

(No Model.)

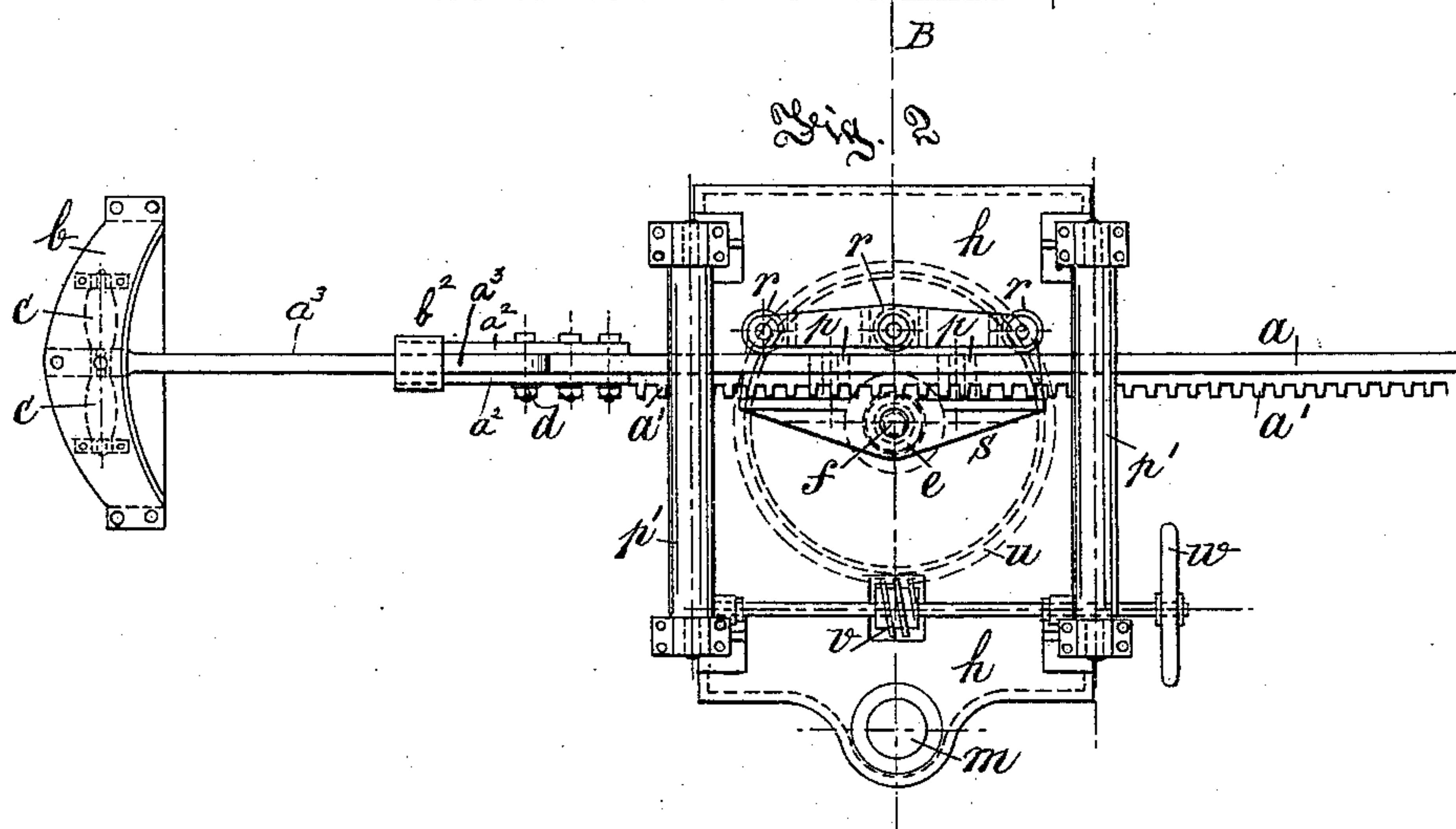
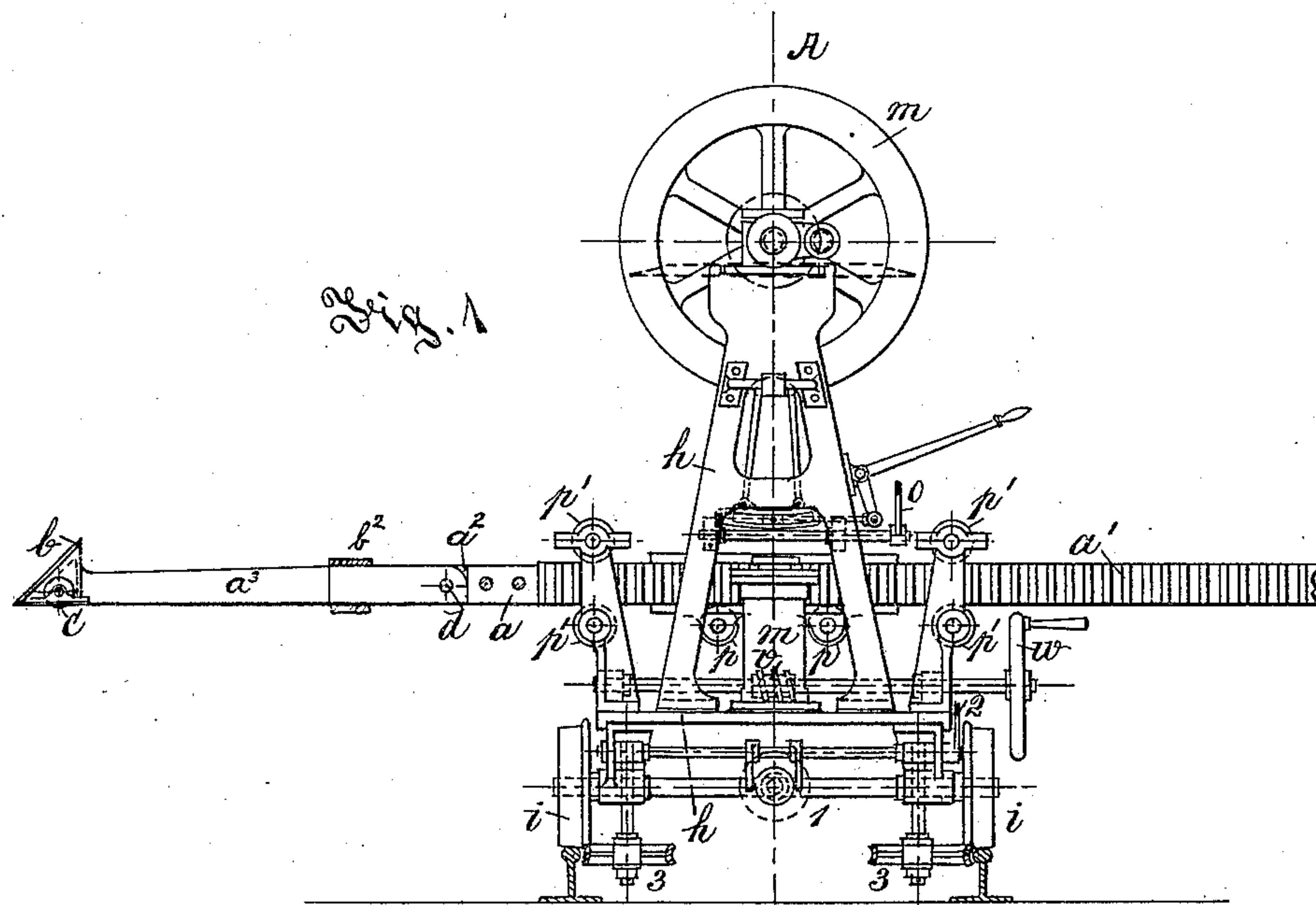
3 Sheets—Sheet 1.

T. SMITH.

APPARATUS FOR EXTRACTING COKE FROM OVENS.

No. 446,936.

Patented Feb. 24, 1891.



Witnesses:
Wm H Muzzey
J B Leare

Inventor:
Thomas Smith
By Wm H Balrock
Atty.

(No Model.)

3 Sheets—Sheet 2.

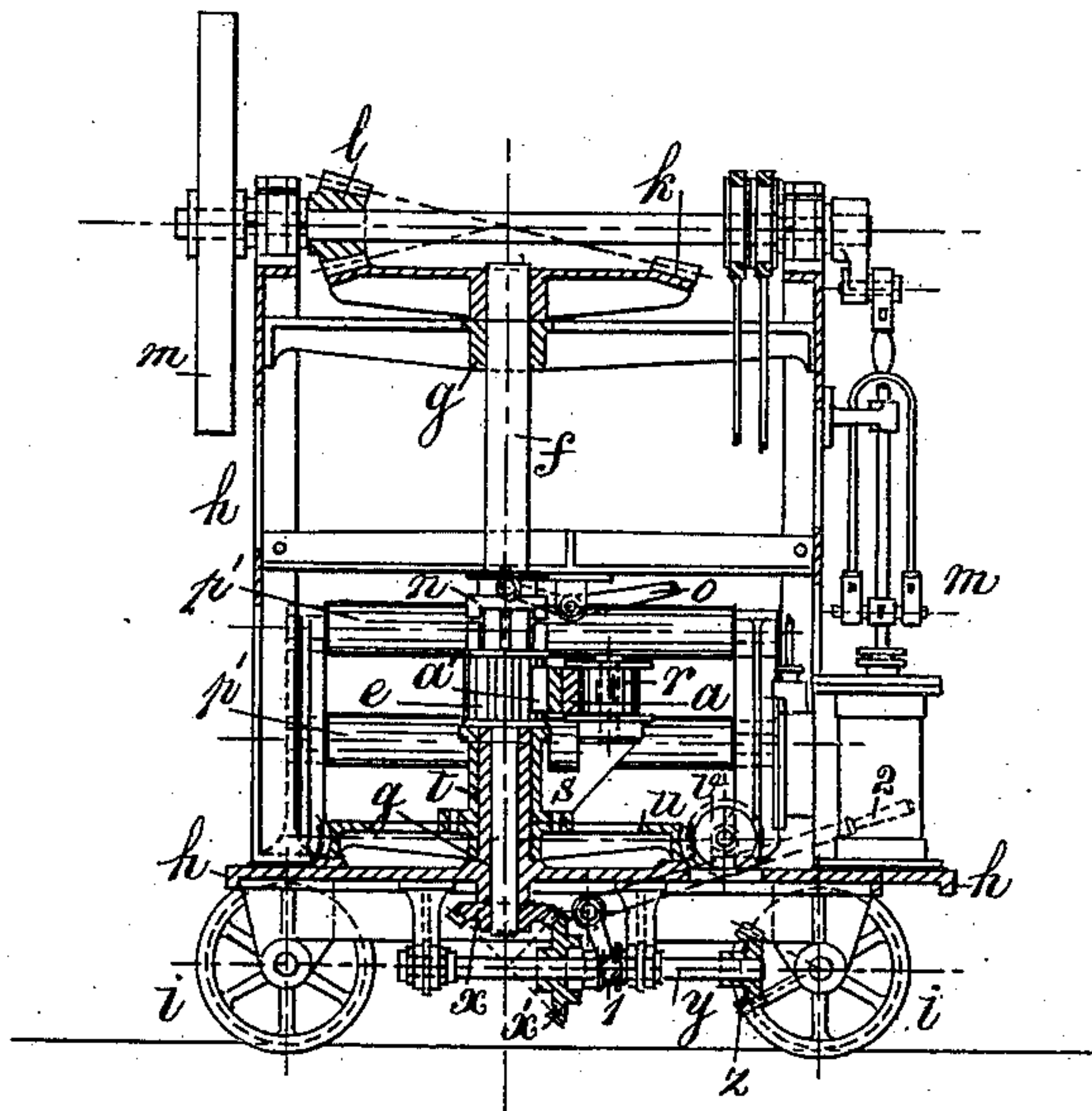
T. SMITH.

APPARATUS FOR EXTRACTING COKE FROM OVENS.

No. 446,936.

Patented Feb. 24, 1891.

July. 3



Witnesses:
Wm H Muzzy
Bleore

Inventor:
Thomas Smith
By Wm H Babcock
Atty

(No Model.)

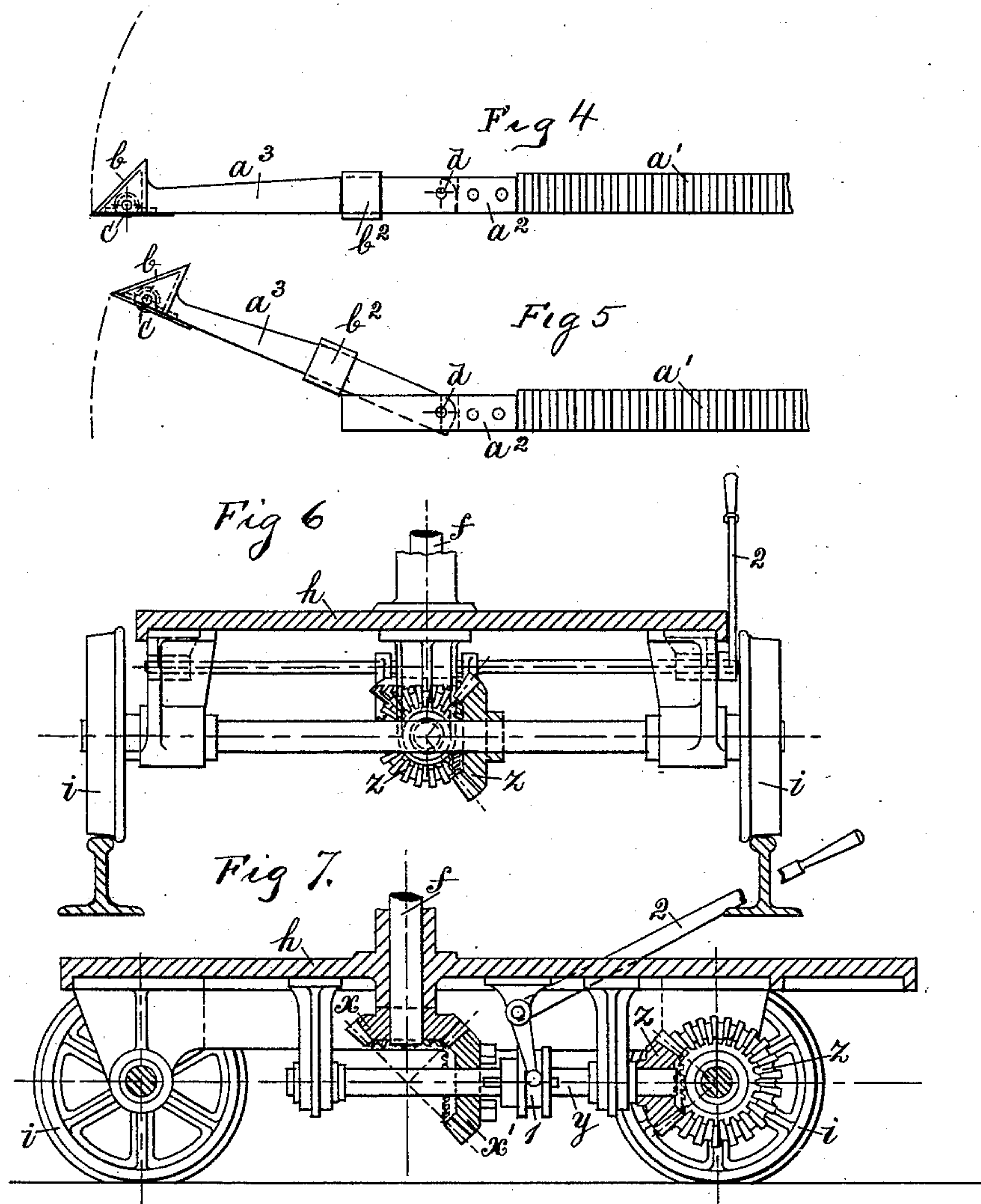
3 Sheets—Sheet 3.

T. SMITH.

APPARATUS FOR EXTRACTING COKE FROM OVENS.

No. 446,936.

Patented Feb. 24, 1891.



Witnesses:
H. Harvey Muzzy
H. G. Conn,

Inventor:
Thomas Smith
by
W. H. Babcock
Attorney.

UNITED STATES PATENT OFFICE.

THOMAS SMITH, OF CHAPELTOWN, ENGLAND.

APPARATUS FOR EXTRACTING COKE FROM OVENS.

SPECIFICATION forming part of Letters Patent No. 446,936, dated February 24, 1891.

Application filed September 24, 1889. Serial No. 324,879. (No model.) Patented in England August 22, 1888, No. 12,112.

To all whom it may concern:

Be it known that I, THOMAS SMITH, colliery manager, a subject of the Queen of Great Britain, of Chapeltown, in the county of York, England, have invented certain new and useful Improvements in Apparatus for Extracting Coke from Coke-Ovens, of which the following is a specification.

My invention relates to machinery for the extraction of coke from coke-ovens; and the objects of my improvements are, first, to provide means for forcing a plate through the door of the oven and under the coke and for then withdrawing the said plate, bringing with it the coke which is to be extracted; second, to enable the said plate to be directed to all parts of the oven in succession, so as to withdraw the whole of the coke; third, to provide guides for the bar carrying the said plate and for allowing it to be moved horizontally in any direction, and, fourth, to provide means for propelling the entire machine along rails in either direction. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the entire machine. Fig. 2 is a top view of the machine; and Fig. 3 is a vertical section of the machine through the line A B, Fig. 1. Figs. 4 and 5 represent detail views of the bar a and rack a' , the former view showing them in line, the latter showing the said arm bent at an angle. Figs. 6 and 7 represent vertical central sections of the lower part of the machine. They are respectively transverse and longitudinal.

Similar letters refer to similar parts throughout the several views.

My improved machinery may be applied to coke-ovens of different kinds; but supposing that it is to be applied to the ordinary form of beehive-oven, having a door or opening in front through which the coke is to be extracted, I arrange in front of such door or opening a horizontal bar a , having at its outer end a frame carrying the curved inclined plate b , which is forced under the coke in the oven, as described.

c c are rollers upon which the outer end of the bar a and the frame are supported.

The outer part of the bar a is shown separate and jointed to the rack at d , so that it can be turned up when desired. This is

shown more clearly in Figs. 4 and 5, a^2 representing side plates bolted to the end of the bar a and inclosing the movable part a^3 of the bar between them.

b^2 is a sliding collar, which when the part a^3 is turned down, as shown in Fig. 4, holds the two portions of the bar firmly in a straight line, but when pushed back allows the part a^3 to be turned up, as shown in Fig. 5.

a' is a strong toothed rack formed upon or attached to the side of the bar and gearing with a toothed pinion e , carried upon a vertical shaft f , which turns in suitable bearings g g , carried by a strong framing h , which is itself supported upon wheels i i , running upon rails, as shown, in front of the oven or ovens. The vertical shaft f has fixed upon its upper end a beveled toothed wheel k , Fig. 3, gearing with a pinion l upon the horizontal driving-shaft of a steam-engine m of any convenient description, carried upon the framing h , supplied with steam from a boiler, (not shown in the drawings,) and provided with reversing-gear of the usual kind, by which it can be rapidly started, stopped, and reversed. The toothed pinion e , which drives the rack, can be connected with or disconnected from the vertical shaft f by means of a coupling or clutch n , actuated by a handle o , Fig. 3.

The bar a and rack a' are supported upon rollers p p , and the rack is kept up to the pinion e by rollers r r behind it, carried upon a strong frame s , which is formed upon or bolted to a sleeve t , which can turn upon the bearing in which the shaft f revolves and concentric with that shaft. The lower end of the sleeve t has fixed to it a horizontal tangent toothed wheel u , which gears with and is driven by a screw v upon a shaft carried in bearings upon the frame and turned by the hand-wheel w .

The lower end of the vertical shaft f has fixed upon it a beveled toothed wheel x , which gears with and drives a corresponding beveled wheel x' upon the horizontal shaft y , carried in bearings below the frame, and the shaft y drives by means of beveled toothed wheels at z the axle of the wheels upon which the frame is carried, so that when necessary the entire apparatus can be propelled along the rails in either direction. The beveled toothed wheel x' can be connected with or

disconnected from the shaft *y* by means of a clutch 1, actuated by a handle 2. The bar *a* is also guided and supported above and below by rollers *p' p'*, turning in bearings carried by the frame *h* and of sufficient length to allow the position of the bar *a* and rack *a'* to be altered round the central vertical shaft *f*. Guiding-wheels are shown at 3 3, Fig. 1, to steady the carriage against the rails.

10 The action of the apparatus is as follows: The entire machine being brought to the proper position in front of the oven-door, the engine is set in motion in the proper direction, and the rack *a* is driven forward by means of the pinion *e*, which is put in gear by the handle *o*. The plate *b* is accordingly driven under the center of the mass of coke in the oven, and is then withdrawn by reversing the engine, and the coke which has been raised and broken is withdrawn through the door as the bar is withdrawn. The bar *a* and rack are then turned sufficiently round the central shaft *f* by turning the hand-wheel *w*, and the frame and plate *b* are again forced in under the coke at one side of the oven and are then withdrawn. The bar and rack are then again turned until the coke at the other side of the oven can be raised and drawn out in the same way. The entire apparatus can then by means of the handle 2 be made to travel along the rails either to the front of another oven or to any position desired.

It is to be understood that where I have described my improved apparatus as used for extracting coke from coke-ovens I include other operations of the like kind, such as the extraction of lime from lime-kilns. The improved machinery or apparatus may be applied to rectangular or other shaped ovens, the necessary modifications being made in the method of arranging and working it, and instead of being worked by steam-power it may be worked by hand or other available power. By its use great economy of time and labor is effected, while it is effective, durable, and inexpensive and not liable to get out of order.

I am aware that mechanism has been used for withdrawing coke from gas-retorts and from coke-ovens by means of hooks and for introducing fuel into gas-retorts by means of scoops actuated by chains and other gear. I do not claim, broadly, such mechanism.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with the bar *a*, the frame and plate *b*, rack *a'*, shaft *f*, pinion *e*, supporting and guiding rollers *p* and *r*, the rollers *p'*, and the means for turning the bar, rack, and frame and plate *b* round the central shaft *f*, substantially as and for the purpose described, and shown in the drawings.

2. The bar *a*, provided with independently-movable part *a²*, carrying terminal plate *b*, in combination with the rack *a'* and the plates *a²*, between which the movable part of said bar is pivoted, a sleeve which may be slipped on the joint between said bar and movable part *a²* to hold them rigid or off from said joint to allow the bending of said movable part, a pinion gearing with said rack to guide the same, and devices for supporting and rotating said pinion, substantially as set forth.

3. In combination with the bar *a*, frame and plate *b*, rack *a'*, central shaft *f*, pinion *e*, rollers *p*, *r*, and *p'*, and means for turning the bar, rack, and frame and plate round the central shaft *f*, the carriage running upon rails and carrying the entire apparatus, and the means for propelling the carriage in either direction along the rails, substantially as and for the purpose described, and shown in the drawings.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS SMITH.

Witnesses:

HARRY M. DEASH,
FRANK M. CLARK.