

No. 614,580.

Patented Nov. 22, 1898.

J. SHEPHERD.
SPARK ARRESTER.

(Application filed May 5, 1898.)

(No Model.)

2 Sheets—Sheet 1.

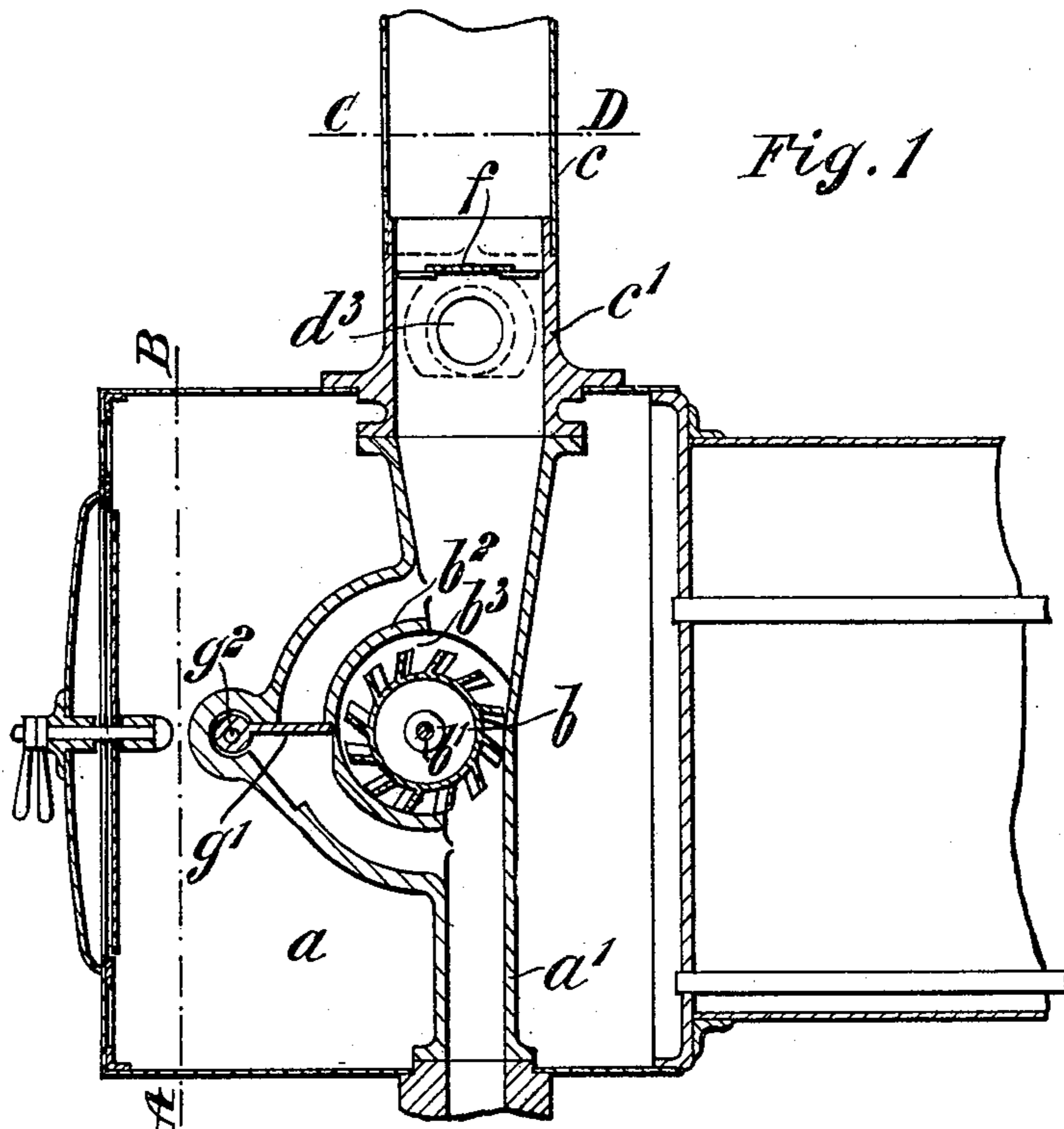


Fig. 1

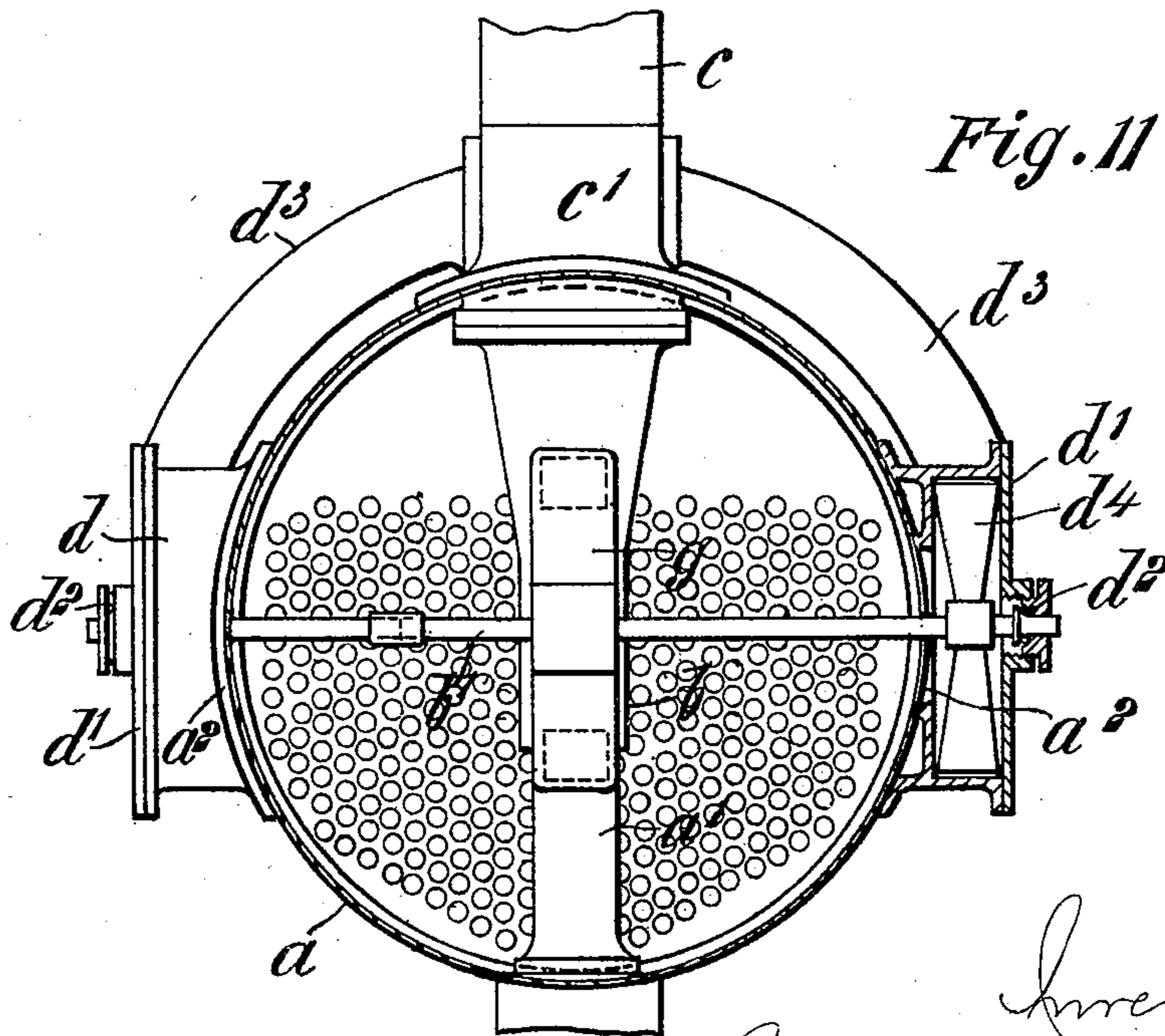


Fig. 11

Witnesses
W. V. Bigwood
J. P. Hammond

Inventor
James Shepherd
By *[Signature]* Attor

No. 614,580.

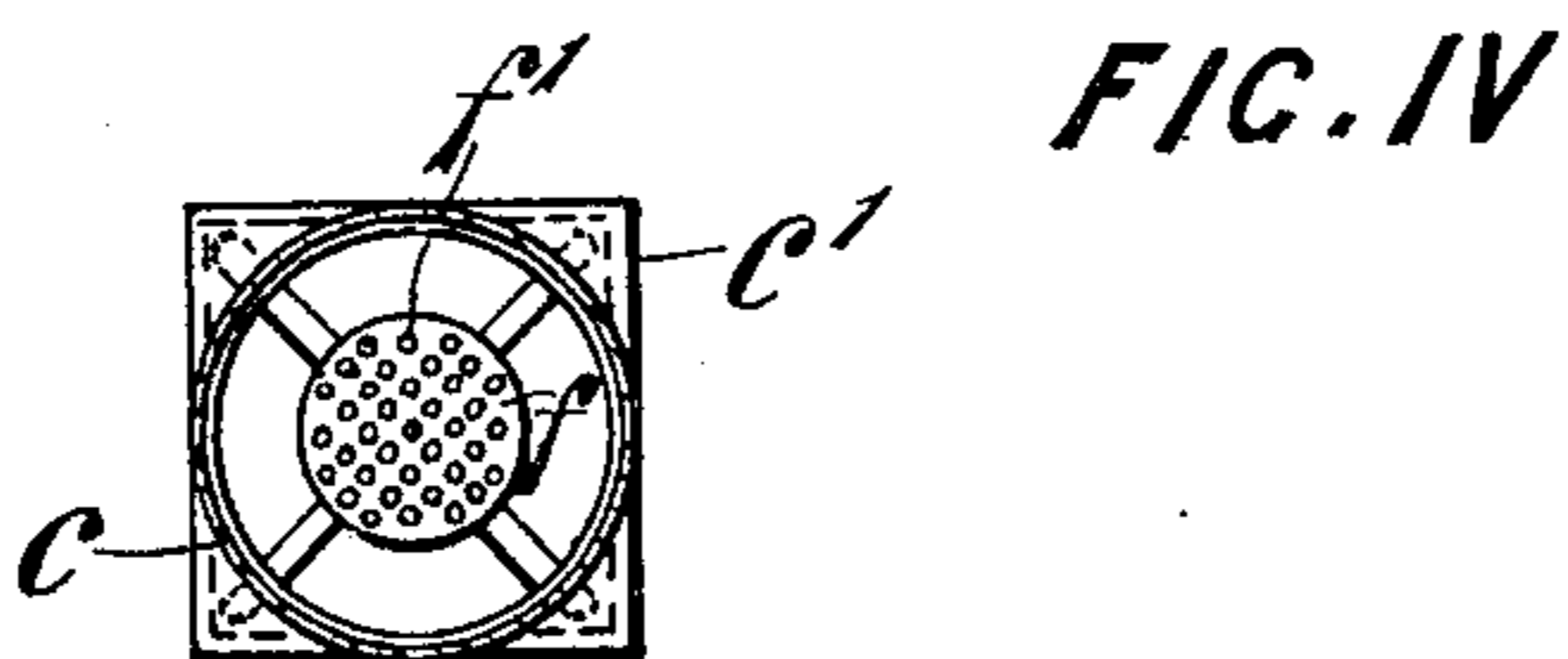
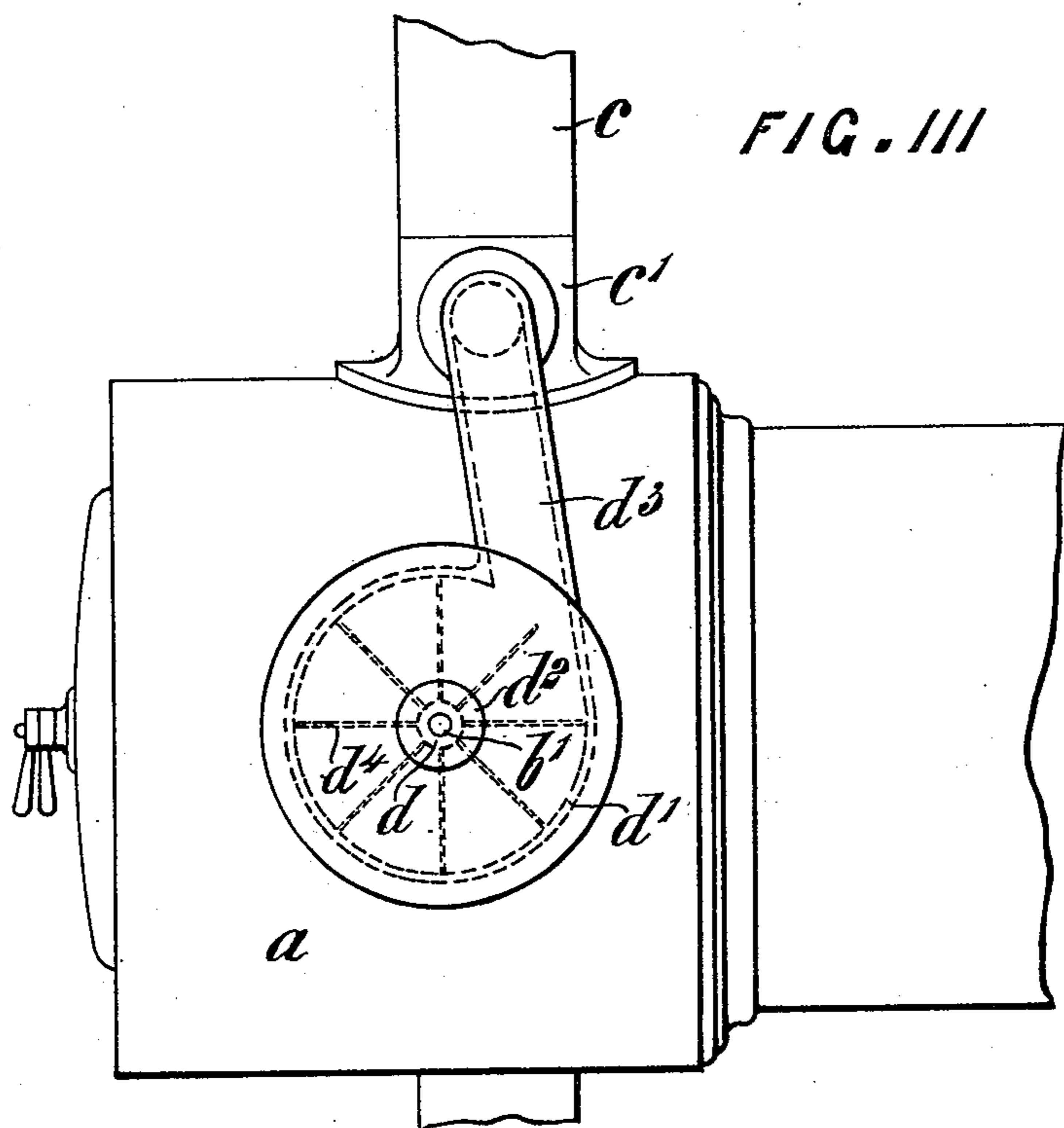
Patented Nov. 22, 1898.

J. SHEPHERD.
SPARK ARRESTER.

(Application filed May 5, 1898.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses
W. V. Biggs
W. P. Hammond

Inventor
James Shepherd
By W. V. Biggs
Attorney

UNITED STATES PATENT OFFICE.

JAMES SHEPHERD, OF WELLINGTON, NEW ZEALAND.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 614,580, dated November 22, 1898.

Application filed May 5, 1898. Serial No. 679,749. (No model.)

To all whom it may concern:

Be it known that I, JAMES SHEPHERD, a British subject, and a resident of 54 Lambton Quay, Wellington, New Zealand, have
5 invented an Improved Spark-Arrester and Smoke-Consumer, of which the following is a specification.

This invention relates to devices used for arresting sparks and consuming smoke from
10 steam-boilers; and its object is to provide apparatus which may be readily affixed to existing boilers and be effective in arresting sparks and consuming a considerable proportion of the smoke.

15 The invention as carried out in the form which is preferred consists of a driving-fan operated by the exhaust-steam to revolve one or more fans which withdraw the products of combustion from the smoke-box and force the
20 same into the funnel, where they meet the exhaust-steam after it has been utilized in operating the driving-fan. Sparks drawn into the fans are extinguished by the fans or after escaping therefrom in a partially-extin-
25 guished condition are finally extinguished by the exhaust-steam. The draft in the funnel is regular, since the action of the fans is to draw an even and constant stream of hot gases from the smoke-box. The fire has thus
30 a regular and constant draft, with a resulting improved fire and better consumption of smoke.

In order that the invention may be most easily understood, reference will be made to
35 the accompanying drawings, which illustrate the invention as applied to the smoke-box of a locomotive-boiler.

Figure 1 is a sectional elevation of a locomotive smoke-box fitted with the invention.
40 Fig. 2 is a cross-section of the same on line A B, Fig. 1. Fig. 3 is an exterior side view of the same. Fig. 4 is a cross-section of the funnel on line C D, Fig. 1.

Similar letters of reference indicate corresponding parts throughout the views.

Referring to the views, the smoke-box *a* has an exhaust-pipe *a'*, fitted with a driving-fan *b* and connected to the funnel *c* by air-tight joints. The shaft *b'* of fan *b* extends
50 upon each side and carries fans *d*, in the casings *d'* of which are bearings *d''*. Ball-bearings are preferred to reduce friction as much

as possible and to facilitate adjustment, or roller-bearings may be used, if desired.

The products of combustion are drawn from
55 the smoke-box into the fans *d* through apertures *a''*, made in the side of the said smoke-box, and after passing through the fans the said products are driven up the pipes *d'''* to the base *c'* of the funnel *c*, where they meet
60 the exhaust-steam after it has been utilized in operating the driving-fan *b*. The products of combustion and the exhaust-steam after striking the baffle-plate *f*, which is perforated with holes *f'*, pass out of the funnel *c*.
65

A by-pass *g* may be opened by operating regulating-valve *g'* from the foot-plate by any ordinary means connected to the shaft *g''* to allow some or the whole of the exhaust-steam to pass. This is necessary when the exhaust-
70 steam is driving the fans at too great a speed or in case the fans should get out of order. The engine would thus not be disabled in case of the apparatus failing to operate.

When the engine is standing, the products
75 of combustion pass through the fan-casings *d'* and up the pipes *d'''* to the funnel.

The chamber *b''* of the fan *b* is made with a gradually-increasing radius to leave an increasingly-widening space *b'''* between the pe-
80 riphery of the fan and the casing *b''* and to prevent the steam from being carried around by the fan.

The vanes *d''* of fans *d* are shaped, as shown on Fig. 2, to lessen the noise made by ordi-
85 nary fans when revolving at a high speed.

It is obvious that pipes may be conducted from the pipes *d'''* to the fire-box and a portion of the hot gases utilized for increasing the
90 combustion of the fuel.

Where the exhaust-steam cannot be employed to operate the fans, the fans *d* may be revolved by means of pulleys and a belt driven from the engine-shaft or by any other suitable means.
95

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination with the smoke-box of an
100 engine a driving-fan operated by the exhaust-steam of the engine apertures in the smoke-box fans for withdrawing the products of combustion from the smoke-box pipes for con-

veying the said products to the funnel an exhaust-pipe fitted air-tight between the steam-chest and the funnel, substantially as and for the purposes set forth herein.

5 2. In combination with the smoke-box of an engine a driving-fan operated by the exhaust-steam of the engine apertures in the smoke-box fans for withdrawing the products of combustion from the smoke-box pipes for conveying the said products to the funnel an exhaust-pipe fitted air-tight between the steam-
10 chest and the funnel and a by-pass, substantially as and for the purposes set forth herein.

3. In combination with the smoke-box of an
15 engine a driving-fan operated by the exhaust-steam of the engine apertures in the smoke-box fans for withdrawing the products of combustion from the smoke-box pipes for conveying the said products to the funnel an exhaust-pipe fitted air-tight between the steam-
20

chest and the funnel a by-pass and a regulating-valve in the by-pass, substantially as and for the purposes set forth herein.

4. In combination with the smoke-box of an engine a driving-fan operated by the exhaust-
25 steam of the engine apertures in the smoke-box fans for withdrawing the products of combustion from the smoke-box pipes for conveying the said products to the funnel an exhaust-pipe fitted air-tight between the steam-
30 chest and the funnel a baffle-plate in the funnel a by-pass and a regulating-valve in the by-pass, substantially as and for the purposes set forth herein.

In witness whereof I have hereunto set my
hand in the presence of two witnesses.

JAMES SHEPHERD.

Witnesses:

E. S. BALDWIN,

A. S. COLLINS.