

No. 720,428.

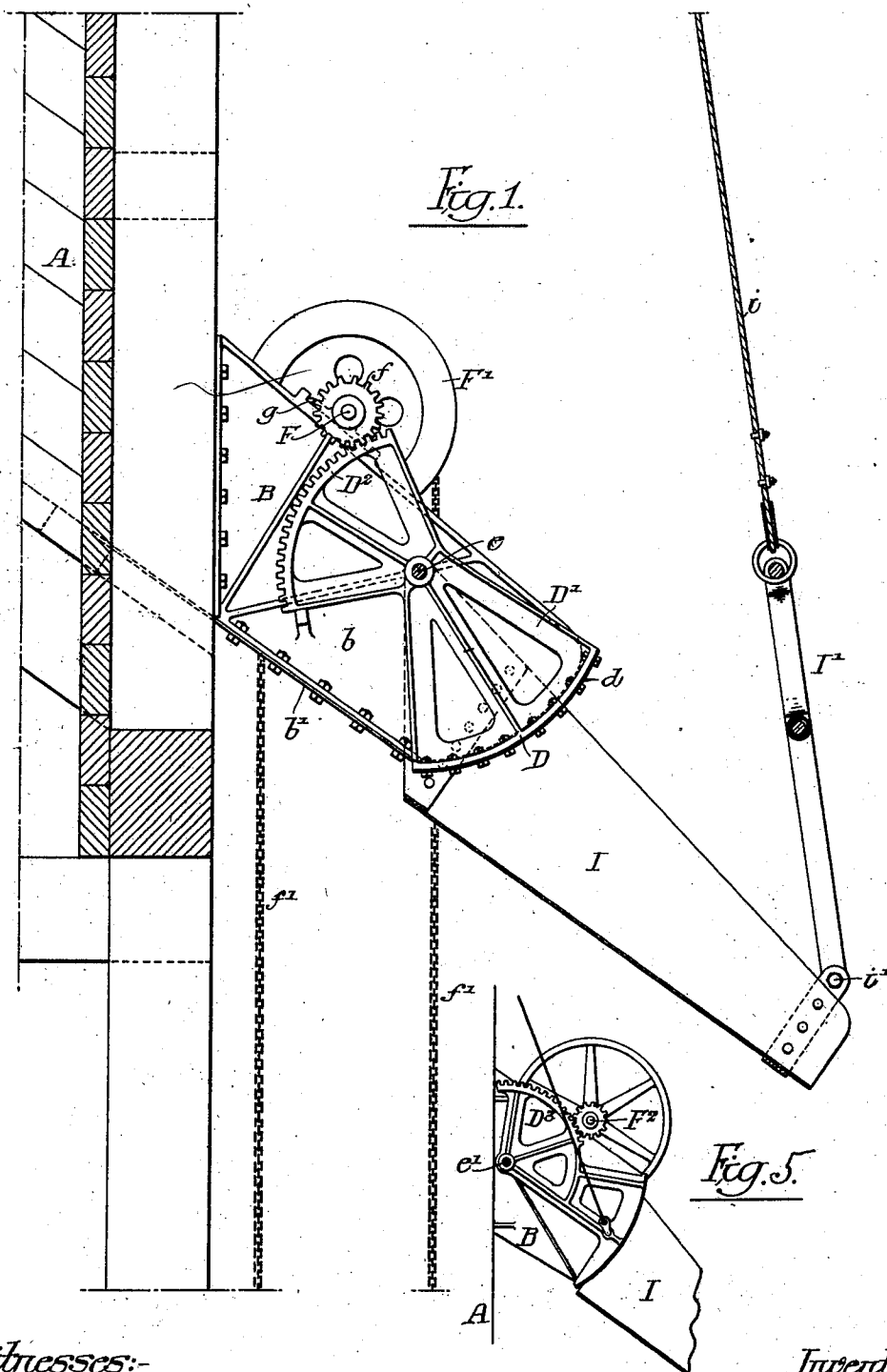
PATENTED FEB. 10, 1903.

F. V. HETZEL.
UNDERCUT GATE.

APPLICATION FILED OCT. 26, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:-

Chas. Wilson.
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Inventor:-

Frederic V. Hetzel,
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Harmon & Harmon

No. 720,428.

PATENTED FEB. 10, 1903.

F. V. HETZEL.
UNDERCUT GATE.

NO MODEL.

APPLICATION FILED OCT. 25, 1902.

3 SHEETS—SHEET 2.

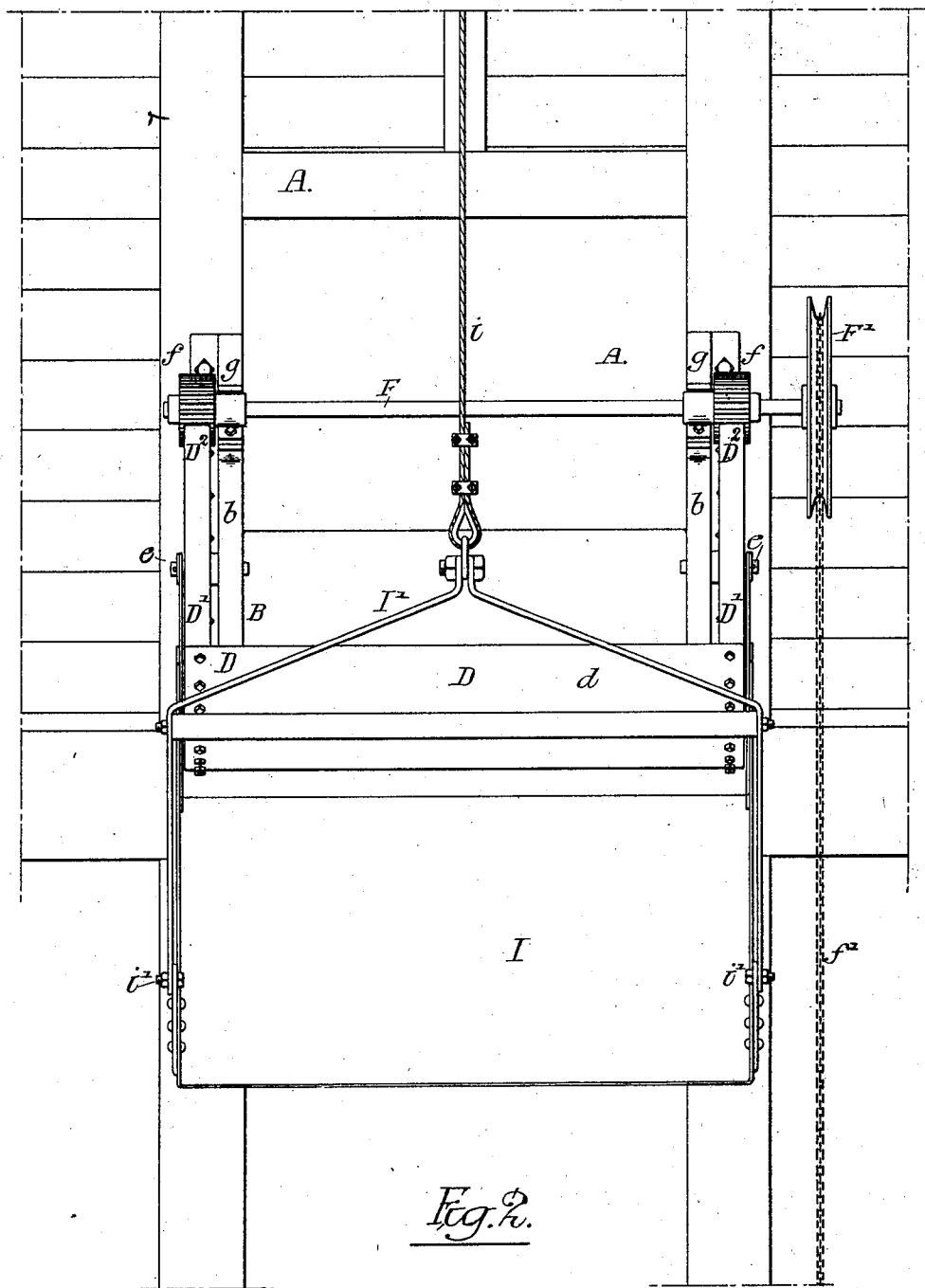


Fig. 2.

Witnesses:-

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No. 720,428.

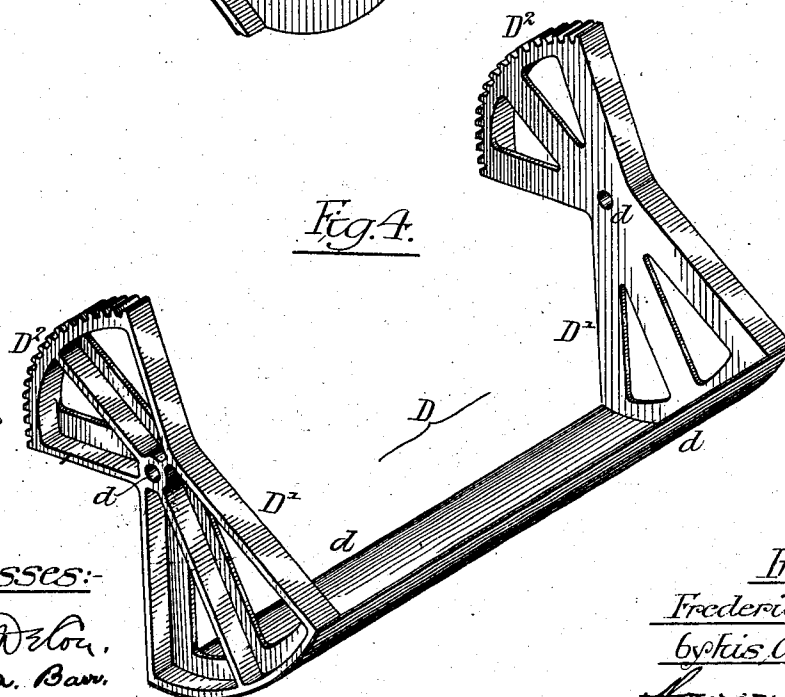
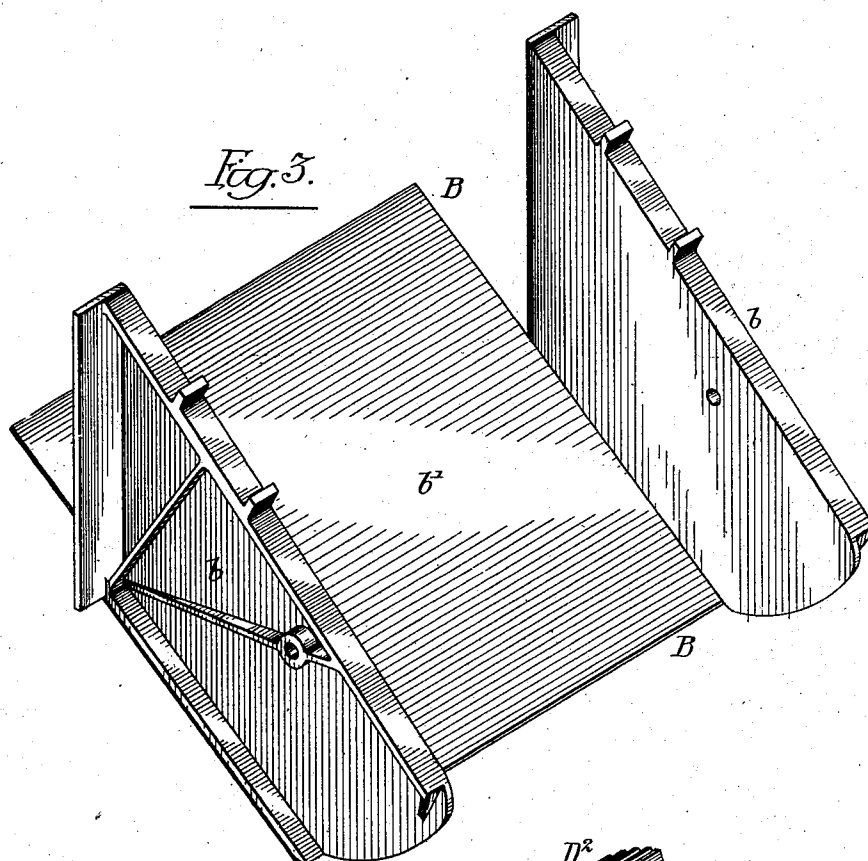
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F. V. HETZEL.
UNDERCUT GATE.

APPLICATION FILED OCT. 25, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:-

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UNITED STATES PATENT OFFICE.

FREDERIC V. HETZEL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE LINK BELT ENGINEERING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

UNDERCUT GATE.

SPECIFICATION forming part of Letters Patent No. 720,428, dated February 10, 1903.

Application filed October 25, 1902. Serial No. 128,770. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC V. HETZEL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Undercut Gates, of which the following is a specification.

The object of my invention is to so construct the mechanism for operating a gate for chutes as to avoid the severe racking that strains
10 the gate and causes it usually to bind around the center.

In the accompanying drawings, Figure 1 is a side view of a coal-chute, illustrating my improved gate-operating mechanism. Fig. 2
15 is a front view of the coal-chute. Figs. 3 and 4 are perspective views showing the gate detached from the chute, and Fig. 5 is a view of a modification.

A is a hopper for containing coal or other
20 material. B is a chute secured to the face of the hopper in any suitable manner. This chute has side plates *b b* and an inclined bottom plate *b'*. The ends of the side plates are formed in the segment of a circle to accom-
25 modate the swinging of the segmental gate D from its center *d*, as shown in Fig. 3.

The gate comprises two side members D' and a cross member *d*, and the cross member is secured to the side members by bolts or
30 rivets. The gate, as shown herewith, is hung on studs *e*, projecting from the side plates *b* of the chute B, so that the gate can swing into and out of position, although a through-shaft may be employed to support the gate. The
35 side plates D' are extended to form segmental racks D², with which engage the pinions *f f*, which are mounted on a cross-shaft F, mounted in bearings *g* on the chute B. On the end of the shaft F in the present instance is a
40 chain-wheel F', around which passes the operating-chain *f'*, so that when the wheel is turned the gate will be opened or closed.

In place of the chain and chain-wheel a hand-wheel may be used, or the shaft may be
45 operated by a train of gears.

The method of construction above described brings an equal strain upon both sides of the gate and causes it to work very much freer than the gate now used.

It will be understood, particularly with 50 such material as coal, that there is considerable weight against the gate when it is closed, and consequently if the gate were operated from one side only it would cause a considerable strain upon the gate and cause it to bind
55 on its pivots.

I is an extension-chute, preferably swung from the pins *e*, on which the gate is hung. This extension-chute can be raised and lowered by a rod *i*, connected to a frame I', which
60 is pivoted at *i'* to the outer end of the supplemental chute I. Any suitable connection may be used for the purpose of raising and lowering the chute, and the chute may be dispensed with in some instances.

Fig. 3 is a view of a modification of my invention, in which the segment D³ is arranged at right angles to the gate. In this construction the pivot-pin *e'* can be placed farther
65 away from the curved portion of the gate.

The shaft F² extends across the chute and has pinions gearing with the segments on each side of the chute. In this instance I have shown a hand-wheel on the shaft instead of a chain-wheel.

I claim as my invention—

1. The combination of a chute, a pivoted segmental gate for the chute, two segmental racks, one on each side of the gate, an operating-shaft, with pinions on the operating-
80 shaft, one pinion engaging with one rack and the other pinion engaging with the other rack, substantially as described.

2. The combination of a chute having a segmental end, a segmental gate closing the end
85 of the chute, said gate having side members pivoted to the chute, said side members extending beyond the pivot and forming segmental racks, with a cross-shaft mounted in bearings on the chute and having pinions,
90 one pinion engaging with one rack and the other pinion engaging with the other rack, substantially as described.

3. The combination of an inclined chute, with an undercut gate consisting of a cross
95 member and two side members, the gate being in the form of a segment, the said side members being pivoted to the chute, a seg-

mental rack formed on each side member, a transverse shaft mounted in bearings on the chute, an operating-wheel on the end of the shaft, and pinions also on the shaft, one pinion meshing with one segmental rack and the
5 other pinion meshing with the other segmental rack, substantially as described.

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

FREDERIC V. HETZEL.

Witnesses:

MURRAY C. BOYER,
WILL. A. BARR.