

M. H. CRANE.
SECTIONAL STEAM-GENERATOR.

No. 173,593.

Patented Feb. 15, 1876.

Fig. 1

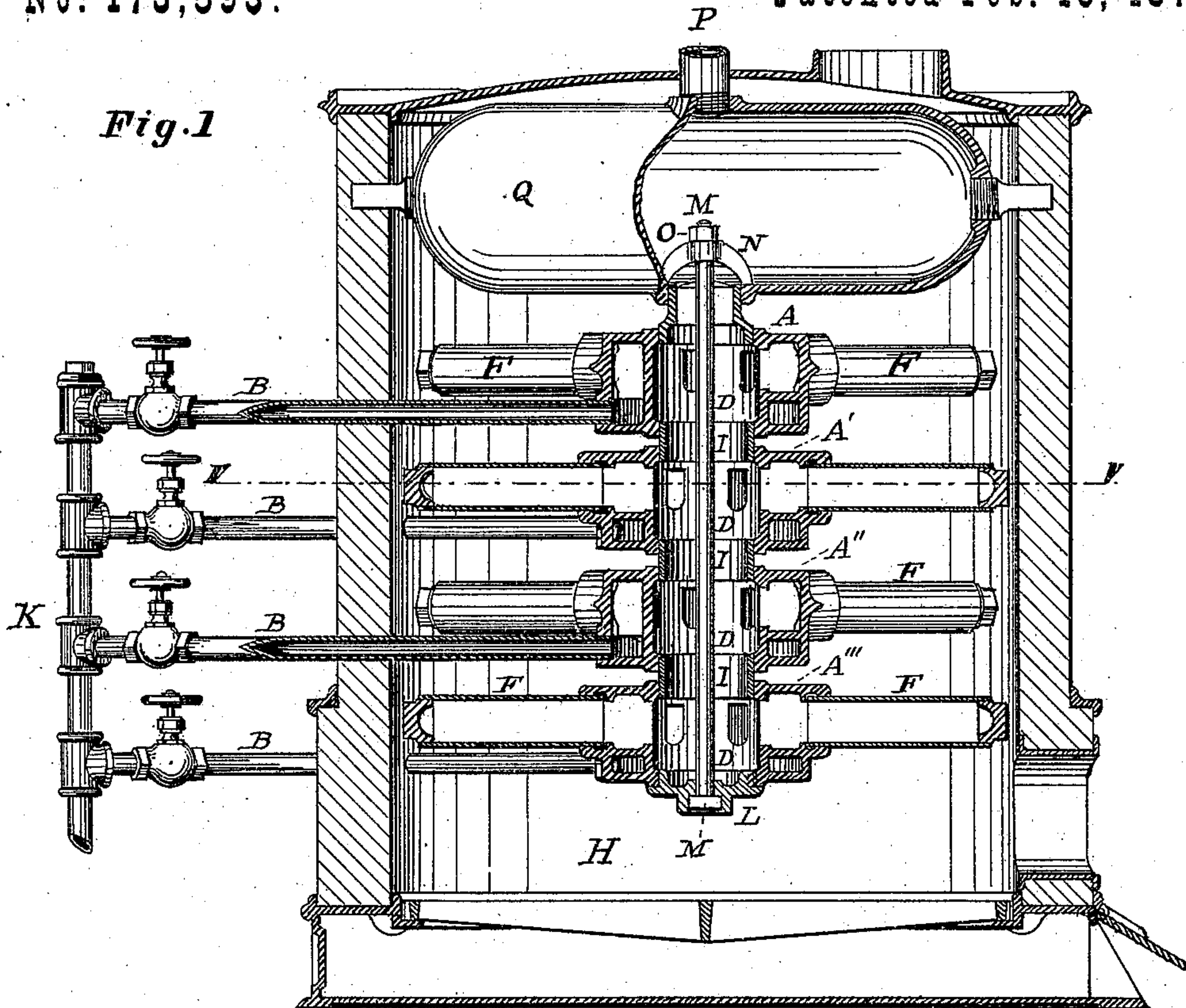
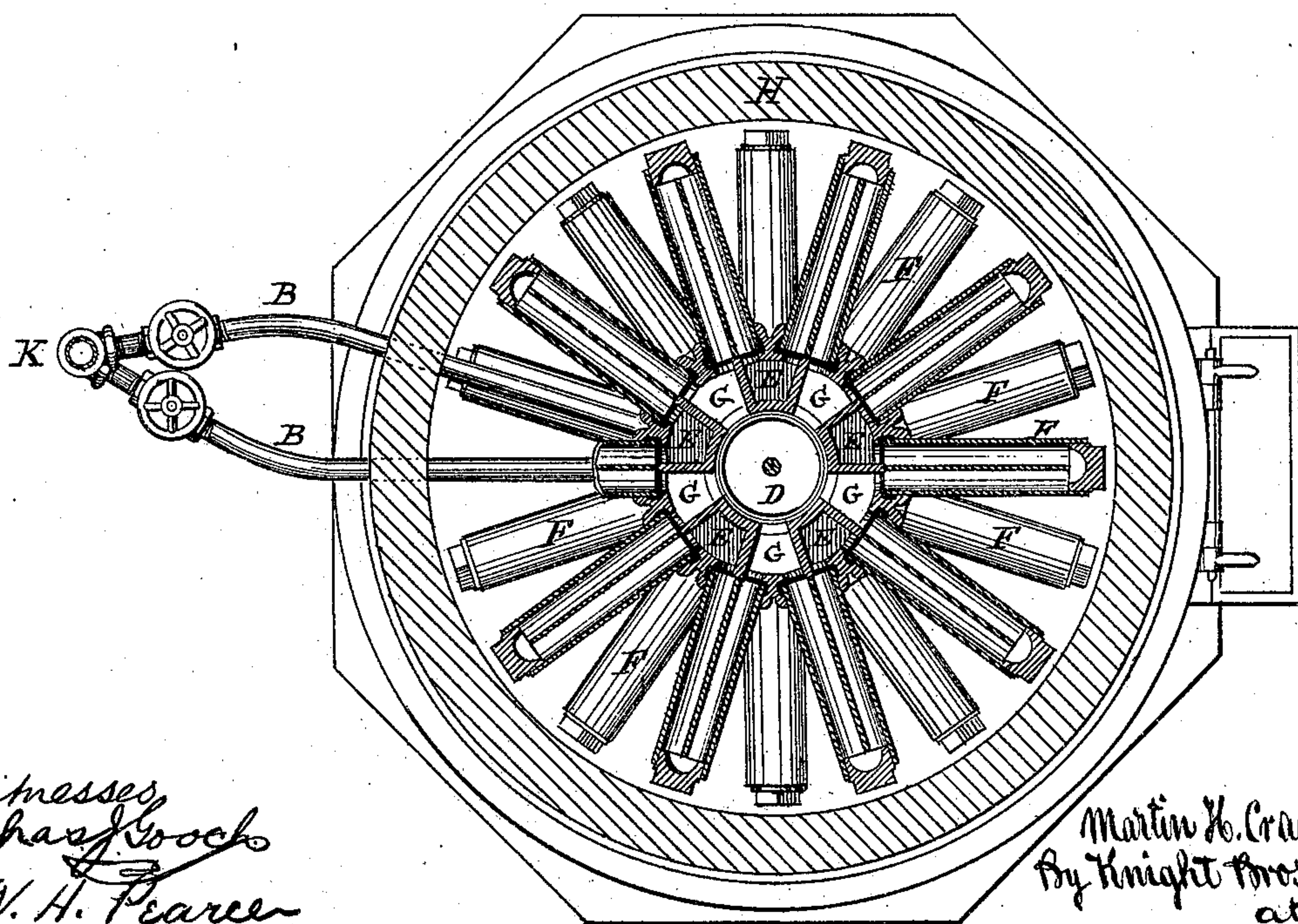


Fig. 2



Witnesses
Chas. G. Cook
W. H. Pearce

Martin H. Crane
By Knight Bros.
attys.

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Fig. 3

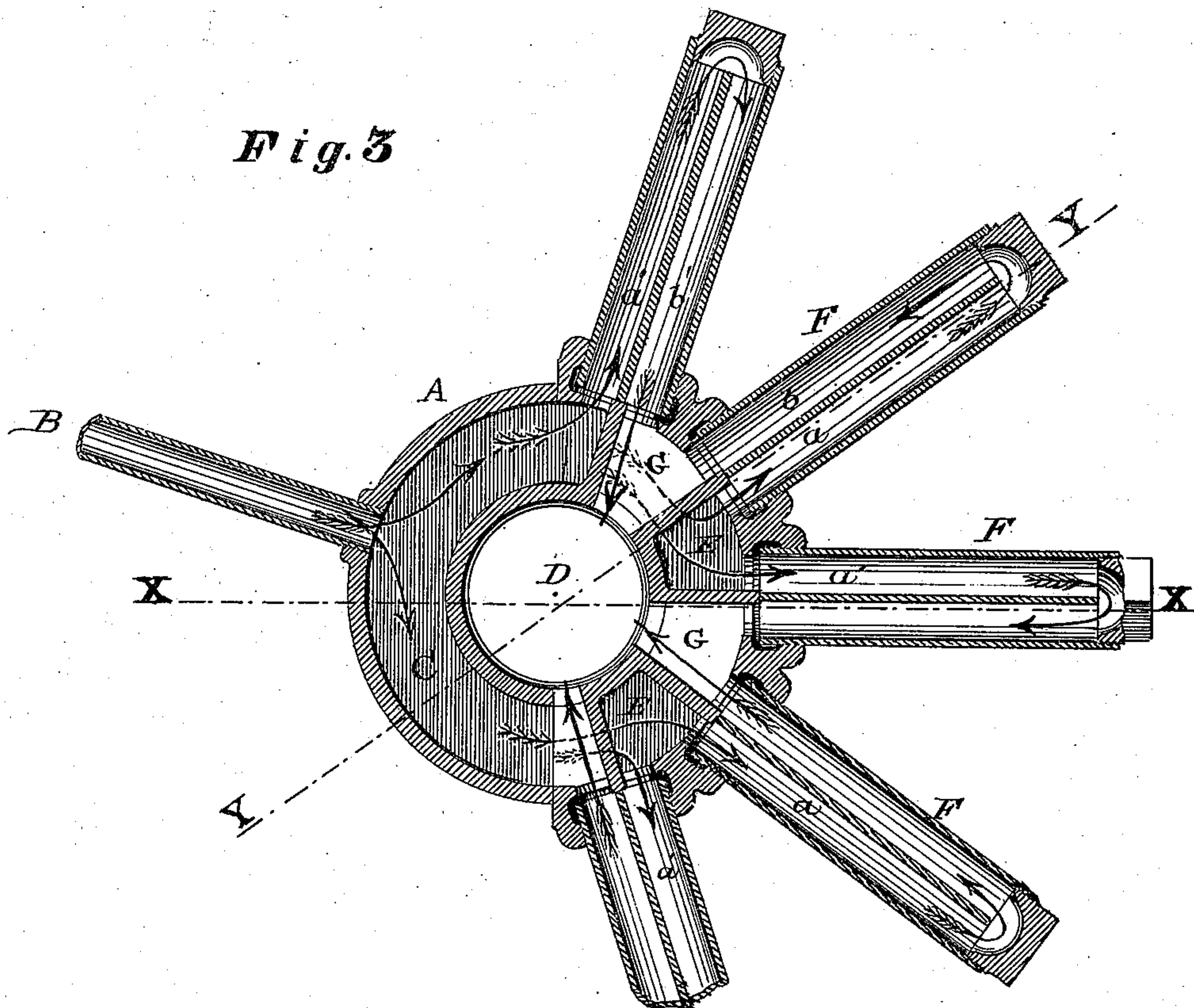


Fig 4

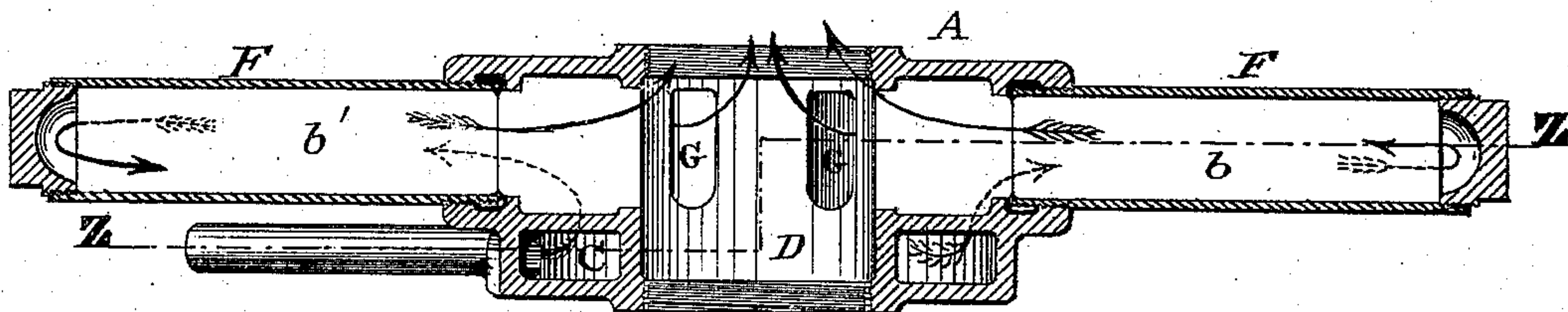
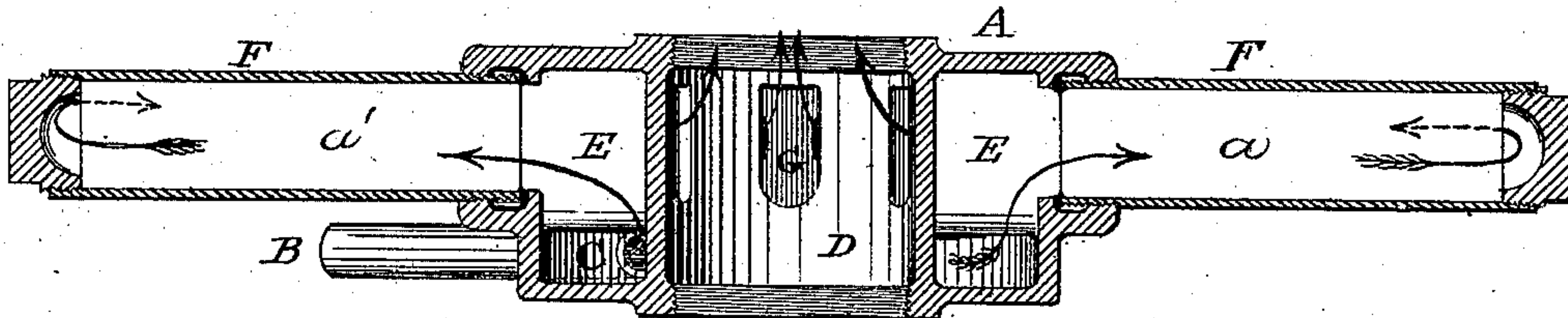


Fig 5



Witnesses
Chas. J. Gooch
W. H. Pearce

Martin H. Crane
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UNITED STATES PATENT OFFICE.

MARTIN H. CRANE, OF CINCINNATI, OHIO, ASSIGNOR TO CRANE, BREED & CO., OF SAME PLACE.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. 173,593, dated February 15, 1876; application filed December 23, 1875.

To all whom it may concern :

Be it known that I, MARTIN H. CRANE, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Steam-Generator, of which the following is a specification :

This is an improved form of those steam-generators which consist of a number of tubes that communicate by one end with a manifold or chamber.

My generator consists, essentially, of one or more central heads or chambers, from which radiate a series of tubes that are each divided into two equal portions by a longitudinal partition or diaphragm. Partitions are also made in the head so as to form two distinct cells or compartments, namely, a receiving-cell for the feed-water, which communicates, by a series of ducts, with the contiguous compartments of each pair of tubes whose fellow-compartments communicate with the other or delivering cell. By this means the water is made to flow from the receiving-cell of the central chamber to the remote extremity of each tube and to return into the delivering-cell, and a prompt and efficient generator is secured within remarkably compact dimensions and at a very moderate outlay. The boiler being wholly composed of cylindrical tubes, is, of course, exempt from liability to dangerous explosion.

In the accompanying drawing, Figure 1 is an axial section at the line *x x*. Fig. 2 is a horizontal section at the line *y y*. Fig. 3 is an enlarged horizontal section at the line *Z Z*. Figs. 4 and 5 are vertical sections at the line *X X* and *Y Y*, respectively.

My boiler contains any desirable number of central heads or chambers, *A A' A'' A'''*, united in a vertical hollow column or stack. Each head is so partitioned interiorly as to form two distinct cells, namely, a receiving-cell, *C*, and a delivering cell, *D*. The receiving-cell *C* is annular and receives the feed-pipe *B*, and opens upward into a series of ducts, *E*, that communicate with the contiguous halves *a a'* of each alternate pair of tubes, *F*, whose other halves, *b b'*, in turn communicate by ducts, *G*, with the delivering-cell *D*.

A result of this arrangement is, that the water which enters the cell *C* has no exit other than through one of the halves *a* or *a'*, and consequently flows out to the end of the tube and thence backward along the half *b* or *b'* before it can enter the cell *D*. In other words, the tubes which radiate from any given head are arranged in alternate pairs, each pair forming conduits for two outgoing streams from the lower cell *C*, and two returning streams to the cell *D*.

A head, with its set of radiating tubes, such as above described, immersed in a suitable furnace, *H*, constitutes of itself a complete steam-generator; but in situations where a greater volume of steam is required, the capacity of the generator may be increased at will, by simply adding one or more of the above-described elements, which may be done by nipple-couplings *I*. In a stack thus formed, the successive heads communicate by their cells *D*, while their cells *C* may (each or any number of them) receive feed-water direct by suitable connection, *B*, with a manifold, *K*, or otherwise. The lowest head is closed by a screw-plug, *L*. A stay-rod, *M*, which traverses the stack of heads, and a bridge, *N*, and nut, *O*, assist the nipples in holding all the component elements of the stack securely together. When several heads are thus united in a stack or column, they are preferably so arranged as to locate the tubes of one vertically over the intervals of those below. The steam-pipe *P* is either connected directly to the central compartment of the uppermost head, or to a steam-drum, *Q*, which may be secured to the head by a nipple in the same manner as the heads are coupled. *H* may represent any suitable inclosing-furnace.

I claim as new and my invention—

1. The generator, composed of central head *A*, annular receiving-cell *C*, and delivering cell *D*, said receiving-cell having ducts, *E*, communicating with contiguous halves, *a a'*, of each alternate pair of tubes *F*, and said delivering-cell having ducts, *G'*, communicating with the other contiguous halves, *b b'*,

of the tubes, F the whole adapted to form a complete generator, as and for the purpose set forth.

2. A series of generators, consisting of central heads, A, having annular receiving-cells, C, and delivering-cells, D, connected by ducts, E G, the partitioned and contiguously-connected tubes F and neck I, in combina-

tion with the manifold K, having pipes B, as and for the purpose set forth.

In testimony of which invention, I hereunto set my hand.

M. H. CRANE.

Attest:

WALTER KNIGHT,
GEO. H. KNIGHT.