

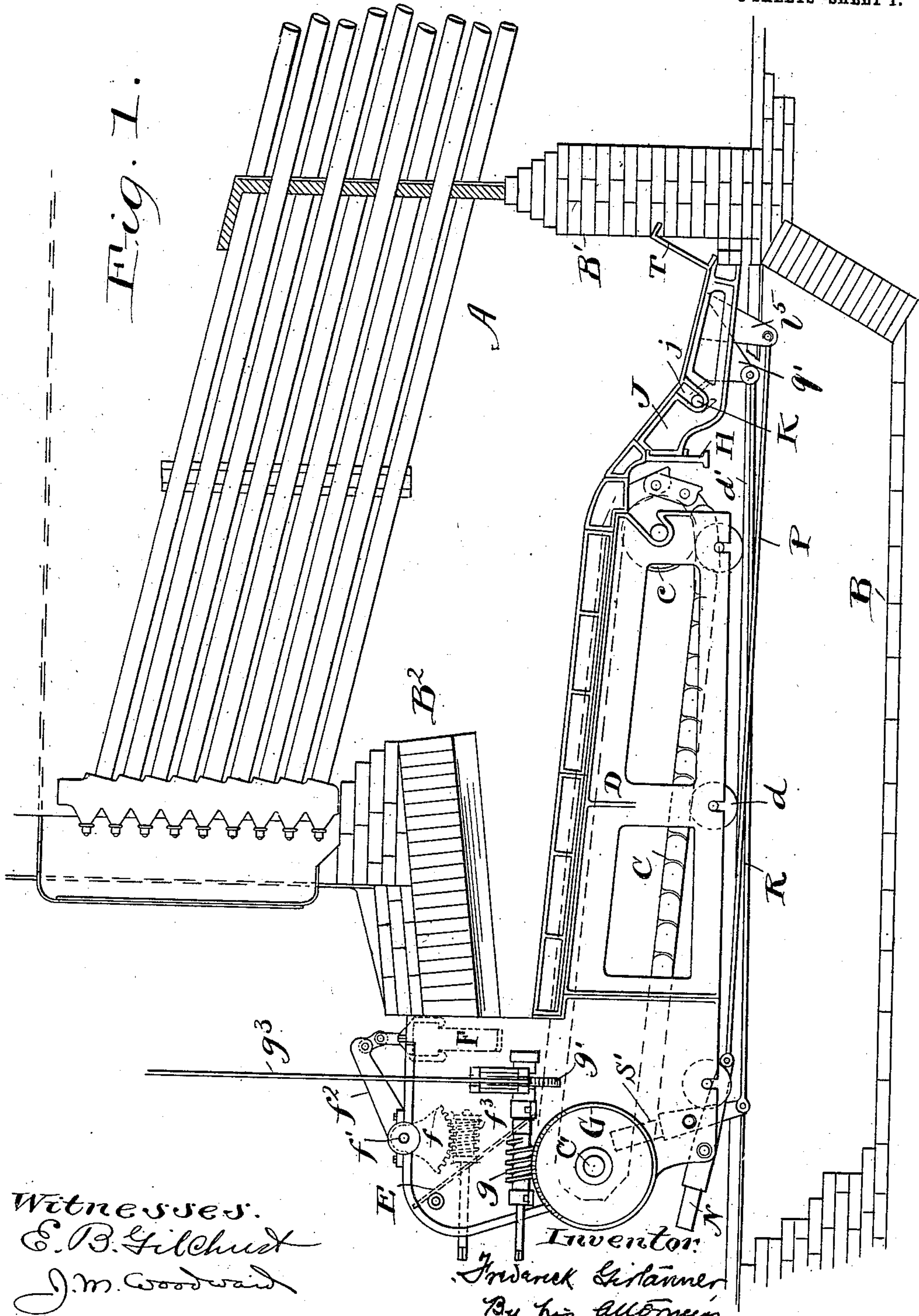
No. 868,338.

PATENTED OCT. 15, 1907.

F. GIRTANNER.
GRATE.

APPLICATION FILED JULY 31, 1906.

3 SHEETS—SHEET 1.



Witnesses:
E. B. Gilchrist
J. M. Woodward

Inventor:
Frederick Girtanner
By his attorney,
Thurston & Bates.

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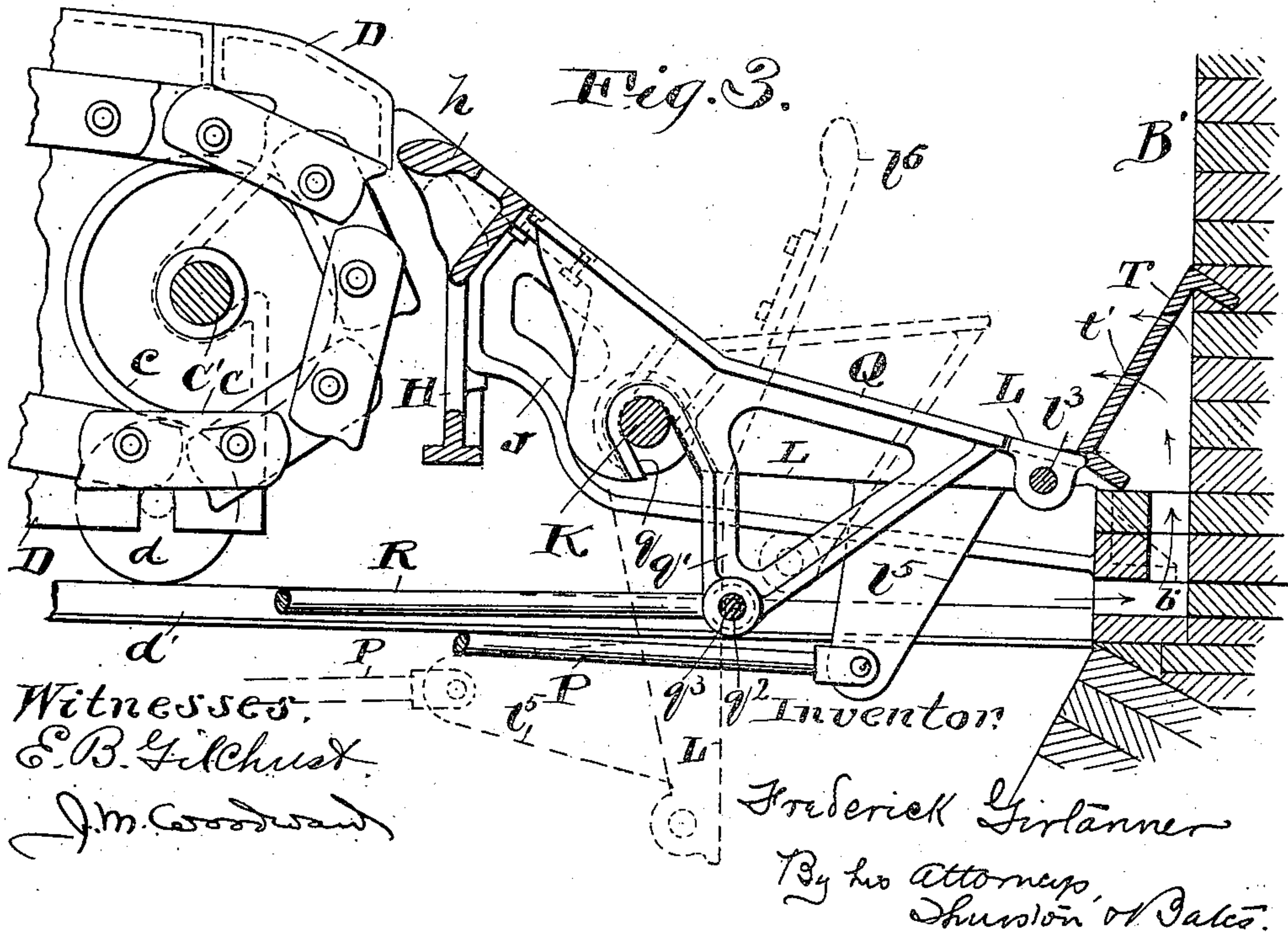
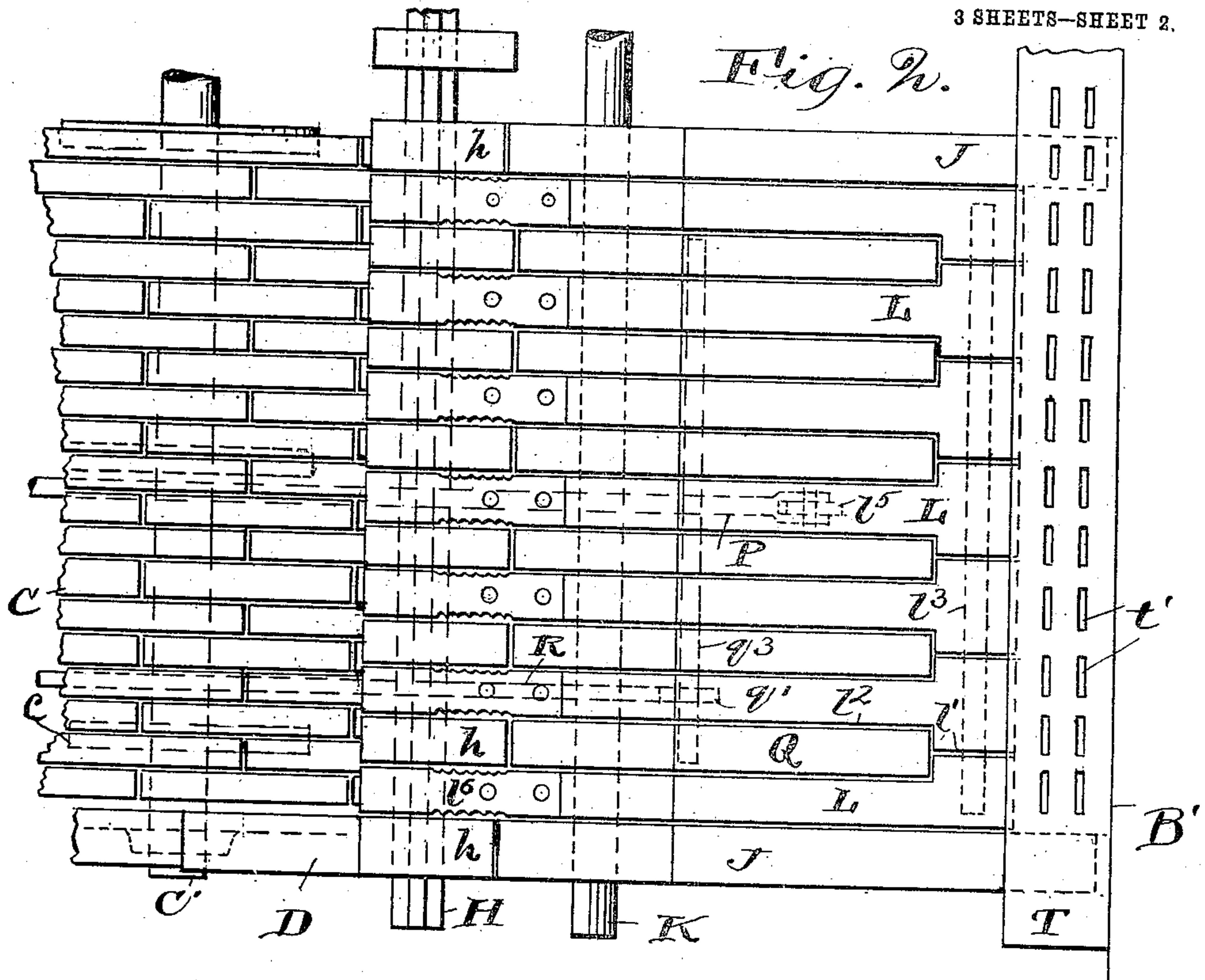
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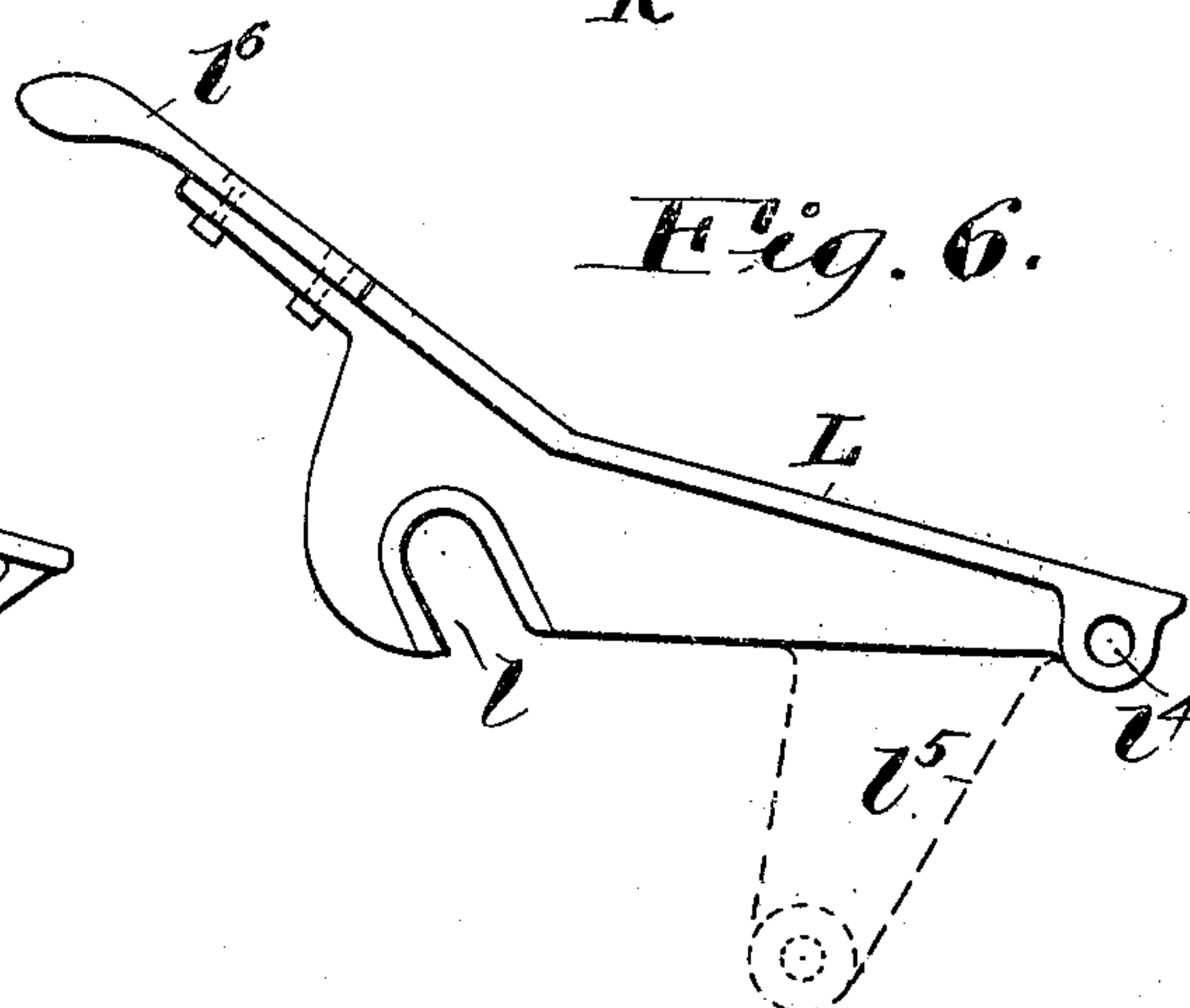
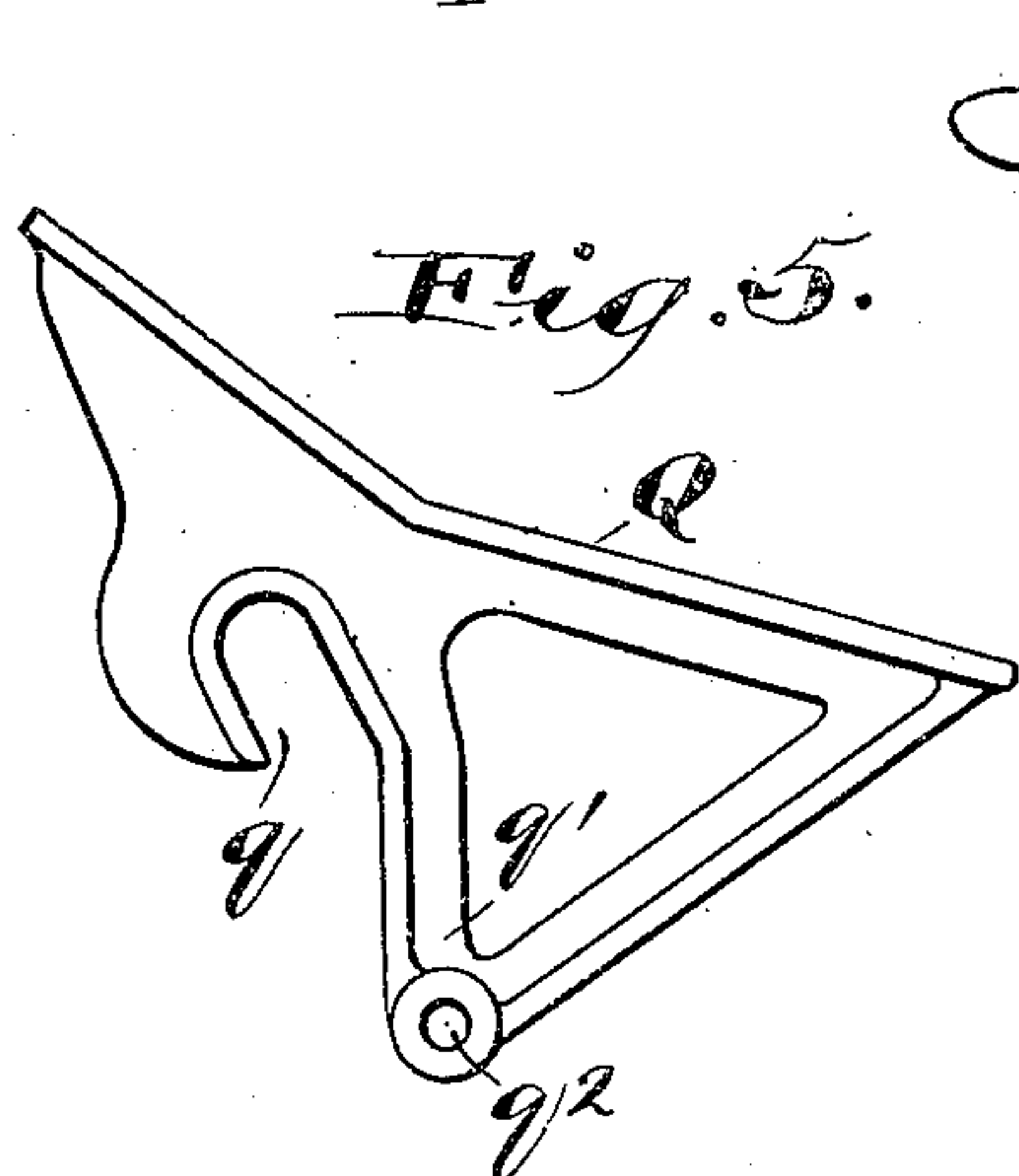
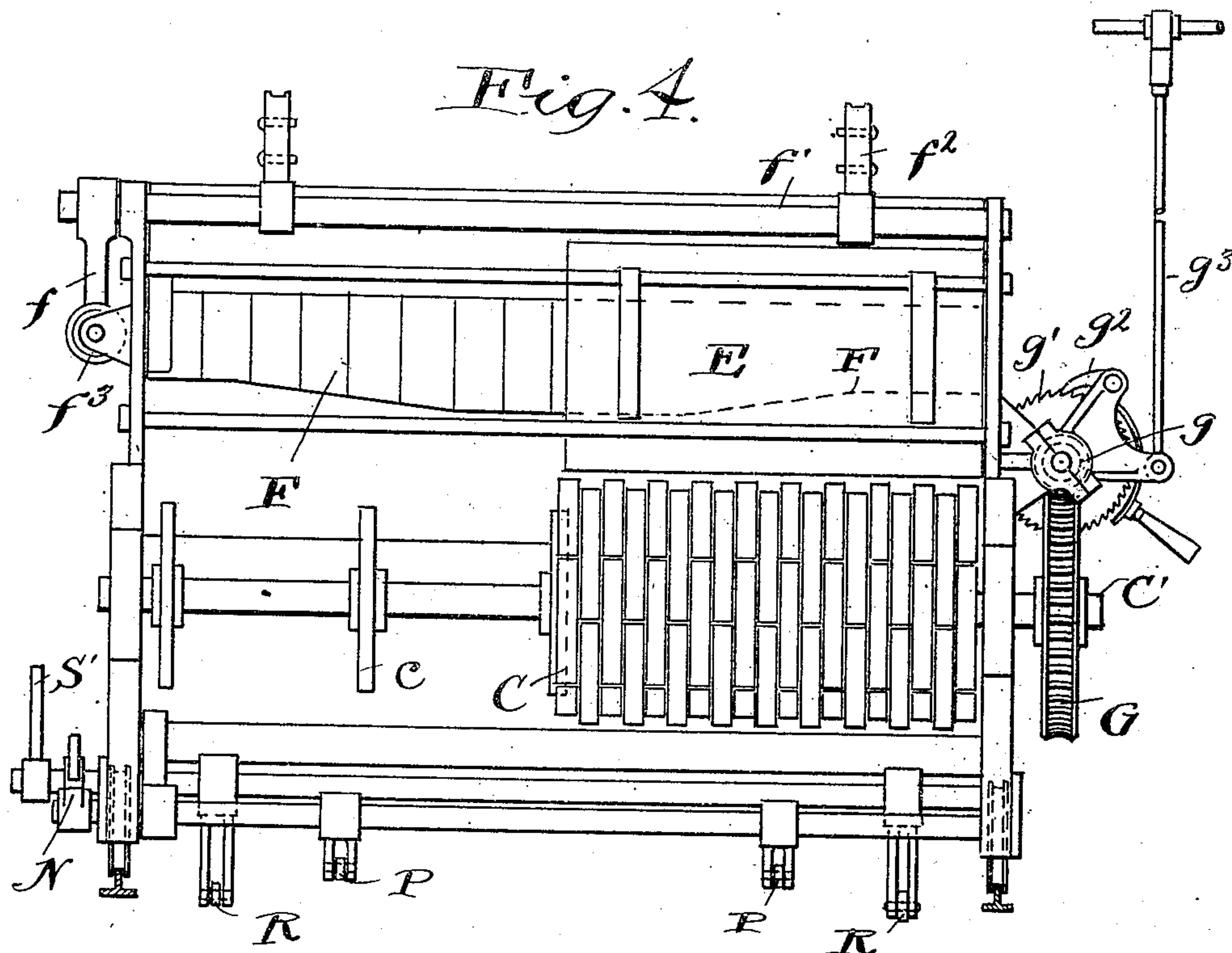
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3 SHEETS—SHEET 3.



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Inventor:
Frederick Girtanner.
By his Attorneys,
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UNITED STATES PATENT OFFICE.

FREDERICK GIRTANNER, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
THE AMERICAN STOKER COMPANY, A CORPORATION.

GRATE.

No. 868,338.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed July 31, 1905. Serial No. 271,950.

To all whom it may concern:

Be it known that I, FREDERICK GIRTANNER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented
5 a certain new and useful Improvement in Grates, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to grates for steam boiler furnaces.

One of its objects is to provide efficient means for breaking the clinkers and for dumping same and the other unconsumed products.

Another object is to endow a chain grate construction with means whereby it may be forced beyond its normal capacity should occasion require.

The present invention is characterized by simplicity in structure and durability of parts. It may be most conveniently summarized as consisting of the combination of parts hereinafter more fully described and
20 definitely set out in the claims.

In the drawings, Figure 1 is a side elevation of a grate having my improvements and installed with a usual steam boiler. Fig. 2 is a plan of the clinker breaking
25 and dumping portion at the rear of the grate proper. Fig. 3 is a vertical section of such parts. Fig. 4 is a front view of the grate, the left hand half having the chain and hopper plate removed. Figs. 5 and 6 are side elevations of one of the clinker breaking bars and
30 one of the dumping bars respectively.

In Fig. 1, the grate is shown as mounted below a tubular boiler A and above the ash pit B². At the rear of the grate is the usual bridge wall B' and over the grate near its forward end the crown wall B². The endless chain C of the grate is carried on wheels c mounted
35 on shafts C' journaled in the front and rear ends of a frame D, which is supported by wheels d resting on tracks d', whereby the grate may be drawn out at the front for cleaning.

The fuel is supplied to the grate above the hopper sheet E and in front of a gate F. This gate may be raised or lowered as desired by means of the segment f connected therewith by a rock shaft f' and arms f². The segment meshes with a worm f³ which is rotated
45 to operate the gate. The chain is shown as driven by means of a worm-wheel G on the forward shaft C'. A worm g meshes with this worm-wheel. On the shaft of the worm is a ratchet wheel g' driven by a pawl g² which is oscillated by a suitable eccentric strap or
50 rod g³.

The features of constructions above described are of well-known form and are not specifically covered by the present invention.

The present invention relates to the structure at the
55 rear of the chain grate which allows the breaking of the

clinkers, the removal of the refuse and the forcing of the grate that is, allows fuel to be passed over the grate more rapidly than it can be consumed on the grate itself. This will now be described.

At the rear of the chain C is a cross beam H secured
60 in the side walls and being approximately an I-beam in form. At its upper edge this beam has fingers or projections h which extend lengthwise of the grate. Secured to the beam H and to the bridge wall near their ends are longitudinal frames J. In these frames are recesses j opening upwards. In the recesses rests a shaft
65 K and on this shaft rest the dumping bars L. These bars are formed as shown in Fig. 6 having downwardly opening recesses l which take over the shaft K.

The dumping bars are extended laterally at their rear
70 ends as shown at l', Fig. 2, so that consecutive bars substantially abut each other at this point while leaving the recesses l² in front thereof. These rear ends of the dumping bars are connected together by a cross rod l³ which extends through alined eyes l⁴ in the
75 dumping bars. By this means the bars are held together in one substantially rigid structure and may be dumped as a unit.

The dumping is accomplished by the operation of the lever N pivoted near the forward end of the grate frame
80 and connected by a link P with an arm l⁵ depending from one of the dumping bars. When the forward end of the lever N is swung upward, the arm l⁵ is drawn forward and downward, dumping the material into the ash pit.

The forward ends l⁶ of the dumping bars lie between the fingers h of the stationary beam H and receive the very hot coal as it is discharged from the chain. These ends are therefore the first to burn off, wherefore I prefer to make them separate from the rest of the dumping
90 bars, being bolted thereto as shown in Fig. 6. The forward ends l⁶ of the projections are enlarged to give them as much durability as possible, and when they burn out, they are easily removed and replaced by substitutes.

The clinker breakers consists of bars Q shown in Fig. 5 and having downwardly opening recesses q by which they hook over the same shaft K which supports the dumping bars. These clinker breakers lie within the recesses l² between consecutive dumping bars, in front
100 of the engaged rear ends of the dumping bars and behind the fingers h of the cross beam H. The clinker breakers have depending portions q' with alined eyes q², through which extends a rod q³ coupling the clinker breakers together as a unit. The clinker breakers are
105 operated by the lever S' which is connected by a link R with the rod q³. By this means the clinker breakers may be rocked to break the clinkers as desired without dumping the material supported above the same. When the grate is dumped, the clinker breakers swing
110

with the dumping bars, such bars engaging the rod q^3 after some independent movement.

The above described arrangement of clinker breakers and dumping bars at the rear of the chain grate forms in fact a supplemental grate allowing the substantially complete combustion of hot coals arriving at the rear of the chain grate. It thus acts as a smoke preventer. It also permits of forcing said fuel over the chain grate more rapidly than it can be consumed on the grate itself for if the coal is not substantially entirely consumed on the chain grate, it is not lost, as is usually the case, but it piles up in a burning mass at the rear of the grate over the dumping bars, where the combustion is continued. This action is facilitated by reason of the fact that the dumping bars and the clinker breakers may be operated alternately so that the material may be broken up and fed rearwardly by the action of these bars and when desired the bars may be simultaneously operated completely dumping the material.

To give more air to the burning mass on the dumping bar than would come between the dumping bars and clinker breakers, I provide at the rear of the same, an inclined cross plate T, which is in the form of a channel beam set in the bridge wall at its upper edge. This channel beam is perforated as shown at t' and is thus adapted to deliver air coming from the ash pit through the passageway b' directly into the burning material above the dumping bars, thus insuring the complete combustion thereof.

It will be noted that the dumping bars may be, by reason of the slotted openings, lifted out assembled, or, if desired, may be lifted out separately, provided the cross rod l^3 uniting them is removed. So also the clinker breakers may be removed independently by the removal of the rods q^3 and all of the mechanism may be lifted bodily out of the construction by reason of the slotted arrangement of the frames J.

I claim:

1. The combination in a grate, of a cross beam having projecting fingers, a cross shaft, dumping bars mounted on the shaft and extending between said fingers, means detachably connecting said bars together near their rear ends, and means for operating the bars.

2. The combination of a cross beam having projecting fingers at its upper edge, pivoted dumping bars extending between said fingers, and pivoted clinker breaking bars opposite the ends of said fingers and between the dumping bars and swinging on the same axis as the dumping bars.

3. In a grate, the combination of a series of pivotally supported and individually removable dumping bars detachably connected together near their rear ends, and independently operated clinker breakers pivotally supported between the bars in front of said rear ends.

4. In a grate, the combination of a series of pivotally supported and individually removable dumping bars having laterally extended rear ends whereby recesses are provided between the bars in front of said rear ends, pivotally supported clinker breakers, occupying said recesses said dumping bars and clinker breakers being arranged to swing on the same axis, and means for swinging the dumping bars and clinker breakers independently.

5. In a grate, the combination of a series of pivotally supported and individually removable dumping bars detachably connected together near their rear ends and to the rear of their pivots, pivotally supported clinker break-

ers between said bars, means connecting said clinker breakers together, and means for operating the dumping bars and the clinker breakers.

6. In a grate, the combination of a series of pivotally supported and individually removable dumping bars having laterally extended rear ends, whereby recesses are provided between the bars in front of said rear ends and to the rear of their pivots, and pivotally supported clinker breakers, occupying said recesses, a cross bar connecting said clinker breakers together, a cross bar detachably connecting said dumping bars together, and levers and links for independently operating the dumping bars and the clinker breakers.

7. In a grate, the combination of means for supporting and feeding fuel, a cross beam at the rear of said means having projecting fingers, bars fitting into the spaces between the fingers and resting on the beam and forming with the fingers when placed on the beam a substantially continuous smooth surface, and a pivotal support on which the bars are mounted and oscillated to and from the beam.

8. In a grate, the combination of means for supporting and feeding fuel, a cross beam at the rear of said means having projecting fingers, bars having removable ends fitting into the spaces between the fingers and resting on the beam and forming with the fingers when placed on the beam a substantially continuous smooth surface, and a pivotal support on which the bars are mounted and oscillated to and from the beam.

9. In a grate, the combination of a series of individually removable bars, pivotal supports for said bars, means independent of the pivot and arranged near the ends of the bars for detachably locking the bars together, a second series of bars pivotally mounted on the same axis and arranged to swing independently of the first series of bars, and means for locking the second series together.

10. In a grate, the combination of a series of individually removable bars, pivotal supports for said bars, means independent of the pivot for locking the bars together a second series of bars pivotally mounted on the same axis and arranged to swing independently of the first series of bars, and means independent of the pivotal support for locking the second series of bars together.

11. In a grate, the combination of two sets of bars, the bars of each set being removable and provided with slotted openings extending downwardly, such slots forming bearings for the bars, a pivotal support for said bars arranged in the slots and means independently of the support for detachably locking the bars of each set together.

12. In a grate, the combination of two sets of bars, the bars of each set being removable and provided with slotted openings extending downwardly, such slots forming bearings for the bars, a pivotal support for said bars arranged in the slots and means arranged away from the pivot for said bars for detachably locking said bars of each set together.

13. In a grate, the combination of a series of pivotally mounted dumping bars having lateral offsets at their ends, a rod passing through the part of the bar having the offsets, for detachably locking the bars together and a series of clinker breakers pivotally mounted between the bars.

14. In a grate, the combination of means for supporting and feeding the fuel, dumping bars arranged at the rear thereof, clinker breakers alternating with said dumping bars, the bars and clinker breakers being pivotally mounted and arranged to be independently oscillated to feed the fuel in a rearward direction from the feeding and supporting means, both of said series of bars being mounted on a stationary pivot.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

FREDERICK GIRTANNER.

Witnesses:

ALBERT H. BATES,
N. L. BRESNAU.