the reception of these bolts.

Lubricating cups and stems are shown at 18 to lubricate the bearing faces of the covers and hollow head.

I do not limit myself to the heads 3 being spherical, as they may be of other shape which will allow of rotation and of tightening up the bearing parts.

What I claim is:—

1. In a rotary joint of the character described, a hollow rotary stem having an outlet port, in combination with a bearing for said stem having a discharge port adapted to communicate with said outlet port during only portion of the revolution of said hollow stem, whereby the latter acts as a trap during the remainder of its revolution.

2. In a rotary joint of the character described, a hollow rotary stem provided with a hollow head having an outlet port, in combination with a bearing for said head, having a discharge port adapted to communicate with said outlet port during only portion of the revolution of said head, whereby the latter acts as a trap during the remainder of its revolution.

3. In a rotary joint of the character described, a hollow rotary stem having an outlet port, in combination with a bearing for said stem having a discharge port adapted to communicate with said outlet port during only portion of the revolution of said hollow stem, whereby the latter acts as a trap during the remainder of its revolution, together with a chamber of relatively large capacity into which said discharge port opens, as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES NUTTALL.

Witnesses:

WILLIAM HENRY SMITH,

JOHN RIDING.