No. 876,175. PATENTED JAN. 7, 1908.

J. S. HAM.

COKE LEVELING MACHINE.

APPLICATION FILED JUNE 15, 1903.

2 SHEETS—SHEET 1.

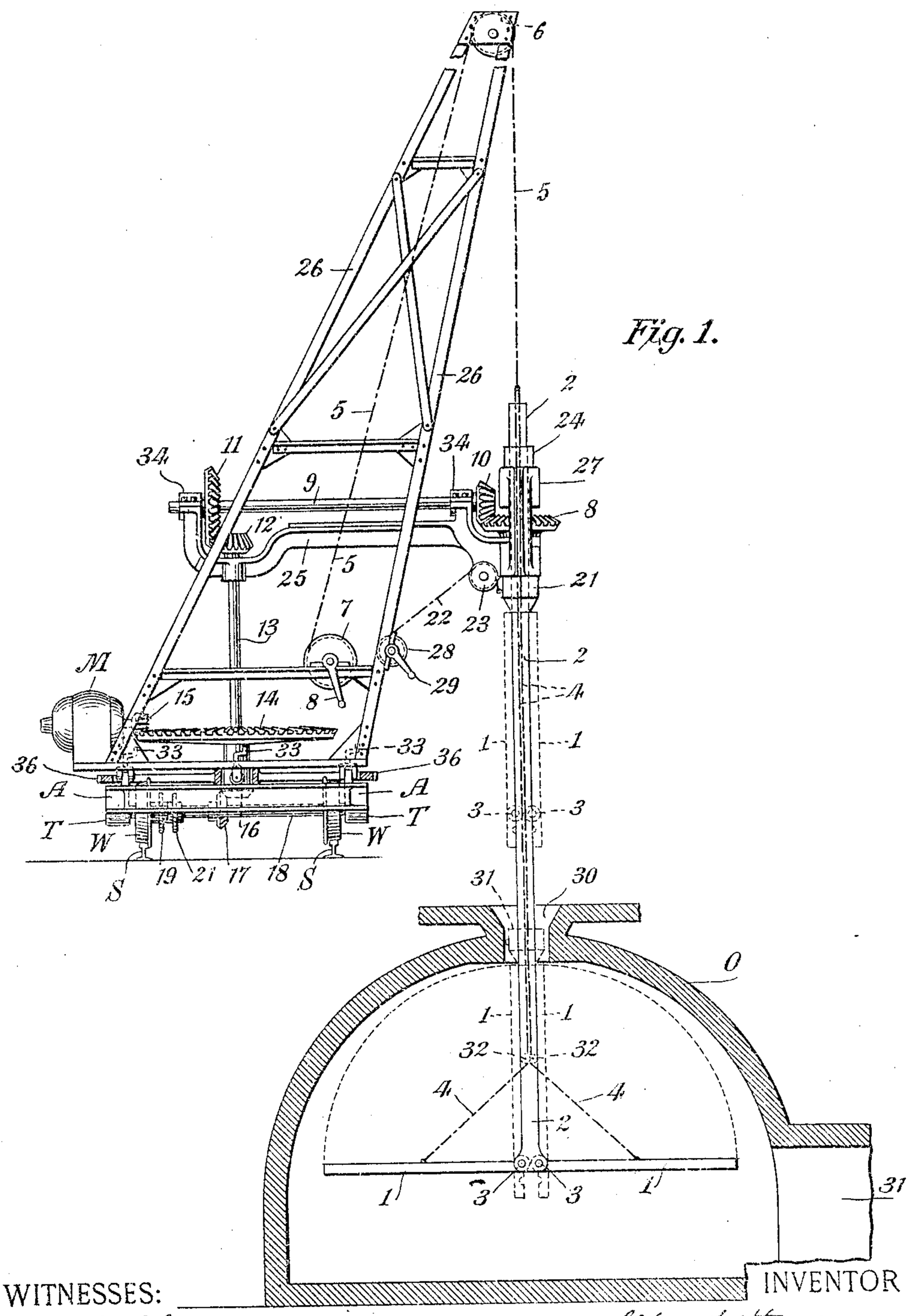

Fig. 1.

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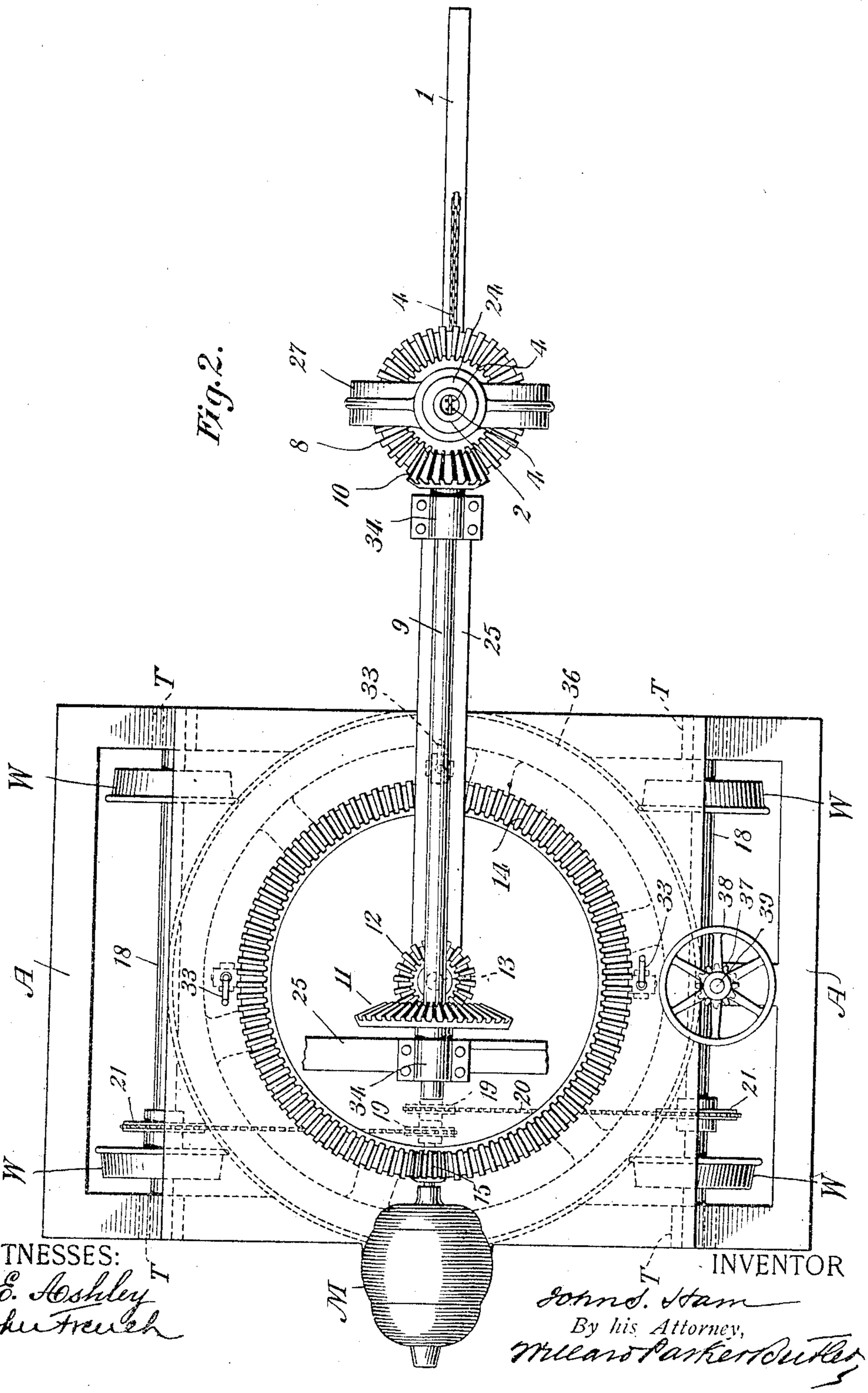
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN S. HAM, OF COVINGTON, VIRGINIA, ASSIGNOR TO COVINGTON MACHINE COMPANY, A CORPORATION OF VIRGINIA.

COKE-LEVELING MACHINE.

No. 876,175. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed June 15, 1906. Serial No. 321,830.

To all whom it may concern:

Be it known that I, JOHN S. HAM, a citizen of the United States, and resident of Covington, Alleghany county, Virginia, have invented a new and useful Improvement in Coke-Leveling Machines, of which the following is a specification.

My invention relates to improvements in machinery for leveling the coke within coke ovens, and particularly to that class of machine for leveling the coke in what are known as "beehive" ovens, as distinguished from other classes of oven. The beehive oven is an oven made in the form of a hemisphere, access being had to the interior thereof, through a central opening at the top and through an opening at the side.

The present invention consists of a device which is carried upon a carriage moving upon a track placed above and preferably at one side of a row of beehive ovens, and which carriage by means of appropriate mechanism, is caused to travel along and over the row of ovens and by further appropriate mechanism, to insert the tool into each oven, so move it horizontally and vertically that all parts of the coke within the oven will be successfully subjected to its effect, and thereupon to withdraw in and then subject the next oven in the row, to a similar procedure.

The invention will be best understood by reference to the accompanying two sheets of drawings, in which

Figure 1 is a vertical elevation of the leveling tool in the carriage upon which it moves, shown in connection with an oven in vertical cross-section. Fig. 2 is a plan view of the carriage and the tool omitting the oven.

Similar letters refer to similar parts throughout the several views.

In the drawings O represents the oven which is provided with an opening 30 in its top and an opening 31 in the sides; S represents a pair of rails extending on top of a row of coke ovens on a suitable platform, W are the wheels of a truck A.

18 are the axles of the wheels, and T T the supporting hangers.

The truck A carries a circular toothed plate 36 which is supported thereon by rollers, which rollers are made vertically adjustable by means of screws 33 and said plate is arranged to turn on a central bearing on the truck A. The plate 36 carries a tower 26, preferably of the type shown in Fig. 1 which in turn carries a frame 25 attached in any convenient manner. This frame is of the shape shown in Fig. 1, and terminates at each end in appropriate bearings 34 upon which a shaft 9 is carried. The tower is arranged to rotate with the plates 36 on the rollers on the truck A by means of the wheel 38 mounted on the shaft 39 which carries a spur wheel 37 which engages with the teeth on the periphery of the plate 36. The tool itself consists of the two leveling arms 1, pivoted together at their inner ends to a hollow shaft 2, by means of the pivots 3, as shown in Fig. 1. These arms are raised and lowered by means of the chains 4, which are led into the interior of and up through the hollow shaft 2 by means of the sheaves 32, and are connected to the chain or rope 5. This in turn is led over a sheave 6, at the top of the tower 26 as shown in Fig. 1, and down to a winch 7, mounted on the tower and provided with a handle 8 whereby the winch may be turned. When the winch 7 is turned from right to left in Fig. 1, it coils up the rope 5, which draws up the chains 4 and in turn raises the arms 1 to the position shown by the dotted lines in Fig. 1.

The shaft 2 is arranged to slide vertically up and downward in a sleeve 27 attached to or formed on the frame 25 in the manner shown in Fig. 1. For the purposes of preventing the shaft from dropping out of this sleeve, an adjustable stop collar 24 is provided at the upper end of the shaft which may be adjusted for various heights according to the depth of the charge in the ovens. The shaft 2 is also provided at its upper end with a gear wheel 8, engaging with a gear wheel 10 at the inner end of the shaft 9. The shaft 9 carries at its outer end a second gear wheel 11, which in turn engages with a gear wheel 12 upon a shaft 13, rotating on the center bearing in bed plate A. At one end of the driving shaft a gear wheel 14 is provided, meshing into a gear wheel 15 upon the shaft of motor M. By starting the motor, motion is imparted through the gear wheels 15 and 14, the shaft 13, the gear wheels 11 and 12, the shaft 9, and the gear wheels 10 and 8 to the shaft 2, and in this way it may be rotated in either direction at any degree of speed. This motor may be driven by either steam, compressed air or electricity. On the bottom

of vertical shaft 13, is the gear 16, which engages with the gear 17 upon a shaft 38 under the carriage. On this shaft are mounted two sprockets 19, connected by the chains 20 to the sprocket wheels 37 on the axles of the carriage. A suitable clutch not shown is provided for throwing the power connection in and out, and in this way the carriage may be moved in either direction on the track over the coke ovens. A conical weight 21 is provided upon the hollow shaft 2, which is arranged to be raised and lowered on the shaft by means of a rope 22 passing over a sheave 23 on the lower surface of the frame 25 which rope passes over a winch 28 provided with a handle 29. The object of this weight is to force the arms 1—1 apart in case they stick when the rope 5 is lowered. This is effected by turning the winch 28 in from left to right thus causing the weight to fall whereupon the sharp edge of the conical weight forces the arms 1—1 apart.

The method of operation is as follows: The winch 7 is rotated from right to left so that the hollow shaft 2 is drawn up with the arms at the bottom closed so as to be free and clear of the coke oven. The truck A is then moved so that the shaft shall come directly opposite the opening in the center of the oven. The winch 7 is then turned in the reverse direction and the shaft 2 is lowered into the oven so that the lower end reaches the position shown in Fig. 1. Thereupon the arms 1 fall of their own weight and assume the horizontal position there shown. In case they stick after the shaft 2 enters the oven, the winch 28 is unwound thereby allowing the conical weight 21 to fall and assume the position shown in Fig. 1 by the dotted lines and throw the two arms 32 apart. As soon as the arms have assumed their horizontal position, a rotary motion is imparted to the shaft 2 by means of the motor through the various gear wheels and shafts and the effect of the rotary motion is to whirl the coke around within the oven and level it off. When the operation has been sufficiently performed, the arms are then drawn up to the position shown by the dotted lines, by means of the winch 7, after first withdrawing the conical weight 21 by means of the winch 28, and the whole leveling device is drawn out of the furnace. Thereupon the clutch is moved and the carriage is advanced in front of the next oven, and the device lowered and operated as before.

I claim as my invention:

1. The combination with a coke oven of the beehive type, of a platform arranged to swing horizontally above the oven on a suitable truck, and to be adjusted vertically at different angles, and a device supported on the platform, arranged to be lowered into the oven from the top, whereby the coke therein may be leveled.

2. The combination with a coke oven of the beehive type, of a platform arranged to swing horizontally above the oven on a suitable truck, and to be adjusted vertically at different angles, and a device supported on the platform, arranged to be lowered into the oven from the top, whereby the coke therein may be leveled by means of arms which automatically spread after introduction into the oven, and which are rotated therein at any desired speed.

3. In a coke leveling machine, the combination of a shaft arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, means for raising the arms upon the shaft and withdrawing the shaft after rotation as described, and means upon the shaft for adjusting the vertical movement thereof to any desired height of charge in the oven.

4. In a coke leveling machine, the combination of a shaft arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft, arranged to spread automatically after the shaft is introduced into the coke oven; a conically shaped collar, sliding on the shaft, arranged to assist the spreading of the arms; means for imparting a rotary movement to the shaft, and means for raising the arms upon the shaft and withdrawing the shaft after rotation substantially as described.

5. In a coke leveling machine, the combination of a truck mounted on a track upon a suitable platform, a platform mounted on the truck arranged to swing around a central bearing a frame mounted on the platform, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, and means for raising the arms and withdrawing the shaft after rotation as described.

6. In a coke leveling machine, the combination of frame carried on a suitable vehicle, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, means for raising the arms and withdrawing the shaft after rotation as described, and means upon the shaft for adjusting the vertical movement thereof to any desired height of charge in the oven.

7. In a coke leveling machine, the combi-

nation of a truck mounted on a track upon a suitable platform, a platform mounted on the truck arranged to swing round a central bearing, a tower mounted on the platform, a frame carried on the tower, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, and means for raising the arms and withdrawing the shaft after rotation as described.

8. In a coke leveling machine, the combination of a truck mounted on a track upon a suitable platform, a platform mounted on the truck arranged to swing round a central bearing, a tower mounted on the platform, a frame mounted on the tower, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, means for moving the truck in either direction on the track, and means for raising the arms and withdrawing the shaft after rotation as described.

9. In a coke leveling machine, the combination of a truck mounted on a track upon a suitable platform, a platform mounted on the truck arranged to swing round a central bearing, a tower mounted on the platform, a frame mounted on the tower, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, means for moving the truck in either direction on the track, means for raising the arms and withdrawing the shaft after rotation as described, and means for facilitating the spreading of the arms, substantially as described.

10. In a coke leveling machine, the combination of a truck mounted on a track upon a suitable platform, a platform mounted on the truck arranged to swing round a central bearing, a tower mounted on the platform, a frame carried on the tower, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft; means for moving the truck in either direction on the track; means for raising the arms and withdrawing the shaft after rotation as described, and means for facilitating the spreading of the arms, substantially as described.

11. In a coke leveling machine, the combination of a tower carried on a platform on a suitable vehicle, a shaft mounted on a frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, means for raising the arms and withdrawing the shaft after rotation as described, and means for tilting the platform so as to bring the arms in line with the bottom of the oven.

12. In a coke leveling machine, the combination of a tower frame carried on a platform on a suitable vehicle, a shaft mounted on the frame arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to the shaft, and means for raising the arms and withdrawing the shaft after rotation as described, and means upon the shaft for adjusting the vertical movement thereof, to any desired height of charge in the oven.

13. In a coke leveling machine, the combination of a frame carried on a suitable vehicle; a shaft mounted on the frame, arranged to be introduced into the coke oven, rotated therein and withdrawn therefrom; two arms attached to the bottom of said shaft, arranged to spread automatically after the shaft is introduced into the coke oven; means for imparting a rotary movement to said shaft; means for raising the arms and withdrawing the shaft after rotation, and means for adjusting the whole to fit varying distances from the center of the track to the center of the ovens.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this thirteenth day of June 1906.

JOHN S. HAM.

Witnesses:
CHARLES STUMPF,
CHARLES ENGEL.