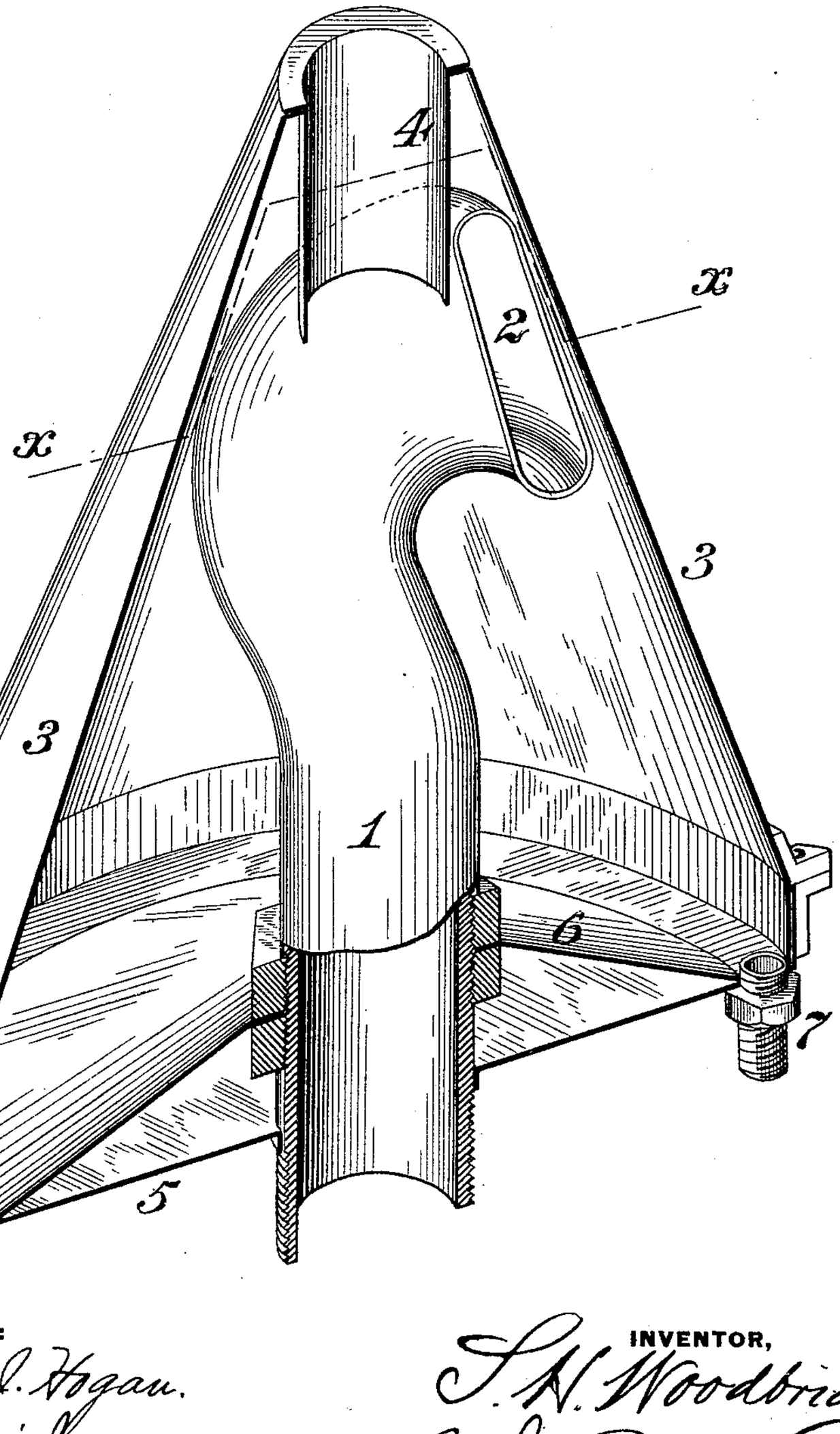
(No Model.) 2 Sheets—Sheet 1.

S. H. WOODBRIDGE.

CONDENSER HEAD.

No. 481,518. Patented Aug. 23, 1892.

FIG. 1.



WITNESSES:

Thomas J. Hogan.

F. E. Gaither

INVENTOR,

S. H. Woodbridge,

by J. Howden Bell

Att'y.

(No Model.) 2 Sheets—Sheet 2.

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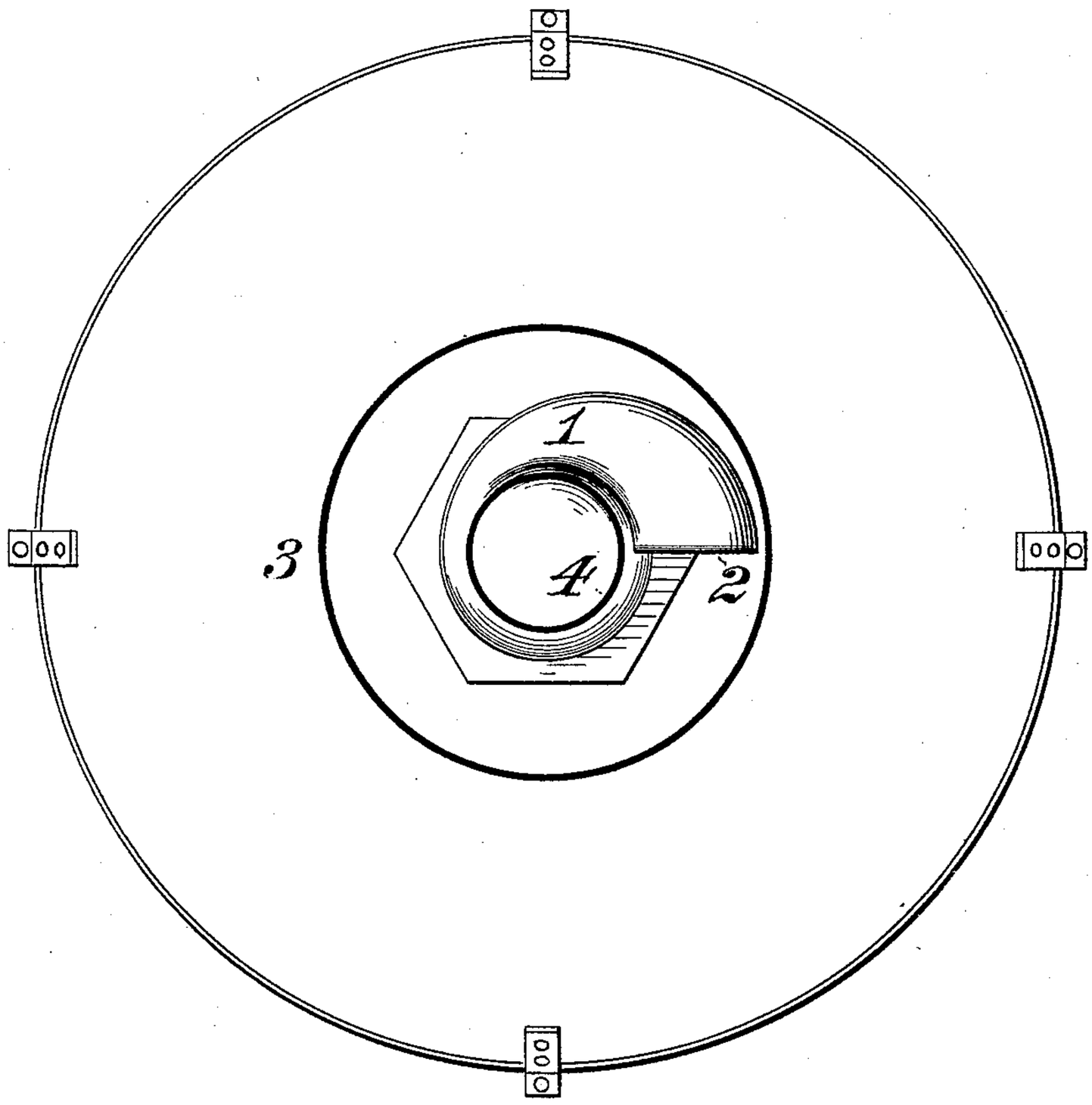
CONDENSER HEAD.

No. 481,518. Patented Aug. 23, 1892.

FIG. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

SAMUEL HOMER WOODBRIDGE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE WESTINGHOUSE, CHURCH, KERR & COMPANY, OF NEW YORK, N. Y.

CONDENSER-HEAD.

SPECIFICATION forming part of Letters Patent No. 481,518, dated August 23, 1892.

Application filed May 24, 1892. Serial No. 434,203. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HOMER WOODBRIDGE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented or discovered a certain new and useful Improvement in Condenser-Heads for Exhaust-Pipes, of which improvement the following is a specification.

The object of my invention is to provide simple and efficient means for the trapping, separation, and collection of the oil and moisture or water of condensation and entrainment which usually escape with the steam at the outlets of steam-exhaust pipes and for the final escape of the steam into the atmosphere in such a condition as to prevent the spraying of water and oil on surrounding objects; and to this end my invention consists in a novel combination of devices forming an exhaust-head or condenser-head for attachment to the outer end of an exhaust-steam pipe.

The improvement claimed is hereinafter fully set forth.

The essential features of my invention, generally stated, consist, first, in an exhaust-nozzle of special form and construction, attached to the discharge end of an exhaust-steam pipe, by means of which the proper direction and motion are imparted to the commingled steam and particles of oil and water; second, in the form and arrangement of an inclosing head, hood, or cover, and, third, in the combination of said devices in such relation as to coact in an efficient manner to produce a complete separation of the oil and water of condensation from the escaping steam, permitting the steam to pass to the atmosphere in such a comparatively dry state that it passes off and is dissipated without any visible condensation or deposition of liquid on objects in the vicinity of its point of discharge.

In the accompanying drawings, Figure 1 is a vertical central section in perspective through a condenser-head for exhaust-pipes embodying my invention, and Fig. 2 a horizontal section through the same at the line *x x* of Fig. 1.

In the practice of my invention I provide an exhaust-nozzle 1, the base or lower end of which is circular in transverse section and of diameter corresponding with that of the exhaust-pipe, to the outer end of which it is connected in any suitable manner. The exhaust-nozzle extends vertically upward for a short distance and is then laterally curved or bent out of a vertical line and also curved horizontally, its radius of curvature increasing toward its upper end, adjacent to which it has a spiral or approximately spiral form. Its form in transverse section is also gradually changed from a circular section in that portion of its length which is vertical to a flattened or elongated section, approximating a rectangle with curved ends or an ellipse at its discharge-outlet 2, the center line of which is outwardly and downwardly inclined relatively to the center line of its vertical portion.

The exhaust-nozzle is surrounded by a sheet-metal casing 3 in the form of a truncated cone, which is concentric with the vertical portion of the nozzle and is so arranged relatively thereto that its upper end shall stand at a short distance above the top of the discharge-outlet 2 of the nozzle. A steam-outlet pipe 4 is secured within the upper end of the casing 3 and projects downwardly therein below the top of the discharge-outlet 2. The casing is closed at its lower end by a base-plate 5, and a conical or dished delivery-plate 6 is fitted around the nozzle above the base-plate and extends outwardly to a connection with the base-plate adjacent to the wall of the casing 3. A drip-pipe 7, through which separated oil and water is led off to a suitable receptacle, is connected to the base-plate 5 between the delivery-plate and the wall of the casing.

In the operation of the appliance the direction of the currents of exhaust-steam which pass into and through the nozzle 1 is changed by the spiral form of the same at and near its discharge-outlet and a gyratory movement is imparted to the currents, which are also downwardly deflected in the casing by their impingement against its outwardly and downwardly tapering wall. The effect of such movement and deflection is to cause a separation of the water and oil from the exhaust-steam, the liquid constituents being deposited upon the inclined discharge-plate 6 and pass-

ing off through the drip-plate 7 and the uncondensed steam rising in the casing and escaping freely therefrom through the outlet-pipe 4.

I am aware that various forms of condenser-heads embodying an exhaust-nozzle which discharges into an inclosing case provided with an upper steam-outlet and a lower liquid-discharge pipe were known in the art prior to my invention, and such devices, as well as their combination, broadly stated, I therefore distinctly disclaim.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a condenser-head, of an exhaust-nozzle of approximately spiral form at and adjacent to its discharge end and having an inclined and elongated discharge-outlet thereat, truncated-cone casing inclosing the major portion of the nozzle with its smaller end above and adjacent to the discharge-outlet thereof, a steam-outlet pipe extending into the casing from its smaller end to a point below the adjacent end of the exhaust-nozzle discharge-outlet, a base-plate closing the larger end of the casing, and a drip-pipe leading out of the casing at or near its larger end, substantially as set forth.

2. The combination, in a condenser-head, of an exhaust-nozzle having a main body of substantially cylindrical form at and adjacent to a receiving end adapted to be connected to a steam-exhaust pipe and which is thereafter turned into approximately spiral form at and adjacent to an elongated discharge-outlet inclined relatively to the axis of the main body, a truncated-cone inclosing casing concentric with said main body and having its smaller end above and adjacent to the discharge-outlet of the nozzle, a steam-outlet pipe extending into the casing from its smaller end to a point below the adjacent end of the exhaust-nozzle discharge-outlet, a base-plate closing the larger end of the casing, and a dripe-pipe leading out of the casing at or near its larger end, substantially as set forth.

In testimony whereof I have hereunto set my hand.

S. HOMER WOODBRIDGE.

Witnesses:

PERCY N. KENWAY,

ALFRED W. FRENCH.