

No. 863,537.

PATENTED AUG. 13, 1907.

J. W. HURD.
COKE PULLER.

APPLICATION FILED OCT. 18, 1906.

5 SHEETS—SHEET 1.

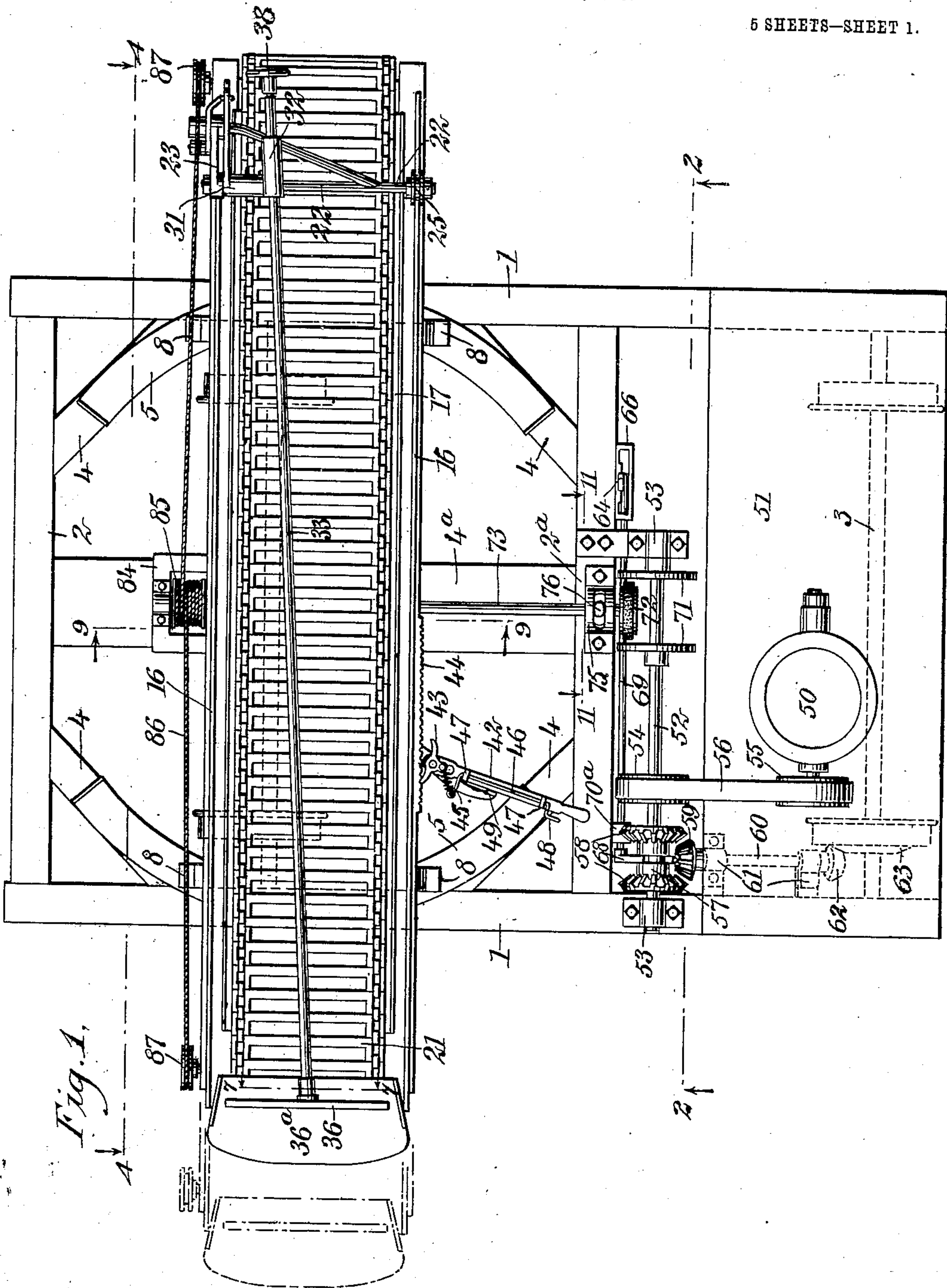


Fig. 1.

WITNESSES

Edward Thorpe
W. W. Hall

INVENTOR

James W. Hurd

BY Munn & Co

ATTORNEYS

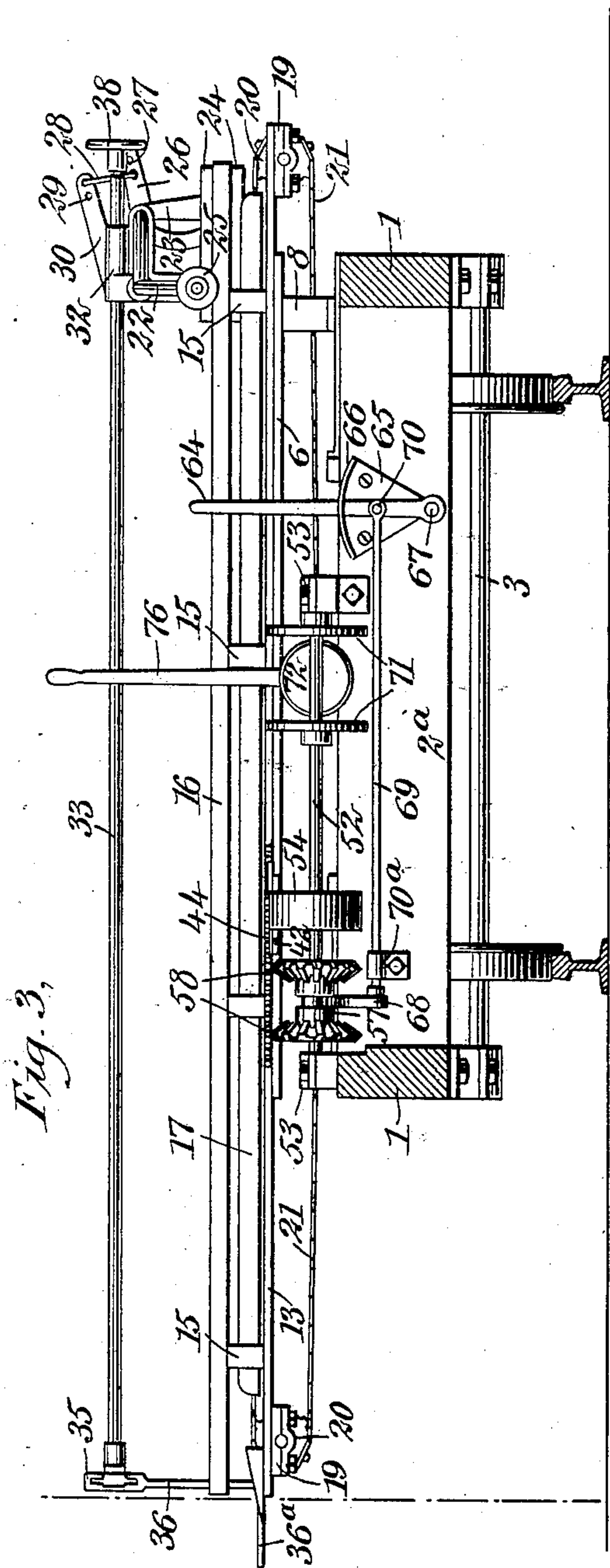
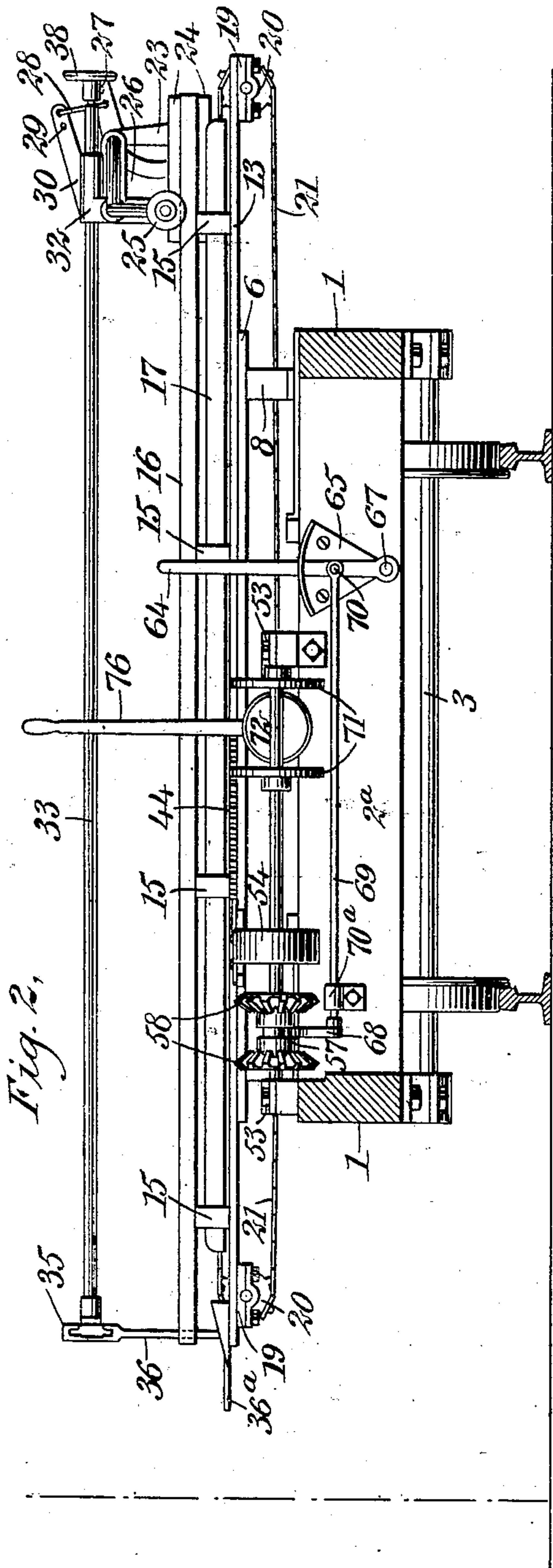
No. 863,537.

PATENTED AUG. 13, 1907.

J. W. HURD.
COKE PULLER.

APPLICATION FILED OCT. 18, 1906.

6 SHEETS—SHEET 2.



WITNESSES

Edward Thorpe.
10.11.1868

W. W. Felt

INVENTOR

James W. Hurd

BY *Mumolo*

ATTORNEYS

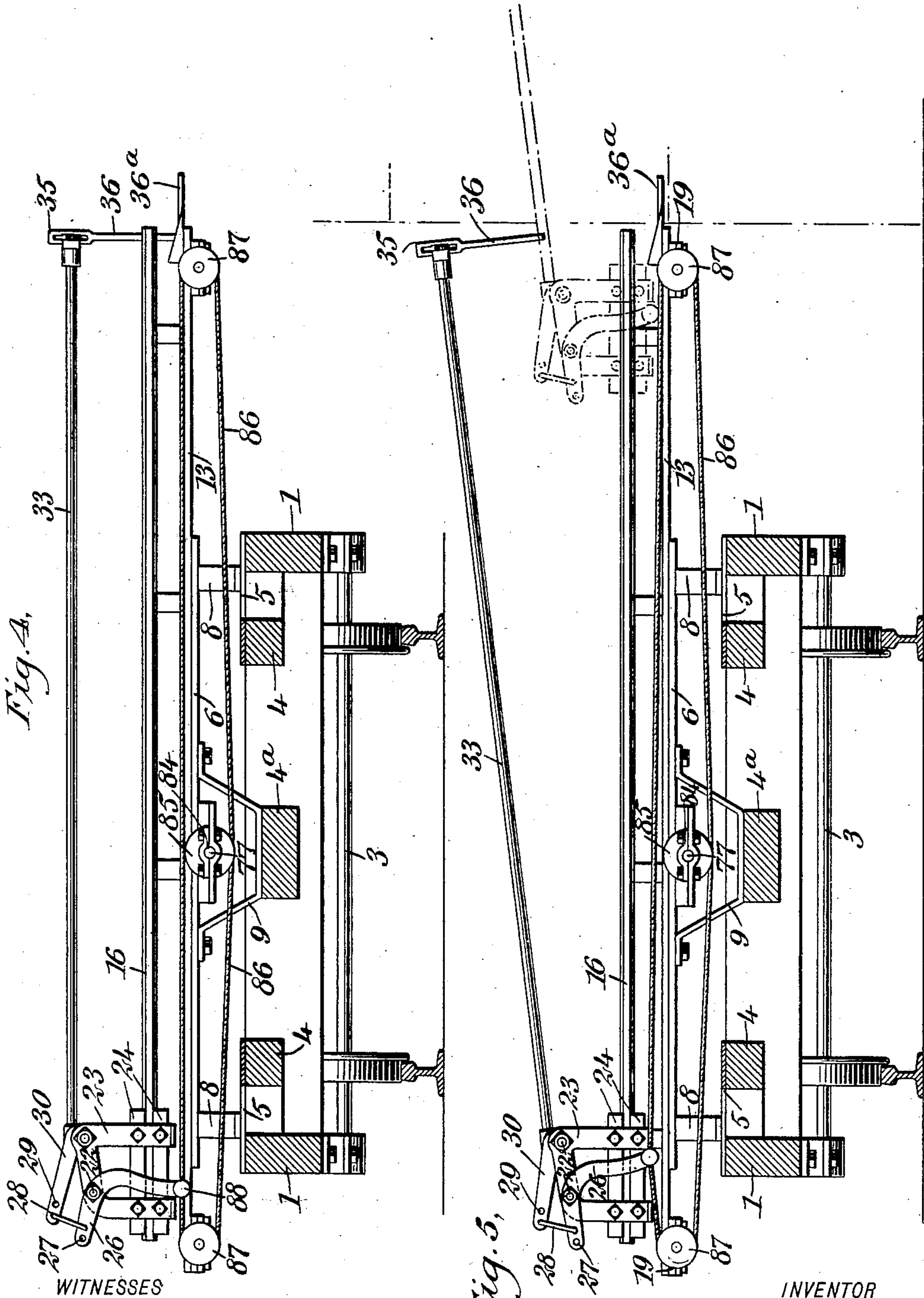
No. 863,537.

PATENTED AUG. 13, 1907.

J. W. HURD.
COKE PULLER.

APPLICATION FILED OCT. 18, 1906.

5 SHEETS—SHEET 3.



WITNESSES
Edward Thorpe.
W. M. Hurd

Fig. 5, 29, 30
INVENTOR
James W. Hurd
BY *Mumford*
ATTORNEYS

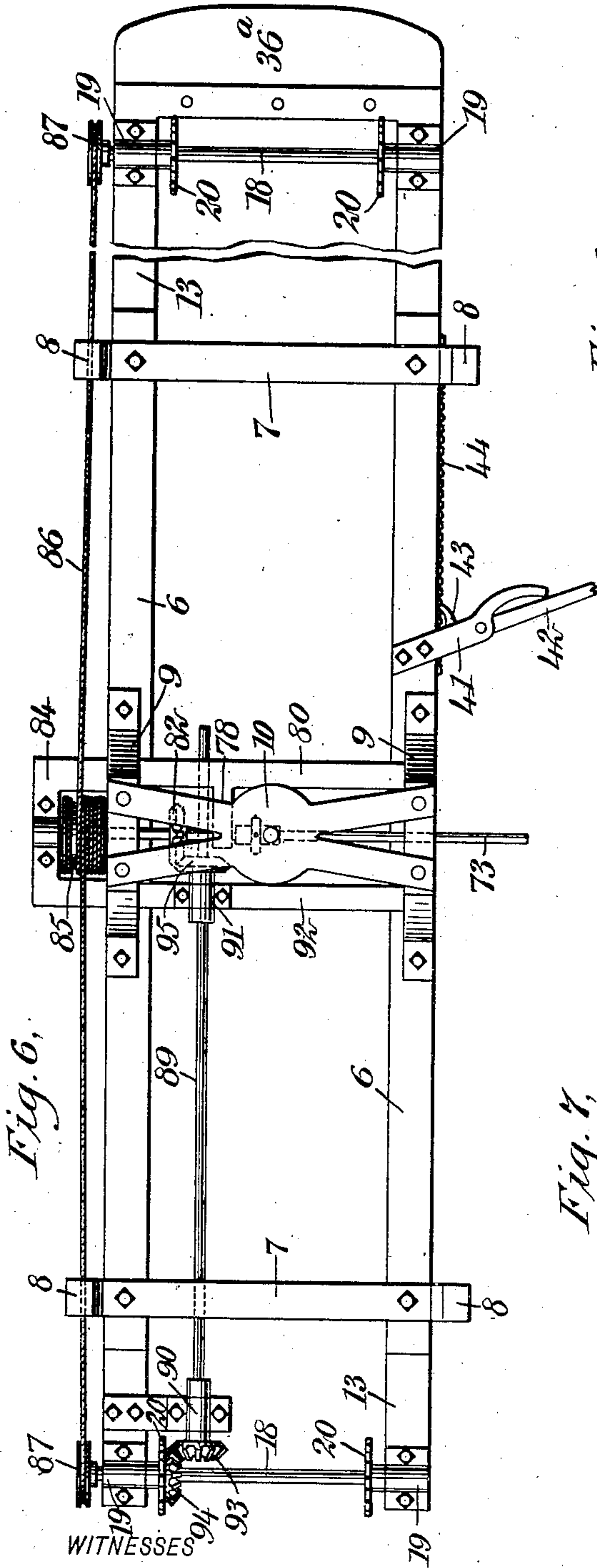
No. 863,537.

PATENTED AUG. 13, 1907.

J. W. HURD.
COKE PULLER.

APPLICATION FILED OCT. 18, 1906.

6 SHEETS—SHEET 4.



Edward Thorpe,
W. W. Hurd

Fig. 8.

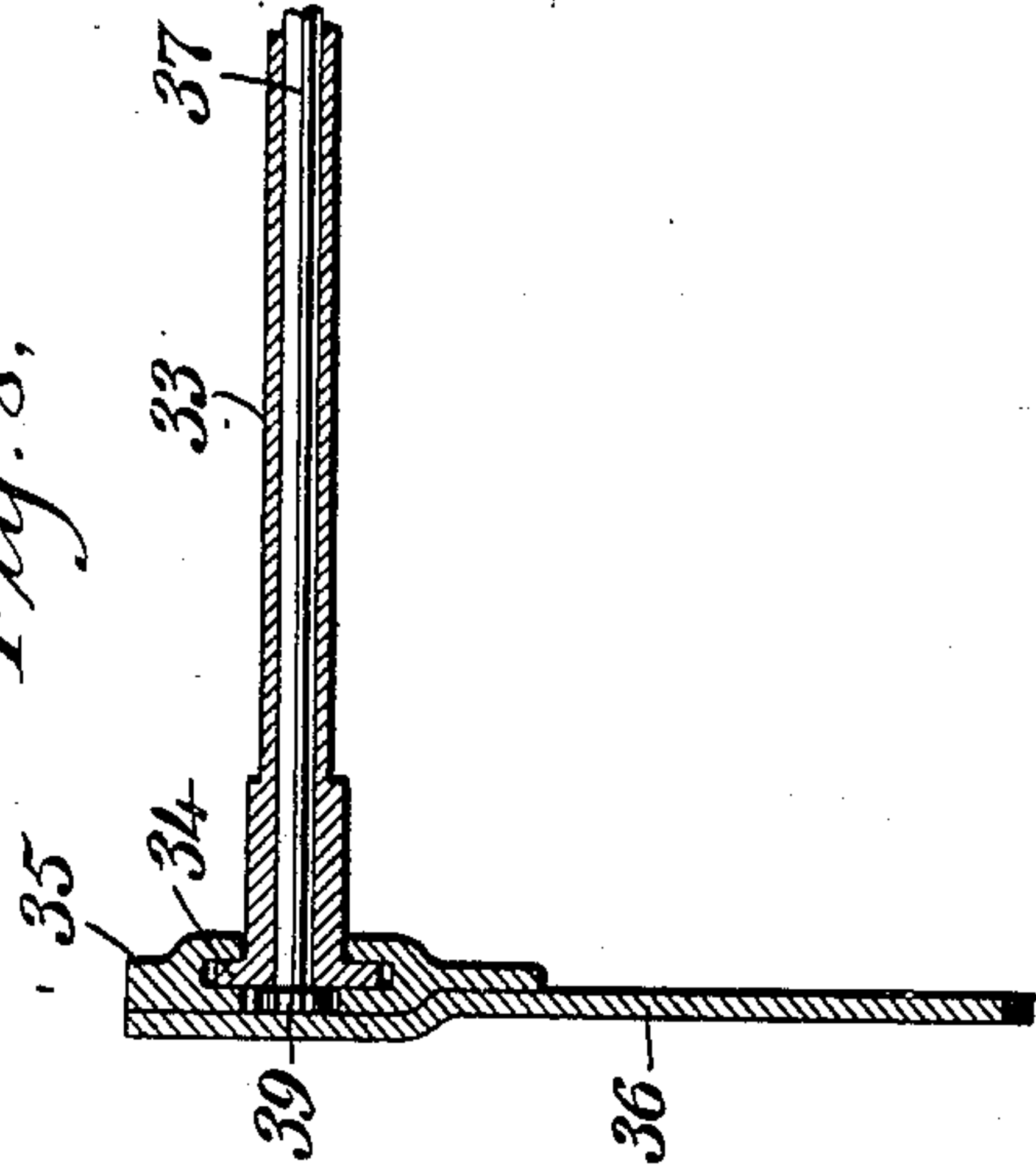
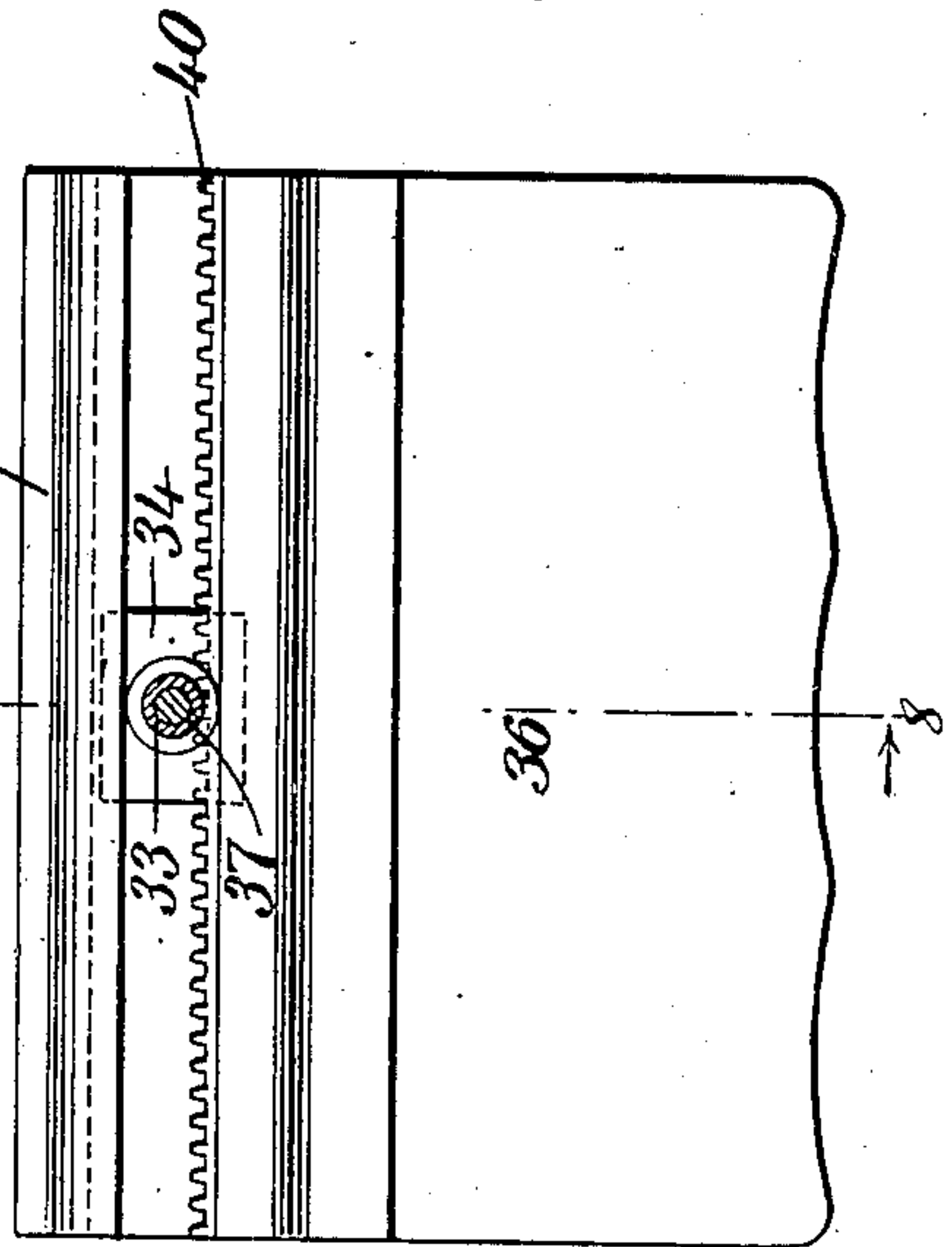


Fig. 7.



INVENTOR
James W. Hurd
BY *Mum & Co*
ATTORNEYS

No. 863,537.

PATENTED AUG. 13, 1907.

J. W. HURD.
COKE PULLER.

APPLICATION FILED OCT. 18, 1906.

5 SHEETS—SHEET 5.

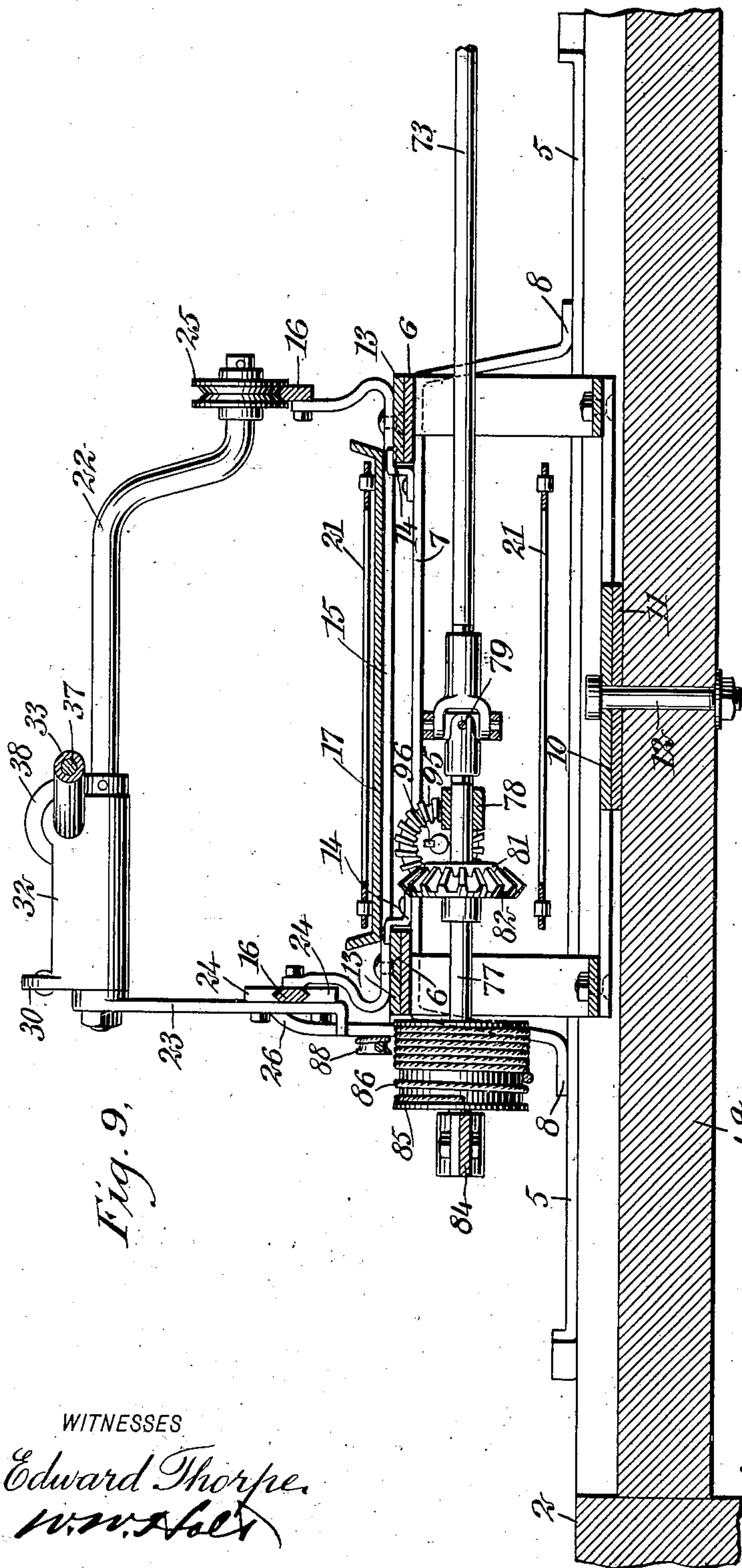


Fig. 9.

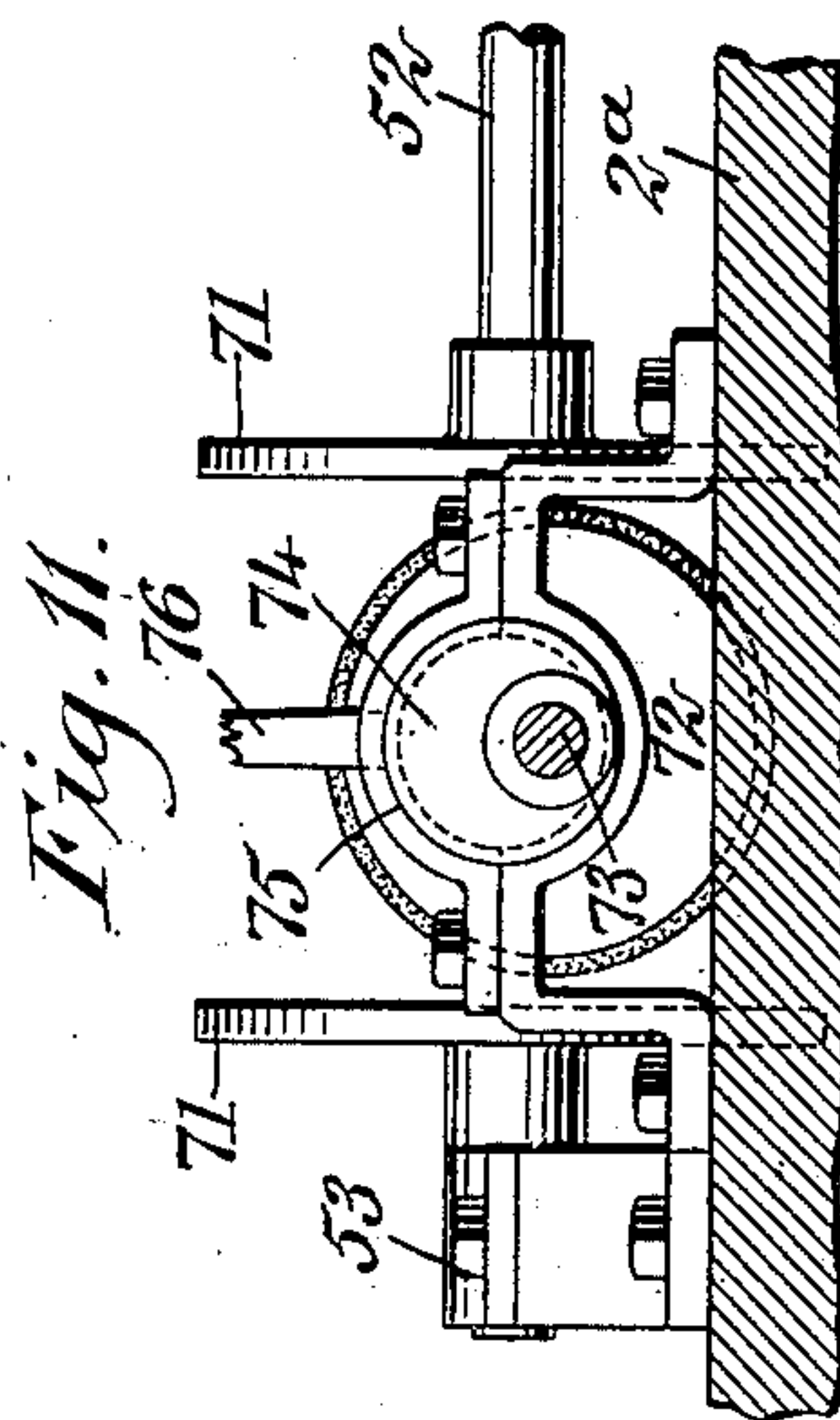


Fig. 11.

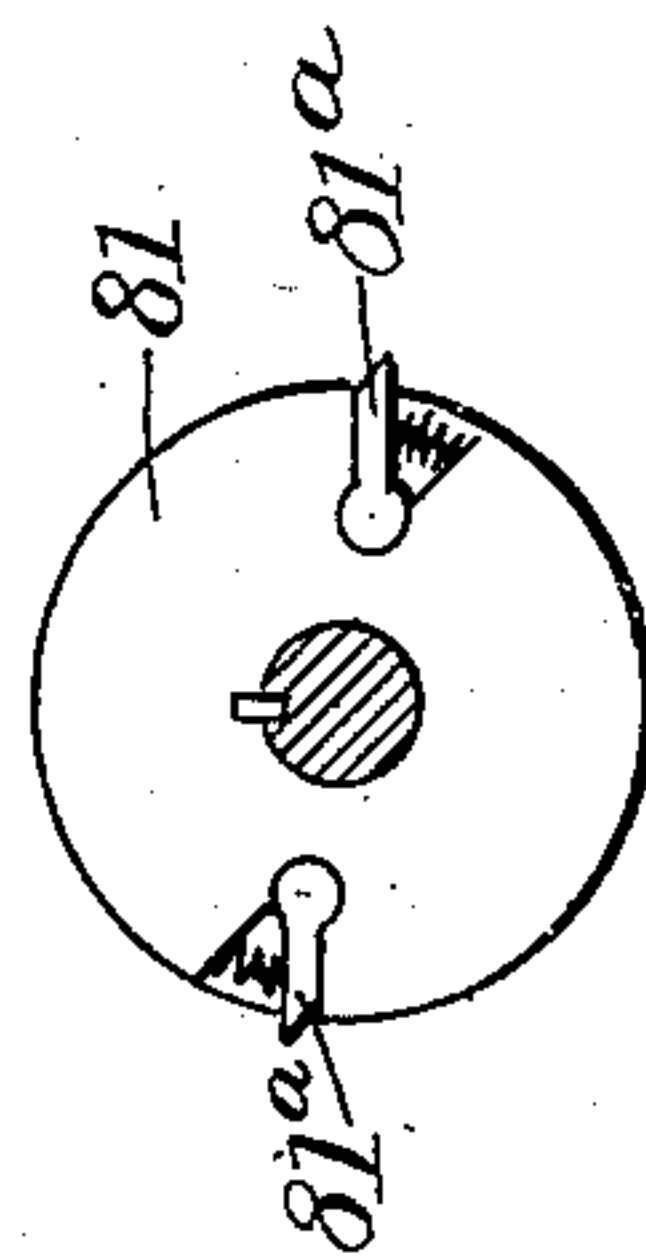


Fig. 10a.

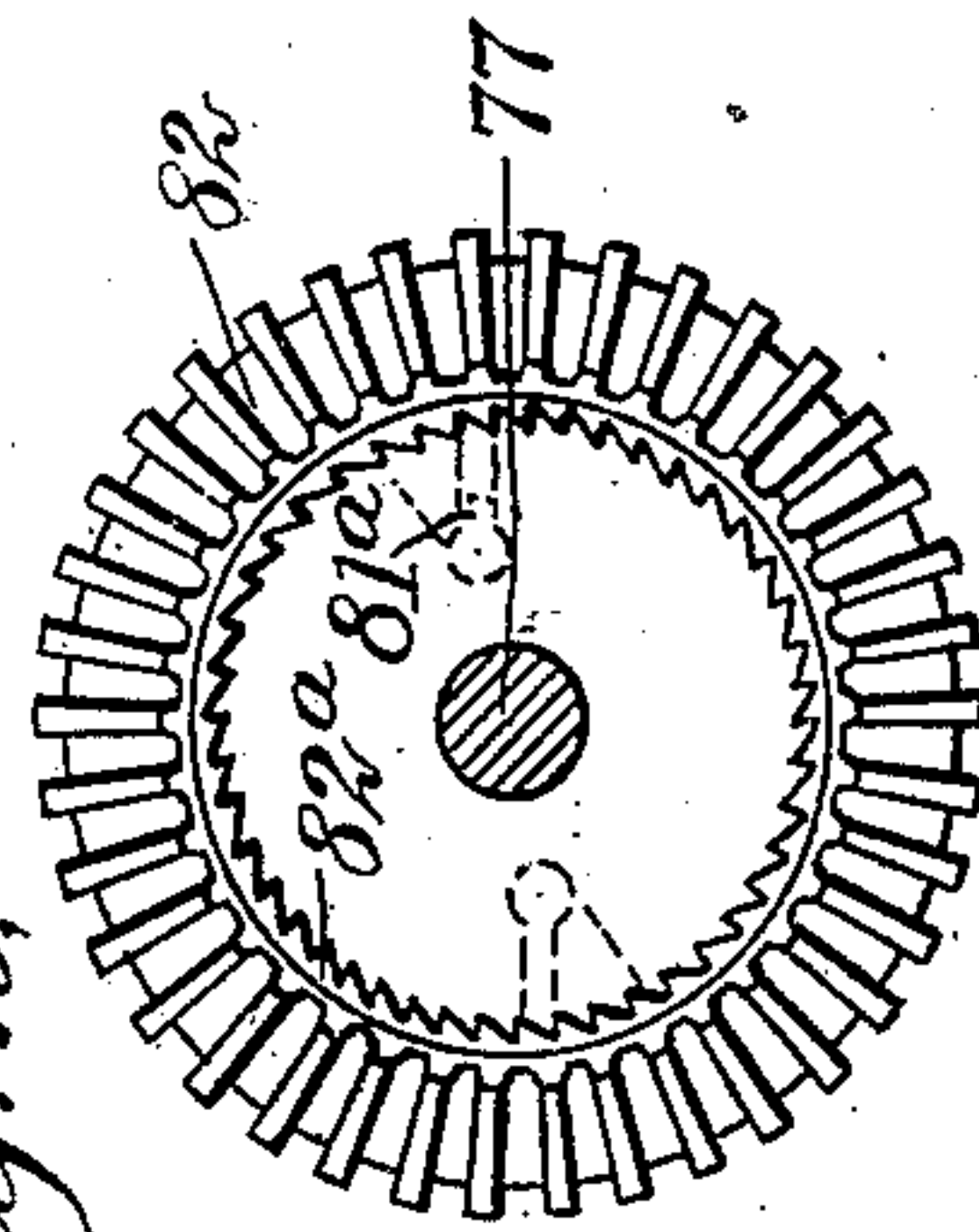


Fig. 10.

WITNESSES
Edward Thorpe.
W. W. Hurd.

INVENTOR
James W. Hurd
BY Munn & Co
ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES WESLEY HURD, OF DONA, VIRGINIA.

COKE-PULLER.

No. 863,537.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed October 18, 1906. Serial No. 339,464.

To all whom it may concern:

Be it known that I, JAMES WESLEY HURD, a citizen of the United States, and a resident of Dona, in the county of Lee and State of Virginia, have invented a new and Improved Coke-Puller, of which the following is a full, clear, and exact description.

This invention is an improved coke puller, automatically operable to remove coke from coke-ovens with facility and discharge it at the opposite side of the track running in front of the ovens.

The invention, generally stated, consists of a car on which is pivotally mounted a carriage carrying a chain or other suitable conveyer, and a rake, the latter being novelly driven to draw the coke from the oven upon the conveyer, which, by its movement in one direction only, discharges on the yard or in any convenient means for receiving it. The power for driving the conveyer and rake is also utilized for moving the car from one oven to the other, suitable controlling means being provided for reversing the movement of either the rake or car and bringing them to a stop without interfering with the motor or other means of power.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of one embodiment of my improved machine complete; Fig. 2 is a transverse, vertical section of the same, substantially on the line 2—2 of Fig. 1, looking in the direction of the arrow; Fig. 3 is a like view with the carriage of the puller moved to a forward position; Fig. 4 is a transverse section on the line 4—4 of Fig. 1, looking in the direction of the arrow; Fig. 5 is a corresponding view showing the rake in an elevated position as it moves forward, and the mechanism for operating the same, in dotted outline at the extreme limit of its forward movement; Fig. 6 is an inverted plan view of the carriage with the conveyer chain removed; Fig. 7 is an inside elevation of the rake, showing the shaft and sleeve connected to the same in section; Fig. 8 is a vertical section on the line 8—8 of Fig. 7, looking in the direction of the arrow; Fig. 9 is a vertical section substantially on the line 9—9 of Fig. 1, looking in the direction of the arrows; Fig. 10 is a face view of a ratchet gear forming an element of the construction; Fig. 10^a is an inner face view of a disk carrying a plurality of spring-pressed pawls which coact with the gear shown in Fig. 10; Fig. 11 is a section on the line 11—11 of Fig. 1, looking in the direction of the arrows.

The invention comprises a car composed of side sills 1 connected together by transverse sills 2 and 2^a, the sill 2^a being arranged on a line intermediate the car's length. Journaled in suitable bearings carried by the side sills 1 are axles 3 to which the usual car-wheels are

fixed, adapting the car to be moved upon the track. The space intermediate the sills 1, 2 and 2^a is provided with diagonally-extending corner pieces 4 and a longitudinal central beam 4^a, said diagonal pieces having fixed thereto at each side of the car curved metal plates 5, forming tracks for the carriage of the machine, said plates being upturned at each end to limit the carriage in its movement in each direction. The carriage is horizontally disposed and is mounted on a support composed of side plates 6 connected together near each end by transverse bars 7, the latter being provided with downwardly-turned feet 8 adapted to rest on the plates 5. Each of the side plates 6 has fixed to its under face at its center, a bracket 9 which are connected together by an X-shaped crossbar 10, having a disk at the intersection of its members, this disk portion of the crossbar forming a bearing-plate which rests upon a wear-plate 11 when the support is in position, said wear-plate being arranged at the center of the beam 4^a and pivotally sustaining the carriage support by a pivot-bolt 12 fastened thereto.

The carriage of the puller is composed of side-plates 13, which rest on the side-plates 6 of the support and are held in engagement therewith by keepers 14 secured to the upper face of bars 7. The side-plates are connected together at suitable points of their length by transverse bars 15 which are provided with upwardly-turned ends forming supports for guide-bars 16, the latter constituting shear members for the rake slide. To the upper face of the bars 15 is secured a trough 17, preferably constructed of sheet metal, with the ends thereof bent downwardly around shafts 18 journaled in bearings 19 carried at the opposite ends of the side-bars 13 of the carriage. At each side of the shafts 18 is fixed thereto sprocket-wheels 20 which engage with enlarged slotted heads of links 21 forming a chain conveyer in the nature of an endless belt for the puller, the chain passing over the top of the trough 17 and under the machine over the crossbar 10.

The slide for reciprocating the rake is composed of a forked rod 22 bridging over the conveyer, with the forked end thereof secured in an inverted U-shaped support 23 slidably mounted on the adjacent guide-bar or shear member 16, by means of guide-blocks 24 fixed to it to embrace the shear member at opposite sides, this shear member, as best shown in Fig. 9, being diamond-shaped at both its top and bottom edges. The opposite end of the forked rod has a downwardly-turned offset, and has journaled at this end a grooved roller 25 seated on the diamond edge of the adjacent shear member 16.

Pivoted to one side of the support 23, preferably on a prolongation of one of the forked members of the rod 22, is a bell crank lever 26 having a plurality of holes 27 at its upper end, one of which is engaged by a link 28 also passing through one of a number of holes 29 provided

at the outer end of a lever 30, which is journaled at its opposite end on the rod 22, where it is provided with an extending bearing 31, the latter carrying at its opposite and inner end a clamping-collar 32. Adjust-
 5 ably clamped in the collar 32 is a sleeve 33 extending substantially the full length of the conveyer carriage, and having a guide-block 34 fixed to its enlarged outer end, as best shown in Figs. 7 and 8. This guide-block is slidably mounted in a slotted head 35, the latter
 10 being in fixed engagement with a metal rake 36, preferably made in the form of a plate, with a corrugated bottom edge as illustrated in Fig. 7, said rake normally resting when out of action, on a shovel 36^a fixed to this end of the carriage. Passing through and revolubly
 15 mounted in the sleeve 33 is a shaft 37, having fixed thereto an operating handle 38 at its outer end, and to its opposite and inner end a pinion 39 which meshes with a rack-bar 40 arranged on the bottom edge of a slot in the head 35.

20 For moving the conveyer carriage to and from the oven is provided a bracket 41, to which is pivoted a hand-lever 42, having a double-ended pawl 43 pivotally mounted thereon adapted to engage a rack-bar 44 carried by one of the side-plates 13 of the carriage. The
 25 pawl 43 is held in engagement with the rack-bar 44 by means of a spring 45 connected to an arm of the pawl and to a crank arm of a lever 46, said lever being journaled in bearings 47 carried on one face of the lever 42 and provided with an operating handle 48 at its outer
 30 end. An upwardly-turned toe 49 at the extremity of the bracket 41 limits the movement of the lever 42 in one direction. By this construction, which is best shown in Fig. 1, on revolving the lever 46 180 degrees, the position of the spring 45 is reversed, which acts to
 35 withdraw one end of the pawl 43 from engagement with the rack-bar and throw its opposite end into engagement therewith, adapting the lever 42 to move the conveyer carriage in either direction, or, by throwing the crank arm to a vertical position the spring 45 will hold both
 40 ends of the pawl from engagement with the rack-bar.

For driving the conveyer and the rake and for moving the car, is provided a motor 50 mounted on a platform 51 secured to the opposite ends of the side-sills 1. This motor drives a shaft 52 journaled in bearings 53 carried by one of the side-sills 1 and the transverse beam
 45 2^a, respectively, by means of a pulley 54 fixed to the shaft, and a driving pulley 55 carried by the motor, said pulleys being connected by a belt 56. Adjacent to the side-sill 1 in which the shaft 52 is journaled, a grooved
 50 sleeve 57 is slidably mounted thereon, which carries at its ends opposed bevel gears 58, either of which is adapted to mesh with a bevel gear 59 fixed to the upper end of an inclined shaft 60 journaled in bearings 61 and having fixed to its opposite and lower end a bevel gear
 55 62 in mesh with a somewhat larger bevel gear 63 made as an integral part or otherwise affixed to the outer face of one of the car wheels.

For shifting the sleeve 57 to reverse the direction of movement of the car on the track or bring it to a stand-
 60 still, is a lever 64 traversing a sector 65 having a slotted and notched flange 66 at its upper edge, the sector being fixed to the side of the beam 2^a with the lever 64 pivoted at 67 to its lower end. This lever is connected to a forked arm 68 by a rod 69 pivotally attached at 70
 65 and supported by a bracket 70^a at its opposite end, the

fork of said arm 68 engaging in the slot of the sleeve 57. It is apparent that on shifting the lever 64 back and forth, the bevel gears 58 are alternately engaged with the bevel gear 59 and may be held in engagement by dropping the lever into one of the notches in the flange
 70 66, thus driving the car in either direction; or if the car is to remain stationary, the lever is disposed as shown in Figs. 1, 2 and 3, acting to hold the gears 58 in an intermediate position and out of engagement with the gear 59.

Fixed to the shaft 52 in spaced relation and at opposite sides of the longitudinal center of the car, are friction disks 71, which coact with a friction-wheel 72 in driving a shaft 73 which is journaled in an eccentric
 74 adjacent to the friction-wheel and revolubly mounted in bearings 75, the eccentric being operated to throw the friction-wheels 72 into and out of engagement with either of the friction disks 71, by an upwardly-extending hand lever 76. The inner end of the shaft 73 is
 80 connected to a short shaft 77, by a gimbal or universal joint 79, which provides for the angular movement of the opposite end of the shaft 73, due to the eccentric 74. The shaft 77 is journaled in a bearing 78 which is extended from a cross-bar 80 attached to the side-plates 6 of the conveyer support. The shaft 77 has
 90 fixed thereon a disk 81 having spring-pressed pawls 81^a on its inner face, as shown in Fig. 10^a, which engage with the ratchet teeth 82^a of a bevel gear 82, shown in Fig. 10, journaled on the shaft 77 adjacent to it, this ratchet mechanism acting to drive the gear 81 in one direction only. The shaft 77 is journaled at its opposite end in a bracket 84 extending from and attached to one side of the conveyer support. Between
 95 this bracket and said support is attached to the shaft a drum 85 having a line 86 wound thereabout, which
 100 passes over grooved wheels 87 journaled on the outer ends of shafts 18, said line being also connected at a point in its length to the lower end of the bell crank lever 27. This is preferably accomplished by providing a fixed roller 88 at this point of the lever and giving
 105 the line a turn or two about it.

For positively driving one of the shafts 18, and as a consequence the chain conveyer, is provided a shaft 89 journaled in bearings 90 and 91, respectively attached to one of the side-plates 13 of the carriage and
 110 to a crossbar 92 fixed to the plates 6 of the carriage support. This shaft has fixed to it adjacent to the bearing 90, a bevel gear 93 in mesh with a bevel gear 94 fixed to the adjacent shaft 18. The stem of a bevel gear 95 surrounds the shaft 89 and is rotatably mounted
 115 in the bearing 91, but is held from longitudinal movement therein by any well-known means. This gear meshes with the bevel gear 82 and is splined to the shaft 89 by a key 96 shown in Fig. 9, adapting said gearing to drive the shaft as the conveyer carriage is
 120 moved back and forth.

Assuming the parts of the machine to be in the position shown in Fig. 1, the car is driven by the mechanism described to the door openings of the coke-furnace, when the conveyer carriage, by means of the lever 42, is moved to project the shovel 36^a therein. On now moving the hand lever 76 to one side, the shafts 73 and 77 act to draw the bell crank lever forwardly through the action of the line 86 wound about the drum 85, the gear 82 at this time remaining stationary,
 130

due to its pawl and ratchet mechanism, and as a consequence, the chain conveyer is not moved. The pull of the line on the bell crank lever at first acts to carry the rake 36 upwardly and thereafter moves the slide of the rake forwardly on the shears 16 with the rake in this position. On reversing the machine, the ratchet mechanism of the gear 82 is engaged, driving the chain conveyer away from the rake and at the same time through the intermediate mechanism, lowering the rake and then drawing it forward, acting to pull the coke from a standing position in the furnace onto the shovel 36^a and thereafter to the conveyer, this operation being repeated until the oven is discharged, when the car is moved to the next oven and the operation repeated. It is often necessary in pulling the coke from the oven, to move the rake from side to side in order that the oven might be fully discharged. This is accomplished by my invention by revolving the shaft 37 by the handle 38, which, through the action of the gear 39 and rack-bar 40, moves the blade of the rake from side to side. For adjusting the vertical throw of the rake, the link 28 is removed and reengaged in different holes of the levers 26 and 30.

I have described the construction and operation of the machine in detail in order that it might be fully understood. It is, however, evident that numerous immaterial changes might be made in the construction; and I consider that I am entitled to such modification as falls within the scope of the annexed claims.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. In a coke puller, in combination, a car, a carriage pivotally mounted on the car, a conveyer and a rake carried by the carriage, and means for reciprocating the rake automatically operating to raise and lower it at the beginning of each movement.

2. In a coke puller, in combination, a car, a carriage pivotally mounted on the car, an endless conveyer carried by the carriage, a shovel fixed to one end of the carriage adjacent to the conveyer and in substantially the same plane thereof, a rake slidably mounted on the carriage, and means for operating the rake to pull the coke upon the shovel and discharge it upon the conveyer.

3. In a coke puller, in combination, a car, a carriage support pivotally mounted on the car, a carriage slidable on said support, a rake slidable on the carriage, a curved track fixed to the car, and downwardly-turned feet fixed to the support and resting on the track, for the purpose described.

4. In a coke puller, in combination, a car, a carriage support pivotally mounted on the car, a carriage slidable on the support, a rake slidable on the carriage, curved plates having upwardly-turned ends fixed to the car, and feet fixed to the support and resting on the plates, said upwardly-turned ends of the plates forming stops for the feet.

5. In a coke puller, in combination, a car, a carriage support pivotally mounted on the car, a carriage slidable mounted on the support, a conveyer carried by the carriage, shears fixed to the carriage, a slide movable on the shears, and a rake pivoted to the slide.

6. In a coke puller, in combination, a carriage, a slide movably mounted on the carriage, a conveyer carried by the carriage, a rake pivotally connected to the slide, and unitary means for moving the slide on the carriage and the rake in a vertical plane, for the purpose described.

7. In a coke puller, a carriage, a chain conveyer carried by the carriage, a slide movably mounted on the carriage, a rake pivotally connected to the slide, unitary means for moving the slide of the carriage and the rake in a vertical plane, and independent means for moving the rake transversely of the carriage.

8. In a coke puller, in combination, a carriage, conveying means carried by the carriage, a rake slidably mounted on the carriage, a rack-bar fixed to the carriage, and a lever having a pawl for engaging the rack-bar.

9. In a coke puller, in combination, a carriage, conveying means carried by the carriage, a rake slidably mounted upon the carriage, a rack-bar fixed to the carriage, a lever having a double-ended pawl for engaging the rack-bar, a spring for forcing one end of the pawl into engagement with the rack-bar, and means for reversing the spring to throw the opposite end of the pawl into engagement with the rack-bar.

10. In a coke puller, in combination, a conveyer, a rake coacting therewith, means for supporting the rake, means for reciprocating the rake to draw the coke upon the conveyer, and means for moving the rake sidewise relatively to said supporting means and conveyer.

11. In a coke puller, in combination, a conveyer, a rake coacting therewith, unitary means for reciprocating the rake and moving it in a vertical plane, and independent means for moving the rake transversely of the conveyer.

12. In a coke puller, in combination, a carriage, a conveyer carried by the carriage, a slide movably mounted on the carriage, a rake pivotally connected to the slide, means for moving the slide and rake independently of the carriage, and means for reciprocating the carriage.

13. In a coke puller, in combination, a carriage, conveying means carried by the carriage, a slide movably mounted on the carriage, a rake coacting with the conveyer pivotally mounted on the slide, a bell crank lever pivoted to the slide, and means adjustably connecting the lever and rake together.

14. In a coke puller, in combination, a carriage, conveying means carried by the carriage, a slide movably mounted on the carriage, a rake pivotally connected to the slide, a bell crank lever pivoted to the slide and adjustably connected to the rake, and a line connected to said lever, for the purpose described.

15. In a coke puller, in combination, a rake, means pivotally connecting the rake with respect to the carriage, and means for shifting the rake sidewise relatively to said pivotally connecting means.

16. In a coke puller, in combination, a car, a horizontally disposed carriage pivotally mounted on the car, an endless conveyer movable over the carriage, means for reciprocating the carriage, a slide carried by the carriage, a rake pivotally supported on the slide adapting said rake to be moved in a vertical plane, means for reciprocating the slide, and independent means for shifting the rake sidewise relatively to said supporting means.

17. In a coke puller, in combination, a car, a motor carried by the car, a carriage pivotally mounted on the car, an endless conveyer movable over the carriage, a rake carried by the carriage, and means for reciprocating the rake from the motor, said means acting to intermittently move the conveyer in one direction only.

18. In a coke puller, in combination, a carriage, a conveyer carried by the carriage, a rake coacting with the conveyer slidably mounted on the carriage, a drum carried by a shaft having a line wound thereabout, for driving the rake, and means journaled on the shaft operating to drive the conveyer in one direction only.

19. In a coke puller, in combination, a carriage support, a carriage slidable mounted on the support, a conveyer and a rake carried by the carriage, a shaft journaled in the support having a drum fixed thereto, a line wound about the drum for driving the rake, means journaled on the shaft for driving the conveyer in one direction, and means for reciprocating the carriage.

20. In a coke puller, in combination, a carriage support, means upon which the support is pivotally mounted, a carriage slidable on the support, a rake, a slide movably mounted on the carriage, a sleeve pivoted to the slide and slidably connected with the rake at its opposite end, and a shaft revolubly mounted in the sleeve having means for moving the rake upon the slidable connection with the sleeve.

21. In a coke puller, in combination, a conveyer, a rake coacting therewith comprising a slotted head, a sleeve in sliding engagement with the slot of the head, a shaft

revolvably mounted in the sleeve, a gear fixed to the shaft in engagement with a rack-bar carried by the head, and means for operating the shaft.

22. In a coke puller, in combination, a car, coke-pulling means pivotally mounted on the car, a motor mounted on the car, a transverse shaft journaled in bearings on the car, means for driving said shaft from said motor, friction disks fixed to said shaft, means for driving the car in either direction from said shaft, a longitudinal shaft journaled in an eccentric bearing on the car, a friction wheel fixed to said longitudinal shaft, means for revolving said eccentric bearing to throw the friction wheel in contact with either of said disks, whereby the longitudinal shaft is driven in opposite directions, and means for driving said coke-pulling means from said longitudinal shaft.

23. In a coke puller, in combination, a car, coke-pulling means pivotally mounted on the car, a motor mounted on

the car, a transverse shaft journaled in bearings on the car, means for driving said shaft from said motor, means spaced apart and fixed to said shaft, a longitudinal shaft journaled in an eccentric bearing on said car, means carried by said longitudinal shaft arranged between said means fixed to the transverse shaft, means for revolving said eccentric bearing to engage said means fixed to the longitudinal shaft with either of the means fixed to the transverse shaft, whereby said longitudinal shaft is driven in opposite directions, and means for driving the coke-pulling means from said longitudinal shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES WESLEY HURD.

Witnesses:

HAMP. MILLER,
WILLIE COLLINS.