J. HAYES.

COKE DRAWING APPARATUS.

APPLICATION FILED JUNE 18, 1913.

1,079,126.

Patented Nov. 18, 1913.

6 SHEETS—SHEET 1.

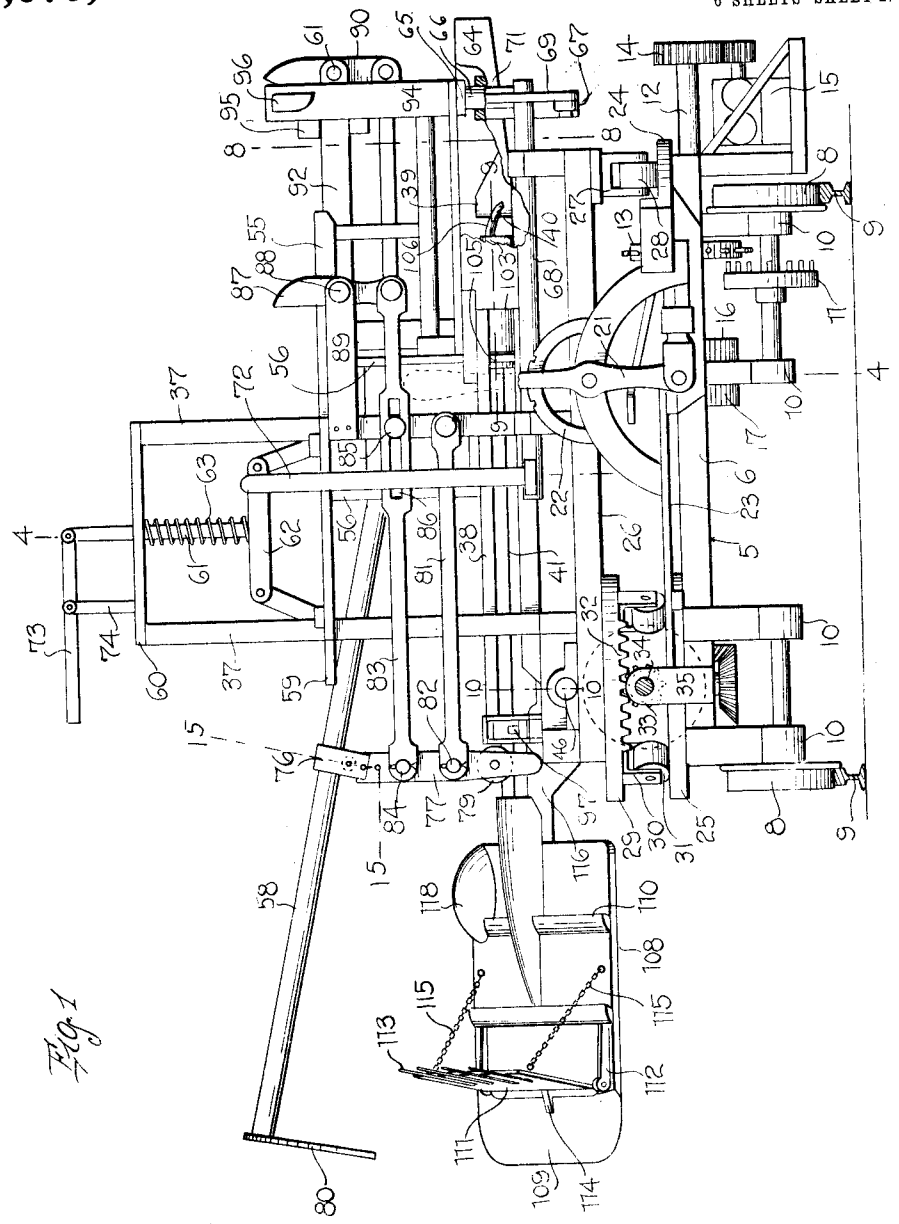


Fig. 1

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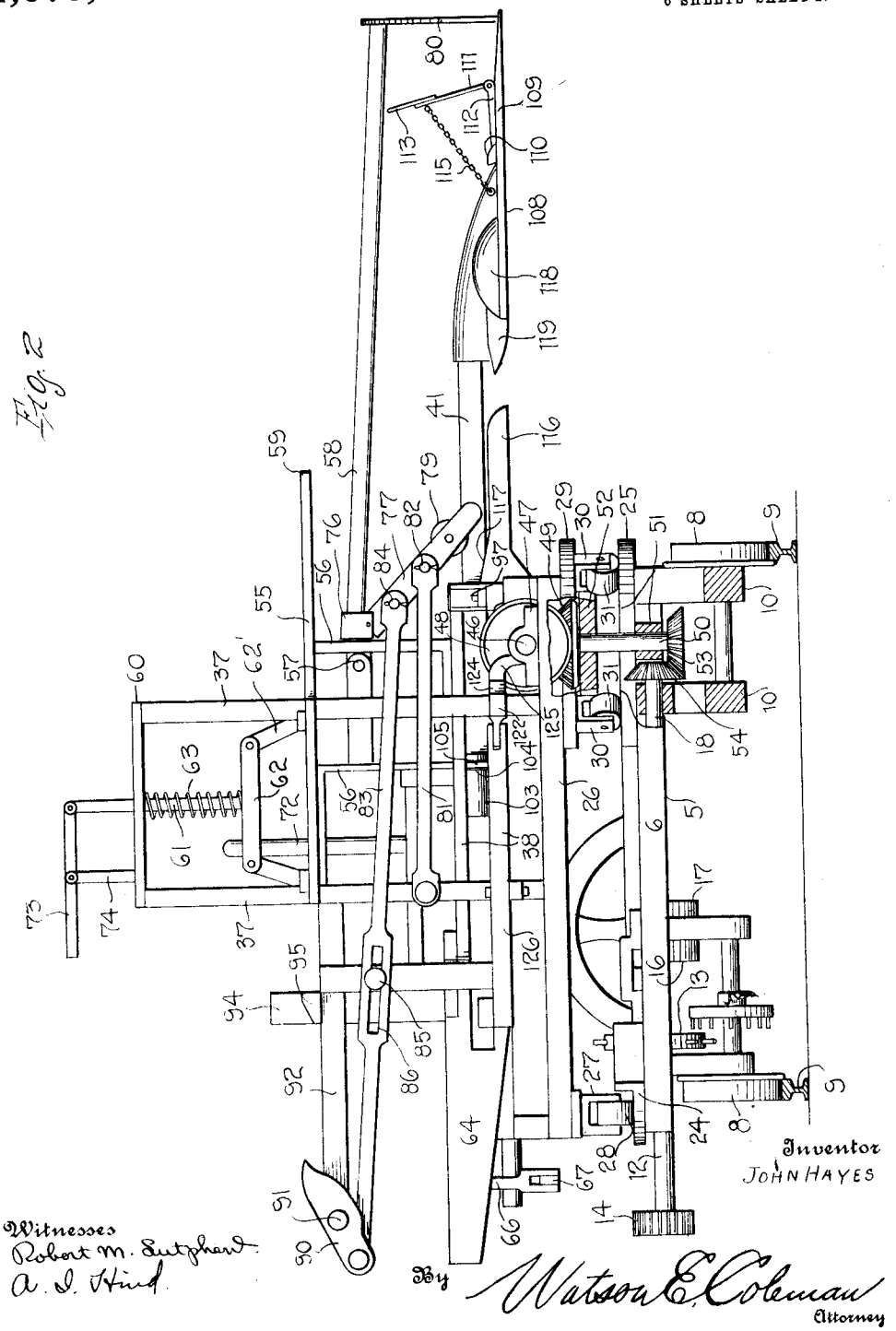
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6 SHEETS—SHEET 2.

Fig. 2



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6 SHEETS—SHEET 3

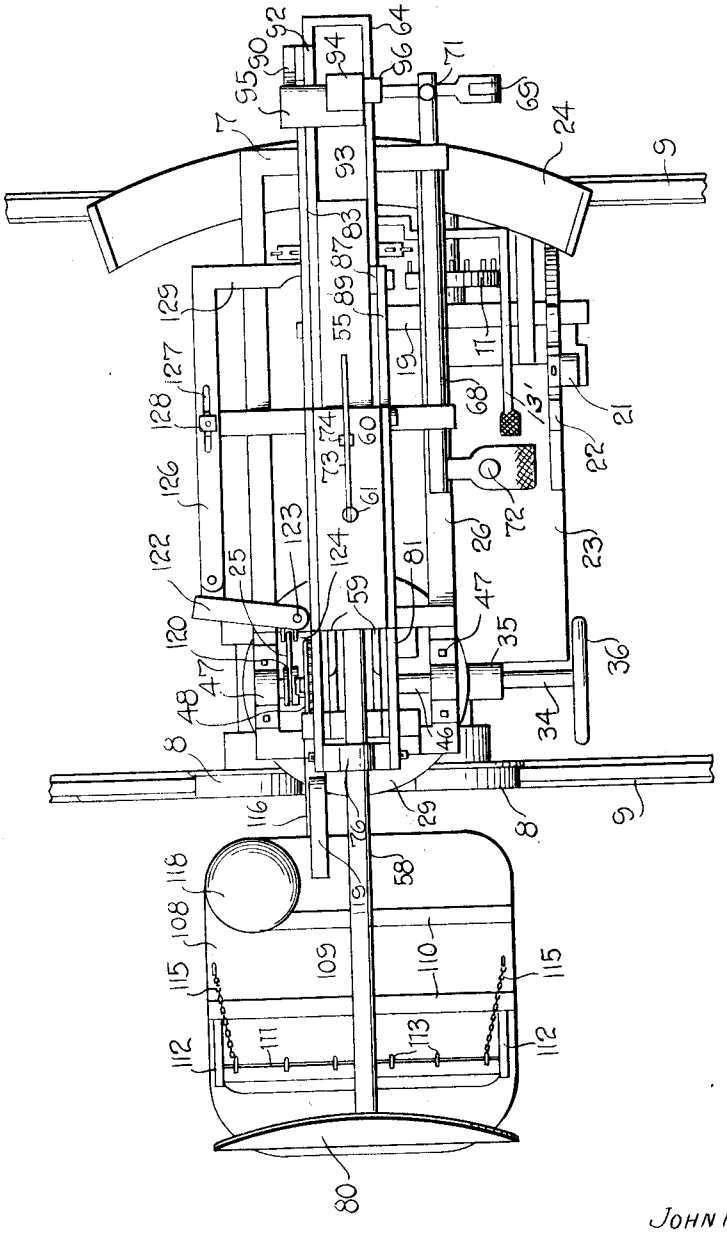


Fig. 3.

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6 SHEETS—SHEET 4.

Fig. 8

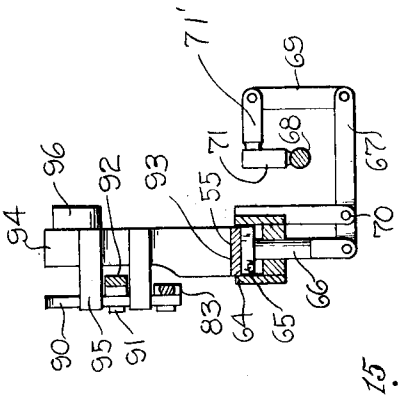


Fig. 9

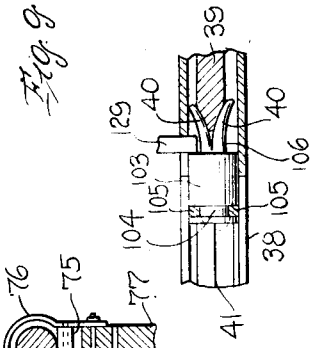


Fig. 15.

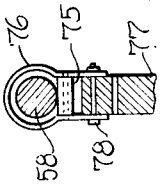
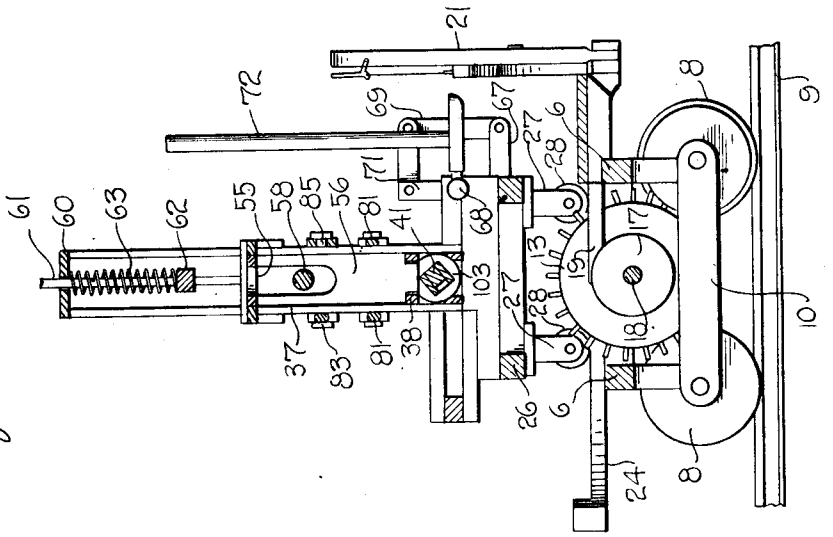


Fig. 4



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6 SHEETS-SHEET 5.

Fig. 5

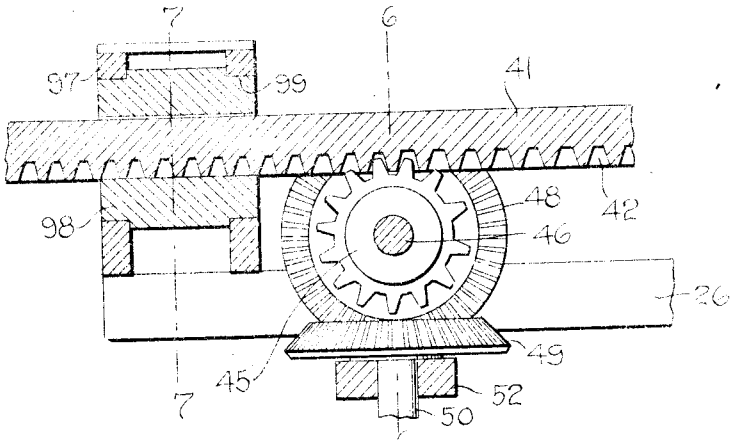


Fig. 6

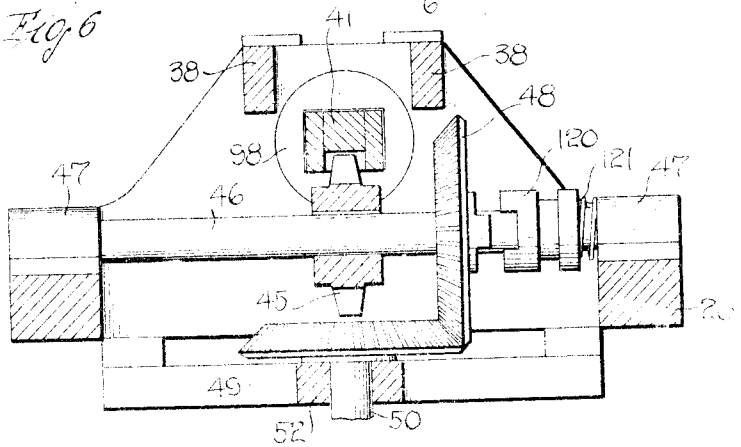
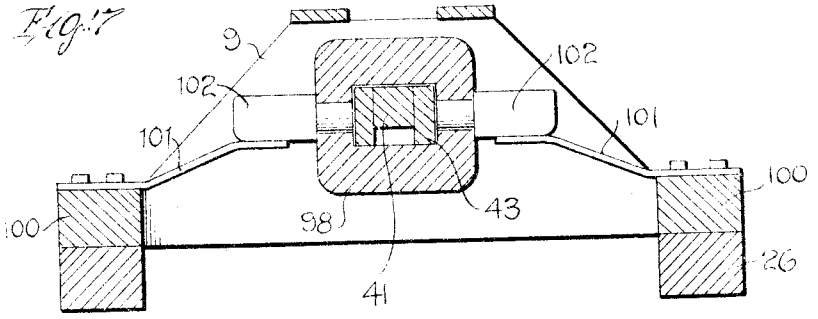


Fig. 7



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Patented Nov. 18, 1913

6 SHEETS—SHEET 6.

Fig. 12

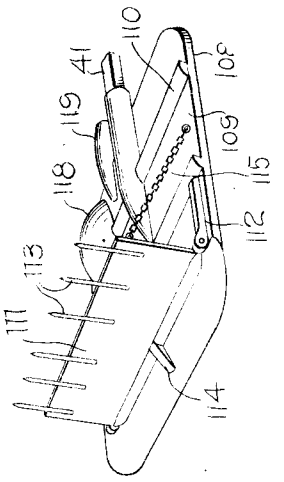


Fig. 13

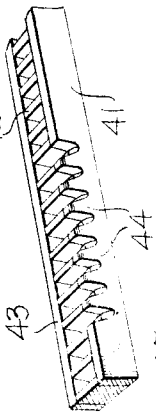


Fig. 14

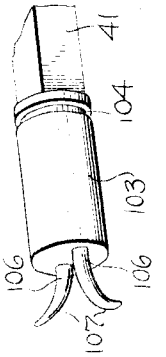


Fig. 10

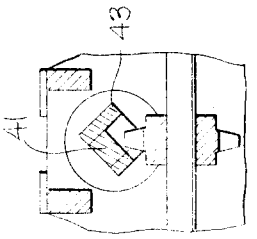
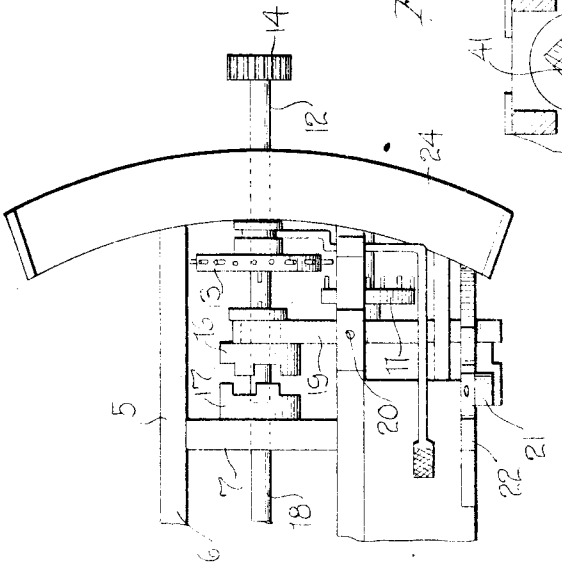


Fig. 11



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COKE-DRAWING APPARATUS.

1,079,126. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed June 18, 1913. Serial No. 774,456.

To all whom it may concern:

Be it known that I, JOHN HAYES, a citizen of the United States, residing at Uniontown, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Drawing Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an apparatus for drawing coke from coke ovens or furnaces and has for its primary object to provide means whereby the coke may be easily, quickly and thoroughly withdrawn from the oven.

Another object of the invention resides in the provision of a shovel, means for moving said shovel into the coke oven and withdrawing the same therefrom, an automatically actuated scraper to scrape the coke upon the shovel, and means to turn the shovel and dump the coke therefrom when the same is withdrawn from the oven.

The invention has for another object the provision of a movable shovel and scraping member, means for actuating the same, and means for raising and lowering the scraper with relation to the shovel.

Another and more specific object of the invention is to provide a rack bar having a coke receiving shovel on one end, a carriage for said rack bar, a wheeled frame upon which said carriage is mounted, means for adjustably positioning the carriage upon said frame to angularly dispose the rack bar, and means for actuating said rack bar to move the shovel into the oven or withdraw the same therefrom.

The invention has for still another object to provide a longitudinally movable frame, a scraping blade mounted in said frame, a movable support for the blade independent of the frame, means for automatically moving said support to raise and lower the blade, means for turning the shovel to dump its contents when the same is withdrawn from the oven, and means for elevating the blade carrying frame to permit of the turning movement of the shovel.

Another object of the invention is to provide an improved mounting for the rack bar, to which the shovel is connected whereby the same may be turned as well as moved longitudinally, said mounting including means tending to yieldingly prevent such turning movement, and means for turning the rack bar and shovel at one end of the longitudinal movement of said bar.

It is a further object of my invention to generally improve the construction of apparatus of the above character whereby its efficiency in operation is materially increased and to provide means whereby the coke may be withdrawn from the furnace with comparatively little labor upon the part of the operator.

With the above and other objects in view as will become apparent as the description proceeds, the invention consists in certain constructions, combinations and arrangements of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation of a coke drawing apparatus embodying the present invention in its preferred form and showing the shovel turned to discharge the coke therefrom; Fig. 2 is a similar view partly in section showing the shovel extended and the scraper blade in its lowered position, to hold the coke upon said shovel; Fig. 3 is a top plan view; Fig. 4 is a section taken on the line 4—4 of Fig. 1; Fig. 5 is a detail longitudinal section illustrating the mounting of the movable rack bar; Fig. 6 is a section taken on the line 6—6 of Fig. 5; Fig. 7 is a section taken on the line 7—7 of Fig. 5; Fig. 8 is a section taken on the line 8—8 of Fig. 1; Fig. 9 is a section taken on the line 9—9 of Fig. 1; Fig. 10 is a section taken on the line 10—10 of Fig. 1; Fig. 11 is a detail fragmentary plan view of the wheel-supported frame showing the operating means; Fig. 12 is a detail perspective view of the shovel; Fig. 13 is a fragmentary perspective view of the rack bar; Fig. 14 is a similar view of the rear end of said rack bar; Fig. 15 is a detail section taken on the line 15—15 of Fig. 1.

Referring in detail to the drawings, 5 designates a frame which includes parallel longitudinal bars 6 and transverse connecting bars 7. This frame is supported at its opposite ends by the wheels 8 which are adapted to travel upon the track rails 9. The axles of these wheels are mounted in the transverse bars 10 suspended from the frame 5. One of the wheel axles is rotatable in the bars 10, the remaining wheels being revolubly mounted upon the ends of their respective axles. To this rotatable wheel axle, a gear wheel 11 is fixed, said wheel having its teeth formed upon one face thereof.

A drive shaft 12 is journaled in suitable bearings at one end of the frame and extends longitudinally thereof. To this shaft, a gear wheel 13 is keyed and is moved by the foot lever 13' into engagement with the gear wheel 11. Said shaft is also provided with a pinion 14, for meshing engagement with the gear provided upon the shaft of a motor or other prime mover indicated at 15, which is secured to a suitable platform carried by the frame 5. A clutch member 16 is keyed for sliding movement upon the drive shaft 11 and is adapted to engage a similar clutch member 17 fixed upon one end of the longitudinally extending shaft 18 which is alined with the drive shaft. The sliding clutch member 16 is actuated through the medium of a yoke 19, the arms of which engage a collar provided upon said clutch member, said yoke being fulcrumed as indicated at 20 upon the wheel-supported frame 5. To the outer end of this yoke, the lower end of a lever 21 is pivotally connected, said lever being fulcrumed upon a rack 22 which is mounted upon a platform 23 secured to the main frame 5. This lever 21 of course carries the usual spring pressed dog for engagement with the teeth of the rack 22 whereby the lever and the yoke may be locked against movement.

To the rear end of the frame 5, a transversely disposed curved track bar 24 is secured, and upon the forward end of said frame, a circular track or annulus 25 is fixed. An elongated rectangular movable carriage 26 is arranged in superposed relation to the main frame 5. In suitable hanger bearings 27 depending from the rear end of this carriage, the supporting rollers 28 are mounted. These rollers are movable upon the transversely disposed track bar 24. To the under side of the carriage 26 at its forward end, an annulus 29 is secured. This annulus is provided at spaced intervals with depending bearing members 30 to receive the rollers 31 which travel upon the upper surface of the circular track bar 25. The bottom face of the annulus 29 is further provided with an arcuate rack 32 with which a pinion 33 is engaged. This pinion is fixed upon the inner end of a shaft 34 mounted in a bearing standard 35 which is fixed to the frame 5. To the outer end of this shaft the hand wheel 36 is secured whereby the shaft is rotated. It will be obvious that by simply rotating the shaft 34, the carriage may be swung transversely of the base frame 5. The purpose of this adjustment of the carriage will be more fully pointed out in the following description.

Upon the forward end of the carriage 26, the spaced bars or uprights 37 are secured, said uprights being connected by the longitudinal bars 38. A stationary block 39 is mounted upon the rear end of said carriage, and this block is provided with divergently inclined faces 40 for a purpose which will be later referred to. A rack bar 41 is arranged for longitudinal movement between the lower ends of the uprights 37, the teeth 42 of said bar facing downwardly. The spaces between these rack teeth are closed by the longitudinally extending side plates 43 which are secured to the rack bar. The lower edge of one of these plates, however, is toothed as indicated at 44, said teeth alining with the teeth 42 of the rack bar. It will thus be seen that the spaces between the teeth 42 for a short distance open upon one edge of the rack bar, thus permitting of the turning or tilting movement of said bar, as clearly shown in Fig. 10. Thus the channels or grooves between the rack teeth are open at one of their ends for a short distance. With the teeth of this rack bar, a pinion 45 fixed upon the transverse shaft 46 engages. This shaft is mounted in suitable bearings 47 arranged upon the carriage 26. A beveled gear 48 is loosely mounted upon said shaft and with the same the beveled gear 49 fixed upon the upper end of the vertical shaft 50 meshes. This vertical shaft is rotatably mounted in the bearing blocks 51 and 52 provided upon the main frame 5 and the carriage 26 respectively. The lower end of the shaft 50 is provided with a beveled gear 53 with which the pinion 54 fixed upon the forward end of the power transmission shaft 18 engages.

Between the uprights 37 a frame generally indicated by the numeral 55 is mounted for longitudinal and vertical movement. This frame includes the spaced uprights 56 between which a bearing member 57 is secured. In this bearing member, the rear end of the longitudinally extending rod 58 is pivotally mounted. The frame 55 includes the forwardly extending spaced arms 59 which are disposed upon opposite sides of the rod 58 and serve to guide the same. The upper ends of the uprights 37 are connected by a plate 60 having an opening therein through which the vertically movable rod 61 is loosely disposed. The lower end of this rod is provided with a bearing block 62 which is

fixed to arms 62′ secured to the transverse guide bars 62ª which slidingly engage the uprights 37. A spring 63 is arranged upon the rod 61 between the block 62 and the top plate 60. Upon the rear end of the carriage 26, a suitable guide way 64 is secured and within the same the vertically movable member 65 is mounted. This member includes a vertical rod 66, to the lower end of which one end of a lever 67 is pivotally connected. A rock shaft 68 is mounted in suitable bearings provided upon the carriage 26 and a link 69 pivotally connects the lever 67 which is fulcrumed as indicated at 70 to the angular extension 71′ of an arm 71 fixed to one end of said rock shaft. A suitable actuating lever 72 is connected to the other end of said shaft whereby the same may be rocked and the member 65 raised to lift the vertically movable frame 55 against the action of the spring 63. It will thus be seen that the frame in which the longitudinally movable scraping blade 80 is mounted may be raised or lowered so as to properly dispose the scraping blade for entrance into the mouth of the oven. The bearing member 62 may also be raised against the action of said spring by means of a lever 73 fulcrumed upon the standard 74, one end of said lever being connected to the upper end of the rod 61. The spring 63 operates to yieldingly hold the frame 55 against vertical movement between the uprights during its sliding movement. By manipulating the lever 73, said frame may be elevated and the scraping blade 80 lowered with respect to the shovel to hold said blade upon the shovel as shown in Fig. 2, as the same is withdrawn from the furnace.

The rod 58 is supported upon a roller 75 which is mounted in a yoke 76. This yoke is vertically adjustable upon the upper end of the bar 77 and is secured in its adjusted position by means of the bolt 78 which extends through coinciding openings in said bar and the arms of the yoke. In the lower end of this bar 77, a roller 79 is mounted and engages upon the upper face of the rack bar 41. 80 designates the scraping blade which is fixed to the forward end of the rod 58. The bar 77 is connected by a pair of longitudinal rods 81 to the rear uprights 37, said bar being provided with trunnions 82 which are loosely mounted in the forward ends of said longitudinal rods. An additional pair of longitudinal rods 83 are pivotally connected to the trunnions 84 projecting from opposite sides of the bar 77 and are slidably mounted upon the stud bolts 85 fixed to one of the uprights 37 and an additional upright 85 respectively, the latter being mounted on the carriage 26. These rods are longitudinally slotted as indicated at 86 to receive said bolts. The rear end of one of the rods 83 is pivotally connected to the lower end of a dog 87 which is fulcrumed intermediate of its ends as at 88 upon the rear end of an arm 89 which is fixed at its other end to one of the uprights 37. The other of the rods 83 has its rear end pivotally connected to a dog 90 which is fulcrumed as at 91 upon the longitudinal bar 92. Upon the lower inwardly extending bar 93 of the frame 55, a standard 94 is mounted. An arm 95 projects from one side of this standard and is adapted for engagement with the dog 90 at one end of the longitudinal movement of the frame, in which position of the parts, the bar 77 is vertically disposed and the scraping blade 80 elevated. At the end of the reverse or forward movement of the longitudinally movable frame 55, the lug 96 projecting from the opposite side of the standard 94 engages the upper end of the dog 87 and shifts the rod 83 to dispose the bar 77 at an inclination as shown in Fig. 2, in which position of the parts, the scraping blade and shovel to be later referred to have been drawn from the oven.

At the forward end of the carriage 26, a bearing 97 for a rotatable sleeve 98 is arranged. This sleeve is provided with a rectangular opening through which the rack bar 41 loosely extends and each end of the sleeve is provided with a flange 99 to prevent longitudinal movement of said sleeve in the bearing 97. The bearing 97 is provided with lateral extensions 100 having slots therein and over these slots, the leaf springs 101 are arranged, said springs at one of their ends being fixed to the extensions 100. Projecting from the periphery of the sleeve at diametrically opposite points are lugs 102 which are normally engaged with the leaf springs 101, said springs acting to yieldingly prevent turning movement of said sleeve and assist in the return of the shovel to its normal position.

The rear end of the rack bar 41 is provided with a cylindrical extension 103 having an annular peripheral groove 104 therein to receive the arms of a depending yoke 105 on the sliding frame 55. This extension on the rack bar is formed with diametrically opposite rearwardly extending fingers 106, the extremities of which are tapered and oppositely curved as indicated at 107. These curved extremities of the fingers are adapted for engagement with the oppositely beveled or inclined faces 40 of the block 39. It will be understood from the above that at the rear terminal of the longitudinal movement of the rack bar 41, the fingers 106 engage the beveled faces 40 and said rack bar is turned upon its side, the toothed edge of the side wall of said rack bar permitting of such turning movement of the same with respect to the operating pinion.

Upon the forward end of the rack bar, a coke receiving shovel 108 is attached. This

shovel consists of a substantially rectangular plate 109 having ribs 110 formed upon its upper surface. A stop plate 111 is pivotally mounted at its opposite ends in the bearing members 112 secured upon the shovel blade and teeth 113 project from the opposite edge of said blade. A stop rib 114 is formed upon the shovel blade at the pivoted edge of said plate and limits the movement thereof in one direction. To this plate, the ends of short chains 115 are connected, the other ends of the chains being connected to the plate of the shovel. These chains assist in sustaining the weight of the coke which is retained upon the shovel by the pivoted plate 111. This shovel is supported upon a forwardly projecting ngitudinal arm 116 which is fixed at its rear end to the forward end of the carriage 26. This arm is gradually widened at its rear end and is provided with a longitudinally inclined upper edge 117. 118 designates a weight fixed to the blade of the shovel 108 upon one corner thereof and between this weight and the end of the rack bar, to which the shovel is attached, a rearwardly projecting finger 119 is secured to the shovel blade. This finger has a beveled bottom face for engagement with the rear inclined upper edge 117 of the arm 116. This finger 119 is adapted to ride upon the upper edge of the arm 116 when the shovel is retracted from the furnace and greatly assists in effecting the tilting of the shovel so as to dump the contents thereof. The weight 118 on the shovel blade acts by gravity, in conjunction with the springs 101 which engage the lugs 102, to return the shovel to its normal position.

As above stated, the gear 48 is loose upon the shaft 46 and upon this shaft, the clutch member 120 is keyed for sliding movement. This clutch member is normally held yieldingly in engagement with clutch teeth provided upon one face of the gear by means of the coil spring 121. 122 designates an arm which is pivotally mounted at one of its ends upon the carriage 26 as indicated at 123. Projecting laterally from this arm at its pivoted end are the spaced ears 124 between which an extension 125 of the sliding clutch member 120 is disposed. To the other end of the arm 122, the forward end of a longitudinally disposed lever 126 is pivotally connected. This lever is slotted as at 127 to receive the guide bolt 128 suitably mounted upon the carriage 26. The rear end of the lever 126 is laterally extended and inwardly disposed as shown at 129, the inner end of said lever being located in the path of movement of the rack bar 41. By means of this construction, it will be readily understood that when the fingers 106 upon the rear end of the rack bar engage the block 39, said bar engages the inner end 129 of the lever 126 and shifts the same longitudinally to move the arm 122. The clutch member 120 is thus moved upon the shaft 46 out of engagement with the loose gear 48, thereby automatically interrupting the transmission of power for the operation of said rack.

From the above description taken in connection with the accompanying drawings, it is believed that the construction and manner of operation of my improved coke drawing apparatus will be clearly and fully understood. The movable shovel may be easily and quickly positioned for projection into the coke oven by simply shifting the carriage 26 upon the wheeled supporting frame 5.

In the operation of the device, the shovel 108 and the scraping blade 80 are moved together into the furnace or oven, said blade pushing or scraping the coke upon the shovel and against the pivotally mounted plate 111 which is arranged thereon. In the forward movement of the sliding frame 55, the shovel blade is lowered as previously explained so that it will engage the teeth 113 and lift said plate to its upright position. At the end of the forward movement of the rack bar, the operator reverses the engine so that the shovel and scraping blade are withdrawn from the oven. In this movement of the shovel, the scraping blade is disposed immediately above the plate 111 and serves to retain the coke in position upon the shovel blade. At the end of the retractile movement of the shovel, the scraping blade is automatically lifted and the operator shifts the lever 67 to lift the member 65 and raise the frame 55 so as to dispose the scraping blade 80 at a sufficient distance above the shovel 108 to permit the same to turn. The scraping blade is elevated above the shovel at the end of the retractile movement of the latter by the engagement of the lug 95 with the upper end of the dog 90, whereby the connecting rod 83 is actuated, and the bar 77 disposed in a perpendicular position. The shovel is then automatically turned in the manner above explained to dump the coke therefrom. This turning movement of the shovel is effected by the engagement of the curved fingers 106 with the beveled faces 40 of the block 39, and also by the engagement of the finger 119 on the shovel with the inclined edge 117 of the arm 116.

It will thus be appreciated that I have produced an apparatus for easily and quickly withdrawing the coke from the furnace, and by means of my invention, comparatively little labor is required upon the part of the operator, and he is enabled to remove the coke from a large number of ovens in a comparatively short time.

The machine as a whole is also simple in its construction, may be produced at small cost and is highly efficient, reliable and durable in practical operation.

While I have shown and described the preferred construction and arrangement of the several elements employed, it is to be understood that my invention is susceptible of considerable modification without departing from its essential features or sacrificing any of the advantages of the same.

Having thus described the invention, what is claimed is:

1. In an apparatus of the character described, a shovel, means for moving said shovel into or out of a coke oven, means for automatically tilting the shovel when the same is withdrawn from the furnace and dump the contents thereof, and additional means acting to yieldingly hold the shovel against such tilting movement and to return the shovel to its normal position.

2. In an apparatus of the character described, a longitudinally movable rack bar, a shovel attached to one end of said bar, means for actuating the rack bar to move the shovel into or out of a coke oven, means for axially turning the rack bar to dump the contents of the shovel, a bearing for said rack bar, and means tending to yieldingly hold the bearing in its normal position and prevent turning movement of the same with the rack bar.

3. In an apparatus of the character described, a shovel, a longitudinally slidable frame, a scraping blade mounted in said frame, means for moving said shovel and scraping blade together into or out of a coke oven, means for vertically moving the sliding frame to dispose the scraping blade with relation to the shovel whereby the shovel may be turned, and means for turning the shovel to dump the coke therefrom.

4. In an apparatus of the character described, a shovel mounted for transverse tilting movement, means for moving said shovel longitudinally into or out of a coke oven, a stationary element, and means on the shovel coöperating with said stationary element at the end of the longitudinal movement of the shovel when the same is withdrawn from the oven to tilt said shovel transversely and dump the contents thereof.

5. In an apparatus of the character described, a longitudinally movable rack bar, a shovel attached to one end of said bar, means for shifting said rack bar in opposite directions, a stationary member, and means carried by the rack bar to coöperate with said stationary member and turn the bar at the end of its longitudinal movement in one direction to dump the contents of the shovel.

6. In an apparatus of the character described, a rack bar, means to support said bar for longitudinal and turning movement, a shovel attached to one end of said bar, a stationary member, and spaced elements carried by said rack bar to engage said stationary member at the end of the longitudinal movement of said rack bar in one direction to turn the bar and dump the contents of the shovel.

7. In an apparatus of the character described, a rack bar mounted for longitudinal and turning movement, a shovel attached to one end of said bar, a stationary member, spaced fingers projecting longitudinally from the other end of said bar to engage the stationary member and turn the rack bar to dump the contents of the shovel at the end of the longitudinal movement of said bar in one direction.

8. In an apparatus of the character described, a rack bar mounted for longitudinal and turning movement, a shovel attached to one end of said bar, a stationary member having oppositely beveled faces, and spaced fingers projecting longitudinally from the other end of said bar and having opposite curved ends to engage the beveled faces of said stationary member whereby the rack bar is turned at the end of its longitudinal movement in one direction to dump the contents of the shovel.

9. In an apparatus of the character described, a bar mounted for longitudinal and turning movement, a shovel attached to one end of said bar, a scraping blade disposed above the shovel, means for moving said shovel and blade together into or out of a coke oven, means for turning the bar to dump the contents of the shovel, and additional means to move the scraping blade with respect to the shovel to permit of the turning movement of the latter.

10. In an apparatus of the character described, a bar mounted for longitudinal and turning movement, a shovel attached to one end of said bar, a scraping blade mounted above said shovel, means for moving said shovel and blade together into the coke oven, means for lowering said blade into engagement with the coke upon the shovel, means for elevating said blade to dispose the same above the shovel in spaced relation thereto, and means for turning said bar to dump the contents of the shovel.

11. In an apparatus of the character described, a shovel, a scraping blade, a movable support for said blade, means for moving the shovel and blade together into a furnace or oven, automatically actuated means connected to the support to move the same and lower the blade upon the contents of the shovel, and additional means connected to said movable support and automatically actuated when the shovel is withdrawn from the furnace to elevate the blade and permit the contents of the shovel to be dumped.

12. In an apparatus of the character described, a shovel, a vertically movable and longitudinally slidable frame, a scraping blade mounted in said frame and disposed

above the shovel, means for moving the shovel and blade together into or out of a coke oven, an additional movable support for the scraping blade, means for automatically moving said support to position the blade with relation to the shovel, and additional means for moving the frame in which the blade is mounted to raise the blade and permit of the dumping of the contents of the shovel.

13. In an apparatus of the character described, a bar, a shovel attached to one end of said bar, a frame, a scraping blade mounted in said frame, means for moving the frame and bar to extend the blade and shovel within the coke oven or withdraw the same therefrom, an additional movable support for the scraping blade, and means actuated in the sliding movement of the frame in each direction to move said support and raise or lower the blade with relation to the shovel.

14. In an apparatus of the character described, a shovel mounted for longitudinal and transverse tilting movement, means for moving the shovel longitudinally into or out of a coke oven, a stationary arm, a finger projecting from the rear end of the shovel to ride upon said arm when the shovel is withdrawn from the coke oven and tilt the shovel to dump the contents thereof, and a weight secured upon the shovel blade acting by gravity to return the shovel to its normal position.

15. In an apparatus of the character described, a bar mounted for sliding and turning movement, a frame connected to said bar and movable therewith, means for actuating the bar, a shovel attached to one end of said bar, a scraping blade having a rod pivotally mounted at one of its ends in said frame, a movable support for said rod, means for moving said support to lower the scraping blade upon the shovel in the movement of the frame in one direction, additional means for moving the support to elevate the scraping blade in the movement of the sliding frame in the opposite direction, and means for turning the shovel carrying bar to dump the contents of the shovel.

16. In an apparatus of the character described, a shovel 108, a scraping blade 80, means for moving said blade and shovel together into or out of a coke oven, a movable support 77 for the blade, rods connected to said support, dogs 87, 90 to which the respective rods are connected, and means coöperating with the respective dogs in the movement of the shovel in each direction to raise or lower the scraping blade with relation to the shovel.

17. In an apparatus of the character described, a bar mounted for sliding and turning movement, a shovel attached to one end of said bar, a frame connected to said bar, a scraping blade having a rod attached thereto pivotally mounted in said frame, a support for said rod, means for sliding said bar and frame to move the shovel and blade together into or out of the coke oven, means for automatically moving the scraping blade with relation to the shovel at the end of the longitudinal movement of the bar in each direction, and additional means for automatically turning said bar when the shovel is withdrawn from the oven to dump the coke therefrom.

18. In an apparatus of the character described, a bar mounted for longitudinal and turning movement, a shovel attached to one end of said bar, a scraping blade having a rod attached thereto, a support for said rod movable with said bar, said rod being also mounted for movement independently of the bar, means for actuating the bar to move the scraping blade and shovel together into or out of the coke oven, automatically actuated means connected to said support to move the same and position the scraping blade with relation to the shovel at the end of the longitudinal movement of said bar in each direction, and additional means for turning said bar to dump the coke from the shovel.

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

JOHN HAYES.

Witnesses:
JNO BOYLE,
J. F. WHITSON.