

(No Model.)

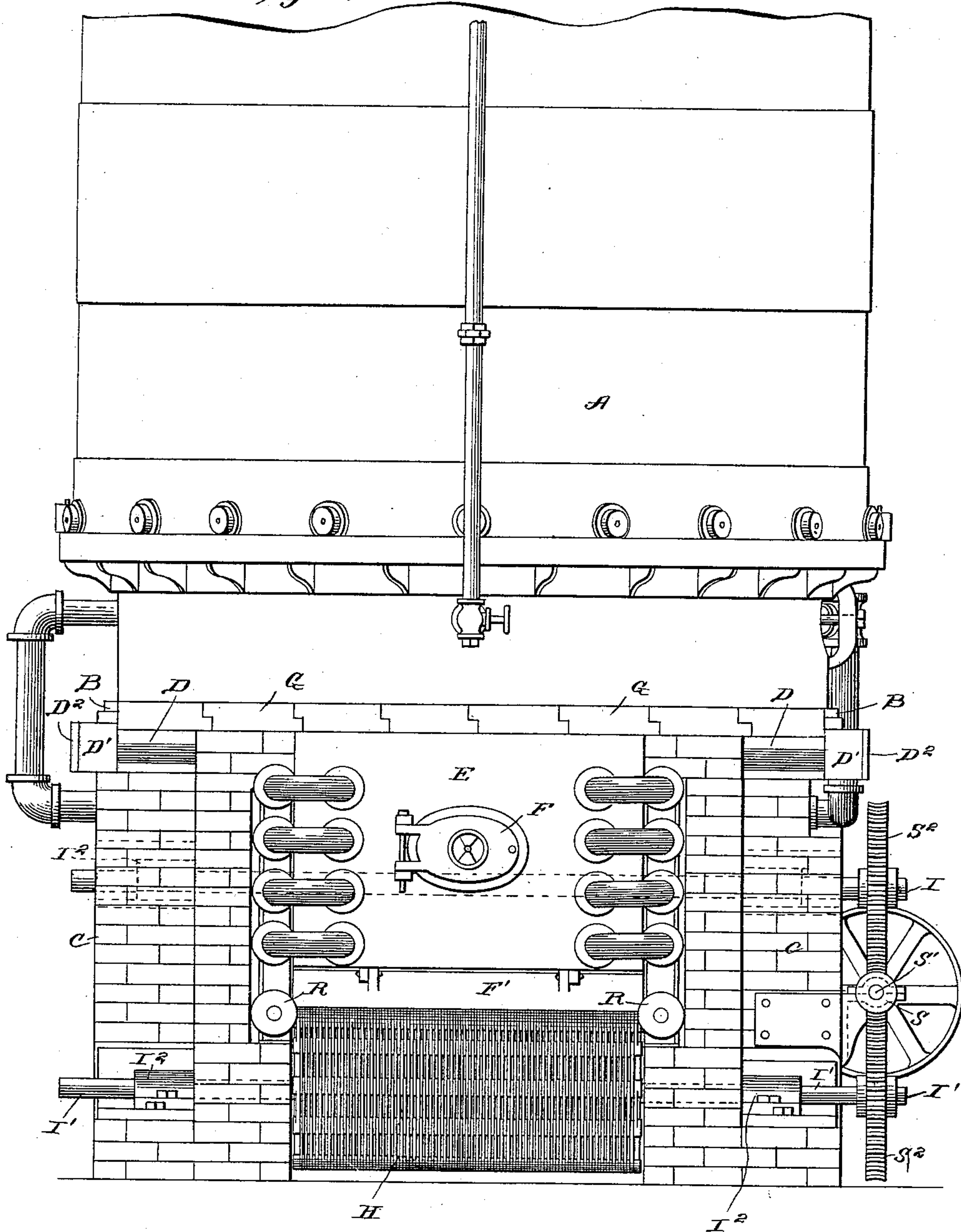
4 Sheets—Sheet 1.

W. H. BERRY.
FURNACE FEEDING FOR CHAIN GRATES.

No. 538,148.

Patented Apr. 23, 1895.

Fig. 1.



Witnesses:
Harry D. Rohrer
J. M. Pond.

Inventor:
William H. Berry
By *W. T. Howard*
Att'y.

(No Model.)

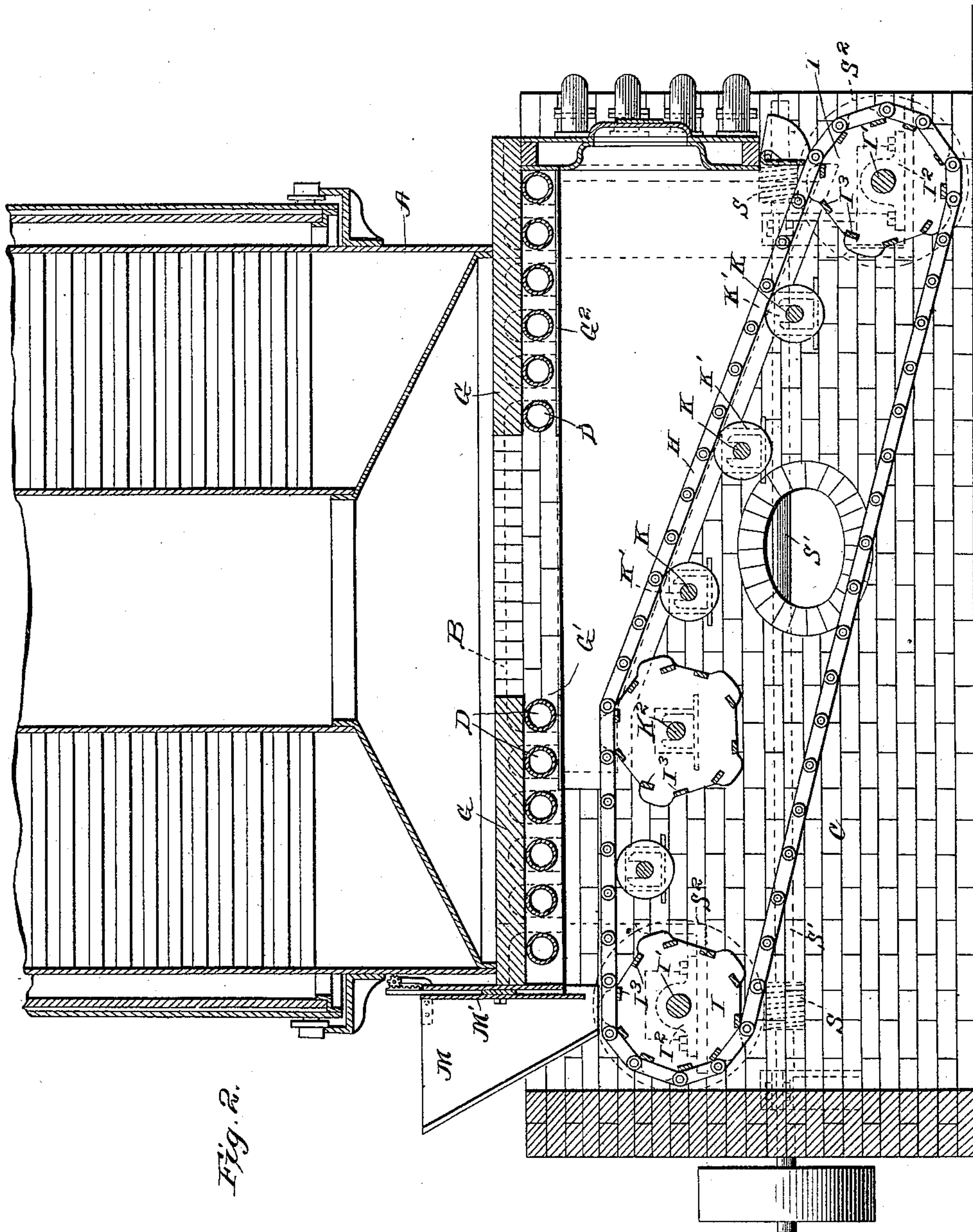
4 Sheets—Sheet 2.

W. H. BERRY.

FURNACE FEEDING FOR CHAIN GRATES.

No. 538,148.

Patented Apr. 23, 1895.



witnesses:
Harry S Rohrer
J. M. Pond.

Inventor:
William H. Berry,
By *Chas. W. T. Hays*
Atty.

(No Model.)

4 Sheets—Sheet 3.

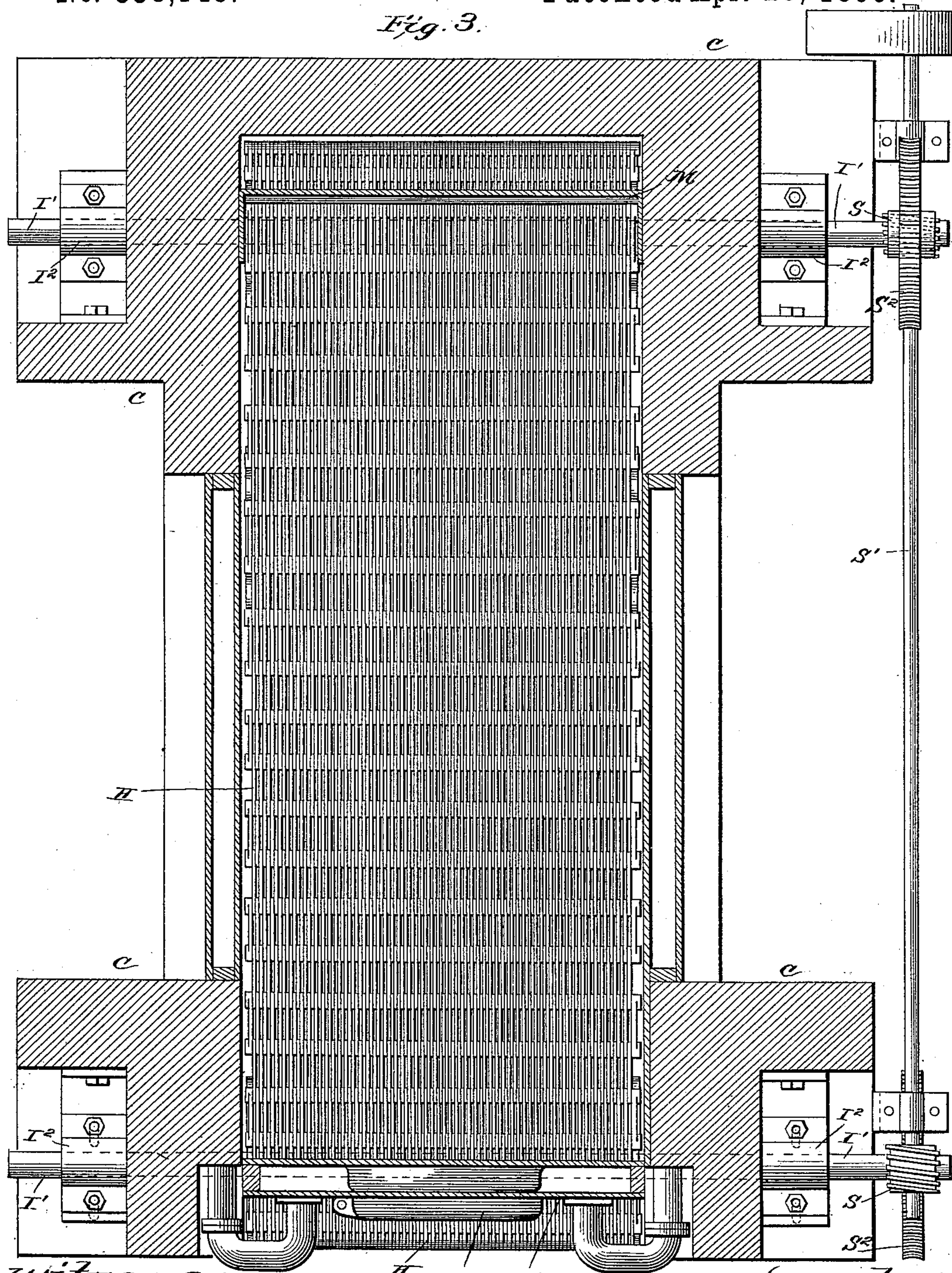
W. H. BERRY.

FURNACE FEEDING FOR CHAIN GRATES.

No. 538,148.

Patented Apr. 23, 1895.

Fig. 3.



Witnesses

Harry S. Rohrer.
J. M. Pond

By

Inventor:
William H. Berry,
Attys.

(No Model.)

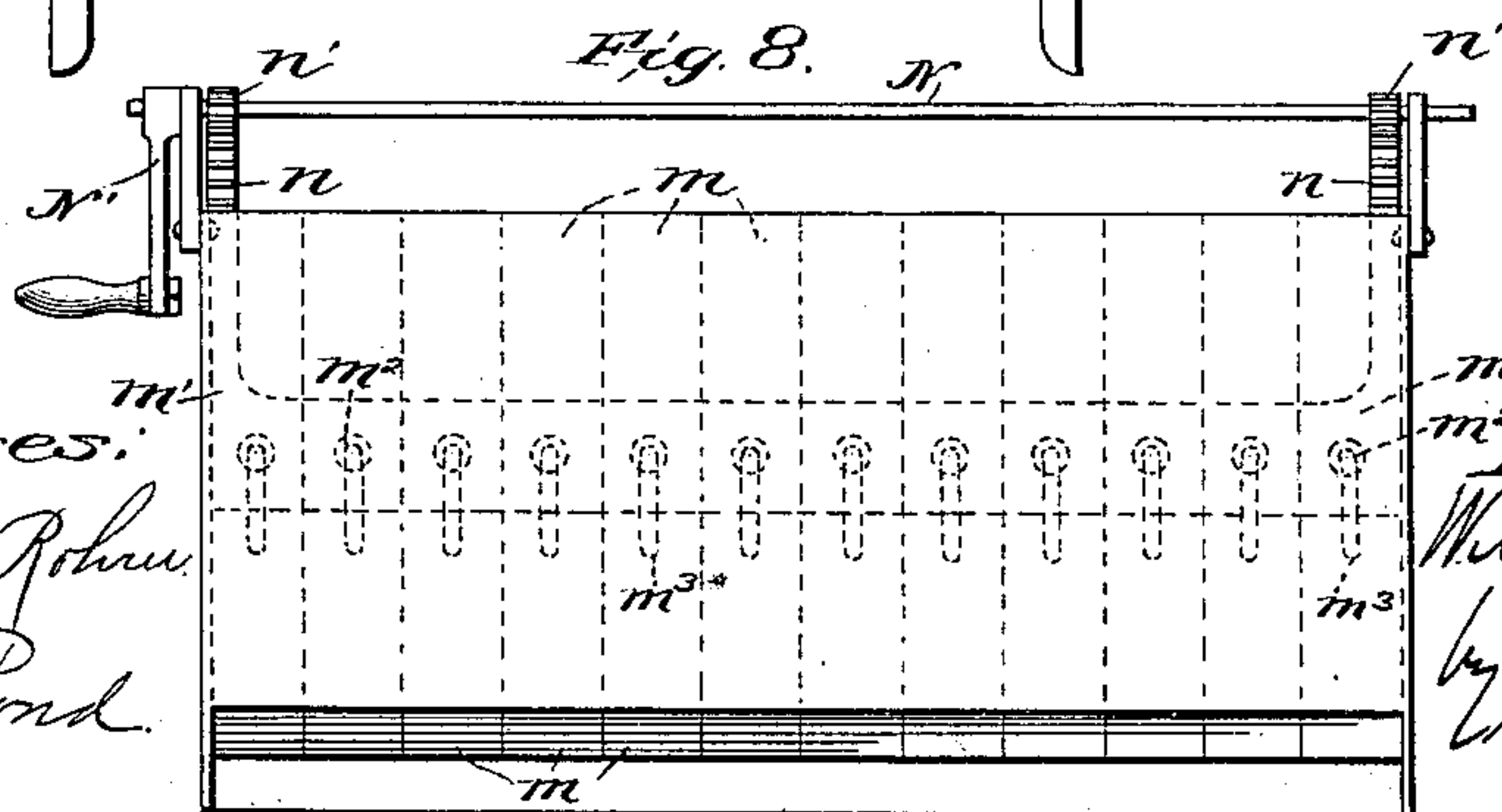
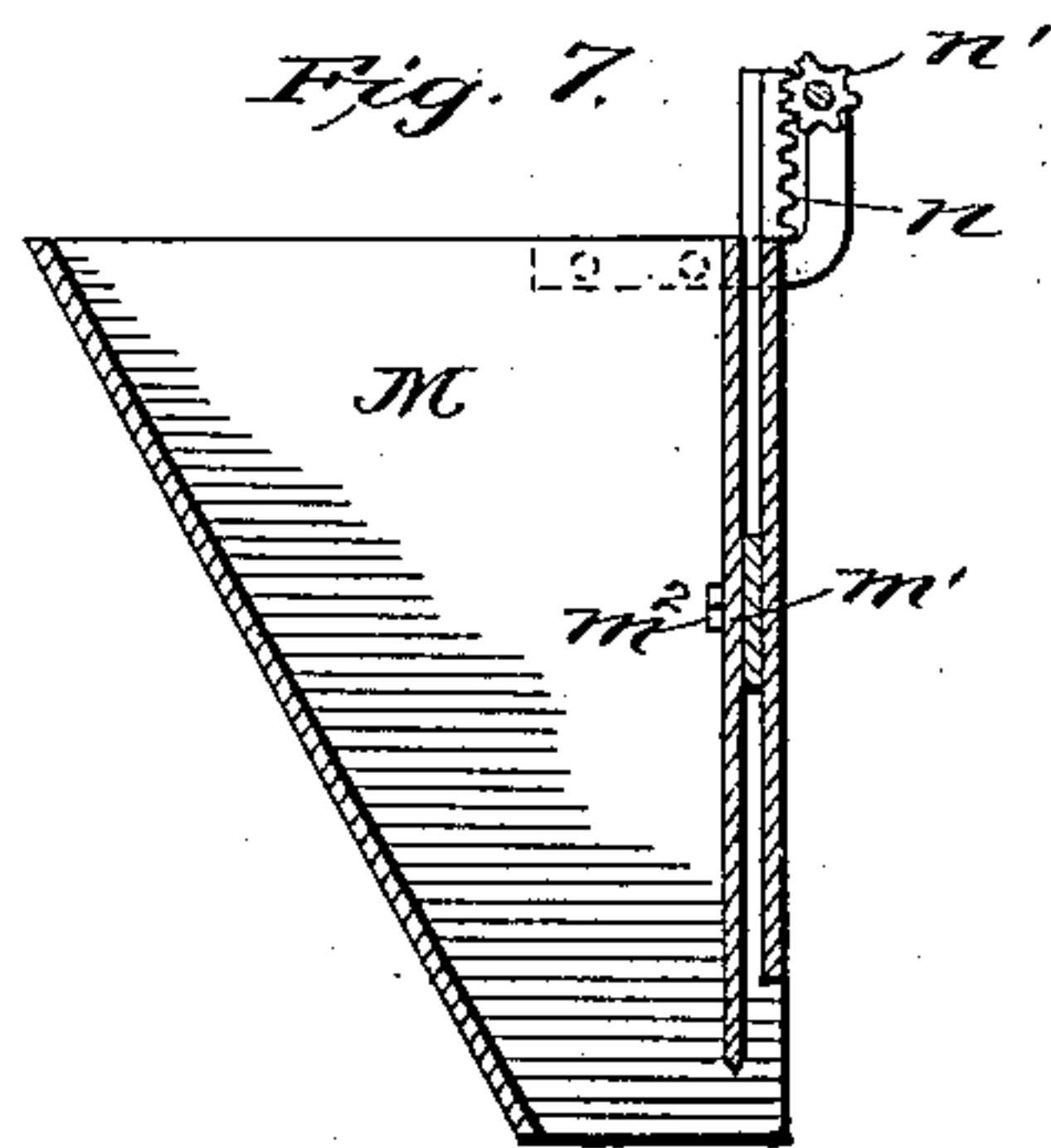
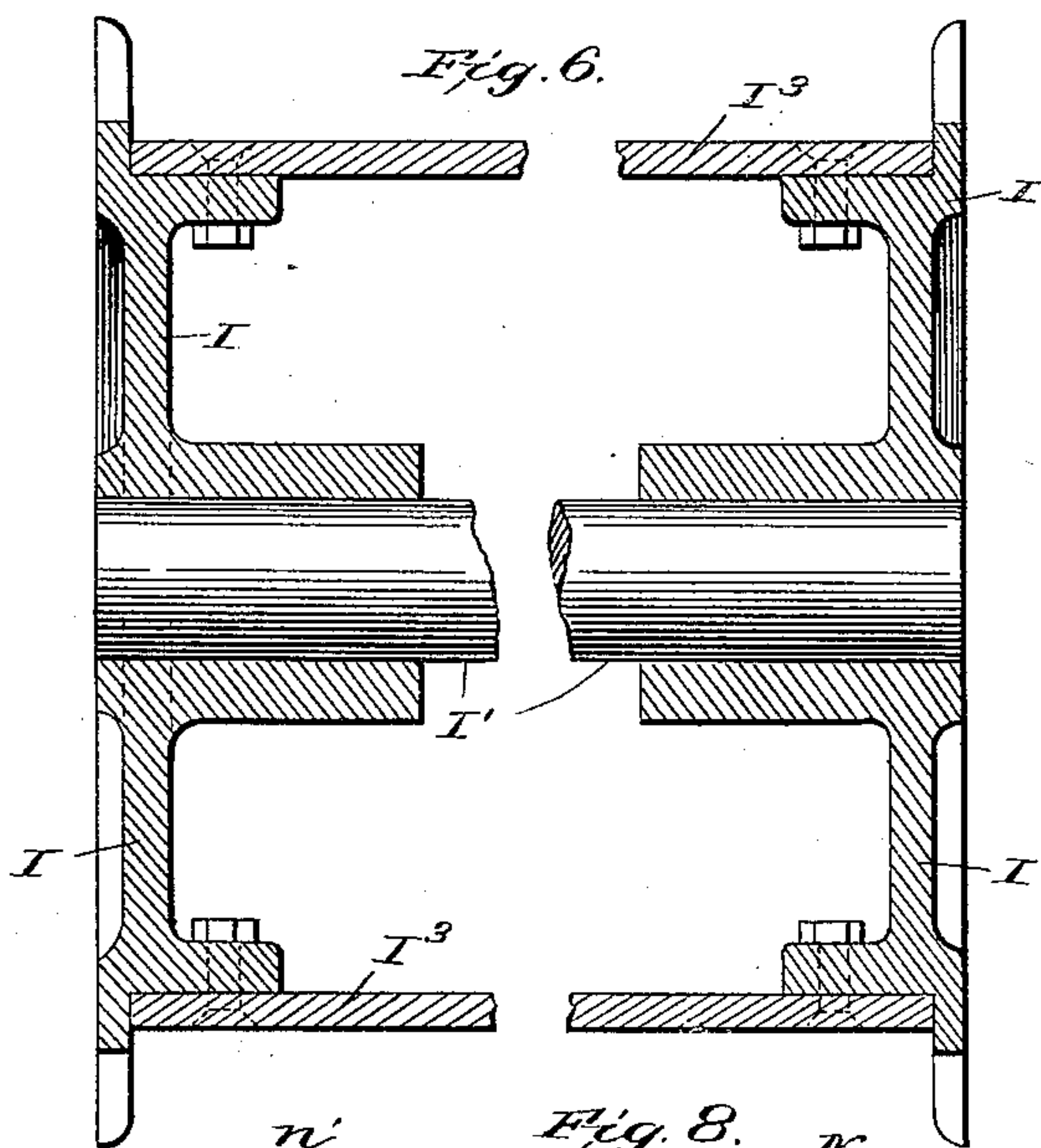
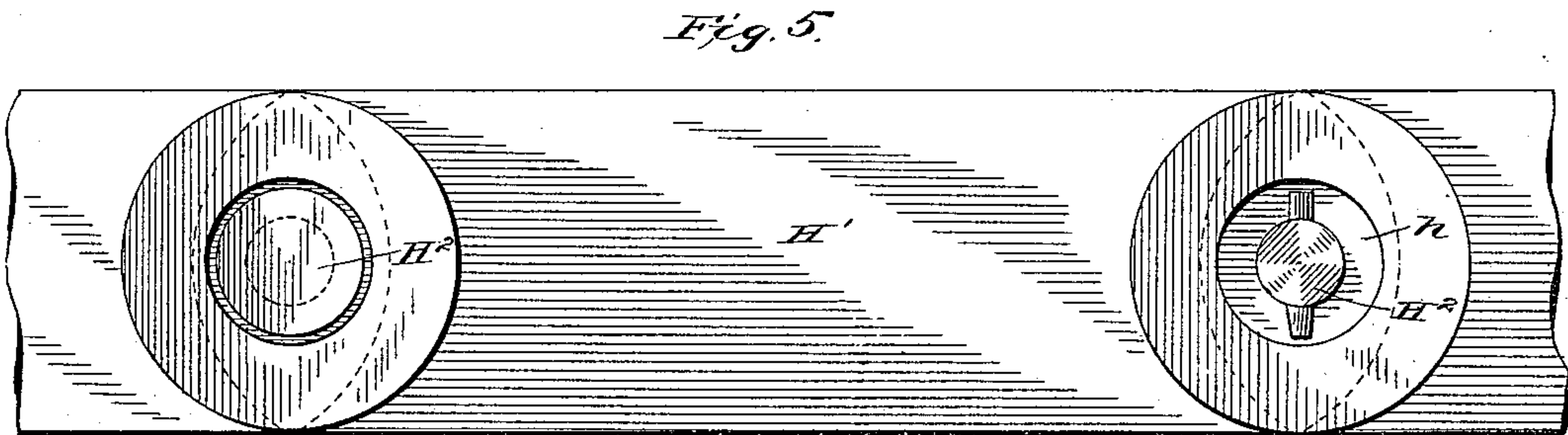
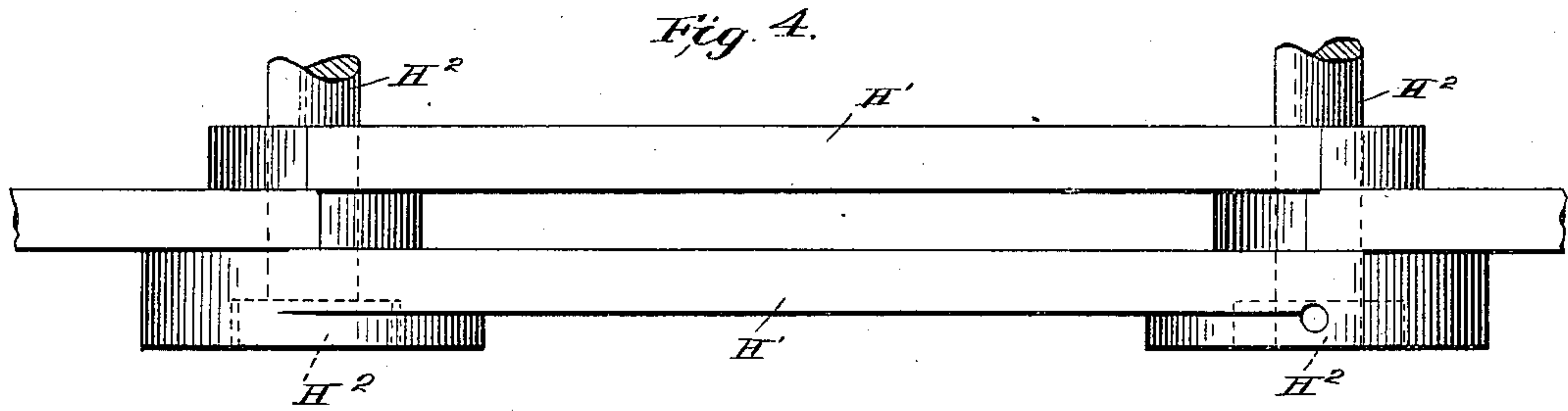
4 Sheets—Sheet 4.

W. H. BERRY.

FURNACE FEEDING FOR CHAIN GRATES.

No. 538,148.

Patented Apr. 23, 1895.



Witnesses:
Henry D. Rohrer
J. M. Pond

Inventor:
William H. Berry
by W. T. Howard
Atty

UNITED STATES PATENT OFFICE.

WILLIAM H. BERRY, OF HOOSICK FALLS, NEW YORK.

FURNACE-FEEDING FOR CHAIN GRATES.

SPECIFICATION forming part of Letters Patent No. 538,148, dated April 23, 1895.

Application filed April 16, 1894. Serial No. 507,702. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BERRY, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Furnace-Feeding for Chain Grates, of which the following is a specification, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The object of my invention is to provide an automatic grate or stoker by means of which fuel of any kind or size is fed at any desired speed, or depth, and in any shape, to the hottest part of the fire, (at the bridge wall) moved forward, against the direction of the draft, while being consumed, and discharged as ashes under the eye of the operator.

My invention consists in the peculiar construction of the moving grate bars, and in the construction and arrangement of the devices employed to feed the coal to said bars and move the latter so as to convey the coal to the combustion chamber and discharge the ashes therefrom.

In the drawings Figure 1 is a front elevation, partly broken away, of a boiler and furnace provided with my improved grate. Fig. 2 is a vertical transverse section of the same. Fig. 3 is a top view of the grate and the devices employed to move it. Fig. 4 is a view of a portion of the link grate, on an enlarged scale. Fig. 5 is a side elevation of one of the links detached. Fig. 6 is a sectional view of a pair of sprocket wheels, their shaft and connecting rods. Fig. 7 is a vertical transverse section of the hopper. Fig. 8 is an elevation of the vertical side of the hopper.

A represents the boiler supported on the plates B resting upon the side walls C, of the furnace. The furnace is provided with a front E having a door or doors F, and also, at its lower edge, a swinging door or flap F'.

Supported upon the side walls and extending across the furnace is a series of tubes D connected by means of the boxes or bends D' (into which they are expanded) so as to form a continuous manifold through which the feed water is forced to circulate before reaching the boiler. To facilitate the construction, cleaning and repairs of this manifold, the bends D' are constructed with a cap D² secured thereto by bolts. Resting upon, and

supported by, the tubes D is a layer of fire brick G, which serves to protect the edge of the boiler where it is over the fire. The plates B on which the boiler rests are formed with pockets to bridge over the tubes D. The result of this arrangement of the tubes D and fire brick G is that arches are avoided while a permanent and well defined bridge wall G' is secured, under which fuel may be fed to the furnace, while any of the tubes may be cleaned or replaced without disturbing any other parts.

The grate H is formed of short links or bars H' having holes near each end, and united into an endless chain or apron by rods H² passing through the holes as shown. The links forming the edges of the grate, are each provided with thickened ends, in each of which a recess h is formed to allow the rods H² to be secured without projecting, and to furnish a better opportunity for the sprocket wheels I which support and drive the chain. (See Fig. 4.) The sprocket wheels I I are mounted upon the shafts I' which are journaled in boxes I², anchored to the foundation. One of the shafts is made adjustable by means of slotted holes in the boxes I² so as to facilitate uniting the apron, in the first place, and to take up slack as occasion may require. The grate is further supported by a series of shafts K journaled in boxes in the side walls L, and upon which rollers K' are placed, and also by the shaft K² located immediately under the bridge wall, and upon which sprocket wheels similar to those I I are mounted. These sprocket wheels, and also those at the ends, are united by a series of bars I³ which extend across the apron to facilitate the even bending of the links in passing over them.

At the rear end of the grate is located a hopper M, of which the grate forms the bottom. The rear side of the hopper M is inclined and reaches down to the grate, while the front side is cut away at its lower end and provided with a sliding door or gate M' which is adapted to be raised and lowered.

The gate M' is composed of a series of narrow slides m each secured to a bar m' by means of a set screw m² which passes through a slot m³ in the slide into the bar m'. By this arrangement, either of the slides m may be vertically adjusted independently of the

others. The two ends of the bar m' are bent upwardly at a right angle and provided with ratchet teeth n , with which the pinions $n' n'$ on the shaft N engage. The shaft is rotated
 5 by the crank N' and its rotation effects the vertical adjustment of the gate M' as a whole. The object of giving the slides m independent adjustment is to vary the shape of the lower edge of the gate in order that the amount of
 10 coal fed to the furnace may be varied at different points, as is sometimes necessary to maintain a uniform fire entirely across the furnace.

The front E may be made of cast iron and
 15 lined with fire brick, as may also the sides of the furnace; but I preferably make the front E of boiler plate, and introduce the water legs $R R$ on the sides of the furnace, and force the feed water to circulate through them.
 20 The grate is inclined toward the front from the bridge wall, and the bottom of the water legs are similarly inclined, being furnished with blow cocks at the lowest point. The result of this arrangement is that fire brick are
 25 avoided in the furnace and the feed water is sufficiently heated to cause it to largely deposit its impurities before entering the boiler.

The operation of the grate is as follows: The hopper M is filled with fuel and the gate
 30 M' raised to allow the desired depth of fuel to pass under it. The grate is now moved forward by means of the revolution of the shaft S' carrying the worm gears $S S$ which engage with the pinions $S^2 S^2$ on the shafts $I' I'$, and
 35 a layer of fuel is spread upon it. When it has advanced far enough into the furnace, a fire is built from the door in front and manipulated by hand until it is evenly burning as far back as the bridge wall. The grate is then
 40 set in motion and will continue to supply fresh coal at the bridge wall, and discharge ashes in front under the flap door. The bridge wall G' being flat and parallel with the grate, transversely of the furnace, the flame will attack
 45 the incoming fuel in a uniform manner across the entire width of the furnace. The front portion of the furnace cover G^2 being also flat tends to deflect the flame downwardly and concentrate it on the incoming fuel. The great
 50 advantage of this arrangement is that the fuel being fed at the bridge wall, the flame, sweeping back over it, ignites it at once; and should it burn more rapidly in the center or at the edges, the manipulation of the slides m will

vary the depth of coal fed to any part of the grate. Once regulated, it will burn steadily as long as desired.

Having described my invention, I claim—

1. The combination of a moving grate with a hopper having an adjustable gate composed
 60 of a series of slides capable of independent adjustment vertically whereby fuel is supplied in a layer of any desired shape or thickness, substantially as described.

2. In a furnace the combination of a moving grate, a fuel hopper discharging onto the grate, and a flap door in the front of the furnace through which the ashes are allowed to escape and the air is prevented from entering the furnace, substantially as described. 70

3. A fuel hopper for a furnace having an adjustable gate, said gate consisting of a series of independently adjustable slides, combined with suitable devices to adjust the gate as an entirety and the slides independently, substantially as described. 75

4. The combination in a furnace having a bridge wall, of a traveling grate, a hopper located to supply fuel at the bridge wall, and an adjustable gate for the hopper composed of
 80 a series of independently adjustable slides, whereby a layer of fuel of any desired shape and thickness is supplied to the grate, substantially as described.

5. In a furnace, the combination of a bridge
 85 wall, a chain grate, a sprocket-wheel mechanism for moving the grate forward against the direction of the draft, and a fuel hopper having a gate comprising adjustable slides for distributing from the hopper to the grate a
 90 layer of fuel of the desired shape and thickness, substantially as set forth.

6. In a furnace, the combination of a flat bridge wall, a flat cover for the front of the furnace, a chain grate, a sprocket-wheel mechanism for moving the grate forward against
 95 the direction of the draft, and a fuel hopper having a gate comprising adjustable slides for distributing from the hopper to the grate a layer of fuel of the desired shape and thickness, substantially as set forth. 100

In testimony whereof I hereunto set my hand and seal.

WILLIAM H. BERRY. [L. S.]

Witnesses:

RICHD. WETHERILL,
 F. L. PERKINS.