

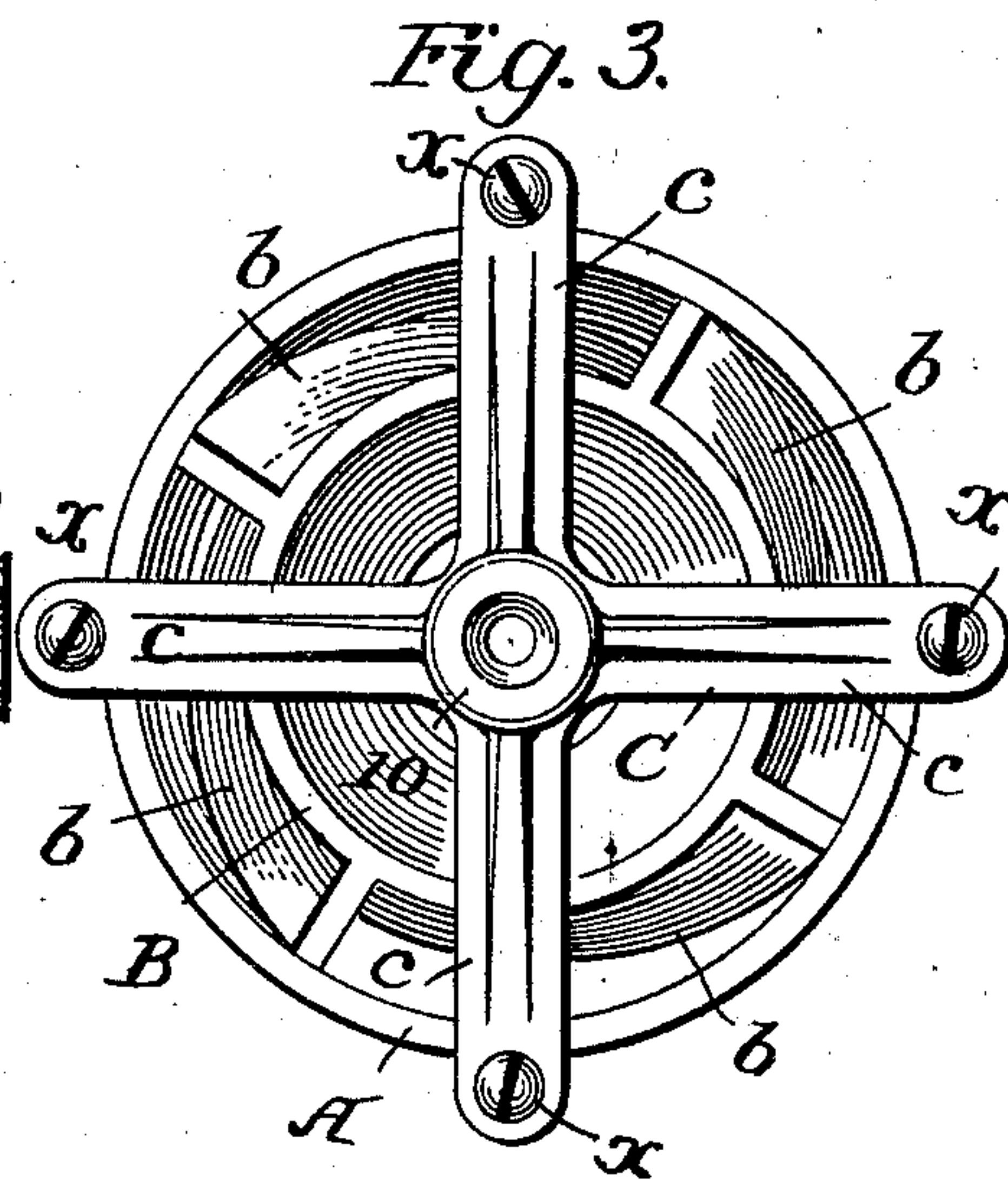
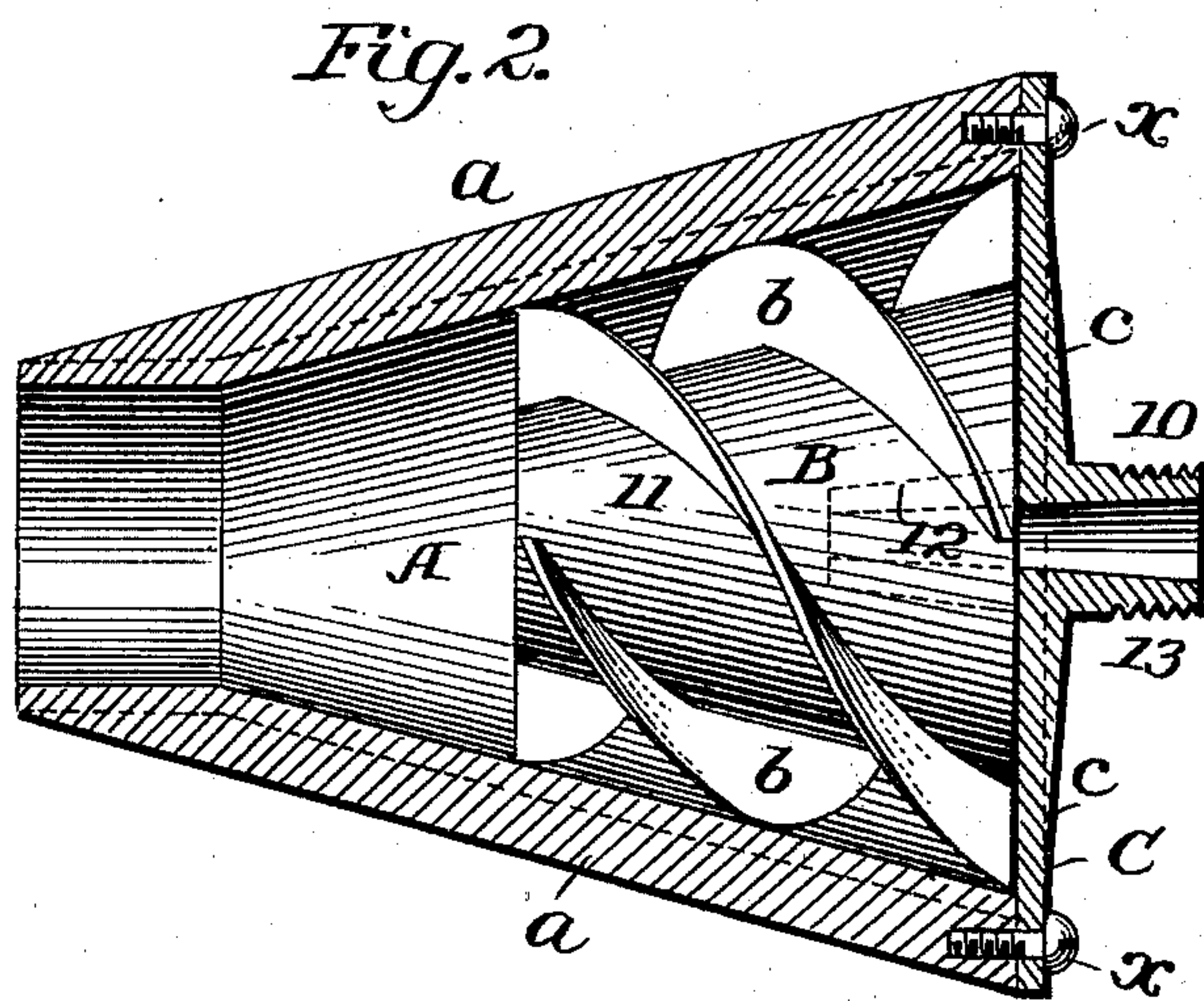
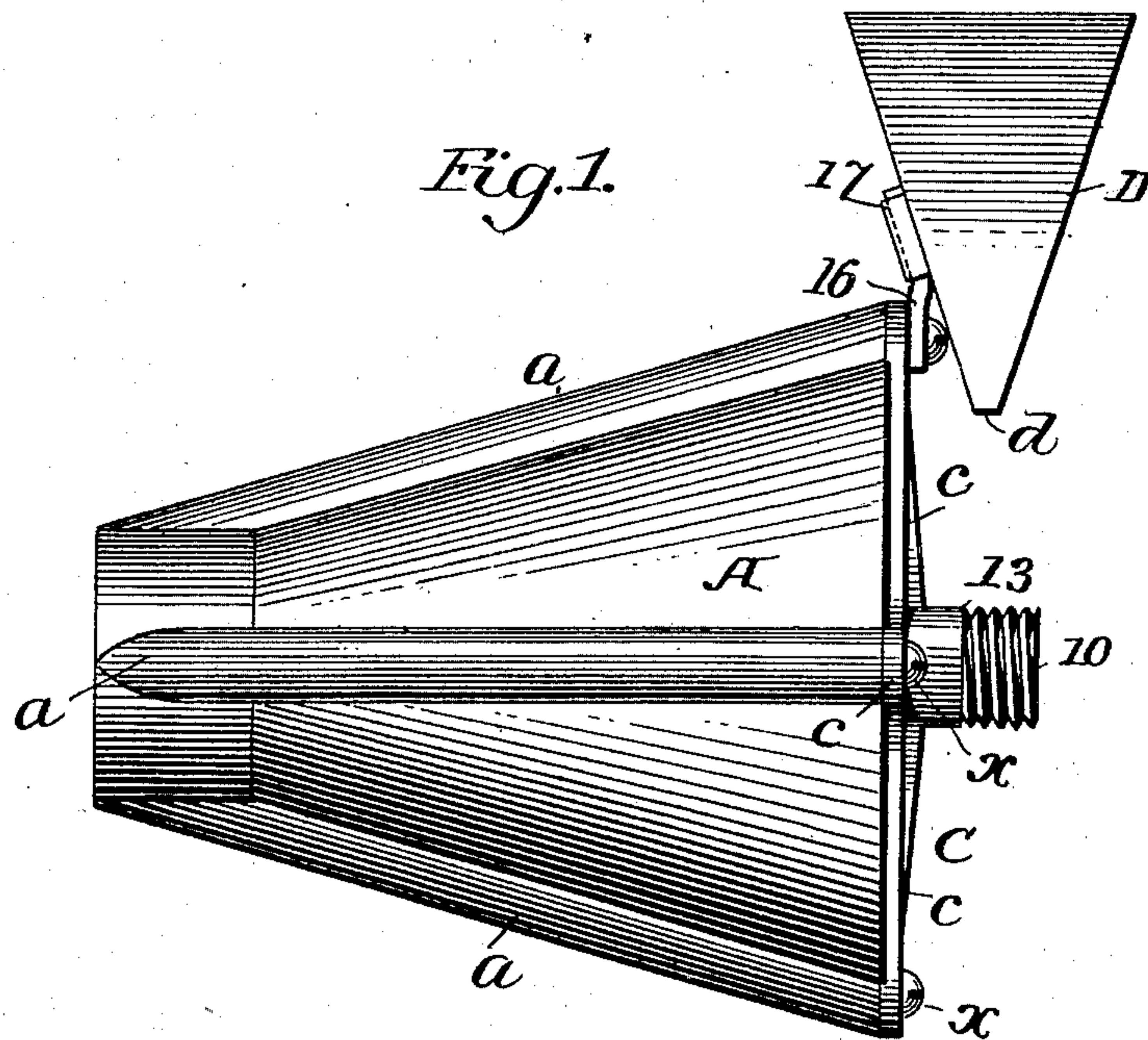
No. 679,756.

Patented Aug. 6, 1901.

W. B. KENNEDY & H. T. HOOPES.
STEAM AND HOT AIR FLUE CLEANER.

(Application filed May 23, 1901.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM BONBRIGHT KENNEDY AND HENRY TOWNSEND HOOPES, OF
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STEAM AND HOT-AIR FLUE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 679,756, dated August 6, 1901.

Application filed May 23, 1901. Serial No. 61,588. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM BONBRIGHT KENNEDY and HENRY TOWNSEND HOOPES, citizens of the United States, residing at New Brighton, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Steam and Hot-Air Flue-Cleaners, of which the following is a specification.

10 This invention relates to that class of boiler tube or flue cleaners by which scale, dirt, &c., are removed from the tube by the action of a forcible jet of steam and air, with which sand or other material may also be employed
15 when desired.

The object of the invention is to improve the structure of devices of this character, and the invention will be fully described hereinafter, reference being had to the accompanying
20 drawings, in which—

Figure 1 is a side elevation of our improved tube-cleaner. Fig. 2 is a longitudinal section, and Fig. 3 is an end view.

In carrying out our invention we employ
25 two coniform shells A and B, the latter being smaller and shorter than the former and supported within it. In the space between the shells are a plurality of spiral webs *b*, and preferably these webs will be rigidly connected to the shell B and be of such width that
30 their outer edges will bear against the interior surface of the shell A when the larger ends of the two shells are in the same plane, and the webs thus support the shell B within
35 the shell A concentric therewith. Obviously, however, the webs *b* might be rigidly connected to the shell A and frictionally engage the outer surface of the shell B with the same result. The shell A is provided with a series
40 of radial ribs *a* on its outer surface, extending longitudinally thereof, and these ribs engage the end of the flue when the device is in use and protect the shell from being worn by contact with the flue.

45 Some means must be employed to maintain the two shells in proper relation to each other, and preferably for this purpose we employ a spider C, having a series of arms *c* radiating from the central hub 10. The ends of the
50 ribs *a* are tapped to receive screws *x*, which pass through the ends of the arms *c* and serve

to securely hold the spider in position against the larger ends of the tubes A and B, and the parts will be so proportioned that when the spider is secured in place the edges of the webs *b* will bear against the inner surface of the shell A with sufficient pressure to frictionally hold the shell B in position. The hub 10 is hollow and projects beyond the arms *c* into the shell B to form a steam-jet
60 nozzle 12, and it also projects beyond the arms *c* outwardly to form a neck 13, which is threaded in order that a steam-supply pipe may be coupled to it.

The device so far as described will operate
65 as follows: Steam being admitted to the neck 13 will pass through the jet-nozzle 12 and through the smaller ends of the shells A and B into the flue to be cleaned. The steam will create a partial vacuum in the two shells, and
70 air will be drawn in through the larger end of the tube B and also through the spiral passages 11, formed by the outer surface of the shell B, the inner surface of the shell A, and the spiral webs *b*, and the air passing through
75 these passages will assume a whirling movement, which will be imparted to the mixed current of air and steam issuing from the small end of shell B, when the two currents become
80 mixed in the small end portion of the shell A beyond the shell B, and the mixed currents will pass into the flue from the end of the shell A with a whirling motion, which will greatly aid in loosening the scale, dirt, &c.,
85 from the tube.

Sometimes it is necessary to inject sand or other material into the tube with the current of air and steam, and in order that this may be done we preferably employ a flattened funnel-shaped box D, which may be detach-
90 ably connected to the flue-cleaner in any desired manner. The lower end of the box D will preferably have a long narrow discharge-opening *d* in order that the material may fall in the form of a thin sheet or film in front
95 of the outer end of the cleaner, and the induced currents of air as they enter the passages 11 and the shell B will carry the sand or other material along, and obviously the sand or other material will also acquire a
100 whirling motion as it passes through the spiral passages 11 and will thus scour or

abrade all parts of the inner surface of the tube. A convenient means for detachably connecting the box D to the cleaner is shown and consists of a short bar 16, secured to the
5 cleaner by one of the screws x , over which a loop 17, secured to the box D, fits.

While the device illustrated and described is specially intended as a flue-cleaner, its use is not restricted to such purpose. On the
10 contrary, the device might be employed for other purposes—as, for example, an injector-burner—for it is obvious that if gas be introduced under pressure instead of steam a whirling current of air will be induced through
15 the passages 11 and there would be a perfect mixture of gas and air issuing from the small end of the shell A.

Without limiting ourselves to the precise details of construction illustrated and de-
20 scribed, we claim—

1. The combination of inner and outer concentric coniform shells having a space between them, the inner shell being shorter than the outer shell and arranged wholly
25 within the latter, spirally-twisted webs in the space between the shells, said webs being rigidly connected to one shell and frictionally engaging the opposing surface of the other, and means to maintain such frictional
30 engagement, substantially as set forth.

2. The combination of inner and outer concentric coniform shells having a space between them, the inner shell being shorter than the outer, spirally-twisted webs in the
35 space between the shells, said webs being rigidly connected to one shell and frictionally engaging the opposing surface of the other, a spider bearing against the larger ends of both shells, and means for securing
40 said spider to the outer shell, substantially as and for the purpose set forth.

3. The combination of inner and outer con-

centric coniform shells having a space between them, the inner shell being shorter than the outer, spirally-twisted webs in the
45 space between the shells, said webs being rigidly connected to one shell and frictionally engaging the opposing surface of the other shell, a spider having a hollow hub and radiating arms, the latter engaging the larger
50 ends of the two shells, means for securing the arms to the outer shell, a steam-jet nozzle projecting from the hub into the inner shell, and means for connecting a steam-supply pipe to said hub, substantially as set forth. 55

4. The combination of inner and outer concentric coniform shells, having a series of spiral passages between them open at both ends, means for discharging a jet of steam into the inner shell, and means for discharg-
60 ing sand in the form of a thin film or sheet in front of and adjacent to the outer open ends of the spiral passages, substantially as set forth.

5. In a flue-cleaner the combination of inner and outer concentric coniform shells having a series of spiral passages between them open at both ends, means for discharging a jet of steam into the inner shell, a sand-box detachably connected to said cleaner and
70 having an elongated narrow discharge-opening to discharge the sand in the form of a thin film or sheet in front of and adjacent to the outer ends of said spiral passages, substantially as set forth. 75

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM BONBRIGHT KENNEDY.
HENRY TOWNSEND HOOPES.

Witnesses:

WM. W. WILSON,
A. C. TOWNSEND.