

No. 615,451.

Patented Dec. 6, 1898.

J. L. HASTINGS.
COAL FEEDER FOR GAS PRODUCERS.

(Application filed June 11, 1897.)

(No Model.)

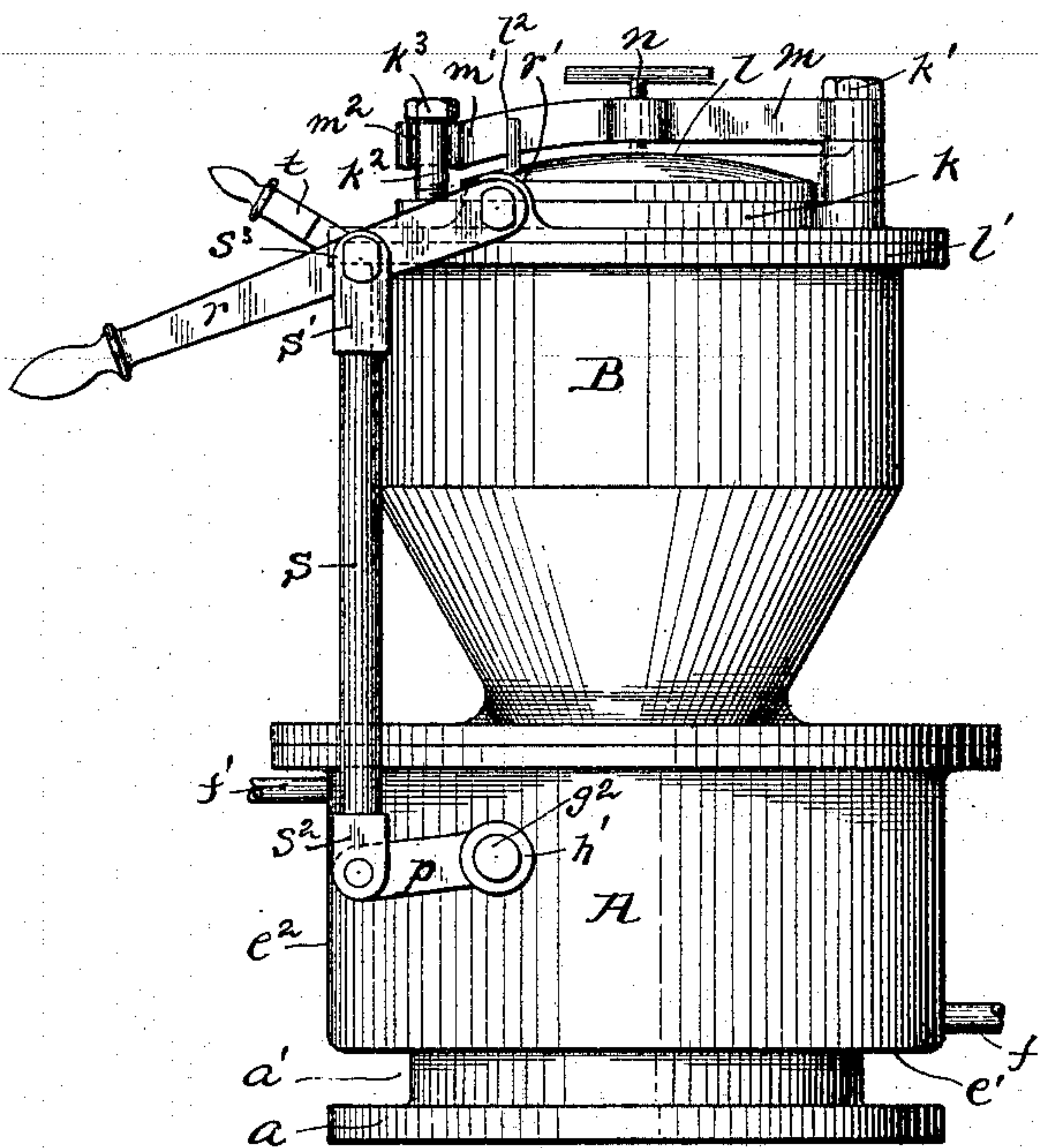


Fig. 1.

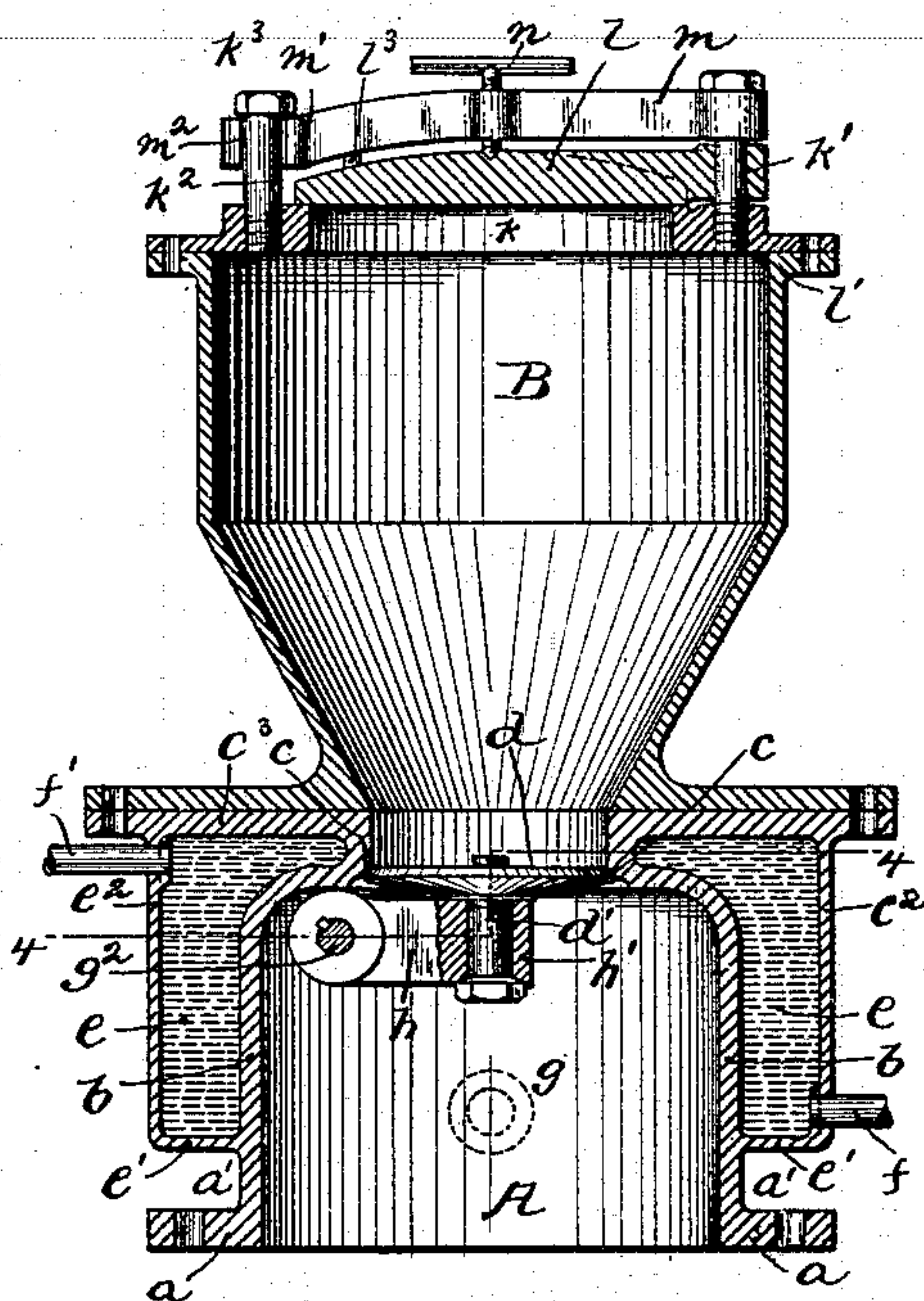


Fig. 2.

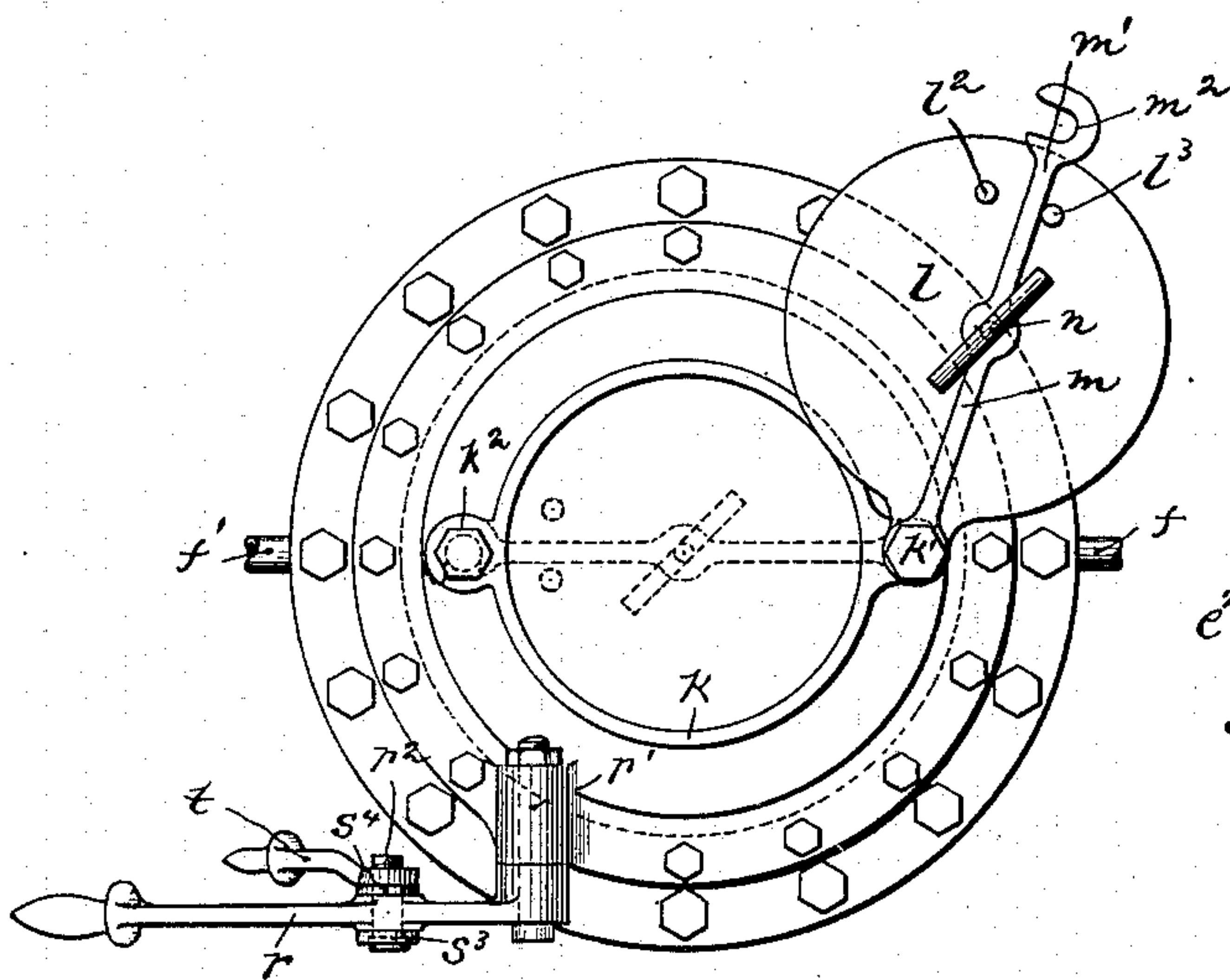


Fig. 3.

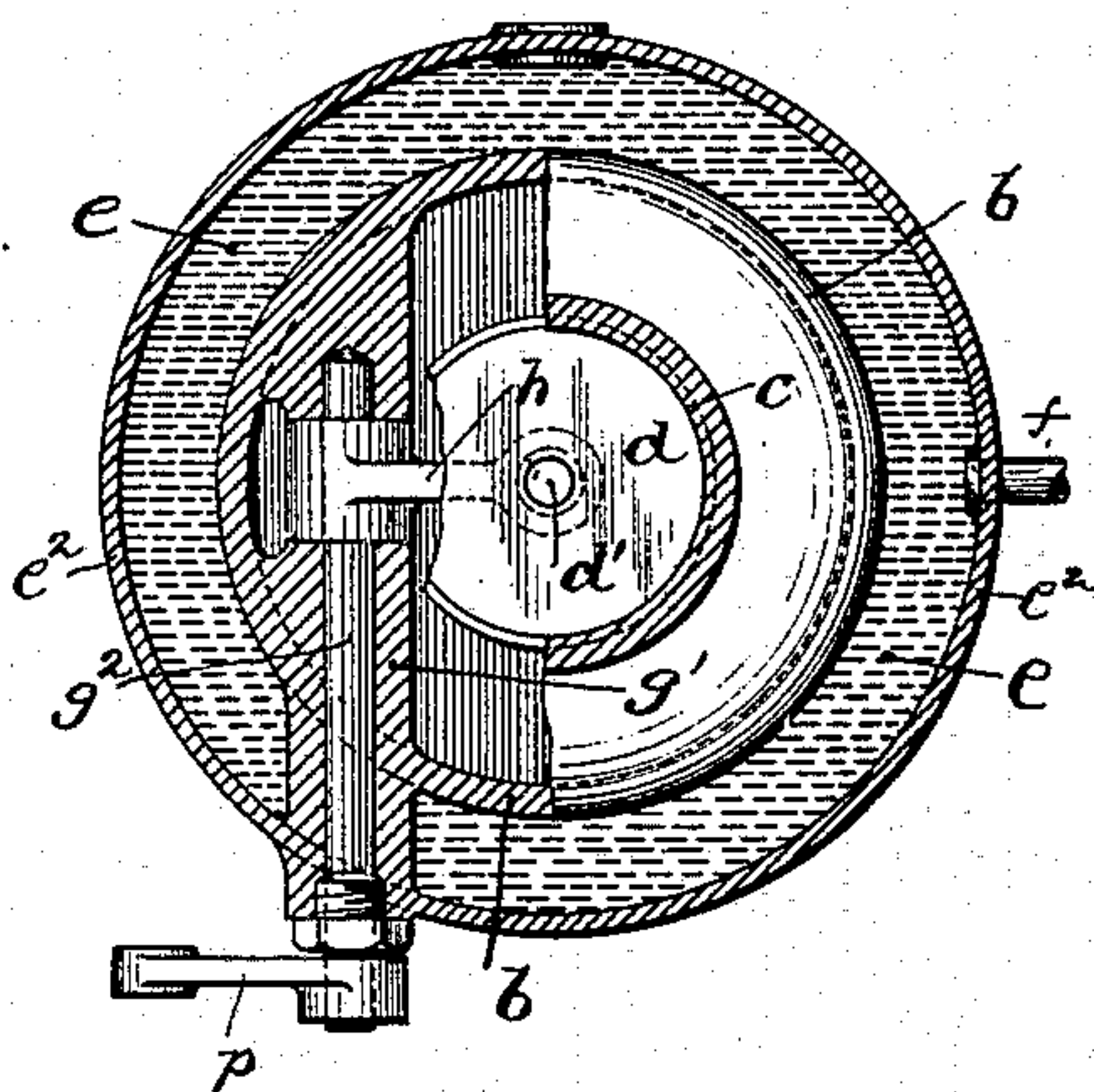


Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES L. HASTINGS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
STANDARD GAS COMPANY OF AMERICA, OF SAME PLACE.

COAL-FEEDER FOR GAS-PRODUCERS.

SPECIFICATION forming part of Letters Patent No. 615,451, dated December 6, 1898.

Application filed June 11, 1897. Serial No. 640,338. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. HASTINGS, a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have
5 invented a new and useful Improvement in Coal-Feeders for Gas Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to coal-feeders for gas-
10 generating and like apparatus.

It is well known that where soft coal is charged into gas-generators it is especially desirable that the coal feeder or hopper shall
15 be such as will prevent the escape of the gas on account of the loss of the same and on account of the smoke or large proportion of soot or solid carbons carried off by the gas passing through the hopper when it is opened. For this reason closed hoppers which hold the
20 coal to be fed in a closed chamber, from which it is dropped by the opening of a valve or dropping bottom, have heretofore been employed. The principal difficulty found with this class of hopper is in connection with the
25 handling of soft or bituminous coal, which is liable to become heated through the heat carried to the hopper by induction through the metal body thereof or the upper walls of the generator. This leads to the formation of tar,
30 which causes the valves to stick and gives much trouble to the operator; and the object of the present invention is to overcome this difficulty in the use of coal-feeding hoppers for gas-generators and like apparatus.

35 The invention comprises, generally stated, a coal-feeding hopper adapted to rest on the top of the generator or furnace and having a hopper-body containing the coal, an upwardly-closing valve forming the bottom
40 thereof, and an annular water-chamber around and in contact with and extending below the valve to absorb the heat and prevent its passage to the upper portion of the body of the hopper which contains the coal. It also
45 comprises certain other improvements, which will be hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying
50 drawings, in which—

Figure 1 is a side view of the hopper. Fig.

2 is a longitudinal central section of the same. Fig. 3 is a top or plan view; and Fig. 4 is a section on the line 4 4, Fig. 2.

Like letters of reference indicate like parts
55 in each figure.

The hopper illustrated embodies the invention in one approved form, though it is to be understood that, so far as the broad idea of the invention is concerned, its form may be
60 changed materially without departing from the same.

The hopper or coal feeder is formed of cast metal, and, as illustrated, it is formed in two main parts—the lower or water-jacket part A
65 and the hopper part B. The water-jacket part A has the base-flange *a*, which rests upon the top of the generator or other furnace to which the coal is to be fed, and in the preferred construction it has the inner shell *b*, which ex-
70 tends up to the valve-seat *c*, being contracted as it approaches the valve-seat, so that within the inner shell is provided space for the swinging of the valve *d*. Around the inner
75 shell *b* is a water-chamber *e*, which is formed by the outer walls *e'* *e''* *e'''*, it being preferred that the water-jacket so formed shall be raised above the bottom flange, so that the water
80 contained within the annular chamber *e* can act directly upon the inner shell of the hopper, while a space *a'* is left between the water-jacket and the bottom flange for the circulation of air. In this way the water-chamber surrounds the valve-seat and is in con-
85 tact with the walls thereof, so that the water acts directly upon the shell of the valve-seat to cool it and prevent the gathering of tar or other such substance as would clog it. To supply the water-chamber *e* with water, suitable pipe connections are made, such as the
90 inlet-pipe *f*, communicating with the lower end of the chamber, and the outlet-pipe *f'*, communicating with the upper end thereof. In the upper part of the central space *g* within the inner shell is formed the bearing *g'* for
95 the operating-shaft *g''*, which carries the valve *d*, the valve and said shaft being connected by a rocker-arm *h*, having a key-and-slot connection with the shaft *g''*, so providing for the opening and closing of the valve. This rocker-
100 arm has at its outer end a socket *h'*, which fits loosely around the central bolt *d'* of the

valve d , said central bolt being tapped into the valve and the valve being carried centrally upon the rocker-arm, but having sufficient play to seat itself properly in the valve-seat c . The valve-seat and valve have faces corresponding with each other and preferably made tapering, as shown. As thus constructed by the turning of the horizontal shaft g^2 the valve can be swung from the valve-seat into the enlarged chamber g , so as to permit of the drop of the coal from the hopper into the gas-generator. It will be noticed that the annular water-chamber e extends close to the valve-seat c , extending over the inner wall b , where it projects inwardly to the valve-seat and so bringing the cooling effect of the water as close as practicable to the valve.

The upper or hopper part of the coal-feeder can be made of any shape desired, it being preferred that it shall have a tapering base, though the walls thereof may be straight, if desired, and the body of coal be entirely supported upon the dropping-valve. It is properly bolted to the top of the water-jacket base A and has at its upper end a flange to which the hopper-top k is connected, this top carrying the posts k' and k^2 , the posts k' forming the bearing for the horizontally-swinging lid l , which fits in the top opening l' of the hopper, and for the cotter-bar m , both lid and bar being mounted on said bearing-post k' , while extending through the cotter-bar is the clamping-screw n , which serves to force the lid down upon its seat. The post k^2 gives support to the free end m' of the cotter-bar, said post having the bolt or head k^3 , into which the hollow seat m^2 of the free end m' of the cotter-bar fits, so that as the cotter-bar is swung to place over the lid the only thing necessary to clamp it down is to turn the hand-bar n , and so clamp the lid upon the cover-seat and form a tight joint between the lid and hopper. It is to be noticed that the face of the hopper-top k is flat and that the lid l has a flat bottom face with a square edge and that in swinging horizontally to place it travels close to the face of the top k . In so doing it wipes off from the top k any coal or other substance which would prevent its forming a close joint therewith. By such construction a perfect joint is always formed between the hopper top and lid, and when the lid is forced down to place a perfect gas-tight joint, metal to metal, is obtained. The lid l has two studs l^2 l^3 on its top face, between which the cotter-bar swings, so that the lid is drawn off or moved to its seat on the hopper-top by the movement of the cotter-bar, which strikes these studs.

For the operation of the valve d I prefer the following construction: The operating-shaft g^2 extends through a bearing beyond the outer wall e^2 of the water-jacket, and a lever p is rigidly connected to the end thereof. A bearing r' is formed on the upper end of the hopper-top k , in which is mounted the

operating-lever r , and that operating-lever is connected to the lever p by the wrought-metal strap s , which has the forked end s' fitting around the operating-lever r and the forked end s^2 fitting around the lever p . The upper forked end s' of the strap is made of considerable length, so as to give spring action to the forks s^3 s^4 thereof, and the connecting-bolt r^2 , passing through the operating-lever and the forks of the strap, has its head seated in one fork to prevent the turning thereof, while its opposite end is threaded, and on this threaded end is secured the hand-nut t , so that when the valve is closed by screwing on the hand-nut the forks s^3 s^4 will be clamped onto the operating-lever r and bind the parts together, and so hold them until it is desired to lower the valve d . The construction therefore forms a clamp between the parts.

In the use of the coal-feeder a current of water is passed through the water-chamber e thereof, which carries off all heat which may have passed by induction or radiation to the body thereof below the valve, and it thus keeps these parts, including the valve and the upper body of the hopper which contains the coal, so cool as to prevent any distilling action whatever in the coal within the hopper. The coal can therefore remain within the hopper for any desired time—for hours, if that be necessary—without being materially raised in temperature or at least without being raised so as to generate either undue pressure within the hopper or distillation of any of the hydrocarbons within the coal. This enables the operators to feed the hopper whenever it is empty and to leave it filled ready for emptying, according as it is found proper in connection with the preferable operation of the generator. Where a number of these hoppers are employed in connection with the generators, the ordinary workmen can therefore proceed to fill them as they are emptied, while the more skilled superintendent or head operator can empty them and feed the coal to the generator at the proper time.

In the mechanical operation of the hopper, to fill the same the valve d is closed through the operating-lever and the hand-nuts screwed up so as to clamp the parts in this position, and the clamp-screw n is screwed up, leaving the cotter-bar and lid free to be swung off from the feeding-opening, and the hopper b can then be filled without fear of escape of gas or smoke. The lid and cotter-bar are then swung around to place, the clamp-screw n screwed down, clamping the lid upon the feeding-opening, and the hopper remains filled until it is desired to dump the coal therefrom. To dump the coal, it is only necessary to screw back the hand-nut t and raise the operating-lever, when the coal will drop into the generator or furnace and the bottom valve can then be closed and the hopper refilled, ready to be dumped when a further supply of coal is needed in the generator. As above stated,

when the coal remains in this hopper all such heat as would cause distillation of the tar or other hydrocarbons therein is carried away by the water flowing through the water-chamber *e* of the water-jacket, and therefore all liability of the clogging or sticking of the valve, which would prevent its being tightly closed and would cause escape of gas, is overcome.

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

1. A coal-feeding hopper having a hopper-body for containing the coal, an upwardly-closing valve forming the bottom thereof, an annular water-chamber around and in contact with the walls of the valve, and having a base-flange and a space between said base-flange and the base of the water-chamber, substantially as set forth.

20 2. The combination in a coal-feeding hopper, with an upwardly-closing valve *d*, of a

rocker-bar *h*, having the socket *h'*, the bolt *d'* fitting loosely within said socket and connected to the valve *d*, shaft *g*², lever *p*, operating-lever *r*, strap *s*, and a clamp between 25 said strap and operating-lever, substantially as and for the purposes set forth.

3. A coal-feeding hopper provided with a hopper-body having two vertical posts *k'* *k*² in combination with the horizontally-swing- 30 ing lid *l* mounted on the post *k'*, the cotter-bar *m* mounted on the post *k'* and having the hollow seat *m*² fitting under the head *k*³ of the post *k*² and the clamping-screw *n* passing through the cotter-bar and contacting with 35 the lid, substantially as set forth.

In testimony whereof I, the said JAMES L. HASTINGS, have hereunto set my hand.

JAMES L. HASTINGS.

Witnesses:

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ROBERT C. TOTTEN.