P. H. DOUGLAS.

COAL LEVELING MACHINE.

APPLICATION FILED DEC. 20, 1911.

1,067,240.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

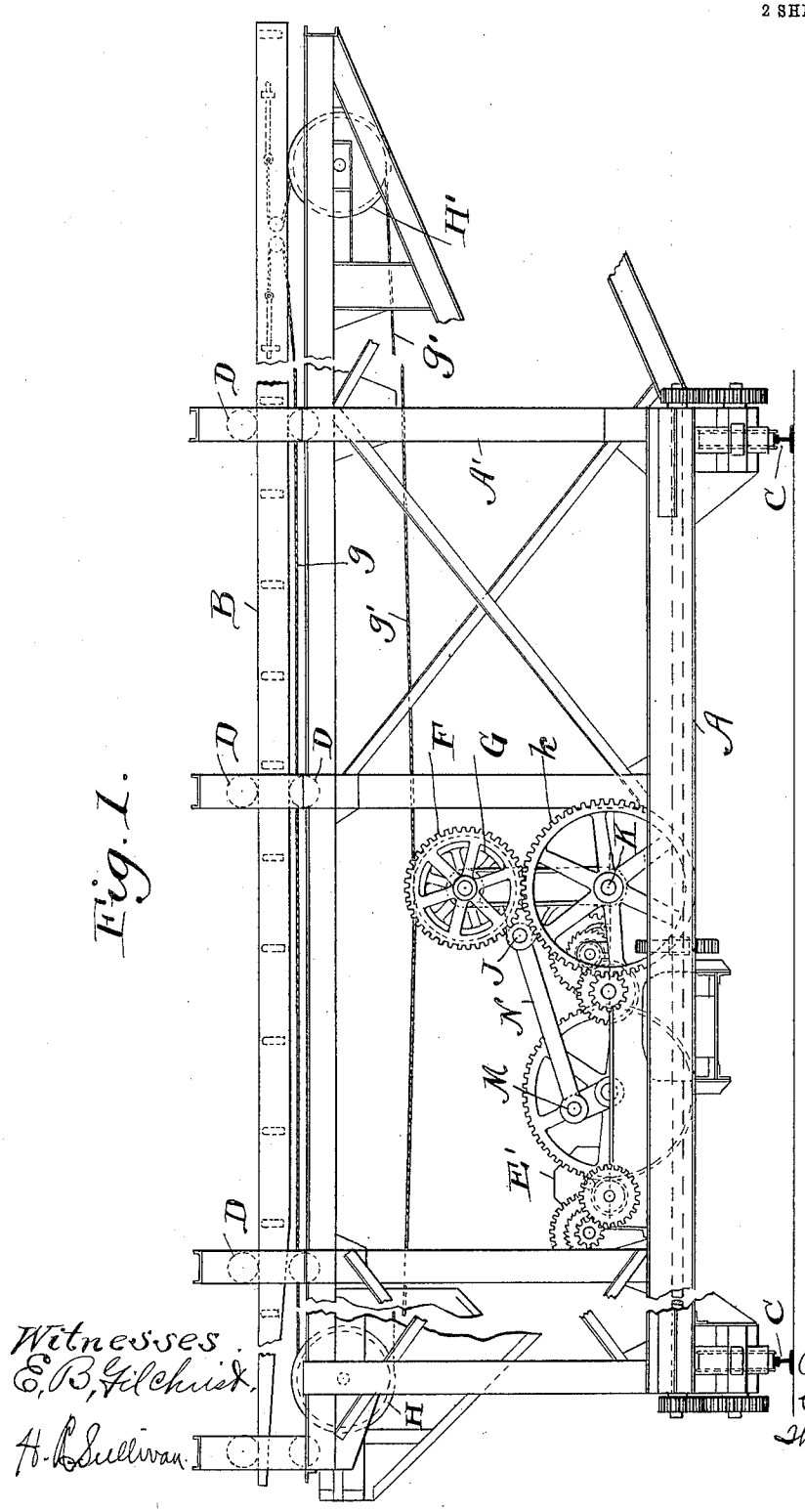


Fig. 1.

Witnesses.
E. B. Gilchrist.
H. R. Sullivan.

Inventor
Paul H. Douglas
by
Thurston & Kerr
Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 2.

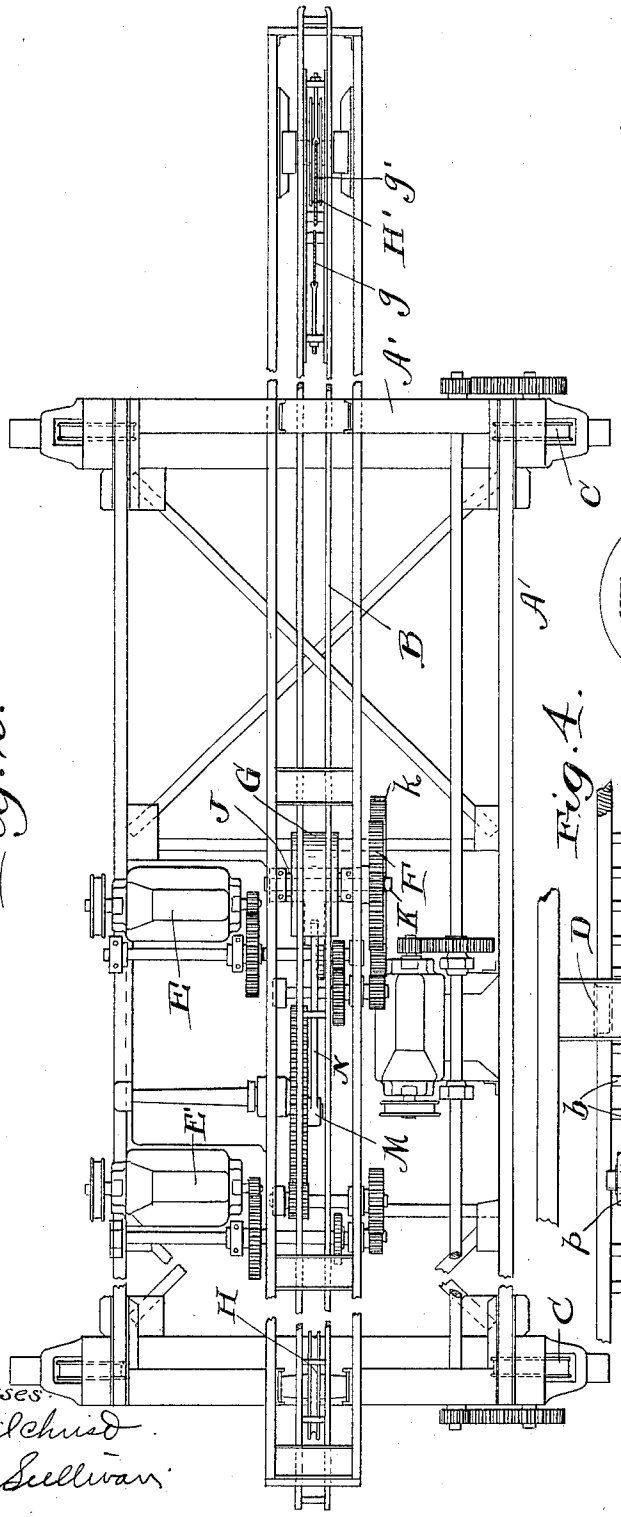


Fig. 3.

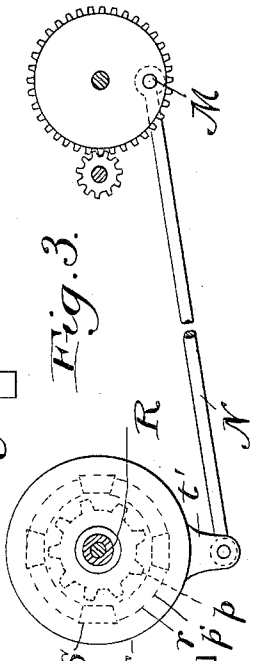
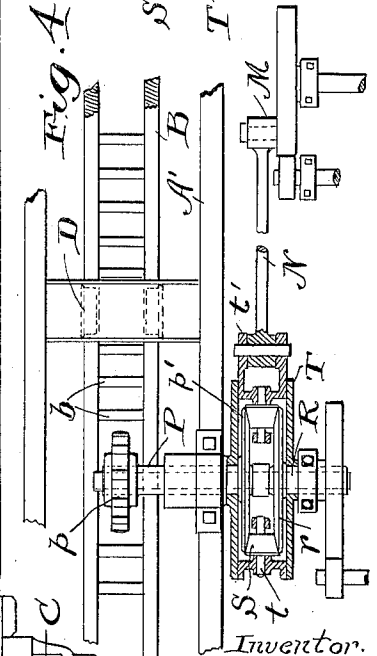


Fig. 4.



Witnesses:
E. B. Gilchrist.
H. P. Sullivan.

Inventor.
Paul H. Douglas
by Thurston & Lewis
attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PAUL H. DOUGLAS, OF EAST CLEVELAND, OHIO, ASSIGNOR TO THE WELLMAN-SEAVER-MORGAN COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

COAL-LEVELING MACHINE.

1,067,240. Specification of Letters Patent. Patented July 15, 1913.

Application filed December 20, 1911. Serial No. 666,948.

To all whom it may concern:

Be it known that I, PAUL H. DOUGLAS, a citizen of the United States, residing at East Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Coal-Leveling Machines, of which the following is a full, clear, and exact description.

This invention relates to machines whose function is to level the crushed coal which has been discharged into the top of a retort coke oven. The machines for this purpose which have heretofore been used have included a movable frame capable of being moved in front of any one of a battery of ovens, and carrying a long leveling bar, and mechanism by which this bar can be moved endwise forward and backward into and out of the oven for the purpose of leveling the coal dust therein. If, in use, this leveling bar encounters a pile of coal dust which it cannot smooth down by moving in one direction against and through it, it is possible and customary to reverse the movement of this leveling bar by reversing the movement of the driving mechanism. By so doing, the leveling bar is caused to move backward and forward until this pile of coal dust is smoothed down. This back and forth movement of the leveling bar produced in this manner, is, however, necessarily slow, and is not at all satisfactory in practice.

The object of this invention is to provide for operating the leveling bar mechanism which is so constructed that the movement of the bar in or out may be stopped at any point, and then the bar may be caused to move back and forth with comparative rapidity without reversing the motion of the mechanism by which its forward and backward movement is ordinarily imparted, and without using clutches and other connecting and disconnecting mechanisms, such as have commonly been employed, which mechanisms are particularly liable to be put out of commission by the flying coal dust around a plant of the sort described.

The invention consists in the novel combinations of parts shown in the drawing and hereinafter described as defined by the appended claims.

In the drawing, Figure 1 is a side elevation, and Fig. 2 is a plan view of a machine which embodies this invention. Fig. 3 is a somewhat diagrammatic representation of a modified form of the parts which embody said invention. Fig. 4 is a sectional plan view showing more in detail this modified construction.

The main frame A of the machine is a built up structure which is mounted on wheels C which facilitate its movement into operative position before the different coke ovens. The machine includes an elevated bridge A′ whereon are pairs of guide rolls D between which the leveling bar B moves, and by which it is guided and supported for endwise movement.

An electric motor E mounted on the main frame drives a suitable train of gears whose terminal member F is fixed to a rope drum G. Cables g, g' are fixed to the leveling bar and extend in opposite directions therefrom over guide sheaves H, H′ mounted on the bridge, and thence to the drum G, on which they are wound in opposite directions. When this drum is turned in one direction or the other by the mechanism provided for this purpose, one of these cables will be wound upon the drum and the other unwound therefrom with the result that the leveling bar will be moved forward or backward, as the case may be.

There is nothing new or distinctive of the present invention embodied in the mechanism which has been heretofore mentioned; in fact, any suitable mechanism capable of doing the described work and of being used in coöperative relation with the mechanism now to be described may be employed in its stead.

The terminal member F of the gear train is mounted on the upper end of a rocking member J. This rocking member in the form shown in Figs. 1 and 2 is a frame which is loosely hung on shaft K, which is the shaft to which is secured that one of the train of gears referred to, namely, gear k, which meshes with the terminal gear F. Another electric motor E′ drives, through a suitable train of gears, a crank M, the shaft of which is mounted on the machine frame. This crank is connected by a pitman N with the oscillating member J.

In using the machine the leveling bar will be caused to move slowly into the coke oven by the motor E and the described mechanism driven thereby. When the leveling bar encounters a pile of coal which cannot be leveled by the slow movement of the leveling

bar into the retort, the motor E is stopped. Preferably also, the motor, or some part of the train of mechanism between it and the terminal member F of said train is locked against rotation. Then the motor E′ is set in operation, whereby the crank M will be rotated, and the rocking member J will be caused to rock back and forth, and thereby, through the described mechanism, the leveling bar will be moved forward and backward through a short path. This movement will be continued until the pile of coal operated upon has been sufficiently leveled when the motor E′ will be stopped and locked against movement and the motor E will be set in operation.

A modified embodiment of the invention is illustrated in Figs. 3 and 4. In the construction shown in these figures the leveling bar is provided with rack teeth, preferably such as is formed by a plurality of cross pins *b*. These rack teeth are engaged by a pinion *p* having suitably formed teeth. This pinion is fixed to a shaft P which is rotatably mounted in suitably fixed bearings. Another shaft R is also mounted in fixed bearings and in axial alinement with the shaft P. The terminal member F of a suitable gear train from a motor is secured to this shaft R.

The rocking member is in the form of a box T which is loosely mounted on the two shafts P and R. The beveled gears *p′* and *r* are fixed respectively to the ends of these two shafts within this box. A beveled gear S (one or more may be employed) is rotatably mounted on a radial stub shaft *t*, which is fixed to the box, and is in mesh with the two beveled gears *p′* and *r*. The box is provided with an arm *t′* to which the pitman N is pivoted, said pitman being connected at its other end with a crank M for which suitable operating mechanism is provided, which mechanism may be like that which has been heretofore described. When the leveling bar B is being moved in one direction or another by the mechanism of which gear F is the terminal member, the box is held immovable, and motion will be transmitted from this terminal member F through shaft R, beveled gears *r*, *p′* and S and shaft P to the pinion *p* which engages the rack on the leveling bar. If, however, the terminal member F of the gear train be held against rotation, and the crank M be rotated, the box T will be oscillated upon its axis. The beveled gear S carried by the box will be rotated upon its axis by reason of its engagement with the now non-rotating beveled gear *r*, and, as a result, the beveled gear *p′*, the shaft P to which it is fixed, and the pinion *p* which engages the rack, will be rotated at double speed. Of course, as the box changes its direction of movement, the direction in which said pinion *p* moves will also be reversed, and the result will be that during each revolution of the crank shaft, the leveling bar will be moved backward and forward through its prescribed path.

Having described my invention, I claim:

1. In a coal leveling machine, the combination of an endwise movable leveling bar, a rotatable member, and means whereby the rotation of said member will move the leveling bar, two motors, a train of mechanism by which one motor may turn the rotatable member, a second train of mechanism intermediate of the second motor and said rotatable member, which second train of mechanism includes a crank, a rocking member and a pitman connecting said crank and rocking member, and means whereby the rocking of said member will reciprocate the leveling bar.

2. In a coal leveling machine, the combination with an endwise movable leveling bar, a rotatable member, and means whereby the rotation of said member will move said bar, a rocking frame on which said rotatable member is connected, a motor, a train of gears between it and said rotatable member, one of said gears being coaxial with the rocking frame, and means for rocking said frame.

3. In a coal leveling machine, the combination with an endwise movable leveling bar, a rotatable member, and means whereby the rotation of said member will move said bar, a rocking frame on which said rotatable member is connected, a motor, a train of gears between it and said rotatable member, one of said gears being coaxial with the rocking frame, a crank shaft, an independent motor for operating it, and a pitman connecting the crank shaft and rocking frame.

4. In a coal leveling machine, the combination with an endwise movable leveling bar, a rotatable rope drum, two ropes wound in opposite directions thereon and extending in opposite directions therefrom and being connected at their ends with said leveling bar, guide sheaves over which said ropes run, a rocking frame on which said rope drum is mounted, a motor, a train of gears between it and said rope drum, one of said gears being coaxial with the rocking frame, and means for rocking said frame.

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

PAUL H. DOUGLAS.

Witnesses:
H. R. SULLIVAN,
E. L. THURSTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."