

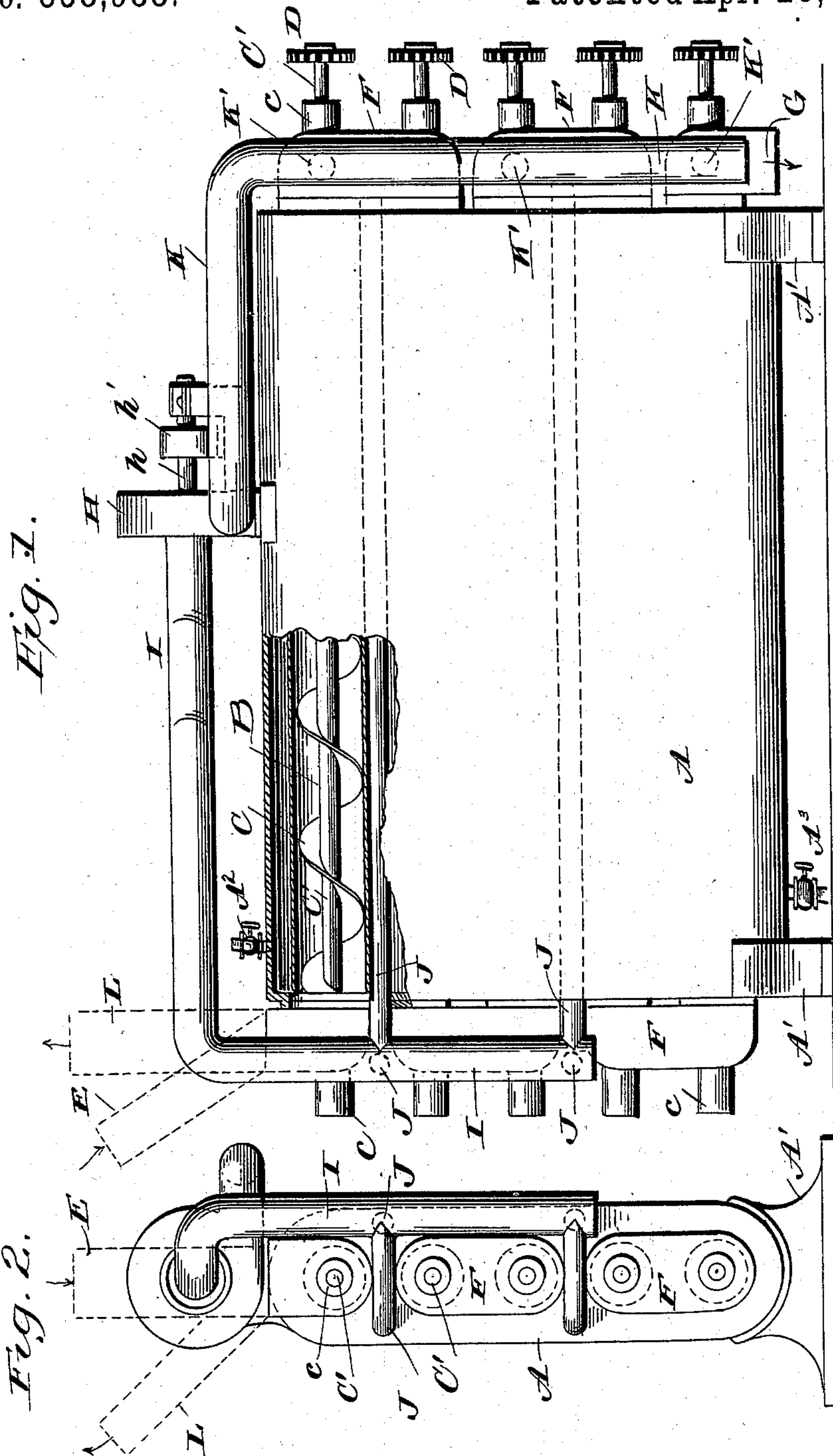
(No Model.)

2 Sheets—Sheet 1.

W. W. SANDERS.
GRAIN DRIER.

No. 558,988.

Patented Apr. 28, 1896.



Witnesses:
L. C. Hills,
E. H. Bond

Inventor:
Wm. W. Sanders,
by E. J. Stocking
Atty

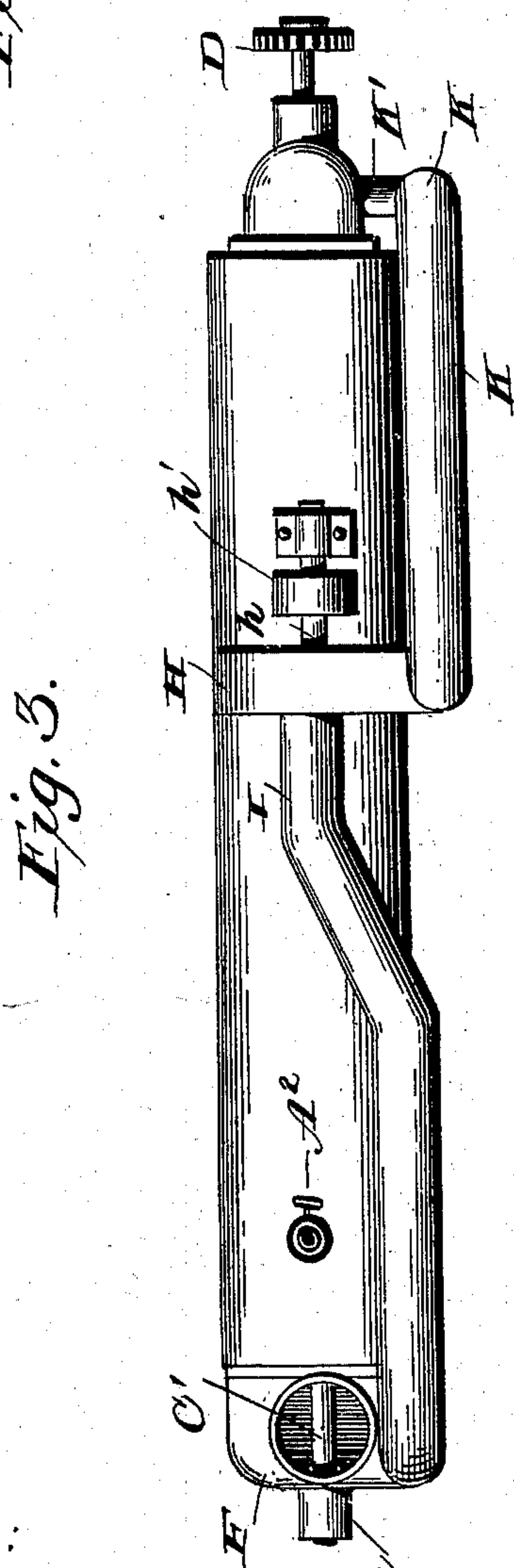
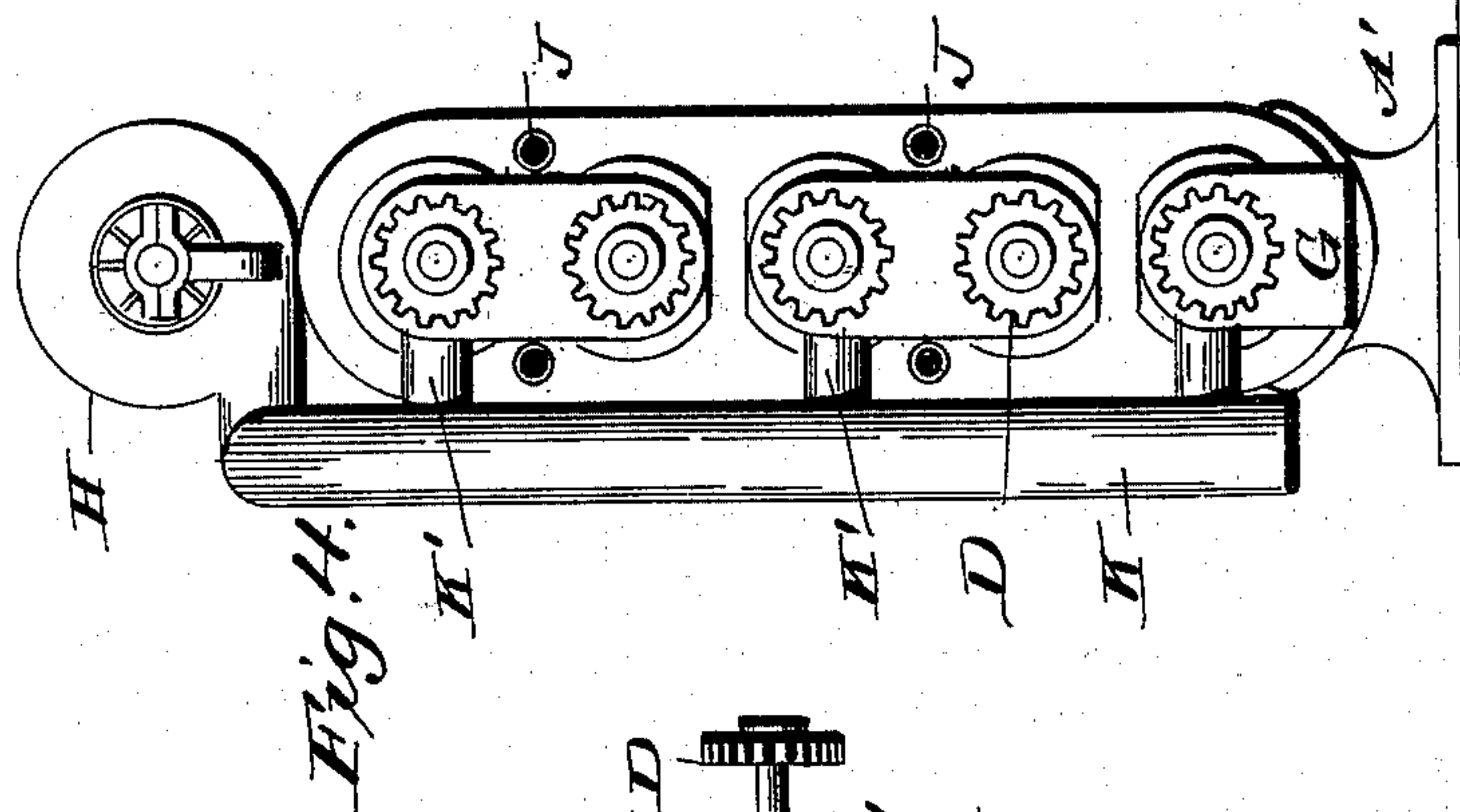
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UNITED STATES PATENT OFFICE.

WILLIAM W. SANDERS, OF CHATTANOOGA, TENNESSEE.

GRAIN-DRIER.

SPECIFICATION forming part of Letters Patent No. 558,988, dated April 28, 1896.

Application filed October 30, 1895. Serial No. 567,375. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. SANDERS, a citizen of the United States, residing at Chattanooga, in the county of Hamilton, State of Tennessee, have invented certain new and useful Improvements in Grain-Driers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in grain-driers of that class in which the grain is conducted into a heated casing and conveyed therethrough in alternately-opposite directions and dried during its passage to the exit-opening of the casing. It has for its object, among others, to provide a simplified and improved construction of grain-drier in which the greatest heat shall be at the point where the damp grain first enters the machine, instead of at the point where the grain is driest, as heretofore. I employ a casing within which are arranged the tubes and conveyers, the actuating mechanism of the latter being arranged outside of said casing, as are also the means for supplying hot air and the devices for causing a change in the direction of the flow of the grain to give it its alternately-opposite movements through the casing and subject it to the greatest amount of heat. The steam for heating is admitted at the top and in close proximity to the point of entrance of the grain into the machine. The hot air for drying the grain is caused to pass through the conveyer-tubes in the direction opposite to that traversed by the grain. I provide simple mechanism for accomplishing the desired end, the whole being constructed so as to occupy a minimum space and to render the device as a whole most efficient in operation and results.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

45 The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

50 Figure 1 is a side elevation of my improved drier with a portion of the casing broken away. Fig. 2 is an end elevation. Fig. 3 is

a top plan, and Fig. 4 is an elevation looking at the other end from that seen in Fig. 2.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the casing, mounted upon a suitable base A' and adapted to be heated by steam admitted thereinto from any suitable source and at any desired point, preferably through the pipe A², shown in Fig. 1 as entering the casing at the top in close proximity to the point of admission of the grain. A drain-pipe A³ is shown at the bottom of the casing for the outlet of the water of condensation. Within this casing are a plurality of tubes B, extending lengthwise thereof and mounted in the end walls of said casing, there being any desired number of such tubes, in this instance five, and within each tube is a spiral conveyer C, mounted to revolve therein by mechanism now to be described. The shaft C' of each conveyer is mounted in suitable bearings, as c, at the ends of the casing and at one end are extended, as seen best in Fig. 1, and provided with gears D, adapted to intermesh or to be driven in any suitable manner so as to cause the conveyers in the tubes to be driven in alternately-opposite directions, or if desired each alternate conveyer may have its blades oppositely disposed, so as to convey the grain in opposite directions in each two adjacent tubes.

E is the spout through which the grain is introduced into the uppermost tube B. At each end of the casing and arranged exteriorly thereof are the chambers or conduits F, which serve to afford communication between the adjacent ends of each two tubes, so that the grain as it passes from the one tube moving in one direction will be conveyed into the next tube of the series to be conveyed in the opposite direction, and so on until it passes from the lowermost tube out of the discharge-spout G.

H is a fan-casing within which is arranged a fan of any suitable construction, (see Fig. 4,) the shaft h of which is mounted in suitable bearings, and on said shaft is a drive-pulley h', adapted to be driven from any suitable source of power. (Not shown.)

I is a pipe or conduit extended over the top

of the casing A and communicating with the fan-casing, as seen in Figs. 1 and 3. This tube or conduit extends down at one end of the casing A, as seen in Figs. 1 and 2.

5 J are hot-air tubes passed through the steam-space of the casing A between the tubes B and communicating at the opposite end with the vertical portion of the tube or conduit I, being open at the opposite end of the
10 casing, as seen in Fig. 4.

K is a pipe or conduit leading from the fan-casing along the top of the casing A and down at the end opposite the vertical portion of the pipe I, as seen in Figs. 1 and 4.

15 K' are branch pipes affording communication between the vertical branch of the conduit K and the upper and each alternate tube B, as seen best in Fig. 4 and by dotted lines in Fig. 1.

20 L is a vent-pipe arranged exteriorly of the casing A and communicating with the upper tube B at the end adjacent to the inlet of the grain.

With the parts constructed and arranged
25 substantially as above described the operation is as follows: The steam having been admitted into the casing, so as to heat the same to the required degree, motion is imparted to the fan and to the conveyers and the grain is
30 fed into the uppermost tube through the spout E, and in its dampest condition is subjected to the utmost heat both from the steam arranged exterior of the tubes and the hot air within the tubes, which is forced through the latter
35 in a direction contrary to the movement of the grain. As the air is drawn in through the tubes J it becomes heated and is drawn up through the conduit I by the fan and forced through the conduit K and its branches K'
40 into the tubes and through the same, and thus drying the grain most thoroughly. The forcing of the hot air through the tubes or flues in an opposite direction to the way the grain is passing serves to drive out all moisture or
45 condensed air or steam arising from the dampness in the grain. Thus the grain is at all times kept in direct contact with dry hot air. The hot air after having passed through the tubes is forced out through the vent-pipe.

50 Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages. Any suitable register or indicator may be employed for the purpose of regulating the heat
55 to any desired degree in order to make the machine entirely under the control of the operator at all times, so as to increase or decrease the heat as the condition of the grain may demand.

What I claim as new is—

1. The combination with the heated casing and the grain-tubes, and conveyers in said tubes, of the hot-air pipes in said casing, conduits extending in opposite directions from the fan-casing, and one of which is connected
60 with said hot-air pipes, and the branch pipes connecting one of said conduits with the hot-air pipes; substantially as described.

2. The combination with the heated casing and the grain-tubes and conveyers therein, the hot-air pipes, the fan-casing, and fan, the conduits leading in opposite directions therefrom, the hot-air tubes, connected with one of said conduits, and passed through the casing, and the branch pipes connecting the
70 other conduit with each alternate grain-tube; substantially as described.

3. The combination with the heated casing and the grain-tubes and conveyers therein, the hot-air pipes, the fan-casing, and fan, the conduits leading in opposite directions therefrom, the hot-air tubes, connected with one of said conduits, and passed through the casing, and the branch pipes connecting the other conduit with each alternate grain-tube,
80 and a vent-pipe communicating with the upper grain-tube adjacent to the grain-inlet; substantially as described.

4. The combination with the heated casing, and the grain-tubes, and conveyers in said tubes mounted to be driven alternately in opposite directions, of the hot-air pipes in the casing, the fan, the conduits leading therefrom and communicating therewith, the branch pipes connecting one of the conduits
90 with the hot-air pipes, and a vent-pipe through which the hot air is driven after its passage through said grain-tubes; substantially as described.

5. The combination with the heated casing, and the grain-tubes, and conveyers in said tubes mounted to be driven alternately in opposite directions, of the hot-air pipes in the casing, the fan, the conduits leading therefrom and communicating therewith, the branch pipes connecting one of the conduits with the hot-air pipes, and a vent-pipe through which the hot air is driven after its passage through said grain-tubes, the hot-air pipes connecting with one of said conduits and leading
100 eccentrically through the grain-tubes; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM W. SANDERS.

Witnesses:

T. G. MONTAGUE,
A. W. JOHNSON.