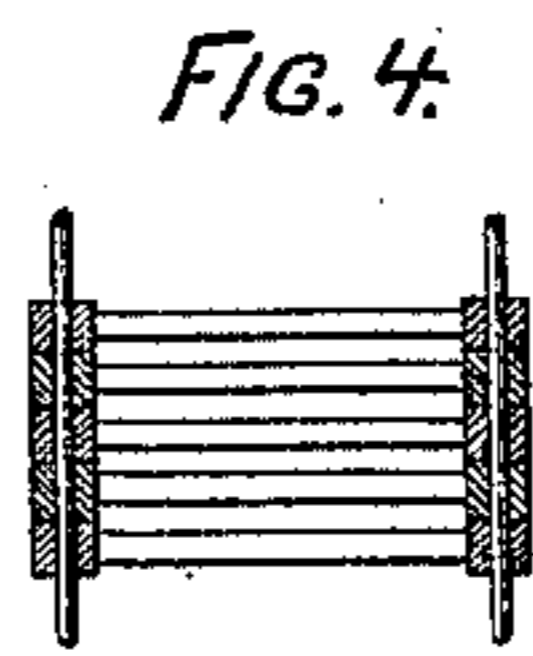
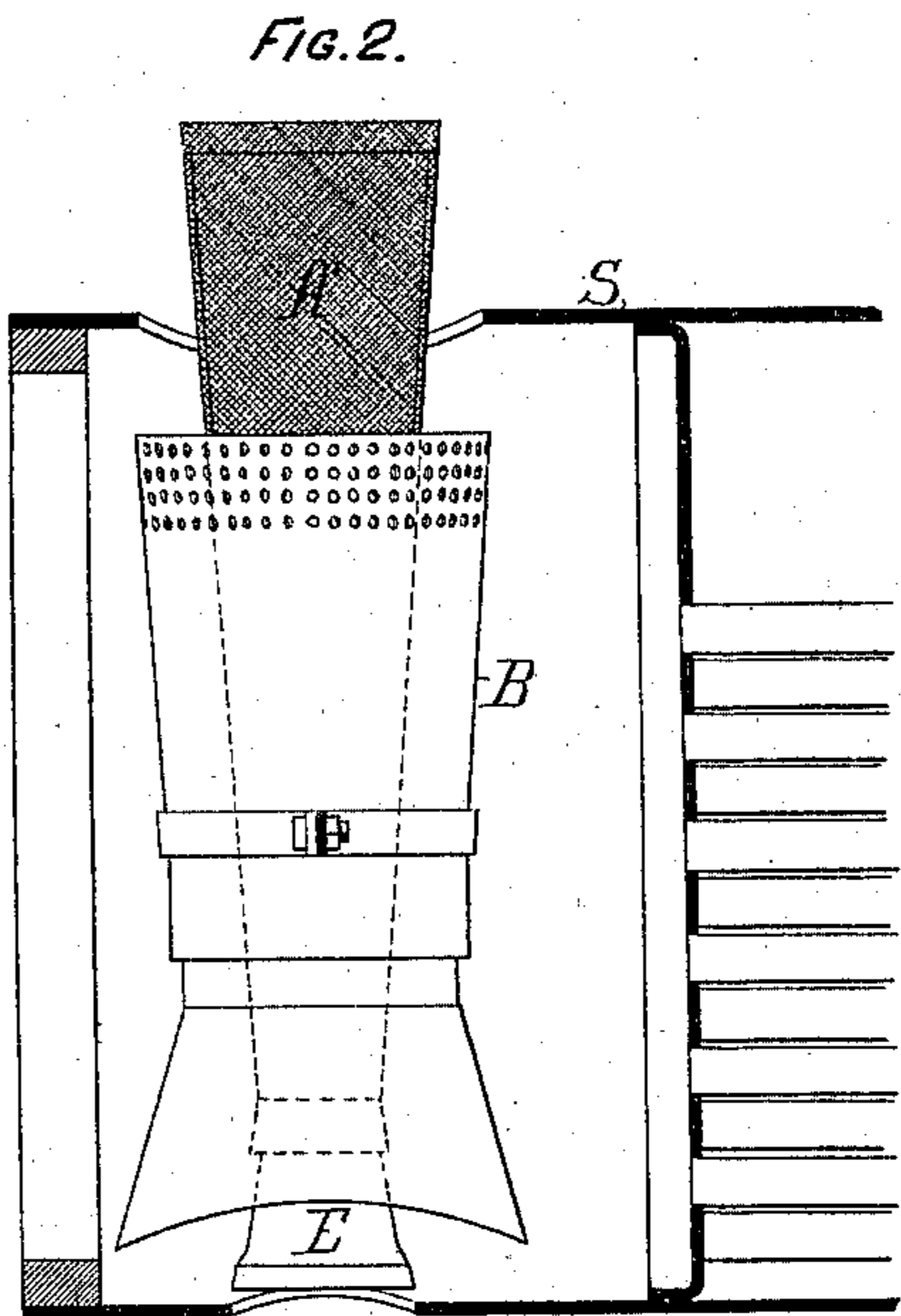
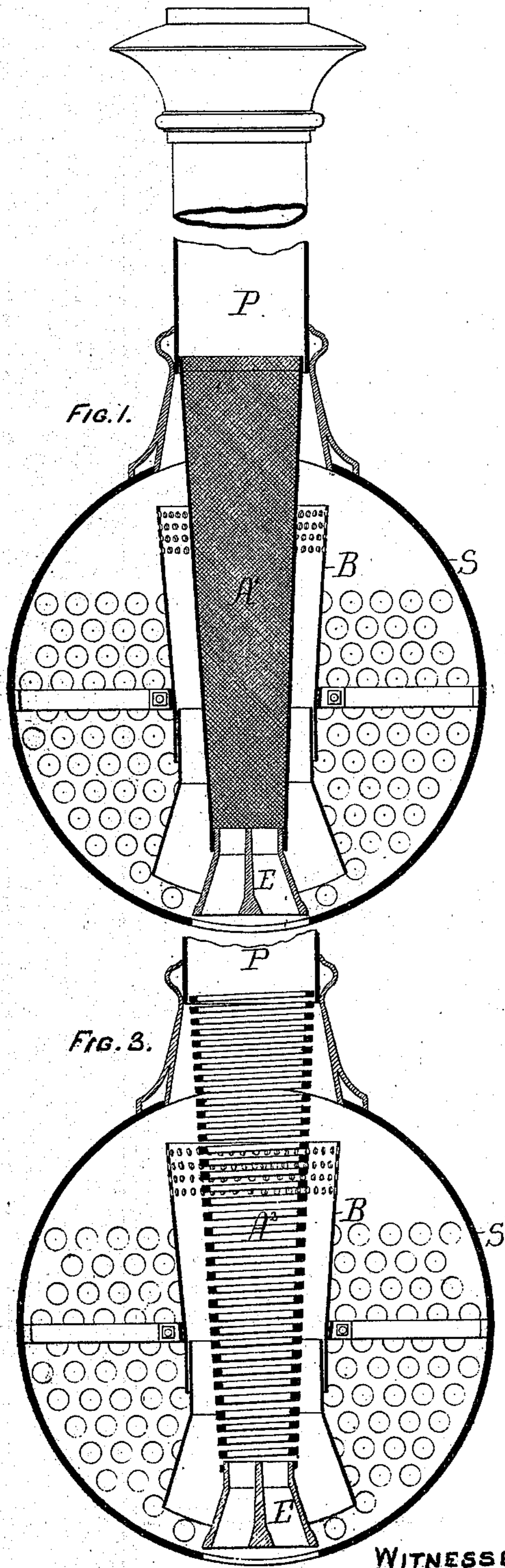


J. Smith,
Spark Arrester.
No. 112,506. Patented Mar. 7. 1871.



James Smith
by his Atty
Howson & Son

WITNESSES { *John Parker*
Jno. B. Harding

UNITED STATES PATENT OFFICE.

JAMES SMITH, OF ALTOONA, PENNSYLVANIA.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **112,506**, dated March 7, 1871.

I, JAMES SMITH, of Altoona, county of Blair, State of Pennsylvania, have invented an Improved Spark-Arrester, of which the following is a specification:

Nature and Object of the Invention.

My invention relates to an improvement in or addition to the invention for which Letters Patent were granted to me on the 16th day of August, A. D. 1870, my present improvements, which are too fully explained hereafter to need preliminary description, having for their object the arresting and destruction or disintegration of sparks arising from wood or hard-coal fires.

Description of the Accompanying Drawing.

Figure 1 is a transverse vertical section of the smoke-box of a locomotive with my improved spark-arrester; Fig. 2, a longitudinal section of the smoke-box, showing an external side view of the spark-arrester. Fig. 3 illustrates a modification of my invention, and Fig. 4 another modification.

General Description.

S represents the shell of the smoke-box, and P the chimney of a locomotive-boiler.

Into the lower end of the smoke-box projects the usual exhaust-nozzle E, between which and the chimney is a tubular tapering casing, A¹, the latter in my aforesaid patent consisting of perforated sheet metal. This casing is surrounded by a shield or casing, B, an annular space intervening between the two, as shown in the drawing, and the upper portion of the said casing B being either straight or tapering, and extending to within a short distance from the top of the smoke-box, while the lower end is flared and terminates a short distance from the bottom of the said smoke-box.

The draft created in the chimney by the exhaust-steam causes the smoke and cinders to pass upward between the two casings, the smoke escaping freely through the perforations in the casing A, and the ignited cinders coming violently in contact with the same, so as to be more or less broken or triturated, the finer particles passing through the perforations, whence they are discharged through the chim-

ney in a harmless condition, while the coarser particles rise and fall between the two casings until by repeated violent contact with the casing A they are grated to particles fine enough to pass through the perforations.

The casing B is perforated near the upper edge, so as to form a counter or downward current, to prevent the lighter particles from passing upward through the top of the said casing.

The above description applies to the device illustrated and claimed in the aforesaid patent, and, as regards the operation of the invention, will apply to my present application. I have found, however, that in using some classes of fuel a perforated casing is not as efficient as a casing, A¹, Figs. 1 and 2, of wire-gauze, which affords a free escape for the products of combustion, and at the same time arrests the light cinders and affords an excellent surface for the abrasion and disintegration of the same. A wire-gauze casing may, for instance, be employed to the best advantage when wood is used as a fuel.

When hard coal is used, however, I prefer to use a grated casing or tube, A², as shown in Fig. 3. This may be made by a continuous bar of wrought-iron coiled spirally, as shown; or it may be composed of a number of cast-iron rings strung to thin rods, as shown in Fig. 4; or the grating may be made in any other desired manner, providing it presents rigid bars for the hard ignited cinders to strike against, and providing there are openings sufficient in number and size to permit the free escape of lighter particles with the products of combustion.

Claim.

The combination of the shield or casing B and a grated or wire-gauze pipe or casing, A¹ or A², the whole being arranged in the smoke-box of a boiler, substantially as described.

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

JAS. SMITH.

Witnesses:

W. A. MALONEY,
GEO. W. STRATTAN.