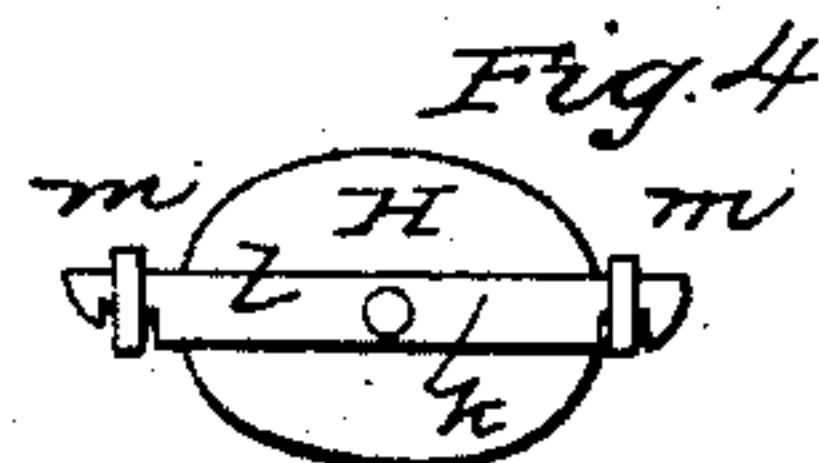
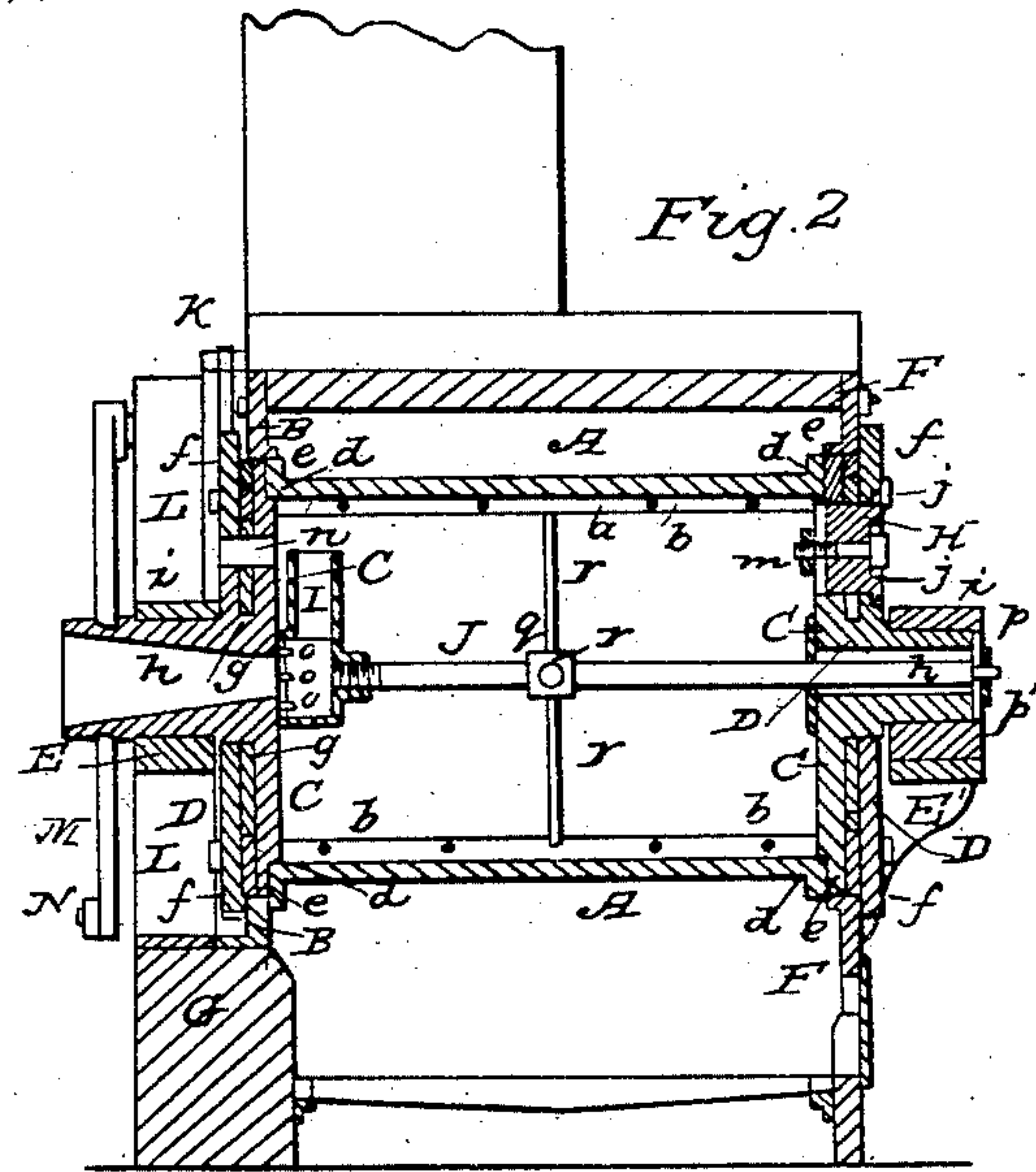
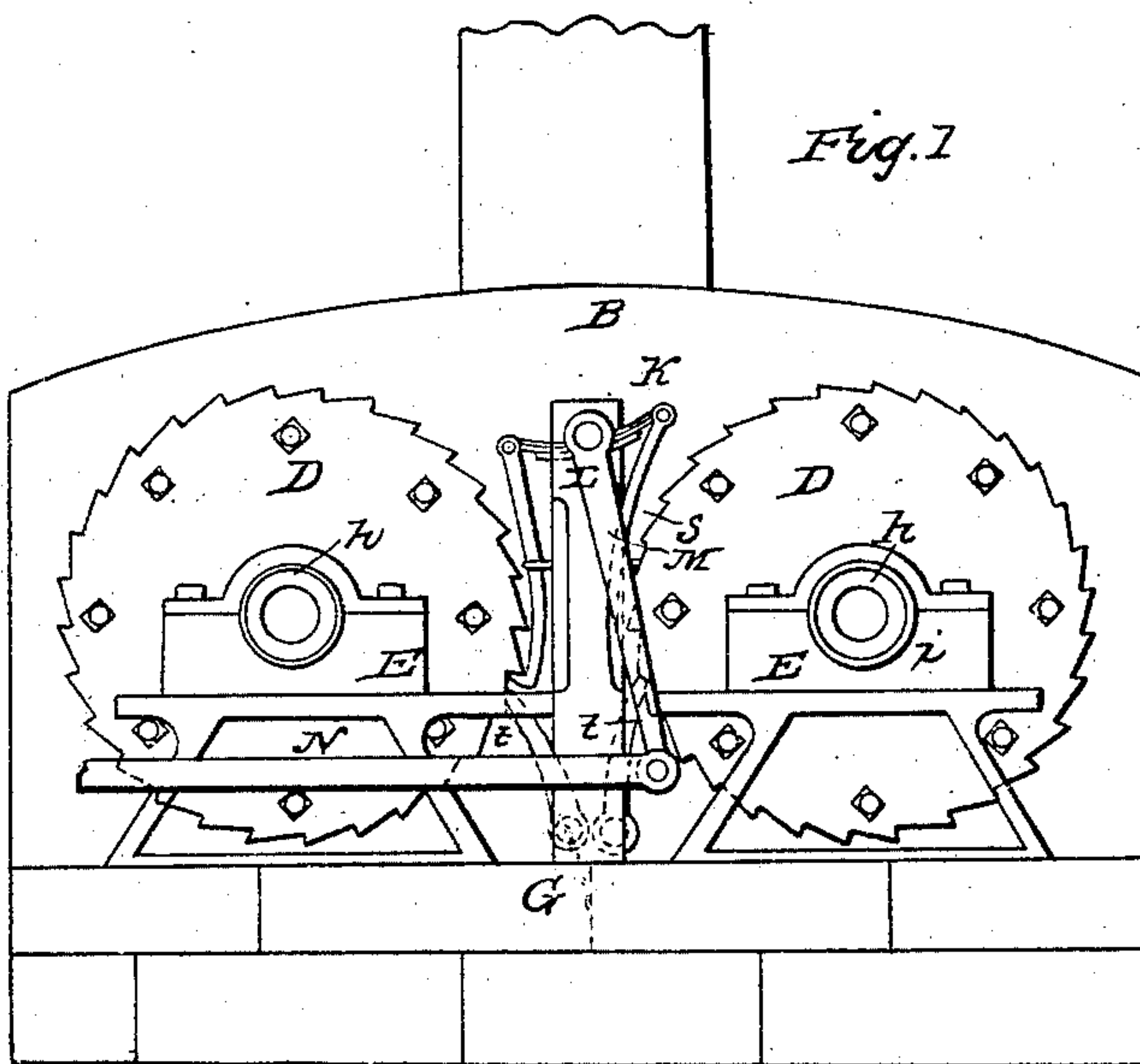
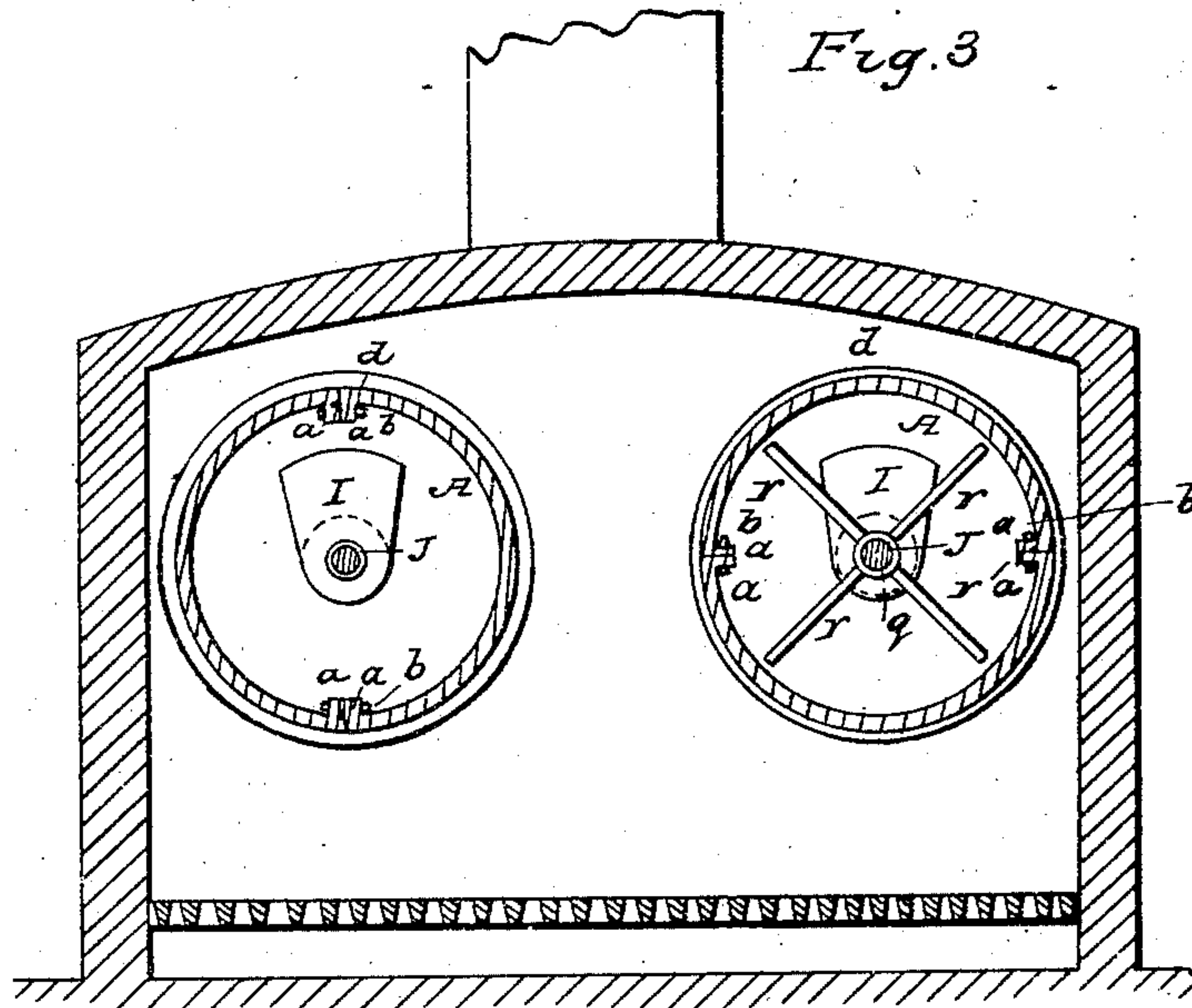


J. GILLESPIE.

Oil Still.

No. 23,362.

Patented March 29, 1859.



WITNESSES
Chas. B. Gillespie
W. B. Daugherty.

INVENTOR
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UNITED STATES PATENT OFFICE.

JAMES GILLESPIE, OF FREEPORT, PENNSYLVANIA.

IMPROVEMENT IN REVOLVING RETORTS FOR DISTILLING COAL-OIL.

Specification forming part of Letters Patent No. 23,362, dated March 29, 1859.

To all whom it may concern:

Be it known that I, JAMES GILLESPIE, of Freeport, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Revolving Retorts for Distilling Coal; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a back end elevation of a pair of retorts with my improvements. Fig. 2 is a vertical central section of one of the said retorts. Fig. 3 is a transverse vertical section of two retorts and their furnace. Fig. 4 is an inside view of the door of one of the retorts.

Similar letters of reference indicate corresponding parts in the several figures.

This invention is principally applicable to the manufacture of coal-oil, but may also be applied to the distillation of coal or other substances to obtain other products. It consists in certain means of keeping the mouth of the eduction-pipe of a revolving coal-oil retort stationary in the upper part of the retort, and thereby preventing as far as is practicable the entrance thereinto of solid matters.

To enable others skilled in the art to make and use my invention, I will proceed to describe it.

The body of each retort is of cylindrical form, composed of two sections, A A, each of which is of semi-cylindrical form, and is provided with two internal flanges, *a a*, which serve to receive the bolts *b b*, by which the two parts are secured together, said flanges, when the two sections are bolted together, constituting projecting ribs extending the whole length of the interior of the retort, and serving to assist in carrying up the coal some distance from the bottom of the retort as it rotates.

Instead of being made of only two sections, the body of the retort may be made of as great a number as may be convenient or desirable. Flanges *d d* are also formed on the ends of the sections A A, for the attachment of the heads of the retort. The heads are each made of an inner plate, C, and an outer plate, D, (see Fig. 2,) each of which plates may be made in one piece or in two or more sections. The inner plate, C, of each head is formed to fit the interior of the body, and with a flange, *e*, to fit and be secured by bolts to the end flanges, *d d*,

of the body. The outer plate, D, is made sufficiently larger than the inner one to leave a broad flange, *f*, all round it, and the two plates are secured to the flanges *d d* by the same bolts, or by two series of bolts. A cavity is also intended to be left between these plates, to receive a filling, *g*, Fig. 2, of clay or other non-conducting material, to prevent as far as practicable the radiation of heat from the heads of the retort which are exposed. The journals *h h'* of the retorts are cast with the inner plates of the heads, or are otherwise secured to the heads, both journals being hollow, and those *h* at the back serving as a means of exit for the vapors. All the joints in the retort must be well calked with iron-cement.

The front F and back B of the furnace are made of iron plates firmly secured and stayed together, and are provided with openings of suitable size to admit the flanges on the bodies of the retorts. The flanges *f f* left on the outer plates are made to fit as closely as practicable to the exterior of the plates F and B, to prevent as far as possible any flashing out of the flame, and escape of the heat from the furnace, and an inward draft of air round the retort. The journals of the retorts are supported in plumber-blocks *i i*, which may be supported on a framing, E, erected upon the foundation-work G, independently of the back and front plates of the furnace, or upon shelves E', bolted to the back and front plates. The former method of support is illustrated at the back of the furnace and the latter at the front.

In the front head of each retort is the door H, Figs. 2 and 4, which is opened for charging the retort and withdrawing the residuum of distillation, the former operation being performed while the said door is above the center of the retort, and the latter while it is in the lowest possible position. This door is made with a surrounding-flange, *j*, which fits into a recess provided for it in the outer plate, D, of the head, so that the said door, when closed, is flush with the outside of the head. This door is secured, when closed, by a screw-bolt, *k*, passing through its center and screwing into a strong bar, *l*, which is placed across the interior of the opening in the head which receives the door, the ends of which bar are received in notches formed in two lugs, *m m*, Figs. 2 and 4, cast with or attached to the head on opposite sides of the opening. This bar *l* can be put in its

place before the door is put in, and when the door is subsequently put in and the screw-bolt put through it and screwed into the bar *l* the door is made perfectly secure. When the screw-bolt is taken out, the door can be removed and the bar turned out of the lugs and withdrawn through the openings, so as not to interfere with the operations of charging and discharging the retort. A recess should be provided in the exterior of the door for the head of the bolt *k*; or the whole of the door should be so far received into the retort-head that the bolt will not project beyond the general surface of the exterior of the retort-head, and hence not prevent the bearing for the journal of the retort being brought quite close to the retort-head, which cannot be done with any of the ordinary fastenings for man-holes or doors of similar character.

Opposite to the door *H* there is a small opening, *n*, in the back head of the retort, through which to introduce into the retort a rod with a screwed end, to which is screwed a rake inserted through the door *H*, for the purpose of raking the coal toward the back of the retort and distributing it evenly from back to front as it is charged through a stationary or movable hopper arranged in front of the door *H*. The rake and hopper are not shown in the drawings. When the whole charge is put in and leveled, the rake is unscrewed from its rod and withdrawn at the door *H*, and the rod drawn out through the opening *n*, which is then closed by a plug.

To provide for the filling of the retort up to or above the hollow journal *h* (which, as before described, also constitutes the exit-pipe for the vapors) without any danger of the coal passing through said journal, and also to exclude from the said journal the dust caused by the agitation of the charge, I fit to the inner opening of the said journal a hopper-like cup, *I*, Figs. 2 and 3, whose mouth, which forms the only means of communication from the interior of the retort to the journal, is near the top of the retort, said cup *I* being stationary during the revolution of the retort. The said cup is supported partly by resting on a number of stationary pins, *o o*, projecting inward round the inner orifice of the journal *h* and entering the throat of the said cup, and partly by being screwed onto or otherwise secured to a shaft, *J*, which runs through the center of the retort, and which passes through the front journal, *h'*, outside of which journal a plate, *p*, is employed, to prevent the said shaft moving forward or turning said plate, which is bolted to the plumber-block of the journal, having a square hole in it to fit a square, *p'*, on the end of the shaft, and the shaft having a shoulder inside the plate.

To avoid the necessity of making the shaft *J* very heavy, and yet to prevent its being bent by the coal striking it, I fit the said shaft with a loose hub, *q*, having attached to it a

series of arms, *r r*, the ends of which bear against the sides of the retort and support the hub in the center thereof.

To provide for effecting the revolution of the retorts, the back outer flange, *f*, of each is formed with ratchet-teeth upon its periphery, as shown in Fig. 1, the two retorts having their teeth set opposite ways, that they may be operated upon by two pawls, *s s*, attached to a short rocker, *K*, one of the journals of which is supported in a bearing in the plate *B*, and the other in a bearing in a standard, *L*, erected on the foundation *G*. The rocker *K* has attached to it an arm, *M*, which is connected by a rod, *N*, with the steam-engine or other motor. The operation of the rocker and its pawls is such as to produce an intermittent rotary motion of the two retorts, which are moved one at a time, each in its turn, thereby economizing power. A stop-pawl, *t*, is applied in combination with each retort to operate on the ratchet-teeth to stop it, but the motion given by the pawls *s s* is such that the teeth upon which the stop is next to act is moved some distance beyond the stop, and has to be brought back against the stop. The weight of the coal in the lower part of the retorts will always effect this backward movement, for, although the coal rolls by gravitation toward the bottom of the retorts as they are rotated, such gravitating action is not quick enough to prevent a slight return movement of the cylinder by the same force, if such return is permitted by the arrangement of the stop-pawls. The sudden stoppage of the return movement by the stop-pawls produces a jarring action upon the whole charge, and changes the position of almost every particle of the coal, and thus presents new surfaces of coal to the action of the heat. The said return movement also helps to start the other retort. Several pairs of retorts may be combined by a similar ratchet-motion, that only one retort may be moved at a time, and thus a great economy of power effected.

To prevent any injurious effect on the revolving mechanism, the arms of the rocker *K*, to which the pawls *s s* are connected, are made of tempered steel, and in the form of a semi-elliptic spring.

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

Securing the hopper-like cup *I* in position by means of the pins *o o* or their equivalents, surrounding the exit-journal *h* of each retort, the square-headed shaft *J*, passing through a hollow journal at the opposite end of the retort, and the external plate, *p*, the whole applied and operating substantially as herein specified.

JAS. GILLESPIE.

Witnesses:

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W. B. DAUGHERTY.