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PATENTED OCT. 29, 1907.

F. M. HOGG.
COKE PULLING APPARATUS.
APPLICATION FILED DEC. 22, 1906.

2 SHEETS—SHEET 1.

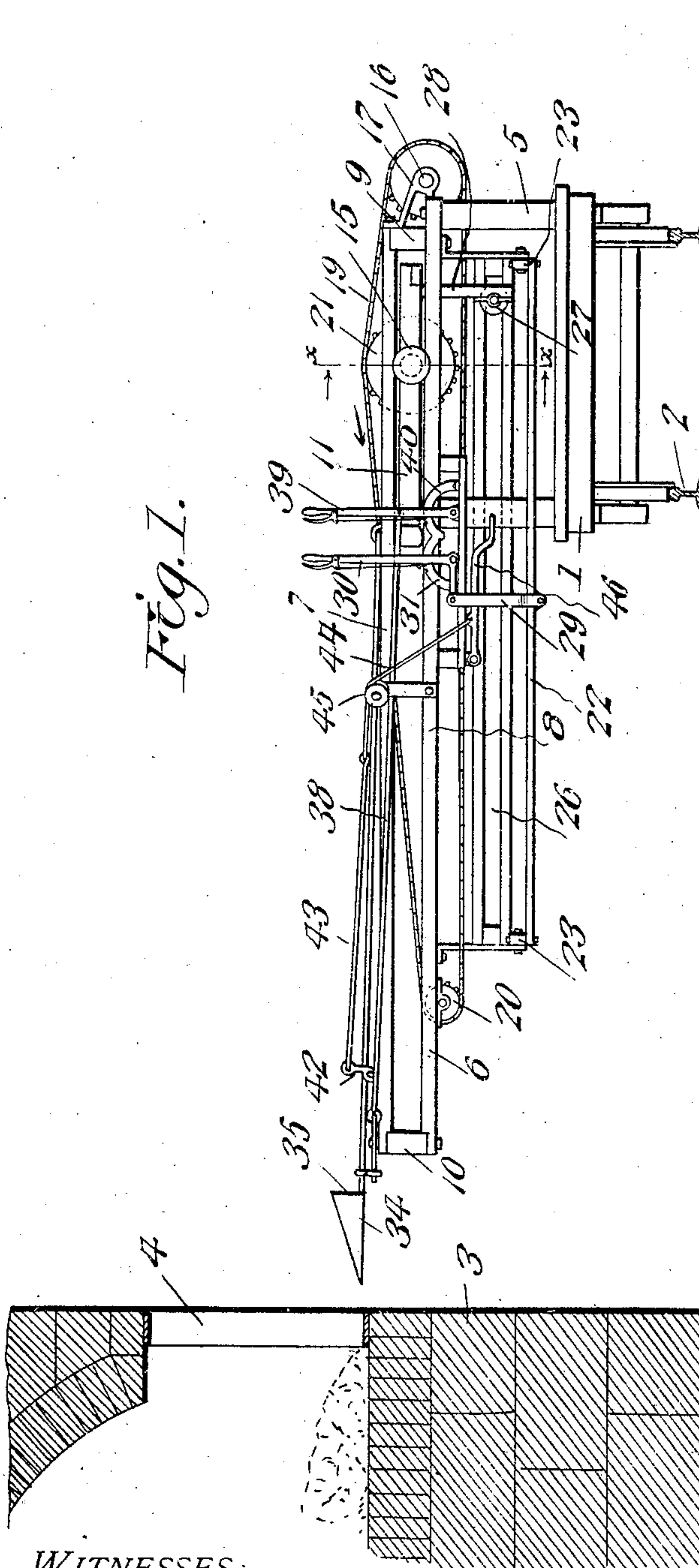


Fig. 1.

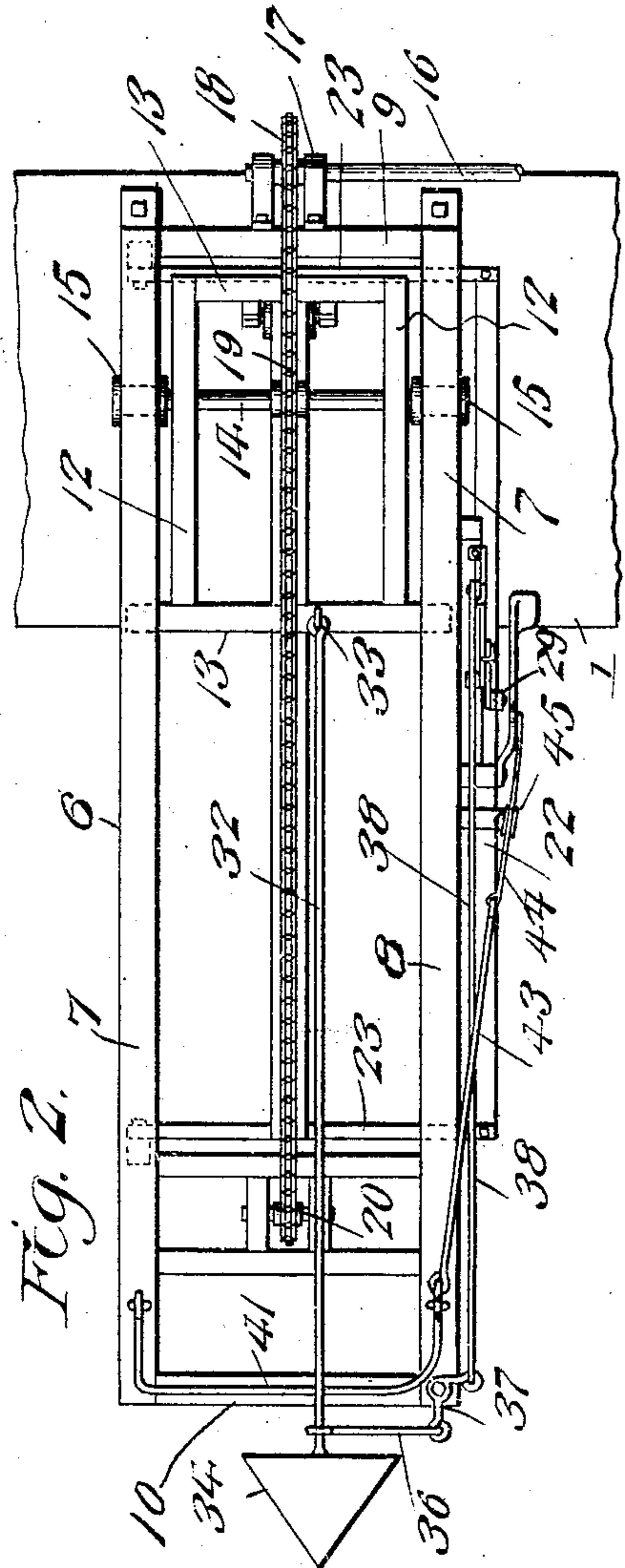


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

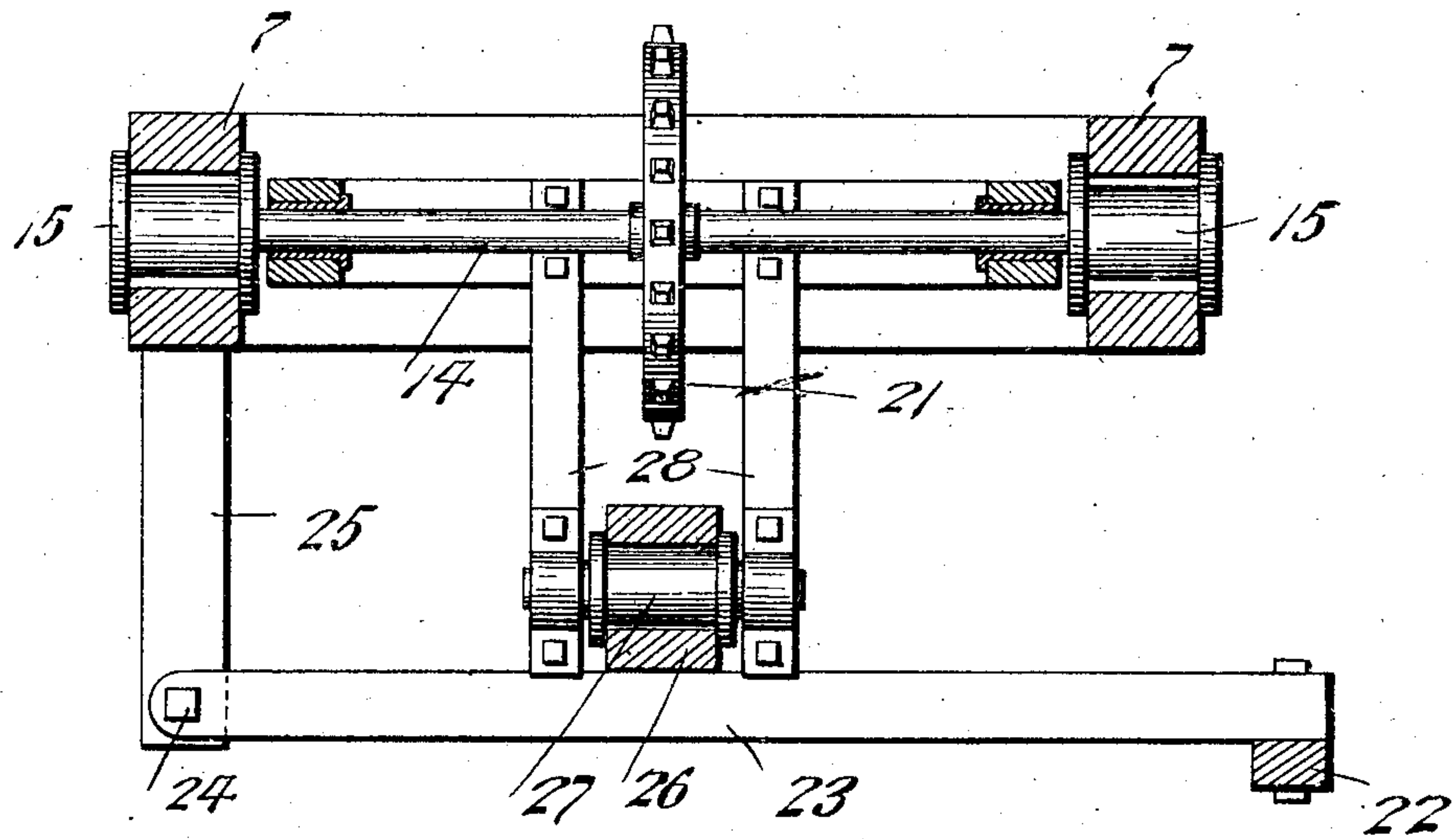
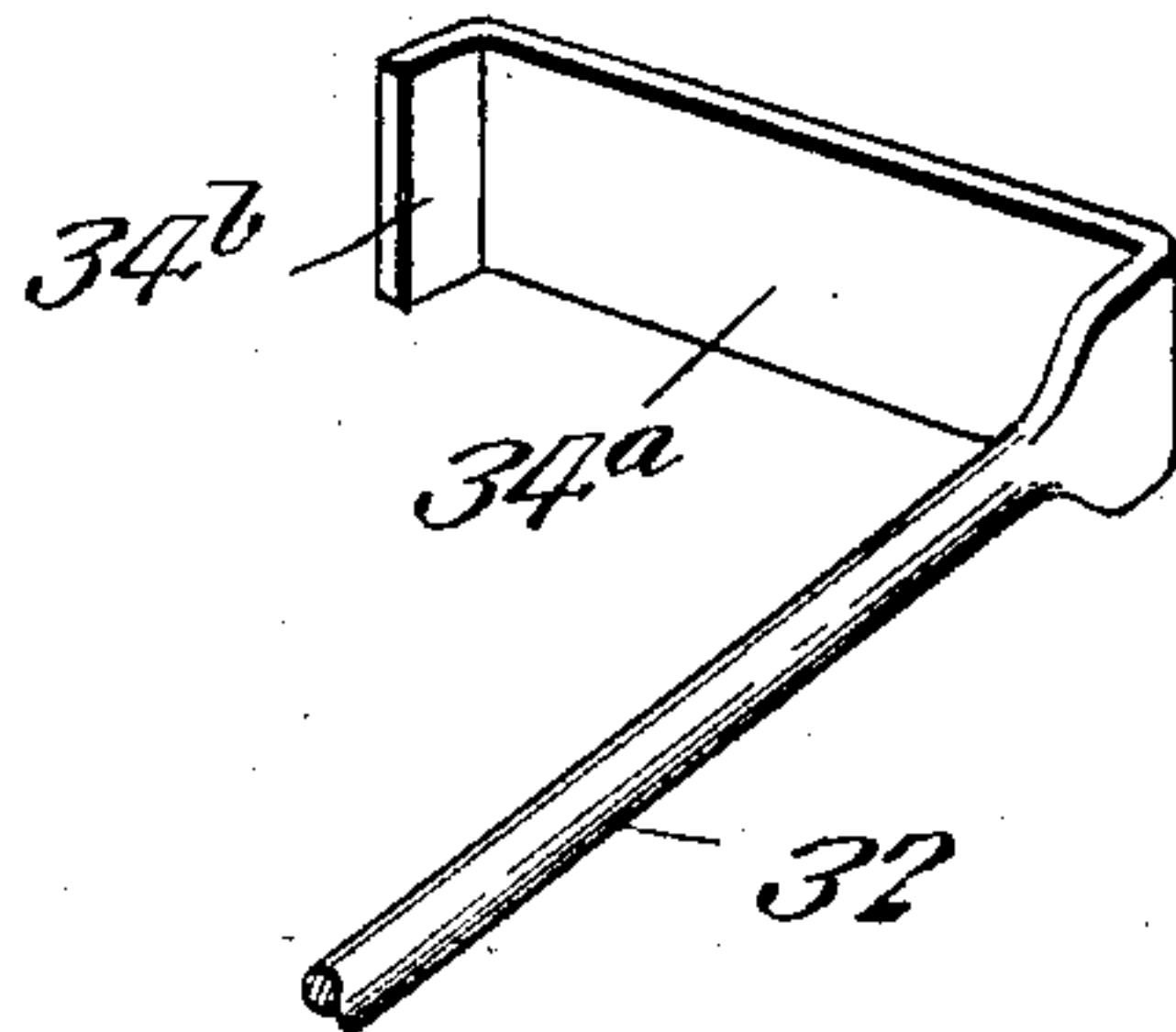


Fig. 4



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COKE-PULLING APPARATUS.

No. 869,305.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed December 22, 1906. Serial No. 349,116.

To all whom it may concern:

Be it known that I, FRANCIS M. HOGG, a citizen of the United States, residing at Bessemer, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Coke-Pulling Apparatus, of which the following is a specification.

This invention relates to an apparatus for pulling or drawing coke from ovens.

The object of the invention is to provide a simple, comparatively inexpensive and readily controlled construction of apparatus whereby the operation of withdrawing the coke may be rapidly and efficiently performed.

In the accompanying drawings,—Figure 1 is a side elevation of the apparatus in operative relation to the door of a coke furnace, the latter appearing in vertical section. Fig. 2 is a top plan view of the apparatus. Fig. 3 is a transverse section on line $x-x$ of Fig. 1 on an enlarged scale. Fig. 4 is a detail view of a modified form of rake.

Referring now more particularly to the drawings, the numeral 1 represents a wheeled supporting frame, preferably in the form of a flat car arranged to travel upon track rails 2 extending alongside and in parallel relation to a battery of coke furnaces, one of which, indicated by 3, is shown in Fig. 1, said furnace being provided with the usual doorway 4.

Projecting upward from the car are posts 5 supporting a guide platform or frame 6, fixed at one end to the posts and projecting a desired distance laterally beyond one side of the car, so that the outer end of said frame will extend close up to the furnace from which the coke is to be withdrawn. The frame 6 is of the open type and of oblong rectangular form and comprises opposite pairs of longitudinal side bars 7 and 8 connected at their inner and outer ends by cross bars 9 and 10 to which the side bars are bolted, or otherwise suitably fastened.

Arranged to reciprocate or travel back and forth in the frame 6 is a carriage 11 comprising side bars 12 and front and rear cross bars 13. Journaled in the side bars of the carriage is a transverse shaft 14 provided at its ends with grooved friction wheels or rollers 15 arranged between the side bars 7 and 8 of the frame 6 and movably mounted for adjustment to frictionally engage the upper bars 7 or the lower bars 8 to effect the travel of the carriage in one direction or the other. The bars 7 and 8 thus form rails to guide and operate the carriage.

A drive shaft 16 is journaled in bearing brackets 17 upon the rear end of the stationary frame 6 and is adapted to be driven from an engine or other motor, not shown, supported upon the platform of the car 1, which motor may also be employed for propelling the car. A

sprocket wheel 18 is fixed to said shaft and transmits motion to a drive chain 19 extending around the same and around a guide sprocket 20 mounted upon the forward portion of the frame 6, the upper stretch of the chain also being arranged to engage a sprocket wheel 21 fixed to the shaft 14, whereby said shaft is operated to transmit motion through the friction gearing to the carriage. The working stretch of the chain 19 travels forwardly, or in the direction of the arrow as shown in Fig. 1, and imparts corresponding motion to the sprocket wheel 21, from which it will be understood that when the grooved friction rollers 15 are in contact with the lower rails 8 a forward movement will be imparted to the carriage 11, while when said wheels are in engagement with the upper rails 9 the carriage will be moved rearwardly.

In order to adjust the carriage vertically to move the friction rollers into operative engagement with either the upper or the lower set of rails shifting mechanism is provided. This comprises a swinging frame arranged below the platform or guide frame 6 and consisting of a longitudinal bar 22 fixed to cross bars 23 pivotally attached, as indicated at 24, to arms 25 depending from the stationary platform 6. A guide frame 26 extends longitudinally and centrally below the guide frame 6 and carriage 11 and is attached at its ends to the cross bars 23, and in this frame travels a guide roller 27 journaled in hangers or a bracket 28 depending from the carriage. A link 29 connects the bar 22 with a bell crank adjusting lever 30 carrying a pawl to engage a rack 31 suitably supported on the frame 6, whereby said lever may be locked in its adjusted positions. By means of this lever the shifting frame formed by the bars 22 and 23 may be swung upward or downward on its pivots to transfer corresponding motion through the roller 27 and bracket 28 to raise or lower the carriage 11 and shift the frictional rollers 15 into engagement with the upper or lower sets of friction rails 7 or 8.

A rod 32 is pivotally connected at its rear end, as at 33, to the front cross bar of the carriage and extends forwardly therefrom and projects beyond the forward end of the frame 6 and carries at its projecting end a rake 34 adapted by the action of the carriage to be projected into the furnace through the door 4 and withdrawn therefrom to rake or pull out the coke. This rake preferably comprises a block in the form of an isosceles triangle having its beveled side facing upwardly and its base arranged to form a rear shoulder 35. When the carriage is projected forwardly the rake, owing to its peculiar form, loosens up the body of coke, and a portion of the same slides over the beveled face and behind the shoulder 35, which when the

carriage is retracted will draw the displaced portion of the coke out of the oven.

The rake is adapted to be swung laterally to withdraw the coke from different portions of the oven through the medium of a link 36 connecting said rod with one arm of a bell crank lever 37, the other arm of which is attached by a connecting rod 38 to an operating lever 39 having a pawl to engage a rack 40 arranged alongside the rack 31 and fixed, like said rack 31, to the guide frame 6, the levers 30 and 39 being disposed in such relation so that they may be conveniently operated by a single attendant who may also control the action of the engine or motor.

The rake 34 may be interchangeably used in connection with the type of rake shown in Fig. 4, comprising a laterally extending blade 34^a having a backturned free end or guard 34^b. After the rake 34 has been employed to loosen up and draw the greater portion of the bed of coke a raking attachment of the form shown in Fig. 4 is applied in lieu of the same to the apparatus, the rake 34^a being better adapted for withdrawing loose remaining particles of coke. The rake 34^a is adapted to be elevated over and dropped behind the particles of coke to be removed and thus must be given a tilting movement in a vertical plane. To effect this a swinging bail 41 is pivotally mounted upon the forward end of the guide frame 6 so as to lie beneath the rake rod 32 and is connected at one end with a crank arm 42, to which is attached one end of a connecting rod 43. The other end of the rod 43 is attached to a rope, cord or other flexible connection 44 passing over a guide pulley 45 and operatively connected with a foot lever 46 pivotally mounted upon the guide frame 6 adjacent to the adjusting levers 30 and 39. By depressing the lever 46, the bail 41 will be swung upward to lift the rake 44^a, which may thus upon the outward projection of the carriage be moved to a position behind the coke to be withdrawn, the bail and rake dropping by gravity to normal position upon the release of the lever 46. In operation, the apparatus is disposed opposite the door 4 of the furnace from which the coke is to be withdrawn, and the carriage alternately reciprocated inwardly and outwardly to actuate the rake, the latter being manipulated through the adjusting mechanism under control of the operator to engage the particles of coke in the furnace as the operator may direct. It will be seen that the type of operating mechanism permits the rake to be quickly and conveniently manipulated to withdraw the coke, and that the simplicity of the construction enables the apparatus to be produced at a comparatively low cost.

The guide frame may project to any desired extent beyond the car 1 within safe limits, the weight of the car and that of the motor and the parts thereon being properly proportioned in practice to maintain an equilibrium and prevent any tendency of the apparatus to tilt under the weight of the projecting parts.

Having thus described the invention, what is claimed as new is:—

1. A coke pulling apparatus comprising a supporting frame, a carriage operative thereon, a rake supported by the carriage, friction gearing for reciprocating the carriage, and means for shifting the carriage to reverse the action of the friction gearing.

2. A coke pulling apparatus comprising a supporting

frame, a carriage operated thereon, a rake controlled by the carriage, friction gearing for reciprocating the carriage, and means for vertically shifting the carriage to reverse the action of the friction gearing.

3. A coke pulling apparatus comprising a supporting frame, a carriage operative thereon, a rake controlled by the carriage, upper and lower guide rails on the supporting frame, friction wheels on the carriage to engage said rails, propelling means associated with the friction wheels, and means for shifting the carriage to bring the friction wheels into engagement with either the upper or the lower rails.

4. A coke-pulling apparatus comprising a supporting frame including a guiding portion having upper and lower guide rails, a reciprocatory carriage provided with rollers to travel said rails, drive gearing for operating the rollers, a rake operated by the carriage, and means for adjusting the rollers into engagement with the upper or lower guide rails to project or retract the carriage.

5. A coke pulling apparatus comprising a supporting frame including a guiding portion having opposed rails, a reciprocatory carriage provided with wheels or rollers to travel said rails, a swinging frame for adjusting the carriage for throwing the wheels into engagement with one or the other sets of rails to project or retract the carriage, means for operating said swinging frame, means for imparting motion to said wheels or rollers, and a rake actuated by the carriage.

6. A coke pulling apparatus comprising a supporting portion including a guiding portion having upper and lower friction rails, a reciprocatory carriage provided with friction wheels to travel upon said rails, a rake actuated by the carriage, propelling means for the carriage including said friction wheels, a swinging frame for raising and lowering the carriage to throw the wheels into engagement with the upper or lower guide rails, and means for operating said swinging frame.

7. A coke pulling apparatus comprising a supporting frame, a drive chain arranged thereon, a carriage having a drive gear engaging the chain, friction gearing associated with said drive gear for reciprocating the carriage, a rake actuated by the carriage, and means for shifting the carriage to reverse the action of the friction gearing.

8. A coke pulling apparatus comprising a supporting frame including a guiding portion having upper and lower friction rails, a drive chain supported by said frame, a carriage adapted to travel on the frame, a rake actuated by the carriage, a shaft upon the carriage carrying a sprocket wheel to engage the chain and friction wheels to engage the friction rails, said carriage being vertically movable to throw the wheels into engagement with the upper or lower set of rails, and means for vertically adjusting the carriage.

9. A coke pulling apparatus comprising a supporting frame having upper and lower friction rails, a reciprocatory carriage provided with friction wheels to engage said rails, means for driving said friction wheels, a swinging frame arranged below the carriage for shifting the same vertically to bring the friction wheels into engagement with the upper or lower friction rails, and means for swinging the swinging frame.

10. A coke pulling apparatus comprising a supporting frame having upper and lower sets of friction rails, a reciprocatory carriage provided with friction wheels to engage said rails, propelling means for driving the friction wheels, a rake actuated by the carriage, a vertically swinging frame arranged below the carriage and having a guiding portion, a guiding device on the carriage arranged to travel upon said guiding portion, and means for swinging the swinging frame for raising and lowering the carriage to throw the friction wheels into engagement with the upper or lower set of friction rails.

11. A coke pulling apparatus comprising a supporting frame provided with upper and lower sets of friction rails, a reciprocatory carriage provided with friction wheels to traverse said rails, propelling means for driving the friction wheels, a rake actuated by the carriage, a swinging frame pivotally supported from the supporting frame below the carriage, said swinging frame being provided with a

5 guiding portion or trackway, a roller supported by the carriage for traversing said trackway, and adjusting means for swinging said swinging frame to raise and lower the carriage and thereby throw the friction wheels into en-

10 12. In a coke pulling apparatus, a supporting frame, a reciprocating carriage, a rake pivotally supported by the carriage, a vertically swinging bail upon the supporting frame arranged to engage the rake, and means for swing-

ing said bail to raise and lower the rake.

13. In a coke pulling apparatus, a supporting frame, a carriage arranged to reciprocate thereon, a rake pivotally

supported by the carriage, a bell crank lever on the supporting frame, a link connecting the rake with one arm of said lever, and adjusting means connected with the other 15 arm of the lever, whereby lateral motion may be communicated to the rake.

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

FRANCIS M. HOGG.

Witnesses:

W. H. DENNIS,
ANNIE WILSON.