

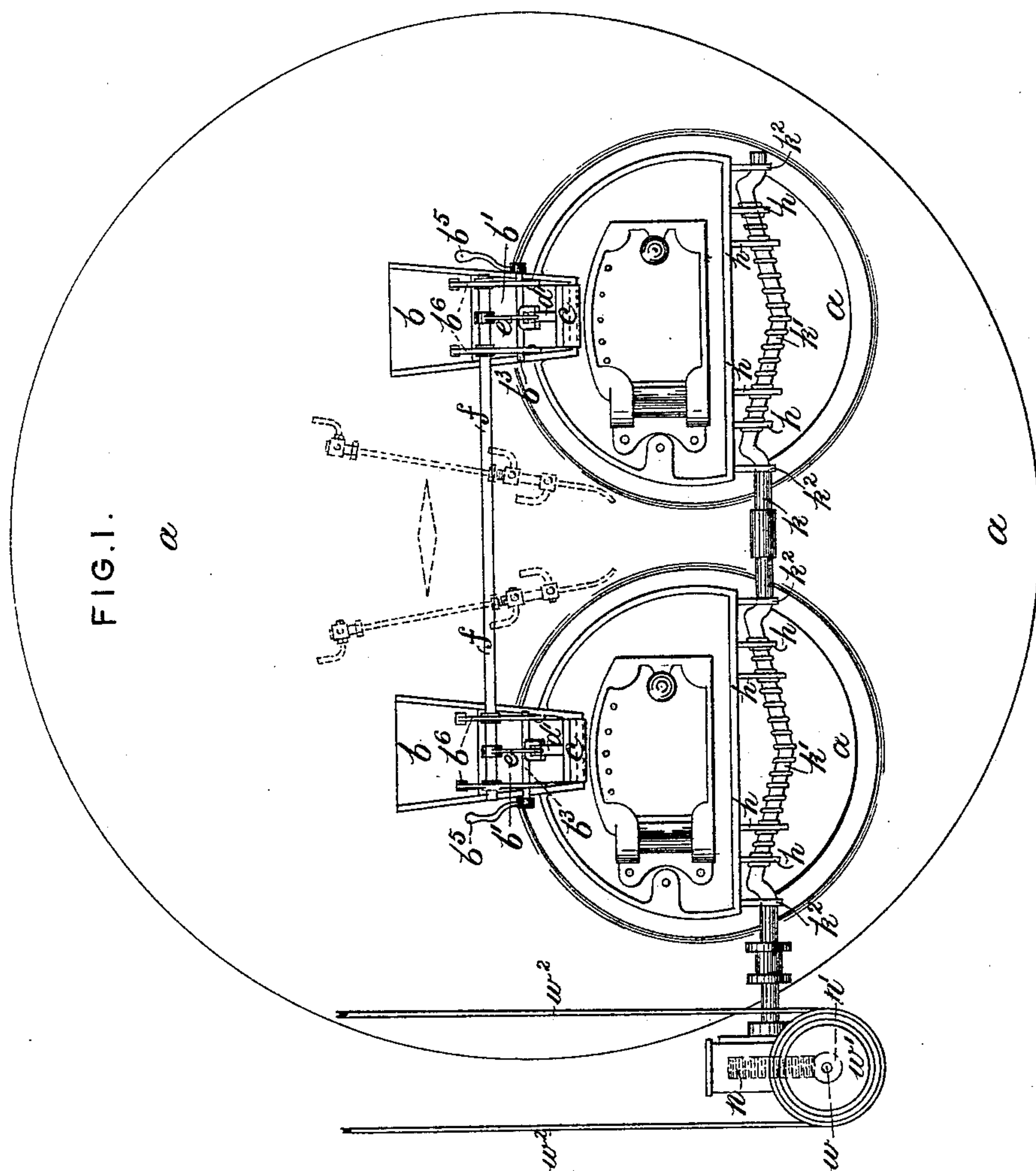
(No Model.)

3 Sheets—Sheet 1.

T. HINSON.
STEAM BOILER FURNACE.

No. 602,755

Patented Apr. 19, 1898.



Witnesses:
Guy A. Curand
Wm. R. Davis

Inventor
Thomas Hinson
by W. H. Babcock
Attorney

(No Model.)

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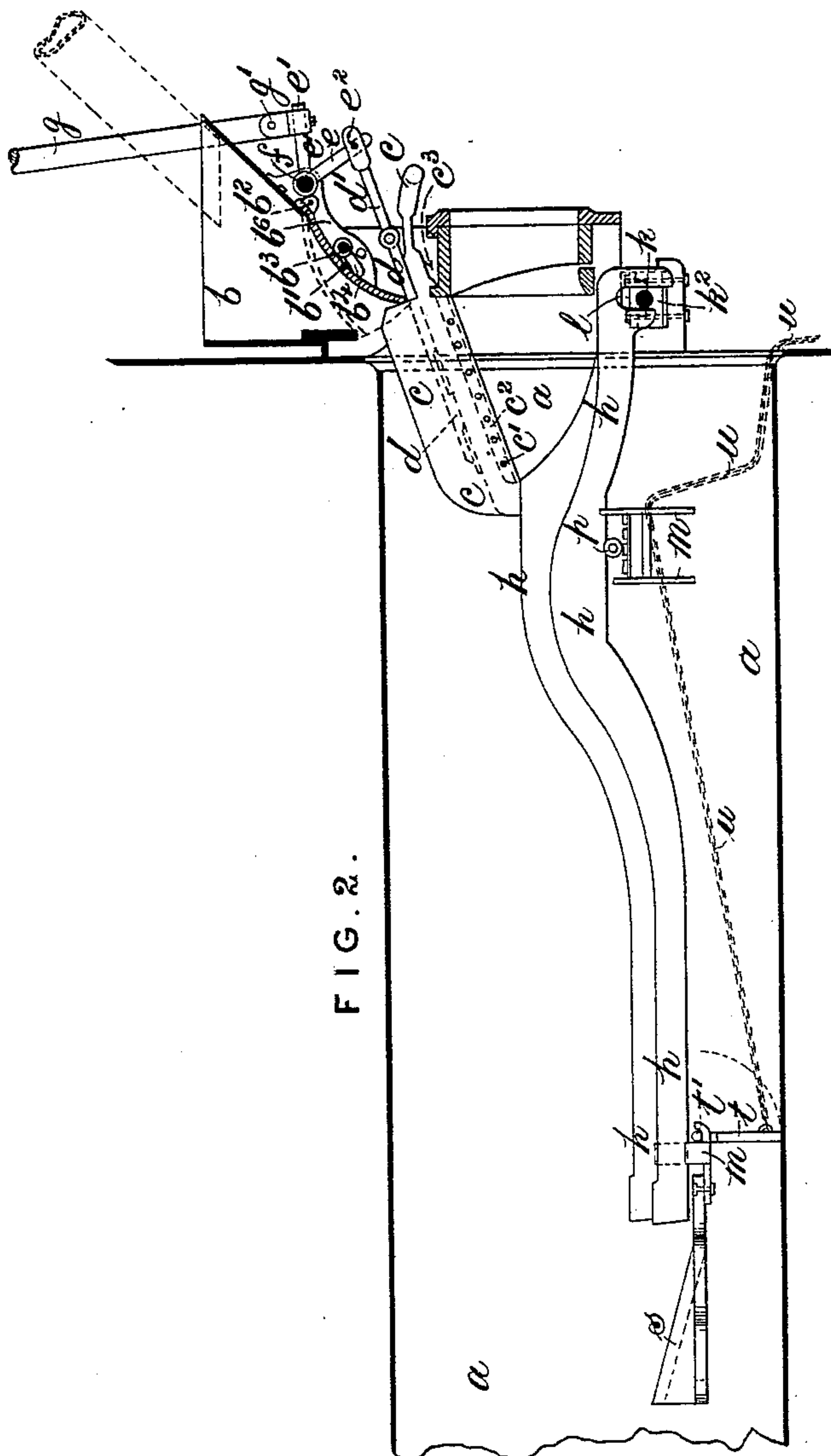


FIG. 2.

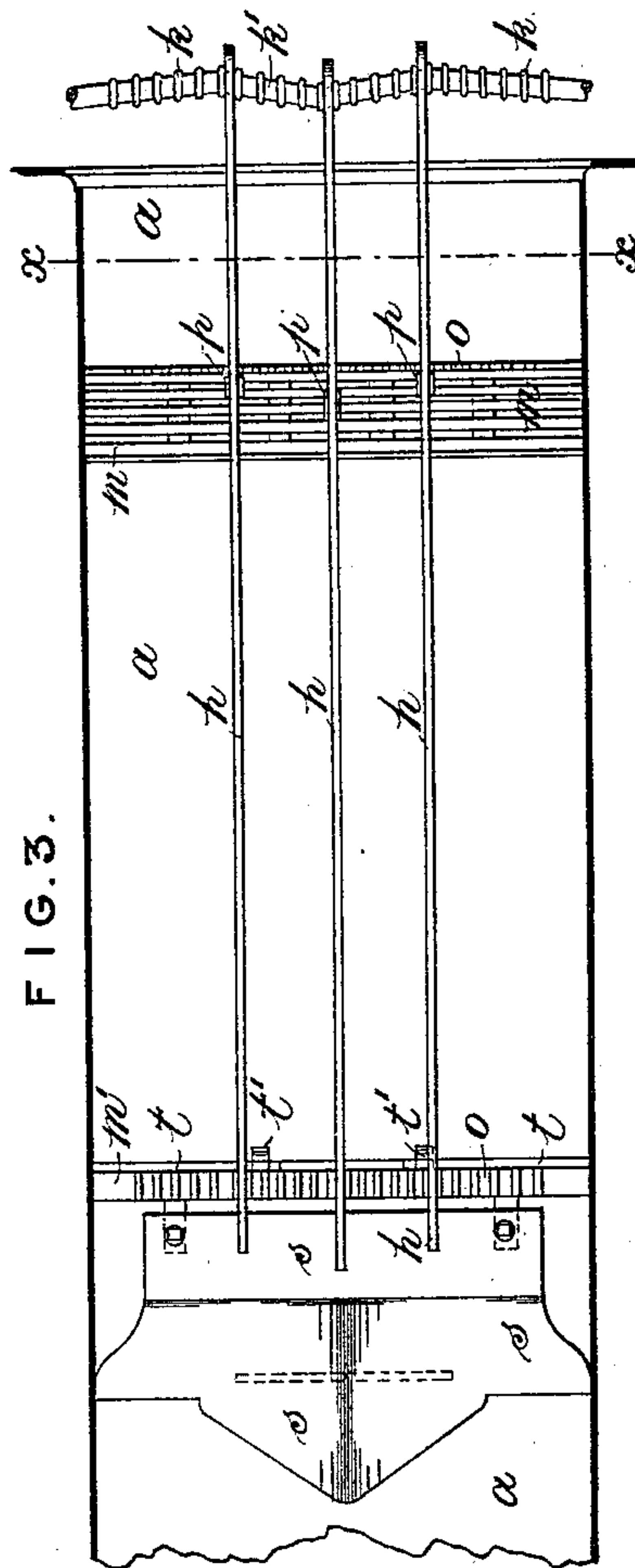


FIG. 3.

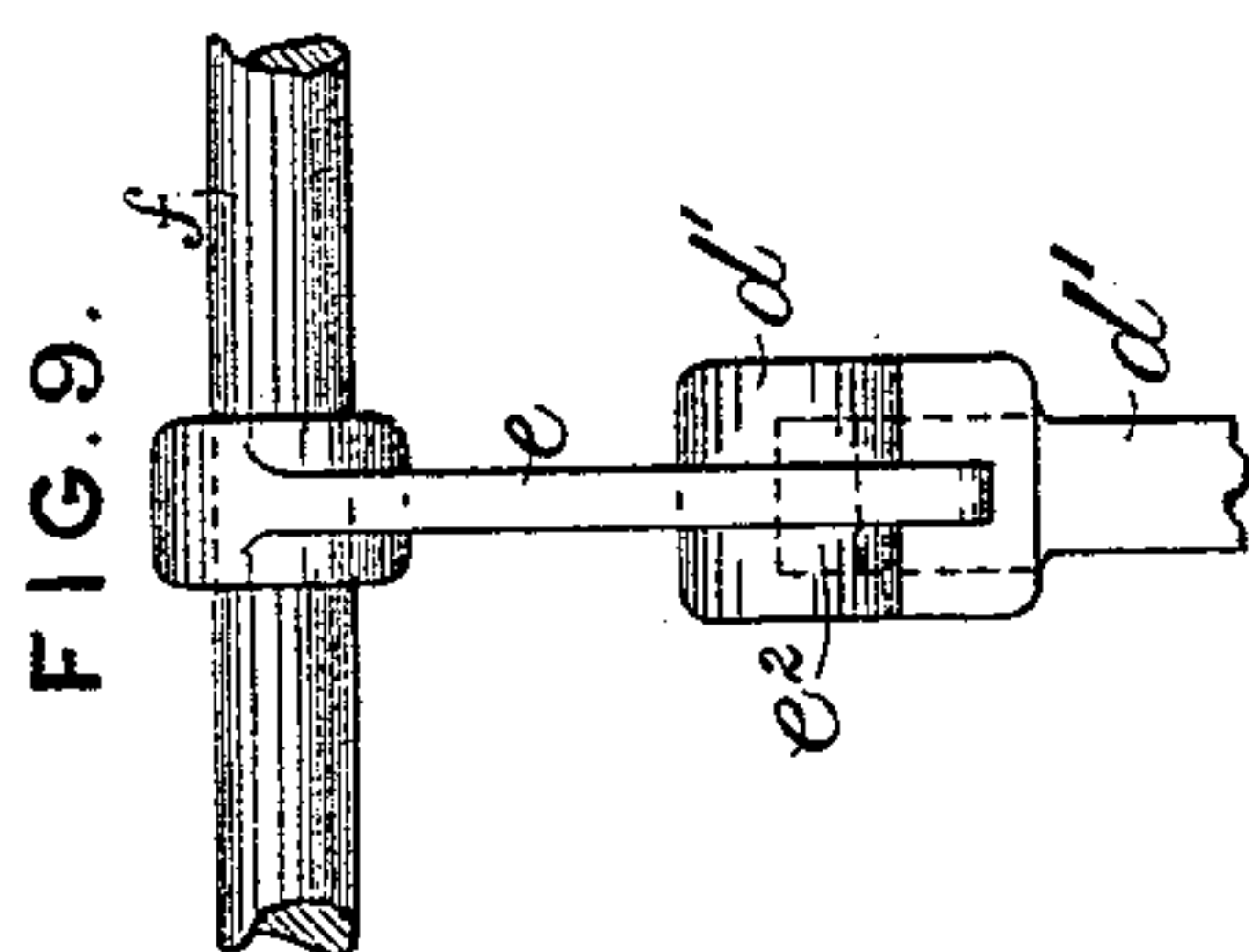


FIG. 9.

Witnesses:
Guy A. Omand.
Wm. R. Davis

Inventor
Thomas Hinson
by Wm. H. Babcock
Attorney

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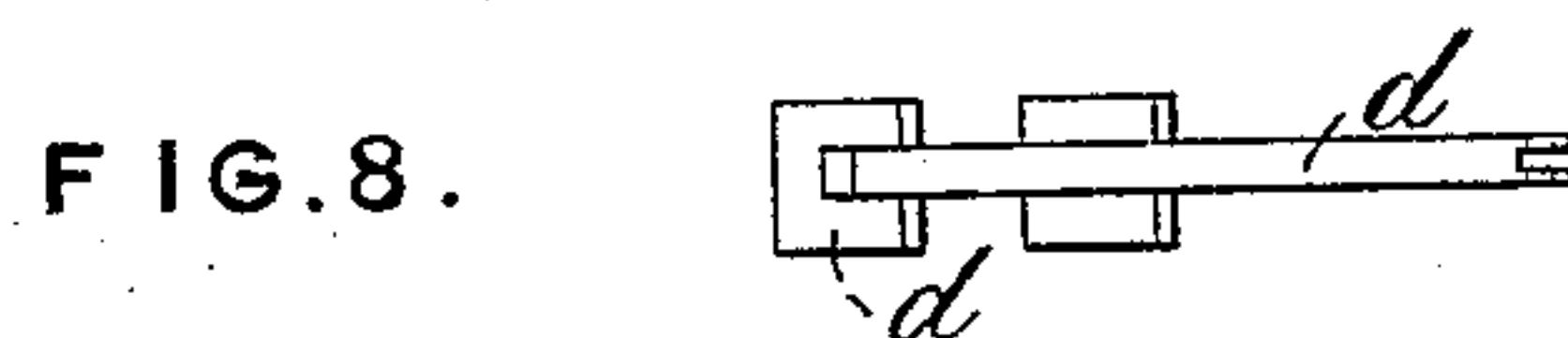
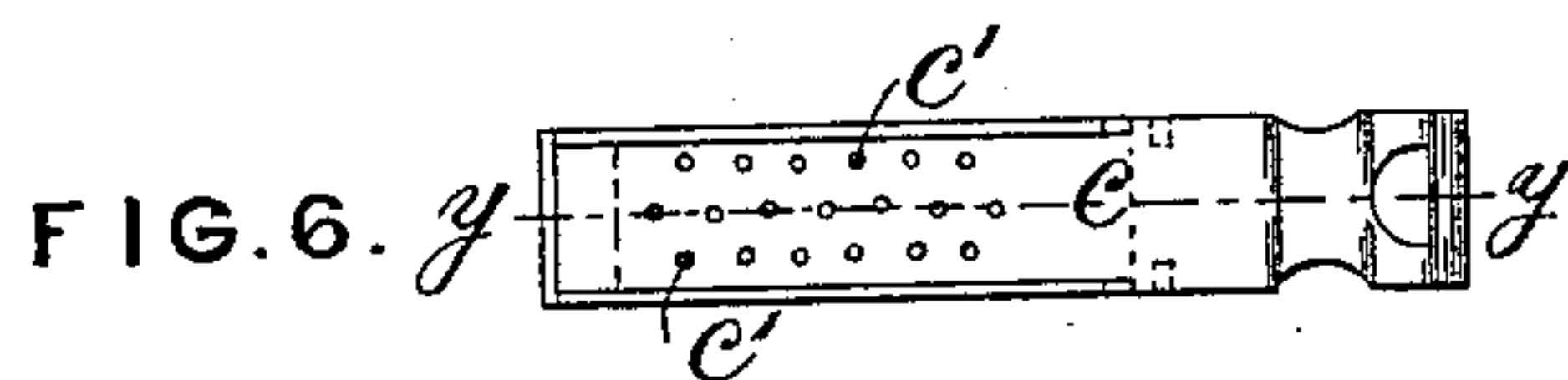
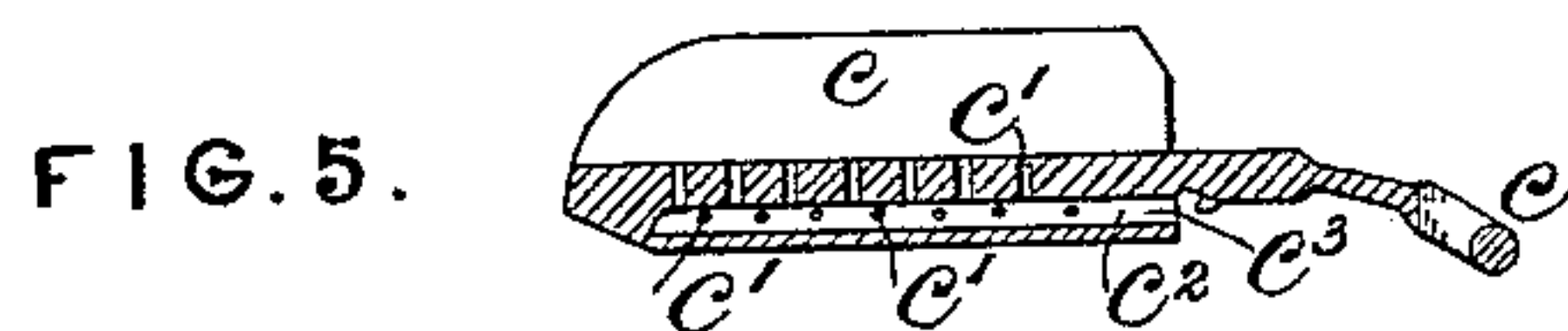
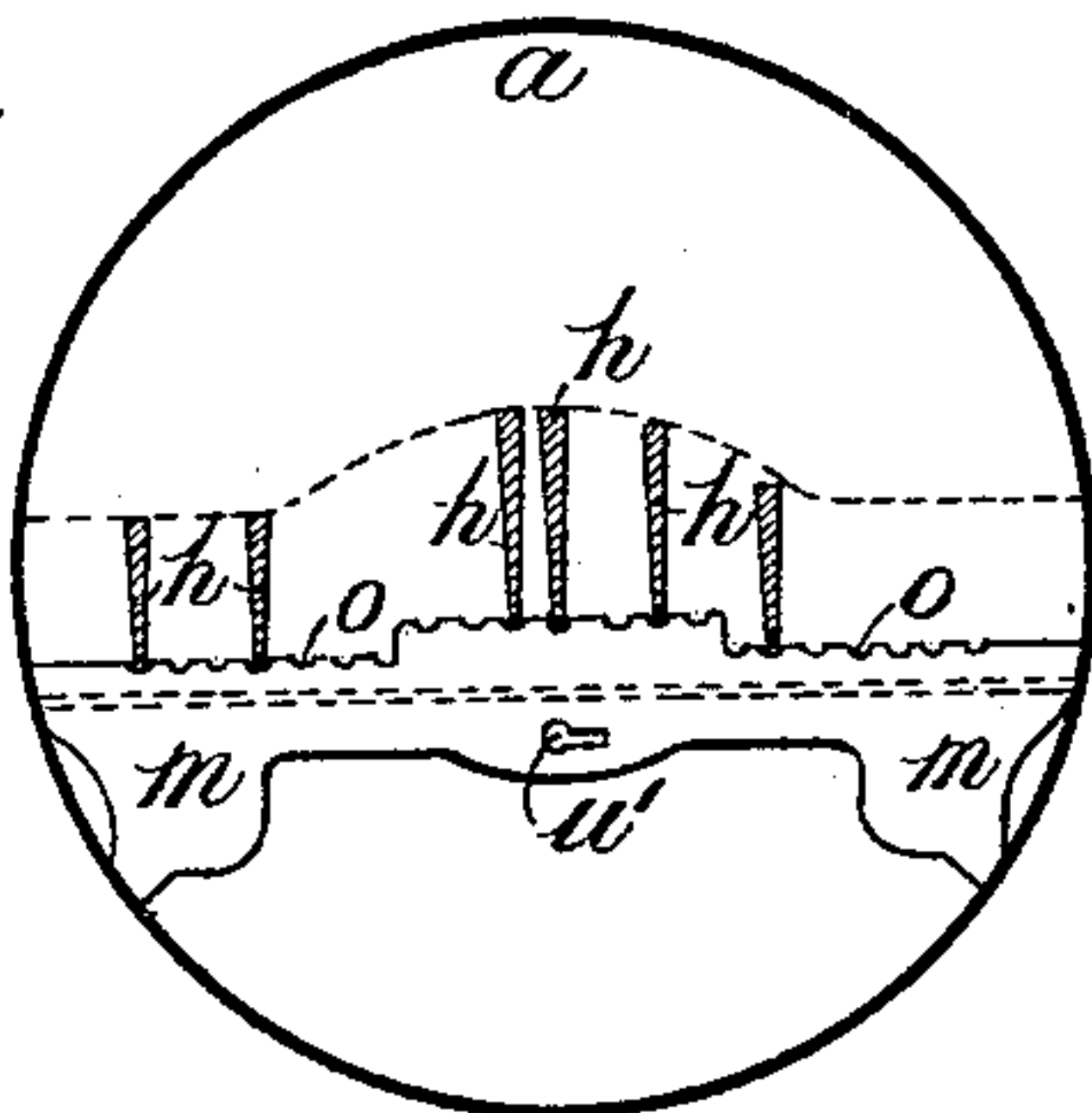


FIG. 4.



Witnesses:
Guy A. Curand
W. R. Davis

Inventor
Thomas Hinson
by W. H. Babcock
Attorney

UNITED STATES PATENT OFFICE.

THOMAS HINESON, OF ASHTON-UNDER-LYNE, ENGLAND.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 602,755, dated April 19, 1898.

Application filed February 3, 1897. Serial No. 621,881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HINESON, a subject of the Queen of Great Britain and Ireland, and a resident of 3 Rutland street, Ashton-under-Lyne, county of Lancaster, England, have invented certain Improvements in or Applicable to Steam-Boiler or other Furnaces, of which the following is a specification.

My said invention relates to improvements in or applicable to steam-boiler and other furnaces which burn coal, coke, or other solid fuels in a fragmentary condition.

In order that my said invention may be more clearly understood, I will describe the same with reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a two-flued Lancashire boiler, showing the invention applied to each furnace. Fig. 2 is a longitudinal section through one of the boiler-furnaces. Fig. 3 is a sectional plan of Fig. 1. Fig. 4 is a section through xx of Fig. 3. Fig. 5 is a section through yy of Fig. 6 to be hereinafter described. Fig. 6 is a plan of Fig. 5. Figs. 7 and 8 are side elevation and plan, respectively, of the sliding scraper to be hereinafter described. Fig. 9 illustrates detail to be hereinafter referred to.

At the front of the furnace a I place a hopper b , to which the fuel may be supplied by hand labor or by means of a specially-devised conveying apparatus from the fuel-store. The said hopper b is provided with a door b' , hinged at b^2 to the brackets b^6 for closing the outlet when required.

Secured to the shaft b^3 is a projection b^4 , which comes in contact with the door of the hopper and closes same when the shaft b^3 is rotated by means of the handle b , (see Fig. 1,) mounted thereon.

The fuel descends by gravity through the hopper into a feed-chute or coking-box c inside the front part of the furnace, where it is subject to the heat of the furnace in such a manner as to become heated, and in the case of coal partly coked before reaching the fire-bars. The said feed-chute c is provided with an air-chamber c^2 , Figs. 2 and 5, into which air, or, if desired, air and steam, is admitted at c^3 and passes through perforations c' in the bottom or sides of the detachable feed-chute. In some cases the bottom of the

chamber may be left away, when hot air from the front of the furnace may be passed through the perforations to the fuel in the feed-chute. For removing the fuel from the said feed-chute c I provide one or more scrapers d , sliding under the fuel in the feed-chute. The said scraper d , connected at d' to the arm e on the shaft f , is operated by the reciprocating bar g , connected at g' to the arm e' and deriving motion from a crank-eccentric or other like device placed at any convenient position over the hopper. When the said scraper d is drawn back, the weight of the superincumbent fuel in the hopper b prevents the retreat of the fuel, but when pushed forward a portion of the fuel is discharged onto the fire-bars h .

The feed-chute and scraper are so constructed as to be easily removable. For this purpose the arm e has a pin e^2 , Fig. 9, taking into a slot in the connecting-piece d' , which is hinged to the scraper d . By simply turning up the connecting-piece d' it is disconnected from the arm e . The door b' is then lifted, when the feed-chute c and the scraper d may be withdrawn. The furnace may then be fired by hand or the fuel may be "banked up" in the usual way for a temporary stoppage without burning away the feed-chute.

The fire-bars h are preferably arranged so as to be higher along the center of the furnace than at the sides, toward which the fuel-bearing surfaces of the bars slope in easy curves or inclines, as shown at Fig. 4.

In order to facilitate the progress of the fuel to the back of the furnace while being burned, the fire-bars h are curved or inclined downward from the end of the feed-chute c toward the rear of the furnace. A similar curve or incline extends from the feed-chute c toward the front of the furnace.

Each fire-bar h receives an oscillating or reciprocating motion in the direction of the length of the boiler. This oscillating or reciprocating motion is obtained from a multiple throw-crank k , rotating in adjustable bearings k^2 , bolted or otherwise secured to the lower part of the hopper-frame, as shown at Fig. 2, and having as many journals or acting portions as there are fire-bars. Secured to the shaft of the said multiple throw-crank k is a worm-wheel n , gearing into a worm n' ,

operated by means of the belt w^2 , passing around the pulley w' , secured to the shaft w . The journals or acting parts k' of the crank k engage with the slots l in the fire-bars h , and thereby impart a to-and-fro motion to the latter as the crank k revolves. The distribution of the journals or acting parts of the crank k about its center of rotation is so arranged as that all of the fire-bars h have not simultaneously the same phase of their respective oscillations. Consequently during any given short interval of time some of the bars h are advancing, some are retreating, while others are practically stationary, owing to the journals k' of the crank k , which operate the latter, being at their "dead-centers." The sides of the slot l have unequal lengths so proportioned that as the journal advances it clears itself from the short rear limb of the slot when passing downward. It, however, takes against the long front limb of the slot when rising. By this construction I am enabled to readily withdraw any single fire-bar when its journal is in its lowest position. On the under side of the fire-bars and resting on the sides of the furnace are bearers m m' , provided with grooves or guides o , Figs. 3 and 4, in which slide the fire-bars h . Flanged rollers or bowls p , moving on the front bearer m and engaging on the under side of each of the fire-bars, serve to diminish friction. The front bearer m is constructed as a grating in order to allow any coal-dust which may fall thereon to pass through. Owing to the differential motion of the fire-bars thus produced the fuel is continually agitated during its combustion and gradually progresses to the rear end of the furnace, where it is discharged from the bars h onto a plate s , having inclined sides which cause it to fall onto the bottom of the furnace.

A chain u , secured to the door t , hinged at t' to the back bearer m' and passing through

a slot u' , formed in the front bearer m , allows the door t to be opened from the front of the boiler and enables the bottom of the furnace to be cleared out from the back thereof.

I am aware that it is not new to combine stationary grate-bars with alternately-arranged fire-bars reciprocating in the direction of their length; also, that it is not new to combine with a crank-shaft a series of fire-bars arranged for successive operation; also, that it is not new to provide a furnace with an inclined coking-box and scraper. Therefore I do not claim, broadly, any of these constructions and combinations; but

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

1. A series of fire-bars h movable individually in succession in the direction of their length, in combination with a multiple crank-shaft having its cranks arranged in different radial positions, in order that they may operate the said fire-bars one after the other, and a grate having its fixed bars arranged alternately with the said fire-bars substantially as set forth.

2. A series of fire-bars h movable individually in succession in the direction of their length, in combination with a multiple crank-shaft having its cranks arranged in different radial positions, in order that they may operate the said fire-bars one after the other, a grate having its fixed bars arranged alternately with the said fire-bars, and an inclined coking-box and scraper substantially as set forth.

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

THOMAS HINESON.

Witnesses:

JOHN HULL,
ROBERT H. DICKINSON.