

No. 713,413.

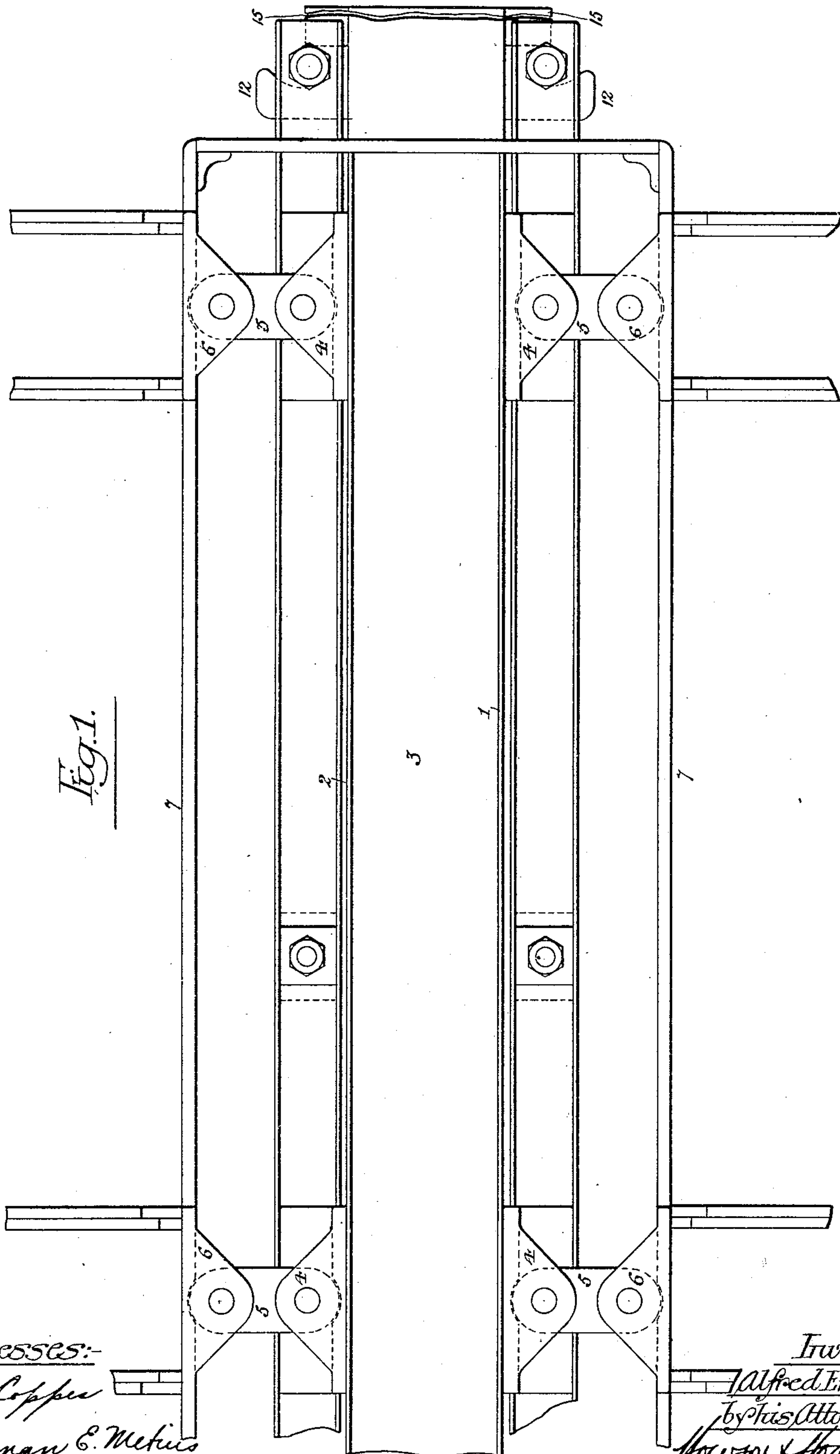
Patented Nov. 11, 1902.

A. ERNST.  
CHARGING DEVICE FOR COKE OVENS.

(Application filed May 21, 1902.)

(No Model.)

5 Sheets—Sheet 1.



*Fig. 1.*

*Witnesses:*

*A. B. C. C. C.*  
*Herman C. Metrus*

*Inventor:*

*Alfred Ernst,*  
*by his Attorneys*  
*Howson & Howson*

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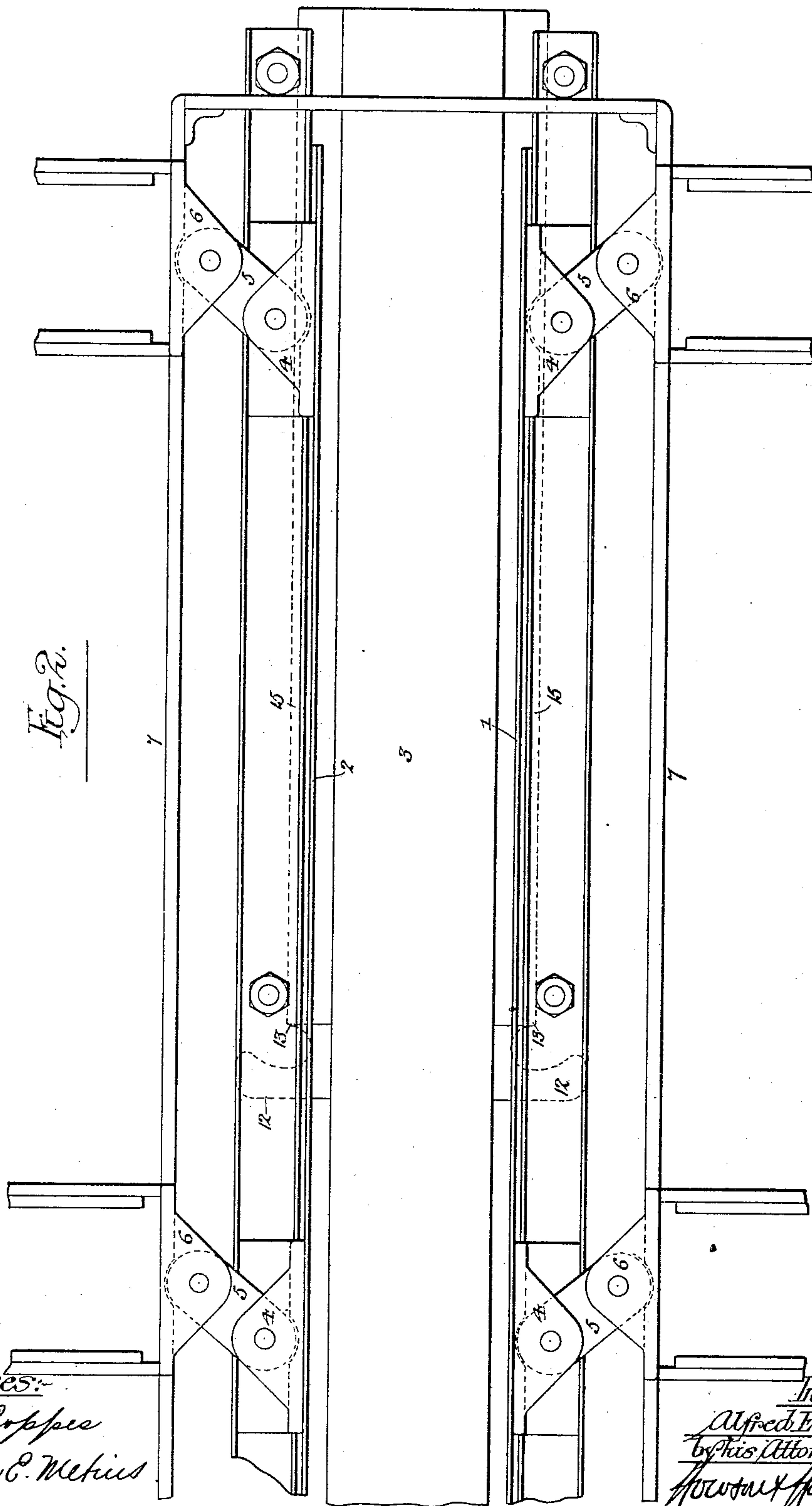
A. ERNST.

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(No Model.)

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*Fig. 2.*

Witnesses:

*A. B. Coppes*  
*Herman C. Metius*

Inventor:

*Alfred Ernst,*  
*by his Attorneys;*  
*Howarth & Howarth*

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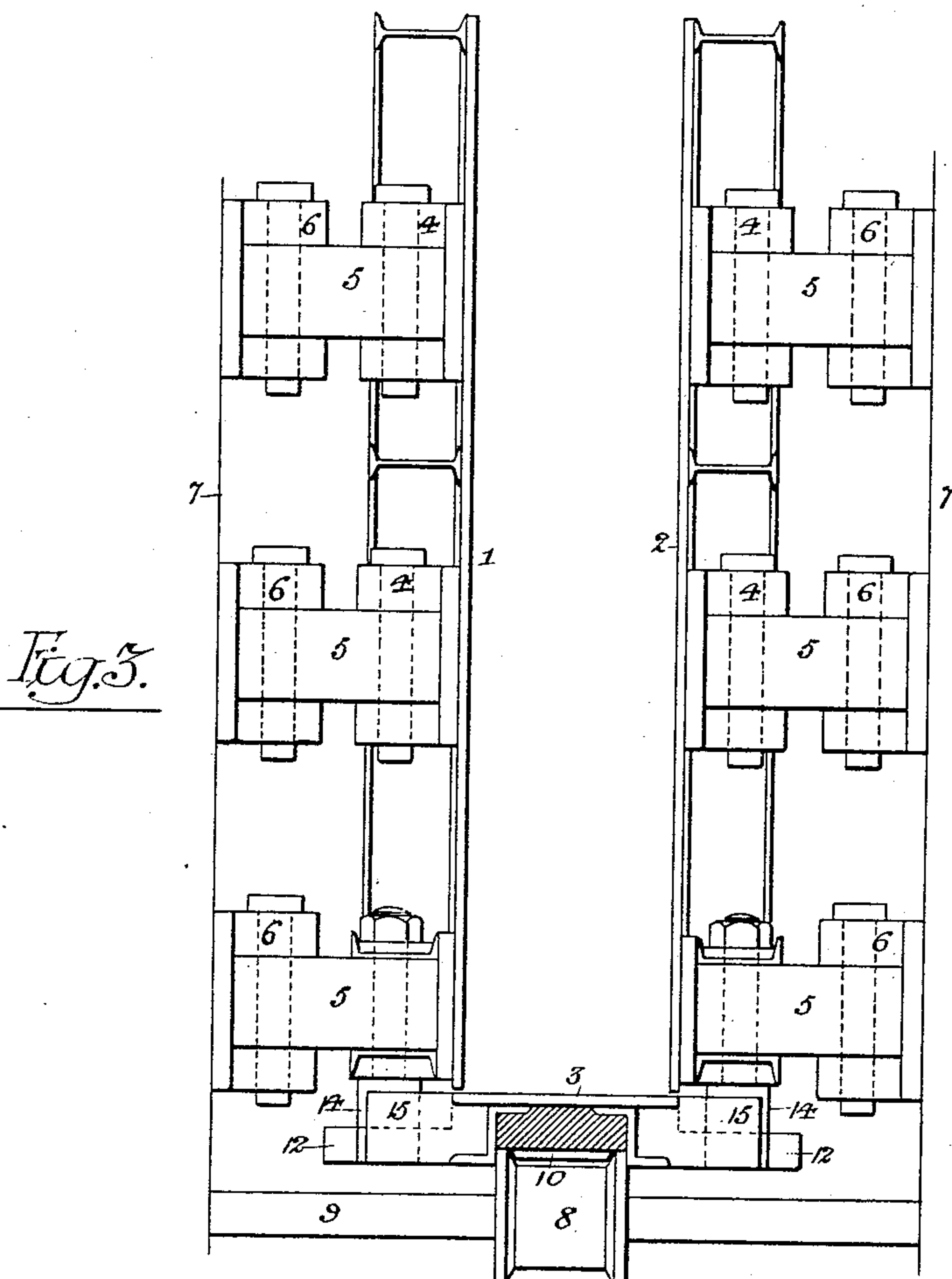


Fig. 5.

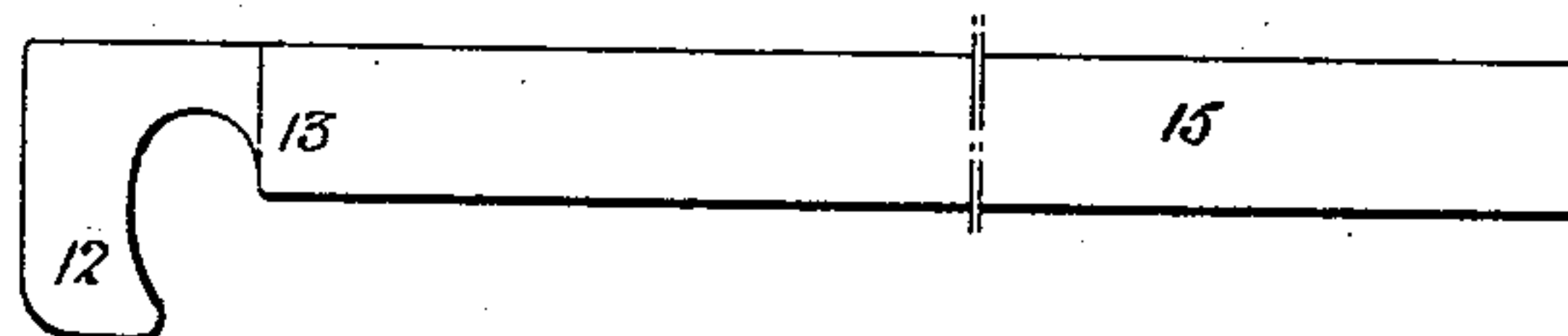


Fig. 6.

Witnesses:-

*A. B. Crippes*  
*Herman E. Mettles*

Inventor:

*Alfred Ernst,*  
*by his Attorneys*  
*Howson & Howson*

No. 713,413.

Patented Nov. 11, 1902.

A. ERNST.

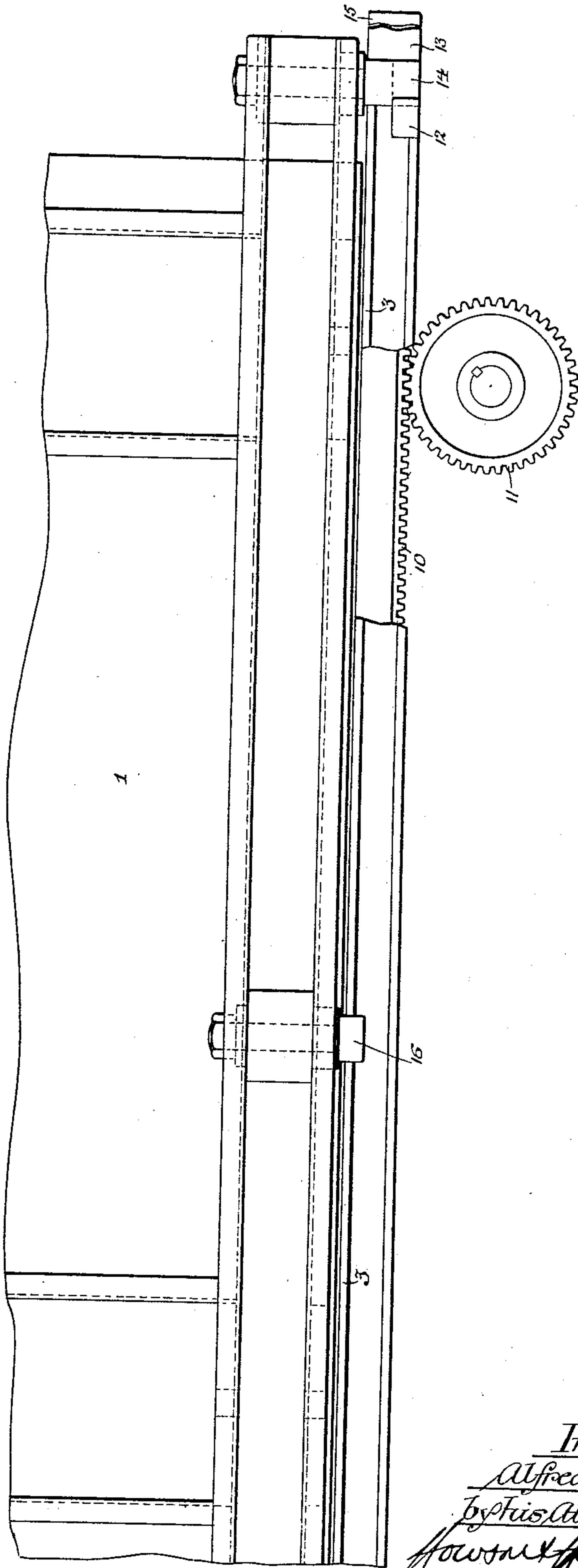
CHARGING DEVICE FOR COKE OVENS.

(Application filed May 21, 1902.)

(No Model.)

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Fig. 4.



Witnesses:-

*A. B. Coppers*

*Herman E. Metrus*

Inventor:-

*Alfred Ernst,*

*by his Attorneys;*

*Howson & Howson*

No. 713,413.

Patented Nov. 11, 1902.

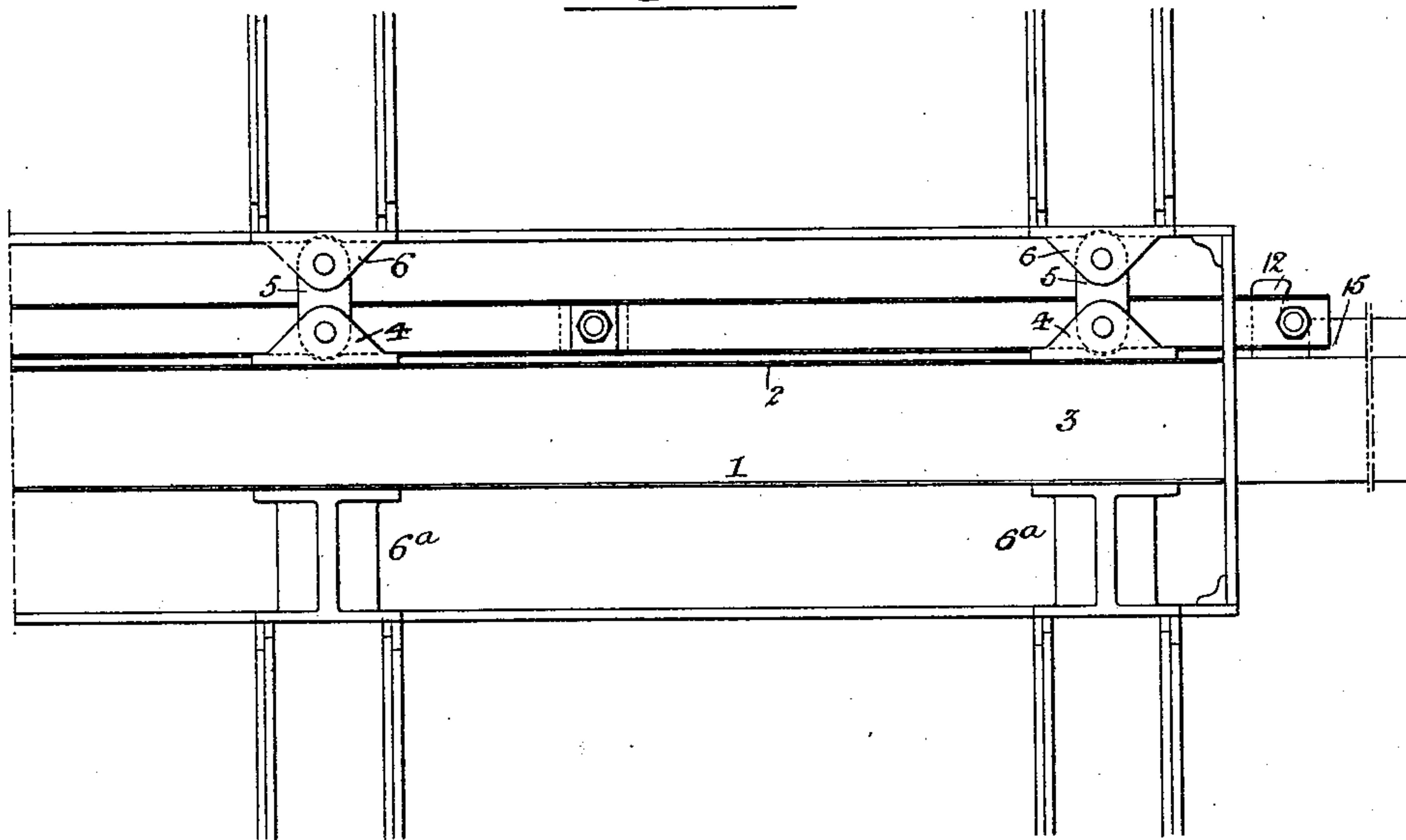
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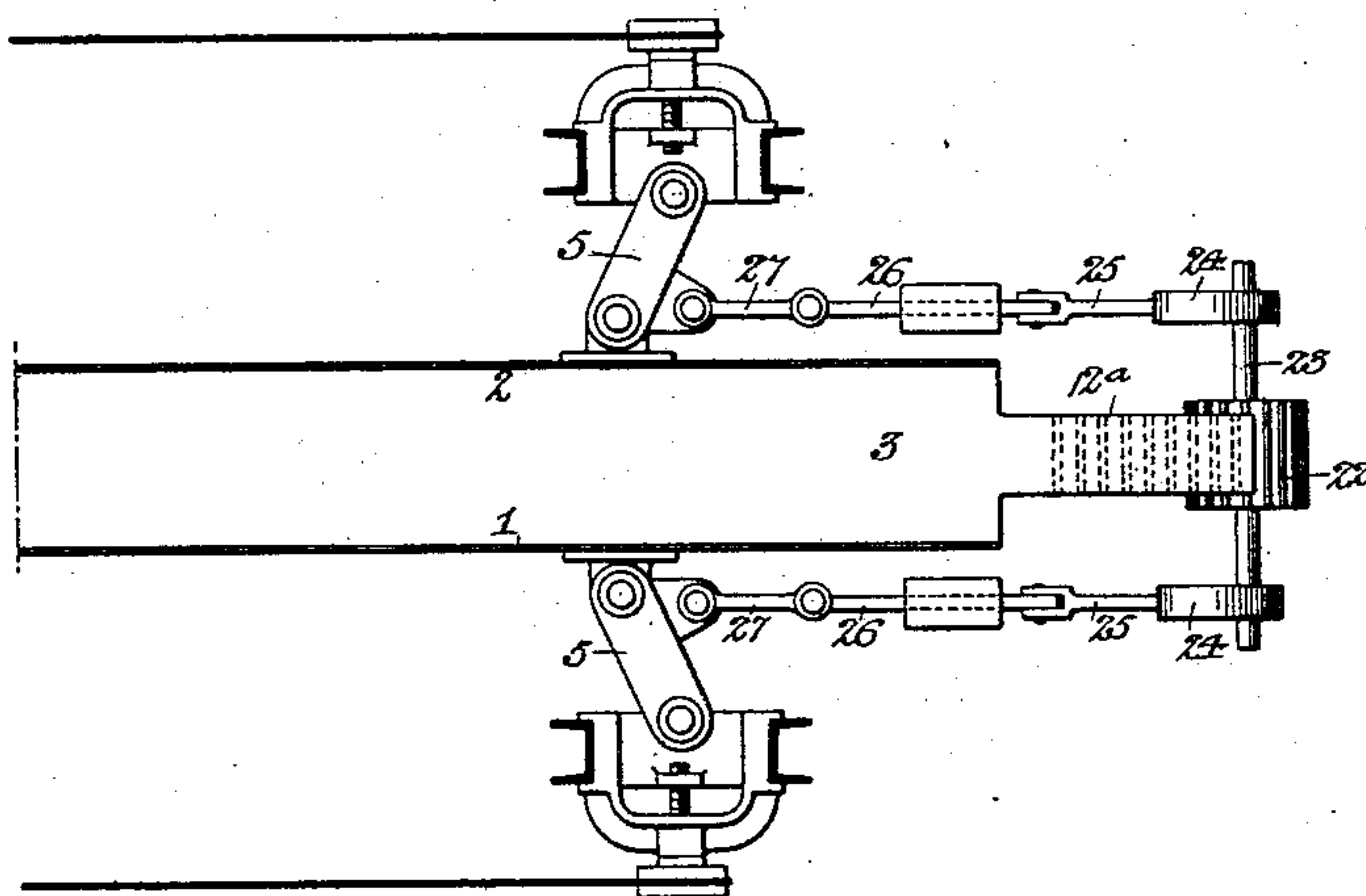
(No Model.)

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*Fig. 7.*



*Fig. 8.*



Witnesses:-

Hamilton D. Turner  
Titus H. Irons.

Inventor

Alfred Ernst,

by his Attorneys

Howe & Howson



# UNITED STATES PATENT OFFICE.

ALFRED ERNST, OF CLEVELAND, OHIO, ASSIGNOR TO THE WELLMAN-  
SEAEVER-MORGAN ENGINEERING COMPANY, OF CLEVELAND, OHIO,  
A CORPORATION OF OHIO.

## CHARGING DEVICE FOR COKE-OVENS.

SPECIFICATION forming part of Letters Patent No. 713,413, dated November 11, 1902.

Application filed May 21, 1902. Serial No. 108,332. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED ERNST, a citizen of the United States, and a resident of Cleveland, Ohio, have invented certain Improvements in Charging Devices for Coke-Ovens, of which the following is a specification.

My invention relates to coke-oven-charging machines of that class shown, for example, in the application for patent filed by Samuel T. Wellman, Charles H. Wellman, John W. Seaver, and Thomas R. Morgan on the 21st day of April, 1902, Serial No. 104,003, and which consists of a long and relatively deep and narrow hopper having laterally-movable sides and a longitudinally-movable bottom, whereby after the mass of coal has been compacted in the hopper the sides of the same can be moved apart from each other, so as to release the mass of coal and permit of the free forward movement of the same into the oven by the longitudinally-moving bottom of the hopper.

The object of my present invention is to so construct a charging-hopper of this character as to provide for the automatic expansion and contraction of the sides of the same by the action of the movable bottom.

In the accompanying drawings, Figure 1 is a plan view of sufficient of a coke-oven-charging machine to illustrate my present invention, the sides of the hopper being shown in their contracted position. Fig. 2 is a view similar to Fig. 1, but showing the sides of the hopper expanded. Fig. 3 is an end view of Fig. 1. Fig. 4 is a side view with parts broken away, and Figs. 5 and 6 are respectively a plan view and a side view of a portion of the bottom of the hopper. Figs. 7 and 8 are views illustrating certain modifications of the invention.

The hopper comprises opposite sides 1 and 2 and a bottom plate 3, said sides of the hopper being suitably braced by vertical and longitudinal beams and having brackets 4, which are connected by links 5 to other brackets 6 on the stationary side structures 7 of the machine, whereby when said links occupy a position at right angles to the longitudinal

axis of the hopper the sides of said hopper will be fully contracted, but when the links occupy a position other than a right angle to said longitudinal axis of the hopper the sides of the latter will be retracted to an extent commensurate with the angle of deflection of the links. This will be understood on reference to Figs. 1 and 2.

The bottom 3 of the hopper is disconnected from the sides of the same and is longitudinally movable, so as to carry forward the compacted mass of coal and feed it into the oven, said bottom 3 of the hopper being supported independently of the sides in any suitable manner and being provided with propelling mechanism, whereby it can be moved longitudinally in either direction.

In the present instance the bottom of the hopper is mounted upon rollers carried by transverse shafts beneath the hopper and is propelled by engagement of a rack on its under side with pinions carried by transverse shafts beneath the hopper, to which shafts rotating movement can be imparted in any appropriate manner.

One of the supporting-rollers 8 and its shaft 9 are represented in Fig. 3, and in Figs. 3 and 4 are shown the rack 10, and in Fig. 4 one of the pinions 11 for operating the same.

The means adopted for supporting and operating the bottom of the hopper are, however, immaterial to my invention so long as the desired longitudinal movement of said bottom in both directions is provided for.

At the rear end of the bottom of the hopper, on each side of the same, is a projecting hook 8, having two members 12 and 13, the forward member of the hook being somewhat longer than the rearward member, as shown in Figs. 1, 2, and 5, and each of these hooks is adapted to engage a downwardly-projecting stud on the framework of one of the sides of the hopper, this stud being preferably in the form of an antifriction-roller 14, mounted upon a pin carried by said frame.

Extending rearwardly from the hooks on the bottom of the hopper is a bar 15, which also projects upwardly above the hooks, as shown in Figs. 3, 4, and 6, and the side frames



of the hopper have downwardly-projecting studs for engaging with that portion of this rearwardly-projecting bar which is above the level of the hooks, these studs being likewise, by preference, in the form of antifriction-rollers 16, mounted upon pins carried by the side frames of the hopper.

When the bottom of the hopper is fully retracted, the rear studs or rollers 14 of the side frames of the hopper rest between the forward and rear members 12 and 13 of the side hooks on the hopper-bottom, as shown in Fig. 1, the sides of the hopper being fully retracted. As the bottom of the hopper is moved forward, however, like movement is imparted to the sides of the hopper, and owing to the link connection of said sides of the hopper with the fixed side structure this forward movement is accompanied by an outward movement. Hence by the time the sides of the hopper are fully expanded the rollers or studs 14 will be free from engagement with the rear members of the hooks on the hopper-bottom and will bear upon the sides of the bar 15 in the rear of said hooks as the forward movement of the hopper-bottom continues, thereby preventing any accidental collapse or contraction of the sides of the hopper, this holding apart of the sides of the hopper continuing throughout the entire travel of the hopper-bottom because of the bearing of the sides of the bar 15 upon the rollers 16, which are distributed throughout the length of the hopper.

On the retraction of the hopper-bottom after it has deposited its load of coal in the oven the projecting forward members of the hooks engage with the studs or rollers 14, and thereby move the sides of the hopper rearwardly, this movement, owing to the link-mounting of said sides of the hopper, causing simultaneous inward movement of the latter until the parts again reach the position shown in Fig. 1 and the sides of the hopper are fully retracted.

While I prefer to provide for direct engagement of the bottom of the hopper with the sides of the same in the manner which I have shown and described, an indirect connection may be adopted—as, for instance, by causing the hopper-bottom to engage with and operate the mechanism for actuating the toggle-levers, whereby the sides of the hopper are actuated in the machine forming the subject of the application for patent before alluded to—and although I prefer to make both sides of the hopper movable, as described, it will be evident that my invention is equally applicable to a hopper having one side fixed and the other movable from and toward it. Hence when I use the term “hopper having sides movable from and toward each other” I intend that phrase to cover a hopper having either one or both sides movable. These modifications are illustrated in Figs. 7 and 8, Fig. 7 illustrating a hopper which has the side 2 movably mounted in the manner be-

fore described, the side 1 being secured to fixed brackets 6<sup>a</sup> and the bottom 3 of the hopper having a projecting hook 12 and bar 15 on one side only.

In the construction shown in Fig. 8 the bottom 3 of the hopper has a projecting rack 12<sup>a</sup>, which engages with a pinion 22 on a shaft 23, the latter having eccentrics 24, whose straps 25 are connected to guided bars 26, the latter being connected by rods 27 to the links 5, which carry the sides 1 and 2 of the hopper.

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

1. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom, and means whereby said longitudinal movement of the bottom is caused to effect expansion or contraction of the sides of the hopper, substantially as specified.

2. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, the movable side or sides of the hopper being mounted, by means of pivoted links, on the fixed side structure, and means whereby the longitudinal movement of the hopper-bottom causes swinging movement of said links and consequent expansion and contraction of the sides of the hopper, substantially as specified.

3. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom, links whereby the mounting of the movable side or sides of the hopper upon the fixed side structure is effected, and means whereby the hopper-bottom is caused to engage the movable side or sides of the hopper so as to impart longitudinal movement thereto and thereby cause swinging movement of the links and expansion and contraction of the sides of the hopper, substantially as specified.

4. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other and a longitudinally-movable bottom having one or more projecting hooks and one or more projections on the sides of the hopper for engagement with said hook formation, substantially as specified.

5. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom, and one or more projecting hooks thereon for engaging the movable side or sides of the hopper, said hooks having forward members which project to a greater extent than the rear members, substantially as specified.

6. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom, one or more projecting hooks thereon for engaging with the



movable side or sides of the hopper, and causing expansion and contraction of the same, and a bar for maintaining the expansion of the sides of the hopper after the same are free from the influence of the hooks, substantially as specified.

7. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom having thereon one or more projecting hooks, and a bar extending rearwardly therefrom, projections on the movable side or sides of the hopper for

engagement with the hook formation and also with the bar, and other projections on the sides of the hopper constructed to engage the bar but free from engagement with the hook formation, substantially as specified.

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

ALFRED ERNST.

Witnesses:

C. W. COMSTOCK,  
W. A. JONES.