

No. 691,978.

Patented Jan. 28, 1902.

A. P. & H. SMITH.

CONDENSER OR EXHAUST TUBE FOR STEAM ENGINES.

(Application filed June 14, 1900.)

(No Model.)

Fig. 1. A

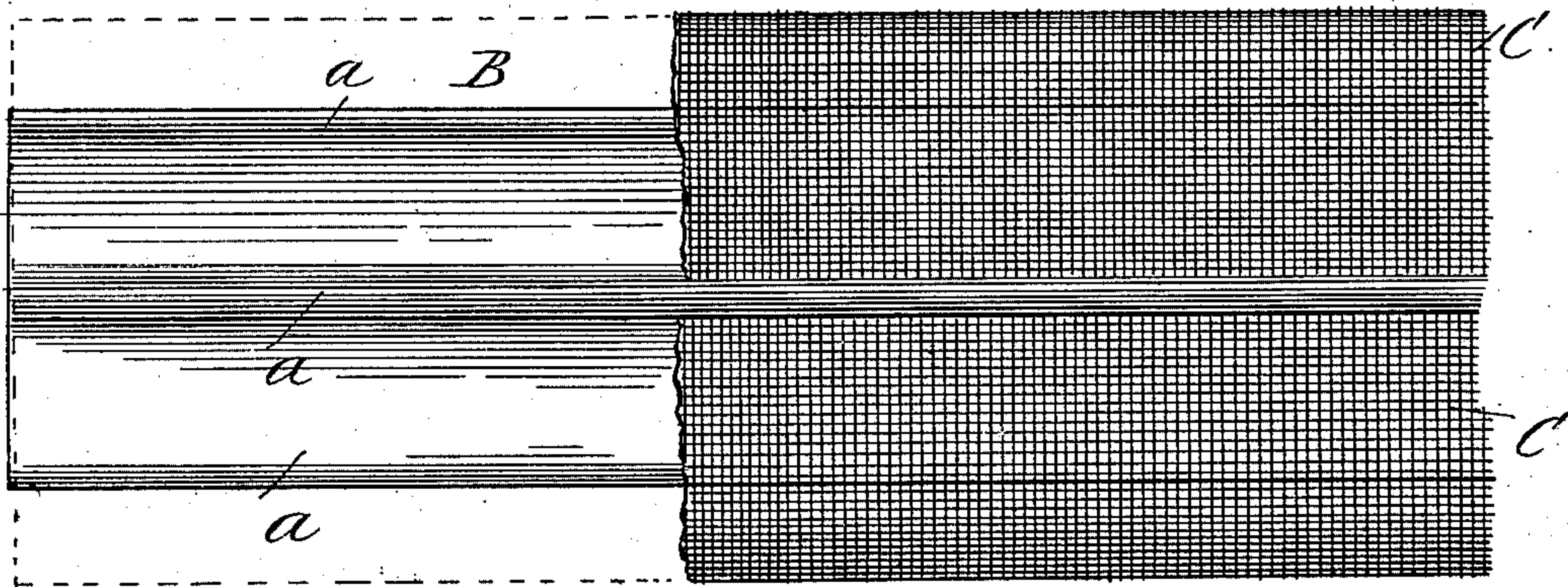


Fig. 2.

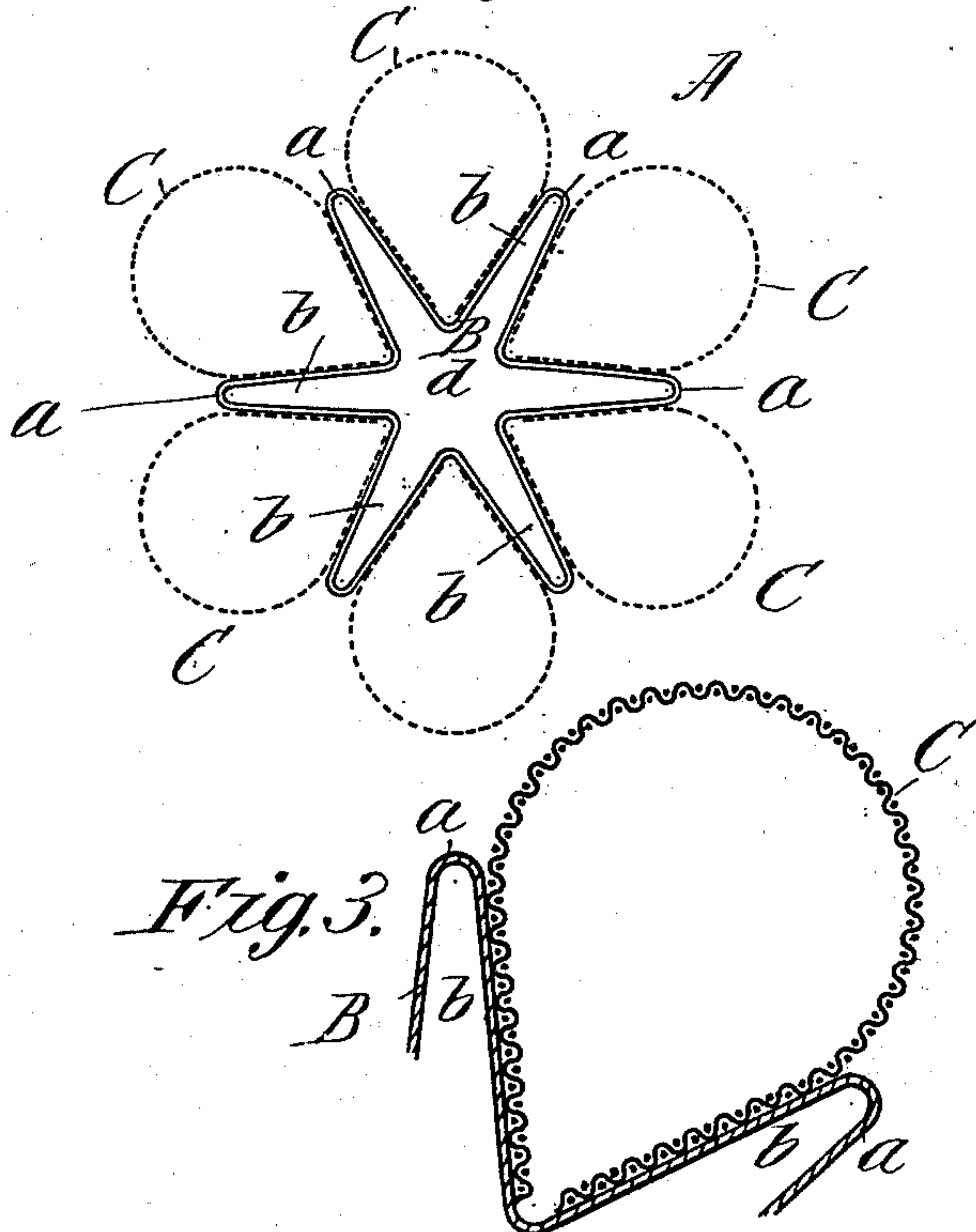


Fig. 3.

B

Witnesses:

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UNITED STATES PATENT OFFICE.

ARTHUR P. SMITH AND HINSDALE SMITH, OF SPRINGFIELD,
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CONDENSER OR EXHAUST TUBE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 691,978, dated January 28, 1902.

Application filed June 14, 1900. Serial No. 20,260. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR P. SMITH and HINSDALE SMITH, citizens of the United States of America, and residents of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Condenser or Exhaust Tubes for Steam-Engines, of which the following is a full, clear, and exact description.

10 This invention relates to improvements in tubes or conduits for the exhaust-steam in steam-engines or for the exhausting power-producing agent in other types of motors, which improved tube is advantageously available for insuring the rapid condensation or cooling of the steam or other fluid or gas being exhausted or otherwise employed in connection with the engine.

20 The object of the invention is to provide an improved tubular conduit of such a novel construction as to afford a high capacity for radiation and exposed air-surface, whereby the heated fluid or gas in passage through the conduit will have the temperature thereof greatly lowered in an unusually short time.

The invention consists in a tube or conduit for the exhaust of an engine or motor constructed substantially as hereinafter fully described, and set forth in the claim.

30 The improved exhaust-conduit or condenser-tube is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a portion of the length of one of the tubes, a part of the open-work external covering being broken away from the star-shaped tubular body. Fig. 2 is a cross-sectional view of the tube. Fig. 3 is a partial cross-sectional view of the tube, on a larger scale, for more truly showing the specific construction thereof.

40 In the drawings, A represents the exhaust-conduit, which, it is understood, may be of any suitable length and which may have end connections with the exhaust-outlet port of the engine or motor, as desired.

50 B represents the body of the tube, which, as shown, is of the form of a hollow star, the wall being constituted by sheet metal wrought to the stated form. The longitudinally-rang-ing radiating members *a a*, each of which has the space *b* therewithin in addition to the

common central space *d*, have the externally-applied and connected coverings C C of open-work construction, each of these coverings being preferably composed of a length or strip of wire-gauze longitudinally bent to assume cross-sectionally a loop form, the marginal portions of each of the so bent gauze strips being convergent and lapped upon the re-entrant external surfaces of the adjacent radiating members of the star-shaped non-porous metallic hollow body B. The sectional gauze coverings may be advantageously united to the tubular body by soldering. The body, of star shape or cruciform, itself presents a large area of radiating-surface, which is subject to the cooling effect of the air. The heat transmitted from the fluid or gas being exhausted and radiating throughout the star-shaped wall of the tubular body B is further more radiated throughout the loops of the open-work fabric C, and thereby so much more effectually subjected to the cooling process by the air that the exhaust steam or gas becomes so reduced in temperature as to be susceptible of reuse in the engine, if desired, and there accrues the further highly-advantageous effect of maintaining the engine or the part of the engine through which the exhaust is carried at a much lower temperature than would be the case if an ordinary exhaust-pipe were employed.

A foraminous outer covering for the non-porous tube-body specifically different from gauze may be employed, if desired—that is to say, perforated sheet metal might be used. The exhaust-tube may have an end head or heads with a coupling-stem, if desired, for convenience in the connection of the tube with the engine or any of the equipments or appliances employed in conjunction therewith.

The tube herein described and claimed may obviously be utilized with advantage for maintaining at a low temperature the water which is employed in circulation about the cylinder of a gas-engine for keeping such cylinder cool.

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

In an exhaust tube or conduit for an engine or motor, the combination with the cen-

tral sheet-metal hollow star-shaped tube-
body B, of the several strips of wire-gauze
bent into cross-sectional loops, with their mar-
ginal portions convergent and arranged with-
5 in the reëntrant spaces between the radiat-
ing member of the sheet-metal body and se-
cured in contact on the external surfaces of
said members, substantially as described.

Signed by us at Springfield, Massachusetts,
this 2d day of June, 1900.

ARTHUR P. SMITH.
HINSDALE SMITH.

Witnesses:

WM. S. BELLOWS,
ETHEL M. KNIGHT.