

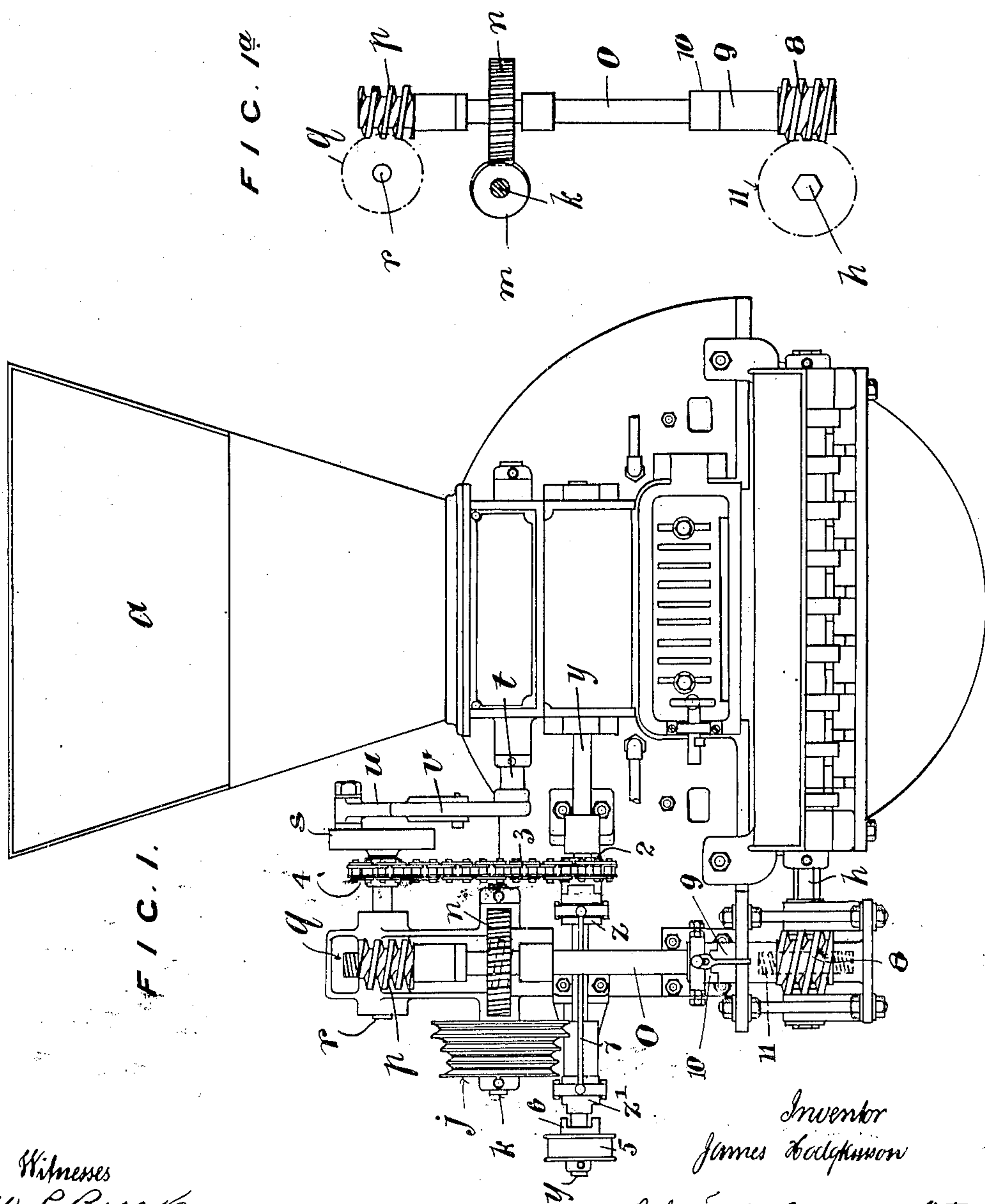
No. 869,708.

PATENTED OCT. 29, 1907.

J. HODGKINSON.
AUTOMATIC STOKER FOR STEAM GENERATORS.

APPLICATION FILED JUNE 27, 1907.

2 SHEETS—SHEET 1.



Witnesses
W. P. Burke
M. P. D.

Inventor
James Hodgkinson
By his Atty Mr. Wallace White

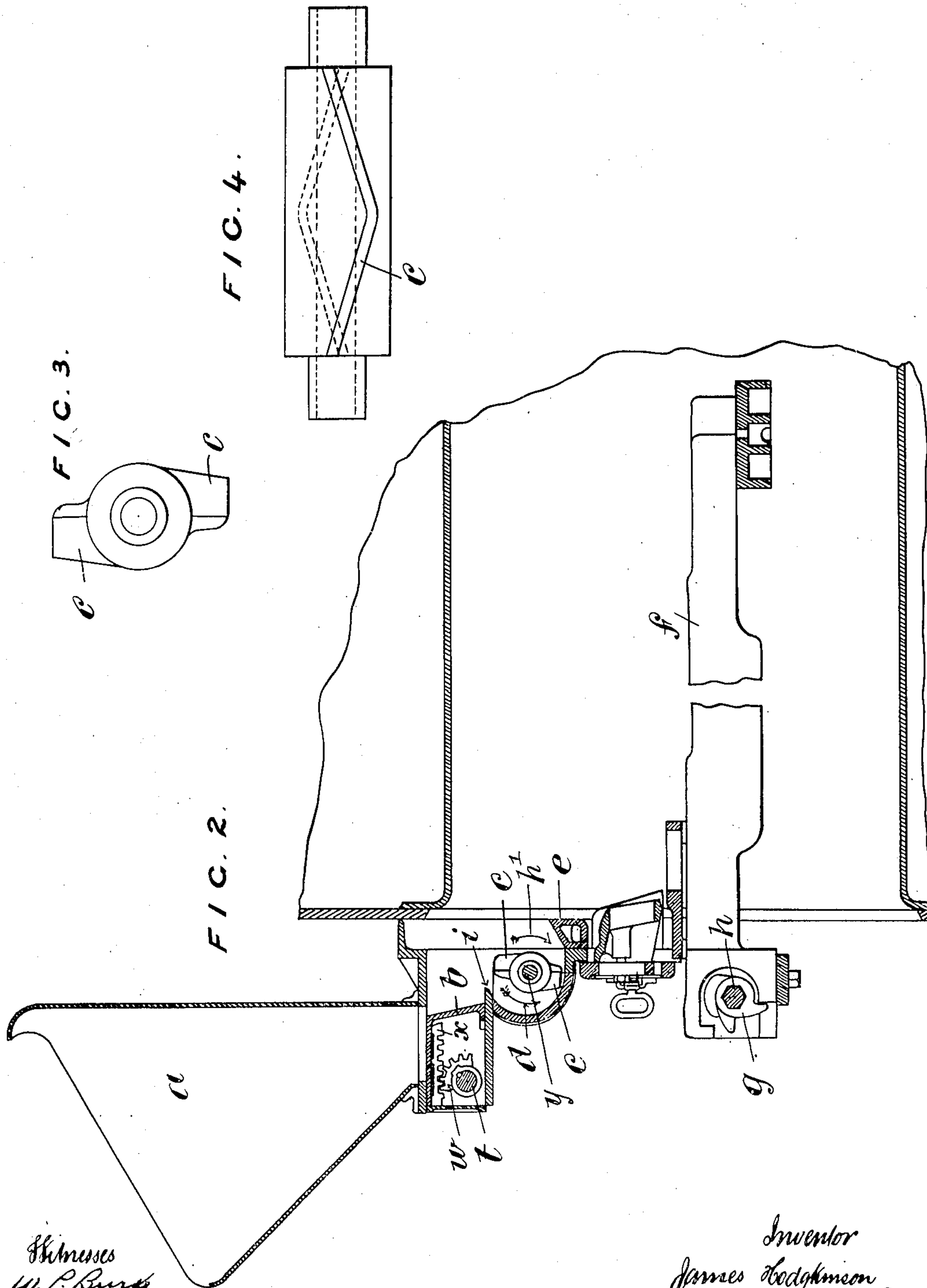
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By his atty M. Waller White

UNITED STATES PATENT OFFICE.

JAMES HODGKINSON, OF MANCHESTER, ENGLAND.

AUTOMATIC STOKER FOR STEAM-GENERATORS.

No. 869,708.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed June 27, 1907. Serial No. 381,175.

To all whom it may concern:

Be it known that I, JAMES HODGKINSON, a subject of Great Britain, residing at Ford Lane Works, Pendleton, Manchester, in the county of Lancaster, England, engineer, have invented new and useful Improvements in Automatic Stokers for Steam-Generators, of which the following is a specification.

My invention relates to that class of apparatus used for automatically feeding or "stoking" the furnaces of steam boilers commonly called "automatic stokers". At present there are two popular types of such automatic stokers in use each of which has its advantages and drawbacks well known to users. One type is known as a "coking" stoker in which the fuel falls before a reciprocating ram which pushes the fuel on to a dead plate in front of the furnace, the fuel being gradually carried to the end of the furnace by reciprocating fire bars. In another type called a "sprinkler" the fuel is thrown over the surface of the grate bars by a steam or air blast or by rotating or oscillating blades. Under my invention I have devised means whereby both these systems are available at will in one apparatus so that "coking" may be used for ordinary requirements and "sprinkling" when so desired, for instance, when there is a sudden heavy call for steam and pressure in the boiler has to be promptly raised.

In the accompanying drawings Figure 1 shows a front elevation of the invention. Fig. 1^a is a side view of part of the gearing. Fig. 2 is a sectional side elevation. Fig. 3 is an end view of the sprinkler blades and Fig. 4 is a front view thereof.

Fuel is contained within the hopper *a* and falls in front of a reciprocating ram *b* and into the path of blade *c* which, when "coking" is being effected, are slowly revolving in the direction of the arrow *d*. The fuel is forced by the rotating blades *c* through a curved passage within the casing of the shaft, formed by the rear and bottom walls of said casing, and over the surface of a distributing plate *e* which is raised towards the center so that the fuel will fall towards the sides thereof and be distributed as evenly as possible over the entire front area of the grate bars *f*. The grate bars are reciprocated by cams *g* mounted on a revolving shaft *h* in the usual manner and these bars slowly force the fuel from the front to the rear of the bars. When "sprinkling" is to be effected the sprinkler blades *c* are rotated at a high speed in the direction of the arrow *h*¹ catching the fuel as it is forced off the ledge *i* by the reciprocating ram *b* and throwing it over the surface of the grate bars towards the rear thereof so as to quickly produce a highly incandescent fire especially towards the back of the fire grate. A face view of the sprinkler blades *c* is shown in Fig. 4 on a larger scale and a side view in Fig. 3. It will be seen the blades are inclined from the center to each side and when "sprinkling" the blades *c* are rotated in the direction of the arrow *h*¹ and

the inclined blades tend to throw the fuel towards each side of the fire grate so as to provide for even distribution of fuel on the fire grate.

To drive the apparatus the differential grooved speed pulley *j* is driven by a band from any suitable source, the shaft *k* on which the pulley *j* is mounted being provided with a worm *m* driving a wheel *n* on a vertical shaft *o*. See also Fig. 1^a which is a view of the gearing at right angles to Fig. 1. A worm *p* on this shaft drives a wheel *q* on a shaft *r* which also has a chain wheel 4 and crank disk *s*. An oscillating motion is communicated to a shaft *t* by means of a rod *u* on the disk *s* connected to a lever or crank *v* on the shaft *t*. A toothed quadrant *w* on the shaft *t* gears with rack teeth *x* on the ram *b* so that as the shaft *t* is rocked the ram *b* is reciprocated to and fro. To drive the sprinkler blades *c* the shaft *y* which carries the sprinkler blades *c* carries two clutch halves *z* *z*¹ which are so mounted that while they are keyed to the shaft they are slidable endwise to some extent thereon. A chain wheel 2 is loosely mounted on the shaft *y* and, as shown in Fig. 1, the clutch *z* is engaged with a clutch half formed on the chain wheel which is thus locked to the shaft *y*. The shaft *y* is thus slowly driven by a chain 3 and the chain wheel 4 in the direction of the arrow *d* Fig. 2. To obtain the reverse motion of the sprinkler blades *c* for "sprinkling" I mount loosely a pulley 5 on the shaft *y*, driven by a belt at a high speed in the direction of the arrow *h*¹ Fig. 2 the pulley having a clutch half 6. The clutches *z* *z*¹ are connected together by a rod 7 and when the clutch *z*¹ is engaged with the clutch 6 the high speed pulley 5 is locked to the shaft *y* and the sprinkler blades *c* are driven at a high speed in the direction of the arrow Fig. 2 as described. To drive the cam shaft *h* a worm 8 on a sleeve 9 gears with a wheel 11 on the shaft *h*. A clutch 10 enables the sleeve 9 and the shaft *h* to be stopped at any time it is desired to put the reciprocating fire bars out of action.

I declare that what I claim is.

1. A combined coking and sprinkling mechanical stoker comprising a shaft and mechanism for rotating said shaft slowly in one direction for coking feed and rapidly in the opposite direction for sprinkling feed, and means for supplying coal to said shaft.

2. A combined coking and sprinkling mechanical stoker comprising a shaft carrying blades and mechanism for rotating said shaft slowly in one direction for coking feed, and rapidly in the opposite direction for sprinkling feed, and means for supplying coal to said shaft.

3. A combined coking and sprinkling mechanical stoker comprising a shaft carrying blades and mechanism for rotating said shaft slowly in one direction for coking feed and rapidly in the opposite direction for sprinkling feed, said blade or blades being substantially concave in the direction of the coking feed and convex in the direction of the sprinkling feed, and means for supplying coal to said shaft.

4. A combined coking and sprinkling mechanical stoker comprising a shaft carrying blades, a casing for said shaft closed at the rear and bottom and open in front, mechanism

ism for rotating said shaft slowly in one direction for coking feed and rapidly in the opposite direction for sprinkling feed, and means for supplying coal to said shaft.

5. In combination in an automatic stoker for steam generator and other furnaces, rotatable blades, with means for feeding fuel to such rotatable blades, and means for slowly rotating the blades in one direction or rapidly rotating the blades in a contrary direction at will substantially as described.

6. In combination in an automatic stoker reciprocating fire bars, a distributing plate, a ram with means for reciprocating such ram, rotatable blades, means for slowly rotating such blades in one direction to feed fuel fed thereto by the ram over the distributing plate upon the reciprocating fire bars, and means for rapidly rotating the blades in a contrary direction to sprinkle the fuel upon the fire bars substantially as described.

7. In combination in an automatic stoker a vertical shaft, means for rotating such shaft, a horizontal shaft and means for rotating such shaft from the vertical shaft, a ram, means for reciprocating such ram from the horizontal shaft, a countershaft, blades mounted on such countershaft, means for slowly rotating the countershaft

and blades in one direction from the horizontal shaft, a distributing plate over which fuel is forced by the slowly rotating blades, and means for rapidly revolving the countershaft and blades in a contrary direction to distribute the fuel upon the fire bars substantially as described. 25

8. In combination in an automatic stoker a hopper for the fuel, a ram disposed below such hopper, means for reciprocating such ram to feed the fuel out of the hopper, a chamber below the ram, blades rotatably mounted in such chamber, a distributing plate, means for slowly rotating the blades in one direction to force the fuel over the distribution plate, fire bars and means for reciprocating such fire bars, means to suspend at will the reciprocation of the fire bars, and means for rapidly rotating the blades in the contrary direction to sprinkle the fuel upon the fire bars substantially as described. 30 35 40

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

JAMES HODGKINSON.

Witnesses:

JOSHUA ENTWISLE,
ALFRED YATES