

(No Model.)

2 Sheets—Sheet 1.

S. L. HUIZER.
APPARATUS FOR DRYING COFFEE, &c.

No. 483,923.

Patented Oct. 4, 1892.

Fig. 1.

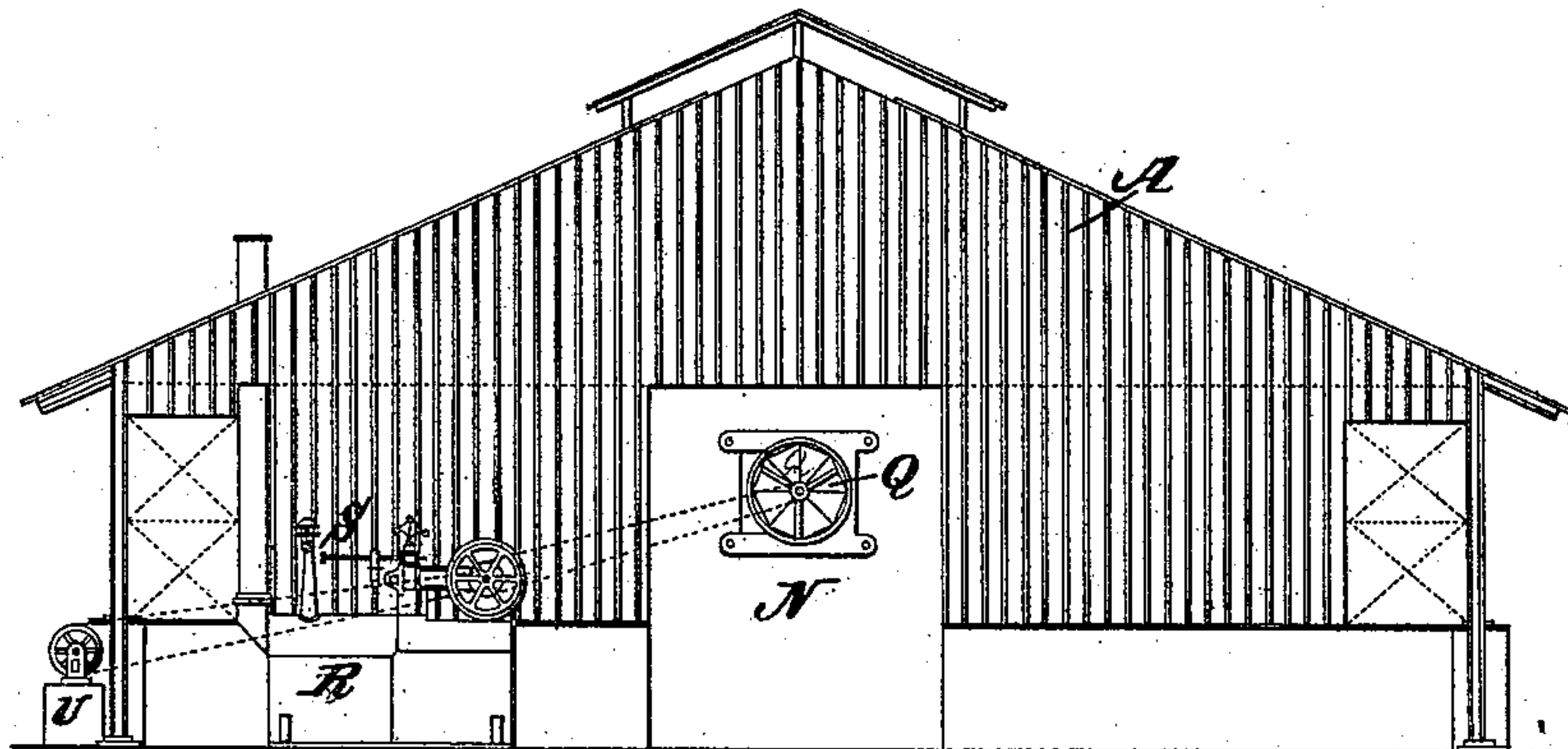


Fig. 2.

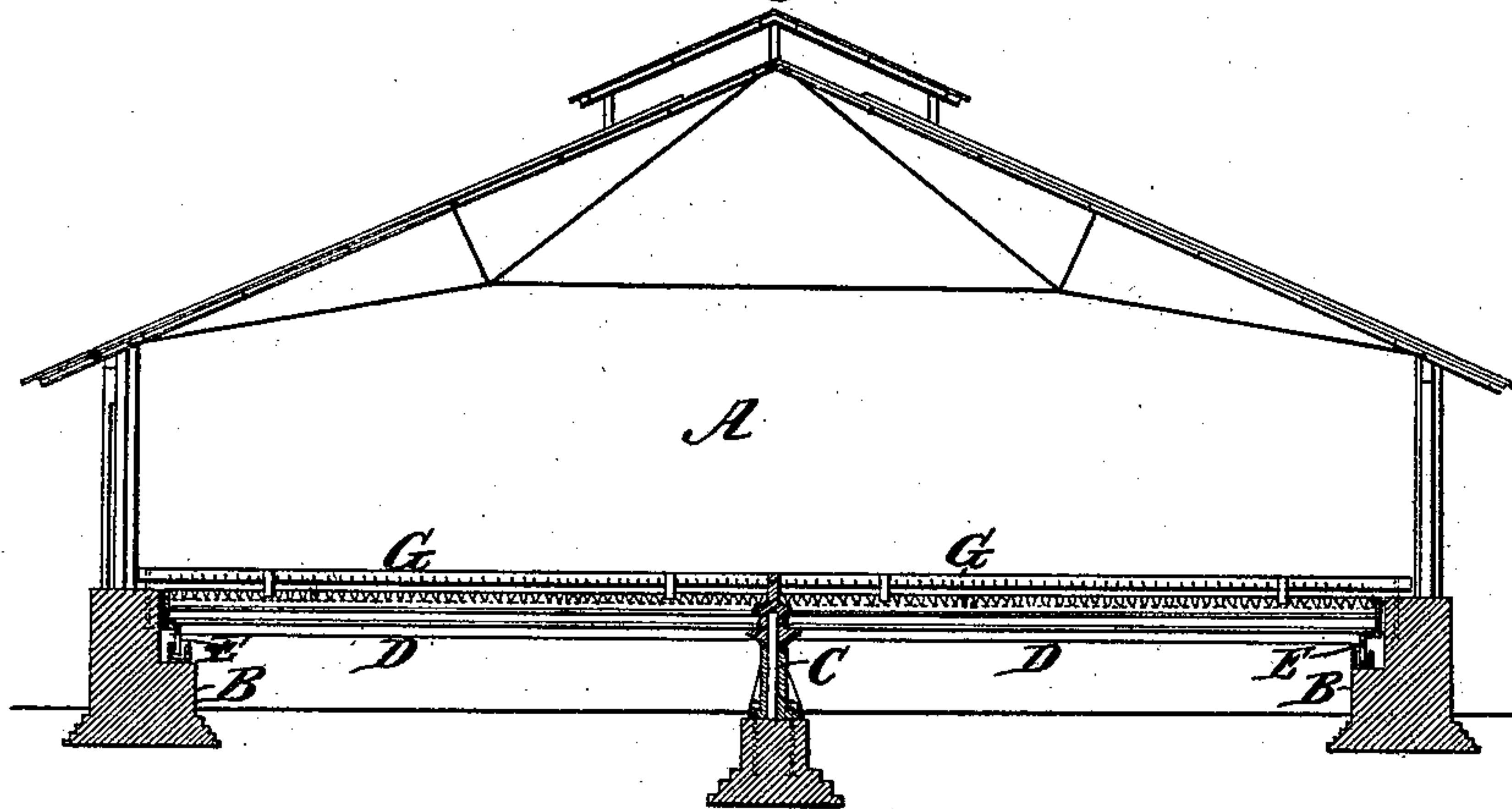


Fig. 5.

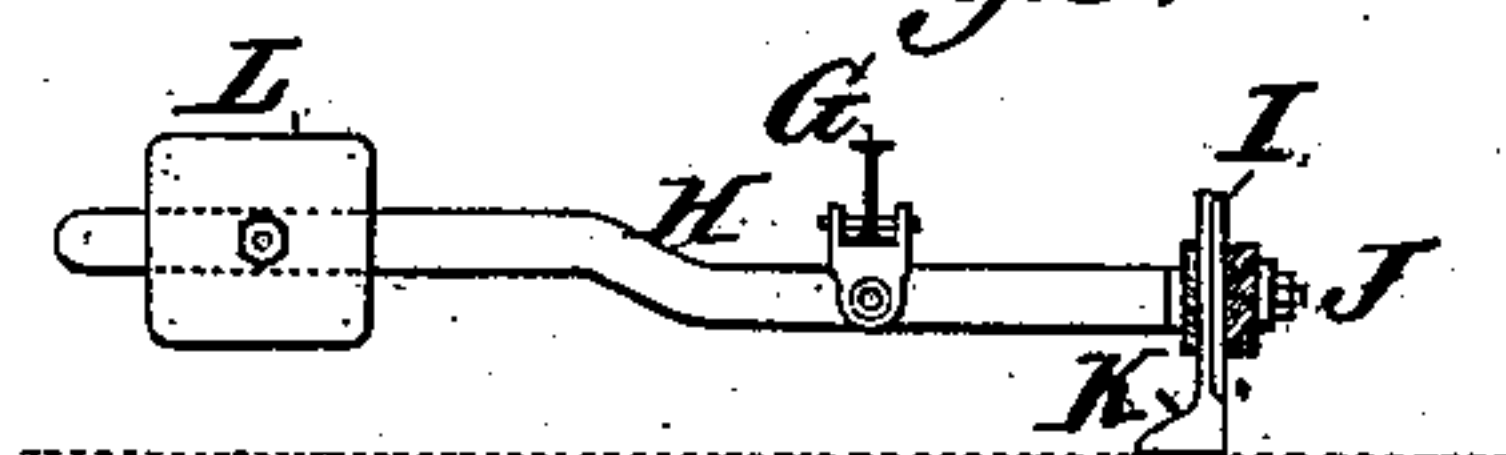
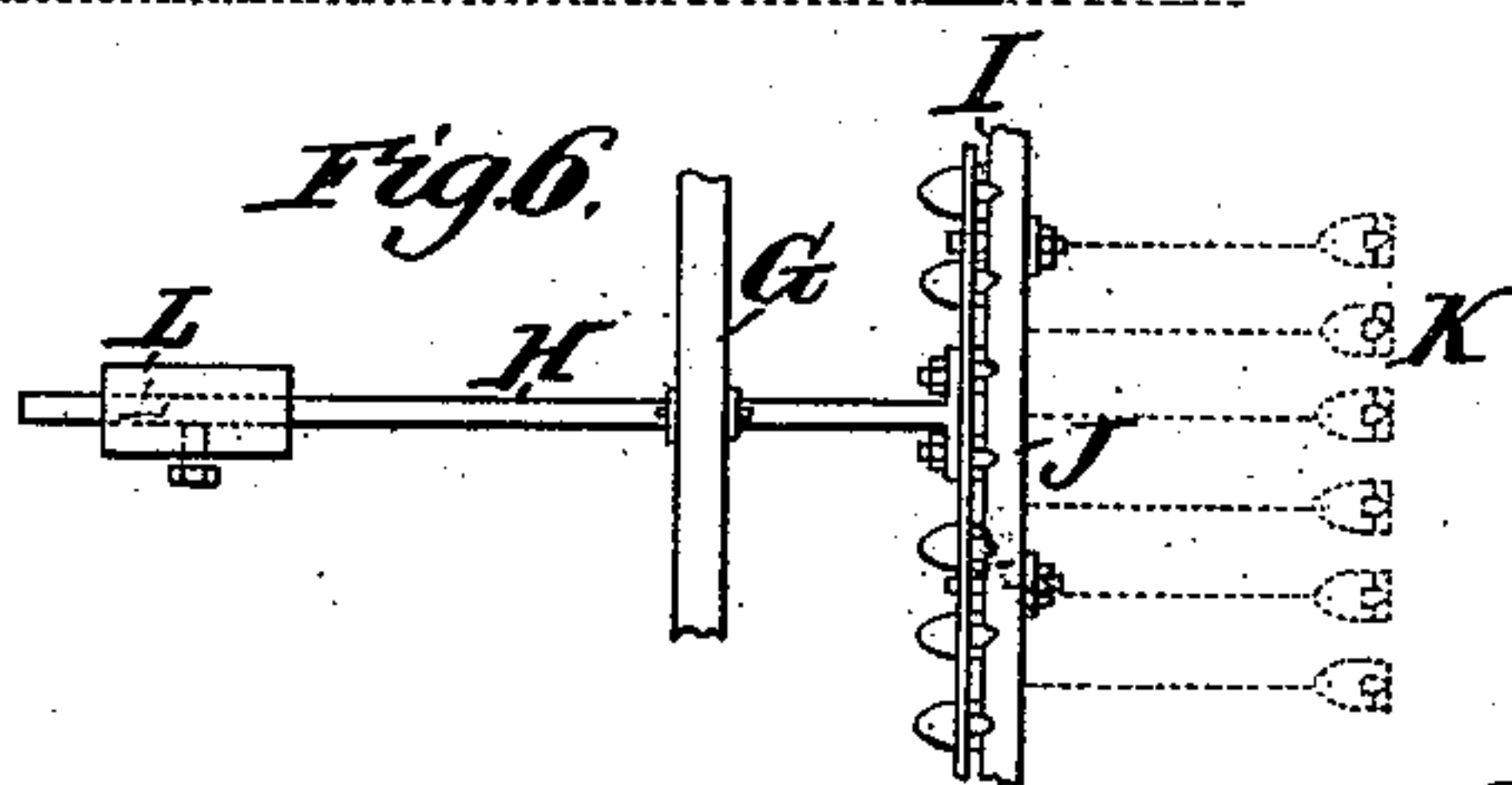


Fig. 6.



Witnesses:
J. A. Rutherford
Robert Coe
Inventor:
Samuel L. Huizer
By James W. Norris
Attorney

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Fig. 3.

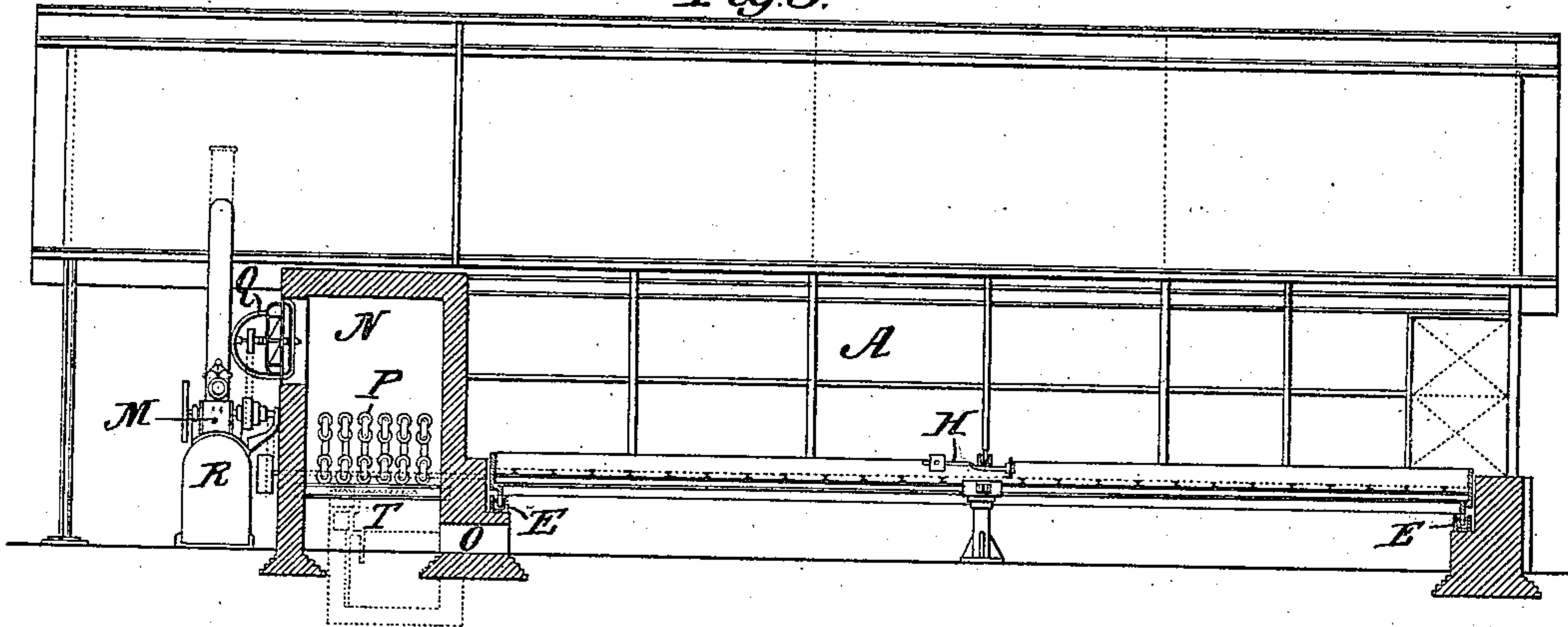
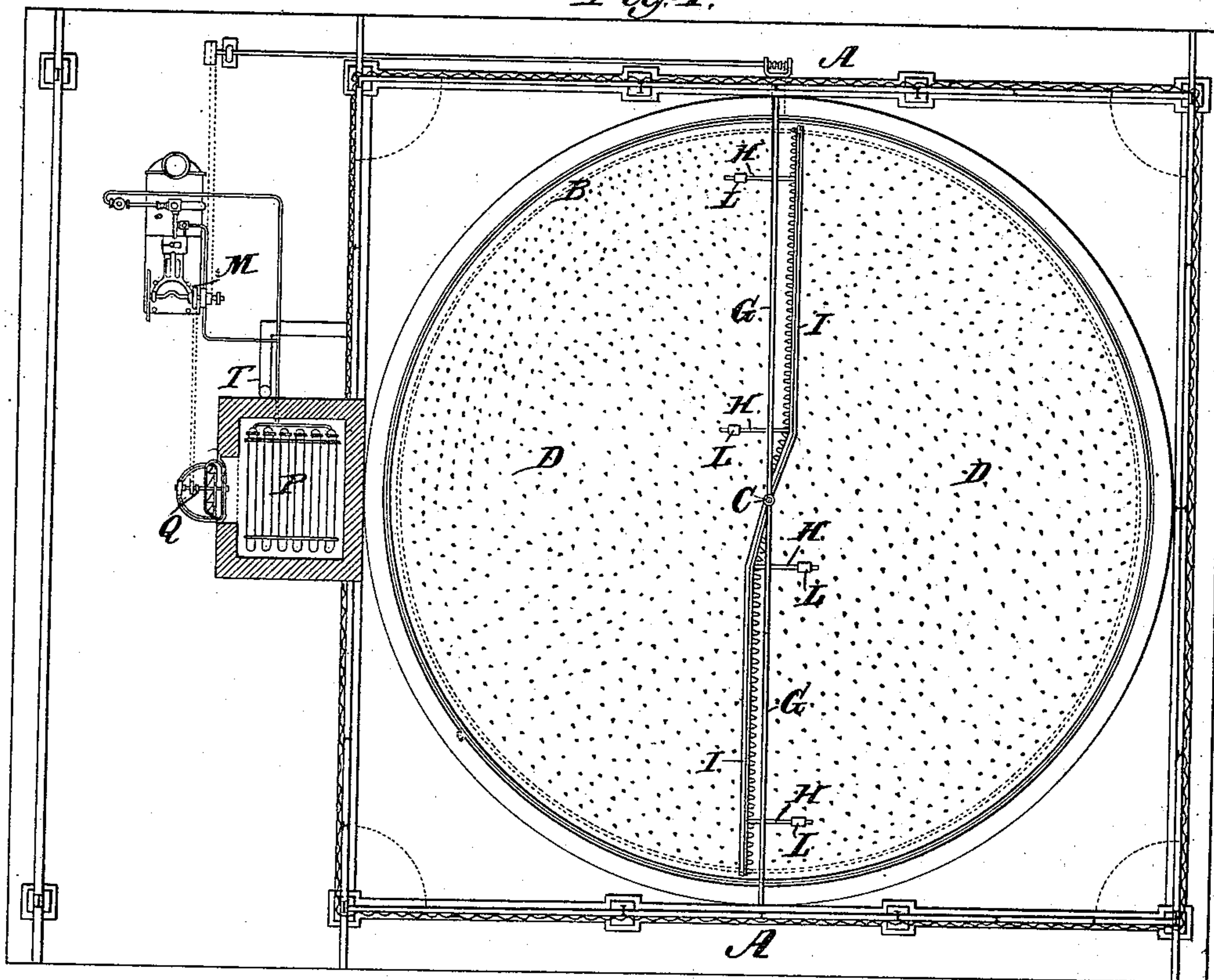


Fig. 4.



Witnesses:
J. A. Rutherford
Robert Bonnett

Inventor:
S. L. Huizer
By Samuel L. Norris,
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL LEENDERT HUIZER, OF THE HAGUE, HOLLAND.

APPARATUS FOR DRYING COFFEE, &c.

SPECIFICATION forming part of Letters Patent No. 483,923, dated October 4, 1892.

Application filed September 10, 1891. Serial No. 405,354. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL LEENDERT HUIZER, engineer, a subject of the Queen of Holland, and a resident of 180 Riouwstraat, The Hague, in the Kingdom of Holland, have invented certain new and useful Improvements in and Relating to Apparatus for Drying Coffee, Cocoa, Pepper, and the Like, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to apparatus for drying coffee, cocoa, pepper, and the like.

The apparatus—such as those hitherto employed on plantations for drying large quantities of coffee, cocoa, pepper, and the like—present more or less serious inconveniences, especially when they are entrusted to unskilled and inexperienced people, as is generally the case on plantations. The cause of this is that the drying is effected by an open fire by which it is extremely difficult to dry properly without the temperature becoming higher than that which the produce is able to bear without injury to its quality. Moreover, in most of the drying apparatus manual labor is continuously required for stirring the produce, in order to effect a uniform heating of the entire material. This work, when done without exercising sufficient care, may occasion the deterioration and even the loss of the produce. I have found that great advantages may be obtained by the employment of a current of hot air passing slowly through a layer of the produce or by the employment of a perforated circular bottom upon which the produce is spread, or of devices for automatically turning over the produce during the drying.

In the accompanying drawings I have shown how my said invention may be conveniently and advantageously carried into practice.

Figure 1 is an elevation of the improved apparatus. Fig. 2 is a transverse section of the latter. Fig. 3 is a longitudinal section of the same. Fig. 4 is a plan thereof, the roof being removed. Figs. 5 and 6 are an elevation and plan of the mixing device of the apparatus.

In the several figures similar letters of reference indicate corresponding parts of the apparatus.

According to this invention I provide a building A, preferably constructed of metal and having a roof with means for ventilation. In the sides of the building are openings for the doors and for the necessary ventilation. In the interior of the building is a small circular wall B, upon which rollers E are mounted in stirrups fixed to the wall. A perforated metallic bottom D, turning upon a pivot C, is adapted to move on the said roller. For this purpose the bottom is provided above with a rail cast in one piece with the circular frame of the said perforated bottom and bearing constantly upon the rollers E. Upon a vertical part of the above-mentioned small wall B are fixed two or more girders G, held at the center upon the head of the pivot C. From each girder is suspended by means of equilibrated levers H a so-called "rake" I, formed by a bar J of wood or iron, to which are fixed wooden teeth K at uniform distances from each other. These teeth have at their lower parts the form of double plowshares and are prolonged to the perforated bottom. In order to prevent the teeth rubbing too much against the said bottom, the rakes are kept balanced by means of counter-weights L, mounted upon the levers H. The rotation of the perforated bottom takes place through the medium of a transmitting-gear set in motion by a small steam-engine or other suitable motor. In some instances I effect the transmission of the movement through the medium of a worm, which engages with a worm-wheel acting in its turn upon a gear cast in one piece with the circular frame of the perforated bottom. When the latter rotates, the material by reason of the rakes is several times turned over, and the teeth are arranged in such a manner that the same furrows are never followed by the teeth of the two consecutive rakes, as is shown in Fig. 3, where the path traveled by the second rake is indicated in dotted lines.

At the exterior of the building and bearing directly against one of the walls of the latter is provided a chamber N, communicating through openings with the space below the perforated bottom. I place in this chamber a heating device P, while in an opening provided in the front wall of the said chamber is mounted a fan Q, set in motion by the motor which actuates the perforated bottom.

motor is a steam-engine and when the heating is effected by steam, the boiler R feeds this motor and the heating device at the same time.

5 The proportion between the heating-surface of the heating device and the effectiveness of the fan is such that the temperature of the heated air in the normal state shall be lower than that which might deteriorate the pro-
10 duce to be dried. Moreover, in cases where the heating is effected by steam the heating apparatus is provided with devices for automatically regulating the admission of the steam in accordance with the temperature
15 which is to be maintained. Should the heating take place by the products of combustion the device is furnished with means for enabling the draft to be suitably regulated. By this arrangement I entirely obviate any liability to
20 injury of the produce by too high a temperature.

My improved apparatus is set in operation in the following manner—that is to say: The fresh produce is spread in the form of a uni-
25 form layer upon the perforated bottom after steam has been generated in the boiler. In order to facilitate this operation, the bottom is set in motion while the workmen spread the material. After the bottom has been cov-
30 ered with material the doors are closed, the stirring of the produce being effected entirely by the rake. By this means the stealing of any produce is obviated during the drying, and the stirring takes place so as to
35 preclude any deterioration. Then the fan is set in motion and steam admitted into the heating device; or, in case the heating takes place by the products of combustion, the fire is lighted in the apparatus. The cold air
40 which is forced into the heating-chamber N by the action of the fan impinges against the surfaces of the heating device and is heated to a high temperature. By reason of the operation of the fan this hot and dry air
45 is sent through the above-mentioned opening O into the space below the perforated bottom, then through the latter, and the produce spread upon this bottom. Owing, more-
50 over, to the great quantity of air which this fan supplies the air is uniformly distributed over the entire surface of the bottom and passes through the produce at every point. As the bottom revolves at the same time in a continuous manner, the produce constantly
55 shifts its place and is turned over under the action of the fixed rakes in such a manner that a complete and uniform drying of the

whole material takes place without any necessity for giving the least attention to it. Owing to the continuous passage of hot air the
60 latter, after it has passed through the layer of the produce, escapes to the exterior through openings provided for this purpose in the roof and in the walls or partitions of the building, even when by the humidity of the
65 produce the temperature of this air has been lowered to that of the exterior air. Accordingly, the temperature imparted to the air by the surfaces of the heating device does not require to be higher than that which is neces-
70 sary for the proper drying, so that the quality of the produce shall not be injured nor any loss of hot air shall take place.

No part of the apparatus is subjected to much wear, and the cost of keeping it in or-
75 der is very small. This drying apparatus, therefore, acts without liability to deterioration of the material by too high a temperature or by too abrupt action, as has heretofore been the case, and this result is obtained
80 by a minimum of manual labor, attendance, consumption of fuel, wear, and maintenance, independently of the little experience required by the workmen.

The arrangement of the drying apparatus
85 hereinbefore described may be variously modified to adapt the same to the nature of the produce to be dried, especially as regards the employment of the devices for heating by steam or air and the number and arrange-
90 ment of the fans.

What I claim is—

In an apparatus for drying coffee, cocoa, pepper, and the like, the combination, with perforated rotating floor, of the stationary
95 girders G, levers H, pivoted to said girders, rakes having plowshare-shaped shoes secured to one end of said levers, a counterbalance-weight secured to the other end of said levers, an air-heating chamber communicat-
100 ing by a passage with the space under the perforated floor, a fan for supplying air to said heating-chamber, and means, substantially as described, for operating said fan and
105 for moving said perforated rotating floor, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SAMUEL LEENDERT HUIZER.

Witnesses:

H. MAKKIE,
WALTER E. GARDNER.