

No. 834,174.

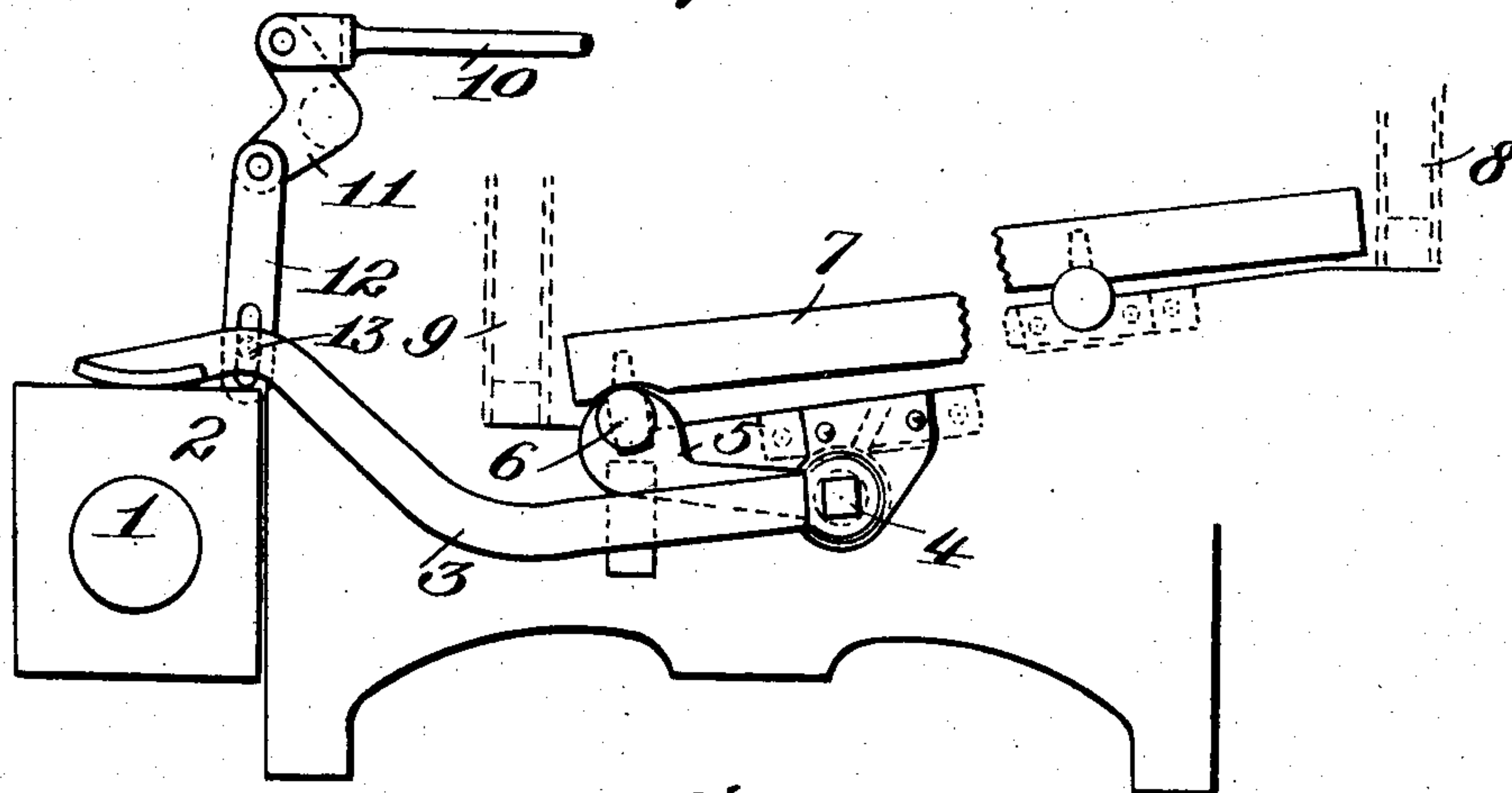
PATENTED OCT. 23, 1906.

W. THOW & W. H. NISBET.  
GRATE OPERATING MECHANISM.

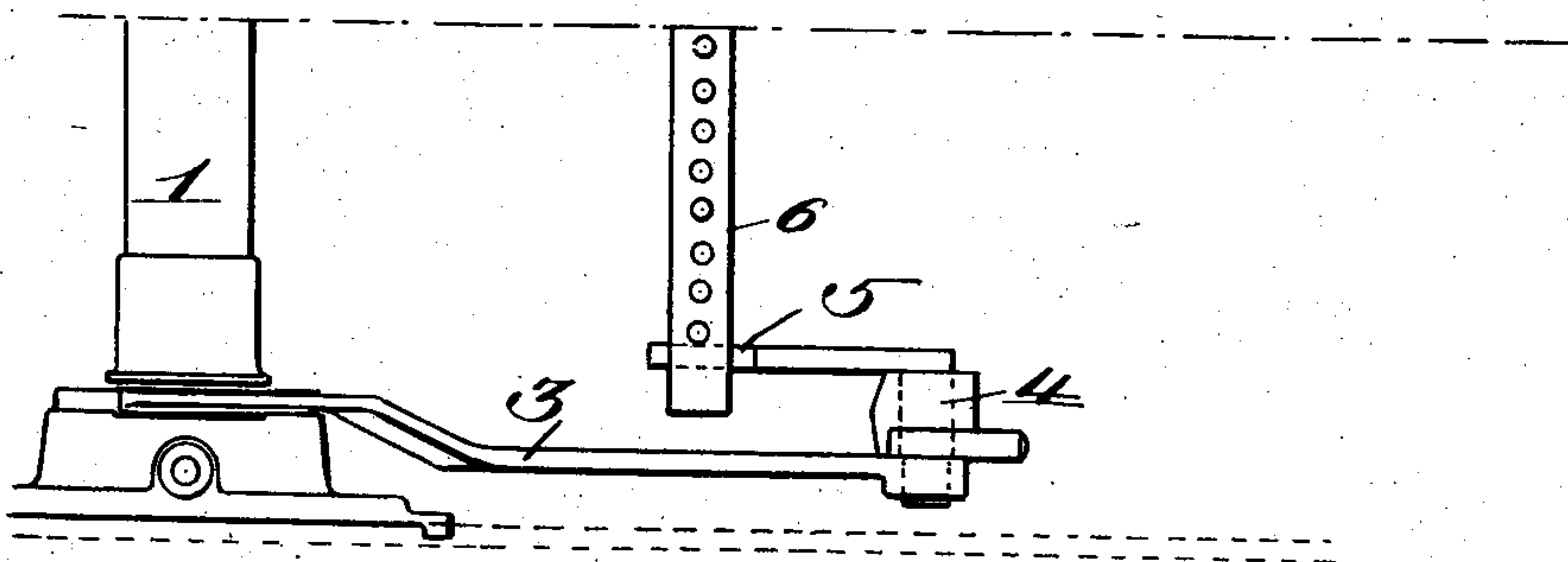
APPLICATION FILED APR. 2, 1906.

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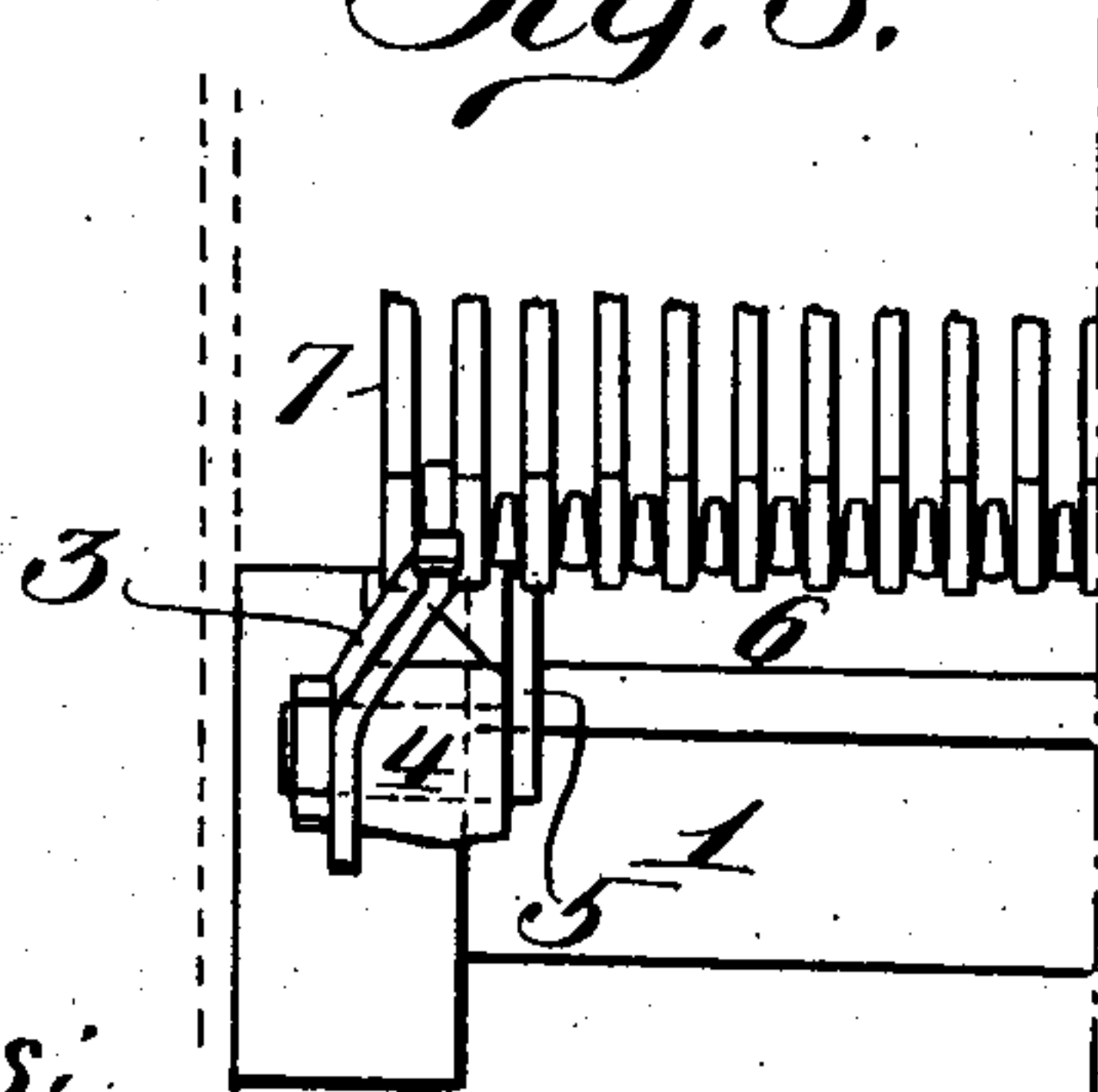
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:  
*C. D. Hesler*  
*Dennis Cumbly*

Inventors  
*William Thow*  
*William H. Nisbet*  
By *James L. Norris*  
*Atty*

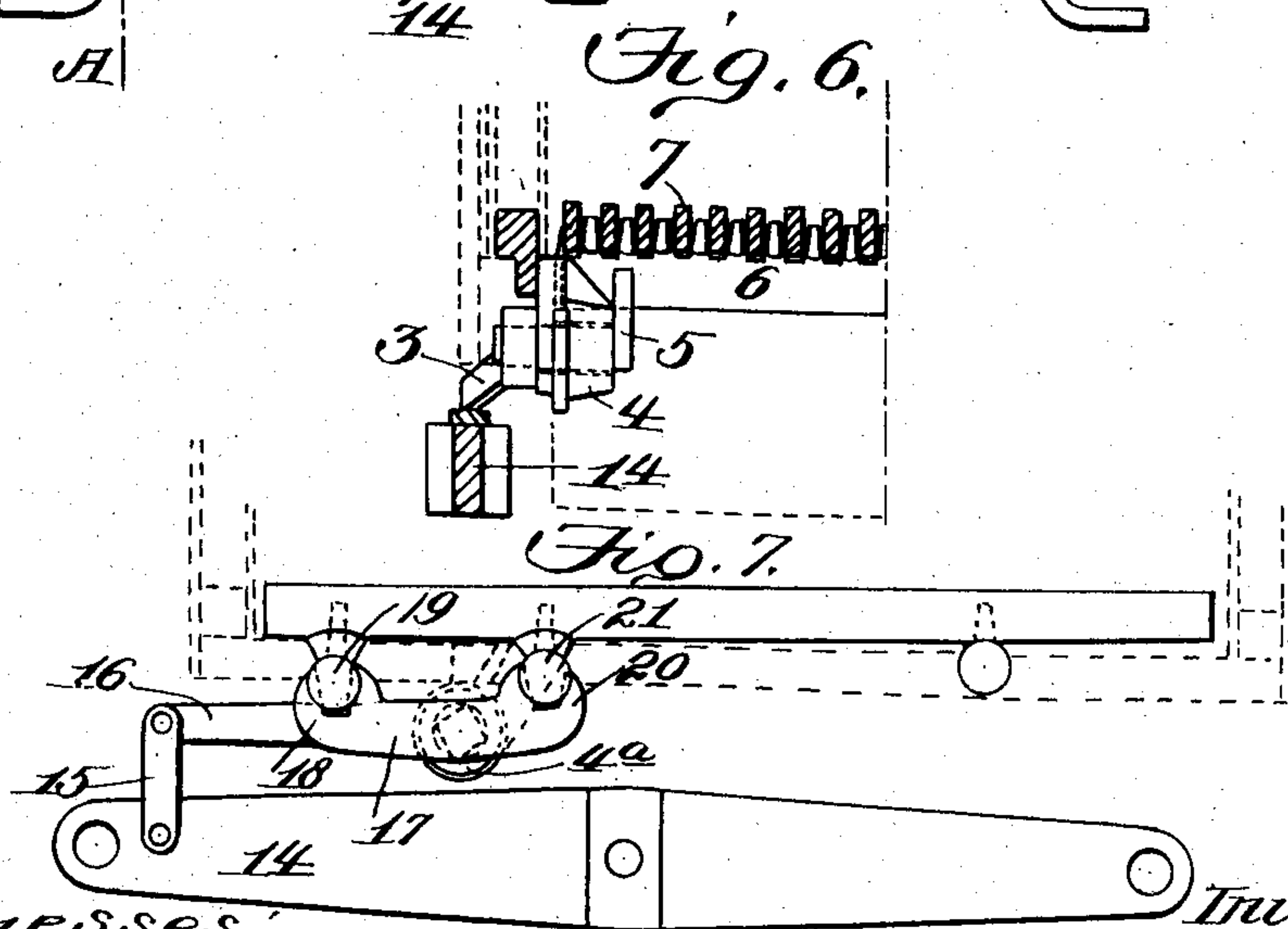
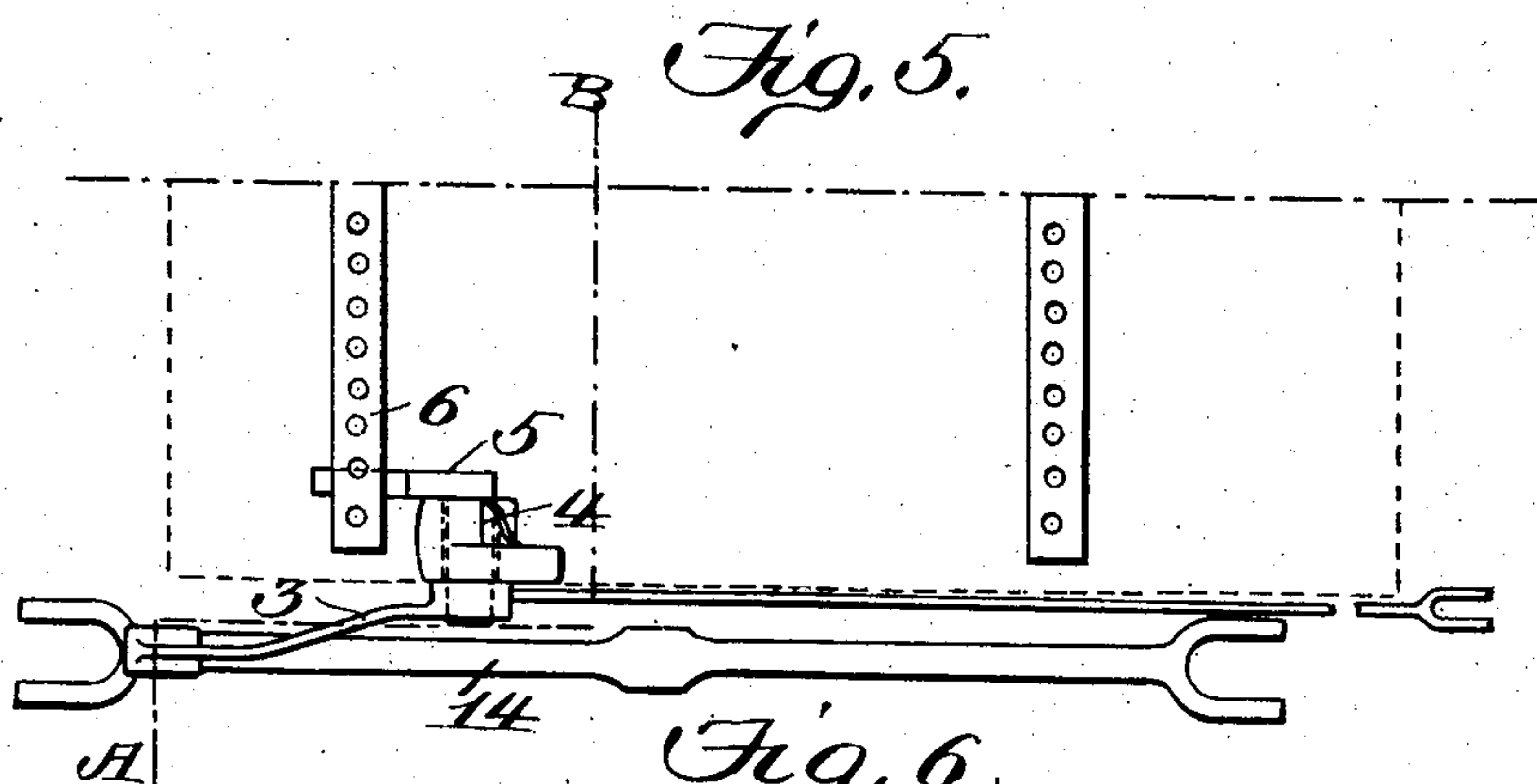
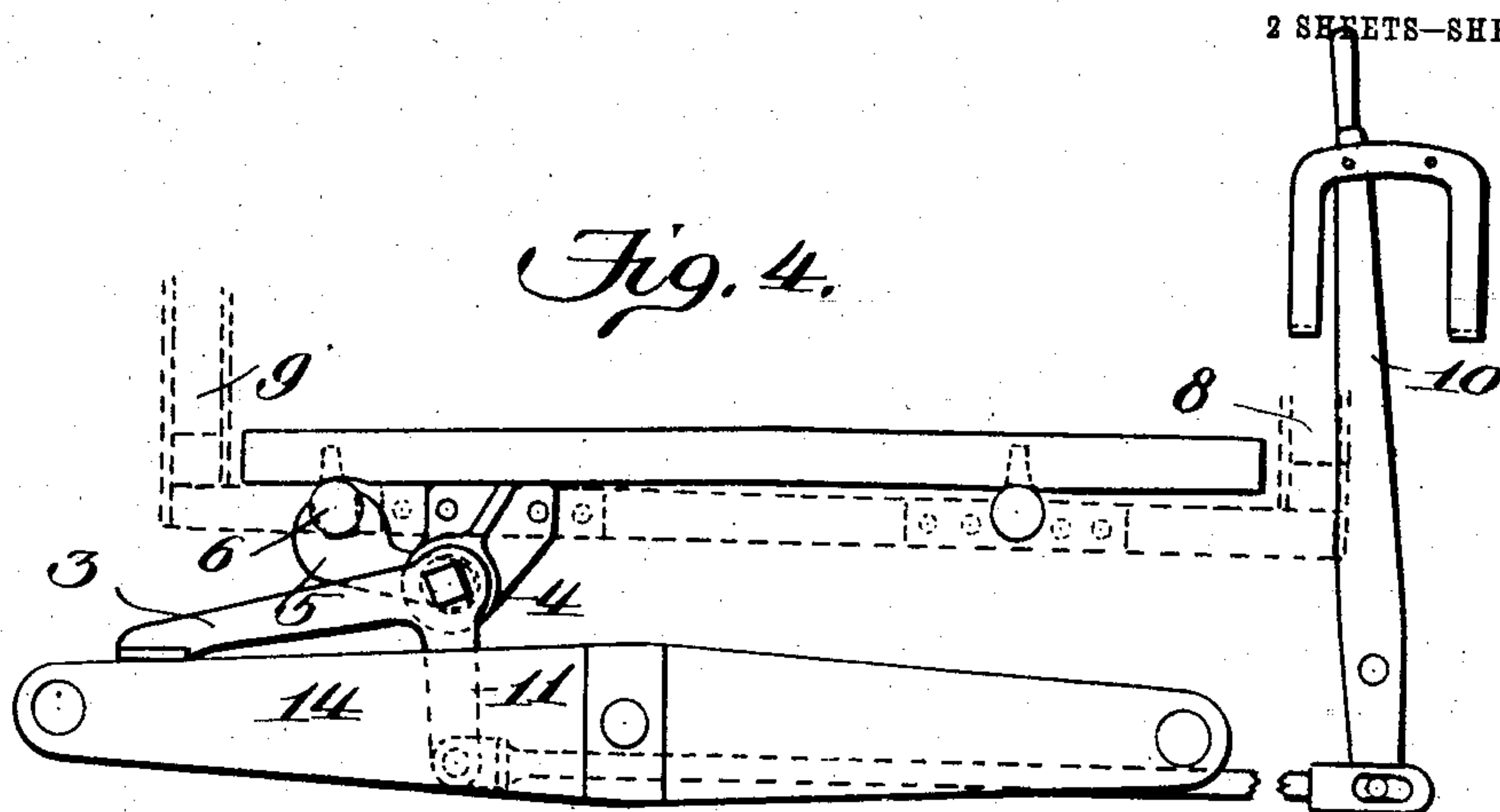
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2 SHEETS—SHEET 2.



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C. D. Hesler  
Lennis Sumbly.

Inventors  
William Thow  
William H. Nisbet  
By James T. Norris  
Atty.



# UNITED STATES PATENT OFFICE.

WILLIAM THOW AND WILLIAM HOLMES NISBET, OF RANDWICK, NEAR  
SYDNEY, NEW SOUTH WALES, AUSTRALIA.

## GRATE-OPERATING MECHANISM.

No. 834,174.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Original application filed March 13, 1905, Serial No. 249,939. Divided and this application filed April 2, 1906. Serial No. 309,397.

*To all whom it may concern:*

Be it known that we, WILLIAM THOW, residing at Ascot, Dutruc street, Randwick, near Sydney, and WILLIAM HOLMES NISBET, residing at Mutual Life of New York Buildings, Martin Place, Sydney, New South Wales, Australia, subjects of the King of Great Britain, have invented certain new and useful Improvements in Grate-Operating Mechanism, of which the following is a specification.

This invention relates to improved means for automatically imparting a rocking, shaking, tilting, or vibrating motion to the fire-bars of locomotive-furnaces independent of the stoker or fireman, such operation of the bars being obtained by an actuating mechanism operated by a part or element of the vehicle, which has a movement independent of, but relative to, the other parts of the vehicle, said movement being due to the motion or travel of the vehicle.

The invention insures great economy of fuel through the more effective removal of ash and breaking up of clinker and the consequent more constant and regular steaming of the boiler, thus saving the time frequently occupied at stations in cleaning fires when movable fire-bars are not used. The comparatively gentle motion automatically imparted to the fire-bars avoids the violent shaking up of the fire and consequent loss of good fuel, as when hand-rocking arrangements or pricking-bars are employed. The invention, furthermore, has the advantage of enabling the fire-bars to be spaced more closely together.

According to our invention we obtain the necessary power from one or more of the axle-boxes or compensating beams or springs or connections thereto at one or both sides of the engine through a series of levers or levers and links, so that when the locomotive is running a vibrating and intermittent motion is automatically given to the fire-bars or some of them. If necessary, one only or more or all the firebars may have motion imparted to them at one time or some bars may be raised while others are lowered. Provision is made for disengaging the lever or levers, so that, if desired, no movement is transmitted to the fire-bars when the engine is running except at the will of the stoker or fireman.

In the accompanying drawings, Figure 1 is

a side elevation illustrating our invention for operating the fire-bars from one of the axle-boxes. Fig. 2 is a half plan of the same, the fire-bars being removed for the sake of clearness, while Fig. 3 is a half end elevation of Fig. 1. Fig. 4 is a side elevation showing our invention as operated from one of the compensating beams. Fig. 5 is a half plan with the fire-bars removed. Fig. 6 is a section through the line A B, Fig. 5; and Fig. 7 is a side elevation of a modification whereby a number of the fire-bars are raised as the remainder are lowered.

The same numerals indicate the same or corresponding parts in all the figures.

Referring to Figs. 1 to 3, 1 is the axle of a locomotive, and 2 the axle-box thereof. The actuating mechanism for the fire-bars comprises an elongated lever 3, which rests on or is in contact with the upper face of said axle-box and which is fulcrumed on a short shaft 4, suitably supported by a bracket. On the shaft 4 is also fulcrumed the short lever 5, upon which rest the bearers 6, carrying one end of each of the fire-bars 7. 8 and 9 are the ends of the fire-box.

If it is desired to disengage the lever 3 from the axle-box, a hand-operated rod 10, a bell-crank 11, fulcrumed on a convenient part of the framing, and slotted link 12 are provided, as clearly shown in Fig. 1. To stop the rocking of the bars, the rod 10 is operated to raise through lever 11, link 12, and pin 13 the lever 3 from contact with the axle-box.

It is evident that while the engine is running a vibrating and intermittent motion is automatically transmitted from the axle-box through lever 3, shaft 4, and lever 5 to the fire-bars or their bearers, which is quite sufficient to break up any clinker which may have formed in the furnace and by keeping the air-spaces open thereby promote free combustion of the fuel.

In Figs. 4 to 6 the lever 3 is in contact with the upper face of the compensating beam 14, from which motion is given to the fire-bars 7 or to the bearers 6 supporting them through the shaft 4 and lever 5, as before. If desired, the hand-lever 10 may be operated to raise the lever 3 from the beam through the arm 11, as clearly shown in Fig. 4.

In the modification illustrated in Fig. 7 the beam 14 transmits motion through the



link 15 to the lever 16, fulcrumed on the shaft 4<sup>a</sup>, on which also is a rocking lever 17, one arm 18 of which operates the bearer 19, carrying one set of fire-bars, while the other arm 20 operates the bearer 21, carrying another set of fire-bars. By this form of the invention a number of the bars are raised at the same time as the remaining bars are lowered.

10 We do not restrict ourselves to the precise arrangements illustrated, as it is evident that the necessary movement could be obtained from the axle-box or compensating beam through the medium of springs or other con-  
15 nections thereto.

The subject-matter of this application is a division of application filed March 13, 1905, Serial No. 249,939.

20 Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a motor-vehicle provided with a fire-box, movable grate-bars therein, actuating mechanism for said bars, said mechanism

adapted to be operated by a part or element 25 of the vehicle having a movement independent of, but relative to, the other parts of said vehicle, said movement being due to the motion or travel of the vehicle.

2. In a motor-vehicle provided with a fire- 30 box, movable grate-bars therein, actuating mechanism for said bars, said mechanism adapted to be operated by a part or element of the vehicle having a movement independent of, but relative to, the other parts of said 35 vehicle, said movement being due to the motion or travel of the vehicle, and means for shifting the actuating mechanism out of operative connection with the said part or element.  
40

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

WILLIAM THOW.

WILLIAM HOLMES NISBET.

Witnesses:

CHARLES EDWARD GRAHAM,

WILLIAM REFORM CLELANO FORSTER.