

(No Model.)

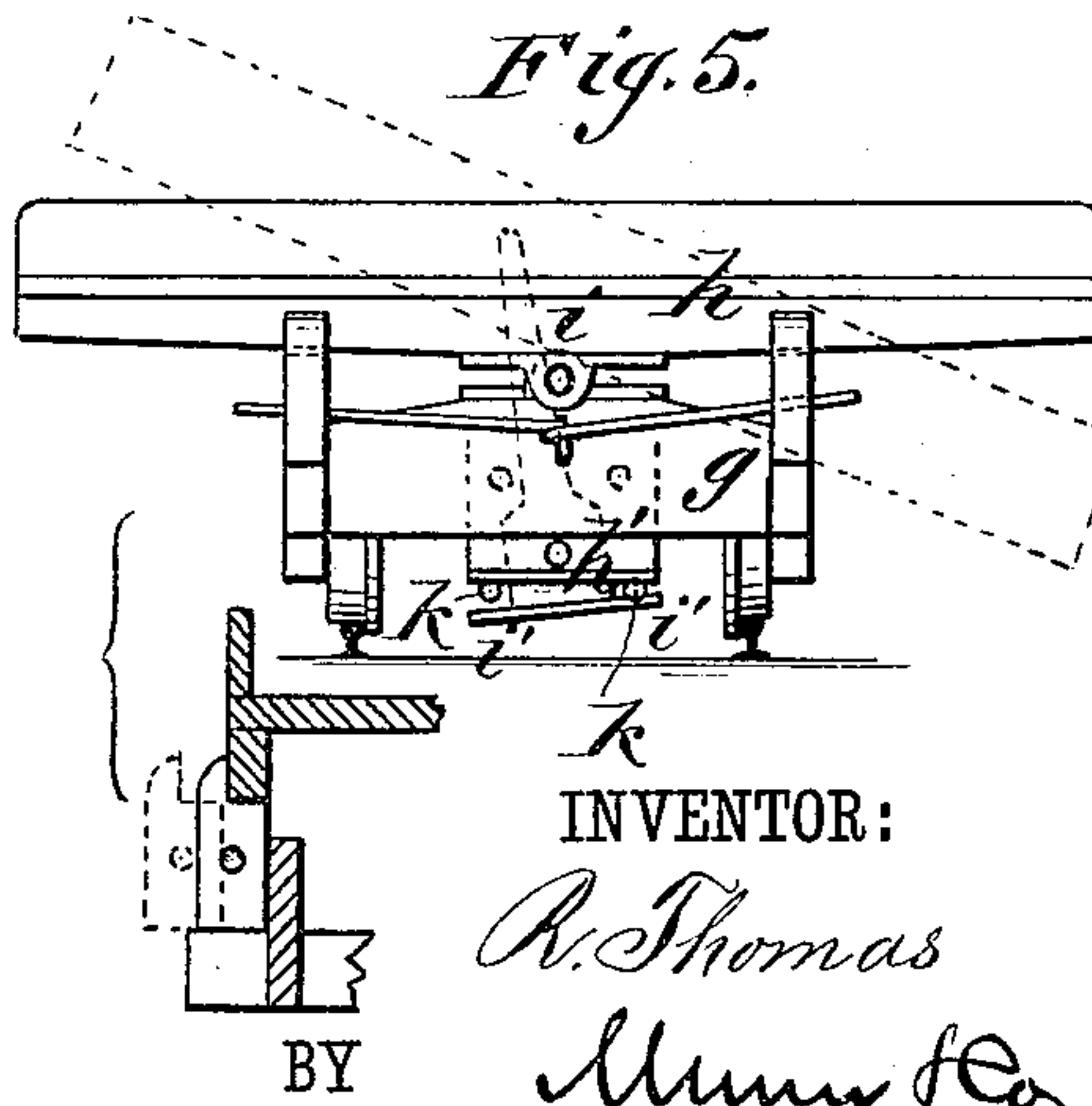
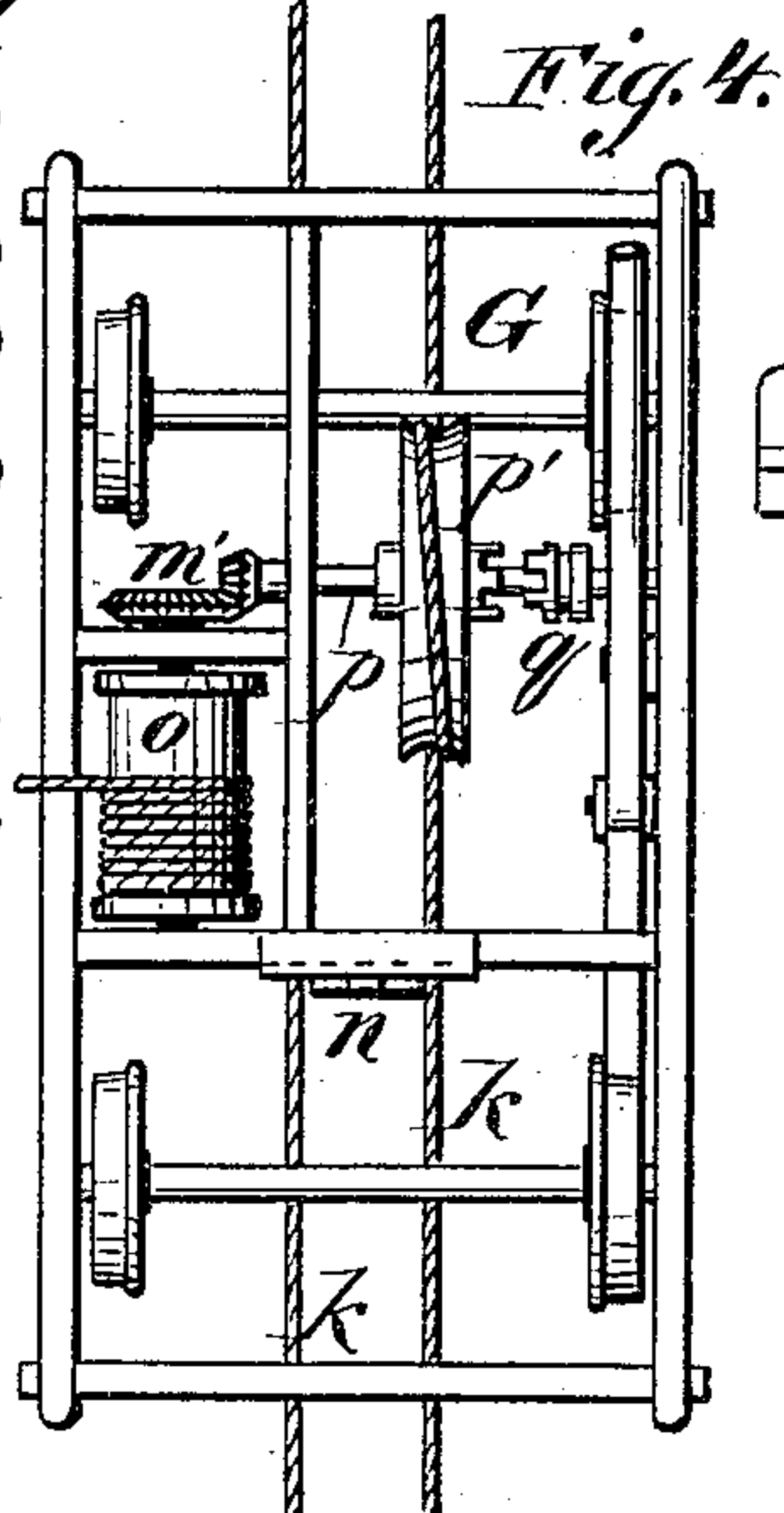
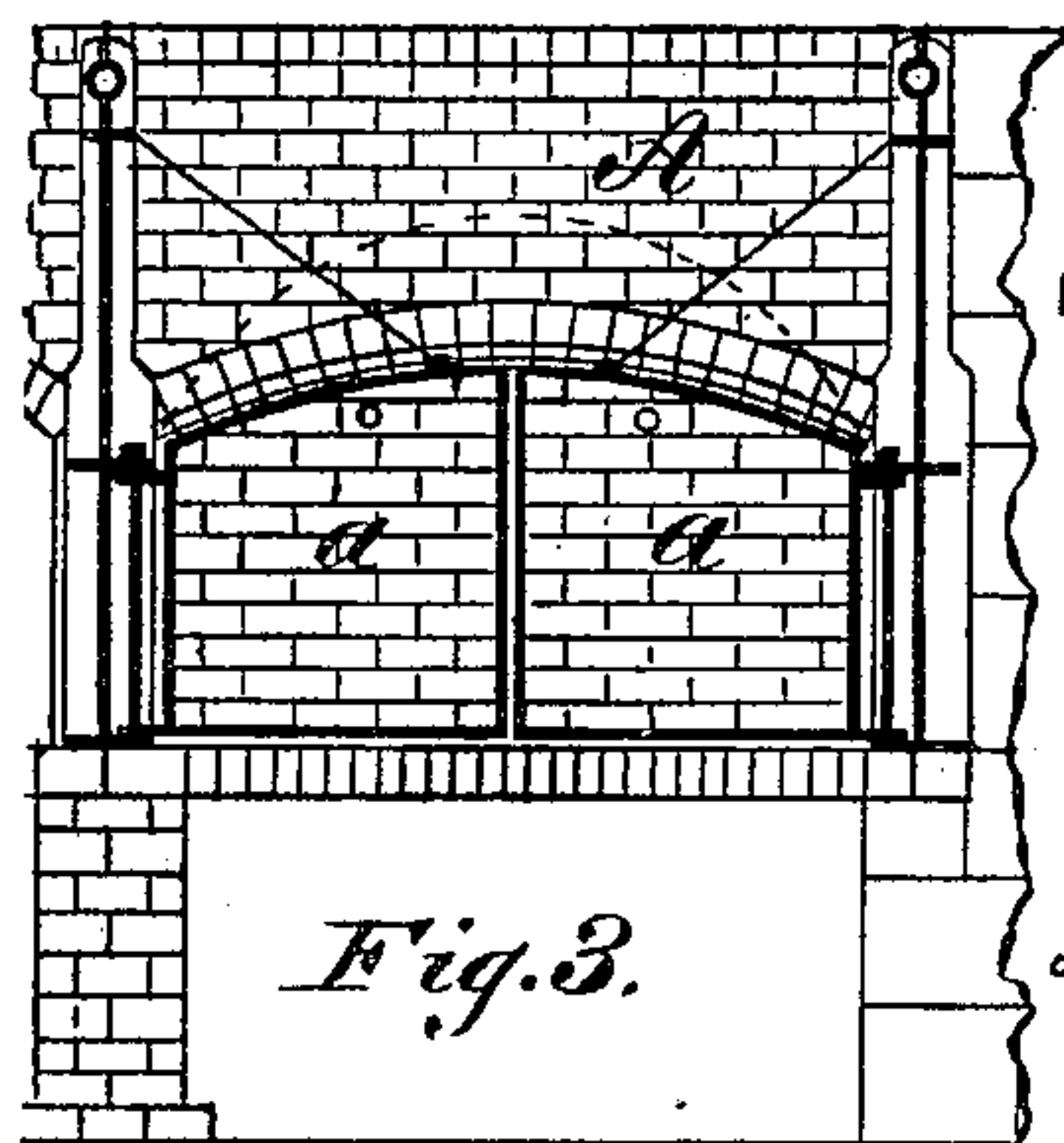
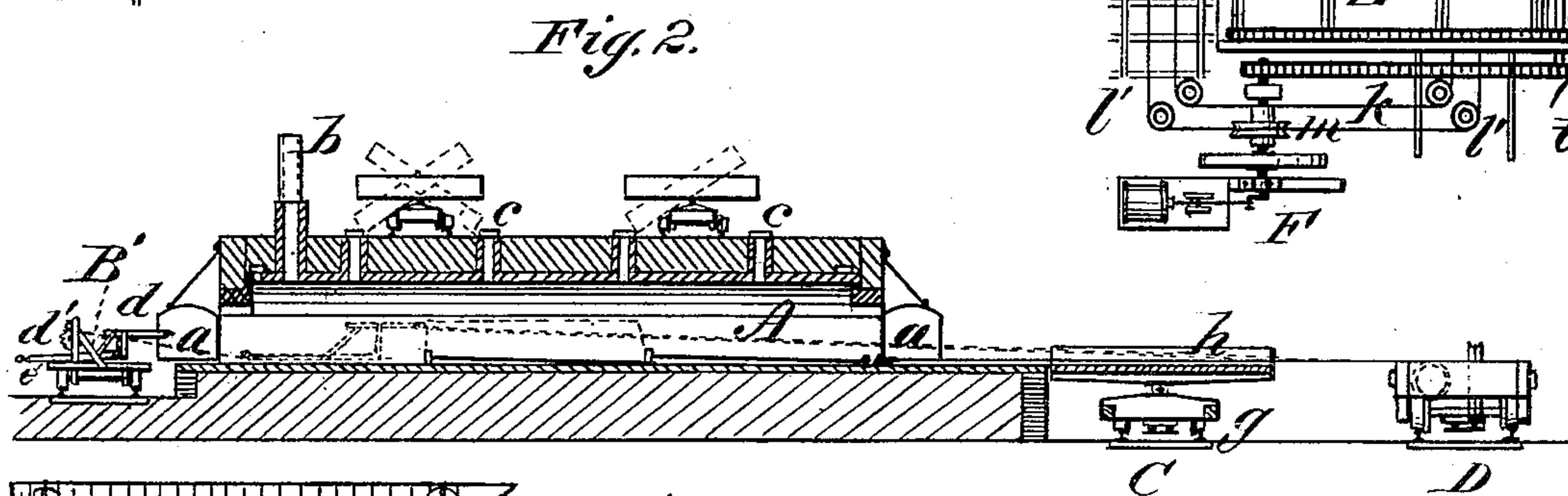
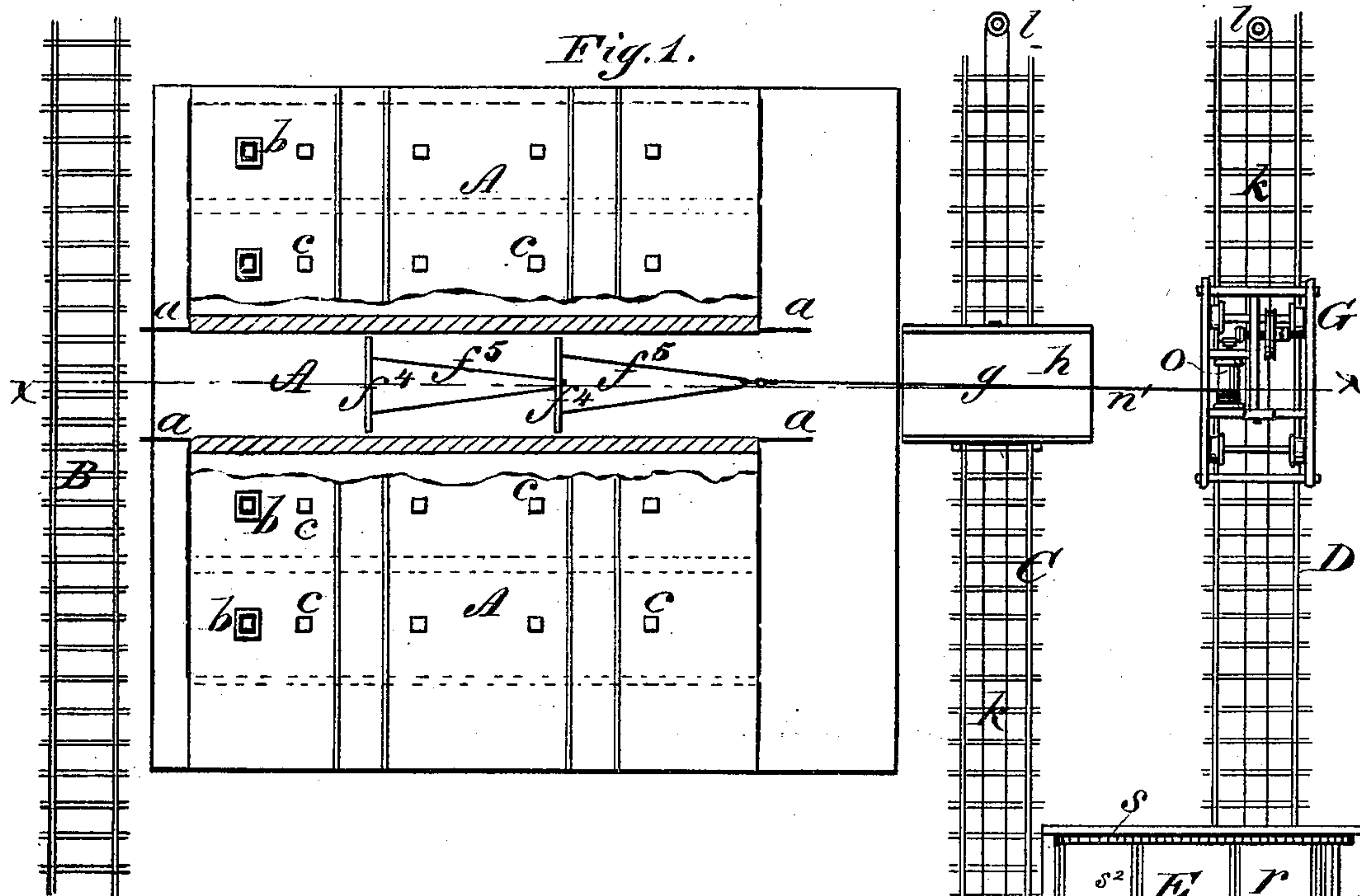
2 Sheets—Sheet 1.

R. THOMAS.

COKE FURNACE AND APPARATUS CONNECTED THEREWITH.

No. 249,694.

Patented Nov. 15, 1881.



WITNESSES:

Donn S. Twitchell,
C. Sedgwick

INVENTOR:

R. Thomas

BY

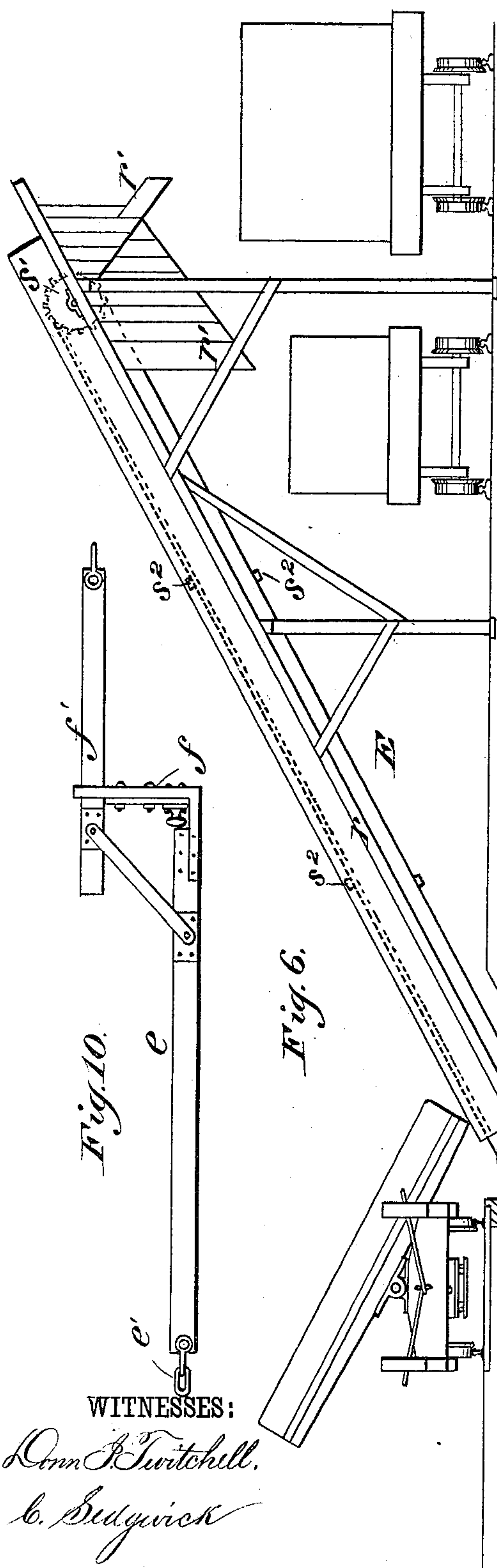
Munn & Co

ATTORNEYS.

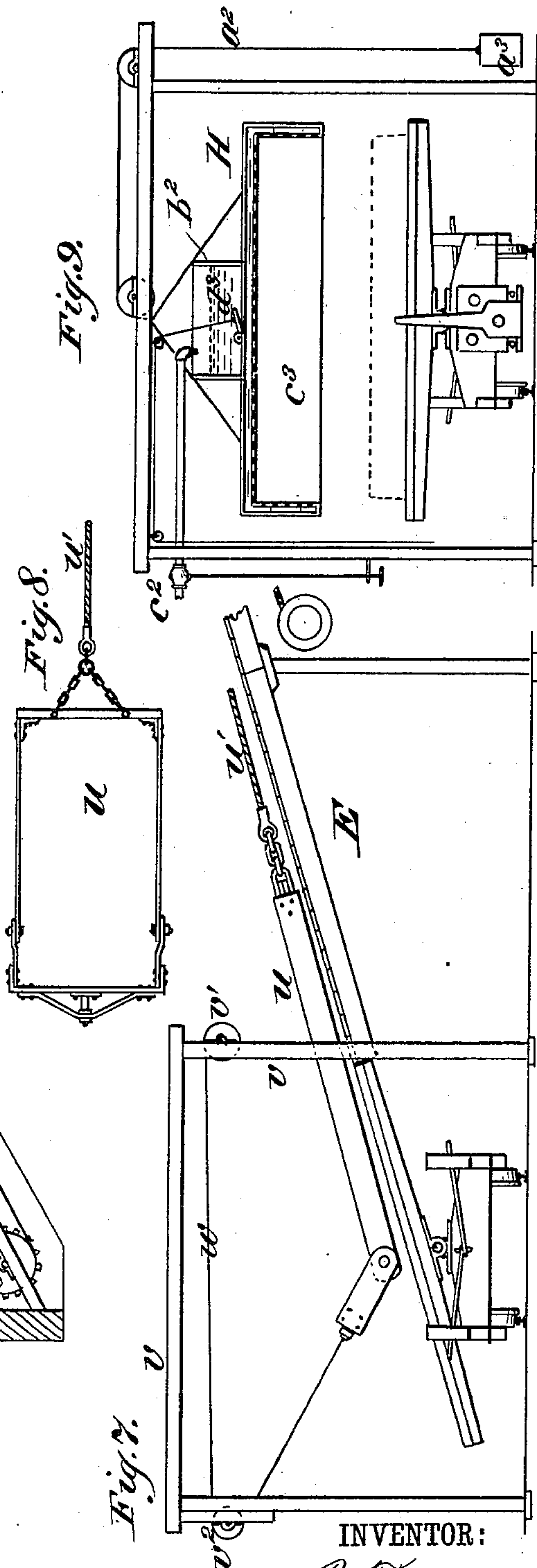
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UNITED STATES PATENT OFFICE.

RICHARD THOMAS, OF CARBONDALE, ILLINOIS.

COKE-FURNACE AND APPARATUS CONNECTED THEREWITH.

SPECIFICATION forming part of Letters Patent No. 249,694, dated November 15, 1881.

Application filed June 18, 1881. (No model.)

To all whom it may concern:

Be it known that I, RICHARD THOMAS, of Carbondale, in the county of Jackson and State of Illinois, have invented certain useful Improvements in Coke-Furnaces and Apparatus Connected Therewith, of which the following is a specification.

The object of my improvements is to provide for the convenient charging of coke-furnaces, removal of coke, and the subsequent handling of the same. For this purpose I combine with the furnaces tramways provided with a winding-engine and cars, elevators for receiving and elevating the coke, and use scrapers of novel form, all of which are set forth in the detail hereinafter, with reference to the accompanying drawings, forming part of this specification.

In the drawings, Figure 1 is a sectional plan view of the apparatus. Fig. 2 is a vertical longitudinal section of one of the furnaces, and Fig. 3 is an end view of the same. Fig. 4 is a plan view of the windlass-truck. Fig. 5 is an end view of the dumping-car used for carrying the coke. Fig. 6 is a side elevation of the elevator and dump. Fig. 7 is a side view, showing a modification of the elevator, and Fig. 8 is a plan view of the elevating-scraper. Fig. 9 is a sectional elevation of the devices used to wet down the coke, and Fig. 10 is a side view of the furnace-scraper.

Similar letters of reference indicate corresponding parts.

Referring first to Figs. 1, 2, and 3, A A A are the furnaces or retorts built side by side at a suitable elevation in any desired number. The furnaces are provided with doors *a a* at each end, a chimney, *b*, near one end for escape of gas, and with well-holes *c c* at the upper side for use in charging the furnaces.

At the front and rear of the stack of furnaces there are placed tracks for use in the removal of the coke, as hereinafter described. At the rear is the single track B, and at the front there are two parallel tracks, C D, all of which tracks are depressed or placed so that the cars shall be on a level with the furnace-bottoms. At one end of the tracks C D, which may be more or less distant from the furnaces, is placed the elevator and dump E, and near that is the winding-engine F.

In Fig. 2 of the drawings, the rear track, B,

is furnished with a platform-car, *d*, carrying a scraper, which is to be drawn through the furnaces for removal of the coke. The form of scraper I prefer is shown in Fig. 10 most clearly, and consists of a frame, *e*, provided with scraping-blades *f* and an elevated tongue, *f'*, at the forward end for connection of the draft-chain. An eye-bolt, *e'*, is also provided at the rear end for connection of a chain from a windlass, *d'*, on the car *d*, so that the scraper can be drawn back upon the car. The car and track serve as convenient means for moving the scraper along to the furnaces in succession.

The track C at the front is furnished with a car, *g*, that has a pivoted platform, *h*, that can be tipped to dump the load. In Fig. 5 an end view of this car is shown in the form I prefer; but I do not limit myself in that respect. At one end of the car a lever, *i*, is hung, which lever has its lower end formed with flanges *i' i'* that form a double clutch operating in connection with a fixed plate, *h'*, for clamping either side of an endless traction-rope, *k*, by which the car is moved. The traction-rope *k* extends between the rails of both tracks, C D, around sheaves *l l' l' l'* placed at the ends of the tracks, so that it is continuous and double on each track. One side or line of the rope passes around a grooved drum or pulley, *m*, of the winding-engine F, by which the rope is to be given a continuous movement in one direction.

On the track D is the windlass truck or car G. This, as shown most clearly in Fig. 4, is fitted with a double-clutch lever, *n*, for engaging either side of the traction-rope, so that the truck can be propelled in either direction.

o is a winding-drum mounted on truck G, carrying a rope, *n'*, for connection to the scraper *e*.

p is a cross-shaft mounted in suitable bearings on the car, and connected by bevel-gearing *m'* with the shaft or drum *o*. *p'* is a grooved pulley, loose on shaft *p*, around which the traction-rope *k* passes. The hub of this pulley is formed as a clutch, and the shaft *p* has a clutch, *q*, fitted for movement by a suitable lever, to engage the pulley, and thereby connect the shaft and pulley. The pulley *p'* being turned by the rope, it will, when connected with the shaft, turn the winding-drum through the bevel-gearing.

The elevator and dump at the end of the tracks, as shown most clearly in Fig. 6, consists of an inclined platform, r , provided at the upper end with chutes r' , and with endless chains s running over chain-wheels s' at the top and bottom of the platform. The shaft of the upper chain-wheels s' , as shown in Fig. 1, is provided with an additional chain-wheel, from which a chain, t , passes to a chain-wheel on the shaft of the winding-engine F , so that the engine serves to drive the elevating-chains. The chains s carry bars or scrapers s^2 at intervals for carrying the coke upward to the chutes r' .

In Fig. 7 a modification of the elevator is shown. In this case the endless chains are dispensed with, and a box-like frame, u , (shown by plan view in Fig. 8,) is fitted for being drawn up the platform r by a rope or chain, u' . The lower end of the platform r terminates above the car, so that the tilting-box of the car can be turned to form a continuation of the platform, as shown. At the base of the platform there is fixed a gallows-frame, v , carrying a windlass, v' , from which a rope, w , passes over a friction-pulley, v^2 , to the elevating-frame u . By winding the rope w the frame u is raised so that it can be brought over the car, and then let down to inclose the load.

Beneath the upper end of the elevating-platform r there will be tracks for the cars that receive the coke, as shown in Figs. 6 and 9.

It is preferable to wet the coke before being dumped, and for that purpose I provide a hood, H , suspended over the track, but at one side of the elevator, so as not to interfere with the discharge of the coke from the elevator into the cars by a rope, a^2 , and weight a^3 on a suitable frame. The hood is provided with a tank, b^2 , to which water is supplied by a pipe, c^2 , and in the bottom of the tank is an opening, from which perforated pipes c^3 extend within the hood. A valve, d^3 , is fitted to close the opening when the apparatus is not in use. The car being loaded, the hood H is drawn down over the coke and the valve d^3 then opened so that the water passing into pipes c^3 is discharged upon the coke.

The furnaces are charged through the well-holes c by means of cars run on tracks placed upon the stack, as shown in Fig. 2. The doors a are then closed, and the coking operation proceeds. To empty the furnaces, the car d is placed at the rear of the first furnace, and the cars g G at the front. The doors being then opened, the rope n' from the winding-drum is drawn through the furnace by means of a hooked iron rod which is passed through the oven from back to front, connected with the rope, and then withdrawn, and the rope connected to the scraper e by its clevis. The winding-drum o is then put in operation by connection of the clutch q , and the scraper being thus drawn through the furnace, the coke is drawn out and upon the car. The rope n' is then disconnected, and the scraper drawn back by operation of the windlass on B , the

rope of said windlass being connected to the scraper previous to the withdrawal of the charge. The operator on the loaded car then moves the clutch-lever i to connect with the rope k , the car is moved back to the elevator, and its load removed, as before described. After being unloaded the car is run to the second furnace by reversal of the clutch i . The truck G is also moved into line with the second furnace by connecting its clutch n with the traction-rope, and the car d being also moved to the rear of the second furnace, the operation may proceed as before. This is continued with the furnaces in succession, and the emptied furnaces can be in the meanwhile recharged without interference.

To allow of building the ovens longer than usual, I provide the drags or scrapers shown in Fig. 1, by which the coke can be drawn in successive charges. These drags are formed of cross-pieces f^4 f^4 , provided with loop or arms f^5 . The charges are divided for withdrawal into three batches, the oven having been charged as heavily as can be withdrawn in safety. Two drags are put into the oven before it is charged with coal, and two iron rods two-thirds the length of oven are placed about five feet apart. A drag is then pushed over the rods until the back or cross-piece drops off the end of the bars. The iron rods are then withdrawn from under the drag for one-third the length of oven. Then another drag is pushed in over the bars until the cross-piece or back of the second drag rests on the loop or hooking place of the first drag, and resting about twelve inches from the outer edge of the first drag. The two iron rods are then withdrawn and the oven charged with coal through the holes in the arch, the coal being dumped in from cars on top of the oven. Thus it will be seen that two drags are left in the oven under the charges. In withdrawing the charge the rope or chain from the windlass on car G is attached to the drag nearest the door, and this drag is withdrawn. In order to reach the second drag an iron rod with a hook and loop is used to hitch the chain to it. When this has been withdrawn two-thirds of the charge are out, and to withdraw the third in the back part of oven an iron rod of the same length as the oven is passed from back to front, and is provided with a loop into which the rope or chain is hooked. A man at the back part of the oven withdraws the rod and pulls the chain through the oven, when the chain is hitched to a clevis in the beam of the scraper. The scraper has another tail-beam, in the end of which is a clevis. Before the scraper is drawn into the oven the chain from the windlass is attached to the clevis in the back part of the scraper. As the scraper is pulled through with the third batch, the chain on the windlass is unwound, and follows the scraper through the oven. When the scraper has deposited the charge on the car in front of the oven the chain from the machinery is unhitched and the man at the windlass draws back the

scraper through the empty oven into the windlass-car ready for removal to the next oven. This leaves the oven clean of coke and ashes and ready for another charge.

5 The top of my car is covered with brick or other fire-proof material, and is on a level with the bottom of oven. The whole of one charge is ready to be removed in a compact body to the extinguisher, where the coke is cooled under cover, goes through a sort of annealing process, and is improved in quality.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

15 1. The plant for manufacture of coke consisting of the elevated furnaces or retorts A, provided with doors at both ends, the tracks B C D, elevating apparatus E, engine F, and endless traveling rope *k*, combined substantially as shown and described.

20 2. The truck or car G, provided with winding-drum *o*, the platform-car *g*, scraper *f*, and car *d*, in combination with the coke-furnaces A and tracks B C D, substantially as shown and described.

25 3. In apparatus for manufacture of coke, the

truck G, provided with drum *o*, shaft *p*, pulley *p'*, and catch *q*, in combination with the track D and endless traveling rope *k*, substantially as specified.

30 4. The combination of the inclined platform *r*, provided at upper end with chutes *r'*, and the endless chains *s s*, having at intervals the scrapers *s²*, said platform and chains being arranged at an incline, for the purpose specified.

35 5. In apparatus for the manufacture of coke, the suspended hood H, tank *b²*, water-supply pipe *c²*, perforated pipes *c³*, and valve *d³*, substantially as shown and described, in combination with the elevator-platform *r* and car-track, for use as specified.

40 6. A scraper for coke-furnaces, consisting of the frame *e*, having the scraper-blades *f* rising vertically from the front end, a draft-tongue, *f'*, secured at the upper part of said blades, and rear eyebolt, *e'*, whereby it can be drawn back and forth in opposite directions.

RICHARD THOMAS.

Witnesses:

B. W. MOORE,

JOHN W. LIGHTFOOT.