

D. ABELL.
 Circulating Device for Steam Generators.
 No. 233,905. Patented Nov. 2, 1880.

Fig. 1.

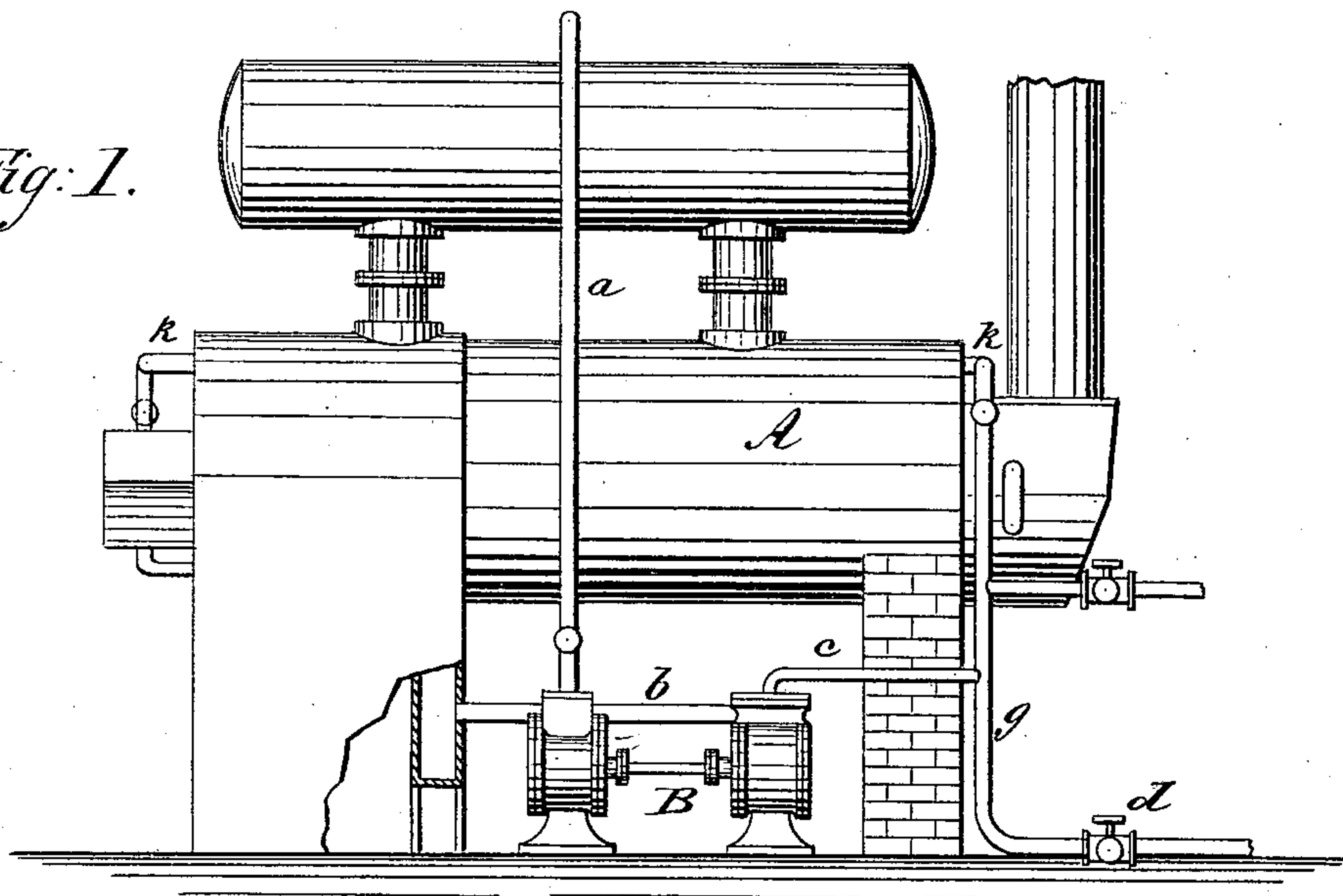


Fig. 2.

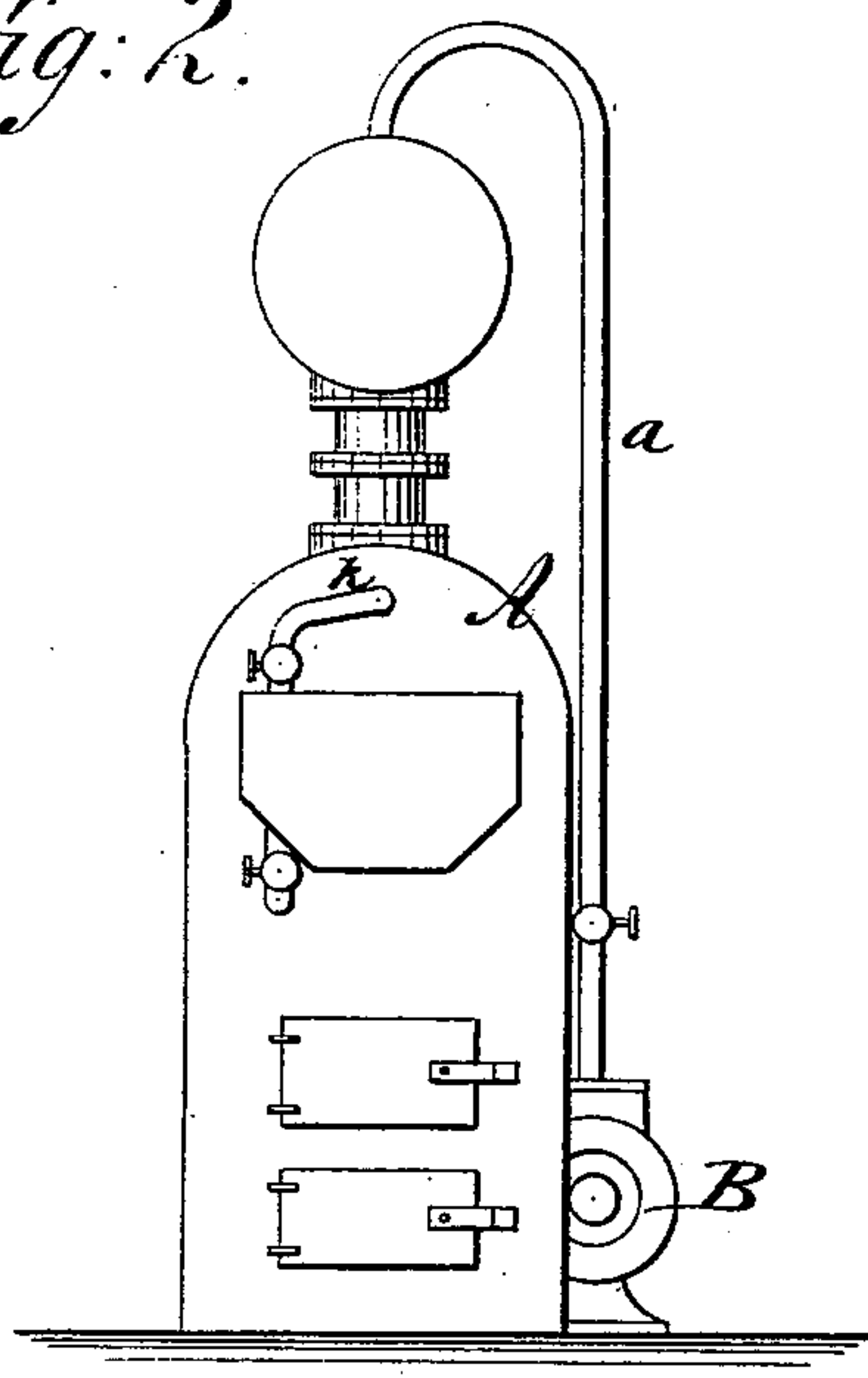
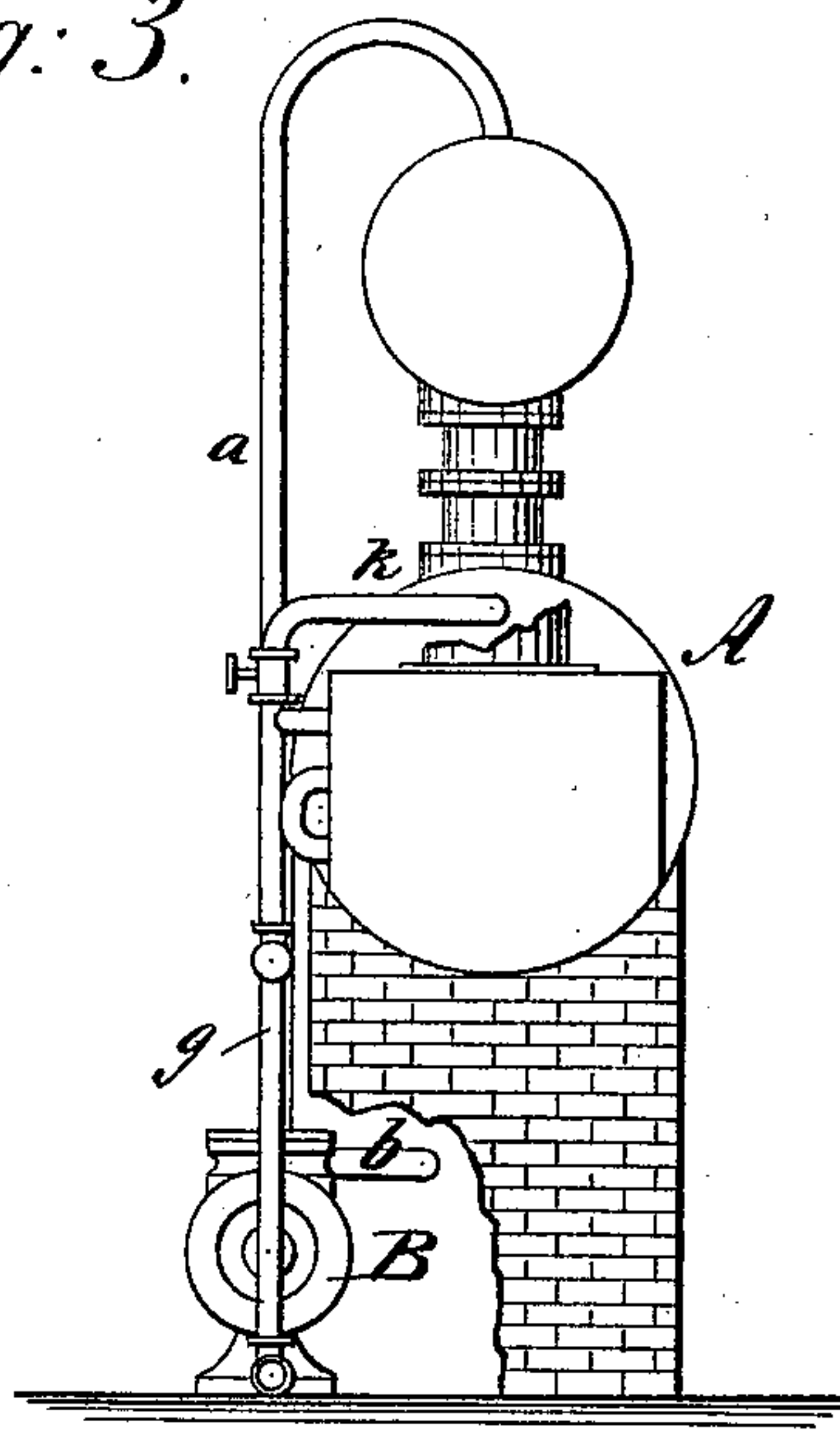


Fig. 3.



WITNESSES:

A. Schehl.
C. Sedgwick

INVENTOR:

D. Abell

BY

Munn & Co.
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

DAN ABELL, OF CARSON CITY, NEVADA.

CIRCULATING DEVICE FOR STEAM-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 233,905, dated November 2, 1880.

Application filed January 9, 1880.

To all whom it may concern:

Be it known that I, DAN ABELL, of Carson City, Ormsby county, State of Nevada, have invented a new and useful Improvement in
5 Circulating Devices for Steam-Generators, of which the following is a specification.

This invention consists in combining with the feed-water and circulation pipes of a steam-generator a steam-pump for keeping up a continuous and rapid circulation of the water
10 within the space of the generator, as set forth hereinafter with reference to the accompanying drawings, wherein—

Figure 1 is a side elevation of a steam-generator fitted with my improvement. Fig. 2 is a front view, and Fig. 3 is a rear view.
15

Similar letters of reference indicate corresponding parts.

A is a boiler of the usual form, of which
20 is the feed-water pipe, that enters the smoke-box at the rear of the boiler. The pipe *g* is to connect with the circulation-pipes *k*, and with a series of pipes passing through the flue-tubes of the boiler into the water-space, as shown and
25 described in the Letters Patent granted to me October 28, 1879; or the circulation-pipes may be arranged in any other suitable manner.

Contiguous to the boiler, and preferably below the water-level, is fitted a steam-pump, B,
30 which is driven by steam taken from boiler A by the pipe *a*. The inlet-pipe *b* of the pump passes into the water-space of the boiler near the bottom thereof. As shown, the pipe *b* enters the water-leg around the fire-box. The

outlet *c* of the pump passes to and is connected
35 with the feed-water pipe *g* at a convenient point outside of the boiler. The pipe *g* is provided with a cock at *d* to shut off connection with the feed-water pump.

When the feed-water pumps are in use circulation will be maintained in the boiler. The
40 pump B is set in operation while the feed-water is shut off to keep up a circulation through the pipes *b*, *c*, *g*, and *k* and the water-space of the boiler, and thus insure an equal
45 heating of the water, prevent overheating of the boiler at its fire-surfaces and unequal expansion and contraction, and preserving the pipes that pass through the flue-tubes, the
50 pump B to be used at any time when found convenient or necessary.

I do not limit myself to the arrangement of the pump and connections with the boiler, as shown, as they may be differently arranged,
55 according to convenience and the location of the boiler.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination, with a steam-generator, of
60 a feed-pump, a feed-pipe, a circulating-pump, and suitable connecting-pipes, said pump being adapted to discharge into said feed-pipe while the feed-pump is running, as and for the purpose specified.

Witnesses:

DAN ABELL.

WM. H. CORBETT,
AUG. CUTTS.