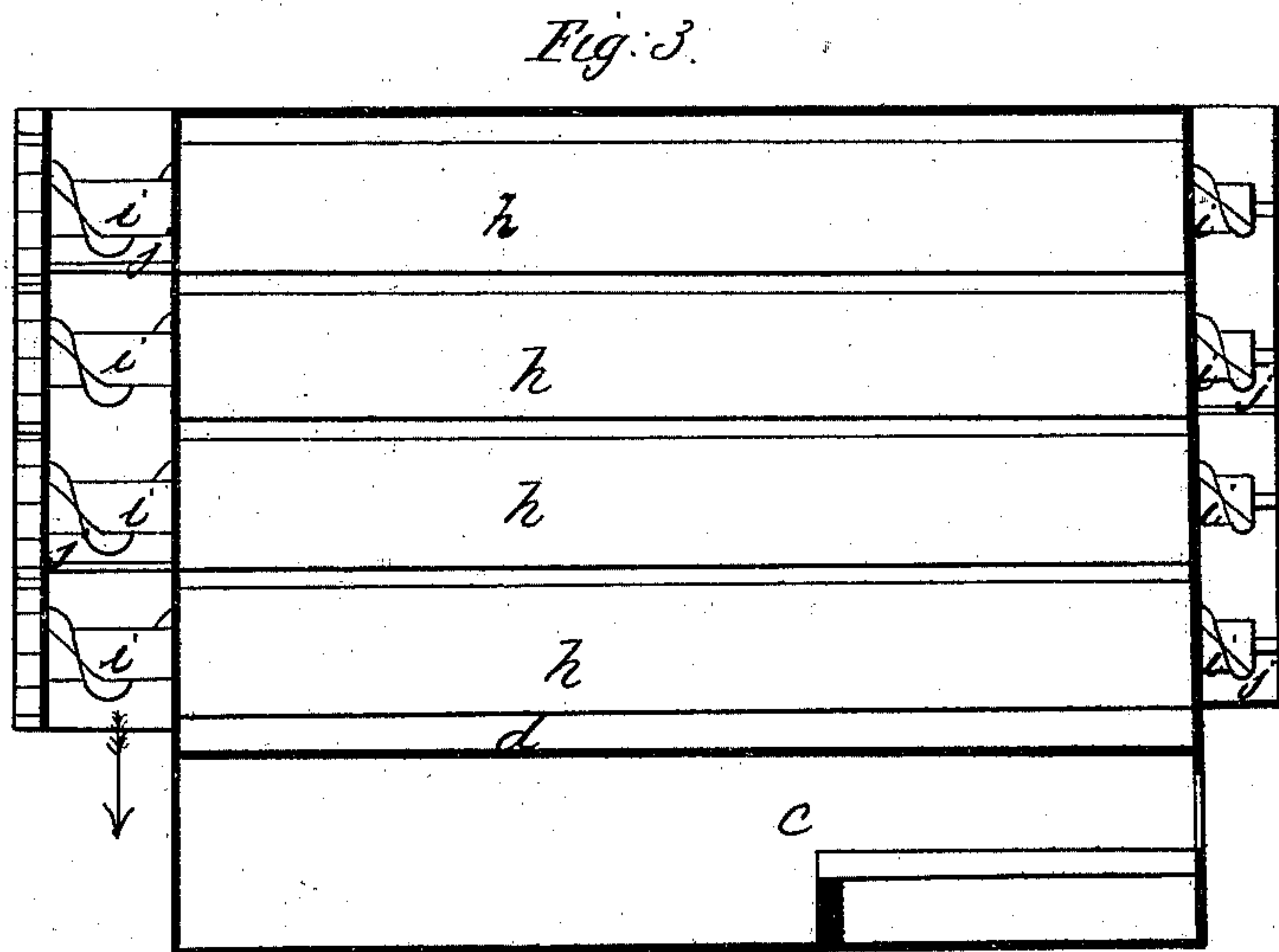
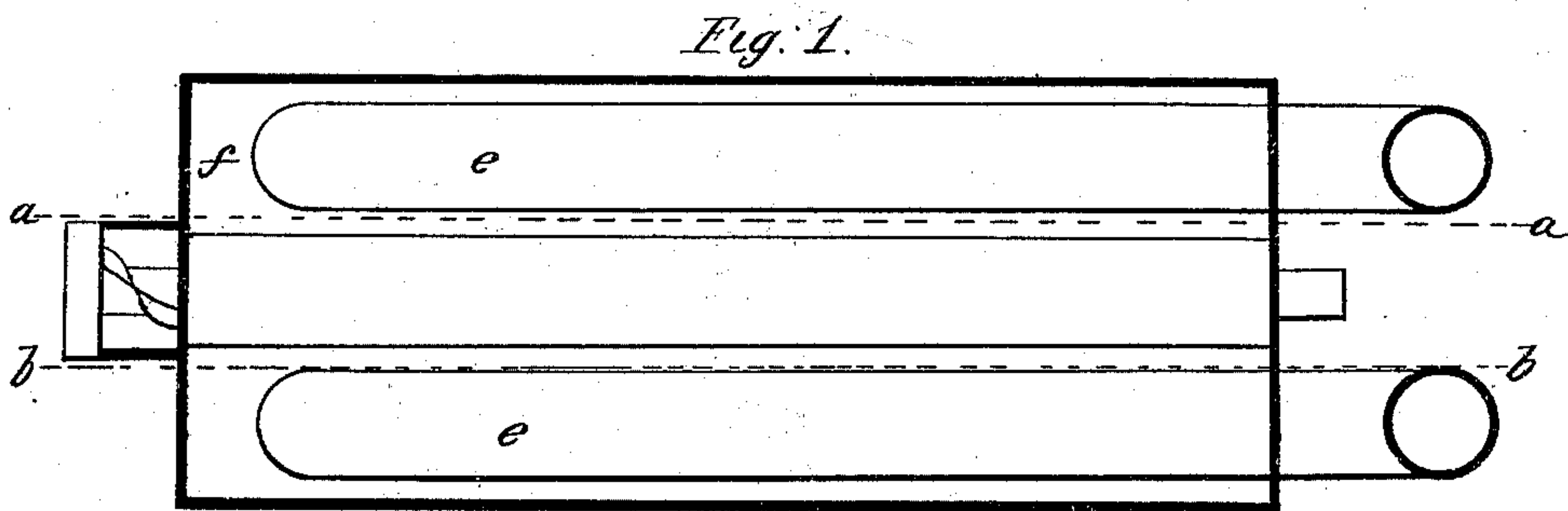
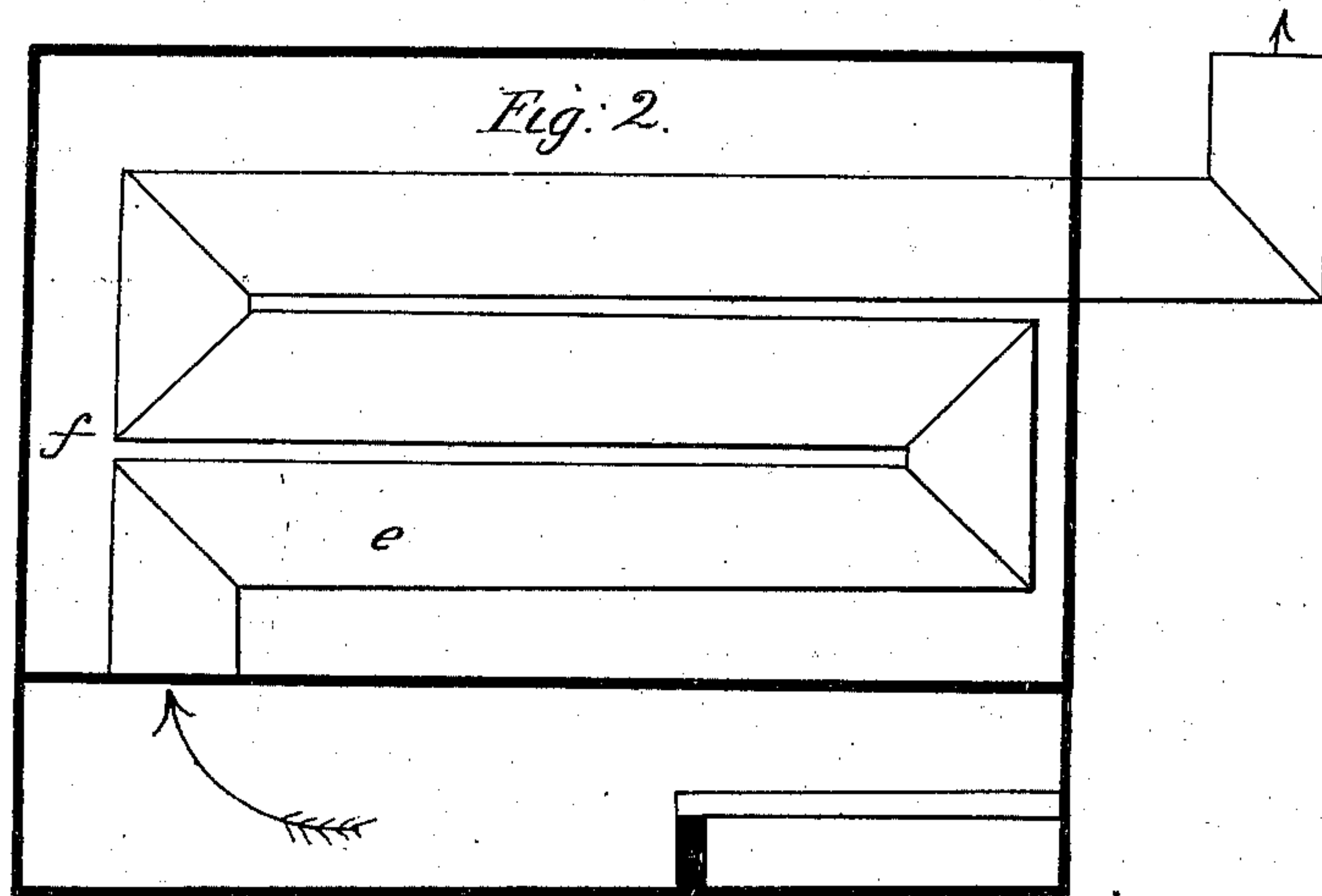


H. G. BULKLEY.
GRAIN DRIER.

No. 8,769.

Patented Mar. 2, 1852.



UNITED STATES PATENT OFFICE.

HENRY G. BULKLEY, OF KALAMAZOO, MICHIGAN.

GRAIN-DRIER.

Specification forming part of Letters Patent No. 8,769, dated March 2, 1852; Reissued June 27, 1854, No. 267.

To all whom it may concern:

Be it known that I, HENRY G. BULKLEY, of Kalamazoo, in the State of Michigan, have invented a new and useful apparatus 5 for kiln-drying grain, flour, lumber, &c., by means of an atmosphere of highly-heated steam used in a chamber without pressure.

The nature of my invention consists in constructing a cheap apparatus which makes 10 so much steam only as is necessary to keep the material to be kiln-dried from scorching and in using the escape heat to keep up the temperature of this steam atmosphere surrounding the case containing the article to 15 be dried for kiln drying rapidly.

The construction of my apparatus is as follows reference being had to the annexed drawings in which—

Figure 1, is a plan. Fig. 2, is a vertical 20 section in the plane *a, a*, Fig. 1. Fig. 3, is a vertical section in the plane *b, b* of Fig. 1.

In constructing the drier for kiln drying grain, flour, meal, &c., I make a box of any desirable size, (if portable of wood, if stationary of brick or other suitable material,) 25 of suitable proportions, say 8 feet long, 2 feet 4 inches wide and 3 ft. 6 inches high, more or less. The bottom of this chamber must be formed of sheet metal which also 30 extends up the sides to a sufficient distance to form a shallow pan (*d*) the whole size of the bottom. Beneath this pan or bottom there is formed in any ordinary way a fire chamber, as shown at (*c*), from which two 35 smoke pipes (*e*) rise, passing up on either side of the chambers of the articles to be dried and made so as to traverse the steam chamber (*f*) three or more times its length, after which it is conveyed off into a chimney or otherwise. The pan (*d*) above named 40 is filled with water to the depth of 6 or more inches, through which the smoke pipe enters the chamber. Through the center of the box or chamber (*f*) above named 45 there is a series of horizontal tubes (*h*) which pass clear through the box and pro-

ject out at either end if grain or meal, &c., is to be dried, which have a heating tube on either side. These grain tubes are all in the same vertical plane and the grain is put 50 into one end of the upper tube of the series, from whence it is conveyed through the box to the opposite end by means of a revolving screw conveyer (*i*) and emerges at the opposite end of the tube, whence it falls into 55 the receiver *j* at the end of the second tube and passes back again to the opposite end and again drops into the receiver of the third tube and so on through the series. The conveyers (*i*) are driven by any convenient power, the whole being geared together and the velocity being regulated at 60 pleasure, and thus any desirable per cent. of the moisture may be extracted with the same fire. To increase the power of the 65 machine multiply the tubes—either in height or in the no. of tiers, or both. When built to be used in a mill or warehouse it (the box) should be constructed of brick or stone and the top arched, which will make it safer from 70 fire than a common stove, since the smoke and heat are required to pass a considerable length, and turn several elbows, in a jet of steam.

In making the drier for lumber I make a 75 double box of wood of the size to hold 2 to 4 M. ft. and fill the spaces between the two with saw dust, tanbark, charcoal or some other nonconducting substance. The sheetiron pan is placed on an arch under 80 the middle and crosswise of the box, to which the floor slants or inclines, so that the condensed steam which falls upon the floor will return naturally to the boiler or pan and thus have a no. degrees of heat. The 85 smoke and heat pass through the sheetiron bottom or pan (as in the grain drier) into the box—and are then conducted a sufficient no. of times the length of the box near the bottom. The ends of the steam box should 90 be doors, so that a car may be loaded with lumber and by means of a track run into

the steam box and the whole steamed till
the sap is removed, and while very hot
should be run out the other end and another
car run into the steam box. By this process
5 no time is lost—the lumber is removed while
there is internal heat sufficient to expel
much of the moisture caused by the steam—
and precludes the necessity of going into the
hot steam chamber to remove the lumber.
10 The lumber on the car should be raised 18
inches or more above the heat pipes to pre-
vent its being scorched by them.

What I claim as my invention and wish
to secure by Letters Patent is—

The employment of an atmosphere of 15
steam surrounding the article to be kiln-
dried, and kept heated substantially in the
manner and for the purpose herein de-
scribed.

HENRY G. BULKLEY.

Witnesses:

GEORGE TORREY,
CHS. S. ARCAMBAL.

[FIRST PRINTED 1912.]