

No. 662,769.

Patented Nov. 27, 1900.

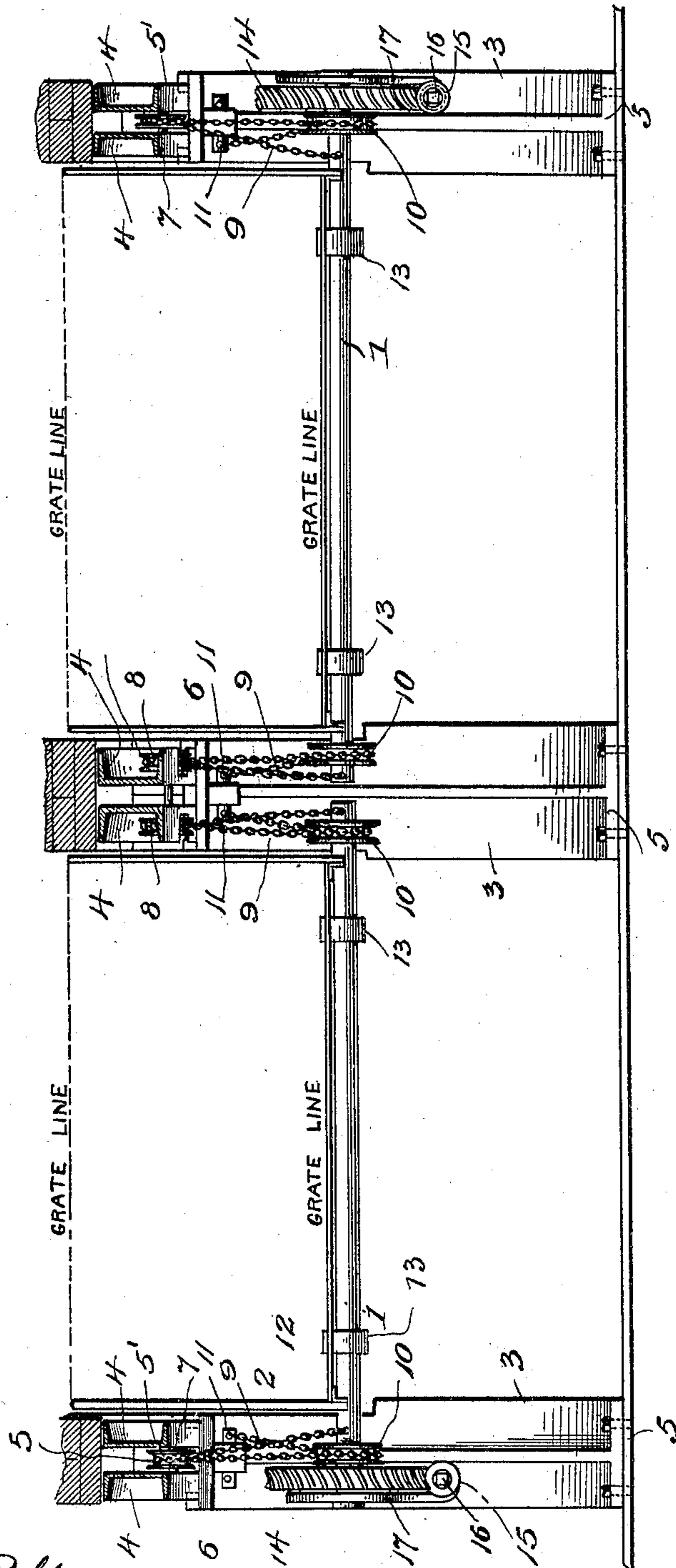
P. L. CROWE.

APPARATUS FOR RAISING OR LOWERING GRATES.

(Application filed Mar. 24, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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Fig. 2.

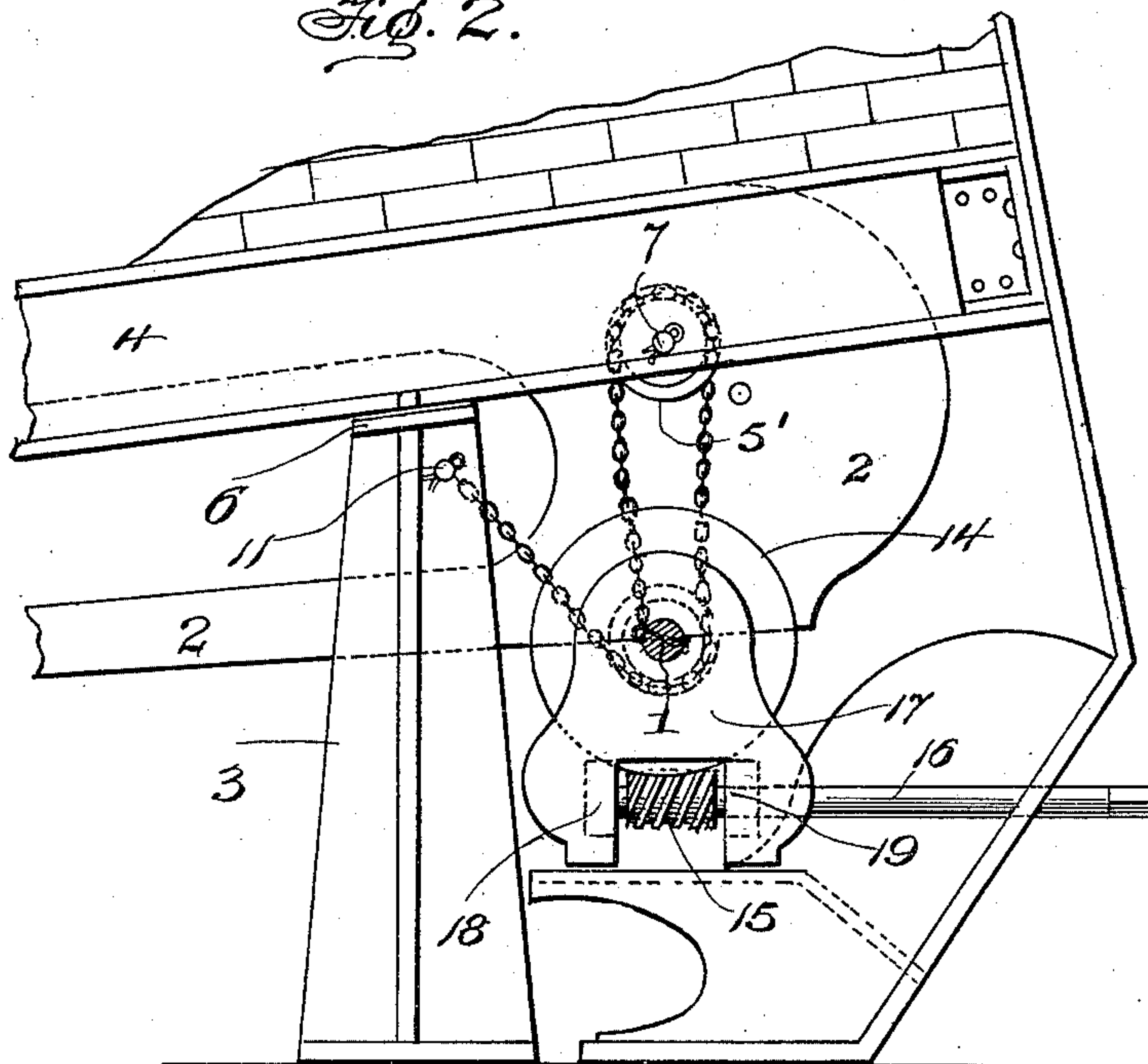
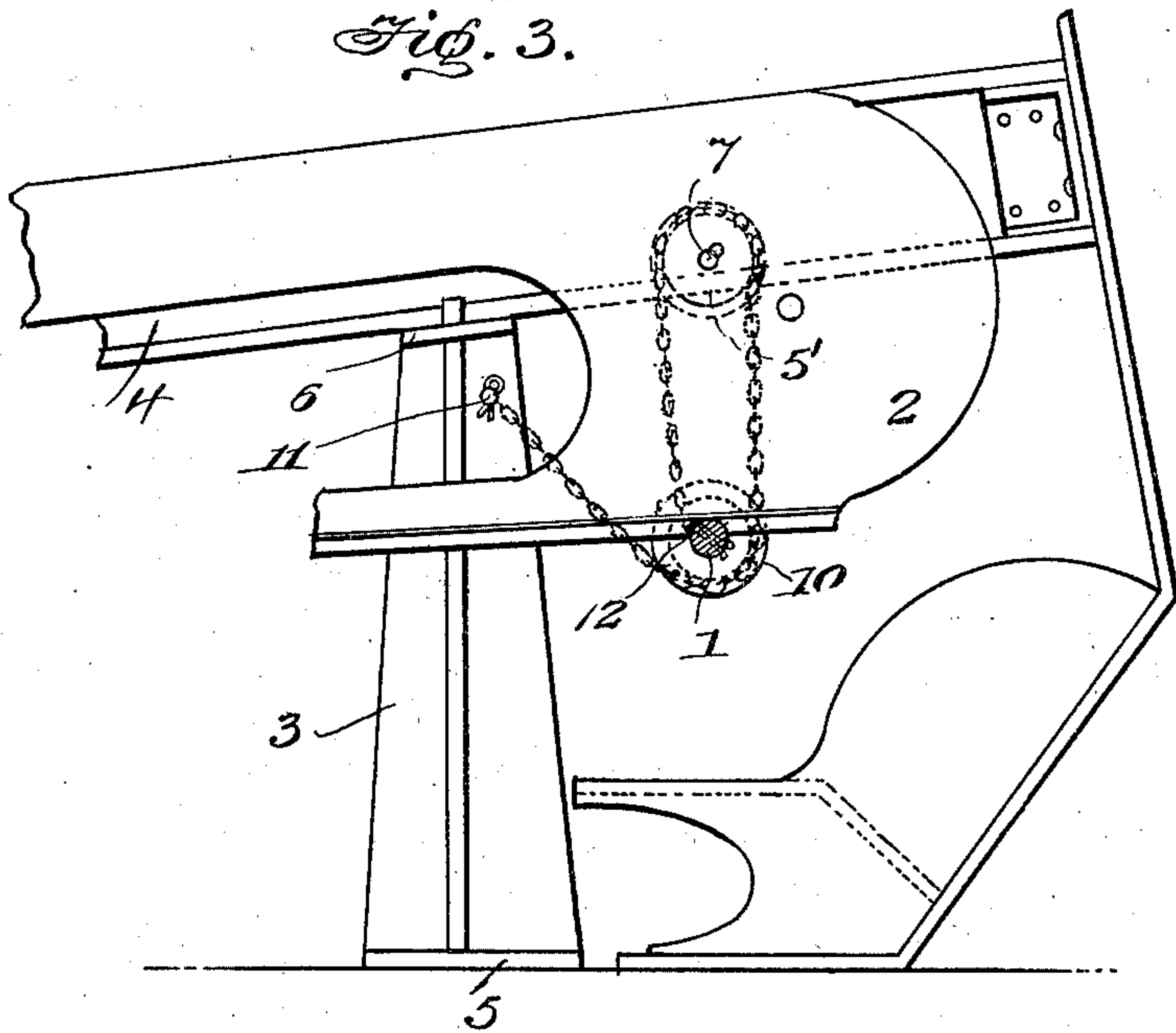


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

PAUL L. CROWE, OF DULUTH, MINNESOTA.

APPARATUS FOR RAISING OR LOWERING GRATES.

SPECIFICATION forming part of Letters Patent No. 662,769, dated November 27, 1900.

Application filed March 24, 1900. Serial No. 10,100. (No model.)

To all whom it may concern:

Be it known that I, PAUL L. CROWE, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Apparatus for Raising or Lowering Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in means for raising and lowering grates, and particularly traveling grates.

It consists in supporting means for a grate, comprising a rigid frame, a shaft supported from said frame by means of chains, the said shaft being arranged beneath the grate and carrying one end thereof, pulleys upon the frame and the shaft for engaging the lifting-chains, and means for rotating the shaft by which the chains may be shortened or lengthened to raise and lower the grate.

It also consists in certain novel features of construction, combination, and arrangement of parts hereinafter fully described and specifically claimed.

In the accompanying drawings, Figure 1 represents a vertical transverse cross-section through a portion of a furnace having a grate-supporting means constructed in accordance with my invention. Fig. 2 represents a side elevation of the rear portion of the said grate-supporting means, and Fig. 3 represents a vertical longitudinal section through a portion of the said means.

The object of my invention is to provide means whereby the rear end of a traveling grate and its pivoted connecting-frames may be raised and lowered at any desired time.

While this means may be applied to grates of any construction, it is particularly adapted for certain traveling grates which are to be used in furnaces of the marine or other type.

The mechanism which I employ is adapted to adjustably support the rear end of a grate so that the said grate and its pivoted frame may be raised or lowered to conform to varying conditions of fuel combustion. This means comprises one or more suspended shafts, as 1, adapted to support a frame 2 of a grate.

While my improvement is applicable to single grates, yet it is very often applied to furnaces having double grates, and for the sake of illustration I have shown a section through a double grate.

The shafts 1 are supported from a suitable rigid structure or frame comprising vertical standards, as 3, upon the top of which are arranged longitudinally-extending channel-bars, as 4 4. The standards 3 are provided with suitable supporting-bases, as 5, and cap-plates, as 6. The channel-bars 4 are preferably arranged in pairs and rest upon the cap-plates 6 of the posts 3, to which they are suitably secured. Each pair of the channel-bars 4 are arranged side by side, either horizontally or at any desired angle, having their vertical flanges parallel and their horizontal flanges extending outwardly, as clearly seen in Fig. 1 of the drawings. In the case of a single grate each pair of the channel-bars 4 4 is arranged with a space between them, in which is mounted a pulley or sheave, as 5'. The pulleys or sheaves 5' are preferably loosely journaled on a short shaft 7, extending from one channel-bar to the other. When a double furnace is used, as illustrated in Fig. 1 of the drawings, the space between the two sections of the furnace is provided with one pair of channel-bars 4 4, which are suitably spaced apart and secured, as heretofore described, to the cap-plates of the posts 3; but instead of mounting a pulley or sheave between them I mount two pulleys or sheaves 8 8 upon the outer surface of each of the channel-bars, one pulley being for use in connection with each section of the grate, suitable notches being cut in the lower flanges of said central channel-beams for the projection of said sheaves and the passage of said chains. Supporting-chains, as 9 9, are secured at one end to the shafts 1 and passed thence upwardly over the pulleys or sheaves 5' 8. Thence the chains 9 extend downwardly and around loose or idler pulleys, as 10 10, mounted upon the shafts 1. The end of each of said chains is then passed to a projecting eye or apertured lug or pin, as 11, secured to each of the posts 3, where it is securely fastened. It will be seen that by rotating the shaft 1 the chains 9 will be wound up upon it, so as to shorten the chain and draw the pulleys 10

upwardly toward the pulleys 5' and 8. The pivoted grate-frame 2 resting upon the said shafts will therefore be elevated or depressed in accordance with the extent to which the chains are wound or unwound. The grate-frames 2 are preferably formed with recesses, as at 12 12, in the lower edges of their side pieces, which engage the shafts 1.

If desired, antifriction loose pulleys or rollers, as 13 13, may be applied to the shafts 1 and interposed between the same and the grate-frames, or said antifriction-rollers may be omitted.

It will be noted that the sheaves or pulleys 5' and 8 are preferably arranged nearly in a vertical plane above the pulleys 10, while the eyes 11 upon the posts 3 are considerably to one side of the vertical plane passing through the said sheaves, so that the chain extending between the pulleys and to the securing-eyes of the posts prevents the shafts 1 from swinging back and forth under ordinary circumstances.

In order to have the shafts 1 under perfect control, they are preferably provided at their ends with keyed worm-gears 14 14, which are adapted to mesh with actuating-worms, as 15, secured to operating-shafts 16. The shafts 16 are journaled in a depending frame, as 17, which is loosely mounted upon the ends of the shafts 1. The journal-bearings 18 and 19, supporting the said shafts 16, are arranged at each end of the worms 15 and prevent their having a longitudinal movement. The supporting-frame 17, being mounted upon the shafts 1, rise and fall with the same and always hold the worm 15 in mesh with the worm-gears 14. The shafts 16 are preferably extended outside the furnace-walls and are squared at their outer ends or otherwise adapted to be engaged by a suitable operating-handle for turning them. By applying the handle to the shaft 16 it may be rotated, actuating the worm 15 and revolving the shafts 1 to wind or unwind the chains 9. Because of the character of the worm-gearing the parts will always remain in the position to which they are adjusted without further attention.

The wall of the furnace may be provided with a suitable vertical slot to accommodate the raising and lowering of the shafts 16.

It will be apparent that the chains 9 may be passed around the pulleys or sheaves 5' from either side without departing from the spirit of the invention.

I find in use that a grate supported in this manner is particularly well adapted for marine furnaces and that the adjustment of the grate can be effected at any time without interfering with the fire upon the grate or the operation of the furnace. It is very desirable in chain-connected traveling grates to raise or lower the end of the grate which is arranged near the bridge-wall of the furnace to increase or diminish the space between the same both to accommodate the fuel upon the

grate and to prevent too much air entering the fuel-chamber from that end of the grate.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. Means for raising and lowering a grate, comprising a shaft suspended upon chains, a pivoted grate-frame resting upon said shaft, a rigid frame for supporting the chains, pulleys or sheaves mounted upon the shaft and said frame for engaging the lifting-chains, and means for rotating the shaft to wind or unwind the lifting-chains for raising and lowering the grate.

2. In a mechanism for raising and lowering one end of a grate, the combination with a suitable rigid frame, of sheaves or pulleys mounted thereon, a shaft supported from the said frame, chains for adjustably holding the shaft in place, sheaves or pulleys upon the shaft, one end of each of said chains being secured to the shaft, the chains being passed over and around the said sheaves or pulleys and secured at their other ends to the rigid supporting-frames, and means for rotating the shaft, whereby the chains will be wound and unwound thereon for drawing the shaft nearer to the sheaves upon the rigid supporting-frame or increasing the distance between them, substantially as described.

3. Means for adjusting a grate, comprising a suspended shaft, rigid frames supporting the said shaft, comprising posts and channel-beams mounted upon the said posts, sheaves mounted between the said channel-beams, loose pulleys upon the shaft, chains secured at one of their ends to the shaft and passing over the sheaves on the channel-beams and around the pulleys on the shaft, their other ends being secured to eyes upon the said posts, and means for rotating the shaft for winding and unwinding the chain, the construction being such that the grate and pivoted grate-frame resting upon the shaft may be raised or lowered by means of the said chains and rotating shafts.

4. In a furnace, the combination with two or more grate-sections, of shafts located beneath the same, sheaves or pulleys mounted upon a suitable rigid frame, and idler-pulleys on the said shafts, chains secured to the said shafts at one of their ends and passing over the shafts on the frame and around the loose pulleys on the shaft, their other ends being fastened to the said frame, and means for revolving the shafts to wind or unwind the chains, whereby the grate-sections may be elevated or depressed to a greater or less extent, as may be desired.

5. A grate-adjusting mechanism, comprising a revoluble shaft, a supporting-frame, sheaves or pulleys upon the said frame and upon the said shaft, chains secured to the shaft and frame and passing about the said pulleys or sheaves, worm-gears secured to the shaft, a worm for engaging the said gear, and means for turning the worm, whereby the

shaft may be revolved and the chains wound or unwound to raise or lower the grate, substantially as described.

6. In a mechanism for raising and lowering
5 grates, the combination with a supporting-
frame, of a revolving shaft suspended there-
from, sheaves or loose pulleys mounted upon
the said frame and the said shaft, chains pass-
ing over the pulleys and secured at their ends
10 to the frame and the said shaft, means for ro-
tating the shaft comprising a worm-gear se-
cured thereto, a frame or hanger suspended
from the said shaft having journal-bearings
formed therein, a shaft mounted in the said
15 journal-bearings, a worm carried by the said
shaft and meshing with the worm-gear, the
construction being such that by turning the
shaft carrying the worm the grate-supporting
shaft may be revolved for winding or unwind-
20 ing the chains and thereby raising or lower-
ing the pivotal grate-carrying frame resting
thereon, substantially as described.

7. In a mechanism for raising and lowering
grates, the combination with a supporting-
25 frame, of a revolving shaft suspended there-

from, sheaves or loose pulleys mounted upon
the said frame and the said shaft, chains pass-
ing over the pulleys and secured at their ends
to the frame and the said shaft, antifriction
pulleys or rollers interposed between the shaft 30
and the pivotal grate-frame resting thereon,
means for rotating the shaft comprising a
worm-gear secured thereto, a frame or hanger
suspended from the said shaft having jour-
nal-bearings formed therein, a shaft mounted 35
in the said journal-bearings, a worm carried
by the said shaft and meshing with the worm-
gear, the construction being such that by turn-
ing the shaft carrying the worm the grate-
supporting shaft may be revolved for wind- 40
ing or unwinding the chains and thereby rais-
ing or lowering the pivotal grate-carrying
frame resting thereon, substantially as de-
scribed.

In testimony whereof I hereunto affix my 45
signature in presence of two witnesses.

PAUL L. CROWE.

Witnesses:

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